

# FA Communications Software CX-Compolet / SYSMAC Gateway

Flexible & High Speed PLC-Accessing Softwares



» High Speed
» Direct Data link Access
» Flexible

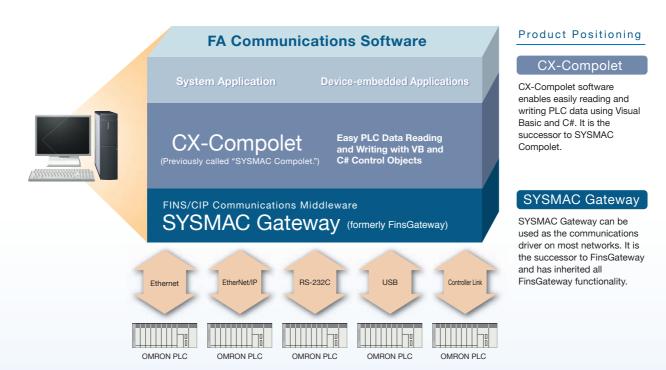
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# OMRON's FA Communications Software High-speed, and Direct Data Link Access

The need for faster transmission of more and more information between personal computers and PLCs is coupled with the need for frequent changes to specifications, such as address allocations in PLCs, a demand for software standardization to eliminate dependence on specific applications and networks, and a demand for cost reductions.

OMRON provides the functions to solve these problems. Data links are now possible using Ethernet. Data links can even be accessed via a LAN port on a notebook computer. And FA Communications Software can be used to access PLC data by using only tag names to enable more flexible and higher-speed access of PLC data from personal computers, and that lowers costs by eliminating the need for a special board for data links.

# Windows 10 (32bit / 64bit version<sup>\*</sup>) / Visual Studio 2015 (32bit/64bit version<sup>\*</sup>) supported



\* This software runs on WOW64 (Windows-On-Windows 64). Customer application must be run as 32bit process.

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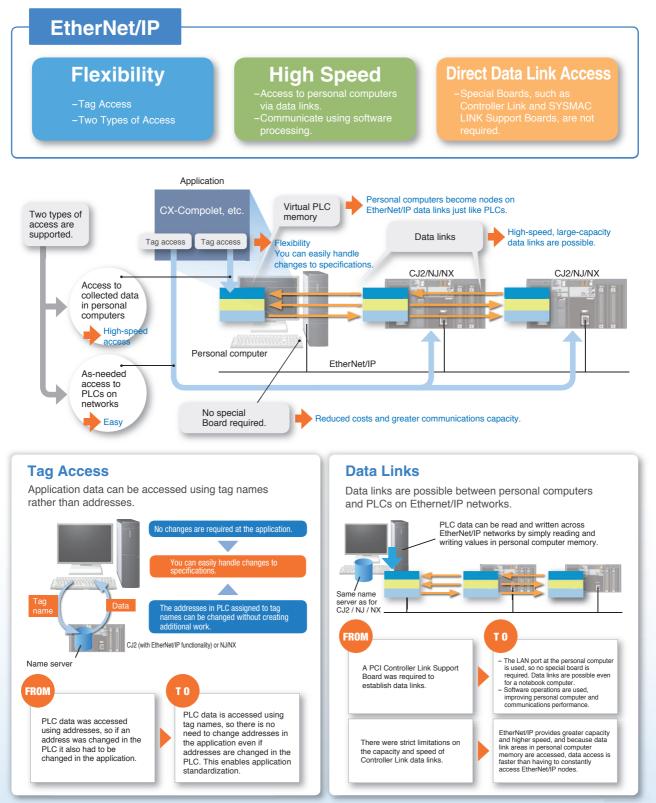
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# Lets You Create Applications with Flexible, to PLCs from Personal Computers.



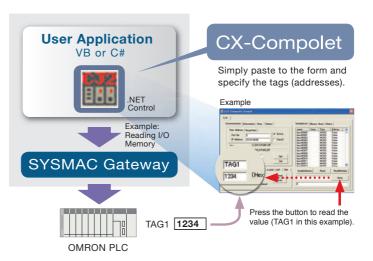
Note: The Network Configurator included in the CX-One Package or Sysmac Studio is required to set tag data links. Tag access is available with CJ2-series and NJ/NX-series CPU Units with EtherNet/IP functionality. Easily Create Programming to Read and Write PLC Data using VB or C#.

**CX-Compolet** 

# .NET Control Objects ActiveX Control Objects are also included.

CX-Compolet is a package of software components that make it easy to program reading and writing OMRON PLC data.

- Read and write I/O memory in the PLC, change the operating mode, read error logs, and perform other operations.
- Supports Microsoft Visual Studio 2005/ 2008/ 2010/ 2012/2013/2015.
- For the CJ2 (with EtherNet/IP functionality) or NJ/NX, I/O memory in the PLC can be accessed by using tag names rather than addresses.
- Array and structure variable access is possible.
- Read and write variables corresponding to the data types of CIP that conform to ODVA specifications.



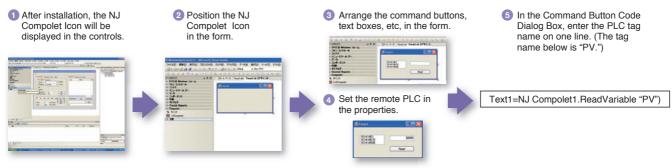
\* When combined with the CJ2 (with EtherNet/IP functionality) or NJ/NX

Creating and Modifying VB/C# Communications Programming Is Too Much Work Situation

Problem			Solution
	Having to program communications frame assembly, reception response interpretation, and monitoring is too much work.		Processing such as communications frame assembly is prepared in advance.
Customers who are	Having to change communications processing, e.g., for Ethernet and serial communications, is too much work.		Data is accessed by using tag names rather than by using addresses, so programming does not have to be changed even if PLC addresses are changed. *
developing VB/C# applications including communications with PLCs	Handling PLC address changes is particularly time consuming.		
	For a block of data of the same data type, it is too much work to have to specify the addresses one by one rather than being able to view them as one group and access that data as an element.		Array variables are supported, so data can be easily specified by simply changing the element subscript with the same tag name. *

# Procedure

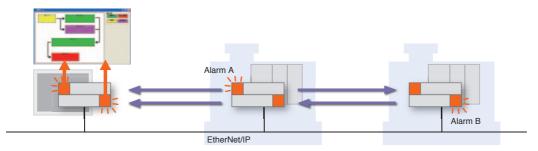
# Simply Paste to a Form and Enter a Line of Code.



# Application Example

# Easily Program Device Alarm Monitoring.

- Using the control components provided by CX-Compolet frees the application designers from having to program the communications portions of the application.
- Data for device alarms and other data are sent to the applications using non-solicited EtherNet/IP communications events.
- Standardization is made easy by specifying data using tag names (such as "Alarm A" and "Alarm B") in the applications.



## Main CX-Compolet Functions

Interface	Function	Description
	Communications with OMRON PLCs	Specifies the PLC to communicate with, and reads network information.
	Reading and writing I/O memory	Read and writes data in memory areas, such as the DM Area or CIO Area. For example, DM word 100 can be specified by using "D100" or by using a tag name.
Properties	Operating status	Reads and changes the operating mode.
Topenies	Area information	Reads information such as the program area size and number of DM Area words.
	Error information	Reads the value and error message when an error occurs.
	Other OMRON PLC information	Reads the model and reads and changes the clock.
	Getting tag information	Gets the NJ/NX-series / CJ2 (with EtherNet/IP functionality) tag name list.
	Reading and writing I/O memory	Reads and writes memory, such as consecutive words in the DM Area or CIO Area. For example, it is possible to specify the data type (integer, single, etc.) or change the data type (BCD, BIN, SBIN).
	Creating I/O tables	Creates the I/O tables for the present configuration.
Methods	Force-setting, force-resetting and clearing bits	Force-sets, force-resets, and clears bits.
	Communications with OMRON PLCs	Specifies the PLC to communicate with.
	FINS service execution	Sends FINS commands and gets the responses that are received.
	Uploads the event log from the PLC *	Uploads the specified category of the event log from the PLC. The date/time and type (system event, access event, or user-defined event) of the past errors stored in the PLC can be uploaded collectively or by category.
Events	Scheduled events	Events occur at regular intervals.

\* Supported only by the NJ/NX-series Machine Automation Controllers. The event log of the Communications Coupler Units, NX Units, EtherCAT slaves, or CJ-series Units cannot be uploaded. Refer to the Troubleshooting Manuals of the CPU Units for details of the event log.

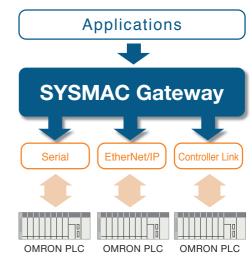
An OMRON PLC Driver with Virtual PLC Memory Functionality

# **SYSMAC** Gateway

# **Communications Driver and Virtual PLC Memory**

SYSMAC Gateway provides an OMRON PLC communications driver and virtual memory. OMRON's FA Communications Software uses the SYSMAC Gateway communications middleware as a common platform.

- In addition to FINS communications, operation of SYSMAC Gateway has been verified on EtherNet/IP.
- Virtual PLC event memory is provided to enable a personal computer to participate as a data link node.
- Changes to memory can be detected in applications at the personal computer.
- The status of SYSMAC Gateway (EtherNet/IP communications) can be checked in task tray.



Note: Communications are possible via USB and Ethernet too.

# Situation Developing or Modifying PLC Applications Is Too Much Work

Problem			Solution	
Costumers who have created their own communications programs	Modifying programs for different networks is a lot of work.	Application A B C Networks	Time spent on programming communications can be reduced by absorbing the differences between networks.	Application SYSMAC Gateway
Customers who are already using FinsGateway	<ul> <li>Insufficient speed.</li> <li>Insufficient data link capacity.</li> </ul>	t Insufficient capacity speed	Using EtherNet/IP enables high-speed, large-capacity data links with no need for a special communi- cations board.	Fast Large capacity
	Programming communi- cations to send and receive messages for each node or block of data is too much work.	Programming is required for each node or block of data.	Communications efficiency can be optimized by using EtherNet/IP data links.	No special board is required.
Customers who want to standardize personal computer applications	Having to modify personal computer applications whenever the PLC memory map is changed is too much work.	Personal computer applications must also be modified.	For the CJ2 (with EtherNet/IP functionality) or NJ/NX, tag access and tag data links (*1) provide freedom from PLC memory maps. *1. Tag data links are not possible from a C language library. They are possible only with .NET.	Personal computer applications do not need to be modified Even when the PLC memory map is changed.

# Task Tray Notification and Troubleshooter

Statuses of EtherNet/IP communications (network, tags, operation history) are displayed.

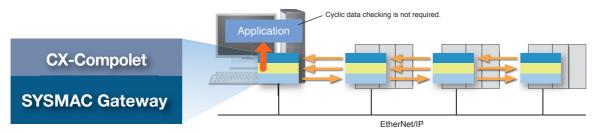
# Event Log Utility

This utility provides the functionality to upload and display the event log information recorded in the NJ/NX-series Machine Automation Controllers.

# Application Example

# Using Events to Provide Notification of Changes in Data

- laces The application is notified using events only when preset conditions are met.
- Eliminating programming for checking cyclic data changes reduces the load on the personal computer processor.
- Notification of data changes is provided immediately, eliminating wasted communications time.



#### Main SYSMAC Gateway Functions

Item	Description
Supported protocols	SYSWAY, SYSWAY-CV, Peripheral Bus (Toolbus), FINS, and CIP
Supported PLCs	NX, NJ, CJ2, CJ1, CS1, CP1, C, and CVM1 / CV
Supported networks	Ethernet (FINS, Data link),EtherNet/IP (CIP, Data link),RS-232C (SYSWAY, SYSWAY-CV, Data link), USB, Controller Link (FINS, Data link), and SYSMAC LINK (FINS)
Virtual event memory	CIO, Auxiliary (A), Holding (H), Work (W), DM, and EM1 to EM1F
Tag access	For the CJ2 (with EtherNet/IP functionality) or NJ/NX, access by tag name is enabled.

#### **CIP Service Specifications**

ltem	Description	
	Number of connections	384
	Allowable communications bandwidth	5,000pps*2
Tag data	Refresh period (RPI)	1 to 10,000ms (unit:1ms)*3
links*1	Link data capacity	184, 832words max.
	Data size per connection	722words (1,444bytes) max.
		CIP connectionless (UCMM) and CIP
	Message send function (client)	connection (Class 3) communications
Explicit	Message receive function (server)	CIP connectionless (UCMM) and CIP
messages	Message receive function (server)	connection (Class 3) communications
	Data size	502bytes
	CIP routing	Not supported.

\*1. Tag data links between SYSMAC Gateway and the NJ/NX-series CPU Unit can be created within the CJ-series specifications for variable with basic data type, array variable, and structure variable. SYSMAC Gateway memory allocation of structure variable is the same as the CJ-series.

\*2. Reference value. The performance depend on your personal computer and the execution status of Windows applications. \*3. The RPIs that can be set depend on the number of connections.

# The Main APIs You Can Set with the SDK

#### **CIP** Communication

Basic operation	
CIPApp_openConnectionExplicit	Opens an explicit message connection (Class3/UCMM).
CIPApp_closeConnectionExplicit	Closes the explicit message connection.
CIPApp_sendRequestExplicit	Sends an explicit message.
CIPApp_receiveExplicit	Receives an explicit message.
Operation to manipulate send / receive data	a
CIPUtil_constructNetworkPath	Constructs the Network Path for the explicit message to send.
CIPUtil_construct RequestPathWithCIA	Constructs the RequestPath for the explicit message to send, with class / instance / attributeID.
CIPUtil_construct RequestPathWithTagName	Constructs the RequestPath for the explicit message to send, with a tag name.
Cotting internal information	
Getting internal information	
CIPPort_getStatus	Gets the network port status.
CIPPort_getConnectionStatus	Gets the datalink connection status.

Note: There are 12 other APIs.

## **Fins Communication**

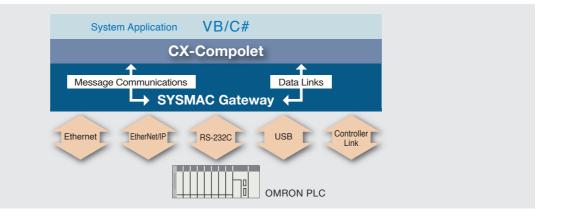
Basic operation			
Fins_sendData	Sends a FINS message.		
Fins_receiveData	Receives a FINS message.		
Getting internal information			
Fins_getNetworkInfo	Gets the network infromation.		
Operation to manipulate send / receive data			
FinsHead_compose	Constructs the FINS message header.		
FinsHead_composeResponse	Constructs the FINS response header.		
	Note: There are 13 other APIs.		

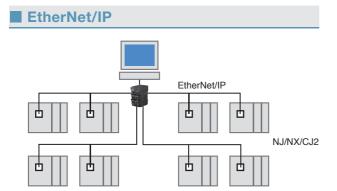
### Datalink / Event memory access

Memory read / write				
Em_readMemory	Reads date from event memory.			
Em_writeMemory	Writes data to event memory.			
event send / receive				
Em_sendEvent	Sends events.			
Em_receiveEvent	Receives events.			
Setting or clearing message-driven event reception				
Em_setCondition	Sets normal event-occurrence condition.			
Em_clearCondition	Clears normal or wide-area event-occurrence condition.			
Getting internal information				
Em getConditionList	Gets the setting list of normal event conditions.			

Note: There are 30 other APIs.

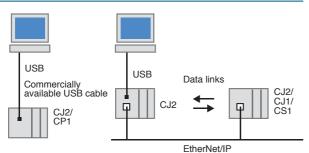
# **CX-Compolet and SYSMAC Gateway can access** the PLCs in the following configurations.





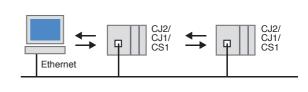
For systems linked with databases, the NJ-series Database Connection CPU Unit (NJ501-1 20) is available. Please contact your OMRON sales representative for details.

# 



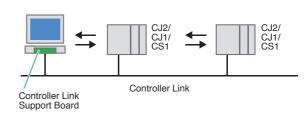
# RS-232C

Controller Link

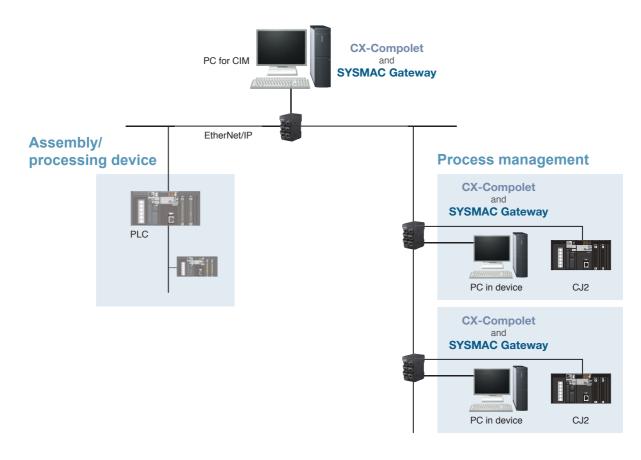


# Controller Link

Ethernet (FINS)



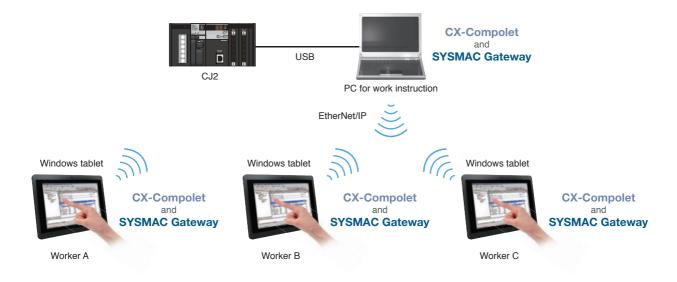
Note: The above configurations are only examples. Communications are also possible with PLCs other than those shown here. For details, refer to Correspondence between Main PLC Models and Connected Networks. •No special hardware for control network is required.



**Application Example 2** 

Use of wireless LAN in notebook computer

• You can operate easily with a notebook computer because of EtherNet/IP data link communications without special hardware.



Note: The above configurations are application examples.

Make sure that you read the online help in the setup disk and check the operating conditions on site before using.

# CX-Compolet

Product name	Specification	Model	Standards
CX-Compolet*	Software components that can make it easy to create programs for communications between a computer and controllers. This packaged product bundles CX-Compolet and SYSMAC Gateway with 1 license each.		
	Supported execution environment: .NET Framework (2.0, 3.0, 3.5, 4.0 or 4.5.1)       WS02-CPLC1         Development environment: Visual Studio 2005/2008/2010/2012/2013/2015       Development languages: Visual Basic, C#         Supported communications: Equal to SYSMAC Gateway.       Visual Studio 2005/2008/2010/2012/2013/2015		
	3 additional licenses (This product provides only additional licenses. The software must be purchased in advance.)	WS02-CPLC1-L3	
	5 additional licenses (This product provides only additional licenses. The software must be purchased in advance.)	WS02-CPLC1-L5	
	10 additional licenses (This product provides only additional licenses. The software must be purchased in advance.)	WS02-CPLC1-L10	
	Software components only. This package includes CX-Compolet with 1 license. SYSMAC Gateway is not included.	WS02-CPLC2	

\* One license is required per computer.

Note 1: When .NET Framework version 1.1 (Visual Studio 2003) is used for develoment, only the specifications of CX-Compolet version 1.5 are available.

## SYSMAC Gateway (Communications Middleware)

Product name	Specification	Model	Standards
	Communications middleware for personal computers running Windows. Supports CIP communications and tag data links (EtherNet/IP) in addition to FinsGateway functions. This package includes SYSMAC Gateway with 1 licence. (Fins Gateway is also included.)	WS02-SGWC1	
SYSMAC Gateway*1	Supported communications: RS-232C, USB, Controller Link, SYSMAC LINK, Ethernet, EtherNet/IP		
	10 additional licenses (This product provides only additional licenses.)	WS02-SGWC1-L10	
SYSMAC Gateway SDK*2	Software development kit for creating communications programs using SYSMAC Gateway. Development languages: C, C++ Please contact your OMRON sales representative when purchasing SYSMAC Gateway.	WS02-SGWC1S	-

\*1. One license is required per computer.

\*2. SYSMAC Gateway SDK doesn't include the license of SYSMAC Gateway.

Please purchase SYSMAC Gateway when execution environment is required.

# System Requirements (CX-Compolet / SYSMAC Gateway)

Item	Requirement		
Operating system (OS) Japanese or English system	Microsoft Windows Server 2003 (32bit) Microsoft Windows XP SP3 (32bit) Microsoft Windows Vista (32bit)	Microsoft Windows Server 2008(32bit/64bit*) Microsoft Windows Server 2008 R2(64bit*) Microsoft Windows Server 2012(64bit*) Microsoft Windows Server 2012 R2(64bit*) Microsoft Windows 7(32bit/64bit*) Microsoft Windows 8(32bit/64bit*) Microsoft Windows 8.1(32bit/64bit*) Microsoft Windows 10(32bit/64bit*)	
Personal compute	Windows computers with Intel x86 processor	Windows computers with Intel 32bit (x86) processor or 64bit (x64) -based processor	
Hard disk	At least 400 MB of available space		

\* This software runs on WOW64 (Windows-On-Windows 64). Customer application must be run as 32bit process. Note 1: USB Port on the PC can not be shared between SYSMAC Gateway and CX-One in Windows Vista or higher. Note 2: System requirements for Windows computers are the same as those recommended by Microsoft. Note 3: The compatible functions of SYSMAC Compolet V2 are supported by Windows XP only.

# Comparison between SYSMAC Gateway SDK and CX-Compolet

Companson	between STSMA	o Galeway SDR a		Yes : Supported, No : Not Supported
Communications Method	Protocols	Specifying memory areas	SYSMAC Gateway SDK (WS02-SGWC1S)	CX-Compolet+SYSMAC Gateway (WS02-CPLC1)
	FINS	Physical address	Yes	Yes
Message Communications	CIP	Physical address	Yes <sup>*1</sup>	Yes
		Tag names	No	Yes
Tag Data Links (EtherNet/IP)	CIP	Physical address	Yes <sup>*2</sup>	Yes
		Tag names	No	Yes
Development languages		C, C++	Visual Basic, C#	

\*1 Please use after understanding the CIP Communications Specifications.

\*2 Data is transferred through the event memory.

#### **Correspondence between Main PLC Models and Connected Networks** Yes : Supported, No : Not Supported RS-232C USB Personal computer Ethernet (LAN) Controller Link CompoWay/F SYSWAY-CV Ethernet SYSWAY Peripheral Bus FINS EtherNet/IP FINS (master at (FINS) (Host Link C Mode) PLC (Host Link FINS) personal computer NX7/NJ1 (unit version 1.10 or later)\*1 Yes\*3 No No No No No No No NJ5/NJ3 (unit version 1.03 or later)\*2 Yes (Specification using ag names is possible Yes Yes No Yes Yes CJ2 with EtherNet/IP functionality Yes Yes\*4 (Peripheral Bus - CS/CJ Yes\*4 Yes<sup>\*4,\*5</sup> Yes Yes<sup>\*4</sup> Yes (Communications Units are not required for CJ1M PLCs with CJ1 Yes No No (Peripheral Bus - CS/CJ Yes Yes\*4,\*5 No Yes\*4 Yes\*4 Yes Yes No CS1 (Peripheral Bus – CS/CJ) Yes<sup>\*4</sup> Yes<sup>\*6</sup> Yes\*6 Yes<sup>\*6</sup> Yes\*7 CP1 No Yes No (CP1H only) (Peripheral Bus - CS/CJ Yes Yes No No No No No Yes\*4 C200HX/HG/HE, CQM1H (Peripheral Bus - C) С Series CPM1/CPM2 Yes No No Yes No No No No (Peripheral Bus - C) Yes Yes\*4 CVM1/CV Yes Yes No No Yes\*4 No (Peripheral Bus - CV) CompoWay/F Slaves, such as No No Yes No No No No No **Temperature Controllers**

Note: Including models whose production were discontinued. \*1. To connect the NX7/NJ1 Controller, CX-Compolet / SYSMAC Gateway version 1.70 or higher is required. \*2. To connect the NJ3/5 Controller, CX-Compolet / SYSMAC Gateway version 1.31 or higher is required. \*3. Tag data links between SYSMAC Gateway and the NJ/NX-series CPU Unit can be created within the CJ-series specifications for variable with basic data type, array variable, and structure variable. SYSMAC Gateway memory allocation of structure variable is the same as the CJ-series.

\*A. A separate Communications Unit is required.
\*5. Specification using tag names is not possible.
\*6. It cannot be used for CP1E E-type.
\*7. The CP1W-CIF41 is required for the CP1H / CP1L other than CP1L-EM/EL. The CP1W-CIF41 version 2.0 or later is required for the CP1E N-type. It cannot be used for CP1E E-type.

### Correspondence between supported OS and Development environment & CX-Compolet / SYSMAC Gateway

			Supported CX-Compolet/SYSMAC Gateway
Supported OS	Client	Windows XP (32bit)	Ver.1.00 or higher
		Windows Vista (32bit)	Ver.1.00 or higher
		Windows 7 (32bit)	Ver.1.10 or higher
		Windows 7 (64bit)	Ver.1.20 or higher
		Windows 8 (32bit/64bit)	Ver.1.50 or higher
		Windows 8.1 (32bit/64bit)	Ver.1.40 or higher
		Windows 10 (32bit/64bit)	Ver.1.70 or higher
	Server	Windows Server 2003 (32bit)	Ver.1.00 or higher
		Windows Server 2008 (32bit)	Ver.1.10 or higher
		Windows Server 2008/R2 (64bit)	Ver.1.20 or higher
		Windows Server 2012/R2 (64bit)	Ver.1.50 or higher
Development environment		Visual Studio 2005	Ver.1.00 or higher
		Visual Studio 2008	Ver.1.00 or higher
		Visual Studio 2010	Ver.1.10 or higher
		Visual Studio 2012	Ver.1.50 or higher
		Visual Studio 2013	Ver.1.40 or higher
		Visual Studio 2015	Ver.1.70 or higher

Note1: From SYSMAC Gateway version 1.31, the unit revision has been changed to revision 2. When EtherNet/IP tag data links are set for SYSMAC Gateway unit revision 1 (SYSMAC Gateway version 1.2 or lower), the settings need to be changed to revision 2 with Network Configurator for EtherNet/IP. 2: When EtherNet/IP tag data links are set to use SYSMAC Gateway unit revision 2 (version 1.31 or higher) as a node, Network Configurator for EtherNet/IP

version 3.50 or higher is required. (Network Configurator for EtherNet/IP is included in • CX-Compolet WS02-CPLC1 version 1.31 or higher • SYSMAC Gateway WS02-SGWC1 version 1.31 or higher • Sysmac Studio version 1.00 or higher • CX-One version 4.24 and CX-One auto update (February 2012 or later)

#### Correspondence between supported OS & Connected Networks

			Yes : Supported, No : Not Supported						
			Ethe	ernet			Controller Link		SYSMAC LINK
			Ethernet (FINS)	EtherNet/IP	RS-232C	USB	PCI	ISA	
	Client	Windows XP (32bit)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Windows Vista (32bit)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supported OS		Windows 7 (32bit)	Yes	Yes	Yes	Yes	Yes	No	No
		Windows 7 (64bit)					No		
		Windows 8 (32bit/64bit)	Yes	Yes	Yes	Yes	No	No	No
		Windows 8.1 (32bit/64bit)	Yes	Yes	Yes	Yes	No	No	No
		Windows 10 (32bit/64bit)	Yes	Yes	Yes	Yes	No	No	No
	Server	Windows Server 2003 (32bit)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Windows Server 2008 (32bit)	Yes	Yes	Yes	Yes	Yes	No	No
		Windows Server 2008/R2 (64bit)					No		
		Windows Server 2012/R2(64bit)	Yes	Yes	Yes	Yes	No	No	No

# Third party products

We will introduce software that supports CX-Compolet/SYSMAC Gateway and can be easily connected to OMRON NJ-series.

# InduSoft, Inc.

# InduSoft Web Studio

# Powerful HMI, SCADA and OEE/Dashboard development software designed for deployment anywhere.

Features

- Mobile accessibility via three types of thin clients, including Enhanced Studio Mobile Access, which offers access to process information on Android, iPhone and iPad.
- Over 240 native communication drivers, as well as support for OPC and direct integration to SYSMAC Gateway (former FINS Gateway).
- All the tools required to develop SCADA, HMI, and OEE/Dashboard applications, including: alarms, trending, reporting, and events.



Spreadsheet

Contact Us : InduSoft. Inc. info@indusoft.com http://www.indusoft.com/

# **TAKEBISHI CORPORATION**

**DeviceXPlorer OPC Server** (Industrial Communications Software)

# You will access to OMRON PLCs from SCADA, CAD, and other general-purpose package software.

Features

- Accessible to OMRON PLCs including new NJ series.
- Ideal for 24-hour continuous operation! Communications parameters can be changed while the system is running.
- OPC UA interface is the first software in Asia.
- \* World's first OPC server supporting NJ series as of July 2012.



Contact Us : TAKEBISHI CORPORATION fa-support@takebishi.co.jp http://www.faweb.net/

# Wellintech Co., Ltd

**KingView** 

(High-Performance software for Industrial Supervisory Control And Data Acquisition)

# KingView allows you to develop Windows based control, monitoring, analyze and data collection applications.

Features:

- Made by the SCADA manufacturer, who is the first to develop the NJ series driver worldwide, and is available in English, Chinese and Japanese.
- Automatically read the variables of the NJ series and create on KingView. · Communicate with series of OMRON PLCs.
- \* World's first SCADA supporting NJ series as of November 2011.



Contact Us : Wellintech Co., Ltd marketing@wellintech.com http://www.kingview.com/

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