FANUC OPC Server

Operator's Manual

Ed.	Date	Design	Description
05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
03	2017.12.25	T.Hosaka	OPC UA support
02	2016.01.13	T.Hosaka	Old CNC support and data type added.

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Contents

SAFETY PRECAUTIONS

"SAFETY PRECAUTIONS" describes the safety precautions related to the use of CNC units, to ensure safe operation of machines fitted with FANUC OPC Server and FANUC CNC units. Read this section carefully before attempting to use any function described in this manual.
Users should also read the relevant descriptions in the Operator's Manual of the CNC to become fully familiar with the functions to be used.

Contents

DEFINITION OF WARNING, CAUTION, AND NOTE

This manual includes safety precautions for protecting the user and preventing damage to the machine.
Precautions are classified into Warnings and Cautions according to their bearing on safety. Also, supplementary information is described as Notes. Read the Warnings, Cautions, and Notes thoroughly before attempting to use the machine.

⚠ WARNING
Applied when there is a danger of the user being injured or when there is a danger of both the user being injured and the equipment being damaged if the approved procedure is not observed.

⚠ CAUTION
Applied when there is a danger of the equipment being damaged, if the approved procedure is not observed.

NOTE
The Note is used to indicate supplementary information other than Warning and Caution.

※ Read this manual carefully, and store it in a safe place.

GENERAL WARNINGS AND CAUTIONS

⚠ WARNING

1 Before operating the machine, thoroughly check the entered data. Operating the machine with incorrectly specified data may result in the machine behaving unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

2 Never attempt to machine a workpiece without first checking the programmed value, compensation value, current position, and external signal settings. Also, never attempt to machine a workpiece without first checking the operation of the machine. Before starting a production run, ensure that the machine is operating correctly by performing a trial run using, for example, the single block, federate override, or machine lock function, or by operating the machine with neither a tool nor workpiece mounted. Failure to confirm the correct operation of the machine may result in the machine behaving unexpectedly, possibly causing damage to the workpiece and/or machine itself, or injury to the user.

3 Ensure that the specified feedrate is appropriate for the intended operation. Generally, for each machine, there is a maximum allowable feedrate. The appropriate feedrate varies with the intended operation. Refer to the manual provided with the machine to determine the maximum allowable feedrate. If a machine is turn at other than the correct speed, unexpected load may be applied to the machine, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

4 When using a tool compensation function, thoroughly check the direction and amount of compensation. Operating the machine with incorrectly specified data may result in the machine behaving unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

5 The parameters for the CNC and PMC are factory-set. Usually, there is no need to change them. When, however, there is no alternative other than to change a parameter, ensure that you fully understand the function of the parameter before making any change. A failure to set a parameter correctly may result in the machine behaving unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

⚠ CAUTION

1 Immediately after switching on the power, do not touch any of the keys on the MDI unit until the position display or alarm screen appears on the CNC unit. Some of the keys on the MDI panel are dedicated to maintenance or other special operations. Pressing any of these keys may place the CNC unit in other than its normal state. Starting the machine in this state may cause it to behave unexpectedly.

2 The operator's manual for the CNC describes all the basic functions of the CNC, including the optional functions. The selected optional functions vary with the machine. Some functions described in this manual may not, therefore, be supported by your machine. Check the machine specifications before using the optional functions.

3 Some machine operations and screen functions are implemented by the machine tool builder. For an explanation of their usage and related notes, refer to the manual provided by the machine tool builder.
For example:

- On some machines, executing a tool function causes the tool change unit to operate. When executing a tool function on such a machine, stand well clear of the tool change unit. Otherwise, there is a danger of injury to the operator.
- Many auxiliary functions trigger physical operations, such as rotation of the spindle. Before attempting to use an auxiliary function, therefore, ensure that you are fully aware of the operation to be triggered by that function.

NOTE

Command programs, parameters, and variables are stored in nonvolatile memory in the CNC. Generally, the contents of memory are not lost by a power on/off operation. However, the contents of memory may be erased by mistake, or important data in nonvolatile memory may have to be erased upon recovering from a failure. To enable the restoration of data as soon as possible if such a situation arises, always make a backup of the data in advance.

GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT

⚠ WARNING

Be careful enough for the following warnings when you develop two or more applications or use networks.
If you neglect them, there is a danger of the user being injured or there is a danger of both the user being injured and the equipment being damaged.

⚠ WARNING

1 Be careful enough if you write an identical CNC data, an identical PMC data or a series of related data set by two or more above applications including network functions. Because they are executed based on each individual cycles (in other words, asynchronous cycles), there is a possibility that the data will be written in an unexpected order.
Therefore, do NOT write above data in the following cases.
- Applications and network functions
- Two or more applications
- Two or more network functions

Data, applications and network functions of interest are listed in below. However, all may not be listed completely because new features will be added in the future.

2 Be careful enough that you must prevent PMC signals in the same byte from being written by the following two or more applications including network functions. While an application reads and writes one byte of PMC signals, other applications may write the same byte.

3 Be careful enough if you process a PMC signal set that is related to a CNC function by using the following two or more applications including network functions. Because they are executed based on each individual cycles (in other words, asynchronous cycles), there is a possibility that the CNC may receive the PMC signal set in an unexpected order.

⚠ WARNING

4 Generally, when multi-byte data are read or written at once among the following two or more applications including network functions, the coherency of the read multi-byte data (in other words, reading all latest data at once) is not guaranteed. To ensure the coherency of the multi-byte data, prepare flags to notify the completion of reading or writing process that is separated from the entity of the data and make the handshaking process to access the data by using the flags.

Data List Table

Category	Data
General data for CNC	Parameter, Tool compensation value and related data, Work zero offset value and related data, Workpiece coordinate system shift value and related data, Macro variable, P-CODE variable, Program and related data, Tool management function data, Tool life management data, Error compensation related data , Overtravel check (Interference check) related data , Software operator's panel related data
PMC data	PMC signal, PMC parameter
Data for Laser, Punch press or Wire cut	Tool data for punch press and related data, Safety zone data and related data, Laser cutting condition data and related data, Laser oscillator setting data and related data, Wire consumption compensation data, Guide position compensation data, Workpiece leveling data
Other data	Parameters for Data Server, Parameters for network setting

List Table of Applications and Network Functions

Category	Functions
Applications	FANUC OPC Server , PMC Ladder, Macro Executor, C Language Executor, FANUC PICTURE, FOCAS2
Network functions	FL-net, EtherNet/IP, PROFINET, Modbus/TCP, PROFIBUS-DP, DeviceNet, CC-Link

5 CNC has functions that read or write PMC signals in other than the G/F address. Be careful enough if the above mentioned applications and network read or write PMC signals used by these functions. When reading or writing the same PMC signal, applications or CNC functions may work in an unexpected manner. For the relevant CNC functions, refer to "LIST OF FUNCTIONS USING PMC SIGNALS OTHER THAN G/F ADDRESS " in Appendix in the CONNECTION MANUAL (FUNCTION) of the relevant CNC.

I. GENERAL

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05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
03	2017.12.25	T.Hosaka	OPC UA support
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1 General

This chapter explains the organization of this manual and how to read this manual.

1.1 COMPOSITION

This manual consists of the following parts:

SAFETY PRECAUTIONS
This section describes the precautions to be observed when reading this manual.

I. GENERAL
This part describes the chapter organization, applicable models, related manuals, and general of the FANUC OPC Server.

II. INSTALLATION
This part describes how to install and uninstall. Please read carefully before installation.

III. SETTING
This part describes the setting items necessary to use each function.

1.2 CNC Model name

The abbreviations of CNC model name in the following table are sometimes used in text descriptions.

<table>
<tr><th>Model name</th><th colspan="3">Abbreviation</th></tr>
<tr><td>FANUC Series 30i-MODEL A</td><td>Series 30i -A</td><td rowspan="4" colspan="2">Series 30i/31i/32i -A</td><td rowspan="28">Series 30i/31i/32i -A/B, 35i -B, PMi -A, 0i -D/F, 0i -B/C, 16i/18i/21i -A/B, PMi -D, PMi -H</td></tr>
<tr><td>FANUC Series 31i-MODEL A</td><td rowspan="2">Series 31i -A</td></tr>
<tr><td>FANUC Series 31i-MODEL A5</td></tr>
<tr><td>FANUC Series 32i-MODEL A</td><td>Series 32i -A</td></tr>
<tr><td>FANUC Series 30i-MODEL B</td><td>Series 30i -B</td><td rowspan="3">Series 30i/31i/32i -B</td><td rowspan="8">Series 30i/31i/32i/35i -B or 30i/31i/32i/35i -B</td></tr>
<tr><td>FANUC Series 31i-MODEL B</td><td rowspan="2">Series 31i -B</td></tr>
<tr><td>FANUC Series 31i-MODEL B5</td></tr>
<tr><td>FANUC Series 32i-MODEL B</td><td>Series 32i -B</td></tr>
<tr><td>FANUC Series 35i-MODEL B</td><td>Series 35i -B</td><td>Series 35i -B</td></tr>
<tr><td>FANUC Series 30i-MODEL B Plus</td><td>Series 30i –B Plus</td><td rowspan="3">Series 30i/31i/32i -B Plus or 30i/31i/32i -B Plus</td></tr>
<tr><td>FANUC Series 31i-MODEL B5 Plus</td><td rowspan="2">Series 31i -B Plus</td></tr>
<tr><td>FANUC Series 31i-MODEL B Plus</td></tr>
<tr><td>FANUC Series 32i-MODEL B Plus</td><td>Series 32i -B Plus</td></tr>
<tr><td>FANUC Power Motion i-MODEL A</td><td>Power Motion i -A</td><td>Power Motion i -A</td><td>PMi -A</td></tr>
<tr><td>FANUC Series 0i-MODEL D</td><td>Series 0i-D</td><td>Series 0i-D</td><td>0i-D</td></tr>
<tr><td>FANUC Series 0i-MODEL F</td><td>Series 0i-F</td><td rowspan="2">Series 0i-F</td><td rowspan="2">0i-F</td></tr>
<tr><td>FANUC Series 0i-MODEL F Plus</td><td>Series 0i-F Plus</td></tr>
<tr><td>FANUC Series 0i-MODEL B</td><td>Series 0i-B</td><td>Series 0i-B</td><td>0i-B</td></tr>
<tr><td>FANUC Series 0i-MODEL C</td><td>Series 0i-C</td><td>Series 0i-C</td><td>0i-C</td></tr>
<tr><td>FANUC Series 16i-MODEL A</td><td>Series 16i -A</td><td rowspan="3" colspan="2">Series 16i/18i/21i -A</td></tr>
<tr><td>FANUC Series 18i-MODEL A</td><td>Series 18i -A</td></tr>
<tr><td>FANUC Series 21i-MODEL A</td><td>Series 21i -A</td></tr>
<tr><td>FANUC Series 16i-MODEL B</td><td>Series 16i -B</td><td rowspan="3" colspan="2">Series 16i/18i/21i -B</td></tr>
<tr><td>FANUC Series 18i-MODEL B</td><td>Series 18i -B</td></tr>
<tr><td>FANUC Series 21i-MODEL B</td><td>Series 21i -B</td></tr>
</table>

FANUC PowerMate *i*- MODEL D	Power Mate *i* -D	Power Mate *i* -D	PM*i* -D	
FANUC PowerMate *i*- MODEL H	Power Mate *i* -H	Power Mate *i* -H	PM*i* -H	

1.3 RELATED MANUALS

The table below lists manuals related to this manual.
Refer to these manuals when you use this manual.

Manual name	Specification number	
Related to Series 30i/31i/32i-A		
DESCRIPTIONS	B-63942EN	
CONNECTION MANUAL (HARDWARE)	B-63943EN	
CONNECTION MANUAL (FUNCTION)	B-63943EN-1	
OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)	B-63944EN	
OPERATOR'S MANUAL (For Lathe System)	B-63944EN-1	
OPERATOR'S MANUAL (For Machining Center System)	B-63944EN-2	
MAINTENANCE MANUAL	B-63945EN	
PARAMETER MANUAL	B-65950EN	
Related to Series 30i/31i/32i-B		
DESCRIPTIONS	B-64482EN	
CONNECTION MANUAL (HARDWARE)	B-64483EN	
CONNECTION MANUAL (FUNCTION)	B-64483EN-1	
OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)	B-64484EN	
OPERATOR'S MANUAL (For Lathe System)	B-64484EN-1	
OPERATOR'S MANUAL (For Machining Center System)	B-64484EN-2	
MAINTENANCE MANUAL	B-64485EN	
PARAMETER MANUAL	B-64490EN	
Related to Series 30i/31i/32i-B Plus		
DESCRIPTIONS	B-64722EN	
CONNECTION MANUAL (HARDWARE)	B-64723EN	
CONNECTION MANUAL (FUNCTION)	B-64723EN-1	
OPERATOR'S MANUAL (Common to Lathe System/Machining Center System)	B-64724EN	
OPERATOR'S MANUAL (For Lathe System)	B-64724EN-1	
OPERATOR'S MANUAL (For Machining Center System)	B-64724EN-2	
MAINTENANCE MANUAL	B-64725EN	
PARAMETER MANUAL	B-64730EN	
Related to Series 35i-B		
DESCRIPTIONS	B-64522EN	
CONNECTION MANUAL (HARDWARE)	B-64523EN	
CONNECTION MANUAL (FUNCTION)	B-64523EN-1	
OPERATOR'S MANUAL	B-64524EN	
MAINTENANCE MANUAL	B-64525EN	
PARAMETER MANUAL	B-64530EN	
Related to Power Motion i-A		
DESCRIPTIONS	B-64572EN	
CONNECTION MANUAL (HARDWARE)	B-64573EN	
CONNECTION MANUAL (FUNCTION)	B-64573EN-1	
OPERATOR'S MANUAL	B-64574EN	
MAINTENANCE MANUAL	B-64575EN	

Manual name	Specification number	
PARAMETER MANUAL	B-64580EN	
Related to Series 0*i*-D		
DESCRIPTIONS	B-64302 EN	
CONNECTION MANUAL (HARDWARE)	B-64303 EN	
CONNECTION MANUAL (FUNCTION)	B-64303 EN -1	
Common to Lathe System / Machining Center System OPERATOR'S MANUAL	B-64304 EN	
For Lathe System OPERATOR'S MANUAL	B-64304 EN -1	
For Machining Center System OPERATOR'S MANUAL	B-64304 EN -2	
MAINTENANCE MANUAL	B-64305 EN	
PARAMETER MANUAL	B-64310 EN	
OPERATION AND MAINTENANCE HANDBOOK	B-64307 EN	
Related to Series 0*i*-F		
DESCRIPTIONS	B-64602 EN	
CONNECTION MANUAL (HARDWARE)	B-64603 EN	
CONNECTION MANUAL (FUNCTION)	B-64603 EN -1	
CONNECTION MANUAL (FUNCTION 0i-PF)	B-64623 EN	
Common to Lathe System / Machining Center System OPERATOR'S MANUAL	B-64604 EN	
OPERATOR'S MANUAL (0i-PF)	B-64624 EN	
For Lathe System OPERATOR'S MANUAL	B-64604 EN -1	
For Machining Center System OPERATOR'S MANUAL	B-64604 EN -2	
MAINTENANCE MANUAL	B-64605 EN	
PARAMETER MANUAL	B-64610 EN	
PARAMETER MANUAL (0i-PF)	B-64630 EN	
Related to Series 0*i*-F Plus		
DESCRIPTIONS	B-64692 EN	
CONNECTION MANUAL (HARDWARE)	B-64693 EN	
CONNECTION MANUAL (FUNCTION)	B-64693 EN -1	
Common to Lathe System / Machining Center System OPERATOR'S MANUAL	B-64694 EN	
For Lathe System OPERATOR'S MANUAL	B-64694 EN -1	
For Machining Center System OPERATOR'S MANUAL	B-64694 EN -2	
MAINTENANCE MANUAL	B-64695 EN	
PARAMETER MANUAL	B-64700 EN	
Related to Series 16*i*/18*i*-A		
DESCRIPTIONS	B-63002EN	
CONNECTION MANUAL (HARDWARE)	B-63003EN	
CONNECTION MANUAL (FUNCTION)	B-63003EN-1	
16*i*/18*i* –MA OPERATOR'S MANUAL	B-63014EN	
16*i*/18*i* –TA OPERATOR'S MANUAL	B-63004EN	
MAINTENANCE MANUAL	B-63005EN	
PARAMETER MANUAL	B-63010EN	
Related to Series 21*i*-A		
DESCRIPTIONS	B-63002EN	
CONNECTION MANUAL (HARDWARE)	B-63083EN	
CONNECTION MANUAL (FUNCTION)	B-63003EN-1	
21*i* –MA OPERATOR'S MANUAL	B-63094EN	
21*i* –TA OPERATOR'S MANUAL	B-63084EN	
MAINTENANCE MANUAL	B-63085EN	
PARAMETER MANUAL	B-63090EN	
Related to Series 16*i*/18*i*/21*i*-B		
DESCRIPTIONS	B-63522EN	

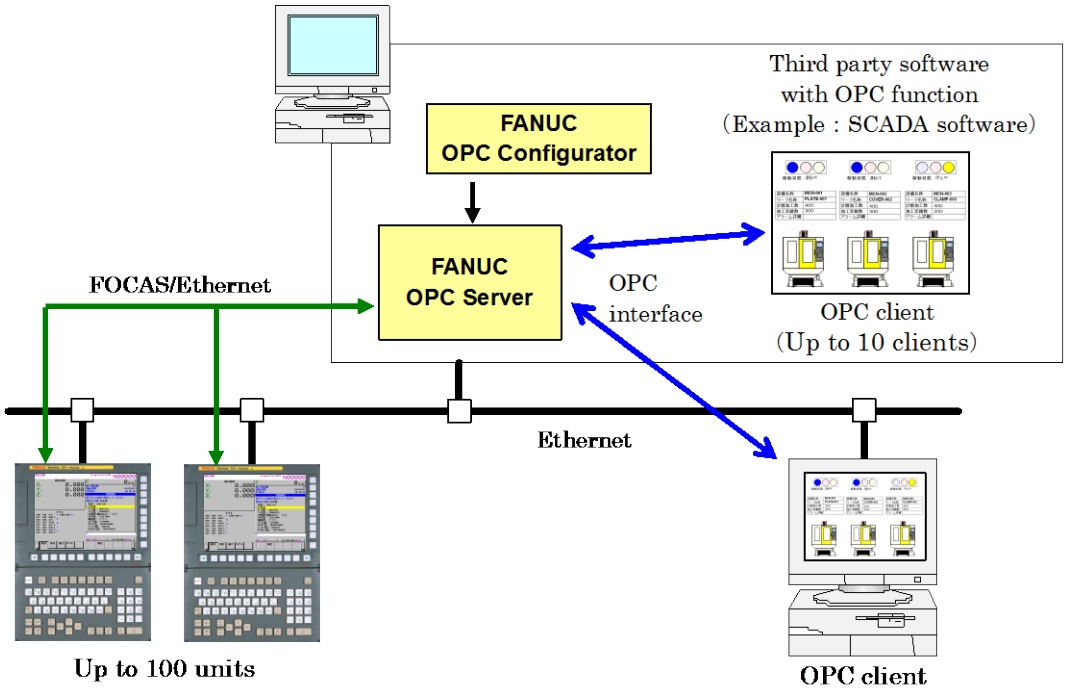
Manual name	Specification number	
CONNECTION MANUAL (HARDWARE)	B-63523EN	
CONNECTION MANUAL (FUNCTION)	B-63523EN-1	
16*i*/18*i* –MB OPERATOR'S MANUAL	B-63534EN	
16*i*/18*i* –TB OPERATOR'S MANUAL	B-63524EN	
21*i* –MB OPERATOR'S MANUAL	B-63614EN	
21*i* –TB OPERATOR'S MANUAL	B-63604EN	
MAINTENANCE MANUAL	B-63525EN	
16*i*/18*i* –B PARAMETER MANUAL	B-63530EN	
21*i*-B PARAMETER MANUAL	B-63610EN	
OPERATION AND MAINTENANCE HANDBOOK	B-63527EN	
Related to Series 0*i*-B		
DESCRIPTIONS	B-63832EN	
CONNECTION MANUAL (HARDWARE)	B-63833EN	
CONNECTION MANUAL (FUNCTION)	B-63833EN-1	
0*i*-TB OPERATOR'S MANUAL	B-63834EN	
0*i*-MB OPERATOR'S MANUAL	B-63844EN	
MAINTENANCE MANUAL	B-63835EN	
PARAMETER MANUAL	B-63840EN	
Related to Series 0*i*-C		
DESCRIPTIONS	B-64112EN	
CONNECTION MANUAL (HARDWARE)	B-64113EN	
CONNECTION MANUAL (FUNCTION)	B-64113EN-1	
0*i*-TC OPERATOR'S MANUAL	B-64114EN	
0*i*-MC OPERATOR'S MANUAL	B-64124EN	
0*i*-TTC OPERATOR'S MANUAL	B-64284EN	
MAINTENANCE MANUAL	B-64115EN	
PARAMETER MANUAL	B-64120EN	
Related to Power Mate *i*-D/H		
DESCRIPTIONS	B-63172EN	
CONNECTION MANUAL (HARDWARE)	B-63173EN	
CONNECTION MANUAL (FUNCTION)	B-63173EN-1	
OPERATOR'S MANUAL	B-63174EN	
MAINTENANCE MANUAL	B-63175EN	
PARAMETER MANUAL	B-63180EN	
OPERATION AND MAINTENANCE HANDBOOK	B-63177EN	
PMC		
30*i*/31*i*/32*i*/35*i* –B PMC PROGRAMMING MANUAL	B-64513EN	
PMC LADDER LANGUAGE PROGRAMMING MANUAL	B-61863EN	
Network		
30*i*/31*i*/32*i*–A/B 35*i* –B Power Motion *i* –A 0*i* –F Fast Ethernet / Fast Data Server OPERATOR'S MANUAL	B-64014EN	
FAST Ethernet Board FAST DATA SERVER OPERATOR'S MANUAL	B-63644EN	
Dual Check Safety		
Dual Check Safety CONNECTION MANUAL	B-64483EN-2	

2 Overview of FANUC OPC Server

This chapter describes the general information about the overview of the FANUC OPC Server.
Hereafter, "FANUC OPC Server" might be described as "OPC Server", and "FANUC OPC Configurator" as "OPC Configurator".

2.1 Introduction to FANUC OPC Server

FANUC OPC Server is an OPC Server software to access the data of FANUC CNC and to expose it to the OPC interface. The third party software with OPC Client function can read and write the data of CNC through FANUC OPC Server.
Up to 100 CNCs and up to 10 OPC clients can be connected to FANUC OPC Server.
FANUC OPC Server supports OPC-DA standard 3.0, 2.0, 1.0a, and OPC-UA standard.
FANUC OPC Configurator is a tool to configure FANUC OPC Server.
FOCAS/Ethernet is used for the communication between FANUC OPC Server and CNC.



2.2 Supported CNC

The following CNCs are supported.
One of the Embedded Ethernet, Multi-function Ethernet or Fast Ethernet board is required.

- Series 30*i*/31*i*/32*i*-A
- Series 30*i*/31*i*/32*i*/35*i*-B , Series 30*i*/31*i*/32*i*-B Plus
- Series 0*i*-TD/MD
- Series 0*i*-TF/MF , Series 0*i*-TF/MF Plus
- Power Motion *i*-A
- Series 16*i*/18*i*/21*i*-A/B

- Series 0*i*-B/C
- PowerMate *i*-D/H

2.3 Supported CNC data

The following types of CNC data are supported.

- CNC System Information (CNC Series, CNC Type, CNC controlled Axis Count/Path)
- Tool Offsets
- Work Offsets
- Program Data
  (Main Program Number, Main Program Comment, Active Program Number, Active Program Comment)
- Custom Macro Variable
  (Local Variable, Common Variable, Embedded Macro Variable, System Variable)
- Alarm Information
  (Alarm Messages, Alarm Number)
- Axis Name
- Position Information
  (Absolute Position, Distance to go Position, Machine Position, Relative Position)
- PMC Data
  (PMC Bit, PMC Byte, PMC 2Byte, PMC 4Byte)
- PMC Alarm
  (PMC Alarm Messages, PMC Alarm Number)
- Number of Machined Parts
- P-CODE
  (Control Variable, Variable, Extended Variable)
- Operator Messages
- CNC Status
  (Mode, Operation, Emergency)

2.4 Number of Point

The data exchanged to CNC is called "point" at OPC Server.
In the FANUC OPC server, maximum 10,000 points can be set. This is a total of all connected CNCs.

NOTE
The performance of the OPC server depends on the following conditions. The performance means how many points can be renewed at how much intervals.
- The performance of the PC where OPC Server runs
- Number of connected CNC and OPC client

When deciding the above-mentioned conditions, please execute the preliminary test to confirm that the performance of OPC Server achieves the necessary performance.

2.5 Update Time of Point

The minimum value for the update time of point is 100ms.

2.6 PC Hardware

The following list details the appropriate hardware environment for the software.

ITEM	MINIMUM	RECOMMENDED
PROCESSOR	Single-core processor, 1.6Ghz	Quad-core processor, 2.8Ghz
RAM	1GByte	4Gbyte
HARD DISK	100Mb of free hard disk space	100Mb of free hard disk space
NETWORK	100base-T Ethernet adapter	100base-T Ethernet adapter
VIDEO	1024×768	1280×1024

2.7 Supported Windows OS

The following PC operating systems are supported.

- Windows 10 Professional 32 bit / 64 bit OS
- Windows 8.1 Professional 32 bit / 64 bit OS
- Windows 7 Professional 32 bit / 64 bit OS
- Windows XP Professional ServicePack 3 32 bit OS

Ⅱ. INSTALLATION

05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
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1 Installation

This chapter describes the software installation of FANUC OPC Server software.

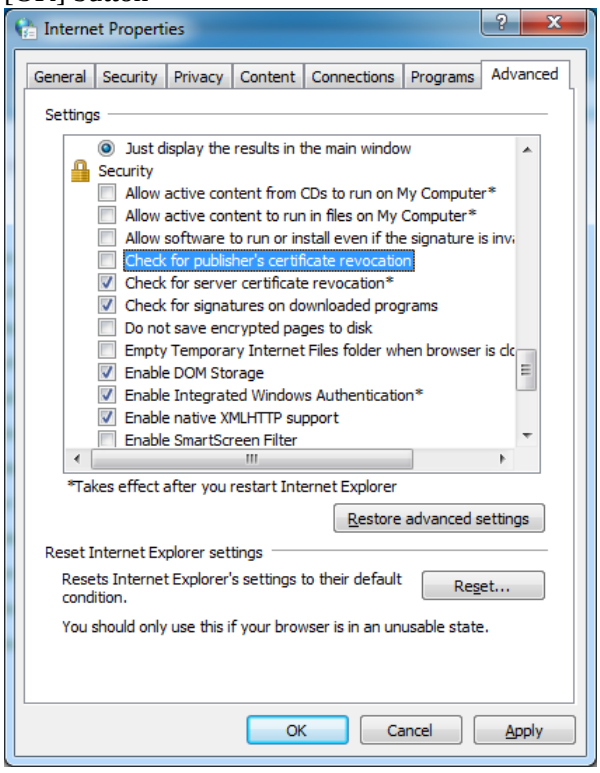
1.1 Shipping Items

Please confirm that you received the following items.
- The installation media of this software
- The paper where the serial number is printed

Please enter the serial number on your FANUC OPC Registration screen after you installed the software.
The input of the serial number is necessary to run this software.

1.2 Preparation

This tool communicates with CNC by using the TCP/IP protocol of Ethernet.
At the PC where you install this tool, please confirm the followings.
- TCP/IP function is installed.
- IP address, subnet mask, and if necessary the default gateway, of the PC are specified.
- If your computer is not connected to the Internet, to disable the check for publisher's certificate revocation of digital signature.
  Open the [Control Panel], click the [Internet Options], Open the Internet Properties.
  Select the [Advanced] tab, uncheck the [check for publisher's certificate revocation], and then click the [OK] button



NOTE
On a PC that does not connect to the Internet, if that is the check box for [Check for publisher's certificate revocation], it takes a long time to start of FANUC OPC Configurator.

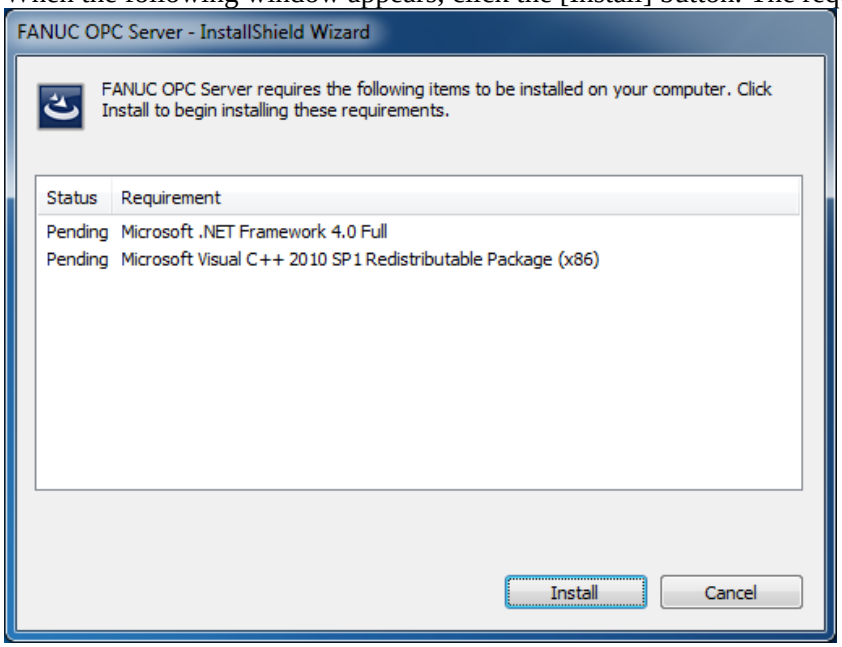
1.3 Installation

This section details the steps of software installation for the Windows 7 operating system. Installation for other OS is almost the same.

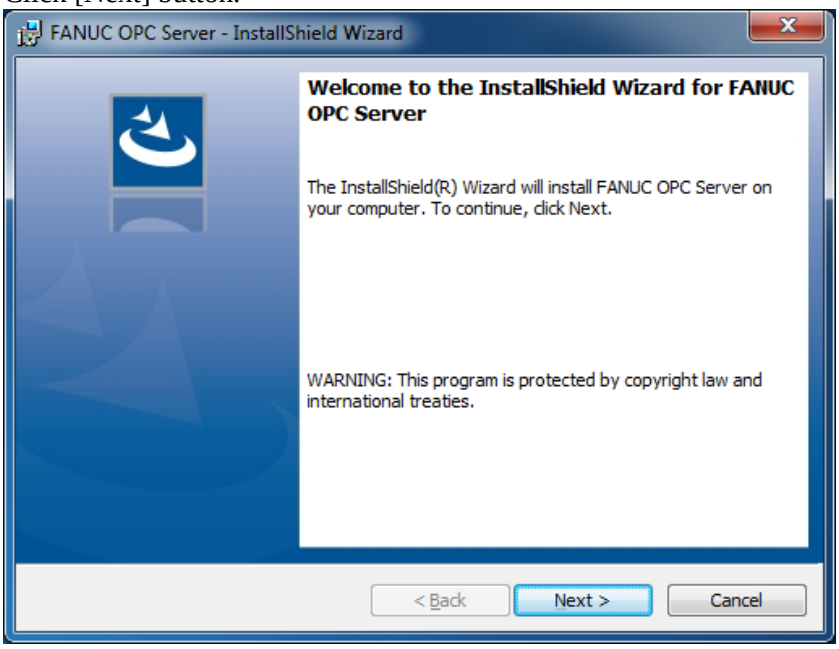
NOTE
1 To install the software, you must have the administrator user name and password.
2 Before installing, please close all running programs.
3 The following software is used. If it is not installed, it is installed automatically.
- Microsoft .NET Framework 4 Client Profile
- Microsoft .NET Framework 4 Extended
- Microsoft Visual Studio C++ 2010 x86 Redistributable
- Windows Installer 4.5 for Windows XP SP2 and later (x86) (Windows XP only)

The standard installation steps install both the FANUC OPC Server and the FANUC OPC Configurator, the configuration tool for the OPC Server.
When "Custom" installation is selected, you can;
- Install FANUC OPC Configurator only
- Change the installation folder.

1) Insert the installation media to the PC. The installer will automatically start.
If the installer does not start, please start the setup.exe in the installation media by using Windows Explorer.
When the following window appears, click the [Install] button. The required software is installed.

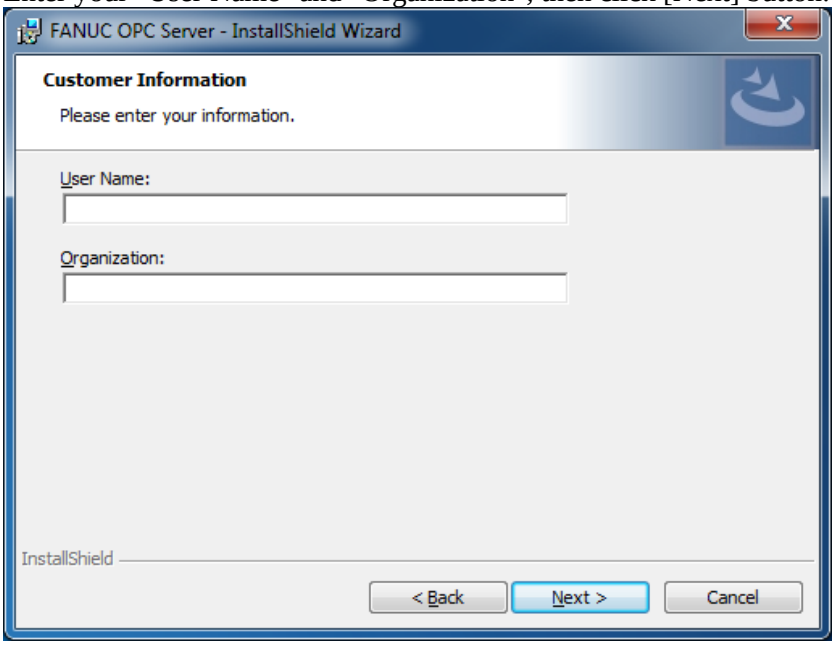


2) Click [Next] button.

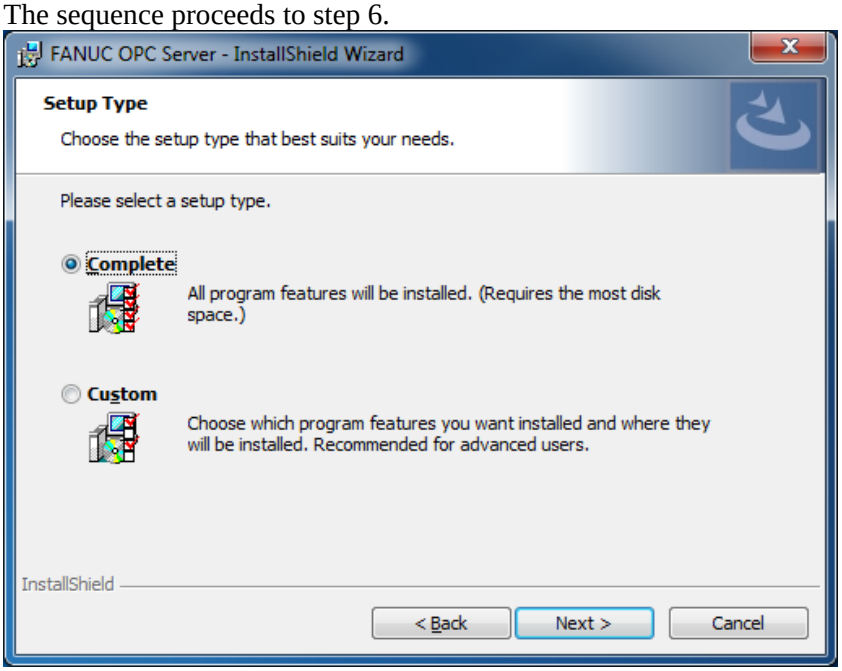


3) The license agreement window appears. Please read the agreement carefully.
When you agree, click [I accept the terms in the licensee agreement], then click [Next] button.

4) The customer information window appears.
Enter your "User Name" and "Organization", then click [Next] button.

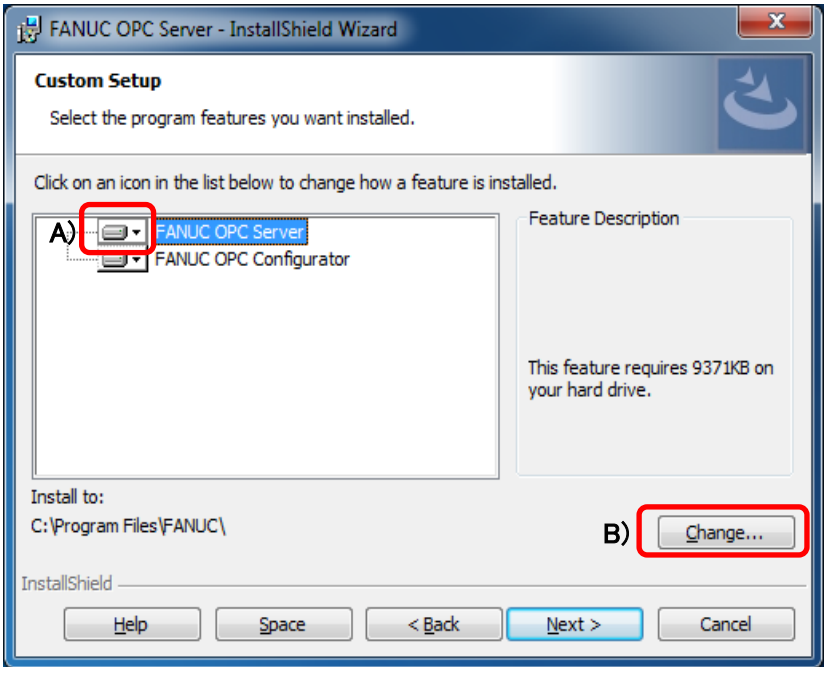


5) Setup Type selection window appears. Usually, select "Complete" and then click the [Next] button.
The sequence proceeds to step 6.



In the following cases, select the "Custom" and then click the [Next] button.
A) You install OPC Configurator only, and do not install OPC Server.
B) You change the folder to install the software.

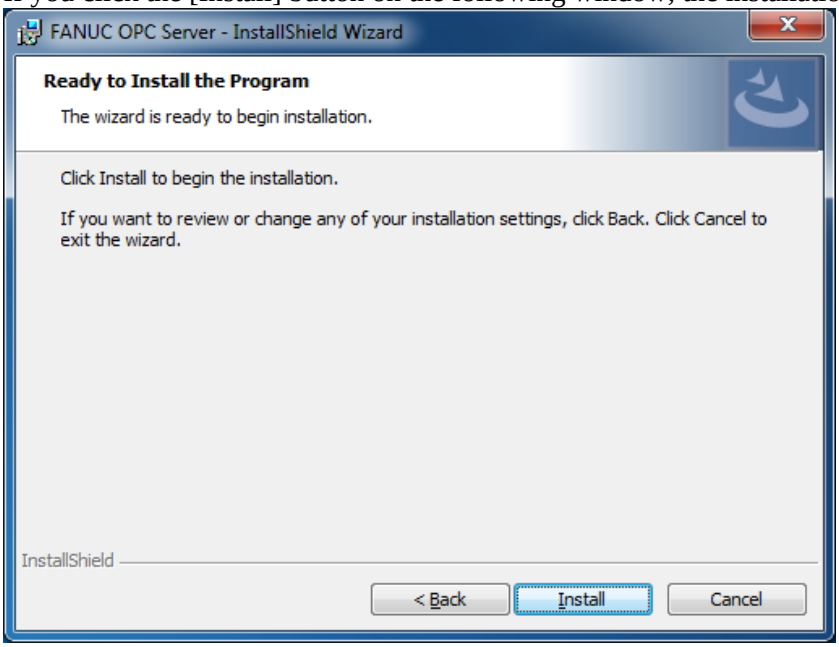
Custom Setup window appears.



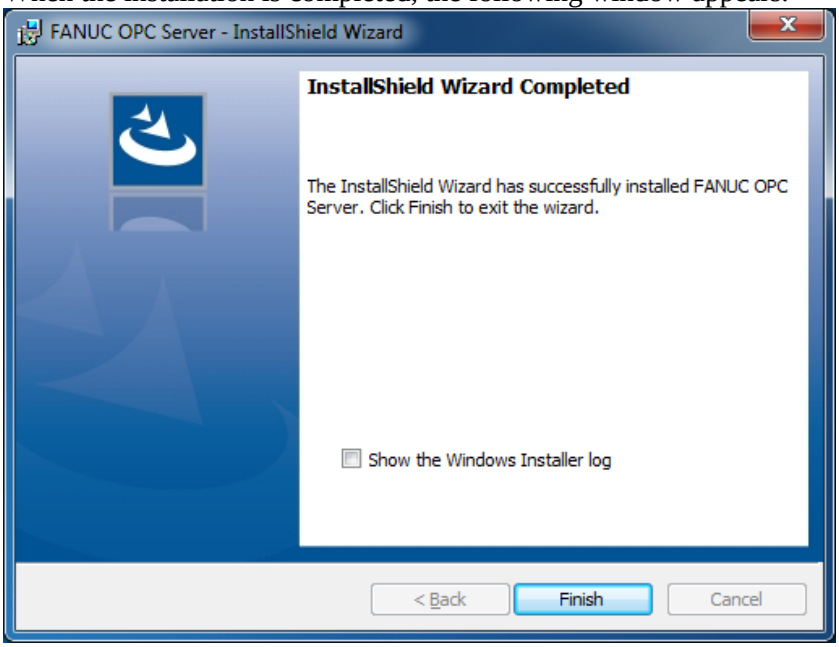
A) If you do not install the FANUC OPC Server, click the icon of FANUC OPC Server, and then select [This feature will not be available].

B) If you change the installation folder, click [Change…] button to change the folder to install the software.

6) If you click the [Install] button on the following window, the installation starts.



7) When the installation is completed, the following window appears.



The [FANUC OPC Configurator] icon is displayed on the desktop.

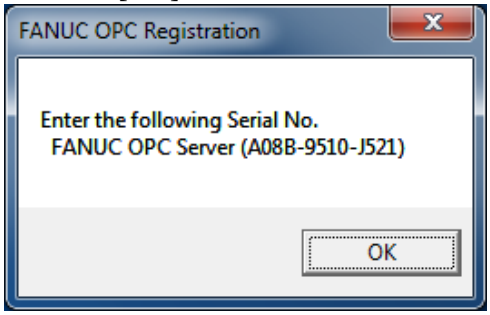
Click [Finish] button to end the installation.

1.4 Registration of serial number

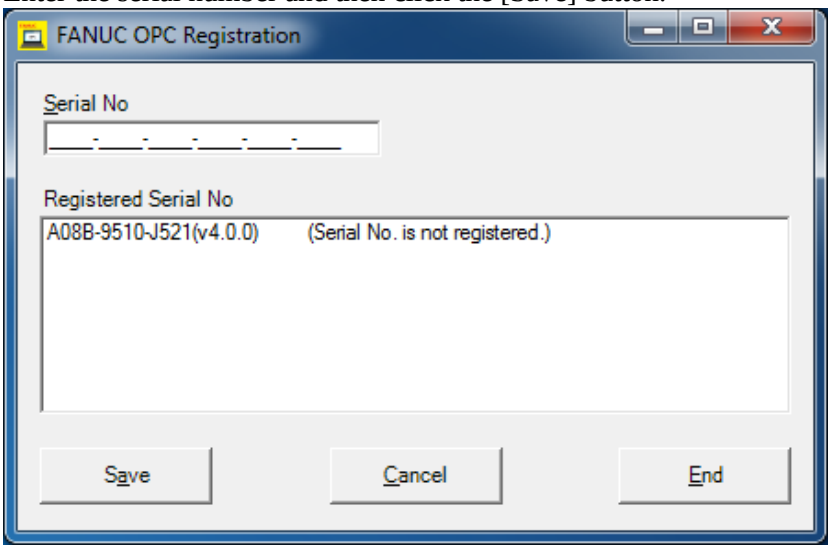
Please register the serial number on the FANUC OPC Registration screen after you install the software.

1) To open the FANUC OPC Registration window, click [START], [PROGRAMS], [FANUC OPC Server] and then [FANUC OPC Registration].

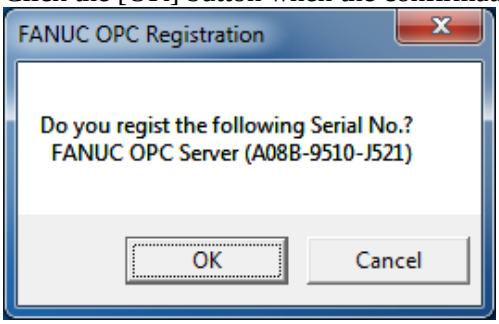
2) The figure number for which the input of the serial number is necessary is displayed on the screen. Click the [OK] button.



3) Enter the serial number and then click the [Save] button.



4) Click the [OK] button when the confirmation message is displayed.

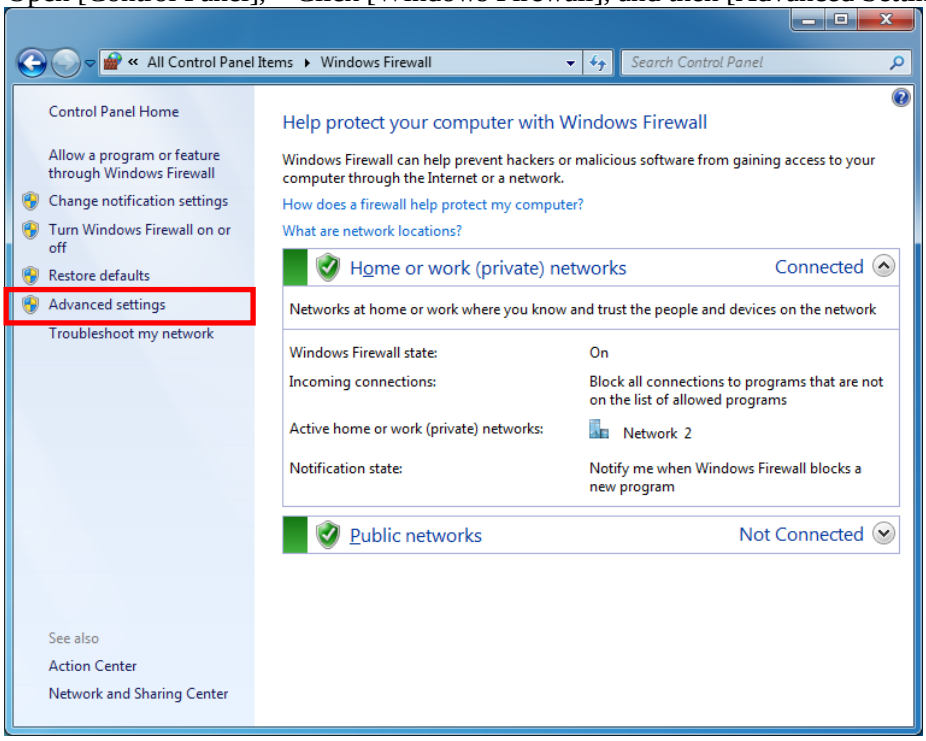


5) If the entered serial number is displayed on the screen, the registration is completed.
Click the [End] button to exit the window.

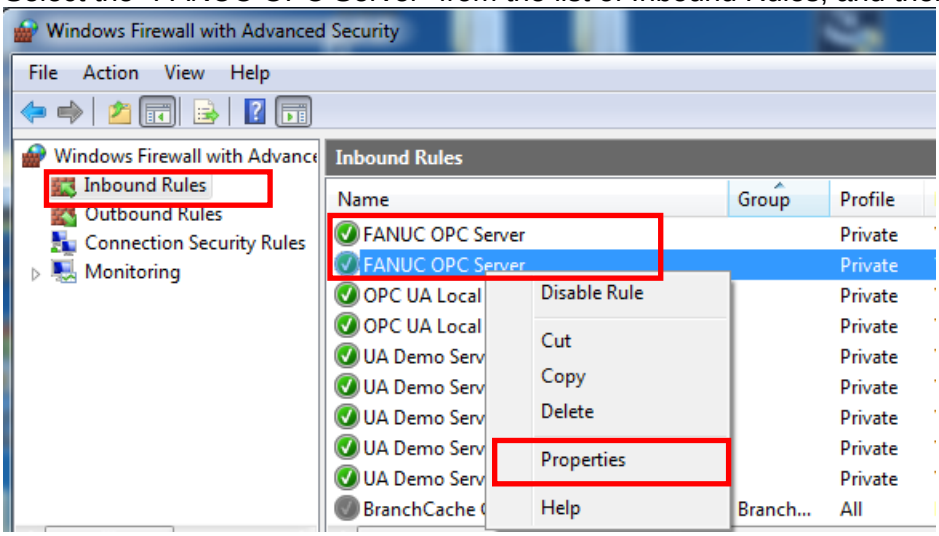
1.5 Firewall Inbound Rules

At installation, it will be added FANUC OPC server rules to the Inbound rules of the Windows firewall. Rules at the time of installation, the profile to be applied has become only the [private].
In accordance with the personal computer of the network environment to be used, please add the profile that you want to use.

1) Open [Control Panel], Click [Windows Firewall], and then [Advanced Setting] Click.

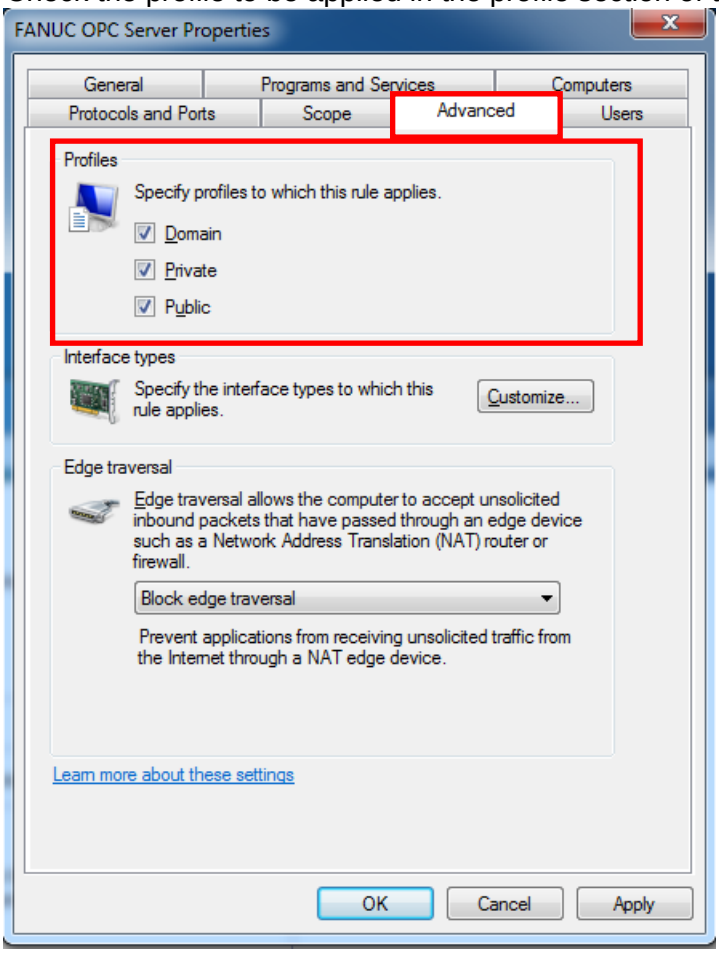


2) Click the [Inbound Rules].
Select the "FANUC OPC Server" from the list of Inbound Rules, and then click Properties.



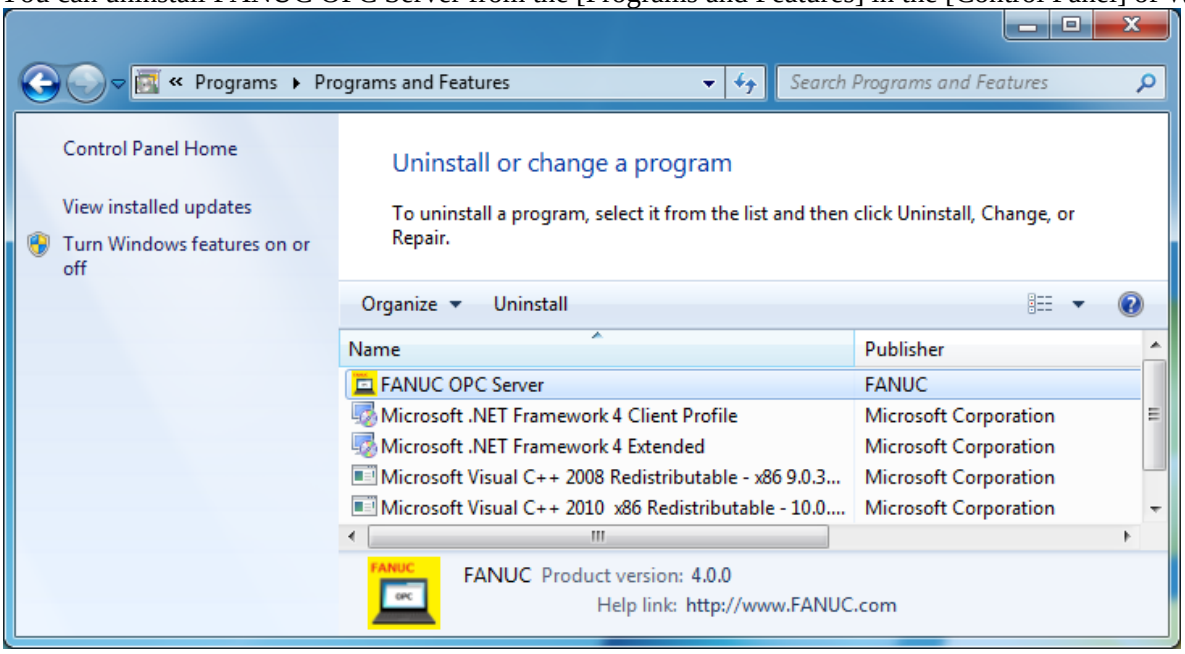
NOTE
Rules Please be set to both TCP and UDP.

3) Check the profile to be applied in the profile section of the Advanced Settings.



2 Un-installation

You can uninstall FANUC OPC Server from the [Programs and Features] in the [Control Panel] of Windows.



NOTE

Before you uninstall the software, please make sure that the FANUC OPC Server is not running. When it is running, please terminate it with the following steps.
If the service mode is running, you do not need termination.

1) Please confirm whether an icon of OPC server is displayed in the system tray of Windows. The details of the procedure are described in "4.1 Display of OPC Server user interface" in "III. Configuration".
2) Please terminate the OPC Server when the icon is displayed.
   - Double click the icon to restore it to the normal size.
   - Click the [File] menu, and then click the [Force Server Exit] in the drop-down menu.

Ⅲ. CONFIGURATION

05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
03	2017.12.25	T.Hosaka	OPC UA support
02	2016.01.13	T.Hosaka	Old CNC support and data type added.

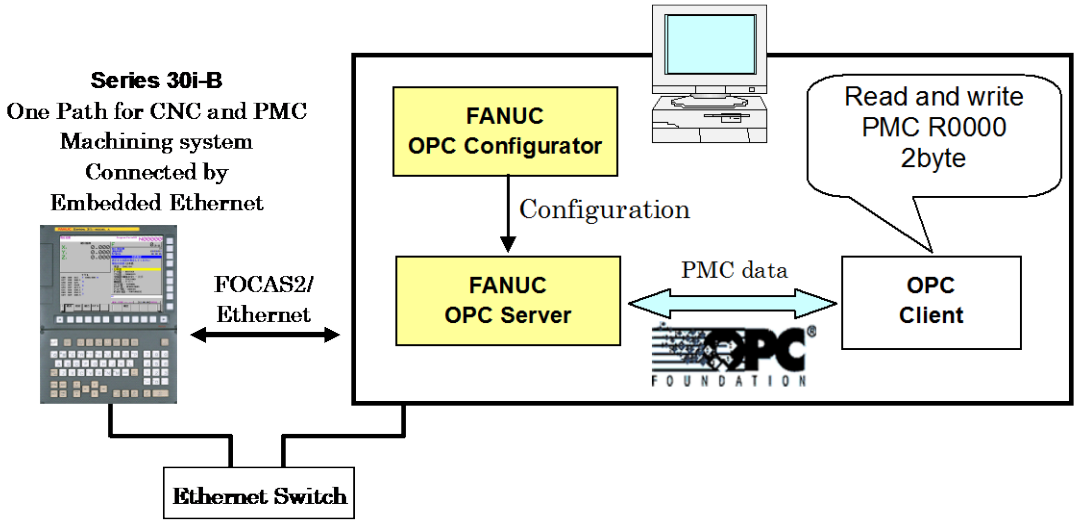
Ed.	Date	Design	Description

Date	2015.09.25	Desig.	T.Hosaka	Check		Apprv.	K.Murata

Title	FANUC OPC Server Operator's Manual
Draw	A-40622-00001EN
FANUC CORPORATION	Sheet. 29/167

1 Quick guide

This chapter explains the necessary setting procedure of Ethernet communication and OPC Configurator to read and write PMC data of CNC from OPC Client.
The following system example is used in explanation.



1.1 Setting IP address of CNC

This section describes the setting procedure of IP address for CNC using the following example.
As for the setting procedure of PC, please refer to the manual of Windows OS.

Equipment	IP ADDRESS
PC for OPC Server	192.168.1.1
CNC	192.168.1.213
SUBNET MASK	255.255.255.0
ROUTER IP ADDRESS	192.168.1.250

Port number used for the FOCAS2/Ethernet : 8193

NOTE
The above setting is an example. For details on IP addresses, subnet mask and router IP address, consult with the administrator of the network.

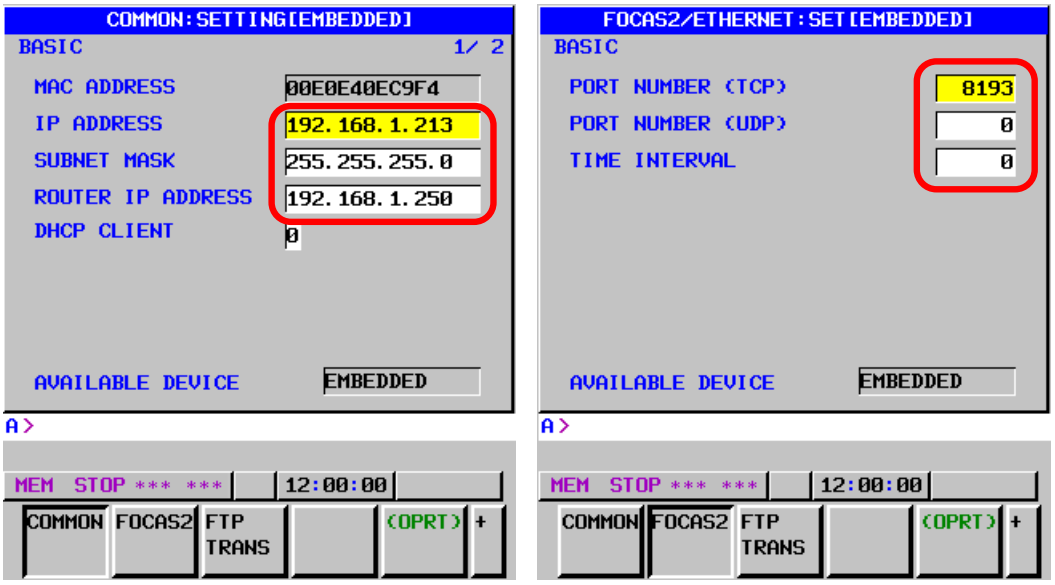
Setting of CNC

Below is the setting procedure of connecting Series 30i-B CNC to the PC with Embedded Ethernet.
The setting procedure is different in each CNC. For details, please refer to the manual of each CNC.

1) Press function key 

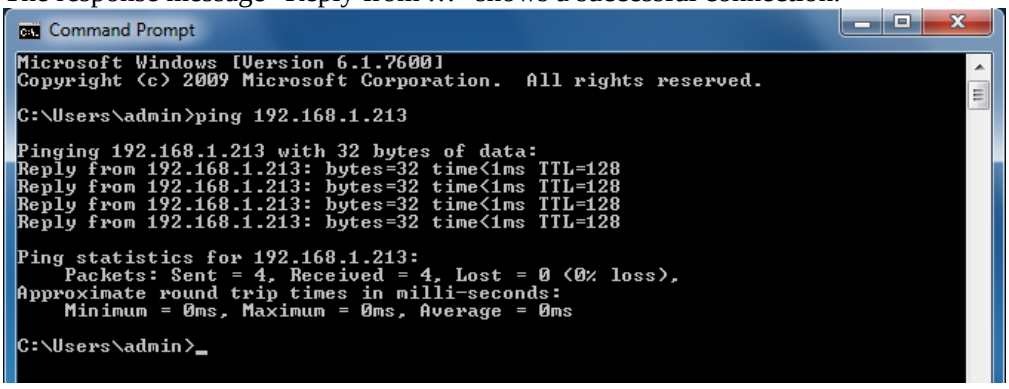
.
2) Soft key [EMBED PORT] appears. When the soft key does not appear, press the continue key.
3) Enter the value "192.168.1.213" to [IP ADDRESS], "255.255.255.0" to [SUBNET MASK] and "192.168.1.250" to [ROUTER IP ADDRESS].

4) Press soft key [FOCAS2]. Enter the value "8193" to [PORT NUMBER (TCP)], 0 to [PORT NUMBER (UDP)] and [TIME INTERVAL].



Verifying IP address setting

1) Click [START], [PROGRAMS], [ACCESSORIES], [COMMAND PROMPT] from the Windows menu.. Command prompt window appears.
2) Type "ping 192.168.1.213", and then press [ENTER] key. The connection will be tested four times. The response message "Reply from …" shows a successful connection.



If the response message "Reply from…" is not received, confirm that the network switch and cables are connected appropriately and the IP addresses of CNC and PC are correct.

1.2 Setting of OPC Configurator

This section explains the setting procedure of OPC Configurator.

1.2.1 Creating a configuration file

The procedure to start OPC Configurator and create a setting file is as follows.

1) Double-Click the icon [FANUC OPC Configurator] on the desktop.

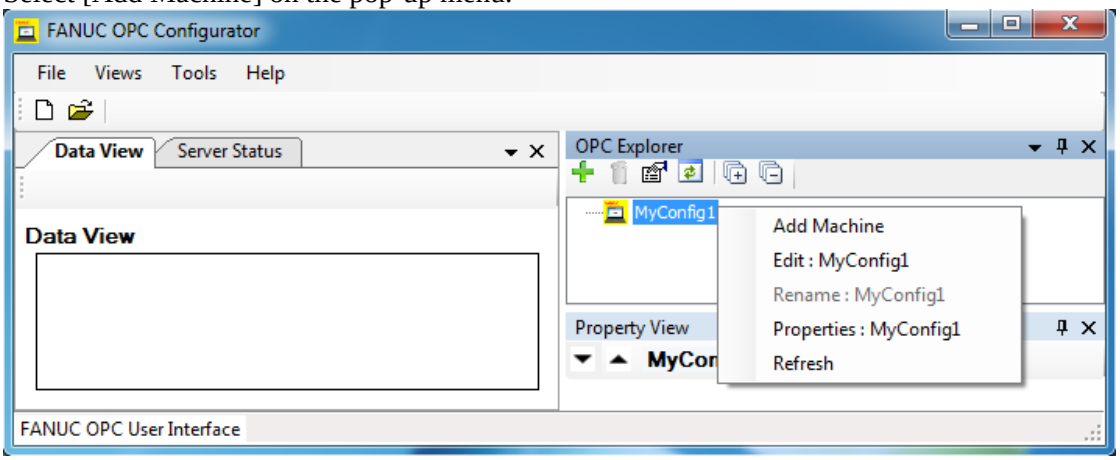
OPC Configurator starts.

2) Click the menu [FILE], [New Configuration].
3) Enter the file name "MyConfig1" in the item "Enter Configuration Name".
4) Click the [Done] button.
5) Click the menu [FILE], [Save Configuration].
6) Click the [Save] button in the default folder to save the configuration to the file "MyConfig1.fs2".
   The default folder is as follows.
   Windows 7 or later : C:¥ProgramData¥FANUC¥OPCUI
   Windows XP : C:¥Documents and Settings¥All Users¥Application Data¥FANUC¥OPCUI

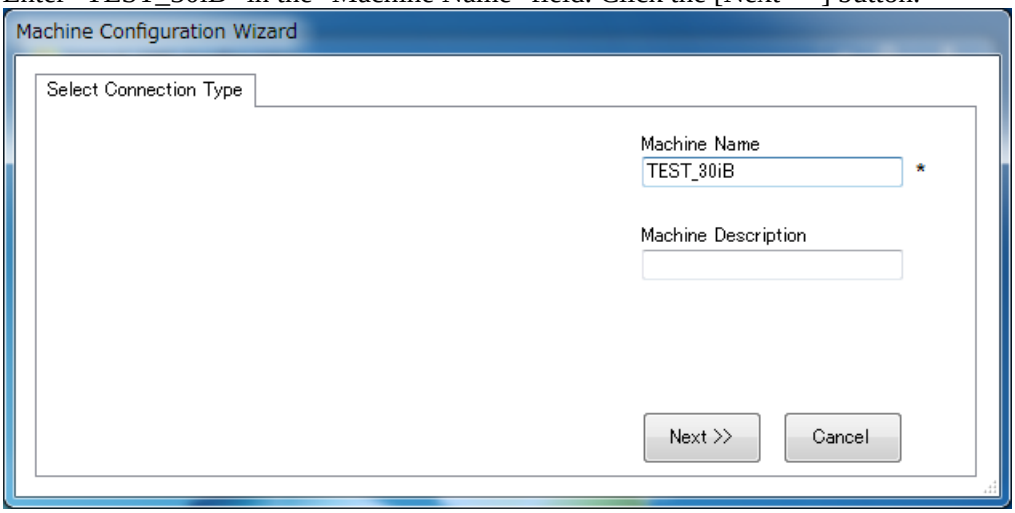
1.2.2 Settings about connecting CNC

The procedure to specify the settings about connecting CNC is as follows. There are items of Ethernet information, CNC type, the number of Path, and so on.

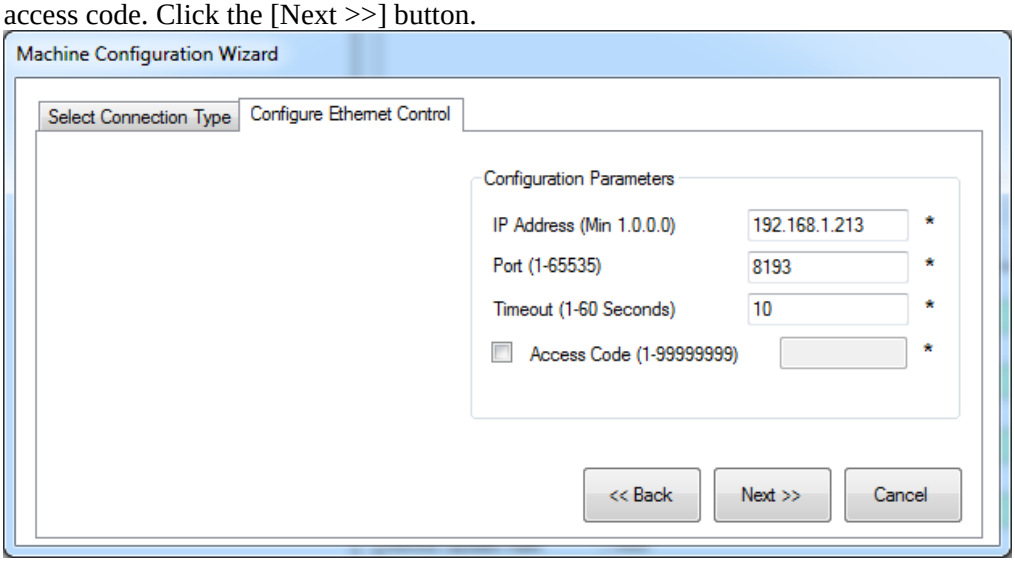
1) Right-click the icon [MyConfig1] in the OPC Explorer window.
2) Select [Add Machine] on the pop-up menu.



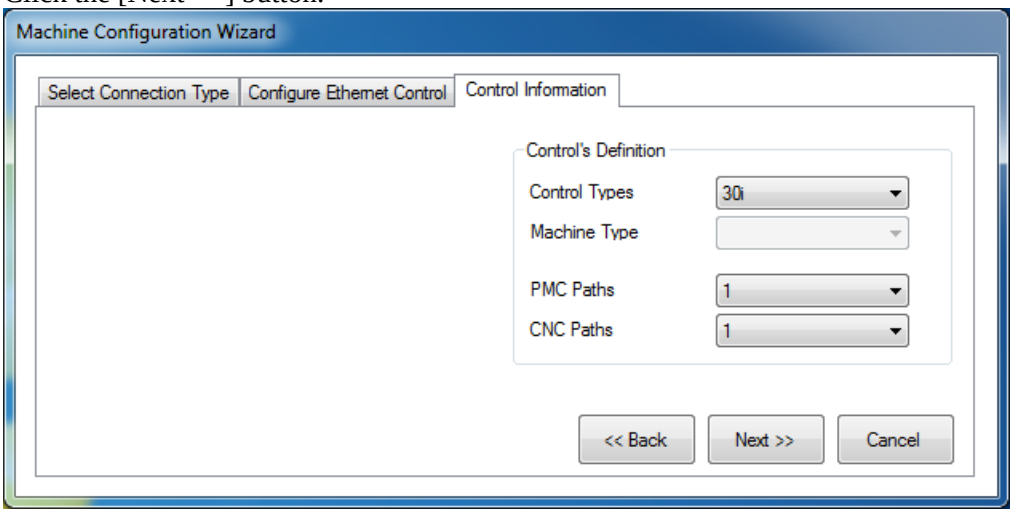
3) The Machine Configuration Wizard starts.
In the following screens, it is necessary to input the value to the field where the mark "*" is displayed.
Enter "TEST_30iB" in the "Machine Name" field. Click the [Next >>] button.



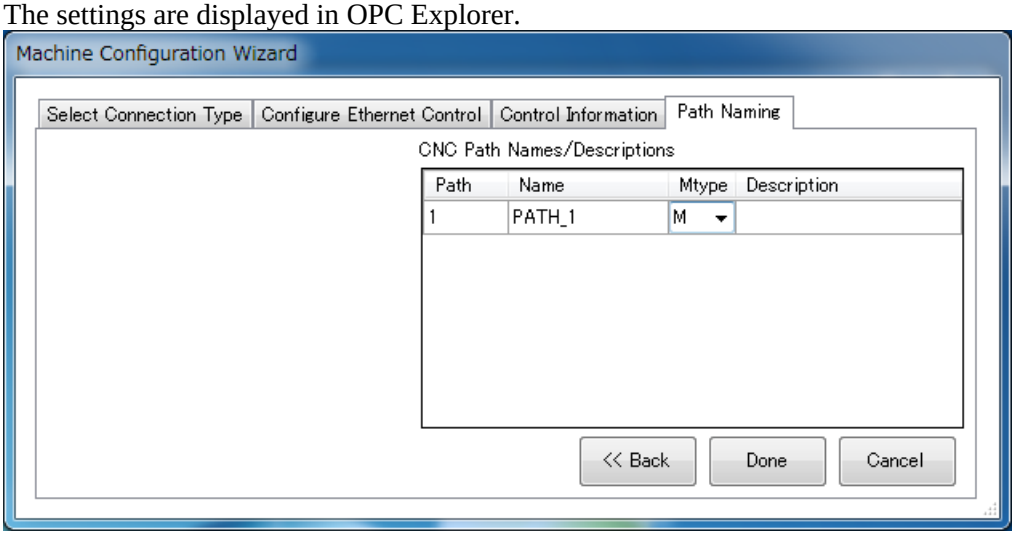
4) The Configure Ethernet Control tab appears.
Enter "192.168.1.213" in the "IP Address" field, "8193" in "Port", "10" to "Timeout". If access code is set on Parameter No.10344 of CNC, enter same access code of CNC. If access code isn't set, not need to enter access code. Click the [Next >>] button.



5) The Control Information tab appears.
Select the following value in the fields "Control Types", "PMC Paths", and "CNC Paths".
Click the [Next >>] button.



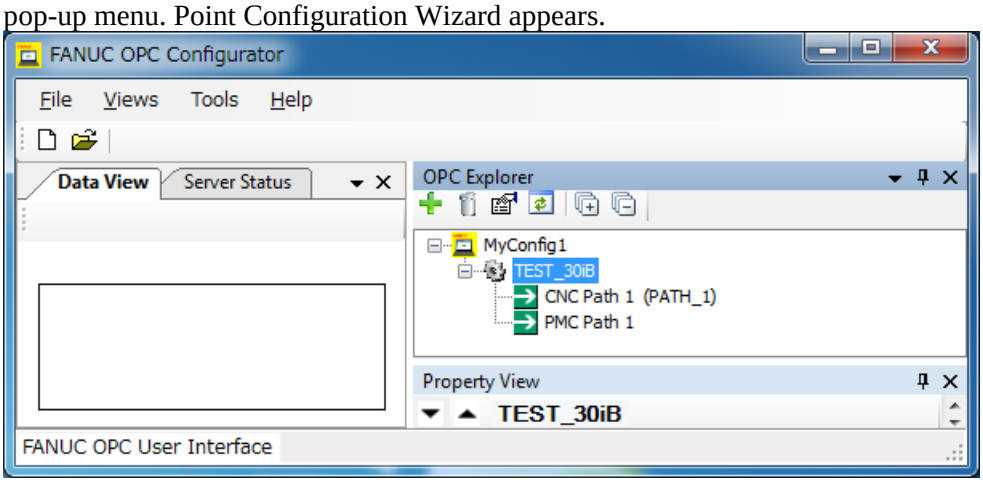
6) The Path Naming tab appears.
Enter "PATH_1" in the "Name" field. Select "M" in the "Mtype" field. Click the [Done] button.
The settings are displayed in OPC Explorer.

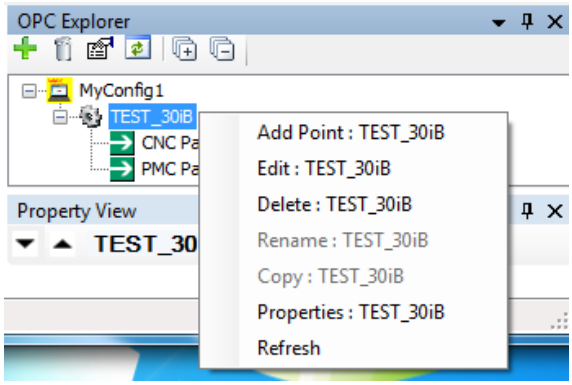


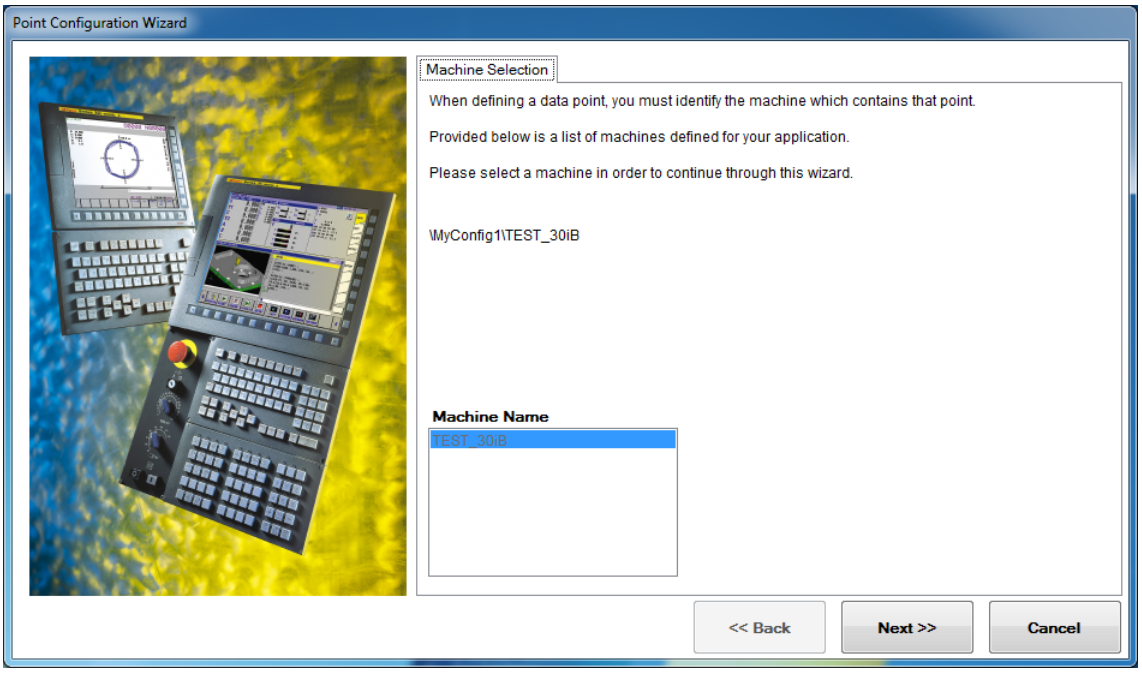
1.2.3 Setting of Point

The procedure to specify the settings about point data is as follows.
In this example, OPC Client reads/writes 2 bytes from R0000 of PMC with the unit of one byte.

1) Right-click the icon "TEST_30iB" in OPC Explorer window, and select [Add Point: TEST_30iB] on the pop-up menu. Point Configuration Wizard appears.

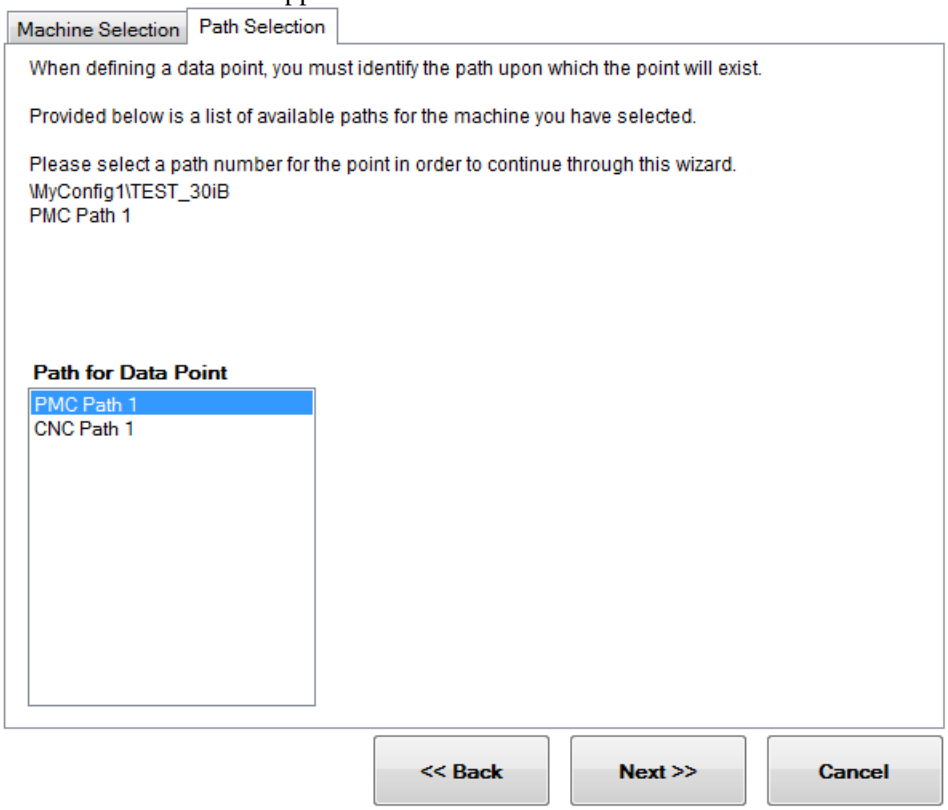






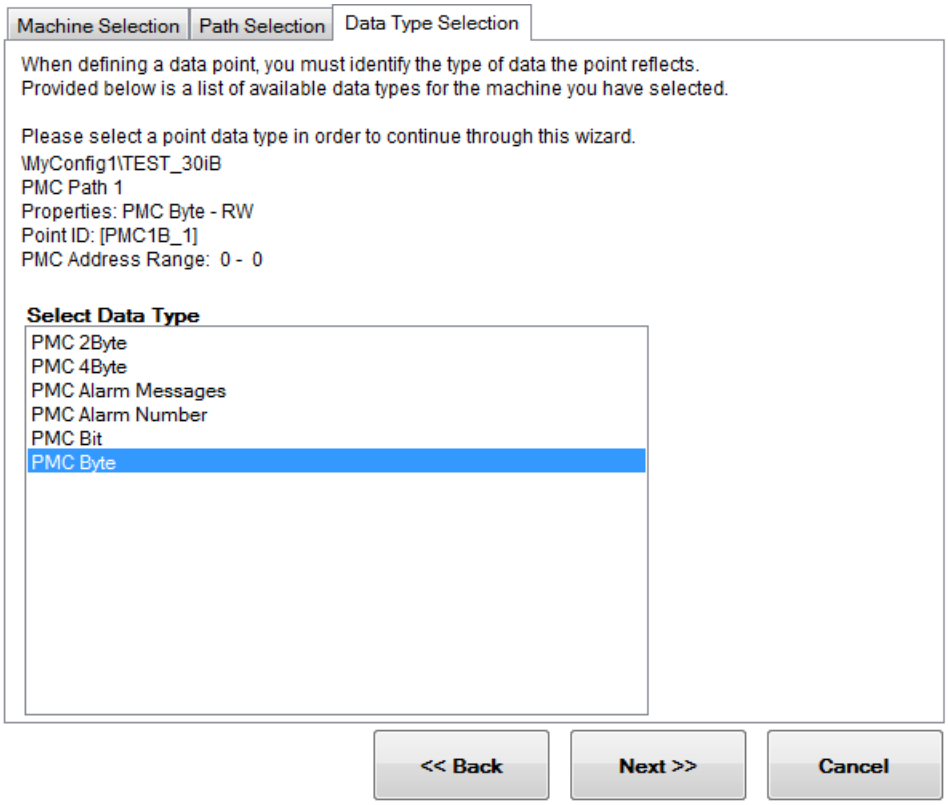
Click the [Next >>] button in Machine Selection tab.

3) The Path Selection tab appears.

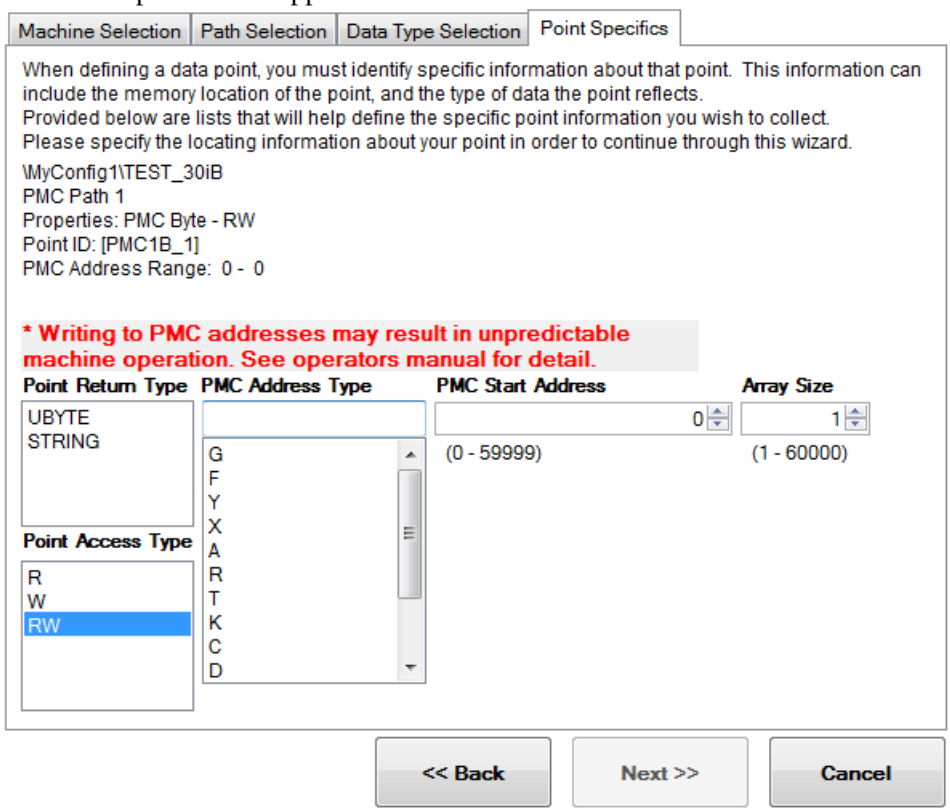


Select [PMC Path 1] and click the [Next >>] button.

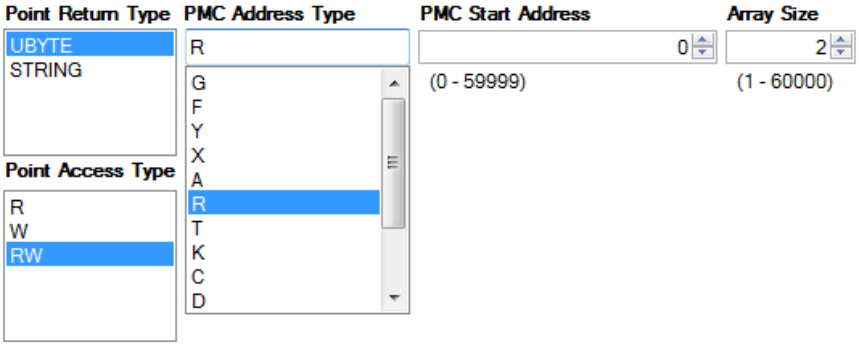
4) The Data Type Selection tab appears.
Select [PMC Byte] and click the [Next >>] button.



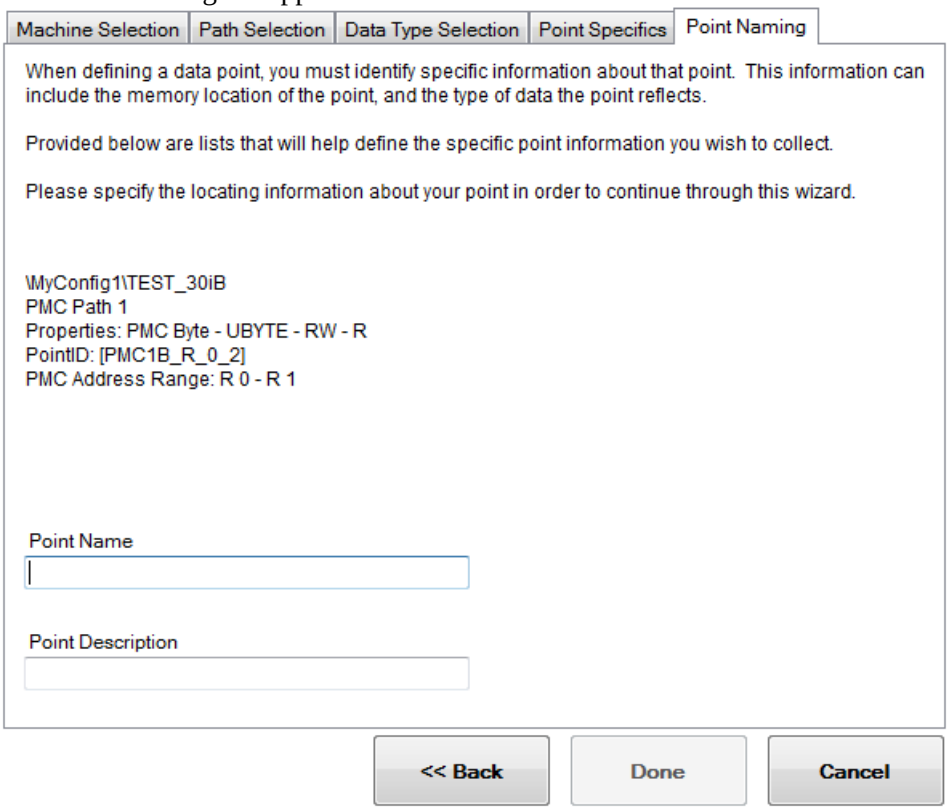
5) The Point Specifics tab appears.



Select the items as follows and click the [Next >>] button.

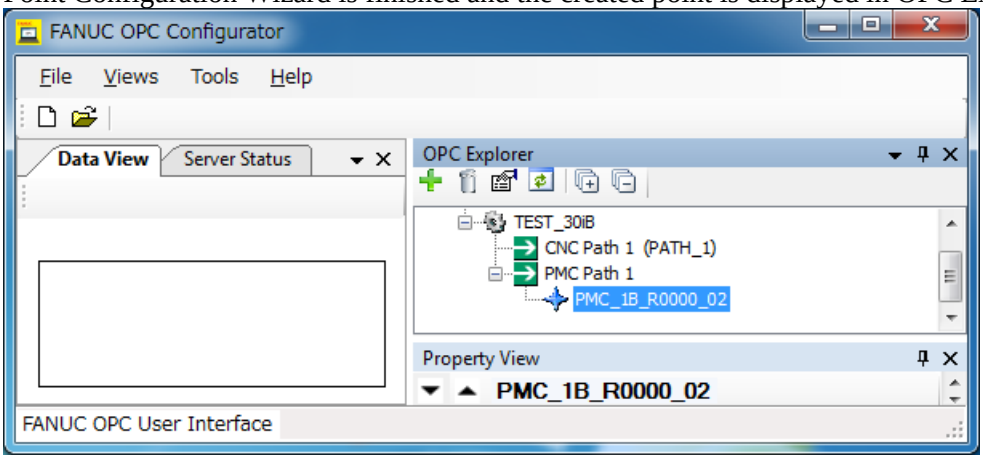


6) The Point Naming tab appears.



Enter "PMC_1B_R0000_02" in the "Point Name" field, and click the [Done] button.

7) Point Configuration Wizard is finished and the created point is displayed in OPC Explorer.



1.2.4 Saving the Configuration File

The procedure to save the settings to the file "MyConfig1.fs2" is as follows.

1) Click the menu [File], [Save Configuration]. The settings are saved in "MyConfig1.fs2".

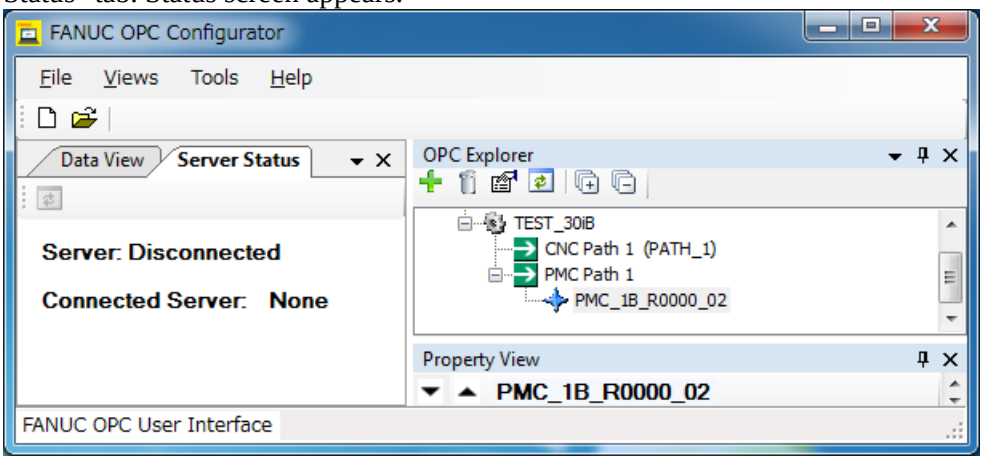
Next, overwrite the configuration file to the file that OPC Server reads.

2) Click the menu [File], [Export].
3) Export Dialog appears. Please confirm that the export destination is the following folder.
   - C:¥ProgramData¥FANUC¥OPCServer
   (In case of Windows XP,"C:¥Documents and Settings¥All Users¥Application Data¥FANUC ¥OPCServer")
4) If the folder is different, click the [Browser...] button. Browse For Folder dialog appears.
   Select "C:¥ProgramData¥FANUC¥OPCServer" folder, and then click the [OK] button.
   (In case of Windows XP, select "C:¥Documents and Settings¥All Users¥Application Data¥FANUC ¥OPCServer" folder, and then click the [OK] button.)
5) Click the "OK" button, the Export Dialog window closes.

1.3 Confirming OPC Server Operation

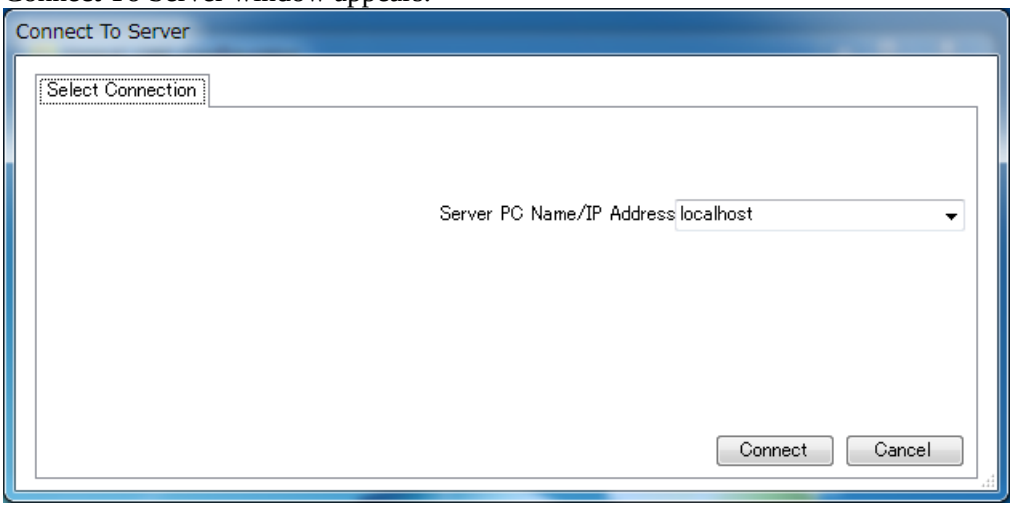
The procedure to start the OPC Server is as follows.

1) After saving the configuration file by the procedure written in the previous section, click the "Server Status" tab. Status screen appears.

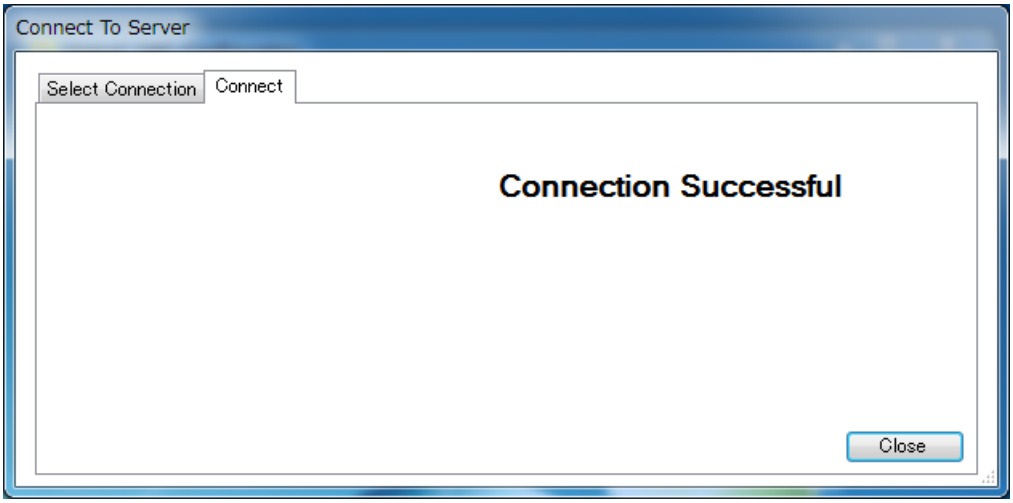


2) Click the menu [Tools], [Server], [Connect to Server].

3) Connect To Server window appears.



Confirm that [localhost] is displayed in the "Server PC Name / IP Address" field, and then click the [Connect] button.
The message, "Connection Successful", shows that the connection to the OPC Server succeeded.

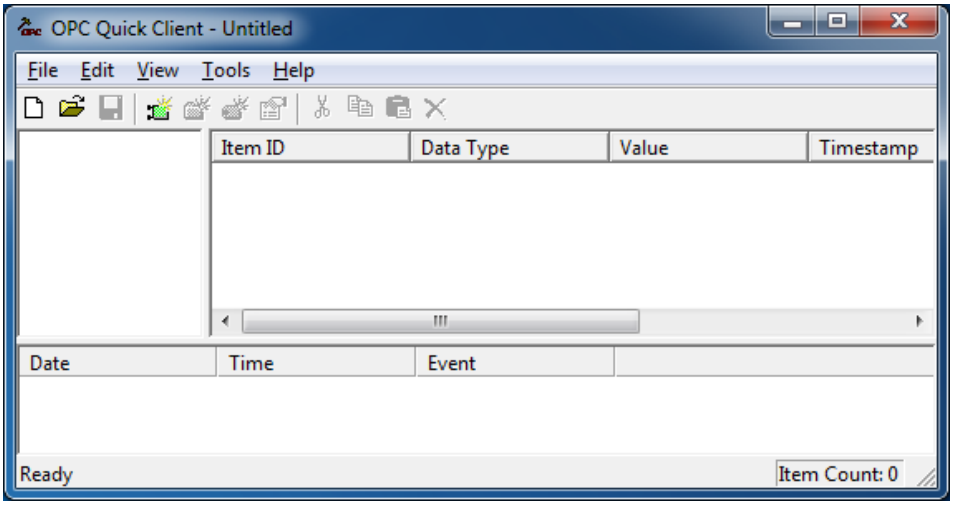


Click the [Close] button to close the Connect To Server window.

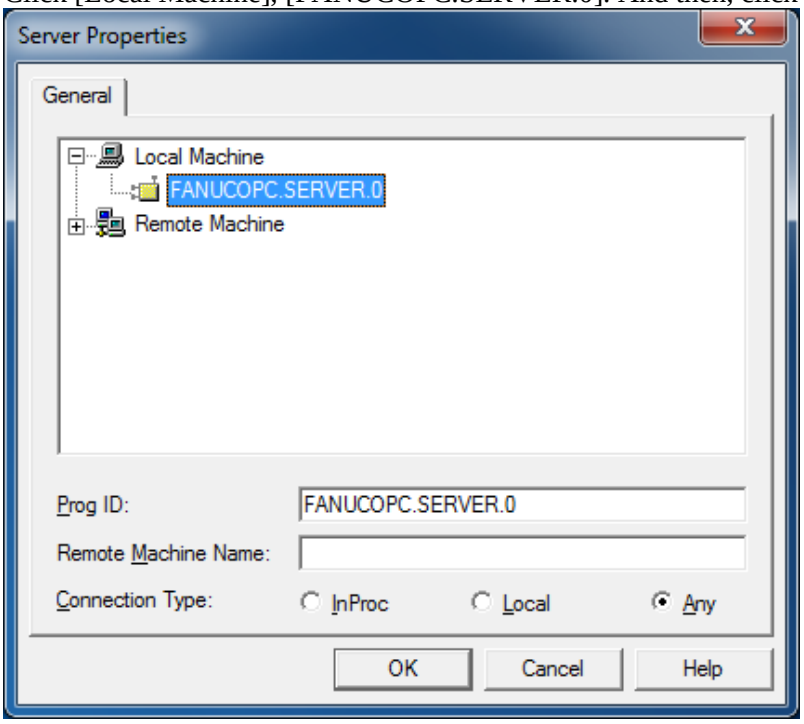
1.4 Confirming OPC Client Operation

This chapter explains the procedure to confirm that OPC client can read and write R0000 area of PMC.
In this section, the freeware OPC Client, "Software Toolbox OPC Quick Client (V4.86.108.0 - U)" (below OPC_QuickClient) is used as an example.
OPC_QuickClient can be downloaded from the home-page of Software Toolbox, Inc.
Home-page of Software Toolbox, Inc. : http://www.softwaretoolbox.com
Execute the downloaded SWTB_OPCQuickClient.exe to install OPC_QuickClient.

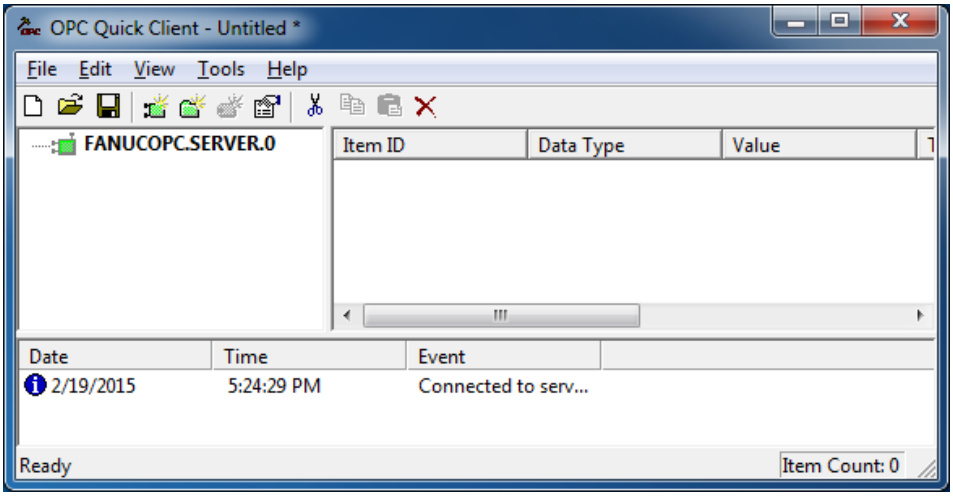
The operating procedure of OPC_QuickClient is as follows.
1) Click the menu of Windows [All Programs], [Software Toolbox], [OPC Quick Client].
OPC_QuickClient appears.



2) Click the menu [Edit], [New Server Connection…].
3) The Server Properties window appears.
Click [Local Machine], [FANUCOPC.SERVER.0]. And then, click the [OK] button.

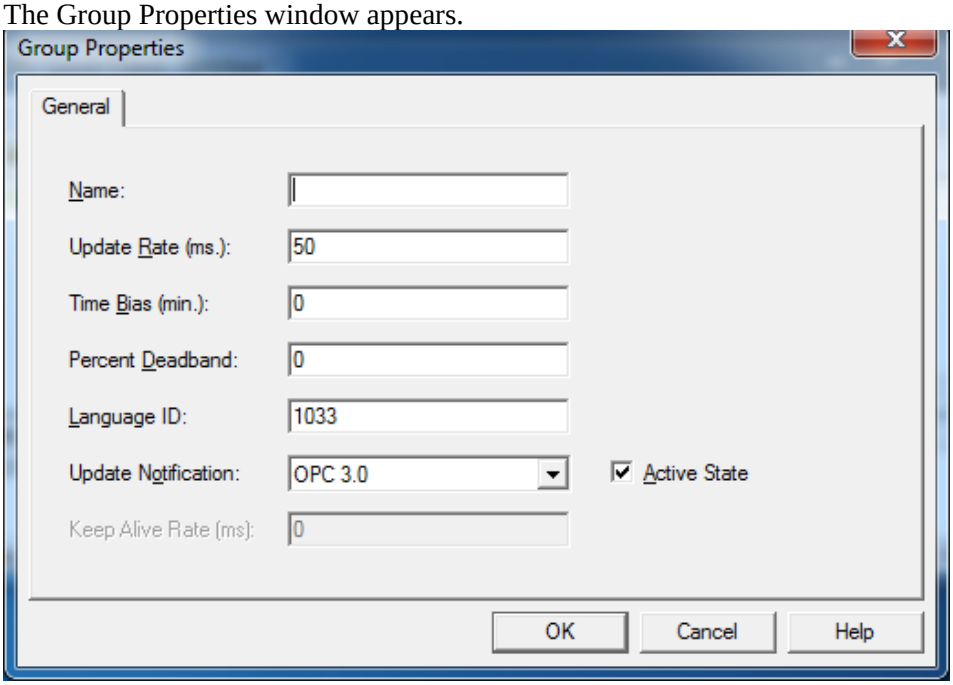


4) Server Properties window is closed and [FANUCOPC.SERVER.0] is displayed on the left area of the main window. It means that the client is connected to OPC Server.



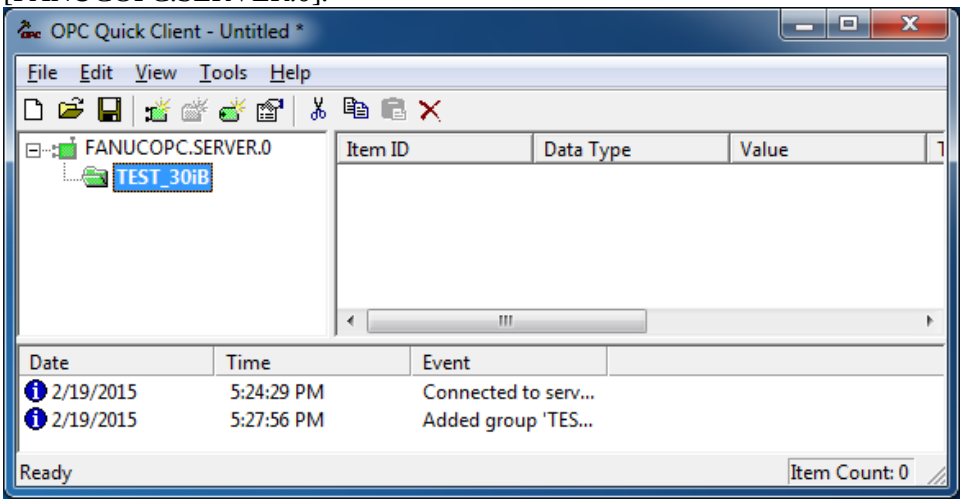
Right-click [FANUCOPC.SERVER.0]. Select [New Group…] on the drop-down menu.

6) The Group Properties window appears.



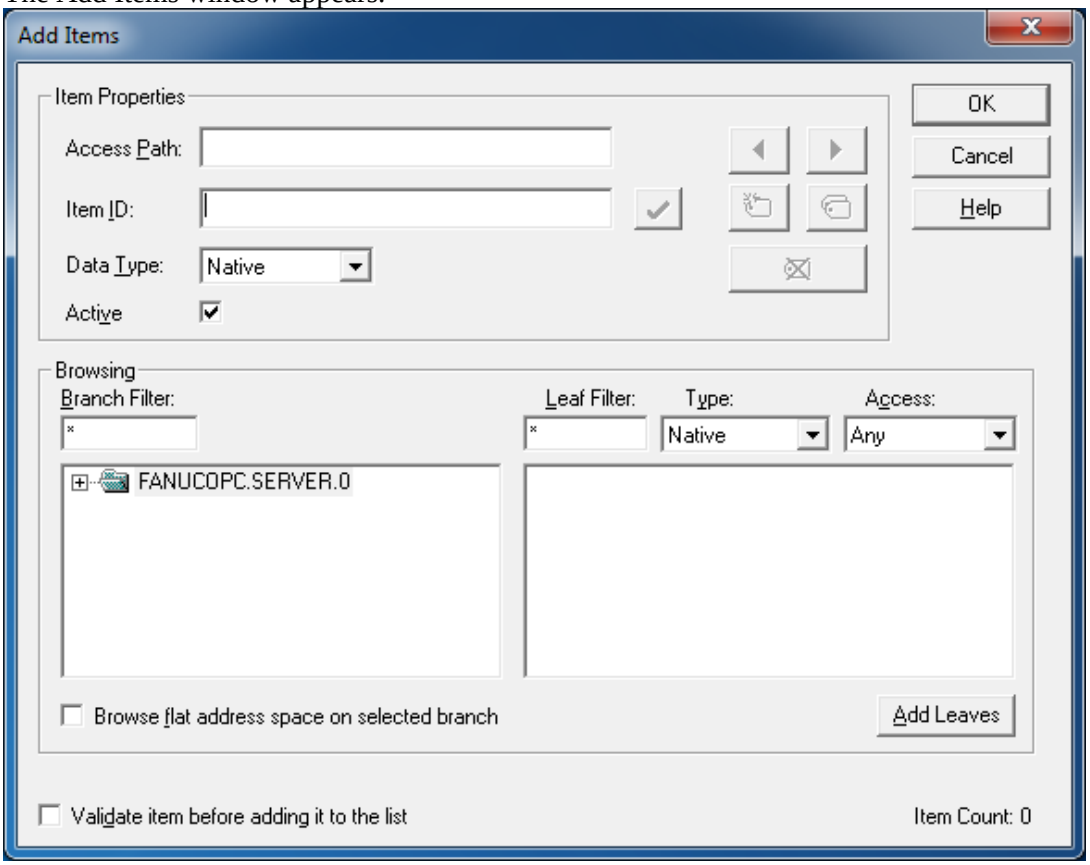
Enter "TEST_30iB" in the "Name" field. Click the [OK] button.

7) Group Properties window is closed, and added group [TEST_30iB] is displayed under [FANUCOPC.SERVER.0].

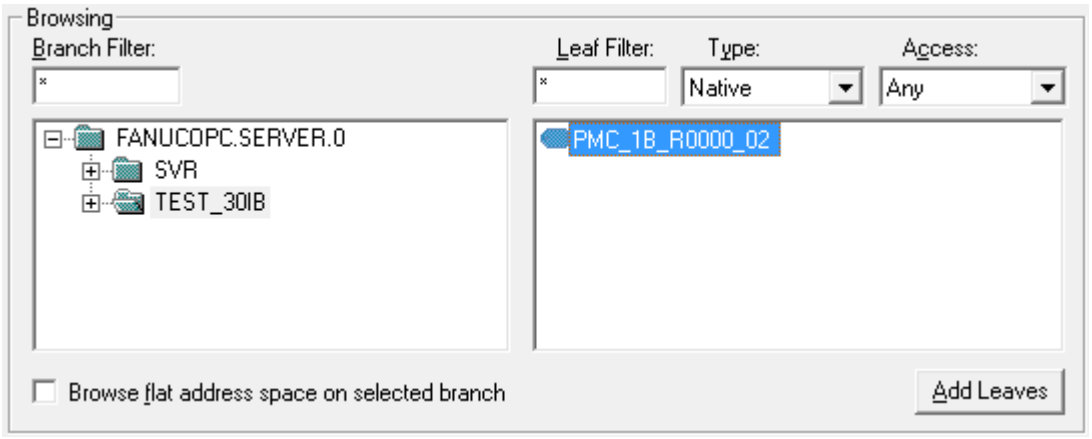


Right-click [TEST_30iB]. Click [New Item…] on the drop-down menu.

8) The Add Items window appears.

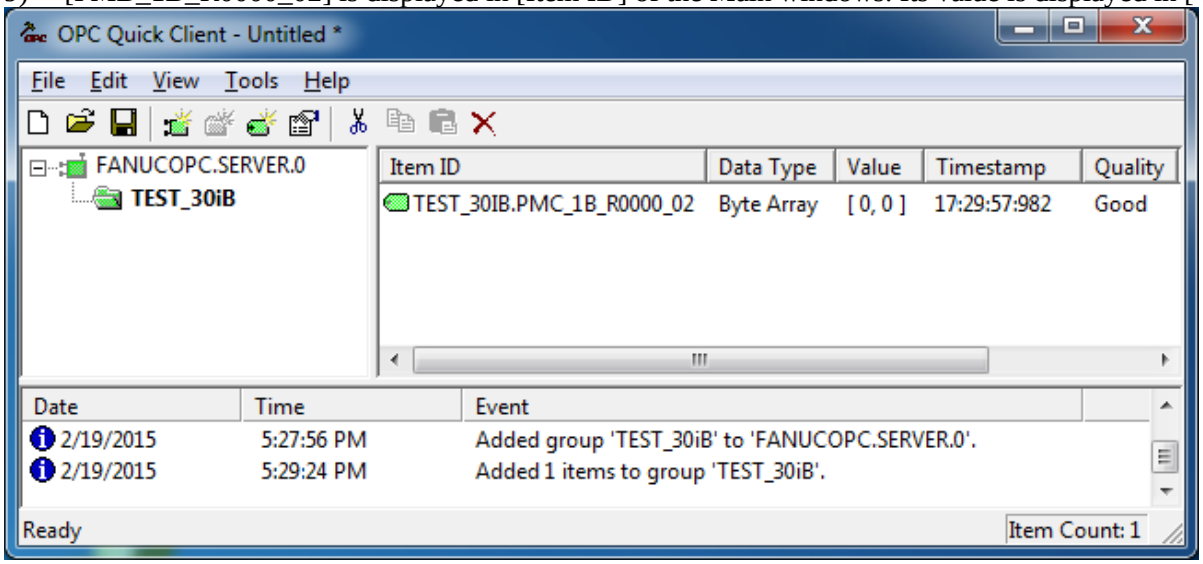


Double-click [FANUCOPC.SERVER.0]. Two items, [SVR] and [TEST_30IB] appear.
Click [TEST_30iB]. Created point [PMC_1B_R0000_02] is displayed in the right area. Click this item, and then click [Add Leaves] button.



Click the [OK] button. Add Items window closes.

9) [PMB_1B_R0000_02] is displayed in [Item ID] of the Main windows. Its value is displayed in [Value].



If the value of R0000 equals 1 and R0001 equals 2, "[1, 2]" is displayed in [Value].

10) Save the settings. Click the menu [File], [Save As…].
Save as dialog appears. Save the settings in any folder.

11) The saved settings can be read by Open dialog. To display the Open dialog, click the menu [File], [Open].
After reading the configuration from the file, it is connected to the specified OPC Server automatically.

2 Management of the configuration data

FANUC OPC Server reads the settings from the configuration file for operation, and it works according to the contents of it.
The folder and file name of the configuration file for operation are fixed.

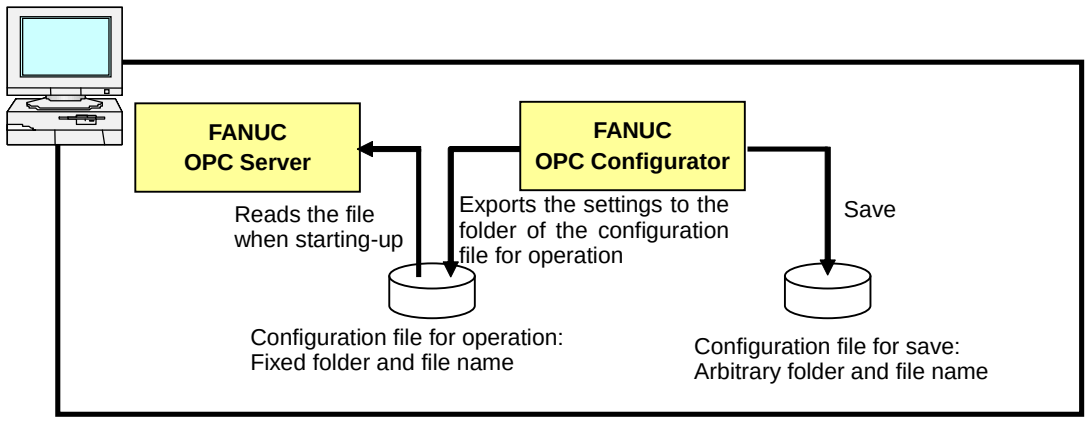
OS	Configuration file for operation
Windows XP	C:¥Documents and Settings¥All Users¥Application Data¥FANUC¥OPCServer¥FASOPC.fs2
Windows 7 or later	C:¥ProgramData¥FANUC¥OPCServer¥FASOPC.fs2

FANUC OPC Configurator can preserve the created setting data in an arbitrary folder by an arbitrary name. The default folder to preserve the setting data is the following places.

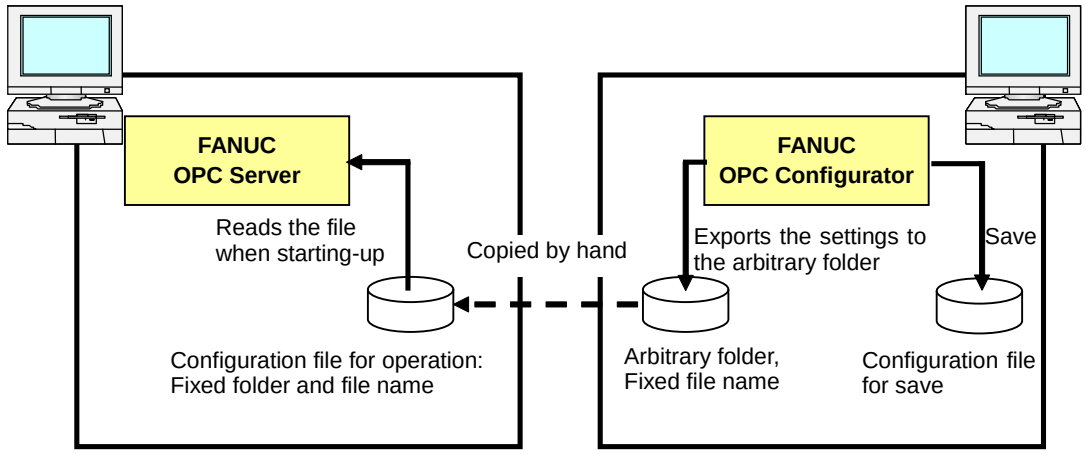
OS	Default folder to preserve the setting data
Windows XP	C:¥Documents and Settings¥All Users¥Application Data¥FANUC¥OPCUI
Windows 7 or later	C:¥ProgramData¥FANUC¥OPCUI

The configuration data currently opened by the FANUC OPC Configurator can be overwritten to the configuration file for operation by "Export" procedure. As a result, the setting of the OPC Server can be changed.
The name of the file created by the "Export" procedure is fixed as "FASOPC.fs2". The folder of it can be specified.

If OPC Server and OPC Configurator run on the same PC, please specify the folder of the configuration file for operation in "Export" procedure. Then, the configuration of the OPC Server can be changed.



If OPC Server and OPC Configurator run on the different PC, export the settings to the arbitrary folder, and then, copy the file by hand to the PC where OPC Server runs.



3 OPC Configurator

This chapter explains the details of OPC Configurator, the setting tool of OPC Server.

Notes on using the functions for the first time

⚠ WARNING

Before using the OPC Server, fully understand the instructions written in "GENERAL WARNINGS FOR CNC APPLICATION DEVELOPMENT" in "SAFETY PRECAUTIONS" at the beginning of this manual.
If you start operation before fully understanding them, the machine may behave unexpectedly, possibly causing damage to the tool, machine, and/or workpiece, or injury to the user.

⚠ CAUTION

Before performing communication using the OPC Server for the first time, consult with your network administrator, carefully set a network address and other items, and conduct communication tests thoroughly. Any error in settings such as a network address setting can lead to an adverse influence such as a communication failure on the entire network. Be very careful about any communication failure. The load on the network may become greater than expected depending on the performance of the personal computer. Before using the functions, completely confirm that there is no problem with the entire system including communication with the personal computer.

⚠ CAUTION

1 In the PMC area, the R area, and E area in volatile memory are all set to 0 immediately after power-on.
2 The E area in the PMC area is normally allocated to volatile memory. However, it can also be used as nonvolatile memory by setting the option.
When the area is used as nonvolatile memory, the contents of the area are retained even after the power is turned off. So, special attention should be paid not to cause an unpredictable operation when the power is turned on next time.

3.1 Starting and quitting

Starting

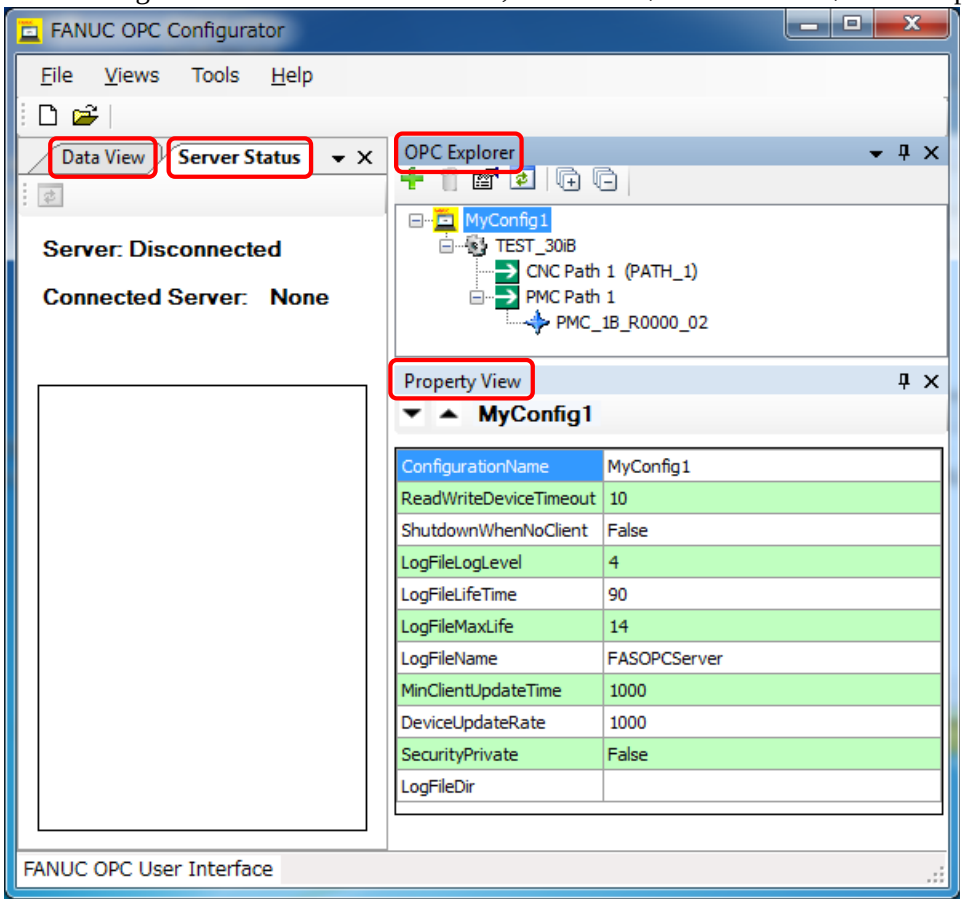
Click the [FANUC OPC Configurator] icon on the desktop.
Or click [START], [PROGRAMS], [FANUC OPC Server], [FANUC OPC Configurator] on the windows menu.

Quitting

Click the upper right [x] button, or click the menu [File], [Exit].

3.2 Screen structure

OPC Configurator consists of four screens, Data View、Server Status、OPC Explorer and Property View.



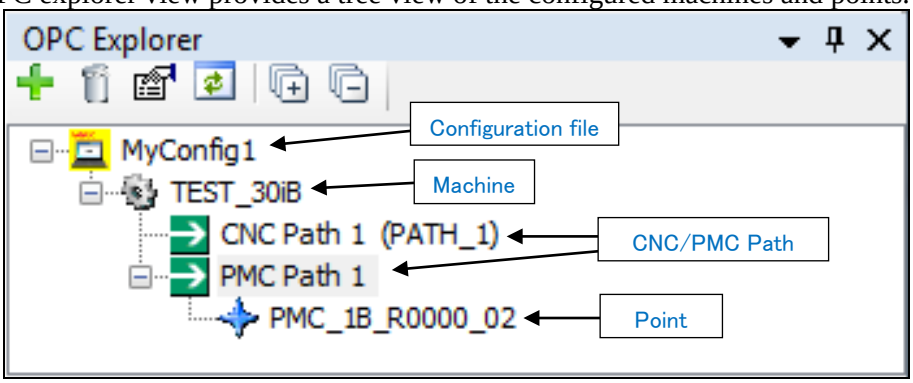
The views are dockable and can be arranged to the users liking by dragging them within the parent form.
The Data View, Server Status, and Property View may be also float outside of the parent form.
The procedure to restore the size and place to the default settings is as follows.

1) Click [TOOLS] on the top menu.
2) Click [DEFAULTS], [Reset All Views] on drop-down menu.

Followings are the explanation about the operation.

3.3 OPC Explorer

OPC explorer view provides a tree view of the configured machines and points.



Possible operation in OPC Explorer is as follows.

3.3.1 Add Element

The function of the Add Element button [ ] is dependent on what is currently selected in the OPC Explorer view.

- When the OPC Explorer view is blank, the system will assume you want to create a new configuration.
- If the configuration file is currently selected, the system assumes you want add a new machine.
- If a machine is selected, the system assumes you want to add a new point for that machine.

3.3.2 Delete Element

The element that will be deleted by the Delete Element button [ ] is dependent on what is currently selected in the window.
MACHINEs, CNC PATHs, and POINTs may be deleted.
Entire configurations may not be deleted.
When CNC/PMC PATH is deleted, all points under the selected CNC/PMC PATH are deleted.

3.3.3 Refresh

The Refresh View button [ ] initiates a manual refresh of the OPC Explorer view. If a new element has been added the view will automatically refresh.

3.3.4 Expand Tree

The Expand Tree button [ ] fully expands the tree view to expose all machines, paths, and point currently configured in the active server configuration.
Clicking the button to the left of any element will expand the tree to reveal all of the related sub-elements.

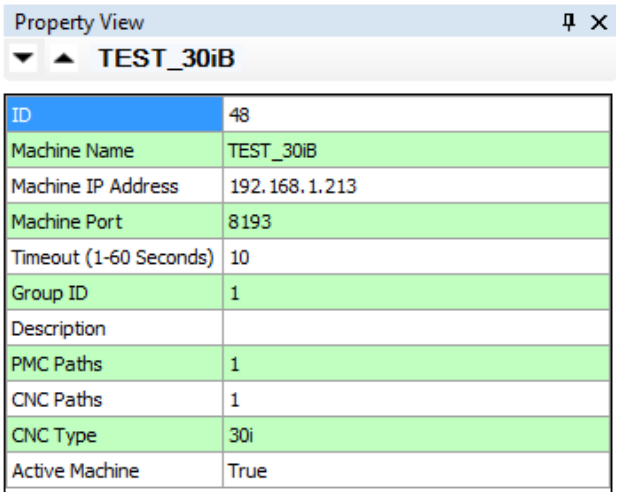
3.3.5 Collapse Tree

The Collapse Tree button [ ] fully collapses the tree view to expose only the root configuration.

Clicking the button to the left of any element will collapse only of the relative sub-elements.

3.4 Property View

This window shows detail about the element that is currently selected in the OPC Explorer view.



3.4.1 Next Button

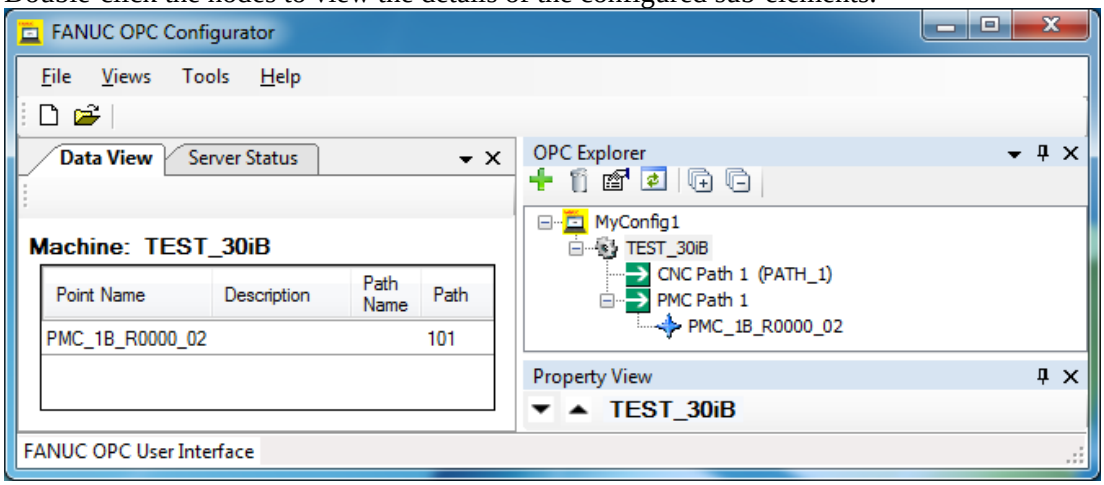
The Next button [▼] advances to the next item in the OPC Explorer view relative to the currently selected item. The details of the selected element are displayed in the Property View.

3.4.2 Previous Button

The Previous button [▲] advances to the previous item in the OPC Explorer view relative to the currently selected item. The details of the selected element are displayed in the Property View.

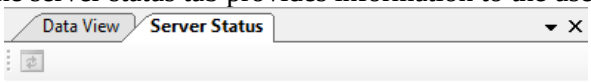
3.5 Data View

The Data View tab displays detail of the configured points under the machine, CNC Path, PMC path. Double-click the nodes to view the details of the configured sub-elements.



3.6 Server Status

The server status tab provides information to the user about the operation of the OPC server.



Server : Connected

Connected Server: localhost FANUCOPC.SERVER.0

SVR.STAT_SAMPLE_PERIOD	1000
SVR.STAT_NUM_CLIENTS	1
SVR.STAT_NUM_GROUPS	1
SVR.STAT_NUM_ITEMS	18
SVR.STAT_NUM_READS_PER_PD	0
SVR.STAT_NUM_WRITES_PER_PD	0
SVR.STAT_NUM_CHG_PER_PD	0
SVR.OUTPUTQUEUECOUNT	0
SVR.LASTREADTIME	0
SVR.LICENSE_EXPIRATION	12/31/9999
SVR.LICENSE_APPLIED_TO	0
SVR.LICENSE_USERS_ALLOWED	10
SVR.LICENSE_NUMBER_OF_MACHINES_ALLOWED	100
SVR.NUMBER_OF_ACTIVE_MACHINES	0
SVR.LICENSE_STATUS	Licensed
SVR.TOTAL_NUMBER_OF_MACHINES	0
SVR.SERVER_VERSION	2.0.0.0
SVR.NUMBER_OF_LOADED_MACHINES	0

To view the FANUC OPC server status information, the server must be connected.
Please connect to the OPC Server with the procedure described in "1.3 Confirming OPC Server Operation" of "Ⅲ. CONFIGURATION".

3.7 Configuration Settings

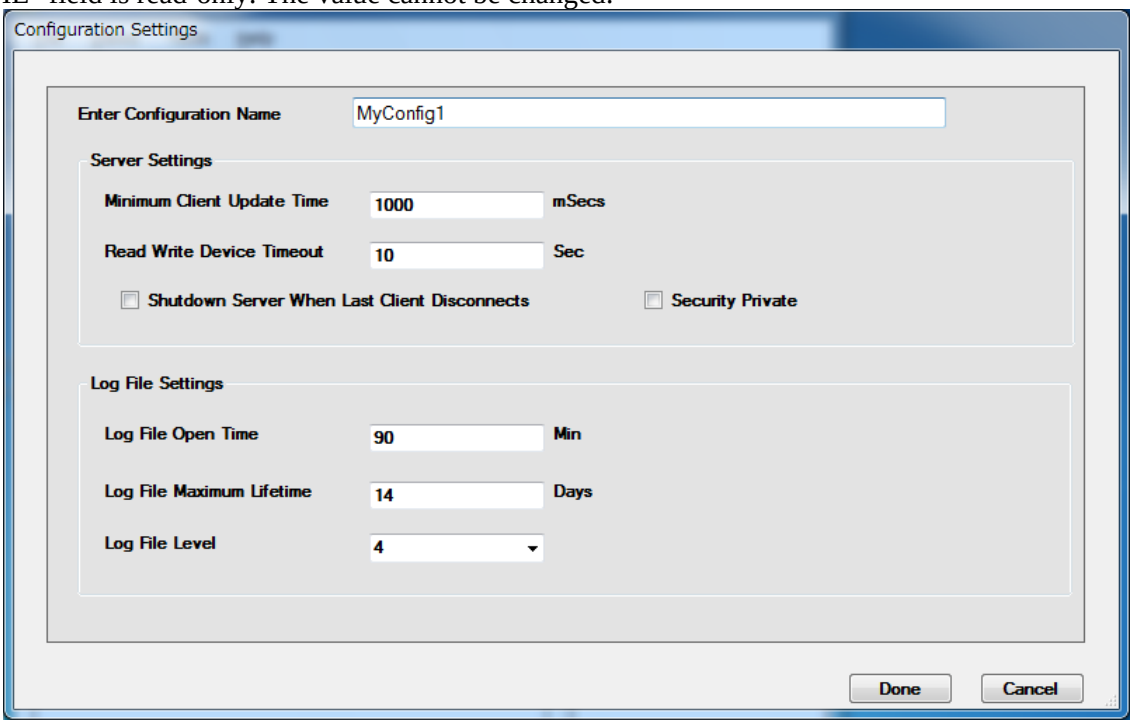
These settings will be used for the OPC Server to control the update rate and log file creation.

1) Click [FILE] on the top menu, and click [New Configuration] on the drop-down menu.
2) Enter <YOUR CONFIG NAME> in the "ENTER CONFIGURATION NAME" field.
3) The following characters cannot be used for the Configuration Name.
   ¥ / : * ? " < > |

The procedure to display this screen for the existing configuration file is as follows.

1) Right click Configuration file displayed at the root tree of the OPC Explorer, click [Edit: <Configuration Name>] on the drop-down menu.

When this screen is opened for the existing configuration file, the value of "ENTER CONFIGURATION NAME" field is read-only. The value cannot be changed.



3.7.1 Minimum Client Update Time

This sets the minimum update time of the value passed to the client.
The client software you choose to use will also have an update time setting. This setting is the master of the two, so if this setting is 1000mSec and the client is set to 100mSec, the client setting will be overridden to 1,000mSec.
This value is set in units of milliseconds and the default value is 1,000ms. Setting range is 10 to 60,000. When the value from 10 to 99 is entered, it is regarded as 100, and when the value larger than 60,000 is entered, it is regarded as 60,000.

3.7.2 Read Write Device Timeout

This sets the maximum allowable time from when the server sends the request to the CNC until the response returns back from the CNC. If the round-trip time is greater than this setting, a CNC connection time-out occurs. This value is set in units of seconds, default is 10 seconds. Setting range is 0~32,767.

3.7.3 OPC UA Mode

Select the mode of operation of the OPC server.
Check box is enabled : OPC server runs on OPC UA standard.
Check box is disabled : OPC server runs on OPC Classic of DA standard.

3.7.4 Shutdown Server When Last Client Disconnects

This checkbox flags the OPC server to shut down when it detects no clients are connected.
Regardless of this setting, the server will automatically start when any client requests a connection.
If the OPC UA mode is checked, this check box is automatically disabled.

3.7.5 Log File Open Time

This sets the maximum amount of time the current server log file will be used. At the end of this period a new log file will be created and the old file will remain in the LOGS directory folder.
This value is set in units of minute, default is 90 minutes. Setting range is 0~2,147,483,647.

3.7.6 Log File Maximum Lifetime

This sets how long the log file will remain in the server LOGS directory folder.
This value is set in units of days, default is 14 days.
Any log files that remain in the folder longer than the period that is specified with this setting will be automatically deleted from the folder.
Setting range is 0 to 32,767.
The LOGS directory folder is as follows.

- Windows 7 or later : C:¥ProgramData¥FANUC¥OPCServer¥Logs
- Windows XP : C:¥Documents and Settings¥All Users¥Application Data¥FANUC¥OPCServer¥Logs

3.7.7 Log File Level

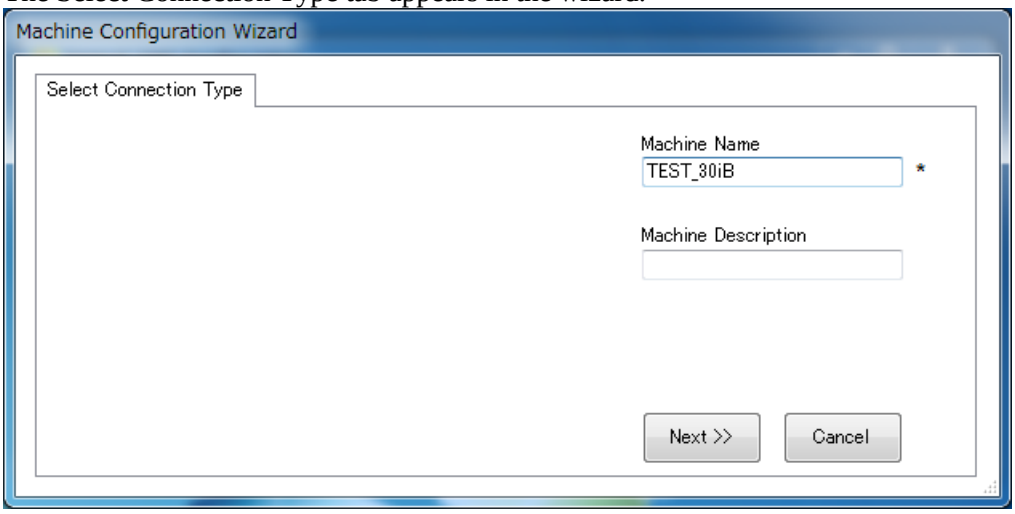
This setting determines how detailed the server log messages will be.
Log level 1 is the least amount of logging and is used for typical day to day operations.
Log level 5 is the most detailed logging level and is used when troubleshooting a connection or server problem.

3.8 Machine Configuration Wizard

This wizard steps through the process of adding a new machine to the configuration file.

1) There are three ways to invoke the machine configuration wizard…
   - Main menu : [Tools], [Wizard], [Machine Configuration]
   - OPC Explorer : RIGHT-CLICK configuration and select [Add Machine]
   - OPC Explorer : CLICK [✚] toolbar button with the configuration pre-selected

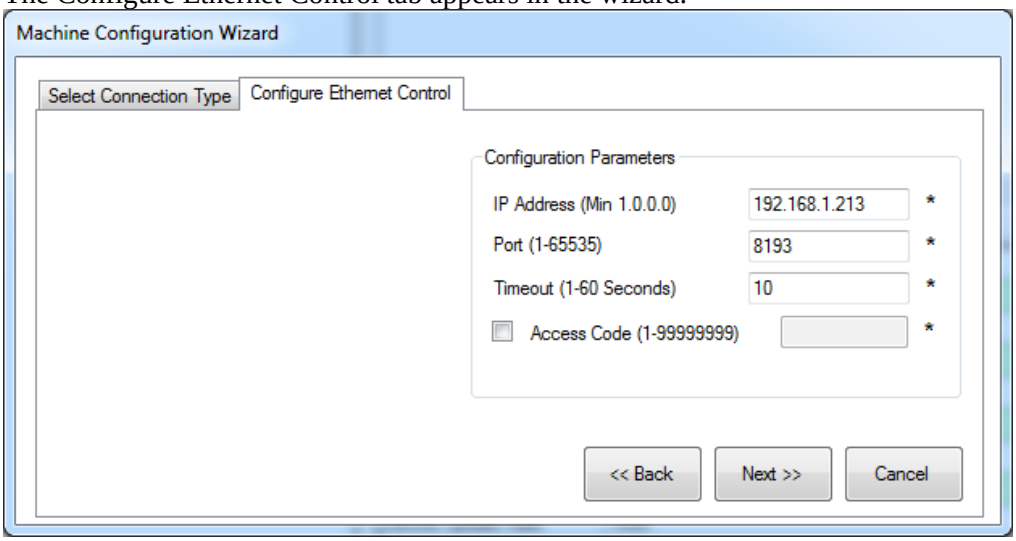
2) The Select Connection Type tab appears in the wizard.



3) Enter the "Machine Name", which can be any name the user wants. This will be the primary node name displayed in explorer view. The character that can be used is an alphanumeric character, under bar, and hyphen.

4) Enter the "Machine Description", this will appear in the property view window.
Click the [Next>>] button to advance to the next tab.

5) The Configure Ethernet Control tab appears in the wizard.



6) Enter the "IP Address", which is specified at [COMMON] screen of CNC.

7) Enter the "Port", which is specified in "PORT NUMBER (TCP)" at [FOCAS2] screen of CNC.

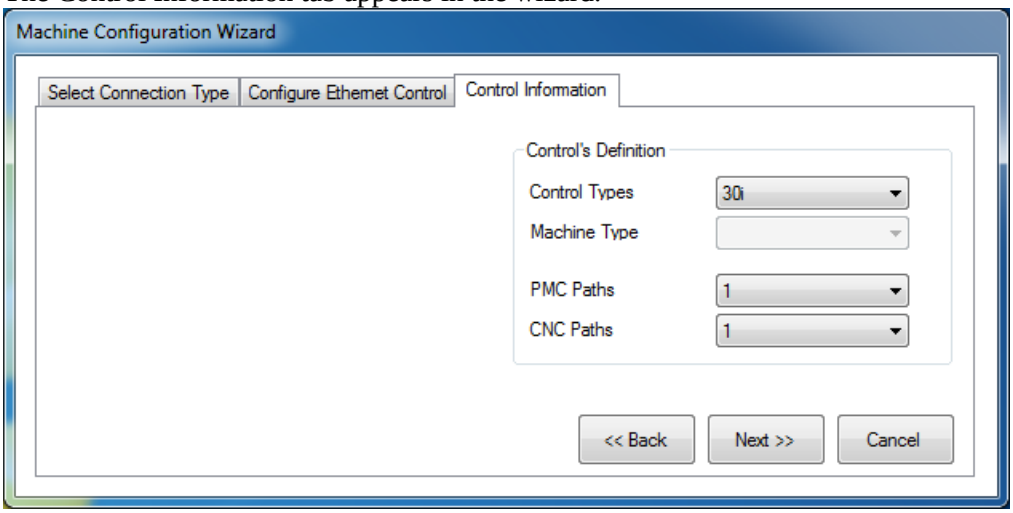
8) Enter the "Timeout", this is the allowable amount of inactivity, in seconds.

9) Enter the "Access code", which is same access code on CNC.
If access code is set on CNC (Parameter of CNC No.10344≠0), check this check box and enter the same value as the access code set on CNC.
If access code is not set on CNC (Parameter of CNC No.10344=0) or FOCAS2 security function is not supported on CNC, do not check this check box.

> For details about overview of FOCAS2 security function and supported version of CNC, refer to following technical report.
> TMN20/097 About a security function in FOCAS2 Library (A-42146-00166EN)

Click the [Next>>] button to advance to the next tab.

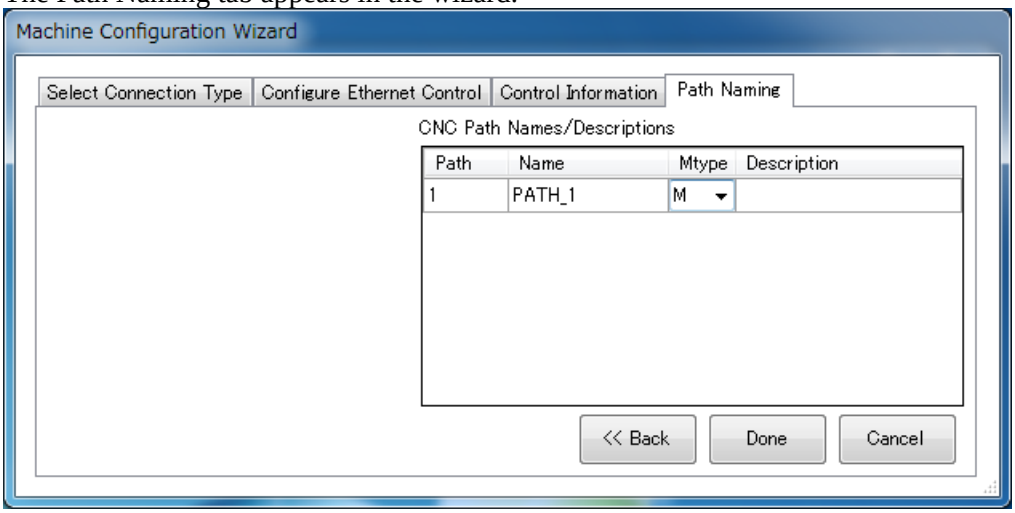
10) The Control Information tab appears in the wizard.



11) Select the "Control Types", series and model in the drop-down box.
12) Select the "Machine Type" for the CNC Control from [M] or [T]. When [30i], [31i], [32i] or [35i] is selected at "Control Types", "Machine Type" cannot be selected.
13) Select the "PMC Paths", the number of PMC Path.
14) Select the "CNC Paths", the number of CNC Path.

Click the [Next>>] button to advance to the next tab.

15) The Path Naming tab appears in the wizard.



16) Enter the name of CNC Path in the "Name" field. This value is displayed at the CNC Path in CNC Explorer, and the item "Description" in Property View.
17) Select the "Machine Type" for the CNC Path from [M] or [T]. When [0iD], [0iF], [PMiA] ,[PMiH] or [PMiD] is selected at "Control Types" in Control Information tab, "Machine Type" cannot be selected.
18) Click [Done] to complete the wizard.
    The added machine now appears in OPC Explorer view, and if selected by a mouse click the details that have just been entered appear in the Property View.
19) Right-Click "Machine Name" in explorer, and select "Edit <Machine Name>" on the pop-up menu. This will start the wizard again so you can make changes to the machine configuration if desired.

3.9 Point Configuration Wizard

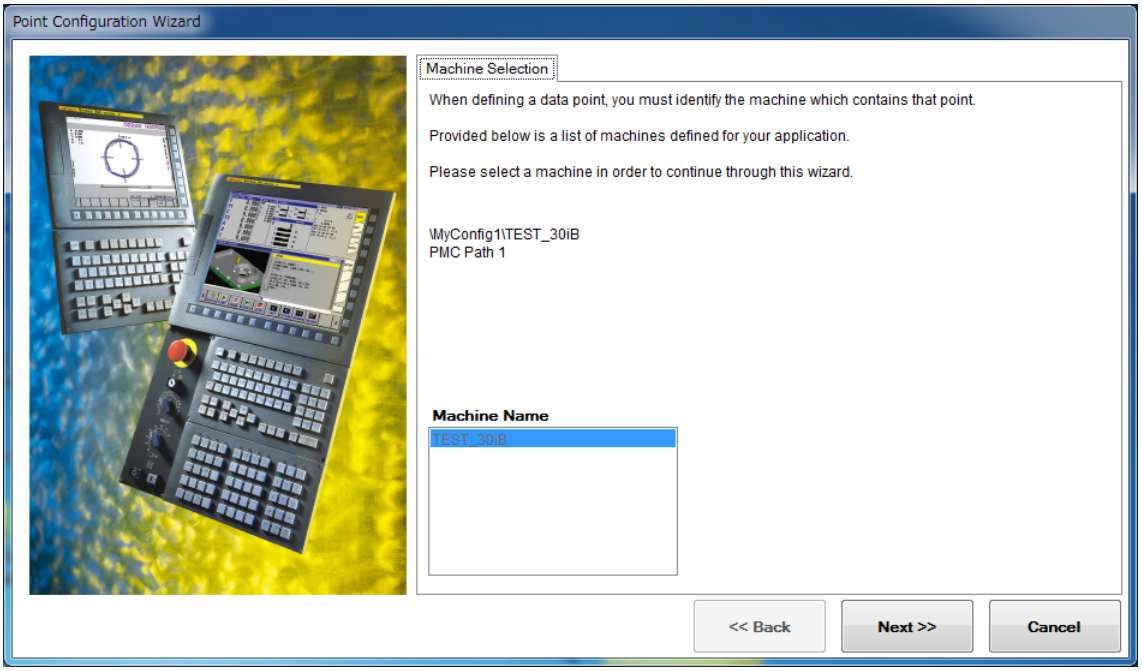
The point configuration wizard steps through the process of adding a CNC or PMC data point to the server configuration file.
Following points can be specified.

- CNC System Information
  (CNC Series, CNC Type, CNC controlled Axis Count/Path)
- Tool Offsets
- Work Offsets
- Program Data
  (Main Program Number, Main Program Comment, Active Program Number, Active Program Comment)
- Custom Macro Variable
  (Local Variable, Common Variable, Embedded Macro Variable, System Variable)
- Alarm Information
  (Alarm Messages, Alarm Number)
- Axis Name
- Position Information
  (Absolute Position, Distance to go Position, Machine Position, Relative Position)
- PMC Data
  (PMC Bit, PMC Byte, PMC 2Byte, PMC 4Byte)
- PMC Alarm
  (PMC Alarm Messages, PMC Alarm Number)
- Number of Machined Parts
- P-CODE
  (Control Variable, Variable, Extended Variable)
- Operator Messages
- CNC Status
  (Mode, Operation, Emergency)

There are three ways to invoke the point configuration wizard…

- Main menu : [Tools], [Wizard], [Point Configuration]
- OPC Explorer : Right-click Machine or Path, and select [Add Point]
- OPC Explorer : Click [ ] toolbar button with the machine pre-selected

The Point Configuration Wizard starts.
Click the [Next>>] button.
The Path Selection tab appears in the wizard.



For the procedure after this, please refer to the section corresponding to the point type you create.

- 3.9.1 CNC System Information Point
- 3.9.2 Tool Offsets Point
- 3.9.3 Work Offsets Point
- 3.9.4 Program Data Point
- 3.9.5 Custom Macro Variable Point
- 3.9.6 Alarm Information Point
- 3.9.7 Axis Name Point
- 3.9.8 Position Information Point
- 3.9.9 PMC Data Point
- 3.9.10 PMC Alarm Point
- 3.9.11 Number of Machined Parts
- 3.9.12 P-CODE Variable Point
- 3.9.13 Operator Messages Point
- 3.9.14 CNC Status Point

NOTE

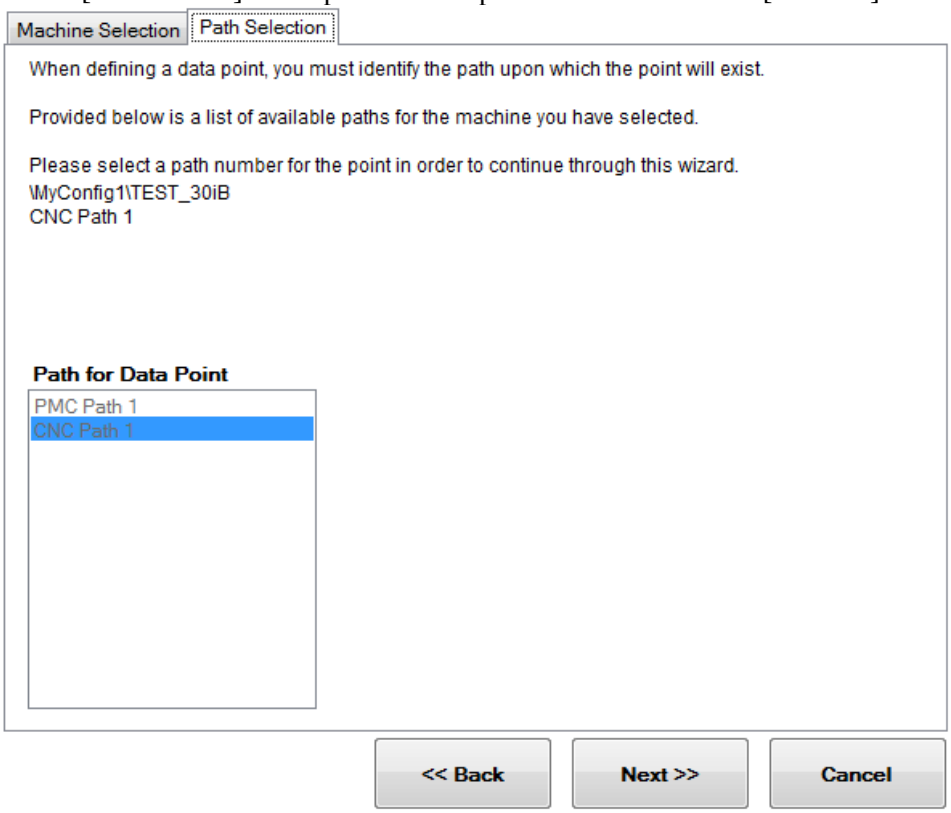
Even if points are defined as an array in the FANUC OPC server, it is not possible to read from and write to the specified range by using IndexRange from the OPC UA client.

3.9.1 CNC System Information Point

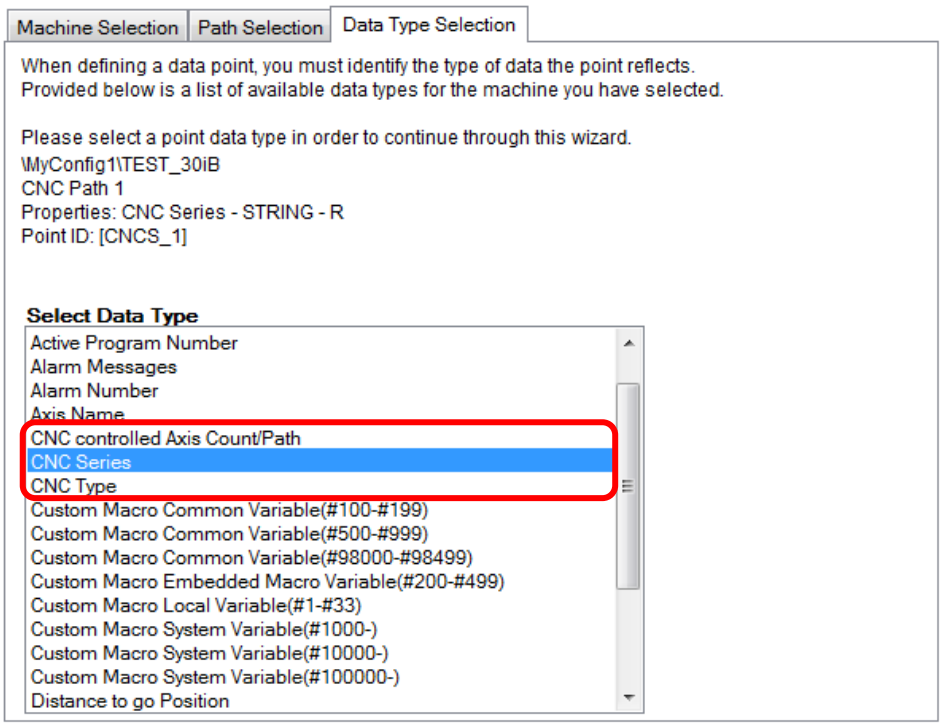
CNC model information can be read. This is a read-only point.

Data Type	Example
CNC Series	30, 16, PM
CNC Type	M, T, MM
CNC controlled Axis Count/Path	3, 7

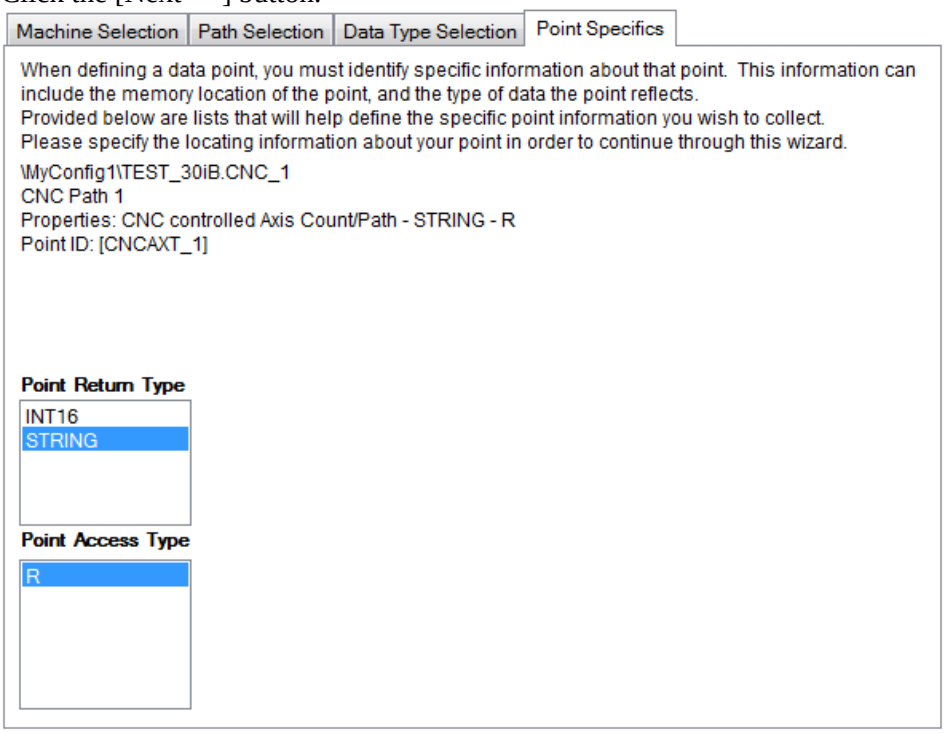
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.



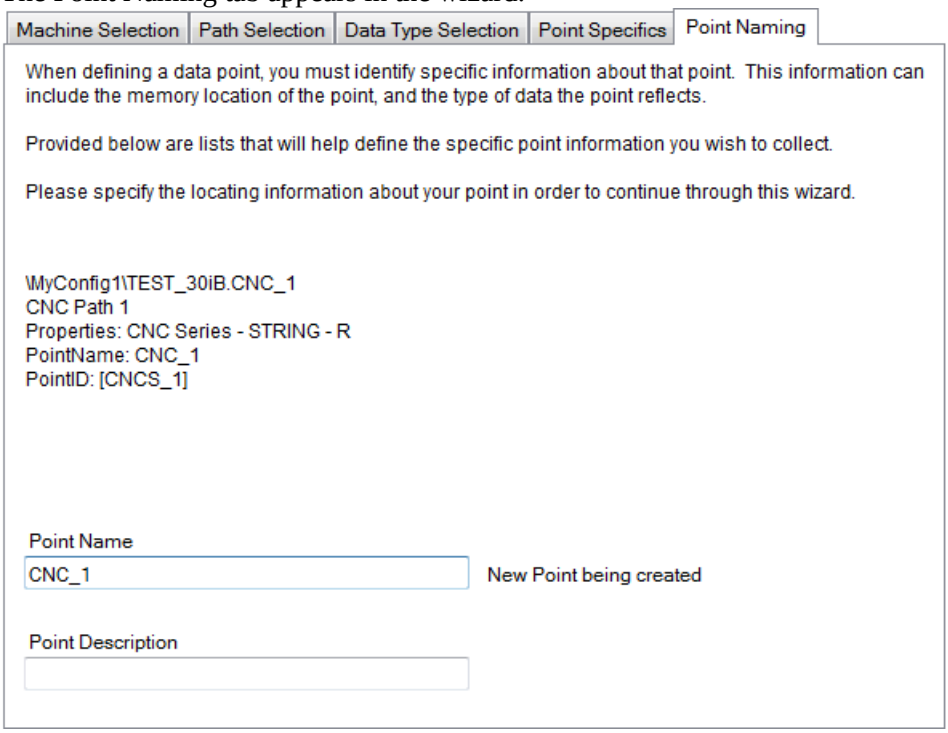
3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box. Click the [Next >>] button.



4) The Point Specifics tab appears in the wizard.
If you select the "CNC series" or "CNC type", Point Return Type is "STRING" only.
Click the [Next >>] button.



5) The Point Naming tab appears in the wizard.

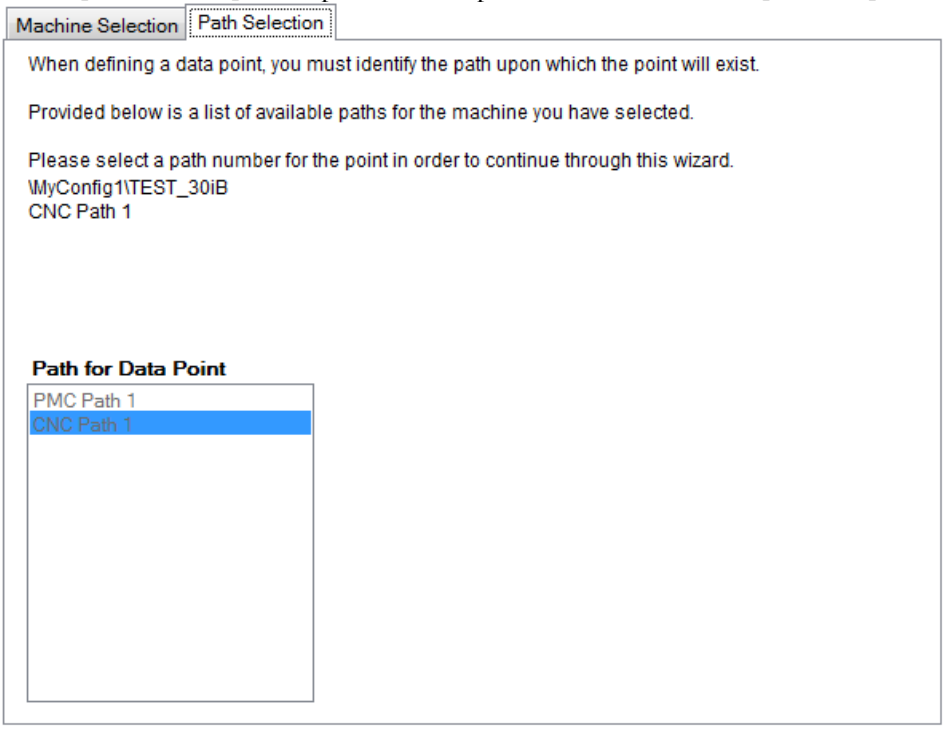


Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

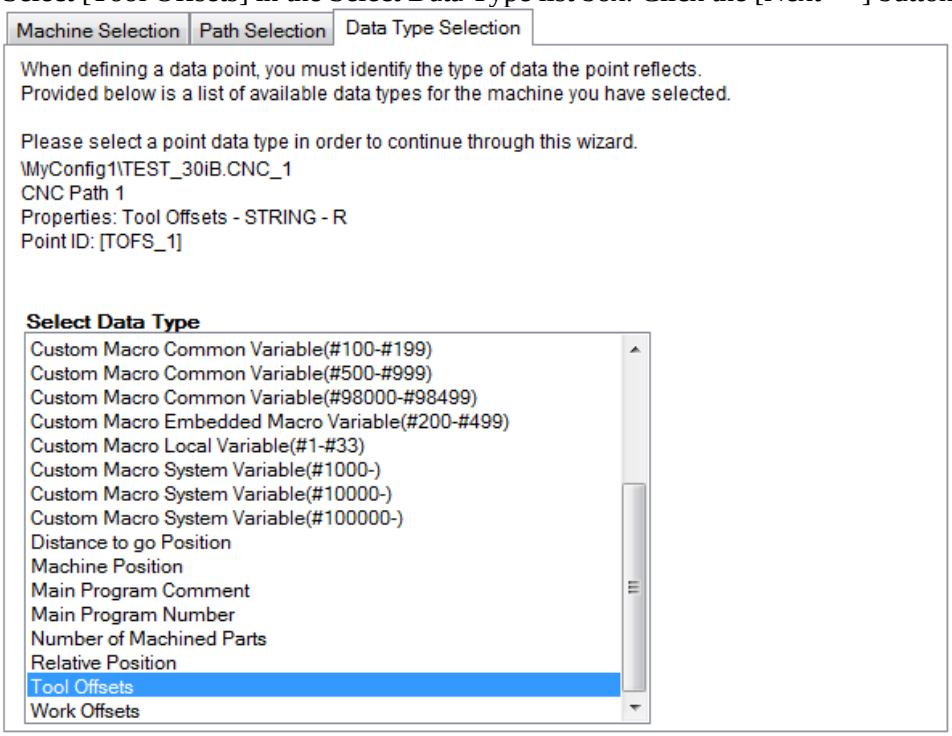
3.9.2 Tool Offsets Point

Tool Offsets status can be read or written.

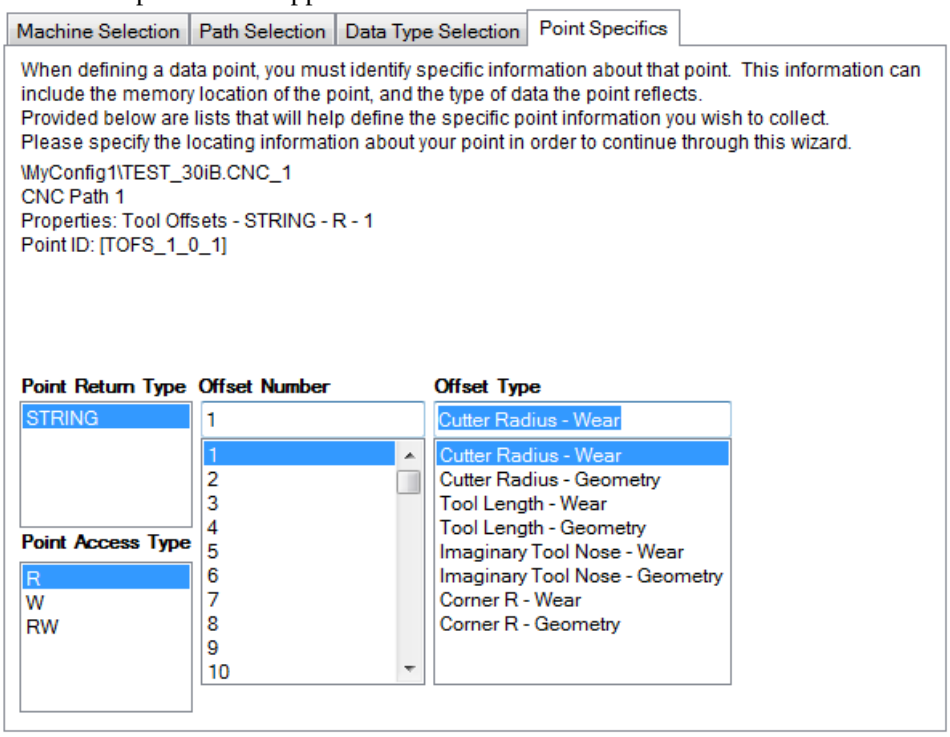
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select [Tool Offsets] in the Select Data Type list box. Click the [Next >>] button.



4) The Point Specifics tab appears in the wizard.



Select [R]:read-only, [W]:write only or [RW]:read/write at "Point Access Type".
Select the "Offset Number" and "Offset Type". Please refer to the following offset type list for details.
Click the [Next >>] button.

Offset Type list

The items displayed in Offset Type depend on the Control Types and Machine Type specified in the machine configuration wizard. There is an item that cannot be used even if it is displayed in the offset type list according to the option setting of CNC. When invalid offset type is specified, the client cannot read/write the value of such item.

In case of M system of 30i/31i/32i-A/B, 35i-B, 0i-F

Offset Type	Memory A	Memory B (*1)	Memory C
Cutter Radius - Wear	DATA	WEAR	WEAR(RADIUS)
Cutter Radius - Geometry	Not used	GEOM	GEOM(RADIUS)
Tool Length - Wear	Not used	Not used	WEAR(LENGTH)
Tool Length - Geometry	Not used	Not used	GEOM(LENGTH)
Imaginary Tool Nose - Wear	T(*2)	T(*2)	T(*2)
Imaginary Tool Nose - Geometry	T(*2)	T(*2)	T(*2)
Corner R - Wear	Not used	Not used	WEAR(CNR R)(*2)
Corner R - Geometry	Not used	Not used	GEOM(CNR R)(*2)

*1 0i-F does not support Memory B.
*2 Tool radius - Tool nose radius compensation is required.

In case of Mc system of 30i/31i/32i-A/B (With Tool offset for Milling and Turning function option)

Offset Type	Memory C(*1)
X Axis - Wear	X W
X Axis - Geometry	X G
Tool Length - Wear	Z/LENGTH W
Tool Length - Geometry	Z/LENGTH G
Cutter Radius -Wear	NOSE R/RAD W
Cutter Radius - Geometry	NOSE R/RAD G
Imaginary Tool Nose - Wear	T
Imaginary Tool Nose - Geometry	T
Y Axis - Wear	Y W
Y Axis - Geometry	Y G
Corner R - Wear	CORNER R W
Corner R - Geometry	CORNER R G

*1 Tool offset memory C is required.

In case of Tc system of 30i/31i/32i-A/B (With Tool offset for Milling and Turning function option)

Offset Type	Memory C(*1)
X Axis - Wear	X W
X Axis - Geometry	X G
Z Axis - Wear	Z/LENGTH W
Z Axis - Geometry	Z/LENGTH G
Nose R - Wear	NOSE R/RAD W
Nose R - Geometry	NOSE R/RAD G
Imaginary Tool Nose - Wear	T
Imaginary Tool Nose - Geometry	T
Y Axis - Wear	Y W
Y Axis - Geometry	Y G
X Axis - 2nd Geometry Offset-Geometry	X AXIS G 2ND GEOM
Z Axis - 2nd Geometry Offset-Geometry	Z AXIS G 2ND GEOM
Y Axis - 2nd Geometry Offset-Geometry	Y AXIS G 2ND GEOM

*1 Tool offset memory C is required.

In case of M system of 0i-B/C, 0i-D, 16i/18i/21i-A/B, PMi-D/H, PMi-A

Offset Type	Memory A	Memory B (*1)	Memory C
Cutter Radius - Wear	DATA	WEAR	WEAR(RADIUS)
Cutter Radius - Geometry	Not used	GEOM	GEOM(RADIUS)
Tool Length - Wear	Not used	Not used	WEAR(LENGTH)
Tool Length - Geometry	Not used	Not used	GEOM(LENGTH)

*1 0i-B/C and 0i-D do not support memory B.

In case of T system of 30i/31i/32i-A/B,0i-F

Offset Type	None Tool geometry/wear compensation	Add Tool geometry/wear compensation
X Axis - Wear	X	X W
X Axis - Geometry	Not used	X G
Z Axis - Wear	Z	Z W
Z Axis - Geometry	Not used	Z G
Nose R - Wear	R (*1)	R W(*1)
Nose R - Geometry	Not used	R G(*1)
Imaginary Tool Nose - Wear	T (*1)	T W(*1)
Imaginary Tool Nose - Geometry	Not used	T G(*1)
Y Axis - Wear	Y AXIS (*2)	Y AXIS W(*2)
Y Axis - Geometry	Not used	Y AXIS G(*2)
X Axis - 2nd Coord Wear	X OFFSET-2(*3)	X W WEAR-2(*3)
X Axis - 2nd Coord Geometry	Not used	X G GEOMETRY-2(*3)
Z Axis - 2nd Coord Wear	Z OFFSET-2(*3)	Z W WEAR -2(*3)
Z Axis - 2nd Coord Geometry	Not used	Z G GEOMETRY -2(*3)
Nose R - 2nd Coord Wear	R OFFSET-2(*3)	R W WEAR -2(*3)
Nose R - 2nd Coord Geometry	Not used	R G GEOMETRY -2(*3)
Imaginary Tool Nose - 2nd Coord Wear	T OFFSET-2(*3)	T W WEAR -2(*3)
Imaginary Tool Nose - 2nd Coord Geometry	Not used	T G GEOMETRY -2(*3)
Y Axis - 2nd Coord Wear	Y AXIS OFFSET-2(*2, *3)	Y AXIS W OFFSET-2 (*2, *3)
Y Axis - 2nd Coord Geometry	Not used	Y AXIS G OFFSET-2(*2, *3)
4th Axis - Wear	E AXIS (*4)	E AXIS W(*4)
4th Axis - Geometry	Not used	E AXIS G(*4)
5th Axis - Wear	5 AXIS (*4)	5 AXIS W(*4)
5th Axis - Geometry	Not used	5 AXIS G(*4)
X Axis - 2nd Geometry Offset - Geometry	Not used	X AXIS G 2ND GEON(*5)
Z Axis - 2nd Geometry Offset - Geometry	Not used	Z AXIS G 2ND GEON(*5)
Y Axis - 2nd Geometry Offset - Geometry	Not used	Y AXIS G 2ND GEON (*2, *5)
X Axis - 2nd Geometry Offset - 2nd Coord Geometry	Not used	X AXIS G 2ND GEON-2 (*3, *5)
Z Axis - 2nd Geometry Offset - 2nd Coord Geometry	Not used	Z AXIS G 2ND GEON -2 (*3, *5)
Y Axis - 2nd Geometry Offset - 2nd Coord Geometry	Not used	Y AXIS G 2ND GEON -2 (*2, *3, *5)

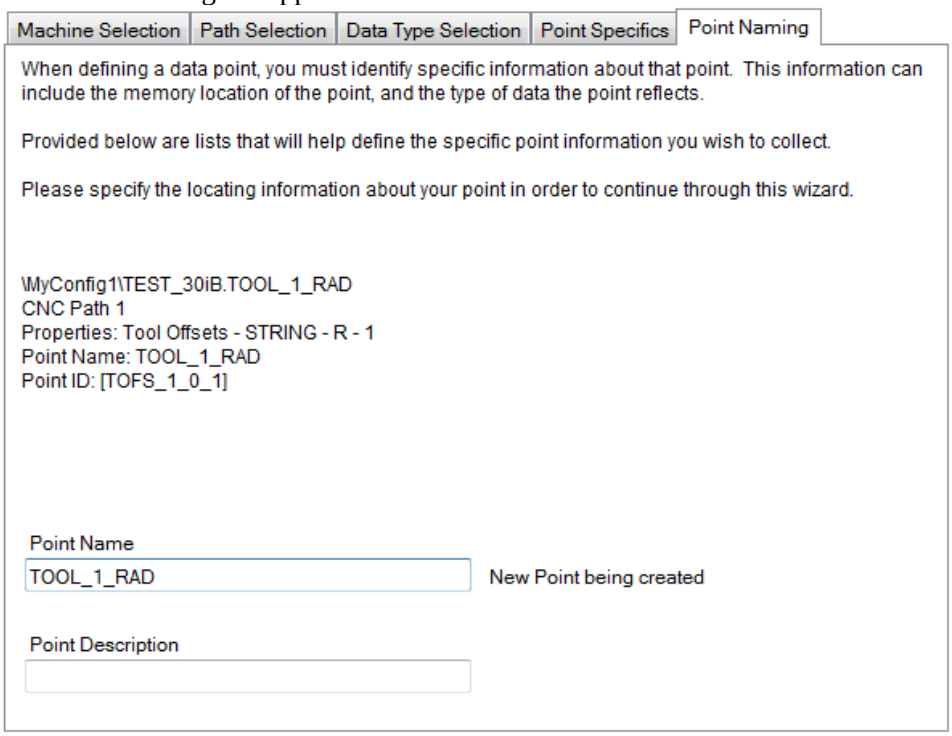
*1 Tool radius - Tool nose radius compensation is required.
*2 Y-axis offset is required.
*3 The offset memory switching function is required.
*4 4th/5th Axis Offset is required.
*5 2nd Geometry Tool Offset is required.

In case of T system of 0i-B/C,0i-D,16i/18i/21i-A/B

Offset Type	None Tool geometry/wear compensation	Add Tool geometry/wear compensation
X Axis - Wear	X	X W
X Axis - Geometry	Not used	X G
Z Axis - Wear	Z	Z W
Z Axis - Geometry	Not used	Z G
Nose R - Wear	R (*1)	R W(*1)
Nose R - Geometry	Not used	R G(*1)
Imaginary Tool Nose - Wear	T (*1)	T W(*1)
Imaginary Tool Nose - Geometry	Not used	T G(*1)
Y Axis - Wear	Y AXIS (*2)	Y AXIS W(*2)
Y Axis - Geometry	Not used	Y AXIS G(*2)

*1 Tool nose radius compensation is required.
*2 Y-axis offset is required.

5) The Point Naming tab appears in the wizard.

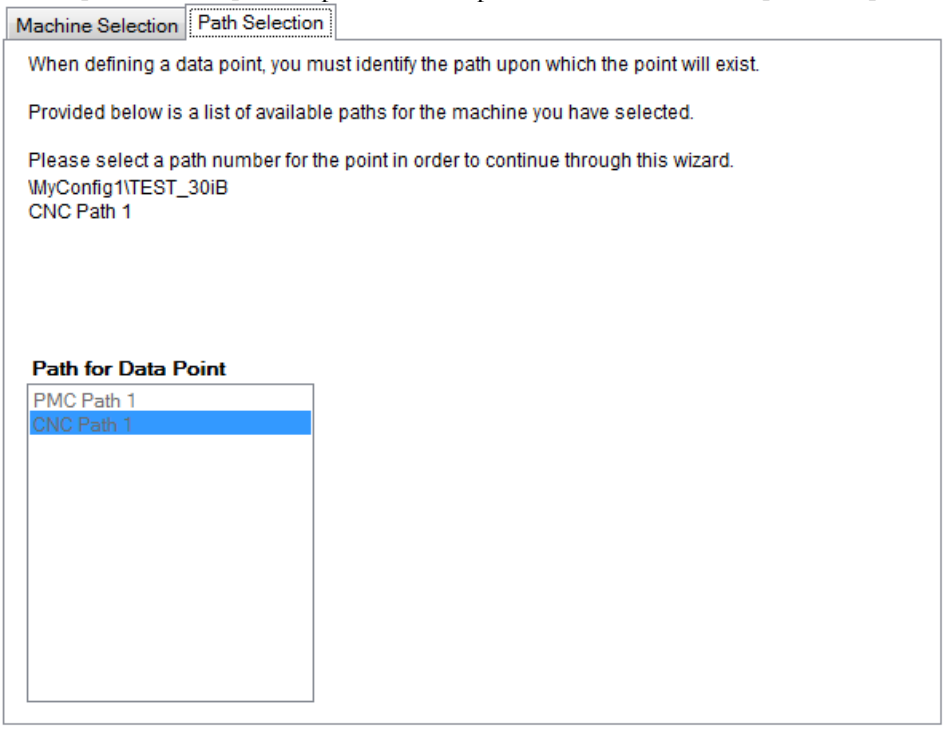


Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

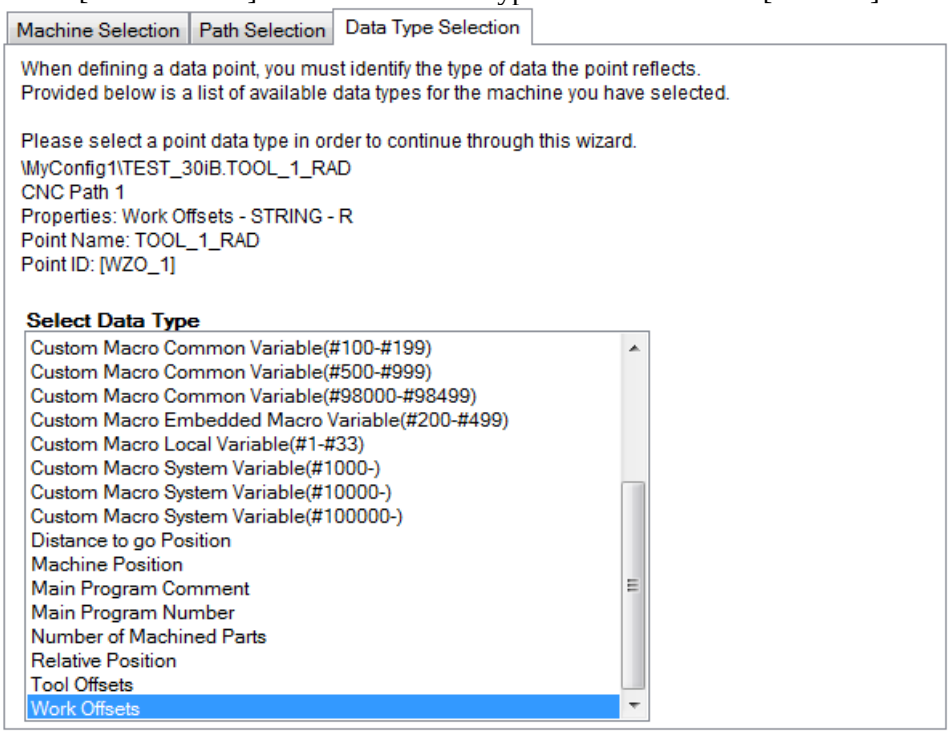
3.9.3 Work Offsets Point

Work Offsets status can be read or written.

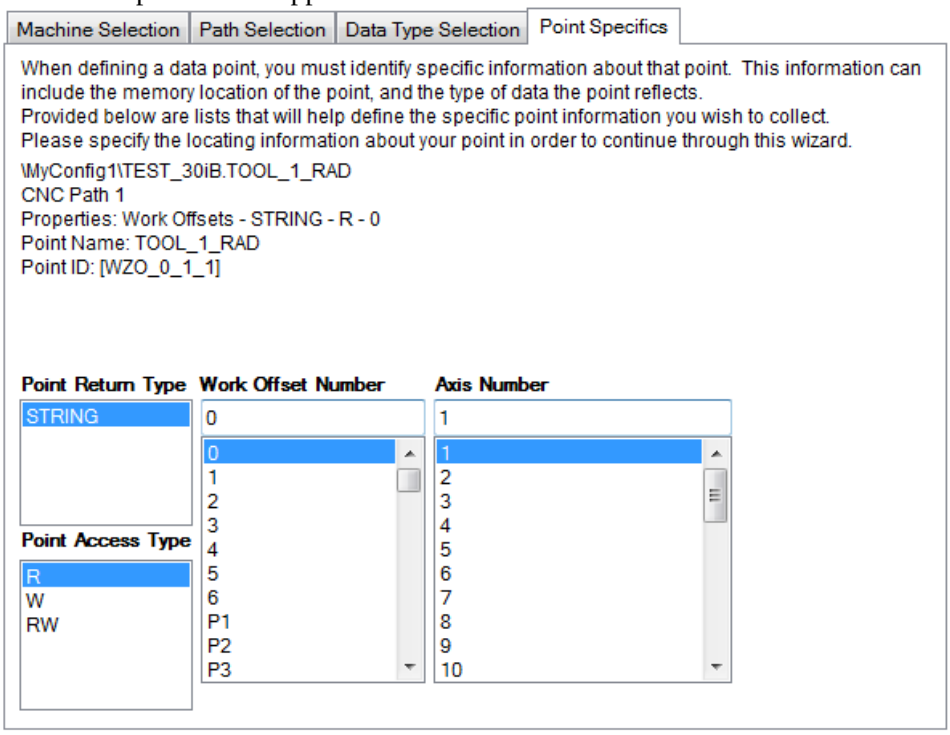
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select [Work Offsets] in the Select Data Type list box. Click the [Next >>] button.



4) The Point Specifics tab appears in the wizard.

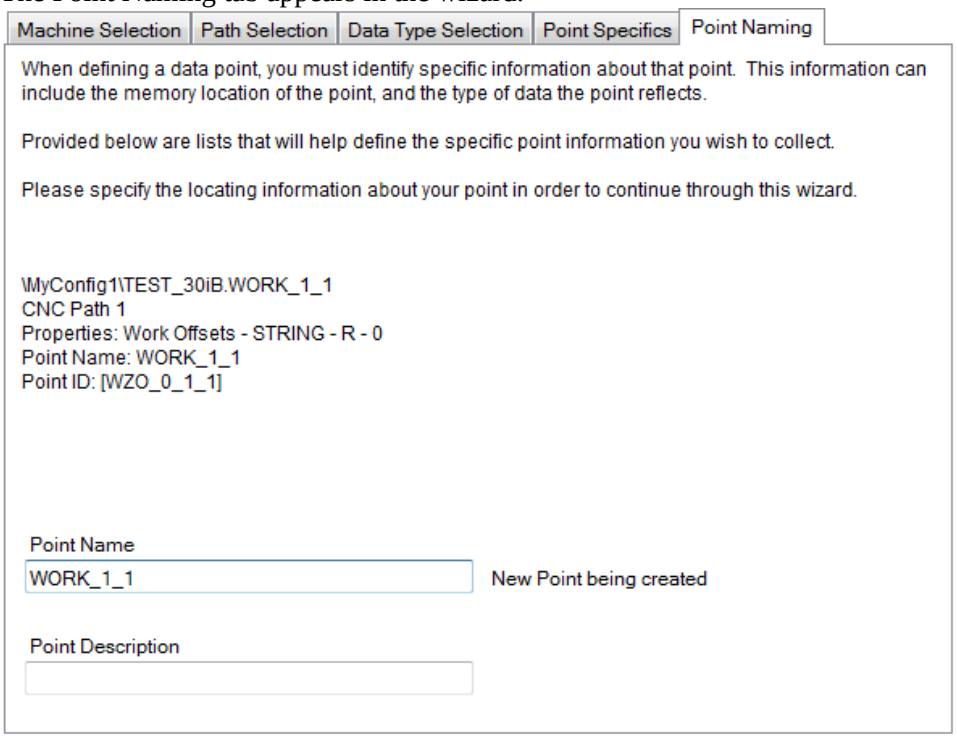


Select [R]:read-only, [W]:write only or [RW]:read/write at "Point Access Type".
Select the "Work Offset Number" and "Axis Number".

0 : external workpiece origin offset value
1-6 : G54～G59
P1-P300 : G54.1 P1～G54.1 P300

Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



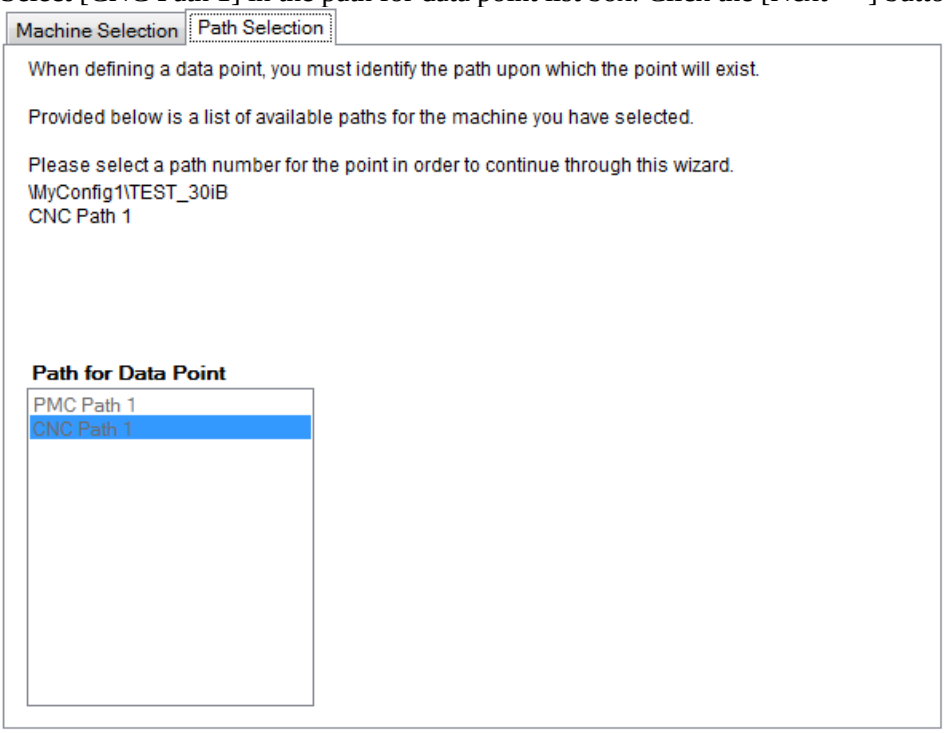
Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

3.9.4 Program Data Point

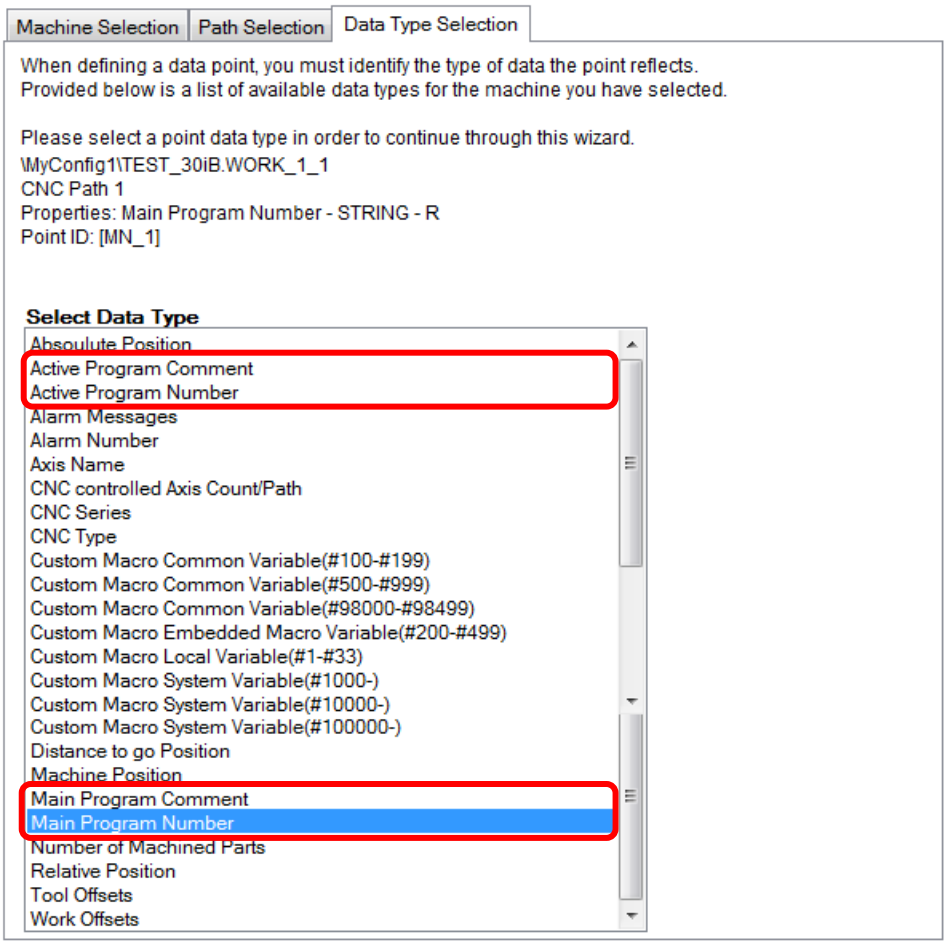
CNC Program Data can be read. This is a read-only point.

Data Type	Example
Main Program Number	//CNC_MEM/USER/PATH1/O1000
Main Program Comment	MAIN_PRG
Active Program Number	O0001
Active Program Comment	ACT_PRG

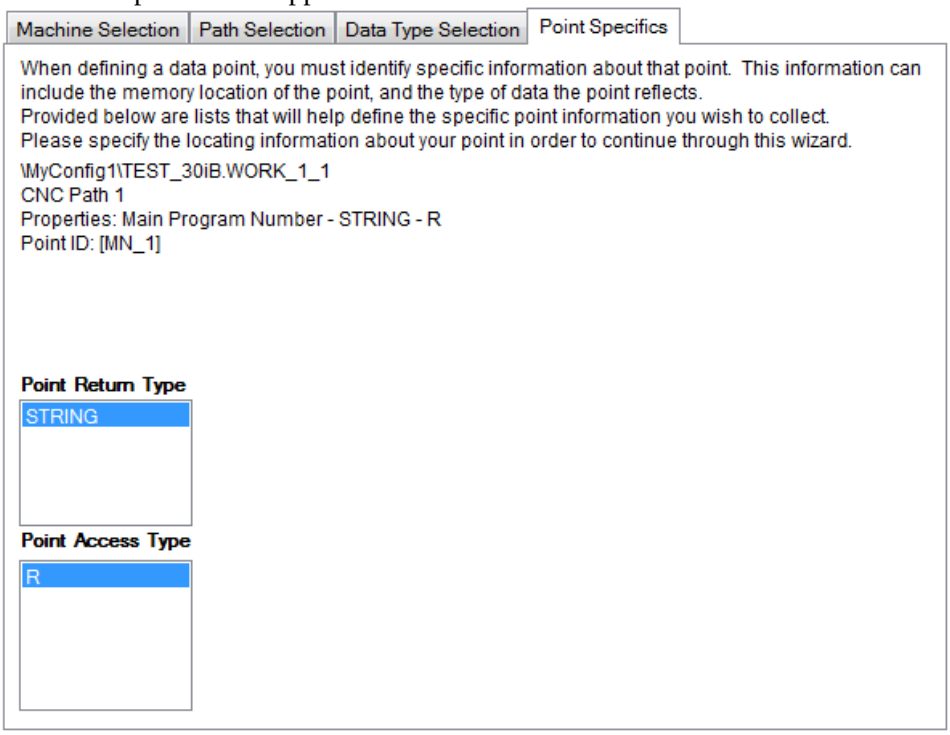
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box. Click the [Next >>] button.

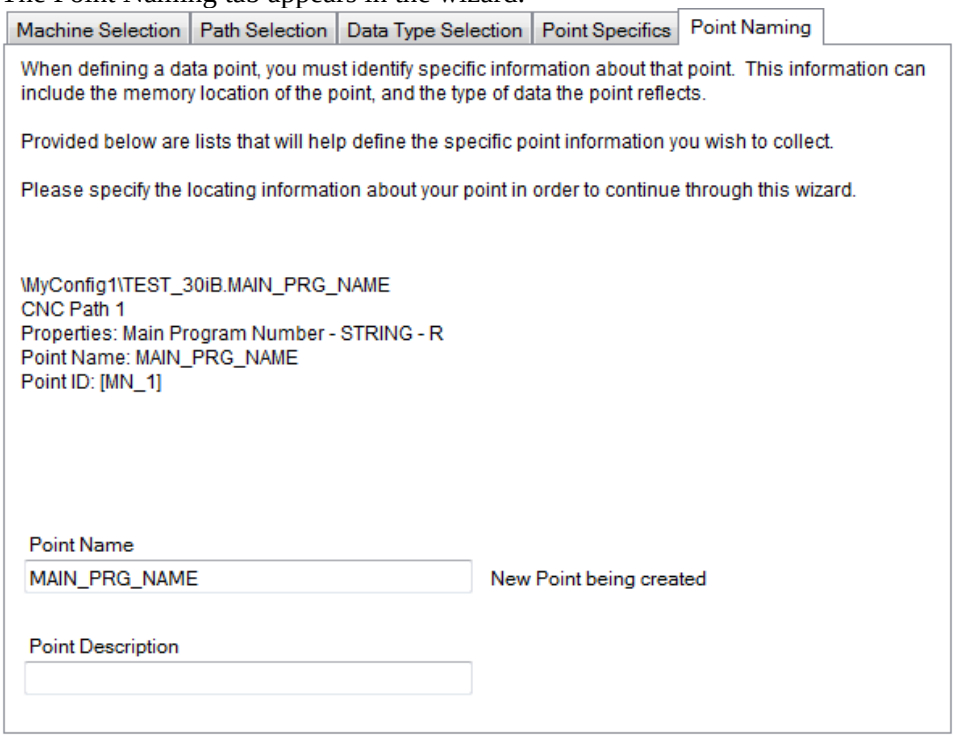


4) The Point Specifics tab appears in the wizard.



Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



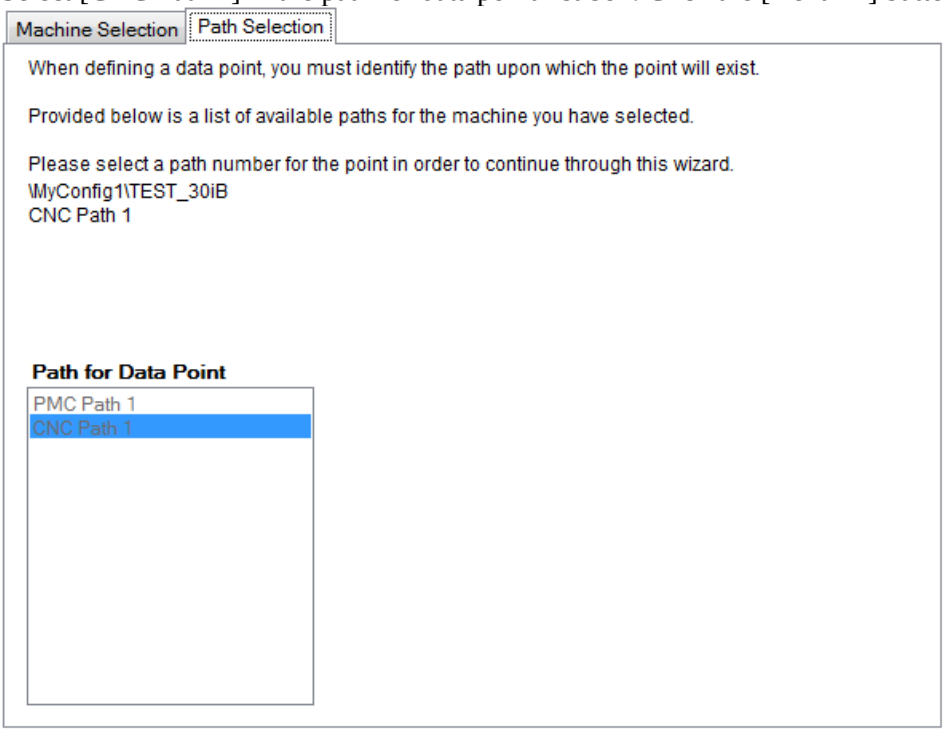
Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

3.9.5 Custom Macro Variable Point

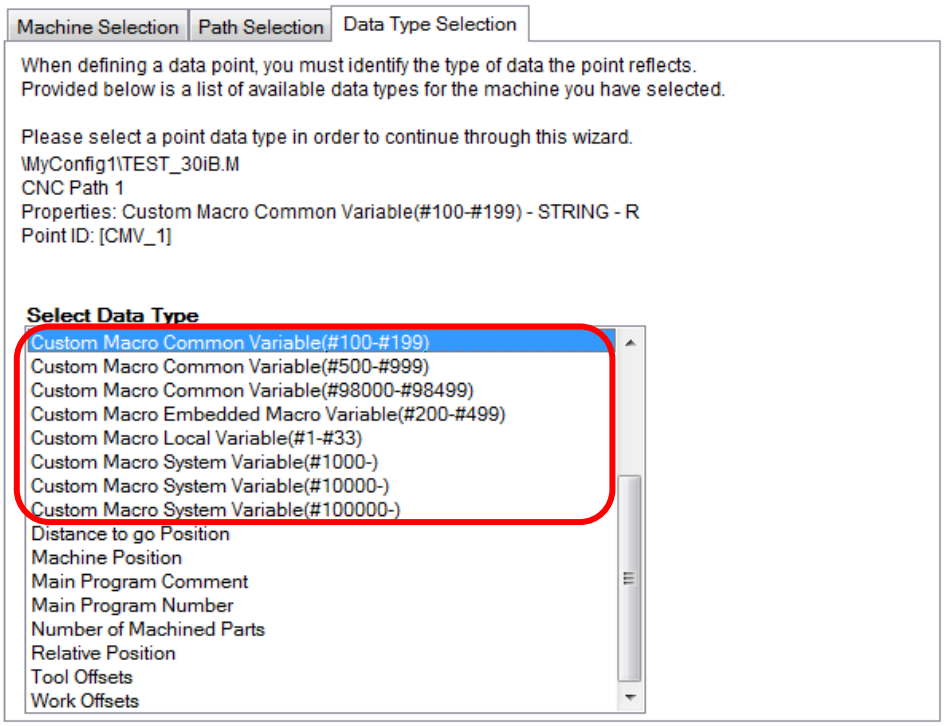
Custom Macro Variable status can be read or written.

Data Type
Custom Macro Local Variable (#1-#33)
Custom Macro Embedded Macro Variable (#200-#499)
Custom Macro Common Variable (#100-#199)
Custom Macro Common Variable (#500-#999)
Custom Macro Common Variable (#98000-#98499)
Custom Macro System Variable (#1000-)
Custom Macro System Variable (#10000-)
Custom Macro System Variable (#10000-)

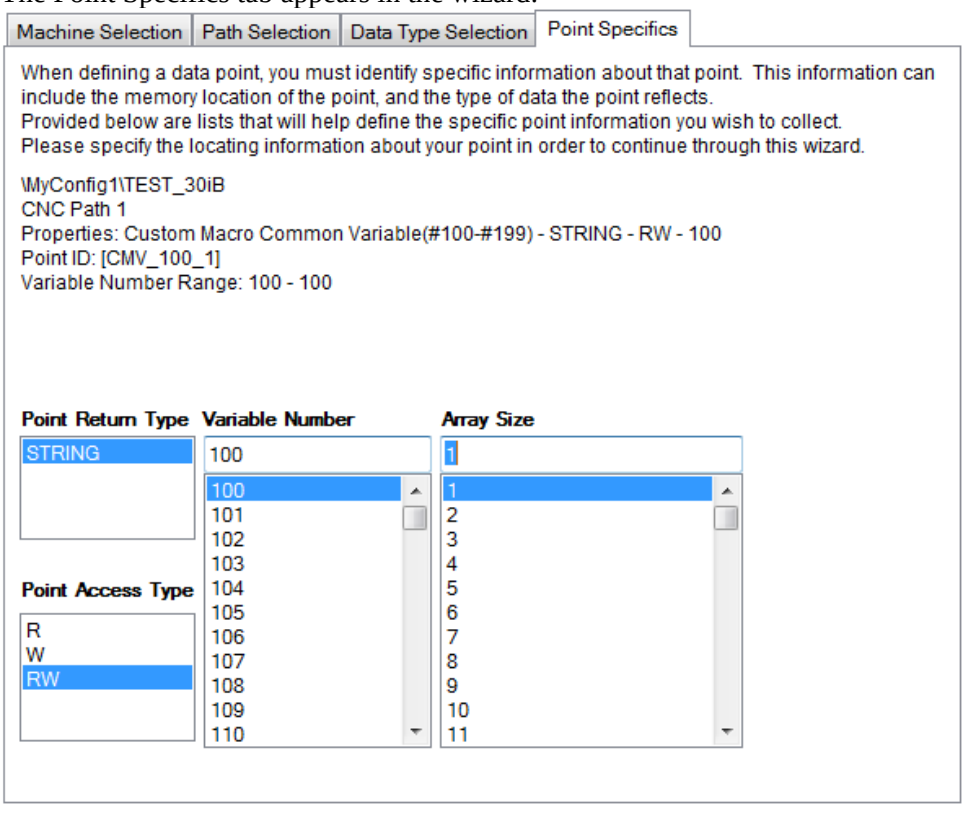
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box.
Click the [Next >>] button.

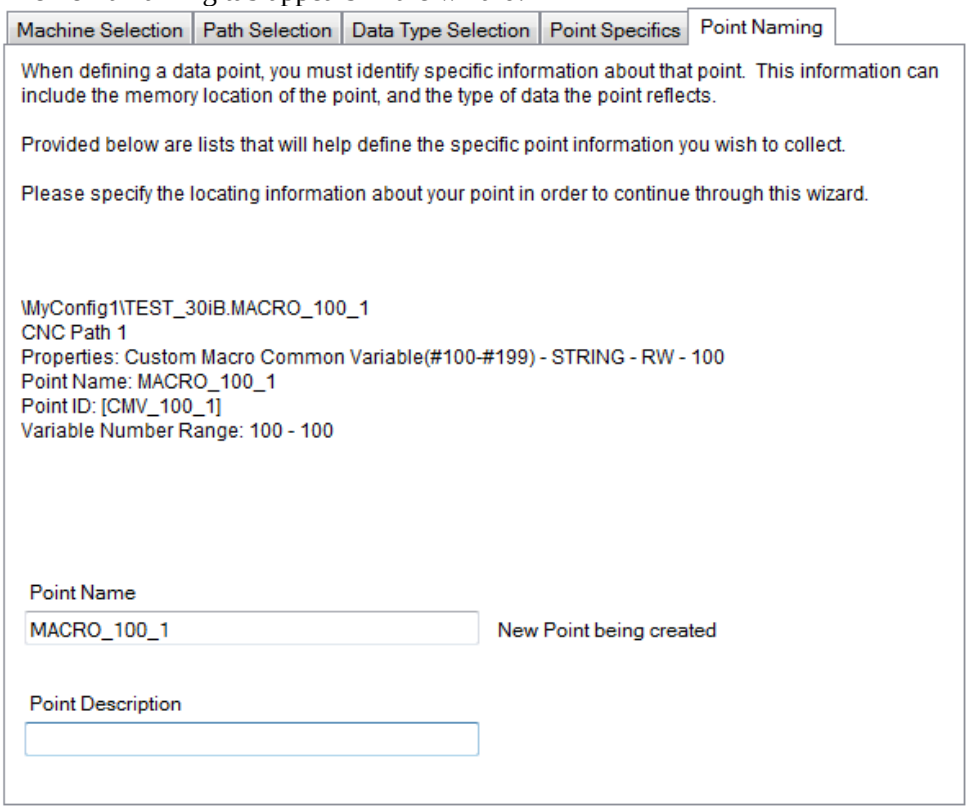


4) The Point Specifics tab appears in the wizard.



Select [R]:read-only, [W]:write only or [RW]:read/write at "Point Access Type".
Select the "Variable Number" and "Array Size". Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



Enter point name in the "Point Name" field. Enter point description in the "Point Description" field.
Click the [Done] button, the point should now appear in the OPC Explorer view.

The <null> value of CNC

There is a state called <null> for a variable. It means that no value is defined. It is displayed as "DATA EMPTY" in CNC. The value of "DATA EMPTY" of CNC is indicated as "NULL" by the OPC client.
When writing "DATA EMPTY" to CNC, set the character string "NULL" to the OPC client.

Effective range and display of variable

*1 The available range of custom points that can be written by the FANUC OPC server depends on the value of parameter F16 (6008#0).
*2 If writing variable values outside the range of (*1) from the OPC client, a message indicating out of range is displayed in the variable value input field of CNC.
*3 Even if underflow or overflow is displayed, CNC internally holds the value within the stated range.

In case of 30i/31i/32i/35i/0i-D/0i-F/Power Motion i-A. The number of significant digits is 12. (6008#0=0)

Range of Values(*1)	Display of CNC(*2)	Internal Retainable Range of CNC(*3)
0 < Values < + 0.00000000001	+ UNDERFLOW	0 < Values <= + 10^{-308}
0 > Values > - 0.00000000001	- UNDERFLOW	0 > Values >= - 10^{-308}
Values > + 999999999999	+ OVERFLOW	0 < Values <= + 10^{308}
Values < - 999999999999	- OVERFLOW	0 > Values >= - 10^{308}

In case of 30i/31i/32i/35i/0i-D/0i-F/Power Motion i-A. The number of significant digits is 8. (6008#0=1)

Range of Values(*1)	Display of CNC(*2)	Internal Retainable Range of CNC(*3)
0 < Values < + 0.0000001	+ UNDERFLOW	0 < Values <= + 10^{-29}
0 > Values > - 0.0000001	- UNDERFLOW	0 > Values >= - 10^{-29}
Values > + 99999999	+ OVERFLOW	0 < Values <= + 10^{47}
Values < - 99999999	- OVERFLOW	0 > Values >= - 10^{47}

In case of 0i-B/0i-C/16i/18i/21i/PowerMate i. The number of significant digits is 8.

Range of Values(*1)	Display of CNC(*2)	Internal Retainable Range of CNC(*3)
0 < Values < + 0.0000001	********	0 < Values <= + 10^{-29}
0 > Values > - 0.0000001	********	0 > Values >= - 10^{-29}
Values > + 99999999	********	0 < Values <= + 10^{47}
Values < - 99999999	********	0 > Values >= - 10^{47}

NOTE

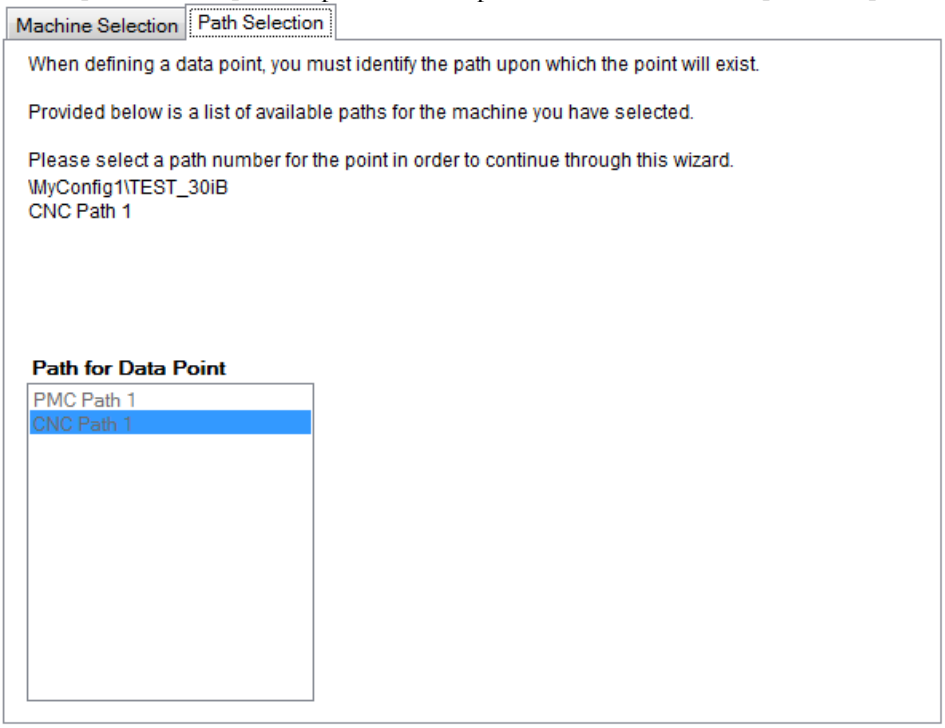
There was a case that the value read by the OPC client is displayed as an exponent. It was fixed so that it will not be displayed as an exponent.

3.9.6 Alarm Information Point

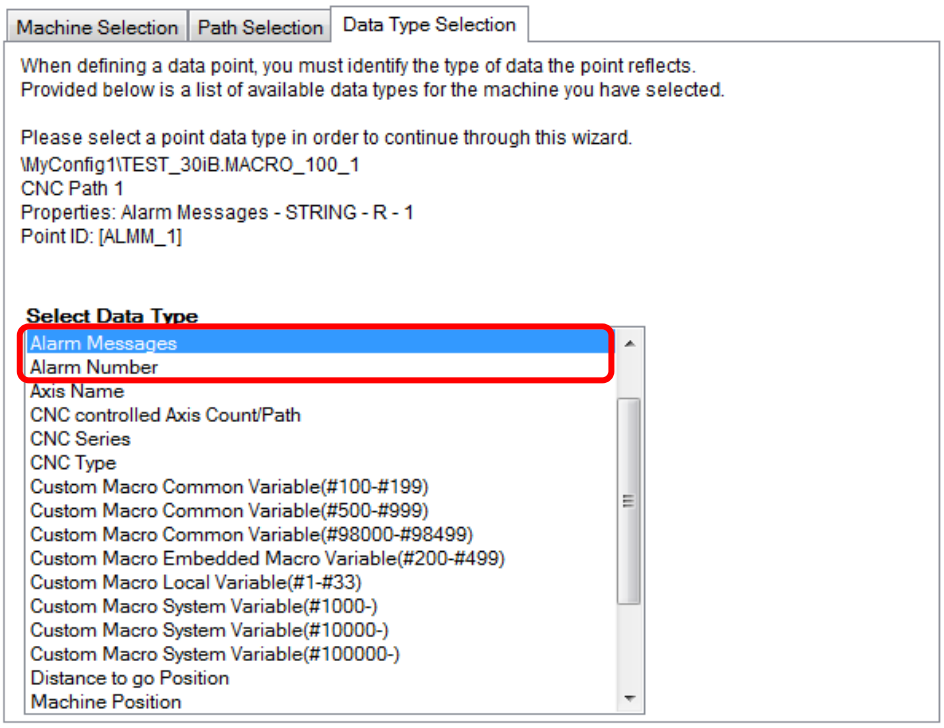
CNC Alarm Information can be read. This is a read-only point.

Data Type	Example
Alarm Messages	SW0100 PARAMETER ENABLE SWITCH ON
Alarm Number	SW0100

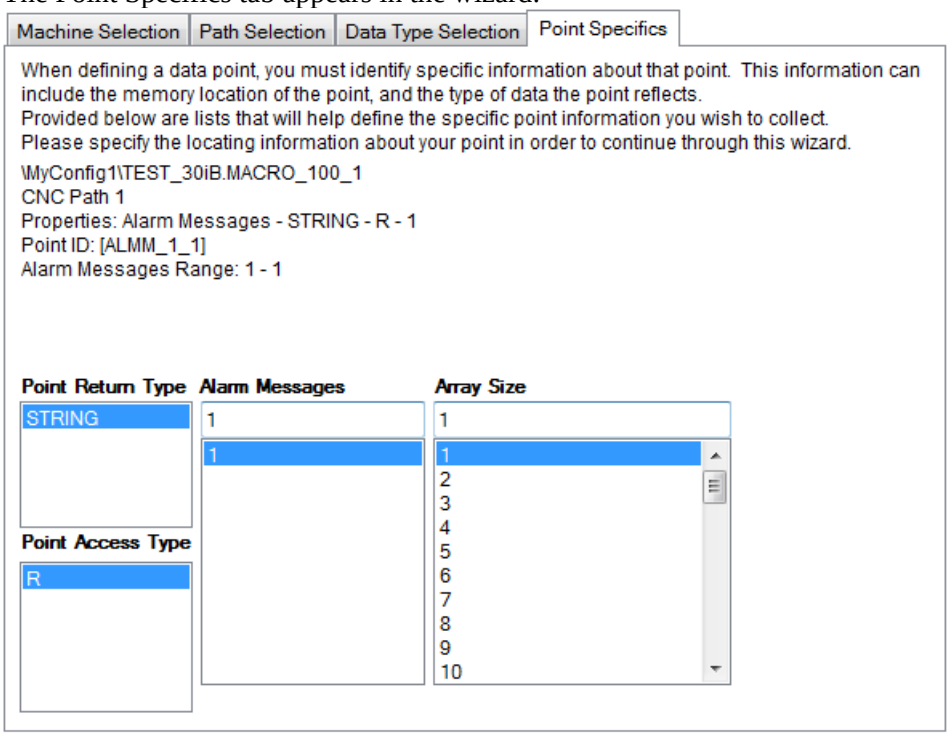
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box.
Click the [Next >>] button.



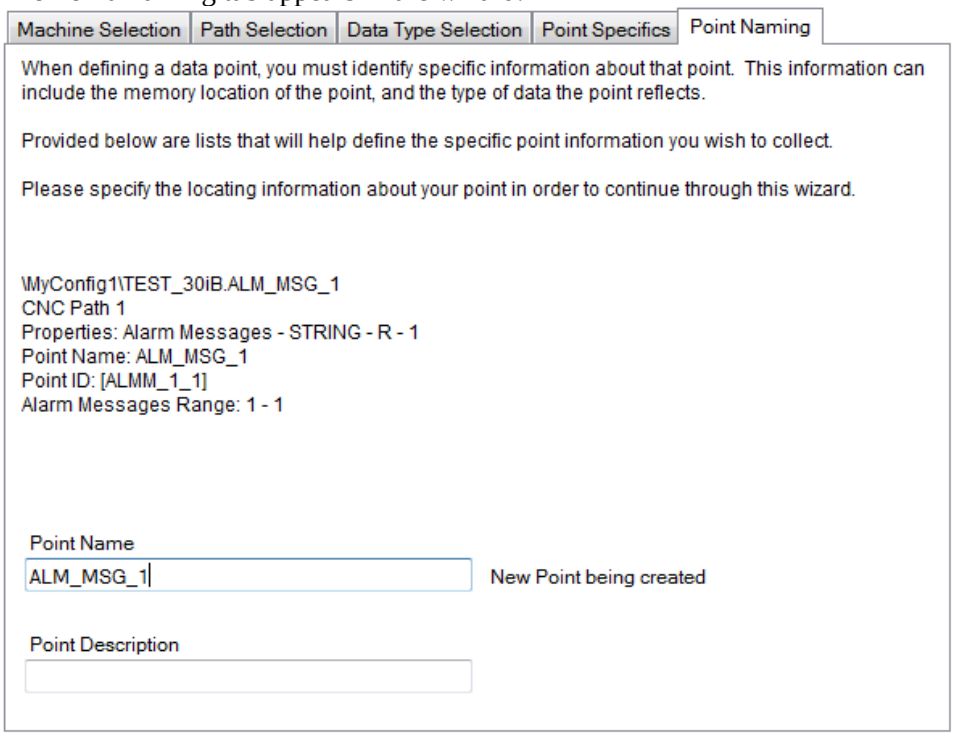
4) The Point Specifics tab appears in the wizard.



The Alarm Messages is a fixed value of one.
Select the "Array Size". Maximum number is 50.

When the CNC Type (Control Types) is 0i-B/C, 16i/18i/21i-A/B or PMi-D/H, and the language other than English and Japanese is selected, alarm number only can be read even if Alarm Messages is selected as Data Type.
If the number of Alarm Messages occurring in the CNC is fewer than the specified number of the array, the empty string (length of the string is 0) is set in the place where the message is not read.
Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.

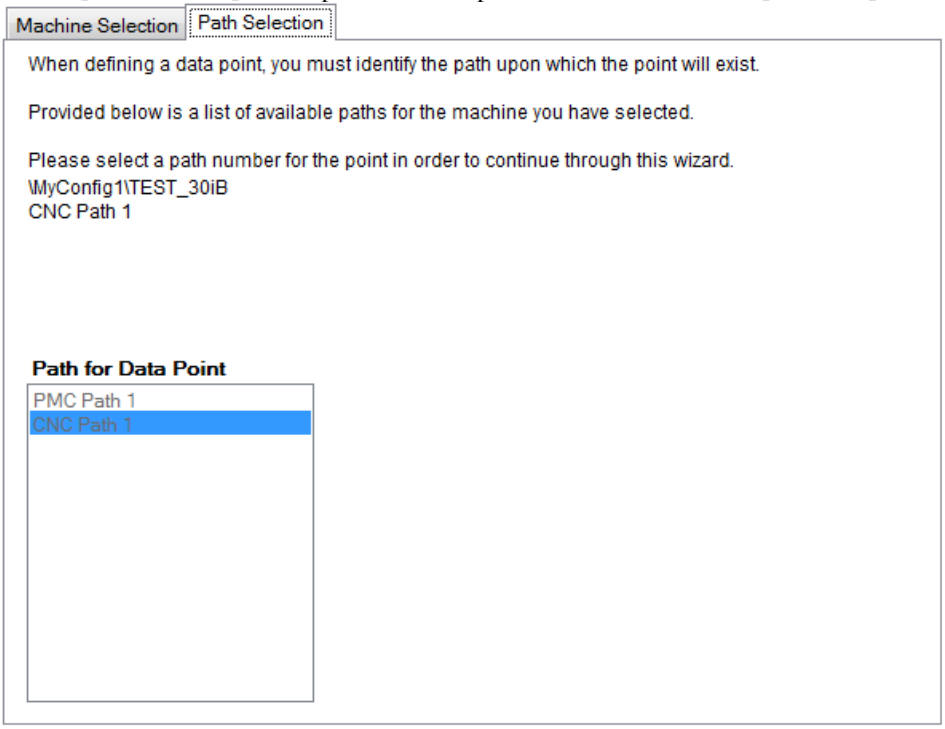


Enter point name in the "Point Name" field. Enter point description in the "Point Description" field.
Click the [Done] button, the point should now appear in the OPC Explorer view.

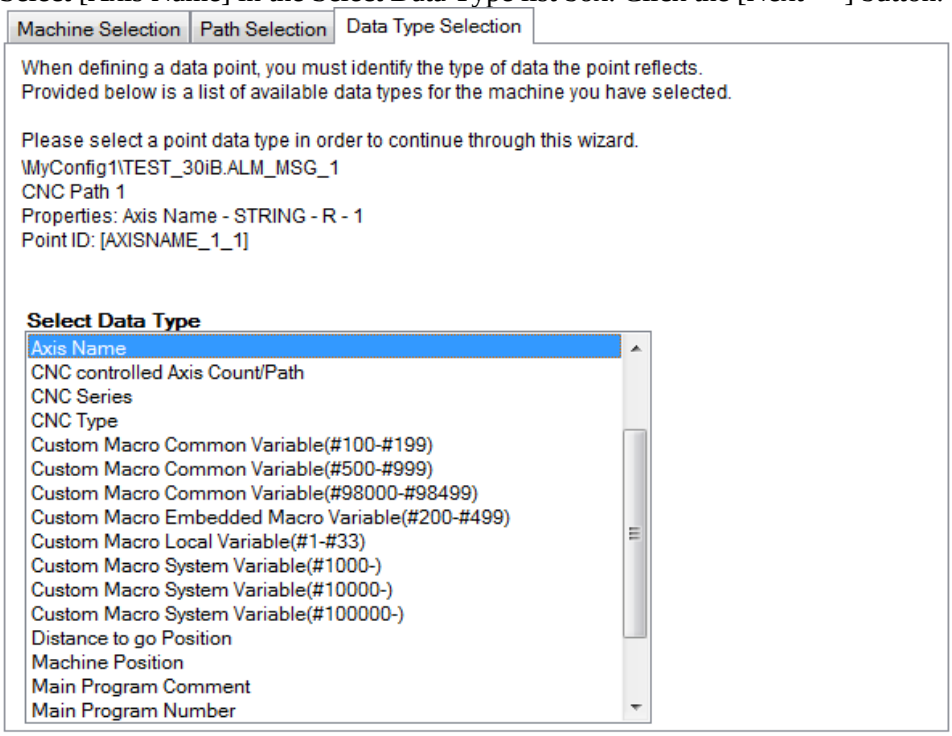
3.9.7 Axis Name Point

CNC Axis Name can be read. This is a read-only point.

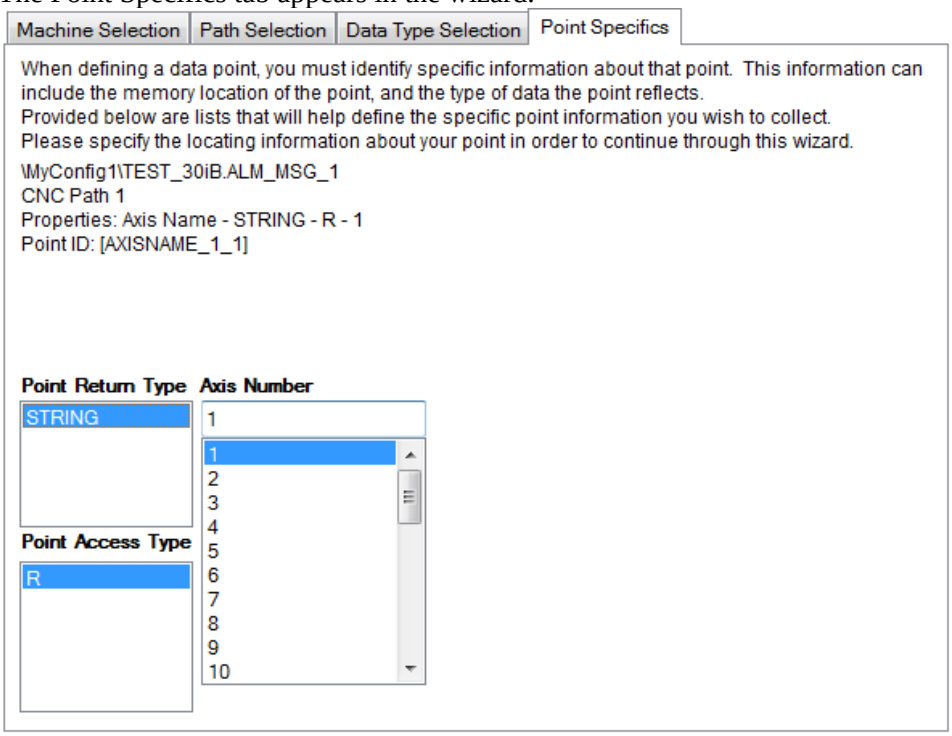
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select [Axis Name] in the Select Data Type list box. Click the [Next >>] button.

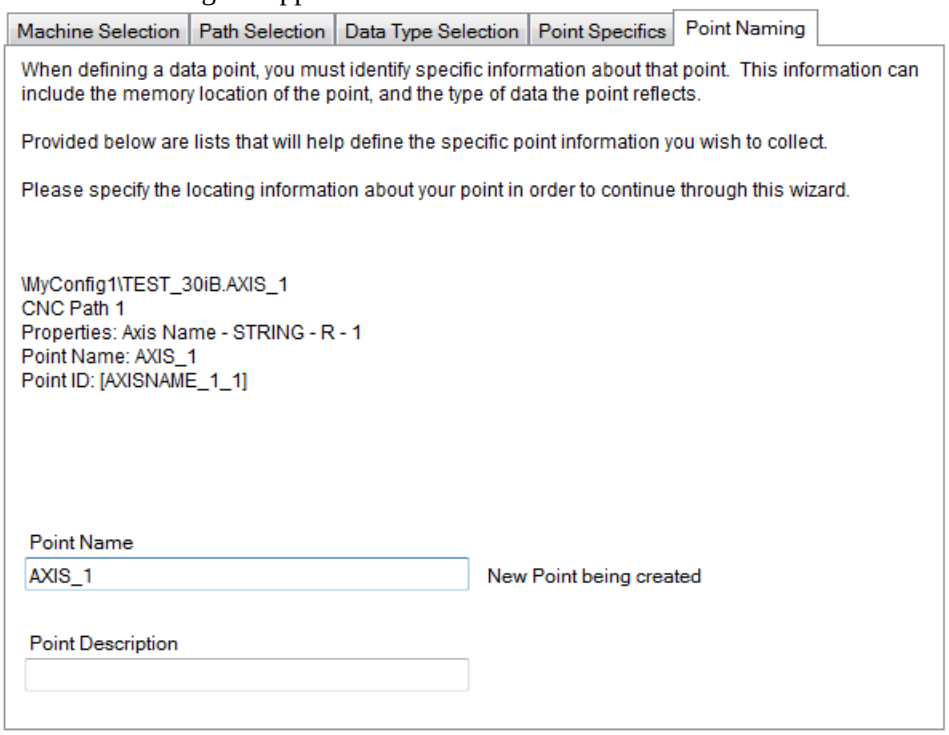


4) The Point Specifics tab appears in the wizard.



Select the "Axis Number". Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



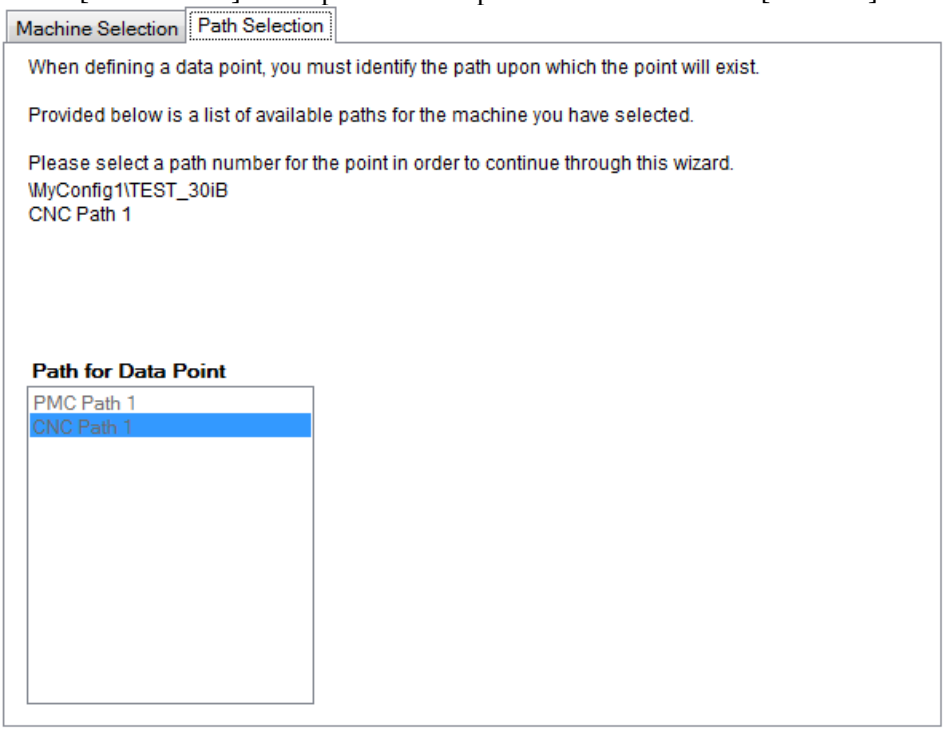
Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

3.9.8 Position Information Point

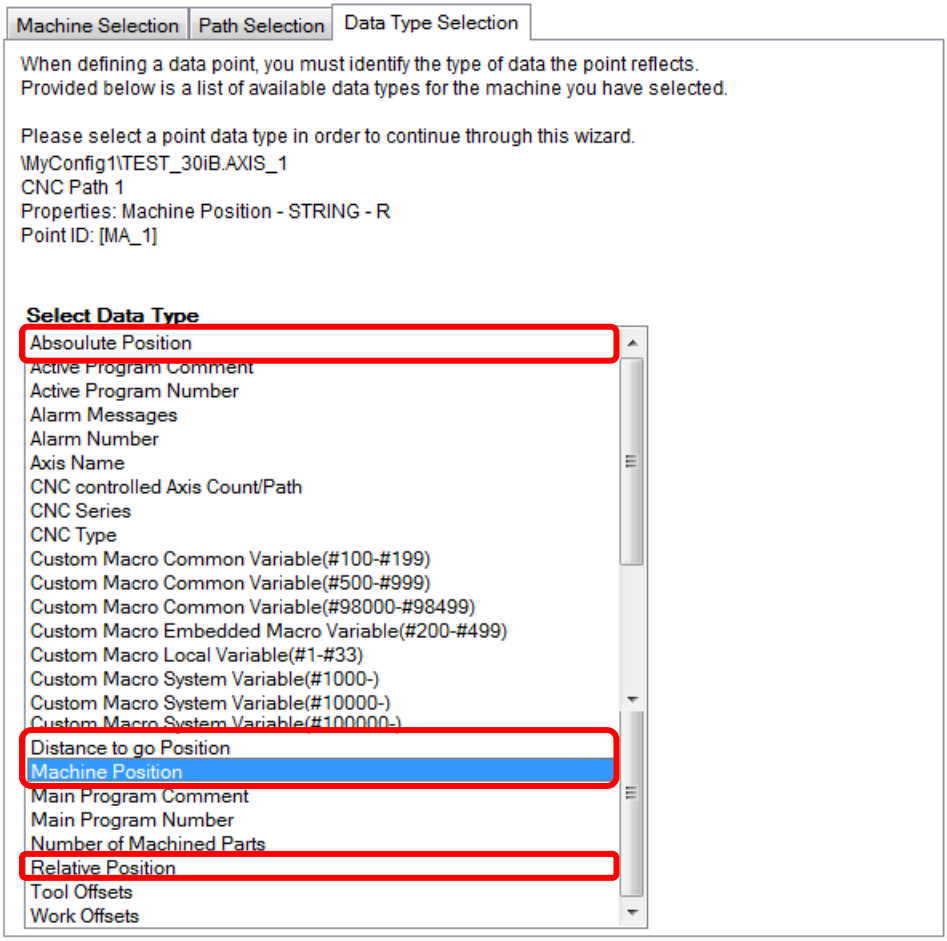
CNC Position Information can be read. This is a read-only point.

Data Type
Absolute Position
Relative Position
Machine Position
Distance to go Position

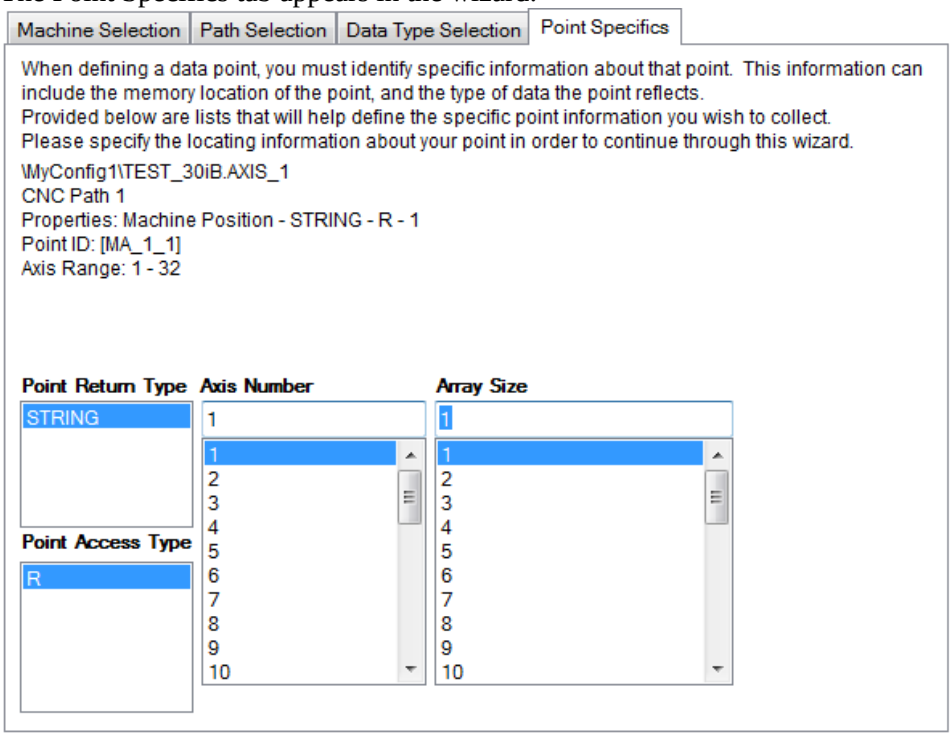
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box. Click the [Next >>] button.

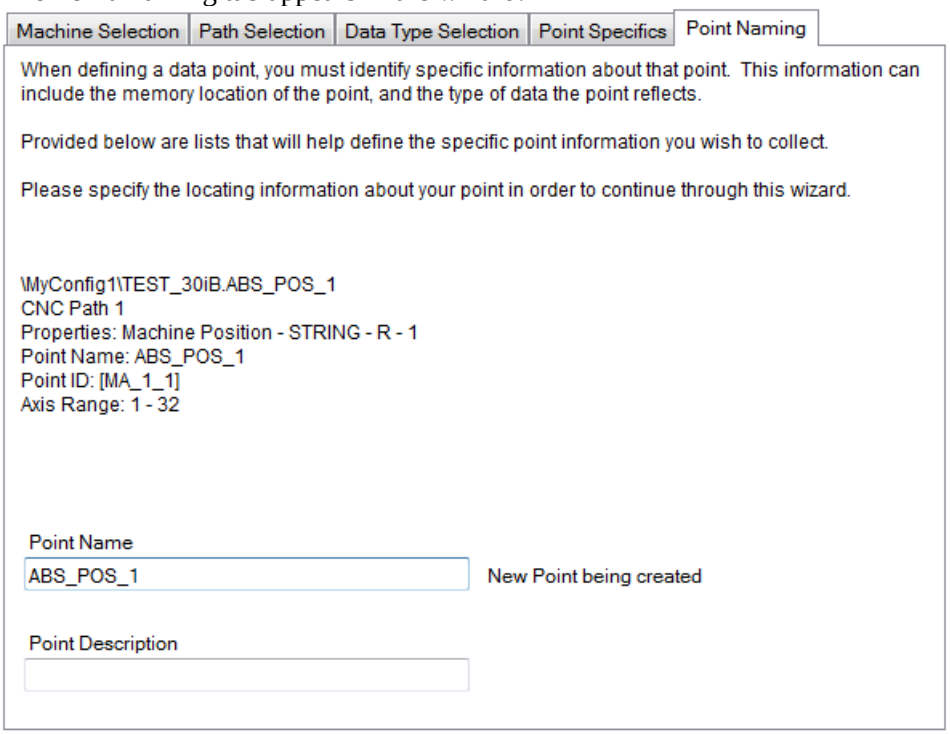


4) The Point Specifics tab appears in the wizard.



Select the "Axis Number" and "Array Size". Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



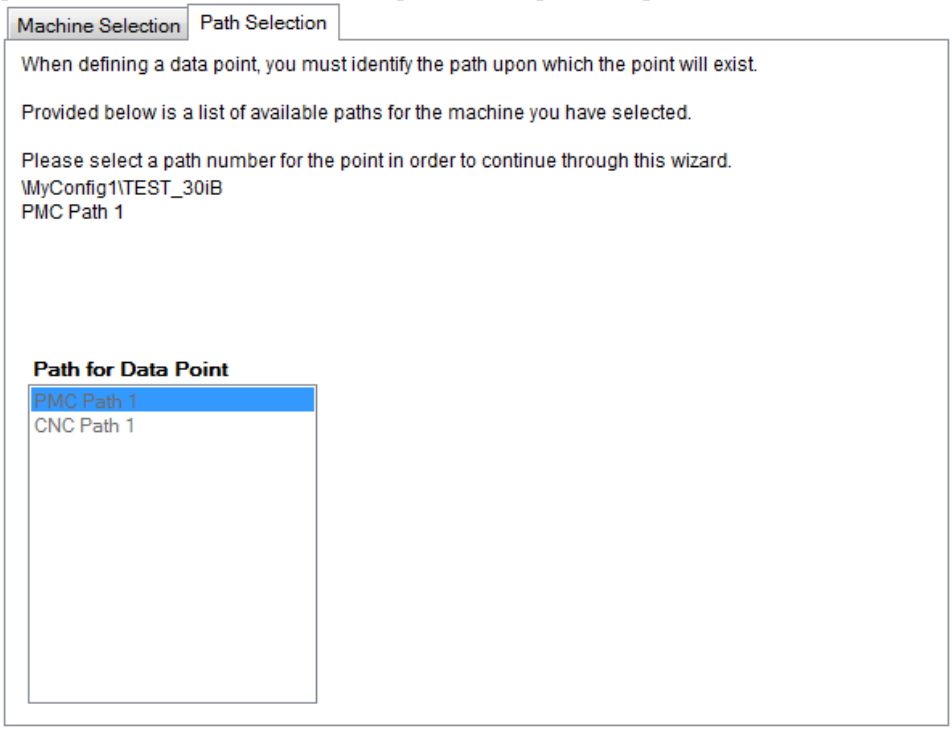
Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

3.9.9 PMC Data Point

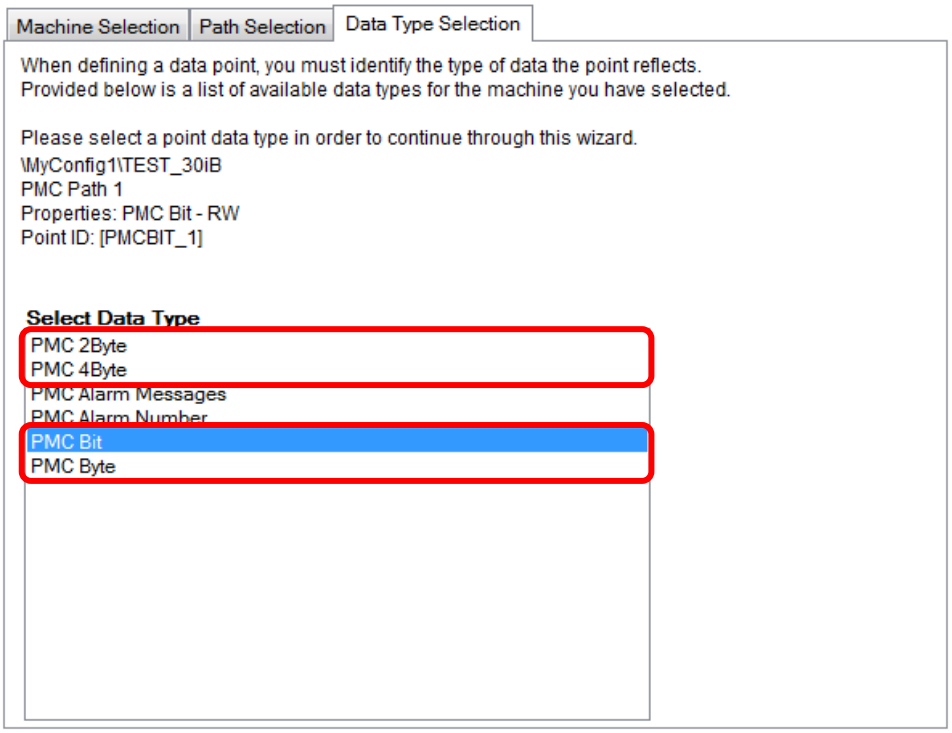
PMC bit or PMC byte status can be read or written. Some PMC address is read only.

Data Type
PMC Bit
PMC Byte
PMC 2Byte
PMC 4Byte

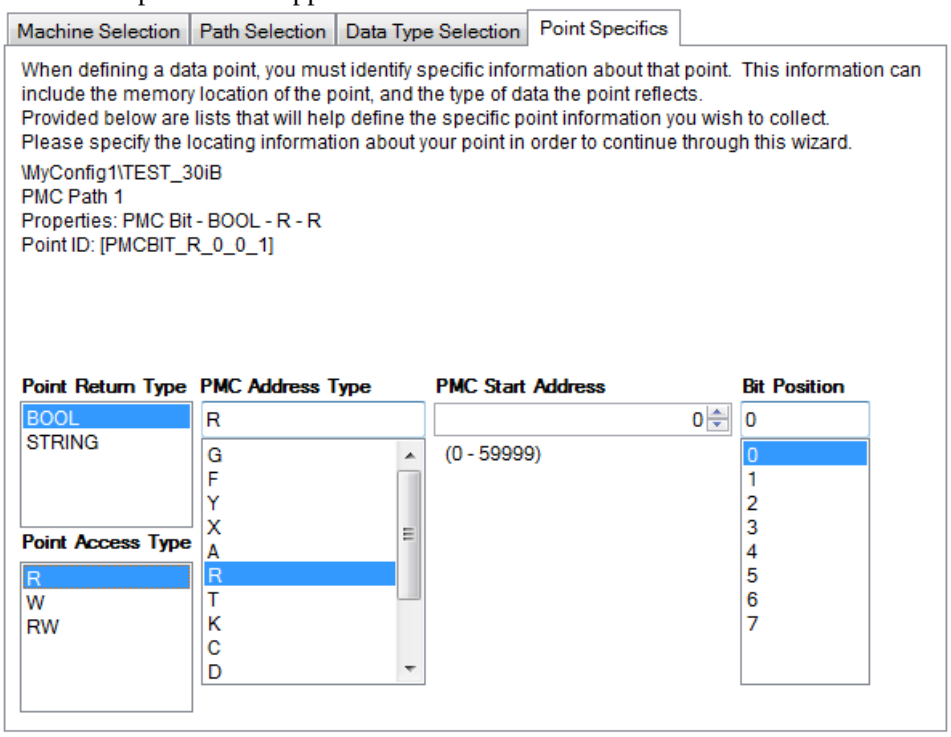
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select the PMC Path number in Path for Data Point list box. PMC Path number is listed by the format of [PMC Path <PMC Path Number>]. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box.
Click the [Next >>] button.

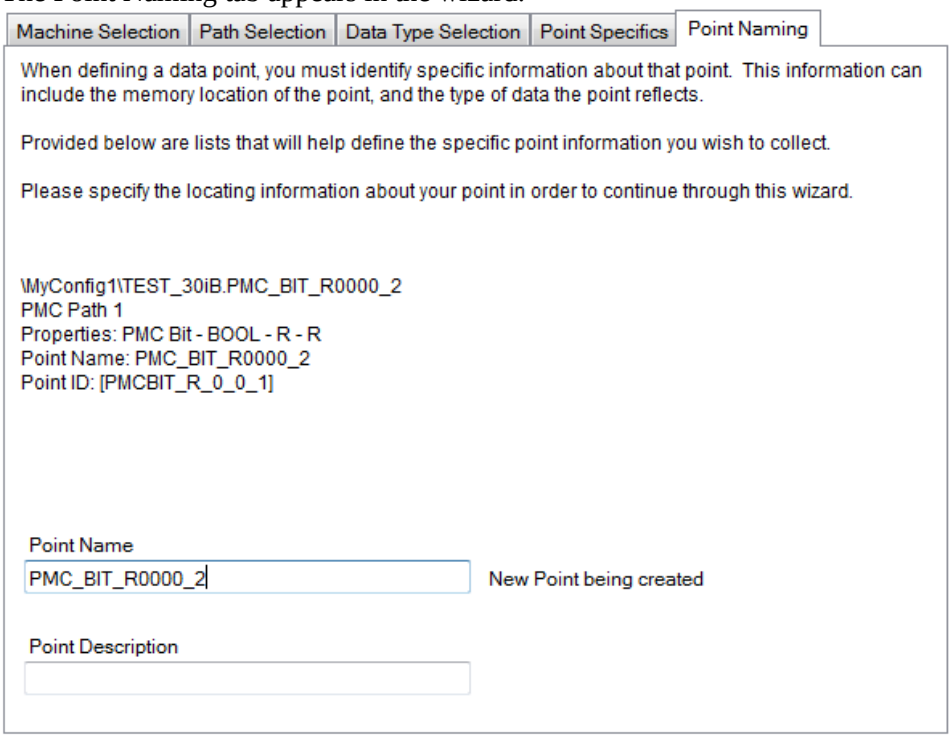


4) The Point Specifics tab appears in the wizard.



Select "Point Return Type".
Select the "PMC Address".
Select [R]:read-only, [W]:write only or [RW]:read/write at "Point Access Type". According to the selected tab "Data Type Selection", only [R] is selectable.
Select the "PMC Start Address", and "Array Size" or "Bit Position".
Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



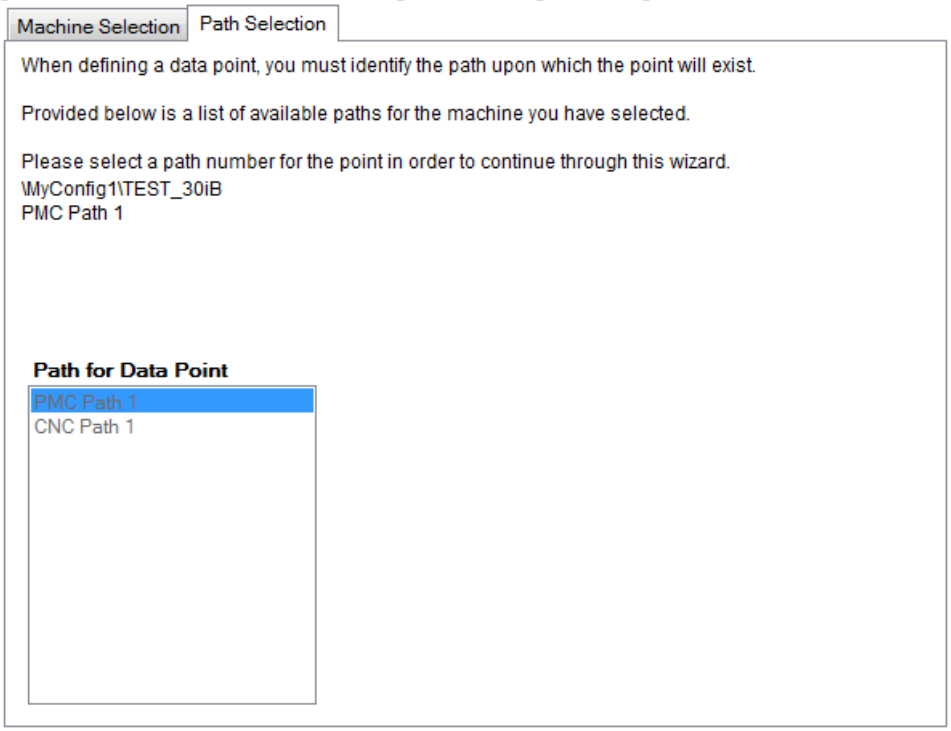
Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

3.9.10 PMC Alarm Information Point

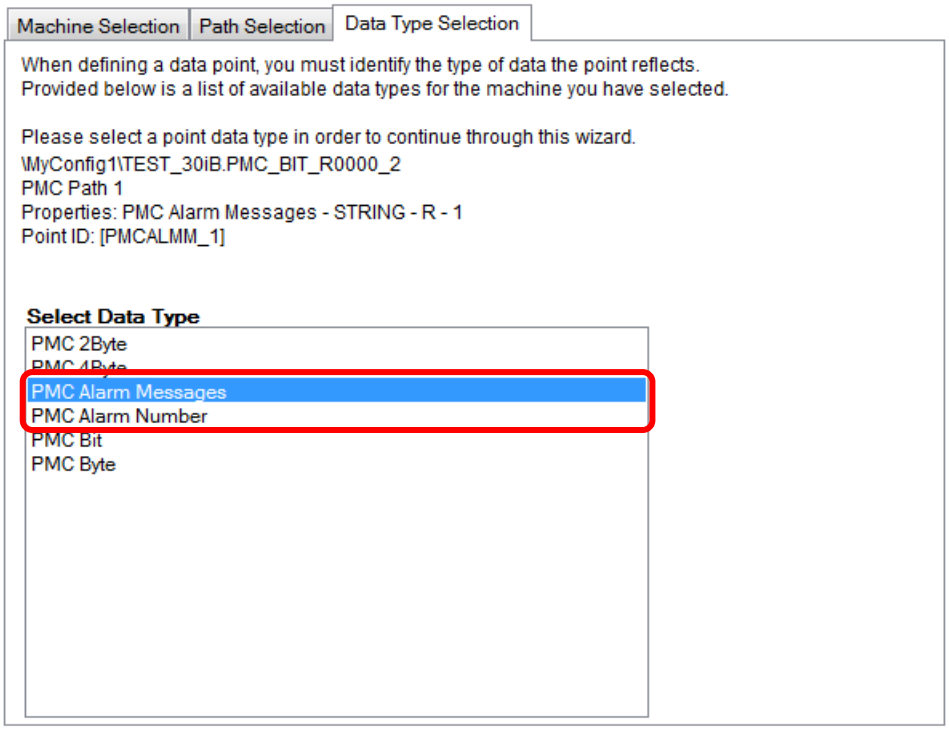
PMC Alarm Information can be read. This is a read-only point.

Data Type	Example
PMC Alarm Messages	ER01 PROGRAM DATA ERROR (PMC2)
PMC Alarm Number	ER01

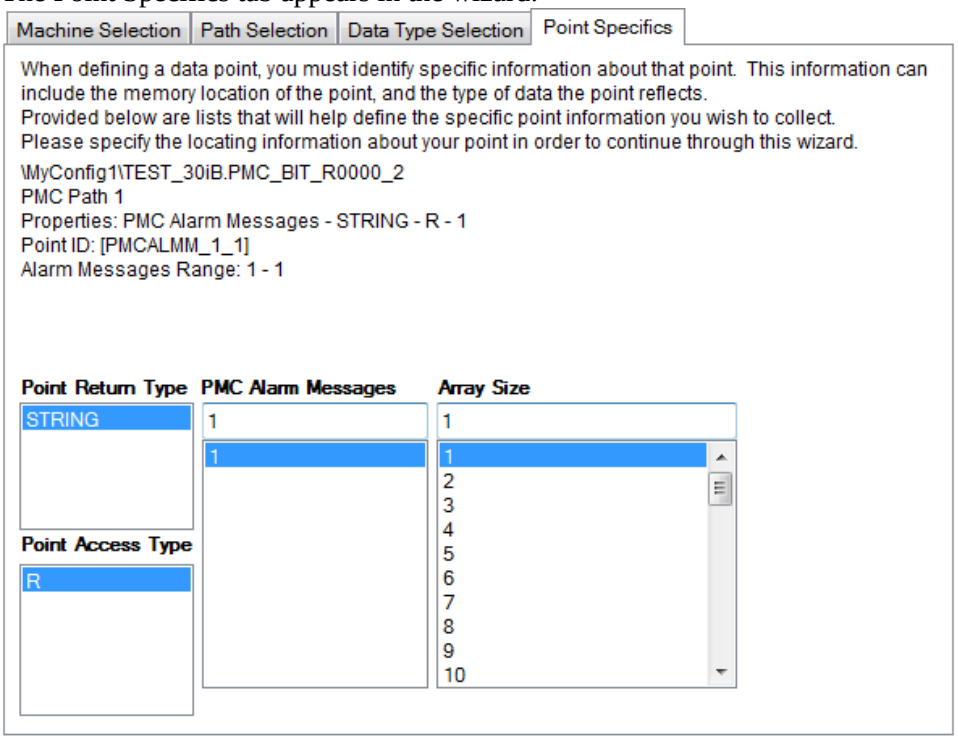
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select the PMC Path number in Path for Data Point list box. PMC Path number is listed by the format of [PMC Path <PMC Path Number>]. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box.
Click the [Next >>] button.

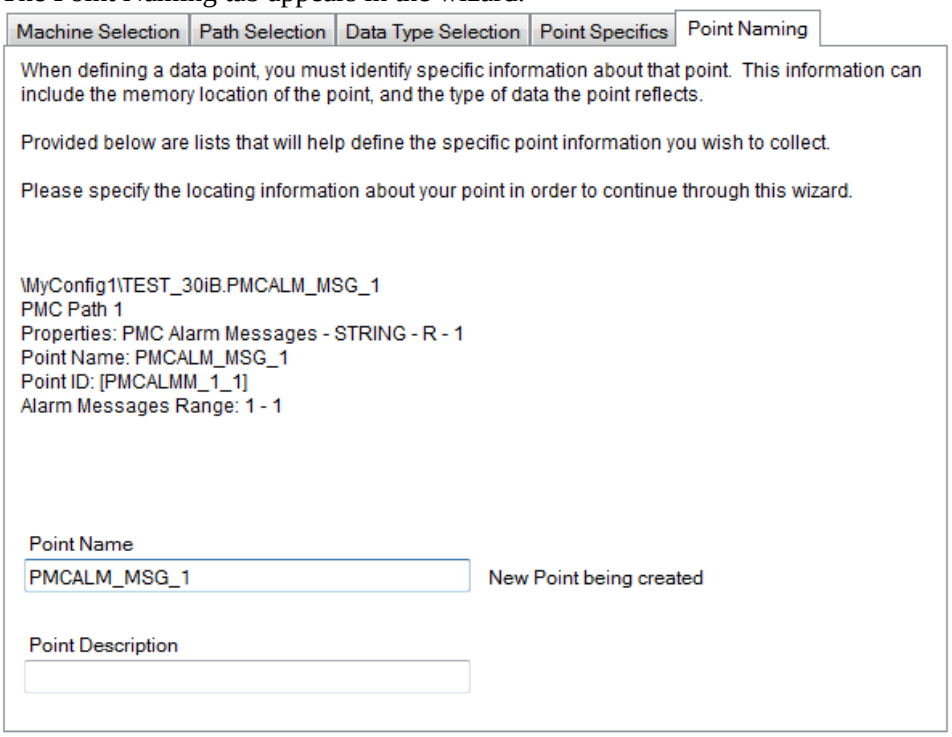


4) The Point Specifics tab appears in the wizard.



The PMC Alarm Messages is a fixed value of one.
Select the "Array Size". Maximum number is 50.
When the CNC Type (Control Types) is 0i-B/C, 16i/18i/21i-A/B or PMi-D/H, and the language other than English and Japanese is selected, alarm number only can be read even if Alarm Messages is selected as Data Type.
Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.

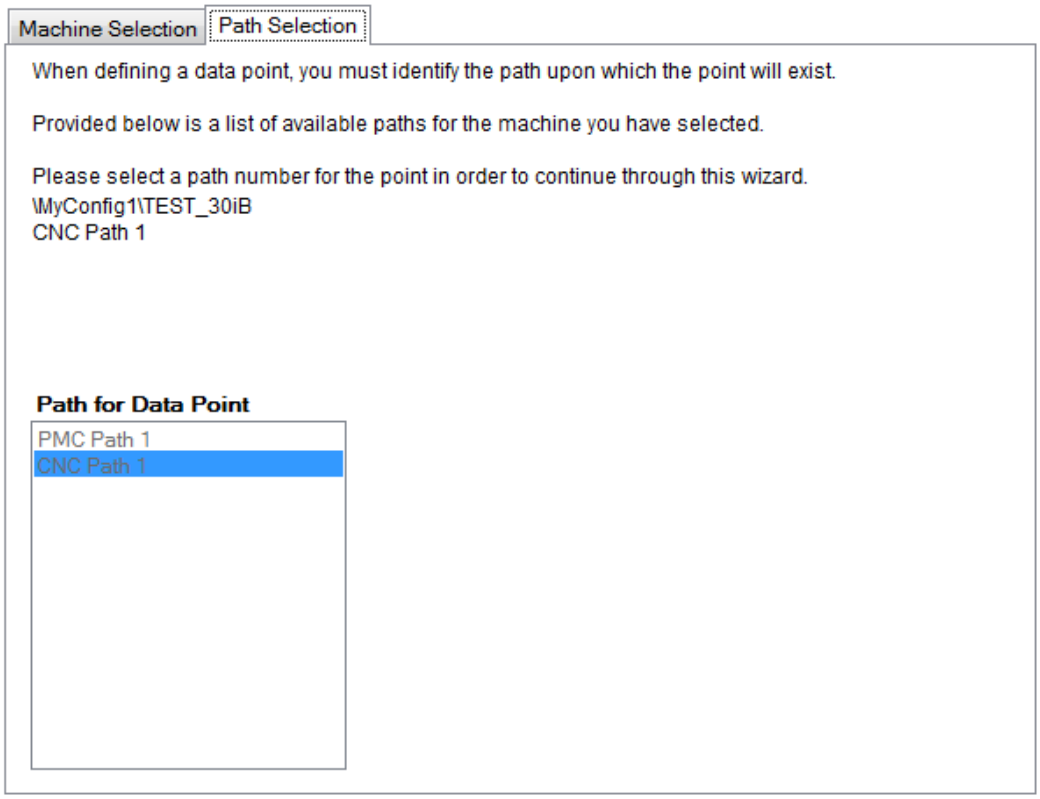


Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

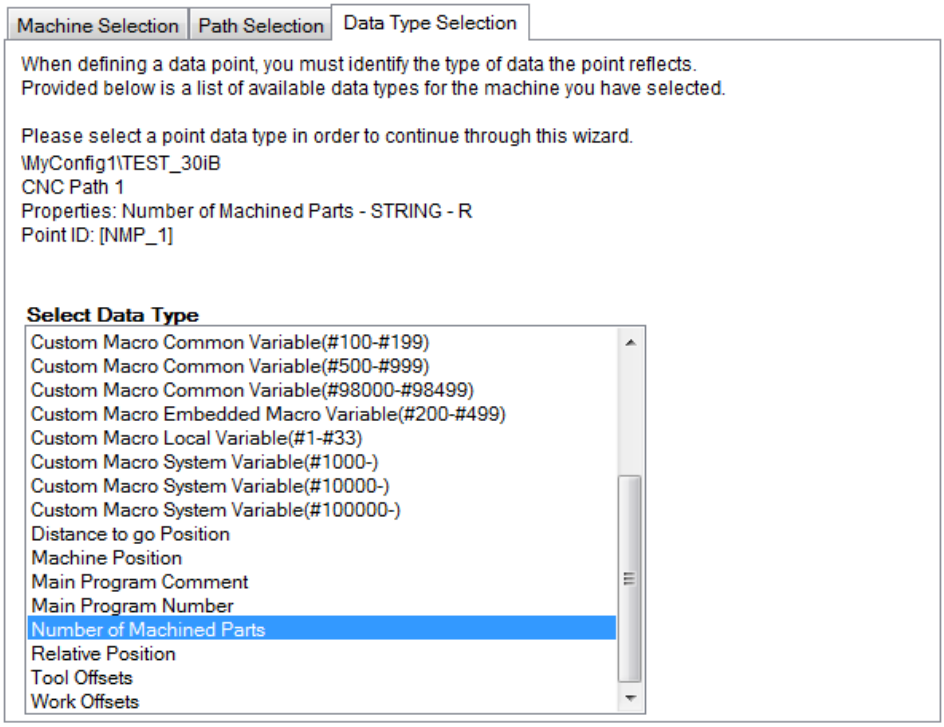
3.9.11 Number of Machined Parts Point

Number of Machined Parts status can be read. This is a read-only point.

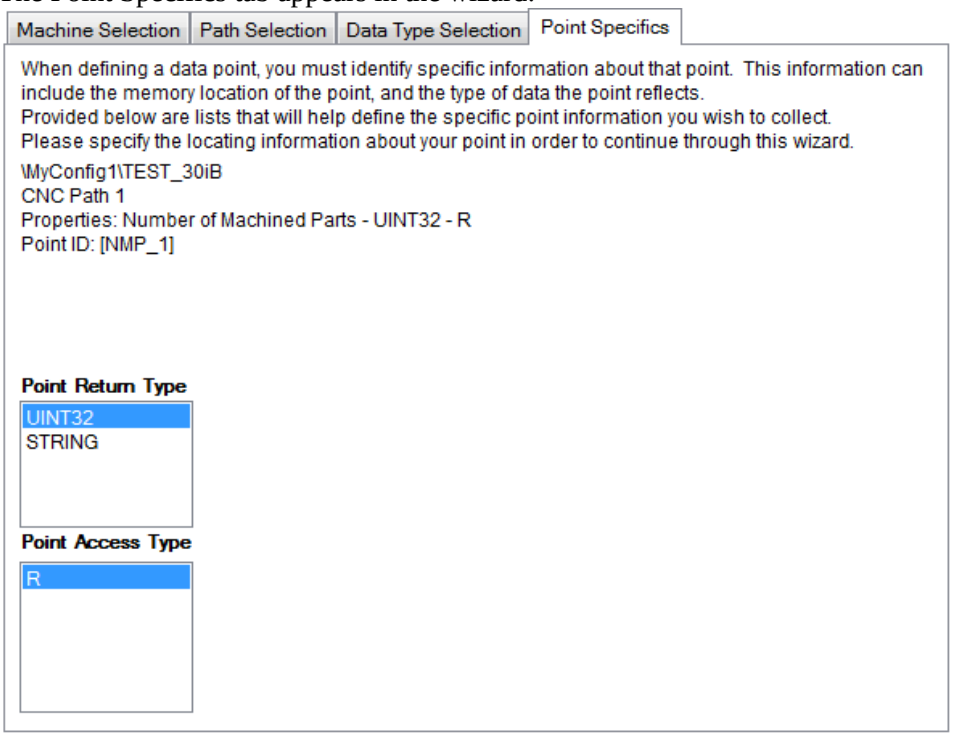
1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.



3) The Data Type Selection tab appears in the wizard.
Select [Number of Machined Parts] in the Select Data Type list box. Click the [Next >>] button.

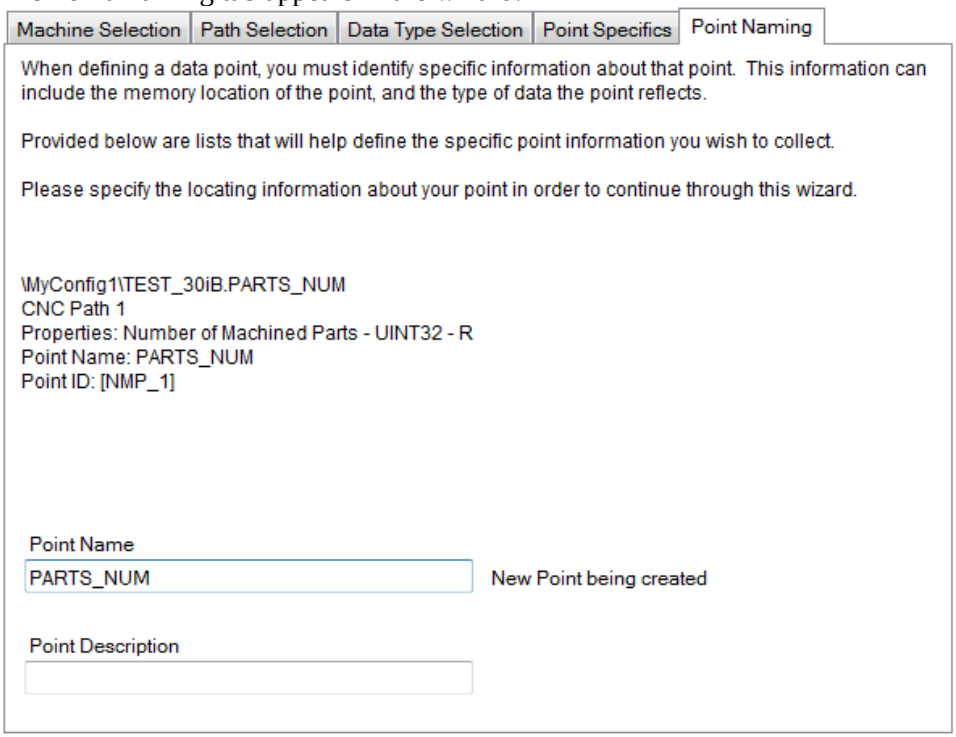


4) The Point Specifics tab appears in the wizard.



Select "Point Return Type". Usually, [UINT32] is used.
Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



Enter point name in the "Point Name" field. Enter point description in the "Point Description" field.
Click the [Done] button, the point should now appear in the OPC Explorer view.

3.9.12 P-CODE Variable Point

P-CODE Variable status can be read or written. Some P-CODE Variable status is read only.
The range of values that can be set varies depending on CNC.

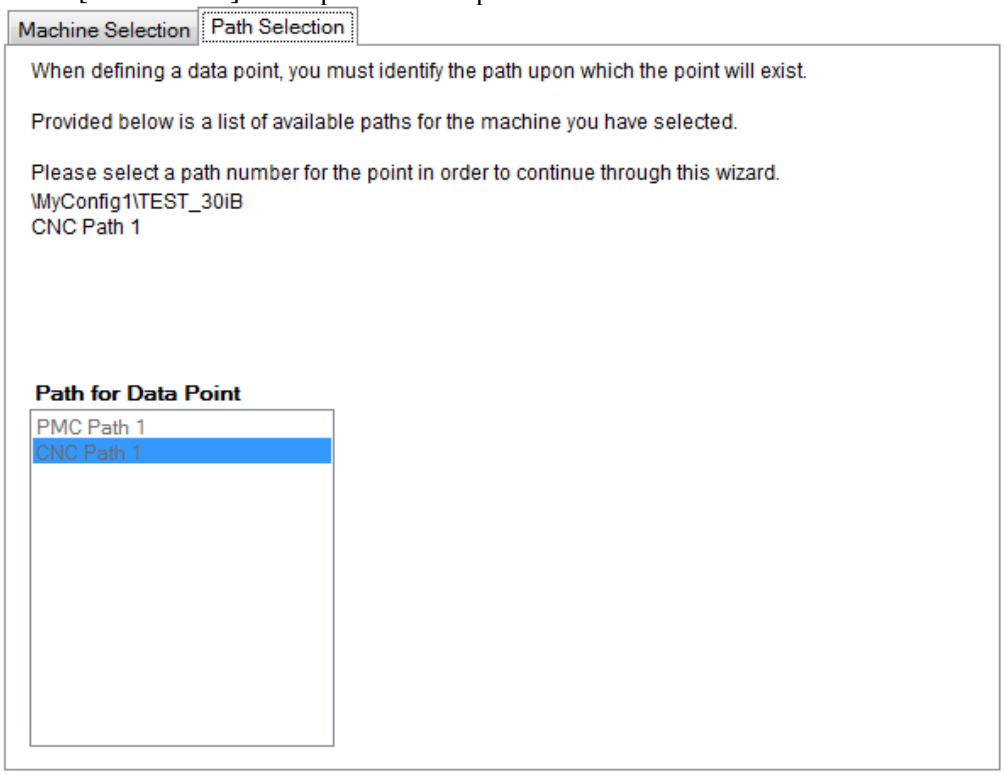
In case of 30i / 31i / 32i / 35i / 0i-D /0i-F / Power Motion i-A

Data Type	Access Type
P-CODE Control Variable (#8500-#8999)	R
P-CODE Variable (#10000-#19999)	R, W, RW
Extended P-CODE Variable (#20000-#89999)	

In case of 0i-B / 0i-C / 16i / 18i /21i / PowerMate i

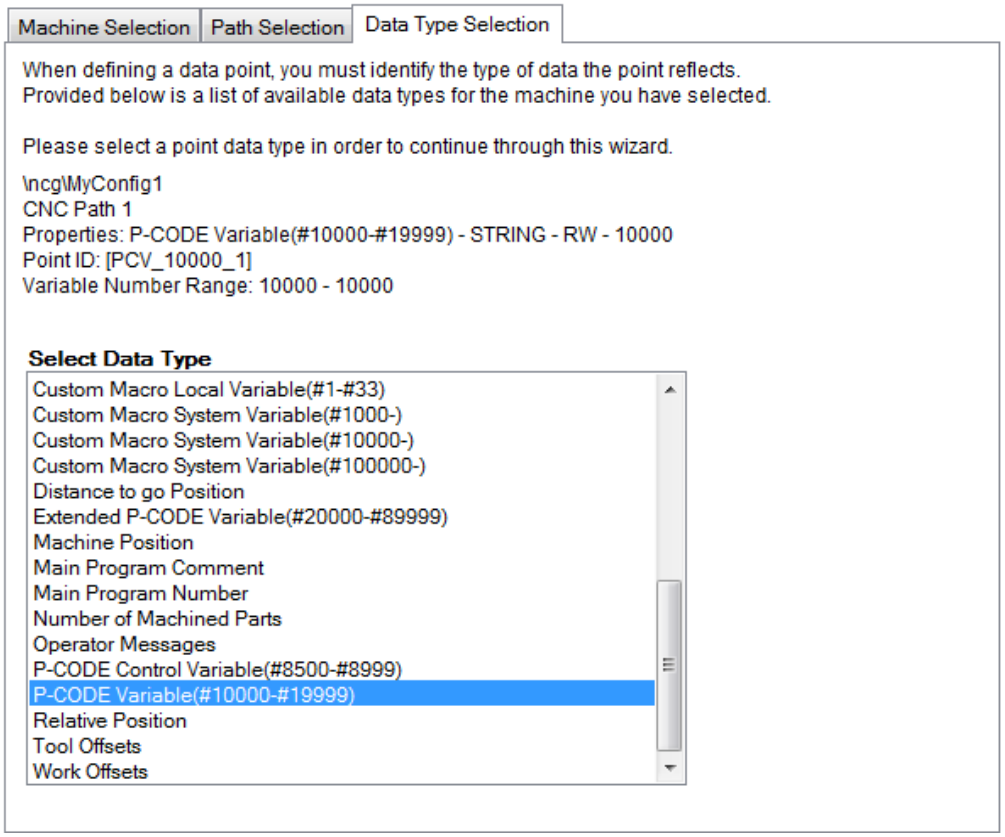
Data Type	Access Type
P-CODE Control Variable (#8500-#8999)	R
P-CODE Variable (#10000-#15999)	R, W, RW
Extended P-CODE Variable (#20000-#85531)	

1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box.



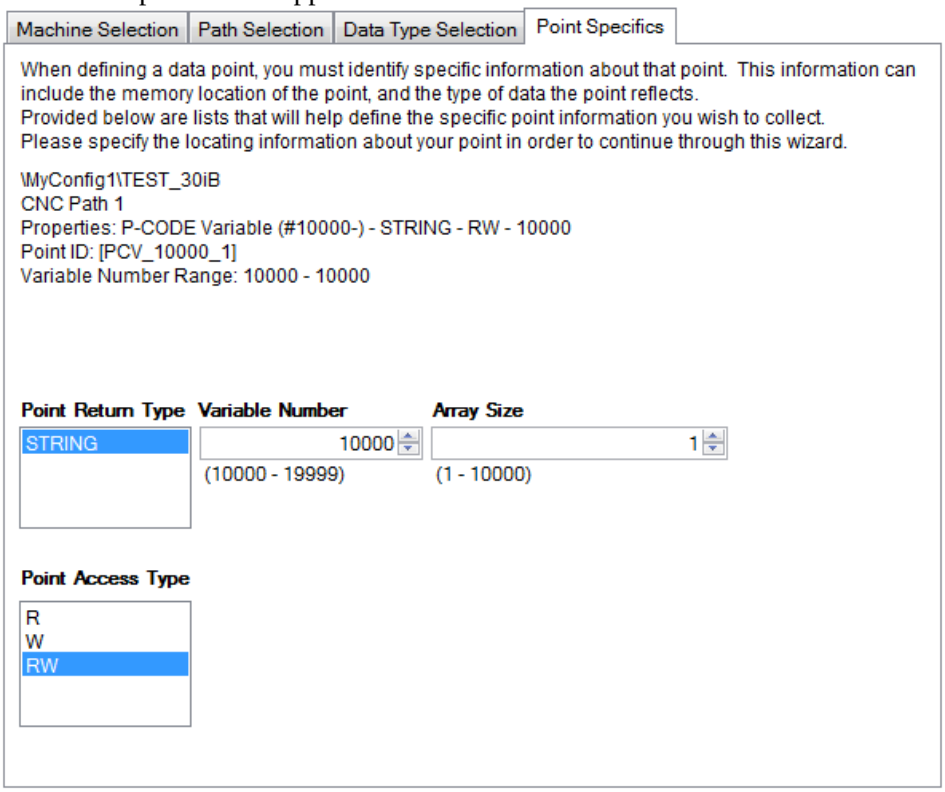
Click the [Next >>] button.

3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box.



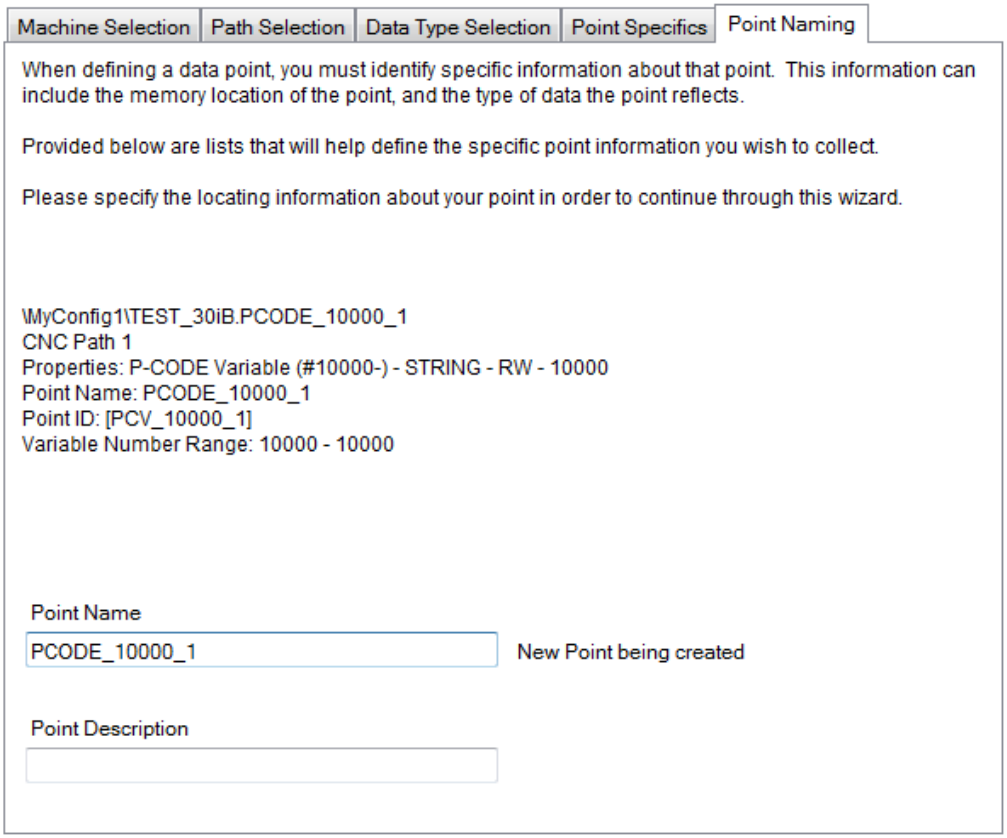
Click the [Next >>] button.

4) The Point Specifics tab appears in the wizard.



Select [R]:read-only, [W]:write only or [RW]:read/write at "Point Access Type".
Select the "Variable Number" and "Array Size". Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



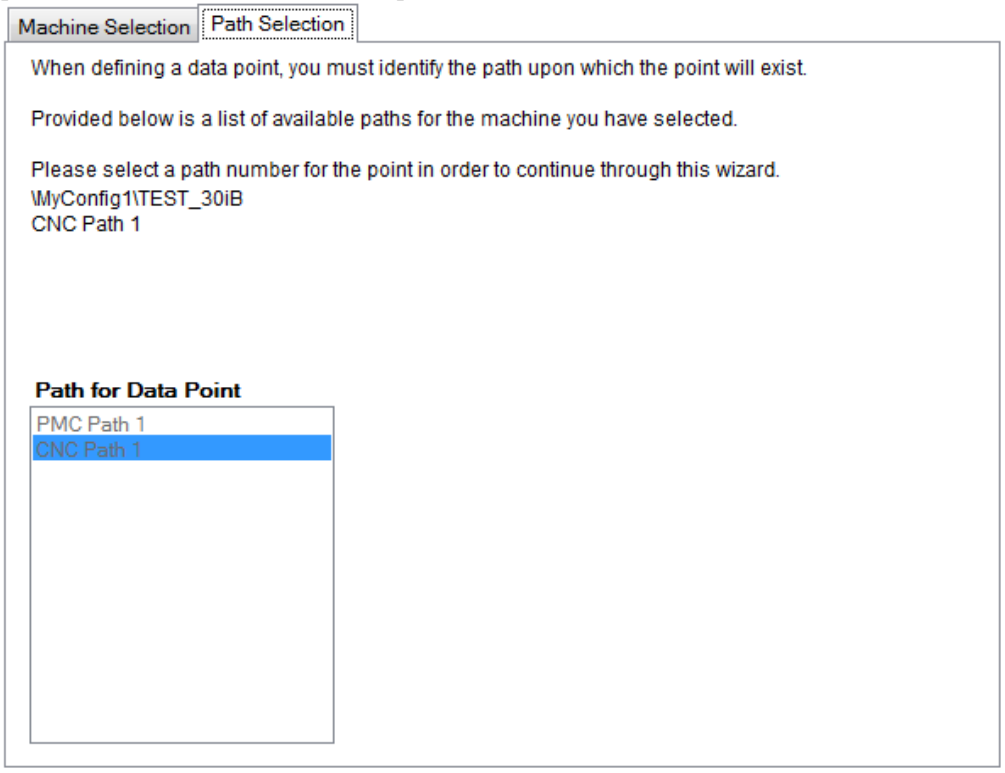
Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

For "**The <null> value of CNC**", "**Effective range and display of variable**", refer to the chapter of "**Custom Macro Variable Point**".

3.9.13 Operator Messages Point

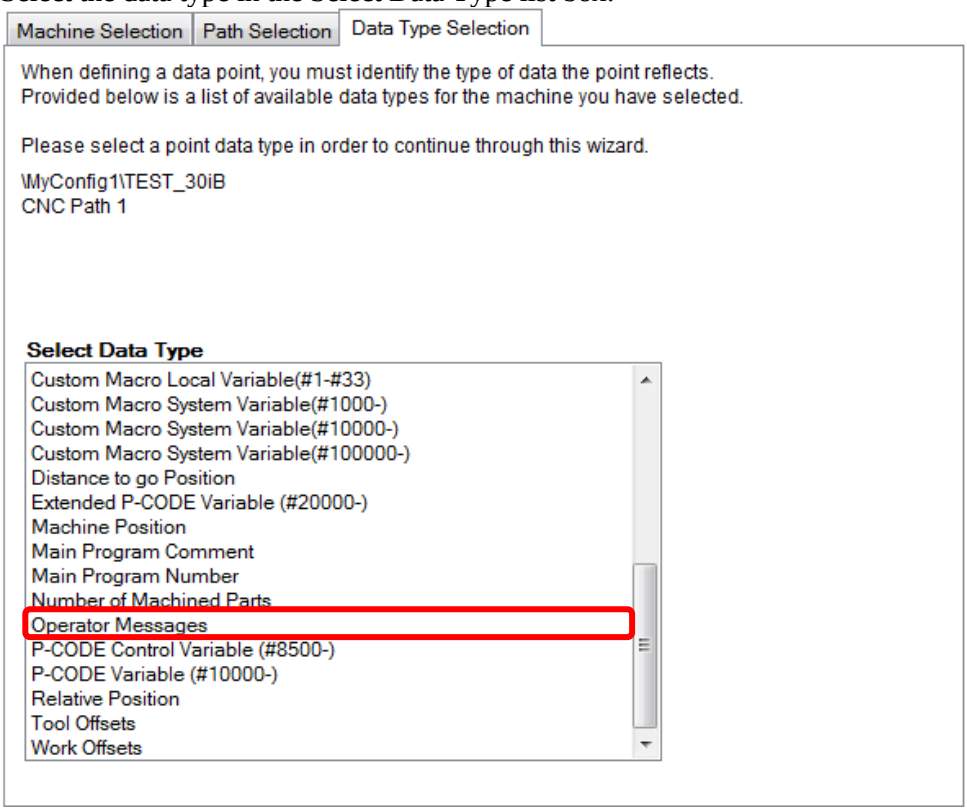
Operator messages can be read. This is a read-only point.

1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select the PMC Path number in Path for Data Point list box. PMC Path number is listed by the format of [PMC Path <PMC Path Number>].



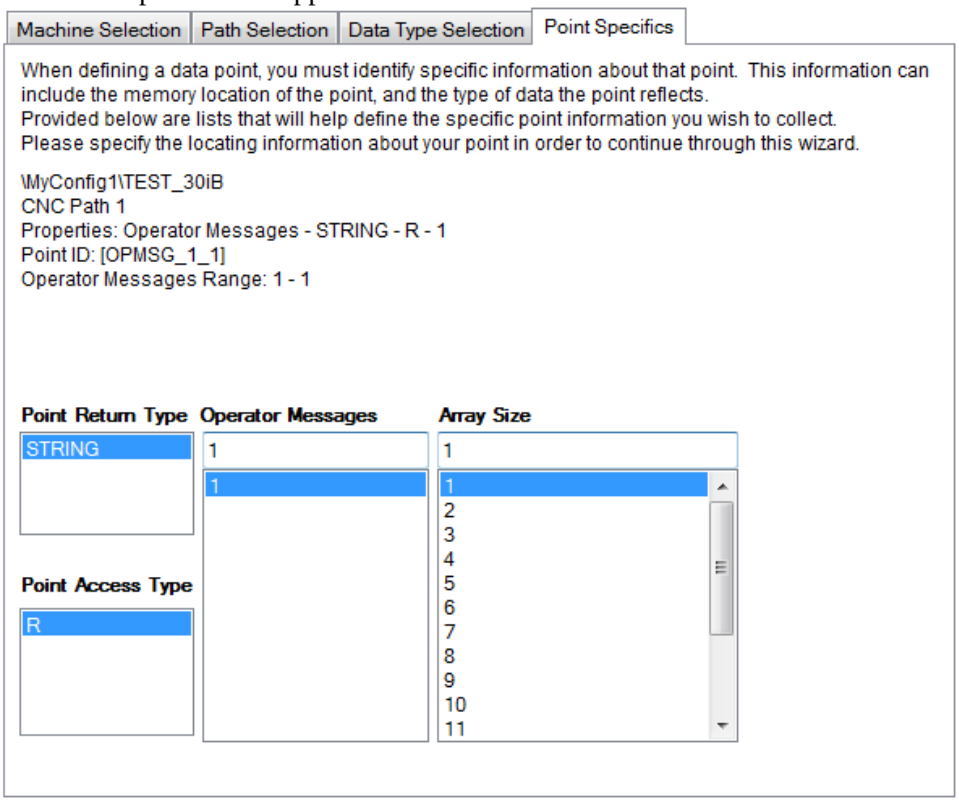
Click the [Next >>] button.

3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box.



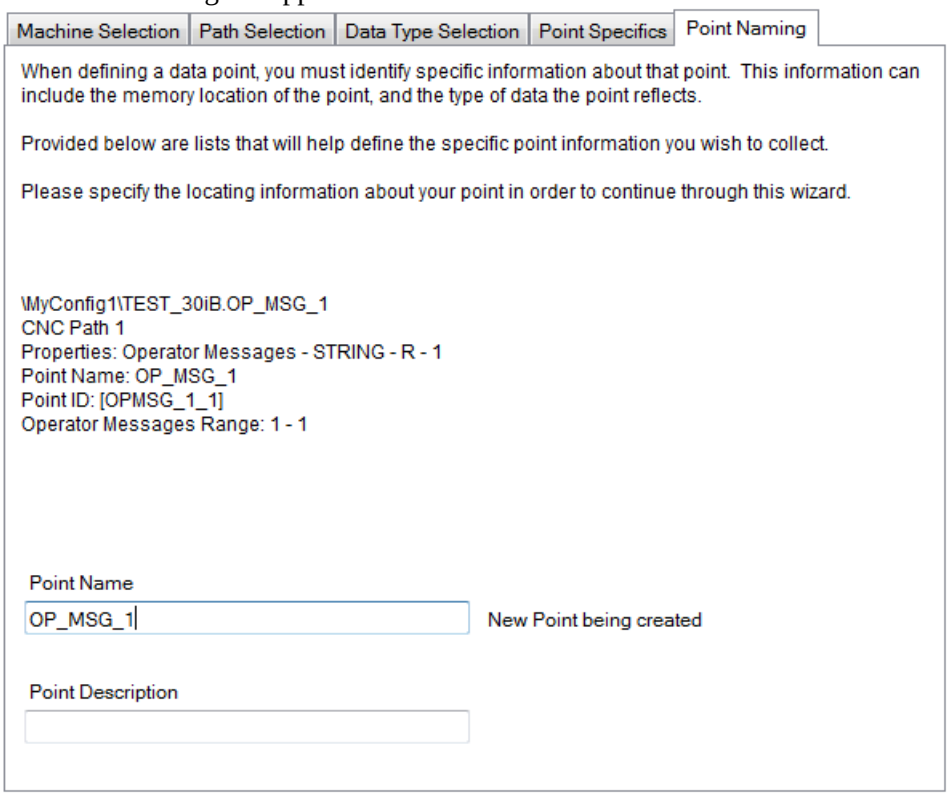
Click the [Next >>] button.

4) The Point Specifics tab appears in the wizard.



Only “1” can be specified for "Operator Messages".
Select the "Array Size". Maximum number is 17.
Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



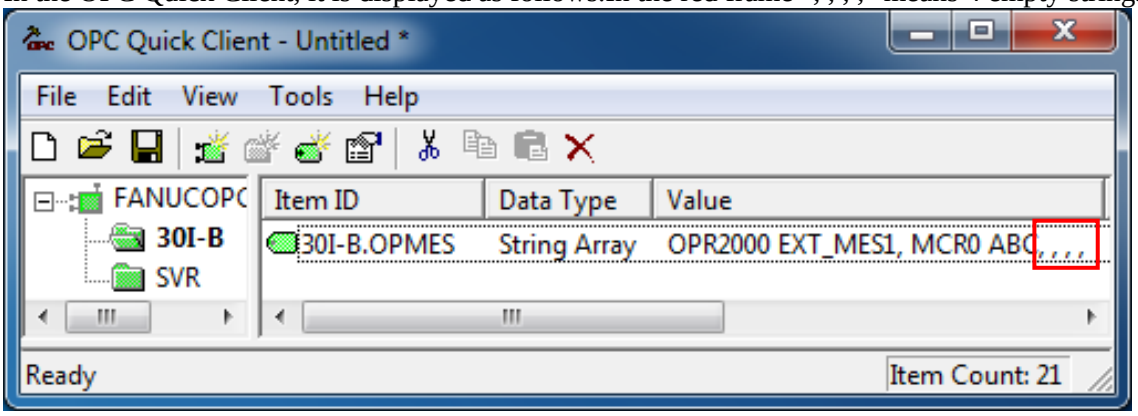
Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

The format of the operator message is as follows.
External Operator Messages: "OPR" + Message Number + " " + Message Body
Macro Messages: "MCR" + Message Number + " " + Message Body

If the number of Operator Messages occurring in the CNC is fewer than the specified number of the array, the empty string (length of the string is 0) is set in the place where the message is not read.
Example: Array size set by configurator is 6, CNC generates 1 External Operator message and 1 Macro message occurs.

String[0]	External Operator Message	"OPR2000 EXT_MES1"
String[1]	Macro Message	"MCR0 ABC"
String[2]	Empty String	" "
String[3]	Empty String	" "
String[4]	Empty String	" "
String[5]	Empty String	" "

In the OPC Quick Client, it is displayed as follows.In the red frame ", , , ," means 4 empty strings.



NOTE

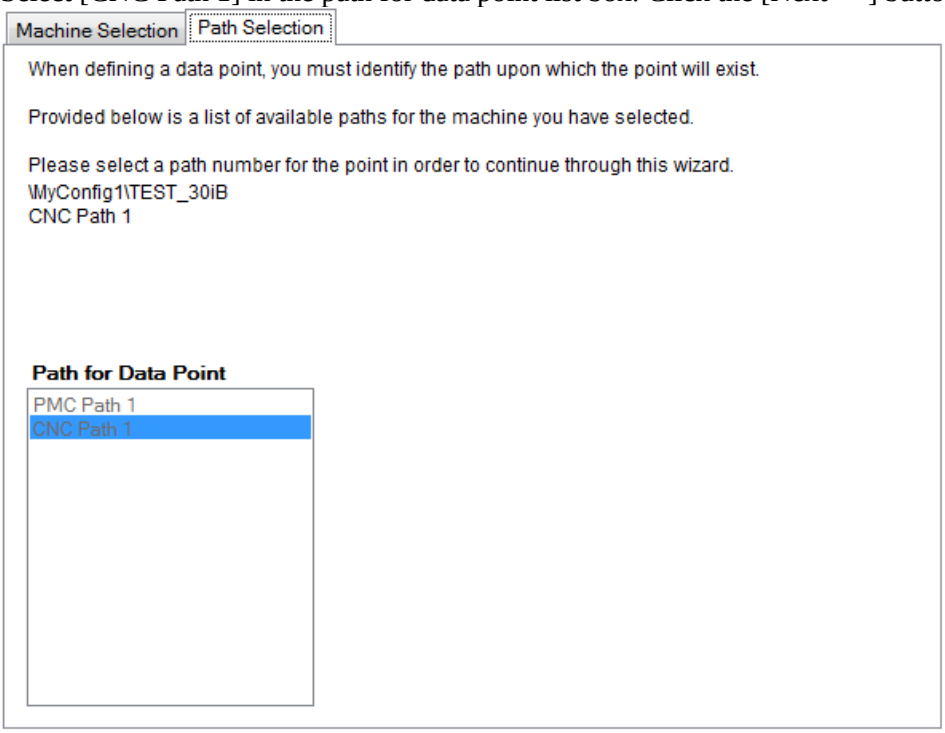
When the CNC Type (Control Types) is 0i-B/C, 16i/18i/21i-A/B or PMi-D/H, and the language other than English and Japanese is selected, the message body will be not output. And the maximum number of messages that can be acquired with these models is five.

3.9.14 CNC Status Point

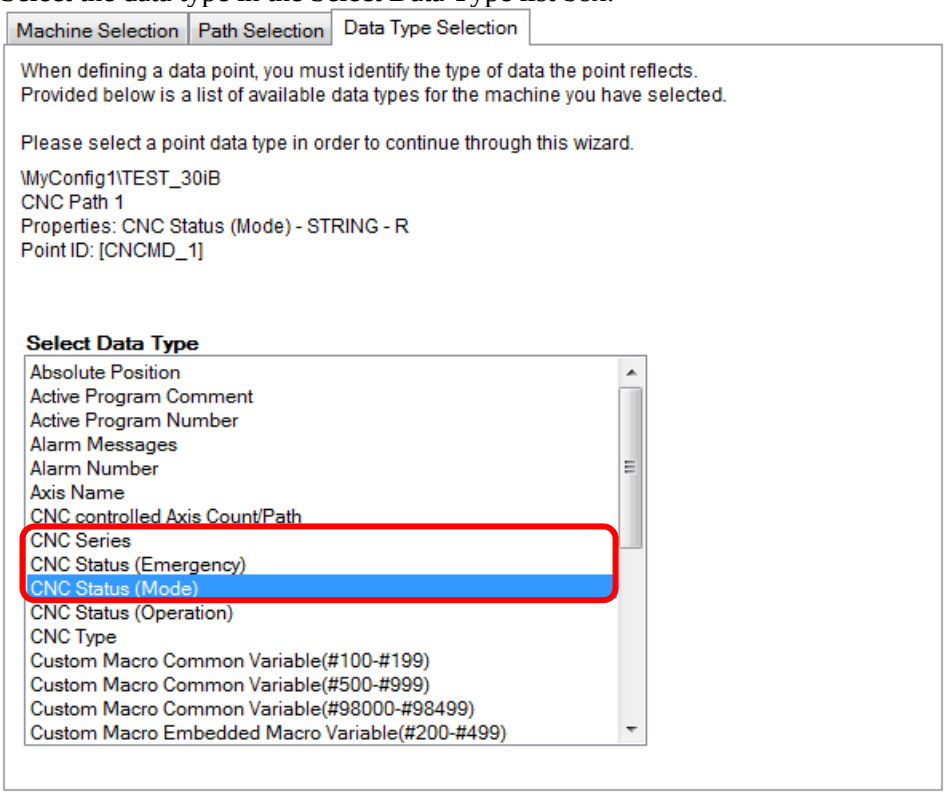
CNC status can be read or written.

Data Type
CNC Status(Mode)
CNC Status(Operation)
CNC Status(Emergency)

1) Start the Point Configuration Wizard. Click the [Next >>] button. The Path Selection tab appears in the wizard.
2) Select [CNC Path 1] in the path for data point list box. Click the [Next >>] button.

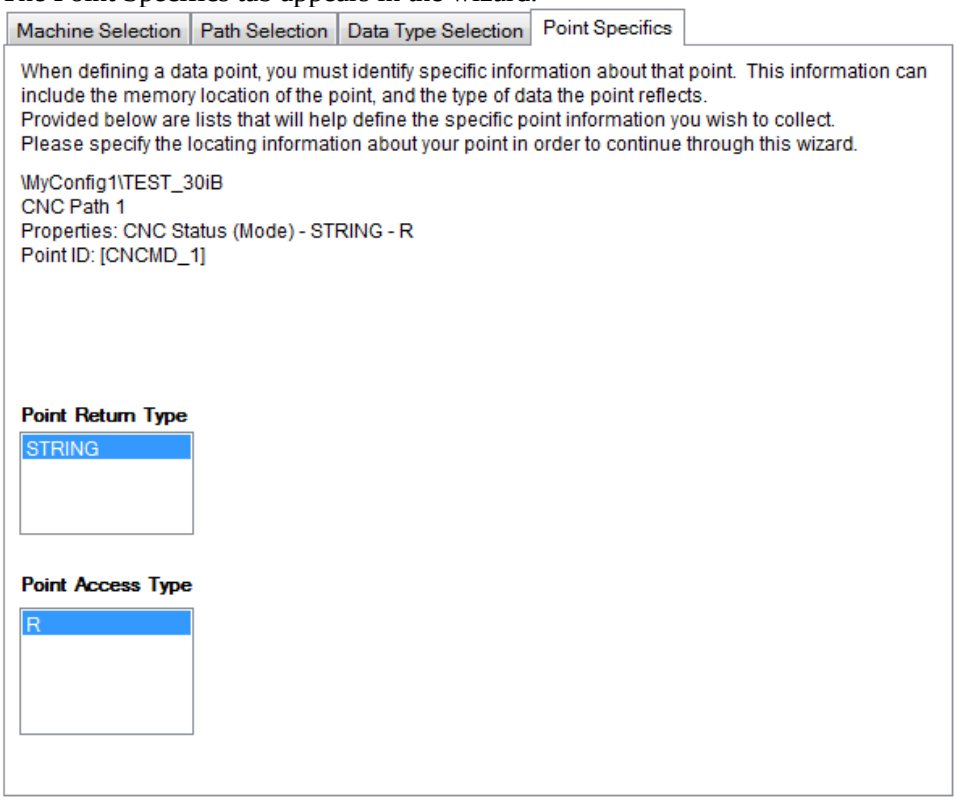


3) The Data Type Selection tab appears in the wizard.
Select the data type in the Select Data Type list box.



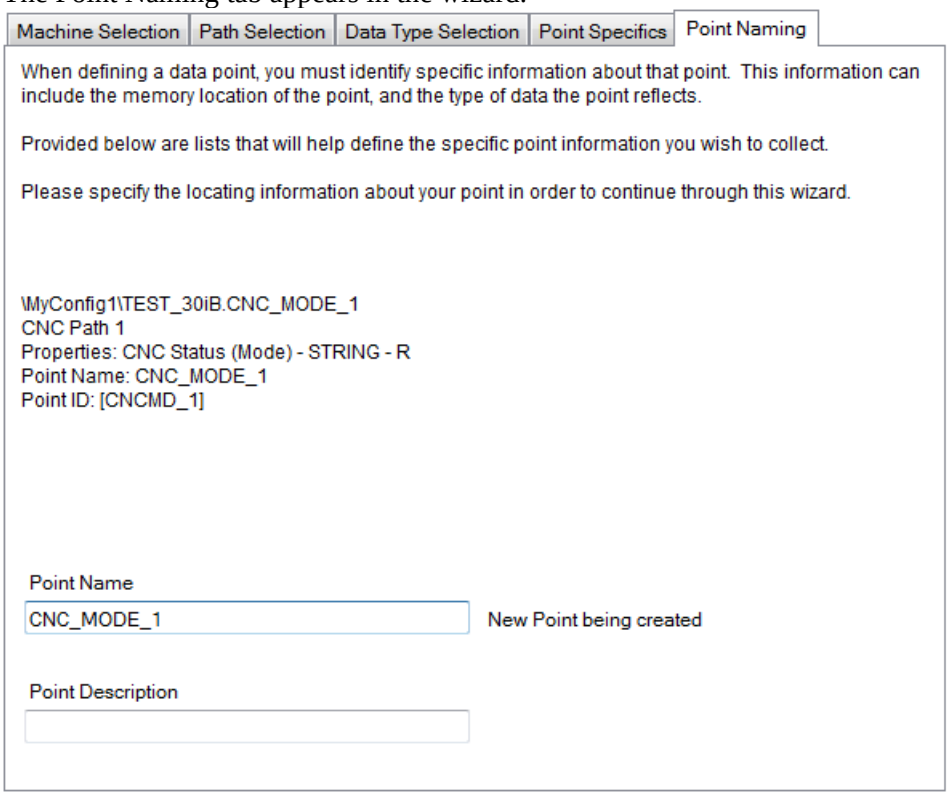
Click the [Next >>] button.

4) The Point Specifics tab appears in the wizard.



Click the [Next >>] button.

5) The Point Naming tab appears in the wizard.



Enter point name in the "Point Name" field. Enter point description in the "Point Description" field. Click the [Done] button, the point should now appear in the OPC Explorer view.

The character string output to the OPC client is as follows.

CNC Status		Output String
Mode	MDI	MDI
	MEMory	MEM
	*****	****
	EDIT	EDIT
	HanDle	HND
	JOG	JOG
	Teach in JOG	TJOG
	Teach in HaNDle	THND
	INC feed	INC
	REFerence	REF
	ReMoTE	RMT
Operation	****(reset)	****
	STOP	STOP
	HOLD	HOLD
	STaRT	START
	MSTR	MSTR
Emergency	Not EMerGency	****
	EMerGency	EMG
	ReSET	RESET
	WAIT (Only 35i)	WAIT

3.10 Configuration file

Setting of OPC Explorer is saved in the configuration file. It is possible to create two or more configuration files and read the settings from one file of them. Use the [File] menu to operate the configuration file.
After the configuration file is updated, to reflect the change to the OPC Server, it is necessary to overwrite it to the file where OPC Server reads. It is called export operation. The OPC server reads the content of the configuration file that is exported finally.

3.10.1 File menu

There are the following items in the [File] menu to operate the configuration file.

[New Configuration]
Creates a new configuration file.
[Open Configuration]
Opens a previously created configuration file.
[Close Configuration]
Closes the open configuration file.
[Save Configuration]
Saves the open configuration file.
[Save As Configuration]
Saves the open configuration file with another name.
[Export…]
Exports the open configuration file.
[Recent Files]
Displays the most recently saved configuration file.
[Exit]
Exits the OPC Configurator.

3.10.2 Saving the configuration file

The procedure to save the settings to the configuration file is as follows.
1) Click the [File] menu, and then select [Save Configuration] on the drop-down menu to save the open configuration file. The default folder is;
   - Windows 7 or later: C:¥ProgramData¥FANUC¥OPCUI
   - Windows XP : C:¥Documents and Settings¥All Users¥Application Data¥FANUC¥OPCUI

The procedure to export the configuration is as follows.
1) Click [File] on the top menu. Select [Export…] on the drop-down menu. Export Dialog appears.
2) Click the [Browse] button of the Export Dialog, and select the following folder.
   - Windows 7 or later : C:¥ProgramData¥FANUC¥OPCServer
   - Windows XP : C:¥Documents and Settings¥All Users¥Application Data¥FANUC¥OPCServer
3) Click [OK] button to export the settings.

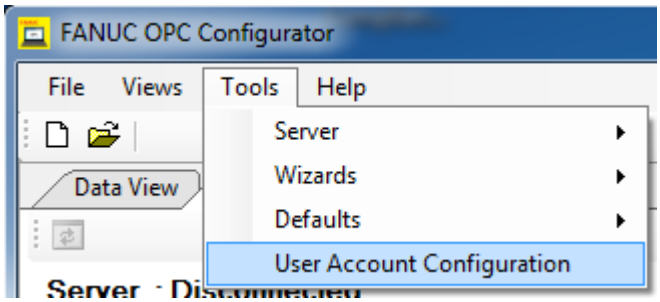
If OPC Server and OPC Configurator are installed in the different PCs;
1) Export the configuration file to the folder of the PC where OPC Configurator is installed.
2) Copy the exported file to the fixed folder of the PC where OPC Server is installed.

When OPC Server is running, restart it by the following procedure.
1) Display the user interface of the OPC Server by the procedure in "4.1 Display of OPC Server user interface" of "III. CONFIGURATION".
2) Click the menu [File], [Restart Server].

3.11 User Account Configuration

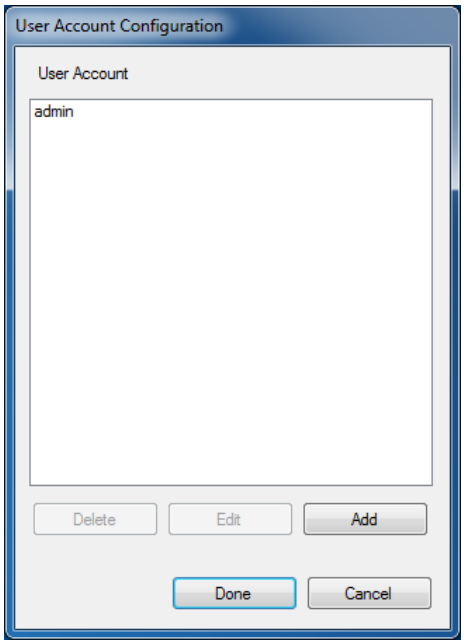
This screen is used to set up a user account that you specify when OPC UA server connection.
User account that has been set in this screen will be reflected in the configuration file that is exported to the OPC server.

User account settings screen, click the [Tools] menu, click the drop-down menu [User Account Configuration].



3.11.1 User Account

It is the list screen of a registered user account.
Additional user account, edit, and delete.
The number of user accounts that can be registered is 50 pieces.

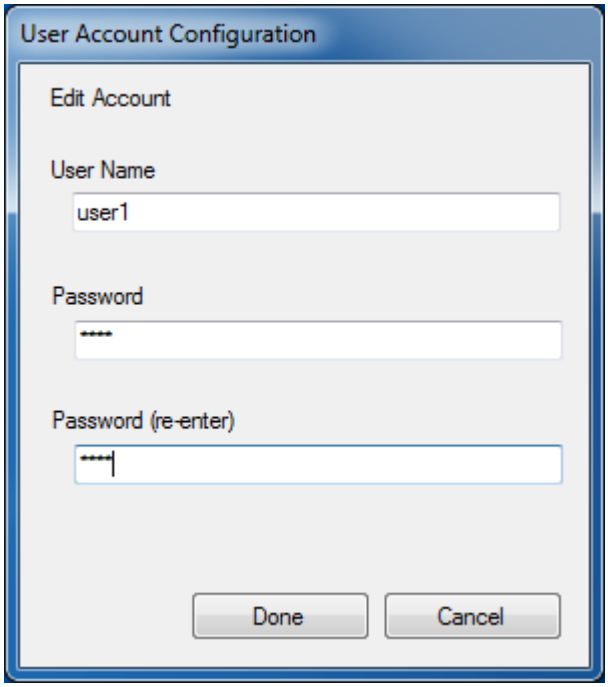


[Delete]
Delete the selected user account.
"admin" user cannot be deleted.

[Edit]
Change the selected user account name and password.
Click to open the Edit account screen.
[Add]
Add a new user account.
If the number of registered user accounts of 50, you cannot select this button.
Click to open the Add Account screen.
[Done]
Save the user account that is displayed.
Click to user account list screen is closed.
[Cancel]
To cancel all of the operation of the user account list screen, and close the screen.

3.11.2 Account Add/Edit

This screen is used to set / change of user account name / password.



[User Name]
Enter user account name.
Input possible character is up to 32 characters.
"Admin" name of the user cannot be changed.
Invalid user name is entered, error message is displayed.
Invalid user name
Registered user name
Characters use of disabled
Exceeds the maximum number of characters

[Password]
Enter user account password.

Input possible character is up to 32 characters.
Entered characters are displayed in the "*".
Invalid password is entered, error message is displayed.
Invalid password
Characters use of disabled
Exceeds the maximum number of characters

[Password (Re-Enter)]

For confirmation of the user account password, and then re-enter the password.
Input possible character is up to 32 characters.
Entered characters are displayed in the "*".
Invalid password is entered, error message is displayed.
Invalid password
Different from the password field password
Characters use of disabled
Exceeds the maximum number of characters

[Done]

Register a user name and password, closes the Add (Edit) screen.
Input the correct user name and password, this button is enabled.

[Cancel]

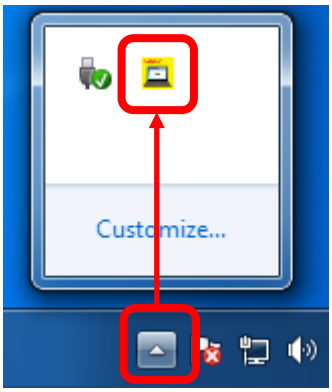
Cancel the user name and password, closes the Add (Edit) screen.

4 OPC Server

This chapter explains the user interface of OPC Server. It displays the current operating status and trace messages.

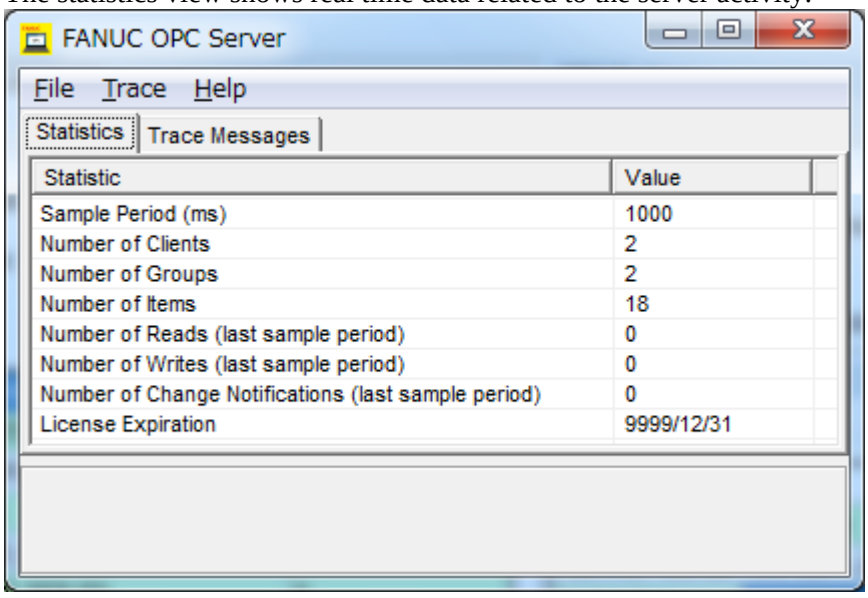
4.1 Display of OPC Server user interface

Double-Click the [FANUC OPC Server] icon in the Windows system tray. The OPC Server user interface will open.



4.2 Statistics View

The statistics view shows real time data related to the server activity.



4.2.1 Sample Period

This field indicates the time period to count the event for Number of Reads/Writes/Change Notifications. The unit is milliseconds.

4.2.2 Number of Clients

This field indicates how many OPC client programs are currently communicating with this OPC server.

4.2.3 Number of Groups

This field indicates how many groups have been created on the server by all currently connected clients.

4.2.4 Number of Items

This field indicates how many total points are being requested by all clients currently connected to the server.

4.2.5 Number of Read Operations (last sample period)

This field indicates how many READ requests occurred on the server in the last sample period.

4.2.6 Number of Write Operations (last sample period)

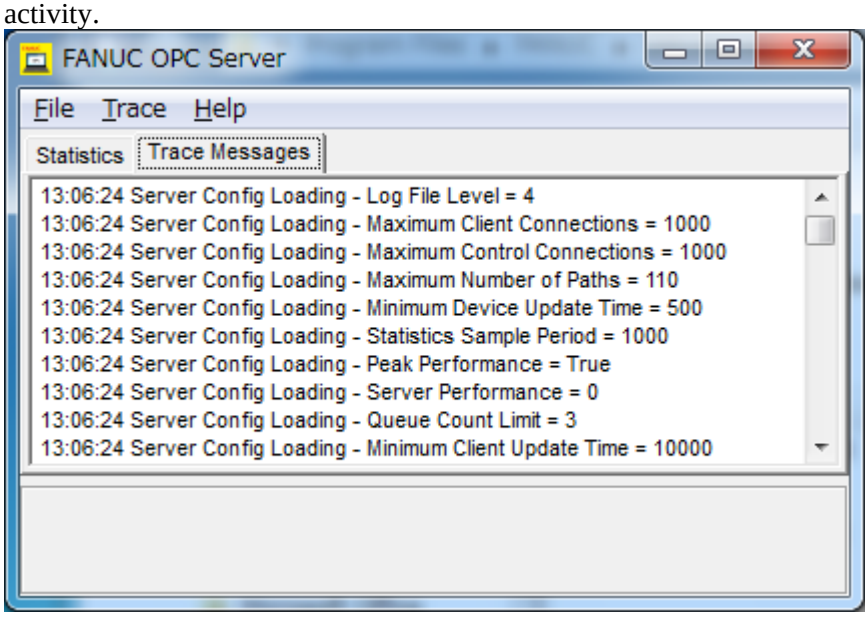
This field indicates how many WRITE requests occurred on the server in the last sample period.

4.2.7 Number of Change Notifications (last sample period)

This field indicates how many unsolicited data items were reported back to the connected client in the last sample period.

4.3 Trace Messages

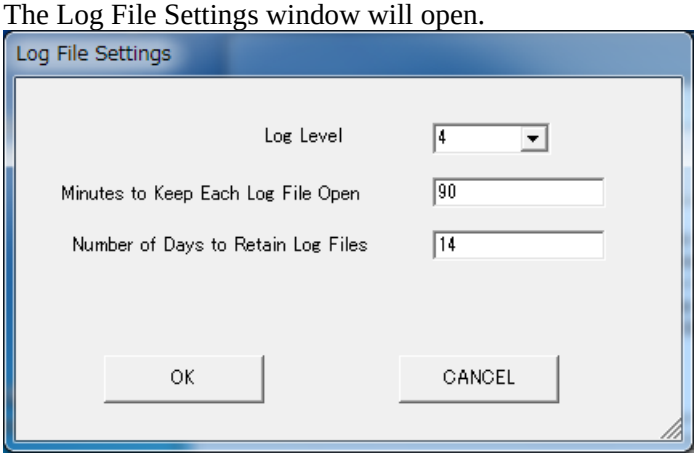
The trace messages tab shows a server activity log. Different log levels may be set to provide more detail of the activity.



4.3.1 Log File Settings

For everyday use a log level of 1 will provide enough detail to accurately indicate server activity. During setup or troubleshooting a log level of 5 shows the greatest detail of server processing.

1) Click [Trace] on the top menu. Select [Log File Settings] on the drop-down menu.
The Log File Settings window will open.



Select the log level in the "Log Level" drop-down box.
2) Click "OK" to close the window.

4.3.2 Minutes to Keep Each Log File Open

This sets the maximum amount of time the current server log file will be used. At the end of this period a new log file will be created and the old file will remain in the LOGS directory folder.
This value is set in units of minute, default is 90 minutes. Setting range is 0~2,147,483,647.

4.3.3 Number of Days to Retain Log Files

This sets how long the log file will remain in the server LOGS directory folder.
This value is set in units of days, default is 14 days.
Any log files that remain in the folder longer than the period that is specified with this setting will be automatically deleted from the folder.
Setting range is 0 to 32,767.

4.4 File Menu

4.4.1 Request Clients to Disconnect

This selection sends a message to the connected OPC clients requesting they disconnect. This is useful when a new configuration file is downloaded to the OPC server.

4.4.2 Force Server Exit

Normally the OPC server will not close while OPC clients are connected. This function forces the OPC server to shut down even with OPC clients connected.

4.4.3 Restart Server

This function restarts the OPC server.

4.4.4 Exit

This function exits the OPC Server.

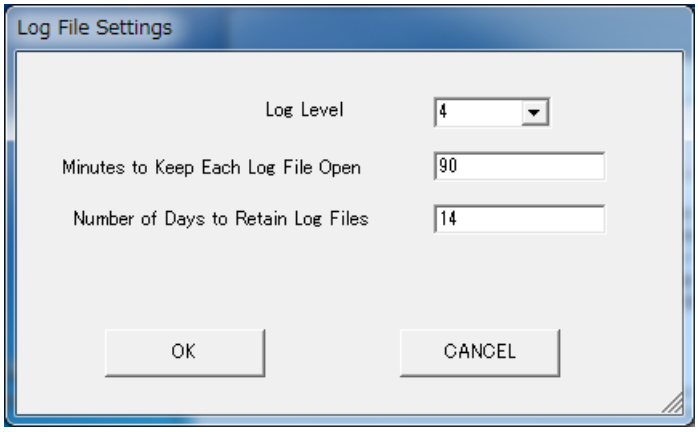
4.5 Trace Menu

4.5.1 Clear Messages

This function clears the all log messages displayed on the Trace Message tab.

4.5.2 Log File Settings

This function changes the settings about the log file.



Log Level

Log level can be specified.

Minutes to Keep Each Log File Open

This sets the maximum amount of time the current server log file will be used. At the end of this period a new log file will be created and the old file will remain in the LOGS directory folder.
This value is set in units of minute, default is 90 minutes. Setting range is 0~2,147,483,647.

Number of Days to Retain Log Files

This sets how long the log file will remain in the server LOGS directory folder. This value is set in units of days, default is 14 days. Any log files that remain in the folder longer than the period that is specified with this setting will be automatically deleted from the folder. Setting range is 0 to 32,767.

4.6 Help Menu

The help menu currently has only one selection, which is [About]. The [About] box indicates the product name and version.

4.7 SVR Date

OPC client is notified of the information of FANUC OPC server.
Description of each data is as follows.

Point Name	Type	Description
SVR.LASTREADTIME	Long	Read processing time at the time of the read request
SVR.LICENSE_APPLIED_TO	String	Fixed to 0
SVR.LICENSE_EXPIRATION	String	License expiration date Fixed to the “9999/12/31”
SVR.LICENSE_NUMBER_OF_MACHINE_ALLOWED	String	Connectable CNC number Fixed at 100
SVR.LICENSE_STATUS	String	License status Fixed to the “Licensed”
SVR.LICENSE_USERS_ALLOWED	String	Connectable Clients number Fixed to 11
SVR.MODE_OPC_UA	String	mode state of FANUC OPC server True : OPC UA mode False : OPC Classic mode
SVR.MODE_SERVICE	String	Service mode state of FANUC OPC server True : Service mode False : Application mode
SVR.NUMBER_OF_ACTIVE_MACHINES	String	Connection CNC number that has been set in the FANUC OPC Configurator
SVR.NUMBER_OF_LOADED_MACHINES	String	CNC number that have been read as a connection object
SVR.OUTPUTQUEUECOUNT	Long	Fixes to 0
SVR.SERVER_VERSION	String	FANUC OPC Server Version
SVR.STAT_NUM_CHG_PER_PD	Long	Number of Change Notifications

Point Name	Type	Description
SVR.STAT_NUM_CLIENTS	Long	Number of clients that are connected to the OPC server
SVR.STAT_NUM_GROUPS	Long	Number of groups that have been created on the client that are connected
SVR.STAT_NUM_ITEMS	Long	Number of points that have been requested by the client connected
SVR.STAT_NUM_READS_PER_PD	Long	Number of read requests that have occurred on the server
SVR.STAT_NUM_WRITES_PER_PD	Long	Number of write requests that have occurred on the server
SVR.STAT_SAMPLE_PERIOD	Long	Period to count the event
SVR.TOTAL_NUMBER_OF_MACHINES	String	Connection CNC number that has been set in the FANUC OPC Configurator

5 OPC UA support

This chapter describes the support of OPC UA of FANUC OPC server.

5.1 Introduction to OPC UA

OPC UA encompasses the OPC technology of the past (OPC Classic), it is the standard specification of the OPC which has been proposed from the OPC Foundation as a new OPC standard.
FANUC OPC server provides the OPC server that conforms to this OPC UA standard.
FANUC OPC server running on the OPC UA standards, will be possible to connect to the OPC client of the OPC client both standards that conforms to the OPC client and OPC UA standard that conforms to the OPC Classic of DA standard.

5.2 OPC UA Support of FANUC OPC Server

FANUC OPC server can operate to switch between two operating modes of operation in the OPC Classic of DA standard (OPC Classic mode) and the operation in the OPC UA standard (OPC UA mode).

OPC Classic mode, can be equivalent operation and version 2.0.0 of FANUC OPC server.
OPC UA mode can be connected to a OPC client of the OPC UA standard in addition to the OPC client of the OPC DA standard.

NOTE
OPC Classic mode, cannot be connected to the OPC UA client.

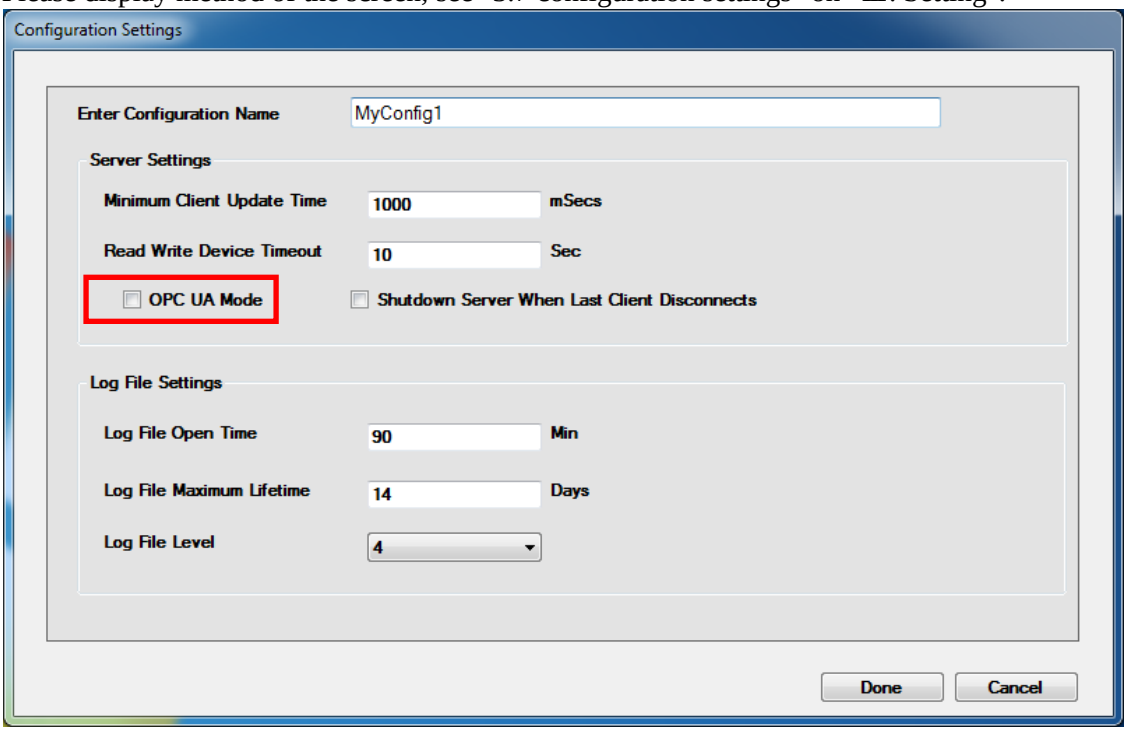
Specification of the OPC UA mode of FANUC OPC server is as follows.

Item	Description	Support
Endpoint URL	opc.tcp://localhost:59611	✓
Transport Setting	TCP Binary	✓
	SOAP/HTTP	-
	HTTPS	-
Security Mode	None	✓
	Sign	✓
	SignAndEncrypt	✓
Security Policy	None	✓
	Basic128Rsa15	✓
	Basic256	✓
Authentication Settings	Anonymous	-
	User Name	✓
	X509 Certificate	-

5.3 Setting of OPC UA mode

Setting procedure of OPC UA mode is as follows.

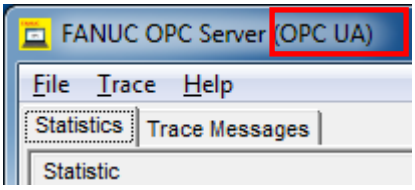
1) Configuration settings screen of FANUC OPC Configurator, set the [OPC UA Mode] check box.
Please display method of the screen, see "3.7 configuration settings" on "Ⅲ. Setting".

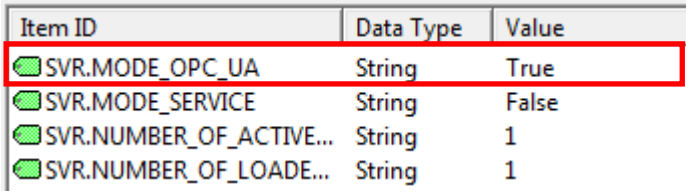


OPC UA mode checkbox
Check box is enabled : Operating in the OPC UA mode
Check box is disabled : Operating in the OPC Classic mode
Set the other setting items in the configuration settings, press the [Done] button.

2) Save the settings.
Click the [File] menu, and then click the [Save Configuration] from the drop-down menu.
Settings are saved to the MyConfig1.fs2.
3) Click the [File] menu, and then click [Export] in the drop-down menu.
4) Click the [OK] button to close the export Dialog window.
5) Click [All Programs],[FANUC OPC server],[FANUC OPC server] of Windows, Start the FANUC OPC server.
6) Current mode of operation, the screen title of FANUC OPC server and can be found in the SVR information of the OPC client.

Title	SVR.MODE_OPC_UA	Description
OPC UA	True	Operating in the OPC UA mode
OPC Classic	False	Operating in the OPC Classic mode





5.4 OPC UA mode connection

This chapter describes the procedure of connection with the OPC UA client.
OPC UA client is described using the Softing company "OPC UA Client".
Connect to the OPC Classic of the client (eg OPC Quick Client) is the same as the FANUC OPC server version 2.0.0. Please and method of connecting the OPC Quick Client refers to the "1.4 OPC client of operation check" in the "Ⅲ. Setting".

5.4.1 Discovery of the OPC server

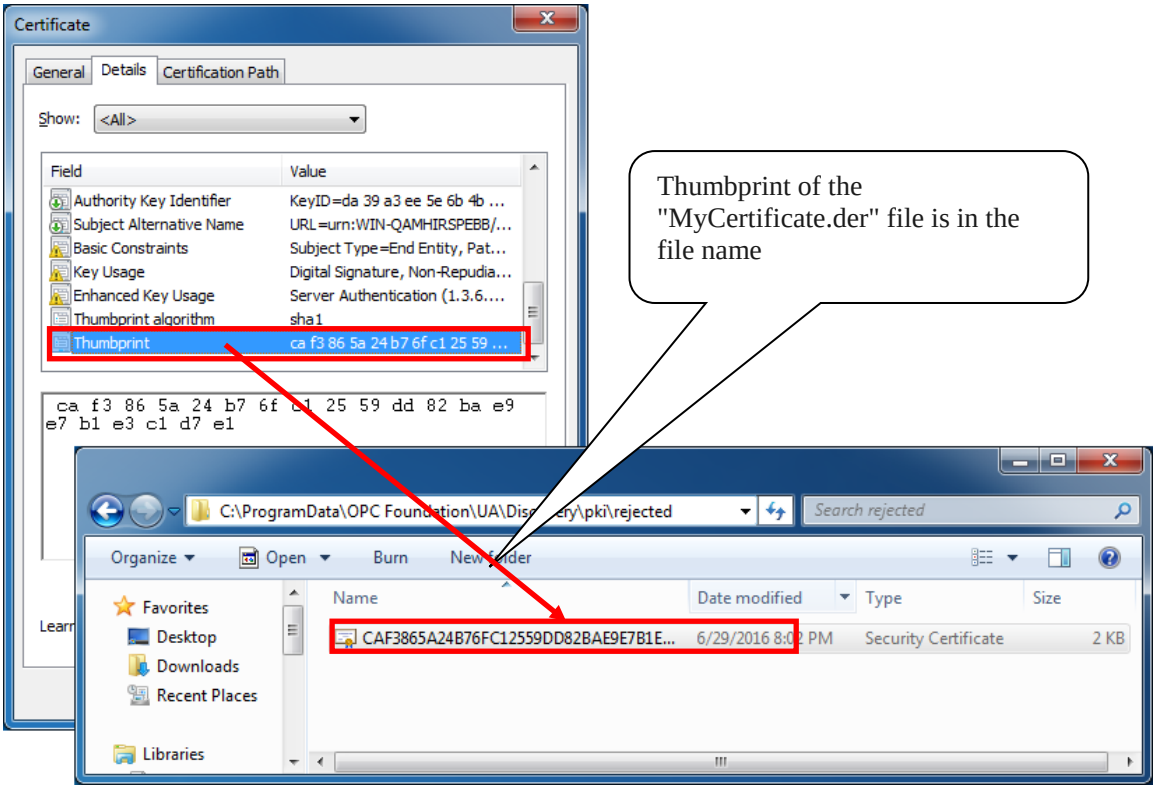
Connection from the OPC UA client to the OPC UA server, specify the endpoint of the OPC UA server.
If the endpoint is known in advance, you can specify the endpoint directly.
Discovery function of the endpoint of the OPC UA server searches for the OPC server If you do not know is located in the OPC UA standard.
Use the discovery feature allows you to search the OPC UA server running on any personal computer.
Search for LocalDiscoveryServer (below LDS) will be installed at the same time with the FANUC OPC server.
OPC UA client using the Discovery Function, you can search for FANUC OPC server.

NOTE
Windows XP cannot use this discovery feature.
Connection from the OPC UA client in Windows XP, please connect by specifying the endpoint directly.

This section describes how to use the discovery function.

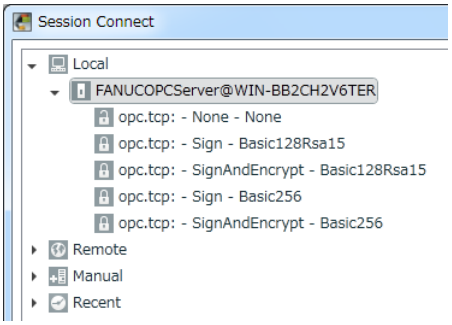
1) When you start the FANUC OPC server in UA mode, it will be issued a certificate of FANUC OPC server.
   Certificate Folder : C:¥ProgramData¥FANUC¥OPCServer¥ PKI¥CA¥certs
   File name of the issued certificate is "MyCertificate.der".

2) Issued FANUC OPC server of the certificate will also be created to reject folder of the certificate issued at the same time as LDS.
   Reject Folder : C:¥ProgramData¥OPC Foundation¥UA¥Discovery¥pki¥rejected
   The name of the file that is created is created with the following rules.



3) After that the file of reject folder of LDS of the certificate is a FANUC OPC server of the certificate is confirmed, move it to the trust folder of LDS.
Trust Folder : C:¥ProgramData¥OPC Foundation¥UA¥Discovery¥pki¥trusted¥certs

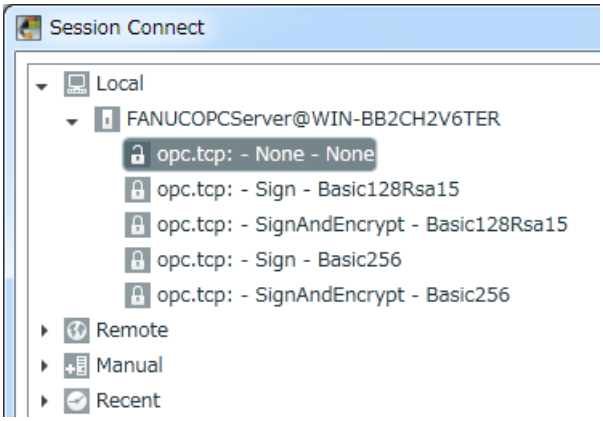
4) Search for the FANUC OPC server from the OPC UA client.



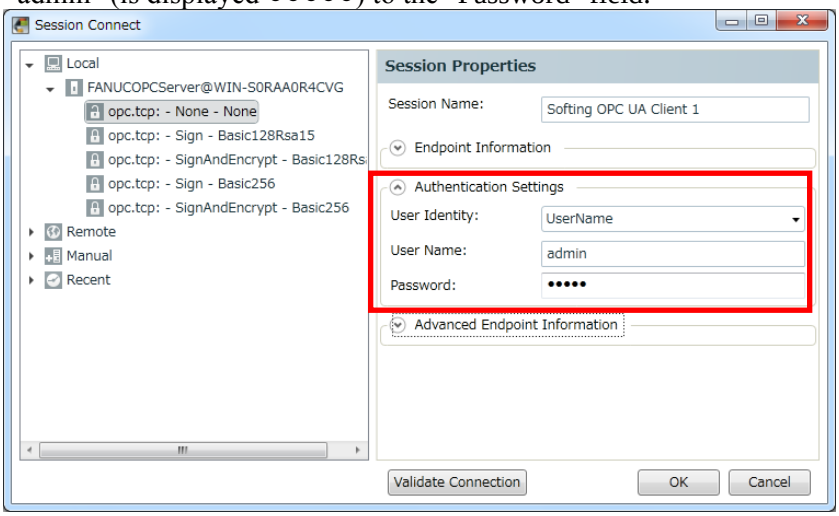
5.4.2 OPC server connection(security disabled)

Connect the OPC UA client and FANUC OPC server.
Disable the security settings to connect to the server.

1) Select the "opc.tcp-None-None" from the search was FANUC OPC server security mode.



2) Select the "UserName" from the "User Identity" field, enter "admin" in the "User Name" field, enter "admin" (is displayed ●●●●●) to the "Password" field.

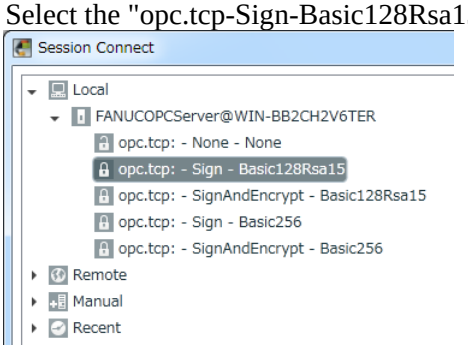


3) [Validate Connection] button is connected to success When a green check mark appears, press.

5.4.3 OPC server connection(security enabled)

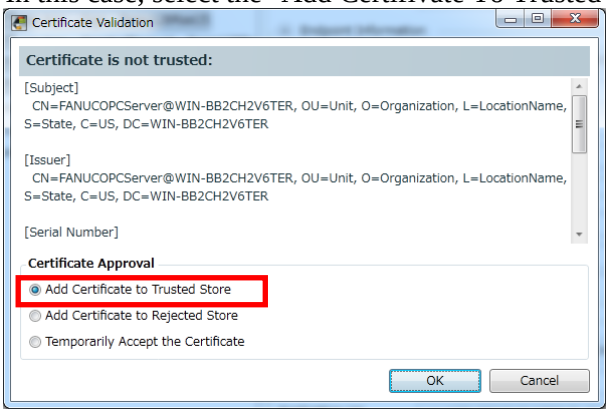
Enable the security settings to connect to the server.

1) Select the "opc.tcp-Sign-Basic128Rsa15" from the search was FANUC OPC server security mode.

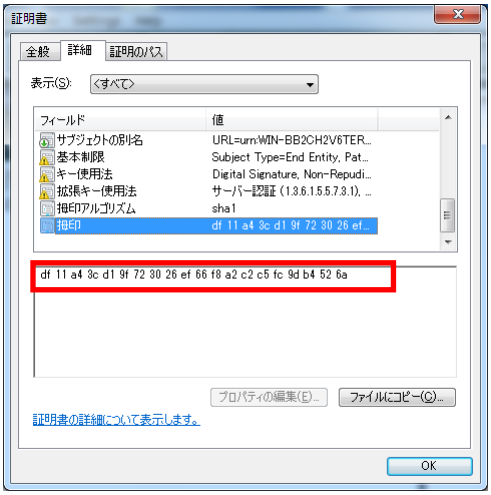


2) Select the "UserName" from the "User Identity" field, enter "admin" in the "User Name" field, enter "admin" (is displayed ●●●●●) to the "Password" field. (No security and the same)

3) If you are using a Softing OPC UA Client, you will see the following screen and press the [Validate Connection] button.
In this case, select the "Add Certificate To Trusted Store", then press the OK button.



When you press the OK button, the trust folder of Softing OPC UA Client, FANUC OPC server of the certificate is created.
Trust Folder : C:¥ProgramData¥Softing¥OpcClient¥pki¥trusted¥certs
Create File Name : FANUCOPCServer@ComputerName [Thumbprint number].der
Thumbprint number : Thumbprint number of FANUC OPC server's certificate
Example)
FANUCOPCServer@WIN-BB2CH2V6TER [DF11A43CD19F723026EF66F8A2C2C5FC9DB4526A].der



4) [Validate Connection] button red "X" mark appears, and connection failure.

NOTE

Connection failure in this case, is normal.
Since the OPC UA client certificate has not been authenticated to the OPC UA server, and connection failure.

5) If the connection fails, to reject folder of FANUC OPC server, certificate of OPC UA client is created.
Reject Folder : C:¥ProgramData¥FANUC¥OPCServer¥PKI¥CA¥rejected
File name is the same as the naming convention of the file name of the 2) of "5.4.1 search of the OPC server".

6) The OPC UA client's certificate in the reject folder of FANUC OPC server, move it to the trust folder of FANUC OPC server.
Trust Folder : C:¥ProgramData¥FANUC¥OPCServer¥PKI¥CA¥certs

7) Again, it is a successful connection when you see a green check mark by pressing the [Validate Connection] button.

NOTE

Same operation in other security mode.
SignAndEncrypt-Basic128Rsa15
Sign-Basic256
SignAndEncrypt-Basic256

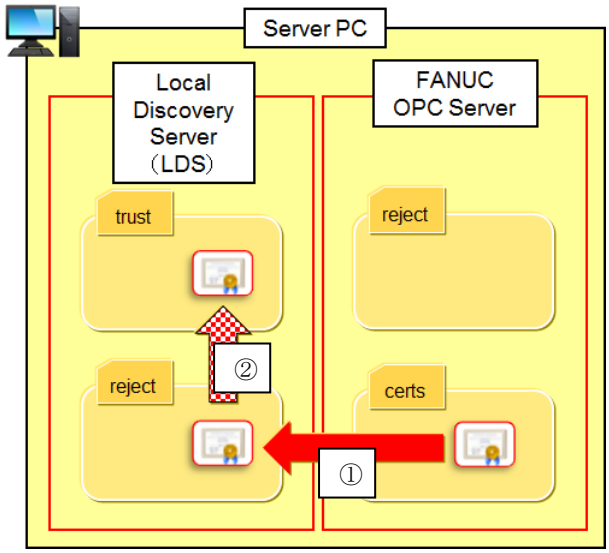
5.5 Certificate authentication

This chapter describes the exchange of certificates that have been made in the OPC UA standard.

OPC UA standards, at the time of connection of the OPC UA server and the OPC UA client, make sure both of the certificate, has established a security on the communication by authentication.
In addition, LDS also be authenticated to verify the certificate of the OPC UA server, you have to notice the existence of the OPC UA server to the OPC UA client.

5.5.1 OPC server certificate registration to the LDS

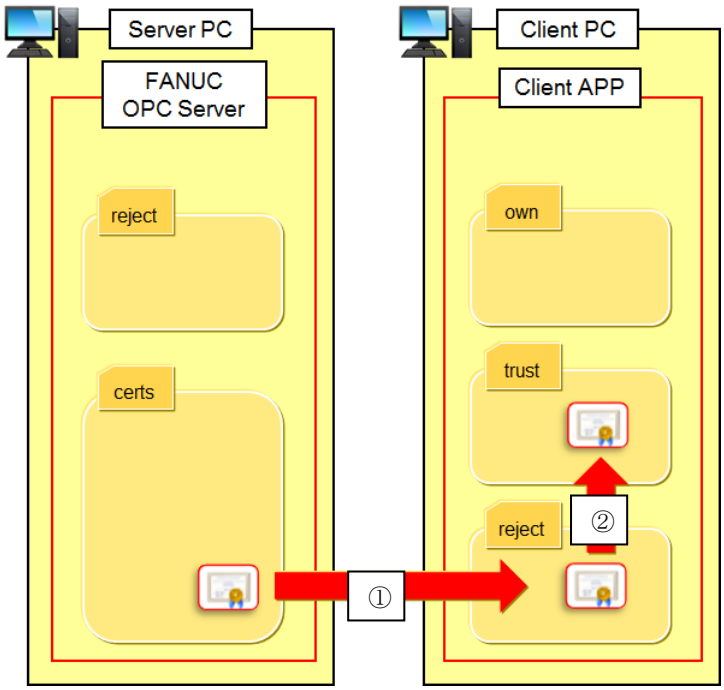
OPC UA server certificate, and save it in the trust folder of LDS.



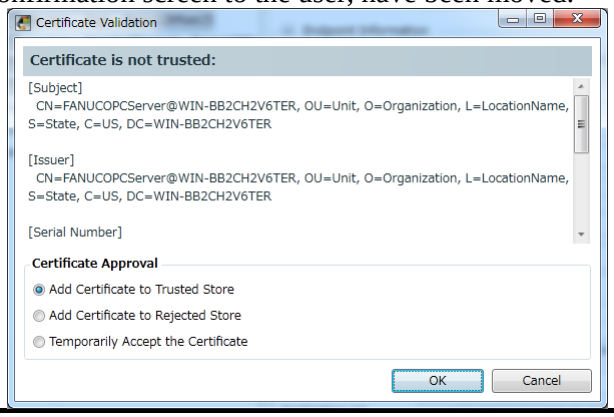
①FANUC OPC server certificate, once, will be created in the reject folder of LDS.
②The certificate of the LDS reject folder, by moving to trust folder of LDS, to register the FANUC OPC server.
LDS to that OPC UA server is registered, you can search the OPC UA server from the OPC UA client.

5.5.2 Certificate authentication of the OPC UA server

The FANUC OPC server's certificate by OPC UA client is stored in the trust folder, to allow a connection to the FANUC OPC server.



①FANUC OPC server certificate, once, will be created in the reject folder of the OPC UA client.
②A certificate of reject folder of the OPC UA client, by moving to trust folder of the OPC UA client and allow the connection of the FANUC OPC server.
"Softing OPC UA Client" is a movement from the reject folder to trust folder, by selected on the confirmation screen to the user, have been moved.

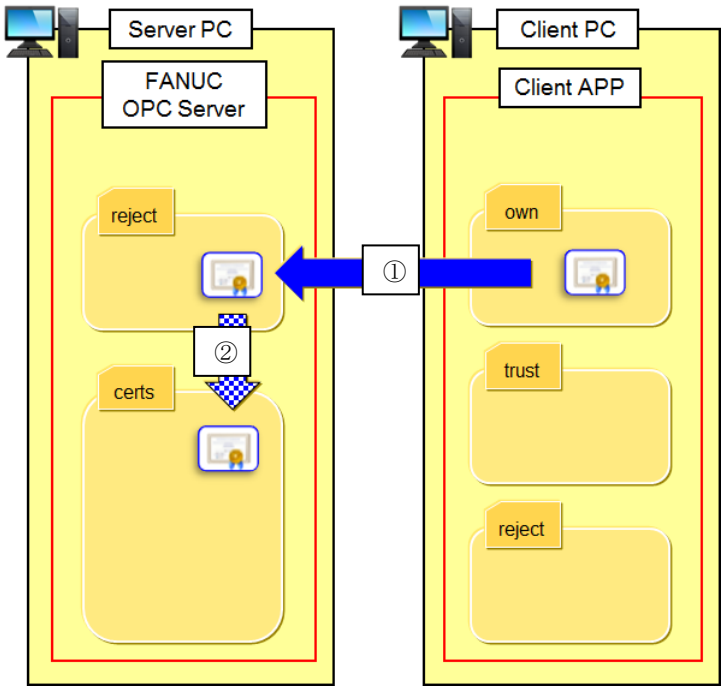


NOTE

How to move the certificate of the OPC UA client is dependent on the specifications of the OPC UA client to use.

5.5.3 Certificate authentication of the OPC UA Client

If the OPC UA client is connected with available OPC UA server and the security mode, the certificate of the OPC UA client, be to save the trust folder of the OPC UA server, to allow a connection to the OPC UA server.



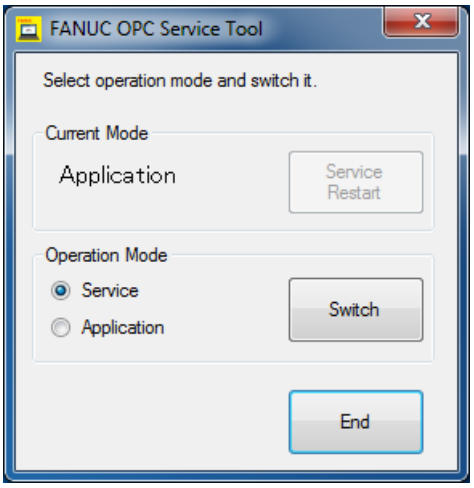
①OPC UA client certificates, once, will be created in the reject folder of the OPC UA server.
②A certificate of reject folder of the OPC UA server, by moving to trust folder of the OPC UA server, allows the connection with the OPC UA client.

6 Windows service support

FANUC OPC server can run as a Windows service.
This chapter describes how to run the FANUC OPC server a Windows services.
In the text, and described as "service mode" the state running on Windows services, the state is running as a normal application "application mode".
FANUC OPC server that is set in the service mode, you can connect to the OPC client in a state in which to log off.

6.1 FANUC OPC Service Tool

When you install the version 3.0.0, "FANUC OPC service tool" will be newly installed in the program menu.
FANUC OPC service tool is a tool for switching the mode of operation of the FANUC OPC server.



Screen Description

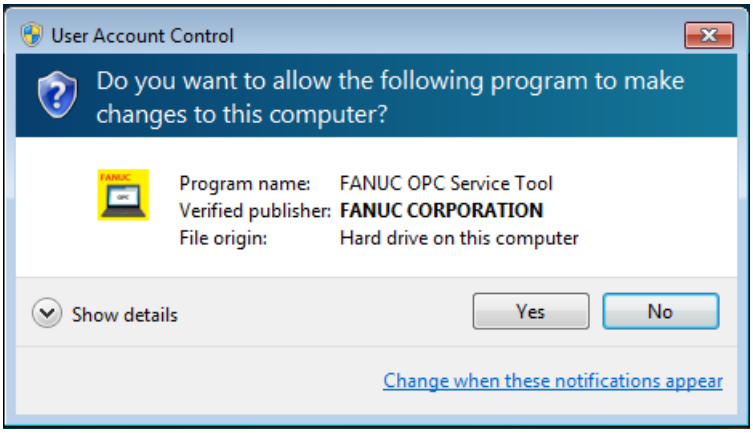
[Current Mode]	: Displays the current operating status of the FANUC OPC server. "Application" "Service" "Service Stopped" is displayed.
[Operation Mode]	: It is a radio button to select the mode of operation of the FANUC OPC server.
[Service Restart]	: This button is used to when to restart the "FANUC OPC server" in the service mode.
[Switch]	: This button to switch to the mode selected a "Operating Mode".
[End]	: Exit the "FANUC OPC service tool".

6.1.1 Switching to service mode

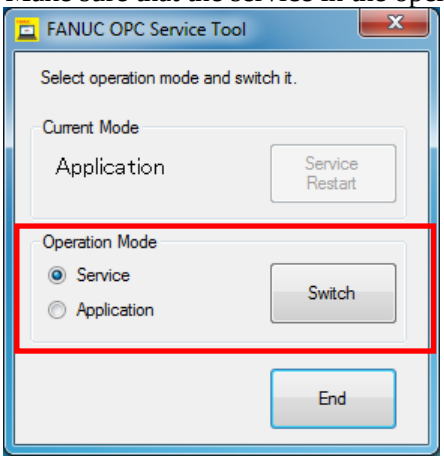
The "FANUC OPC server" describe how to switch to run in a Windows service.

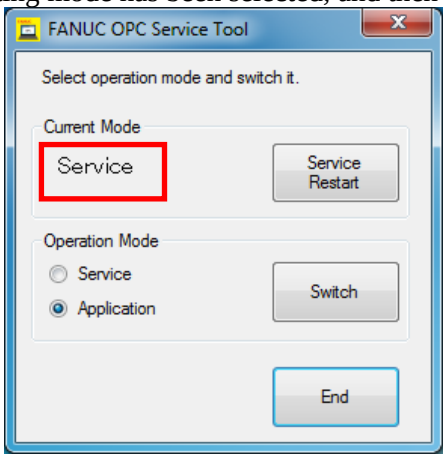
1) Terminate the "FANUC OPC server".
   In the case of "FANUC OPC server" is already running at the time of switching to the service, it cannot be switched.
2) Click the program menu [All Programs], [FANUC OPC Server - Click the [FANUC OPC Service Tools.

3) Opens the user account control screen.
   Make sure that the program name is FANUCOPCServiceTool.exe, and then press the [OK] button.



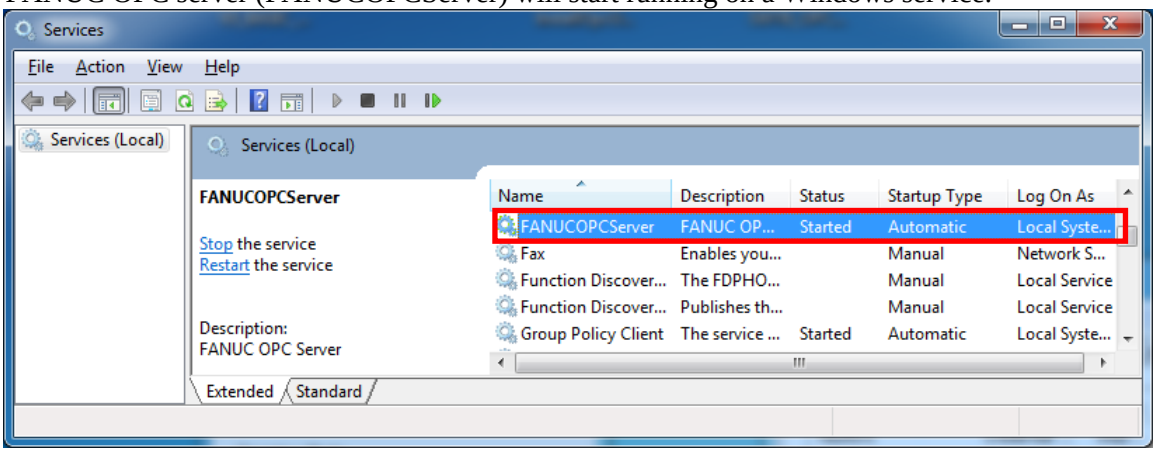
4) FANUC OPC service tool is started.
Make sure that the service in the operating mode has been selected, and then click the switch button.





When switching to the Windows service is complete, the "current mode" display will change to "service".

5) FANUC OPC server (FANUCOPCServer) will start running on a Windows service.



Ed.	Date	Design	Description
05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
03	2017.12.25	T.Hosaka	OPC UA support
02	2016.01.13	T.Hosaka	Old CNC support and data type added.

Date	2015.09.25	Desig.	T.Hosaka	Check		Apprv.	K.Murata

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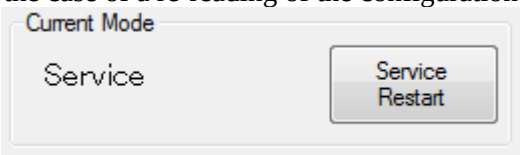
FANUC CORPORATION		Sheet.	133/167

NOTE

Method of connecting also client running in service mode is the same as the application mode.
However, the Connection to the OPC Classic client requires DCOM setting.
See [6.2 Connection to the OPC Classic clients]

6.1.2 Restarting the service mode

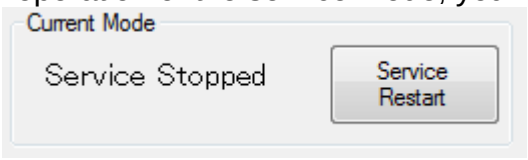
FANUC OPC server running on a Windows service is always running up to power down the PC.
That's the state of the running, if you change the configuration file in FANUC OPC configurator, cannot reflect the contents of the configuration file to FANUC OPC server.
In the case of a re-reading of the configuration file, you can use the service restart button.



1) Start the FANUC OPC service tool.
2) Click the [Service Restart] button.
3) After the display of the [Service Restart] button is changed to [Service Stopping], and again returns to the [Service Restart], it is restart the completion of the FANUC OPC server.

NOTE

Even if the "Service Stopped" to the current mode is displayed, when the restart operation of the service mode, you might be able to restart the service.

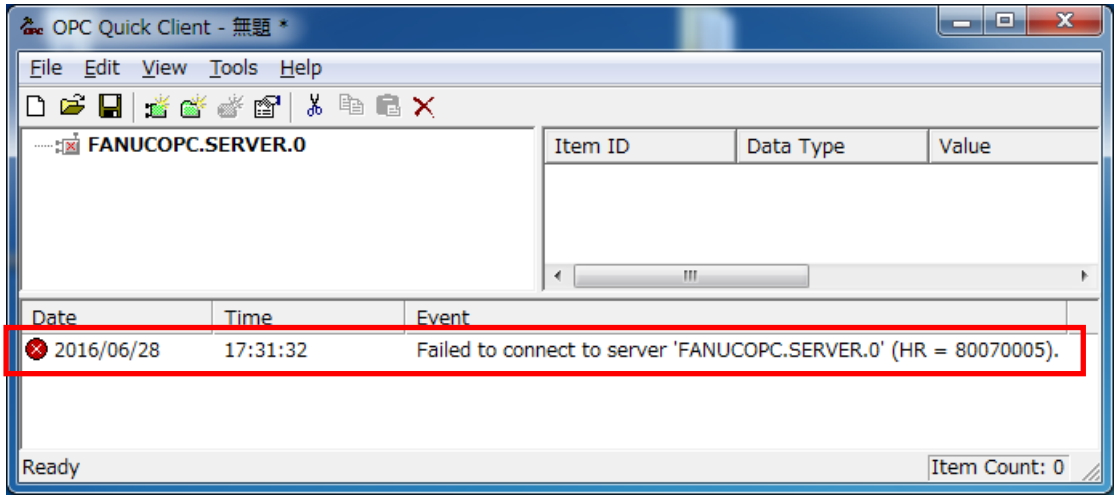


6.2 Connection to the OPC Classic clients

Even in the OPC server and OPC Classic client on the same PC, and FANUC OPC server running in service mode, when you connect the OPC client of OPC Classic, you will need a DCOM setting.
Please refer to the client side of the DCOM configuration, refer to "7.3.2 DCOM settings".

NOTE

If you do not have DCOM setting, it cannot be connected to a client of OPC Classic.

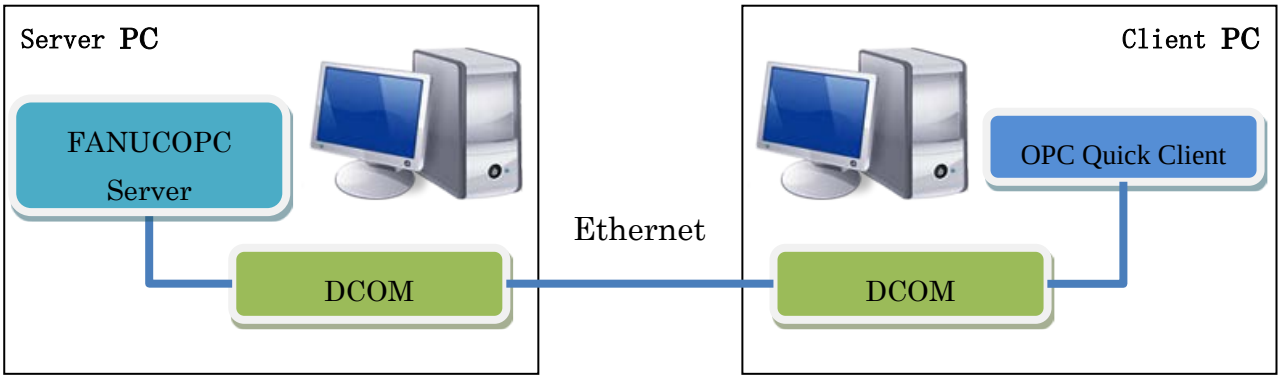

OPC Quick Client - 無題 *
File Edit View Tools Help
FANUCOPC.SERVER.0
Item ID
Data Type
Value
Date
Time
Event
2016/06/28
17:31:32
Failed to connect to server 'FANUCOPC.SERVER.0' (HR = 80070005).
Ready
Item Count: 0

7 DCOM Setting

This chapter describes DCOM summary, for the DCOM method of setting the server PC and the client PC.
If you want to connect in OPC Classic clients from other personal computer to the server of OPC Classic mode requires DCOM setting.
This setting method in the case of server / client PC is "Windows 7 Professional 32bit OS".

7.1 Summary

The DCOM, a Microsoft's technology for communication between software components on a computer which is distributed on the network (distributed object technology).
Another client PC and server PC (FANUC OPC server) (OPC Quick Client) will communicate with Ethernet through DCOM.



7.2 Server/Client PC sharing settings

If you are using DCOM on the WORKGROUP , and set the following three points in both of the server / client PC.

1) The same account name, and log in with the same password.
2) Set the login password sure.
3) To belong to the same WORKGROUP.

7.3 Client PC Settings

This section describes the configuration of the client PC.

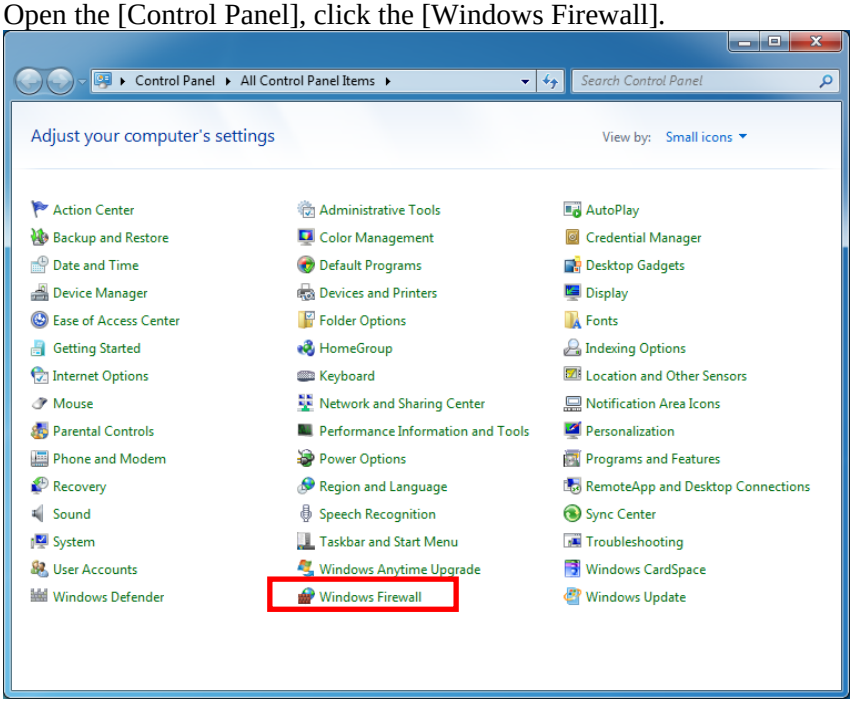
The client PC assumes that the following software is installed.

- OPC Core Components
- Software toolbox OPC Quick Client

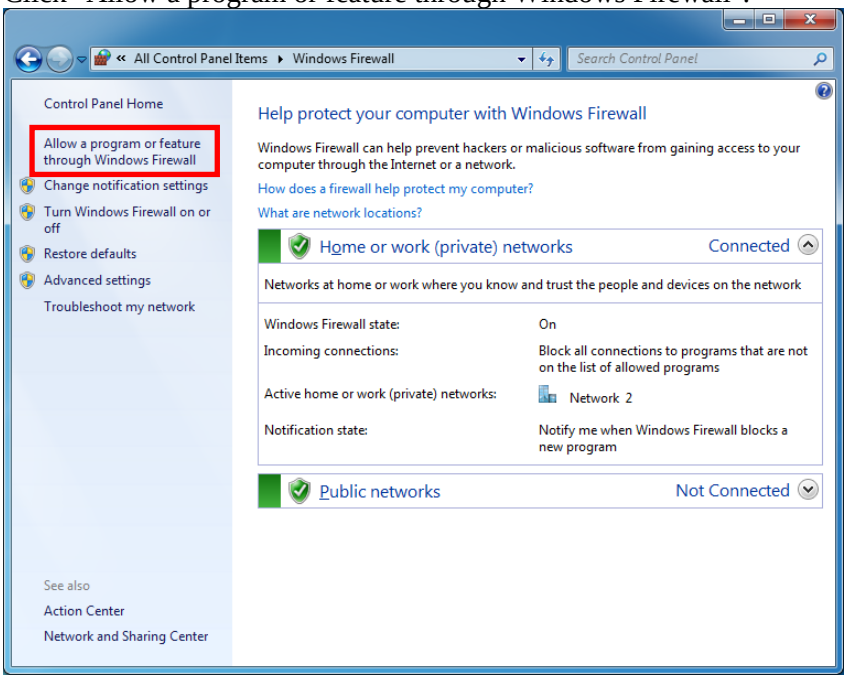
7.3.1 Windows Firewall Exceptions settings

This section describes the Windows Firewall exception settings on the client PC.
Firewall and preferably disable it unnecessary environment. If you disable, exceptional settings of the firewall, you do not need.

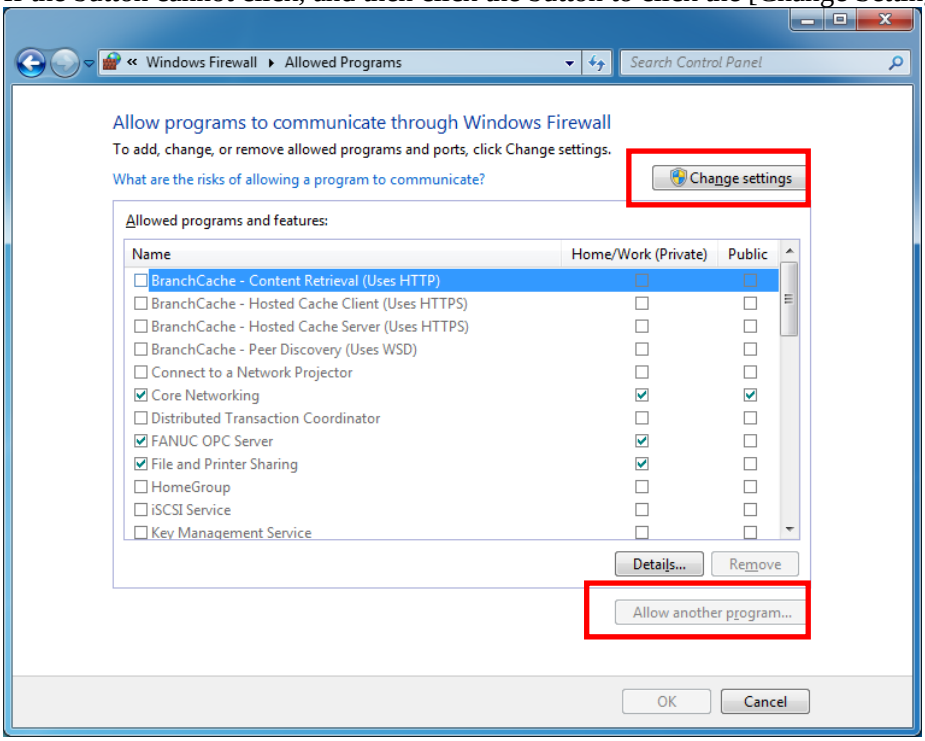
1) Open the [Control Panel], click the [Windows Firewall].



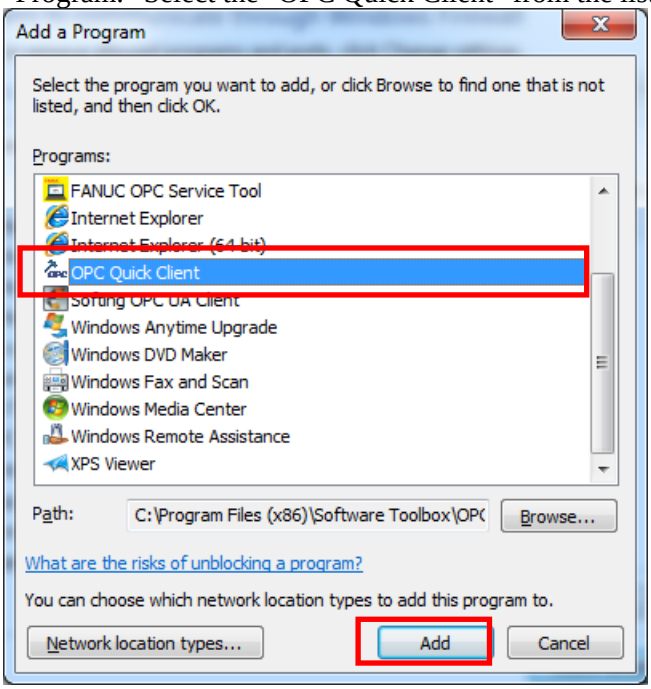
2) Click "Allow a program or feature through Windows Firewall".



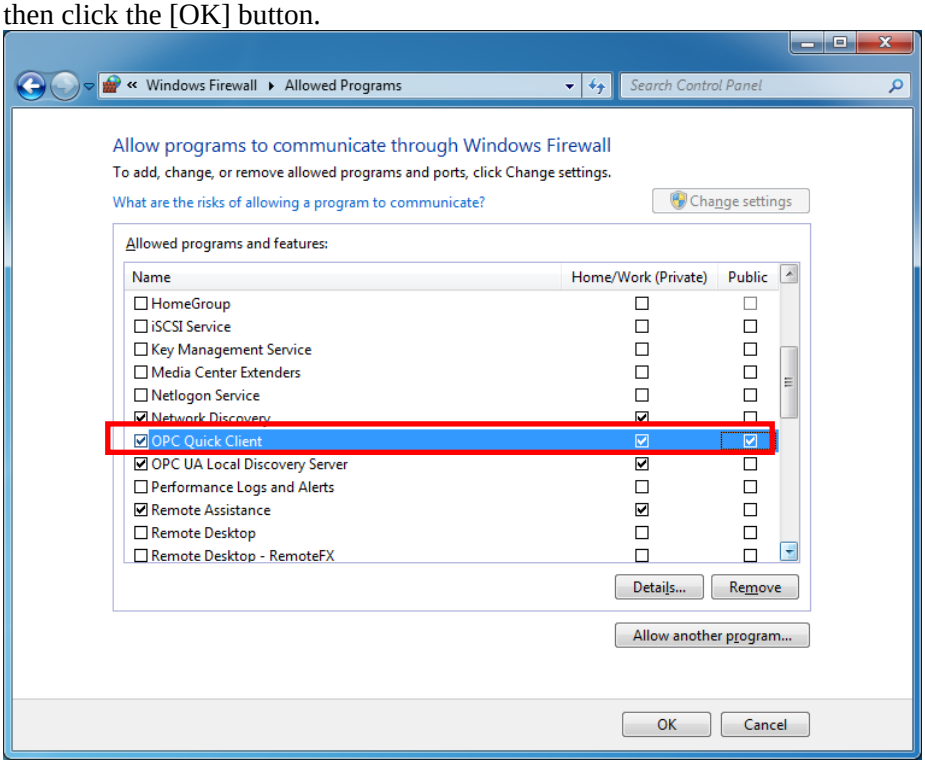
3) Click [Allow another program…].
If the button cannot click, and then click the button to click the [Change Settings] button.



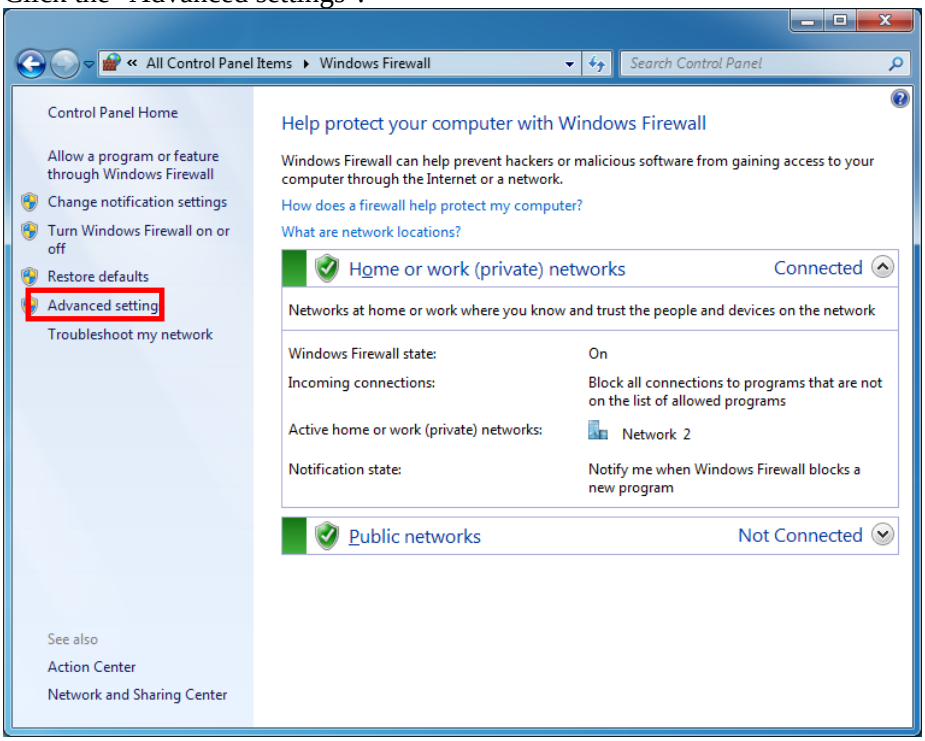
4) "Program:" Select the "OPC Quick Client" from the list, and click the [Add] button.



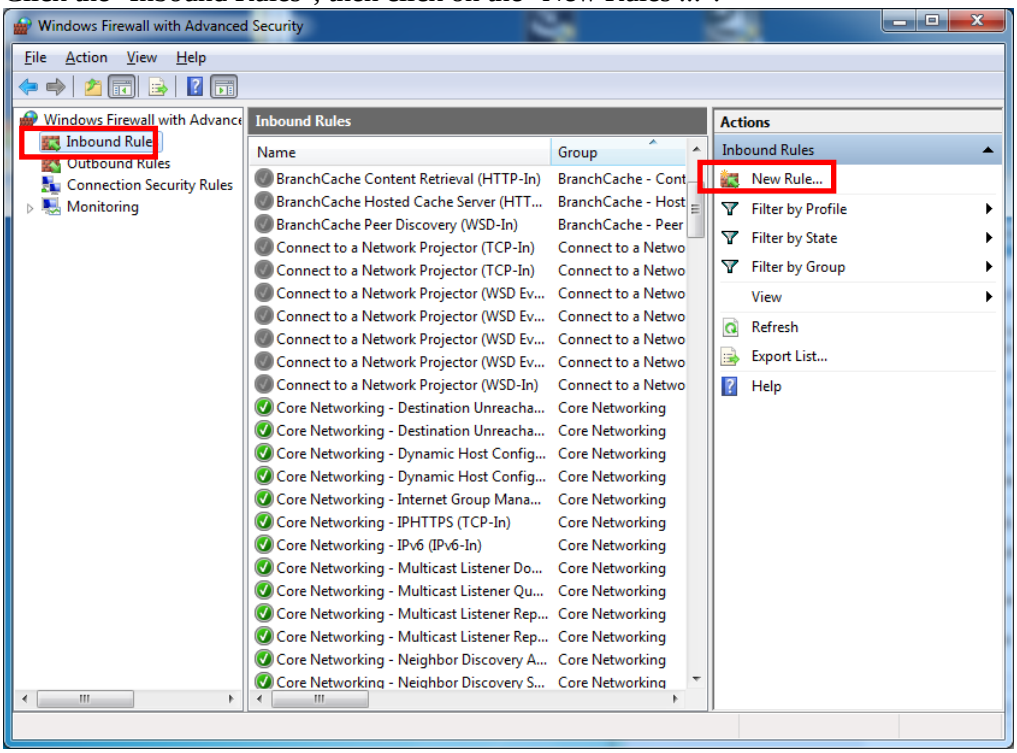
5) "Allowed programs and features:" the has been added to the list "OPC Quick Client" is set as follows, and then click the [OK] button.



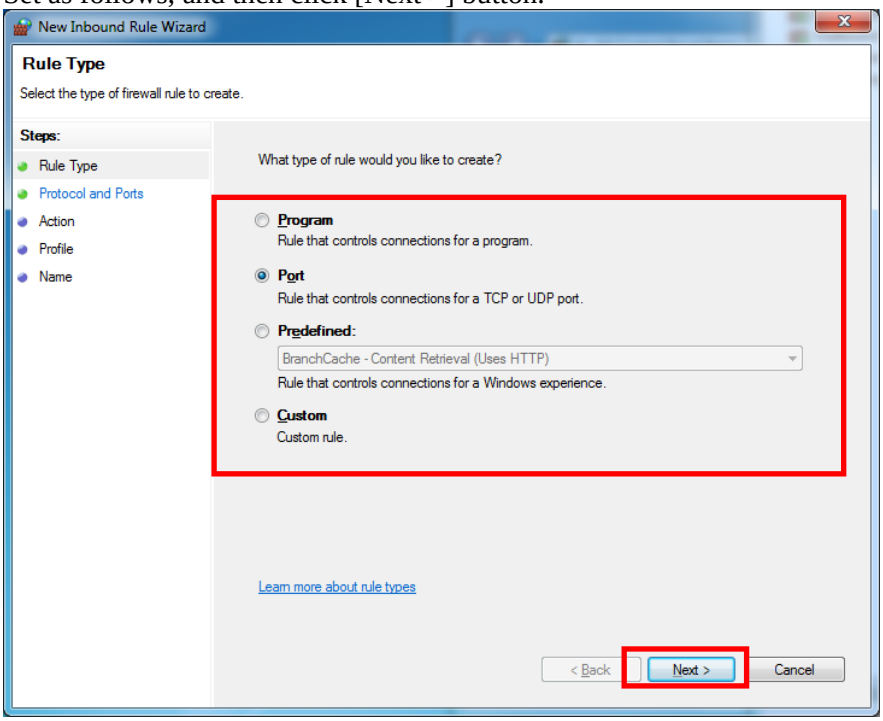
6) Click the "Advanced settings".



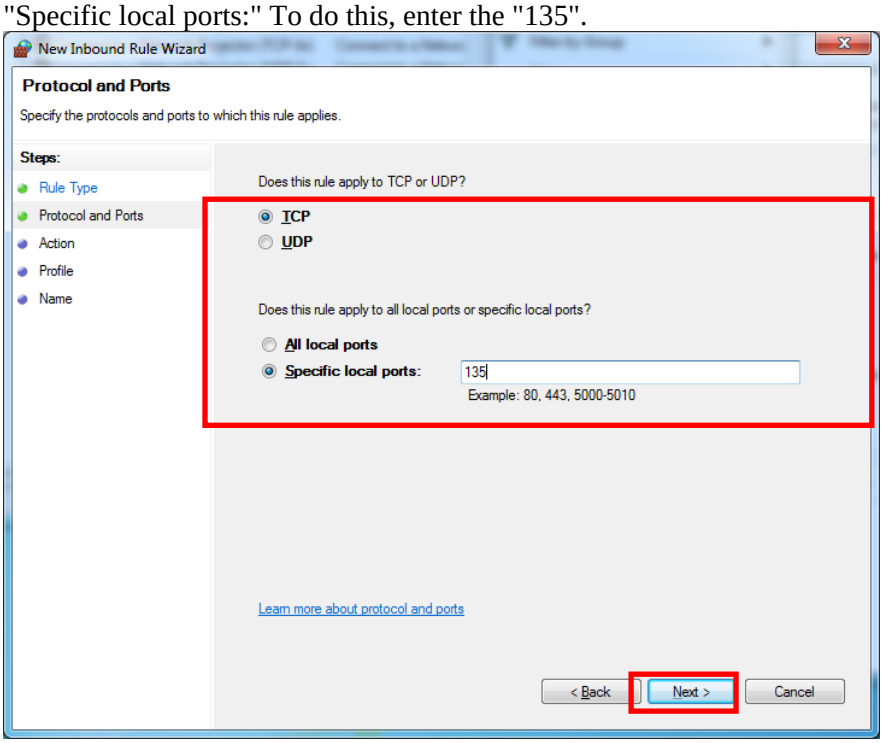
7) Click the "Inbound Rules", then click on the "New Rules ...".



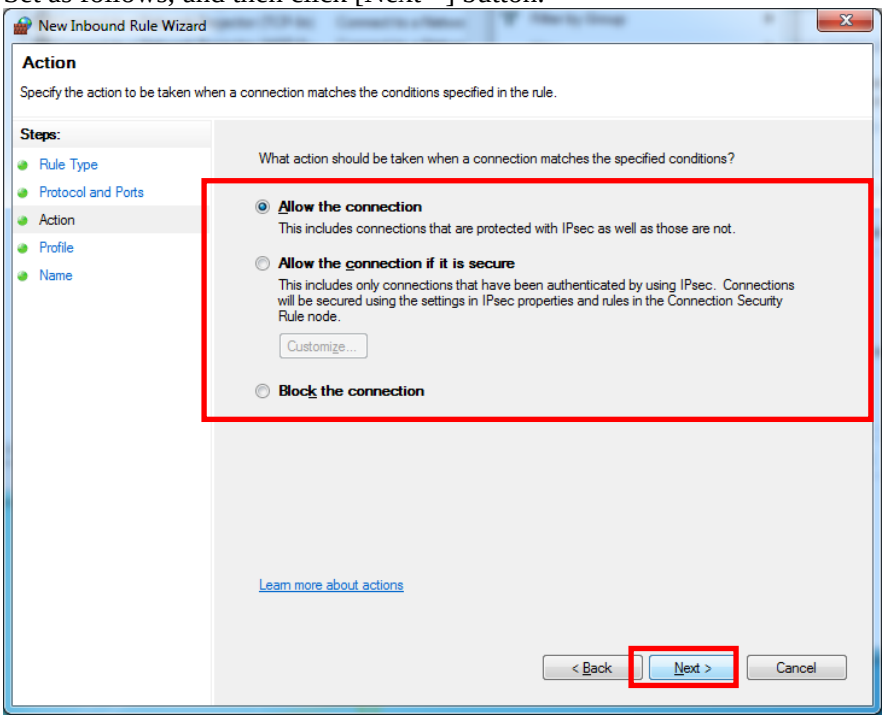
8) Set as follows, and then click [Next >] button.



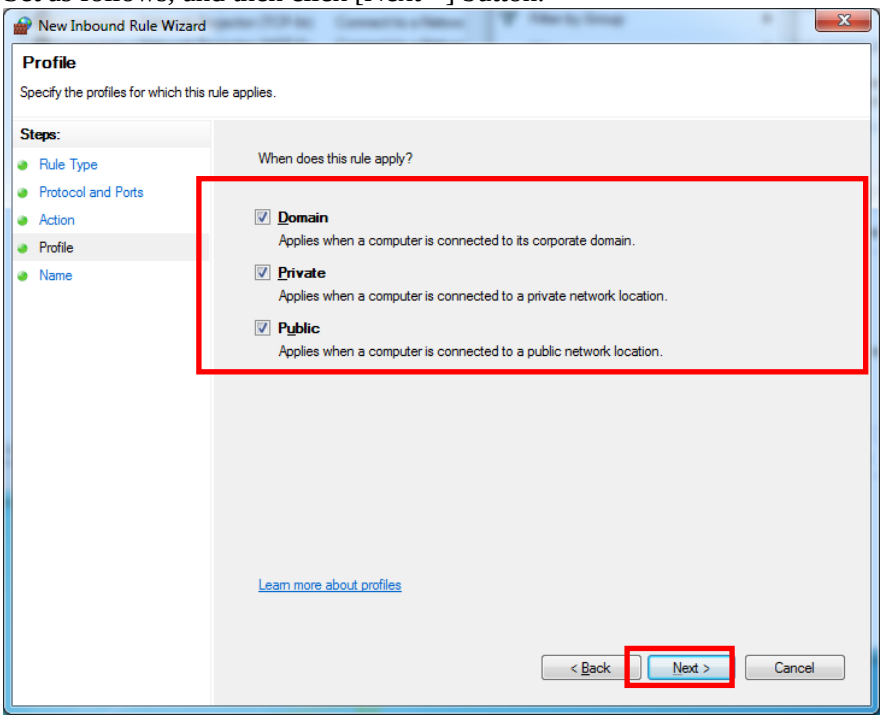
9) Set as follows, and then click [Next >] button.
"Specific local ports:" To do this, enter the "135".



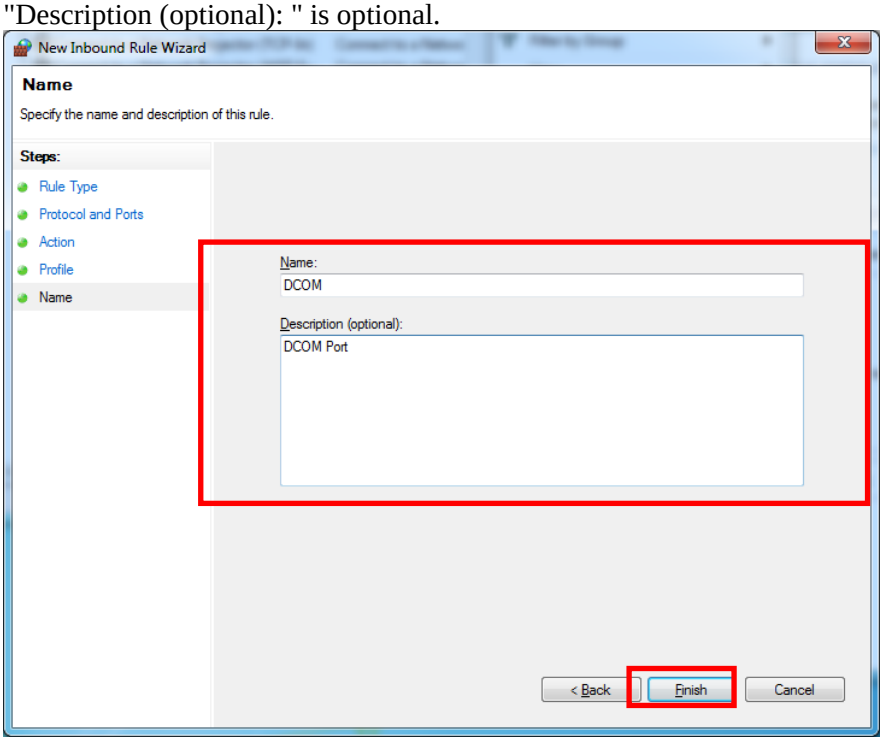
10) Set as follows, and then click [Next >] button.



11) Set as follows, and then click [Next >] button.



12) Set as follows, and then click [Done] button.
"Name: " Enter the "DCOM".
"Description (optional): " is optional.

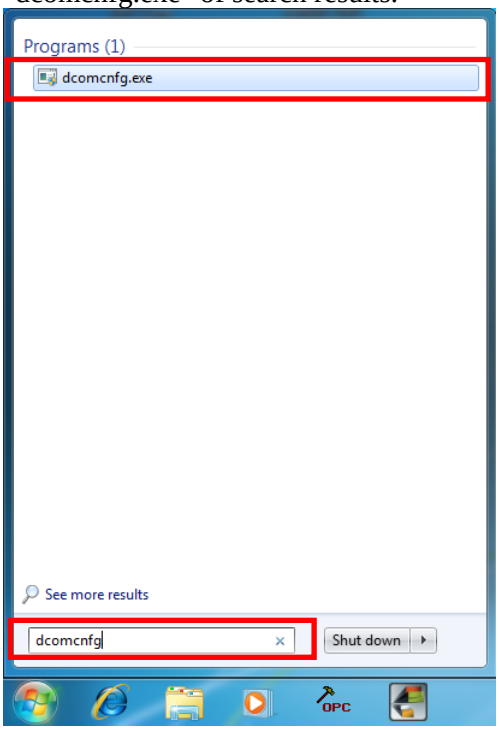


13) Is an exception settings the completion of the Windows firewall or more. Close the open window.

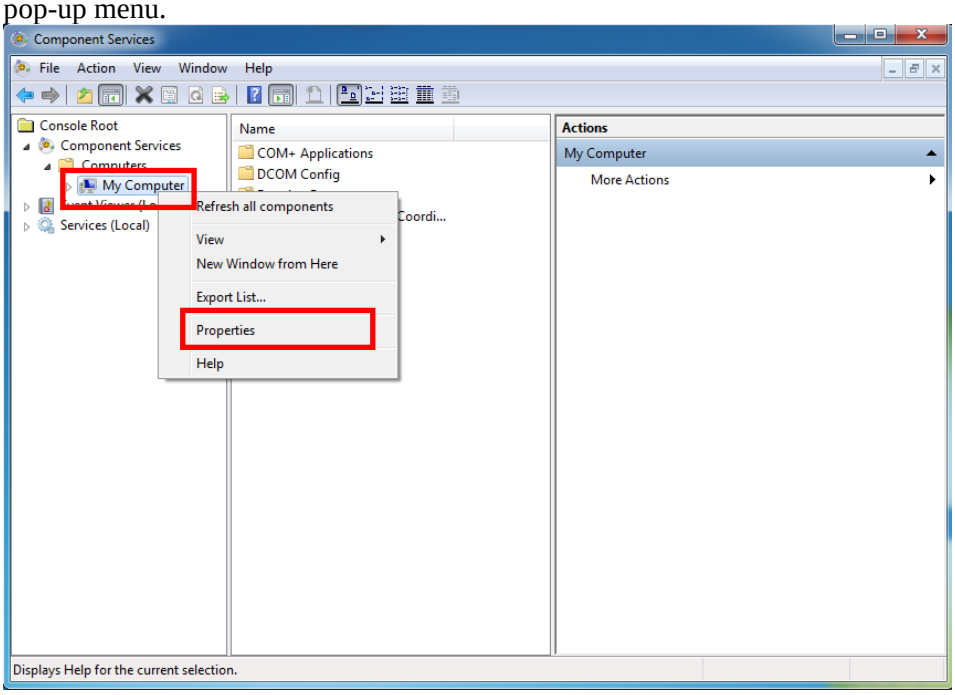
7.3.2 DCOM settings

This section describes the DNS settings on the client PC.

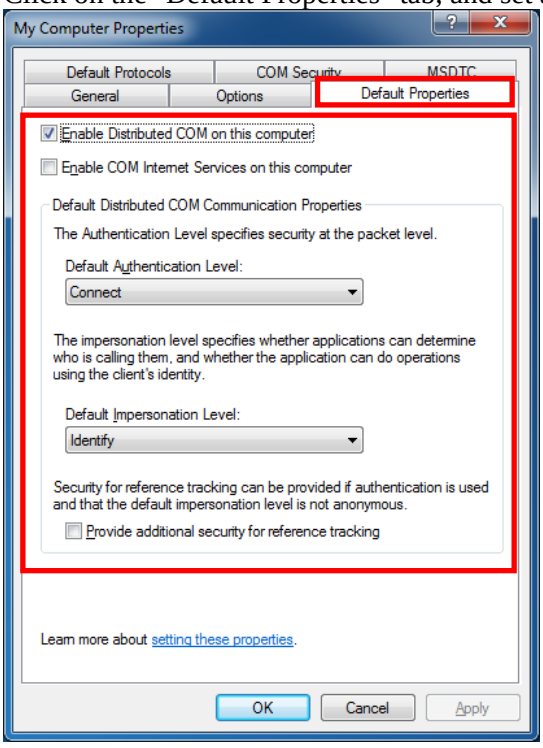
1) Enter the Start menu "Search programs and files" in the text box "dcomcnfg", and then click the "dcomcnfg.exe" of search results.



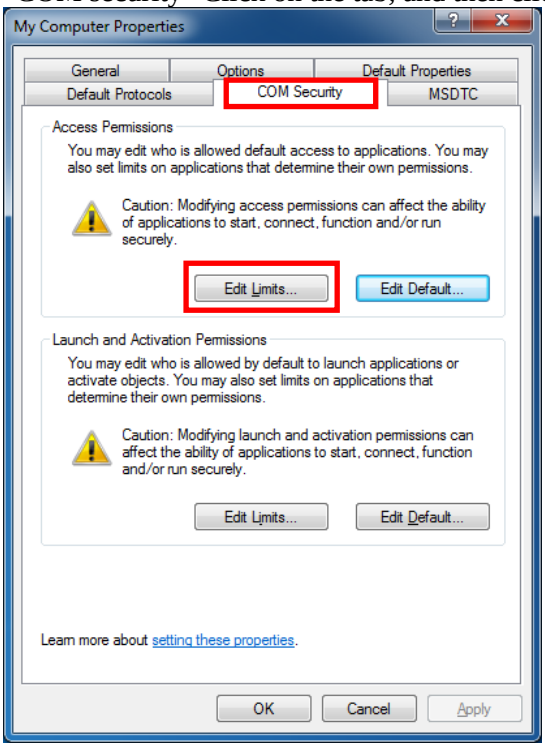
2) “Component Services", "computer", right-click on "My Computer", and then click "Properties" from the pop-up menu.



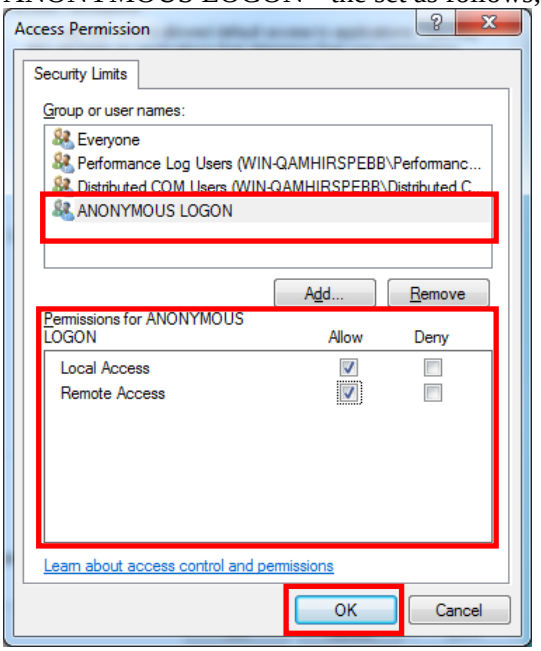
3) Click on the "Default Properties" tab, and set as follows.



4) "COM security" Click on the tab, and then click [Edit Limits...] button of "Access permissions".



5) "Group or user names:" After selecting from the list "ANONYMOUS LOGON", "Permissions for ANONYMOUS LOGON " the set as follows, and then click the [OK] button.



Ed.	Date	Design	Description
05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
03	2017.12.25	T.Hosaka	OPC UA support
02	2016.01.13	T.Hosaka	Old CNC support and data type added.

Date	2015.09.25	Desig.	T.Hosaka	Check		Apprv.	K.Murata

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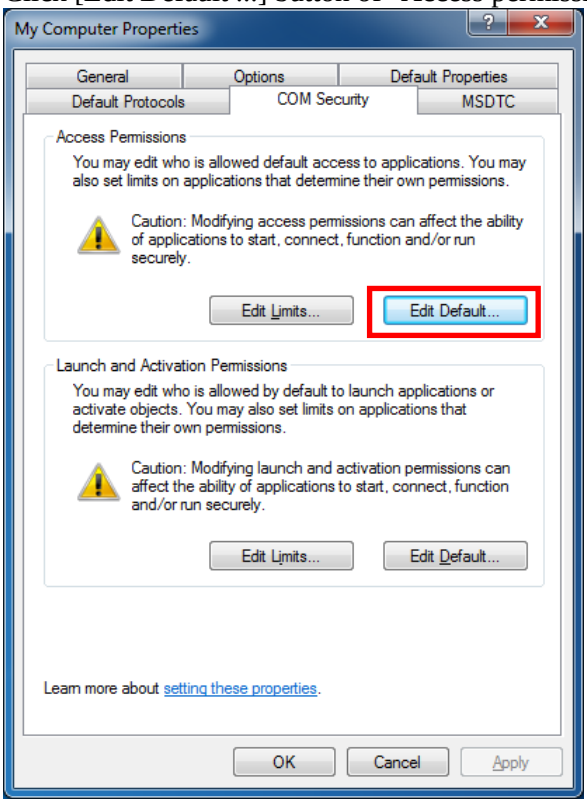
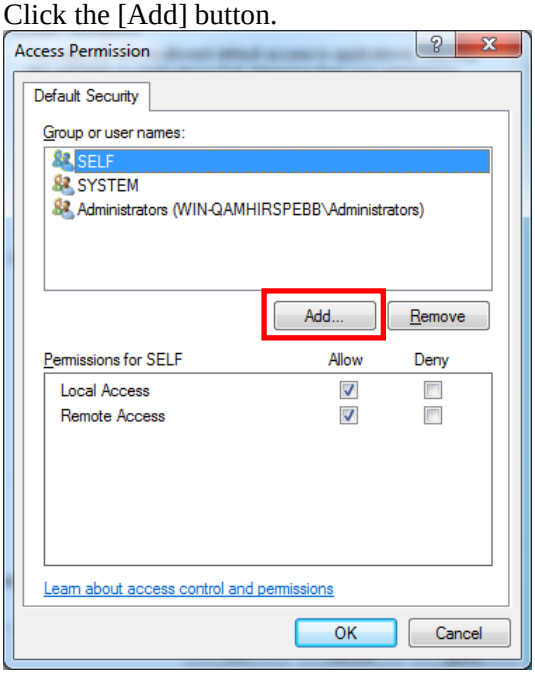
6) Click [Edit Default ...] button of "Access permissions".



7) Click the [Add] button.



Ed.	Date	Design	Description
05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
03	2017.12.25	T.Hosaka	OPC UA support
02	2016.01.13	T.Hosaka	Old CNC support and data type added.

Date	2015.09.25	Desig.	T.Hosaka	Check		Apprv.	K.Murata

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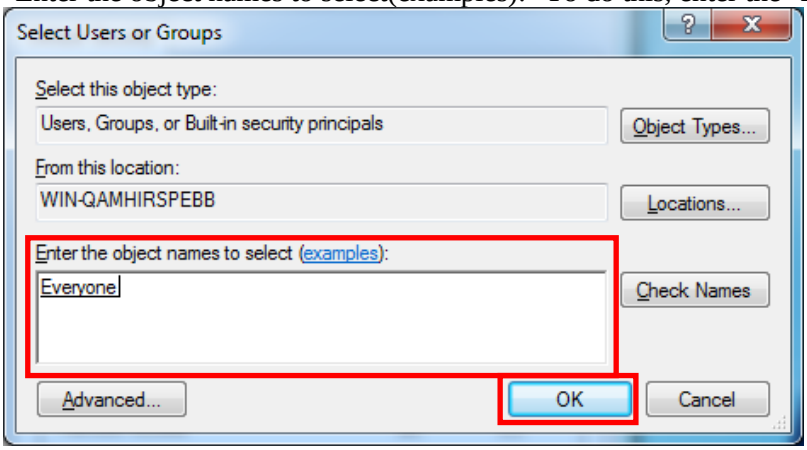
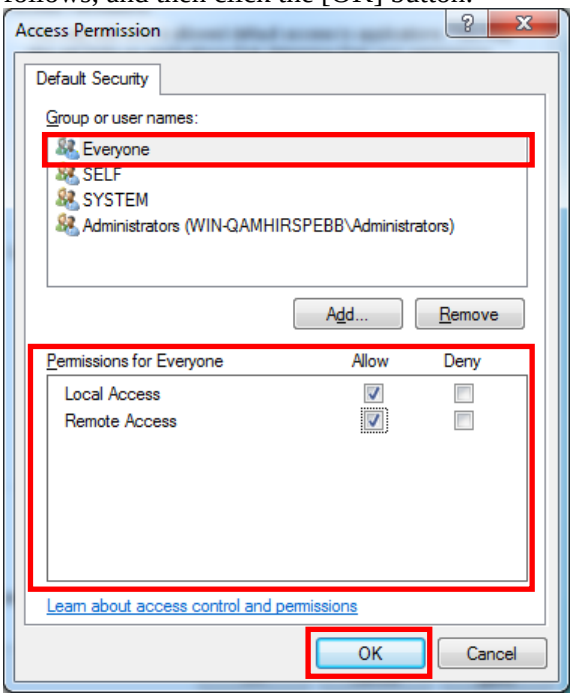
8) "Enter the object names to select(examples):" to set the following, and then click the [OK] button.
"Enter the object names to select(examples):" To do this, enter the "Everyone".



9) "Group or user names:" After selecting the "Everyone" from the list, the "Permissions for Everyone" set as follows, and then click the [OK] button.



Ed.	Date	Design	Description
05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
03	2017.12.25	T.Hosaka	OPC UA support
02	2016.01.13	T.Hosaka	Old CNC support and data type added.

Date	2015.09.25	Desig.	T.Hosaka	Check		Apprv.	K.Murata

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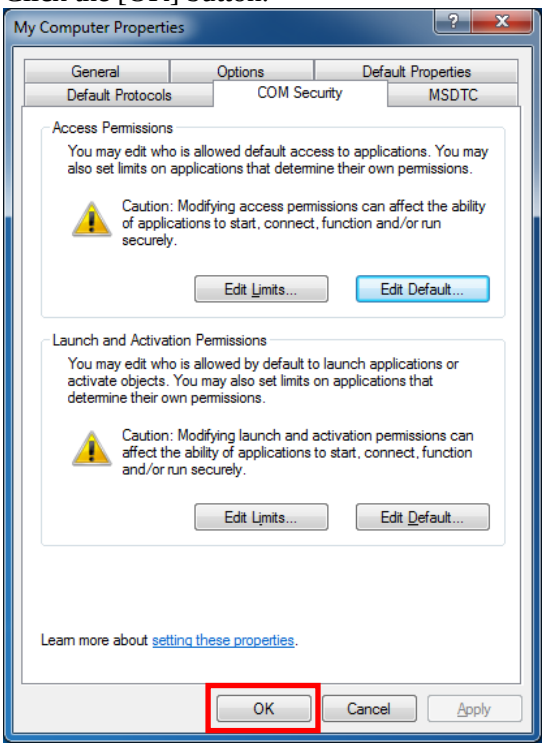
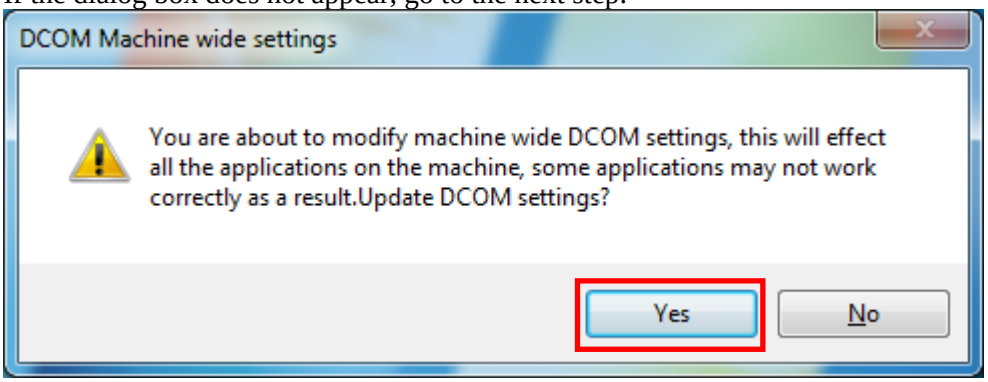
10) Click the [OK] button.



11) If the following message dialog box appears, click Yes (Y)] button.
If the dialog box does not appear, go to the next step.



7.4 Server PC Settings

This section describes the settings of the server PC。

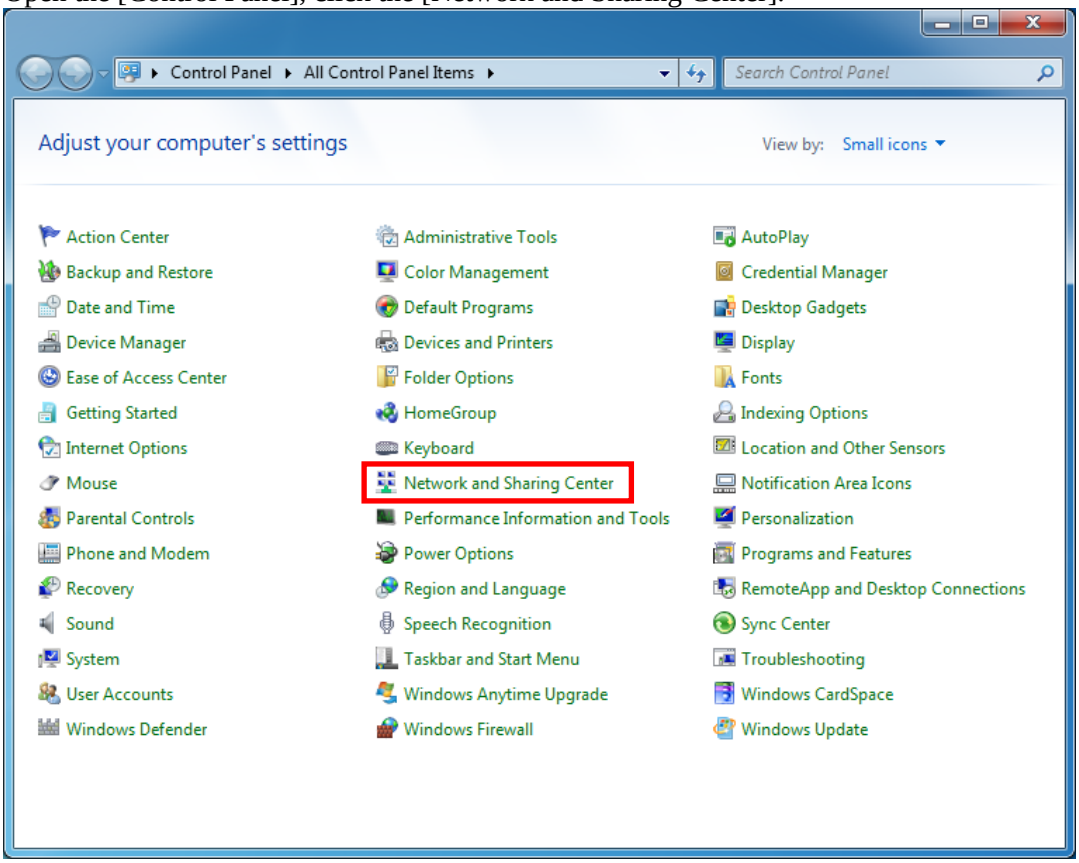
The server PC assumes that the following software is installed.

・FANUC OPC Server

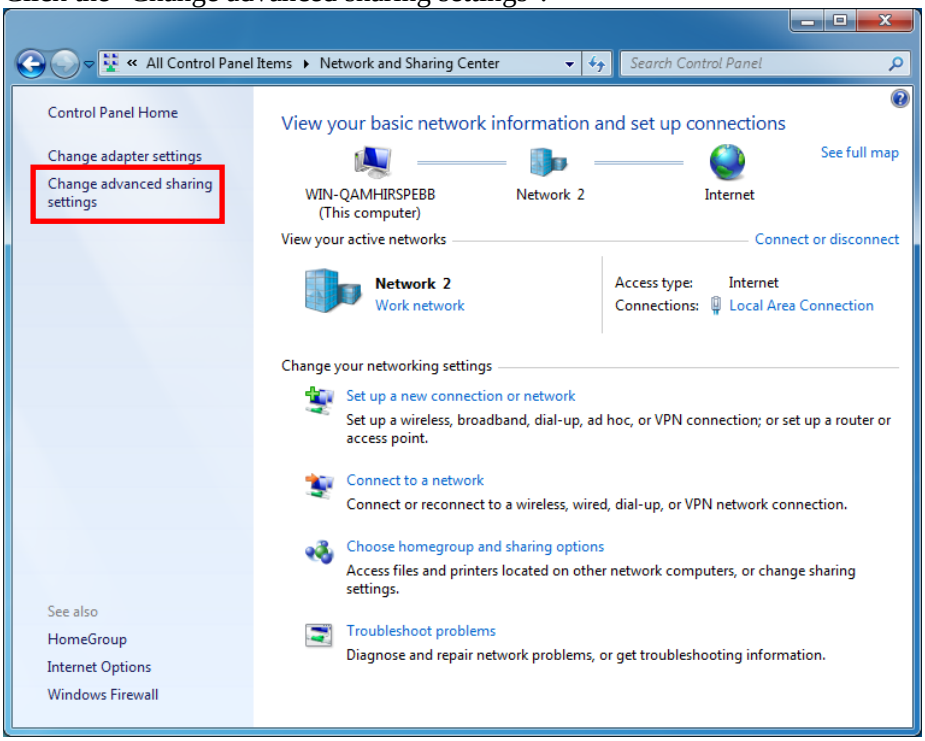
7.4.1 Enabling network discovery / file sharing

This section describes the settings of network discovery / file sharing of the server PC.

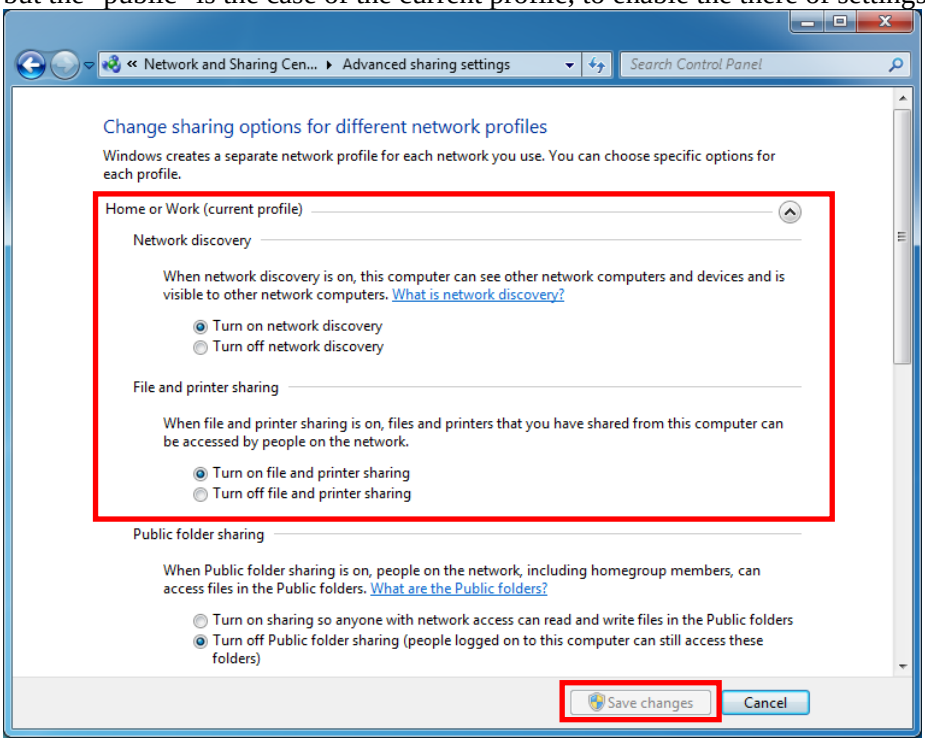
1) Open the [Control Panel], click the [Network and Sharing Center].



2) Click the "Change advanced sharing settings".



3) Set as follows, and then click the [Save Changes] button.
Change only the settings in the frame. In the following "Home or Work" has become the current profile, but the "public" is the case of the current profile, to enable the there of settings.

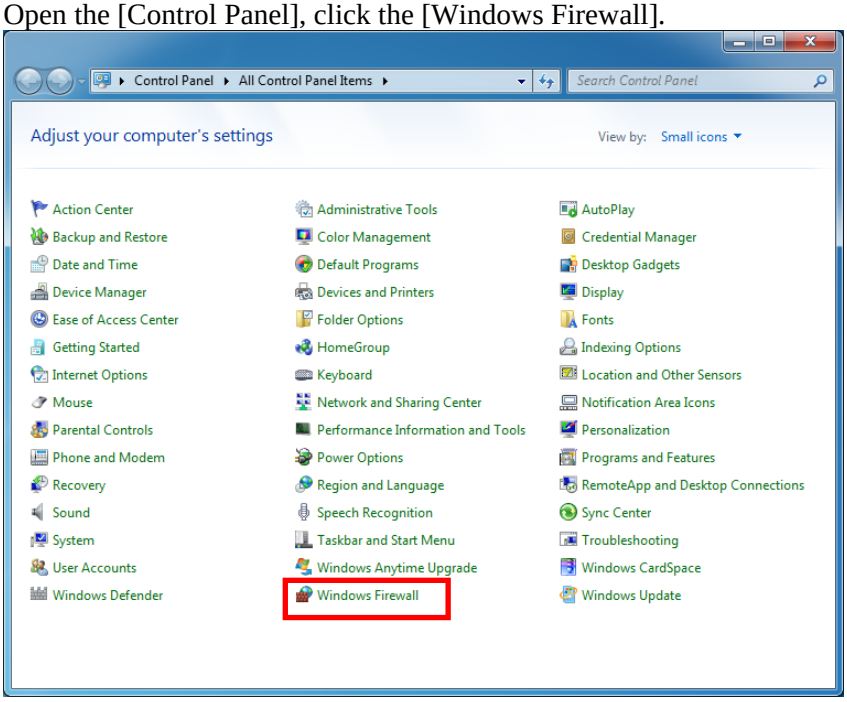


4) This enabled the completion of the network search / file sharing settings above. Close the open window.

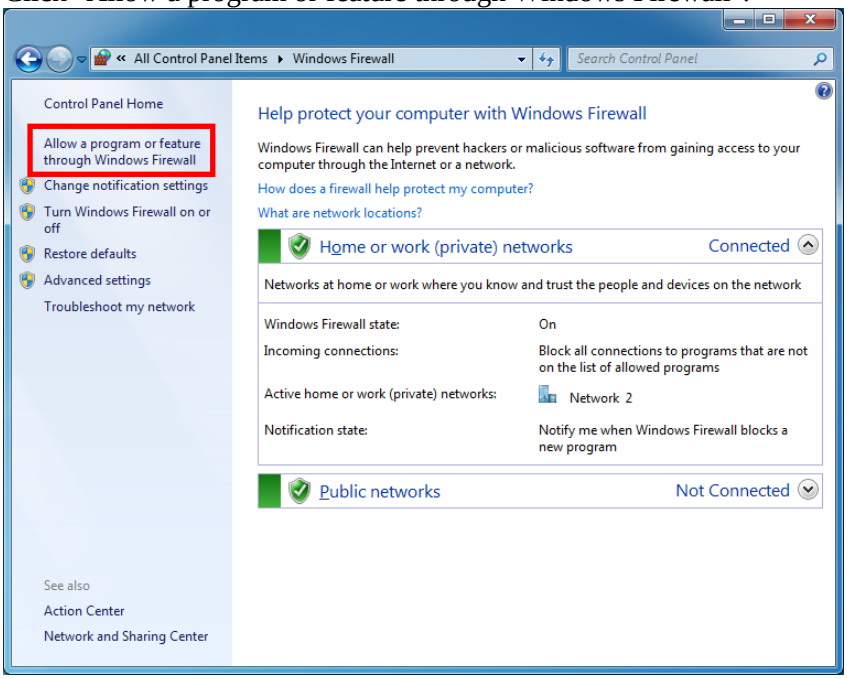
7.4.2 Windows Firewall Exceptions settings

This section describes the Windows Firewall exception settings on the server PC.
Firewall and preferably disable it unnecessary environment. If you disable, exceptional settings of the firewall, you do not need.

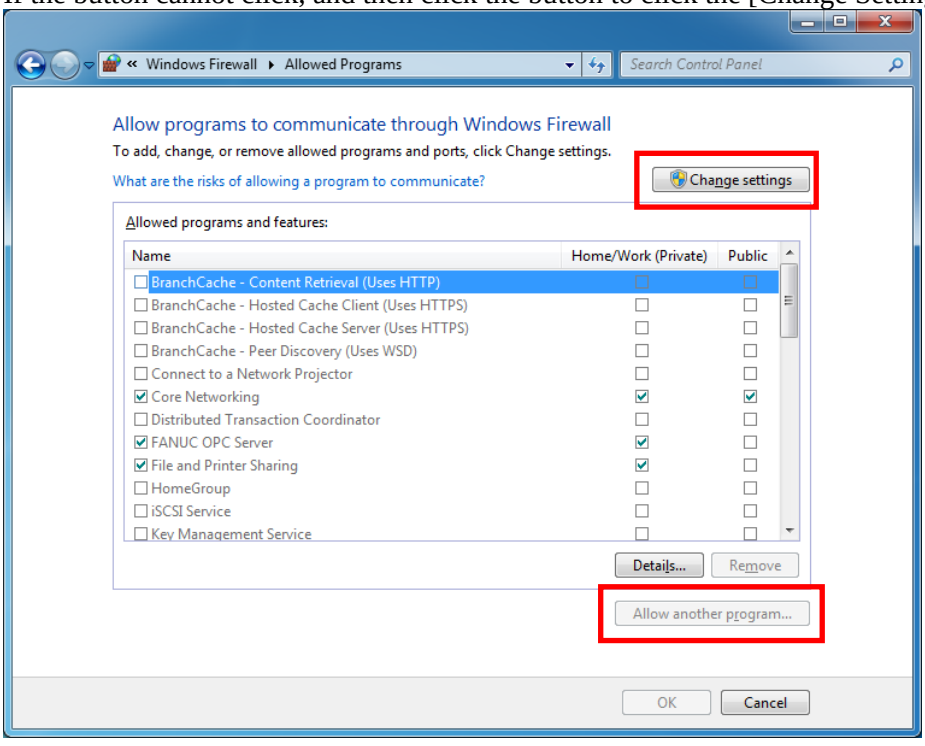
1) Open the [Control Panel], click the [Windows Firewall].



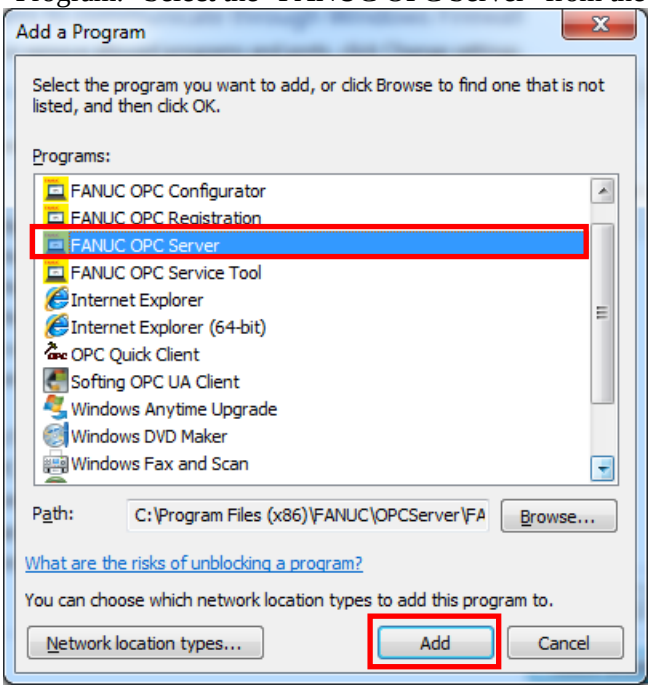
2) Click "Allow a program or feature through Windows Firewall".



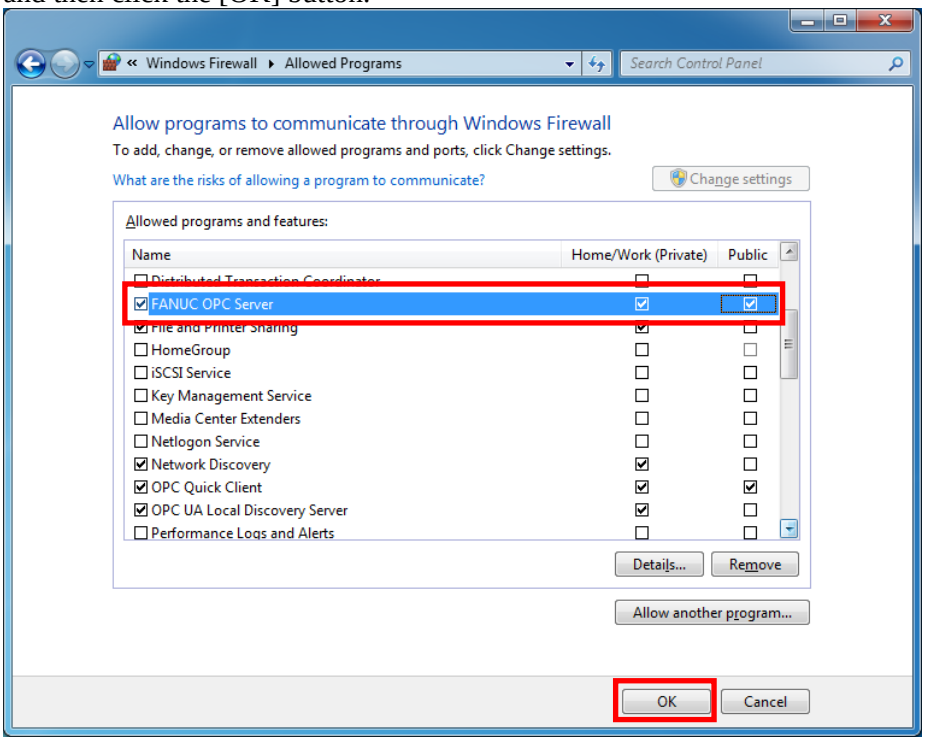
3) Click [Allow another program…].
If the button cannot click, and then click the button to click the [Change Settings] button.



4) "Program:" Select the "FANUC OPC Server" from the list, and click the [Add] button.



5) "Allowed programs and features:" the has been added to the list "FANUC OPC Server" is set as follows, and then click the [OK] button.



Ed.	Date	Design	Description
05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
03	2017.12.25	T.Hosaka	OPC UA support
02	2016.01.13	T.Hosaka	Old CNC support and data type added.

Date	2015.09.25	Desig.	T.Hosaka	Check		Apprv.	K.Murata

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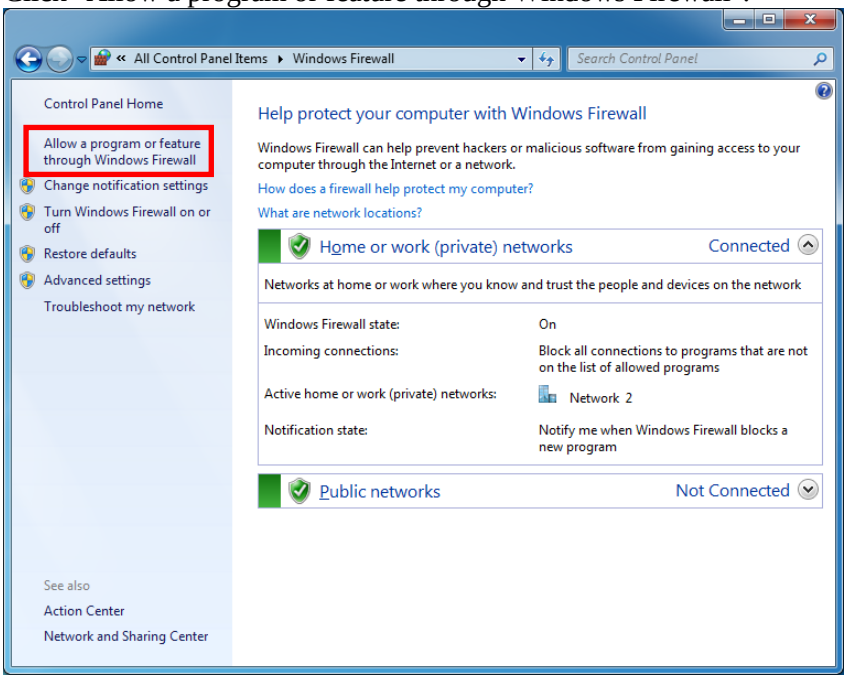
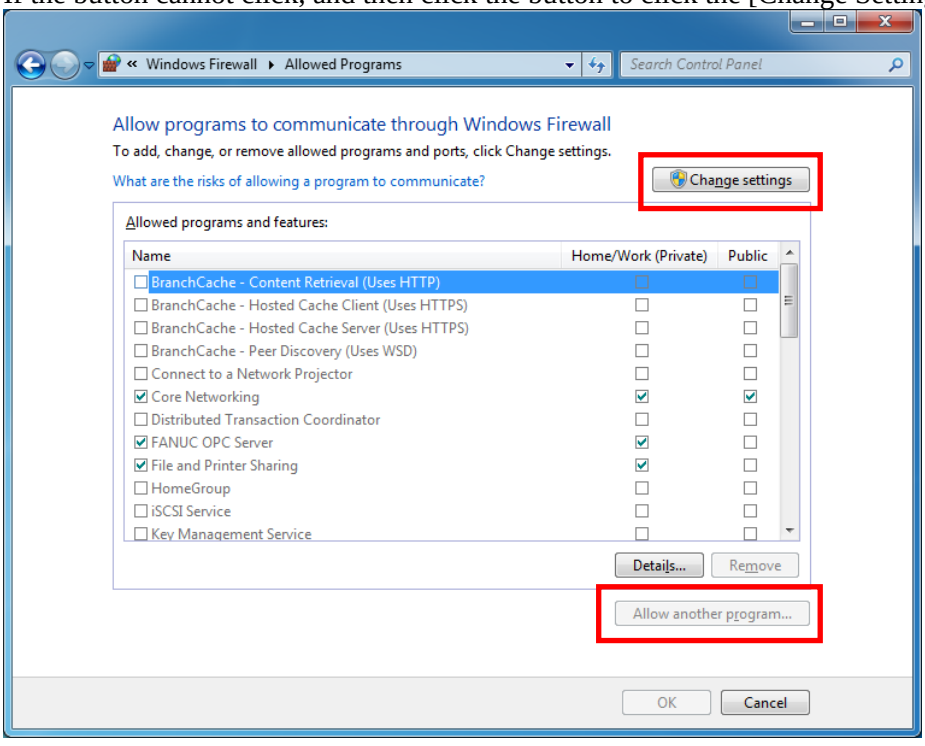
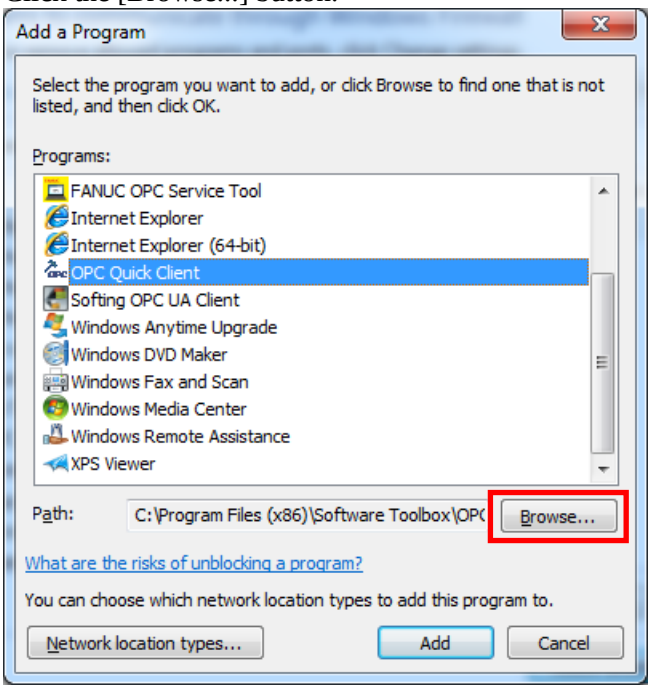
6) Click "Allow a program or feature through Windows Firewall".



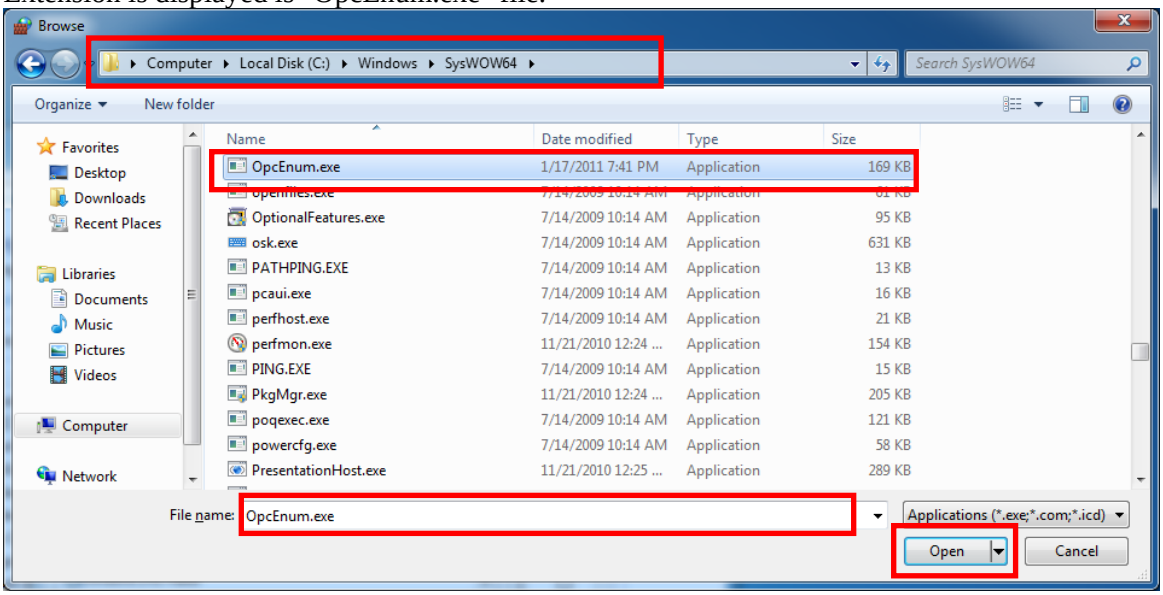
7) Click [Allow another program…].
If the button cannot click, and then click the button to click the [Change Settings] button.



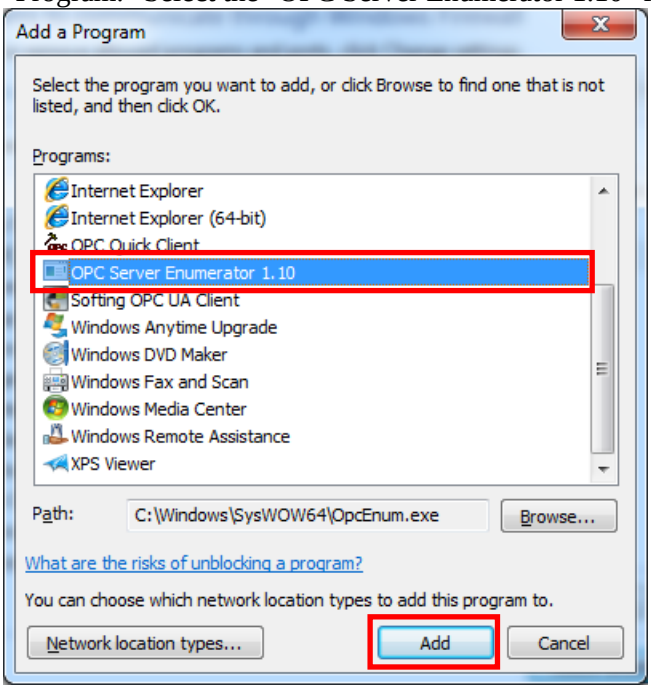
8) Click the [Browse...] button.



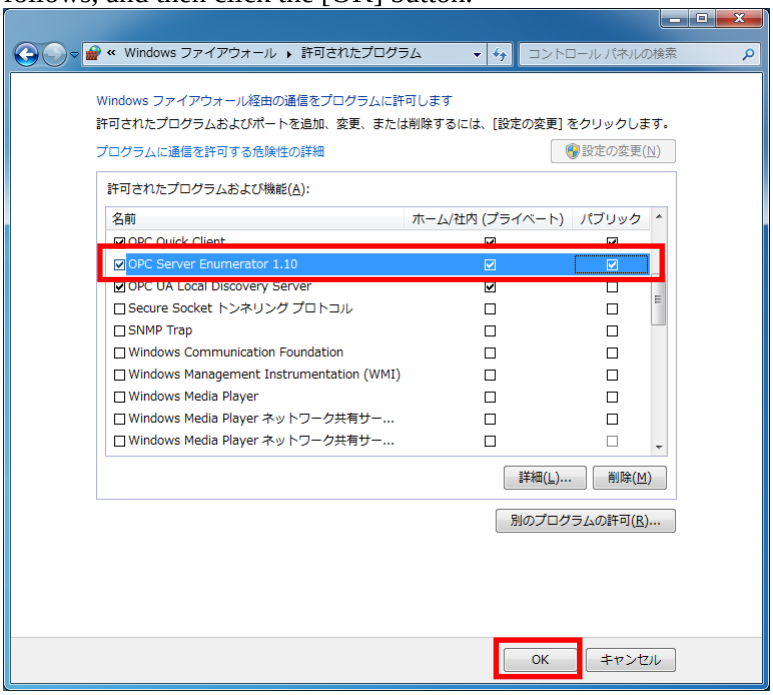
9) Open the: "C:¥Windows¥System32" folder, after selecting the "OpcEnum" file, and then click [Open] button.
Extension is displayed is "OpcEnum.exe" file.



10) "Program:" Select the "OPC Server Enumerator 1.10" from the list, and click the [Add] button.



11) "Allowed programs and features:" the has been added to the list " OPC Server Enumerator 1.10" is set as follows, and then click the [OK] button.



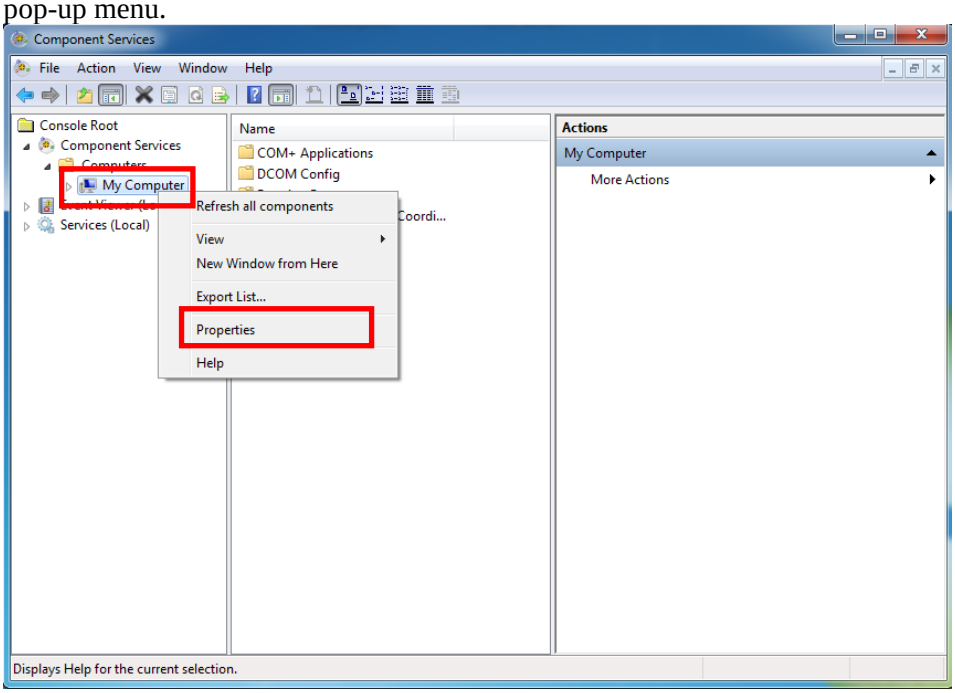
12) Is an exception settings the completion of the Windows firewall or more. Close the open window.

7.4.3 DCOM settings

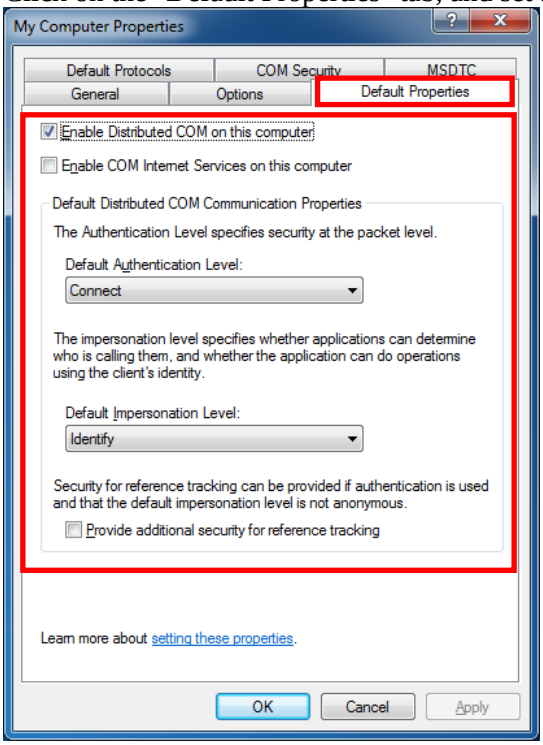
This section describes the DNS settings on the server PC.

1) Enter the Start menu "Search programs and files" in the text box "dcomcnfg", and then click the "dcomcnfg.exe" of search results.

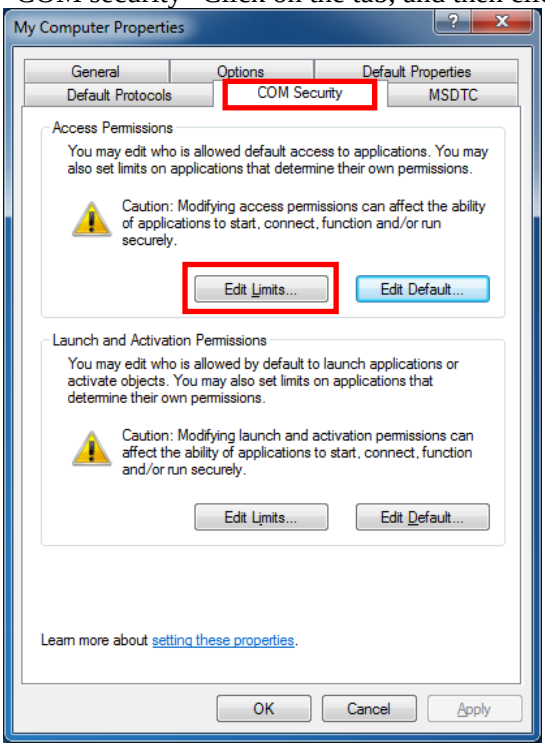
2) “Component Services", "computer", right-click on "My Computer", and then click "Properties" from the pop-up menu.



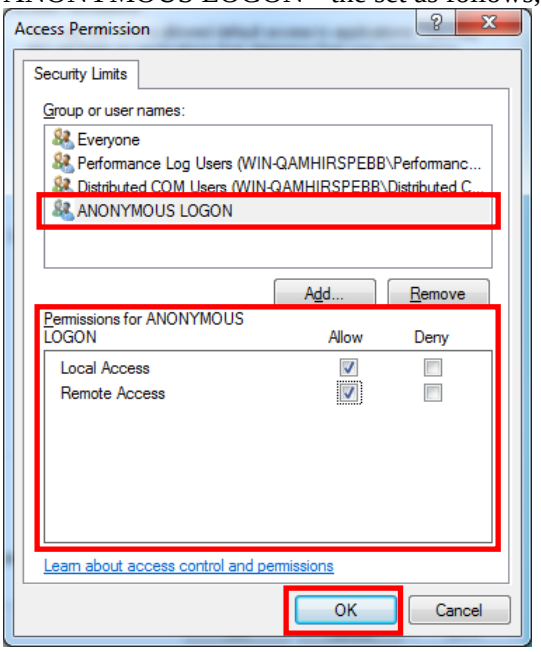
3) Click on the "Default Properties" tab, and set as follows.



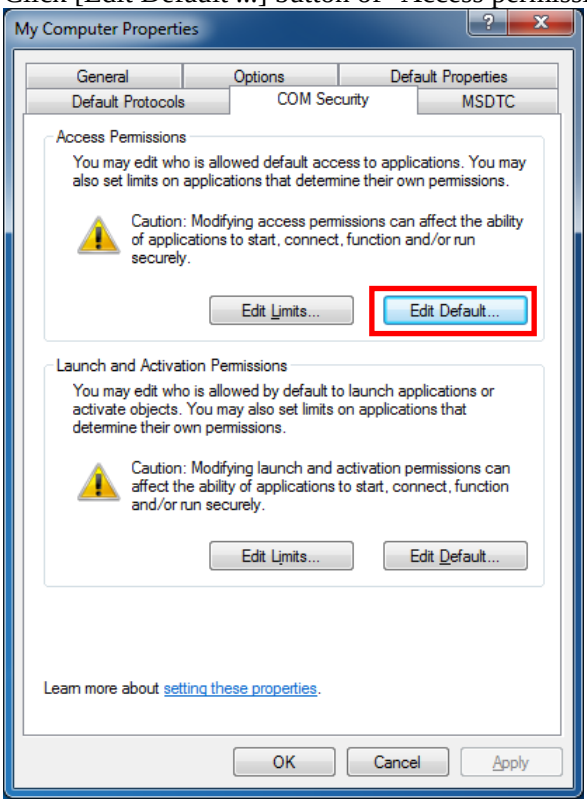
4) "COM security" Click on the tab, and then click [Edit Limits...] button of "Access permissions".



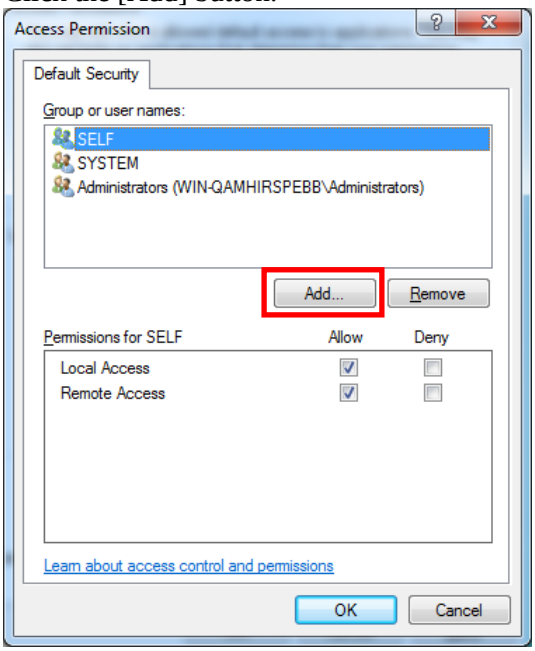
5) "Group or user names:" After selecting from the list "ANONYMOUS LOGON", "Permissions for ANONYMOUS LOGON " the set as follows, and then click the [OK] button.



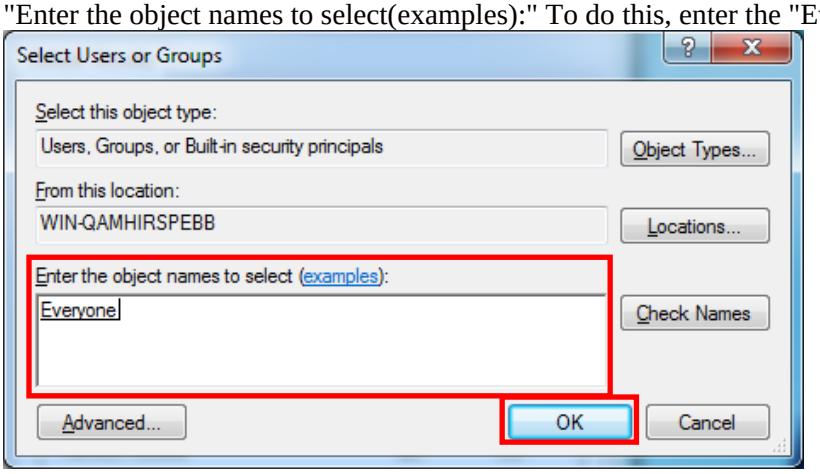
6) Click [Edit Default ...] button of "Access permissions".



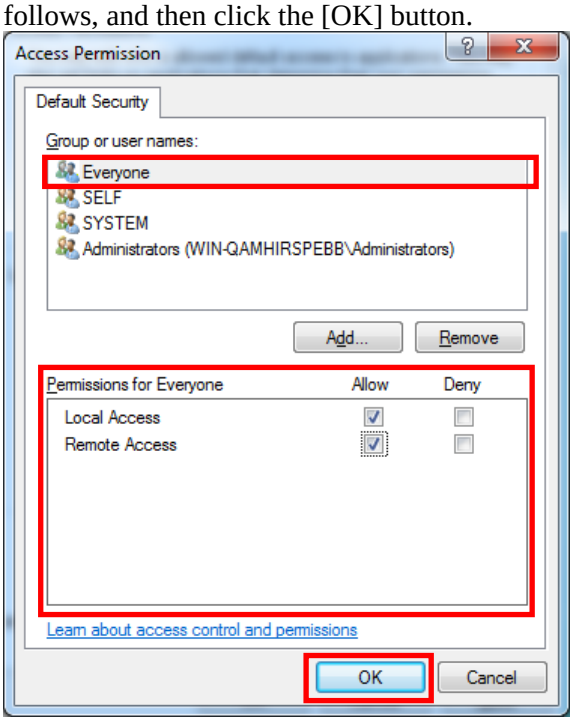
7) Click the [Add] button.



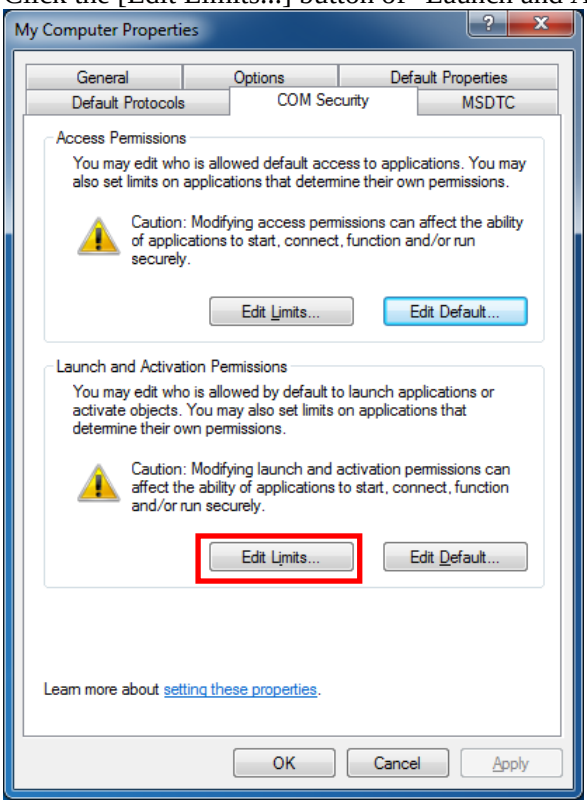
8) "Enter the object names to select(examples):" to set the following, and then click the [OK] button.
"Enter the object names to select(examples):" To do this, enter the "Everyone".



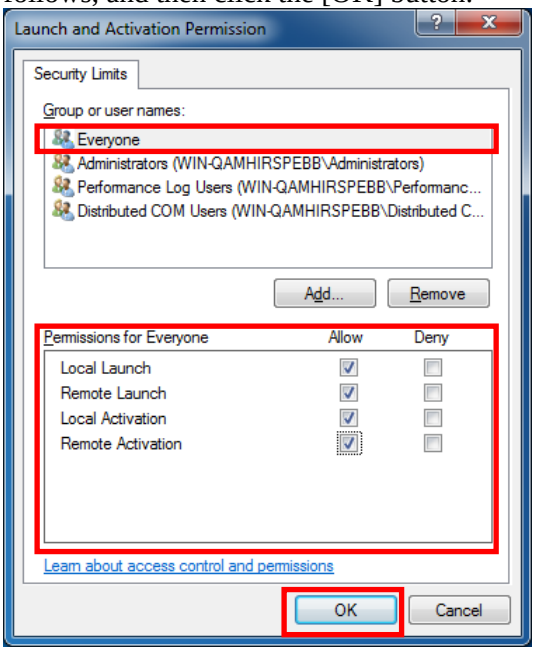
9) "Group or user names:" After selecting the "Everyone" from the list, the "Permissions for Everyone" set as follows, and then click the [OK] button.



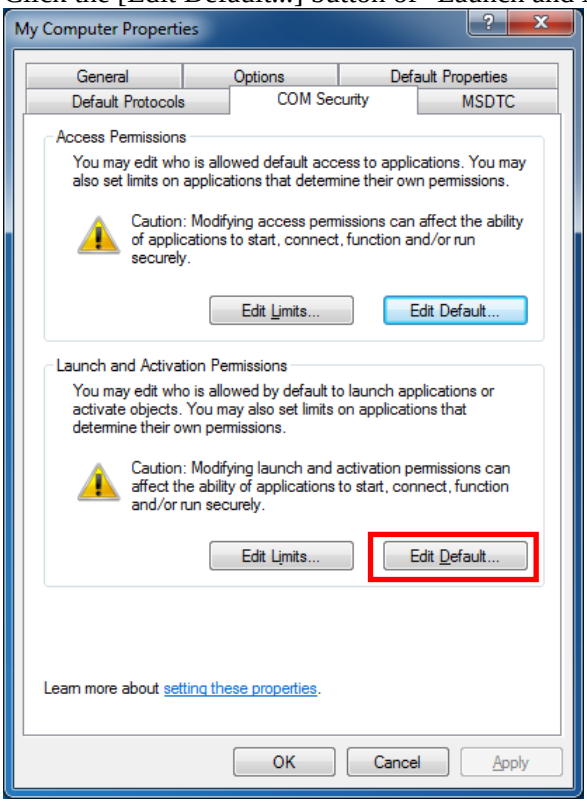
10) Click the [Edit Limits...] button of "Launch and Activation Permissions".



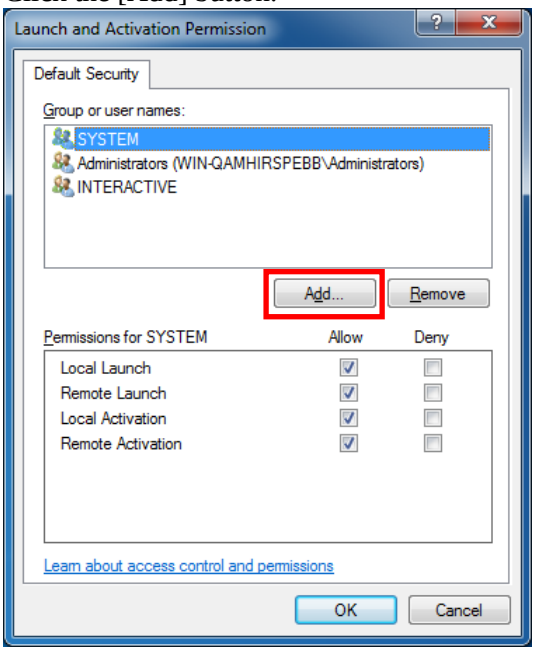
11) "Group or user names:" After selecting from the list "Everyone", "Permissions for Everyone " the set as follows, and then click the [OK] button.



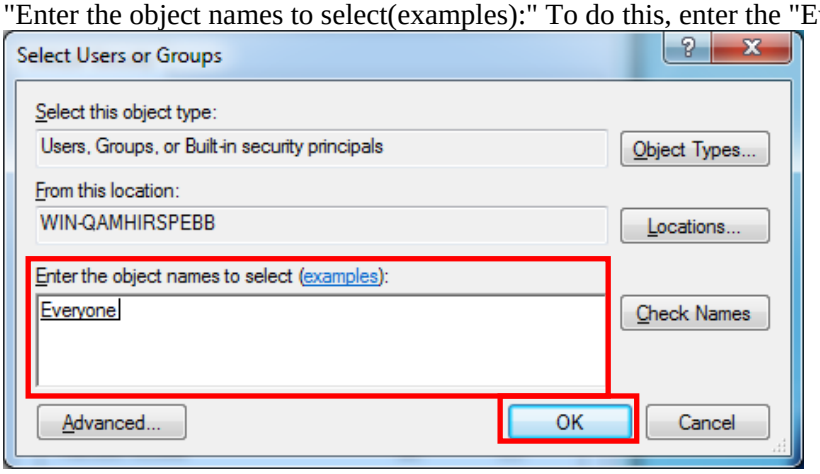
12) Click the [Edit Default...] button of "Launch and Activation Permissions".



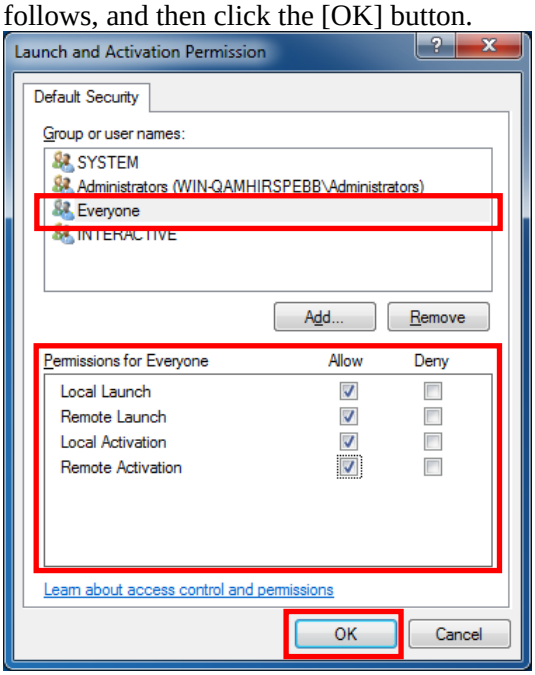
13) Click the [Add] button.



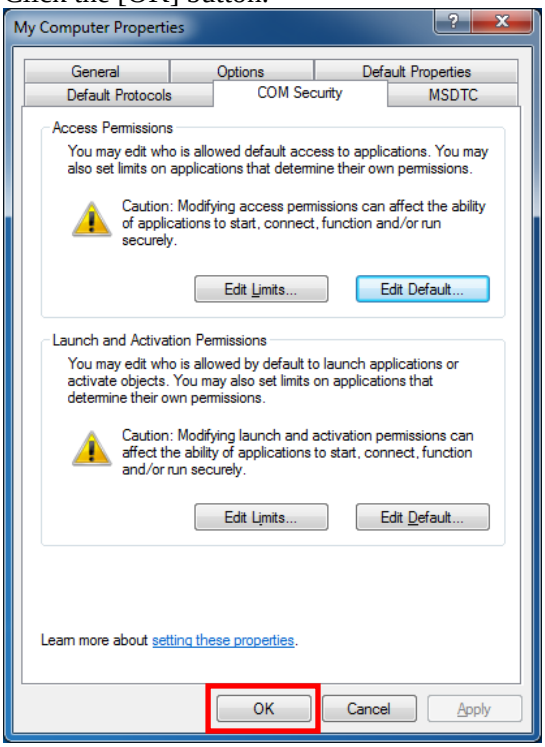
14) "Enter the object names to select(examples):" to set the following, and then click the [OK] button.
"Enter the object names to select(examples):" To do this, enter the "Everyone".



15) "Group or user names:" After selecting the "Everyone" from the list, the "Permissions for Everyone" set as follows, and then click the [OK] button.



16) Click the [OK] button.



Ed.	Date	Design	Description
05	2020.09.30	R.Imada	The security function of FOCAS2 added. T.Hosaka
04	2018.06.21	S.Matsukura	Data type added.
03	2017.12.25	T.Hosaka	OPC UA support
02	2016.01.13	T.Hosaka	Old CNC support and data type added.

Date	2015.09.25	Desig.	T.Hosaka	Check		Apprv.	K.Murata

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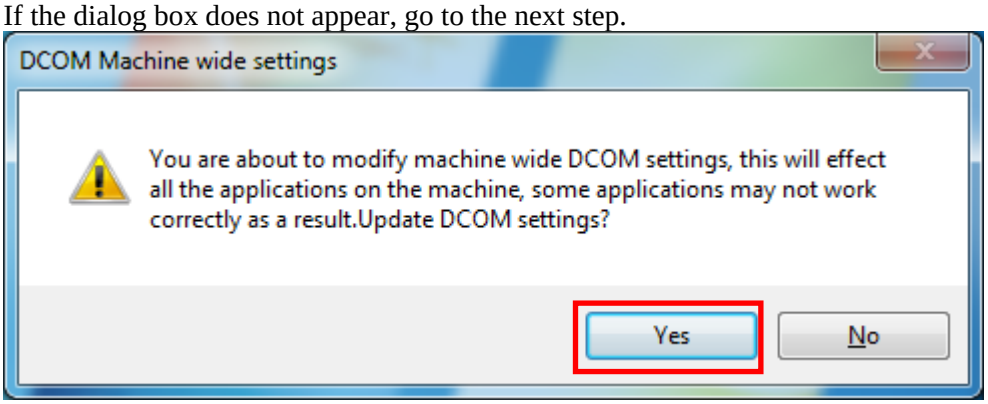
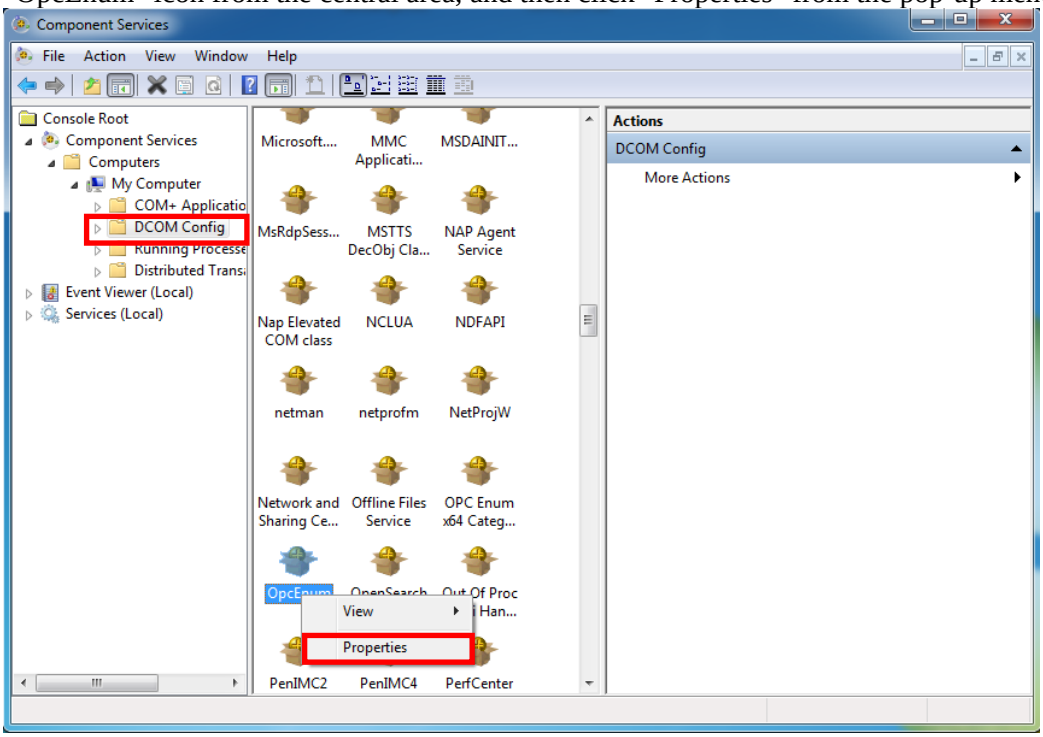
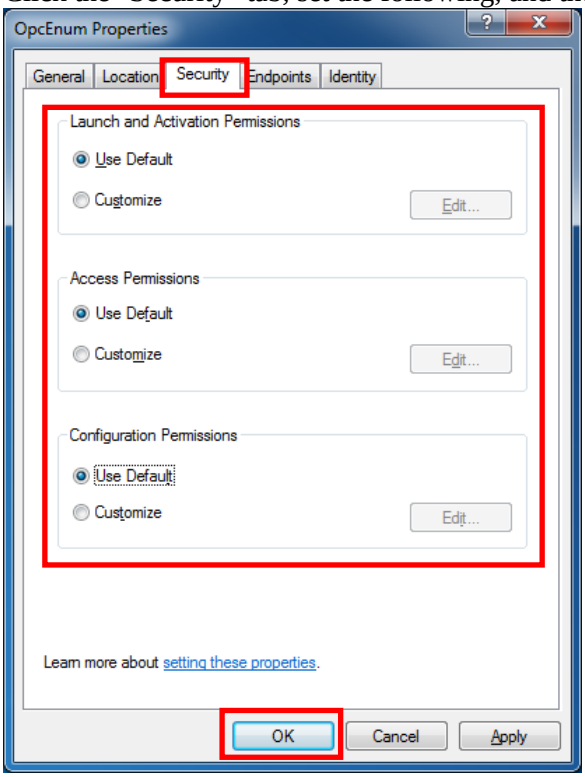
17) If the following message dialog box appears, click Yes (Y)] button.
If the dialog box does not appear, go to the next step.



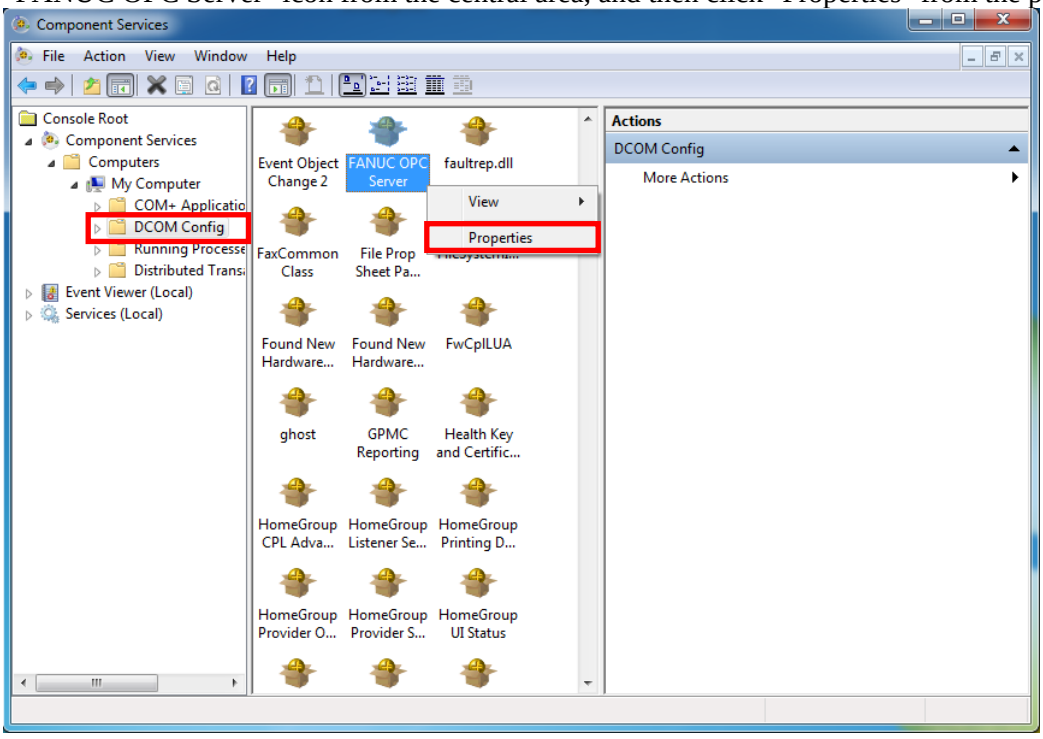
18) After selecting the “Component Services", "computer",” My Computer”, “DCOM Config”,right-click on "OpcEnum" icon from the central area, and then click "Properties" from the pop-up menu.



19) Click the "Security" tab, set the following, and then click the [OK] button.



20) After selecting the "Component Services", "computer","My Computer", "DCOM Config",right-click on "FANUC OPC Server" icon from the central area, and then click "Properties" from the pop-up menu.



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Date	2015.09.25	Desig.	T.Hosaka	Check		Apprv.	K.Murata

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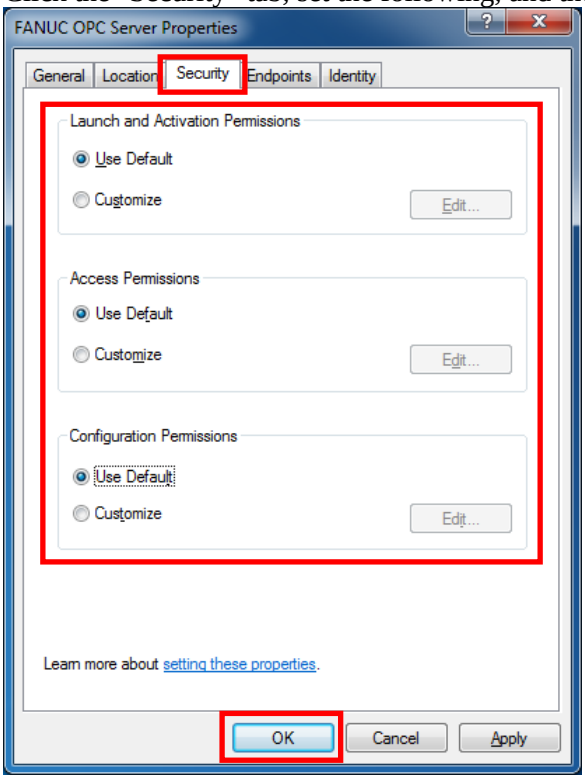
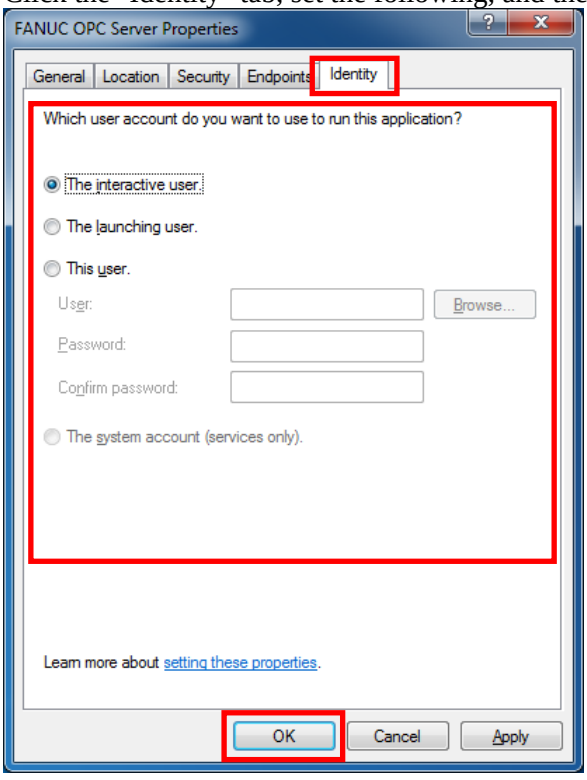
21) Click the "Security" tab, set the following, and then click the [OK] button.



22) Click the "Identity" tab, set the following, and then click the [OK] button.



23) Is DCOM settings complete. Close the open window.

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