

Machine Automation Controller NJ-series

# DeviceNet™ Connection Guide

## ABB Ltd

IRC5 Robot Controller

Network  
Connection  
Guide

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## Table of Contents

<b>1. Related Manuals .....</b>	<b>1</b>
<b>2. Terms and Definitions .....</b>	<b>1</b>
<b>3. Remarks .....</b>	<b>2</b>
<b>4. Overview .....</b>	<b>3</b>
<b>5. Applicable Devices and Device Configuration .....</b>	<b>4</b>
5.1. Applicable Devices .....	4
5.2. Device Configuration .....	5
<b>6. DeviceNet Settings .....</b>	<b>7</b>
6.1. Setting the DeviceNet Communications Parameters .....	7
6.2. Allocation for Remote I/O Communications .....	7
<b>7. DeviceNet Connection Procedure .....</b>	<b>9</b>
7.1. Work Flow .....	10
7.2. Wiring the network .....	11
7.3. Setting Up the ABB Robot Controller .....	13
7.4. Setting Up the Controller .....	28
7.5. Setting Up the Network .....	36
7.6. Checking DeviceNet Communications .....	43
<b>8. Initialization Method .....</b>	<b>49</b>
8.1. Initializing the Controller .....	49
8.2. Initializing the ABB Robot Controller .....	51
<b>9. Appendix 1 Details of Remote I/O Communications Settings .....</b>	<b>53</b>
9.1. Global Variable Table .....	53
<b>10. Appendix 2 Setting Procedure without the Configuration Files .....</b>	<b>54</b>
10.1. Overview of Setting Procedure without the Configuration Files .....	54
10.2. Work Flow of "Procedure for Setting Parameters from the Beginning" .....	55
10.3. Setting Up the Controller without the Configuration Files .....	57
10.4. Setting Up the Network Using the Software .....	67
<b>11. Revision History .....</b>	<b>78</b>

## 1. Related Manuals

The table below lists the manuals related to this document.

To ensure system safety, make sure to always read and heed the information provided in all Safety Precautions, Precautions for Safe Use, and Precaution for Correct Use of manuals for each device which is used in the system.

Cat. No.	Model	Manual name
W500	NJ501-□□□□ NJ301-□□□□	NJ-series CPU Unit Hardware User's Manual
W501	NJ501-□□□□ NJ301-□□□□	NJ-series CPU Unit Software User's Manual
W497	CJ1W-DRM21	CJ-series DeviceNet™ Units Operation Manual for NJ-series CPU Unit
W267	-	DeviceNet™ Operation Manual
W504	SYSMAC-SE2□□□	Sysmac Studio Version 1 Operation Manual
W464	-	CX-Integrator Ver.2. Operation Manual
3HAC021313-001	IRC5	Product Manual Robot Controller IRC5
3HAC020676-001	IRC5	Application Manual DeviceNet



## 2. Terms and Definitions

Term	Explanation and Definition
Master/Slave	<p>A master is a unit that controls the DeviceNet communications.</p> <p>A master sends output data to multiple slaves and receives input data from the slaves.</p> <p>Slaves receive output data that are sent from the master, and send input data to the master.</p> <p>At least one master is required for a DeviceNet system.</p>
EDS file	An EDS file is a file that contains the I/O points of DeviceNet slave units and the parameters that can be set via DeviceNet.
Node address (MAC ID)	<p>A node address is an address to identify a unit connected to DeviceNet.</p> <p>With DeviceNet, a MAC (Media Access Control) ID is used as a node address. Thus, a node address is a MAC ID.</p>
Scan list	A scan list is used to register slaves with which a master communicates in DeviceNet remote I/O communications. A master communicates with the slaves based on the scan list settings.

### 3. Remarks

- (1) Understand the specifications of devices which are used in the system. Allow some margin for ratings and performance. Provide safety measures, such as installing safety circuit in order to ensure safety and minimize risks of abnormal occurrence.
- (2) To ensure system safety, always read and heed the information provided in all Safety Precautions, Precautions for Safe Use, and Precaution for Correct Use of manuals for each device used in the system.
- (3) The user is encouraged to confirm the standards and regulations that the system must conform to.
- (4) It is prohibited to copy, to reproduce, and to distribute a part or the whole of this document without the permission of OMRON Corporation.
- (5) The information contained in this document is current as of June 2013. It is subject to change without notice for improvement.

The following notation is used in this document.

 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
 <b>Caution</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.



#### Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.



#### Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.



#### Additional Information

Additional information to read as required.

This information is provided to increase understanding or make operation easier.

#### Symbol



The filled circle symbol indicates operations that you must do.  
The specific operation is shown in the circle and explained in text.  
This example shows a general precaution for something that you must do.

## 4. Overview

This document describes the procedure for connecting the Robot Controller (IRC5) of ABB Ltd. (hereinafter referred to as ABB) to the NJ-series Automation Controller + DeviceNet Unit of OMRON Corporation (hereinafter referred to as OMRON), and provides the procedure for checking their connection.

It describes the procedure for performing DeviceNet remote I/O communications using the DeviceNet settings of the project file prepared beforehand (hereinafter referred to as the "procedure for using the configuration files").

Section 9 A-1 and Section 10 A-2 describe the procedures for setting parameters with software without using files (hereinafter referred to as the "procedure for setting parameters from the beginning").

To follow the "procedure for using configuration files", obtain the latest "Sysmac Studio project file" and "CX-Integrator project file" (they are referred to as "configuration files") from OMRON in advance.

Name	File name	Version
Sysmac Studio project file (extension: smc)	ABB_IRC5_DN_EV100.smc	Ver.1.00
CX-Integrator project file (extension: cin)	ABB_IRC5_DN_EV100.cin	Ver.1.00

## 5. Applicable Devices and Device Configuration

### 5.1. Applicable Devices

The applicable devices are as follows:

Manufacturer	Name	Model
OMRON	NJ-series CPU Unit	NJ501-□□□□ NJ301-□□□□
OMRON	DeviceNet Unit (master)	CJ1W-DRM21
ABB	Robot Controller	IRC5
ABB	Manipulator	IRB series



#### Precautions for Correct Use

As applicable devices above, the devices with the models and versions listed in Section 5.2. are actually used in this document to describe the procedure for connecting devices and checking the connection.

You cannot use devices with versions lower than the versions listed in Section 5.2.

To use the above devices with versions not listed in Section 5.2 or versions higher than those listed in Section 5.2, check the differences in the specifications by referring to the manuals before operating the devices.



#### Additional Information

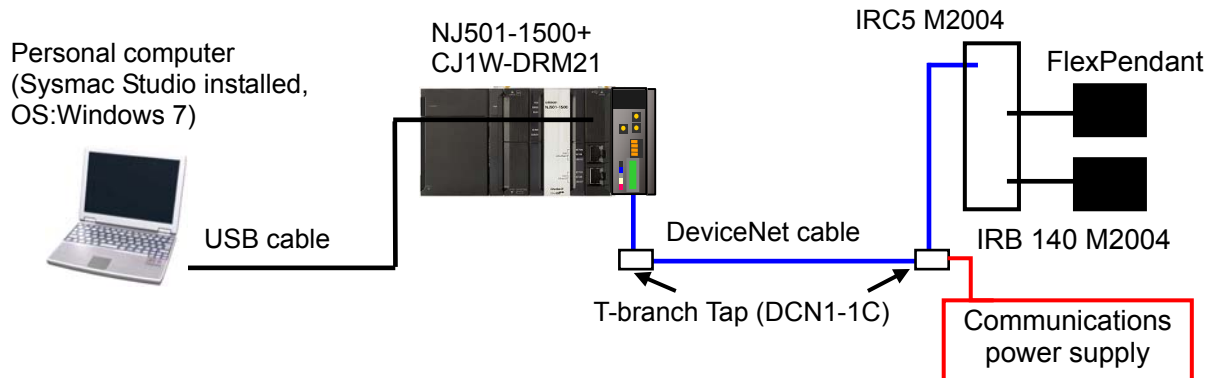
This document describes the procedure to establish the network connection. Except for the connection procedure, it does not provide information on operation, installation or wiring method. It also does not describe the functionality or operation of the devices. Refer to the manuals or contact the device manufacturer.

(ABB Ltd. <http://www.abb.com/>)

This URL is the latest address at the time of this document creation. Contact each device manufacturer for the latest information.

## 5.2. Device Configuration

The hardware components to reproduce the connection procedure of this document are as follows:



Manufacturer	Name	Model	Version
OMRON	DeviceNet Unit (master)	CJ1W-DRM21	Ver.1.1
OMRON	CPU Unit	NJ501-1500	Ver.1.05
OMRON	Power Supply Unit	NJ-PA3001	
OMRON	DeviceNet cable	DCA1-5C10	
OMRON	T-branch Tap	DCN1-1C	
OMRON	Sysmac Studio	SYSMAC-SE2	Ver.1.06
OMRON	CX-Integrator	(Included in Sysmac Studio.)	Ver.2.57
OMRON	Sysmac Studio project file	ABB_IRC5_DN_EV100.smc	Ver.1.00
OMRON	CX-Integrator project file	ABB_IRC5_DN_EV100.cin	Ver.1.00
-	Personal computer (OS: Windows7)	-	
-	USB cable (USB 2.0 type B connector)	-	
-	Communications power supply	-	
ABB	Robot Controller	IRC5 M2004	RW5.14-03.0 1.3071.
ABB	Manipulator	IRB 140 M2004	
ABB	FlexPendant	-	
ABB	EDS file	IRC5_Slave.eds	Ver.1.1



### Precautions for Correct Use

Prepare the corresponding EDS file beforehand.  
To obtain, contact ABB Ltd.



### Precautions for Correct Use

When there is an icon file specific to the device, the icon file and the EDS file must be stored in the same folder.





### Precautions for Correct Use

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Prepare the latest "Sysmac Studio project file" and "CX-Integrator project file" from OMRON in advance.

(To obtain the files, contact your OMRON representative.)

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### Precautions for Correct Use

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Update the Sysmac Studio to the version specified in this section or higher version using the auto update function.

If a version not specified in this section is used, the procedures described in Section 7 and subsequent sections may not be applicable. In that case, use the equivalent procedures described in the Sysmac Studio Version 1 Operation Manual (Cat. No. W504).

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### Additional Information

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For information on the DeviceNet cable and network wiring, refer to *Chapter 2 Network Configuration and Wiring* of the *DeviceNet Operation Manual* (Cat. No. W267).

Connect a terminating resistor to each end of the trunk line of DeviceNet.

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### Additional Information

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The system configuration in this document uses USB for the connection to the Controller. For information on how to install a USB driver, refer to *A-1 Driver Installation for Direct USB Cable Connection* of the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

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## 6. DeviceNet Settings

This section describes the specifications such as communication parameters and remote I/O communications that are defined in this document.

Hereinafter, the Robot Controller is referred to as the "destination device" in some descriptions.

### 6.1. Setting the DeviceNet Communications Parameters

The communications parameters required to connect the Controller and the destination device via DeviceNet are given below.

	Controller (DeviceNet Unit)	Robot Controller
Unit number	0	-
Bus type	-	DeviceNet1
Unit Name	-	tmp0
Node address (MAC ID)	63	0
Baud rate (bps)	500kbps	500kbps

### 6.2. Allocation for Remote I/O Communications

The remote I/O communications data of the destination device are allocated to the global variables of the Controller. The allocation for the remote I/O communications data is called a scan list. The relationship between the device data and the global variables is shown below. The following global variables are defined in the "Configuration file".

#### ■Output area (Controller → Robot Controller)

Destination device data	Memory used for CJ-series Units	Global variable name	Data type
Digital Input 00 to 63	%3200 to %3203	DN00_InputData_OUT	BOOL[64]

#### ■Input area (Controller ← Robot Controller)

Destination device data	Memory used for CJ-series Units	Global variable	Data type
Digital Outputs 00 to 63	%3300 to %3303	DN00_OutputData_IN	BOOL[64]

In this document, only bits 0 to 3 of the input and output areas are allocated.

#### ■Details on output area

DN00_InputData_OUT[64]	63 to 4	3	2	1	0
	Not allocated	di4	di3	di2	di1

#### ■Details on input area

DN00_OutputData_IN[64]	63 to 4	3	2	1	0
	Not allocated	do4	do3	do2	do1

**Additional Information**

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When the DeviceNet Unit is used with a Controller, slave data are allocated to the memory used for CJ-series Units. With programs, specify variable names for the memory used for CJ-series Units.

With Sysmac Studio, add the prefix "%" to each address to indicate the memory used for CJ-series Units.

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**Additional Information**

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With the Sysmac Studio, two methods can be used to specify an array for a data type. After entering, (1) is converted to (2) and the data type is always displayed as (2).

(1)WORD[3] / (2) ARRAY[0..2] OF WORD

In this document, the data type is simplified by displaying WORD[3].

(The example above means a WORD data type with three array elements.)

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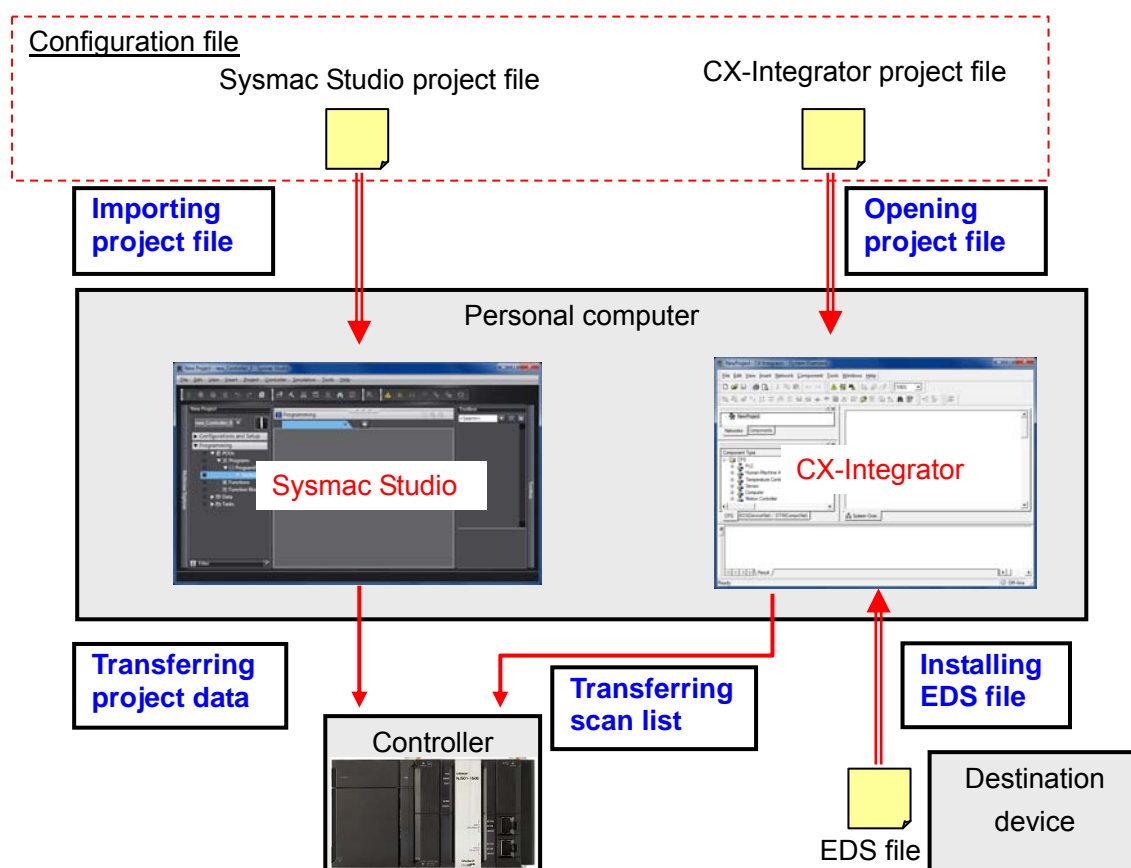
## 7. DeviceNet Connection Procedure

This section describes the procedure for connecting the Controller to the Robot Controller via DeviceNet using the "procedures for using configuration files".

This document explains the procedures for setting up the Controller and the Robot Controller from the factory default setting. For the initialization, refer to *Section 8 Initialization Method*.

### ■ Setting Overview

The following shows the relationship of processes to perform DeviceNet remote I/O communications using the "procedures for using configuration files".



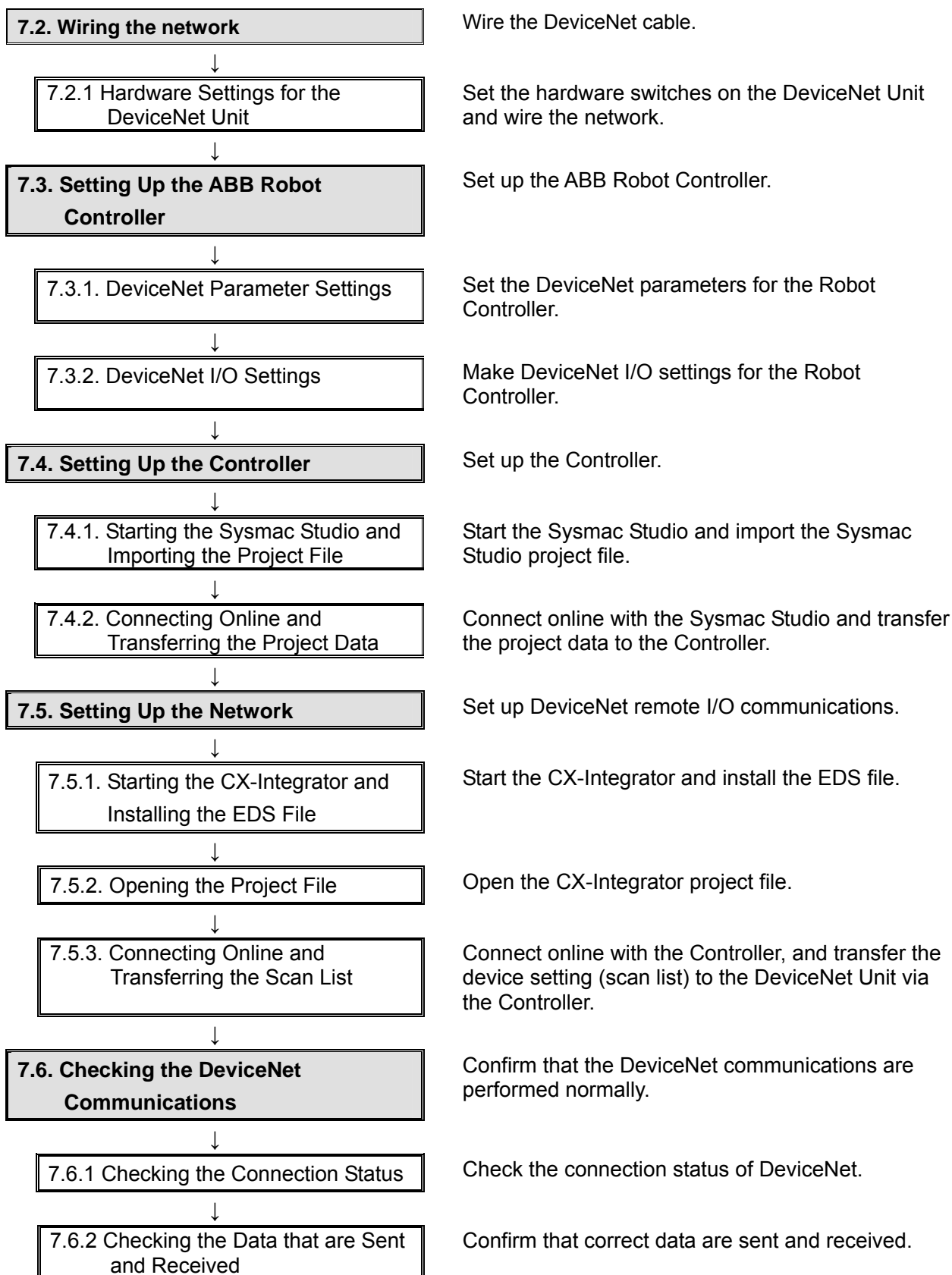
### Precautions for Correct Use

Prepare the latest "Sysmac Studio project file" and "CX-Integrator project file" from OMRON in advance.

(To obtain the files, contact your OMRON representative.)

## 7.1. Work Flow

Take the following steps to perform DeviceNet remote I/O communications.



## 7.2. Wiring the network

Wire the DeviceNet cable.

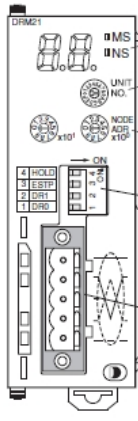


### 7.2.1. Hardware Settings for the DeviceNet Unit

Set the hardware switches on the DeviceNet Unit and wire the network.



#### Precautions for Correct Use

Make sure that the power supply is OFF when you perform the setting up.

1	<p>Make sure that the power supply to the Controller is OFF.</p> <p>*If the power supply is turned ON, settings may not be applicable as described in the following procedure.</p>	
2	<p>Check the hardware switches located on the front panel of the DeviceNet Unit by referring to the right figure.</p>	 <p>Indicators</p> <p>Unit No. switch This switch sets the unit number of the DeviceNet Unit as a one-digit hexadecimal value.</p> <p>Node address switches These switches set the node address as a two-digit decimal value.</p> <p>DIP switch The pins have the following functions: Pins 1 and 2: Baud rate Pin 3: Continue/Stop communications for error (when used as a Master) Pin 4: Hold/clear I/O for communications error (when used as a Slave)</p> <p>Communications connector Connect the Network communications cable to this connector. The communications power for this Unit is also supplied through this connector. A parallel connector with screws (XW4B-O5C1-H1-D) is provided for node connection.</p>
3	<p>Set the Unit No. Switch to 0.</p>	 <p>Setting method: One-digit hexadecimal Setting range: 0 to F Note: The unit number is set to 0 at the factory.</p>
4	<p>Set the node address switches to 63.</p>	 <p>Setting method: Two-digit decimal Setting range: 0 to 63 Note: The node address is set to 63 at the factory.</p>

- 5 Set only pin 2 of the DIP switch to ON. (Set pins 1, 3 and 4 of the DIP switch to OFF.)

\*Set the baud rate to 500 kbps.



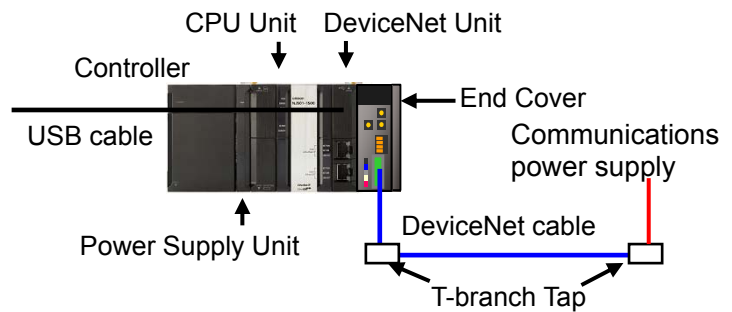
Hold/clear I/O for communications error (when used as a slave)  
Continue/stop communications for communications error (when used as a master)  
Baud rate

Pin	Function	Setting
1	Baud rate	See the next table.
2		
3	Continue/stop remote I/O communications for communication errors (when used as a master)	OFF: Continue communications ON: Stop communications
4	Hold/clear remote outputs for communications error (when used as a slave)	OFF: Clear remote outputs ON: Hold remote outputs

Pin 1	Pin 2	Baud rate
OFF	OFF	125 kbps
ON	OFF	250 kbps
OFF	ON	500 kbps
ON	ON	Not allowed.

All pins are set to OFF at the factory.

- 6 Connect the DeviceNet Unit to the CPU Unit.  
Connect the Controller with the DeviceNet cables and USB cable as shown in 5.2. Device Configuration.  
Connect the communications power supply to DeviceNet.



### 7.3. Setting Up the ABB Robot Controller

Set up the ABB Robot Controller.

#### Caution

Always confirm safety before you reset the Controller or any components.



#### Precautions for Correct Use

This document explains the setting procedure when the DeviceNet board is installed on the Robot Controller and safety circuits are connected.

For information on installing the Robot Controller, refer to 2 *Installation and Commissioning* of the *Product Manual Robot Controller IRC5* (3HAC021313-001).

For information on installing the DeviceNet board, refer to 2. *Hardware description* of the *Application Manual DeviceNet* (HAC020676-001).

#### 7.3.1. Hardware Settings

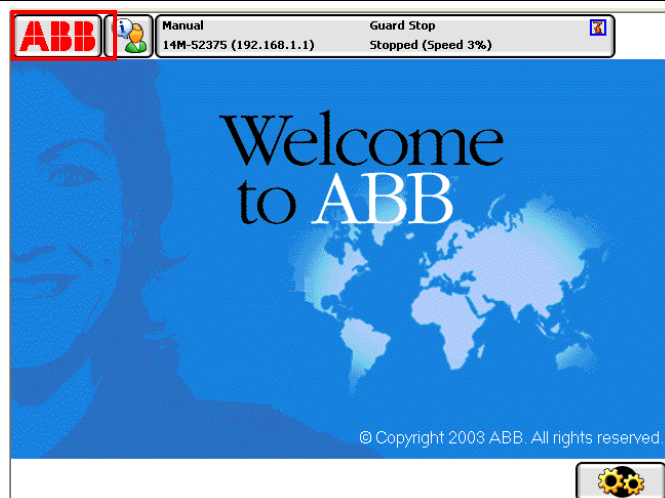
Set the DeviceNet parameters for the Robot Controller.

- 1 Connect the Manipulator and FlexPendant to the Robot Controller.  
Connect the power supply cable and the DeviceNet cables.  
Turn ON the communications power supply to DeviceNet and the power supply to the Robot Controller.

\*For information on wiring the Robot Controller, refer to 2.5 *Connections* of the *Product Manual Robot Controller IRC5* (3HAC021313-001).

\*For DeviceNet connection, refer to 2.2 *Connections* of the *Application Manual DeviceNet* (HAC020676-001).

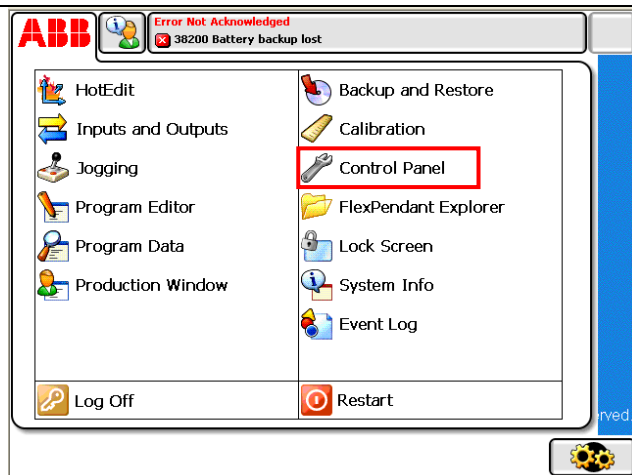
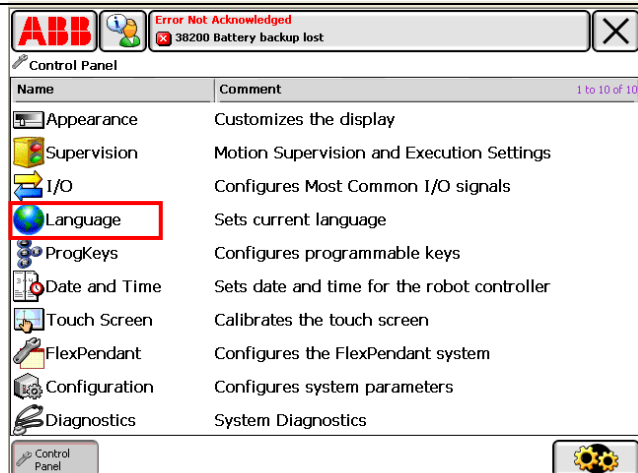
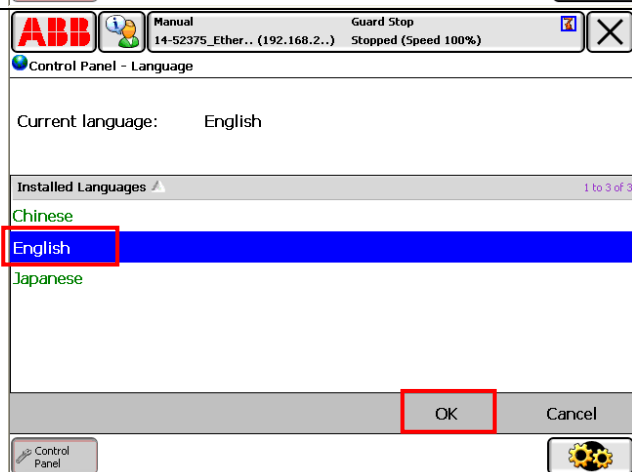
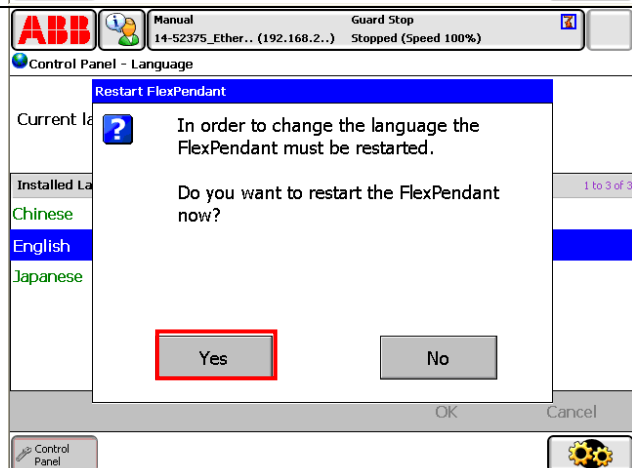
- 2 The initial window is displayed on the FlexPendant.  
Press **ABB**.



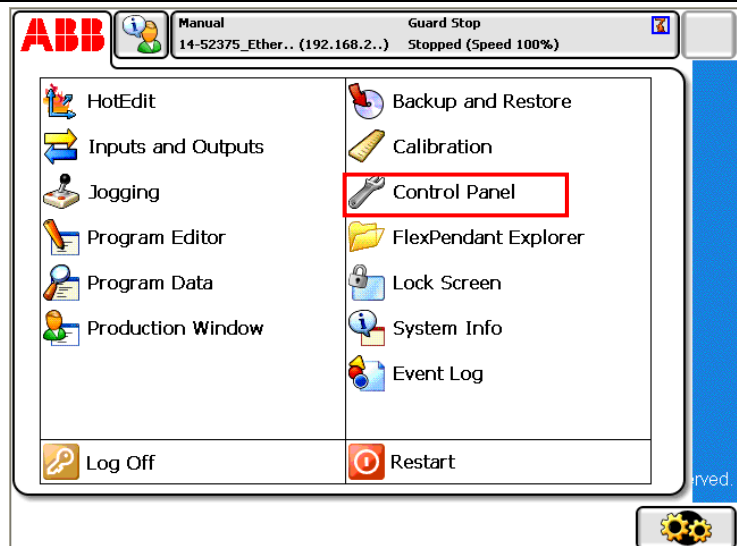


3 Press **Control Panel**.

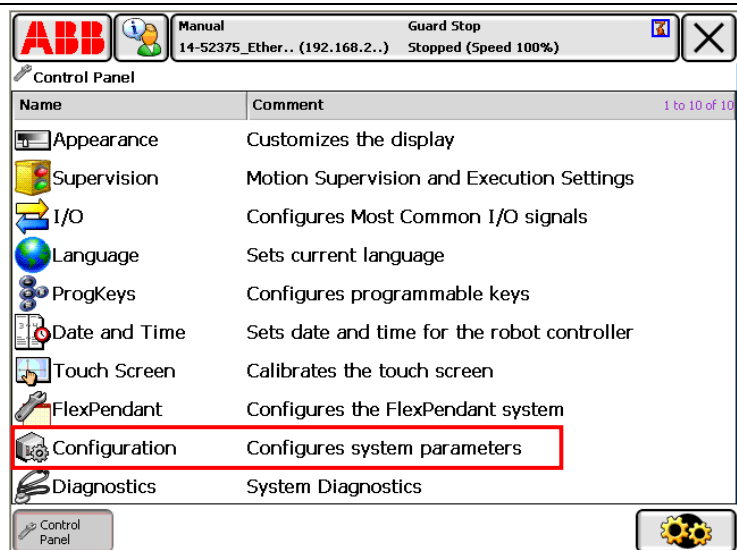
\*If the window on the right is displayed in English, steps 4 to 6 are unnecessary. Proceed to step 7.

4 Press **Language**.5 Select **English** and press **OK**.6 A change confirmation window is displayed. Press the **Yes** Button. The Robot Controller restarts. The same initial window as step 2 is displayed. Press **ABB**.

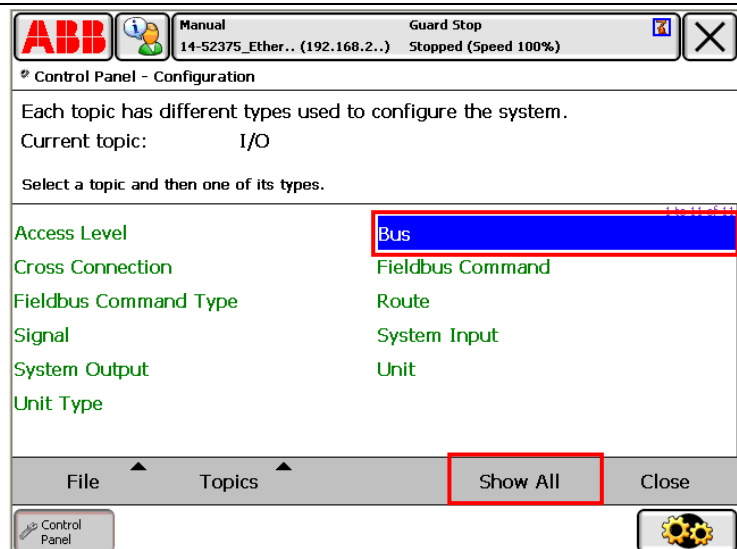
- 7 The window is displayed in English.  
Press **Control Panel**.



- 8 Press **Configuration**.



- 9 Select **Bus** and press **Show All**.



- 10 Select **DeviceNet1** and press **Edit**.

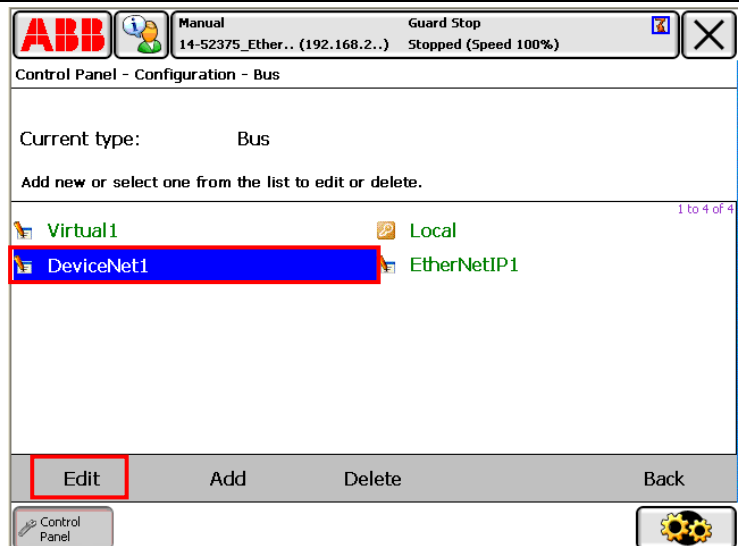


ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Bus


Current type: Bus

Add new or select one from the list to edit or delete.

Virtual1 Local  
DeviceNet1 EtherNet/IP1

Edit Add Delete Back

Control Panel

- 11 Display the next page by pressing .

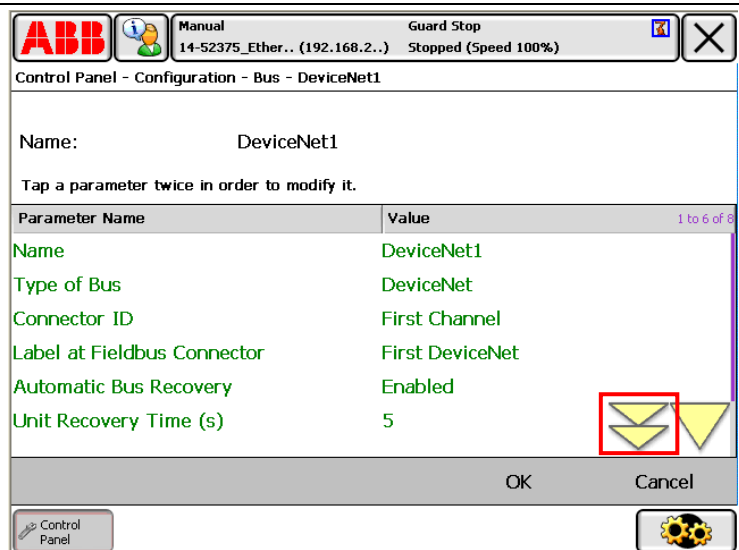


ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Bus - DeviceNet1

Name: DeviceNet1

Tap a parameter twice in order to modify it.

Parameter Name	Value
Name	DeviceNet1
Type of Bus	DeviceNet
Connector ID	First Channel
Label at Fieldbus Connector	First DeviceNet
Automatic Bus Recovery	Enabled
Unit Recovery Time (s)	5

OK Cancel

Control Panel

- 12 Select **DeviceNet Master Address** and press the value.

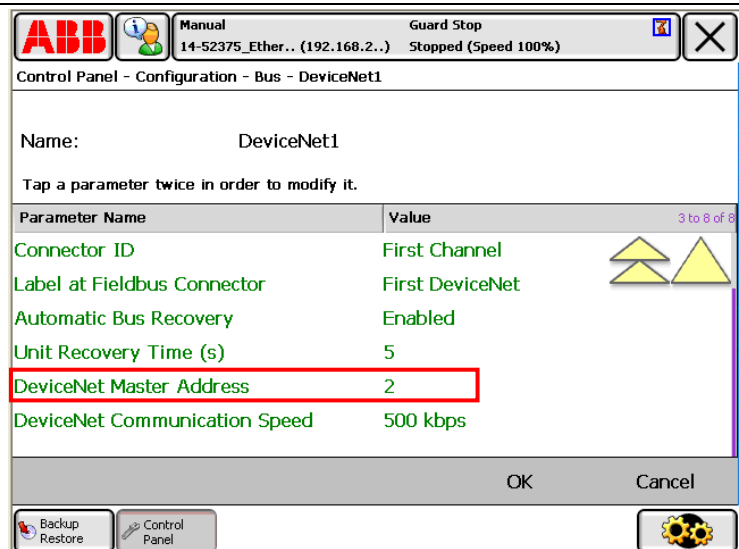


ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Bus - DeviceNet1

Name: DeviceNet1

Tap a parameter twice in order to modify it.

Parameter Name	Value
Connector ID	First Channel
Label at Fieldbus Connector	First DeviceNet
Automatic Bus Recovery	Enabled
Unit Recovery Time (s)	5
DeviceNet Master Address	2
DeviceNet Communication Speed	500 kbps

OK Cancel

Backup Restore Control Panel

13 Enter 0 and press **OK**.

ABB Manual 14-52375\_Ether.. (192.168.2..) Guard Stop Stopped (Speed 100%)

DeviceNet Master Address

0

1 2 3 4 5 6 7 8 9 0 - = < >

q w e r t y u i o p [ ]

CAP a s d f g h j k l ; ' +

Shift z x c v b n m , . / Home

Int'l ' \ < > < > End

OK Cancel

Backup Restore Control Panel

14 Confirm that DeviceNet Master Address was changed to 0. Confirm that DeviceNet Communication Speed is 500 kbps and press **OK**.

ABB Manual 14-52375\_Ether.. (192.168.2..) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Bus - DeviceNet1

Name: DeviceNet1

Tap a parameter twice in order to modify it.

Parameter Name	Value
Connector ID	First Channel
Label at Fieldbus Connector	First DeviceNet
Automatic Bus Recovery	Enabled
Unit Recovery Time (s)	5
DeviceNet Master Address	0
DeviceNet Communication Speed	500 kbps

OK Cancel

Backup Restore Control Panel

\*If a different value is set as the DeviceNet Communication Speed, select **DeviceNet Communication Speed** and press the value as shown on the right. Select **500 kbps** from the pull-down list that is displayed.

ABB Manual 14-52375\_Ether.. (192.168.2..) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Bus - DeviceNet1

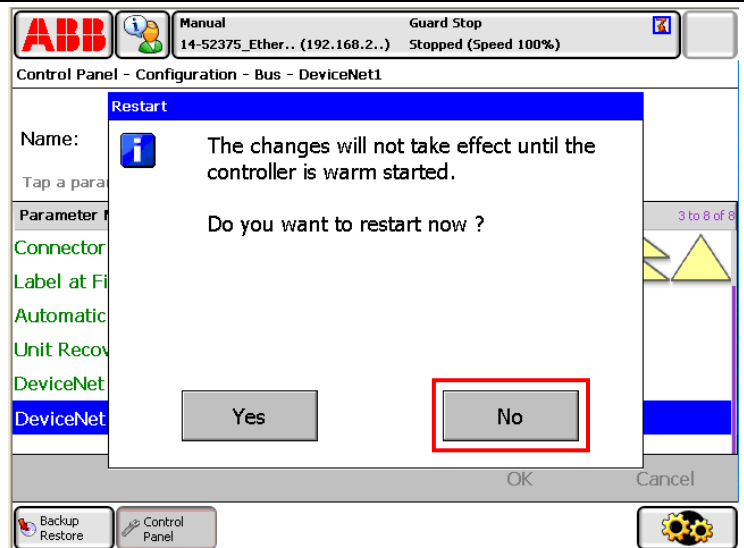
Name: DeviceNet1

Tap a parameter twice in order to modify it.

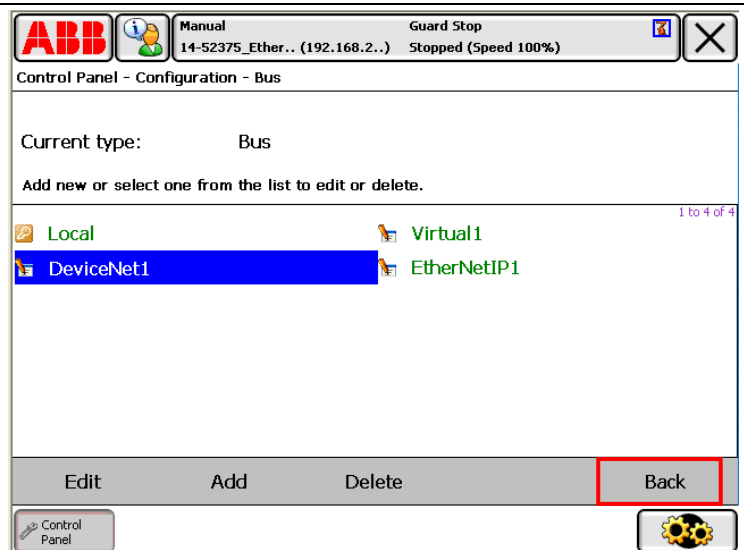
Parameter Name	Value
Connector ID	First Channel
Label at Fieldbus Connector	First DeviceNet
Automatic Bus Recovery	Enabled
Unit Recovery Time (s)	5
DeviceNet Master Address	0
DeviceNet Communication Speed	500 kbps
	125 kbps
	250 kbps
	500 kbps

Backup Restore Control Panel

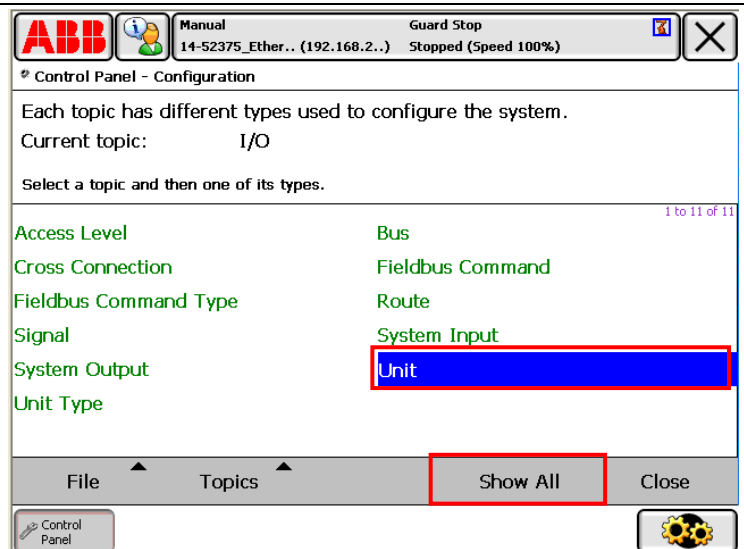
- 15 If the setting values were changed in steps 12 to 14, the Restart Window is displayed. Press the **No** Button. If no change was made, proceed to step 16.



- 16 Press **Back**.



- 17 Select **Unit** and press **Show All**.



18 Press **Add**.

ABB Manual 14-52375\_Ether.. (192.168.2..) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Unit

Current type: Unit

Add new or select one from the list to edit or delete.

PANEL	DRV_1
DRV_2	DRV_3
DRV_4	

1 to 5 of 5

Edit Add Delete Back

Control Panel

19 Select **Type of Unit** and press the value.

ABB Manual 14-52375\_Ether.. (192.168.2..) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Unit - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

Parameter Name	Value
Name	tmp0
Type of Unit	
Connected to Bus	
Unit Identification Label	
Unit Trustlevel	Error when lost (1)
Unit Startup State	Activated

1 to 6 of 6

OK Cancel

Control Panel

20 Select **DN\_SLAVE** and press **OK**.

ABB Manual 14-52375\_Ether.. (192.168.2..) Guard Stop Stopped (Speed 100%)

tmp0 - Type of Unit

Current Value:

Select a value. Then press OK.

Virtual	LOCAL_GENERIC
DN_GENERIC	d320
d327A	d328A
d332A	d355A
d651	d652
d653	DN_SLAVE
DN_INTERNAL_SLAVE	d350A

1 to 14 of 23

OK Cancel

Control Panel

- 21 Select **Connected to Bus** and press the value.

ABB Manual 14-52375\_Ether.. (192.168.2..) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Unit - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

Parameter Name	Value
Name	tmp0
Type of Unit	DN_SLAVE
Connected to Bus	
Unit Identification Label	
Unit Trustlevel	Error when lost (1)
Unit Startup State	Activated

OK Cancel

Control Panel

- 22 Select **DeviceNet1** from the pull-down list.

ABB Manual 14-52375\_Ether.. (192.168.2..) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Unit - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

Parameter Name	Value
Name	tmp0
Type of Unit	DN_SLAVE
Connected to Bus	DeviceNet1
Unit Identification Label	Virtual1
Unit Trustlevel	Local
Unit Startup State	DeviceNet1
	EtherNetIP1

OK Cancel

Control Panel


- 23 Display the next page by pressing .

ABB Manual 14-52375\_Ether.. (192.168.2..) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Unit - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

Parameter Name	Value
Name	tmp0
Type of Unit	DN_SLAVE
Connected to Bus	DeviceNet1
Unit Identification Label	
Unit Trustlevel	Error when lost (1)
Unit Startup State	Activated

OK Cancel

Control Panel

- 24 Select **DeviceNet Address** and press the value.

ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Unit - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

Parameter Name	Value
Unit Identification Label	
Unit Trustlevel	Error when lost (1)
Unit Startup State	Activated
Store Unit State at Power Fail	No
Regain Communication Reset	Disabled
<b>DeviceNet Address</b>	<b>63</b>

OK Cancel

Control Panel

- 25 Enter 0 and press **OK**.

ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

DeviceNet Address

0

1 2 3 4 5 6 7 8 9 0 - = [X]

q w e r t y u i o p [ ]

CAP a s d f g h j k l ; ' +

Shift z x c v b n m , . / Home

Int'l ' \ [ ] ↑ ↓ ← → End

OK Cancel

Control Panel

- 26 Confirm that DeviceNet Address is 0.  
Press **OK**.

ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Unit - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

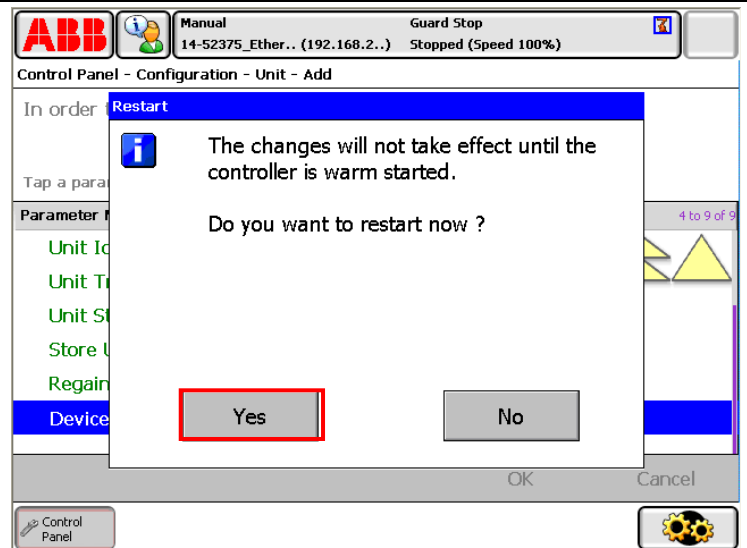
Parameter Name	Value
Unit Identification Label	
Unit Trustlevel	Error when lost (1)
Unit Startup State	Activated
Store Unit State at Power Fail	No
Regain Communication Reset	Disabled
<b>DeviceNet Address</b>	<b>0</b>

OK Cancel

Control Panel

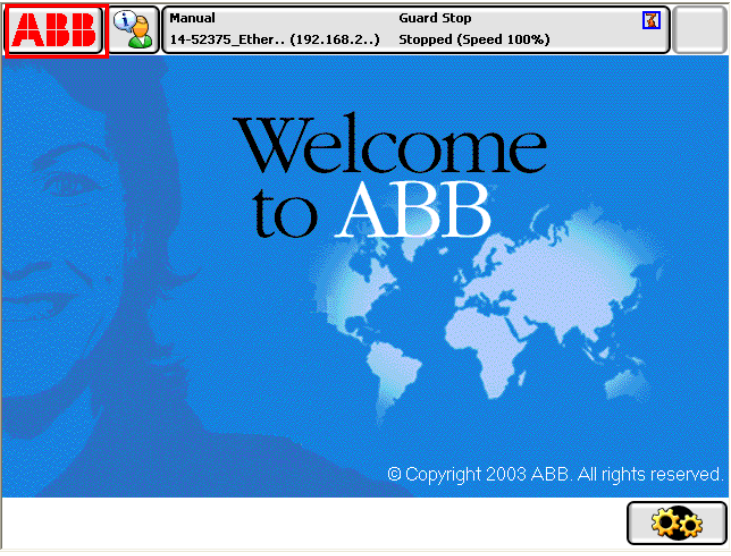
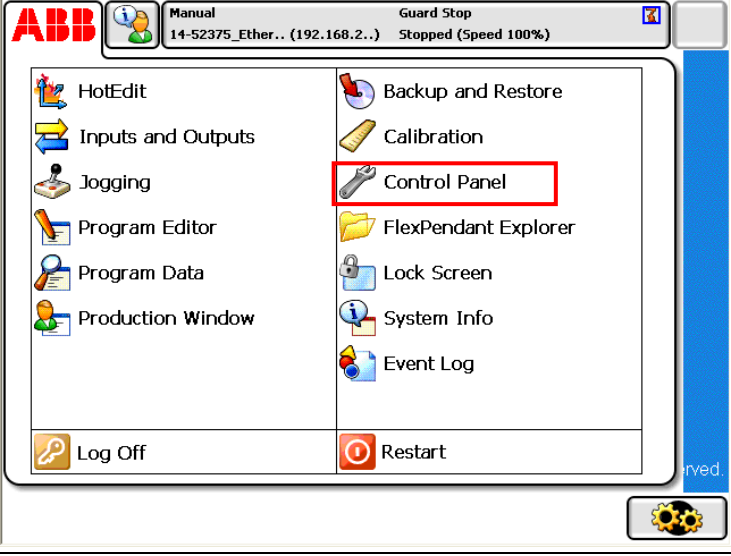
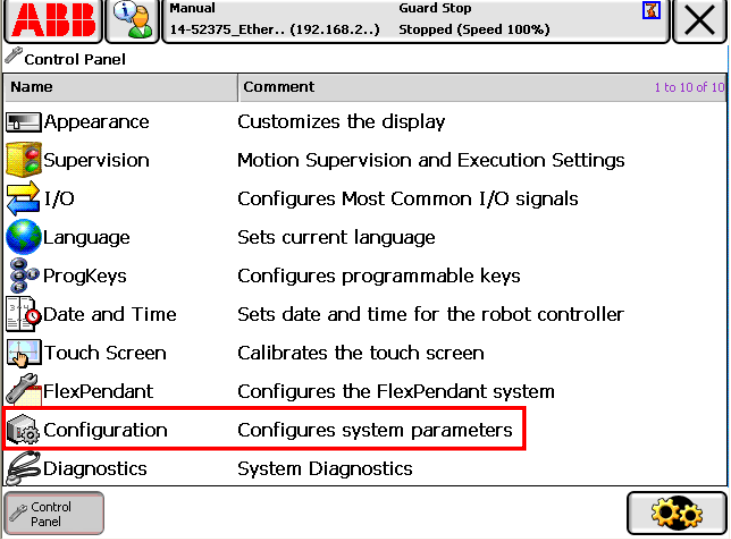


- 27 A restart confirmation window is displayed. Press the **Yes** Button.



## 7.3.2. DeviceNet I/O Settings

Make DeviceNet I/O settings for the Robot Controller.

<p>1 The Robot Controller restarts and the initial window is displayed on FlexPendant. Press <b>ABB</b>.</p>																							
<p>2 Press <b>Control Panel</b>.</p>																							
<p>3 Press <b>Configuration</b>.</p>	 <table border="1"> <thead> <tr> <th>Name</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>Appearance</td> <td>Customizes the display</td> </tr> <tr> <td>Supervision</td> <td>Motion Supervision and Execution Settings</td> </tr> <tr> <td>I/O</td> <td>Configures Most Common I/O signals</td> </tr> <tr> <td>Language</td> <td>Sets current language</td> </tr> <tr> <td>ProgKeys</td> <td>Configures programmable keys</td> </tr> <tr> <td>Date and Time</td> <td>Sets date and time for the robot controller</td> </tr> <tr> <td>Touch Screen</td> <td>Calibrates the touch screen</td> </tr> <tr> <td>FlexPendant</td> <td>Configures the FlexPendant system</td> </tr> <tr> <td><b>Configuration</b></td> <td><b>Configures system parameters</b></td> </tr> <tr> <td>Diagnostics</td> <td>System Diagnostics</td> </tr> </tbody> </table>	Name	Comment	Appearance	Customizes the display	Supervision	Motion Supervision and Execution Settings	I/O	Configures Most Common I/O signals	Language	Sets current language	ProgKeys	Configures programmable keys	Date and Time	Sets date and time for the robot controller	Touch Screen	Calibrates the touch screen	FlexPendant	Configures the FlexPendant system	<b>Configuration</b>	<b>Configures system parameters</b>	Diagnostics	System Diagnostics
Name	Comment																						
Appearance	Customizes the display																						
Supervision	Motion Supervision and Execution Settings																						
I/O	Configures Most Common I/O signals																						
Language	Sets current language																						
ProgKeys	Configures programmable keys																						
Date and Time	Sets date and time for the robot controller																						
Touch Screen	Calibrates the touch screen																						
FlexPendant	Configures the FlexPendant system																						
<b>Configuration</b>	<b>Configures system parameters</b>																						
Diagnostics	System Diagnostics																						

- 4 Select **Signal** and press **Show All**.

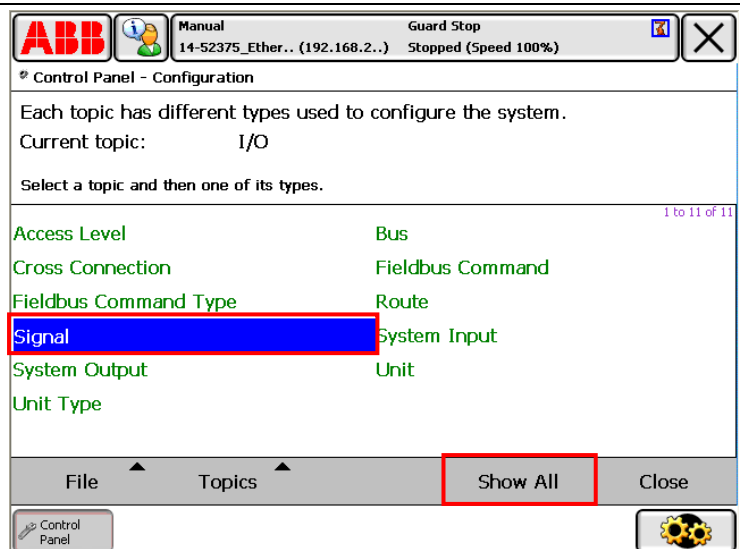


ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration

Each topic has different types used to configure the system.  
Current topic: I/O

Select a topic and then one of its types.

Access Level	Bus
Cross Connection	Fieldbus Command
Fieldbus Command Type	Route
<b>Signal</b>	System Input
System Output	Unit
Unit Type	

File Topics **Show All** Close

Control Panel

- 5 Press **Add**.

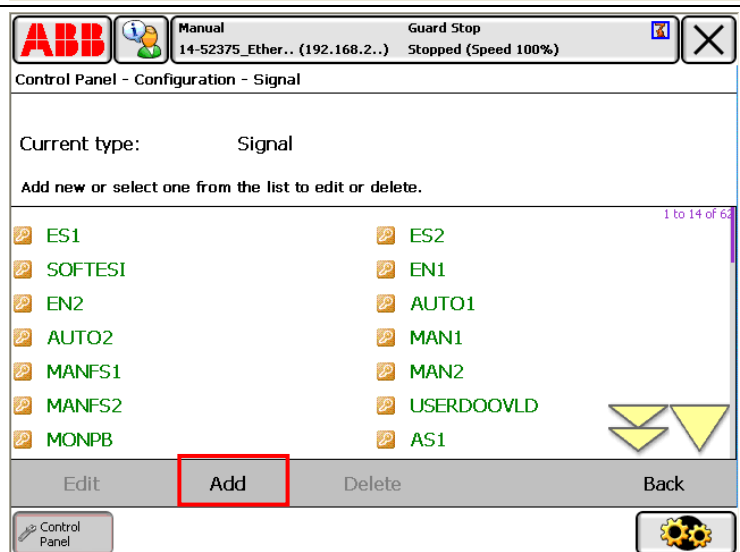


ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Signal

Current type: Signal

Add new or select one from the list to edit or delete.

ES1	ES2
SOFTES1	EN1
EN2	AUTO1
AUTO2	MAN1
MANFS1	MAN2
MANFS2	USERDOOVLD
MONPB	AS1

Edit **Add** Delete Back

Control Panel

- 6 Select **Name** and press the value.

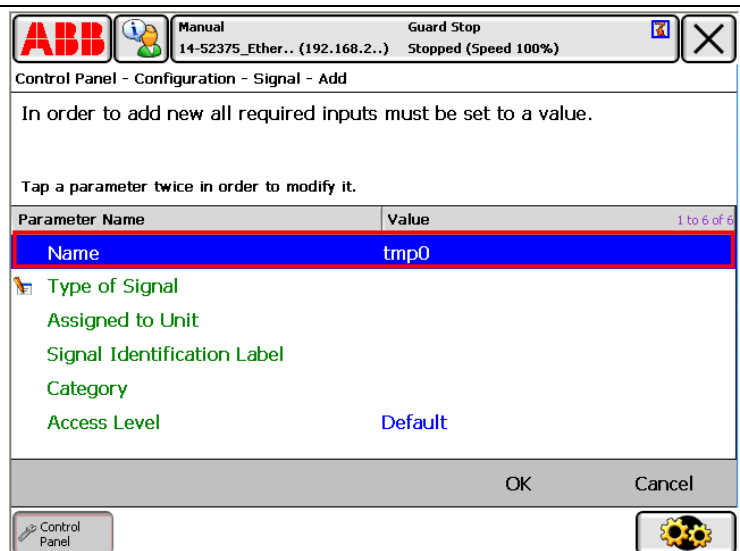


ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Signal - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

Parameter Name	Value
<b>Name</b>	tmp0
Type of Signal	
Assigned to Unit	
Signal Identification Label	
Category	
Access Level	Default

OK Cancel

Control Panel

7 Enter di1 and press **OK**.

ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Name

di1

1 2 3 4 5 6 7 8 9 0 - =

q w e r t y u i o p [ ]

CAP a s d f g h j k l ; ' +

Shift z x c v b n m , . / Home

Int'l ' \

OK Cancel

Control Panel

8 Select **Type of Signal**, press the value, and then select **Digital Input** from the pull-down list that is displayed.

ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Signal - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

Parameter Name	Value
Name	di1
Type of Signal	Digital Input
Assigned to Unit	Digital Output
Signal Identification Label	Analog Input
Category	Analog Output
Access Level	Group Input
	Group Output

Control Panel

9 Select **Assigned to Unit**, press the value, and then select **tmp0** from the pull-down list that is displayed.

ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Signal - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

Parameter Name	Value
Name	di1
Type of Signal	Digital Input
Assigned to Unit	tmp0
Signal Identification Label	
Category	
Access Level	Default

OK Cancel

Control Panel

- 10 Select **Unit Mapping** and press the value.

ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Control Panel - Configuration - Signal - Add

In order to add new all required inputs must be set to a value.

Tap a parameter twice in order to modify it.

Parameter Name	Value
Name	di1
Type of Signal	Digital Input
Assigned to Unit	tmp0
Signal Identification Label	
Unit Mapping	
Category	

OK Cancel

Control Panel

- 11 Enter 0 and press **OK**.

ABB Manual 14-52375\_Ether... (192.168.2...) Guard Stop Stopped (Speed 100%)

Unit Mapping

0

1 2 3 4 5 6 7 8 9 0 - = [X]

q w e r t y u i o p [ ]

CAP a s d f g h j k l ; ' +

Shift z x c v b n m , . / Home

Intl ' \ [ ] ↑ ↓ ← → End

OK Cancel

Control Panel

- 12 Press **OK**.

ABB Manual 14-52375\_Ether... (192.168.2...) 手動 保護停止 停止しました (速度 100%)

コントロールパネル - 構成 - Signal - di1

名前: di1

変更するにはパラメータを2度押します。

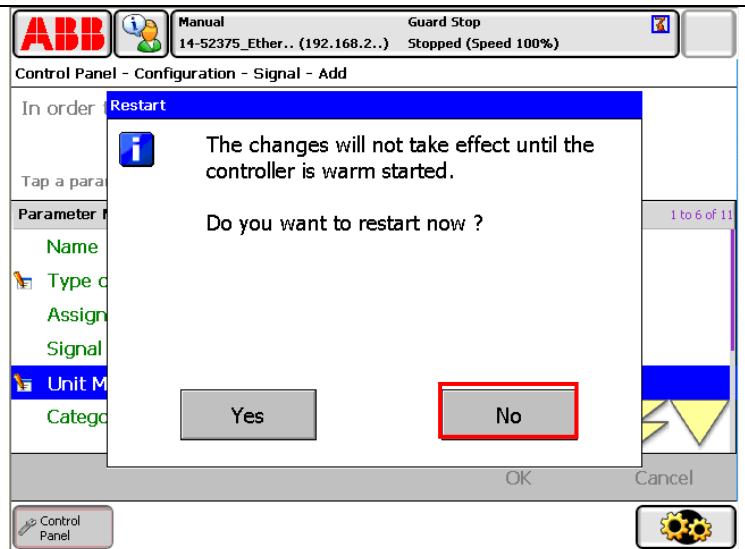
パラメータ名	値
Name	di1
Type of Signal	Digital Input
Assigned to Unit	tmp1
Signal Identification Label	
Unit Mapping	0
Category	

OK キャンセル

HotEdit キャンセル コント...

13 Press **No**.

The same initial window as step 5 is displayed.



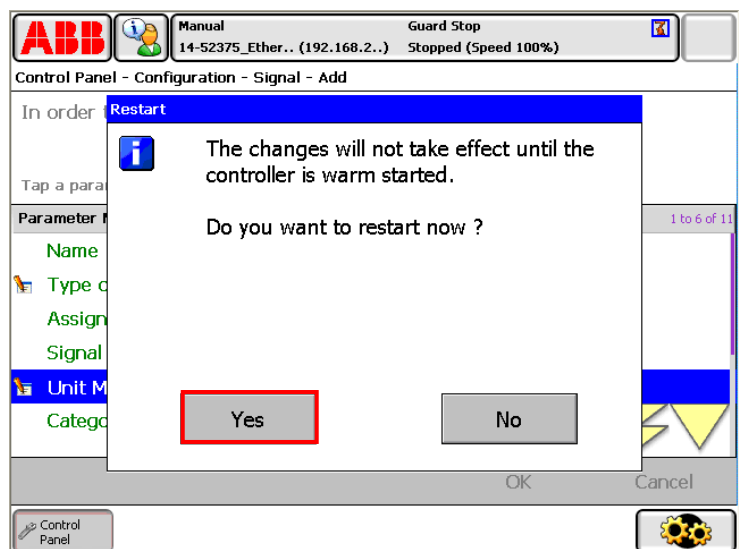
14 Add the following signals in the same way as steps 5 to 13.

- Name: di2  
Type of signal: Digital Input  
Assigned to Unit: tmp0  
Unit Mapping: 1
- Name: di3  
Type of signal: Digital Input  
Assigned to Unit: tmp0  
Unit Mapping: 2
- Name: di4  
Type of signal: Digital Input  
Assigned to Unit: tmp0  
Unit Mapping: 3

15 Add the following signals in the same way as steps 5 to 13.

- Name: do1  
Type of signal: Digital Output  
Assigned to Unit: tmp0  
Unit Mapping: 0
- Name: do2  
Type of signal: Digital Output  
Assigned to Unit: tmp0  
Unit Mapping: 1
- Name: do3  
Type of signal: Digital Output  
Assigned to Unit: tmp0  
Unit Mapping: 2
- Name: do4  
Type of signal: Digital Output  
Assigned to Unit: tmp0  
Unit Mapping: 3

\*Press the **Yes** Button in step 13 only when you make the last setting (setting for do4).



16 The Robot Controller restarts and the initial window is displayed on FlexPendant. Press **ABB**.

(The same window as step 2 is displayed.)

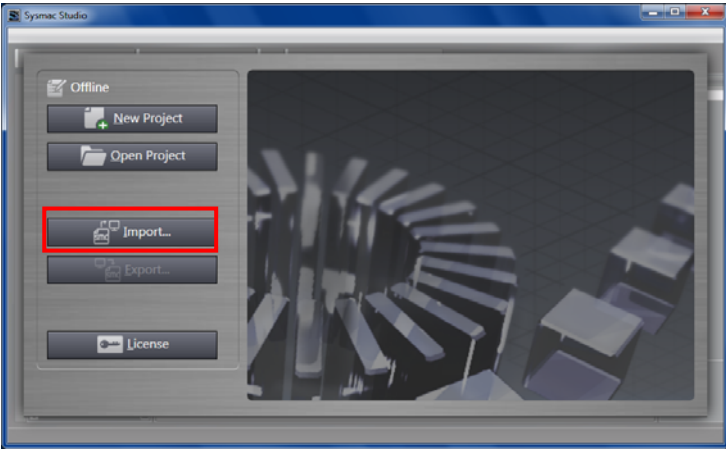
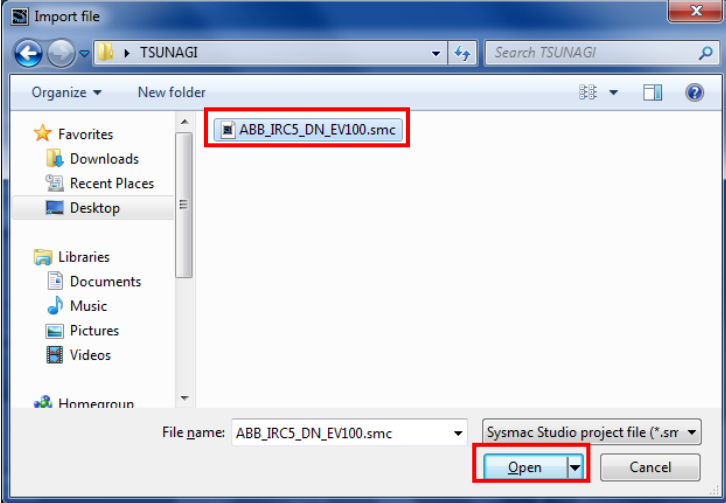
## 7.4. Setting Up the Controller

Set up the Controller.

### 7.4.1. Starting the Sysmac Studio and Importing the Project File

Start the Sysmac Studio and import the Sysmac Studio project file.

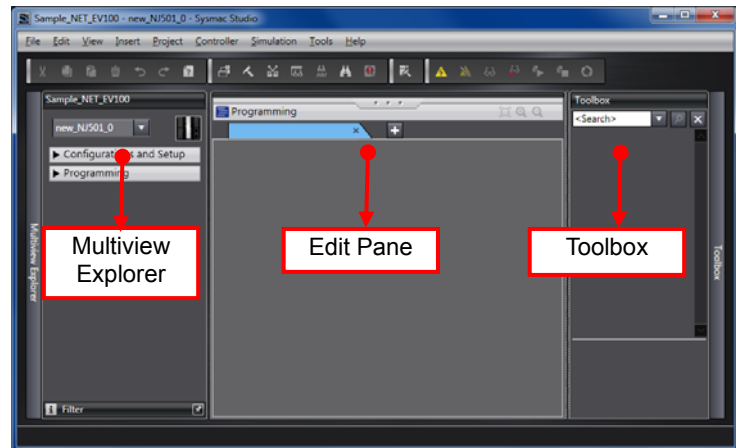
Install the Sysmac Studio and USB driver in the personal computer beforehand.

1	Turn ON the power supply to the Controller.	
2	<p>Start the Sysmac Studio. Click the <b>Import</b> Button.</p> <p>*If a confirmation dialog for an access right is displayed at start, select to start.</p>	
3	<p>The Import File Dialog Box is displayed. Select ABB_IRC5_DN_EV100.smc (Sysmac Studio project file) and click the <b>Open</b> Button.</p> <p>*Obtain the Sysmac Studio project file from OMRON.</p>	

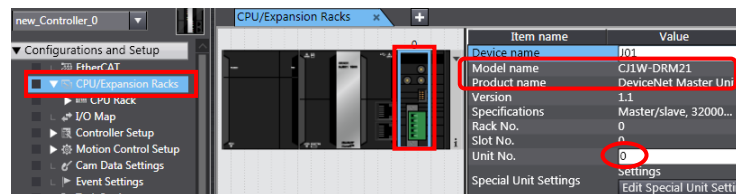
- 4 The ABB\_IRC5\_DN\_EV100 project is displayed.

The left pane is called Multiview Explorer, the right pane is called Toolbox and the middle pane is called Edit Pane.

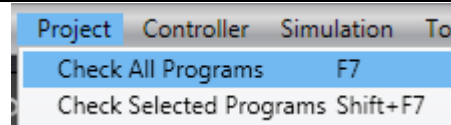
\*If an error message is displayed stating "Failed to Load Descendants", change the version of the Sysmac Studio to the version specified in 5.2. Device Configuration or higher version.



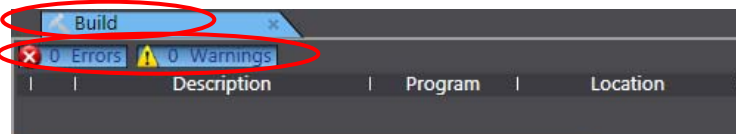
- 5 Double-click **CPU/Expansion Racks** under **Configurations and Setup** in the Multiview Explorer, and select the DeviceNet Unit that is displayed. Confirm that CJ1W-DRM21 is displayed as shown on the right and that the unit number is 0.



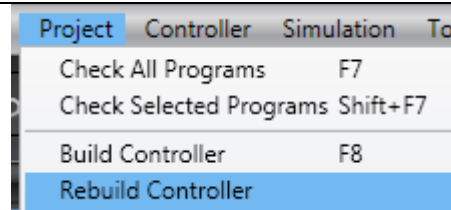
- 6 Select **Check All Programs** from the Project Menu.



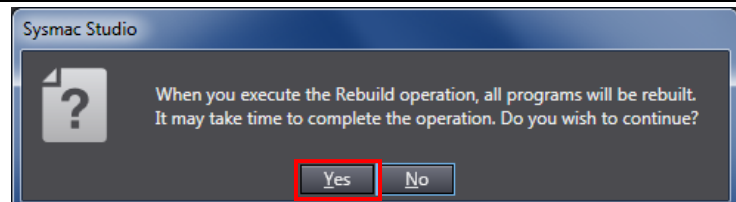
- 7 The Build Tab Page is displayed in the Edit Pane. Confirm that "0 Errors" and "0 Warnings" are displayed.



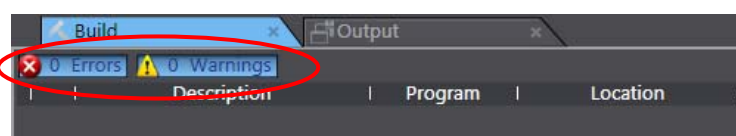
- 8 Select **Rebuild Controller** from the Project Menu.



- 9 A confirmation dialog box is displayed. Confirm that there is no problem and click the **Yes** Button.



- 10 Confirm that "0 Errors" and "0 Warnings" are displayed in the Build Tab Page.





### 7.4.2. Connecting Online and Transferring the Project Data

Connect online with the Sysmac Studio and transfer the project data to the Controller.

## WARNING

Always confirm safety at the destination node before you transfer a user program, configuration data, setup data, device variables, or values in memory used for CJ-series Units from the Sysmac Studio.

The devices or machines may perform unexpected operation regardless of the operating mode of the CPU Unit.

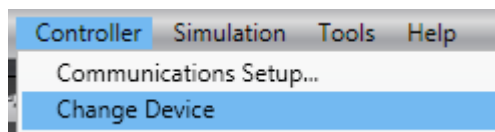


## Caution

Always confirm safety before you reset the Controller or any components.



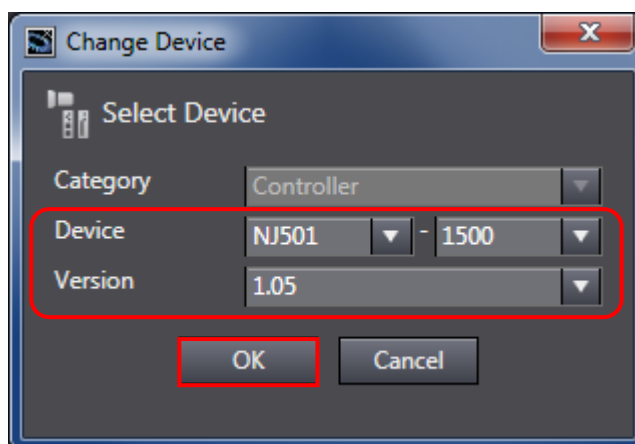
- 1 Select **Change Device** from the Controller Menu.



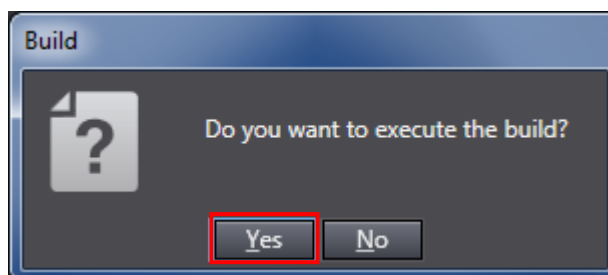
- 2 The Change Device Dialog Box is displayed.  
Confirm that Device and Version to use are set as shown on the right.

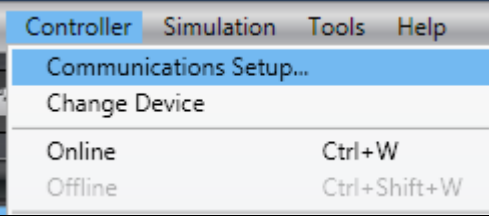
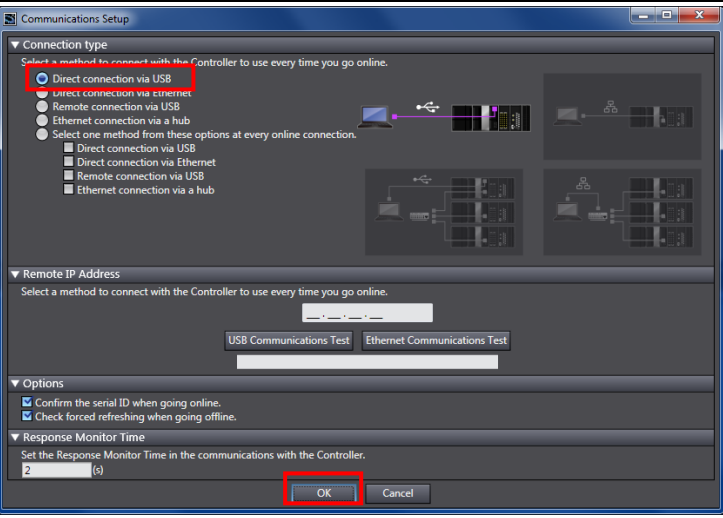
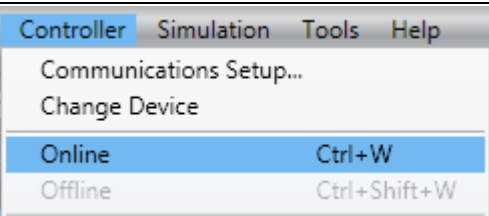
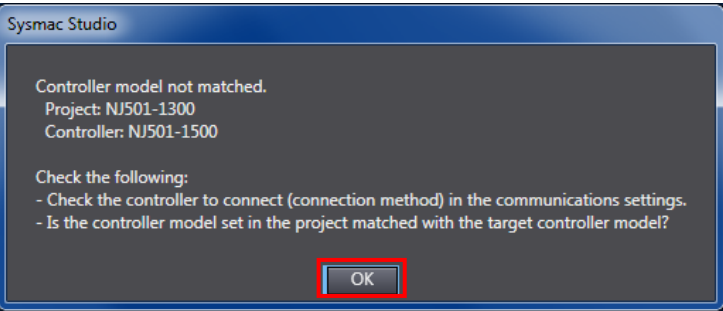
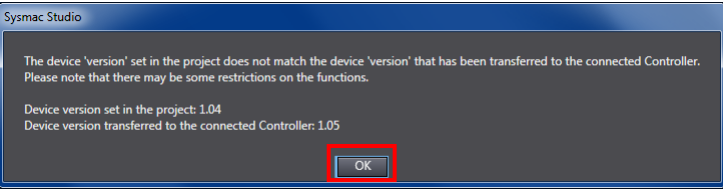
\*If the settings are not correct, select the setting items from the pull-down list.

Click the **OK** Button.



- 3 If the settings were changed in step 2, the Build Dialog Box is displayed. Check the contents and click the **Yes** Button.



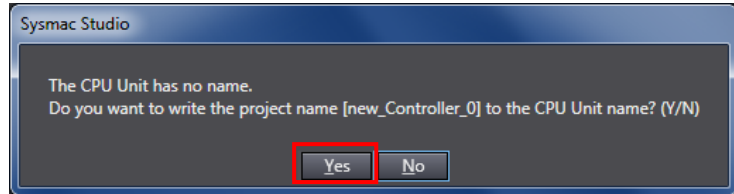
4	<p>Select <b>Communications Setup</b> from the Controller Menu.</p>	
5	<p>The Communications Setup Dialog Box is displayed. Select the <i>Direct connection via USB</i> Option for Connection Type.</p> <p>Click the <b>OK</b> Button.</p>	
6	<p>Select <b>Online</b> from the Controller Menu.</p> <p>*If the dialog on the right is displayed, the model or version of the Controller does not match that of the project file. Match the Controller model and version by changing the device settings of the project file, and then repeat the procedure from step 1 in this section. Close the dialog box by clicking the OK Button.</p> <p>*The model and version displayed on the confirmation dialog box differ depending on the Controller used and the device setting of the project file.</p>	 <p>*Example of confirmation dialog</p>  



### Additional Information

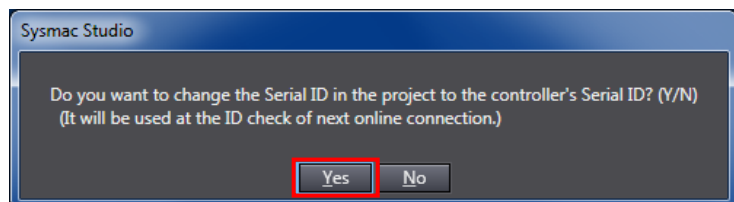
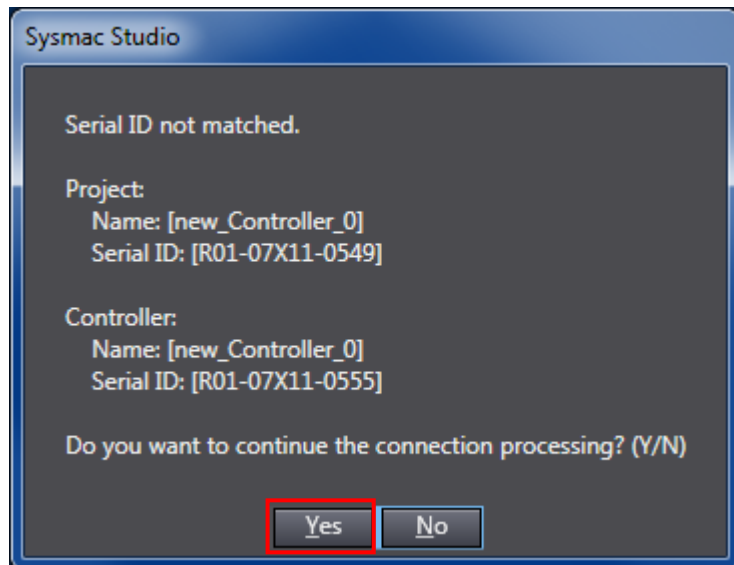
For details on online connections to a Controller, refer to *Section 5 Online Connections to a Controller* of the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

- 7 A confirmation dialog box is displayed as shown on the right. Confirm that there is no problem and click the **Yes** Button.

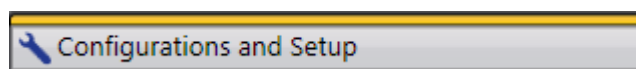


\*The displayed dialog depends on the status of the Controller used. Click the **Yes** Button to proceed with the processing.

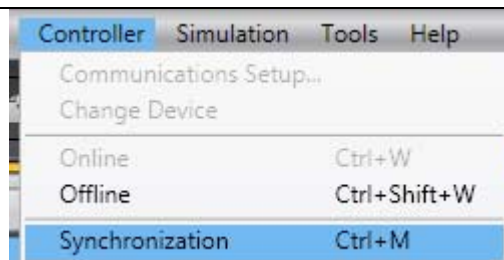
\*The displayed serial ID differs depending on the device.



- 8 When an online connection is established, a yellow bar is displayed on the top of the Edit Pane.



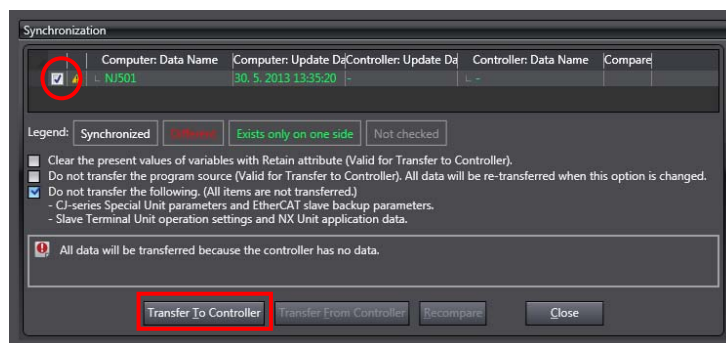
- 9 Select **Synchronization** from the Controller Menu.



10 The Synchronization Dialog Box is displayed.

Confirm that the data to transfer (NJ501 in the right dialog) is selected. Then, click the **Transfer to Controller** Button.

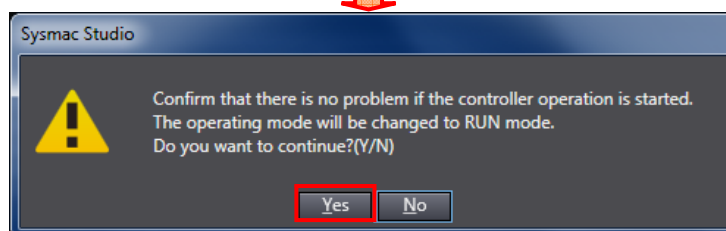
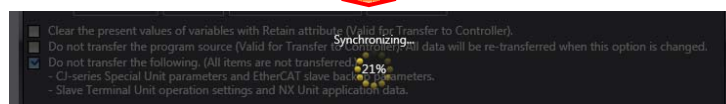
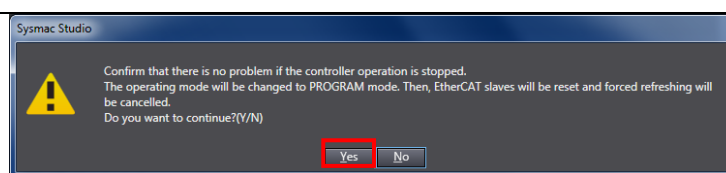
\*After executing the Transfer to Controller, the Sysmac Studio data is transferred to the Controller and the data are compared.



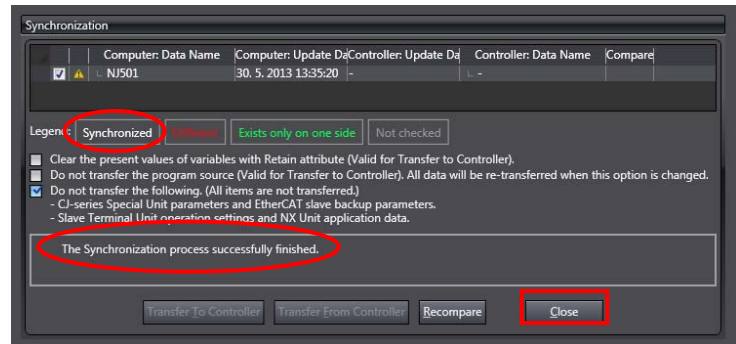
11 A confirmation dialog box is displayed. Confirm that there is no problem and click the **Yes** Button.

A screen stating "Synchronizing" is displayed.

A confirmation dialog box is displayed. Confirm that there is no problem and click the **Yes** Button.



- 12 Confirm that the synchronized data is displayed with the color specified by "Synchronized", and that a message is displayed stating "The synchronization process successfully finished". If there is no problem, click the **Close** Button.



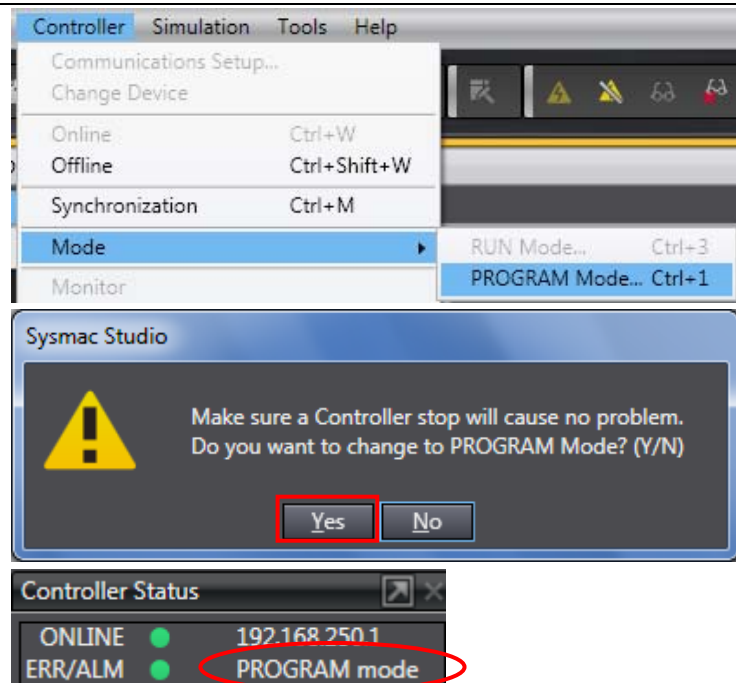
\*A message stating "The synchronization process successfully finished" is displayed if the Sysmac Studio project data and the data in the Controller match.

\*If the synchronization fails, check the wiring and repeat from step 1.

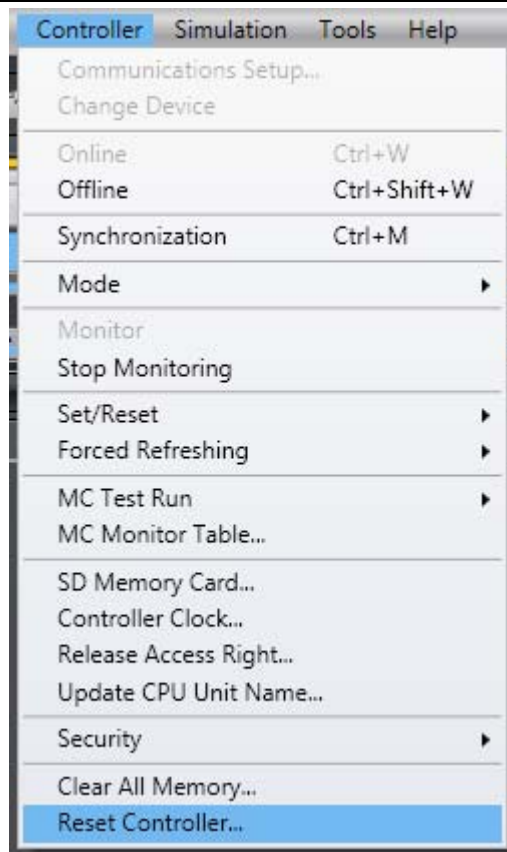
- 13 Select **Mode - PROGRAM Mode** from the Controller Menu.

A confirmation dialog box is displayed as shown on the right. Confirm that there is no problem and click the **Yes** Button.

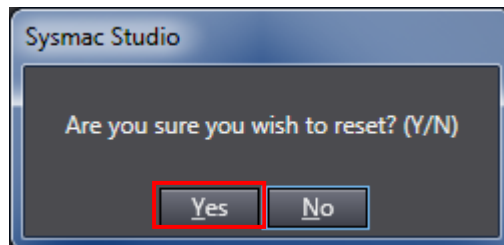
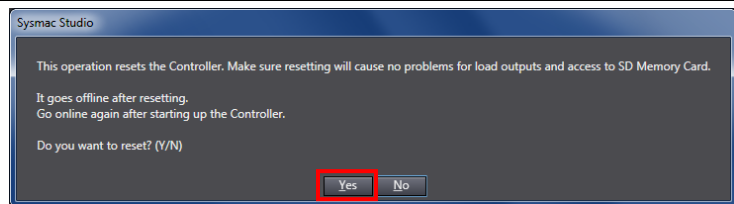
The Controller Status changed to PROGRAM mode.



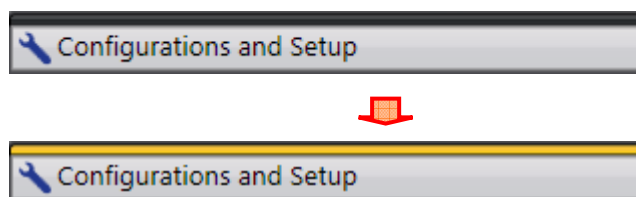
- 14 Select **Reset Controller** from the Controller Menu.



- 15 A confirmation dialog box is displayed. Click the **Yes** Button.



- 16 The Controller is reset and Sysmac Studio goes offline. The yellow bar on the top of the Edit Pane disappears. Go online by following steps 6 to 8. Change to PROGRAM mode in the same way as step 13.



## 7.5. Setting Up the Network

Set up DeviceNet remote I/O communications.

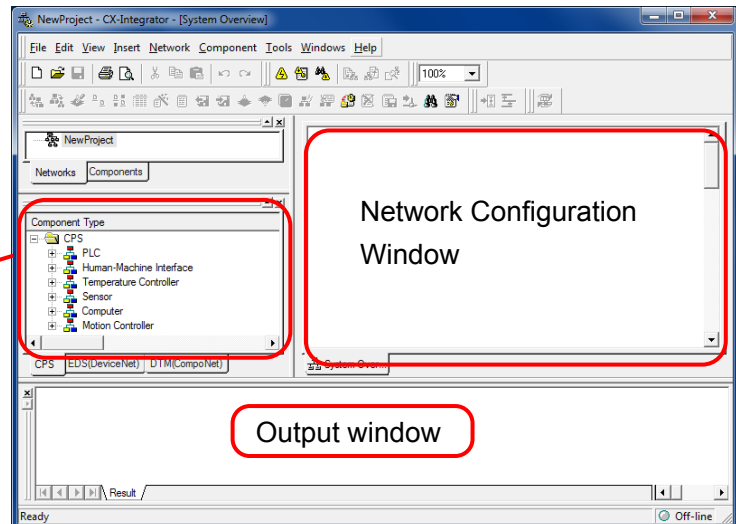
### 7.5.1. Starting the CX-Integrator and Installing the EDS File

Start the CX-Integrator and install the EDS file.

#### 1 Start the CX-Integrator.

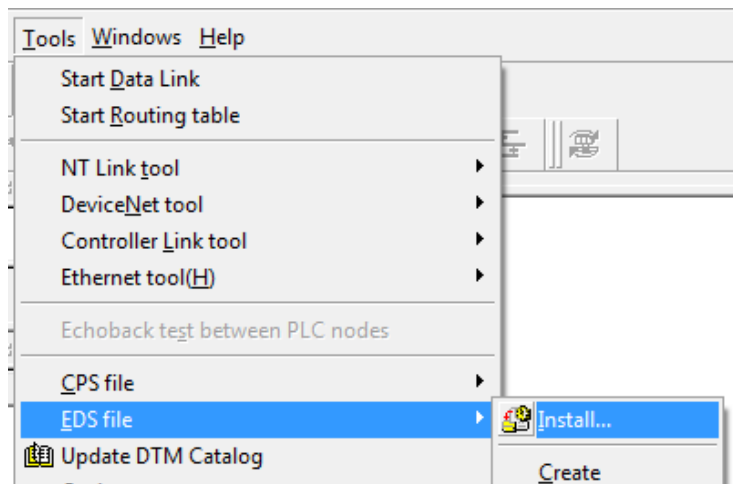
\*If the Component List Window is not displayed, select **Windows - Component List Window** from the View Menu.

Component List Window



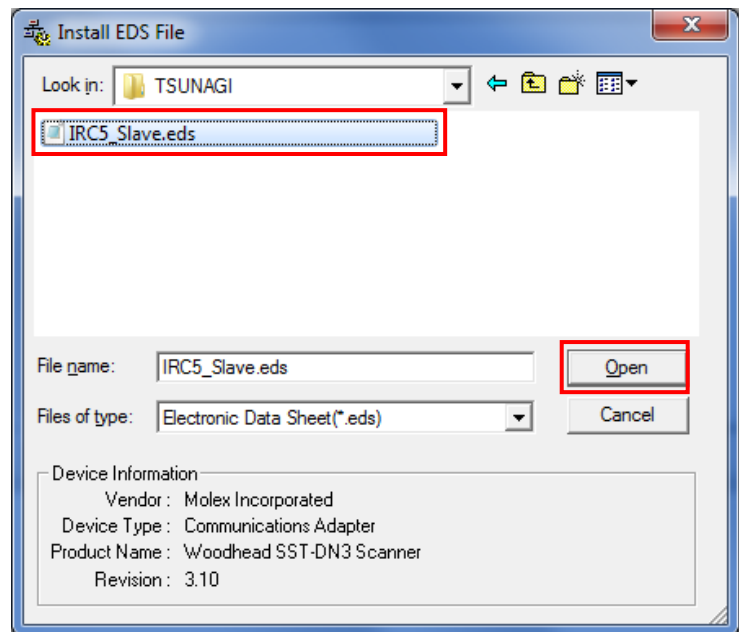
#### 2 Install the EDS file to register the Robot Controller in the network.

Select **EDS file - Install** from the Tools Menu.

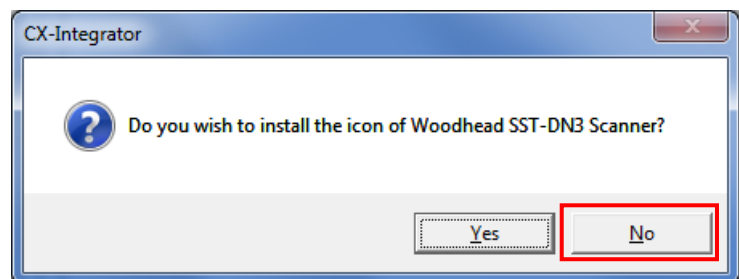


- 3 Select [IRC5\_Slave.eds] as an EDS file to install and click the **Open** Button.

\*For how to obtain the EDS file, refer to *Precautions for Correct Use* in 5.2. *Device Configuration*.

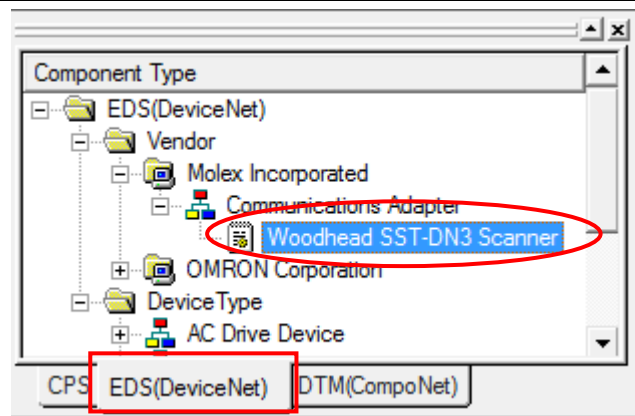


- 4 The dialog box on the right is displayed. Check the contents and click the **No** Button.



- 5 Select the EDS(DeviceNet) Tab on the Component List Window and confirm that the installed device was added ([Woodhead SST-DN3 Scanner] was added in the right figure).

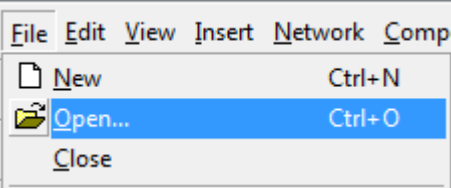
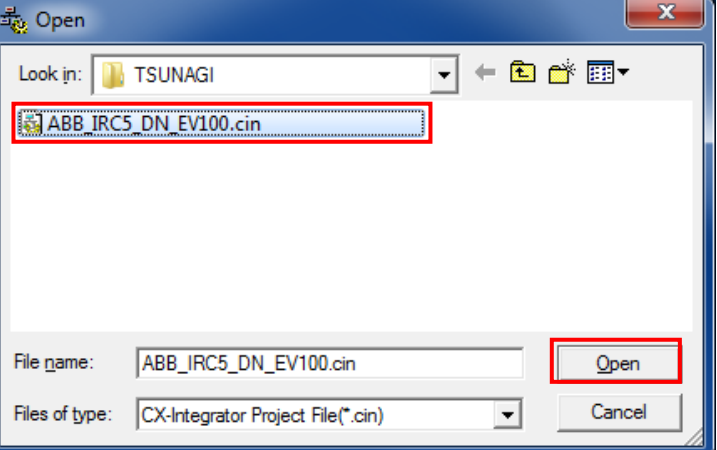
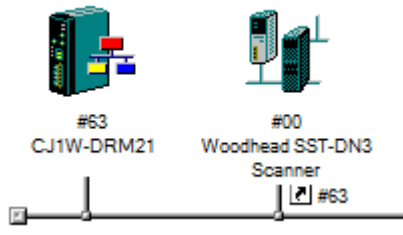
\*When you install the [IRC5\_Slave.eds], [Woodhead SST-DN3 Scanner] device will register.





### 7.5.2. Opening the Project File

Open the CX-Integrator project file.

1	Select <b>Open</b> from the File Menu.	
2	The Open Dialog Box is displayed. Select [ABB_IRC5_DN_EV100.cin] (CX-Integrator project file) and click the <b>Open</b> Button.	
3	<p>The following devices are displayed in the Network Configuration Pane as shown in the right figure.</p> <p>#63: CJ1W-DRM21</p> <p>#00: Woodhead SST-DN3 Scanner</p> <p>*IRC5 is shown as [Woodhead SST-DN3 Scanner].</p>	

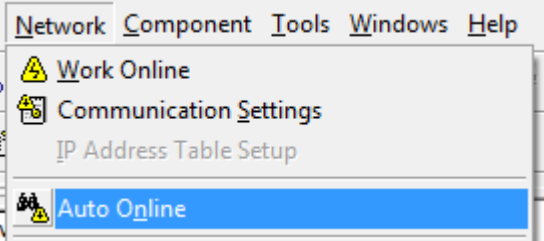
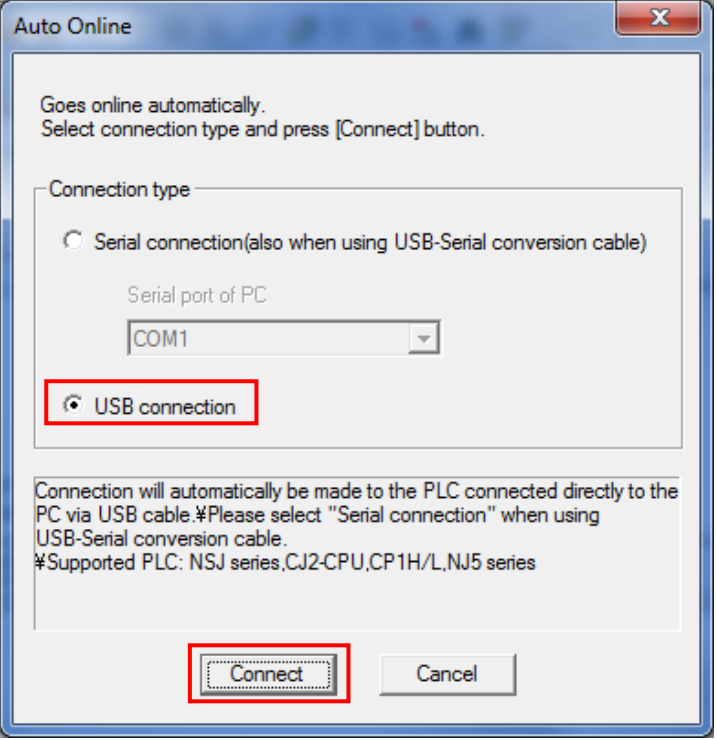
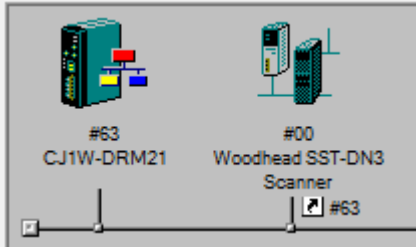


#### Precautions for Correct Use

Confirm that the DeviceNet cable is connected before proceeding to the following procedure. If it is not connected, turn OFF the power supply to each device, and then connect the DeviceNet cable.

### 7.5.3. Connecting Online and Transferring the Scan List

Connect online with the Controller, and transfer the device setting (scan list) to the DeviceNet Unit via the Controller. When the transfer is completed, remote I/O communications start automatically.

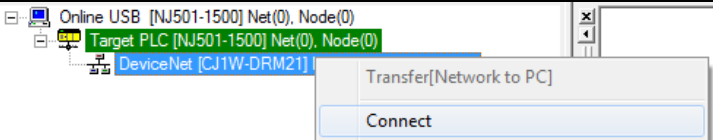
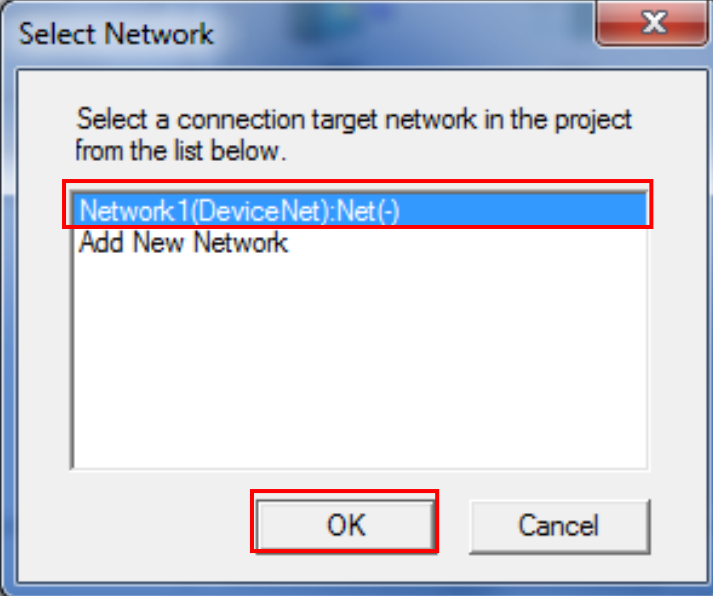

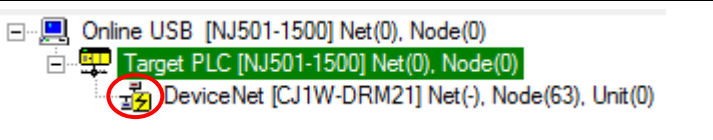
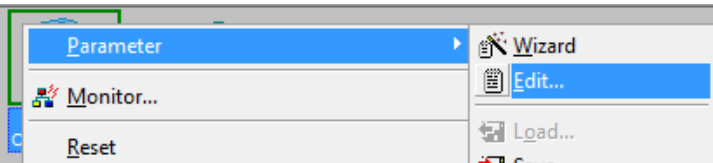
1	Select <b>Auto Online</b> from the Network Menu.	
2	The Auto Online Dialog Box is displayed. Select the <i>USB connection</i> Option for Connection type, and click the <b>Connect</b> Button.	
3	After an online connection is established, the background color of the Network Configuration Window changes as shown in the right figure.  *IRC5 is shown as [Woodhead SST-DN3 Scanner].	



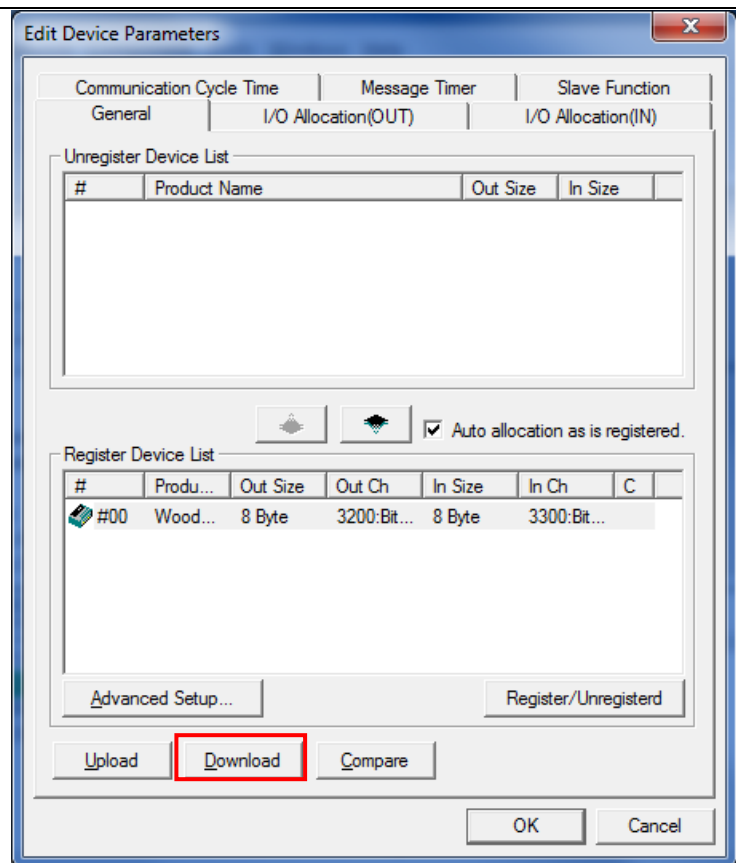
### Additional Information

If an online connection cannot be made to the Controller, check the cable connection. Or, return to step 1, check the settings and repeat each step.

Refer to *Section 2 Basic Operations of the CX-Integrator Ver.2. Operation Manual* (Cat. No. W464) for details.

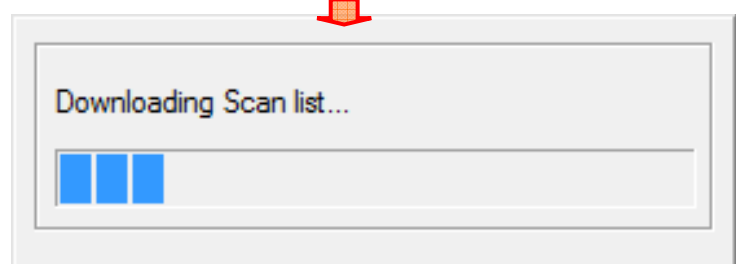
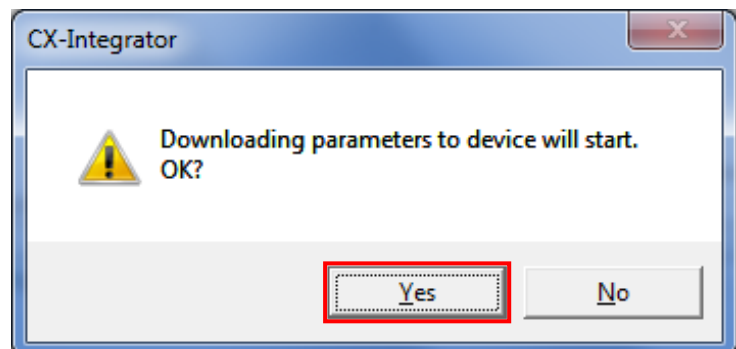
4	Right-click DeviceNet in the Online Connection Information Window, and select <b>Connect</b> .	
5	Select DeviceNet in the Select Network Dialog Box, and click the <b>OK</b> Button.	
6	Confirm that DeviceNet is in online status (  icon) in the Online Connection Information Window.	
7	Right-click <b>CJ1W-DRM21</b> on the Network Configuration Window, and select <b>Parameter - Edit</b> .	

- 8 The Edit Device Parameters Dialog Box is displayed. Click the **Download** Button.

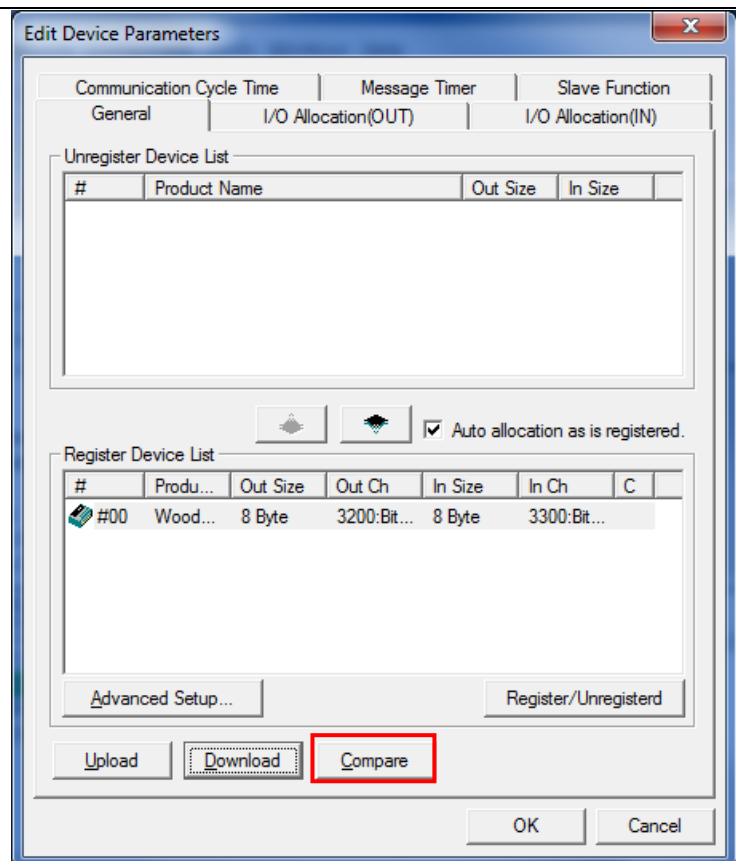


- 9 A download confirmation dialog box is displayed. Confirm that there is no problem and click the **Yes** Button.

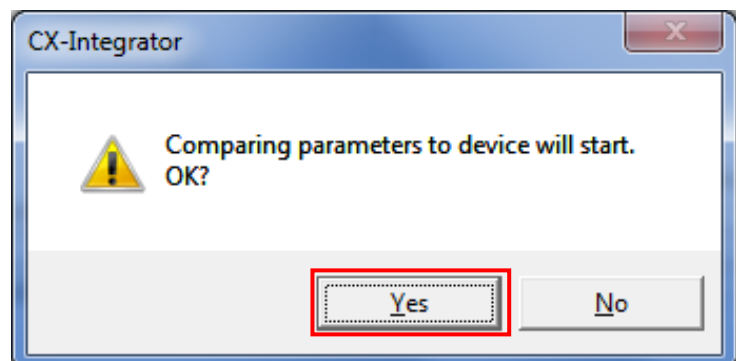
A dialog box indicating the downloading is in progress is displayed.



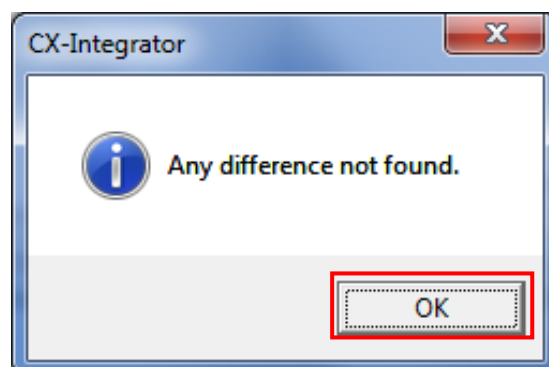
- 10 The Edit Device Parameters Dialog Box is displayed again. Click the **Compare** Button.



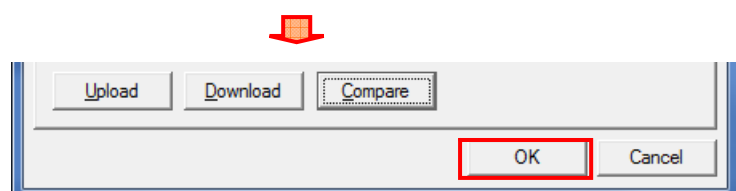
- 11 A dialog box shown on the right is displayed. Confirm that there is no problem. Click the **Yes** Button to compare the parameters.



When the comparison is completed, a dialog box shown on the right is displayed. Check the contents and click the **OK** Button.



The Edit Device Parameters Dialog Box is displayed again. Click the **OK** Button to close the dialog box.



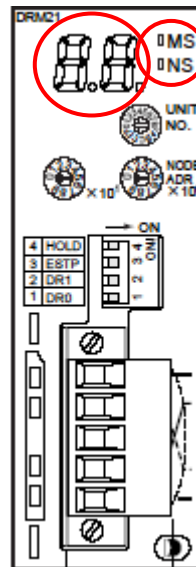
## 7.6. Checking DeviceNet Communications

Confirm that the DeviceNet communications are performed normally.

### 7.6.1. Checking the Connection Status

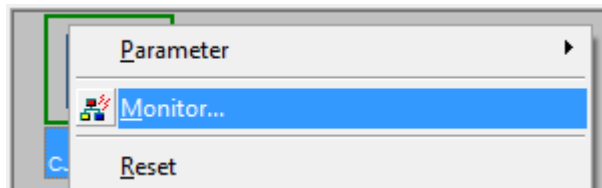
Check the connection status of DeviceNet.

- 1 Confirm that the DeviceNet communications are performed normally by checking the LED indicators on each unit.
  - Controller (DeviceNet Unit)  
LED indicators in normal status:  
[MS]: Lit green  
[NS]: Lit green  
The 7-segment display shows 63 during normal operation. (63: Master node address, remote I/O communications active and normal)



(DeviceNet Unit)

- 2 Confirm that the DeviceNet communications are performed normally from the CX-Integrator by referring to the status information on the Monitor Device Dialog Box.

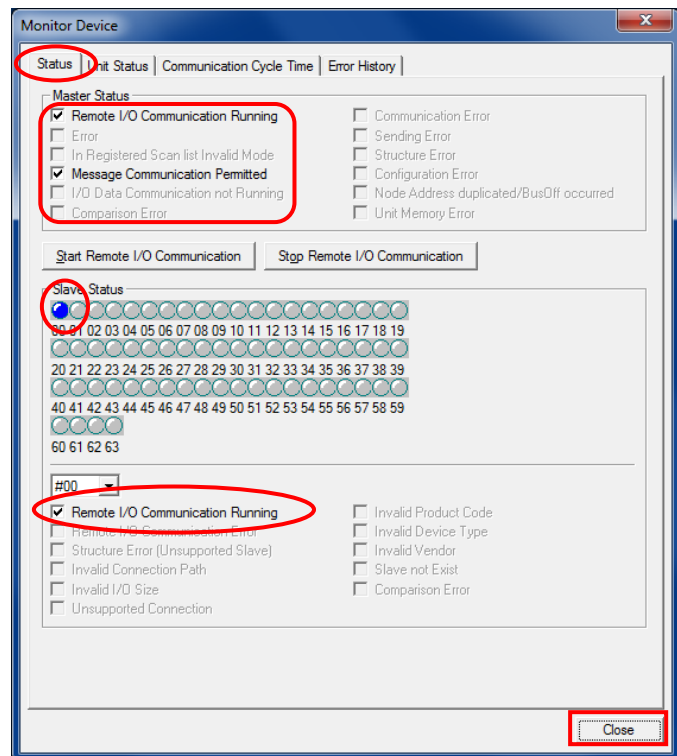


Right-click the DeviceNet Unit icon on the Network Configuration Window, and select **Monitor**.

- 3 The figure on the right shows the Status Tab Page of the Monitor Device Dialog Box.


The DeviceNet communications are normally performed if the same items are selected in the Master Status Field, #00 is lit blue in the Slave Status Field, and the Remote I/O Communications Running Check Box is selected.

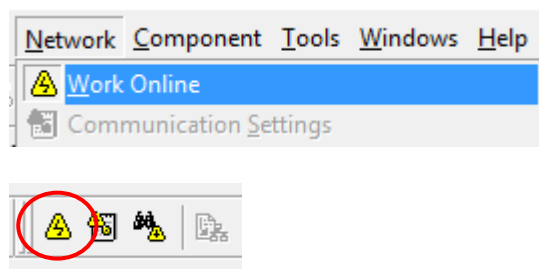
Click the **Close** Button.



(Monitor Device window)

- 4 Go offline with the CX-Integrator. Select **Work Online** from the Network Menu.

\*The icon  is not pressed down during offline connection.



### 7.6.2. Checking the Data that are Sent and Received

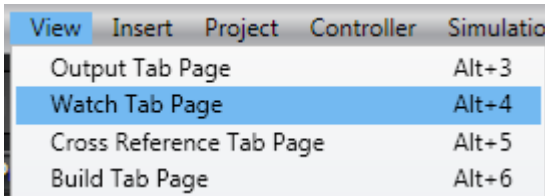
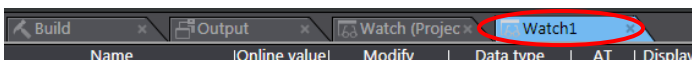
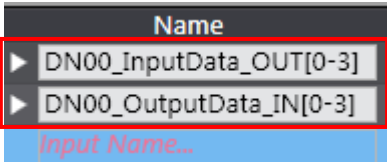
Confirm that correct data are sent and received.

## ⚠ WARNING

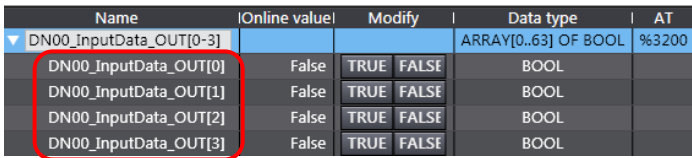
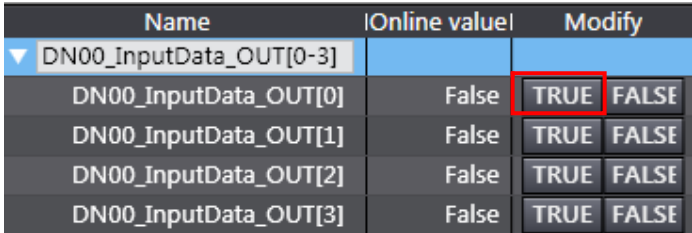
Always confirm safety at the destination node before you transfer a user program, configuration data, setup data, device variables, or values in memory used for CJ-series Units from the Sysmac Studio.

The devices or machines may perform unexpected operation regardless of the operating mode of the CPU Unit.

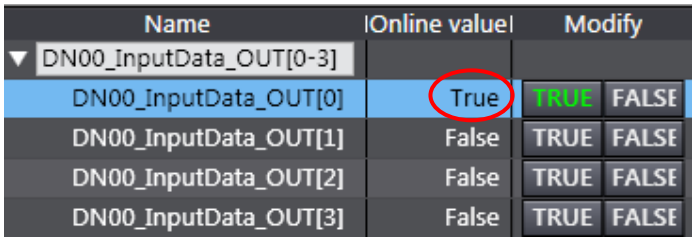


- 1 Select **Watch Tab Page** from the View Menu.
 
- 2 The Watch1 Tab Page is displayed in the lower section of the Edit Pane.
 
- 3 The following names are entered in the Watch (Controller) Tab Page for monitoring.  
 DN00\_InputData\_OUT[0-3]  
 DN00\_OutputData\_IN[0-3]
 

Click ► on the left of the Name Column. The details are displayed.


- 4 Click **TRUE** in the Modify Column of *DN00\_InputData\_OUT[0]*.
 

The online value changes to True.

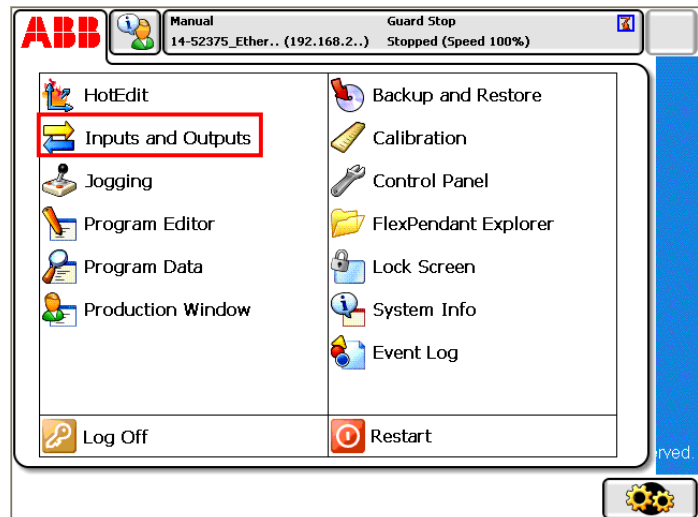




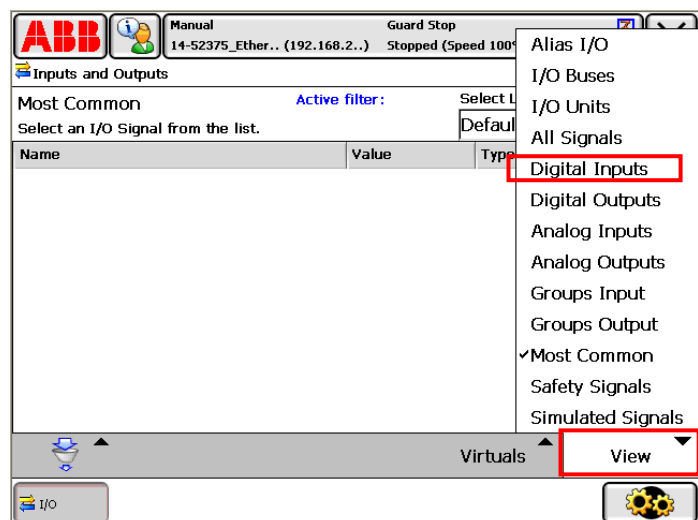
- 5 In the same way, click **TRUE** in the Modify Column of *DN00\_InputData\_OUT[2]*.

Name	Online value	Modify	
▼ DN00_InputData_OUT[0-3]			
DN00_InputData_OUT[0]	True	TRUE	FALSE
DN00_InputData_OUT[1]	False	TRUE	FALSE
DN00_InputData_OUT[2]	True	TRUE	FALSE
DN00_InputData_OUT[3]	False	TRUE	FALSE

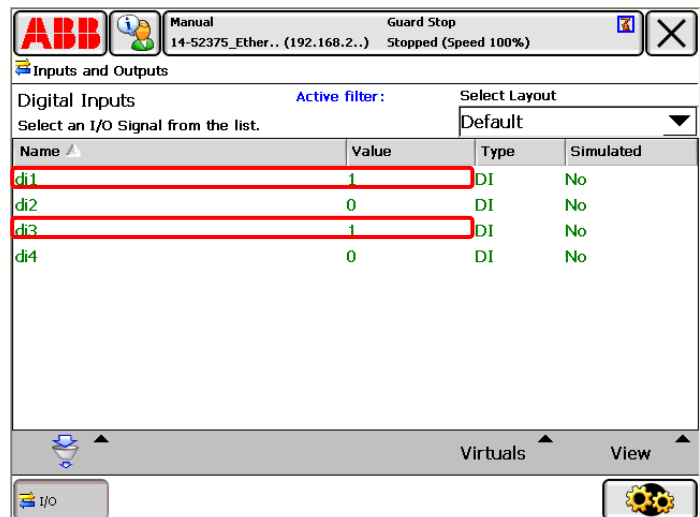
- 6 Confirm that the window shown on the right is displayed on FlexPendant.  
If not displayed, press **ABB**.  
Press **Inputs and Outputs**.



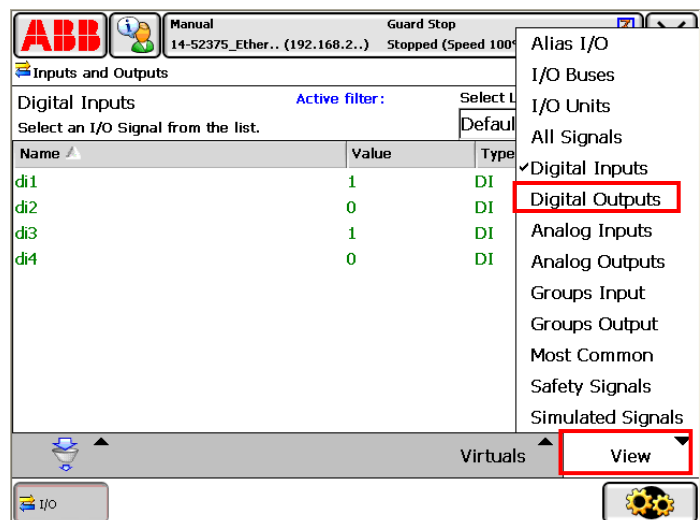
- 7 The Inputs and Outputs Window is displayed.  
Press **View** and select **Digital Inputs**.



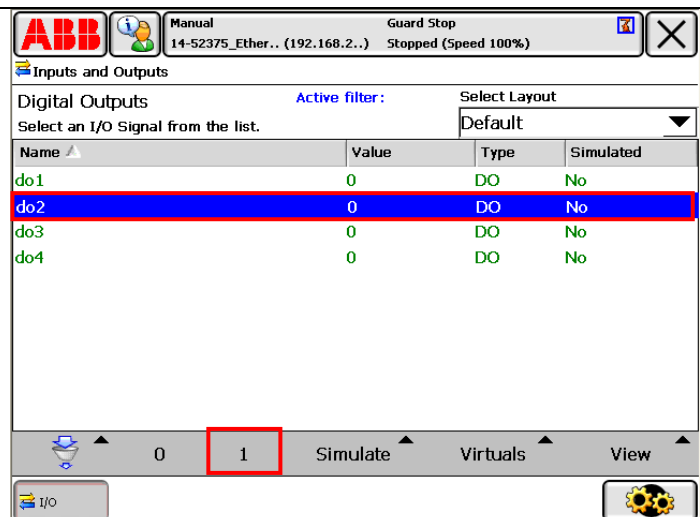
- 8 The Digital Input Window is displayed.  
Confirm that 1 was set for the bit that was changed to 1 in step 4 and 5.



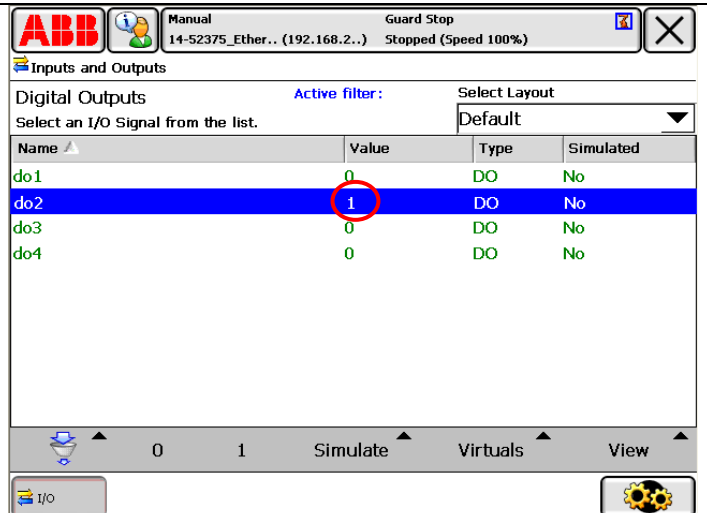
- 9 Press **View** and select **Digital Outputs**.



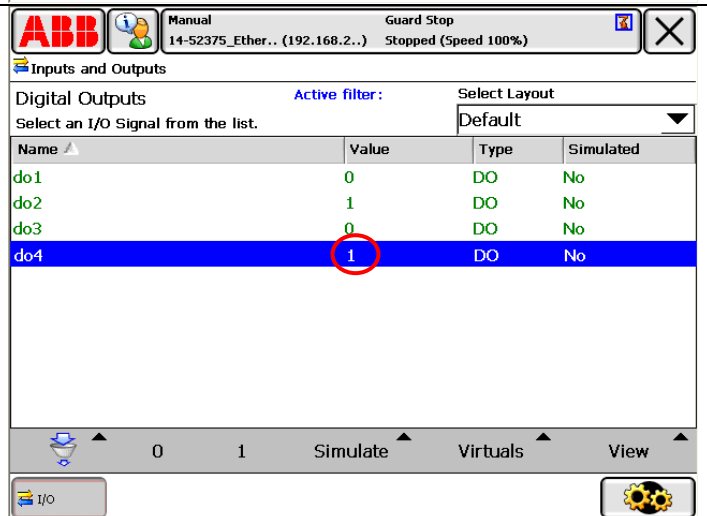
- 10 The Digital Output Window is displayed.  
Select **do2** and press **1**.



11 The value of do2 is changed to 1.



12 In the same way, set the value of do4 to 1.



13 Return to the Sysmac Studio. Check the details of *DN00\_OutputData\_IN[0-3]* by clicking . The online values of *DN00\_OutputData\_IN[1]* and *DN00\_OutputData\_IN[3]* changed to True.

Name	Online value	Modify	
▼ DN00_InputData_OUT[0-3]			
DN00_InputData_OUT[0]	True	TRUE	FALSE
DN00_InputData_OUT[1]	False	TRUE	FALSE
DN00_InputData_OUT[2]	True	TRUE	FALSE
DN00_InputData_OUT[3]	False	TRUE	FALSE
▼ DN00_OutputData_IN[0-3]			
DN00_OutputData_IN[0]	False	TRUE	FALSE
DN00_OutputData_IN[1]	True	TRUE	FALSE
DN00_OutputData_IN[2]	False	TRUE	FALSE
DN00_OutputData_IN[3]	True	TRUE	FALSE

## 8. Initialization Method

This document explains the setting procedure from the factory default setting.  
Some settings may not be applicable as described in this document unless you use the devices with the factory default setting.

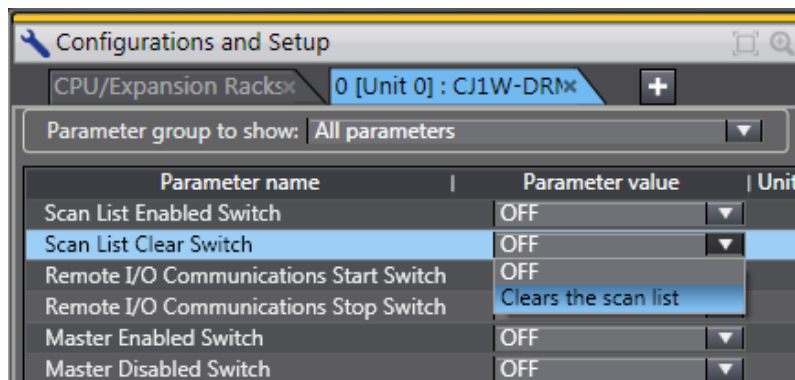
### 8.1. Initializing the Controller

To initialize the settings of the Controller, it is necessary to initialize the CPU Unit and DeviceNet Unit. Place in PROGRAM mode before the initialization.

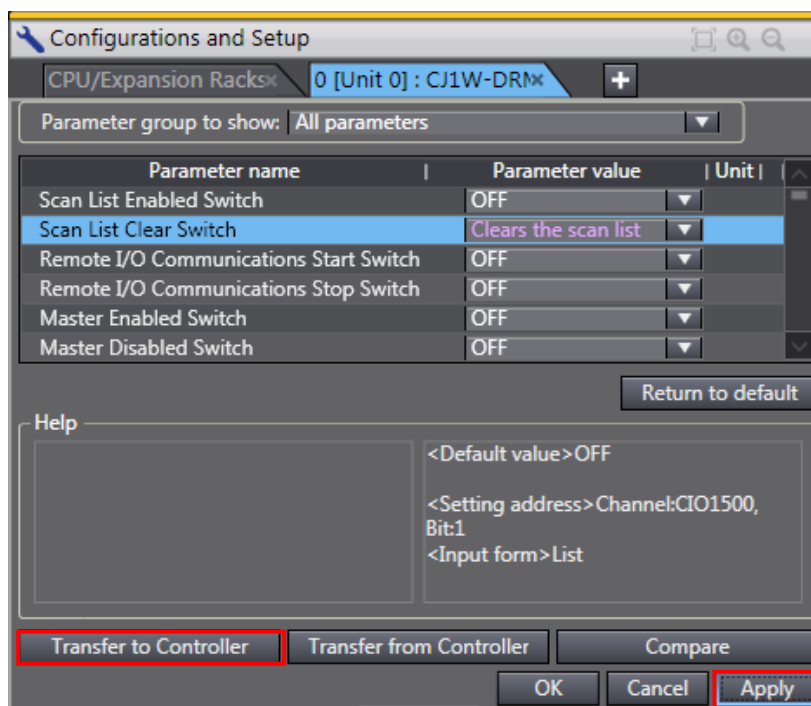
#### 8.1.1. DeviceNet Unit

To initialize the settings of the DeviceNet Unit, select **Edit Special Unit Settings** of CJ1W-DRM21 in CPU/Expansion Racks from the Sysmac Studio.

Select ***Clears the scan list*** for Scan List Clear Switch.

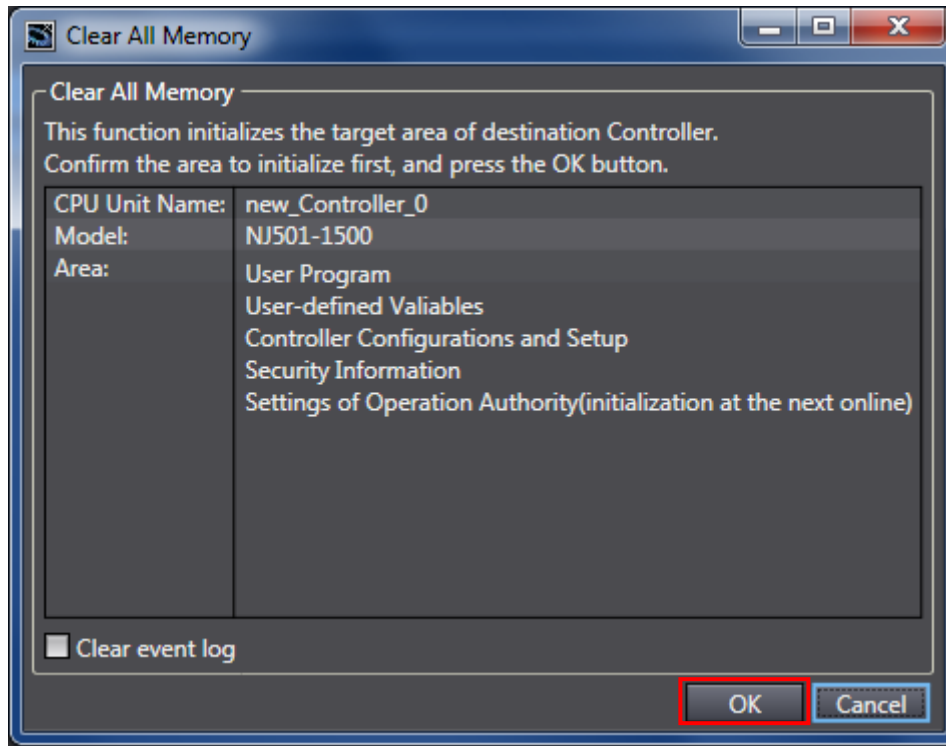


Click the **Apply** Button and click the **Transfer to Controller** Button.



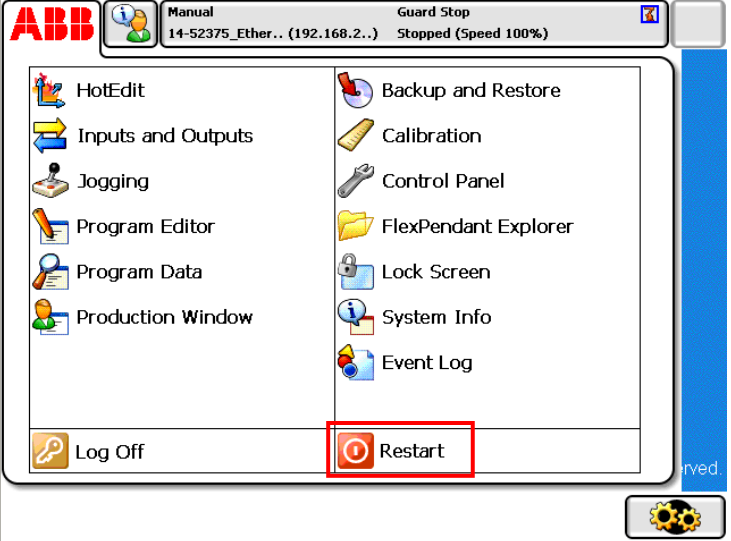
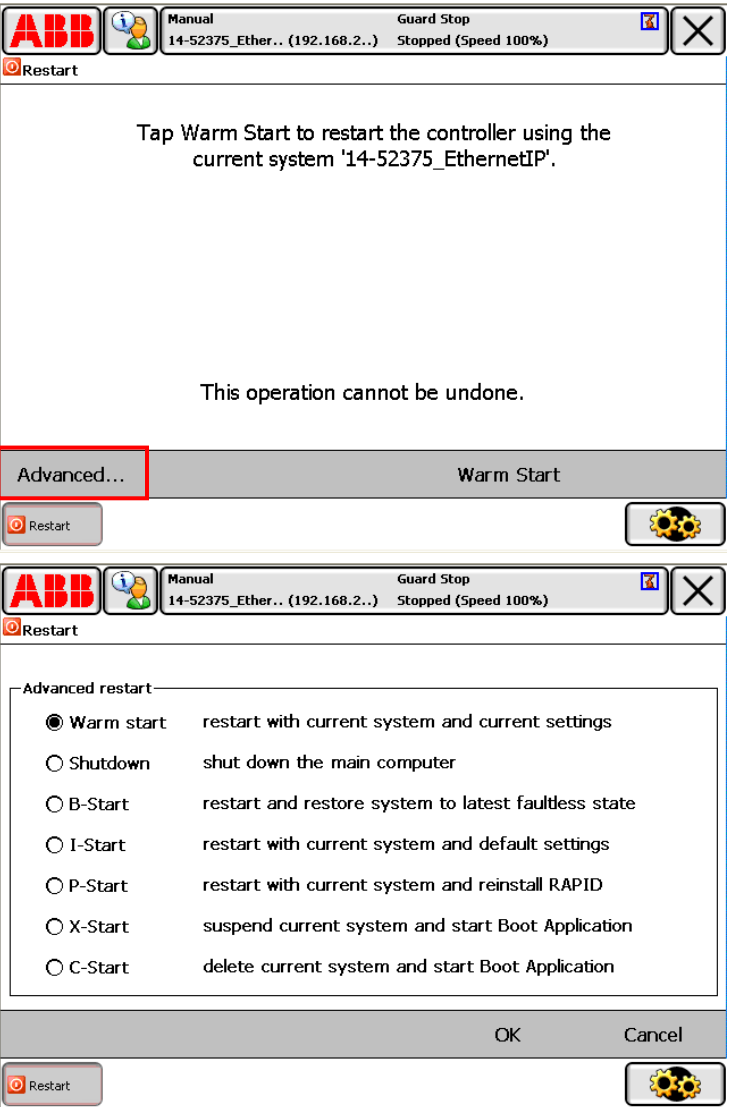
### 8.1.2. CPU Unit

To initialize the settings of the Controller, select **Clear All Memory** from the Controller Menu of the Sysmac Studio. The Clear All Memory Dialog Box is displayed. Click the **OK** Button.

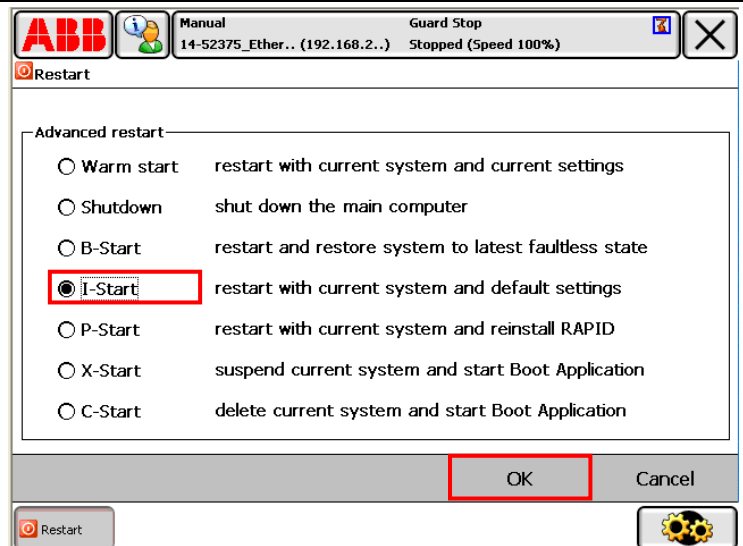


## 8.2. Initializing the ABB Robot Controller

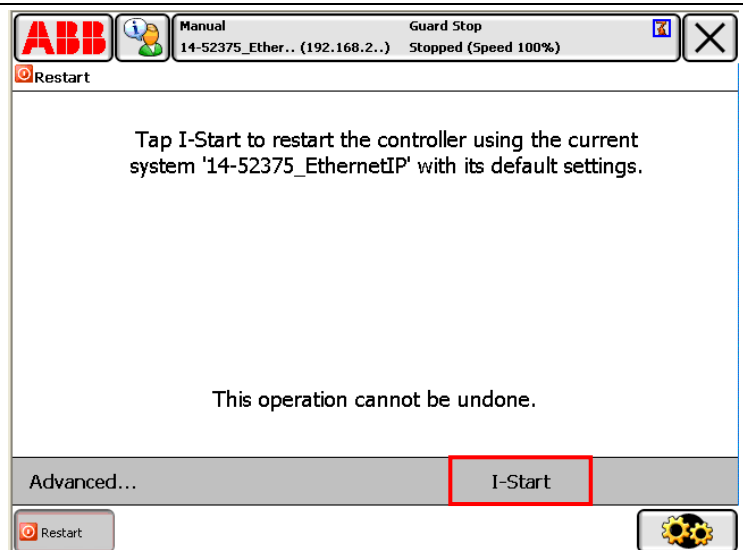
To initialize the ABB Robot Controller, execute Restart - I-Start by using the following procedure.

<p>1 Press <b>Restart</b>.</p>	 <p>The screenshot shows the ABB Robot Controller main menu. At the top, there's a status bar with 'Manual', '14-52375_Ether.. (192.168.2...)', and 'Guard Stop Stopped (Speed 100%)'. Below this is a grid of icons for various functions: HotEdit, Inputs and Outputs, Jogging, Program Editor, Program Data, Production Window, Backup and Restore, Calibration, Control Panel, FlexPendant Explorer, Lock Screen, System Info, Event Log, Log Off, and Restart. The 'Restart' button, which has a power icon, is highlighted with a red rectangle.</p>
<p>2 Press <b>Advanced</b>.</p> <p>The Advanced Restart window is displayed.</p>	 <p>The top screenshot shows the 'Restart' window with the text: 'Tap Warm Start to restart the controller using the current system '14-52375_EthernetIP'.' Below this, it says 'This operation cannot be undone.' At the bottom, there are two buttons: 'Advanced...' (highlighted with a red rectangle) and 'Warm Start'.</p> <p>The bottom screenshot shows the 'Advanced restart' dialog box. It contains a list of options with radio buttons:         <ul style="list-style-type: none"> <li><input checked="" type="radio"/> Warm start: restart with current system and current settings</li> <li><input type="radio"/> Shutdown: shut down the main computer</li> <li><input type="radio"/> B-Start: restart and restore system to latest faultless state</li> <li><input type="radio"/> I-Start: restart with current system and default settings</li> <li><input type="radio"/> P-Start: restart with current system and reinstall RAPID</li> <li><input type="radio"/> X-Start: suspend current system and start Boot Application</li> <li><input type="radio"/> C-Start: delete current system and start Boot Application</li> </ul>         At the bottom of the dialog are 'OK' and 'Cancel' buttons.       </p>

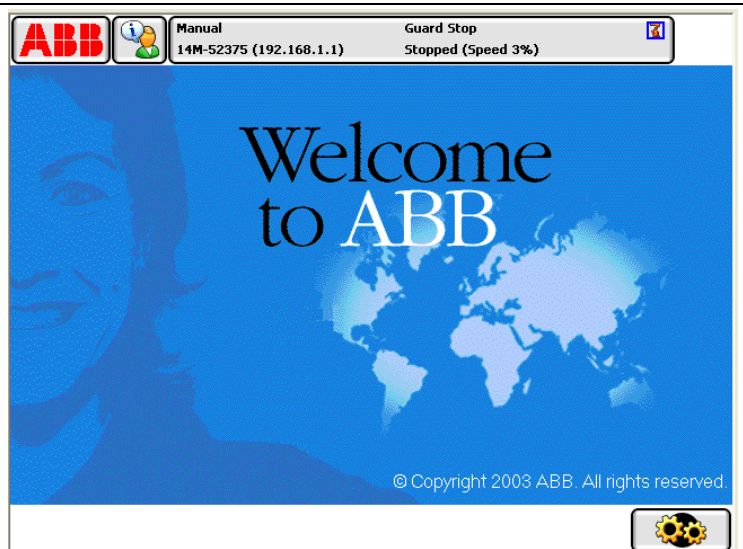
3 Select **I-Start** and click **OK**.



4 Press **I-Start**.



5 The initial window is displayed again.



## 9. Appendix 1 Details of Remote I/O Communications Settings

This section explains the details on the settings necessary to perform DeviceNet remote I/O communications.

### 9.1. Global Variable Table

The Controller accesses the remote I/O communications data as global variables. The following are the settings of the global variables. Register a global variable table with the Sysmac Studio.

Name	Data type	AT	Destination device allocation
DN00_InputData_OUT	BOOL[64]	%3200 to %3203	Digital Input 00 to 63 (8 bytes)
DN00_OutputData_IN	BOOL[64]	%3300 to %3303	Digital Output 00 to 63 (8 bytes)

In this document, only the following areas are allocated.

#### ■Details on output area

DN00_InputData_OUT[64]	63 to 04	03	02	01	00
	Not used	di4	di3	di2	di1

#### ■Details on input area

DN00_OutputData_IN[64]	63 to 04	03	02	01	00
	Not used	do4	do3	do2	do1



#### Additional Information

You can assign the same address to more than one variable. However, this is not recommended as it reduces readability and makes the program more difficult to debug. If you do this, set an initial value for only one of the variables. If you set a different initial value for each individual variable, the initial value is not stable.



#### Additional Information

With the Sysmac Studio, two methods can be used to specify an array for a data type. After specifying, (1) is converted to (2) and the data type is always displayed as (2).

(1)WORD[3] / (2) ARRAY[0..2] OF WORD

In this document, the data type is simplified by displaying WORD[3].

(The example above means a WORD data type with three array elements.)



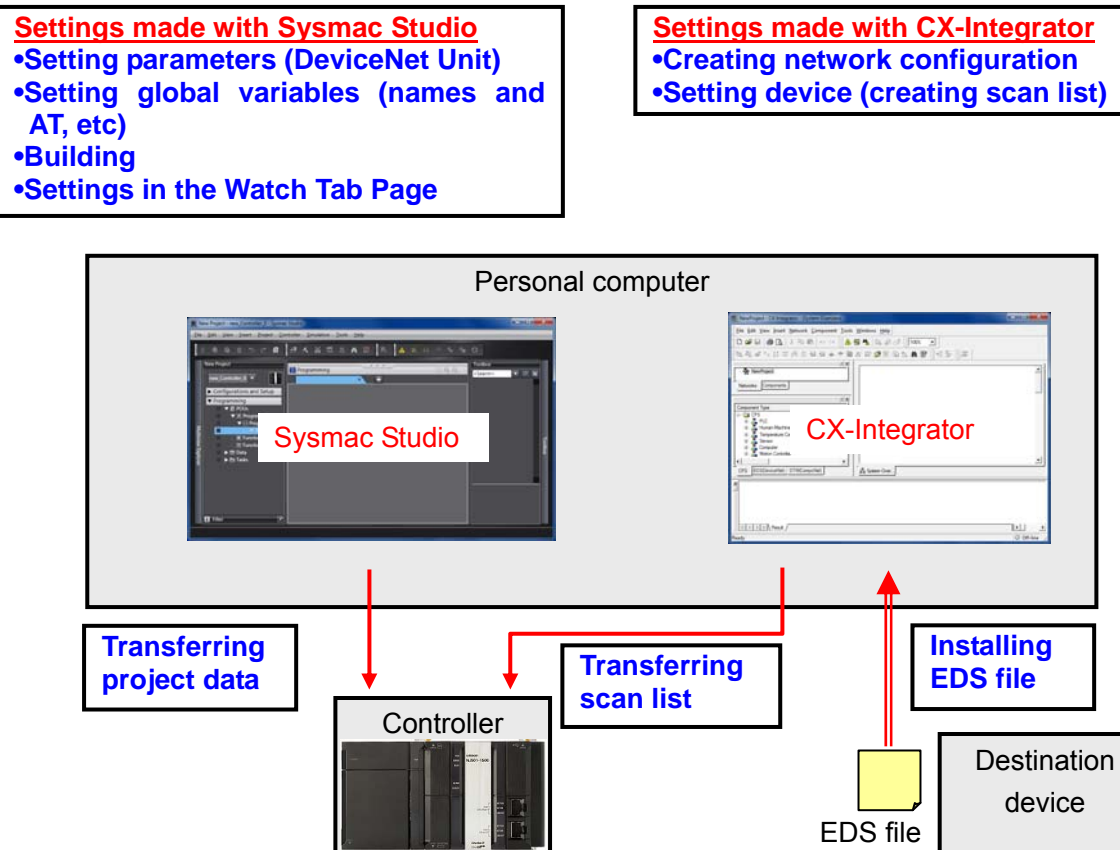
## 10. Appendix 2 Setting Procedure without the Configuration Files

This section describes the procedure for setting the Controller without the configuration files (Procedure for setting parameters from the beginning).

You can also refer to this section when you want to change the parameters of the configuration files.

### 10.1. Overview of Setting Procedure without the Configuration Files

The following is the relationship of processes to perform remote I/O communications using the "procedure for setting parameters from the beginning".

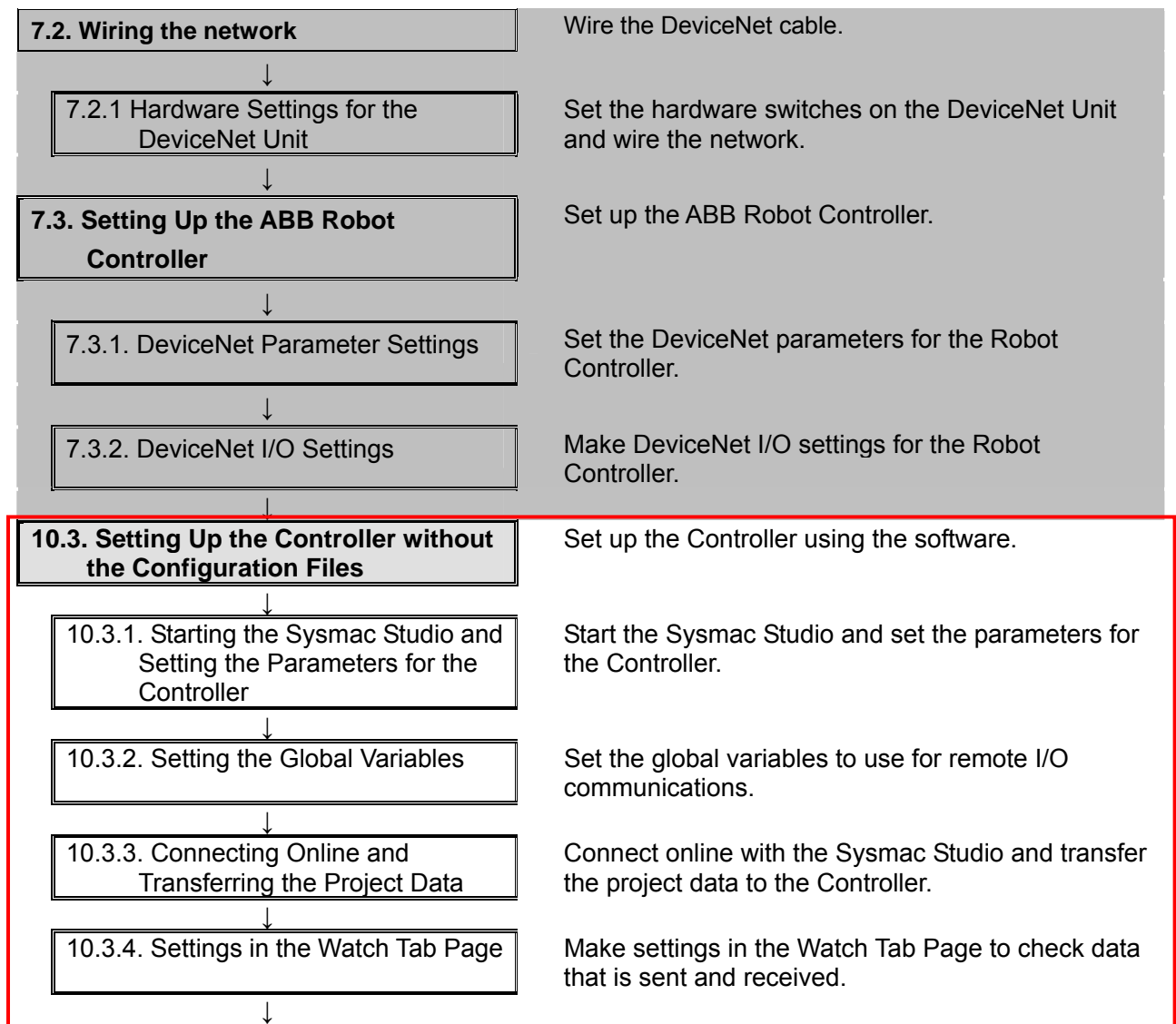


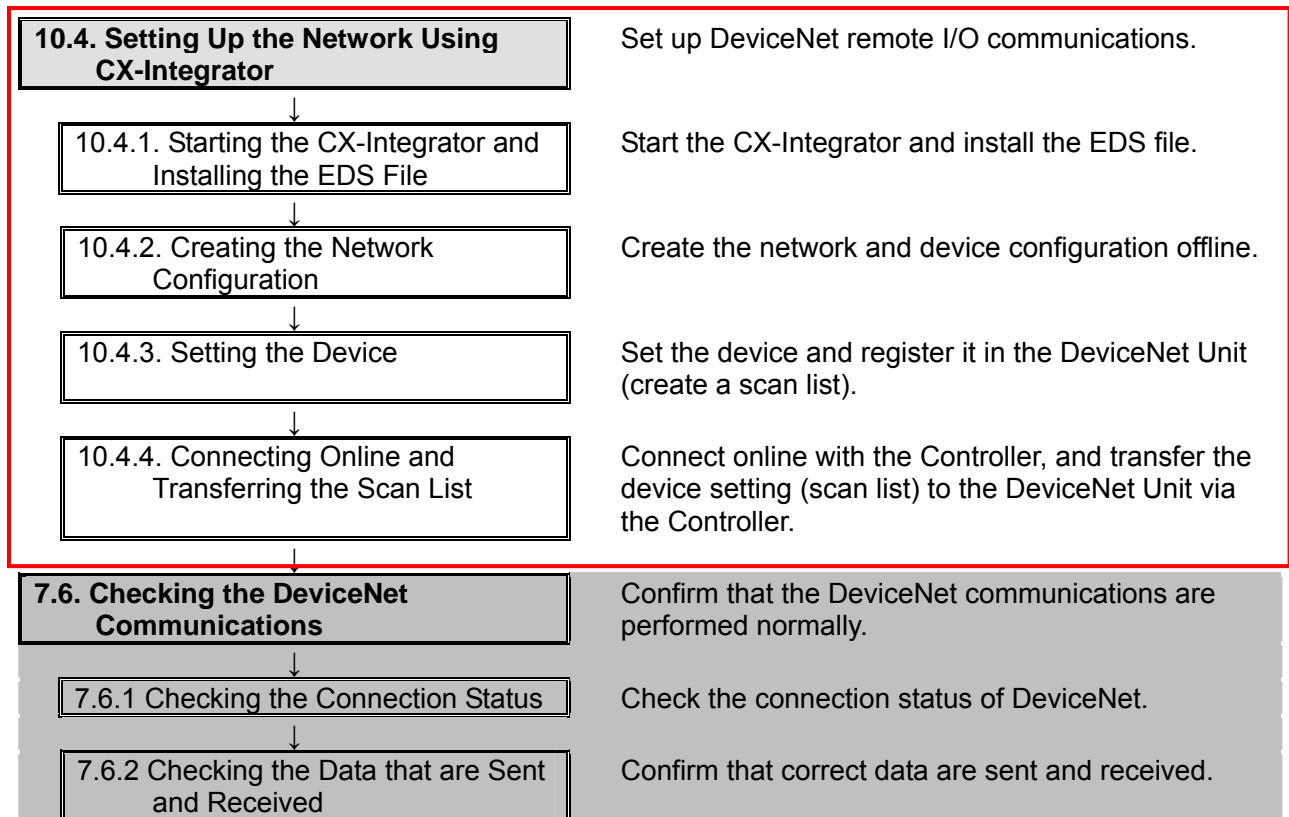
## 10.2. Work Flow of "Procedure for Setting Parameters from the Beginning"

Take the following steps to make the connection settings for DeviceNet remote I/O communications using the "procedure for setting parameters from the beginning".

This section describes the detailed procedures for 10.3 Setting the Controller without the Configuration Files and 10.4 Setting Up the Network Using CX-Integrator (in red frames below) without using the "configuration files".

The procedures for 7.2.Wiring the network, 7.3. Setting Up the ABB Robot Controller, and 7.5. Checking DeviceNet Communications are the same as the "procedure for using the configuration files". Refer to the procedures in Section 7.





### 10.3. Setting Up the Controller without the Configuration Files

Set up the Controller using the software.

#### 10.3.1. Starting the Sysmac Studio and Setting the Parameters for the Controller

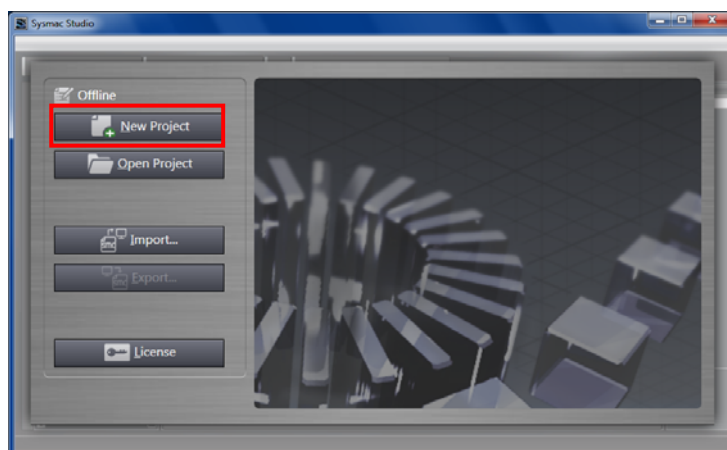
Start the Sysmac Studio and set the parameters for the Controller.

Install the Sysmac Studio and USB driver in the personal computer beforehand.

- 1 Turn ON the power supply to the Controller.

- 2 Start the Sysmac Studio.  
Click the **New Project** Button.

\*If a confirmation dialog for an access right is displayed at start, select to start.



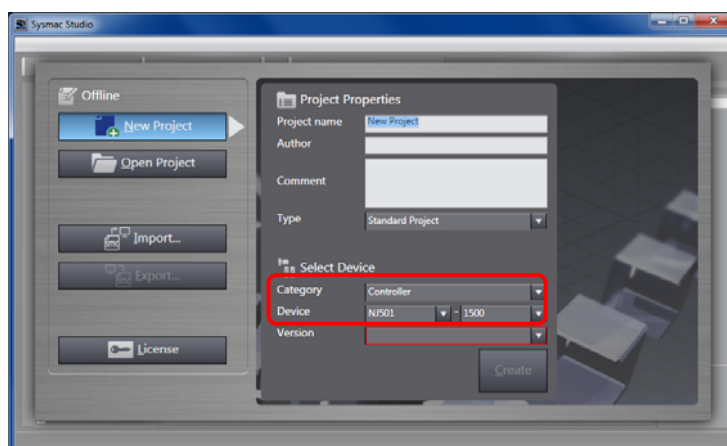
- 3 The Project Properties Dialog Box is displayed.

\*In this document, New Project is set as the project name.

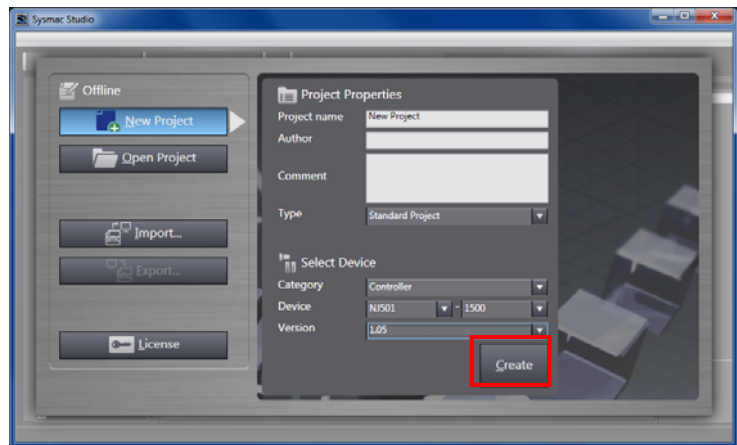
Confirm that Category and Device to use are set in the Select Device Field.

Select **version 1.05** from the pull-down list of Version.

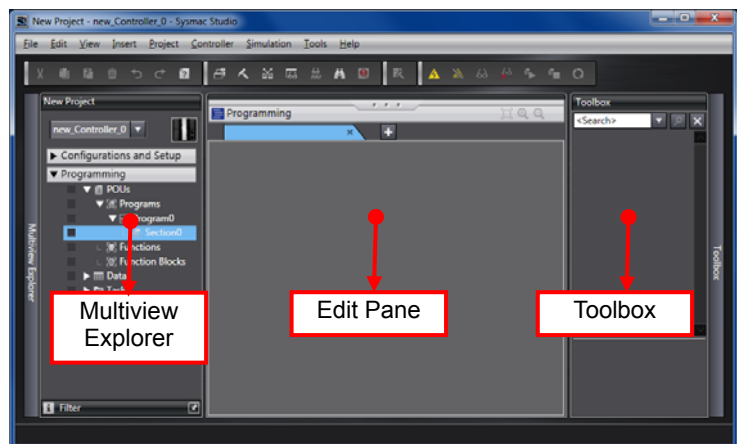
\*Although 1.05 is selected in this document, select the version you actually use.



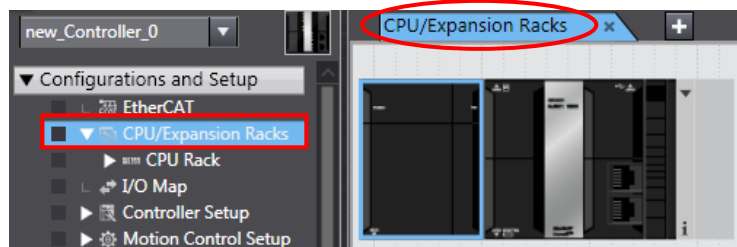
- 4 Click the **Create** Button.



- 5 The New Project is displayed.  
The left pane is called Multiview Explorer, the right pane is called Toolbox and the middle pane is called Edit Pane.



- 6 Double-click **CPU/Expansion Racks** under **Configurations and Setup** in the Multiview Explorer.  
The CPU/Expansion Racks Tab is displayed in the Edit Pane.



7

Select **Communications** under Category in the Toolbox.

Select **CJ1W-DRM21 Ver.1.1**.

Right-click on **CJ1W-DRM21 Ver.1.1**.

Select **Insert** from the menu that is displayed.

CJ1W-DRM21 is displayed on the CPU/Expansion Racks Tab Page as shown on the right.

Category

All categories

Communications

Analog I/O

Basic I/O

General purpose device

Input Keyword

Show all versions

CJ1W-DRM21 Ver.1.1

CJ1W-EIP21 Ver.2.1

CJ1W-DRM21 Ver.1.1

Insert

CJ1W-EIP21 Ver.2.1

CPU/Expansion Racks

0

Item name	Value
Device name	J01
Model name	CJ1W-DRM21
Product name	DeviceNet Master Unit
Version	1.1
Specifications	Master/slave, 32000...
Rack No.	0
Slot No.	0
Unit No.	0
Special Unit Settings	Settings
	Edit Special Unit Settings

8

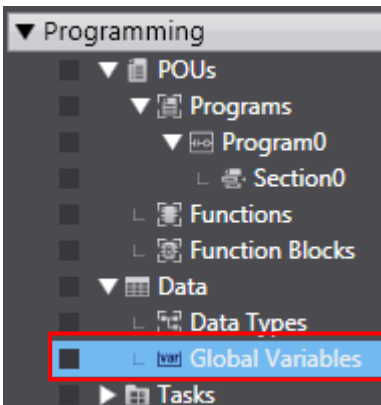
Enter 0 for Unit No.

Item name	Value
Device name	J01
Model name	CJ1W-DRM21
Product name	DeviceNet Master Unit
Version	1.1
Specifications	Master/slave, 32000...
Rack No.	0
Slot No.	0
Unit No.	0
Special Unit Settings	Settings
	Edit Special Unit Settings

## 10.3.2. Setting the Global Variables

Set the global variable to use for remote I/O communications.

- 1 Double-click **Global Variables** under **Programming - Data** in the Multiview Explorer.

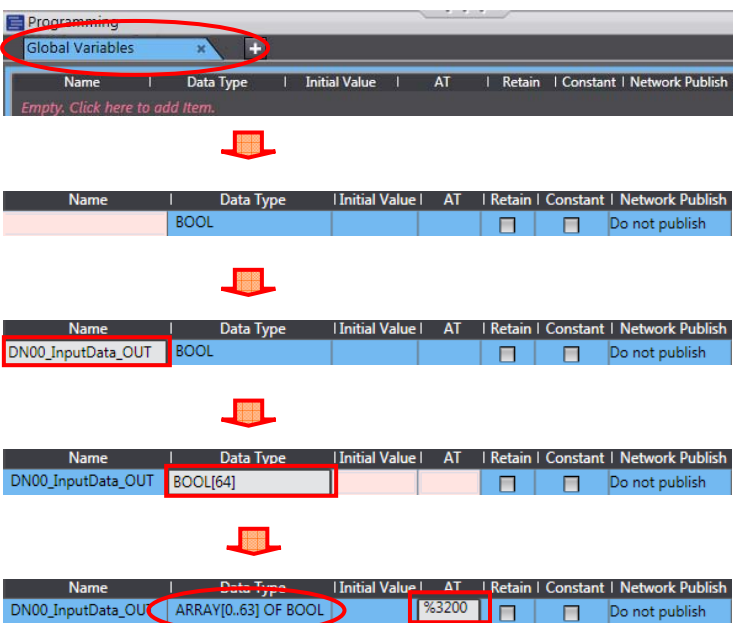

- 2 The Global Variables Tab Page is displayed in the Edit Pane. Click a column under the Name Column to enter a new variable.

Enter *DN00\_InputData\_OUT* in the Name Column.

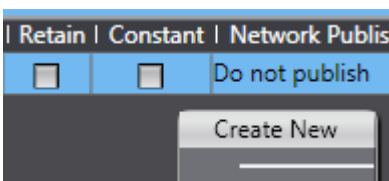
Enter *BOOL[64]* in the Data Type Column.

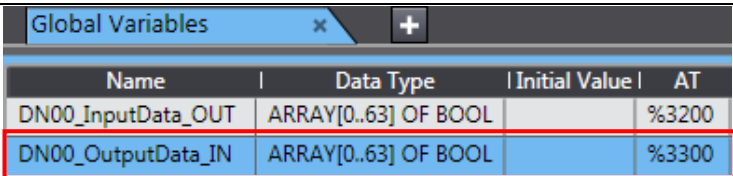
\*After entering, the value changes to *ARRAY[0..63] OF BOOL* as shown on the right.

Enter *%3200* in the AT Column.



Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish
	BOOL			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish
DN00_InputData_OUT	BOOL			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish
DN00_InputData_OUT	BOOL[64]			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish
DN00_InputData_OUT	ARRAY[0..63] OF BOOL		%3200	<input type="checkbox"/>	<input type="checkbox"/>	Do not publish
- 3 After entering, right-click and select **Create New** from the menu.


- 4 Enter the following data in the new columns in the same way as step 2.

  - Name: *DN00\_OutputData\_IN*.  
Data type: *BOOL[64]*  
AT: *%3300*

Name	Data Type	Initial Value	AT
DN00_InputData_OUT	ARRAY[0..63] OF BOOL		%3200
DN00_OutputData_IN	ARRAY[0..63] OF BOOL		%3300

### 10.3.3. Connecting Online and Transferring the Project Data

Connect online with the Sysmac Studio and transfer the project data to the Controller. After transferring, reset the Controller.

#### WARNING

Always confirm safety at the destination node before you transfer a user program, configuration data, setup data, device variables, or values in memory used for CJ-series Units from the Sysmac Studio.

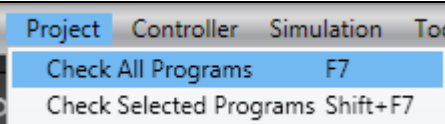
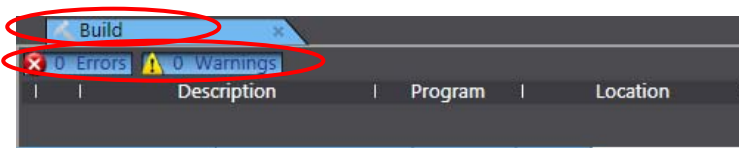
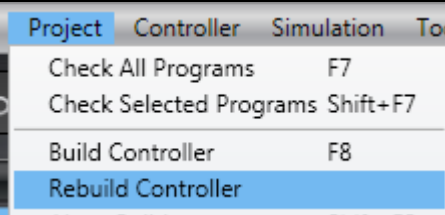
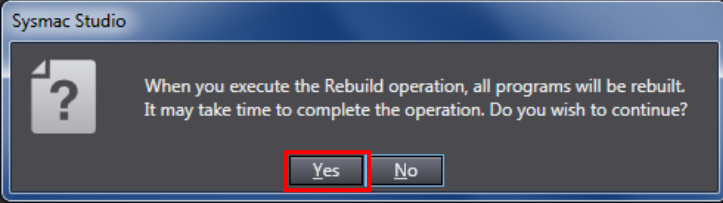
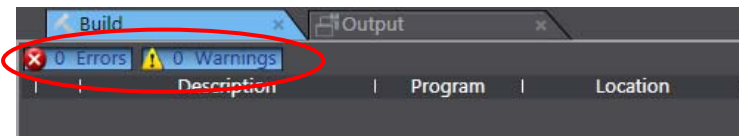
The devices or machines may perform unexpected operation regardless of the operating mode of the CPU Unit.



#### Caution

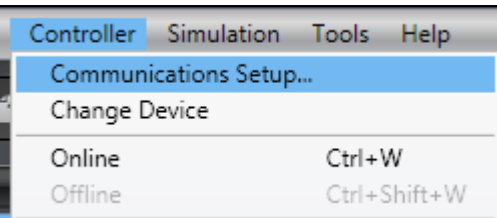
Always confirm safety before you reset the Controller or any components.



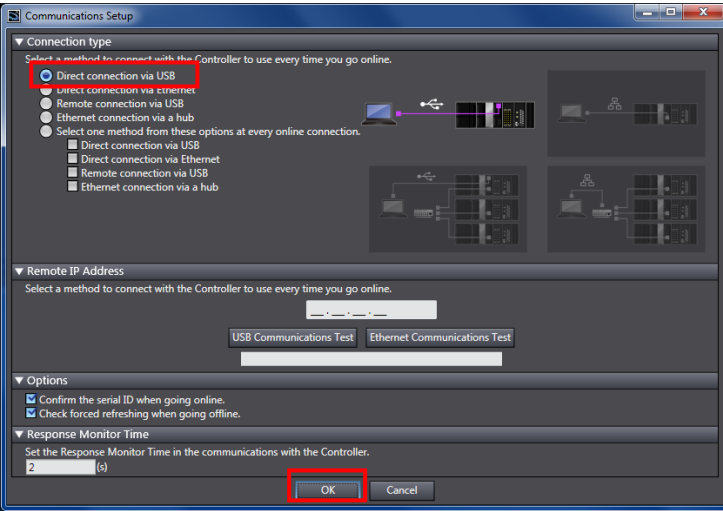
1	Select <b>Check All Programs</b> from the Project Menu.	
2	The Build Tab Page is displayed in the Edit Pane. Confirm that "0 Errors" and "0 Warnings" are displayed.	
3	Select <b>Rebuild Controller</b> from the Project Menu.	
4	A confirmation dialog box is displayed. Check the contents and click the <b>Yes</b> Button.	
5	Confirm that "0 Errors" and "0 Warnings" are displayed in the Build Tab Page.	



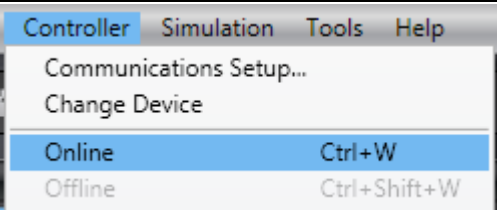
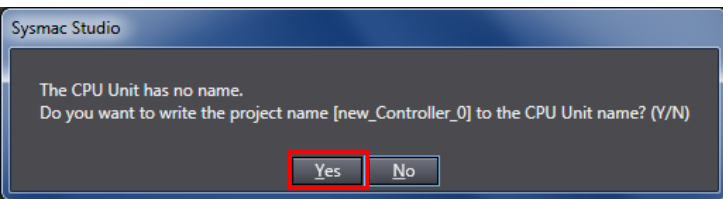
- 6 Select **Communications Setup** from the Controller Menu.



- 7 The Communications Setup Dialog Box is displayed. Select the *Direct connection via USB* Option for Connection Type.

Click the **OK** Button.


- 8 Select **Online** from the Controller Menu. A confirmation dialog box is displayed. Confirm that there is no problem and click the **Yes** Button.

\*The displayed dialog depends on the status of the Controller used. Check the contents and click the **Yes** Button to proceed with the processing.



- 9 When an online connection is established, a yellow bar is displayed on the top of the Edit Pane.

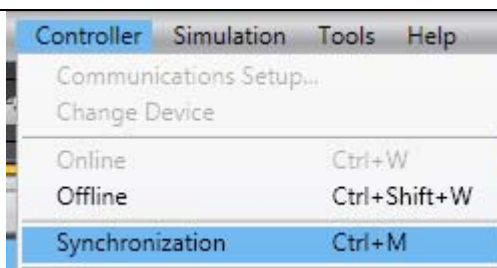




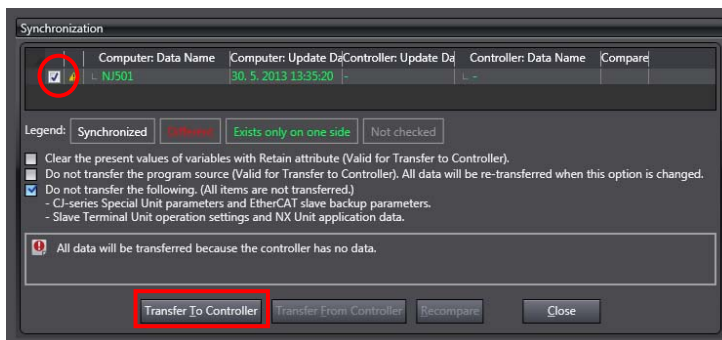
### Additional Information

For details on online connections to a Controller, refer to *Section 5 Online Connections to a Controller* of the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

- 10 Select **Synchronization** from the Controller Menu.

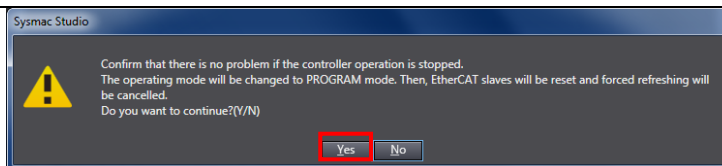


- 11 The Synchronization Dialog Box is displayed. Confirm that the data to transfer (NJ501 in the right dialog) is selected. Then, click the **Transfer to Controller** Button.

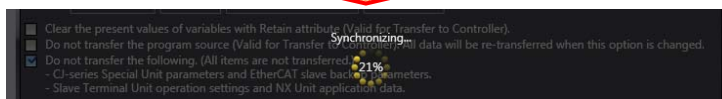


\*After executing the Transfer to Controller, the Sysmac Studio data is transferred to the Controller and the data are compared.

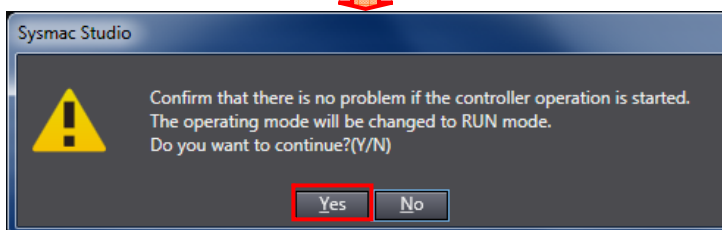
- 12 A confirmation dialog box is displayed. Confirm that there is no problem and click the **Yes** Button.



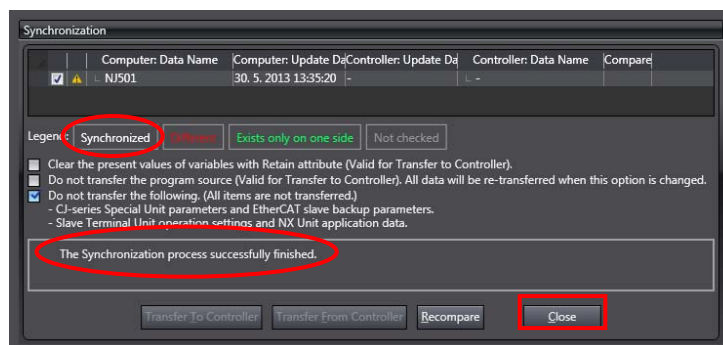
A screen stating "Synchronizing" is displayed.



The dialog box on the right is displayed. Confirm that there is no problem and click the **Yes** Button.



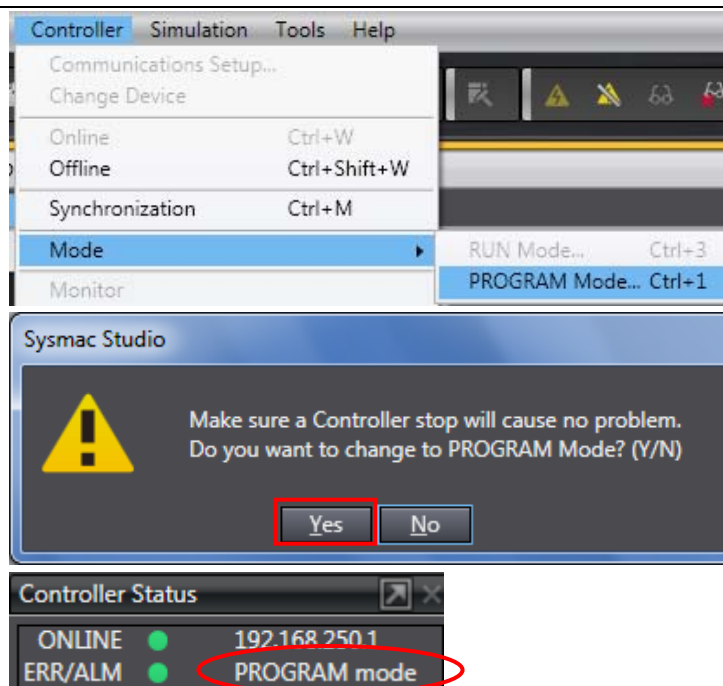
- 13 Confirm that the synchronized data is displayed with the color specified by "Synchronized", and that a message is displayed stating "The synchronization process successfully finished". If there is no problem, click the **Close** Button.



\*A message stating "The synchronization process successfully finished" is displayed if the Sysmac Studio project data and the data in the Controller match.

\*If the synchronization fails, check the wiring and repeat from step 1.

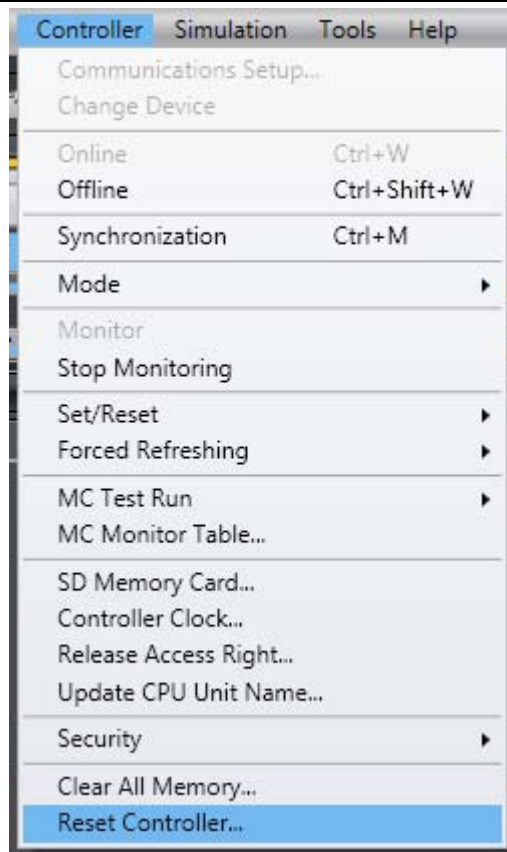
- 14 Select **Mode - PROGRAM Mode** from the Controller Menu.



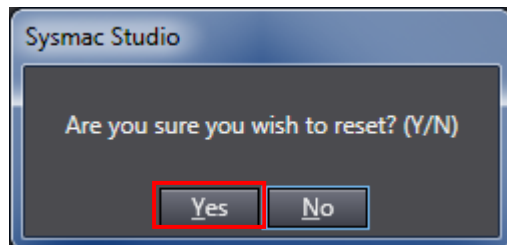
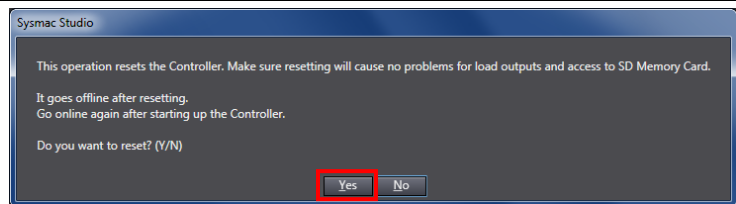
A confirmation dialog box on the right is displayed. Confirm that there is no problem and click the **Yes** Button.

The Controller Status changed to PROGRAM mode.

- 15 Select **Reset Controller** from the Controller Menu.



- 16 A confirmation dialog box is displayed. Check the contents and click the **Yes** Button.

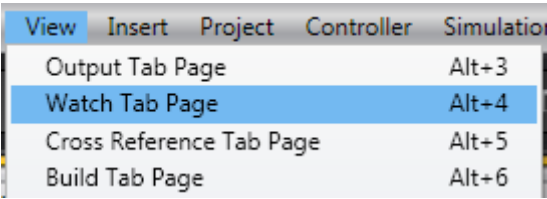
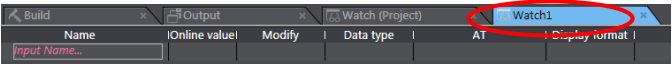
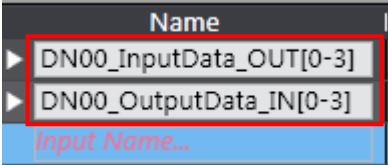


- 16 The Controller is reset and the Sysmac Studio goes offline. The yellow bar on the top of the Edit Pane disappears. Go online by following steps 6 to 8. Change to PROGRAM mode in the same way as step 13.



10.3.4. Settings in the Watch Tab Page

Make settings in the Watch Tab Page to check data that is sent and received.

1	Select <b>Watch Tab Page</b> from the View Menu.	
2	The Watch1 Tab Page is displayed in the lower section of the Edit Pane.	
3	Enter the following names in the Watch1 Tab Page for monitoring. To enter a new name, click a column stating <i>Input Name</i> . DN00_InputData_OUT[0-3] DN00_OutputData_IN[0-3]	
*You will use the settings in 7.6.2. Checking the Data That are Sent and Received.		

## 10.4. Setting Up the Network Using the Software

Set up DeviceNet remote I/O communications by using the software.

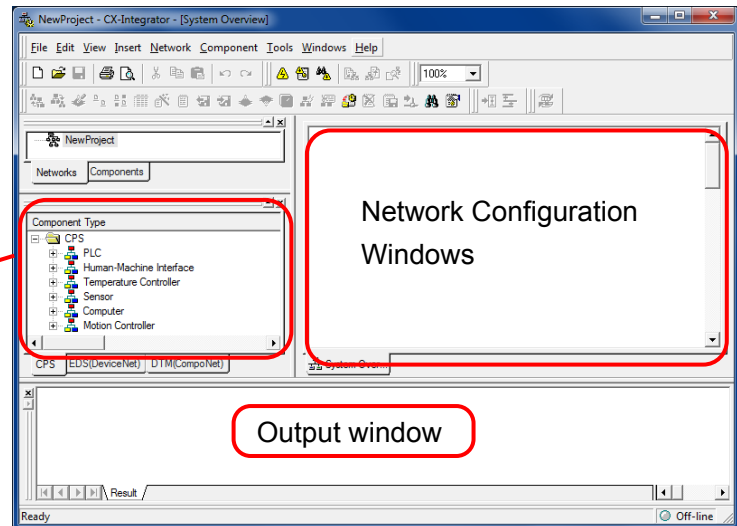
### 10.4.1. Starting the CX-Integrator and Installing the EDS File

Start the CX-Integrator and install the EDS file.

#### 1 Start the CX-Integrator.

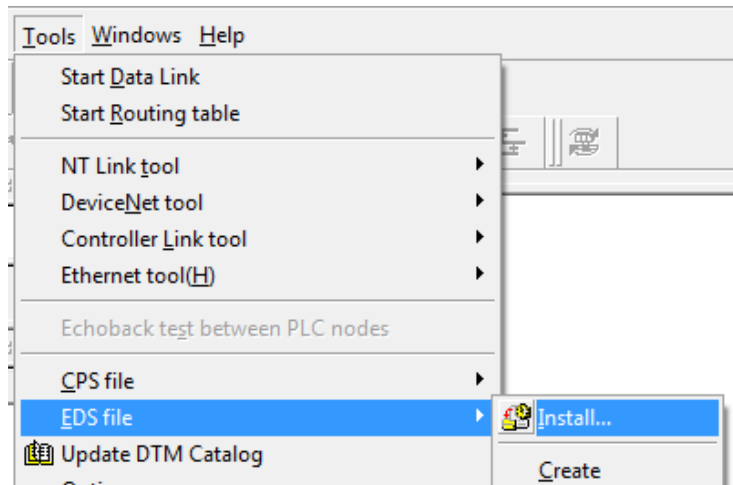
\*If the Component List Window is not displayed, select **Windows - Component List Window** from the View Menu.

Component List Window



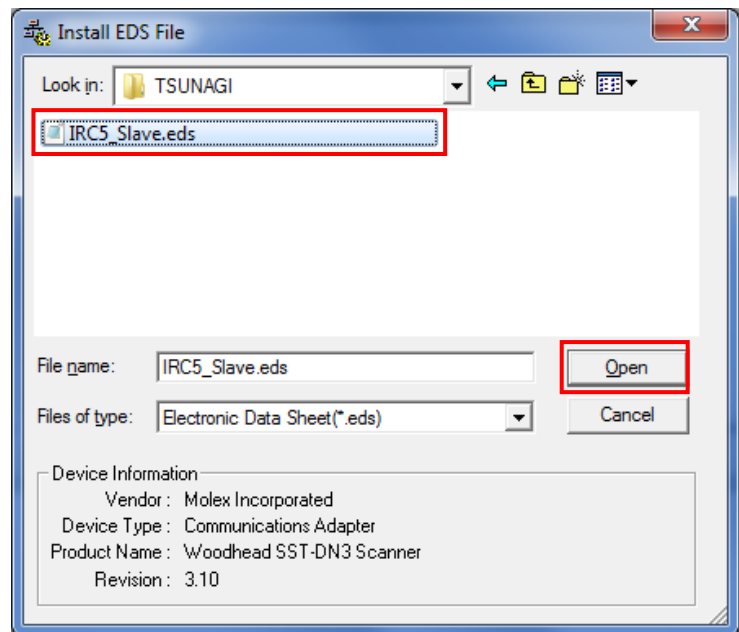
#### 2 Install the EDS file to register the Robot Controller in the network.

Select **EDS file - Install** from the Tools Menu.

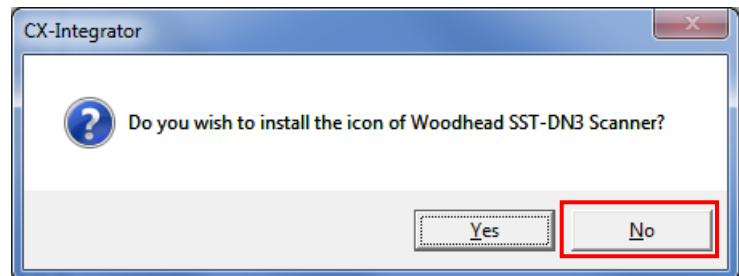


- 3 Select [IRC5\_Slave.eds] as an EDS file to install and click the **Open** Button.

\*For how to obtain the EDS file, refer to *Precautions for Correct Use* in 5.2. *Device Configuration*.

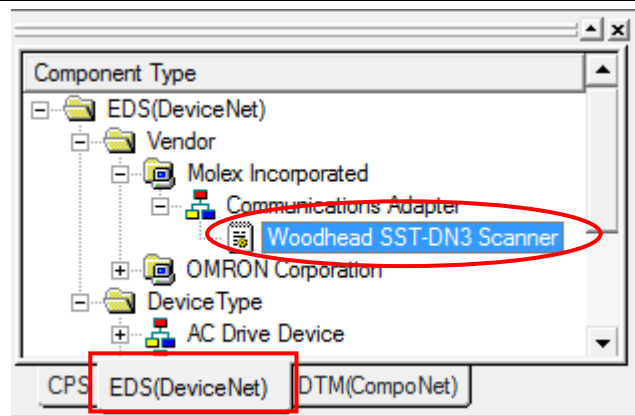


- 4 The dialog box on the right is displayed. Check the contents and click the **No** Button.



- 5 Select the EDS(DeviceNet) Tab on the Component List Window and confirm that the installed device was added ([Woodhead SST-DN3 Scanner] was added in the right figure).

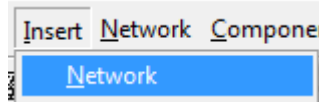
\*When you install the [IRC5\_Slave.eds], [Woodhead SST-DN3 Scanner] device will register.

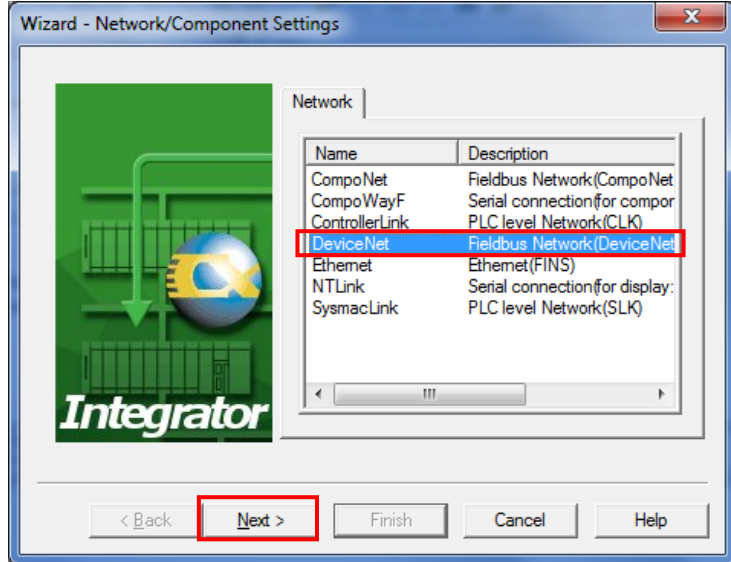


### 10.4.2. Creating the Network Configuration

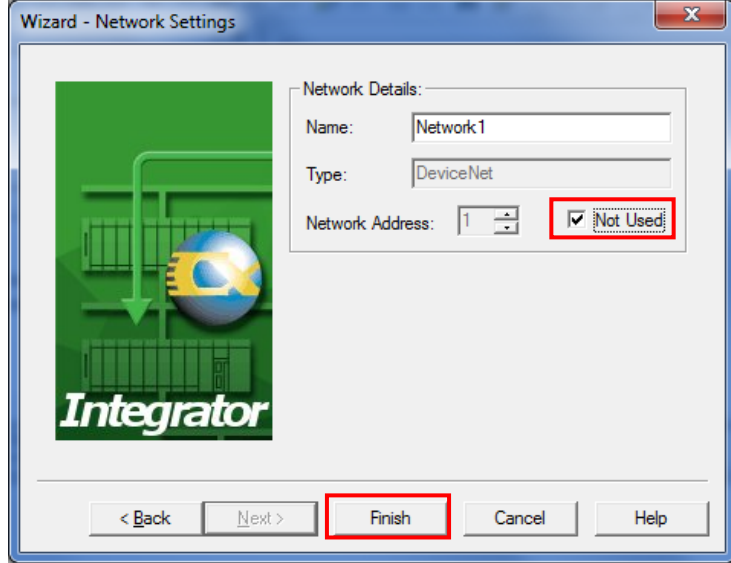
Create the network and device configuration offline.

- 1 Select **Network** from the Insert Menu of the CX-Integrator.


- 2 Select **DeviceNet** and click the **Next** Button.



Name	Description
CompoNet	Fieldbus Network(CompoNet)
CompoWayF	Serial connection(for compor)
ControllerLink	PLC level Network(CLK)
DeviceNet	Fieldbus Network(DeviceNet)
Ethernet	Ethernet(FINS)
NTLink	Serial connection(for display)
SysmacLink	PLC level Network(SLK)
- 3 Select the *Not Used* Check Box for Network Address and click the **Finish** Button.

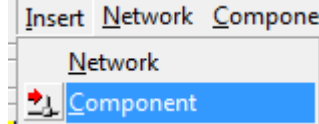


Network Details:

Name: Network1

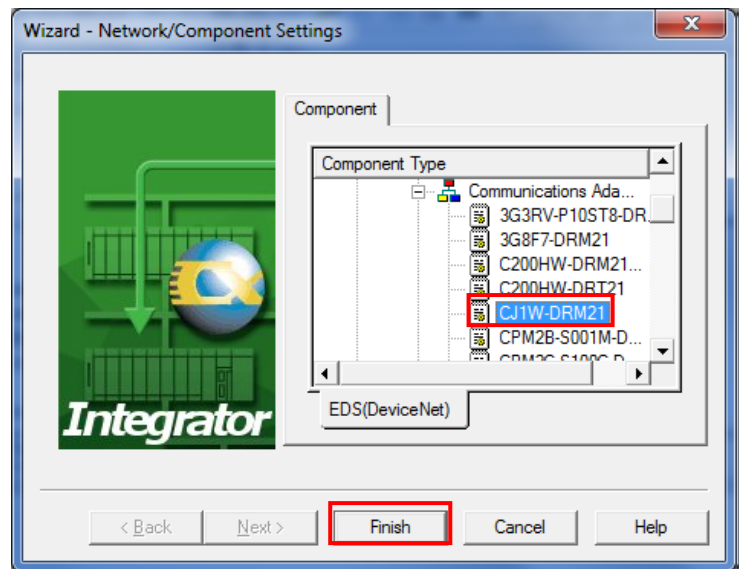
Type: DeviceNet

Network Address: 1 ☒ Not Used
- 4 Register the DeviceNet Unit in the Network.  
Select **Component** from the Insert Menu.

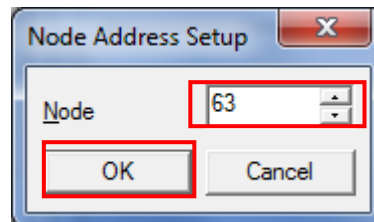




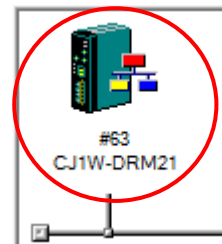
- 5 Select the DeviceNet Unit from the component list and click the **Finish** Button.  
OMRON Corporation -  
Communications Adapter -  
CJ1W-DRM21 is selected here.



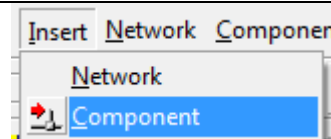
- 6 Enter the node address (63 is entered here) in the Node Address Setup Dialog Box, and click the **OK** Button.



- 7 Confirm that the DeviceNet Unit is registered in the Network Configuration Window.

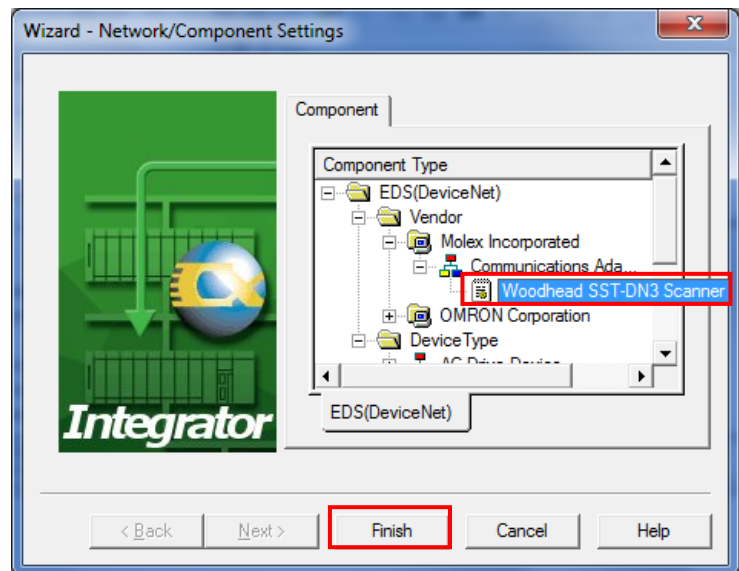


- 8 Register the Robot Controller (hereinafter referred to as the Slave Unit) in the network. Select **Component** from the Insert Menu.

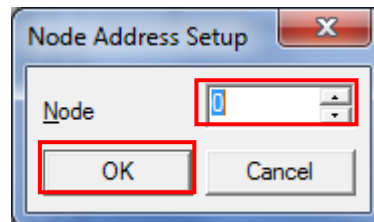


- 9 Select the Slave Unit to connect from the component list, and click the **Finish** Button. Woodhead SST-DN3 Scanner is selected here.

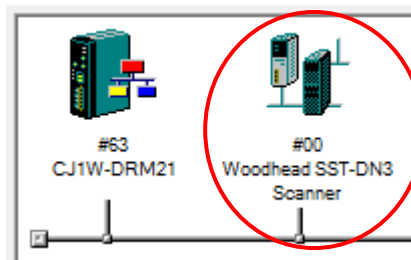
\*When you install the [IRC5\_Slave.eds], [Woodhead SST-DN3 Scanner] device will register.



- 10 Enter the node address (0 is entered here) in the Node Address Setup Dialog Box, and click the **OK** Button.

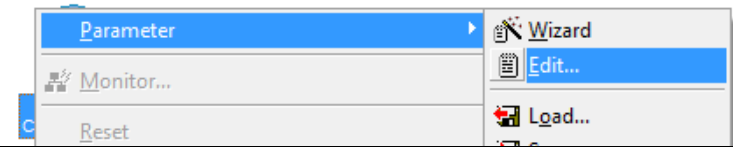
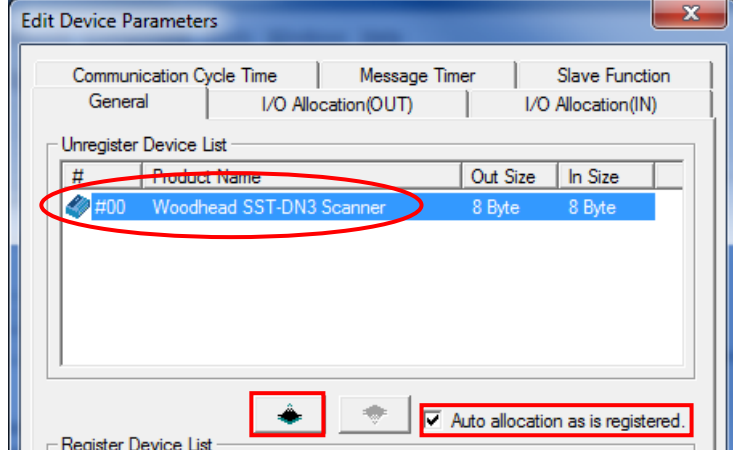
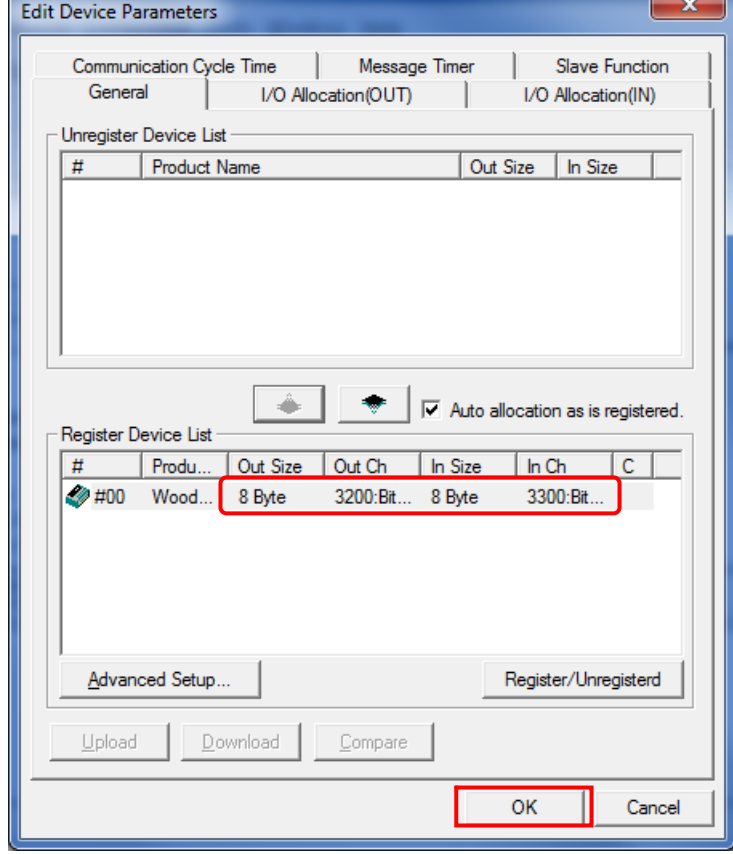


- 11 Confirm that the Slave Unit is registered in the Network Configuration Window.



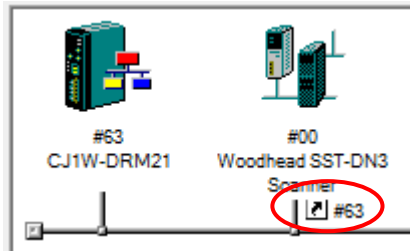
### 10.4.3. Setting the Device

Set the device and register it in the DeviceNet Unit (create a scan list).

1	Right-click the DeviceNet icon and select <b>Parameter - Edit</b> .	
2	<p>The Edit Device Parameters Dialog Box is displayed.</p> <p>Slave Unit (#00) is displayed in the Unregister Device List.</p> <p>Select the <i>Auto allocation as is registered</i> Check Box.</p> <p>Click the ↓ button.</p>	
	<p>Slave Unit (#00) is registered in the Register Device List.</p> <p>Confirm that the sizes and channels are set as follows, and click the <b>OK</b> Button.</p> <p>OUT Size: 8 Byte Out Ch: 3200:Bit00 In Size: 8 Byte In Ch: 3300:Bit00</p>	

- 3 Confirm that node address #63 is displayed under the slave unit icon on the Network Configuration Window.

\* The icon of IRC5 is the [Woodhead SST-DN3 Scanner] device.

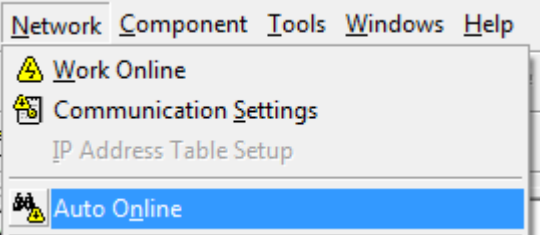
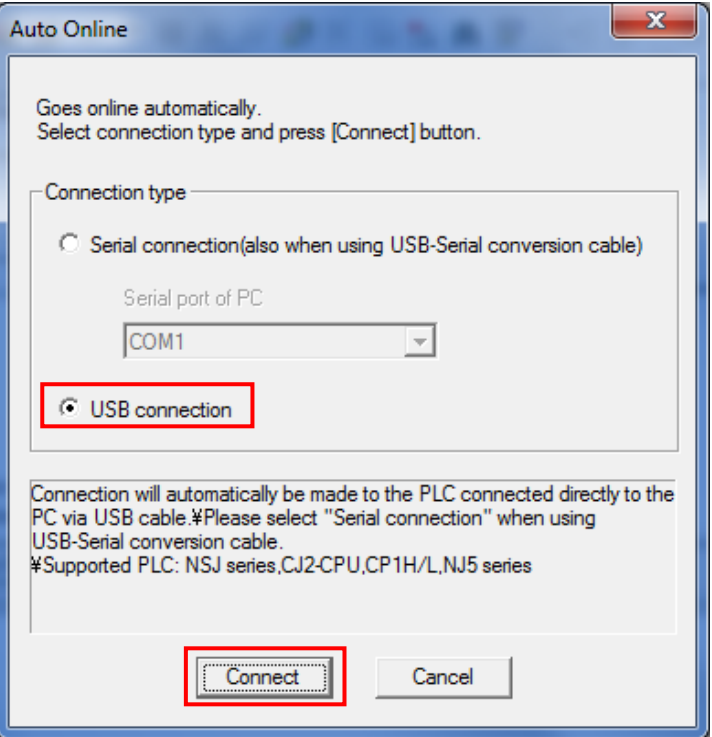
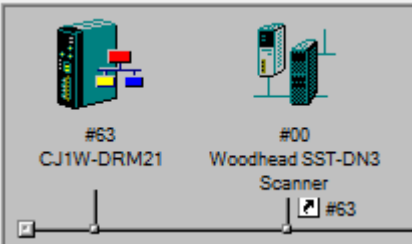


#### Precautions for Correct Use

Confirm that the DeviceNet cable is connected before proceeding to the following procedure. If it is not connected, turn OFF the power supply to each device, and then connect the DeviceNet cable.

#### 10.4.4. Connecting Online and Transferring the Scan List

Connect online with the Controller, and transfer the device setting (scan list) to the DeviceNet Unit via the Controller. When the transfer is completed, remote I/O communications start automatically.

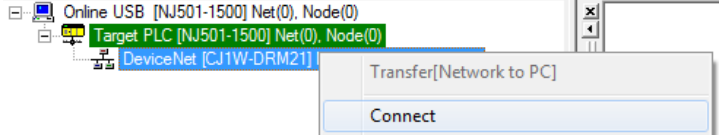
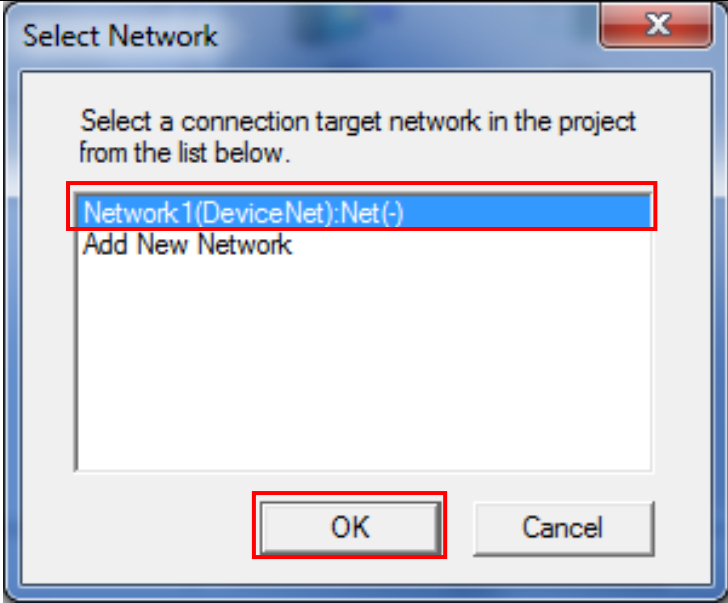

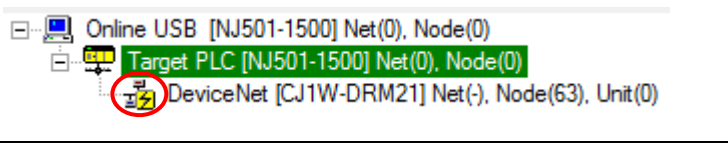
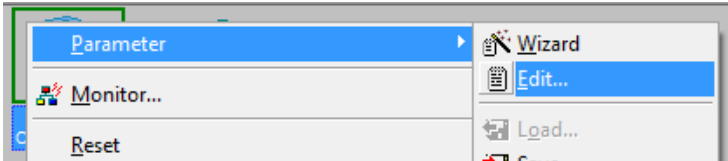
1	Select <b>Auto Online</b> from the Network Menu.	
2	<p>The Auto Online Dialog Box is displayed. Select the <b>USB connection</b> Option for Connection type, and click the <b>Connect</b> Button.</p> <p>A confirmation dialog is displayed indicating the connection is being established.</p>	
3	<p>After an online connection is established, the background color of the Network Configuration Window changes as shown in the right figure.</p> <p>* The icon of IRC5 is the [Woodhead SST-DN3 Scanner] device.</p>	



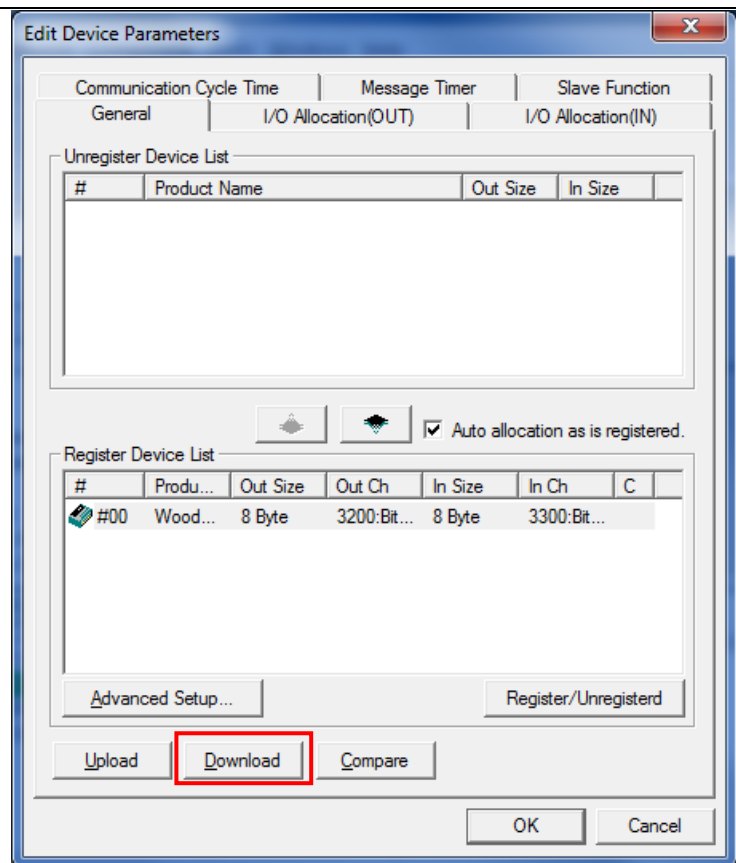
### Additional Information

If an online connection cannot be made to the Controller, check the cable connection. Or, return to step 1, check the settings and repeat each step.

Refer to *Section 2 Basic Operations of the CX-Integrator Ver.2. Operation Manual* (Cat. No. W464) for details.

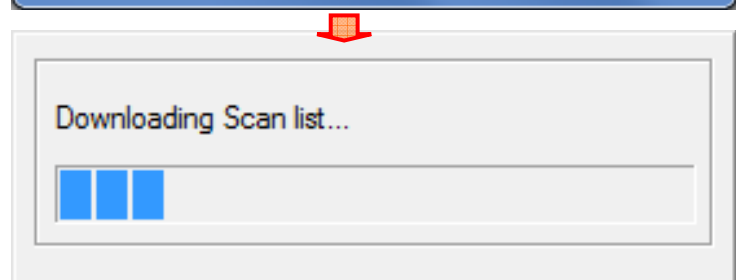
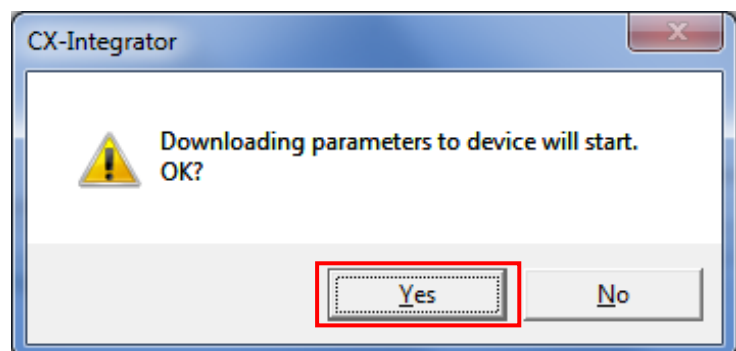
4	Right-click DeviceNet in the Online Connection Information Window, and select <b>Connect</b> .	
5	Select DeviceNet in the Select Network Dialog Box, and click the <b>OK</b> Button.	
6	Confirm that DeviceNet is in online status (  icon) in the Online Connection Information Window.	
7	Right-click <b>CJ1W-DRM21</b> on the Network Configuration Window, and select <b>Parameter - Edit</b> .	

- 8 The Edit Device Parameters Dialog Box is displayed. Click the **Download** Button.

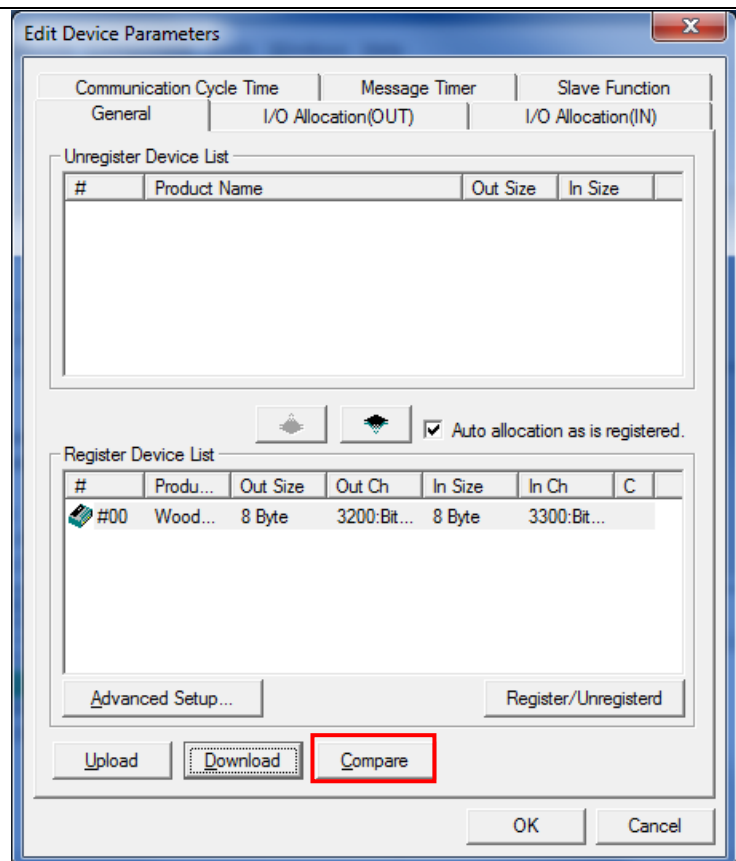


- 9 A download confirmation dialog box is displayed. Confirm that there is no problem and click the **Yes** Button.

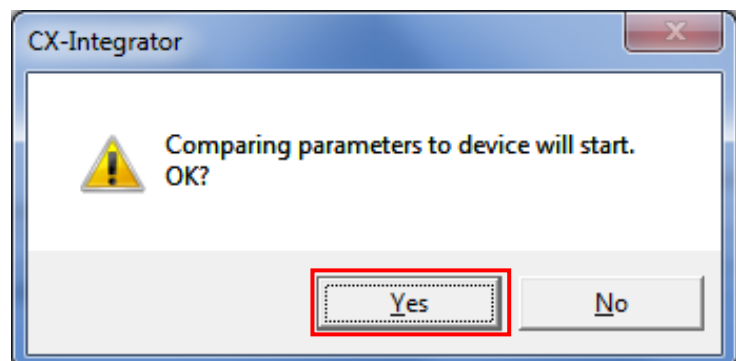
A dialog box indicating the downloading is in progress is displayed.



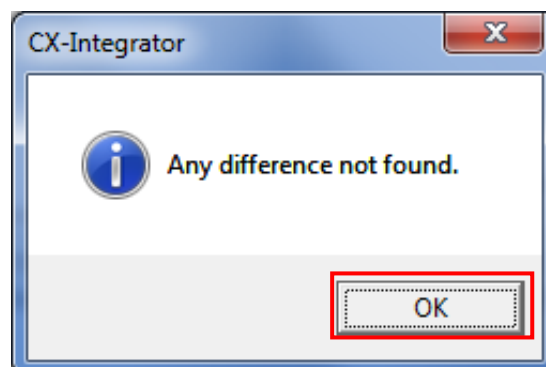
- 10 The Edit Device Parameters Dialog Box is displayed again. Click the **Compare** Button.



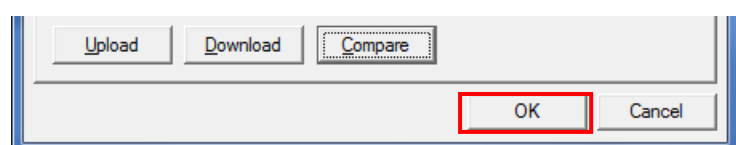
- 11 A dialog box shown on the right is displayed. Confirm that there is no problem and click the **Yes** Button to compare the parameters.



When the comparison is completed, a dialog box shown on the right is displayed. Check the contents and click the **OK** Button.



The Edit Device Parameters Dialog Box is displayed again. Click the **OK** Button to close the dialog box.





## 11. Revision History

Revision code	Date of revision	Revision reason and revision page
A	Jun. 7, 2013	First edition

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