HITACHI PROGRAMMABLE CONTROLLER

EH-150

PROFIBUS-DP MASTER MODULE 2 (EH-RMP2) APPLICATION MANUAL

(SERVICE MANUAL)

NJI-621(X)

○ Warranty period and coverage

The warranty period is the shorter period either 18 months from the data of manufacture or 12 months from the date of installation.
However within the warranty period, the warranty will be void if the fault is due to;

(1) Incorrect use as directed in this manual and the application manual.

(2) Malfunction or failure of external other devices than this unit.

(3) Attempted repair by unauthorized personnel.

(4) Natural disasters.

The warranty is for the PLC only, any damage caused to third party equipment by malfunction of the PLC is not covered by the warranty.

○ Repair

Any examination or repair after the warranty period is not covered. And within the warranty period ant repair and examination which results in information showing the fault was caused by ant of the items mentioned above, the repair and examination cost are not covered. If you have ant questions regarding the warranty please contact with your supplier or the local Hitachi Distributor. (Depending on failure part, examination might be impossible.)

○ Ordering parts or asking questions

When contacting us for repair, ordering parts or inquiring about other items, please have the following details ready before contacting the place of purchase.

(1) Model

(2) Manufacturing number (MFG.No.)

(3) Details of the malfunction

○ Reader of this manual

This manual is described for the following person.

- Person considering the introduction of PLC
- PLC system engineer
- Person handling PLC
- Manager after installing PLC

Warning

(1) Reproduction of the contents of this manual, in whole or in part, without written permission of Hitachi-IES, is prohibited.

(2) The content of this document may be changed without notice.

(3) While efforts have been made to be accurate, if any wrong or missing information is found, please contact us.

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PROFIBUS, PROFIBUS-DP are trademarks of PROFIBUS international.

Safety Precautions

Read this manual and related documents thoroughly before installing, operating, performing preventive maintenance or performing inspection, and be sure to use the unit correctly. Use this product after acquiring adequate knowledge of the unit, all safety information, and all cautionary information. Also, make sure this manual enters the possession of the chief person in charge of safety maintenance.

Safety caution items are classifies as “Danger” and “Caution” in this document.

DANGER : Identifies information about practice or circumstances, which may lead to personal injury or death, property damage, or economic loss.

CAUTION : Identifies information about practice or circumstances, which may lead to personal injury, property damage, or economic loss.

However, depending on the circumstances, items marked with CAUTION may result in major accidents.

The both marks show important information. Be sure to follow the instructions.

Icons for prohibited items and required items are shown below:

: Identifies prohibition. For example, when open flames are prohibited, is indicated.

: Identifies requirement. For example, when grounding must be performed, is indicated.

1. Installation

⚠ CAUTION
• Use this product in an environment as described in the catalog or this document. If this product is used in an environment subject to high temperature, high humidity, excessive dust, corrosive gases, vibration or shock, it may result in electric shock, fire or malfunction. • Be sure to install the PLC according to this manual. Failure to do so could result in damage by falling off, failure or malfunction. • Do not allow foreign objects such as wire chips to enter the unit. They may become the cause of fire, malfunction or failure.

2. Wiring

REQUIRED
• The PLC must be grounded (FE terminal). Failure to do so could result in injury to personnel or causing it to malfunction.

⚠ CAUTION
• Always use the power supply voltage listed in specifications. Using other voltage may damage the equipment or present a risk of fire. • The wiring operation should be performed by a qualified personnel. Failure to do so could result in fire, damage or electric shock.

3. Precautions when using the unit

DANGER
• Do not touch the terminals while the power is on. There is a risk of electric shock. • Appropriate emergency stop circuit, interlock circuitry and similar safety measures should be added to the PLC system to ensure safety in the event of incorrect, missing or abnormal signals caused by broken signal lines, momentary power interruptions or other causes. Do not share the power supply of relay output module and interlock circuitry because relay output might not work properly due to switching noise from interlock circuitry.

⚠ CAUTION
• When performing program change, forced output, RUN, STOP, etc., while the unit is running, be sure to check system safety carefully. Failure to do so could lead to damage to equipment. • Supply power according to the power–up order. Failure to do so could lead to damage to equipment or malfunction.

⚠ CAUTION
USE POWER SUPPLY UNIT OF EH-PS SERIES FOR SUPPLYING ELECTRIC POWER.

4. Preventive maintenance

⚠ DANGER

- Do not connect the +/- of the battery in reverse polarity. Do not recharge, disassemble, heat, place in fire, or short circuit the battery. There is a risk of explosion or fire.

PROHIBITED

- Do not attempt to disassemble, repair or modify any part of the PLC.
  Electric shock, malfunction or failure may result.

⚠ CAUTION

- Turn off power to the PLC before mounting or dismounting the module
  Electric shock, malfunction or failure may result.

Revision History

No.	Description of revision	Date of revision	Manual number
1	The first edition	Oct. 2014	NJI-621(X)

Table of Contents

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Chapter 1 Introduction

1.1 Before use

Thank you very much for choosing Hitachi Programmable Controller (hereinafter referred to as PLC), EH-150 series. This manual explains how to use the PROFIBUS-DP master module 2 with the Hitachi EH-150 series Programmable Controller. Read this manual thoroughly and keep for installation operations, maintenance checks and other procedures. The following documentation related to PLC is also available and should be used together with this manual.

Table 1.1-1 List of Description materials

Items		Title of document	Manual number
EHV+ series	Main system of EHV+	IEC 61131-3 Compliant PLC EHV+ APPLICATION MANUAL	NJI-564*(X)
EHV series	Main system of EHV	EH-150 EHV-CPU APPLICATION MANUAL EH-150 EHV-CPU PROGRAMMING MANUAL	NJI-481*(X) NJI-482*(X)
	Programming software (Standard edition)	EH-150 EHV series Ladder Programming software Control Editor INSTRUCTION MANUAL	NJI-537*(X)
	Programming software (Variable Name Edition)	EH-150 EHV series Ladder Programming software Control Editor INSTRUCTION MANUAL	NJI-486*(X)
EH-150 series	Main system of EH-150	EH-150 APPLICATION MANUAL	NJI-280*(X)
	Programming software	LADDER EDITOR for Windows® INSTRUCTION MANUAL	NJI-206*(X)

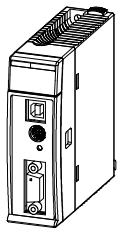
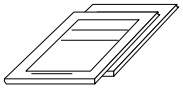
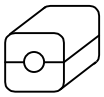
* The alphabet between the number and (X) means version (A,B…) and the space means the first edition.

1.2 Item packaged with the module

Great care has been taken in the manufacture of this product, but we advise that the following points are checked immediately after purchase.

1. Is the model the same one that you ordered?
2. Has the product been damaged in any way?
3. Are any of the accessories listed in Table 1.2-1 missing?

Table 1.2-1 List of accessories supplied with the EH-RMP2

No.	Product name	Model name	Appearance	Quantity	Remarks
1	PROFIBUS Master module 2	EH-RMP2		1	
2	Instruction manual	NJI-617*(X)		1	
3	Ferrite Core	SFC-10		2	For applying CE marking (EMC direction). Please refer to 3.3 Wiring.

1.3 System configurations

EH-RMP2 is master module on PROFIBUS-DP protocol of industrial network. EH-RMP2 is helpful as master controller of PROFIBUS system. Example of system configuration is shown below.

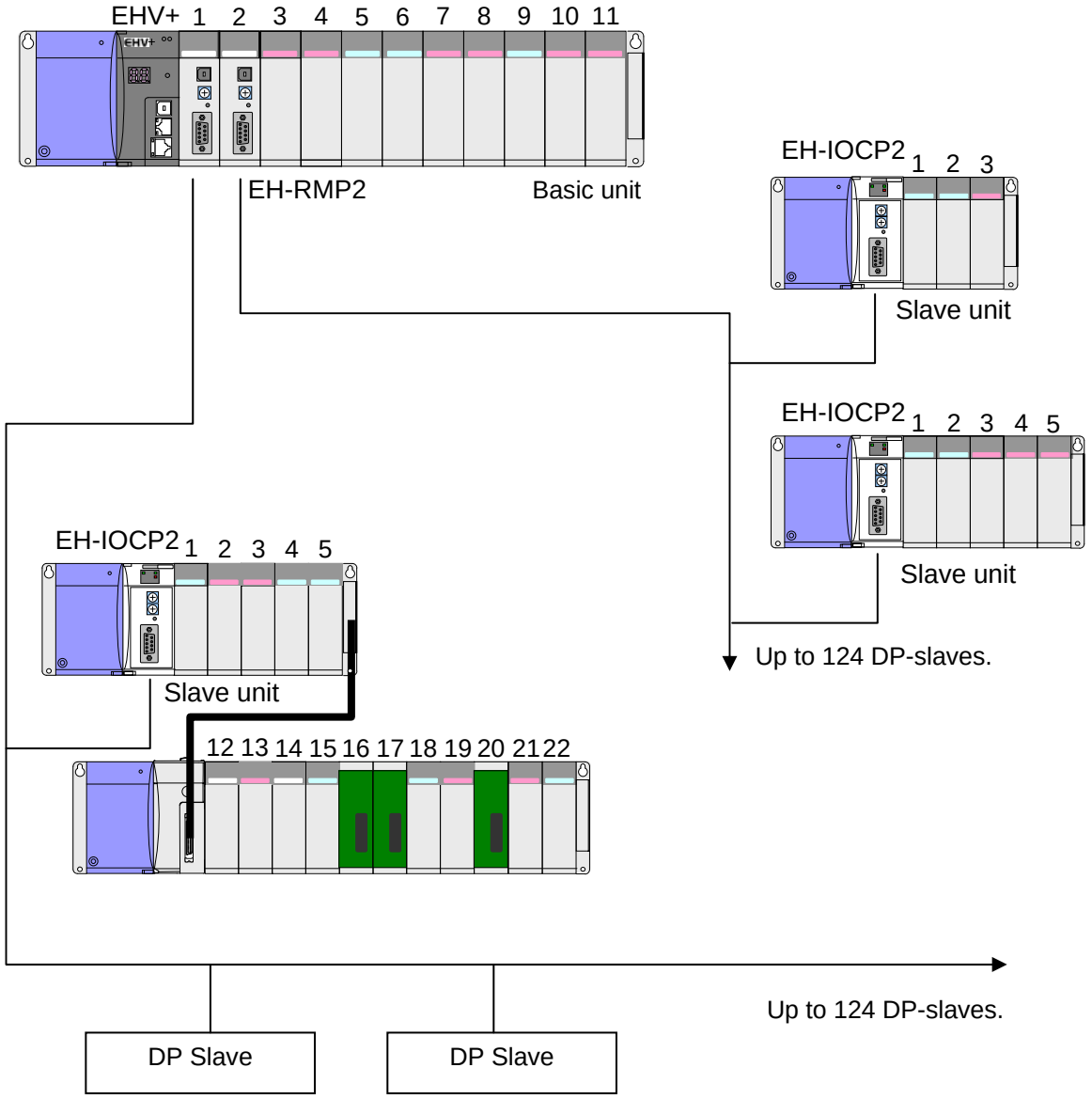


Figure 1.3-1 Example of system configurations

1.4 Difference between EH-RMP2 and EH-RMP

There are some differences between EH-RMP2 and EH-RMP.

(1) Configuration tool

EH-RMP : Sycon

EH-RMP2 : SYCON.net

(2) Configuration cable

EH-RMP : Exclusive serial cable

EH-RMP2 : USB cable (The cable currently used in EHV series can be used.)

(3) Bus Termination

EH-RMP : Built-in

EH-RMP2 : Not built-in (Please use a connector which has a termination switch.)

CAUTION

EH-RMP2 expands the input and output size to use in PROFIBUS network in comparison with EH-RMP. For this reason, the input data of the PROFIBUS network may be rarely affected under noise environment. As measures method under the noise environment, we recommend the following measures.

(1) PROFIBUS cable and signal cables of various input and output modules must be routed in metal duct separated from power cables.

(2) The shield wire of PROFIBUS cable must be grounded both ends.

(3) By increasing the capacity of the power supply for the input and output signals, reduce the voltage fluctuation due to noise.

1.5 Replacement from EH-RMP

Cautions of replacement from EH-RMP are shown below.

Table 1.5-1 Cautions of replacement from EH-RMP

No.	Item	EH-RMP	EH-RMP2	Action
1	Configuration tool	Sycon	SYCON.net	Configurations file is not compatible between EH-RMP and EH-RMP2. Please reconfigure with use of SYCON.net.
2	Configuration cable	D-sub 9 pin serial connector	Type-B USB cable	Please prepare the type-B USB cable. Type-B USB cable is same as cable of using in EHV / EHV+ series.
3	Link parameter of CPU module	Sending data area is WLx000 to WLx0FF	Sending data area is WLx000 to WLx1FF	Please change parameter with use of the programming tool.
4	Terminator	Build-in	Not Build-in	Please use a connector which has a termination switch.
5	Rotary switch	-	The input / output sizes of PROFIBUS network	Please set rotary switch to “0”.
6	Side DIP switch	Output hold selecting		Please set same settings.
7	Start-up time	5 second	10 second	Please change user program.
8	LED indications	RDY, RUN, STATUS, ERR, TOKEN	RDY, RUN, ERR, STATUS, REM	Please check each application manual.

MEMO

Chapter 2 Specifications

2.1 General Specifications

General specifications are shown in Table 2.1-1. These specifications are common in EH-150 series.

Table 2.1-1 General specifications

Item	Specifications
Operating ambient temperature	0 to 55 °C
Storage ambient temperature	－10 to 75 °C
Operating ambient humidity	5 to 95 % RH (no condensation)
Storage ambient humidity	5 to 95 % RH (no condensation)
Vibration resistance	Conforms to IEC 60068-2-6
Noise resistance	○ Noise voltage 1,500 Vpp Noise pulse width 100 ns, 1μ (Noise created by the noise simulator is applied across the power supply modules input terminals. This is determined by this company's measuring method.) ○ Based on IEC61131-2 ○ Static noise: 3,000V at metal exposed area
Insulation resistance	20 MΩ or more between the AC external and case ground (FE) terminal (based on 500 V DC)
Dielectric withstand voltage	1,500 V AC for 1 minute between the AC external terminal and case ground (FE) terminal
Grounding	Class D grounding (ground with power supply module)
Usage environment	No corrosive gases, no excessive dust
Structure	Open, wall-mount type
Cooling	Natural air cooling

2.2 Functional Specifications

Functional specifications are shown in Table 2.2-1.

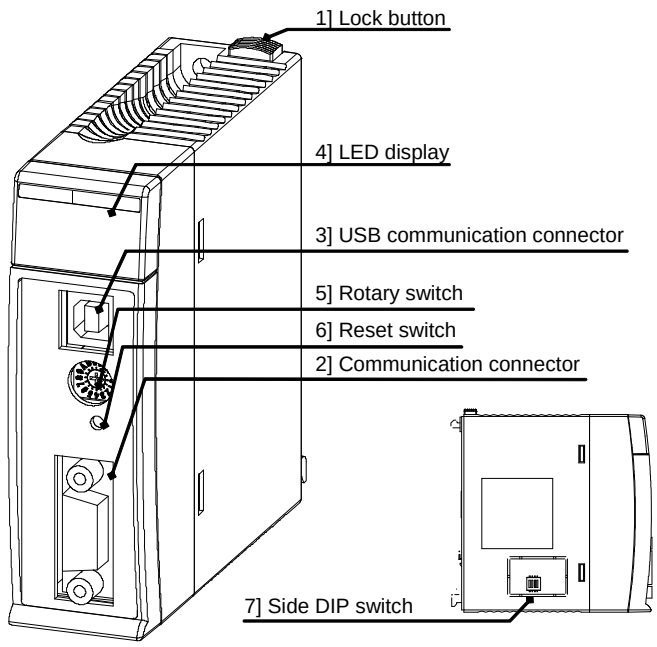
Table 2.2-1 Functional specifications

Item			Specifications	
			EH-RMP2 (This product)	EH-RMP (Existing model)
Communication specifications	Communication protocol		PROFIBUS-DP V0	
	Range of node address		0 to 125: Setting by configuration tool	
	Maximum I/O size		Input: 512 words, output: 512 words (Setting by rotary switch)	Input: 256 words, output: 256 words
	Connector		D-sub 9 pin	
	Topology		BUS	
	Communication cable		PROFIBUS cable	
	Segment length, Transmit speed		9.6 kbps : 1,200 m 19.2 kbps : 1,200 m 93.75 kbps : 1,200 m 187.5 kbps : 1,000 m 500 kbps : 400 m 1500 kbps : 200 m 3 Mbps : 100 m 6 Mbps : 100 m 12 Mbps : 100 m	
	Maximum connectable number of slaves		125 slaves	
	Output hold		Supported (Clear mode, Freeze mode, Copy mode*1)	
	Termination		Not built-in	Built-in
	Configuration tool		SYCON.net	SyCon
Functional specifications	Support CPU module		EH-CPU316A/516/548, EHV-CPU16/32/64/128, EHV-CPU1025/1102	
	I/O assignment		LINK	
	Number of modules	EH-CPU	2 modules / CPU	
		EHV-CPU	8 modules / CPU	
	Self-check		WDT check	WDT check System memory check
	Error indication		LED	
	Current consumption		780 mA	600 mA
	Standard compliant		CE, C-Tick*2	UL, CE, C-Tick

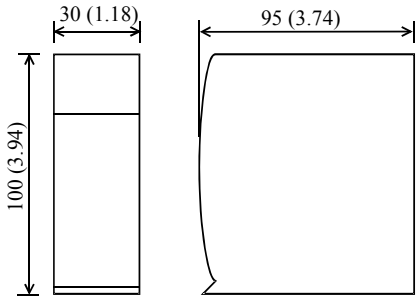
*1 When using EH-CPU316A, this mode is effective in case that EH-CPU316A ROM version is 02 or higher.
*2 UL is not supported. Contact your local supplier for further information.

2.3 Name and function of each part

Name and function of each part

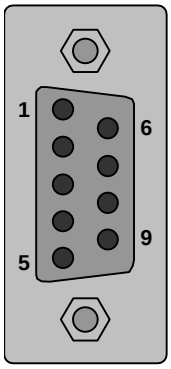


Model name	EH-RMP2
Weight	0.16 kg (0.35 lb)
Current consumption (5VDC)	0.78 A
Dimensions (mm (in.))	



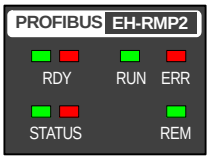
No.	Name	Function	Remarks
1]	Lock button	Press this button to dismount. Module can be fixed firmly by a screw of M4 × 10mm (0.39in).	
2]	Communication connector	D-sub 9-pin connector for communication cable.	
3]	USB communication connector	Type-B USB connector for configuration.	
4]	LED display	The status of module is displayed on this LED.	
5]	Rotary switch	This is a rotary switch to set network input / output sizes.	
6]	Reset switch	The module can be reset by pressing this switch when the module detected an error. At the time the RDYLED is turned off immediately after the press, it will be reset.	Please do not press and hold the reset switch.
7]	Side DIP switch	This is a switch to set an operation mode.	

■ Description of Connector

Connector	Symbol	Indication	Details
PROFIBUS 	PROFIBUS	Communication connector	D-sub 9 pin connector. Terminal layouts are shown below.

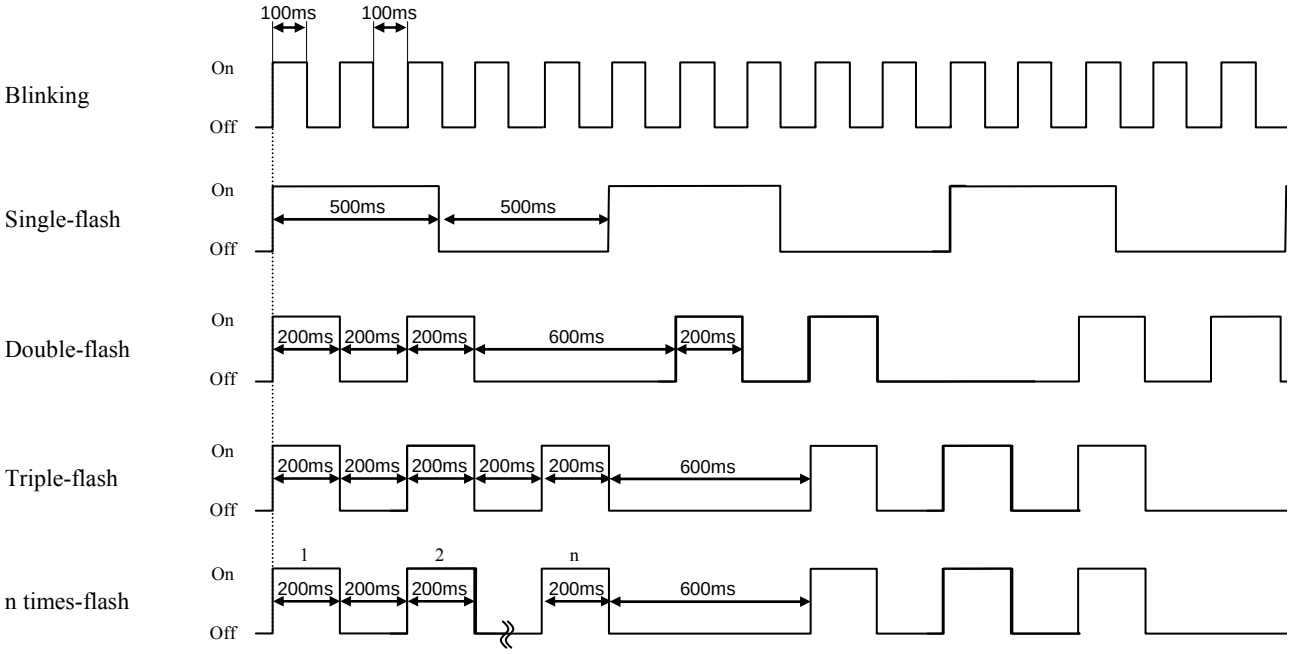
Pin No.	Details
1	NC
2	NC
3	B-Line
4	NC
5	GND
6	+5 V DC
7	NC
8	A-Line
9	NC

■ Description of LED display

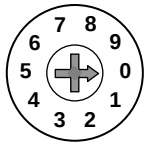
<table>
<tr><th>LED</th><th>LED name</th><th>Indication</th><th>Details</th></tr>
<tr><td rowspan="5"> 
</td><td>RDY</td><td>Hardware status
(Green / Red)</td><td>Display EH-RMP2 hardware status.
<table>
<tr><th>State</th><th>Details</th></tr>
<tr><td>Off</td><td>Hardware error
Power supply error</td></tr>
<tr><td>Flash in green or red</td><td>Initialization</td></tr>
<tr><td>Lit in red</td><td>Hardware error</td></tr>
<tr><td>Lit in green</td><td>No error</td></tr>
</table></td></tr>
<tr><td>STATUS</td><td>System status
(Green / Red)</td><td>Display the EH-RMP2 system status.
<table>
<tr><th>State</th><th>Details</th></tr>
<tr><td>Off</td><td>Power supply error</td></tr>
<tr><td>Flash in red</td><td>Internal error</td></tr>
<tr><td>Lit in red</td><td>WDT error</td></tr>
<tr><td>Fifth-flash in green</td><td>Side DIP switch setting error</td></tr>
<tr><td>Forth-flash in green</td><td>Link parameter error</td></tr>
<tr><td>Triple-flash in green</td><td>Configuration data error</td></tr>
<tr><td>Double-flash in green</td><td>CPU module error</td></tr>
<tr><td>Single-flash in green</td><td>Initialization</td></tr>
<tr><td>Lit in green</td><td>No error</td></tr>
</table></td></tr>
<tr><td>RUN</td><td>Network status
(Green)</td><td>Display PROFIBUS network status.
<table>
<tr><th>State</th><th>Details</th></tr>
<tr><td>Off</td><td>No communication established</td></tr>
<tr><td>Blinking</td><td>Under communication establishment</td></tr>
<tr><td>On</td><td>Communication established</td></tr>
</table></td></tr>
<tr><td>ERR</td><td>Error status
(Red)</td><td>Display PROFIBUS error status.
<table>
<tr><th>State</th><th>Details</th></tr>
<tr><td>Off</td><td>No error</td></tr>
<tr><td>Blinking</td><td>Slave units at least one are not established.</td></tr>
<tr><td>On*1</td><td>All slave units are not established</td></tr>
</table></td></tr>
<tr><td>REM</td><td>Operating mode
(Green)</td><td>No use. It is always off.</td></tr>
</table>

CAUTION In establishing all slave units, Error status LED is lighting for a moment but it is no problem.

The state of LED is indicated below.



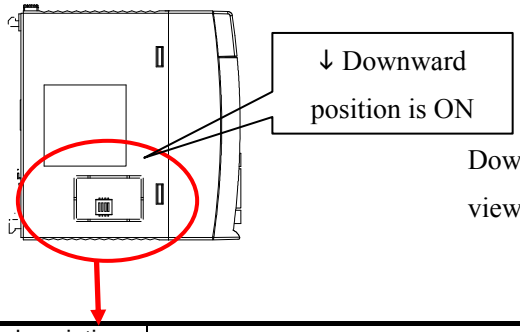
■ Description of Rotary switch

Rotary switch	Symbol	Meaning	Details of setting
MODE  [Default setting: 0]	MODE	Input / Output Sizes	The input / output sizes of PRFOBUS network is set by rotary switch.

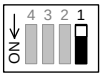
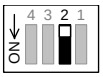
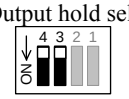
Value	Network size	Input size	Output size
0	Variable size	512 words max	512 words max
1	64W / 64W fixed	64 words	64 words
2	128W / 128W fixed	128 words	128 words
3	256W / 256W fixed	256 words	256 words
4	512W / 512W fixed	512 words	512 words
5	Variable size	512 words max	512 words max
6			
7			
8			
9			

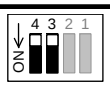
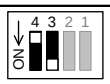
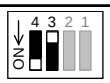
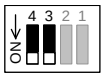
Please set rotary switch to 0 if you use auto addressing function with use of the SYCON.net. If you map each slave I/O address including offset address, please set rotary switch value 1, 2, 3 or 4. When actual input / output sizes exceed setting sizes, EH-RMP2 detects error.

■ Description of Side DIP switch



Downward position is ON side in case of side view like left figure.

No.	Setting description	Details
1	No use  [Default setting: OFF]	Please keep off.
2	No use  [Default setting: OFF]	Please keep off.
3,4	Output hold selecting  [Default setting: OFF]	When the CPU is switched from RUN to STOP position, it can select output status.

Bit4	Bit3	Position	Output hold function selection
OFF	OFF		Clear mode. When the CPU is switched from RUN to STOP position, EH-RMP2 outputs the zero data to PROFIBUS. But the link area (WL) is not cleared.
OFF	ON		Freeze mode. When the CPU is switched from RUN to STOP position, EH-RMP2 holds output data that is last data received.
ON	OFF		Copy mode. When the CPU is switched from RUN to STOP position, EH-RMP2 continues to copy in the link area. When using EH-CPU316A, this mode is effective in case that EH-CPU316A ROM version is 02 or higher.
ON	ON		Don't care.

Chapter 3 Installation

3.1 Mounting Module

(1) Mounting

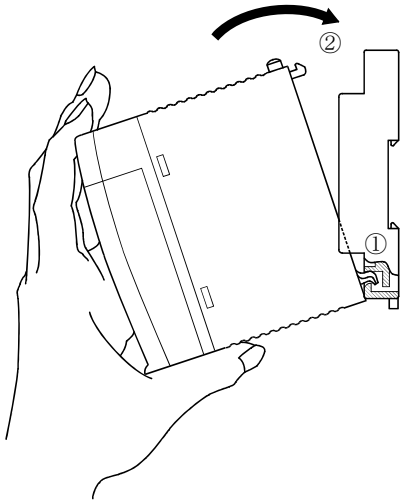


Figure 3.1-1 Mounting Module

1] Hook the lower part of the module to the hole in the base.

2] Press in the upper side of the module until it clicks.

Note 1: Make sure the module is mounted securely.

Note 2: Slot position of power supply module is fixed as 1st slot of base unit.

Note 3: Slot position of CPU module is fixed as 2nd slot of base unit.

Modules can be fixed firmly by M4×10mm screws.

(2) Removing

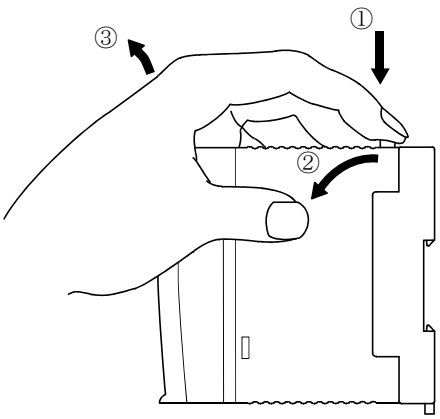


Figure 3.1-2 Removing Module

1] Press the lock button.

2] With the lock button pressed, pull the top of the module.

3] Pull the unit away from the base unit.

Note: Press the lock button for a power supply module.

3.2 Mountable slots for EH-RMP2

The mounting position of EH-RMP2 is restricted according to CPU module. EH-RMP2 cannot be on expansion base unit regardless of CPU module.

(1) If you use EHV-CPU16/32/64/128 in CPU module.

Maximum 8 link modules (EH-RMP2) can be on base unit. Mountable slot numbers are 0 to 7 as shown in Figure3.2-1. Please note that EHV-CPU16/32/64/128 cannot mount on old model base unit (EH-BS3, EH-BS5, EH-BS8).

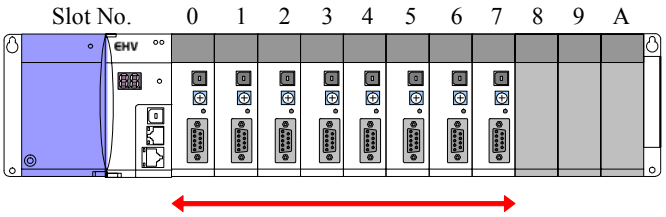


Figure 3.2-1 Mountable slots for EH-RMP2 (EHV-16/32/64/128)

(2) If you use EHV-CPU1025/1102 in CPU module.

Maximum 8 link modules (EH-RMP2) can be on base unit. Mountable slot numbers are 0 to 7 as shown in Figure3.2-2. Please note that EHV-CPU1025/1102 cannot mount on old model base units (EH-BS3, EH-BS5, EH-BS8).

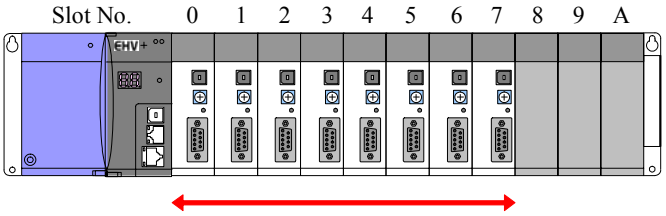


Figure 3.2-2 Mountable slots for EH-RMP2 (EHV-CPU1025/1102)

(3) If you use EH-CPU516/548 in CPU module.

Maximum 2 link modules (EH-RMP2) can be on base unit. Mountable slot numbers are 0 to 7 as shown in Figure3.2-3.

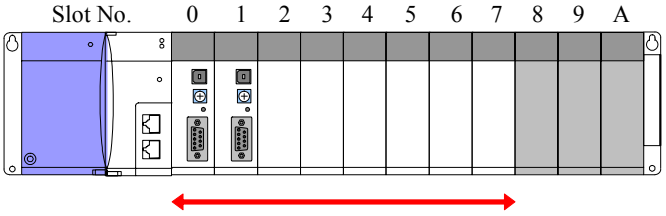


Figure 3.2-3 Mountable slots for EH-RMP2 (EH-CPU516/548)

If base unit is old model base units (EH-BS3, EH-BS5, EH-BS8), mountable slot numbers are 0 to 2.

(4) If you use EH-CPU316A in CPU module.

Maximum 2 link modules (EH-RMP2) can be on base unit. Mountable slot numbers are 0 to 7 as shown in Figure3.2-4.

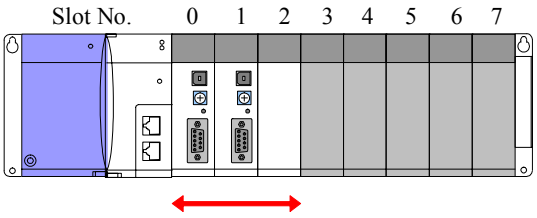


Figure 3.2-4 Mountable slots for EH-RMP2 (EH-CPU316A)

3.3 Wiring

For information about installation of the PROFIBUS DP fieldbus, please refer to the document *Installation Guideline for PROFIBUS-DP/FMS* from PNO, Order No. 2.112.

PROFIBUS homepage: http://www.profibus.com

3.3.1 PROFIBUS port

EH-RMP2 has D-sub 9 pin female connector for PROFIBUS port.

Terminal layouts are shown below.

Table 3.3.1-1 Terminal layouts of EH-RMP2

Pin No.	Details
1	NC
2	NC
3	B-Line
4	NC
5	GND
6	+5 V DC
7	NC
8	A-Line
9	NC

+5V DC and GND are used for bus termination. Some devices, like optical transceivers (RS-485 to fiber optics) might require external power supply from these pins. In normal applications, PROFIBUS-DP is only used A-Line and B-Line.

3.3.2 Recommended connectors

Recommended connectors of EH-RMP2 are shown below.

Table 3.3.2-1 Recommended connectors of EH-RMP2

Manufacturer	Model name	Description
PHOENIX CONTACT	PROFIB/SC2	Angle type
	PROFIB/AX/SC	Straight type

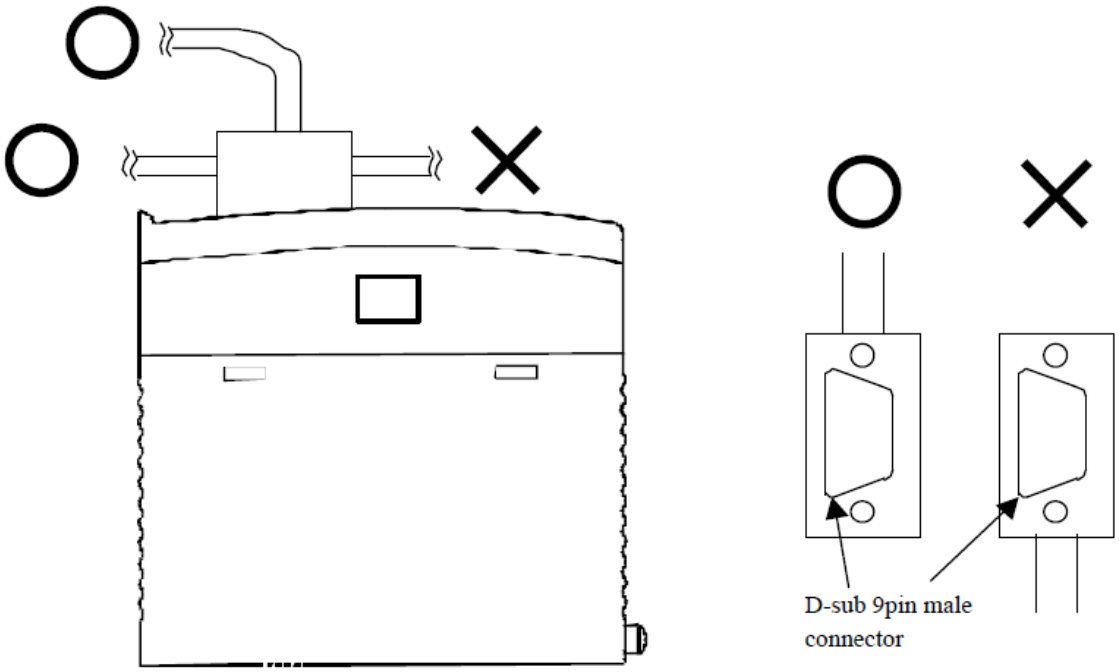


Figure 3.3.2-1 The connector type for EH-RMP2

3.3.3 Cable parameters

The bus cable is specified in EN 50170 part 8-2 as “Cable Type A”, and should comply with the parameters in the table below. Cable type B, which is also described in EN 50170, is outdated and should no longer be used.

Table 3.3.3-1 Cable parameters

Parameter	Cable type A
Characteristic impedance	135 to 165 Ω at a frequency of 3 to 20MHz
Operating capacity	< 30 pF/m
Loop resistance	<= 100 Ω/km
Core diameter	> 0.64 mm
Core cross-section*1	> 0.34mm^2

*1 The cable cross-sections used should be compatible with the mechanical specifications of the bus interface connector.

3.3.4 Maximum length of bus segment

Maximum length of bus segment is shown below.

Table 3.3.4-1 Maximum cable lengths per segment

	Data transfer rate (kbit/s)								
	9.6	19.2	93.75	187.5	500	1500	3000	6000	12000
Max segment length (m)	1200	1200	1200	1000	400	200	100	100	100

CAUTION

If EH-RMP2 is applied for CE marking (EMC direction), follow the instructions below.

1] Communication cable must be routed in metal duct separated from power or I/O cables as much as possible.

2] Use included ferrite core for communication cable with one turn as the picture below.

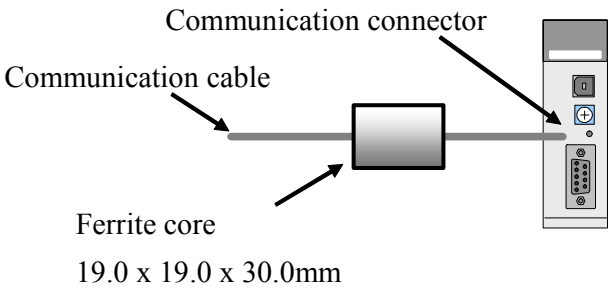


Figure 3.3.4-1 Use ferrite core

MEMO

Chapter 4 Operation

4.1 Start up

To operation this module normally, the making a setup which is shown in the following figure is necessary.

1] Set up the DIP switch. Refer to section 4.1.1.

2] Set up the Rotary switch. Refer to section 4.1.2.

3] Set up the configuration data from configurator. Refer to section 4.1.3.

4] Set up the LINK parameter from the programming tool. Refer to section 4.1.4.

4.1.1 DIP switch

EH-RMP2 can be configured to run in different modes depending on the requirements.

The configuration is accomplished by the switch placed on the left side of EH-RMP2.

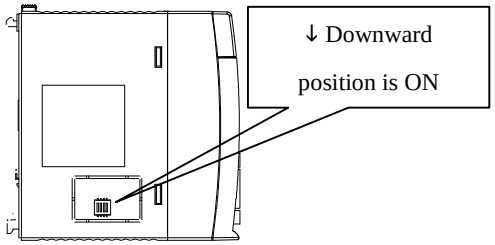


Figure 4.1.1-1 Side DIP switch

CAUTION

1] The configurations will affect the behavior of the output area when the CPU is turned from RUN to STOP. The input area are the same in all modes, the entire input area are always copied.

2] Don't operate this switch while EH-RMP2 is working.

(1) Clear mode

When the CPU is switched from RUN to STOP position, EH-RMP2 outputs the zero data to PROFIBUS. But the link area (WL) is not cleared.

Switch	Position
1	Don't care
2	Don't care
3	OFF (default)
4	OFF (default)

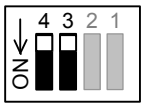


Figure 4.1.1-2 Clear mode

(2) Freeze mode

When the CPU is switched from RUN to STOP position, EH-RMP2 holds output data that is last data received.

Switch	Position
1	Don't care
2	Don't care
3	ON
4	OFF

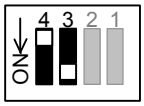


Figure 4.1.1-3 Freeze mode

(3) Copy mode

When the CPU is switched from RUN to STOP position, EH-RMP2 continues to copy in the link area.

This mode is effective when using the EH-150 EH-CPU 308 / 316 ROM version 02 or later.

Switch	Position
1	Don't care
2	Don't care
3	OFF
4	ON

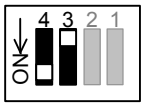


Figure 4.1.1-4 Copy mode

4.1.2 Rotary switch

The input / output sizes of PRFOBUS network is set by rotary switch.

Table 4.1.2-1 The input / output sizes of PRFOBUS network

Value	Network size	Input size	Output size
0	Variable size	512 words max	512 words max
1	64W / 64W fixed	64 words	64 words
2	128W / 128W fixed	128 words	128 words
3	256W / 256W fixed	256 words	256 words
4	512W / 512W fixed	512 words	512 words
5	Variable size	512 words max	512 words max
6			
7			
8			
9			

Please set rotary switch to 0 if you use auto addressing function with use of the SYCON.net. If you map each slave I/O address including offset address, please set rotary switch value 1, 2, 3 or 4. When actual input / output sizes exceed setting sizes, EH-RMP2 detects error. (For the offset address, please refer to "4.3 Offset address".)

4.1.3 Configuration from configurator

The configuration of EH-RMP2 is accomplished by the configurator called SYCON.net.

For general information about the configurator, please refer to the manual for this configurator.

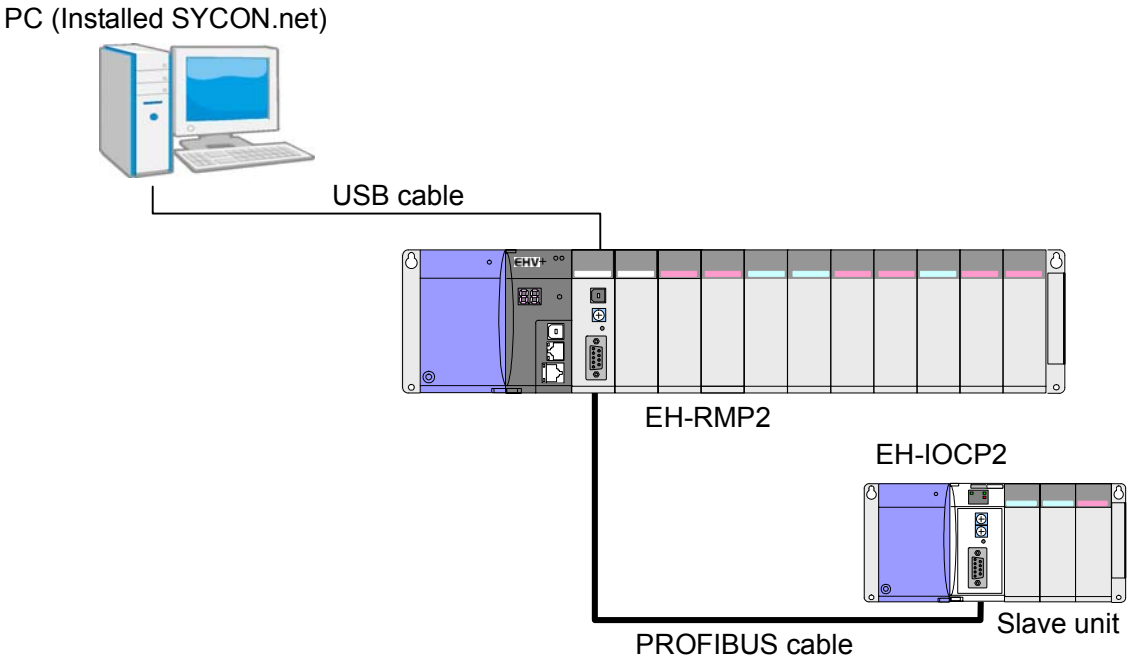


Figure 4.1.3-1 Configuration from configurator

■Online Configuration

Please set up the I/O assignment from a programming tool before configuration.

(1) Set up as shown in Figure 4.1.3-1, turn on power to the EH-RMP2 and connect the USB cable to config port.

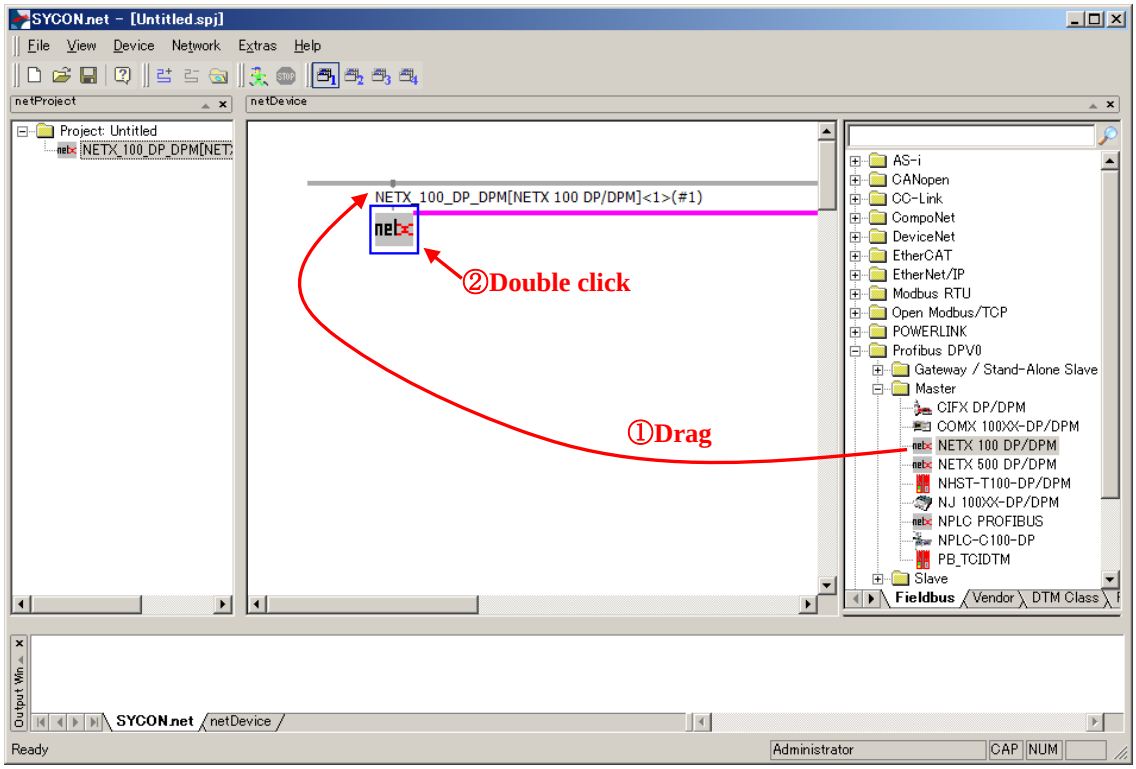
(If a power supply is turned ON, with a USB cable connected, it will be detected as a device unknown at Windows.)

(2) Drag the [Profibus DPV0] - [Master] - [NETX 100DP/DPM] to the gray colored bus.

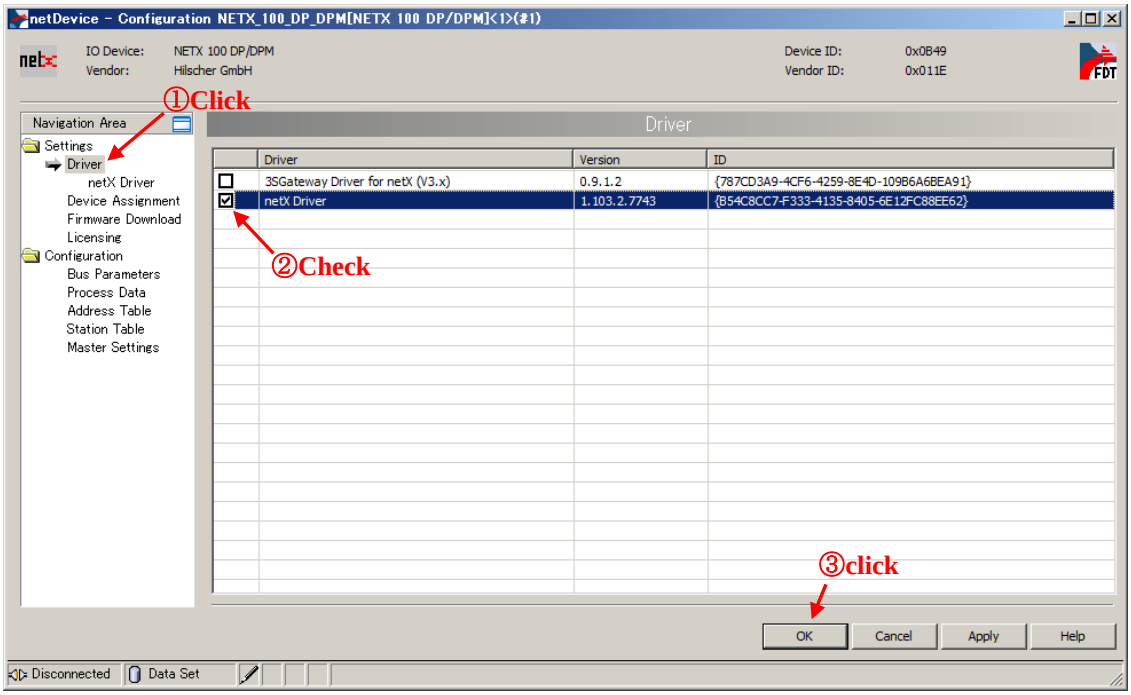
(When coming to the right position, the mouse pointer will change from to .)

Double click the “netX”.

Hereafter the following figure screen is called as main screen.



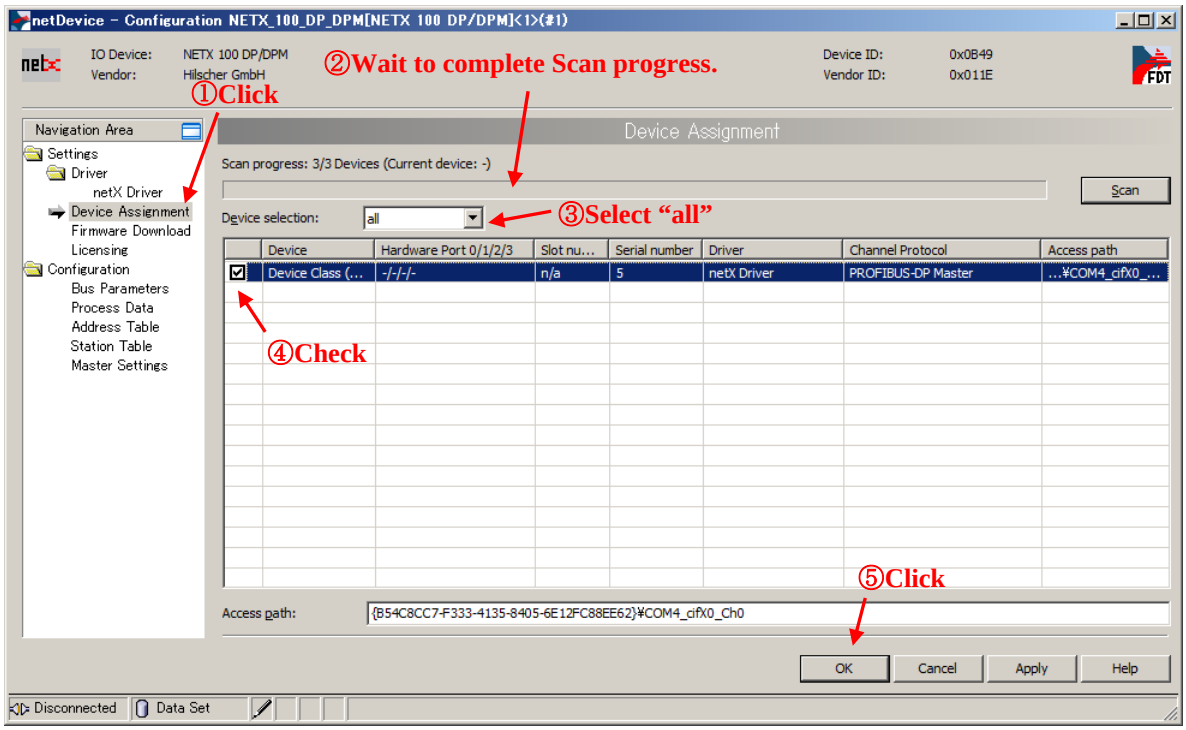
(3) Configuration dialog appears. Select the “Driver”. Check the “netX Driver” and click the “OK” button.



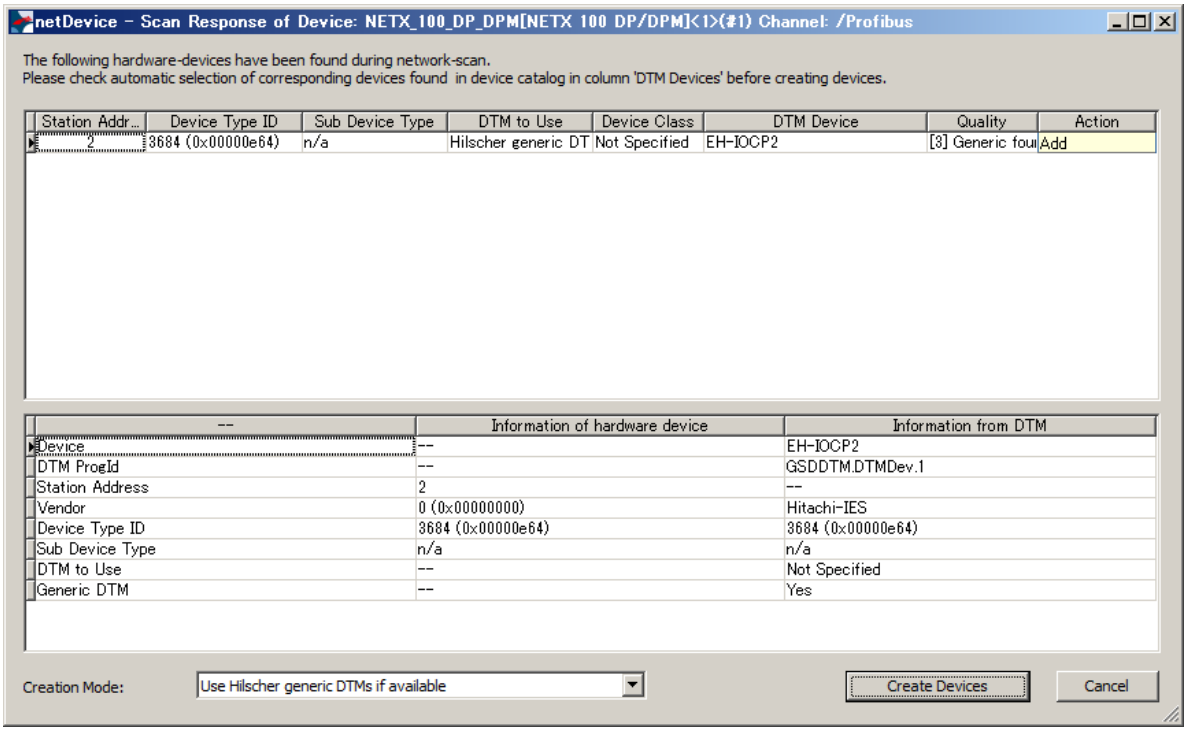
(4) Double-click the ”netX” in the main screen and select the “Device Assignment” on the same dialog as (3).

Wait to complete Scan progress.

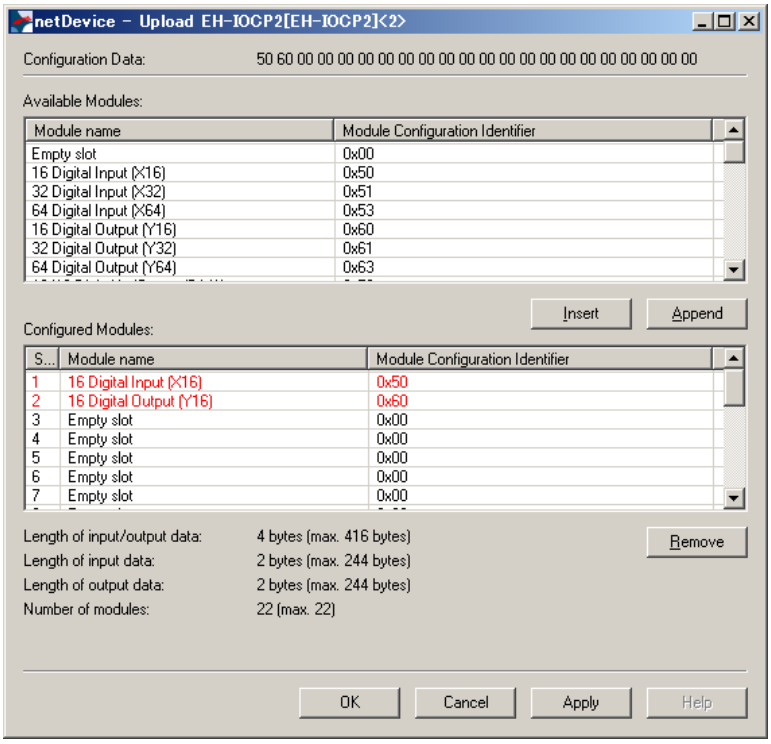
Select device selection as “all”. Then, device appears. Check the device and click the “OK” button.



(5) Right-click the ”netX” in the main screen and click the ”Network Scan”. Then connected modules are found. Click the “Create Devices” button.

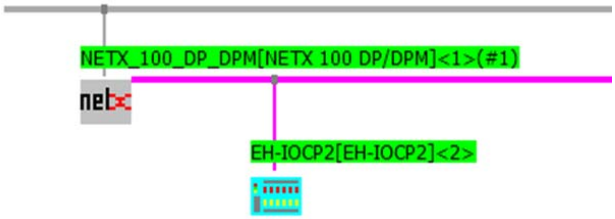


(6) The following dialog appears after the network scan, click the “OK” button.



NOTE) If network scan is executed when configration is not executed, slots over mountable position are displayed as "Empty". In addition, since “4 Analog Input (X4W)” is recognized as “64 Digital Input (X64)”, remove “64 Digital Input (X64)” and add “4 Analog Input (X4W)”.

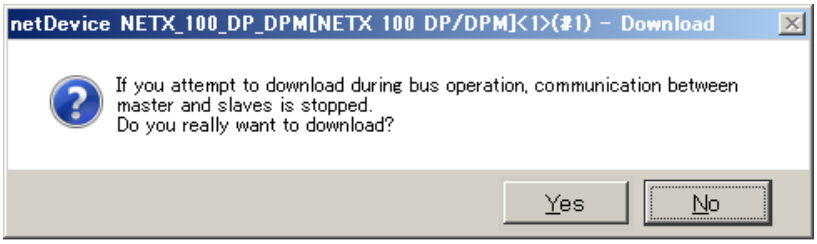
(7) The scanned result is displayed in the main screen.



(8) Right-click the “netX” in the main screen and click the “Download”.

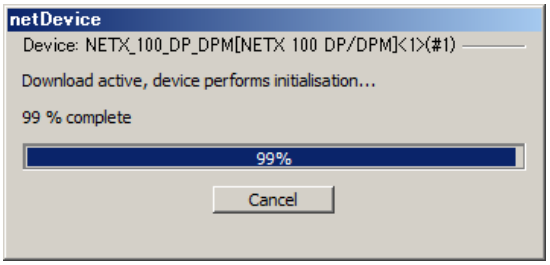
The message that the communication between master and slaves stops appears.

Make sure if it’s no problem and click the “Yes” button.

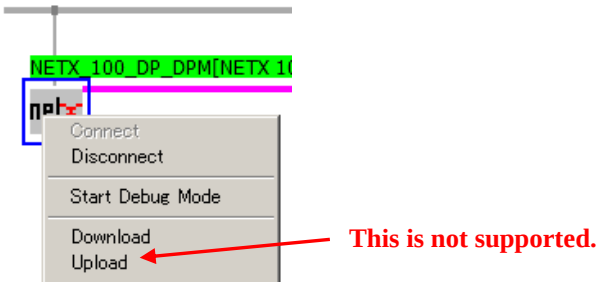


Download of configuration is started to netX.

The following screen appears. When downloading is completed, this dialog disappears.



NOTE) Upload function is not supported by EH-RMP2.



(9) After download is completed, save the project file by choosing [File] - [Save as …].

Comfiguration is completed.

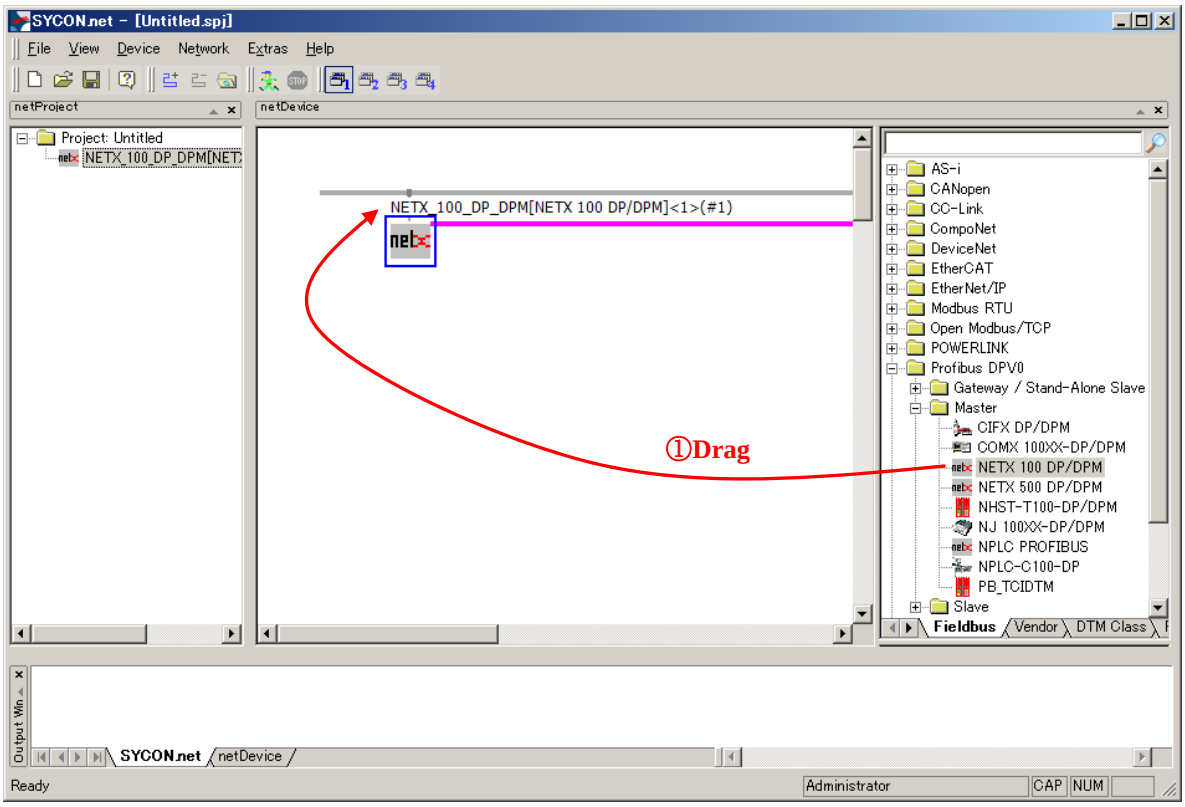
■Offline Configuration

The offline configuration sets a network scan part of the online configuration by manual operation. Please set up the I/O assignment from a programming tool before configuration.

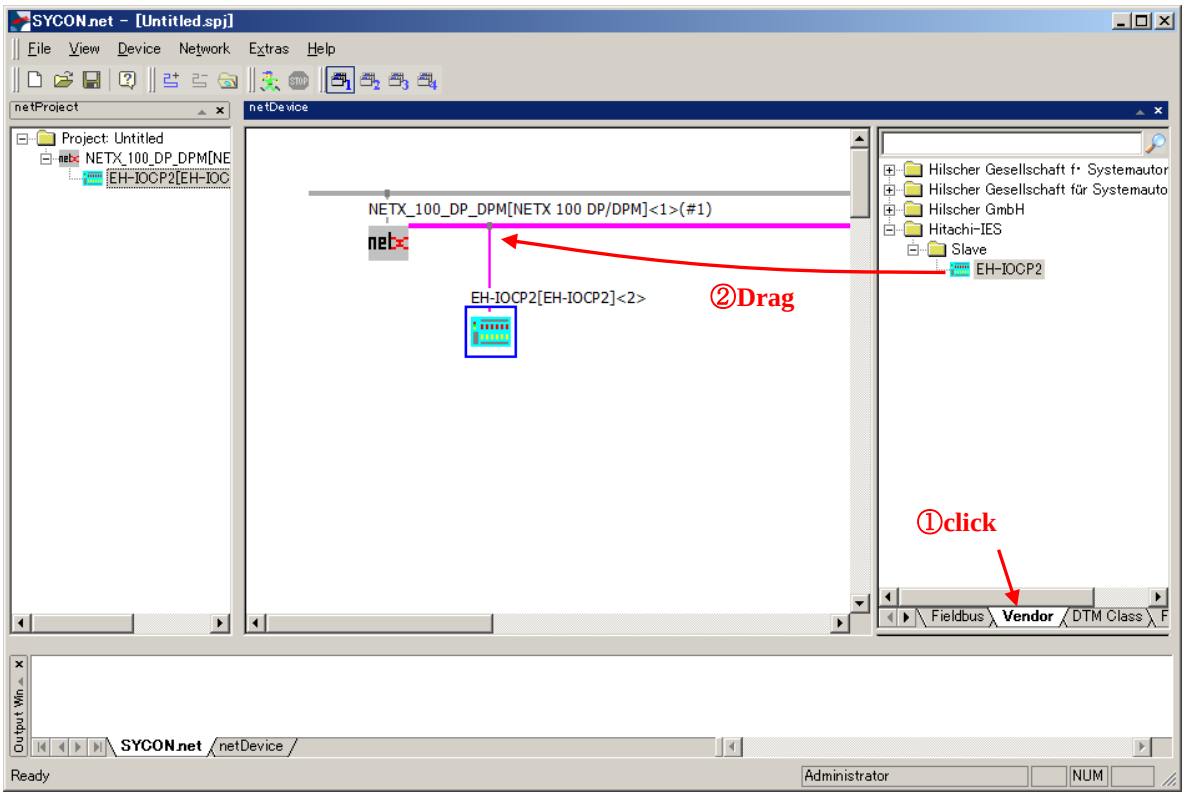
(1) Drag the [Profibus DPV0] - [Master] - [NETX 100DP/DPM] to the gray colored bus.

(If it becomes a position which can be arranged, a mouse pointer will change from to .)

Double click the “netX”. Hereafter the following figure screen is called as main screen.

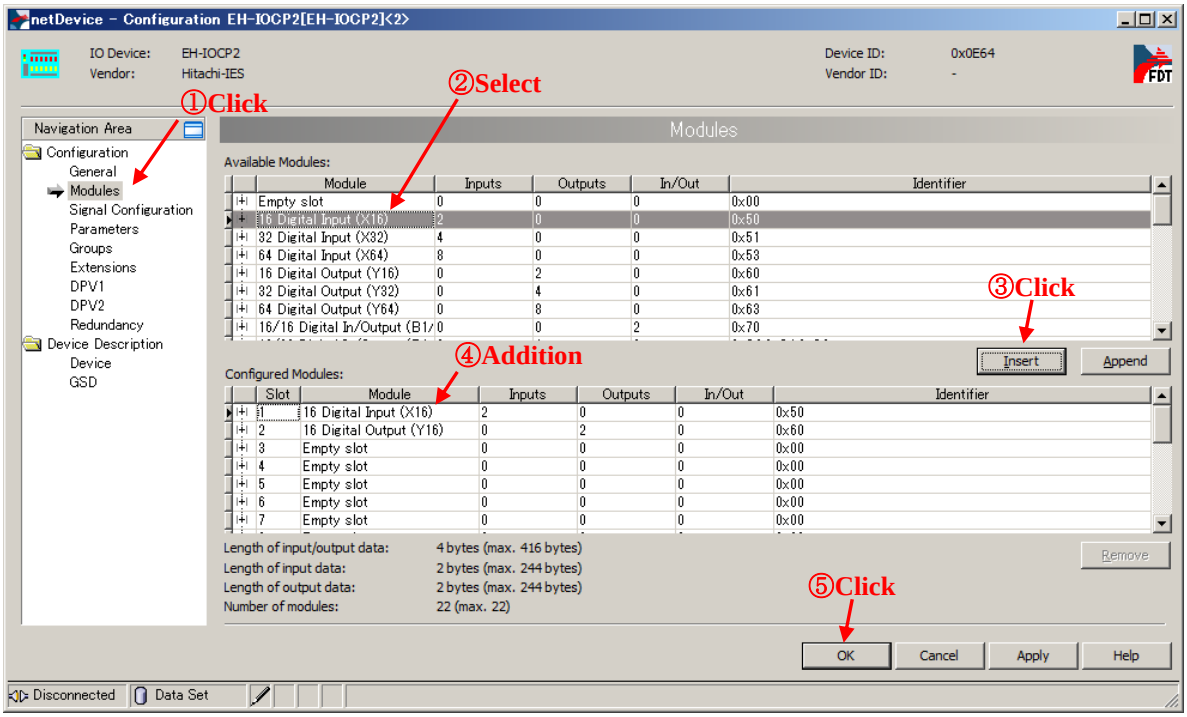


(2) Click the [Vendor] tab and drag the [Hitachi-IES] - [Slave] - [EH-IOCP2] to the pink colored bus.



(3) Double-click the “EH-IOCP2” in the main screen. Configuration dialog appears, click the “Modules”. Next, select the modules that are mounted in EH-IOCP2 base from the "Available Modules", and then click the “Insert” button, please add to the “Configured Modules”. Click the “OK” button at the end. It is possible to select the 22 modules maximum, select the "Empty slot" in empty slot part.

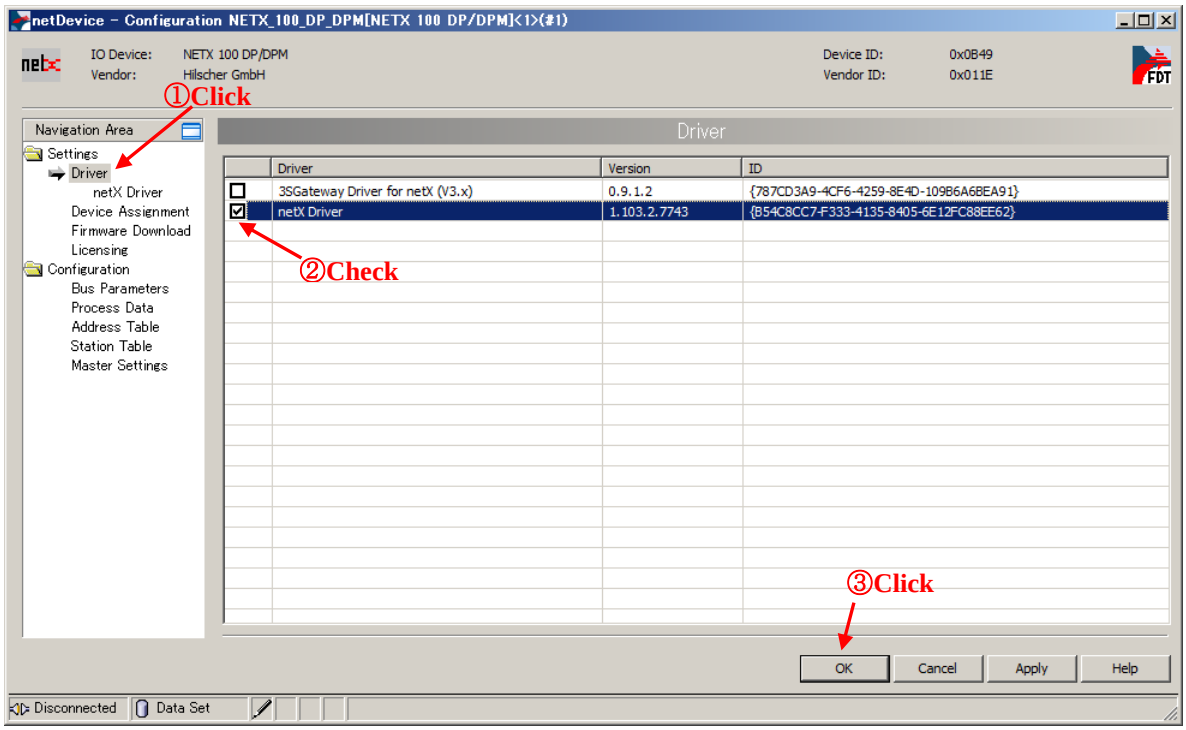
(The figure below shows an example that slot 0 is 16 points input, slot 1 is 16 points output.)



(4) Set up as shown in Figure 4.1.3-1. After turning on the power of EH-RMP2, connect the USB cable to config port. (If a power supply is turned ON, with a USB cable connected, it will be detected as a device unknown at Windows.)

(5) Double-click the ”netX” in the main screen and click the “Driver”.

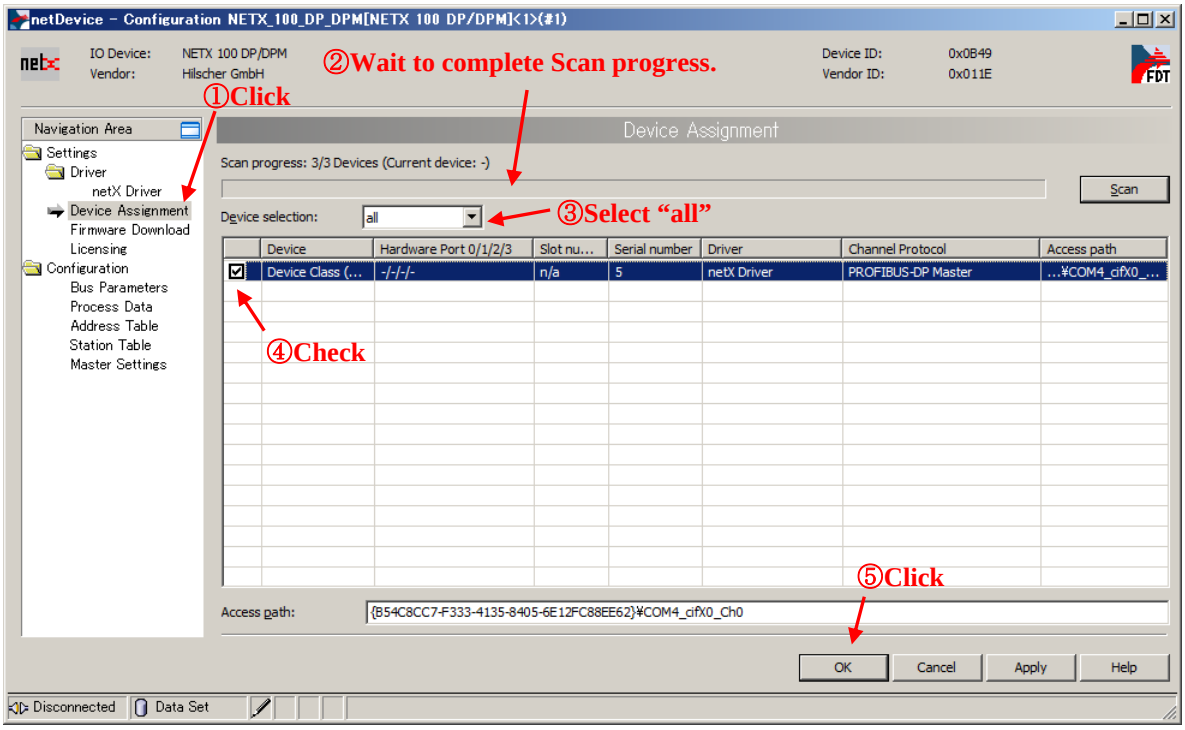
Check the “netX Driver” and click the “OK” button.



(6) Double-click the ”netX” in the main screen and select the “Device Assignment” on the same dialog as (5).

Wait to complete Scan progress.

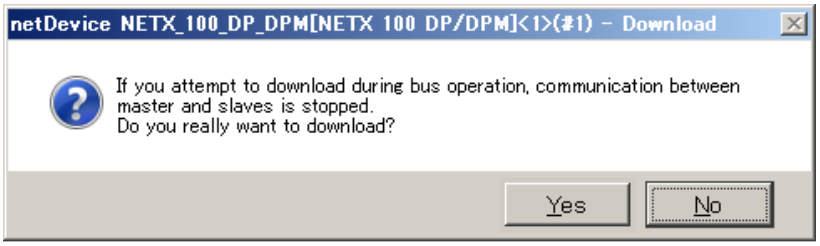
Select device selection as “all”. Then, device appears. Check the device and click the “OK” button.



(7) Right-click the “netX” in the main screen and click the “Download”.

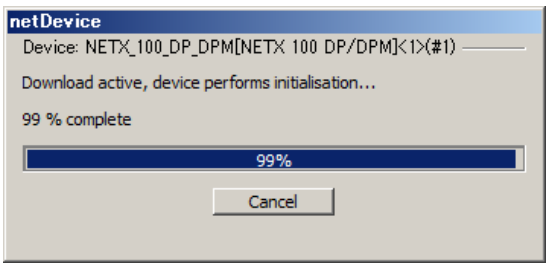
The message that the communication between master and slaves stops appears.

Make sure if it’s no problem and click the “Yes” button.

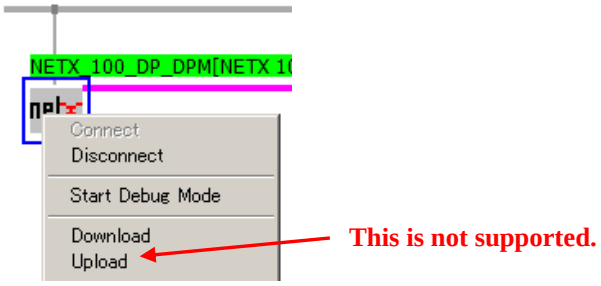


Download of configuration is started to netX.

The following screen appears. When downloading is completed, this dialog disappears.



NOTE) Upload function is not supported by EH-RMP2.



(8) After download is completed, save the project file by choosing [File] - [Save as …]. Comfiguration is completed.

CAUTION

1] When EH-RMP2 is power on while connect to PC, PC indicates “unknown USB device”.
2] EH-IOCP can’t be supported auto module configuration.

4.1.4 Configuration from programming tool

EH-RMP2 operates in the EH-150 system as a link module. The link area of EH-RMP2 is allocated from one nearer to CPU module.

The output area of EH-RMP2 must be fixed 512 words and the output area start address must be fixed 0.

The link parameter is set by programming tool which is different depending on CPU module.

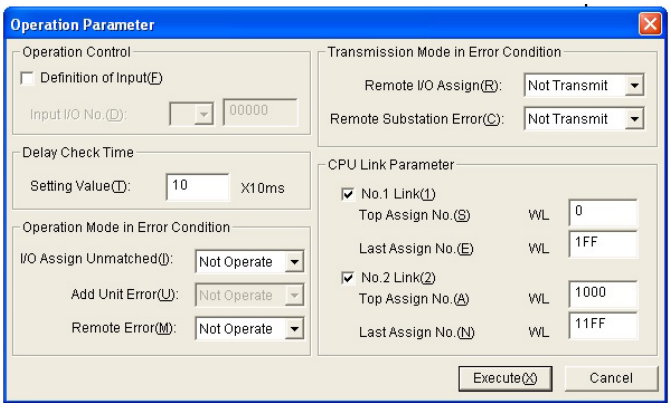


Figure 4.1.4-1 The link parameter setting by LADDER EDITOR

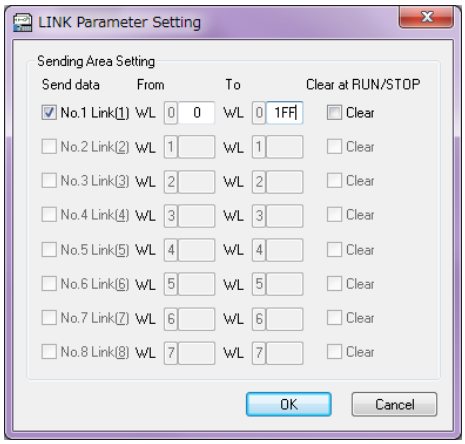


Figure 4.1.4-2 The link parameter setting by Control Editor

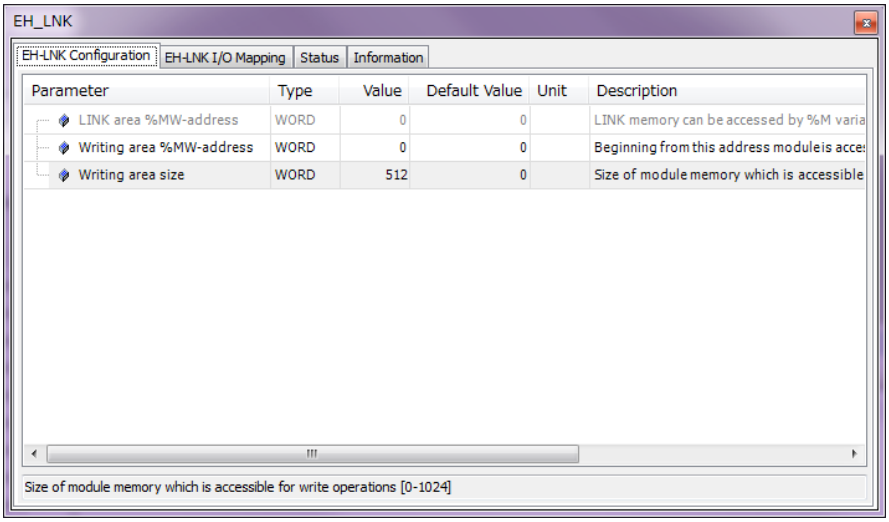


Figure 4.1.4-3 The link parameter setting by EHV-CODESYS

Input area and output area are used from 0 to 512 words.

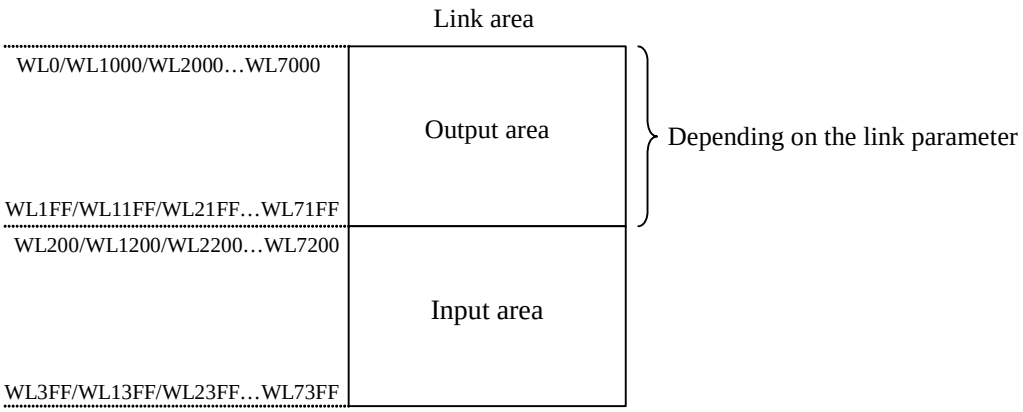


Figure 4.1.4-4 Using area of EH-RMP2 in the link area

4.2 Data format

The data format of EH-RMP2 outputs in PROFIBUS network is shown below.

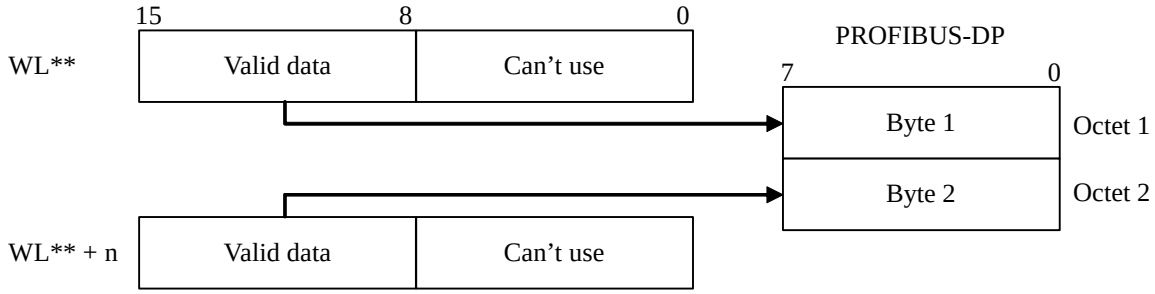


Figure 4.2-1 Byte data format for byte oriented slave module

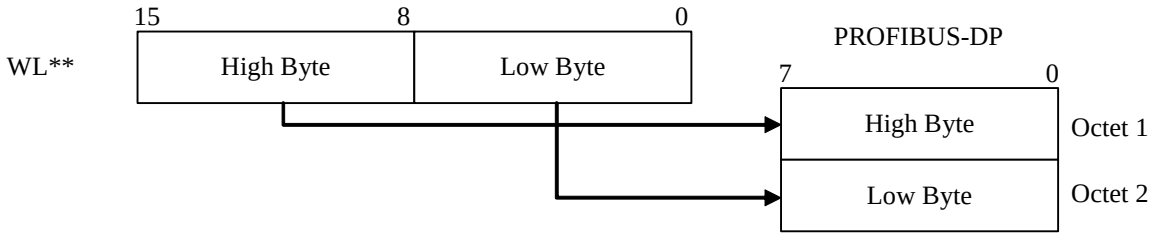


Figure 4.2-2 Word data format

If you want to swap I/O data, change parameter "Process image storage format" with use of the SYCON.net.

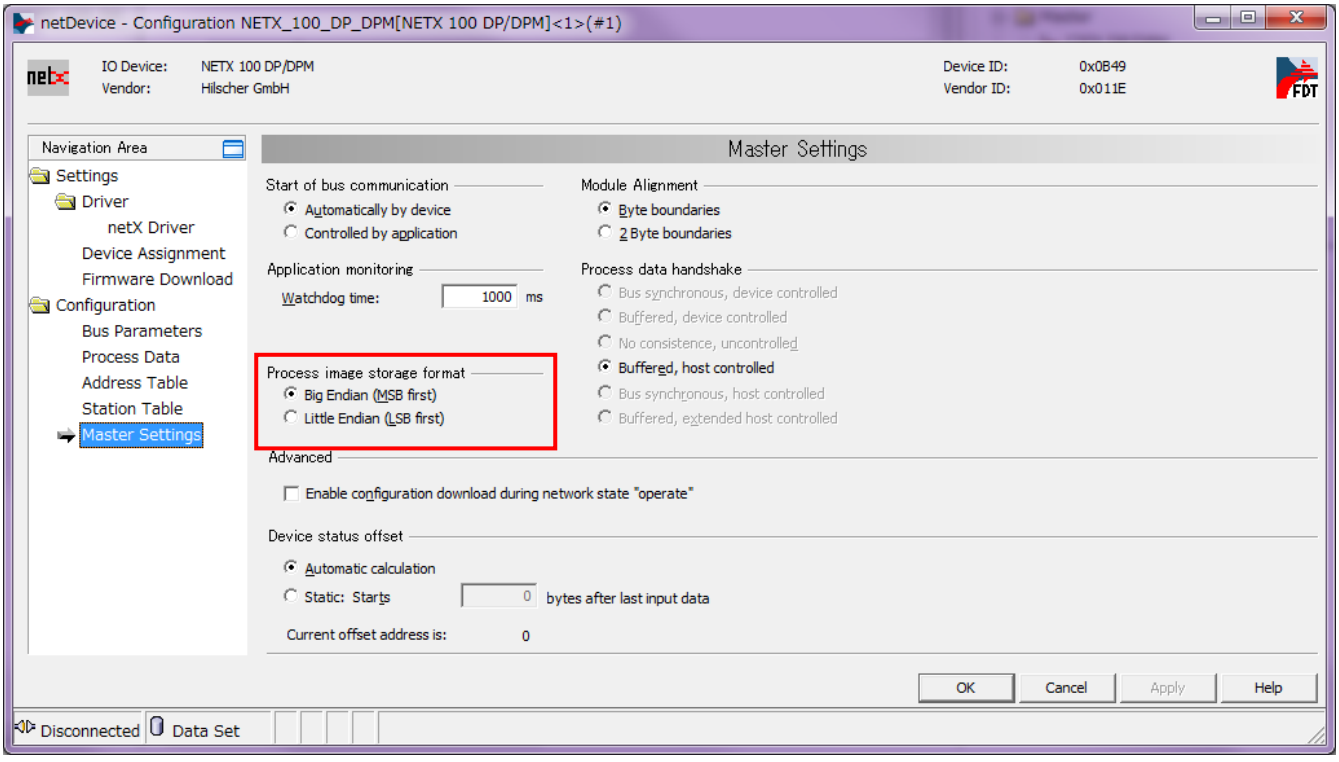
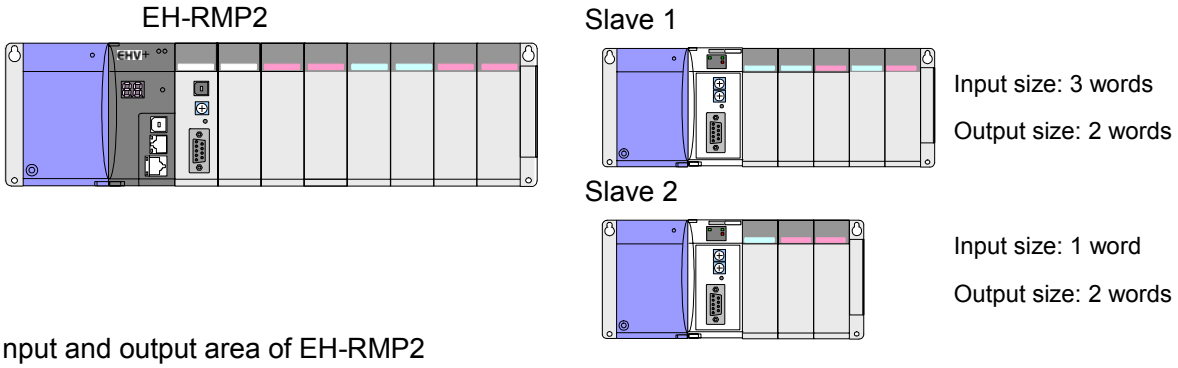


Figure 4.2-3 Byte swap

4.3 Offset address

EH-RMP2 can use offset address with use of the SYCON.net.



Input and output area of EH-RMP2

	Input area (word)
WL200 / %MW512	Slave1 data
WL201 / %MW513	Slave1 data
WL202 / %MW514	Slave1 data
WL203 / %MW515	Slave2 data
WL204 / %MW516	
WL205 / %MW517	
WL206 / %MW518	
…	
WL3FF / %MW1023	

	Output area (word)
WL0 / %MW0	Slave1 data
WL1 / %MW1	Slave1 data
WL2 / %MW2	Slave2 data
WL3 / %MW3	Slave2 data
WL4 / %MW4	
WL5 / %MW5	
WL6 / %MW6	
…	
WL1FF / %MW511	

Not including offset address

	Input area (word)
WL200 / %MW512	Slave1 data
WL201 / %MW513	Slave1 data
WL202 / %MW514	Slave1 data
WL203 / %MW515	Blank
WL204 / %MW516	Blank
WL205 / %MW517	Slave2 data
WL206 / %MW518	
…	
WL3FF / %MW1023	

	Output area (word)
WL0 / %MW0	Slave1 data
WL1 / %MW1	Slave1 data
WL2 / %MW2	Blank
WL3 / %MW3	Slave2 data
WL4 / %MW4	Slave2 data
WL5 / %MW5	
WL6 / %MW6	
…	
WL1FF / %MW511	

Including offset address

Figure 4.3-1 Offset address

If you want to include offset address, change address table with use of the SYCON.net.

- Remove the check of Auto addressing
- Change the address in slave

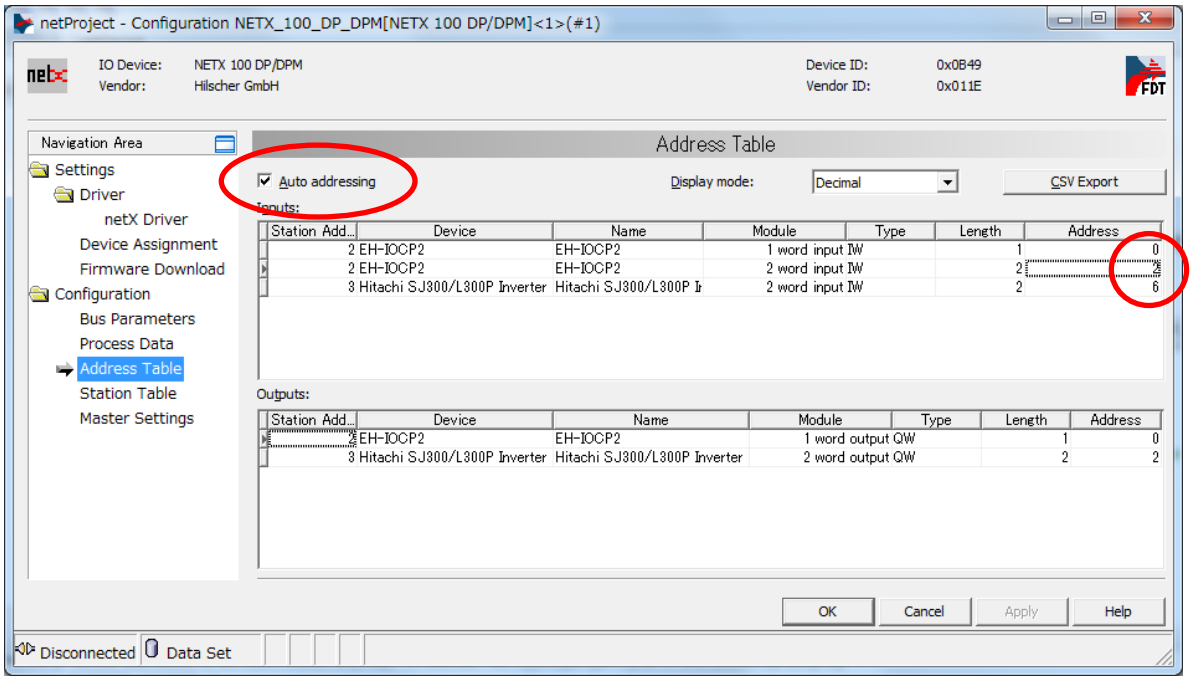


Figure 4.3-2 Address table setting

Chapter 5 Indications

The EH-RMP2 can give indications to the user in two different ways. The first way is via the four indications LED at the top of the module and the second way is via the special internal output of EH-CPU / EHV-CPU or use function block for EHV+, where detailed information about the PROFIBUS-DP network is available for the PLC programmer.

5.1 LED Indications

The LED indications are placed at the top of this module.

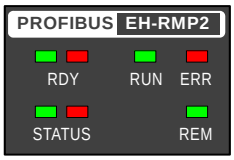


Figure 5.1-1 LED indications

5.1.1 RDY LED

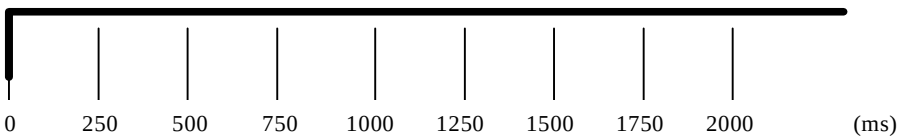
The RDY LED will give information about the hardware state of the EH-RMP2

The LED will flash red or green different times depending on the hardware status indicated.

(a) No error.

When the EH-RMP2 is initialized, the RDY LED is constantly lit in green.

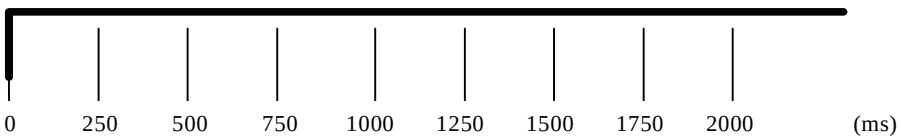
Color: Green



(b) Hardware error.

When the EH-RMP2 broke, the RDY LED is constantly lit in red. If hardware error occurred, please change EH-RMP2 to spare module.

Color: Red



(c) Power supply error.

As it is possible that EH-RMP2 is not being supplied power, please check power supply. If EH-EMP2 had been supplied power, EH-RMP2 may be hardware error. Please change EH-RMP2 to spare module.

Color: -

5.1.2 STATUS LED

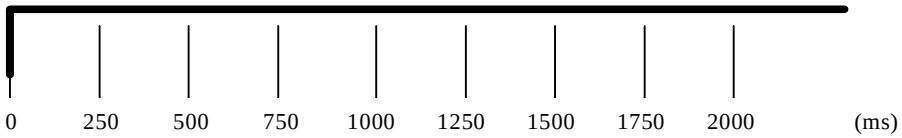
The STATUS LED will give information about the system status of EH-RMP2.

The LED will flash red or green different times depending on the status indicated.

(a) No error.

When the EH-RMP2 is normal operation, the STATUS LED is constantly lit in green.

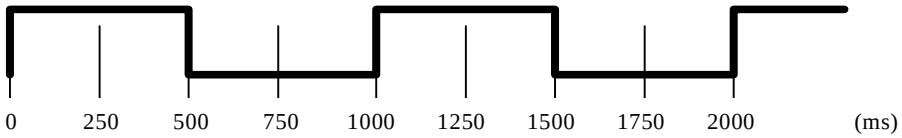
Color: Green



(b) Initialization.

When EH-RMP2 has not finished initialization, the STATUS LED is single-flash in green. Set the I/O assignment of the CPU module.

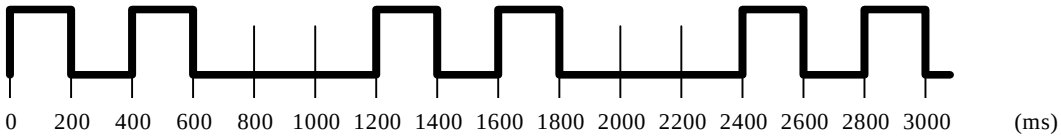
Color: Green



(c) CPU module error.

When the CPU module detects errors, the STATUS LED is double-flash in green. Clear errors of the CPU module.

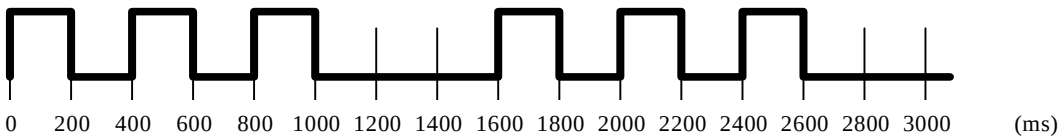
Color: Green



(d) Configuration data error.

When the configuration data of EH-RMP2 is not matched between set data and actual network data, the STATUS LED is triple-flash in green. Configure correct data with use of the SYCON.net.

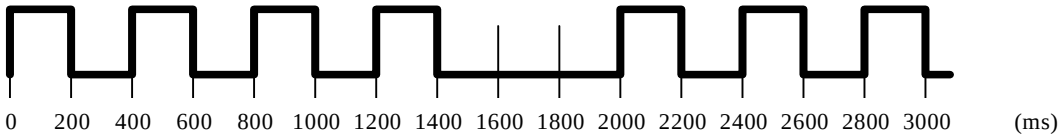
Color: Green



(e) Link parameter error.

When the CPU module link parameter is not correct, the STATUS LED is forth-flash in green. Set the address in the CPU module link output area to 0 to 512(H00 to H1FF)

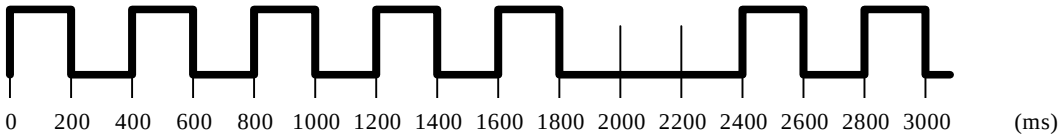
Color: Green



(f) Side DIP switch error

When the setting of side DIP switch of EH-RMP2 is wrong, the STATUS LED is fifth-flash in green. Please set EH-RMP2 side DIP switch to correct setting

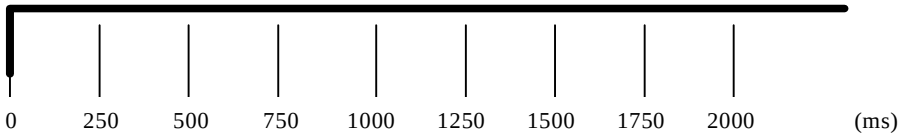
Color: Green



(g) WDT error.

When EH-RMP2 detects WDT error, the STATUS LED is lit in red. Please change EH-RMP2 to spare module.

Color: Red



(h) Internal error.

When EH-RMP2 detects internal error, the STATUS LED is flash in red. Please change EH-RMP2 to spare module.

Color: Red

(i) Power supply error.

As it is possible that EH-RMP2 is not being supplied power, please check power supply. If EH-EMP2 had been supplied power, EH-RMP2 might detect hardware error. Please change EH-RMP2 to spare module.

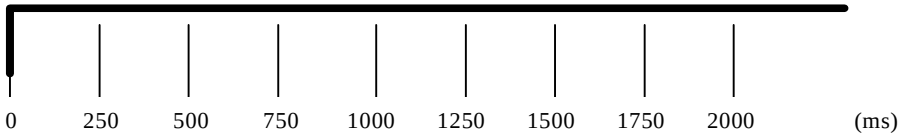
Color: -

5.1.3 RUN LED

(a) Communication established.

When all slave units are established, the RUN LED is lit in green.

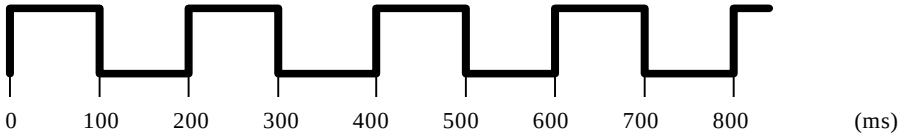
Color: Green



(b) Checking PRFOIBUS-DP network.

The RUN LED is blinking during checking PROFIBUS-DP network.

Color: Green



(c) No communication established.

When slave units at least one are not established, the RUN LED is OFF.

Color: Green

5.1.4 ERR LED

(a) No error.

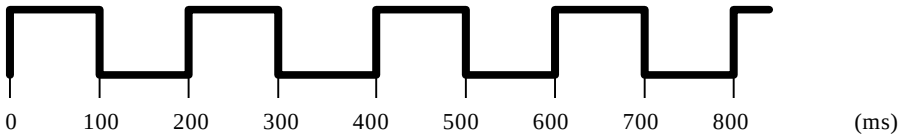
When all slave units are established, the ERR LED is OFF.

Color: Red

(b) Slave units at least one are not established.

When slave units at least one are not established, the ERR LED is blinking.

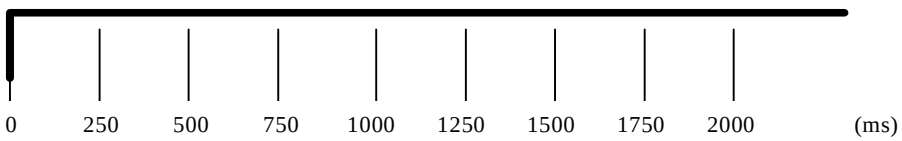
Color: Red



(c) All slave units are not established.

When all slave units are not established, the ERR LED is lit in red.

Color: Red



5.2 Link information flag area

In the Link information flag area, programming tool can get valuable information about the PROFIBUS-DP fieldbus.

The method to get information is different depending on programming tool.

5.2.1 Get link information

(1) If you use LADDER EDITOR (CPU module is EH-CPU316A/516/548).

The LADDER EDITOR can get the link information with use of special internal output.

OFFSET address (word)

Start address of LINK No.1: WRF0E0

Start address of LINK No.2: WRF140

Table 5.2.1-1 Contents in the LINK information flag area

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Reserved								Error code								+00
Reserved																+01
Reserved																+02
Reserved																+03
Main state of master system								Global error bits								+04
Reserved								Reserved								+05
Heavy bus error count																+06
Number of rejected PROFIBUS telegrams																+07
Reserved																+08
Reserved																+09
Reserved																+0A
Reserved																+0B
15															0	+0C
31															16	+0D
47															32	+0E
63						Slave Config									48	+0F
79															64	+10
95															80	+11
111															96	+12
-	126														112	+13
15															0	+14
31															16	+15
47															32	+16
63						Slave State									48	+17
79															64	+18
95															80	+19
111															96	+1A
-	126														112	+1B
Reserved																+1C
Reserved																+1D
Reserved																+1E
Reserved																+1F
Reserved																+20
Reserved																+21
Reserved																+22
Reserved																+23
Reserved																+24
Reserved																+25
Reserved																+26
Device error								Reserved								+27
Reserved																
Refreshing time max (ms)																+5D
Refreshing time min (ms)																+5E
Refreshing time now (ms)																+5F

(2) If you use Control Editor (CPU module is EHV-CPU16/32/64/128).

The Control Editor can get the link information with use of special internal output.

OFFSET address (word)

Start address of LINK No.1: WRF0E0

Start address of LINK No.2: WRF140

Start address of LINK No.3: WRF1A0

Start address of LINK No.4: WRF200

Start address of LINK No.5: WRF260

Start address of LINK No.6: WRF2C0

Start address of LINK No.7: WRF320

Start address of LINK No.8: WRF380

Table 5.2.1-2 Contents in the LINK information flag area

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Reserved								Error code								+00
Reserved																+01
Reserved																+02
Reserved																+03
Main state of master system								Global error bits								+04
Reserved								Reserved								+05
Heavy bus error count																+06
Number of rejected PROFIBUS telegrams																+07
Reserved																+08
Reserved																+09
Reserved																+0A
Reserved																+0B
15															0	+0C
31															16	+0D
47															32	+0E
63						Slave Config									48	+0F
79															64	+10
95															80	+11
111															96	+12
-	126														112	+13
15															0	+14
31															16	+15
47															32	+16
63						Slave State									48	+17
79															64	+18
95															80	+19
111															96	+1A
-	126														112	+1B
Reserved																+1C
Reserved																+1D
Reserved																+1E
Reserved																+1F
Reserved																+20
Reserved																+21
Reserved																+22
Reserved																+23
Reserved																+24
Reserved																+25
Reserved																+26
Reserved																+27
Reserved																
Refreshing time max (ms)																+5D
Refreshing time min (ms)																+5E
Refreshing time now (ms)																+5F

(3) If you use EHV-CODESYS (CPU module is EHV-CPU1025/1102).

The EHV-CODESYS can get the link information with use of function block “GetProfibusInfo”.

STRUCT ProfibusInfo: wErrorCode (WORD)
byMainState (BYTE)
byGlobalErrorBits(BYTE)
byErrorNumber (BYTE) <No use>
byErrorRemoteAddress (BYTE) <No use>
wHeavyBusErrorCount (WORD)
wNumRejectedProfibusTelegrams (WORD)
wSlaveConfig0_15 (WORD)
wSlaveConfig16_31 (WORD)
wSlaveConfig32_47 (WORD)
wSlaveConfig48_63 (WORD)
wSlaveConfig64_79 (WORD)
wSlaveConfig80_95 (WORD)
wSlaveConfig96_111 (WORD)
wSlaveConfig112_127 (WORD)
wSlaveState0_15 (WORD)
wSlaveState16_31 (WORD)
wSlaveState32_47 (WORD)
wSlaveState48_63 (WORD)
wSlaveState64_79 (WORD)
wSlaveState80_95 (WORD)
wSlaveState96_111 (WORD)
wSlaveState112_127 (WORD)
wDeviceError (WORD) <No use>
wRefreshingTimeMax (WORD)
wRefreshingTimeMin (WORD)
wRefreshingTimeNow (WORD)

5.2.2 Detail of each information

(a) Error Code.

The following error codes can be present in this register.

Table 5.2.2-1 Error Code

Value	Description
Hex 00	No error
Hex 01	Failed to initialize PROFIBUS-DP master.
Hex 02	Start address of link area in the PLC is not zero.
Hex 03	The link length configured in the PLC is different from 512 words.
Hex 06	Internal Error on PROFIBUS-DP master.

(b) Main state of master system.

This register contains information about the state of the master system. The following states can be present.

Table 5.2.2-2 Main state of master system

Value	Description
Hex 00	Off-line
Hex 40	Stopped
Hex 80	Clear
Hex C0	Operate

(c) Global error bits.

Details of global error bits are shown below.

Table 5.2.2-3 Global error bits

Bit number	Description
7-6	Reserved
5	1 = HOST is not ready 0 = Normal operation
4	1 =Bus short circuits detected 0 = Normal operation
3	1 = Because of heavy bus error, no further bus communication is possible 0 = Normal operation
2	1 = At least one slave is not in the data exchange mode or reports fatal error 0 = Normal operation
1	1 = The master branched into auto clear mode because of a slave error 0 = Normal operation
0	1 = A parameter error occurred 0 = Normal operation

(d) Heavy bus error count.

This register is incremented if there for example is a short circuit on the bus cable.

(e) Number of rejected PROFIBUS telegrams.

(f) Slave Config.

This 16 bytes bit-field indicates if a node is configured in the master or not. Address bit 0 corresponds to node address zero, bit 1 corresponds to node address 1 and so on. If the bit is 1, the corresponding node is configured otherwise the node is not configured.

(g) Slave State.

This 16 bytes bit-field indicates if a node is active in the data exchange or not. Address bit 0 corresponds to node address zero, bit 1 corresponds to node address 1 and so on. If the bit is 1, the corresponding node is active in the data exchange otherwise the node is not active.

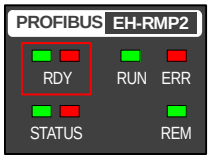
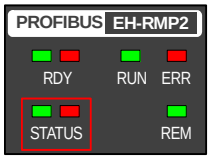
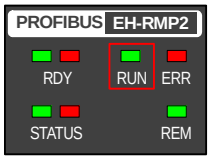
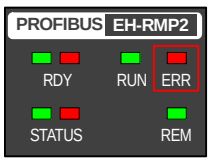
MEMO

Chapter 6 Troubleshooting

6.1 Error indications of EH-RMP2

Error indications of EH-RMP2 are shown below.

Table 6.1-1 Error Indications of EH-RMP2

LED	Indicate pattern	Description	Actions
RDY 	OFF	Hardware error Power supply error	・Check power of power supply module ・Replace EH-RMP2
	Lit in red	Hard ware error	・Replace EH-RMP2
STATUS 	OFF	Power supply error	Check power of power supply module
	Flash in red	Internal error	Replace EH-RMP2
	Lit in red	WDT error	Replace EH-RMP2
	Fifth-flash in green	Side DIP switch setting error	Check the side DIP switch.
	Forth-flash in green	Link parameter error	Set CPU module link output area address to 0 to 512
	Triple-flash in green	Configuration data error	・Check the connection of the communication cable ・Configure correct data with use of the SYCON.net
	Double-flash in green	CPU module error	Clear error of the CPU module
	Single-flash in green	Initialization	Set the I/O assignment of the CPU module.
RUN 	OFF	No communication established	・Check the connection of the communication cable ・Check system and node address and push reset switch of EH-RMP2
ERR 	Blinking	Slave units at least one are not established	・Check the connection of the communication cable ・Check system and node address and push reset switch of EH-RMP2
	Lit	All slave units are not established	・Check the connection of the communication cable ・Check system and node address and push reset switch of EH-RMP2

6.2 New entry of slave unit to PROFIBUS

New entry of slave unit to PROFIBUS, slave units may fall to enter PROFIBUS communication, when new entry or restarting from communication error.

In this case, reboot the slaves that do not online.

6.3 Startup time of EH-RMP2

It takes approximately 10 seconds until EH-RMP2 starts I/O communication with the slave devices after the initialization since EH-RMP2 can deal with large size input / output data.

Therefore, please not use input / output data of EH-RMP2 until the bits of all using slave state are 1 in the LINK information flag area.