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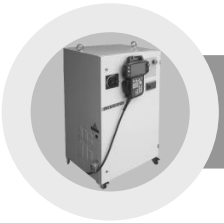
Warning

THE INSTALLATION SHALL BE MADE BY QUALIFIED INSTALLATION PERSONNEL AND SHOULD CONFORM TO ALL NATIONAL AND LOCAL CODES.



Hi5a Controller Function Manual

RAPIEnet Slave

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1 Overview

1.1. Prior Knowledge

To understand this manual well, you are required to have the following knowledge.

- How to use the Hi5a robot controller
- Basic knowledge about RAPIEnet

1.2. BD525 Board Exterior

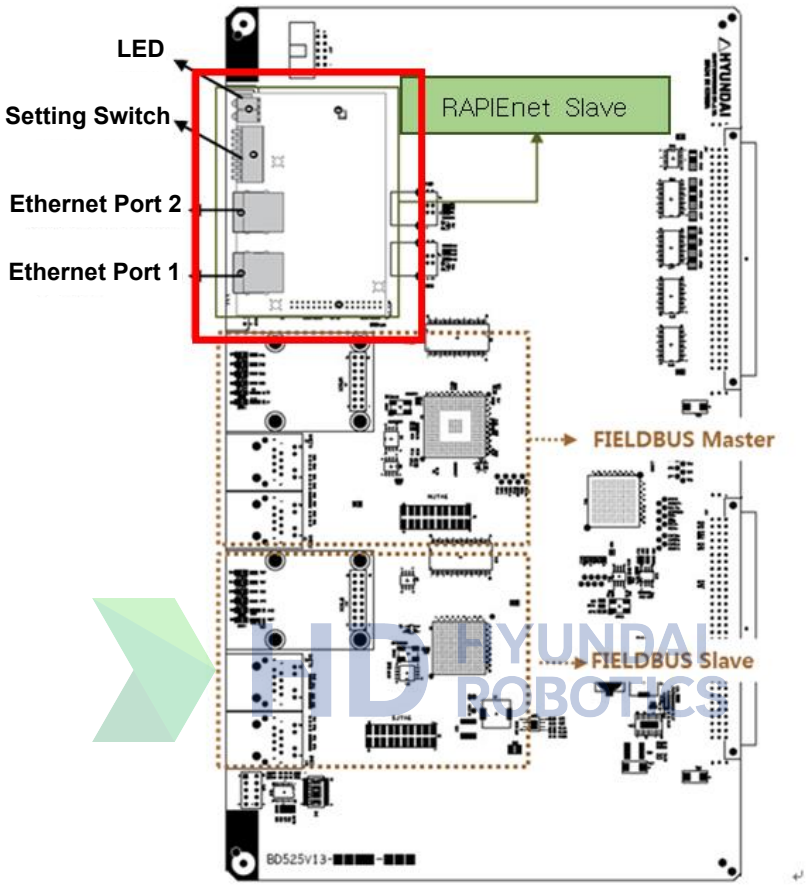


Figure 1.1 RAPIEnet Communication Board

BD525 multi-protocol communication board can support up to three channels of industrial communication at the same time, including RAPIEnet slave as well as Fieldbus or Real-Time Ethernet master and slave. When it comes to the Fieldbus or Real-Time Ethernet other than RAPIEnet, you need to refer to the function manual about the relevant protocol.

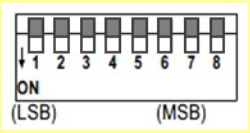
The RAPIEnet slave communication board is mounted on the BD525 board in the form of a piggyback and has a setting switch (using the default settings), four LEDs, and two Ethernet ports.

※ For more information) The RAPIEnet slave can only be supported when the BD525 hardware version is V1.3 or higher.

(1) Setting Switch

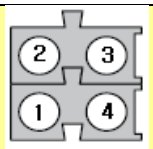
You can set the station number using the setting switch. However, the basic specification for operation is that the station number needs to be set through a TP. Accordingly, it is needed to set all pins, #1–8, to 0. (Please be informed that you can perform the setting using the same station number that you may use through the setting switch.)

Table 1-1 Setting Switch

			Description	Remarks
PIN No.	Usage	Value		
1–8	Station No.	0	Setting of the station number through the shared memory	When a change is made, it will be reflected after the power is reset.
		1–119	Station number	
		120 onward	Parameter error	

(2) LED

Table 1-2 LED Status

			Description
No.	Display	Status	
1	Run	Off	- Power off
		Green	- Normal operation
2	SEMA	Off	- Shared memory Semaphore released
		Green	- Shared memory Semaphore acquired
3	PRM/Flash ERR	Off	- Parameter setting is normal. No abnormality with the flash memory.
		Red	- Parameter setting is abnormal, or there is an error with the flash memory
4	ERR	Off	- Normal operation
		Red	- Own station is abnormal. There is an IP duplicate station.
		Red blinking	- Link error

1.3. BD525 RAPIEnet Slave Specification

Table 1-3 RAPIEnet Slave Specification

Device Type	Intelligent device station
Communication Speed	100 Mbps (fixed)
Topology	Line type and ring type
Connection Cable	- Cat.5e or higher (Ethernet cables that can satisfy 1000BASE-T standards) - Dual-shielded type is recommended.
Node Number	1–119
Connector Specification	Shielded RJ-45
Maximum Input and Output Size	Input: 768 Byte, Output: 768 Byte
Maximum Number of Stations That Can be Connected	64 stations including the RAPIEnet master device - If there is one master on the network, the maximum number of stations that can be connected will be 63.

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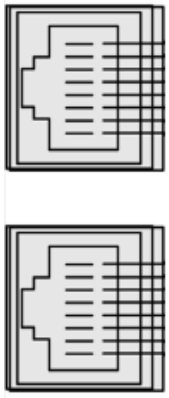
Communication Cable Connection

2.1. Communication Connectors

The BD525 RAPIEnet slave provides two Rj45 sockets. It is required to use the shielded RJ45 connector conforming to ANSI/TIA/EIA-568-B (Category 5e) to connect the communication cables.

Table 2-1 RJ45 Connector Pin Map

	Pin No.	Signal	Meaning
	1	TD+	For data transmission+
	2	TD-	For data transmission-
	3	RD+	For data reception
	4	Termination	
	5	Termination	
	6	RD-	For data reception
	7	Termination	
	8	Termination	

2.2. Communication Cables

It is required to use a Category 5e or higher ANSI/TIA/EIA standard Ethernet cable that has passed CLPA tests and is recommended by CLPA.

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RAPIEnet Setting and Diagnosis

3.1. RAPIEnet Slave Setting

To use the RAPIEnet slave, the node number and network number should be set. It is required to perform the setting according to the following procedure.

(1) Select "[F2]: System" → "2: Control Parameter" → "2: Setting of Input and Output Signals" → "17: Setting and Diagnosis of RAPIEnet Slave."

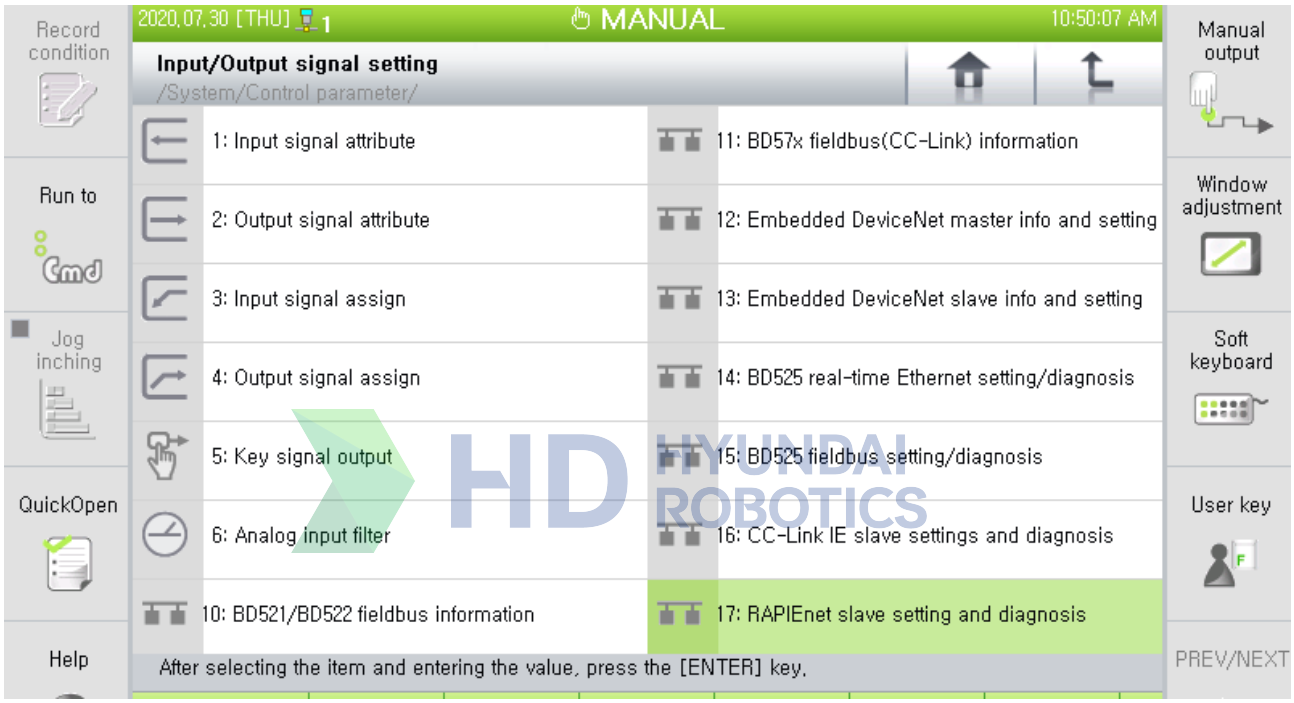

Figure 3.1 Menu for RAPIEnet Slave Setting and Diagnosis

(2) In the RAPIEnet slave setting and diagnosis screen, set items such as input in case of a communication error, station number, and input/output data sizes, and then click the Apply button.

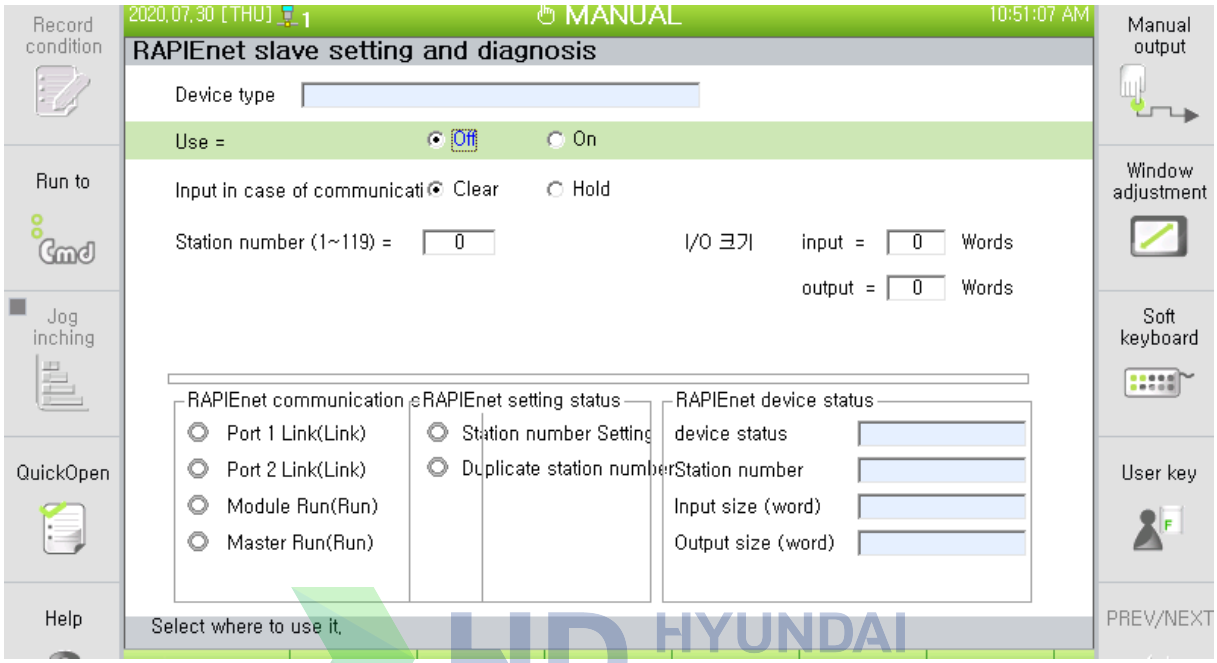

Figure 3.2 RAPIEnet Field Slave Setting Screen

- Use:
  Should be set to On to use the RAPIEnet slave communication.

- Input in the case of communication error:
  This is an option to process input data (FB5.X) when a RAPIEnet slave communication error occurs. When it is set to Clear, all input data will be cleared to become 0 when a communication error occurs. If it is set to Hold, the last valid value will be maintained when a communication error occurs.

- Station No.:
  The is the RAPIEnet slave station number, and its valid range is 1–119.

  This setting will be valid only when pins #1 through #8 of the dip switch on the RAPIEnet communication board are all turned off. (Caution) If the setting values of the pins #1–8 of the dip switch on the communication board is set to a value in the range of 1–119, the value will become the node number. When you use the dip switch, the dip switch value will be applied, while the setting value will not be applied).

■ Input and Output Data Sizes:
Sets the data sizes of the RAPIEnet data communications. The unit is Word.

Table 3-1 I/O Data

RAPIEnet Data	Data Location	Input Range (Unit: WORD)
INPUT	FB5.X	1–60
OUTPUT	FB5.Y	1–60

After changing the settings, you should click the "[F6]: Apply" button to reflect/save it in the controller. Moreover, if the setting is changed in the On or Off status, the change will be reflected after the device is reset or the controller is rebooted.

3.2. RAPIEnet Slave Diagnosis

In the RAPIEnet slave setting and diagnosis screen, you can diagnose the communication, setting status, and device status.

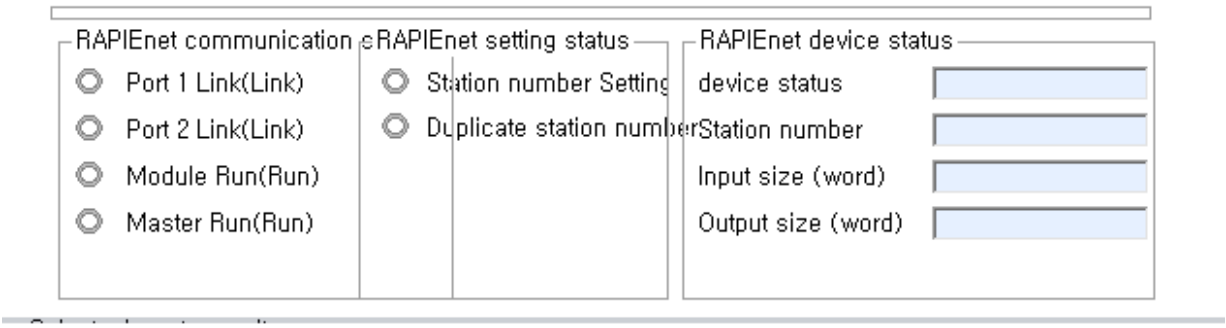

Figure 3.3 RAPIEnet Slave Diagnosis Screen

(1) RAPIEnet Communication Status

Table 3-2 RAPIEnet Communication Status

Item	Status	Description
Port 1 Link	Off	Ethernet not linked
	Green	Ethernet linked
Port 2 Link	Off	Ethernet not linked
	Green	Ethernet linked
Module Run	Off	RAPIEnet daughter board in abnormal operation
	Green	RAPIEnet daughterboard in normal operation
Master Run	Off	RAPIEnet master stop
	Green	RAPIEnet master run

(2) RAPIEnet Setting Status

Table 3-3 RAPIEnet Setting Status

Item	Status	Description
Setting of the Station No.	Off	Node number not valid - Master and station numbers not matching
	Green	Station number normal
Duplication of Station No.	Off	Station number not duplicated
	Red	Station number duplicated

(3) RAPIEnet Device Status

Table 3-4 RAPIEnet Device Status

Item	Display	Description
Device Status	Not Mounted	RAPIEnet communication board not mounted
	Off	RAPIEnet slave use in Off status
	Reset	RAPIEnet communication board resetting in progress
	Initialize	RAPIEnet communication initialization in progress
	Error	RAPIEnet communication error
	Malfunction	RAPIEnet communication board malfunctioning
	Initialization Failure	RAPIEnet communication initialization failure
	Normal	RAPIEnet communication normal
Station No.	1–119	Display of the RAPIEnet daughterboard station number setting value
Input Size	Word Count	Size of the data being exchanged with the RAPIEnet master
Output Size	Word Count	

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