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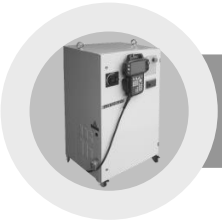
WARNING

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

Hyundai Robot

Hi5DS130301FMEN1



Hi5 Controller Function Manual

Embedded DeviceNet Slave

HYUNDAI
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1 Overview

1.1. Prior knowledge

Understanding the manual well requires the following knowledge.

- Method for using the Hi5 robot controller
- Method for installing and utilizing the DeviceNet network

1.2. About fieldbus

Fieldbus is an open industrial standard for operating diverse devices such as sensors, buttons, motor drivers and manipulating interface in factories, by connecting them to PLC (Programmable Logic Controller) through a single cable line.

Fieldbus makes it possible to provide intelligent services such as centralized monitoring of the overall status of a network or centralized reconfiguration of the network. For example, when it comes to switches, fieldbus is advantageous because more detailed information (operation mode setting, sensor failure), not just about on/off status, can be sent and received.

As a single cable line is used for a field bus, the time and costs for wiring can be reduced. As the configuration of wiring is simple, fieldbus is advantageous in terms of maintenance. In addition, differently from protocols with non-deterministic response such as Ethernet, fieldbus guarantees a certain level of data response speed, making it possible to meet the requirements of some industries where critical time characteristic is important.

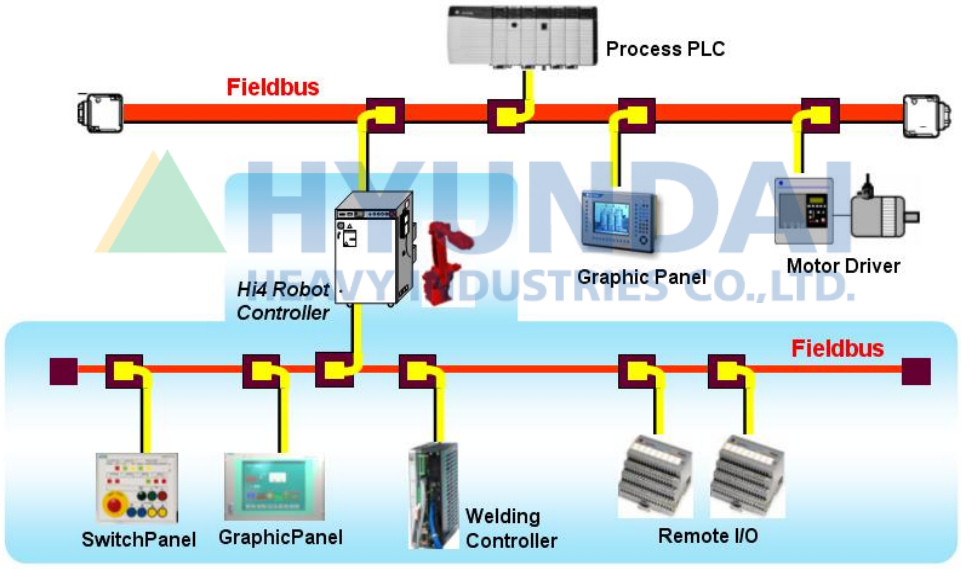

Figure 1.1 Fieldbus network, master and slave units

One master and multiple slaves are connected trough one fieldbus network. The master searches and manages the overall network and exchange data with slaves. Generally speaking, a PLC is a master and other units, such as sensors, buttons, and controllers are slaves.

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2 DeviceNet Basic Spec.

2.1. DeviceNet basic specification

The following shows basic specification of DeviceNet.

Table 2-1 DeviceNet basic specification

Transfer rate	The cable can have :			
	Trunk length	Max drop length	Maximum node account	Cumulative drop length
125k bit/s	500 m (1,640 ft)	6m (20 ft)	64	156 m (512 ft)
250k bit/s	250 m (820 ft)			78 m (256 ft)
500k bit/s	100 m (328 ft)			39 m (128 ft)
Terminating resistor	121Ω, 1% metal film, 1/4 Watt			
Potential difference between V+ and V-	24 Volt			

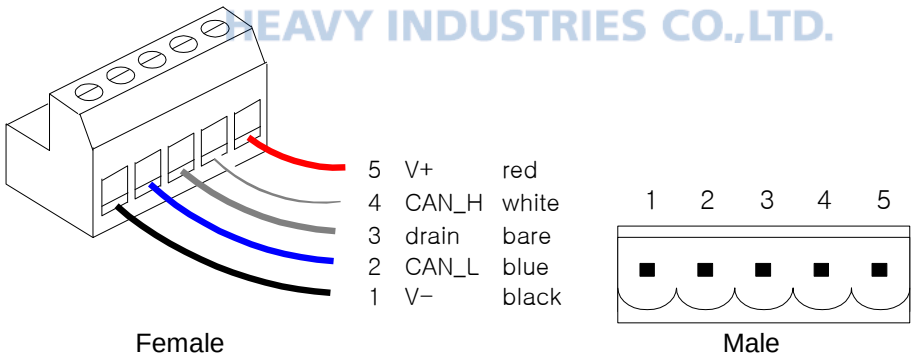


Figure 2.1 DeviceNet open type connector pin-out

2.2. Slave function of the embedded DeviceNet

The following Table 2-2 shows the specification of the Hi5 embedded DeviceNet salve function.

Table 2-2 Embedded DeviceNet slave basic specification

IO Connection	POLL, COS(Change Of State)
Node address (MAC ID)	0~63
Input	User setting (1~120bytes)
Output	User setting (1~120bytes)
Embedded PLC fieldbus Input and output	FB5 object

2.3. License of the embedded DeviceNet

A license is needed to use the Hi5 embedded DeviceNet. The license can be provided in the following methods.

- Through a BD574 CAN extension board mounted on the BD510 main board
  If the BD574 board is installed on the BD510 main board, DeviceNet can be used without the need for entering a license key separately (Refer to Figure 3.1).

- By entering a license key
  If a BD574 board is not installed on the BD510 main board, it is required to register a license key separately. Regarding the license key, you can contact our sales department for inquiry.

(1) Select 『[F2]: System』 → 『2: Control parameter』 → 『10: Register license key of option function』.

Figure 2.2 Menu for register license key of option function

(2) Set the Embedded Fieldbus (DeviceNet) item to be “Enable”, and enter the license key and then select the 『[F7]: Complete』 key.

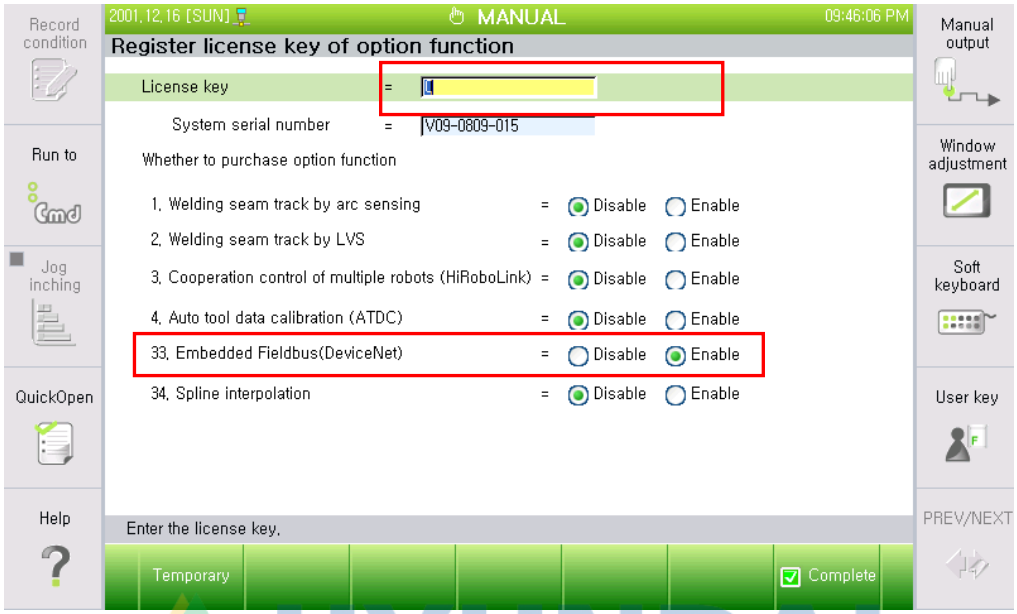


Figure 2.3 License key registration

(3) A temporary license key can be used for one month until an official license key is issued. After setting the Embedded Fieldbus(DeviceNet) to be valid, users need to select 『[F1]: Temporary』. Then the temporary license key will be entered.

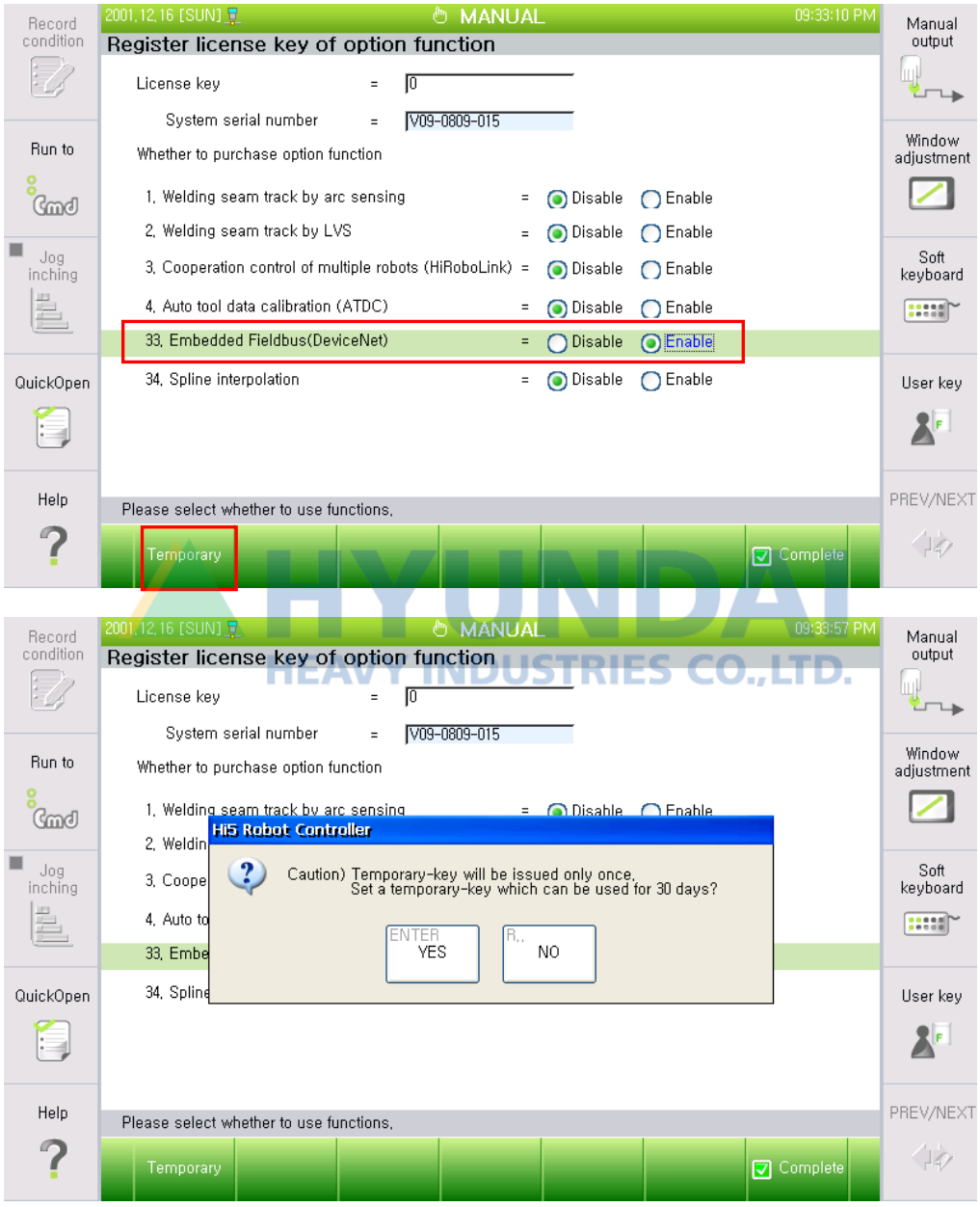


Figure 2.4 Temporary key creation

3 DeviceNet Connection

3.1. CAN port of the embedded DeviceNet slave

The embedded DeviceNet slave can be connected to the DeviceNet master through the CAN port mounted on the main board or the CAN port mounted on the BD574 extension CAN board depending on how the user sets.

Refer to [4.1 Information and setting for the embedded DeviceNet slave].

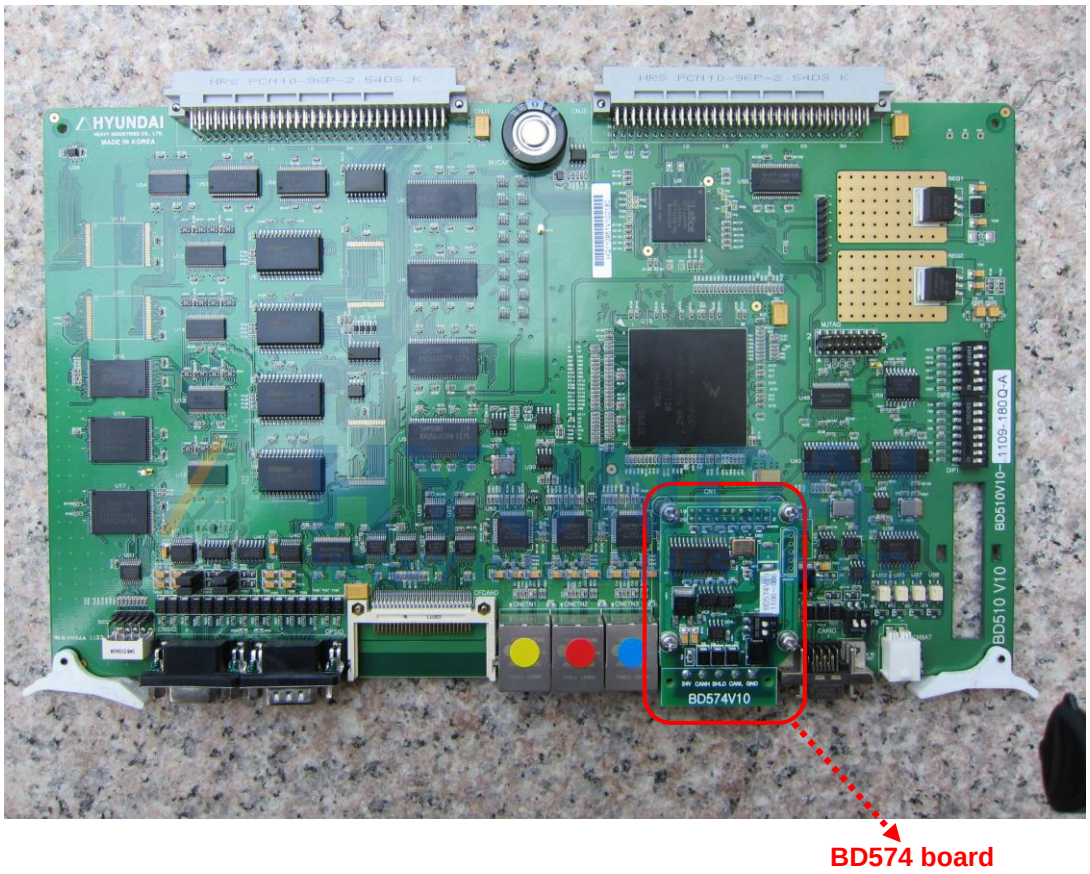


Figure 3.1 BD510V10 with the BD574 mounted on it

3.2. Connection between the main board and DeviceNet

The main board CAN port is connected to the small door board through an inner wiring inside the controller via the system board as shown in Figure 3.2.

When the connection to DeviceNet needs to be made through the CAN port of the main board, the DeviceNet communication cable needs to be connected to the user CAN connector of the small door board.

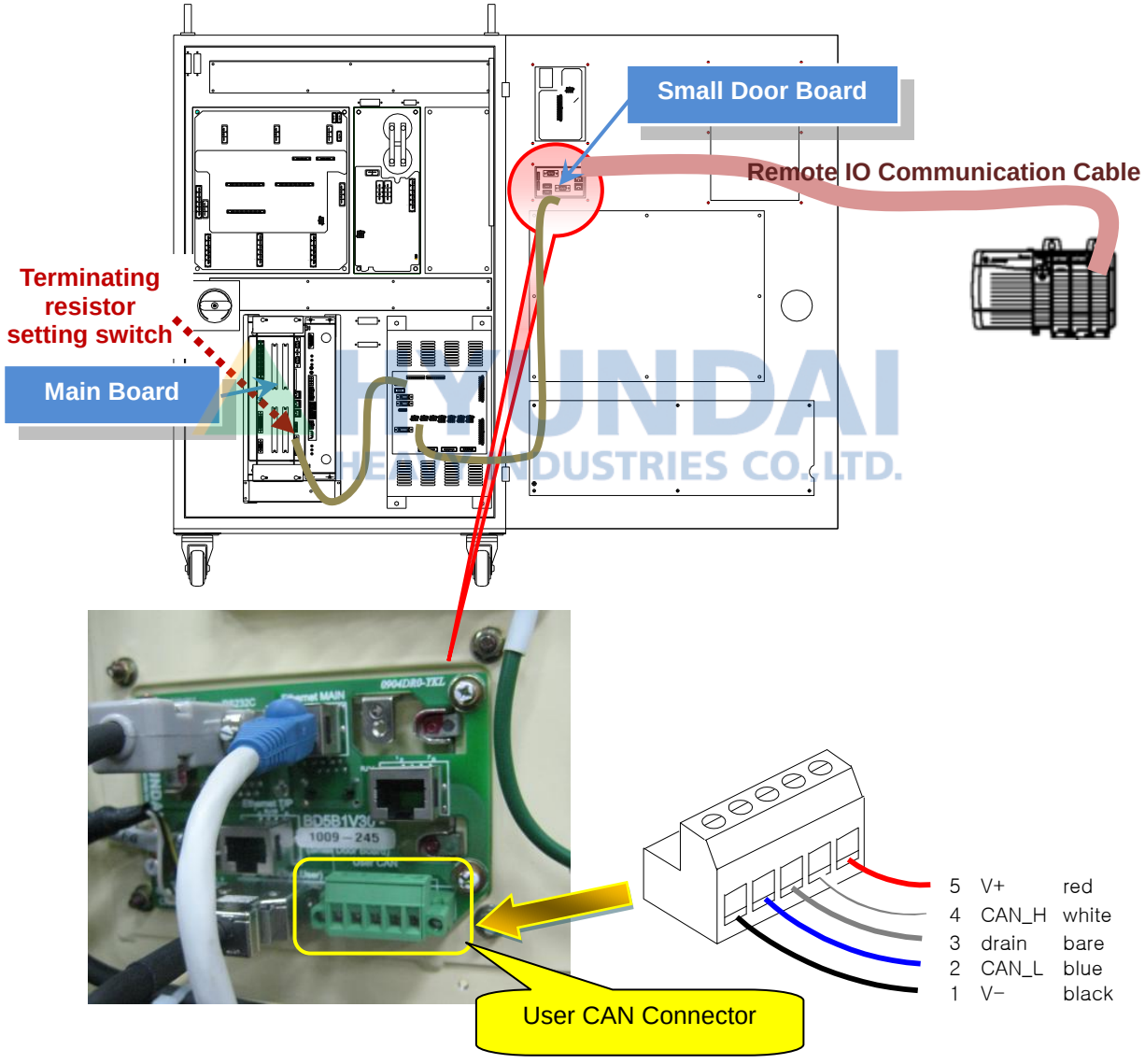


Figure 3.2 Main board CAN port connection with DeviceNet

The user DeviceNet connector of the small door board is an open type 5Pin connector and its pin map is as shown in Figure 3.3.

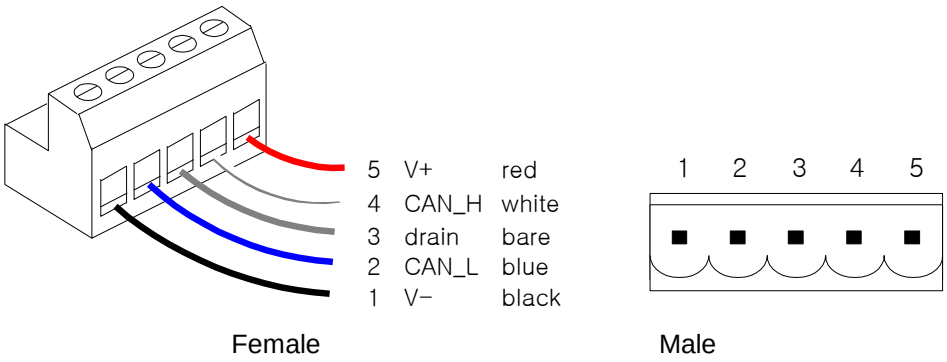
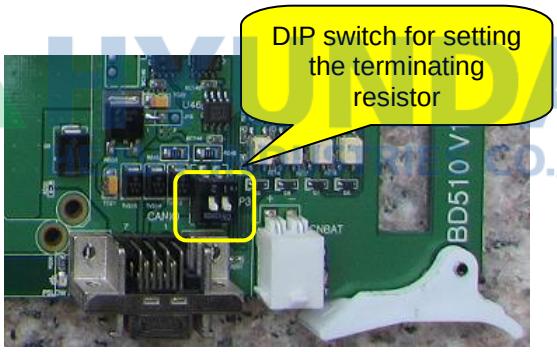


Figure 3.3 Open type connector pin map

If the Hi5 controller is the terminating part, the DIP32 pin of the dip switch of the main board (BD510V10) needs to be set in the On position to turn on the terminating resistor



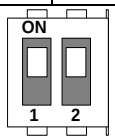
Switch No.		1	2
Setting content	OFF	System CAN terminating resistor off	Embedded DeviceNet terminating resistor off
	ON	System CAN terminating resistor on	Embedded DeviceNet terminating resistor on
Switch appearance			

Figure 3.4 BD510 terminating resistor setting

3.3. Connection between the BD574 board and DeviceNet

When the embedded DeviceNet slave needs to be connected to the master through the DB574 extension CAN board, it can be connected to DeviceNet through the open type 5Pin connector of the BD574 board as shown in the figure below.

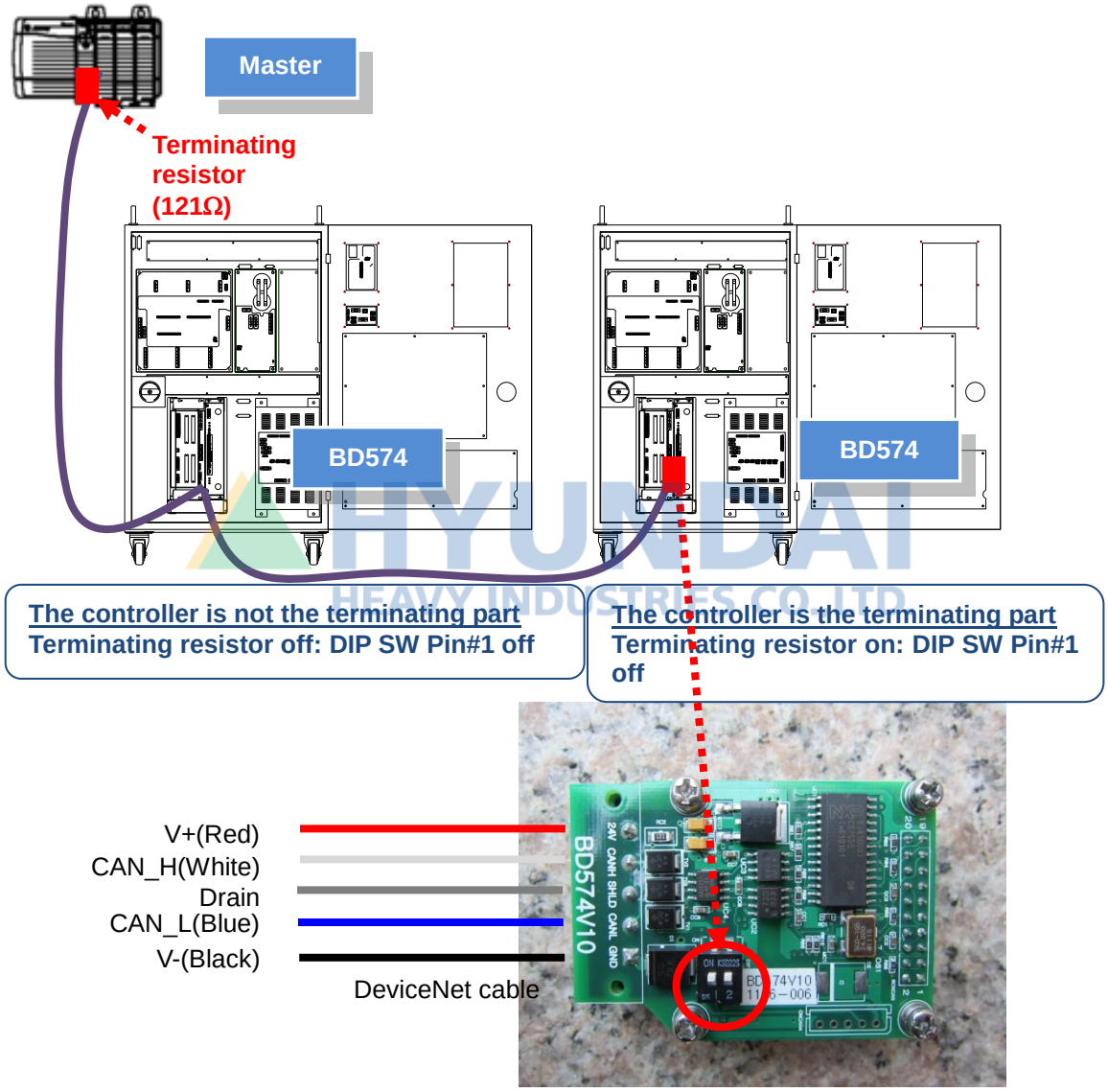


Figure 3.5 BD574V10 board cable connection

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4 Information & Setting

4.1. Embedded DeviceNet slave Info and setting

The network parameters for the embedded DeviceNet slave function should be set prior to using it.

Select 『[F2]: System』 → 『2: Control parameter』 → 『2: Input/Output signal setting』 → 『13: Embedded DeviceNet slave Info and setting』.

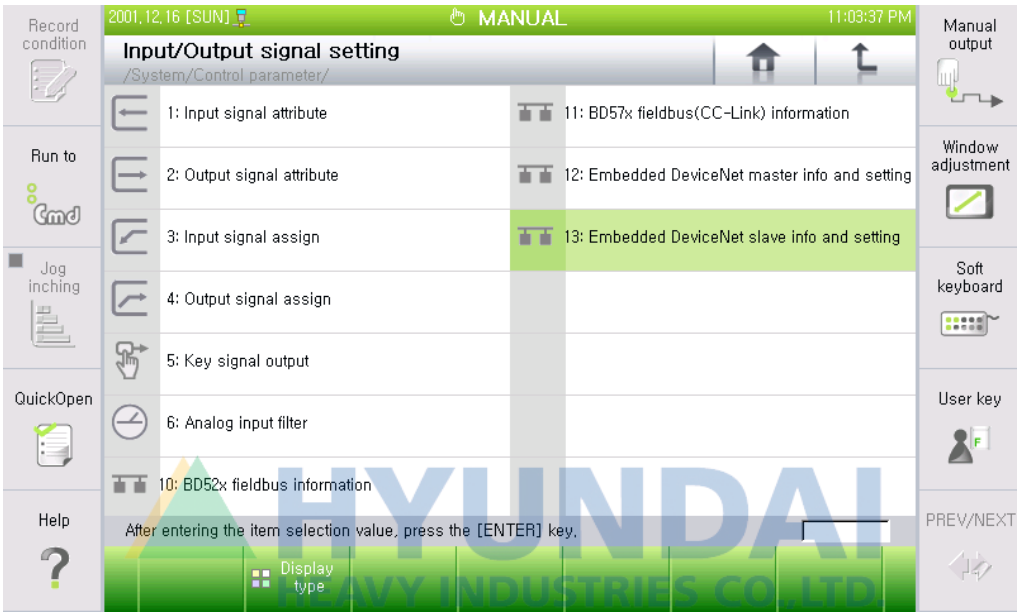

Figure 4.1 Information and the setting menu of the embedded DeviceNet slave

*** Precautions**

① **While the BD57x CC-Link function is used, the embedded DeviceNet slave function can not be used.**

② **If the embedded DeviceNet slave function needs to be used at the same time when the embedded DeviceNet master function is used, the CAN port of the BD574 board must be used.**

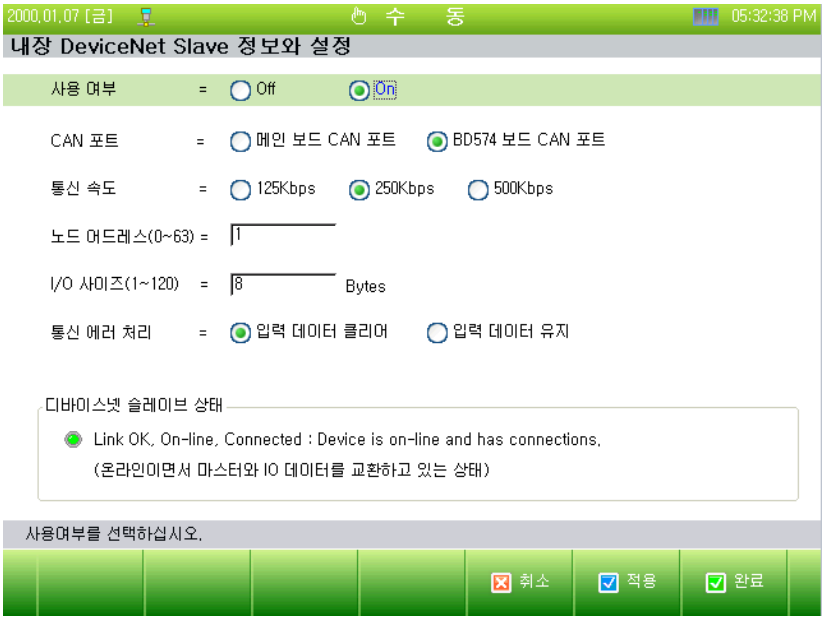

Figure 4.2 Information and the setting menu of the embedded DeviceNet slave

- Use: For selecting whether to activate the DeviceNet slave function.
- CAN port: For setting the CAN port that is to be used for the DeviceNet slave function.
  - CAN port of the main board: For using the CAN port of the main board
  - CAN port of the BD574 board: For using the CAN port of the BD574 board
- Communication speed:
  For setting the communication speed of DeviceNet. The communication speeds that can be use for the embedded Device slave are 125Kbps, 250Kbps and 500Kbps.
- Node address:
  For setting the MAC ID (Node address) of the embedded DeviceNet slave. The allowable range for setting the node address is 0~63.
- Size of input and output data:
  For setting the size of the input and output data of the embedded DeviceNet slave. The allowable range for setting the size of input and output data is 1~120.
- Communication error handling:
  An option for handling input data (FB5.X object) when a communication error occurs to DeviceNet.
  - Clear the input data:
    When a communication error occurs, the FB5.X object will clear the value to be “0”.
  - Keep the input data:
    When a communication error occurs, the FB5.X object will maintain the existing value.
- DeviceNet slave status: For showing the network status of the embedded DeviceNet slave.

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5 Fieldbus I/O Access

5.1. Configuration of the embedded DeviceNet slave relays

The embedded DeviceNet slave corresponds to the FB5 object. It has 960 X inputs and 960 Y outputs. It is accessible through the 5 different types as shown in Table 5-1.

Table 5-1 the embedded DeviceNet slave relays

Classification	Command grammar	Max. signal number	Description and example
Output	FB5.Y{Signal No.}	960	Bit signal output
	FB5.YB{Signal No.}	120	Byte signal output
	FB5.YW{Signal No.}	60	Word signal output
	FB5.YL{Signal No.}	30	Double word signal output
	FB5.YF{Signal No.}	30	Float signal output
Input	FB5.X{Signal No.}	960	Bit signal output
	FB5.XB{Signal No.}	120	Byte signal output
	FB5.XW{Signal No.}	60	Word signal output
	FB5.XL{Signal No.}	30	Double word signal output
	FB5.XF{Signal No.}	30	Float signal output

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