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WARNING

INSTALLATION SHOULD ONLY BE PERFORMED BY QUALIFIED INSTALLATION PERSONNEL AND MUST CONFORM TO ALL NATIONAL AND LOCAL CODES

Hyundai Robot

Hi5HV091201FMEN1

Hi5 Controller Function Manual

HRView

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1 Introduction

1.1. Advance knowledge

In order to understand this manual clearly, the following information should be possessed.

- Instructions to use Hi5 controller

1.2. About HRView

HRView is a software which allows transmitting and receiving various files inside the Hi5 controller from external PC through RS-232C cable or Ethernet. HRView runs on PC window environment and provides convenient and easy user interface.

※ Only files saved on the main board of Hi5 controller can be accessed. Please use the file manager function of teach pendant for confirming and copying files saved in teach pendant.

The following are main functions that HRView provides.

- View file lists inside the controller
- Copy files inside the controller to PC
- Copy files of PC for Hi5 controller to the controller
- Delete files inside the controller or PC
- Edit controller files saved on PC (Call notepad which is a window utility)
- Change work file type (Renew Step No., convert work file version, indentation and etc…)

1.3. Operating environment of HRView

Table 1-1 Operating environment of HRView

Hardware	Pentium-level PC recommended	
Operating system	MS window 98/2000/NT/XP/Vista	
Video	1024x768, 256 colors or higher recommended	
Robot controller	All versions of Hi5 controller	
Others	In case of using RS-232C (Refer to Clause 1.4)	1 extra COM serial port on PC side RS-232C cable
	In case of using Ethernet (Refer to Clause 1.5)	PC side - Ethernet function UTP cable for Ethernet

1.4. Wiring method of RS-232C cable

Use RS-232C cable wired as [Figure 1.1]. The picture on the left side shows the connection to cabinet of robot controller and the picture on the right side is the direct connection to the main board.

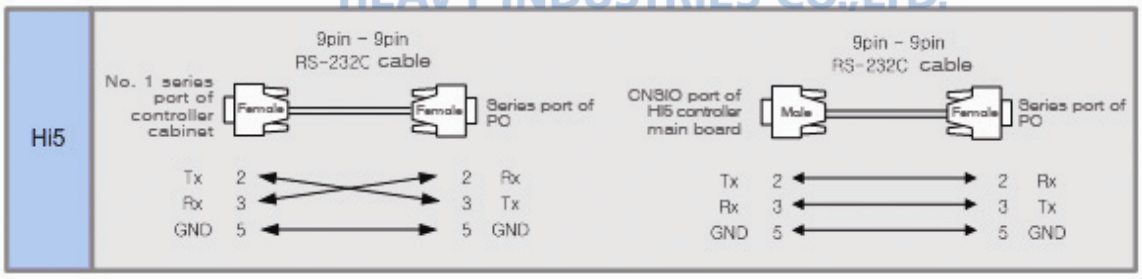

Figure 1.1 Wiring of RS-232C cable for HRView

1.5. Configuration of Ethernet environment

(1) In case Hi5 controller is not connected to hub, connect PC to Hi5 controller using Ethernet UTP cable of 1:1 cross type as [Figure 1.2].

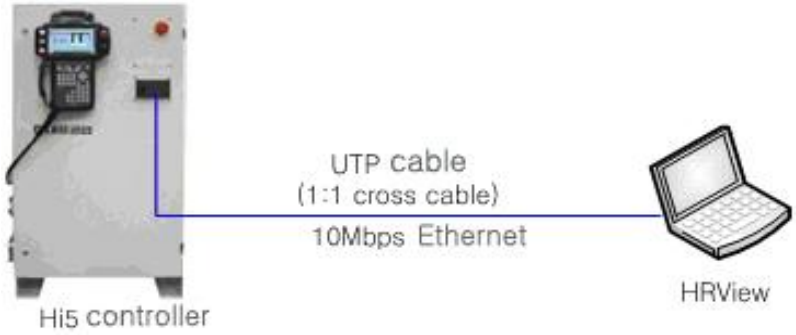

Figure 1.2 Connecting Ethernet (using 1:1 cross cable)

(2) In case Hi5 controller is connected to a hub, connect PC to the same hub using straight type Ethernet UTP cable as [Figure 1.3].

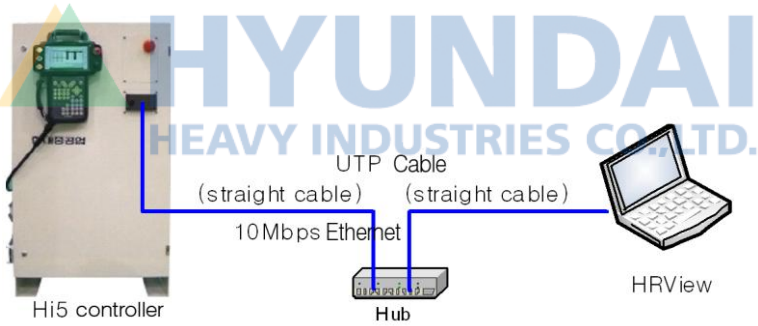

Figure 1.3 Ethernet connection (using direct cable and hub)

(3) Ethernet UTP cable in case of straight cable can be easily purchased on the market, and the method of wiring the cable to 1:1 cross is as [Figure 1.4].

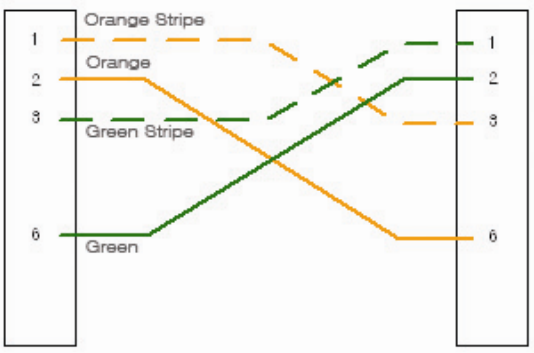

Figure 1.4 1:1 Wiring method of cross cable

2

Installation and start of HRView

2.1. Installation of HRView

(1) Insert HRView CD into CD-Rom drive.

(2) Open HRView installation directory on the explorer and run “HRView.msi”.

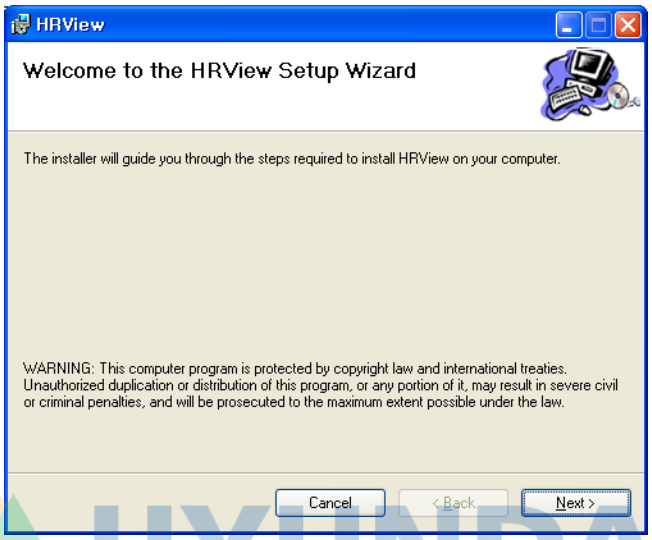

Figure 2.1 HRView installation screen

(3) Read the license carefully and click “Next (N) >” button.

(4) Select a folder where HRView will be installed and the range of users (Everyone (E) or Just me (M)) and click “Next (N) >” button.

(5) Select a language to be used (Korean or English) and click “Next (N) >” button.

(6) Click “Next (N) >” button on the message screen saying that it’s ready to install.

(7) Click “Close (C)”button when a dialog box saying the installation is completed as [Figure 2.2].

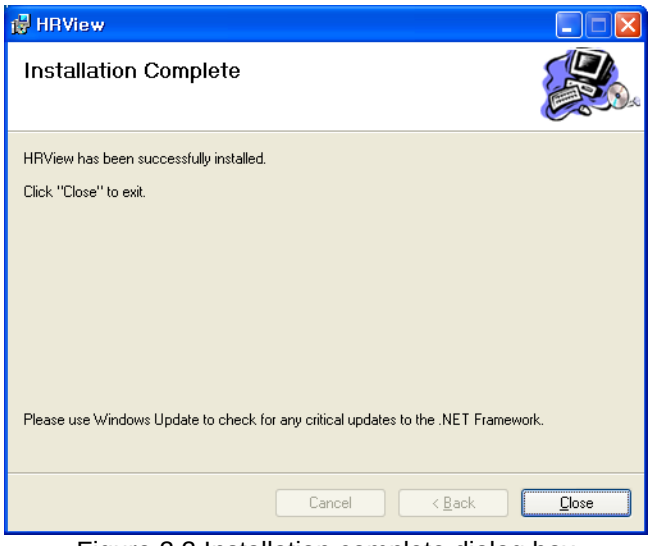

Figure 2.2 Installation complete dialog box

2.2. Start of HRView

(1) Click start button and click HRView of 『program → HHI Robotics → HRView』 folder or double-click HRView icon on desktop as [Figure 2.3] for executing HRView.

Figure 2.3 HRView icon

(2) [Figure 2.4] presents a picture of HRView that is running normally.

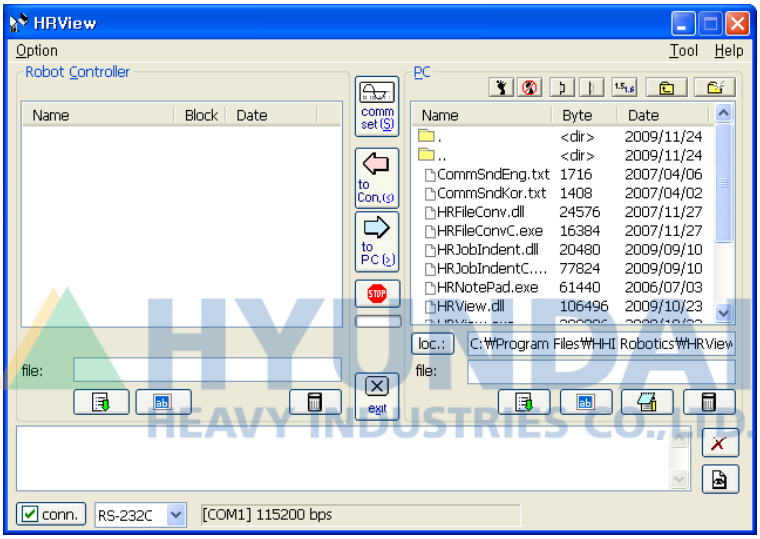

Figure 2.4 HRView being executed

(3) Click 

to finish HRView.

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3

Communication setting

3.1. RS-232C communication setting

3.1.1. Hi5 controller side setting

(1) Enter 『[F2]: System』→ 『2: Control parameter』→ 『3: Serial port』 → 『1: Serial port #1』 (or, 『2: Serial port #2』) screen from teach pendant of Hi5 controller as [Figure 3.1]. Select baudrate and set character length, stop bit, parity bit, echo, port usage and communication type as the picture

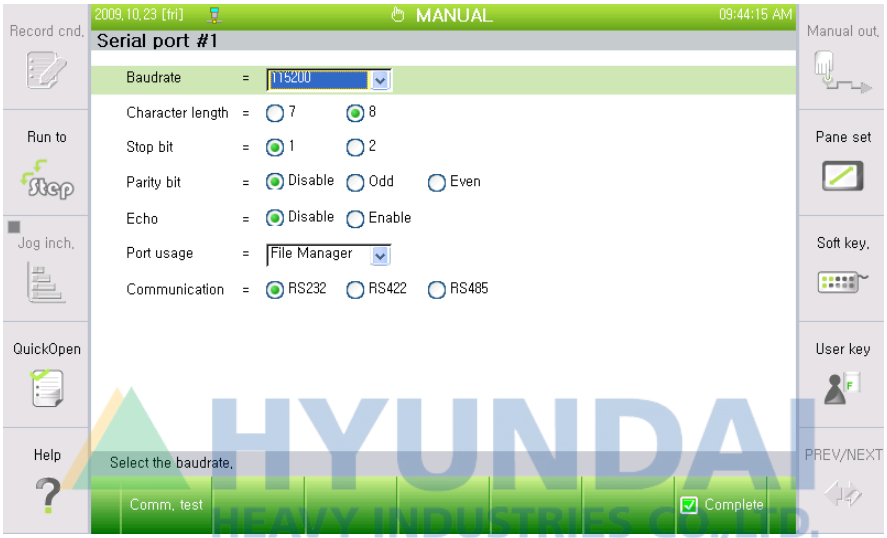


Figure 3.1 Empty ladder document

(2) Red square on the left side of Rung is a sign indicating that it is a selected box. Rung or command can be selected by clicking it with the left button of mouse. Number “0001” is Rung No. and it is incremented by 1 whenever Rung is added.

3.1.2. PC side setting

(1) Most of all, communication type should be selected as RS-232C. Select RS-232C from the list box on the bottom of dialog box as [Figure 3.2].

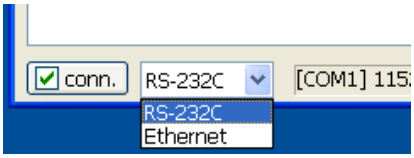


Figure 3.2 Selecting RS-232C

(2) When 

button is clicked or 『Option (O) → Comm. Setup(C)』 on the menu is selected, RS-232C communication setting dialog box will be displayed

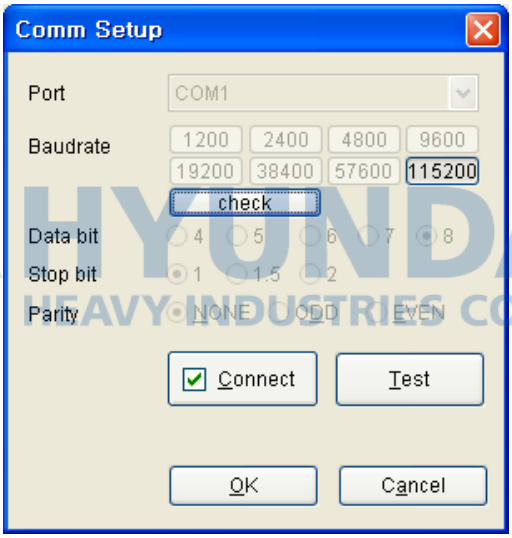
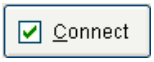
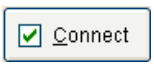


Figure 3.3 RS-232C communication setting dialog box

(3) Parameter change is only possible when 

button of RS-232C communication setting dialog box is not checked (That is, not connected), so if it is checked, uncheck by clicking it.

(4) Select the communication port of PC which RS-232C cable is connected and set transfer speed to be same as Hi5 controller. Set data bit, stop bit and parity as [Figure 3.3].

(5) When clicking 

button to check and clicking confirmation button, set value will be applied and dialog box will be closed.

(6) Set communication port and transfer speed will be displayed on the bottom of dialog box as [Figure 3.4].

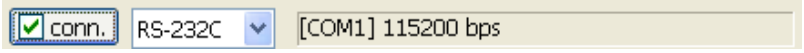


Figure 3.4 Display of set communication port and transfer speed

3.2. How to solve RS-232C communication problem

In case normal operation cannot be done in relation to RS-232C communication, follow problem solving flow chart of [Figure 3.5].

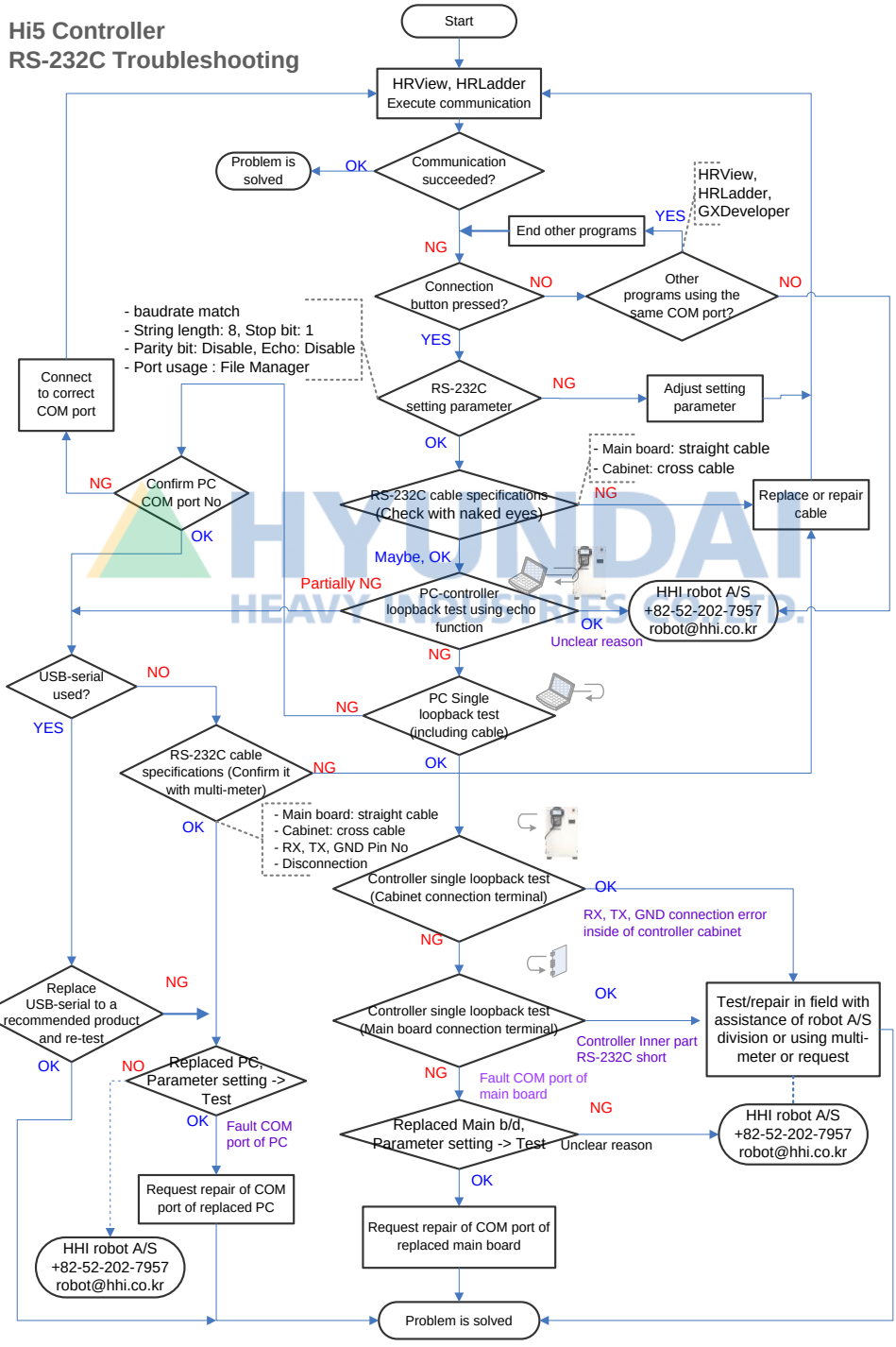


Figure 3.5 RS-232C problem solving flow chart

3.2.1. How to test PC side loopback

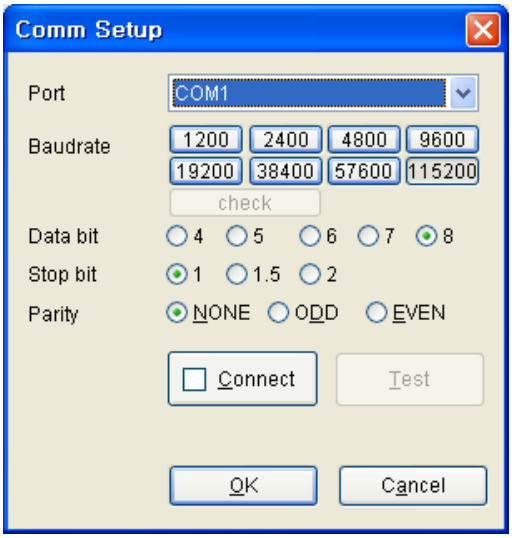
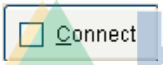
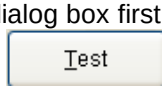


Figure 3.6 RS-232C communication setting dialog box

(1) In order to test if RS-232C connection is normal, open communication setting dialog box first and press 

button to connect the communication. When pressing 

button, RS-232C communication test dialog box will be displayed as follows.

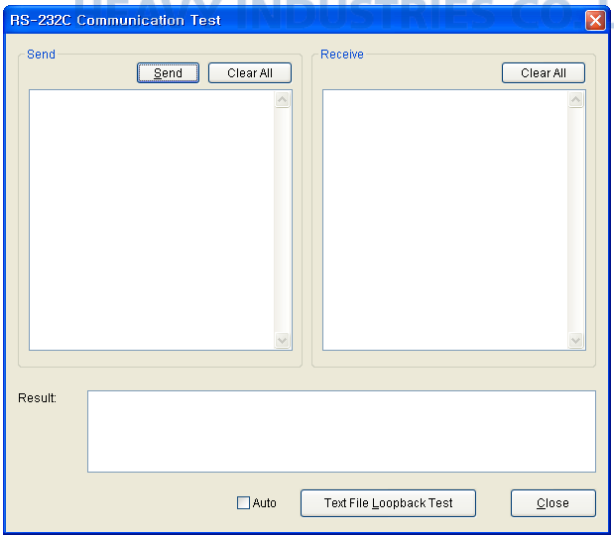


Figure 3.7 RS-232C communication test dialog box

Table 3-1 RS-232C communication test dialog box

Transmission group box	**Transmission button**	It transfers a string inputted in transmission edit box to RS-232C. (Only front 500 byte will be transmitted.)
	Delete all button	It deletes all strings in transmission edit box.
	Edit box	This is a location for recording a string to be transmitted. In case of text file loopback test, it displays a string to be transferred.
Reception group box	**Delete all button**	It deletes all strings in reception edit box.
	Edit box	It displays a strong which is being received to RS-232C.
Test result edit box		It displays the result of text file loopback test. Transmitted bytes, received bytes, conformity option, location of unconformity occurred and the string will be displayed.
Automatic check box		It selects whether text file loopback test will be repeated automatically or not.
Text file loopback test button		It executes text file loopback test. It reads long string data from internal text file, transmits it to RS-232C and test conformity option by comparing it with data received by loopback. Transmitted and received data will be displayed on edit box separately.
Close button		It closes RS-232C communication test dialog box.

(2) A method of confirming if COM port selected from serial ports of PC is running normally is as follows: Short No.2 pin and No.3 pin first from the connector of cable attached to COM port of PC as [Figure 3.8].

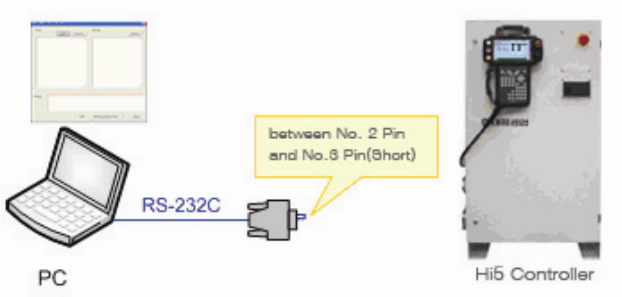


Figure 3.8 PC side transmission and reception short

(3) When pressing text file loopback test button, internal text file will be transmitted and received, and the contents of text file will be displayed on edit box. If it is displayed as [Figure 3.9], it is normal

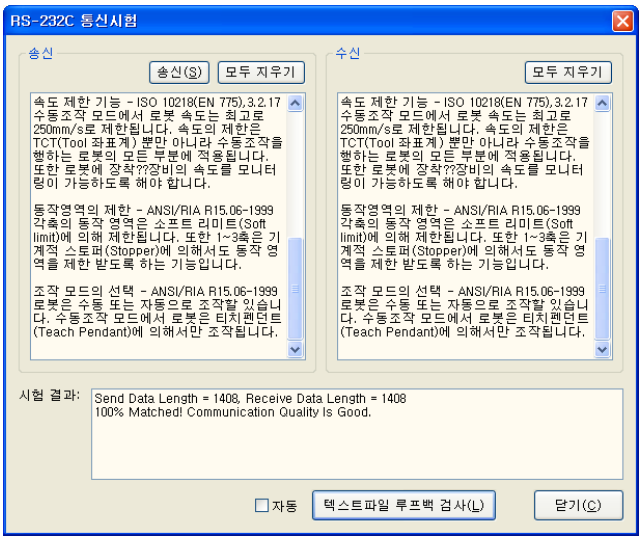


Figure 3.9 text file loopback test

(4) The conclusions according to test result are indicated [Table 3-2] below.

Table 3-2 PC side text file loopback test result

Result	Conclusion (Reasons which can be presumed)
Transmitted data is displayed on reception edit box and test result is displayed as 100% Matched!	COM port of PC is running normally.
There is no data displayed on reception edit box.	- Cable is disconnected. - Cable is connected to wrong COM port of PC. - COM port failure of PC - No. 2 pin and No. 3 pin are not shorted. - Setting error or fault of USB-Serial product (If used)
Partially damaged string rather than received data is displayed on reception edit box.	- Transmission and reception functions of COM port of PC are partially faulty. H/W failure needs to be checked. - Fault or insufficient capacity of USB-Serial product (if used).

(5) A method of confirming if serial communication connection with Robot controller is normal is as follows: Connect COM port of PC and robot controller with serial communication cable first as [Figure 3.10].

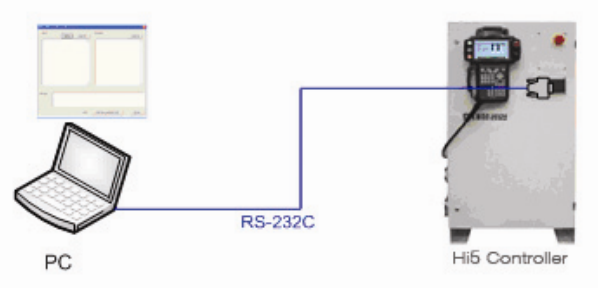


Figure 3.10 RS-232C connection between PC and controller

(6) Enter 『[F2]: System』→ 『2: Control parameter』→ 『3: Serial port』 → 『1: Serial port #1』 (or, 『2: Serial port #2』) screen from teach pendant of robot controller, set communication parameter to be equal with PC side and set “Echo” as <Enable> as [Figure 3.11].

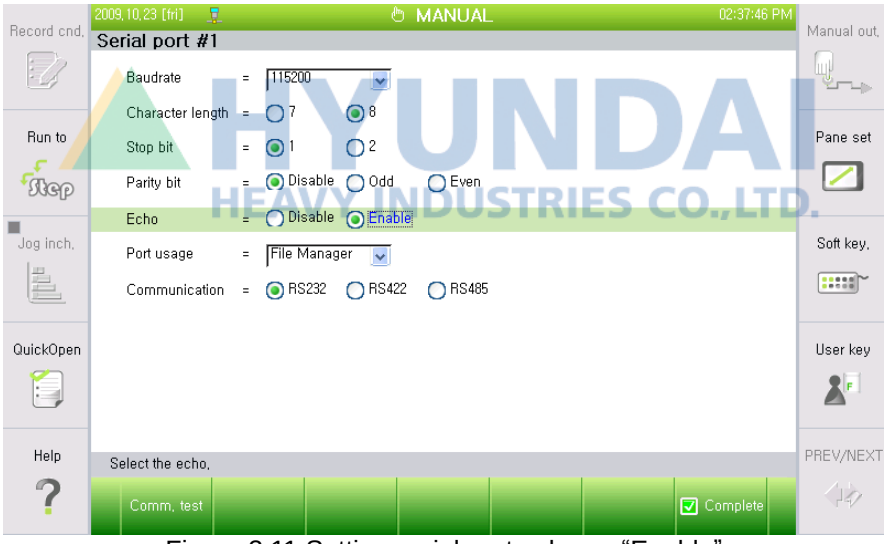


Figure 3.11 Setting serial port echo as “Enable”

(7) When pressing text file loopback test button, internal text file will be transmitted and received, and its contents will be displayed on edit box. The conclusion according to the test result is indicated [Table 3-3] below.

Table 3-3 PC - controller text file loopback test result

Result	Conclusion (Reasons which can be presumed)
Transmitted data is displayed on reception edit box and test result is displayed as 100% Matched!	COM port of PC is running normally.
There is no data displayed on reception edit box.	- Cable is disconnected. - Cable is connected to wrong COM port of PC. - COM port failure of PC - No. 2 pin and No. 3 pin are not shorted. - Setting error or fault of USB-Serial product (If used)
Partially damaged string rather than received data is displayed on reception edit box.	- Transmission and reception functions of COM port of PC are partially faulty. H/W failure needs to be checked. - Fault or insufficient capacity of USB-Serial product (if used).

(8) After testing, restore “Echo” setting on teach pendant serial port screen as <Disable> again.

3.2.2. Controller side loopback test

(1) Enter 『[F2]: System』 → 『2: Control parameter』 → 『3: Serial port』 → 『1: Serial port #1』 (or, 『2: Serial port #2』) screen from teach pendant of robot controller and press 『[F1]: Comm. test』.

(2) Sort No. 2 pin and No.3 pin from RS-232C terminal of controller cabinet according to the direction on the screen as [Figure 3.12] A. (Short B together if the internal cable needs to be checked.)

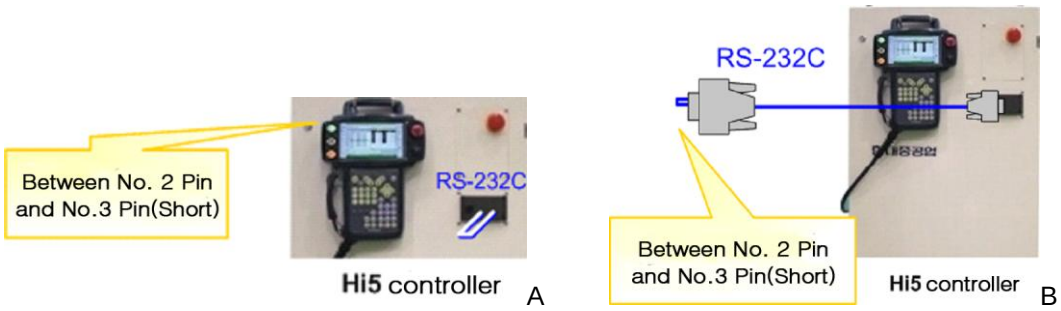


Figure 3.12 controller cabinet side RS-232C transmission and reception short

(3) If the message as [Figure 3.13] is displayed when pressing [ENTER] key, it is normal.

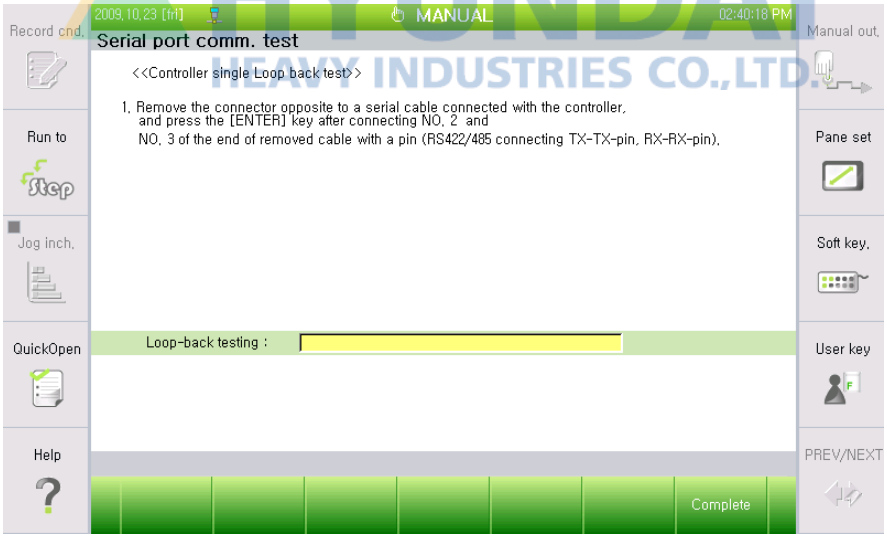


Figure 3.13 Normal loopback test result

(4) In case an error occurs, a message saying skipping over to the second step will be displayed as [Figure 3.14]. Short No.2 pin and No. 3 pin on the main board RS-232C terminal according to the direction.

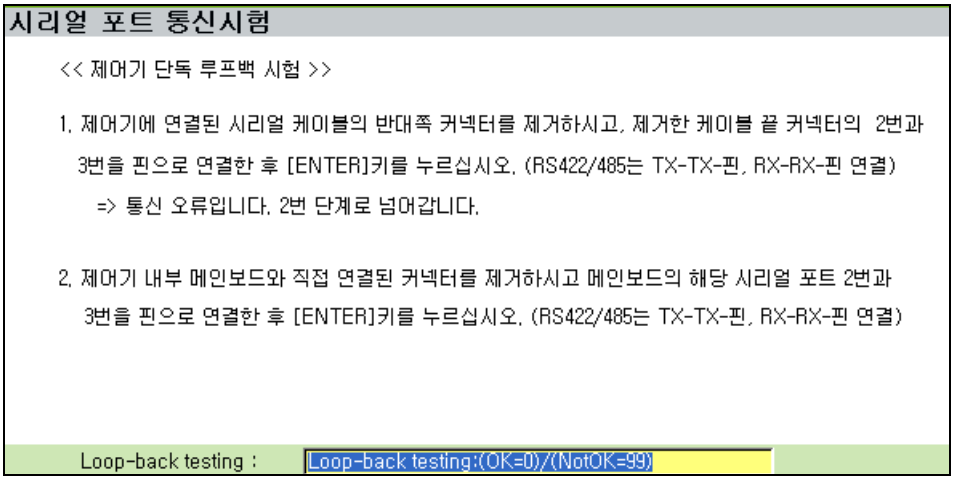


Figure 3.14 main board side RS-232C transmission and reception short

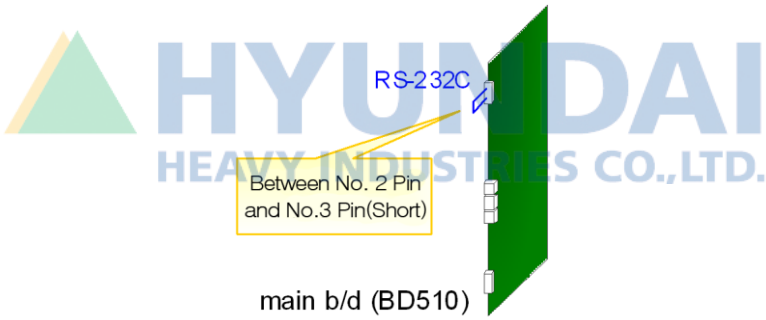


Figure 3.15 main board side RS-232C transmission and reception short

(5) If a message as below is displayed when pressing [ENTER] key, there will be no problem on the main board, so check cable wiring on the inside of controller cabinet from RS-232C terminal to the main board.

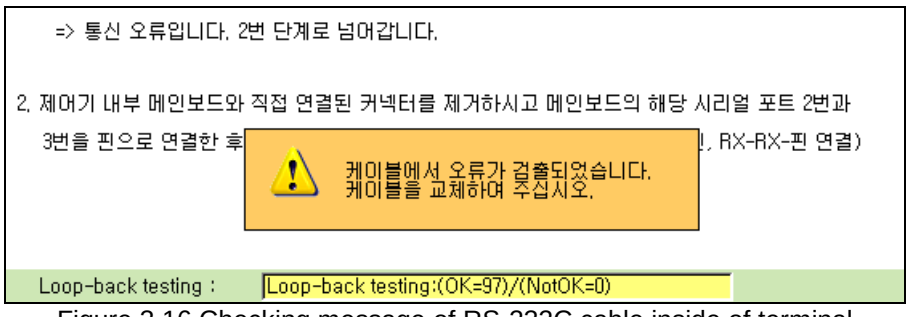


Figure 3.16 Checking message of RS-232C cable inside of terminal

(6) If the message below is displayed when pressing [ENTER] key, the main board has a problem, so replace the main board.

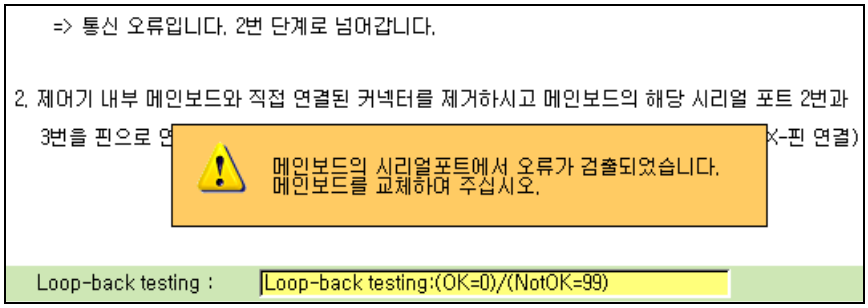


Figure 3.17 Main board RS-232C error message

3.3. Ethernet communication setting

3.3.1. Hi5 controller side setting

Enter 『[F2]: System』 → 『2: Control parameter』 → 『9: Network』 → 『1: Environment setting』 screen from teach pendant of Hi5 controller. Confirm if IP address and other addresses are set correctly while EN2 (generic) tap is selected as [Figure 3.18].

Figure 3.18 Set communication port and transfer speed display

3.3.2. PC side setting

(1) The communication type should be selected as Ethernet first. Select Ethernet from the list box on the bottom of dialog box as [Figure 3.19].

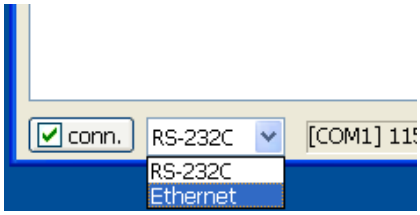


Figure 3.19 Selecting Ethernet

(2) When clicking 

button or selecting 『Option(O) → Comm. Setup(C)』 from the menu, Ethernet communication setting dialog box will be displayed as [Figure 3.20].

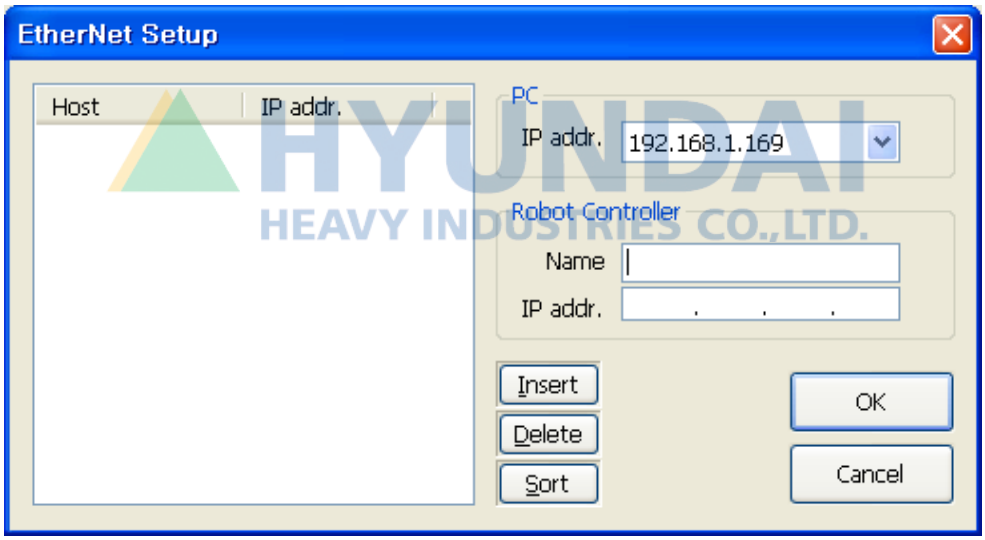


Figure 3.20 Ethernet communication setting dialog box

(3) Open the list box of IP address from PC group box first and select IP address of PC itself as [Figure 3.21]. This is a step of assigning a device for communication, in case more than 2 Ethernet devices are installed in PC.

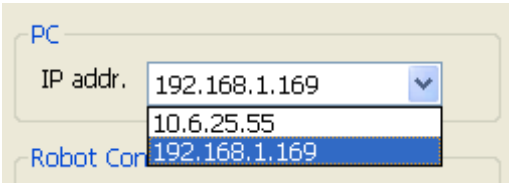


Figure 3.21 Selecting IP address of PC

(4) Register frequently accessed controllers to this dialog box now. Registration shall be done as follows.

① Insert host name (Controller name or No.) and IP address on blanks on the right side. When clicking “Insert(I)” button after inserting, the controller will be added to the list on the left side. Prepare the list of controllers as [Figure 3.22] by repeating this procedure

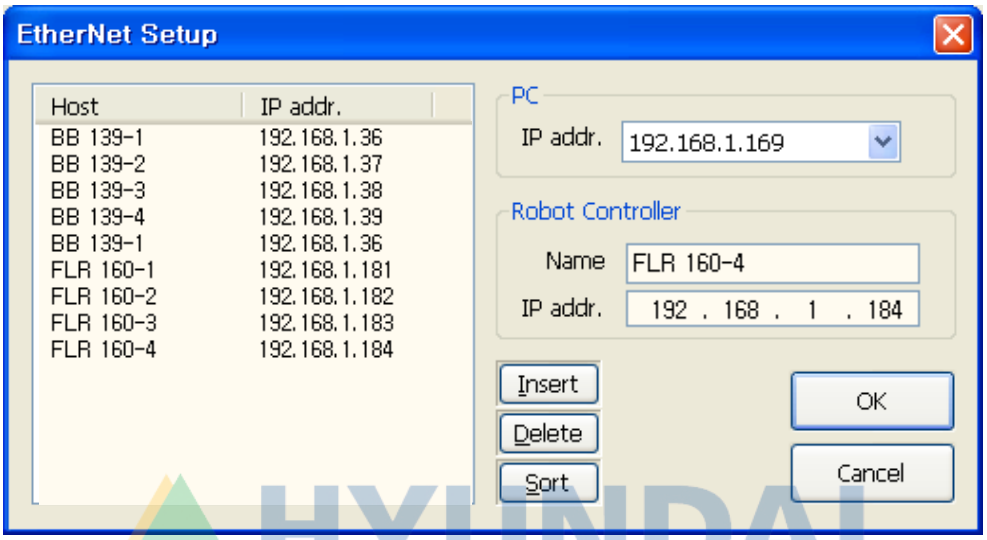


Figure 3.22 Preparing IP address list of controller

② In order to delete an item from the list, select the relevant item and click 『Delete(D)』 button.

③ In order to sort items on the list in 123 or ABC sequence, click 『Sort(S)』 button.

④ When selecting a relevant item, changing its value on the right side blank and selecting another item for the purpose of editing any inserted item of the list, the edited value of the item will be applied.

⑤ When selecting an item from the list and clicking 『OK』 button, that item will be selected as the host to be connected and dialog box will be closed. The prepared list will be saved under text file name of “ENetSetup.dat” on the directory where HRView execution file is located

(5) [Figure 3.23] is an example of “ENetSetup.dat” opened with note pad.

Figure 3.23 Example of “ENetSetup.dat” file opened with note pad.

(6) Set communication port and transfer speed will be displayed on the bottom of dialog box as [Figure 3.24].

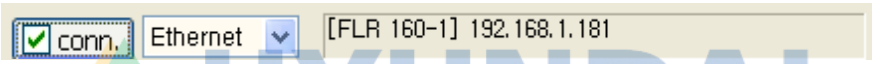


Figure 3.24 Set controller name and IP address

3.4. How to solve Ethernet communication problem

In case normal operation cannot be done in relation to RS-232C communication, open commend prompt of Window as [Figure 3.25] and [Figure 3.26] and execute ping command to IP address of robot controller.

The conclusions according to test result are as [Table 3-4] below

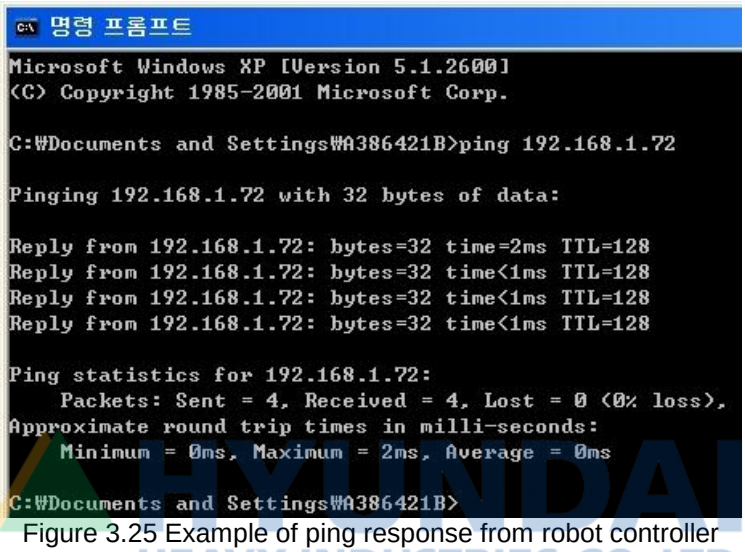


Figure 3.25 Example of ping response from robot controller

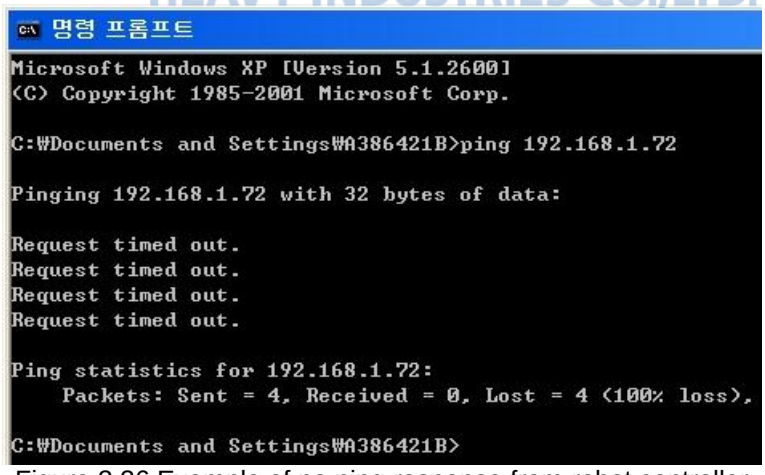


Figure 3.26 Example of no ping response from robot controller

Table 3-4 Ping test result for controller

Result	Conclusion (Reasons which can be presumed)
Reply from {IP ADDRESS} is displayed. This means that there is ping response from robot controller.	Ethernet connection between controller and PC is normal, but the communication can't be established due to other reasons. - Wrong communication setting of HRView - Monitoring service error of robot controller → Try turning off and on HRView and robot controller together. - HRView service prohibited by window firewall → Include HRView to excluded program list of window firewall. (Control panel – Security center – Windows firewall – Exclusion tab)
Request timed out is displayed. This means that there is no ping response from robot controller.	▶ In case there is a problem on internet or LAN to a relevant PC: → Faulty Ethernet function of PC, request PC inspection
	▶ In case there is no problem on internet or LAN to a relevant PC: - Wrong IP address setting or discordance of subnet - Wrong Ethernet cable connection between robot controller and PC. (cable disconnected, wrong cable production, etc) - (In case hub is used) Faulty hub, bad power condition → Check cable by LAN tester or replace cable. - Ethernet cable inside of robot controller cabinet disconnected or faulty Ethernet function of controller main board → Inquire to A/S center of our company

4 Using HRView

4.1. Display, transfer and delete of file list

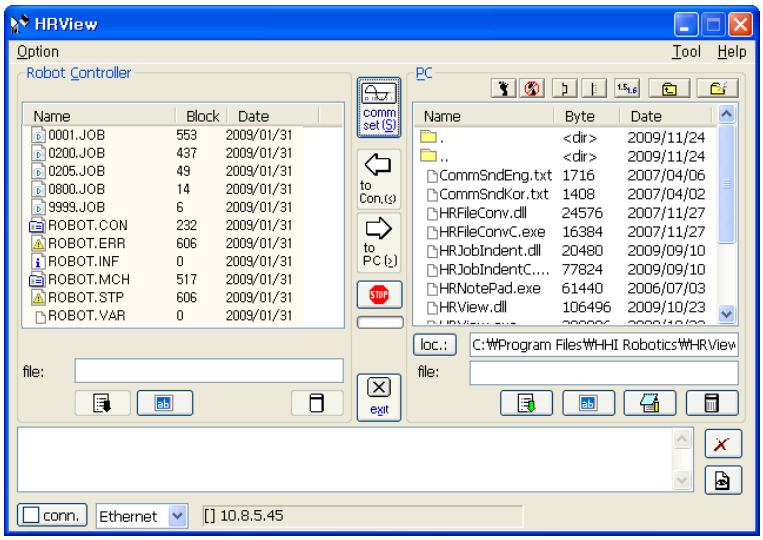


Figure 4.1 Example of HRView execution

The group box on the left side of dialog box indicates Hi5 controller side and the group box on the right side indicates PC side. Originally, Hi5 controller doesn't have folder structure. On the other hand, work folder on PC side must be selected. When clicking loc.: button, folder search dialog box will be displayed so that current folder of PC group box can be selected.
(A method of dragging a targeted folder icon from Window explorer and dropping it on the HRView window as [Figure 4.2] can also be used.)

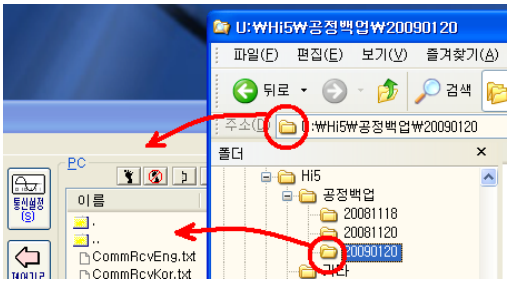


Figure 4.2 Dragging a folder icon of explorer and selecting current folder

(1) When double clicking  button or  icon of the list from PC group box, you will move to patent folder. When clicking  button, a new folder will be created on current folder. When double clicking subfolder icon of PC list box, the screen will move to the relevant subfolder.

(2) When clicking  (List renew) on the left side, file list of controller will be received and displayed on the list. When clicking  (List renew) on the right side, file list display of current folder will be renewed.

(3) When selecting a file from controller list box with the left button of mouse and clicking  , the selected file will be transferred to the current folder in PC. When transfer is completed, result message box will be displayed. If various files need to be selected, click files with [Ctrl] key or [Shift] key together.

(4) When selecting a file from PC list box and clicking  , the selected file will be transferred to the controller. When transfer is completed, result message box will be displayed.

(5) When selecting files on controller side or PC side list box and clicking  of relevant group box, selected files will be deleted.

4.2. Other functions

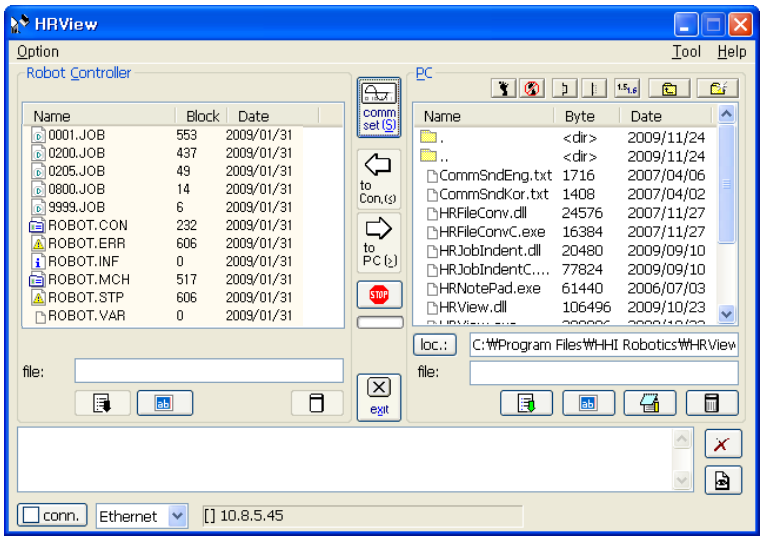


Figure 4.3 Using HRView

(1) When selecting a file from PC list box and clicking  button, the relevant file can be edited with note pad. (Only text file is possible)

(2) When selecting a file from PC list box and clicking  button, the file name can be changed.

(3) When selecting work program files from PC list box and pressing  (step on) button, stem No. will be assigned to each step of relevant files. If a file already has an assigned Step No., Step No. will be renewed. When pressing  (step off) button, all Step No. of steps will be deleted.
(Step No. renewal function is useful for examining/editing work file with note pad. In case of inserting or deleting steps during work, it would be difficult adjusting each Step No. with note pad manually. At this time, Step No. can be renewed by pressing  and  button in orderly manner.)

(4) You can move to a relevant subfolder by double clicking a folder icon from PC list box.

(5) When selecting work program files from PC list box and clicking  button, work file for Hi4a (Version 1.5) will be converted into work file for Hi5 (Version 1.6).
(There is a difference in the direction of robot coordinates between Hi4a and Hi5, so the value of hidden pose or pose constant needs to be converted. This function only converts grammar form, so other methods should be used for converting pose.)
※ There are also v1.0 → v1.5 and v1.5 → v1.0 item on the tool item of menu. These are functions for converting the version of work file for Hi4 controller, so these functions are irrelevant to work file for Hi5.

(6) In case FOR~NEXT and IF~ENDIF are used, readability of work file can be raised by indentation. When selecting work programs and clicking  button, automatic indentation will be executed. When transferring work file to Hi5 controller after editing, indentation must be removed by clicking  button.

(7) In case of selecting and transferring various files, click  button If you want to suspend the transfer while files are being transferred.

(8) After file transfer is completed, success or failure and the elapsed time for transferring each file will be displayed on the result window at the bottom. When clicking  button, result window will be erased completely. If you want to save displayed contents, you can open displayed contents with note pad by clicking  button.

4.3. Other setting

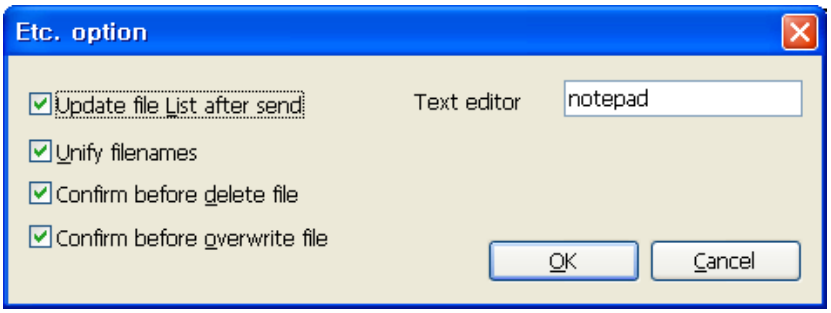


Figure 4.4 Other setting dialog box

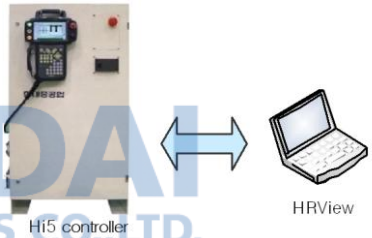
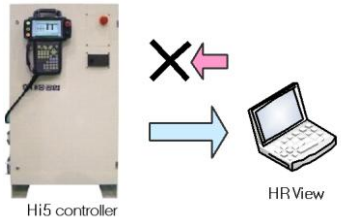
When selecting 『Option(O) – Etc.(E)』 on the menu, other setting dialog box will be displayed as [Figure 4.4]. Table 4-1 provides the description of each item

Table 4-1 Other setting dialog box

Item name	Description
Update file List after send	It displays copied result by copying a file and renewing list box of file list.
Unify filenames	When selecting a file from controller side or PC side list box, edit box of both sides will be assigned as the same file name. (For example, when selecting and copying 0002.JOB file of PC side, it will be also copied on controller side as a file named 0002.JOB file. If you want to copy a file under the name of 0003.JOB, change 0002.JOB of controller side edit box to 0003.JOB with key board and copy it.)
Confirmation before delete file	When clicking  button, it asks the confirmation of delete with message box.
Confirmation overwrite file	When copying a file from controller to PC, it asks the confirmation of overwriting with message box if there is a file with the same name on current folder of PC.
Text editor	When clicking  button, this editor assigns the name of application to be called. Basic setting is notepad (note pad of window).

4.4. Type of Hi5 controller file

Table 4-2 Other setting dialog box

file type	file name	Available transferring direction
Work file	0001.JOB ~ 9999.JOB	 Two-way transfer possible
Control constant file	ROBOT.CON	
Machine constant file	ROBOT.MCH	
Whole pose variable file	ROBOT.POS	
Whole area shift variable file	ROBOT.POS	
Local pose file variable file	L00.POS~L10.POS	
Local shift file variable file	L00.SFT~L10.SFT	
Whole area local constant actual number variable file	ROBOT.VAR	
Error record	ROBOT.ERR	
Stop record	ROBOT.STP	
PLC ladder	ROBOT_00.LAD	
Load estimate	{Robot type name}.NLD	
Iterative learning control	ROBOT.ILC	
Field bus setting file	ROBOT.FBU	
Spot welding	ROBOT.SWD	
Palletize	ROBOT.PAL	
Laser vision sensor	ROBOT.LVS	
Analog arc start condition	ROBOT.AAS	
Analog arc end condition	ROBOT.AAE	
Analog arc subsidiary condition	ROBOT.AAU	
Arc weaving condition	ROBOT.WEV	
Analog arc welding machine	ROBOT.AAP	
Digital arc condition	ROBOT.ADC	
Digital arc welding machine	ROBOT.ADP	
Data connection	0001.GDT ~ 9999.GDT	 Only transferring to PC possible
Servo gathering	ROBOT.GSV	
Trace gathering	ROBOT.GTJ	
System information	ROBOT.INF	
Program diagnosis	0001.JRP ~ 9999.JRP	

※ Some files cannot be copied to Hi5 controller in Motor ON status for security matters.

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