HD-3846E-4

OPERATION MANUAL

HrBasic Developing Environment

VER.2.10

Hirata

Challenge the future

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HrBasic Developing Environment
Operation Manual
Ver. 2.10
USER'S GUIDE (HD-3846E-4)

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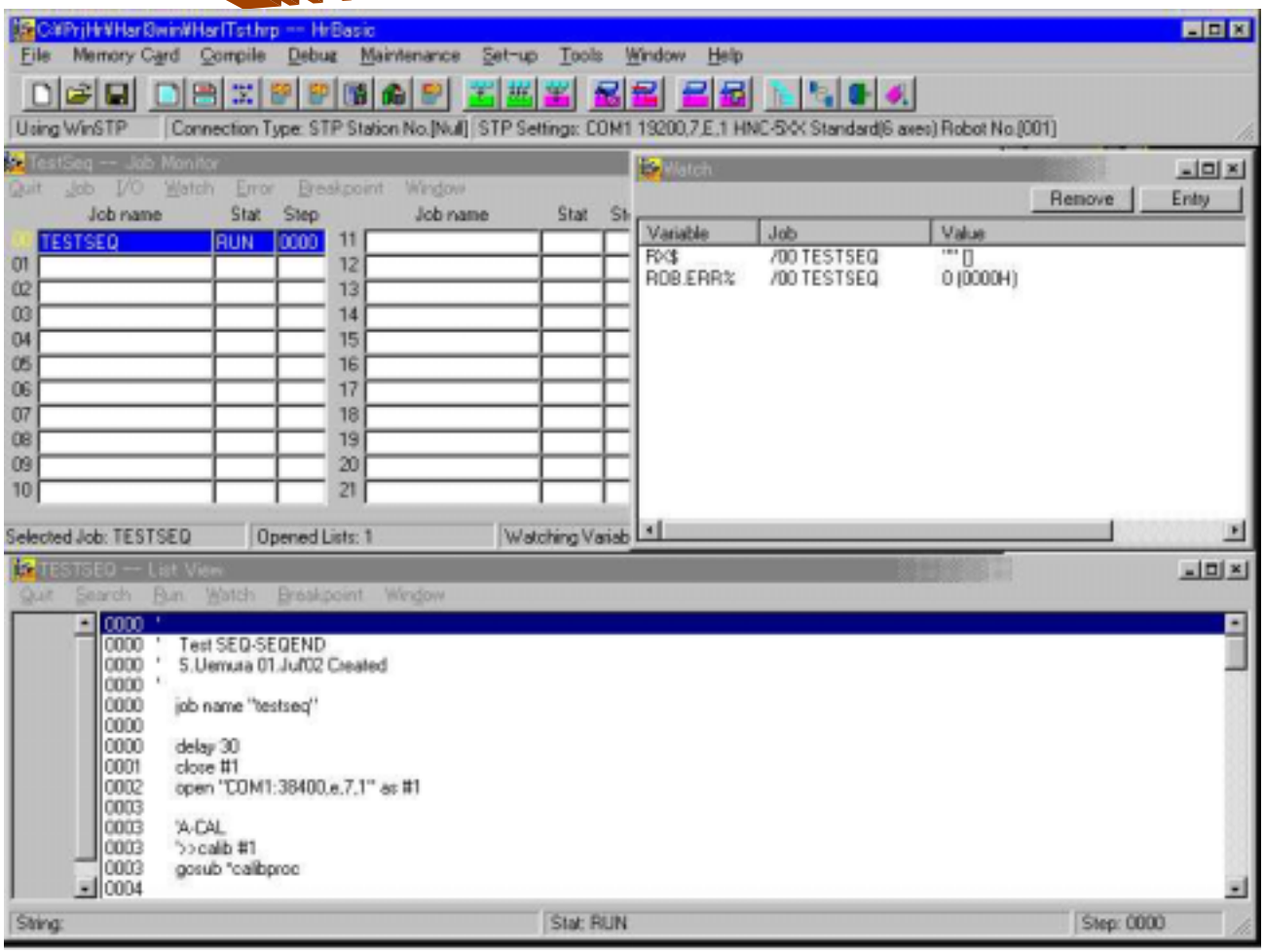
Robot Control Language Developing And Executing Environment



Main menu and debugging windows of HBDE

Robot control language

HrBasic

HrBasic is the language based on BASIC to learn easily that includes the extended statements for robot control, I/O control and timer control and that can run as maximum 32 jobs simultaneously. You can develop and debug the HrBasic program on a Windows PC using HBDE.

HrBasic executing environment

STP

STP (Station Processor) is the environment that executes HrBasic programs. It is equipped normally in the next generation robot controller HAC-8XX. "WinSTP" is the STP for Windows that can execute HrBasic on a PC.

HrBasic developing environment

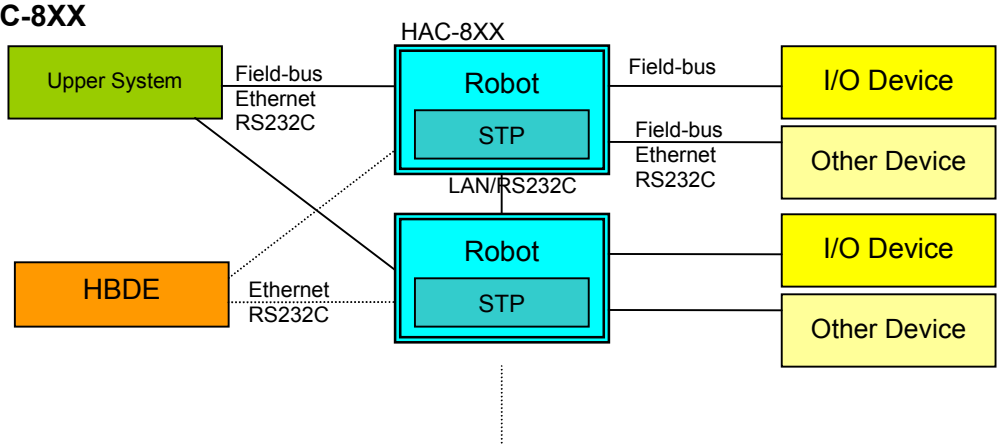
HBDE

HBDE (HrBasic Developing Environment) is the integrated developing software for a robot control system using HrBasic on a Windows PC. You can operate and manage projects, developing programs, compiling, linking, downloading to STP, debugging, monitoring I/O, robot setting data.

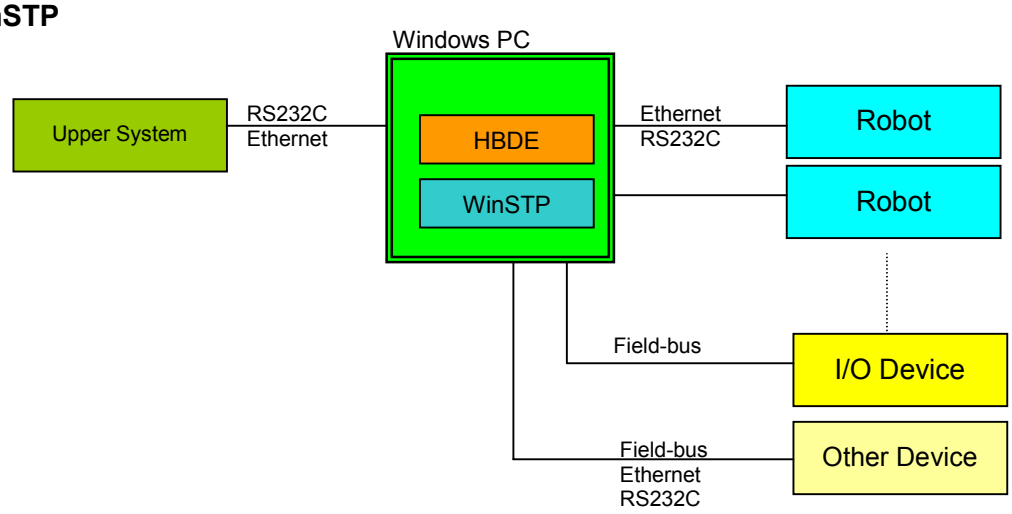
HrBasic/HBDE is the upper compatible version of our product HARL-III/HARL-III Compiler.
HARL-III: Hirata Assembly Robot Language-III

Example of the system

Using HAC-8XX

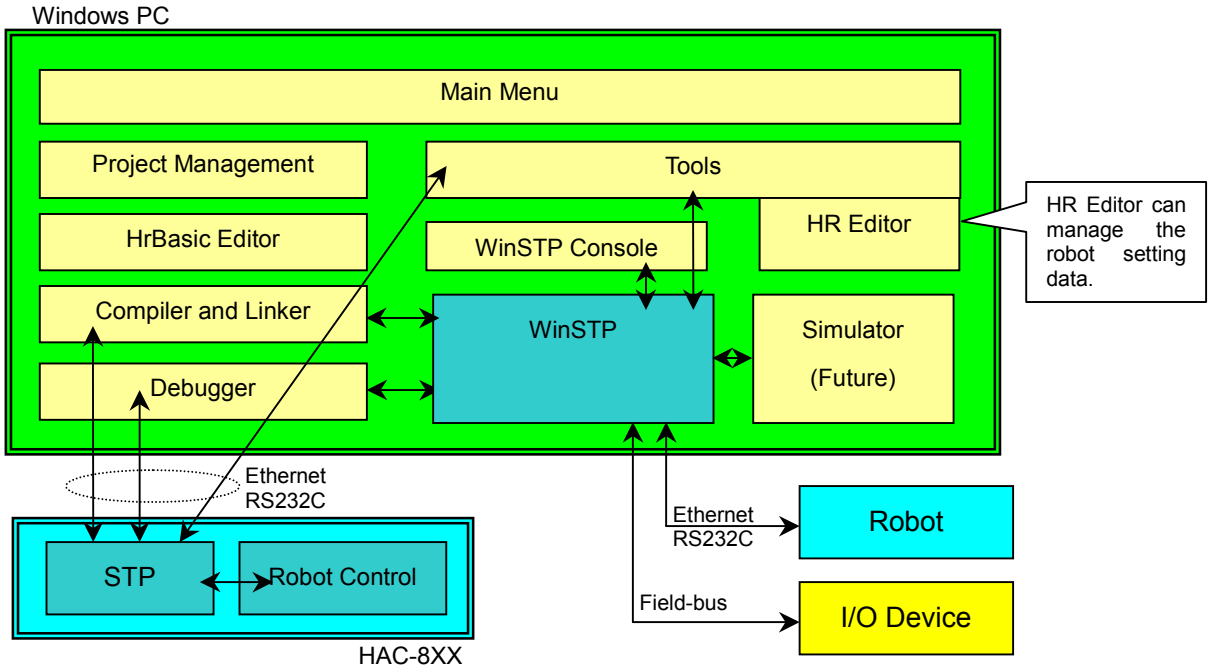


Using WinSTP



Note) "Field-bus" represents InterBus, PROFIBUS and so on.

Software Components of HBDE



Specification

STP Hardware Specification

Item	HAC-8XX	Windows
Microprocessor	Hitachi SH-4 (240MHz)	According to using PC specification Recommended) CPU: above 200MHz Memory: above 64MB HDD: more than 40MB free space OS: Windows95/98/Me/NT/2000/XP Note1) Using a PCI board (Hilscher GmbH) for InterBus or PROFIBUS interface Note2) HrBasic supports the following communication 1) Serial COM1 to COM9 2) Ethernet
Arithmetic co-processor	Built-in co-processor on SH-4	
Memory	Flash memory : 4MB SDRAM : 64 MB SRAM : 2MB (battery-backup)	
Serial communication	8 ports for standard PC104 extension Baud rate : 115200 bps max.	
Real-time clock	Built-in calender and timer on SH-4 Battery-backup	
Interruption of timer	1 msec	
Remote I/O	PC104 extension board (Hilscher GmbH) InterBus Master, Slave PROFIBUS Master, Slave In : 256 bits (max. 4096 bits) Out : 256 bits (max. 4096 bits)	
Ethernet	10BASE-T * 1	
Other interfaces	Compact flash card	
Monitor on board	7 segments LED	
Size	200 mm * 100 mm * 2 boards (CPU and extension interface board)	

STP Execution Time (Note: The value changes according to the running environment.)

Item	HAC-8XX (*1)	Windows (CPU:533Mhz)
One step execution interval of HrBasic	Average 0.050msec	Average 0.050msec
Max. interruption time by operating system	About 1msec	About 6 to 10msec

(*1) Using real-time operating system "Micro-C OS"

HrBasic Specification

Item	Specification
Job	Max. 32 jobs running simultaneously
Max. program area	1MB (about 45000 to 57000 steps of all jobs)
Max. variable area	1MB
Max. position data memory	8000 points
MD memory (general purpose, battery-backup, byte memory)	1024 bytes
MW memory (general purpose, battery-backup, word memory)	1024 words
I/O	In : 256 bits (Max. 4096 bits) Out : 256 bits (Max. 4096 bits)
Available user timer	32 timers (Min. scale 1msec)
Available variable type	String, Integer, Long, Single float, Double float

HrBasic Statements and Functions

Kind	Usage	Statement	Function
Psuedo-instruction	Definition	JOB NAME	Set the first job and job name.
Definable instruction	Definition	DIM	Define as array variable.
		DIMNET	Define as network global variable
		GLOBAL	Define as global variable.
		DIMPOS	Define the number of position memory.
		REM	Define the comment line.
General instruction	Substitution	LET	Substitute value to variable.
		PULSE	Substitute value for specific time.
	Flow control	GOTO	Jump to a specified line, then execute.
		GOSUB	Call subroutine.
		RETURN	Terminate subroutine, then resume the former process.
		FOR TO STEP-NEXT	Repeat the instruction between FOR and NEXT.
		IF THEN ELSE	Decide the condition of logical expression.
		DELAY	Break temporarily the execution of job.

		WAIT	Wait until conditions are satisfied.
		TIMEOUT	Get the result of timeout by WAIT command.
		SELECT CASE	Evaluate an expression and execute the processing block.
Interrupt control instruction	Error control	ON ERROR GOTO	Specify the destination at error.
		RESUME	Terminate error process, then resume the former process.
		ERR	Hold error code.
Control instruction	Job control	JOB START JOB ON JOB OFF	Control job execution.
	Robot control	MOVE	Move a robot to specified coordinates.
		SET	Set operating characteristic data of a robot.
		REF	Deal data inside of a robot.
		SEQ-SEQEND	Set or terminate robot sequence mode.
		FINISH	Complete MOVE in sequence mode.
		HOLD	Specify or cancel the servo lock of the robot.
		DISABLE	Prohibit robot movement.
		CALIB	Execute automatic origin calibration.
		SETROBNO	Set a robot number for the robot communication.
		CLEARROBNO	Clear a robot number for the robot communication.
		GETROBNO	Get a robot number for the robot communication.
	File control	OPEN “COM…”	Open a communication file.
		CLOSE	Close a file.
		INPUT$	Read the specified lemgth of the character strings from a specified file.
		INPUT #	Substitute data of a sequential file to a variable.
		LINE INPUT #	Read one line from a sequential file.
		PRINT #	Output data to a file.
		EOF	Examine the termination code of a file.
	Clock control	TIME$	Get time. Setting is possible.
		DATE$	Get date. Setting is possible.
Network instruction	Network communication	NETOPEN	Open a network communication.
		NETCLOSE	Close a network communication.
		NETREAD	Read data from a network communication.
		NETWRITE	Write data from a network communication.
Conversion instruction	Arithmetic function	SIN	Get sine.
		COS	Get cosine.
		TAN	Get tangent.
		ATN	Get arctangent.
		SGN	Get the sign of value
		ABS	Get absolute value.
		INT	Remove decimals
		FIX	Remove decimals
		LOG	Get natural logarithms.
		EXP	Get e raised to a power.
		SQR	Get square root.
	Arithmetic Constant	PAI	Get the value of pi.
	Character	LEFT$	Pick out arbitrary length from the left of character strings.
		MID$	Specify one part of character strings.
		RIGHT$	Pick out arbitrary length from the right of character string.
		SPACE$	Get arbitrary length blank character strings.
		CHR$	Get the character of specified character code.
		STRING$	Get the character strings connected one arbitrary character.
		HEX$	Get the character strings converted decimal into hexadecimal.
		STR$	Convert numerical value into character strings.
		VAL	Convert the number of character string display into actual value.
		ASC	Get the character codes of characters.
		LEN	Get the total byte count of character strings.
		INSTR	Get the position of the specified character strings in character strings.

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1. Overview

1.1. Introduction to HBDE

HBDE (HrBasic Developing Environment) is the tool by which you can develop and debug the HrBasic (Basic for Hirara Robots) programs that run in STP (Station Processor).
HrBasic is based on BASIC and it has additional commands such as job control, robot control, I/O control statement and it can execute 32 jobs (max.) simultaneously.

You can use following functions by HBDE.

• Project management
  You can treat many program groups in the different conditions as a project. You can manage and save the settings of directories, communication parameter, communication format as a project.

• Development of program source
  HBDE has HrBasic Editor as default to edit source, header or macro files. And you can manage program files for the target STP using a make file.

• Compiling, linking, downloading program
  You can compile and link developed programs and download linked programs to STP. The differential compiling that compiles only updated programs is available by make file.

• Online debug
  You can debug the current running programs in STP to open list of the job and to stop the job, run by a step, set breakpoints, watch variables of the job and use I/O Monitor. When some errors has occurred, you can see the detail of error information.

• I/O Monitor
  You can watch current ON/OFF status of remote I/O by I/O Monitor. And you can fix ON or Off of specified I/O.

Besides these function, HBDE has software of HR Editor.
Note) Refer to “HrBasic Reference Manual” about the specification of HrBasic.

Overview of HR Editor

HR Editor is the tool to edit robot data on a personal computer.
Available data for HR Editor is as follows.

Position data	Teaching data of the robot.
System data	System Generation (S.G.) Data and System Parameter (S.P.) Data including the various specifications for the motion of the robot and the various constants for the system.
Configuration	Definition of system configuration for the robots and the motors using by HNC-5XX type controllers.
Servo parameter	Definition of specification and constants for the servo motors using by HNC-5XX type controllers. This data type includes “Memory Data” that keeps servo parameters, A-CAL DISTANCE and EPI data for HNC-1XX,2XX,3XX,544 type controllers.
Expanded parameter	Expanded S.G./S.P. data using by HNC-5XX type controllers.

These data are categorized to two types for the explanation of this manual.

- Position data
- Robot settings data (data except position)

You can change and register the above-mentioned data by the teaching pendant connected with the robot controller.

Using HR Editor, you can save or edit the all kind of data above-mentioned on a computer.
HR Editor has following functions.

- Uploading the data from a robot to a computer.
- Reading or writing data in a memory card for the robot.
- Editing and printing data on a computer.
- Reading from or writing to Excel worksheet.
- Downloading the data from a computer to a robot.

You can use these functions for saving the robot data, teaching by off-line or making the documents of the robot system.

Important

- "HNC-1XX,2XX,3XX,544" represents the following controller types.
  HNC-1XX, HNC-2XX, HNC-3XX, HNC-544, HAC-644
  Max. 4 axes controlled.
- "HNC-5XX" represents the following controller types.
  HNC-580, HNC-584, HNC-586, HNC-564, HNC-566, HNC-568
  Includes 4 virtual robots and max. 6 axes controlled per robot.
  Notice that HNC-544 does not belong to this type.

Robot Data Types and Access Types

There are two types to access robot data for HR Editor.

(1) Communication by RS232C
You can upload or download robot data by communication to connect the serial port of your computer with the robot controller.

(2) Memory card
Standard robot controllers have the memory card slot and you can use the memory card to save or load robot data by operating the teaching pendant.
HR editor can read from or write to this memory card if the card slot is equipped in the computer.

The following table shows the relation of controller types, robot data type and access type.

Data Type	Access Type	HNC-1XX, 2XX, 3XX, 544	HNC-5XX	Editor
Position Data	Communication	OK	OK	Position Editor
	Memory Card	OK	OK	Position Editor
S.G. Data	Communication	OK	OK	S.G. Editor
	Memory Card	OK	OK	S.G. Editor
S.P. Data	Communication	OK	OK	S.P. Editor
	Memory Card	OK	OK	S.P. Editor
Configuration	Communication	----	OK	Configuration Editor
	Memory Card	----	NG *2	Configuration Editor
Servo Parameter	Communication	OK *1	OK	Servo Parameter Editor
	Memory Card	OK *1	OK	Servo Parameter Editor
Expanded Parameter	Communication	----	OK	Expanded Parameter Editor
	Memory Card	----	OK	Expanded Parameter Editor

OK: Robot holds this data and HR Editor can access it.
----: Robot does not hold this data.

NG: Robot holds this data but HR Editor can not access it.
*1) HR Editor treats servo parameter of HNC-1XX,2XX,3XX,544 as “Memory Data”.
*2) Robot controller has no function to read or write to the memory card for this data.

Extension of Robot Data File Name

HR Editor manages robot data files using the following extension of file name.

Position Data	.pos
S.G. Data	.sg
S.P. Data	.sp
Configuration	.cfg
Servo Parameter	HNC-1XX,2XX,3XX,544: .mem HNC-5XX: .svo
Expanded Parameter	.epr

1.2. Software Components

HBDE has the following software components.

• Main Menu
Main Menu is the integrated menu for HBDE.
The executable file is “Harl3Win.exe”.

• Project Management
Project Management treats the settings of directories, communication parameter and communication format. And it saves those settings to the file or create new project settings.
The executable file is “Harl3Win.exe”.

• HrBasic Editor
HrBasic Editor is the exclusive editor for development of HrBasic program.
The executable file is “Hedit.exe”.

• HBDE, Linker
HBDE, Linker can compile and link the HrBasic programs. It includes the function to download programs to STP.
It translates program sources to executable intermediate codes for STP and downloads those codes to STP.
The executable file is “harlcomp.exe”.

• Debugger
Debugger communicates with STP to debug the current running HrBasic programs. It includes I/O Monitor.
The executable file is “Harl3Win.exe”.

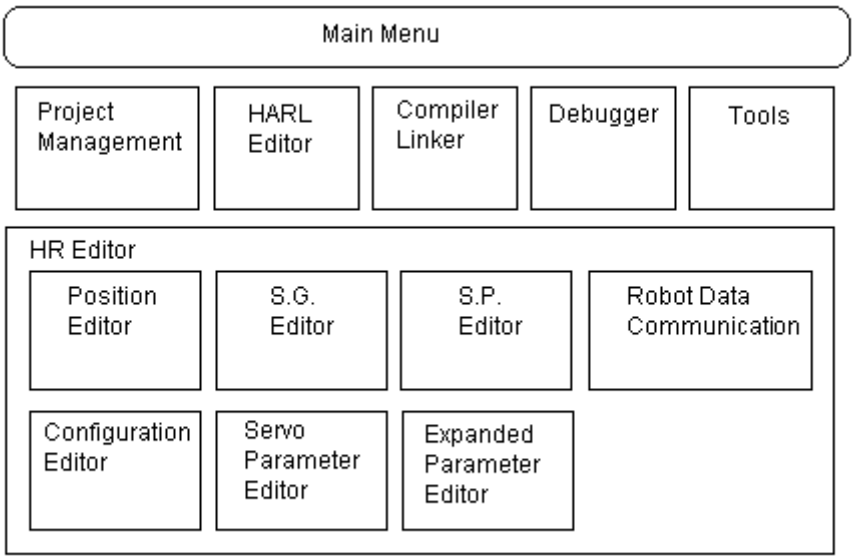
• Tools
Tools includes Communication Test and Terminal.
The executable file is “Harl3Win.exe”.

• HR Editor

To use HR Editor, you can upload position data, S.G. data, S.P. data from a robot and edit the data and download it. HR Editor contains the following programs.

Robot Data Communication	Upload and download robot data The executable file is “UpDown.exe”.
Position Editor	Edit Position Data The executable file is “PosEdit.exe”.
S.G. Data Editor	Edit S.G. Data The executable file is “SgEdit.exe”.
S.P. Data Editor	Edit S.P. Data The executable file is “SpEdit.exe”.
Configuration Editor	Edit Configuration The executable file is “CfgEdit.exe”.
Servo Parameter Editor	Edit Servo Parameter The executable file is “EprEdit.exe”.
Expanded Parameter Editor	Edit Expanded Parameter The executable file is “EprEdit.exe”.

Component Structure



1.3. Operating Environment

HBDE runs under following environment.

Computer

Above i486 processor and Windows 95/98/Me, Windows NT4.0/2000/XP running

Memory

Above 16MB (recommended above 32MB)

Hard Disk

Available above 10MB

Display

Above 640 x 480 pixel

Operating System

Windows 95/98/Me or Windows NT4.0/2000/XP

STP Version

Version 5.03 or later

Memory Card

SRAM memory card formatted and saved by HIRATA robot controller.
TOSHIBA I/O type card is not available.
You cannot access a memory card on a computer running Windows NT4.0.

Robot Controller Type

Types of a robot controller that HR Editor can operate are as follows.

(1) HNC-1XX, HNC-2XX, HNC-3XX, HNC-544, HAC-644 (max. 4 axes)

Note 1) These types are displayed as “HNC-1XX,2XX,3XX,544 (max. 4 axes)” in HR Editor.

Note 2) HR Editor does not support the type that is numbered by two decimals (e.g. HNC-34).

Note 3) Position data is not available to upload, download or edit in case of the following combination of the robot system. You can use a memory card to save position data for these systems. And HR editor can read or write the memory card.

- HNC-SR364＋AR-K440
- HNC-YS364＋AR-K400

Note 4) Among HNC-1XX controllers, DD robot is not supported. But the case of using the upgraded ROM to the DD robot controller is excepted from this restriction.

(2) HNC-5XX standard (max. 6 axes)

(3) HNC-5XX for semiconductor (max. 6 axes)

(4) HNC-5XX with URL (max. 6 axes)

Note 5) "HNC-5XX" represents the following robot controllers based on "HNC-580" controller that includes four virtual robots and can control six axes maximum per robot.

- HNC-580, HNC-584, HNC-586, HNC-564, HNC-566, HNC-568

Note 6) “HNC-5XX for semiconductor” is the type that holds the different S.G. data definition from “HNC-5XX standard” type. “HNC-5XX with URL” is the type that holds the different position data from “HNC-5XX standard” type. URL is robot parameter that is contained in position data of a robot. URL defines the pose of arms of a SCARA type robot. (See “Input Position Data”.) There are very few robots of these types. So, you may ordinarily specify “HNC-5XX standard” type.

Note 7) If the robot controller uses the customized ROM, HR Editor cannot edit the robot data but it can upload or download the robot data. When using the customized ROM, please ask us.

Note 8) Besides these controller types, the robot controller has the stroke-length type as follows.

Short Stroke	-999.999 to +999.999 mm
Standard Stroke	-9999.999 to +9999.999 mm
Long Stroke	-99999.99 to +99999.99 mm
Super Long Stroke	-999999.9 to +999999.9 mm

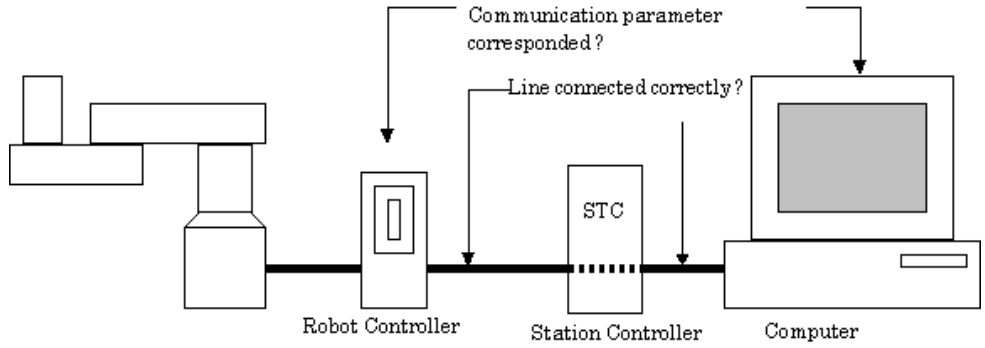
HR Editor supports all these stroke types.

1.4. Connection with STP

When you download HrBasic programs or debug online with STP, RS232C interface is used for the communication with a robot.
The following conditions are necessary to communicate with STP properly.

- Communication parameters correspond with STP.
- Communication cable lines are connected correctly.

You can communicate with a robot directly to use HR Editor. In this case, you must set "Robot Directly" in [Set Up]-[Project Settings]-[COM Format] of Main Menu.



Setting of Communication Parameters

Communication parameters are as follows.

- Speed (300,600,1200,2400,4800,9600,19200,38400)
- Data length (7,8)
- Stop bits (1,2)
- Parity (E,O,N)
- Format (STX-ETX-LRC,STX-CR-LF)

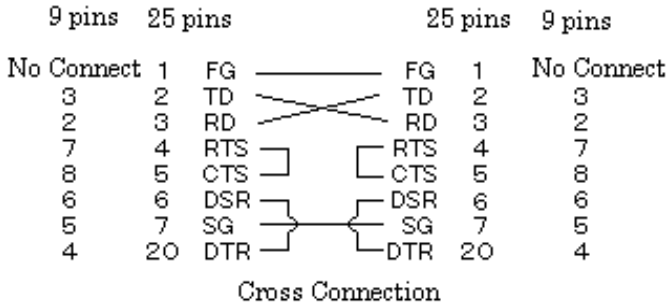
You can set RS232C parameters for the computer by [Set Up] -[Project Settings]-[RS232C Port] of Main Menu. And you can set communication format by [Set Up] -[Project Settings]-[COM Format] of Main Menu. Setting data is saved to the parameter file 'harl.dat'. (See "harl.dat File".)
See "Setting of RS232C Port" about the standard RS232C settings of a robot or STP. And you can see details of how to set RS232C parameters of a robot or STP in the manuals of a robot controller or STP.
See "Setting of COM Format" about other parameters.

STP COM Port

When your computer is connected with STP, only COM8 or COM9 is available for STP.
See "STP COM Port" about the details of STP COM port.

1 for 1 Cable Connection between Computer and STP/Robot

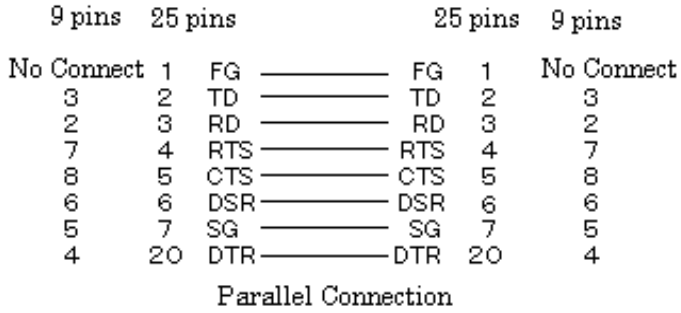
A cross cable is needed for the connection between a computer and a robot, between a computer and STP or between STP and a robot. The RS232C connection is as follows.



Note) • You cannot connect with pins that are not shown above.
• FG is connected with a shield of the cable.
• You cannot connect pin number #1 in a 9 pins cable for the 9 pins - 25 pins or 9 pins - 9pins connection.

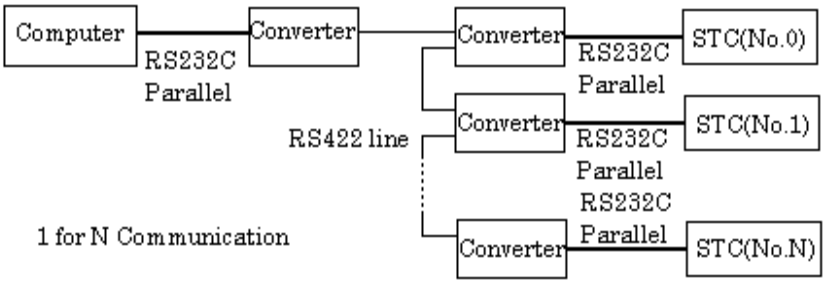
1 for N Cable Connection between Computer and STP

In case of the connection between a computer and more than two STP, use RS232C/RS422 converter and parallel RS232C cable as follows.



Parallel Connection

Note) • You cannot connect with pins that are not shown above.
• FG is connected with a shield of the cable.
• You cannot connect pin number #1 in a 9 pins cable for the 9 pins - 25 pins or 9 pins - 9pins connection.



Note) • The terminated resistance is required for RS422 line.
• Refer to the instruction manual of RS232C/RS422 converter.

STP Number (Station Number)

Each STP has its own station number. In case of 1 for N connection, you must set the different station number to each STP. If a computer is communicating with one of STP, you must specify the station number of that STP for communication.

In case of 1 for 1 connection, you can set the adequate station number to the STP.

The range of the station number is 0 to 999.

You can read or write the station number by [Maintenance]-[Set STP Number] of Main Menu. (See "Set STP Number".)

To use [Setup]-[Project Settings]-[COM Format], you can specify the station number of STP which you want to communicate with. (See "Setting of COM Format".)

1.5. STP COM Port

STP has the following communication ports. According to COM number, the usage for communication is different. You must choose the STP COM port correctly.

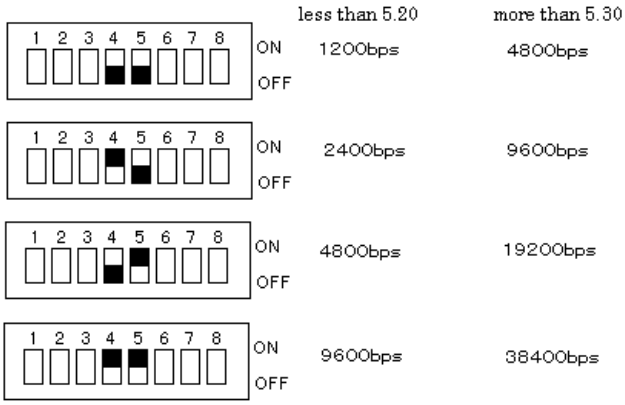
COM0	Available for only HPC-589 (old) type. Connected with a robot by dual port RAM.
COM1	Connected with a robot normally. Also used general-purpose port.
COM2	Connected with a robot normally. Also used general-purpose port.
COM3	Connected with a robot normally. Also used general-purpose port.
COM8	Host port. Connected with a host computer normally. But able to connect with a robot or HBDE. Also used general-purpose port.
COM9	Programming port. Connected with HBDE normally. Cannot connect with a robot.

Setting of RS232C parameters

The RS232C parameters of each COM in STP are set as follows at initialization after power on.

(1) COM9 (Programming port)

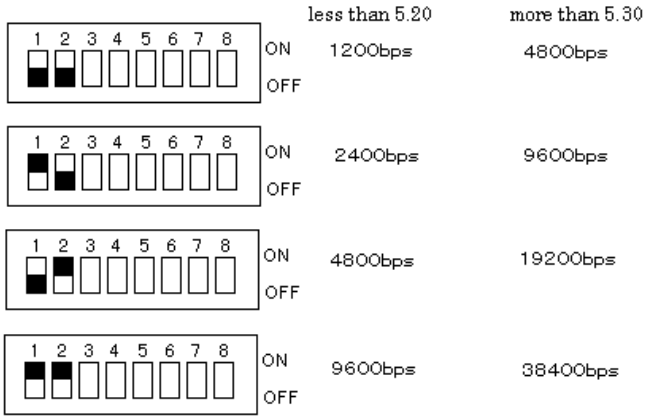
• Speed : According to the dip switch #4 and #5 set in STP. Following figure shows the relation between the dip switch and speed.



• Data length : 8 bits
• Stop bit : 1 bit
• Parity: Non

(2) COM8 (Host port)

• Speed : According to the dip switch #1 and #2 set in STP. Following figure shows the relation between the dip switch and speed.



• Data length : 8 bits

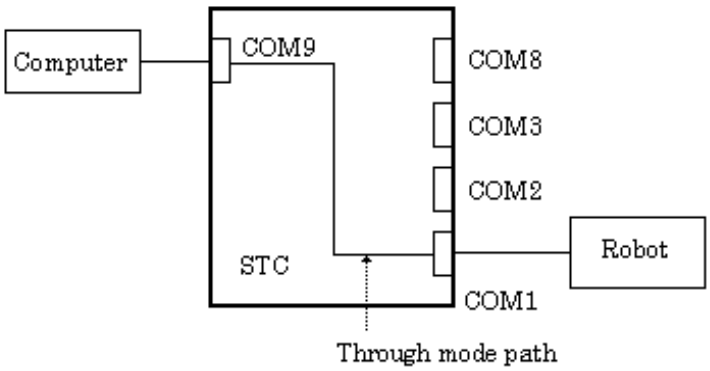
- Stop bit : 1 bit
- Parity: Non

(3) COM1, COM2, COM3 (Robot port)
- Speed : 9600 bps
- Data length : 7 bits
- Stop bit : 1 bit
- Parity: Even

HrBasic programs in STP can access COM1,COM2,COM3 (Robot port) or COM8 (Host port).
When OPEN statement of the HrBasic program is executed, the parameters for these COM are changed by the value described in the OPEN statement.
The parameters for COM9 is never changed because HrBasic program cannot access COM9.

Through Mode

When HR Editor (or HBDE) communicates via STP with a device such as a robot connected with STP COM, STP transfers the status to the "Through Mode".
"Through Mode" is the mode that has the communication path in STP between the computer and the device.



There are two types for the communication of Through Mode as follows.

(1) All the jobs running in STP are stopped immediately when the communication of Through Mode starts. And all the jobs restart at the first step (step number zero) when the communication of Through Mode is terminated.
(2) All the jobs continue to run without stopping when the communication of Through Mode starts. But if there is the conflict of the COM access between the computer using the Through Mode and the HrBasic program, the faster access gets priority to communicate with the COM and the later access is suspended to communicate till the COM is released.

You can select (1) or (2) type for Through Mode in [Set-up]-[Project Settings]-[STP COM port]. And you can set the parameters of RS232C for the STP COM using the communication of Through Mode.
See "STP COM Port Settings" for details.

1.6. Flow of STP Program Development

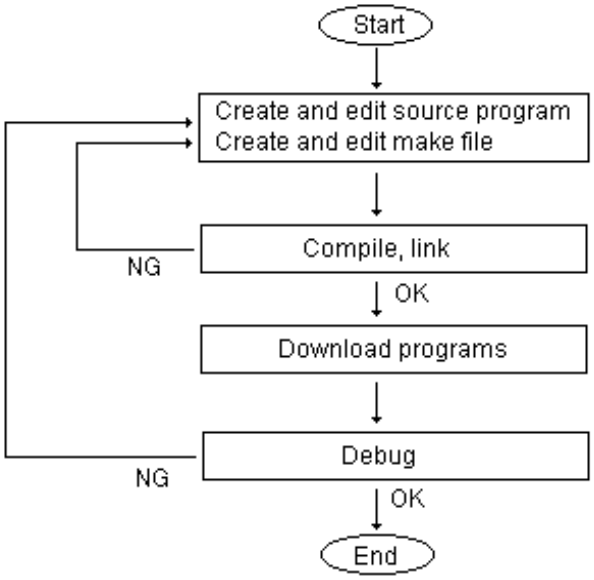
You must develop HrBasic programs that runs in STP by means of the following flow.

1. Edit source programs
- Create and edit HrBasic source files to use a text editor or HrBasic Editor.
- Create and edit HrBasic header or macro files to use a text editor or HrBasic Editor if necessary.
- Create and edit a make file to manage programs that will be downloaded to STP.

2. Compile and link
- Compile and link the programs to specify the make file.
- If compiling or linking errors have occurred, modify the programs and compile and link them again.

3. Download the programs
- Download the programs without compiling or linking errors to STP.

4. Debug the programs
- Check the programs in STP run correctly and debug them.
- If an error occurs or the programs run with the unexpected execution, modify the program and retry 2. 3. 4.



2. Installation

2.1. Install HBDE

The installation program (SETUP.EXE) contained in the system disks creates the new directory (default: ¥Program Files¥Hbde) in the specified hard disk and copies files of HBDE.
In this section, we assume the installing floppy drive is 'A:' and the destination directory of the installing hard disk is 'C:' when you install HBDE.

Note) You have to terminate all Windows applications.
If you have inserted a memory card to the card slot, remove it.

Uninstall Current HBDE

If HBDE has been already installed, uninstall the current HBDE according to "Uninstall HBDE".

Confirm Available Hard Disk

You must confirm that available volume of hard disk is above10MB before the installation.

How to Install

1. Start Windows95/98/Me/NT/2000/XP.

2. Insert the system disk of HBDE to the drive.

3. Start installation program to click or double-click "Setup.exe" in the system disk. If the disk is CD-R, refer to "ReadMe.txt" in the disk.

4. The installation program runs and operate according to the guidance message. During the installation, the dialog box to input a security ID will be shown. Please input the security ID printed on the setup disk. If the specified ID is invalid, the installation is terminated unsuccessfully. When the installation completes, following files are copied to the specified directory.

Default.hrp	Default project file
Harl.ini	Initializing file for Main Menu
Comtest.ini	Initializing file for Communication Test
Harl3Win.exe	Executable file of Main Menu
Hedit.exe	Executable file of HARL Editor
HarlComp.exe	Executable file of compiler/linker
PosEdit.exe	Executable file of Position Editor
SgEdit.exe	Executable file of S.G. Editor
SpEdit.exe	Executable file of S.P. Editor
CfgEdit.exe	Executable file of Configuration Editor
SvoEdit.exe	Executable file of Servo Parameter Editor
EprEdit.exe	Executable file of Expanded Parameter Editor
UpDown.exe	Executable file of Robot Data Communication
HRhelpE.hlp	Help file (English)
HRhelpE.gid	GID file for Help (English)
HRhelpE.cnt	Help contents file (English)
HRhelpJ.hlp	Help file (Japanese)
HRhelpJ.gid	GID file for Help (Japanese)
HRhelpJ.cnt	Help contents file (Japanese)
Variable.dag	S.G. data definition file (for HNC-3XX)
Variable.dap	S.P. data definition file (for HNC-3XX)
Variable_1.dam	Memory data (type 1) definition file (for HNC-3XX)
Variable_2.dam	Memory data (type 2) definition file (for HNC-3XX)
Variable_3.dam	Memory data (type 3) definition file (for HNC-3XX)

Variable_4.dam	Memory data (type 4) definition file (for HNC-3XX)
Vari_6.dac	Configuration definition file (for HNC-5XX)
Vari_6.dae	Expanded Parameter definition file (for HNC-5XX)
Vari_6.dag	S.G. data definition file (for HNC-5XX)
Vari_6_Semicon.dag	S.G. data definition file (for HNC-5XX Semiconductor)
Vari_6.dap	S.P. data definition file (for HNC-5XX)
Vari_6.dag	Servo Parameter definition file (for HNC-5XX)
compe.dsp,compj.dsp	Message definition file of compiling error
compmsge.dsp,compmsgj.dsp	Message definition file of compiler/linker
edmsge.dsp,edmsgj.dsp	Message definition file of HARL Editor
joberre.dsp,joberrj.dsp	Message definition file of job error
msge.dsp,msgj.dsp	Message definition file of Main Menu
pemsge.dsp,pemsgj.dsp	Message definition file of Position Editor
sgemsge.dsp,sgemsgj.dsp	Message definition file of S.G. Editor
spemsge.dsp,spemsgj.dsp	Message definition file of S.P. Editor
CfgemsgE.dsp, CfgemsgJ.dsp	Message definition file of Configuration Editor
SvoemsgE.dsp, SvoemsgJ.dsp	Message definition file of Servo Parameter Editor
EpremsgE.dsp, EpremsgJ.dsp	Message definition file of Expanded Parameter Editor
udmsge.dsp,udmsgj.dsp	Message definition file of Robot Data Communication
Comerre.dsp,Comerrj.dsp	Message definition file of communication error
Roberre.dsp,Roberrj.dsp	Message definition file of robot error
Stc_erre.dsp,Stc_errj.dsp	Message definition file of STP error
Errcape.dsp,Errcapj.dsp	Message definition file of error window caption
VBrunErrE.dsp,VBrunErrJ.dsp	Message definition file of VB runtime error
Hrcom.dll	Common DLL

The following files will be copies to the directory where Windows 95/98/Me/NT/2000/XP is installed.

¥System¥HrMemCardX.ocx	Memory card access ActiveX
¥System¥hmc.dll	Memory card access DLL
¥System¥HrMcdErrE.dsp	Message definition file of memory card access
¥System¥HrMcdErrJ.dsp	
¥System¥Himcard.vxd	Device driver for memory card
¥Inf¥Himcard.inf	Device driver setup information for memory card

6. After the installation, the group icon [HrBasic Developing Environment X.XX] is registered in the start menu of Windows. And in this group, following icons are registered.

Icon	**Explanation**
[HrBasic Developing Environment X.XX]	This starts Main Menu of HBDE.
[HrBasic Editor]	This starts HrBasic Editor (Hedit.exe) alone
[Position Editor]	This starts Position Editor (PosEdit.exe) alone.
[S.G. Editor]	This starts S.G. Editor (SgEdit.exe) alone
[S.P. Editor]	This starts S.P. Editor (SpEdit.exe) alone.
[Configuration Editor]	Starts Configuration Editor (CfgEdit.exe) alone.
[Servo Parameter Editor]	Starts Servo Parameter Editor (SvoEdit.exe) alone.
[Expanded Parameter Editor]	Starts Expanded Parameter Editor (EprEdit.exe) alone.
[Robot Data Communication]	This starts Robot Data (position data, S.G. data, S.P. data) Communication alone. You can upload or download the robot data.
[Help]	Help is shown.

7. After the installation, you must start Main Menu first by [HrBasic Developing Environment X.XX] in the start menu. If you start [Position Editor], [S.G. Editor], [S.P. Editor] or [Robot Data Communication] first, an error has occurred since 'harl.dat' file is not created. 'harl.dat' file is created after running of Main Menu with checking directories for HR Editor. If 'harl.dat' file has been created once, you can starts [Position Editor], [S.G. Editor], [S.P. Editor] or [Robot Data Communication] without running of Main Menu. (See "harl.dat File".)

8. After the installation, a new project is opened when Main Menu starts. In this status, settings of file directories, communication parameters and communication format for STP or a robot are default.

So you have to set proper values to select [Set Up]-[Project Settings]-[Directory], [Set Up] -[Project Settings]-[RS232C Port] and [Set Up] -[Project Settings]-[COM Format] in Main Menu.

You can save the settings to select [File]-[Save Project As]. At the next running of Main Menu, the saved settings are automatically read from the last used project file.

When you change the settings by Main Menu, the settings are written to 'harl.dat' file and 'harl.dat' file will be used by [Position Editor], [S.G. Editor], [S.P. Editor] or [Robot Data Communication].

2.2. Install Memory Card Driver

To insert the memory card to the card slot, HR Editor can access the memory card (HNC memory card) used by the robot controller if the computer is equipped with the card slot.
If Windows NT/2000/XP is running, HR Editor cannot access the memory card.
Also if your computer does not support PCMCIA (Card Service), HR Editor cannot access the memory card.

When HR Editor is installed, the driver file to access the memory card is copied to the hard disk of the computer. Because this driver is based on Windows plug and play, the installation of the driver is executed at the first insertion of the memory card.
After HR Editor installation, operate as follows to install the memory card driver. After this operation one time, HR Editor can access the memory card only by insertion to the card slot.
You must execute the following operation with the condition to terminate all application programs including HR Editor.

1. Insert the memory card to the card slot of the computer.

2. "New hardware found" dialog is shown.

3. "Building hardware information database" dialog is shown to create the hardware information database. And then the driver installation is executed automatically by Windows plug and play.

4. "New hardware found" dialog is shown. If you can see the hardware name "HNC XXXX Memory Card" in this dialog, the installation of HNC memory card driver is completed.
If you can see the other name such as "SRAM memory card", still inserting the memory card, you must operate after "5."
If you cannot see the hardware name in this dialog, still inserting the memory card, you have to open device manager by operate "5." to "7." After [Memory Technology Drivers (MTD)] double-clicked, you can see the hardware name of the currently inserted memory card at the node under [Memory Technology Drivers (MTD)]. If this name is not "HNC XXXX Memory Card", operate after "9."

5. Open [Settings]-[Control Panel] from the start menu of Windows.

6. Open [System] icon to show system properties window.

7. Select [Device Manager] tab to show the device structure.

8. After [Memory Technology Drivers (MTD)] double-clicked, you can see the hardware name of the currently inserted memory card such as "SRAM memory card" at the node under [Memory Technology Drivers (MTD)]. Double-click this hardware name or click [Properties] button selecting the hardware name to show the hardware properties.

9. Select [Driver] tab.

10. Click [Change Driver] to show the device selection window.

11. Select "HNC XXXX Memory Card" and click [OK] button.

12. Neglecting the message "No Drivers are installed for this device." click [OK] button.

13. The message "Your hardware settings have changed. You must restart your computer for these changes to take effect. Do you want to restart your computer?" is shown. Click [Yes] to restart the computer.

14. After the computer restarted, open device manager by operation "5." to "7."

15. After [Memory Technology Drivers (MTD)] double-clicked, if you can see the hardware name "HNC XXXX Memory Card" of the memory card, the installation of HNC memory card driver is completed.

Confirmation of Memory Card Hardware Name

You can confirm the memory card hardware name as follows after inserting the memory card to the card slot.

1. Open [Settings]-[Control Panel] from the start menu of Windows.

2. Open [System] icon to show system properties window.

3. Select [Device Manager] tab to show the device structure.

4. Double-click [Memory Technology Drivers (MTD)] node to show the hardware name of the currently inserted memory card at the node under [Memory Technology Drivers (MTD)].

If you can see the hardware name "HNC XXXX Memory Card", the installation of the driver that HR Editor can recognize has been completed correctly.
If you cane see the other name, you have to operate after "5." of the memory card installation procedures mentioned above.

2.3. Uninstall HBDE

1. Start [Add/Remove Program Properties] in the control panel of Windows.

2. Select [HrBasic Developing Environment X.XX] in the [Install/Uninstall] tab and click [Add/Remove] button.

3. The uninstallation program is started. Operate according to shown messages.

4. During uninstalling, the message that means "This file is shared." may be showed. In this case, select [Save]. And if you select [Save], the message that means "Some components cannot be deleted." may be shown at the end of uninstallation but this is not an error.

5. At the end of uninstallation, the message that means "Directory cannot been deleted." may be shown. This is not an error and this message is shown in case some files (for example 'harl.dat') besides the installing files remain at the directory of HBDE system. If you don not need to save the installed directory, delete the directory by the explorer after uninstallation completed.

2.4. Registration of File Types

When installation, the installer registered file types of robot data files to Windows system.
Registration of file types means that data file is related to the editor application.
If you show the directory at which robot data files are located by Explore, robot data icons will be shown as follows.

Name	Size	Type	Modified
580ueda.cfg	2KB	HR Configuration File	1/6/00 6:29 PM
580ueda.cfx	1KB	CFX File	1/6/00 6:29 PM
580ueda.epr	9KB	HR Expanded Para...	1/6/00 2:49 PM
580ueda.pos	24KB	HR Position File	1/6/00 2:48 PM
580ueda.sg	2KB	HR S.G. Data File	1/6/00 7:04 PM
580ueda.sgx	1KB	SGX File	1/6/00 7:04 PM
580ueda.sp	2KB	HR S.P. Data File	1/6/00 2:48 PM

Select a robot data file in Explore and click or double-click an icon to start an editing application of HR Editor opening the selected file.
Note) Before executing the above-mentioned operation, you must start Main Menu to select [Start]-[Programs]-[HrBasic Developing Environment X.XX]-[HrBasic Developing Environment X.XX] and terminate it only once after installation.

3. Overview of Main Menu

Main Menu is started by clicking [Programs]-[HrBasic Developing Environment X.XX]-[HrBasic Developing Environment X.XX] in the start menu. After starting, Main Menu shows the logo and the menu window as follows.

Main Menu is the integrated menu for HBDE. You can use the following functions.

[File] menu

[New Project]

Creates a new project.

[Open Project]

Opens the project already existed.

[Update Project]

Updates the current opened project.

[Save Project As]

Saves the current opened project as the other name.

[Network Definition]

Edits network definition file.

[Make]

Creates and edit a make file.

[Source]

Creates and edits a source file. This starts the editor specified by [Setup]-[Project Settings]-[Directory]. Default is HrBasic Editor (Hedit.exe).

[Header]

Creates and edits a header file. This starts the editor specified by [Setup]-[Project Settings]-[Directory]. Default is HrBasic Editor (Hedit.exe).

[Macro]

Creates and edits a macro file. This starts the editor specified by [Setup]-[Project Settings]-[Directory]. Default is HrBasic Editor (Hedit.exe).

[List]

Opens a list file. This starts the editor specified by [Setup]-[Project Settings]-[Directory]. Default is HrBasic Editor (Hedit.exe).

[Position]

Starts Position Editor (PosEdit.exe).

[S.G. Data]

Starts S.G. Editor (SgEdit.exe).

[S.P. Data]

Starts S.P. Editor (SpEdit.exe).

[Recent Used Files]

Shows the list of recent opened files up to 64 files. You can select a file in the list to open it.

[Exit]

Exits HBDE.

[Memory Card] menu

[Open File]

Opens a file saved in a robot memory card.

[Memory Card Information]

Shows memory card information such as file list, memory size, number of using files and free space and so on.

[Memory Card Check]

Checks a robot memory card formatted.

[Delete File]

Deletes a file save in a robot memory card.

[Memory Card Format]

Formats a robot memory card.

[Binary Compare]

Compares two memory card files as binary data.

[Dump]

Dumps a robot memory card.

[Compile] menu

[Compile]

Compiles a source file.

[Make]

Compiles only updated source files registered in the make file and links them.

[Build All]

Compiles all source files registered in the make file and links them.

[Download]

Downloads the linked program to STP.

[Option]

Sets option for compiling or linking.

[Get Information]

Shows the compiling or linking information such as the volume of used memory in STP, the number of used variables.

[Debug] menu

[Debug]

Debugs the running program in STP.

[I/O Check]

Shows I/O monitor that watches the current DI/DO signals in STP. You can fix these signals to ON or OFF.

[Maintenance] menu

[Terminal]

Communicates by terminal mode. You can receive or send HRCS (Hirata Robot Communication System) commands for a robot or STP.

[STP Version]

Reads STP version.

[Set Clock]

Sets clock to STP.

[Set STP Number]

Sets the station number to STP.

[Program Make Information]

Reads make file name and created date/time of the current running program in STP.

[Fieldbus]

Reads or watches various state of fieldbus network working in STP.

[Robot Data Communication]

Uploads or downloads position data, S.G data or S.P. data. (Start Robot Data Communication (UpDown.exe).)

[Set Up] menu

[(Project Name) Project Settings]

Sets several conditions of the current opened project. Contents of settings are as follows.

- Directory

  Sets the directory for robot data (position data, S.G. data, S.P. data)

- RS232C Port

  Sets communication parameters of COM ports of a computer.

- COM Format

Sets communication conditions such as whether via STP or robot directly, STP number, robot number, COM number in STP, type of robot controller, communication retry number, communication time out value.

• STP COM Port

Sets various parameters for STP COM ports in the case of the communication via STP.

[Robot Stroke]

Sets robot stroke types as default used in editing applications.

[Printer]

Sets printer conditions.

[Language]

Selects displayed language (English or Japanese).

[Font]

Selects a font of Main Menu.

[Clear List of Recent Files]

Remove all lists of recent used project files displayed in [File] menu.

[Tools] menu

[Communication Test]

Tests the communication with a robot or STP. This examines the RS232C port automatically and renews the project settings.

[Ascii Code]

Shows ascii code table.

[Robot Error Code]

Shows robot HRCS command error response table.

[STP Error Code]

Shows STP HRCS command error response table.

[Window] menu

Note) The following menus to operate editor windows are available only when you have started editors from Main Menu. If you started editors alone from Windows [Start] menu, these menus are disabled.

[Maximize All Editors]

Maximizes all editor windows running currently.

[Minimize All Editors]

Minimizes all editor windows running currently.

[Arrange Editor Windows]

Arranges editor windows running currently. Arrangement is as follows.

• Move Main Menu to the top of the screen.

• Maximize editor windows not overlapped with Main Menu window.

[Cascade Editor Windows]

Cascades editor windows running currently under Main Menu window.

[Position Editor]

This menu is available only when Position Editor has been started from Main Menu. Position Editor among editor windows is activated to show at the top of windows.

[S.G. Editor]

This menu is available only when S.G. Editor has been started from Main Menu. S.G. Editor among editor windows is activated to show at the top of windows.

[S.P. Editor]

This menu is available only when S.P. Editor has been started from Main Menu. S.P. Editor among editor windows is activated to show at the top of windows.

[Configuration Editor]

This menu is available only when Configuration Editor has been started from Main Menu. Configuration Editor among editor windows is activated to show at the top of windows.

[Servo Parameter Editor]

This menu is available only when Servo Parameter Editor has been started from Main Menu. Servo Parameter Editor among editor windows is activated to show at the top of windows.

[Expanded Parameter Editor]

This menu is available only when Expanded Parameter Editor has been started from Main Menu. Expanded

Parameter Editor among editor windows is activated to show at the top of windows.

[Terminate All Editors]

Terminates all editor windows running currently. If you have not saved an opened file, each editor shows the message to request saving.

[Help] menu

[Help Topics]

Shows help topics.

[Logo]

Shows HR Editor logo.

[Version]

Shows HR Editor version.

Status Bar

In status bar, the summary of the project settings currently specified in [Set-up]-[Project Settings] is shown.

- The settings of PC RS232C communication are shown by the following format.
  PC COM Settings: COM-no. Speed, Data-length, Parity, Stop-bit

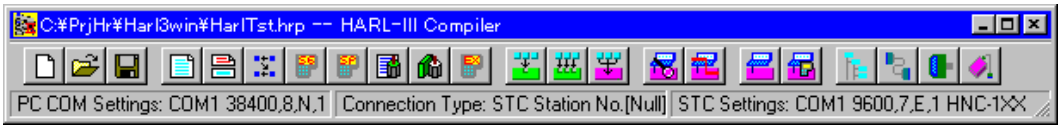
- The settings of connection type are shown by the following format.
  Connection Type: Equipment-to-connect Robot-no./STP-no.

- The settings of STP COM port are shown by the following format.
  STP Settings: STP-COM-no. Speed, Data-length, Parity, Stop-bit Equipment-to-connect Robot-no.

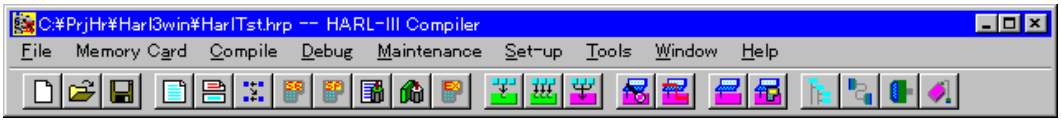
Changing Outward Appearance

The popup menu that displays the visible state of the menu bar and the status bar is shown to click the right button of the mouse on the toolbar (a bar on which buttons is located). When the menu bar or the status bar is visible, the checking mark is displayed in the popup menu.
You can hide or resume the menu bar or the status bar to click [Menu Bar] or [Status Bar] in the popup menu.

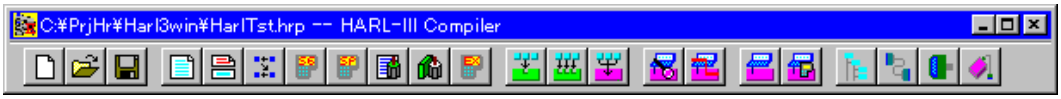
- Only the menu bar is hidden



- Only the status bar is hidden

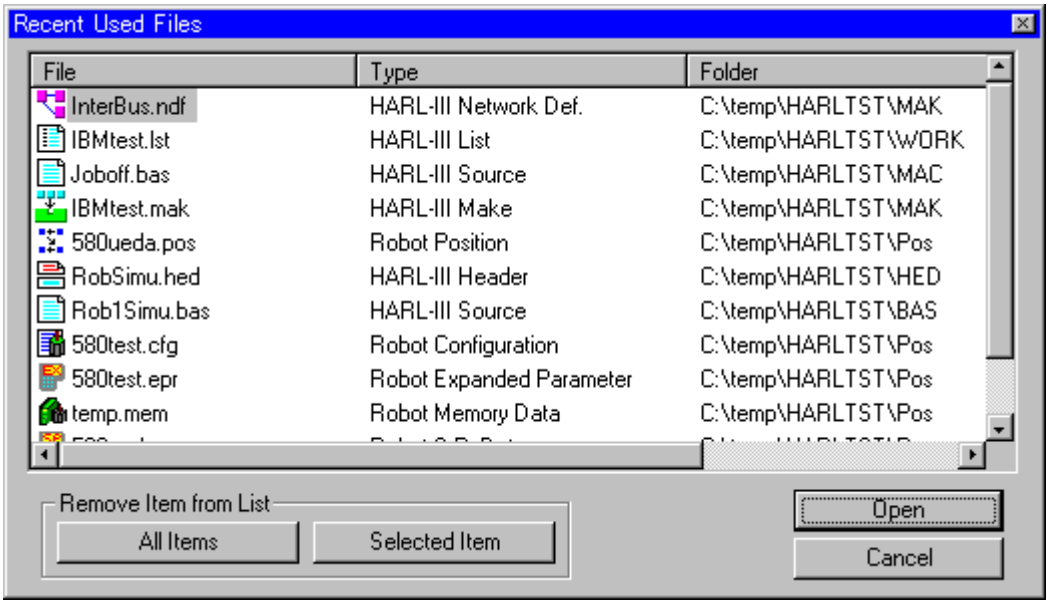


- Both the menu bar and the status bar are hidden



[File]-[Recent Used Files]

After you have clicked [File]-[Recent Used Files] in Main Menu, the following window is shown.



The list of files recently opened is displayed in the list view.
The maximum number of the displayed items is 64.
After you select a file in the list, click [open] button or double-click a file to open the selected file showing the editing window according to the file type.

By using [Remove item from List], you can remove the item of the list.
Note) The file itself is never removed in PC.
Click [Selected Item] button to remove only the currently selected item.
Click [All Items] button to remove all items in the list.

4. Project Management

4.1. Project Settings

Project is managed to save the settings of file directories, communication port parameters, communication format to a project file. To save these settings as a project file, you can treat many program groups in the different conditions by selecting the project file.

In Main Menu, one project file is opened currently. To start Main Menu after installation, a new project is opened. The settings of a new project are defined in 'Default.hrp' file. You can customize the settings of a new project to edit 'Default.hrp' by a text editor. The format of 'Default.hrp' file is the same as 'harl.dat' file. (See "harl.dat File".)

You can change the current settings by [Setup]-[Project Settings]. Contents of settings are as follows. And you can see and change the settings by switching tabs.

(1) Directory

You can set the directory for work files, source files, header files, macro files, make files and robot data files. And you can set the file path of a using editor to edit HrBasic programs. Refer to "Setting of Directories" about operation.

(2) RS232C Port

You can set parameters of RS232C port of a computer that communicates with a robot or STP. You can specify speed, data length, stop bits, parity and you can select a serial port of PC to communicate.
Refer to "Setting of RS232C Port" about operation.

(3) COM Format

You can set communication conditions as follows.

- Via STP or robot directly
- STP number (Station number)
- Robot number
- COM number in STP in case of via STP
- Robot controller type
- Communication format
- Command retry number in case of communication error
- Wait timer for response

Refer to "Setting of COM Format" about operation.

(4) STP COM Port

Through Mode of STP is used when the computer communicates with a robot via STP. (See "STP COM Port".)
You can set various conditions of STP COM in the case of using the communication of Through Mode.

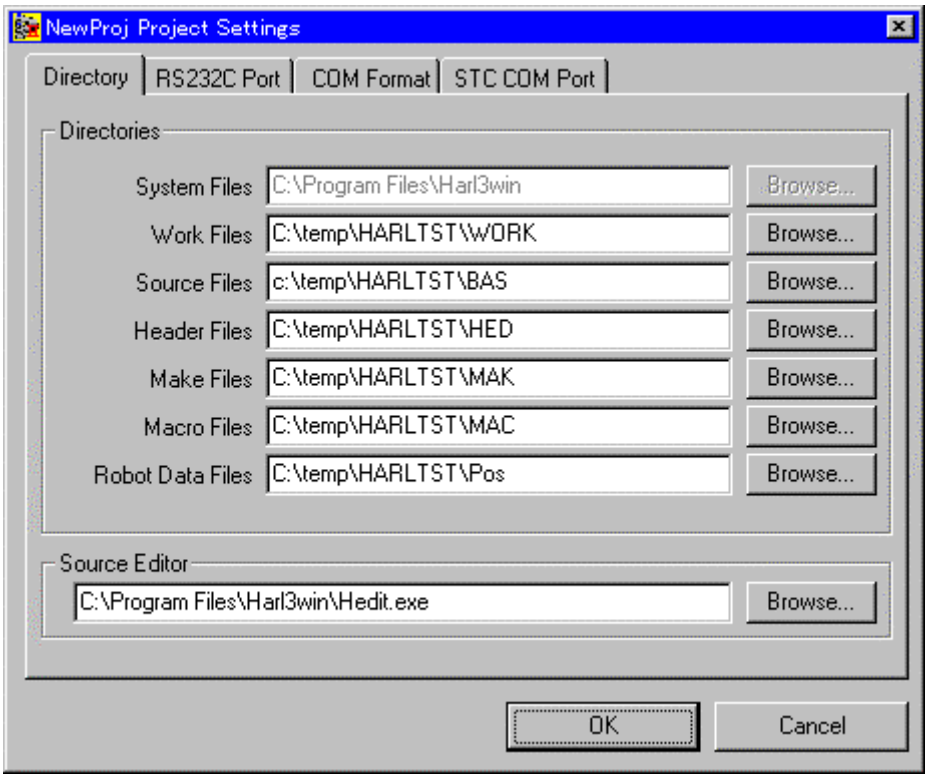
- RS232C parameters of STP COM (speed, data length, parity, stop bits)
- Using or not using the current RS232C parameters set in STP
- Robot number and robot controller type
- Stopping or not stopping jobs during the communication
- Waiting timer till the HrBasic program releases STP COM in the case of not stopping jobs during the communication.

Refer to "Setting of STP COM Port" about operation.

You can read and use the settings after you save this parameters and conditions as a project file (suffix ".hrp") to select [File]-[Update] or [File]-[Save As]. When the next starting Main Menu, the recent used project file is read automatically.

4.2. Setting of Directories

Select [Setup]-[Project Settings] in Main Menu and then select [Directory] tab or click  button in the toolbar.



Setting of Directories

You must specify the directories at which the following files are located.

(1) System Files
You cannot change the HBDE system directory. The system directory shown in this window is detected when Main Menu started.

(2) Work Files
In this directory, the following files that are created by compiling and linking are located.

XXXXX.obj	Program object file (Intermediate code file translated by compiler)
XXXXX.var	Local variable file
XXXXX.gbl	Global variable file
XXXXX.job	Job name file
XXXXX.exv	Linked information file
XXXXX.ref	Reference file (Contains compiling information)
XXXXX.lst	List file (Used by Debugger)

(3) Source Files
Specify the directory for program source files (suffix ".bas").

(4) Header Files
Specify the directory for header files (suffix ".hed").

(5) Make Files
Specify the directory for make files (suffix ".mak") and network definition files (suffix ".ndf").

(6) Macro Files

Specify the directory for macro files (suffix ".bas").

(7) Robot Data Files

Specify the directory for the following robot data files which HR Editor reads or writes.

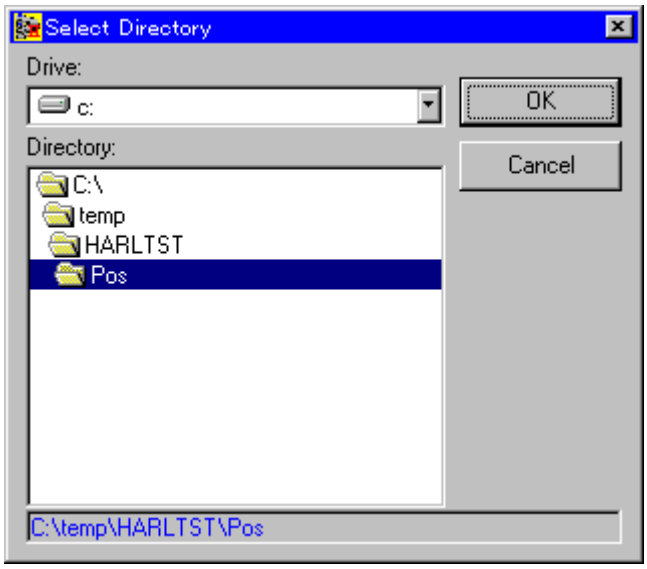
- Position data file (suffix ".pos")
- S.G. data file (suffix ".sg")
- S.P. data file (suffix ".sp")
- Configuration file (suffix ".cfg")
- Servo parameter file (suffix ".svo" or ".mem")
- Expanded parameter file (suffix ".epr")

Setting of Source Editor

Specify the full path of a text editor used in [File]-[Source], [File]-[Header], [File]-[Macro] and [File]-[List]. HBDE chooses HrBasic Editor as default.

How to Specify the Directory

Enter the directory name and click [OK]. If the specified directory is not found, the message is shown to create it. Click [Browse] to show the browsing window and you can select the directory.



Double click the folder to select the directory. Selected directory is shown at the lower of the window. Confirm the directory name and click [OK] to set the directory.

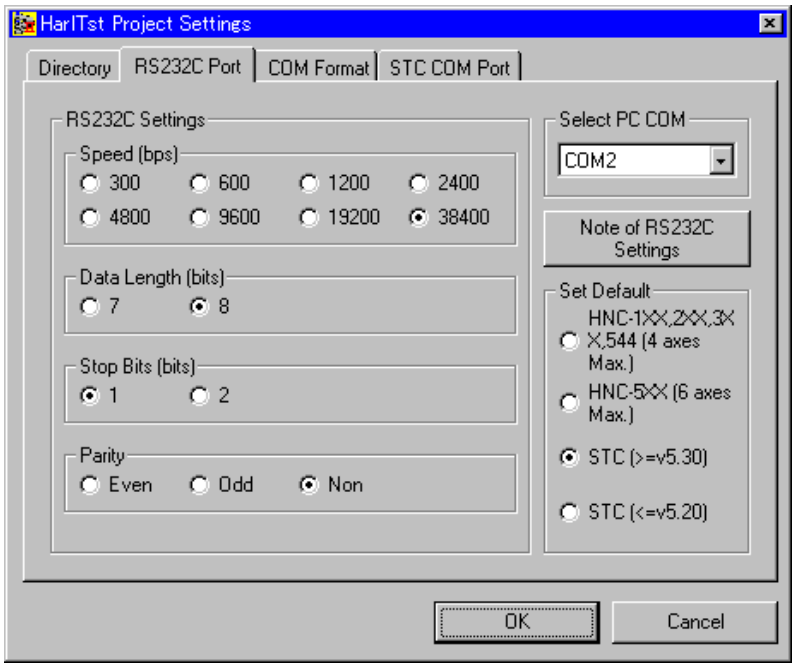
4.3. Setting of RS232C Port

Select [Setup]-[Project Settings] in Main Menu and then select [RS232C Port] tab or click  button in the toolbar.

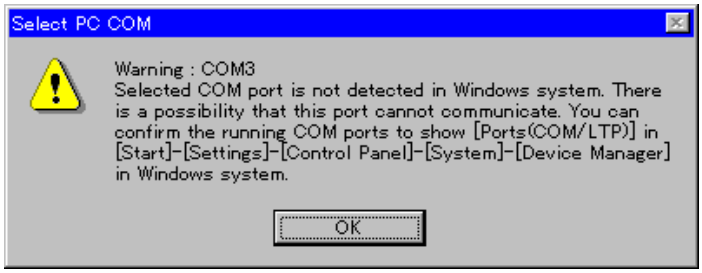
You can set parameters for the RS232C communication port (COM port) of a computer.
You must set parameters to correspond the computer settings to a robot or STP when you use the following functions.

- [Compile]-[Download]
- [Debug]-[Debug]
- [Debug]-[I/O Check]
- [Maintenance]-[Terminal]
- [Maintenance]-[STP Version]
- [Maintenance]-[Set Clock]
- [Maintenance]-[Set STP Number]
- [Maintenance]-[Program Make Information]
- [Maintenance]-[Fieldbus]
- [Maintenance]-[Robot Data Communication]

See "Connection with STC" about the connection with a robot or STP.



First, you must select a serial port of the computer in "Select PC COM". For the standard computer, COM1 or COM2 is available. If you select a PC COM that Windows system cannot detect, the following message is shown.



According to the message, check available PC COM to open Device Manager of Windows.
Without this message, then select the setting for speed, data length, stop bit and parity of the selected PC COM.
Click [OK] to enable the selected settings. If you click [Cancel], the settings are not change.

Standard settings for the communication with STP

When communicated with a robot via STP, standard settings are as follows.

Data length : 8 bit
Stop bit : 1 bit
Parity : Non
Speed : Choose between 1200,2400,4800,9600,19200,38400(bps) according to the dip switch #4 and #5 set in the STP. In case STP version is less than 5.20, STP setting is 9600 bps and in case STP version is more than 5.30, STP setting is 38400. See "STP COM Port" about the relation between the dip switch and the speed.

Standard settings for the communication with a robot

When communicated with a robot directly, standard settings are as follows.

Data length : 7 bit
Stop bit : 1 bit
Parity : Even
Speed : Choose between 300,600,1200,2400,4800,9600,19200,38400(bps) according to S.G. data [ORIGIN]-[SET-UP SYSTEM]-[TRANSFER RATE] set in the robot. Check the robot setting by Teach Pendant.

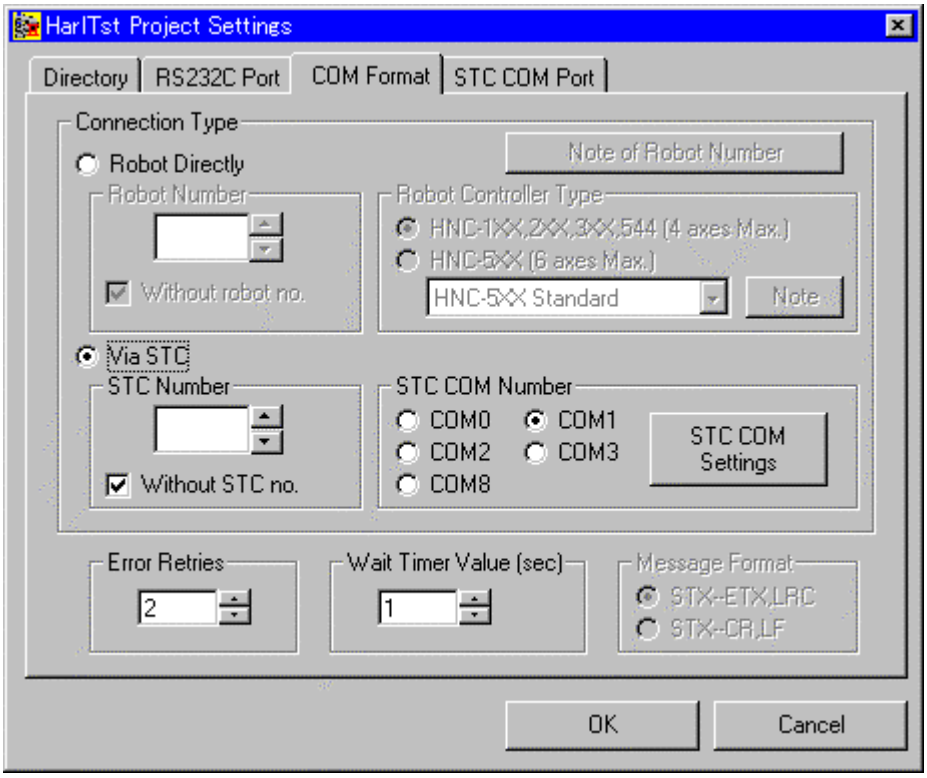
Set default

To select a connected destination in "Set Default", standard settings of the selected equipment are automatically set.

4.4. Setting of COM Format

Select [Setup]-[Project Settings] in Main Menu and then select [COM Format] tab or click  button in the toolbar.

You can set the communication conditions for a robot or STP.



Connection Type

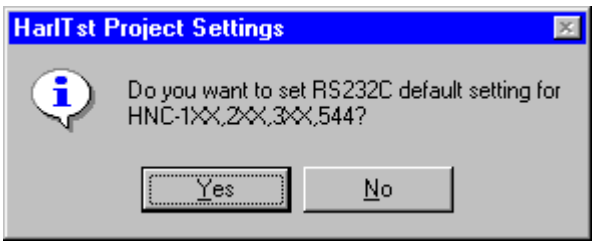
You can select the communication with a robot via STP or with a robot directly.
The following settings are available to select “Robot Directly”.

- Robot Number
- Robot Controller Type

The following settings are available to select “Via STP”.

- STP Number
- STP COM Number

After you have changed connection type, if the current RS232C settings are different from the standard settings of selected connection type, the following message is shown.



Select [Yes] to change the current RS232C settings to default automatically.

Robot Number

You cannot change the robot number when communicated with a robot via STP. You can set it only when communicated with a robot directly.
You can specify 0 through 999 as the value of robot number.

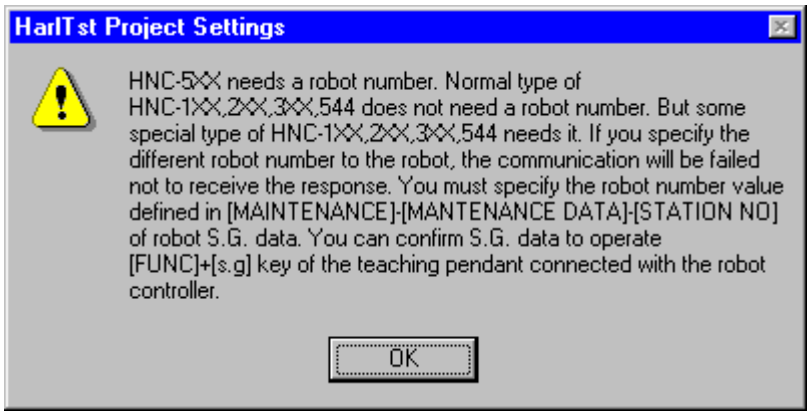
(1)Communication with a robot in which the robot number is available.
In case of the communication with a robot in which the robot number is available, you must set the robot number whether via STP or robot directly and whether one-for-one or one-for-N communication. If the specified number is not the same as the target one or the communication is without the robot number, the communication time out error will occurs since the robot never responds.
You must specify the value of the robot number that is set in S.G. (system generation) data, [MAINTENANCE]-[MAINTENANCE DATA]-[STATION NO.].

(2)Communication with a robot in which the robot number is not available.
In case of the communication with a robot in which the robot number is not available, check [Without robot no.]. If you specify the robot number, the command error will be received.

Note) A HNC-5XX (max. 6 axes) type controller always needs the robot number.
A standard HNC-1XX,2XX,3XX,544 (max. 4 axes) type controller cannot use the robot number. But some special type of HNC-1XX,2XX,3XX,544 needs it.

Robot Controller Type

You cannot change the robot controller type when communicated with a robot via STP. You can set it only when communicated with a robot directly.
According to the robot controller type to access, the communication format of position , S.G., S.P. data is different. If the specified controller type is not matched, an error may occurs when communication or invalid data may be uploaded/downloaded.
When the mouse pointer moves on a option button of controller type, detailed model names of available controllers will be shown as the tool-tip window.
When you select HNC-1XX,2XX,3XX,544 (4 axes max.), the specified robot number is deleted automatically, but you can enter it again.
If you select HNC-5XX without a robot number, the robot number is proposed automatically showing the following message. Proposed number is not suitable, change it.



After [OK] clicked, the message dialog that asks to change RS232C settings to HNX-5XX default will be show.
When you select HNC-5XX, “HNC-5XX Standard” is selected automatically. “HNC-5XX for semiconductor” is the type that holds the different S.G. data definition from “HNC-5XX standard” type. “HNC-5XX with URL” is the type that holds the different position data from “HNC-5XX standard” type. URL is robot parameter that is contained in position data of a robot. URL defines the pose of arms of a SCARA type robot. (See “Input Position Data”.) There are very few robots of these types. So, you may ordinarily specify “HNC-5XX standard” type.

STP Number (Station Number)

You cannot change the STP number when communicated with a robot directly. You can set it only when communicated with a robot via STP.
You can specify 0 through 999 as the value of STP number.

(1)Communication with more than two STP by multiple drop
In case of the communication with more than two STP by multiple drop, you must specify the target STP number by keyboard input or scrollbar. If the specified STP number is not the same as the target one, the response is never received and the communication time out error will occur. If you set the communication without STP number, all STP responds and it will be unexpected situation for the communication.

(2)Communication with only one STP
In case of the communication with only one STP, Communication is possible whether you set the STP number or you select [Without STP no.] that does not use the STP number in the communicated command.

You can check the target STP number to select [Maintenance]-[Set STP Number] or operate as follows in Terminal window.
(1)Connect the target STP by one-for-one.
(2)Open [Maintenance]-[Terminal] and input "RN" + return on the HRCS protocol mode.
(3)STP responds with the STP number that contains three decimal character.

STP COM Number

You cannot change the STP COM number when communicated with a robot directly. When communicated with a robot via STP, you must specify the COM number in STP that connected with the target robot. If the specified COM number in STP is invalid, the communication time out error will occur or an another robot will response through the different COM port in STP.

STP COM Settings

You cannot set the STP COM conditions when communicated with a robot directly. You can set it only when communicated with a robot via STP.
You can set various conditions of each STP COM port in the case of using the communication of Through Mode.
See "Setting of STP COM Port" about the details of settings.

Error Retries

Set the maximum number to retry sending the HRCS command when the communication error occurs. If the communication cannot be successful in spite of retrying the specified times to send, the error message is shown to select the process to retry, abort or ignore.
The recommended retry number is at most 5. When the communication error occurs even though the setting is more than 5, there is a possibility that the cable or the hardware is wrong.
[Maintenance]-[Terminal] uses this value on HRCS protocol mode.

Wait Timer Value

Set the waiting timer by second that has a period from the HRCS command sent to the response received. If there is no response for specified period, HR Editor retries to send the command.
The recommended waiting timer value is at most 5 sec.
[Maintenance]-[Terminal] uses this value on HRCS protocol mode.

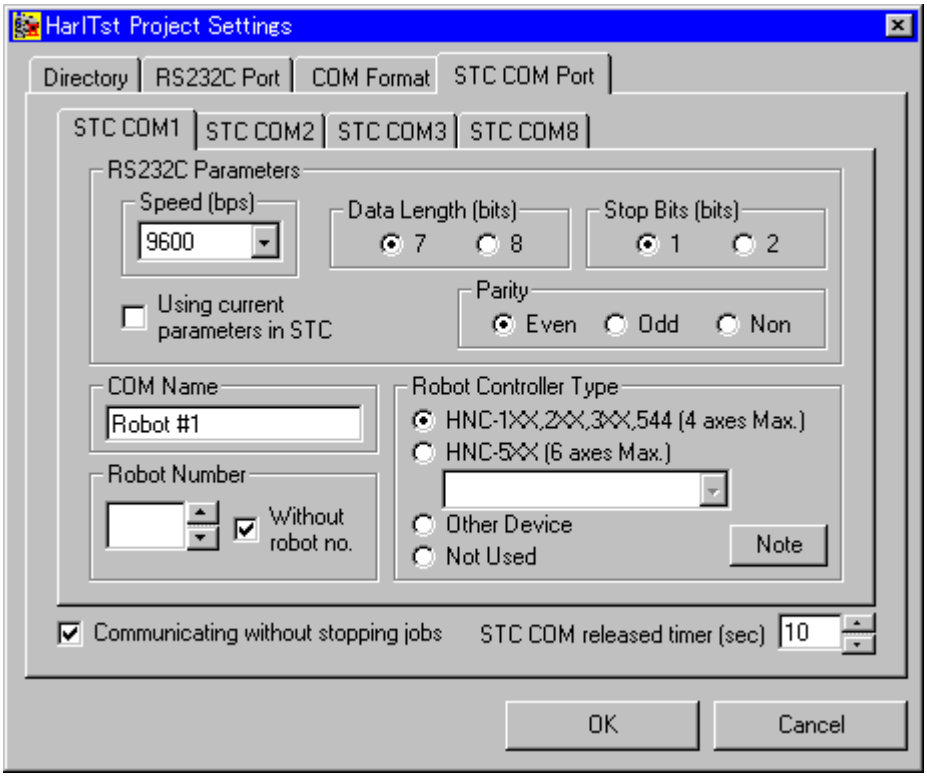
Message Format

STX-ETX,LRC type is only available now. You cannot change this.

4.5. Setting of STP COM Port

You can not select this function in the case of selecting the direct communication with a robot.

Select [Setup]-[Project Settings] in Main Menu and then select [COM Format] tab or click  button in the toolbar.
Also you can select this function to click [STP COM Settings] button enabled when via STP in [COM Format] tab.
You can set various conditions of each STP COM port in the case of using the communication of Through Mode.
See "STP COM Port" about the details of STP COM.



Selection of STP COM

Click [STP COM n] tab to show the setting of selected STP COM port.

RS232C Parameters

You can set RS232C parameters of the selected STP COM for the communication using Through Mode.

If you check [Using current parameters in STP] box to ON, STP does not use the parameters of this window but uses the current parameters in STP when communicated by Through Mode.
The value of the current parameters in STP is as follows.

- If the COM has not been opened yet by the HrBasic program, the RS232C parameters remains unchanged from power ON with the following value.
  COM8 : 9600 (or 38400) bps, 8 bits, non parity, 1 stop bit
  COM1,2,3 : 9600 bps, 7 bits, even parity, 1 stop bit
- If the COM has been opened, the current RS232C parameters has the value described at the OPEN statement.

Note 1) You can check the current RS232C parameters for the COM in STP by the following operation.
1. Open [Maintenance]-[Terminal] in Main Menu.
2. Enter the following command.
   RF#COM-Number[return] Example) RF#2
3. The current RS232C parameters of the specified COM are shown as follows.
   Speed Parity Data-length Stop-bits Example) 9600 E 7 1

If you check [Using current parameters in STP] box to ON, you cannot set [Speed], [Data Length], [Stop Bits] and [Parity] in this window.

If you check [Using current parameters in STP] box to OFF, STP uses the RS232C parameters of this window when communicated by Through Mode.
When Through Mode is terminated, the STP resumes the RS232C parameters of the COM and then its value is the same before Through Mode.
You must set the value to [Speed], [Data Length], [Stop Bits] and [Parity] corresponded with a robot connected by the STP COM.

Note 2) If [Speed], [Data Length], [Stop Bits] or [Parity] is not corresponded with a robot, the computer cannot receive the response from a robot.

COM Name

Enter the any string that represents the STP COM. The number of characters has no limit. It does not care if the string is not entered.

Robot Number

You can specify 0 through 999 as the value of robot number.

(1)Communication with a robot in which the robot number is available.
In case of the communication with a robot in which the robot number is available, you must set the robot number whether via STP or robot directly and whether one-for-one or one-for-N communication. If the specified number is not the same as the target one or the communication is without the robot number, the communication time out error will occurs since the robot never responds.
You must specify the value of the robot number that is set in S.G. (system generation) data, [MAINTENANCE]-[MAINTENANCE DATA]-[STATION NO.].

(2)Communication with a robot in which the robot number is not available.
In case of the communication with a robot in which the robot number is not available, check [Without robot no.]. If you specify the robot number, the command error will be received.

Note) A HNC-5XX (max. 6 axes) type controller always needs the robot number.
A standard HNC-1XX,2XX,3XX,544 (max. 4 axes) type controller cannot use the robot number. But some special type of HNC-1XX,2XX,3XX,544 needs it.

Robot Controller Type

According to the robot controller type to access, the communication format of position , S.G., S.P. data is different. If the specified controller type is not matched, an error may occurs when communication or invalid data may be uploaded/downloaded.
When the mouse pointer moves on a option button of controller type, detailed model names of available controllers will be shown as the tool-tip window.
When you select HNC-1XX,2XX,3XX,544 (4 axes max.), the specified robot number is deleted automatically, but you can enter it again.
If you select HNC-5XX without a robot number, the robot number is proposed automatically showing the message. Proposed number is not suitable, change it.
After [OK] clicked, the message dialog that asks to change RS232C settings to HNX-5XX default will be show.
When you select HNC-5XX, “HNC-5XX Standard” is selected automatically. “HNC-5XX for semiconductor” is the type that holds the different S.G. data definition from “HNC-5XX standard” type. “HNC-5XX with URL” is the type that holds the different position data from “HNC-5XX standard” type. URL is robot parameter that is contained in position data of a robot. URL defines the pose of arms of a SCARA type robot. (See “Input Position Data”.) There are very few robots of these types. So, you may ordinarily specify “HNC-5XX standard” type.

Communicating without stopping jobs

[Communicating without stopping jobs] is the common setting for all COMs.
If you check [Communicating without stopping jobs] box to ON, the communication of Through Mode is executed without stopping jobs in STP.
The conflict of COM access between the computer using Through Mode and HrBasic program running in STP is solved as follows.

- When the computer starts to communicate with the COM using Through Mode, in case that the HrBasic program does not communicate with the COM, STP is transferred to Through Mode immediately. After this, when the HrBasic program is going to communicate with the COM, the execution of the communicating step is suspended. The execution of this step will start when Through Mode is terminated.
- When the computer starts to communicate with the COM using Through Mode, in case that the HrBasic program has already communicated with the COM, the computer waits for the COM released by the HrBasic program during the time set in [STP COM Released Timer]. If the communication with the COM by the HrBasic program is terminated within this time, the computer starts to communicates with the COM using Through Mode. If the communication with the COM by the HrBasic program is not terminated within this time, the computer abort to communicate with the COM using Through Mode.

If you check [Communicating without stopping jobs] box to OFF, when the computer starts to communicate with the COM using Through Mode, all the jobs will be stopped immediately. And all the jobs restart at the first step (step number zero) when the communication of Through Mode is terminated.

STP COM Released Time

[STP COM Released Time] is the common setting for all COMs.
When [Communicating without stopping jobs] check box is OFF, you cannot set this parameter.
When [Communicating without stopping jobs] check box is ON, you can set the waiting timer for the COM released by the HrBasic program in the case of the communication using Through Mode.
You must specify the value of seconds as more than the time that the one step of HrBasic program takes when the step communicates with a robot. For example, in the case of the executing of one MOVE statement takes five seconds maximum, you must specify six seconds.
You can specify 5 through 99 seconds to this parameter.

4.6. Open Project

Select [File]-[Open Project] in Main Menu, then a dialog box to select a project file is shown. Select the project file to read it. And the name of the project file is shown in the title bar (the upper area of the window).
Suffix of a project file is ".hrp".
If the current opened project has been changed, the message whether you save the project or not is shown.
You can also open a project to click  button in the tool bar.

System Directory Illegal

Main Menu detects the HBDE system directory when Main Menu started. When you open a project file, if the system directory set in the project file is not the same as the directory that was detected when starting, the following message is shown.

When you click [OK], Main Menu use the detected directory instead of a setting in the project file. You need to save the project to write the detected directory to the project file. If you open a new project or open the other project or exit Main Menu without saving the project, the message that asks whether you save the project or not is shown.

4.7. Create New Project

[File]-[New Project] in Main Menu opens a new project.
If you have already opened the project that have been changed, the message is shown whether you save the current project or not. When you select [Yes], Main Menu saves the current project and opens a new project.
A new project contains the default settings such as the directory for robot data (position data, S.G data, S.P data), the parameters for communication port, the communication conditions for a robot and STP. This default settings is defined in 'Default.hrp' file that is located at the system directory (the installation directory).
You can changed the default settings to modify 'Default.hrp' file by using a text editor such as Word Pad. To save 'Default.hrp' file is recommended before you modify it.
The format of 'Default.hrp' file is the same as 'harl.dat'. (See "harl.dat File".)
If you open a new project and use this project later, to save the project by [File]-[Save Project As] is necessary.
The saved project file is named with ".hrp" suffix.
You can also create a new project to click  button in the tool bar.

4.8. Update Project

[File]-[Update Project] in Main Menu overwrites the current project to a project file.
You cannot select this function if you have not executed [File]-[Save Project As] after a new project is opened.
You can also update a project to click  button in the tool bar.

4.9. Save Project As

[File]-[Save Project As] in Main Menu saves the current opened project as a specified file.
For example, you can use this function when you want to save the new project or save the current opened project to an another file.

You can also save a new project as the specified name to click  button in the tool bar.

5. HrBasic Editor for Program Source

5.1. Start HrBasic Editor

HrBasic Editor is the exclusive editor for the development of HrBasic programs.

There is two ways to start HrBasic Editor as follows.

(1) Select the following menu in Main Menu according to the kind of the opening file.

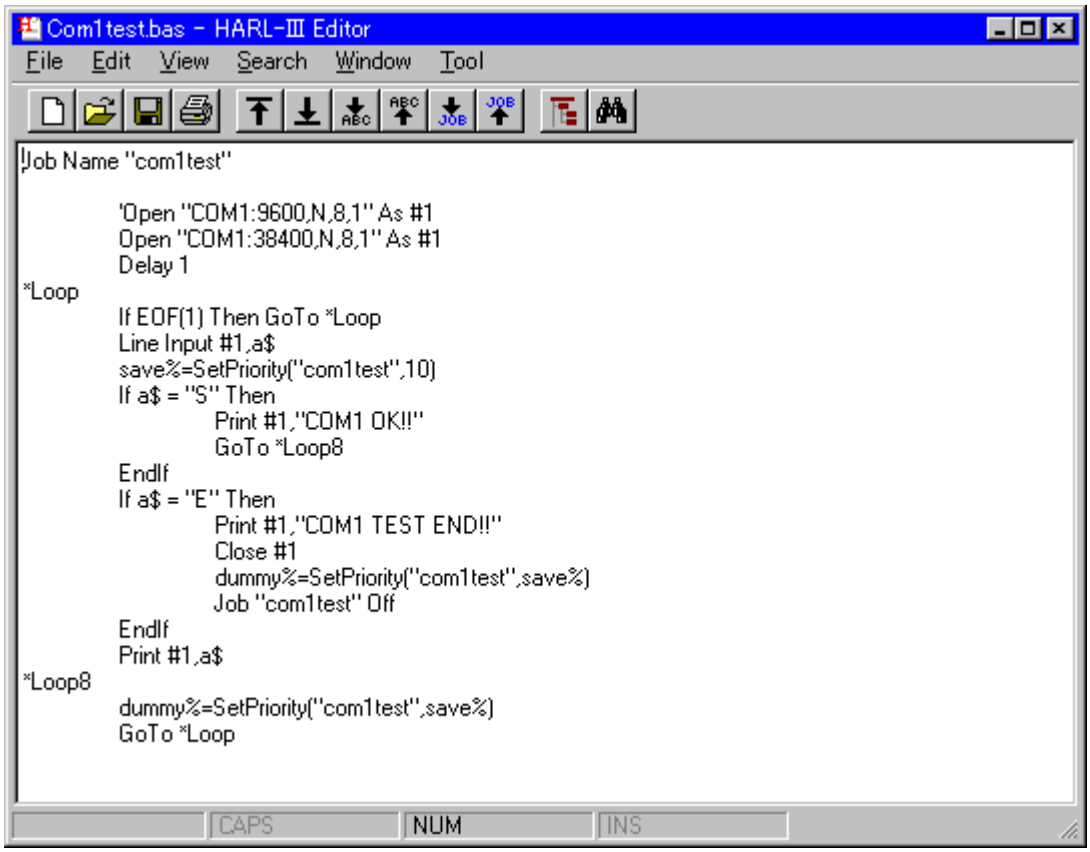
Source file (suffix ".bas")	[File]-[Source]
Header file (suffix ".hed")	[File]-[Header]
Macro file (suffix ".bas")	[File]-[Macro]
List file (suffix ".lst")	[File]-[List]

After selecting these menu, the dialog box to open a file is shown. Select the file or enter the file name.
If you specify the file that does not exist, the file is opened as a new file.

Note) The file name except the suffix must consists of one to eight characters. When the file name consists of more than nine characters, the error message is shown and you cannot edit a file.

(2) Select [HrBasic Developing Environment X.XX]-[HrBasic Editor] in the start menu of Windows.

A file is opened as a new file without the name. You must select [File]-[Open] or  button to open the existing file after HrBasic Editor started.



5.2. Overview of HrBasic Editor

The functions of HrBasic Editor are explained according to the menus as follows.

[File] menu
- [New] -- Create a new file
- [Open] -- Open the file already existed.
- [Update] -- Update the current opened file.
- [Save As] -- Save the current opened file as the other name.
- [Print] -- Print the current opened file.
- [Exit] -- Exit the current opened window.
- [Terminate All] -- Terminate all windows currently opened.

[Edit] menu
- [Cut] -- Cut the current selected text to copy to the clipboard.
- [Copy] -- Copy the current selected text to the clipboard.
- [Paste] -- Paste the clipboard to the text.
- [Select All] -- Select all the text.

[View] menu
- [Top] -- Display the top of the text.
- [Bottom] -- Display the bottom of the text.
- [Next Job] -- Display the next job.
- [Previous Job] -- Display the previous job.
- [Program View] -- Display the program structure as the tree view.

[Search] menu
- [Search] -- Show the dialog box to search a string.
- [Next String] -- Search the specified string from the current cursor position to the bottom of the text.
- [Previous String] -- Search the specified string from the current cursor position to the top of the text.

[Window] menu
- [Tile Vertically] -- Tile all the windows vertically.
- [Tile Horizontally] -- Tile all the windows horizontally.
- [Tile] -- Tile all the windows to arrange equally.
- [Cascade] -- Show all the windows in cascades.
- [Minimize All] -- Minimize all the windows.

[Tool] menu
- [Font] -- Select a font to display.
- [Clear List of Recent Files] -- Remove all lists of recent used project files displayed in [File] menu.

5.3. Create New File

Select [File]-[New] in HrBasic Editor menus or  button in the tool bar.
A new window that does not have a text is opened. And 'New File' is shown in the title bar of a new window.

You can save the text after entering some text to select [File]-[Save As]. If you exit after entering some text without saving, the following message box is shown.

When [Yes] selected, the saving dialog box is shown and input a file name. When [No] selected, the current window is terminated without saving. When [Cancel] selected, the saving is canceled to go back to the editing window.

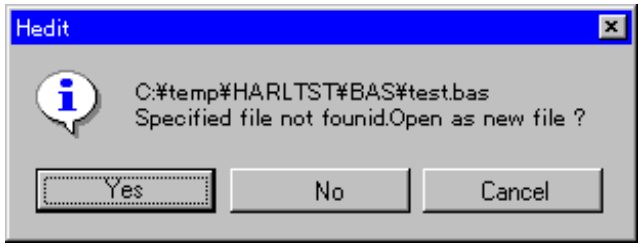
Note) The file name except the suffix must consists of one to eight characters. When the file name consists of more than nine characters, the error message is shown.

5.4. Open File

Select [File]-[Open] in HrBasic Editor menus or  button in the tool bar. After the dialog box to select a file is shown, select the file in the list or enter the file name.

Note) The file name except the suffix must consists of one to eight characters. When the file name consists of more than nine characters, the error message is shown.

If the specified file exists, a new window is opened to read the file. If the specified file does not exist, the following message box is shown.



When [Yes] selected, a new window is opened for the new file with the specified name. When [No] or [Cancel] selected, the opening is canceled to go back the editing window.

5.5. Edit Program

You can edit the program to input characters to the text box using the keyboard. You must describe the program conformed to HrBasic language specification.

When editing, you can cut and paste the text to select [Edit] menu or click the right button of the mouse on the text box as follows.

Cut the Text
Select the text to drag the mouse. Then you can cut the selected text and copy it to the clipboard to select [Edit]-[Cut].

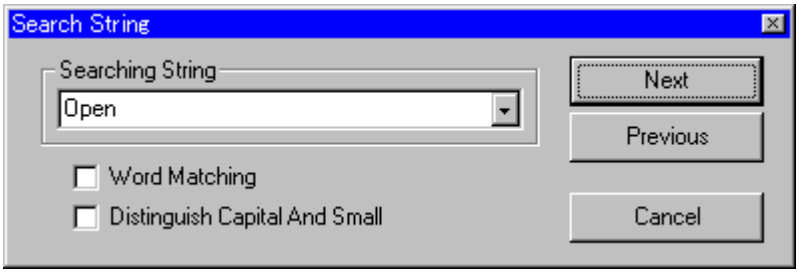
Copy the Text
Select the text to drag the mouse. Then you can copy the selected text to the clipboard to select [Edit]-[Copy].

Paste the Text
To select [Edit]-[Paste], you can paste the text of the clipboard at the position of the cursor. After cutting or copying the text, you can insert the cut or copied text to paste. Also you can paste the text that is cut or copied in the other application software such as Word.

Select All the Text
You can select all the text of the current window by [Select All].

5.6. Search String

The following dialog box to search a string is shown to select [Search]-[Search] in the menu or click  button after selecting the string in the text box. (“Move” is selected for example.)



If you select [Search]-[Search] in the menu or click  button without selecting the string in the text box, nothing is shown in the combo box (the box with pull-down list). So you must enter the string to search by the keyboard. Check [Word Matching] or [Distinguish Capital and Small] if you need.

When [Next] clicked, the specified string is searched from the current position of the cursor to the bottom of the text. When [Previous] clicked, the specified string is searched from the current position of the cursor to the top of the text. When [Cancel] clicked, this dialog box is closed.

The specified string is available till you specify the new string. The current string for searching is shown in the status bar of HrBasic Editor window.

Forward searching is executed to select [Search]-[Next String] or click  button from the current position of the cursor to the bottom of the text after you have specified the string.

Backward searching is executed to select [Search]-[Previous String] or click  button from the current position of the cursor to the top of the text after you have specified the string.

5.7. Change View

Show Top of Text

Select [View]-[Top] in the menu or click  button to show the top of the text.

Show Bottom of Text

Select [View]-[Bottom] in the menu or click  button to show the top of the text.

Show Next Job

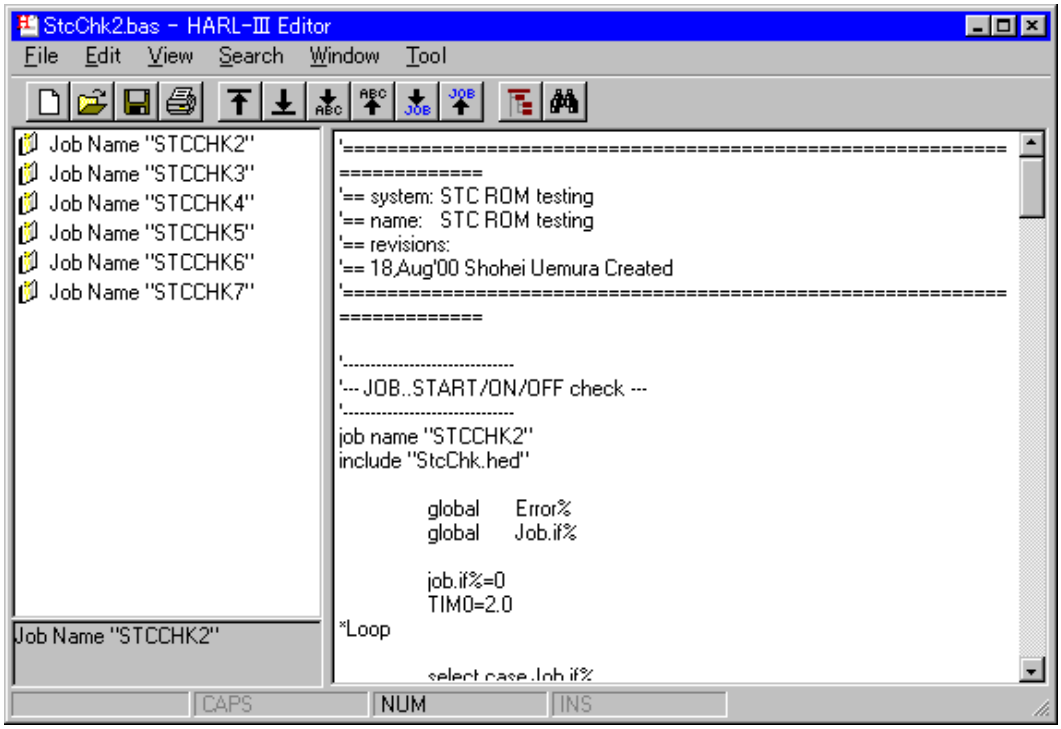
Select [View]-[Next Job] in the menu or click  button to show the top of the next job.

Show Previous Job

Select [View]-[Previous Job] in the menu or click  button to show the top of the previous job.

5.8. Program View

In the status of showing only the text, you can show Program View in the left side of the window to select [View]-[Program View] in the menu or click  button in the tool bar. To display Program View takes time for a while and “Analyzing program...” is shown in this period. If the text is not the HrBasic program, the message is shown and Program View is not opened.



Program View is available only for the file with suffix “.bas”. In case of opening the file with other suffix, you cannot select [View]-[Program View] or  button.

Structure of Program View

In Program View, the structure of the source program is displayed as a tree view.
Just after Program View opened, only the job nodes are shown.

There is three kind of icons for node as follows.

 --- The lower level exists, but it is not shown.

 --- The lower level exists, and it is shown to expand.

 --- The lower level does not exist.

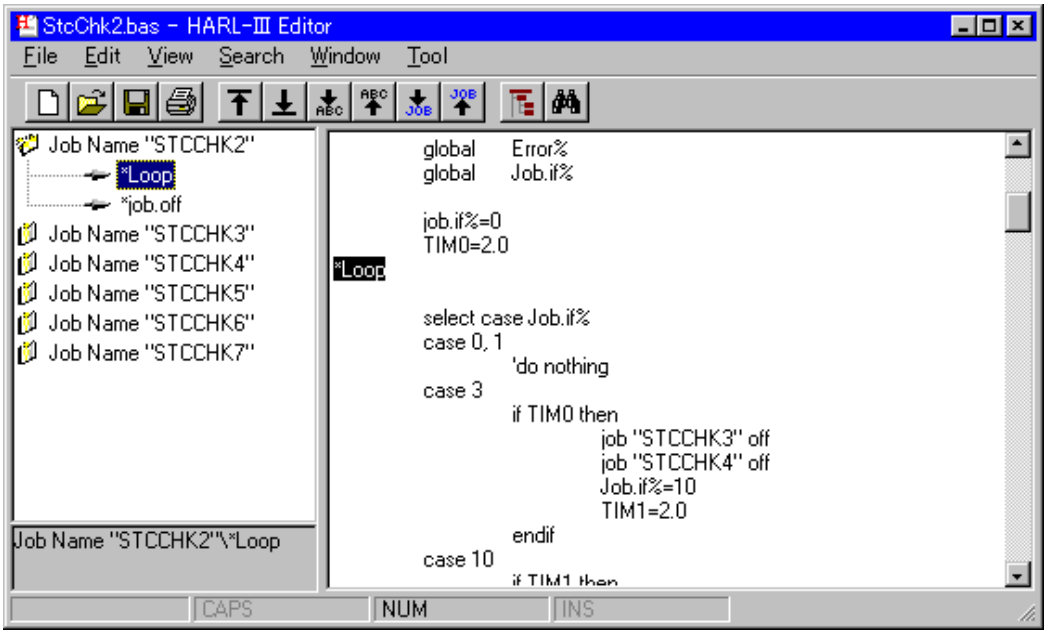
You can expand and show the lower level to double-click the  icon. And you can close the expansion of the lower level to double-click the  icon.

Each node indicates the program structure as the following expression.

Job Name	Job Name “Job-Name”
Label	*Label-Name
GoSub Statement	GoSub *Label-Name
Subroutine	(Sub) *Label-Name

Jump to Text

You can jump and show the step directly to select the node that you want to jump.



Change Size of Program View

The mouse pointer is changed as “<==>” to move the mouse pointer to the separator bar between the text box and Program View. In this status, drag the mouse to change the size of Program View.

Modify Text with Program View

Program View is closed automatically when the text is modified.

Close Program View

When Program View opened, you can close Program View to select [View]-[Program View] or click  button.

5.9. Save File

Update File

You can update the file that has been read and edited currently to select [File]-[Update] in the menu or click  button. In case of a new file without a file name, you cannot select this function.

Save File As

You can save the current editing text as a file to select [File]-[Save As] in the menu. When it selected, the dialog box to select a file is shown and you must select the file in the list or enter the file name.

Note) The file name except the suffix must consists of one to eight characters. When the file name consists of more than nine characters, the error message is shown.

5.10. Arrange Windows

You can arrange the HrBasic Editor windows by several type of arrangement.

[Window]-[Tile Vertically]

This function tiles the windows vertically in the whole screen.

[Window]-[Tile Horizontally]

This function tiles the windows horizontally in the whole screen.

[Window]-[Tile]

This function tiles all the windows to arrange equally in the whole screen.

[Window]-[Cascade]

This function shows all the windows in cascades.

[Window]-[Minimize All]

This function minimizes all the windows.

Window List

The List of the currently opened HrBasic Editor window is shown in [Window] menu. You can activate the window to select the file name in this list.

6. Make File

6.1. About Make File

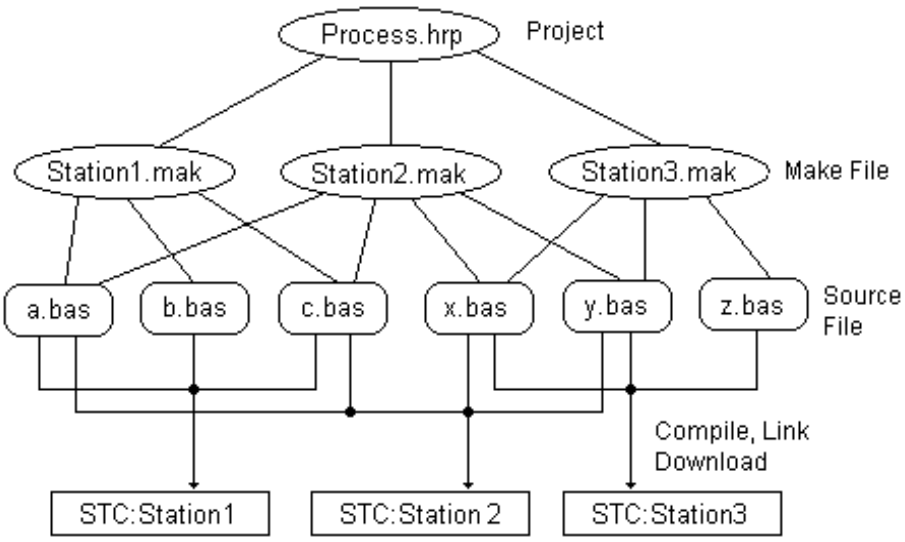
The program group for one STP must be registered to one make file.
Compiler or linker compiles or links the programs registered in the make file. And these programs registered in the make file can be downloaded to STP.

The following information is registered in the make file

- Source file name to compile and link
- Header file name included by the source file

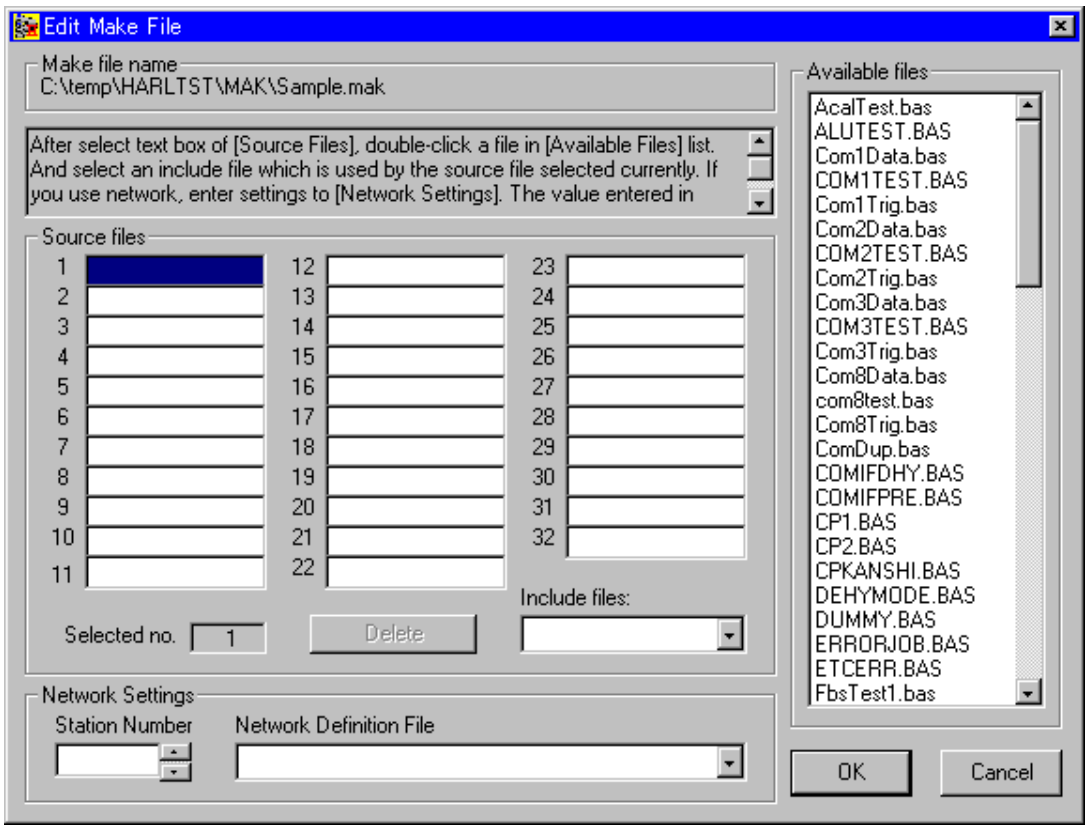
There can be more than two make files in one project.
For example, consider that there are three STP named as “Station1”, “Station2”, “Station3” in the process name as “Process”. In this case, you can create the project file named as “Process.hrp” and create the make files named as “Station1.mak”, “Station2.mak”, “Station3.mak”.

The different make files can contain the common source file.
For example, when “Station1.mak” contains “a.bas”, “b.bas”, “c.bas”, “Station2.mak” can contain “a.bas”, “c.bas”, “x.bas”, “y.bas”.



6.2. Open Make File

Select [File]-[Make] in Main Menu to show the dialog box to select a make file.
Select the existed make file to read it and show the editing window.
If you enter the make file name that does not exist in the dialog box, the editing window is opened as a new make file.



Note) The make file name except the suffix must consists of one to eight characters. When the file name consists of more than nine characters, the error message is shown and you cannot edit the specified file.

6.3. Edit Make File

Register Source File

You can register 32 source files maximum in the make file. You can specify the source file as follows.

1. Click the text box of [Source Files] to select it. The number of the current selected text box is shown at [Selected No.]. And the color of the current selected text box is gray.
2. The available source files is shown in the list named as “Available Files”. Double-click a file in the list which you want to register and then the selected file name is registered and shown in the text box of [Source Files].

Also you can enter the source file name to the text box directly.

Note) The source file name except the suffix must consists of one to eight characters. When the file name consists of more than nine characters, the error message is shown.

Delete Registration

You can delete the registration of a source file as follows.

1. Click the text box of [Source Files] to select the source file which you want to delete.
2. Click [Delete] button to clear the text box.

Also you can delete the registration to clear the text box by the backspace.

Register Header File

In case that the source file includes the header file, you can set the relation between the header file and the source in the make file. By this relation, after the header file is modified, compiler can automatically compiles the source program that has not been modified.
You can specify the header file to set the relation as follows.

1. Click the text box of [Source Files] to select the source file.
2. Select the header file in the combo box named as [Include Files].

After registration of the header file, when selecting the text box of [Source Files], the related header file name is shown in the combo box of [Include Files].

You can register only one header file as the related file to a source file.

Available Files

The source files shown in [Available Files] is located in the source file directory that is specified in [Setup]-[Project Settings]-[Directory] of Main Menu.
Also the header files shown in [Include Files] is located in the header file directory that is specified in [Setup]-[Project Settings]-[Directory] of Main Menu.

You cannot specify the files in other directory. So, you must set the setting of directories in [Setup]-[Project Settings] correctly.

Save and Update Make File

Click [OK] button after editing. When [Cancel] clicked, the window is terminated without saving or updating. When [OK] clicked, the dialog box to save a file is shown. You can update the make file to click [Save] button. If you want to save the file as other name, enter the new file name and click [Save] button.

Note) The source file name except the suffix must consists of one to eight characters. When the file name consists of more than nine characters, the error message is shown.

Network Settings

When STP running with version 5.40 or later, you can use fieldbus network system.
If you want to use the network functions by HrBasic programs, the following setting is necessary for STP.

- Station number that is assigned exclusively in the network
- Network definition data

If you want to use the network functions by HrBasic programs, you must specify the station number and the network definition file for the STP to which the program built by the make file will be downloaded.
If you do not use the network functions, fill the blank.

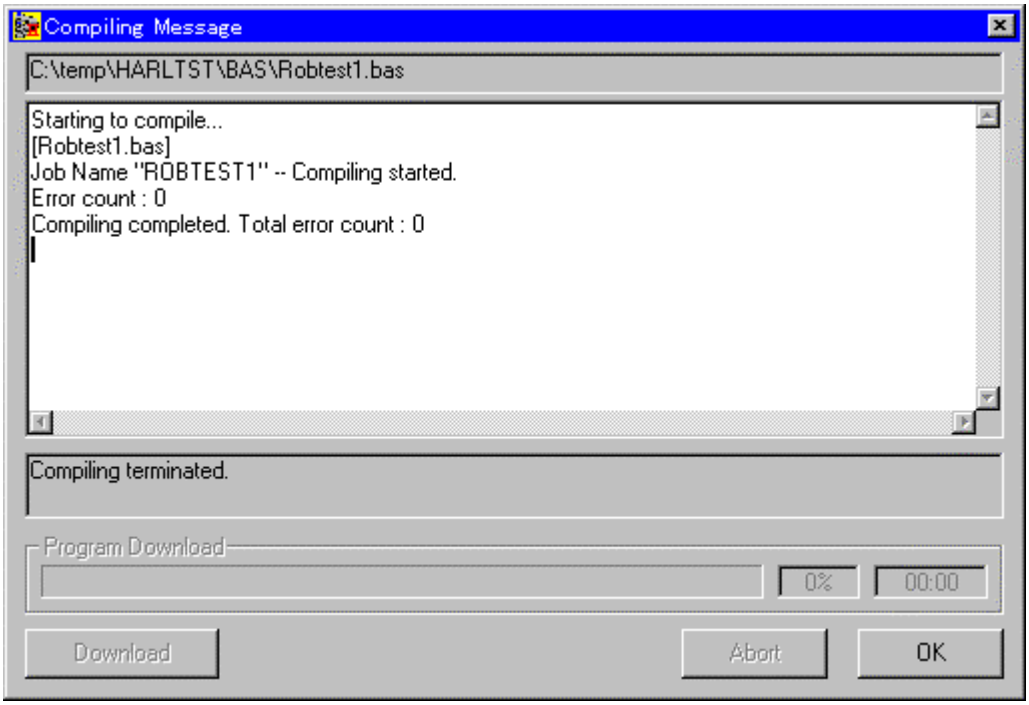
The station number and the network definition data specified here will be automatically downloaded at the beginning of downloading the program built by the make file.

See from "Overview of Fieldbus Network" onward about the detail of fieldbus network.

7. Compile, Link, Download

7.1. Compile A Program

Select [Compile]-[Compile] in Main Menu to show the dialog box to select a source file.
Select one source file to start the compiling showing the message window.



The compiling message window shows the following information of compilation.

- Source file name
- Job name
- Error information of compiling
- Number of errors for a job
- Number of errors for all jobs

You cannot use [Download] button.

Files Created by Compilation

The following files are created in the work file directory that is specified in [Setup]-[Project Settings]-[Directory] by compilation.

- Object file (suffix ".obj")
- Local variable file (suffix ".var")
- Global variable file (suffix ".gbl")
- Job name file (suffix ".job")
- Reference file (suffix ".ref") -- Only when specified in [Compile]-[Option]
- List file (suffix ".lst") -- Only when specified in [Compile]-[Option]

The file name of these files except suffix is as the same as the source file.

7.2. Make Programs

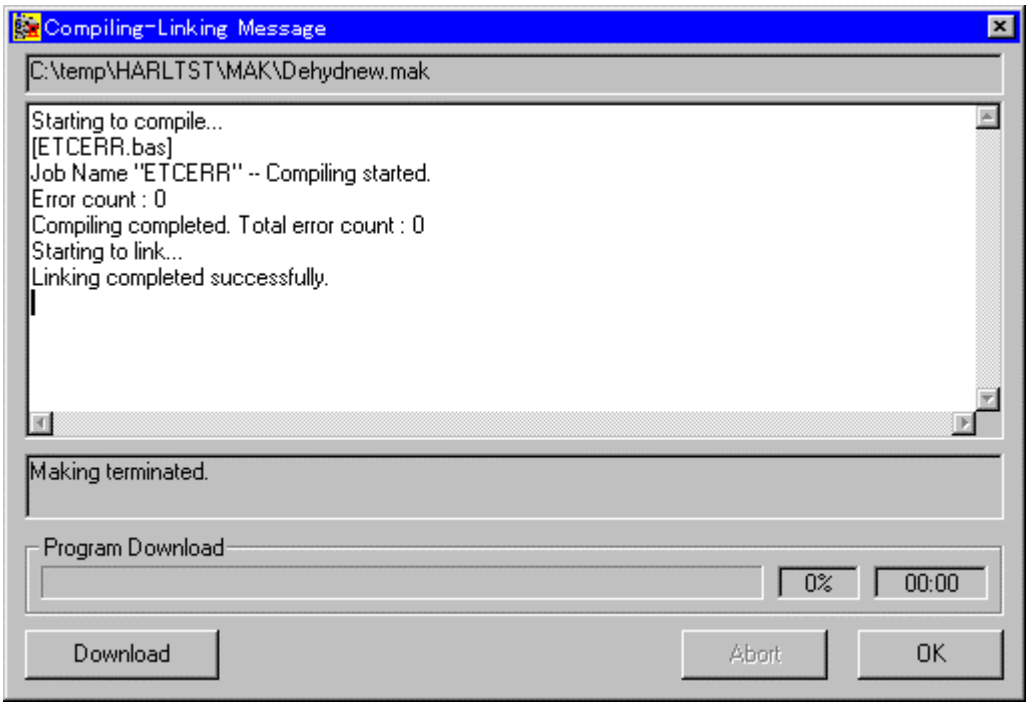
Select [Compile]-[Make] in Main Menu or click  button to show the dialog box to select a make file.
Select one make file to start the compiling and linking showing the message window.

1. The make function executes the differential compilation of the source files registered in the make file as follows.

- The make function gets the updating date and time of the source file, the relating header file and the object file
- If the updating date and time of the source file is newer than the one of the object file, the make function compiles the source file.
- If the updating date and time of the header file is newer than the one of the source file, the make function compiles the source file.
- No source file is compiled but the source files described above.
- The compiling procedure is the same as the explanation in “Compile A Program” section.

You can compile the source files efficiently to use the make function since it compiles only the last updating source files.

2. The make function checks all the source files registered in the make file to compile differentially and then links the programs.
The linking builds the global information to integrate the files created by compiling.



The processing information is shown in the message window. This information by compiling is similar to the explanation in “Compile A Program” section.

File Created by Linking

The following file is created in the work file directory that is specified in [Setup]-[Project Settings]-[Directory] by linking.

- Linked file (suffix “.exv”)

The file name of these files except suffix is as the same as the source file.

7.3. Build Programs

Select [Compile]-[Build] in Main Menu or click  button to show the dialog box to select a make file.
Select one make file to start the compiling and linking showing the message window.

1. The build function compiles all the source files unconditionally.

2. Then the build function links all the programs.

The build function is the same as the make function except that the build function does not execute the differential compilation but compiles all the source files.

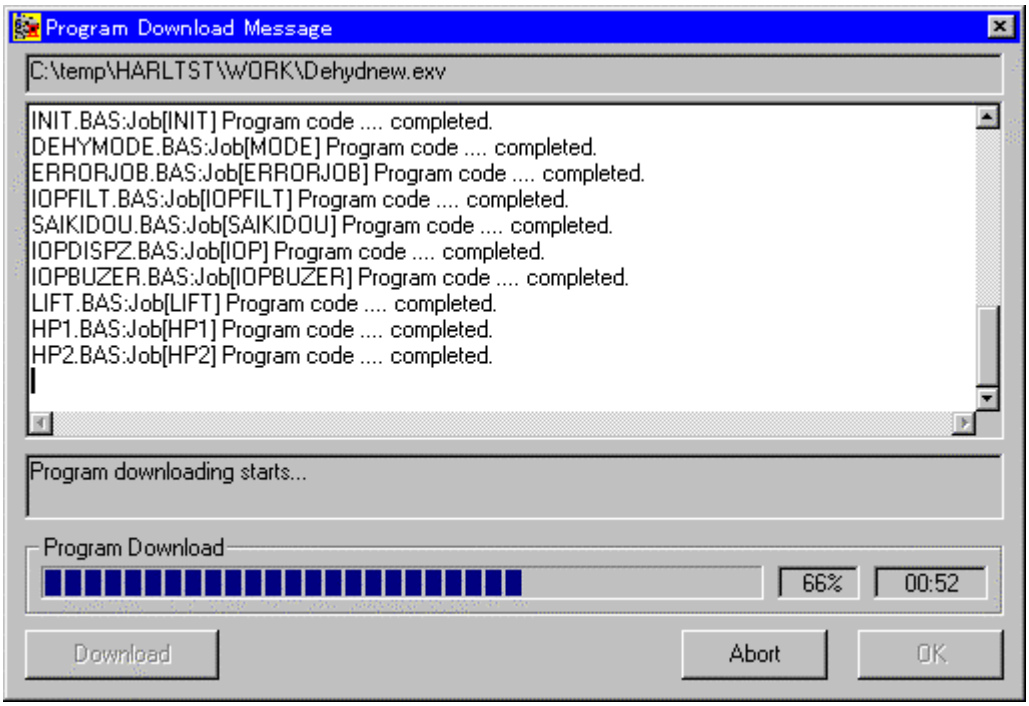
7.4. Download Programs

Download After Make or Build

When you use the make or build function, [Download] button is enabled after compiling and linking has completed.
Click [Download] button to download the programs to STP that is connected with your computer correctly.
If you does not want to download the programs, click [OK] button to exit.

Note) It is necessary that your computer is connected with COM9 (Programming Console) or COM8 (Host) of STP to download the programs.

Starting to download, the progress message about the current downloading program is shown in the text box.
The progress bar and the percentage of the downloading volume is shown. And you can see the time of the downloading.



During the downloading, [Download] and [OK] button are disabled.
Click [Abort] button to stop the downloading.

When the downloading is completed, the percentage becomes 100% and the completion message is shown.

[Compile]-[Download] in Main Menu

You can download the programs already linked to select [Compile]-[Download] in Main Menu or to click 

button.

Select [Compile]-[Download] in Main Menu or click  button to show the dialog box to select a linked file.
Select one linked file to start the downloading showing the message window.

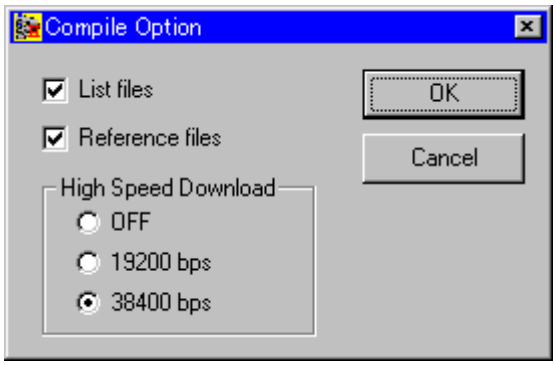
The downloading function is the same as clicking [Download] button after the making or the building.

7.5. Compiling Option

You can set the following compiling option to select [Compile]-[Option] in Main Menu.

- Create the list file
- Create the reference file
- Communication speed up for downloading

These settings is not saved. The default settings is shown after restarting Main Menu.



List Files

You can specify whether the compilation creates the list file (suffix ".lst") or not. The default is that the compilation creates the list file. You must ordinarily leave the setting as default since the debugger uses the list file.

Reference Files

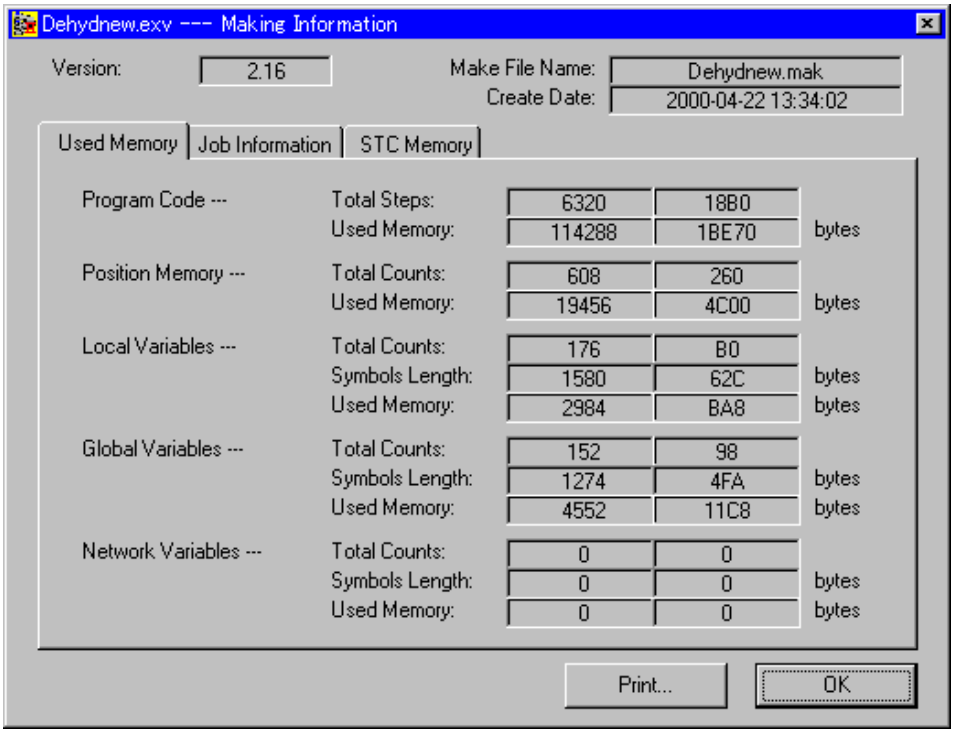
You can specify whether the compilation creates the reference file (suffix ".ref") or not. The default is that the compilation creates the reference file.
The reference file by a text contains the information of the global and local variables which the source program uses.

High Speed Download

You can specify the higher communication speed for downloading than the setting in [Setup]-[Project Settings]-[RS232C Port]. The default is [38400 bps].
In case of selecting [OFF], the program is downloaded with the communication speed set in [Setup]-[Project Settings]-[RS232C Port].
In case of [19200 bps] or [38400 bps], the program is downloaded with this speed.
Select [38400 bps] ordinarily unless there is the communication problem such as the noise.

7.6. Compiling Information

Select [Compile]-[Get Information] in Main Menu to show the dialog box to select a linked file.
Select one linked file to show the compiling information about the specified linked file.



Version

This is the version of the compiler/linker by which the specified linked file is compiled and linked.
This version is for the compiling and linking function. It is not the same as the HBDE version shown in [Help] of Main Menu.

Make File Name and Create Date

The make file name for the specified linked file and the date of linking are shown. The linked file name except suffix is the same as the make file.

Used Memory

Click [Used Memory] tab to show the volume of used memory that the program uses.

- Total steps and used memory of program code
  The total executable steps and the used memory of the program codes are shown by decimal and hexadecimal expression.
- Total counts and used memory of position memory
  The total counts and the used memory of the position memory which the program declares is shown by decimal and hexadecimal expression.
- Total counts and used memory of local variables
  The total counts and the used memory of the local variables which the program declares is shown by decimal and hexadecimal expression.
- Total counts and used memory of global variables
  The total counts and the used memory of the global variables which the program declares is shown by decimal and hexadecimal expression.

The memory capacity is as follows.

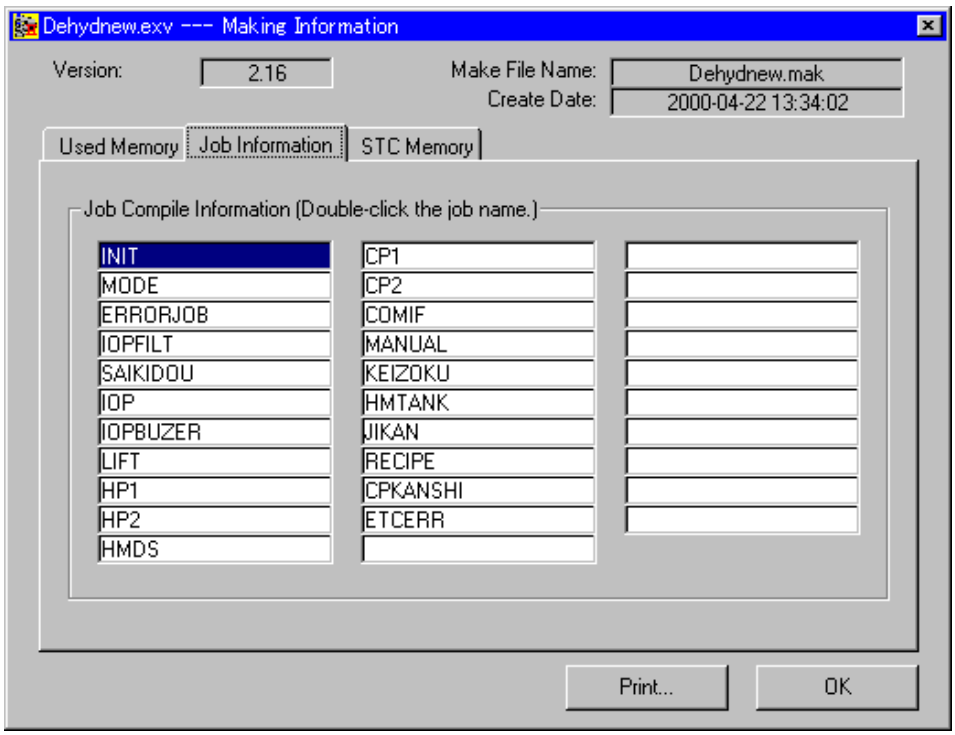
Program Code	235,936 bytes
Total area of local and global variables	196,608 bytes

You must develop programs within these capacity.
Position memory, MD, MW area is maintained exclusively besides the program code and the variables described above.

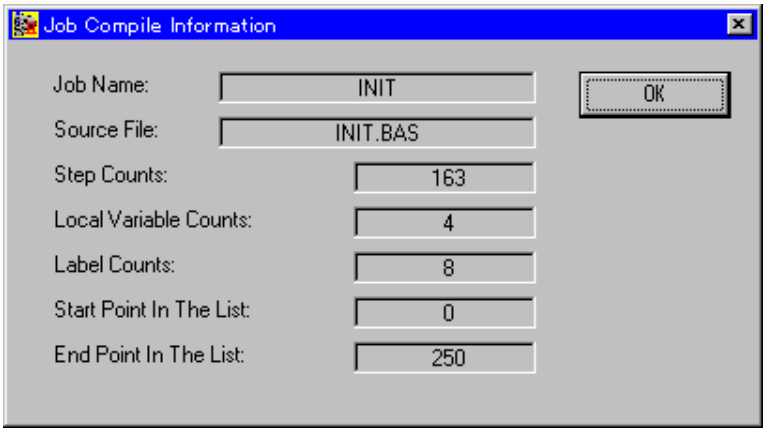
Position	608 points maximum
MD	256 bytes
MW	256 words

Job Information

Click [Job Information] tab to show the list of jobs.



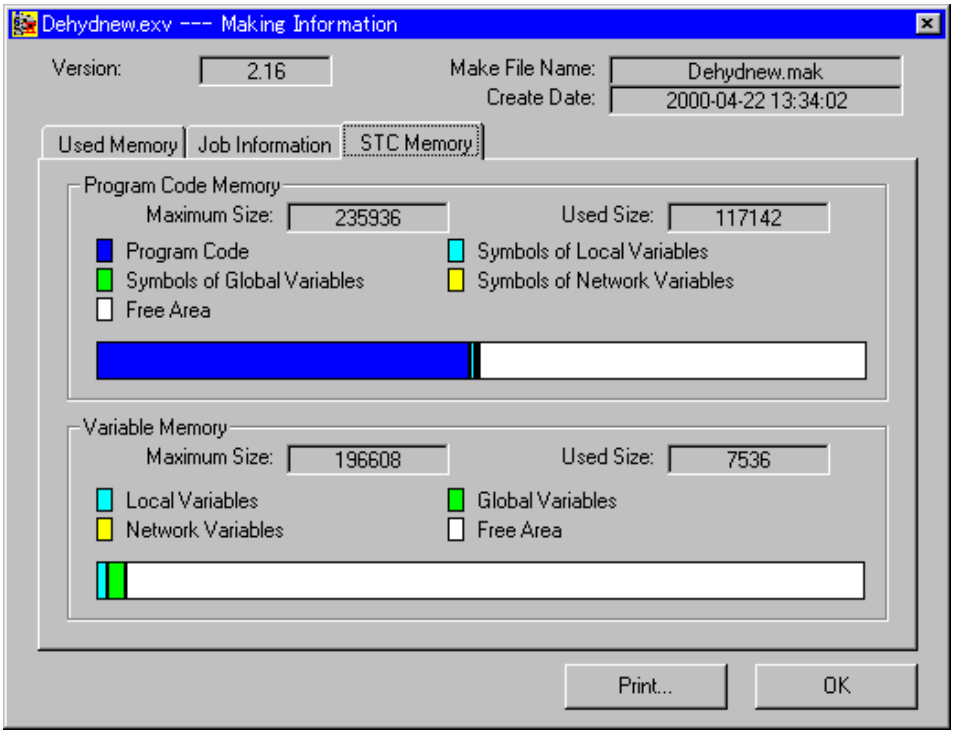
Double-click the job name in [Job Compile Information] to show the compiling information of the specified job.



Job Name	shows the job name.
Source File	shows the source file name of which the job is contained.
Step Counts	shows the executable step counts of the job.
Local Variable Counts	shows the local variable counts which the job uses.
Label Counts	shows the label counts which the job uses such as GOTO.
Start Point In The List	shows the list line number of the head of the job. (The line number starts from zero.)
End Point In The List	shows the list line number of the bottom of the job. (The line number starts from zero.)

STP Memory

Click [STP Memory] tab to show the layout of used STP memory graphically.



Print

Click [Print] button to show the dialog for printing.
If [OK] button clicked in the dialog, the data of used memory, job information and STP memory will be printed out.

8. Debug

8.1. Introduction to Debug

Connection with STP

When you debug the programs running in STP, you must connect the computer with STP correctly by RS232C interface. You can see about the connection with STP in "Connection with STC" section.
And You must select COM9 (Programming Console) or COM8 (Host) of STP for the communication.

Functions to Debug

The following windows is available to debug online.

- Job Monitor window
- List window
- Watch window

You can operate the following functions in these windows.

(1) Job Control

Debug	transfers the specified job to Debug mode.
Mask	inhibits the specified job to run.
Stop	halts the specified job.
Init	initializes the specified job and halts the job at the first step.
Step	runs the specified job by a step.
Pass	halts the specified job at the next breakpoint.
Run	runs the specified job.

(2) Set/Reset Breakpoints

You can set or reset any step as a breakpoint in List window. You can halts the job at the step set as a breakpoint.

(3) Watch Variables

You can watch the current values of the variables which the program uses. You can watch not only user variables but also the reserved memory such as position, MD, MW.

(4) Error Information

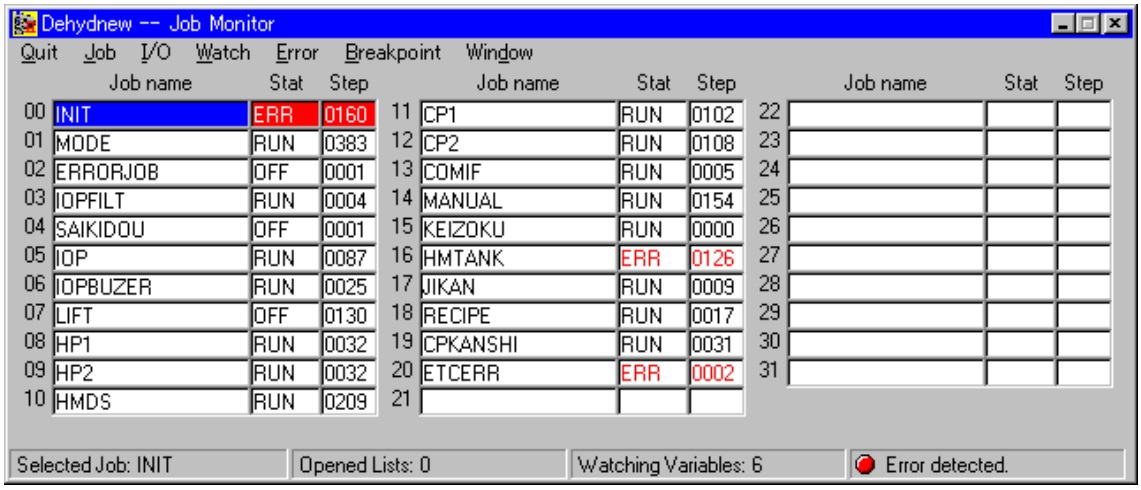
When a system error, a job error or a robot error occurs in STP, you can see the error information in detail.

(5) I/O Monitor

You can open I/O Monitor that shows the current ON/OFF status of DI/DO.

8.2. Open Job Monitor Window

After you select [Debug]-[Debug] in Main Menu or click  button in the tool bar, the message “Reading job data file... Please wait for a while.” is shown and then Job Monitor window is opened.
When Job Monitor is shown, Main Menu is minimized automatically.



In Job Monitor, you can see the list of current running jobs.

Job Name

[Job name] column shows the name of the current running job. The displayed name is described in the program source as “JOB NAME” statement.

Status

[Stat] column shows the current job status. The kinds of job status are as follows.

RUN	Running
DEBUG	Debug mode
OFF	Job off (by “JOB OFF” statement)
DOWN	Job down (by dip switch #8 OFF on STP board)
MASK	Job running inhibited
ERR	Stopped by error or error resumed by “RESUME” statement

Step

[Step] column shows the step currently executed. The first step number is zero.

Status Bar

The following information is shown in the status bar (located at the lowest part) in Job Monitor.

- Job name selected currently
- Number of List windows opened currently
- Number of variables watched currently
- Job error occurred or not

8.3. Restriction for Debug

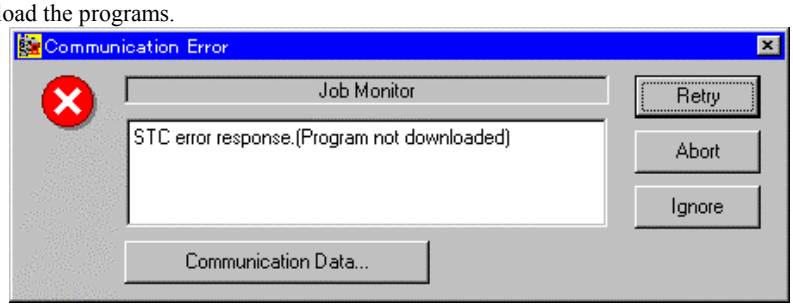
In the following cases, you can not open Job Monitor window or you can use Job Monitor under some restrictions.

Less Than STP Version 5.02

Job Monitor works connected with STP the version of which is more than 5.03. In case of less than version 5.02, Job Monitor cannot be opened to show the following message.

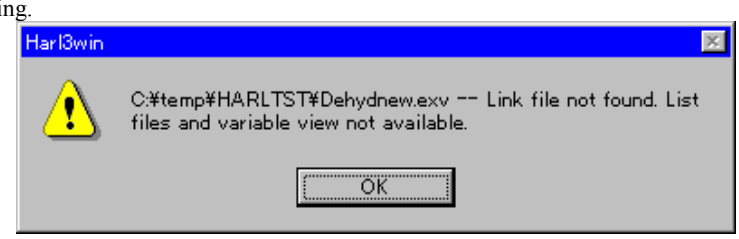
Program Not Downloaded

When the programs has not been downloaded to STP, the communication error message is shown. Click [Abort] button and download the programs.



Cannot Found Linked File

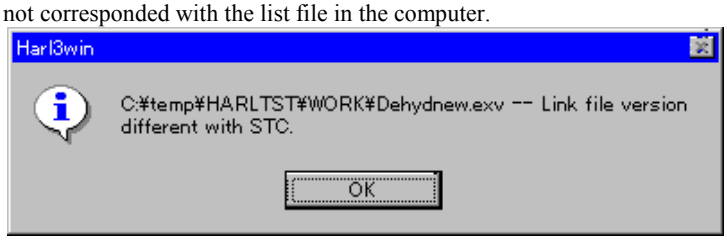
In case that the linked file for the current running programs in STP is not found in the computer, Job Monitor is opened with the following message. But you cannot use List window and the list view of variables used by the programs for watching.



In this case, there is a possibility that the setting for the work files specified in [Setup]-[Project Settings]-[Directory] is not correct. Confirm and set the directory for the work files at which the linked file of the current running programs is located correctly.

Different Link Version with STP

In case that the linked file for the current running programs in STP can be found in the computer but the version of the linked file is not the same as the running programs in STP,
Job Monitor is opened with the following message.
You can debug the programs without restriction. But there is a possibility that the steps of the current running programs in STP are not corresponded with the list file in the computer.



If possible, download the newest programs and debug it.

8.4. Overview of Job Monitor

The functions of Job Monitor are explained according to the menus as follows.

[Quit] menu
- [Quit List of Selected Job] -- Close a List window of the selected job.
- [Quit Watch View] -- Close Watch window.
- [Quit All Lists] -- Close all opened List windows.
- [Quit Debug] -- Close Job Monitor, all opened List windows and Watch window and terminate debugging.

[Job] menu
- [Run] -- Run the selected job.
- [Debug] -- Transfer the selected job to Debug mode.
- [Mask] -- Inhibit the selected job to run.
- [Stop] -- Halt the selected job.
- [Step] -- Run the selected job by a step.
- [Pass] -- Halt the selected job at the next breakpoint.
- [Init] -- Initialize the selected job and halt the job at the first step.
- [Open List] -- Open the List window of the selected job.
- [Show List At Top] -- Show the List window of the selected job at the top.
- [Add Watch] -- Add watching variable of the selected job.
- [Job Error] -- Show the error information of the selected job.
- [Clear Breakpoints] -- Clear all breakpoints of the selected job.

[I/O] menu
- [I/O Monitor] -- Open I/O Monitor window.

[Watch] menu
- [Watch View] -- Open Watch window.
- [Add Watch (All Jobs)] -- Add watching variable of all jobs.
- [Remove All Watches] -- Remove all watches currently shown.

[Error] menu
- [System Error] -- Show the current system error information in STP.
- [Job Error] -- Show the current job error information in STP.
- [Robot Error] -- Show the current robot error information in STP.

[Breakpoint] menu
- [Clear Breakpoints of All Jobs] -- Clear all breakpoints of all jobs.

[Window] menu
- [Tile All] -- Tile Job Monitor window, all List windows and Watch window to arrange equally.
- [Tile Lists Vertically] -- Tile List windows vertically.
- [Tile Lists Horizontally] -- Tile List windows horizontally.
- [Tile Lists] -- Tile all List windows to arrange equally.
- [Cascade Lists] -- Show all List windows in cascades.
- [Watch View] -- Activate Watch window.

8.5. Select Job in Job Monitor

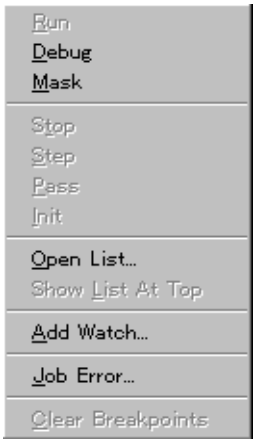
You can select the job in the job list to click the following area of the target job.

- Job number
- Job name
- Status
- Step

The color of the selected job becomes blue and the name of the current selected job is shown in the status bar.

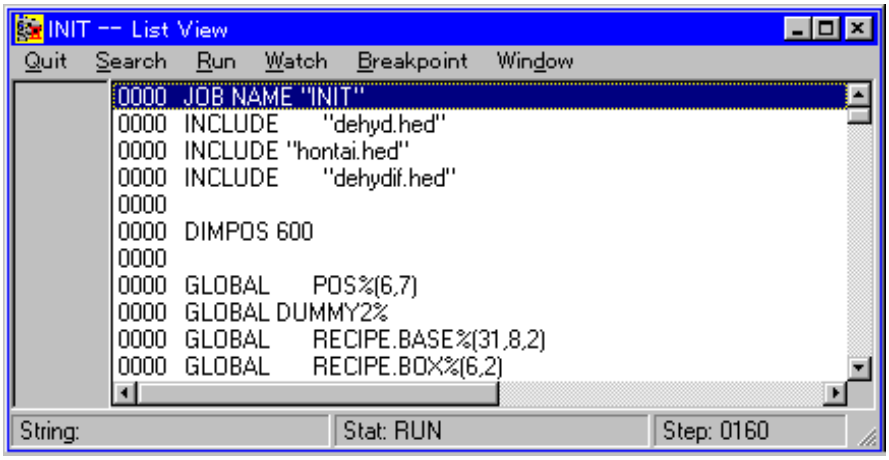
Pop-up Menu

You can show the pop-up menu for job operation to select the job and then click the right button of the mouse. You can operate the job more efficiently to use the pop-up menu.



8.6. Open List Window

After selecting the job in Job Monitor, Select [Job]-[Open List] or [Open List] in the pop-up menu shown by clicking the right button of the mouse on the job list.
After showing the message “Reading list file... Please wait for a while.”, List window of the selected job is opened.
When the first List window is opened, Job Monitor windows moves at the top of the screen automatically.



In the status bar of List window, the search string currently specified, the current job status and the current executing step of the job are shown.

Step Status

In the left side of the window, the current step status is shown. The kinds of the step status are as follows.

STOP Shown at the halted step when the job is halted , stopped by an error or inhibited to run.

BREAK Shown at the step set as a breakpoint.

ERROR Shown at the error detected step. This step is the step at which the error has occurred even though the job runs continuously by “ON ERROR” statement.

8.7. Overview of List Window

The functions of List window are explained according to the menus as follows.

[Quit] menu
- [Quit] -- Close List window.
- [Quit All Lists] -- Close all List window currently opened.

[Search] menu
- [Next String] -- Search a next string if the current search string specified.
- [Previous String] -- Search a previous string if the current search string specified.
- [Select String] -- Select the current search string.
- [Head] -- Display the head line of the source list.
- [Bottom] -- Display the bottom line of the source list.
- [First Step] -- Display the first executable step.
- [Current Step] -- Display the current executing step or halting step.
- [Error Step] -- Display the error detected step.
- [Specified Step] -- Display the step which you specifies.

[Run] menu
- [Run] -- Run the job.
- [Debug] -- Transfer the job to Debug mode.
- [Mask] -- Inhibit the job to run.
- [Stop] -- Halt the job.
- [Step] -- Run the job by a step.
- [Pass] -- Halt the job at the next breakpoint.
- [Init] -- Initialize the job and halt the job at the first step.

[Watch] menu
- [Watch View] -- Open Watch window.
- [Add Watch] -- Add watching variable of the job.
- [Remove All Watches] -- Remove all watches currently shown.

[Breakpoint] menu
- [Toggle Breakpoint] -- Set/Reset a breakpoint at the current selected step in the source list.
- [Clear Breakpoint] -- Clear all breakpoints of the job.
- [Next Breakpoint] -- Display the next breakpoint.
- [Previous Breakpoint] -- Display the previous breakpoint.

[Window] menu
- [Tile All] -- Tile Job Monitor window, all List windows and Watch window to arrange equally.
- [Tile Lists Vertically] -- Tile List windows vertically.
- [Tile Lists Horizontally] -- Tile List windows horizontally.
- [Tile Lists] -- Tile all List windows to arrange equally.
- [Cascade Lists] -- Show all List windows in cascades.
- [Job Monitor] -- Activate Job Monitor window.
- [Watch View] -- Activate Watch window.

8.8. Control Jobs

You can control the jobs to select the following menu.

- [Job] menu or the pop-up menu on the job list in Job Monitor
- [Run] menu in List window

Transfer The Job to Debug Mode

Select [Debug] to transfer the job the status of which is “RUN” or “MASK” to debug mode.
On debug mode, the job status shown in Job Monitor or List window becomes “DEBUG”.
In this status, you can operate further the job as follows.

[Stop] You can halt the job. The job is stopped at the step where the “Stop” command was accepted by STP.
When List window is opened, the stopped step is shown automatically, and “STOP” is displayed at this step.

[Step] You can execute only one step and stop the job again. If you have not stopped the job, one step is executed and stopped after “Step” command is accepted by STP.
When List window is opened, the stopped step is shown automatically, and “STOP” is displayed at this step.

[Pass] You can resume executing and halt the job at the step set as a breakpoint.
If you have not set breakpoints at all, the job is not stopped.
If you have set breakpoints but the step as a breakpoint is not executed, the job is not stopped.
When List window is opened and the job is stopped at a breakpoint, the stopped step is shown automatically, and “STOP” is displayed at this step.

[Init] You can initialize the job. After initializing, the job halts to wait executing the step zero.
When List window is opened, “STOP” is displayed at the step zero.

Mask The Job

Select [Mask] to transfer the job the status of which is “RUN” or “DEBUG” to mask mode.
On mask mode, the job status shown in Job Monitor or List window becomes “MASK”.

Inhibiting the execution, the job is stopped at the step where the job status is transferred to mask mode.

You can resume executing to select [Run].
Then the job status shown in Job Monitor or List window becomes “RUN”.

You can transfer the job to debug mode to select [Debug].
Then the job status shown in Job Monitor or List window becomes “DEBUG”. When the job is transferred to debug mode, the job starts to run. If you want to stop the job, select [Stop] on debug mode.

Run The Job

You can resume the job running to select [RUN].
Then the job status shown in Job Monitor or List window becomes “RUN”.

Job Status After Job Monitor Terminated

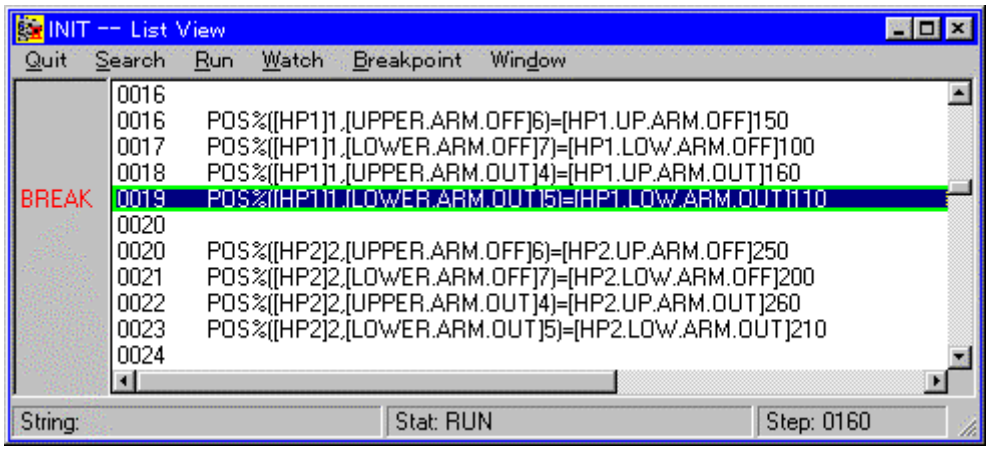
When the job status is debug mode or mask mode, the job is automatically transferred to “RUN” by terminating Job Monitor.

8.9. Set/Reset Breakpoints

You can set or reset a breakpoint to the step of the job to operate as follows in List window. See "Open List Window" section about opening List window.

Set A Breakpoint

1. Select the step not set as a breakpoint in List window.
2. Select [Breakpoint]-[Toggle Breakpoint] menu.
3. Then the selected step is enclosed by the green line and "BREAK" is displayed at the left of the step.



Reset A Breakpoint

1. Select the step set as a breakpoint in List window.
2. Select [Breakpoint]-[Toggle Breakpoint] menu.
3. Then the green line that has enclosed the step disappears and "BREAK" displayed at the left of the step disappears.

Clear All Breakpoints of The Job

1. Select [Breakpoint]-[Clear Breakpoint] in List window.
2. Also in Job Monitor, after selecting the job, select [Job] menu or click the right button of the mouse on the job list to show the pop-up menu and then select [Clear Breakpoints].
3. Then all "BREAK" marks at the left of the step disappear.

Clear All Breakpoints of All The Jobs

1. Select [Breakpoint]-[Clear Breakpoints of All Jobs] in Job Monitor.
2. Then all "BREAK" marks of all List windows at the left of the step disappear.

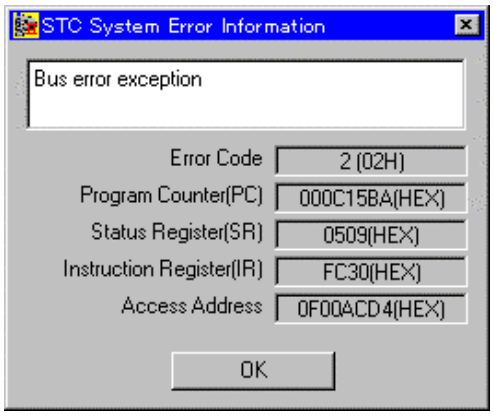
8.10. Display Errors

There is three kinds of errors that can occur in STP.

System error	This is the trouble of STP system. The trouble of STP OS (Operating System) or the hardware of STP causes this error. When this error detected, please call HIRATA corporation.
Job error	This is the executing error of the HrBasic program. The invalid or illegal usage of HrBasic or the problem of the communication by the program causes this error.
Robot error	When the program communicates with the robot, the error response from the robot causes this error.

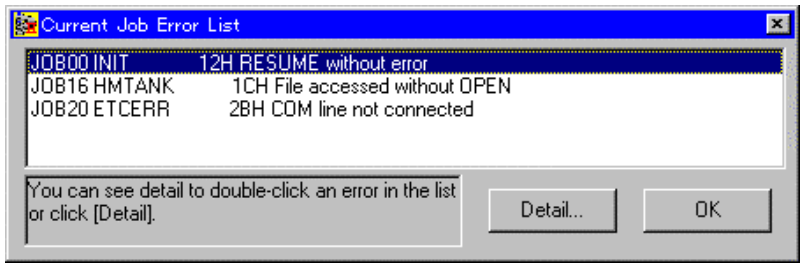
System Error

Select [Error]-[System Error] in Job Monitor.
In case that a system error is not detected, the message as “STP system error not detected.” is shown.
In case that a system error detected, the STP system error information is shown.



Job Error

Select [Error]-[Job Error] in Job Monitor.
In case that a job error is not detected, the message as “Job error not detected.” is shown.
In case that a job error detected, the job error list is shown.



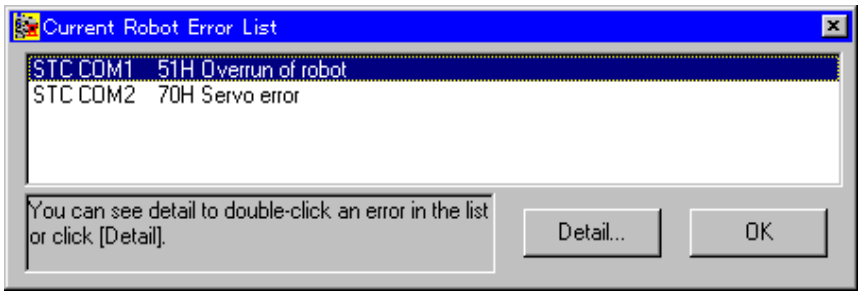
If you want to see the detail of the error, after selecting the error, double-click the error or click [Detail] button.

Also you can see the job error to select the job as follows.

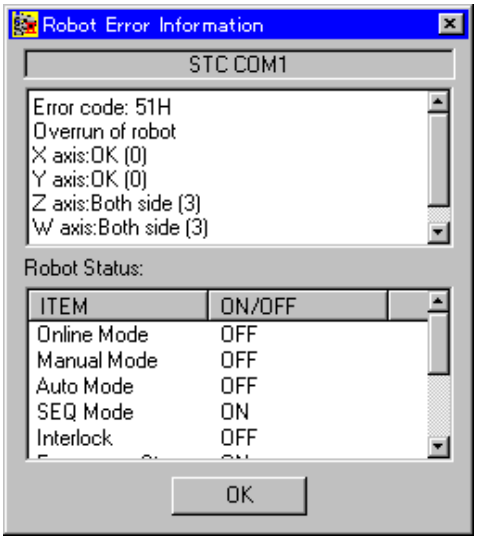
1. Select the job in Job Monitor.
2. Select [Job]-[Job Error] in the menu. Or click the right button of the mouse on the job list to show the pop-up menu and the select [Job Error].

Robot Error

Select [Error]-[Robot Error] in Job Monitor.
In case that a robot error is not detected, the message as “Robot error not detected.” is shown.
In case that a robot error detected, the robot error list is shown.



If you want to see the detail of the error, after selecting the error, double-click the error or click [Detail] button.



You can see the axis information and the robot status when error occurs in the robot error information.

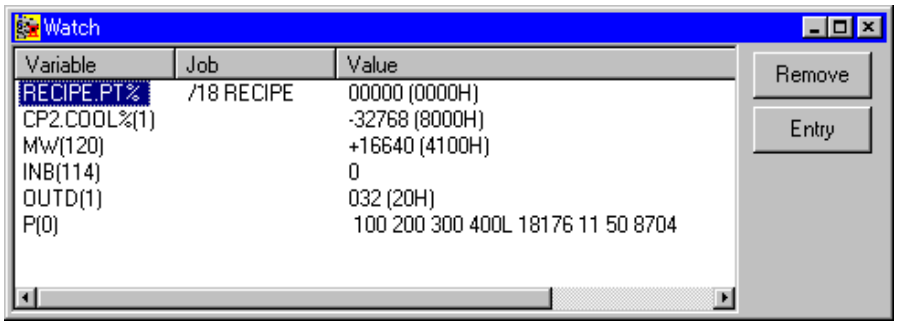
8.11. Watch Variables

You can watch the value of the variable to Watch window. You can check the program that sets the new value to the variable by watching variables. And you can set the value to the variable directly from the computer.

You can specify the variable to watch in Job Monitor window or List window.

Open Watch Window

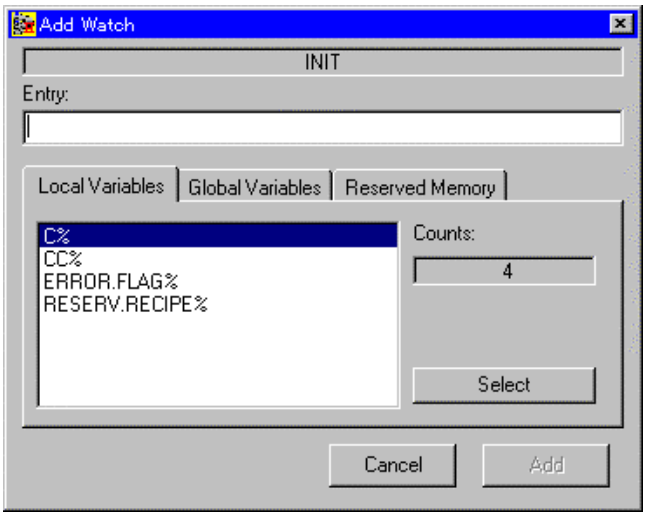
The value of the specified variable is shown in Watch window.
Select [Watch]-[Watch View] in Job Monitor. Then Watch window is opened at the lower area of the screen.



Open Add Watch Window

You must open the Add Watch window to specify the variable to watch by one of the following operations.

- In Job Monitor, after selecting the job, select [Job]-[Add Watch]. Or after selecting the job, click the right button of the mouse on the job list to show the pop-up menu and select [Add Watch].
- Select [Watch]-[Add Watch] in List window.
- Select [Watch]-[Add Watch (All jobs)] in the menu of Job Monitor window. In this case, the variables for all jobs are shown and you cannot select local variables.
- After the variable selected, click [Entry] button in Watch window. In this case, Add Watch window shows the variables for only one job or all jobs according to the attribute of the selected variable.



Specify The Variable to Watch

In Add Watch window, enter the variable name to [Entry] text box by the following format.

- In case of a local variable, you must specify "/job-number" at the head of the variable name.
  Example) /0ERROR.FLAG%
- In case of a global variable, enter the variable name only.
  Example) CP1.COOL%

• There is not a distinction between the capital letter and the small letter.

After entering the variable name, press the RETURN key or click [Add] button to add watch.

You can select the variable of the list that shows the variables used in the job.
Select the tab that is categorized to [Local Variables], [Global Variables] and [Reserved Memory].
Select the variable to watch and double-click the variable or click [Select] button to show the variable name in the [Entry] text box.
In case of a local variable, "/job-number" is added automatically.
In case of showing global variables, you can change the view for the current job only or all the jobs. Default is "This job only" and click the [All jobs] radio button to see all the global variables.

Note) [Reserved Memory] shows all the reserved memory regardless of usage of the job.

Entry of The Array Variable

To specify the array variable to watch, you must put the index of the array variable in parentheses.
Example) CP1.COOL%(4)
You cannot specify the variable expression as the index.
Example) CP1.COOL%(X%) --- NG
In case that you select the array in the list, zero is set to the index value as the default. If you want to watch the other index, modify the index value by keyboard.

Entry of The Continuous Area of The Array

For Example, if you want to watch the array from A%(0) to A%(5) of A%(10) defined by "DIM" statement, you can enter as follows to the [Entry] text box.
A%(0-5)
In case of 2 dimensions array, enter as follows.
B%(1-3,2) ----- B%(1,2), B%(2,2), B%(3,2) watched.
In case of 3 dimensions array, enter as follows.
C%(0,4-5,1) ------ C%(0,4,1), C%(0,5,1) watched.

Note#1) It is an error that you enter the first subscript bigger than the second.
Example) A%(5-0) B%(2,12-11)
Note#2) It is an error to specify more than 10 elements of the array.
Example) A%(0-10) B%(1-12,2)
Note#3) In case of 2 or 3 dimensions array, it is an error that you enter the description in more than 2 dimensions.
Example) B%(0-2,2-3) C%(1-5,2,6-9)

Entry of Reserved Memory

In case that the reserved memory has the multiple area, you can enter the name by the following two entry.

• Enter the index at the end of the reserved memory name.
Example) MW128
• Put the index value in parentheses at the end of the reserved memory similarly to the case of an array. For this expression, you can enter the continuous area expression.
Example) MW(128) MW(10-14)

Note) STP position memory described as "P" cannot be written. You must write each components of the position memory.
Example) P0=10.0 ----- NG
PX0=10.0 ----- OK

Set The Value to The Variable

You can set the value to the variable in the Add Watch window.
Enter the text with the following format and Click [Add] button.

Variable-name = Setting-value

Example) /0ERROR.FLAG%=1

CP1.COOL%(2)=10

In case of selecting the variable in the list, enter "=" and the setting value by keyboard.
You can enter a space between the variable name or the setting value and "=".
After this operation, the written variable is added to watch automatically.

To set the value to the continuous area of array, this format is applied. In this case, the specified value is set continuously to the elements of array.

Example) A%(0-5)=10
B%(1-3,2)=3
C%(0,4-5,1)=0

Add Watch Without Opening Watch Window

Without opening the Watch window, if you add watch, the watching variable is registered and it will be showed to open Watch window.

Without opening the Watch window, if you set the value to the variable, the writing is executed when you click [Add] button and the written variable will be showed to open Watch window.

Checking of Entry

After [Add] button clicked, the entry of the watching specified in [Entry] text box is checked whether the format is valid or not. If the format of the entry is invalid, the error message is shown and the variable is not added to watch.

Though the format of the entry is detected as valid, in case that STP detected the variable undefined or the specified position memory is not initialized, the message "Undefined or memory not initialized" is shown in Watch window.

Restriction of Number of Watching Variables

The maximum of the number of watching variables is 32. If you add more variables to watch, the oldest watching variable is removed and add the specified variable.

Remove All Watches

You can remove all watches by the following operation.

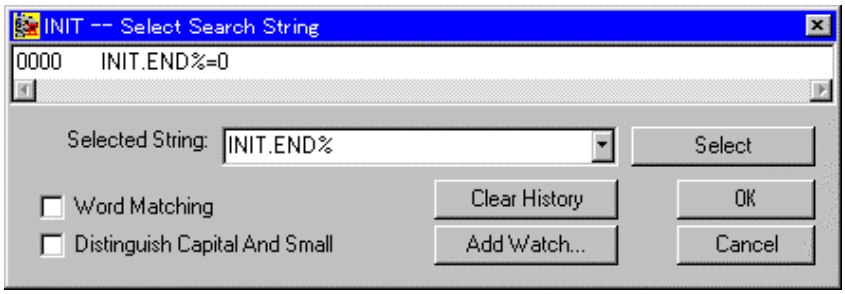
- Select [Watch]-[Remove All Watches] in Job Monitor.
- Select [Watch]-[Remove All Watches] in List window.

In Watch window, after the variable selected, click [Remove] button to remove the selected variable for watching.

8.12. Search String in List

You can search the string in the program list.
In List window, show the string selection by the one of the following operations.

- Select the step where the string to search is contained and then select [Search]-[Select String] menu.
- Double-click the step where the string to search is contained.



How to Select String

The string selection window displays the one step line which you selected in List window.
In the combo box [Selected String], the first string detected in the specified step excluding the step number is displayed automatically.
If you want to choose another string, drag the string of the displayed step and click [Select] button or enter the string to [Selected String] directly.
Also you can choose the recent selected string in the list of the combo box.
After selecting the string, click [OK] button to register the string as the current searching string.
The current searching string is shown in the status bar in List window.

Searching Condition

You can specify the condition for searching.

- Check the [Word Matching] check box to search the strings that has the same length of the searching string. On this condition, you cannot find the string the part of which is the searching string. The default of [Word Matching] is checking off.
- Check the [Distinguish Capital and Small] check box to search the strings distinguishing between capital (uppercase) letters and small (lowercase) letters. The default of [Distinguish Capital and Small] is checking off.

The specified condition is available till you will change this condition.

Clear History

You can clear the list of the recent selected strings displayed in the [Selected String] combo box to click [Clear History] button.

Execution of Searching

You can execute the searching for the current specified string to select [Search]-[Next String] or [Search]-[Previous String] in List window.

- To select [Search]-[Next String] or enter F3 key, the current specified string is searched from the current step to the end of the source list.
- To select [Search]-[Previous String] or enter SHIFT+F3 key, the current specified string is searched from the current step to the top of the source list.

Add Watch of The Selected String

When the [Selected String] displays the string, click [Add Watch] button to show the Add Watch window.
The specified string is shown in the [Entry] text box of the Add Watch window. If the variable list contains this string, the variable that has this name in the list is selected automatically.
Refer to "Watch Variables" about the operation.

8.13. Change View in List

You can change the view of the list in List window.

Show Head of List

Select [Search]-[Head] menu or enter CTRL+H key to show the head of the list.

Show Bottom of List

Select [Search]-[Bottom] menu or enter CTRL+B key to show the bottom of the list.

Show First Step of List

Select [Search]-[First Step] menu or enter CTRL+F key to show the executable first step of the list. This step has normally the step number “0000”.

Show Current Step of List

Select [Search]-[Current Step] menu or enter CTRL+C key to show the current executing step of the list when this operation is accepted by STP. If the job has been stopped, the stopped step is shown.

Show Error Step of List

Select [Search]-[Current Step] menu or enter CTRL+E key to show the error detected step of the list. This step is the step at which the error has occurred even though the job runs continuously by “ON ERROR” statement.

Show The Specified Step

Click [Search]-[Specified Step] to show the dialog box to specify the step number.
Enter the step number and click [Jump] to show the executable step that has the specified number.
In case that the specified number is over the end step of the list, the end step is shown.

8.14. Arrange Windows

When Job Monitor, List windows and Watch window are opened, you can arrange these windows as follows.

Tile All

Select [Window]-[Tile All] in Job Monitor or List window to tile the current Job Monitor window, List windows and Watch window.
Job Monitor moves the top of the screen.
List windows moves in piles below the Job Monitor.
Watch window moves the bottom of the screen.

Tile Lists Vertically

Select [Window]-[Tile Lists Vertically] in Job Monitor or List window. All the List windows are tiled vertically in the whole screen.

Tile Lists Horizontally

Select [Window]-[Tile Lists Horizontally] in Job Monitor or List window. All the List windows are tiled horizontally in the whole screen.

Tile Lists

Select [Window]-[Tile Lists] in Job Monitor or List window. All the List windows to arrange equally in the whole screen.

Cascade Lists

Select [Window]-[Cascade Lists] in Job Monitor or List window. All the List windows moves in cascades.

Window List

The list of the currently opened List window is shown as the job name in [Window] menu.
Select the job name in this list to activate the List window of the job.

8.15. Terminate Debug

You can terminate debugging to close Job Monitor window as follows.

- Select [Quit]-[Quit Debug] in the menu of Job Monitor window.
- Click the termination icon (X marked) in the upper right corner of the window.

When debugging terminated, all List Windows and Watch window currently opened are closed.

And the following current information is saved to the window information file when debugging terminated..

- Position (left, top, width and height) of Job Monitor window
- Positions of List windows opened currently
- Position of Watch window
- Variables watched currently

When next starting Debug Mode, If the window information file exists for the debugging program, Debugger reads this file and opens the Job Monitor, List, Watch windows according to the saved information. And Debugger sets the watched variables data to the current watched information.

The window information file is named as ‘make-file-name.dbx’ and created at HrBasic Work Directory. So, a user can save the debugging window information for each make file.

9. I/O Monitor

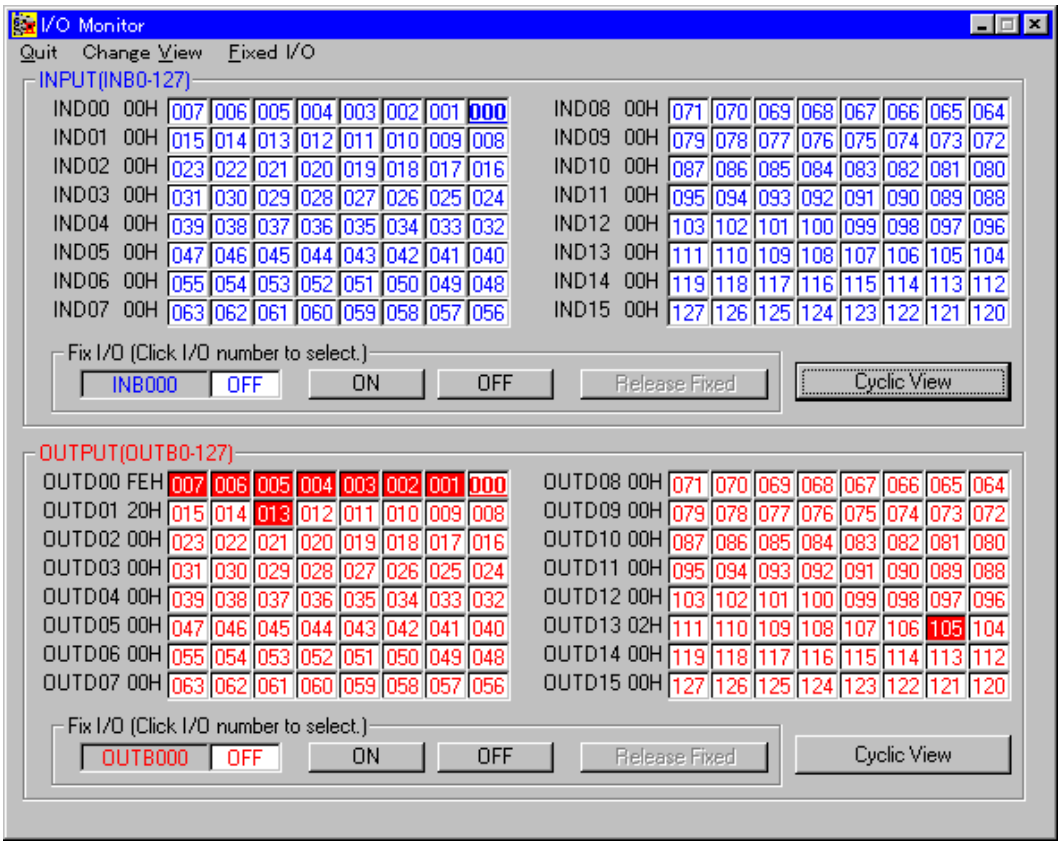
9.1. Introduction to I/O Monitor

STP can treat 256 input signals (DI signals) and 256 output signals (DO signals) through the remote I/O.
I/O Monitor watches the current input or output signals in STP.
And you can fix the signal as the compulsory ON/OFF status to test or debug the program.
When the input signal is compulsory, the signal is regardless of the actual input signal.
When the output signal is compulsory, the signal is regardless of the execution result of the program.

When you use I/O Monitor, you must connect the computer with STP correctly by RS232C interface. You can see about the connection with STP in "Connection with STP" section.
And You must select COM9 (Programming Console) or COM8 (Host) of STP for the communication.

I/O Monitor is opened by the one of the following operations.

- Select [Debug]-[I/O Check] in Main Menu or click  button in the tool bar.
- Select [I/O]-[I/O Monitor] in Job Monitor.



9.2. View of I/O Monitor

The input signals of 256 bits have the number 0 through 255.
HrBasic can express these input signals as INB0 through INB255 or INB(0) through INB(255).
The output signals of 256 bits have the number 0 through 255.
HrBasic can express these output signals as OUTB0 through OUTB255 or OUTB(0) through OUTB(255).

After I/O Monitor opened, the input or output signals are displayed as follows.

- The input signals of 128 bits as INB(0) through INB(127) are showed in the upper area of the window.
- The output signals of 128 bits as OUTB(0) through OUTB(127) are showed in the lower area of the window.

In case of OFF status, the back color of the signal is white. In case of ON status, it is reversed.

The serial signals of 8 bits (1 byte) can be expressed as follows.

- The data of input 8 bits signals is expressed as IND0 through IND31 or IND(0) through IND(31).
- The data of output 8 bits signals is expressed as OUTD0 through OUTD31 or OUTD(0) through OUTD(31).

I/O Monitor displays this byte data as the hexadecimal expression.

Select Menu to Change View

You can change the view to select [Change View] menu.

[INB(0-127):INB(128-255)]	Upper: INB(0) through INB(127) shown. Lower: INB(128) through INB(255) shown.
[INB(0-127):OUTB(0-127)]	Upper: INB(0) through INB(127) shown. Lower: OUTB(0) through OUTB(127) shown.
[INB(0-127):OUTB(128-255)]	Upper: INB(0) through INB(127) shown. Lower: OUTB(128) through OUTB(255) shown.
[INB(128-255):OUTB(0-127)]	Upper: INB(128) through INB(255) shown. Lower: OUTB(0) through OUTB(127) shown.
[INB(128-255):OUTB(128-255)]	Upper: INB(128) through INB(255) shown. Lower: OUTB(128) through OUTB(255) shown.
[OUTB(0-127):OUTB(128-255)]	Upper: OUTB(0) through OUTB(127) shown. Lower: OUTB(128) through OUTB(255) shown.

[Cyclic View] Button

Also you can change the view to click [Cyclic View] button. In this case, the changing of view is as follows.

- It is assumed that the showing of INB(0) through INB(127) is expressed as IN1, the showing of INB(128) through INB(255) as IN2, the showing of OUTB(0) through OUTB(127) as OUT1 and the showing of OUTB(128) through OUTB(255) as OUT2.
- When IN1 is shown in the upper, IN2-OUT1-OUT2 is showed as a cyclic view to click [Cyclic View] button in the lower. Similarly, When IN2 shown in the upper, IN1-OUT1-OUT2 is shown as a cyclic view.
- When IN1 is shown in the lower, IN2-OUT1-OUT2 is showed as a cyclic view to click [Cyclic View] button in the upper. Similarly, When IN2 shown in the lower, IN1-OUT1-OUT2 is shown as a cyclic view.

9.3. Fix I/O

You can fix the input or output signal status to ON/OFF compulsorily as follows.

1. Select the signal to fix compulsorily to click the signal number. When the signal selected, the signal number becomes bold and with underline and the current selected number is displayed in the [Fixed I/O] area as “INBxxx” or “OUTBxxx”.

2. Click [ON] button or [OFF] button in the [Fixed I/O] area. After the signal is fixed, the signal number becomes green and the [Release Fixed] button is enabled.

Release Fixed I/O

The signal displayed with the green number is fixed compulsorily.
You can release this fixed signal to click [Release Fixed] button after selecting the sinal.
And you can all the signals that are currently fixed to select [Fixed I/O]-[Release All Fixed I/O] menu.

In case of the input signal, the compulsory input is released and the actual input is read in the STP.
In case of the output signal, STP holds the compulsory output till the program execute the new output for the signal.

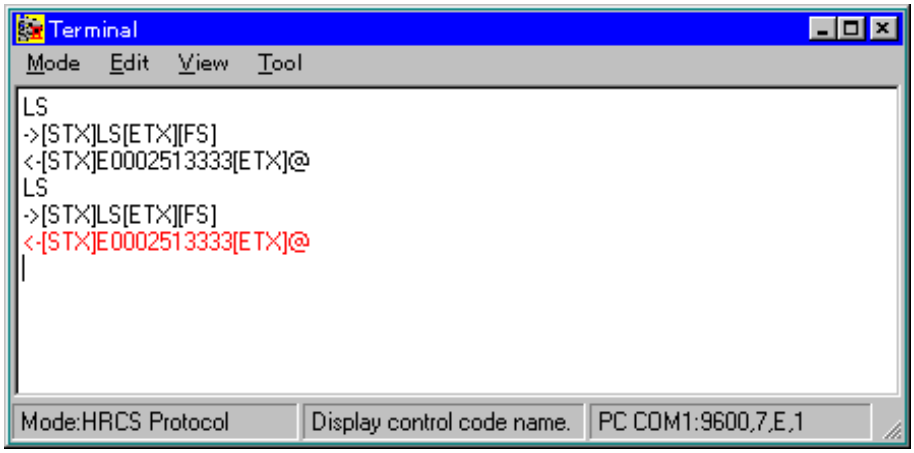
When terminating I/O Monitor, all the fixed I/O signals are released automatically.

10. Maintenance

10.1. Terminal

[Maintenance]-[Terminal] in Main Menu shows the communication terminal window.
In case the terminal window has been already opened or the window communicated with STP or a robot has been opened, you cannot select this function.

You can also show the terminal window to click  button in the tool bar.



[Mode] Menu

There is two input modes on the terminal window.
These modes is switched to select [Mode]-[HRCS Protocol] or [Mode]-[Terminal]. Default mode is [HRCS Protocol]. And the current mode is shown in the status bar.

(1)HRCS protocol
You can communicate with a robot or STP by HRCS (Hirata Robot Communication System) protocol. The input characters are sent when you enter the return key adding STX to the top of the characters and ETX, LRC to the end of them.
After sending data, the window is waiting for the response from a robot or STP. When the response received, the window shows the response data. In case of response not received and time out, the window shows an error message.

(2)Terminal
This is a pure terminal mode in which the entered one character is sent by each key input. The window checks receipt after each input and if there is receive data, the window shows it.

Input Hex Value on HRCS Protocol Mode

In case of HRCS protocol mode, you can input data by hex value and send it to treat binary data such as the control code.
Two characters after "^" are regarded as two digits of hexadecimal expression and one byte expressed by these two digits is sent. For example, "^FB" is regarded as hexadecimal FBH to send. "0"to "9" and "A" to "F" are allowed for hexadecimal expression. If you input another expression, the error message is shown.
In case the hex value of one byte is 0H to FH, you must input "0" at the top of hexadecimal expression. ("^0A" for example)
If you input more than three characters for hexadecimal expression, two characters at the top of characters are effective and characters after third position are sent by those character code. For example, "^1BE" sends 1BH and 45H (character "E").
If you want to send character "^", you must input "^5E" as hexadecimal expression.
This hexadecimal expression is available in either view types, [View]-[Control Code Name] or [View]-[Hex Data].

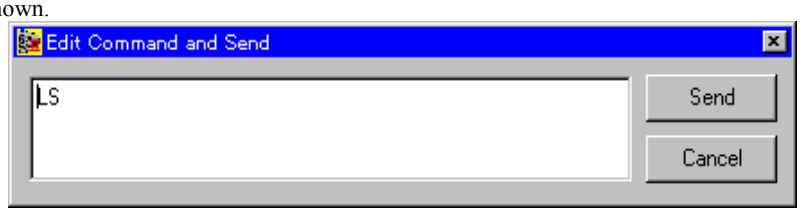
In case of terminal mode, you cannot input by hexadecimal expression. Key input code is sent through.

[Edit] Menu

(1)[Edit]-[Copy To Clipboard]
All text of the window is copied to the clipboard.

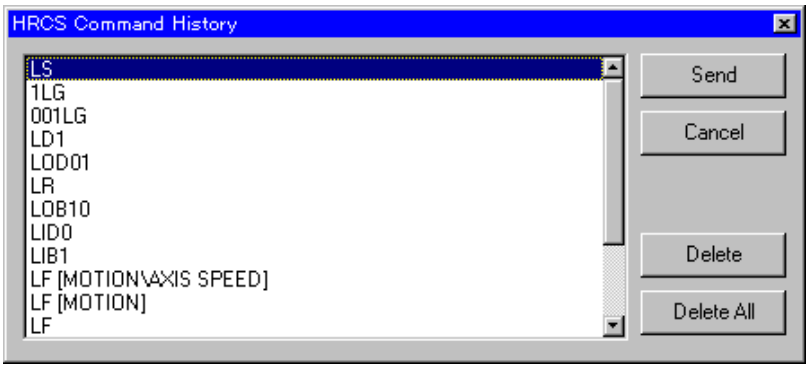
(2)[Edit]-[Save To File]
The dialog box to save is shown and input a file name to save all text of the terminal window to the specified file.

(3)[Edit]-[Edit And Send]
If you move a cursor to the top of HRCS command already sent and select [Edit]-[Edit And Send], the following window is shown.



You can change the shown command or do nothing and select [Send], the current shown command is sent. It is effective to send the long size command already sent.

(4)[Edit]-[HRCS Command History]
This shows history of commands that have been sent in HRCS protocol mode.



- Select a command in the history and then double-click it or click [Send] button to send the command again.
- Select a command in the history and then click [Delete] button to delete the command.
- If [Delete All] button clicked, delete all commands in the history after confirmation dialog shown.

[View] Menu

(1)[View]-[Clear View]
All text of the terminal window is deleted.

(2)[View]-[Control Code Name] or [Hex Data]
You can select types of displayed format by the control code name such as “STX”, “ETX” or “02”, “03” as hexadecimal expression.
In case of [Control Code Name], sending or receiving data that cannot be expressed by character is shown as “[Code Name]” and in case of [Hex Data], it is shown as “[^Hexadecimal Expression]”.
Example)

	Control Code Name	Hex Data
Hex value 02H	[STX]	[^02]

[Tool] Menu

(1)[Tool]-[Ascii Code]
This shows the table of ascii codes.
Click the button (x mark) in the upper right corner to terminate the window.

(2)[Tool]-[STP Error Code]
This shows the table of error codes in the error response from STP by HRCS command.
Click the button (x mark) in the upper right corner to terminate the window.
An error response from STP has the following format.

[STX]!_HHmessage[ETX][LRC]

HH: Error code by hexadecimal expression
message: String of error information

(3)[Tool]-[Robot Error Code]
This shows the table of error codes in the error response from a robot by HRCS command.
Click the button (x mark) in the upper right corner to terminate the window.
An error response from a robot has the following format.

[STX]Esssseeaaaa[ETX][LRC]

ssss: Robot status (4 characters)
ee: Error code by hexadecimal expression
aaaa: Error axis information (for only existing axis)

See "HRCS Robot Error Format".

Display Communication Parameter

Current settings of RS232C communication parameter is shown in the status bar by the following format.

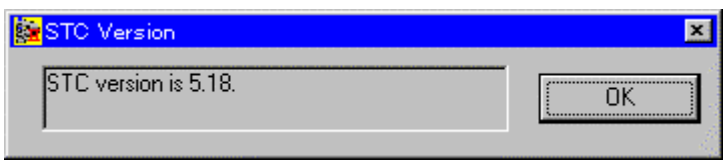
PC COMa:ssss,d,p,b

a: COM number of the computer (1 or 2)
ssss: Baud rate (38400,19200,9600,4800,2400,1200,600,300)
d: Data length (8,7)
p: Parity (E,O,N)
b: Stop bits (1,2)

10.2. Display STP Version

Select [Maintenance]-[STP Version] in Main Menu to open the STP version window.

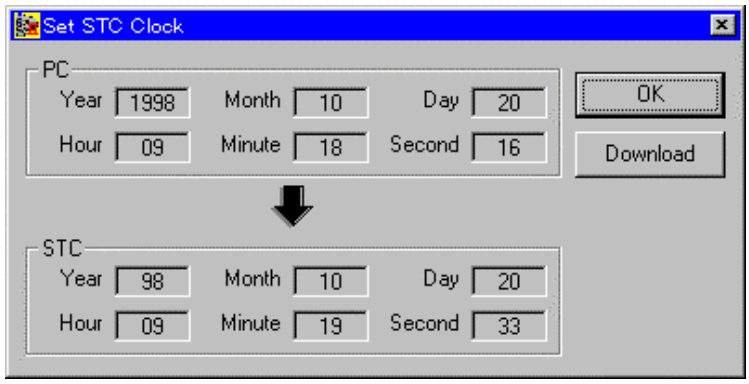
When you use the STP version window, you must connect the computer with STP correctly by RS232C interface. You can see about the connection with STP in "Connection with STC" section.
And You must select COM9 (Programming Console) or COM8 (Host) of STP for the communication.



10.3. Set Clock of STP

Select [Maintenance]-[Set Clock] in Main Menu to open the STP clock window.

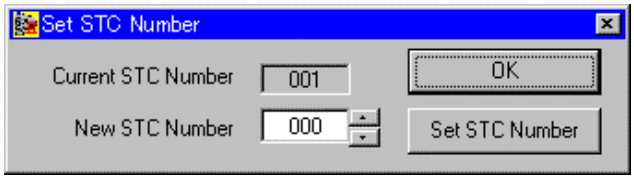
When you use the STP clock window, you must connect the computer with STP correctly by RS232C interface. You can see about the connection with STP in "Connection with STC" section.
And You must select COM9 (Programming Console) or COM8 (Host) of STP for the communication.



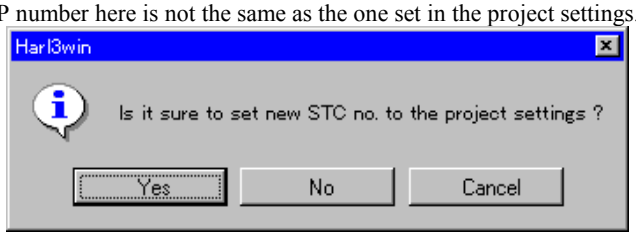
In the [PC] frame, you can see the calendar and the time and in the [STP] frame, you can see the STP's one.
Click [Download] button to download the value of the calendar and the time of the computer to STP.
Click [OK] button to terminate the window.

10.4. Set STP Number

Select [Maintenance]-[Set STP Number] in Main Menu to open the STP number window.
When you use the STP number window, you must connect the computer with STP correctly by RS232C interface. You can see about the connection with STP in "Connection with STC" section.
And You must select COM9 (Programming Console) or COM8 (Host) of STP for the communication.



When the STP number window is opened, you can see the current STP number.
To set the new STP number, after entering the new STP number to the [New STP No.] text box by decimal expression or clicking the spin button to change the STP number, click [Set Number] button.
The range of the STP number is 0 through 999. In case that the specified number is out of range or the entry is invalid, the message is shown and the setting is not executed.
After the setting of the STP number is all right, when you click [OK] button, the following message may be shown in case that the specified STP number here is not the same as the one set in the project settings.

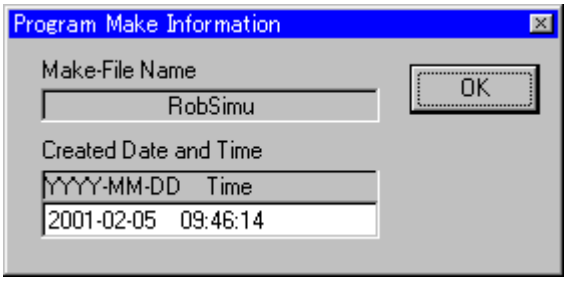


If you want to modify the project settings by the new STP number specified here, click [Yes] button. [No] button clicked, the window is terminated without modifying the project settings. [Cancel] button clicked, this dialog exits.

10.5. Read Program Make Information from STP

Select [Maintenance]-[Program Make Information] in Main Menu to open the program make information window.
If the program has not been downloaded yet, the error message will be shown.

When you use the program make information window, you must connect the computer with STP correctly by RS232C interface. You can see about the connection with STP in "Connection with STC" section.
And You must select COM9 (Programming Console) or COM8 (Host) of STP for the communication.



[Make-File Name]

The make file name that corresponds to the downloaded program is shown here.
You can recognize the following files that have built and link the downloaded program by the displayed name.
Make file: Displayed-Name.mak
Link file: Displayed-Name.exv

[Created Date and Time]

Date and time when the downloaded program was created and linked is shown here.

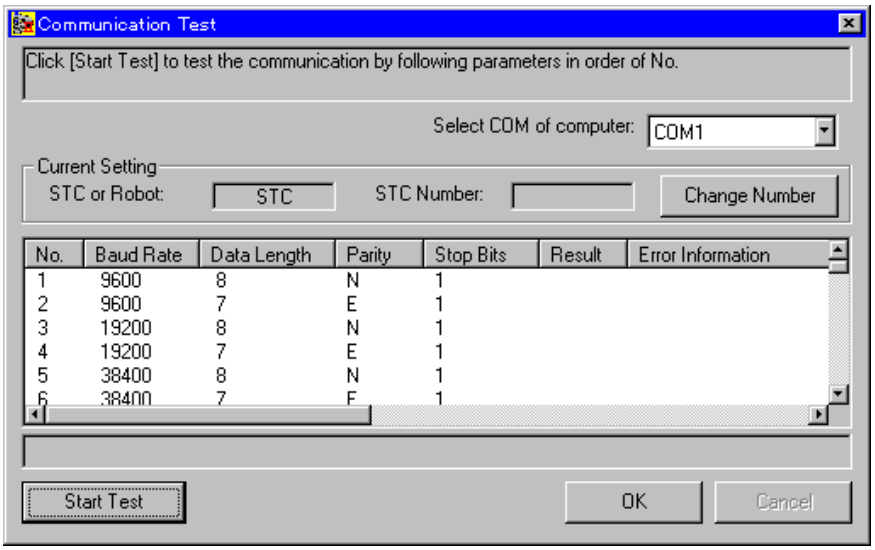
11. Tools

11.1. Communication Test

[Tools]-[Communication Test] in Main Menu tests the communication with a robot or STP.
It examines RS232C port and checks the response to vary the communication parameters. You can see the testing patterns in the list view in order.

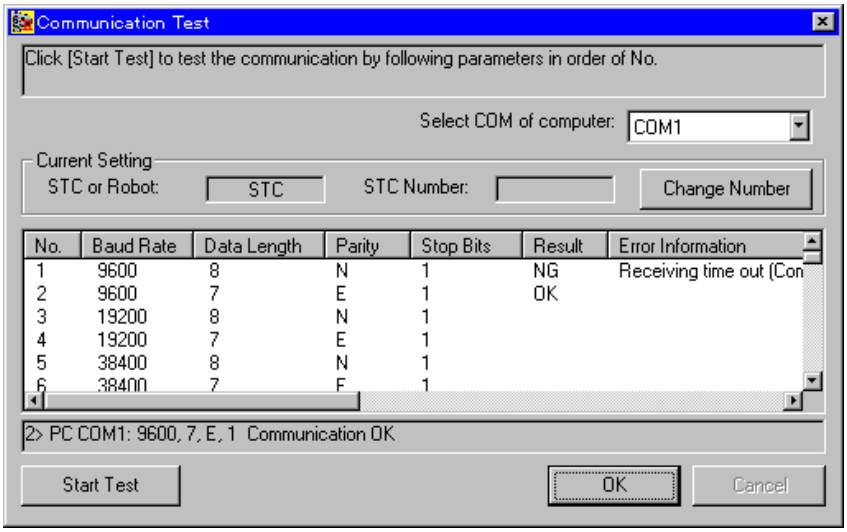
Note) You can customize the testing patterns to change 'comtest.ini' file. (See "comtest.ini File".)

In [Select COM of computer], the PC COM number that is specified in the project settings is already selected. You can change PC COM number here.



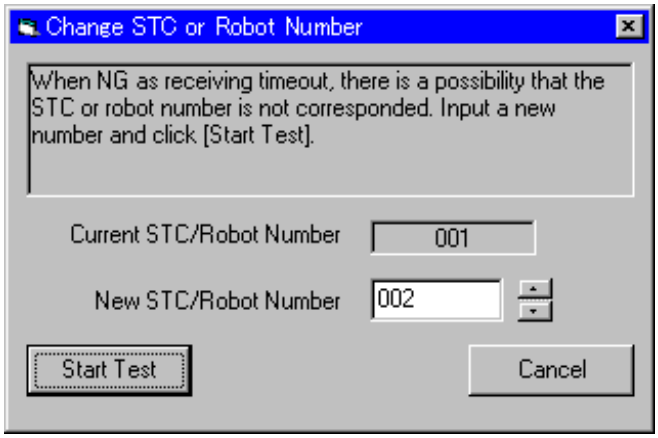
When [Start Test] clicked, testing starts. If testing of the current pattern is OK, "OK" is shown in the "Result" column. If testing is NG, "NG" is shown in the "Result" column and a error information is shown in the "Error Information" column. In case of NG, testing of a next pattern is executed. Current testing status is shown as a message in the lower of the window.

[Cancel] button is enable only during testing. Click [Cancel] to abort testing. [OK] button is disable during testing.



STP or Robot Number Not Coincident

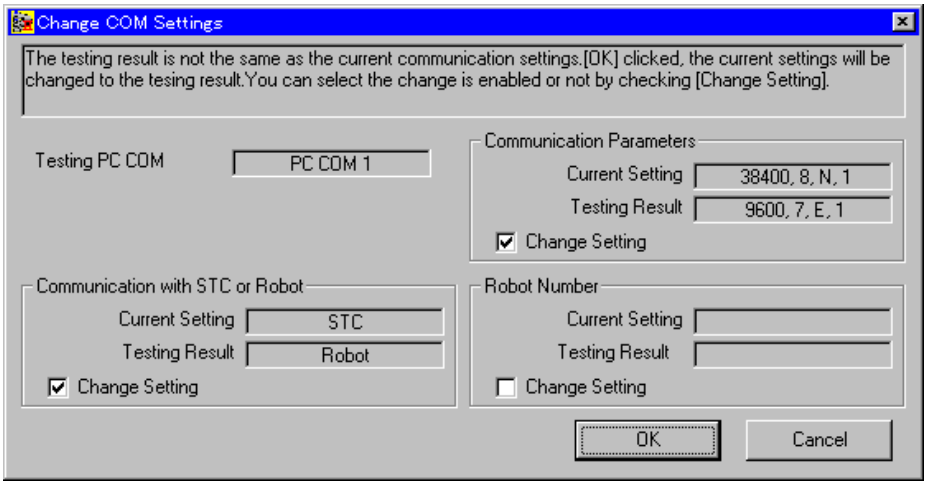
When the robot number is specified in [Set Up]-[Project Settings]-[COM Format], if the setting number is coincided with the STP or robot controller, all the testing patterns result in NG as receiving timeout.
The reason of this is that the STP or robot controller cannot respond in this situation. (This is the specification of one-for-N communication.)
If all the testing patterns are terminated as NG, the following window is shown.



In this window, specify the new STP or robot number and click [Start Test] to start the testing again with the new number.
This window can be opened to click [Change Number] button in the Communication Test window.

Termination of Testing

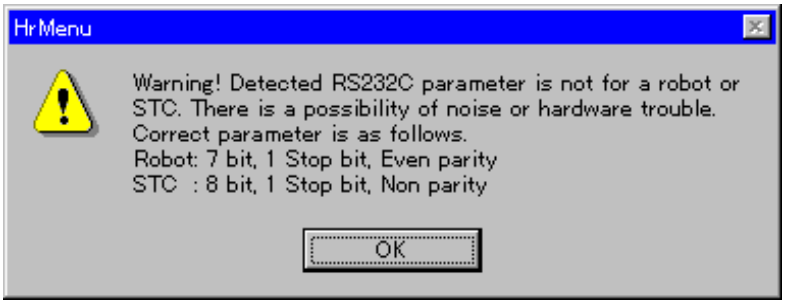
After testing is OK, testing is terminated and [OK] button is enable.
[OK] button clicked, in case the RS232C parameters at which OK is detected is not the same as the current parameters set in the project settings, the following window is shown to confirm changing the current settings.



[OK] button clicked in this window, the current settings of the project is changed to the settings when the testing result is OK. The new settings is not saved automatically, so you need to save the new settings to a file by [File]-[Update Project] after [OK] button clicked.

[Change Setting] clicked, it is disable to change the current setting.
[Cancel] clicked, Communication Test is terminated without changing the current settings.

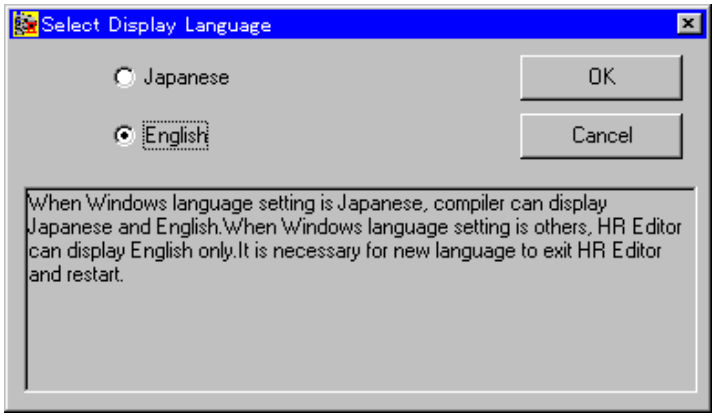
Note) After [OK] button clicked in the Communication Test window, if the detected RS232C parameter as testing OK is not allowed for a robot or STP, the following message is shown. In this case, there is a possibility of noise or hardware trouble of the robot, STP, the cable for communication.



12. Environment Settings

12.1. Change Language

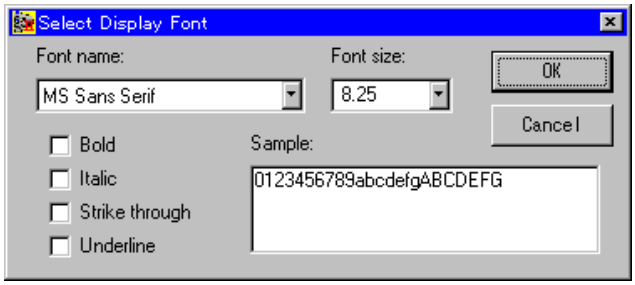
You can switch the displaying language to select [Setup]-[Language] in Main Menu. Available language is Japanese or English.



When the using language for Windows set by [Control Panel]-[Locale] is Japanese, you can select Japanese or English. When the Windows setting is not Japanese, you can choose only English.
It is necessary for new language to exit HBDE and restart.
This setting is written to “harl.ini” file in the HBDE system directory. (See “harl.ini File”.)

12.2. Change Font

[Set Up]-[Font] in Main Menu changes a displaying font.



Select the font in the list box, set the other settings such as [Font size], [Bold] etc. and click [OK].
These settings are not used by Position Editor, S.G. Editor, S.P. Editor and Robot Data Communication. These functions use fixed font as follows.

Japanese --- MS Gothic, Font size=9
English --- MS Sans Serif, Font size=9

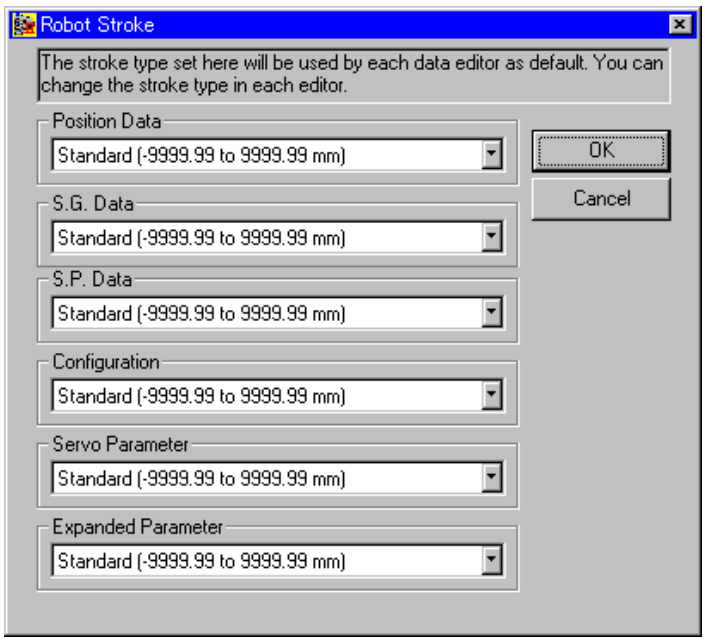
This settings are not available if you exit and restart HBDE. These settings are available only for current running of Main Menu of HBDE.
If you want to change the font when HBDE starts next, you must directly edit “harl.ini” file in the HBDE system directory by using a text editor such as Word Pad. It is recommended that you save “harl.ini” file before you edit the file. (See “harl.ini File”.)

12.3. Setting of Printer

[Set Up]-[Printer] in Main Menu shows the setting window for the printer.
This window is the property setting window that is shown in the Windows control panel for the usually used printer.

12.4. Robot Stroke Settings

When you select [Set Up]-[Robot Stroke] in Main Menu, the following robot stroke setting dialog is shown.



You can set a robot stroke using by each robot data editor application as default.
You can also set a robot stroke in each editor application.
An editor selects a robot stroke set in this dialog automatically when a file opened.
But you can change it temporally when you open a file by an editor.

13. Upload/Download Robot Data

13.1. Introduction to Uploading/Downloading

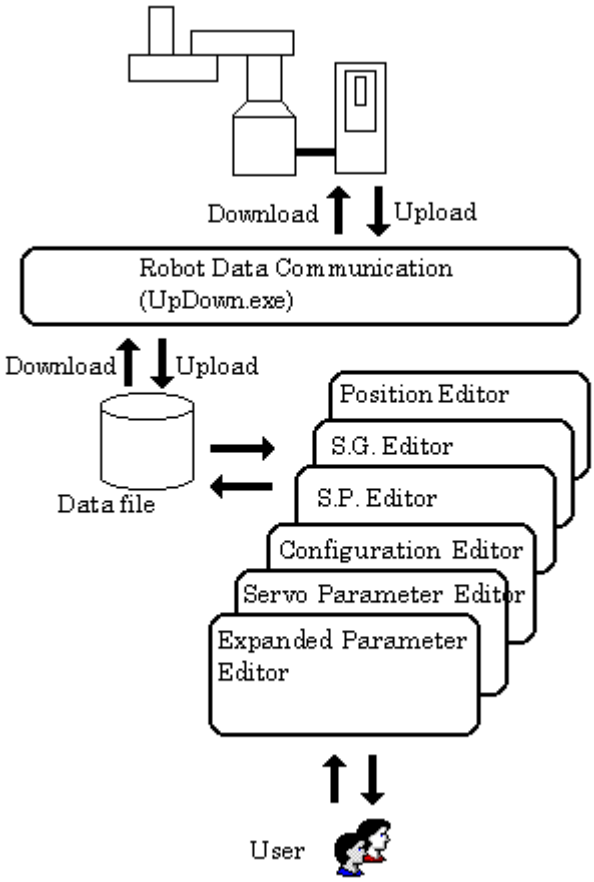
Robot Data Communication can upload robot data from a robot controller to a computer and it can download robot data from a computer to a robot.
Robot data means position data, S.G.(System Generation) data, S.P.(System Parameter) data, configuration, servo parameter and expanded parameter.

HNC-5XX supports all robot data types.
HNC-1XX,2XX,3XX,544 does not hold configuration and expanded parameter.
Refer to "Introduction to HBDE" about the relation between robot controller type and robot data type.

Uploading/Downloading starts by following operation.
(1) Select [Robot Data Communication] of [HrBasic Developing Environment X.XX] group in the start menu of Windows.
(2) Select [Maintenance]-[Robot Data Communication] in Main Menu of HBDE.

(3) Click  button in Main Menu of HBDE.

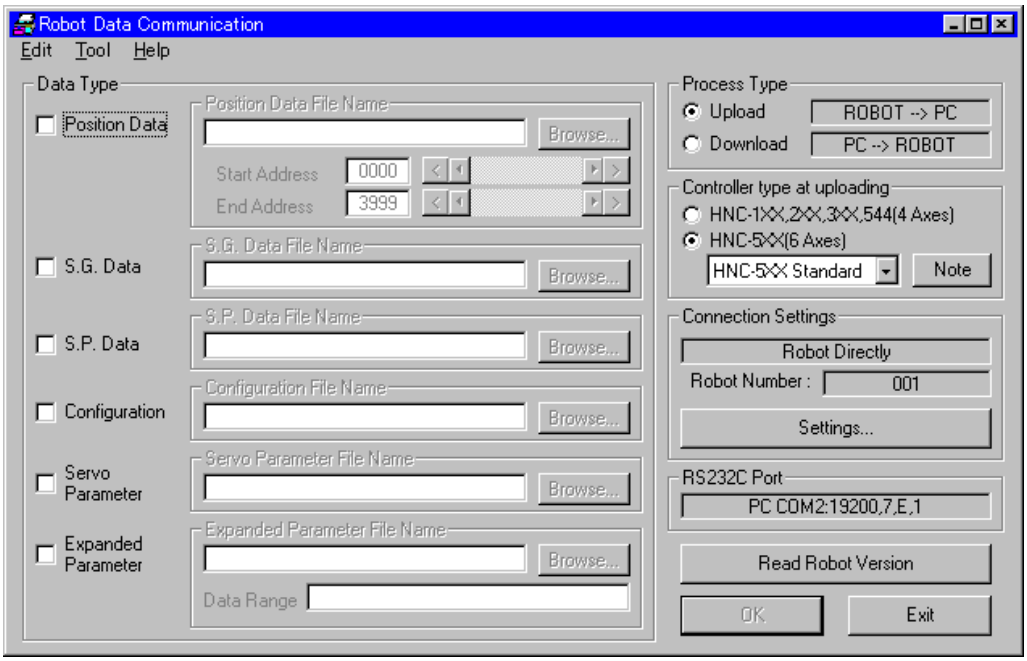
Function Structure of Robot Data Communication



13.2. Start Uploading/Downloading

Select [Robot Data Communication] of [HrBasic Developing Environment X.XX] group in the start menu of Windows or select [Maintenance]-[Robot Data Communication] in Main Menu. Then the main window of Robot Data Communication is opened.

Note) After installation, first starting of Robot Data Communication must be selected by Main Menu.



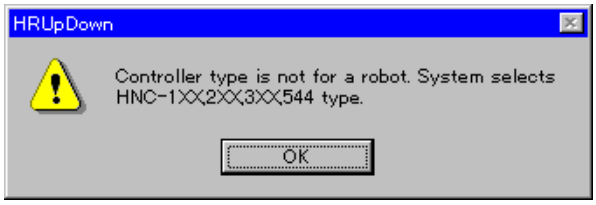
Note) The RS232C settings of the computer is shown in the window as following format. Confirm it for the communication with a robot or STP.

PC COMa:ssss,d,p,b
a : COM number of the computer (Typically 1 or 2)
ssss : Baud rate (38400,19200,9600,4800)
d : Data length (8,7)
p : Parity (E,O,N)
b : Stop bit (1,2)

If the setting is wrong, select [Exit] and set the correct parameters by [Set Up]-[Project Settings]-[RS232C Port] of Main Menu.

Warning of Robot Controller Type When Via STP Selected

In the case of selecting “Via STP” in [Set-up]-[Project Settings]-[COM Format] and selecting the type except a robot such as “Other Device” or “Not Used” in [Set-up]-[Project Settings]-[STP COM Port], the following message is shown and the “HNC-1XX,2XX,3XX,544” is selected automatically.



13.3. Upload from Robot to Computer

Uploading function will receive the robot data from the robot.

Robot Conditions When Uploading

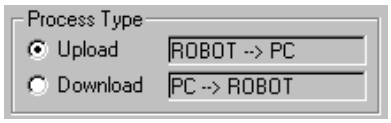
The following robot status is recommended for uploading robot data.

- Without moving (Key-In mode the best)

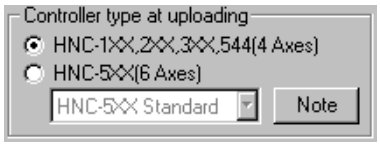
Some type of robots cannot be uploaded when an error occurs such as emergency stop, servo error or overrun.

Setting of Uploading

1. Select [Upload] radio button in [Process Type].



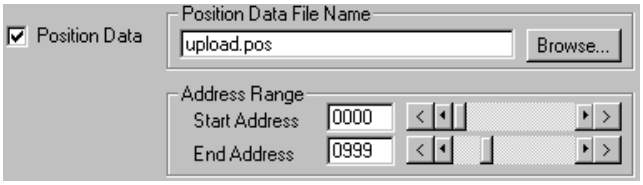
2. Select [Controller type at uploading] radio button according to the target robot controller.



In case of selecting HNC-1XX,2XX,3XX,544 if the start address or the end address of position data is over 0999, the address is changed to 0999 automatically.
If you select HNC-1XX,2XX,3XX,544 type, you cannot select "Configuration" and "Expanded Parameter" as the data type. These data are only available for HNC-5XX type.

3. Select [Data Type] to upload.

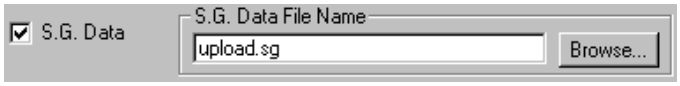
If you upload position data, click [Position Data] check box and input the uploaded data file name to [Position Data File Name] text box. Also you can select the file by the file selection dialog box to click [Browse...] button.
And specify the range of position address. Default of the range is 0000 to 0999 for HNC-1XX,2XX,3XX,544 and 0000 to 3999 for other types. You can enter the start address to [Start Address] text box or the end address to [End Address] text box to change the range. Also you can change the range to move sliders. To click [<] or [>] button clicked, you can select the address with every 1000 points automatically.



To select [Tool]-[Read Position Address Range] menu, you can read the range of position addresses defined in the robot controller, and you can set the value of [Start Address] and [End Address] automatically.

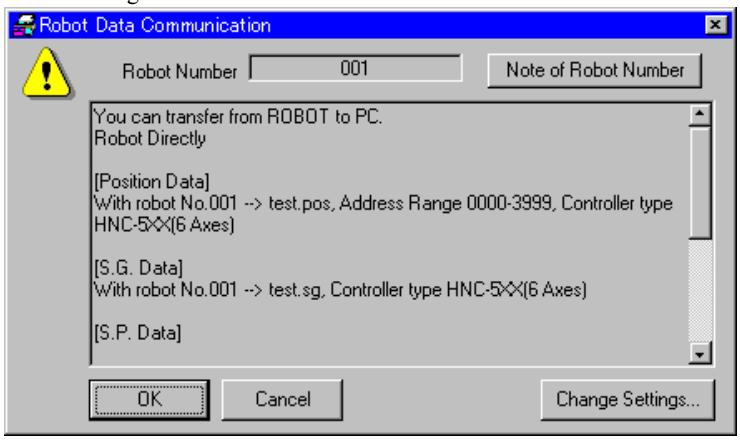
If you upload other data, click the check box of other data and input the uploaded data file name to [Data File Name] text box. Also you can select the file by the file selection dialog box to click [Browse...] button. When you have selected HNC-1XX,2XX,3XX,544, you must specify ".mem" as the file extension. When HNC-5XX selected, specify ".svo".

In case of servo parameter, when you have selected HNC-1XX,2XX,3XX,544, you must specify ".mem" as the file extension. When HNC-5XX selected, specify ".svo".



If you have already specified the file name to the other text box, the suggested file name with the modified suffix is automatically shown in the text box of the selected data.
You can select more than two data types at once. In this case, the robot data will be uploaded in the following order. position data -> S.G. data -> S.P. data -> configuration -> servo parameter -> expanded parameter.

4. Click [OK] after setting 1. - 3. And the confirming dialog box is shown. Check the contents of the message. You can see the hidden message to scroll.

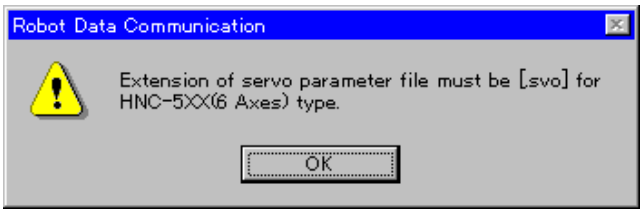


Click [OK] button to start uploading robot data and click [Cancel] to cancel uploading.
If you want to change the communication conditions such as robot number, click [Set Conditions]. See "Change Connection Conditions" about the settings.
After [OK] button clicked, various checking will be executed as shown below.

Checking File Name Extension of Servo Parameter

• After HNC-1XX,2XX,3XX,544 selected, if the specified extension of file name is not ".mem", the following message is shown.

• After HNC-5XX selected, if the specified extension of file name is not ".svo", the following message is shown.



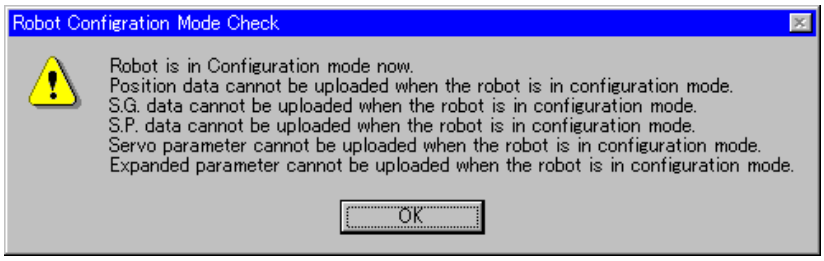
Click [OK] button and then specify the correct file name extension again.

Checking Robot Configuration Mode

In case of HNC-5XX robot, there is a restriction of uploading data types whether the connected robot is currently under configuration mode or not.

Data Type	Configuration Mode	Not Configuration Mode
Position data S.G./S.P. data Servo parameter Expanded parameter	Cannot be uploaded	Can be uploaded
Configuration	Can be uploaded	Can be uploaded

Before the execution of uploading, HR Editor checks the current configuration mode of the robot and if the specified data cannot be uploaded, the following message will be shown.



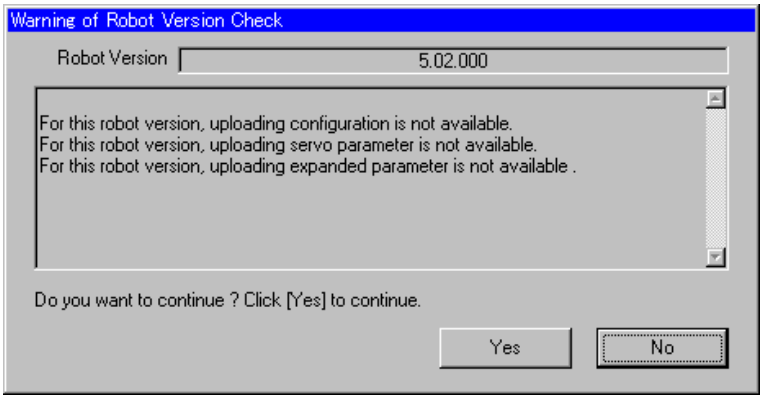
Click [OK] button to abort the execution of uploading.
And then in main window, selected check boxes that cannot be uploaded will be off automatically.

Checking Robot Version

When uploading configuration, servo parameter or expanded parameter, HR Editor checks the ROM version of the connected HNC-5XX robot before the execution of uploading. These data types are available only to a specific version or later.

Data Type	HNC-5XX ROM Version
Configuration	5.02.008M or later
Servo parameter	5.02.007 or later
Expanded parameter	6.02.008T or later

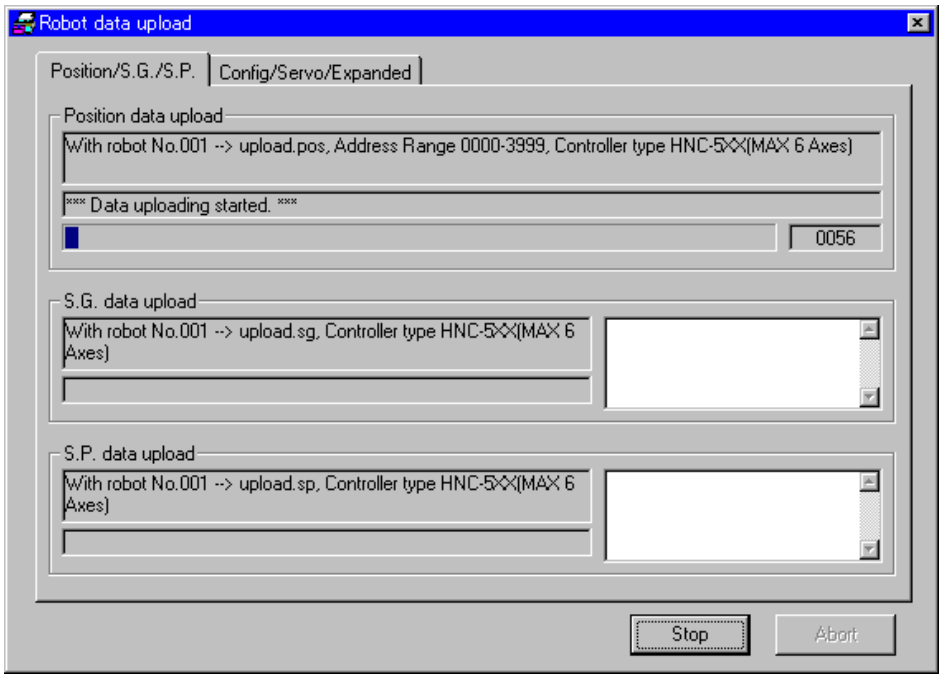
If the detected ROM version is older than one described in this table, the following message will be shown.



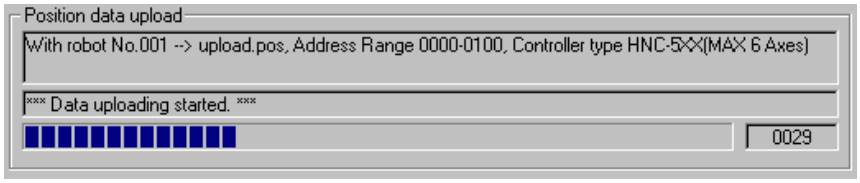
Click [Yes] to start uploading.
Click [No] to exit uploading.

Execution of Uploading

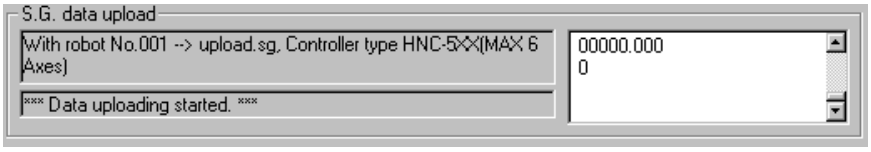
After you click [OK] button in the confirming window and then the some checking procedures are detected as good, uploading starts and the progress window is shown.



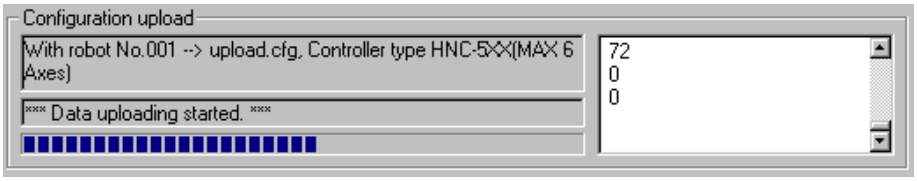
When uploading position data, you can check the uploading process by the progress bar and the current uploading address of position.



When uploading S.G. data or S.P. data, you can check the uploading process by the text box in which uploading data is shown.



When uploading configuration, servo parameter or expanded parameter, you can check the uploading process by the progress bar and the text box in which uploading data is shown.



Completion of Uploading

After uploading is completed, all messages of each data will become “Data uploading completed.”.
Then the [Stop] button will change to [Retry] button and [Abort] button will be enabled.

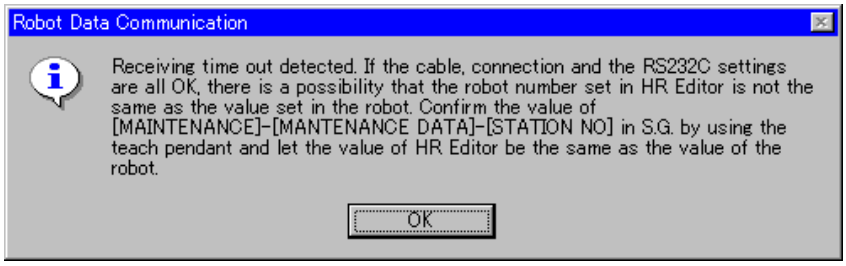
Stopping to Upload

Click [Stop] button to stop uploading.
When stopped, the data already uploaded has been saved to the specified file.
Click [Retry] to restart uploading or click [Abort] to go back the main uploading/downloading window.

Note) [Stop] button or [Retry] button is toggled. When uploading , the button is available as [Stop] and when stooped, it is available as [Retry].

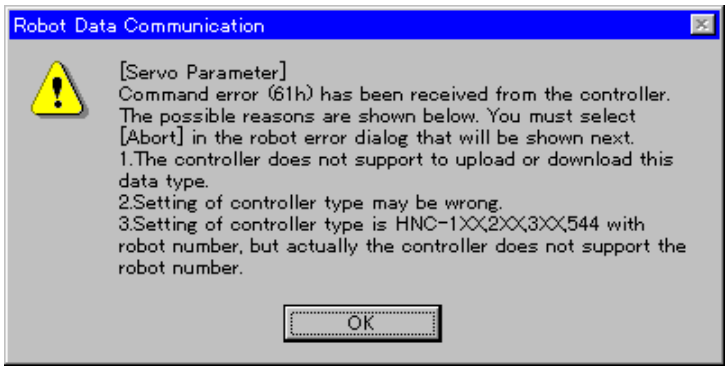
Uploading Error

(1) No response from the robot controller
If there is no response from the robot during uploading, the following message will be shown.



Confirm the value of RS232C port, COM format and STP COM port in the project settings and check the cable. If you have selected to use the robot number, confirm that the specified robot number is the same as the value set in [MAINTENANCE]-[MAINTENANCE DATA]-[STATION NO.] of robot S.G. data.
Click [OK] button to show the error dialog described below.

(2) Command error received
Or else if response of command error is received, the following message is shown.



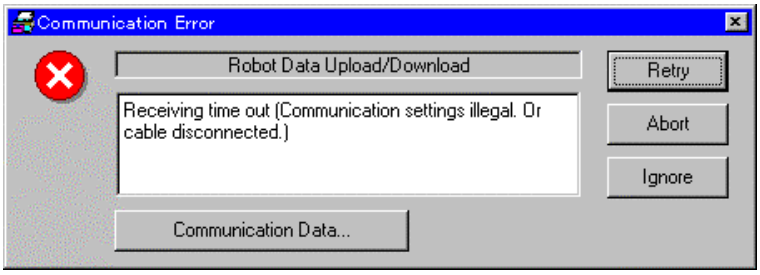
Possible reason and action of this error is show below.

(a) The controller does not support to upload or download this data type.
Some old type or version of the robot controller does not support to upload or download servo parameter or expanded parameter. In this case, you have to save data only by the memory card. HR Editor can read from or write to saved data in the memory card.

(b) Setting of controller type may be wrong.
In case that you have selected HNC-5XX as the controller type but actual type is HNC-1XX,2XX,3XX,544 without robot number, Uploading or downloading will fail as command error.

(c) Setting of controller type is HNC-1XX,2XX,3XX,544 with robot number, but actually the controller does not support the robot number.
The setting of robot controller type is right but using the robot number. Select “Without robot number” and retry.

Whether these message have been shown or not, if the communication error is detected when uploading, the communication error dialog box is shown.



In case of [Retry] clicked, the HRCS command by which the error has occurred is sent once more.
In case of [Abort] clicked, uploading is stopped.
And in case of [Ignore] clicked, the error occurred command is passed and uploading is continued.
[Communication Data] clicked, you can see sending and receiving data when the error has occurred.

Position Address Out of Range

When position data uploaded, if the current execution address exceeds the range of position addresses defined in the controller, the following message will be shown.
But in case of HNC-1XX,2XX,3XX,544 controller, the message "Possibility that some positions are not initialized." will be shown. See next "Uploading Position Data That Has Not Been Initialized" for this case.

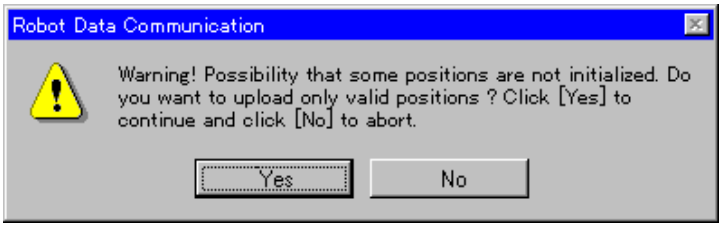
Continue to click [OK] button.
But, in case that [Start Address] was out of range, position data was not uploaded at all. Set [Start Address] in the range and upload again.

Uploading Position Data That Has Not Been Initialized

Position data of the robot is ordinarily initialized at the release as follows.

Axis data	0.0
M data	End Position (shown as "??" by T-PEN)
F data	99
S data	0
ARM	L

When there are positions that has not been initialized by some reason, the following message is shown at uploading position data.



[Yes] clicked, uploading is continued to skip the invalid data. [No] clicked, abort uploading. The file uploaded to select [Yes] can be edited by Position Editor.

In case of HNC-1XX,2XX,3XX,544 controller, if the current execution address of position exceeds the range of position addresses defined in the controller, this message will be shown. You must select [No] usually and set the valid value to [Start Address] and [End Address] to upload again. If [Yes] selected, continue to upload neglecting invalid addresses.

13.4. Download from Computer to Robot

Downloading function will send the robot data to the robot.

Robot Conditions When Downloading

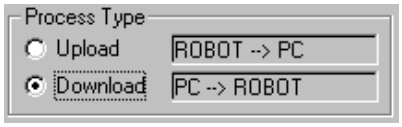
The following robot status is recommended for downloading robot data.

- Without moving (Key-In mode the best)

Some type of robots cannot be downloaded when an error occurs such as emergency stop, servo error or overrun.

Setting of Downloading

1. Select [Download] radio button in [Process Type].



After download selected, [Controller type at uploading] will be disabled because HR Editor recognizes the controller type information saved in the downloading file.

If you have selected HNC-1XX,2XX,3XX,544 type in [Controller type at uploading], you cannot select "Configuration" or "Expanded parameter" as the data type.

In this case, you have to do one of the following operations if you want to download "Configuration" or "Expanded parameter".

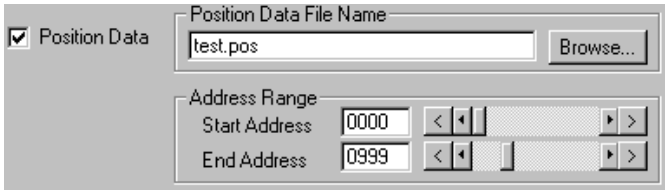
(1) Terminate Robot Data Communication window and select HNC-5XX type in [Project settings]-[COM Format]-[Robot Controller Type] of HR Editor Main Menu.

(2) Select "Upload" in [Process Type] and then select "HNC-5XX" in [Controller type at uploading]. And select "Download" again in [Process Type].

2. Select [Data Type] to download.

If you download position data, click [Position Data] check box and input the downloaded data file name to [Position Data File Name] text box. Also you can select the file by the file selection dialog box to click [Browse...] button.

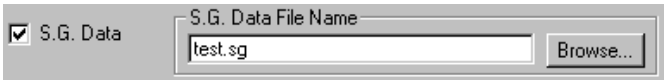
And specify the range of position address. Default of the range is 0000 to 0999 for HNC-1XX,2XX,3XX,544 and 0000 to 3999 for other types. You can enter the start address to [Start Address] text box or the end address to [End Address] text box to change the range . Also you can change the range to move sliders. To click [<] or [>] button clicked, you can select the address with every 1000 points automatically.



To select [Tool]-[Read Position Address Range] menu, you can read the range of position addresses defined in the robot controller, and you can set the value of [Start Address] and [End Address] automatically.

If you download other data, click the check box of other data and input the downloaded data file name to [Data File Name] text box. Also you can select the file by the file selection dialog box to click [Browse...] button.

In case of servo parameter, when you have selected HNC-1XX,2XX,3XX,544, you must specify the file with the extension ".mem". When HNC-5XX selected, specify the file with extension ".svo".



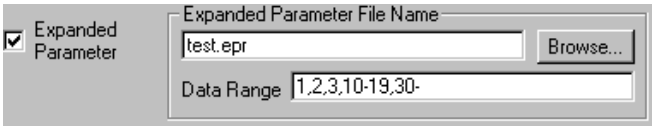
If you have already specified the file name to the other text box, the suggested file name with the modified suffix is automatically shown in the text box of the selected data.

You can select more than two data types at once. In this case, the robot data will be downloaded in the

following order. position data -> S.G. data -> S.P. data -> configuration -> servo parameter -> expanded parameter.

The execution between "Configuration" and other data must be exclusive each other.
If you select "Configuration", you cannot select other data type.
If you select the data type except "Configuration", you cannot select "Configuration".

For Expanded Parameter, you can download parts of data in the file.



You may enter the data numbers that you want to download to [Data Range]. The format to enter is shown below.
The data number is the number which is displayed as "Expansion 9999" when you edit Expanded Parameter file.

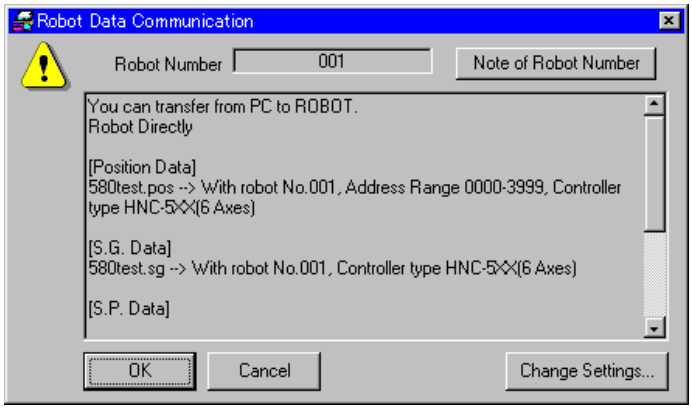
- Separate the data numbers by a comma.
- In case of serial numbers, bind the first number and the end number by a hyphen. If you omit the end number, it means that you specify the maximum data number for the end number.
- There can be a space character in front of and behind a comma or a hyphen.

In case of the following conditions, the format error will be shown when you click [OK] button.

- You have entered an another character besides a comma, space, hyphen or numerical character.
- You have entered only a comma, space or hyphen.
- You have entered a minus number.
- When a hyphen used, the first number is more than the end number.

If you have not entered any character to [Data Range], all data in the file will be downloaded. It is noted that the error message will be shown if you have entered only space characters.

3. Click [OK] after setting 1. - 2. And the confirming dialog box is shown. Check the contents of the message. You can see the hidden message to scroll.

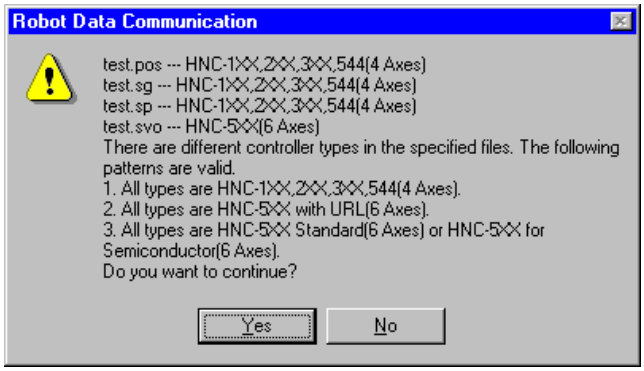


Click [OK] button to start downloading robot data and click [Cancel] to cancel downloading.
If you want to change the communication conditions such as robot number, click [Set Conditions]. See "Change Connection Conditions" about the settings.
After [OK] button clicked, various checking will be executed as shown below.

Checking Controller Type in Data File

If you specify more than two data types, it is checked whether controller types registered in the files have consistency or not. If the following conditions are not satisfied, the message is shown as follows.
(1) All types are HNC-1XX,2XX,3XX,544
(2) All types are HNC-5XX with URL

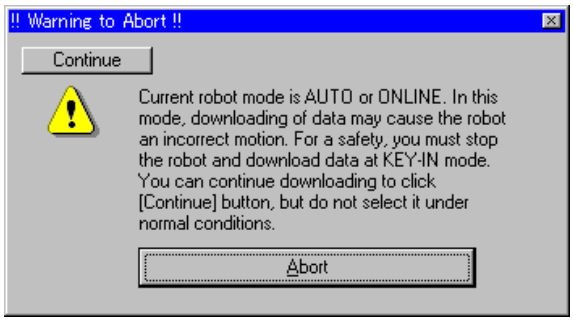
(3) All types are HNC-5XX standard or HNC-5XX for semiconductor



Click [Yes] button to continue downloading. Click [No] button to abort downloading.
Specify the files in accordance with the conditions mentioned above.

Checking Robot Mode (Important!)

Before downloading, the current robot mode is checked. Downloading of bad data during the robot running may cause the robot an incorrect motion. If the current robot mode is "AUTO" or "ONLINE", the following message is shown.



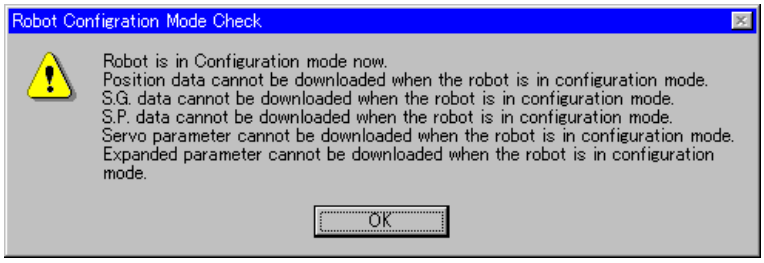
You must usually select [Abort] button to stop downloading. For a safety, you must stop the robot and download data at "KEY-IN" mode.
After downloading, check the motion of the robot using "CHECK" mode for example.

Checking Robot Configuration Mode

In case of HNC-5XX robot, there is a restriction of downloading data types whether the connected robot is currently under configuration mode or not.

Data Type	Configuration Mode	Not Configuration Mode
Position data S.G./S.P. data Servo parameter Expanded parameter	Cannot be downloaded	Can be downloaded
Configuration	Can be downloaded	Cannot be downloaded

Before the execution of downloading, HR Editor checks the current configuration mode of the robot and if the specified data cannot be downloaded, the following message will be shown.



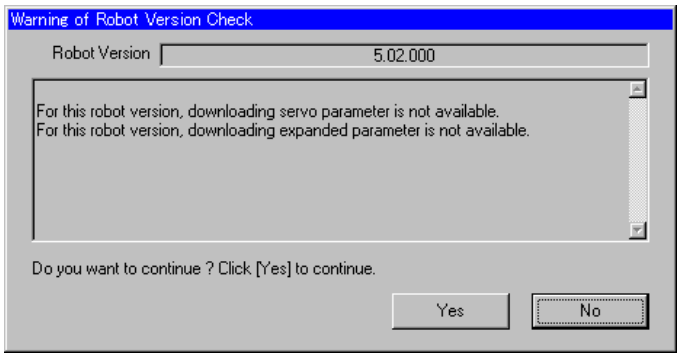
Click [OK] button to abort the execution of downloading.
And then in main window, selected check boxes that cannot be downloaded will be off automatically.

Checking Robot Version

When downloading configuration, servo parameter or expanded parameter, HR Editor checks the ROM version of the connected HNC-5XX robot before the execution of downloading. These data types are available only to a specific version or later.

Data Type	HNC-5XX ROM Version
Configuration	5.02.007V or later
Servo parameter	5.02.007 or later
Expanded parameter	6.02.008T or later

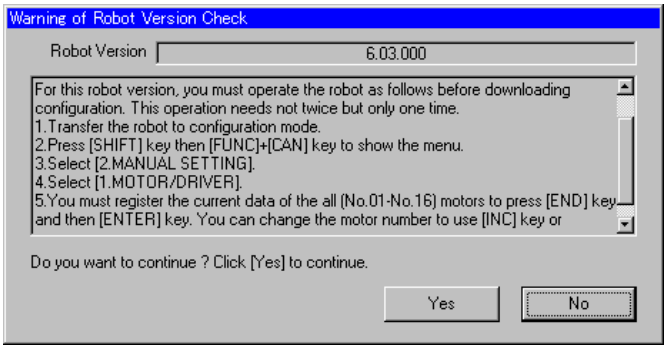
If the detected ROM version is older than one described in this table, the following message will be shown.



Click [Yes] to start downloading.
Click [No] to exit downloading.

Mention Especially for Downloading Configuration

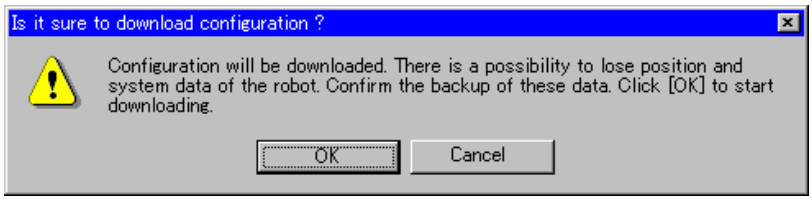
Before downloading configuration, if the ROM version of the connected HNC-5XX robot is older than 6.03.000, the following message will be shown.



Click [Yes] button to start the execution of downloading. Click [No] button to exit downloading.
If the version is older than 6.03.000, the following operation is necessary only one time. Without this operation, the robot will respond the error “Communication command error” for downloading configuration.
(1) Transfer the robot to configuration mode.
(2) Press [SHIFT] key then [FUNC]+[CAN] key to show the menu.
(3) Select [2.MANUAL SETTING].
(4) Select [1.MOTOR/DRIVER].
(5) You must register the current data of the all (No.01-No.16) motors to press [END] key and then [ENTER] key. You can change the motor number to use [INC] key or [SHIFT]->[INC] key.

Confirming to Download Configuration

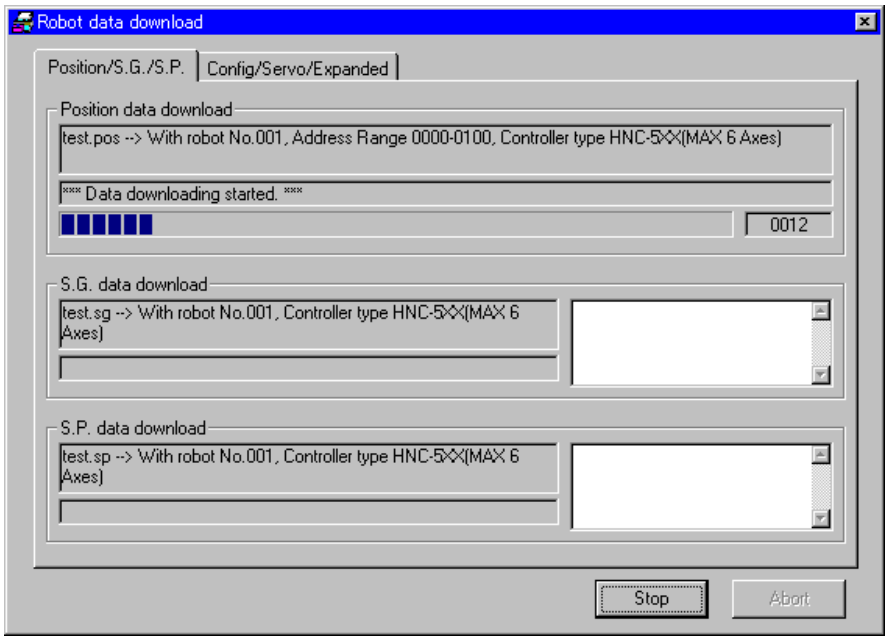
When downloading configuration, if the some checking procedures are detected as good, the following message will be shown to confirm downloading.



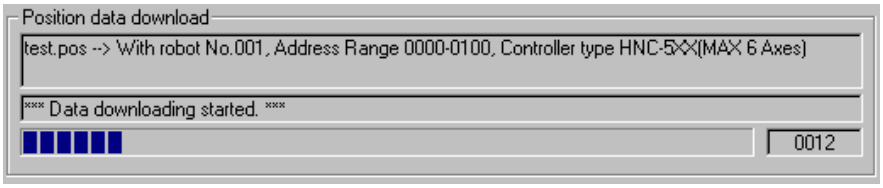
Click [OK] button to start downloading.
Click [Cancel] button to exit downloading.

Execute Downloading

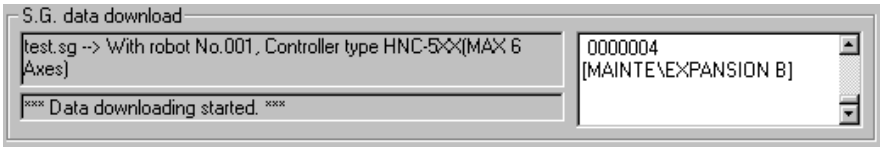
After you click [OK] button in the confirming window and then the some checking procedures are detected as good, downloading starts and the progress window is shown.



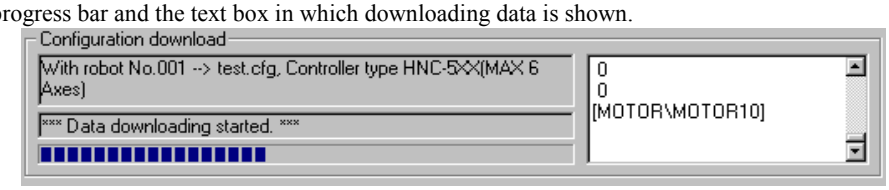
When downloading position data, you can check the downloading process by the progress bar and the current downloading address of position.



When downloading S.G. data or S.P. data, you can check the downloading process by the text box in which uploading data is shown.



When downloading configuration, servo parameter or expanded parameter, you can check the downloading process by the progress bar and the text box in which downloading data is shown.



Completion of Downloading

After downloading is completed, all messages of each data will become “Data downloading completed.”.
Then the [Stop] button will change to [Retry] button and [Abort] button will be enabled.

Stopping to Download

Click [Stop] button to stop downloading.
Click [Retry] to restart downloading or click [Abort] to go back the main uploading/downloading window.

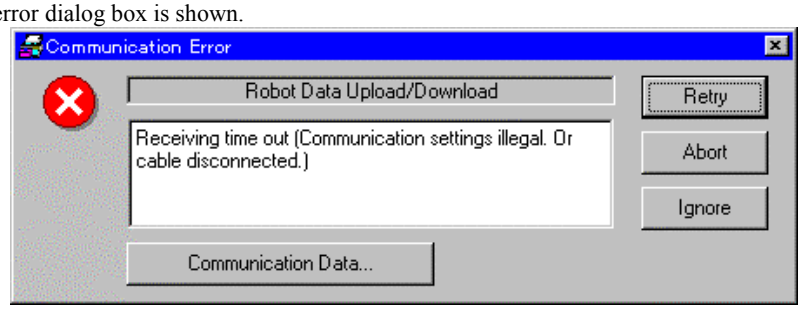
Note) [Stop] button or [Retry] button is toggled. When downloading, the button is available as [Stop] and when stooped, it is available as [Retry].

Downloading Error

(1) No response from the robot controller
(2) Command error received

Refer to “Upload from Robot to Computer” about this error.

Whether these message have been shown or not, if the communication error is detected when uploading, the communication error dialog box is shown.



In case of [Retry] clicked, the HRCS command by which the error has occurred is sent once more.
In case of [Abort] clicked, downloading is stopped.

And in case of [Ignore] clicked, the error occurred command is passed and downloading is continued.
[Communication Data] clicked, sending and receiving data when the error has occurred is shown.

Position Address Out of Range

When position data downloaded, if the current execution address exceeds the range of position addresses defined in the controller, the following message will be shown.

Continue to click [OK] button.
But, in case that [Start Address] was out of range, position data was not downloaded at all. Set [Start Address] in the range and download again.

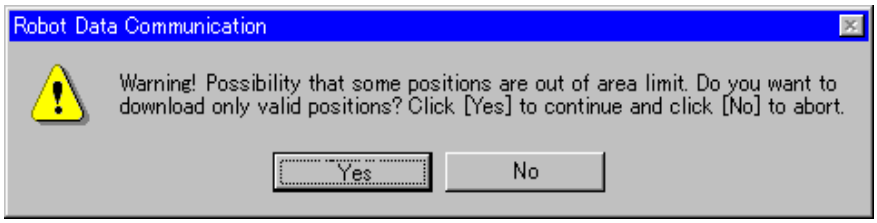
When communicated with HNC-1XX,2XX,3XX,544 controller, the error “Communication format error” occurs in this case showing the error dialog. You must [Abort] and set the valid value with the range to [Start Address] and [End Address] and download again.

“Out of Area Limit” Error When Downloading Position Data

When downloading position data, the robot controller responds “Out of area limit” error in the following cases.

- Downloading the data that has the value out of the range specified [UPPER] and [LOWER] in the S.G. data group of [LIMIT]-[AREA LIMIT] currently set to the robot controller.
- Downloading the zero data of axes toward the robot controller that cannot move to the zero position such as AR series in the type of the horizontal articulated (SCARA) robot.

In these case, the following message is shown when downloading.



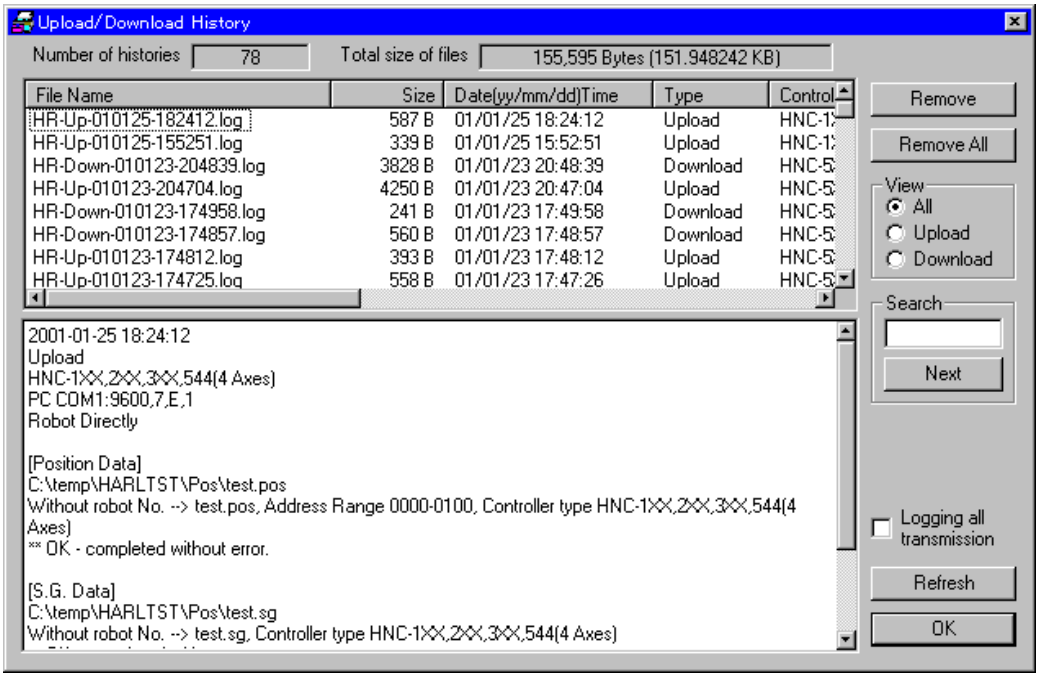
[Yes] clicked, downloading is continued without registration of the error position to the robot and the error message will be never displayed after this operation. [No] clicked, abort downloading.

13.5. Upload/Download History

After uploading or downloading, a history file is created at the following folder.

Windows95,98	¥Windows¥Temp¥HrUpDownHistory
WindowsNT	¥Temp¥HrUpDownHistory

A history file is a text file with the extension ".log" and with the file name that includes created date and time.
You can open a history file by text editor such as "Note Pad" or documentation application such as "Word".
You can display logging data registered in the history file to select [Tool]-[Upload/Download History] menu in the main window.



In the list-view at the upper part of window, the list of history files is shown in order of created date and time.
Click the file name to show the detailed logging data in the lower part of window.
If an error occurred during uploading or downloading, error information was logged to the history file. When an error occurs, the message whether you want to display histories or not is shown at the termination of uploading or downloading.

Remove History

After selecting a history file, click [Remove] button. Then the confirmation dialog is shown, if [Yes] selected, remove the selected history file.
Using [Shift] key or [Ctrl] key, you can select more than two history files.
If [Remove All] button clicked, you can remove all history files after the confirmation dialog is shown.
You may remove history files by Windows application such as "Explorer".

Change View

Select an option button in "View" to filter history files by operated type.

Search Text

You can search a text written in history files. Enter a text to find and then click [Next] button to start searching form the current cursor position.
If the text cannot be found in the current history file, it is searched in all history files.
When the text is found, the history file that includes the searching text is selected automatically and the color of the found text is reversed.

Refresh the View

Click [Refresh] button to refresh the view of window.

Logging All Transmission

After you have checked to ON at “Logging All Transmission”, all transmission data between PC and the robot controller during uploading/downloading will be logged to the history file.
Checking status of “Logging All Transmission” is not saved after the termination of HR Editor. When HR Editor starts next, checking status of “Logging All Transmission” becomes always OFF.
Notice the following matter when logging all transmission data.

- It takes time a little longer for uploading or downloading.
- Increment of the history file volume causes to consume the hard disk more faster.

Free Space of Hard Disk

Total file size of all history files is displayed at upper part of the window.
With attention to the free space of hard disk of your PC, if the available space becomes little, remove the history.
When “Upload/Download History” window opened, if total size of all history files exceeds one megabytes, the following warning is shown.

13.6. Waiting for COM Released When Via STP

In the case that you have selected [Via STP] in the settings of the connection type and you have checked [Communicating without stopping jobs] box to ON in [STP COM Settings], when the communication started, it is checked that the HeBasic program uses the specified STP COM currently.
If the HeBasic program does not use the STP COM, STP is transferred to Through Mode and then uploading or downloading starts.
If the HeBasic program uses the STP COM now, the following message is shown.

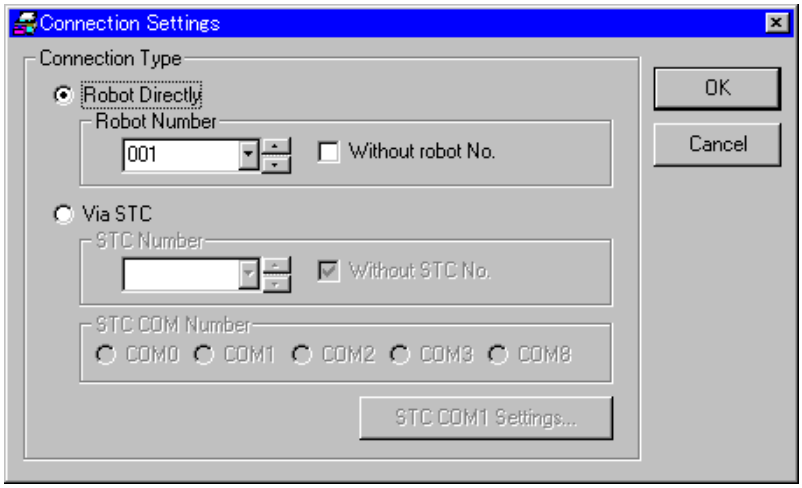
Click [Abort] to stop uploading or downloading. And then execute [Retry].
After waiting the time specified by [STP COM released timer] in [STP COM Setting], if the COM has not been released by the HeBasic program, the following message is shown.

Click [OK] button and execute [Retry]. Or increase the value of the time set by [STP COM released timer] in [STP COM Setting] and then execute uploading or downloading.

13.7. Change Communication Conditions

When uploading or downloading robot data, the settings of communication in the parameter file 'harl.dat' that contains the data set by Main Menu are used ordinarily. But you can change the settings temporarily by the setting dialog box.
Operate as follows to open the setting dialog box.

- Click [Change Settings] button in the confirming window before uploading or downloading starts.
- Click [Settings] button in the main window.



Connection Type

You can select [Robot Directly] or [Via STP] for [Connection Type].
When [Robot Directly] selected, you can set only [Robot Number].
When [Via STP] selected, you can set only [STP COM Number] and [STP COMn Settings] button.

Robot Number

In case of [Robot Directly], enter robot number to the combo box. You can select the robot number in the list that shows the numbers used recently. If you do not use the robot number, enter null string or click [Without robot no.] check box.

STP COM Number

In case of [Via STP], select [STP COM No.] that communicates with a robot.
Click [STP COMn Settings] to change the settings for the specified STP COM.

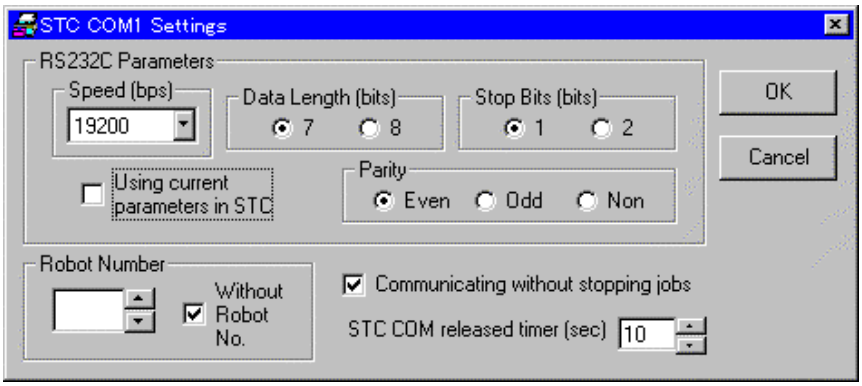
Termination of Setting

After [OK] button clicked, the specified settings is used for uploading/downloading.
Click [Cancel] to cancel the specified settings.

Note) The specified settings are changed temporarily but the parameter file 'harl.dat' is never changed.

STP COM Settings

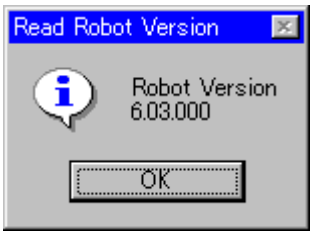
After [STP COMn Settings] button in the setting dialog box is clicked, the following dialog box is shown. You can change the settings of STP COM used by the communication via STP.



See "Setting of STP COM Port" about the details of the settings.

13.8. Reading Robot Version

Click [Read Robot Version] button in the main window to read the ROM version of the connected robot and the following message will be shown.



[Read Robot Version] button is disabled when you select HNC-1XX,2XX,3XX,544 type controller.
Selecting HNC-5XX type, if you read the version from HNC-1XX,2XX,3XX,544 actually, "Communication command error" will occur.

13.9. Exit Uploading/Downloading

Click [Exit] button in the main window of uploading/downloading to exit.

13.10. Error Messages of Uploading/Downloading

Data Input Error Messages

Error Message	Explanation and Action
Position/S.G./S.P. data file name is Null.	File name or path of data is not entered. Enter file name or path.
Start/End address out of range.	Position address is out of range. Enter the value of address from 0000 to 7999.
Start address is bigger than end address.	Start address of position is bigger than end address. Enter the start address less than the end address.
Robot number out of range.	Robot number is out of range. Enter the value of robot number from 0 to 999.

File Error Messages

Error Message	Explanation and Action
Position/S.G./S.P. data file exists. [File Name] Do you want to overwrite ?	The file specified for uploading already exists. If you want to overwrite the file, click [OK]. If you do not overwrite, click [Cancel] and enter the another file name.
Position/S.G./S.P. data file not found. [File Name]	The file specified for downloading is not found. Enter the existing file name.
Cannot open file. [File Name]	The file cannot be opened. Check the attribution of the file in the property. When the other process has already opened the file, terminate the process.
Controller type invalid. [File Name]	First line in the Position/S.G./S.P data file is invalid controller type.

Uploading Error Message

Error Message	Explanation and Action
Cannot save file. [File Name]	The file cannot be saved. It may be caused by disk space exhausted. Delete useless files or change the save drive and retry uploading.
Warning! Possibility that some positions are not initialized. Do you want to upload only valid positions ?	See described section.
Data cannot be uploaded when the robot is in configuration mode.	See described section.
For this robot version, uploading XXXX is not available.	See described section.
Extension of servo parameter file must be [.mem] for HNC-1XX,HNC-2XX,HNC-3XX,HNC-544(4 Axes) type.	See described section.

Extension of servo parameter file must be [.svo] for HNC-5XX(6 Axes) type.	See described section.
Address range error is received from robot. It will be neglected to upload the rest of addresses. Uploaded data until now will be saved normally.	See described section.

Downloading Error Messages

Error Message	Explanation and Action
Bad range of Expanded Parameter.	The format specified as the data range for downloading Expanded Parameter is wrong. Enter the data numbers by correct format.
Position data of start address not found.	When downloading position data, the data of the specified start address cannot be found in the position data file. Enter the correct start address that exists in the file.
Position data not found. Address nnnn ~ NNNN position data downloaded.	For example, though the specified range of position data is 0100 to 0200 for downloading, address 0000 to 0150 data has been found in the file. In this case, this message is shown and downloading 0100 to 0150 data is completed successfully.
Warning! Possibility that some positions are out of area limit. Do you want to download only valid positions?	See described section.
ARM value set in the file is not supported for the downloading by RS232C communication with HNC-1XX,2XX,3XX,544.	• HNC-SR364+AR-K440 • HNC-YS364+AR-K440 Using this type, you have downloaded position data file read from the memory card. But this file includes some special data that cannot be supported for data communication. It is only supported by the memory card interface.
Data cannot be downloaded when the robot is in configuration mode.	See described section.
For this robot version, downloading XXXX is not available.	See described section.
For this robot version, you must operate the robot as follows before downloading configuration. This operation needs not twice but only one time.	See described section.
Current robot mode is AUTO or ONLINE. In this mode,	See described section.

downloading of data may cause the robot an incorrect motion. For a safety, you must stop the robot and download data at KEY-IN mode. You can continue downloading to click [Continue] button, but do not select it under normal conditions.	
There are different controller types in the specified files.	See described section.
Address range error is received from robot. It will be neglected to download the rest of addresses. Downloading until now has been executed normally.	See described section.

Common Error Messages for Downloading/Uploading

Error Message	Explanation and Action
STP has been already through mode by the other COM that is not connected with your computer. Do you want to release through mode ?	See described section.
It may be that Windows cannot detect this COM port. Confirm the running COM ports to show [Ports(COM/LTP)] in [Start]-[Settings]-[Control Panel]-[System]-[Device Manager] in Windows system.	You have selected the PC OM port that cannot be detected by Windows system. Confirm the running PC COM port and then select it by [Set-up]-[Project Settings]-[RS232C Port] in the main menu.
PC COM number is illegal. System selects PC COM1.	There is a possibility that “Harl.dat” file is destroyed. Terminate HR Editor and then remove “Harl.dat” file located in the installed folder. Then restart HR Editor.
Receiving time out detected. If the cable, connection and the RS232C settings are all OK, there is a possibility that the robot number set in HR Editor is not the same as the value set in the robot. Confirm the value of [MAINTENANCE]-[MANTENANCE DATA]-[STATION NO] in S.G. by using the teach pendant and let the value of HR Editor be	See described section.

the same as the value of the robot.	
Command error (61h) has been received from the controller. The possible reasons are shown below. You must select [Abort] in the robot error dialog that will be shown next.	See described section.

14. Edit Position Data

14.1. Introduction to Position Editor

You can use Position Editor to show and edit the position data uploaded from a robot.
And you can create a new position data file by Position Editor.
If the computer has the PC card slot, you can read position data saved in the memory card or write position data to the memory card.

Position Editor starts by following operation.
(1) Select [Position Editor] of [HrBasic Developing Environment X.XX] group in the start menu of Windows.
(2) Select [File]-[Position] in Main Menu of HBDE.

(3) Click  button in Main Menu of HBDE.

Function Structure of Position Editor

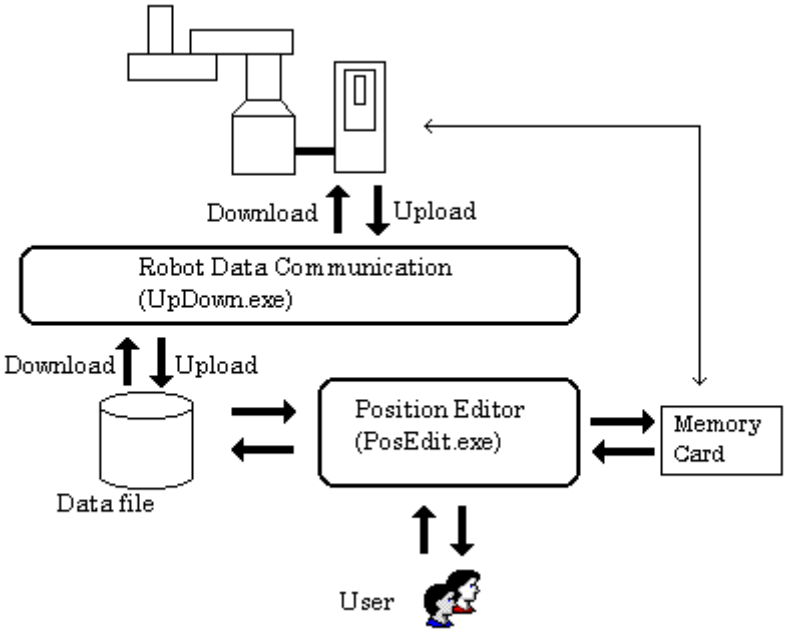


Table of Data Type

Data Type	Access Type	HNC-1XX, 2XX, 3XX, 544	HNC-5XX	Editor
Position Data	Communication	OK	OK	Position Editor
	Memory Card	OK	OK	Position Editor

OK: Robot holds this data and HR Editor can access it.

14.2. Start Editing of Position Data

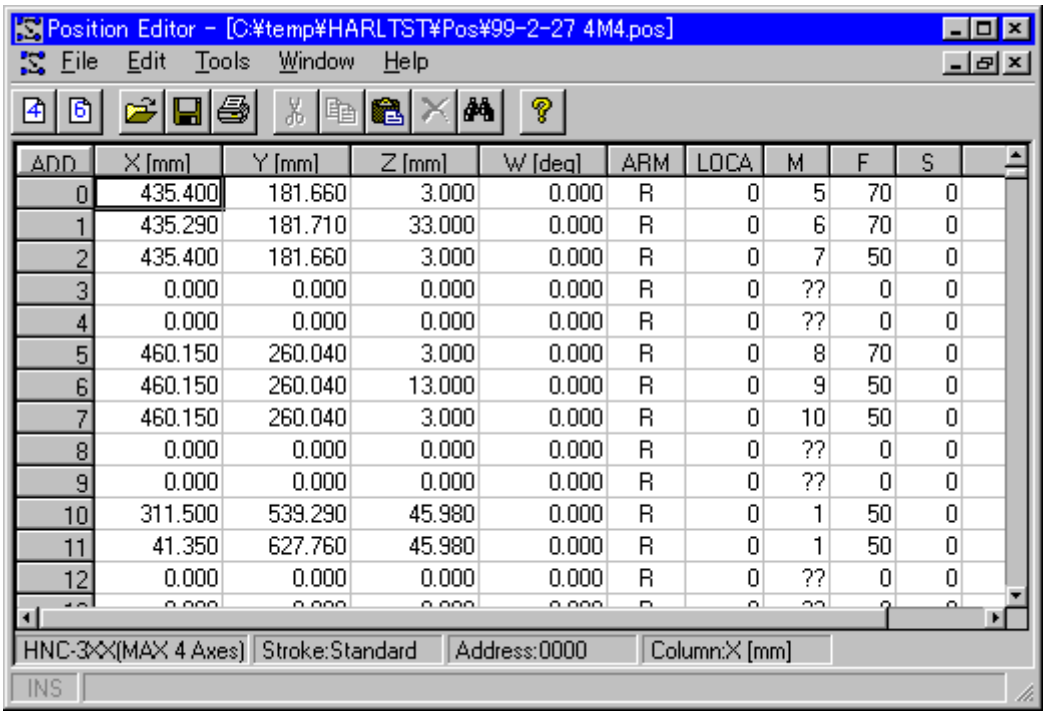
You can start Position Editor by one of the following operations.

1. Select [File]-[Position] in Main Menu. Then you must select to open a new file or an existing file. In case of opening an existing file, specify the file to open.

2. Select [Position Editor] of [HrBasic Developing Environment X.XX] group in the start menu of Windows.

3. Select a position data file by Windows Explore and double-click it.

Note) After installing, first starting of Position Editor must be selected by Main Menu.



ADD	X [mm]	Y [mm]	Z [mm]	W [deg]	ARM	LOCA	M	F	S
0	435.400	181.660	3.000	0.000	R	0	5	70	0
1	435.290	181.710	33.000	0.000	R	0	6	70	0
2	435.400	181.660	3.000	0.000	R	0	7	50	0
3	0.000	0.000	0.000	0.000	R	0	??	0	0
4	0.000	0.000	0.000	0.000	R	0	??	0	0
5	460.150	260.040	3.000	0.000	R	0	8	70	0
6	460.150	260.040	13.000	0.000	R	0	9	50	0
7	460.150	260.040	3.000	0.000	R	0	10	50	0
8	0.000	0.000	0.000	0.000	R	0	??	0	0
9	0.000	0.000	0.000	0.000	R	0	??	0	0
10	311.500	539.290	45.980	0.000	R	0	1	50	0
11	41.350	627.760	45.980	0.000	R	0	1	50	0
12	0.000	0.000	0.000	0.000	R	0	??	0	0

If Position Editor is started without selection of an existing file, a new editing window opens for the specified controller type defined in parameter file 'harl.dat'. (See "harl.dat File".)

About creating a new file for the other controller type, see "Create New Position Data File".

When starting, a child window of Position Editor is maximized.

14.3. View of Position Editor

You can open more then two windows to edit position data in the main window.
And you can arrange editing windows or icons by the [Window] menu.
The sheet of position data is shown in the editing window. The contents of the sheet have variation according to the controller type as follows.

HNC-1XX,2XX,3XX,544 (max. 4 axes)

Rows: You can edit the 1000 points for which the address is assigned from 0000 to 0999.
Columns:

Title of Column	Explanation
ADD	Address number
X[mm]	Position of X axis
Y[mm]	Position of Y axis
Z[mm]	Position of Z axis
W[mm]	Position of W axis
ARM	Pose of robot arm
LOCAL	Type of coordinates
M	M data
F	F code
S	S code
Comment	Any string

HNC-5XX (max. 6 axes): Standard or for Semiconductor

Rows: You can edit the 4000 points for which the address is assigned from 0000 to 3999.
Columns:

Title of Column	Explanation
ADD	Address number
X[mm]	Position of X axis
Y[mm]	Position of Y axis
Z[mm]	Position of Z axis
W[mm]	Position of W axis
R[mm]	Position of R axis
C[mm]	Position of C axis
ARM	Pose of robot arm
LOCAL	Type of coordinates
M	M data
F	F code
S	S code
Comment	Any string

HNC-5XX with URL (max. 6 axes)

Rows: You can edit the 4000 points for which the address is assigned from 0000 to 3999.
Columns:

Title of Column	Explanation
ADD	Address number
X[mm]	Position of X axis
Y[mm]	Position of Y axis
Z[mm]	Position of Z axis
H[deg]	Position of H axis
T[deg]	Position of T axis
S[deg]	Position of S axis
u	μ data
ARM	Pose of robot arm
ROUND	Round flag
SIGN	Sign flag
ENABLE	Enable flag
LOCAL	Type of coordinates
M	M data
F	F code
S	S code
Comment	Any string

Status Bar in The Editing Window

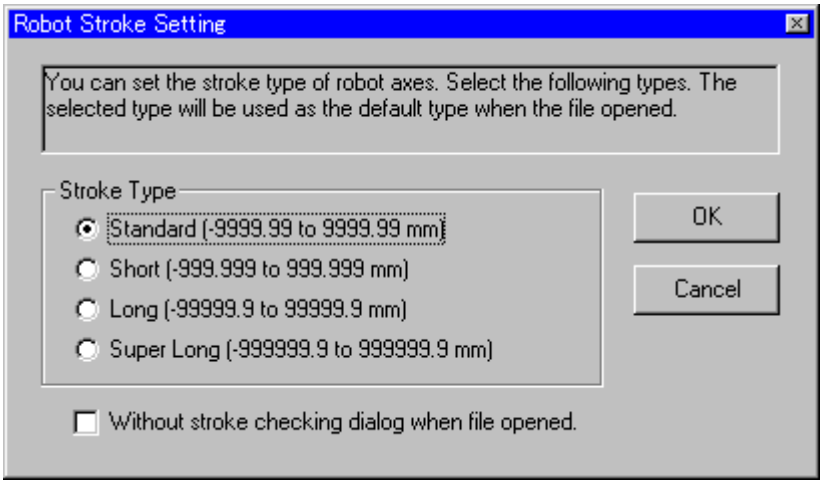
The following information is shown in the status bar (the bar at the lowest area of the window) in the editing window for the each position file.

- Controller type
- Stroke type
- Position address of the active cell
- Column name of the active cell

14.4. Stroke Type Setting

You can set the default stroke type applied to editing to select [Tool]-[Option]-[Stroke Setting] in the menu.

Note) See "Operating Environment" about stroke types.



The stroke type selected here will be used as the default value of the stroke checking dialog opened when the following operation is executed.

(1) Create new position file.
(2) Open position file.
(3) Open position file saved in memory card.

To select [Without stroke checking dialog when file opened] check-box to ON, the stroke checking dialog will not be shown when (1)-(3) is operated and the stroke type selected here will be applied to editing.

If you set the wrong stroke type that differs from the type of actual data, there will be the following result.

(1) After creating new position file.
You cannot enter the axis value out of the stroke limit.
(2) After opening position file.
If there is a value out of the stroke limit in the opened file, it is able to read but you cannot edit this value.
And you cannot enter the new axis value out of the limit of the stroke.
(3) After opening position file saved in memory card.

HNC-1XX, 2XX, 3XX, 544 (4 axes)	If there is a value out of the stroke limit in the opened file, it is able to read but you cannot edit this value. And you cannot enter the new axis value out of the limit of the stroke.
HNC-5XX (6 axes)	The decimal point is shifted. The displayed value of an axis is x10, x100, x1000 or 1/10, 1/100, 1/1000 from the actual data. And you cannot enter the new axis value out of the limit of the stroke.

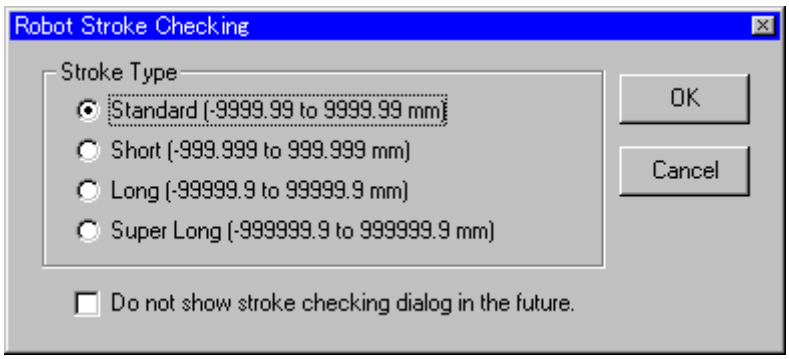
14.5. Create New Position Data File

Click [File]-[New HNC-xxx] according to the controller type to create a new position file.
Then an editing window for the new position data is opened in the main window.

Also you can open the new editing window to click the button such as  in the tool bar.

Stroke Checking Dialog

If [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu is selected to OFF, the following stroke checking dialog is shown. The initial displayed type is the stroke that has been selected in [Tool]-[Option]-[Stroke Setting] of the menu.



Select the stroke type for the file to create.

To select [Do not show stroke checking dialog in the future] check-box to ON, this dialog will be never shown when the opening or creating position file. And the default stroke type set in [Tool]-[Option]-[Stroke Setting] will be applied automatically.
If you want to show this dialog again, select [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu to OFF.

See "Stroke Type Setting" about other explanation.

14.6. Open Position Data File

1. Click [File]-[Open] to show the file selection dialog box.

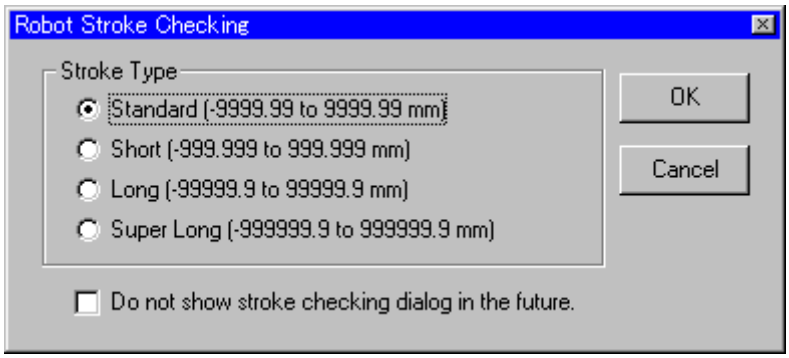
2. Select the file in the list view to open and click [Open] button. Then the editing window for the specified file is opened.

Also you can open the editing window for the existing file to click  button in the tool bar.

The list of recent opened files is shown at the lower area of [File] menu. Click the file name of this list to open the file.

Stroke Checking Dialog

If [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu is selected to OFF, the following stroke checking dialog is shown. The initial displayed type is the stroke that has been selected in [Tool]-[Option]-[Stroke Setting] of the menu.



Select the stroke type for the file to open.

To select [Do not show stroke checking dialog in the future] check-box to ON, this dialog will be never shown when the opening or creating position file. And the default stroke type set in [Tool]-[Option]-[Stroke Setting] will be applied automatically.
If you want to show this dialog again, select [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu to OFF.

See "Stroke Type Setting" about other explanation.

14.7. Open Position Data File Saved in Memory Card

1. Insert the memory card to a memory card slot of the computer.
In case of "New hardware detection" from Windows, install the memory card driver by the operation described at "Install Memory Card Driver".

2. Select [File]-[Memory Card]-[Open] in the menu to show the file selection dialog for the memory card.
Select the file to open in the list and click [Open] button.
There is the case that the following message is shown just after you have inserted the memory card to the card slot.

In this case, click [OK] button and then click [Cancel] button in the file selection dialog.
Wait for few seconds and select [File]-[Memory Card]-[Open] in the menu again.

In case that this message is shown several times and you cannot access the memory card, confirm the hardware name of the memory card. If the hardware name is correct, terminate HR Editor and other application program and then reboot the computer to let the memory card in the card slot. If the hardware name is wrong, change memory card driver of Windows. (See "Install Memory Card Driver".)

If you select the file except position data, the error message is shown and the file cannot be opened.

3. After showing the robot type dialog, HR Editor reads the specified file to show the editing window.

Memory Card Removal

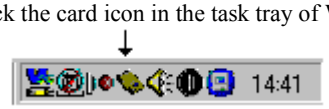
You can remove the memory card from the computer unless HR Editor is currently accessing the memory card.
The access to memory card means that

- the file selection dialog for the memory card is shown.
- HR Editor reads or writes the memory card file.

Concerning safety, it is recommended that you remove the memory card after HR Editor is terminated.

Note) After operating as follows, a Windows fatal exception error occurs on some type computer. In this case, you have to reset the computer. And you must not operate as follows, but you can remove the memory card directly. Although [Unexpected PC Card Removal] message is shown, there is no problem for the memory card unless HR Editor is currently accessing the memory card.

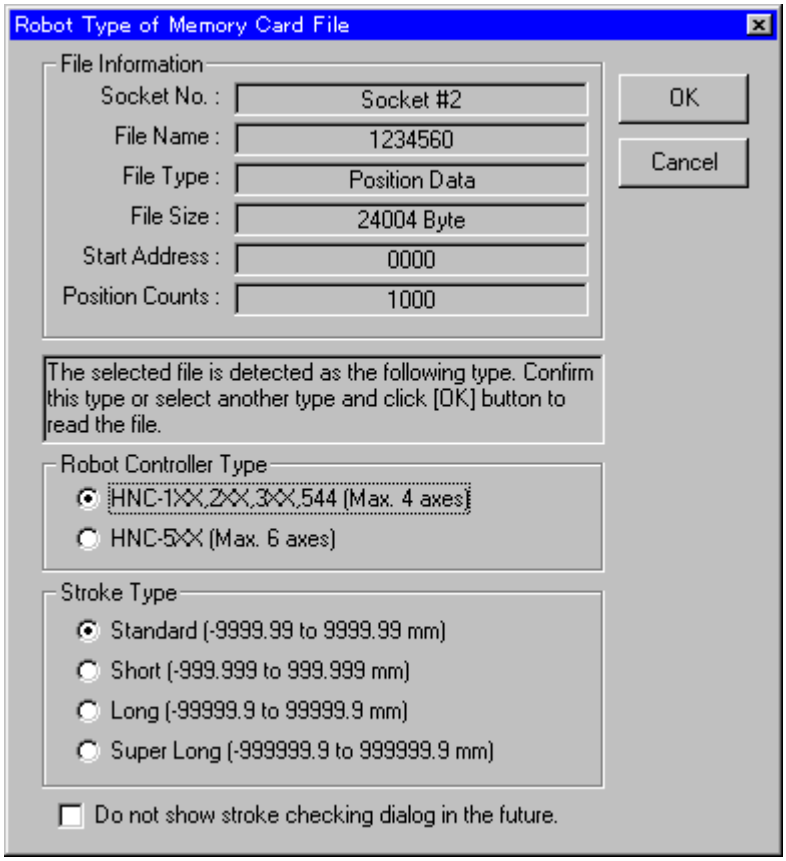
(1) Click the card icon in the task tray of Windows.



(2) After [Stop HNC SRAM Memory Card] menu is shown, click to select it.
(3) After [You may safely remove this device.] message is shown, click [OK] button.
(4) Remove the memory card from the card slot.

Robot Type Dialog

After selecting the file saved in the memory card, the following robot type dialog is shown.



The information of the specified file is shown in [File Information].
And the robot controller type decided by this information is shown.
You need not change the displayed controller type ordinarily.

If [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu is selected to OFF, the stroke type checking message is shown. The initial displayed type is the stroke that has been selected in [Tool]-[Option]-[Stroke Setting] of the menu.
Select the stroke type for the file to open.
To select [Do not show stroke checking dialog in the future] check-box to ON, this dialog will be never shown when the opening or creating position file. And the default stroke type set in [Tool]-[Option]-[Stroke Setting] will be applied automatically.
If you want to show this dialog again, select [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu to OFF.

See "Stroke Type Setting" about other explanation.

14.8. Input Position Data

To change the data of the sheet, click the cell and enter the value to the cell.
Key functions are as follows.

Key	Function
Cursor Up	Activate a upper cell.
Cursor Down	Activate a lower cell.
Cursor Right	Activate a right cell.
Cursor Left	Activate a left cell.
TAB or RETURN	Activate a forward cell. (Forward direction is left to right and upper to lower)
SHIFT+TAB	Activate a backward cell. (Backward direction is lower to upper and right to left)
PageUp	Activate a cell at one page upper.
PageDown	Activate a cell at one page lower.
CTRL+PageUp	Activate a cell at one page left.
CTRL+PageDown	Activate a cell at one page right.
HOME	Activate a cell at the first column in the current row.
END	Activate a cell at the last column in the current row.
CTRL+HOME	Activate a cell at the top of the sheet.
CTRL+END	Activate a cell at the end of the sheet.
ESC	Undo the value of an active cell
BS	Delete a character before cursor.
DEL	Delete a character after cursor.

Available ranges of input value are as follows.

Controller type: HNC-1XX,2XX,3XX,544 (max. 4 axes)

Kind of Data	Changeable	Range	Default
Position of X axis	Changeable	Depends on stroke type	0.000
Position of Y axis	Changeable	Depends on stroke type	0.000
Position of Z axis	Changeable	Depends on stroke type	0.000
Position of W axis	Changeable	Depends on stroke type	0.000
Pose of robot arm	Changeable	"R" or "L"	"R"
Type of coordinates	Changeable	0～3	0
M data	Changeable	0～99 (end point:"??")	"??"
F code	Changeable	0～99	99
S code	Changeable	0～99	0

Note) Some robot such as AR-K400 types can use “r” or “l” for the pose of robot arm. These poses are the special value set when robot teaching. But these poses are only available in the memory card file. The file that includes “r” or “l” cannot be downloaded by the RS232C communication.

Controller type: HNC-5XX (max. 6 axes), Standard or for Semiconductor

Kind of Data	Changeable	Range	Default
Position of X axis	Changeable	Depends on stroke type	0.000
Position of Y axis	Changeable	Depends on stroke type	0.000
Position of Z axis	Changeable	Depends on stroke type	0.000
Position of W axis	Changeable	Depends on stroke type	0.000
Position of R axis	Changeable	Depends on stroke type	0.000
Position of C axis	Changeable	Depends on stroke type	0.000
Pose of robot arm	Changeable	"R" or "L"	"R"
Type of coordinates	Changeable	0～3	0
M data	Changeable	0～99(end point:"??")	"??"
F code	Changeable	0～99	99
S code	Changeable	0～99	0

Controller type: HNC-5XX with URL (max. 6 axes)

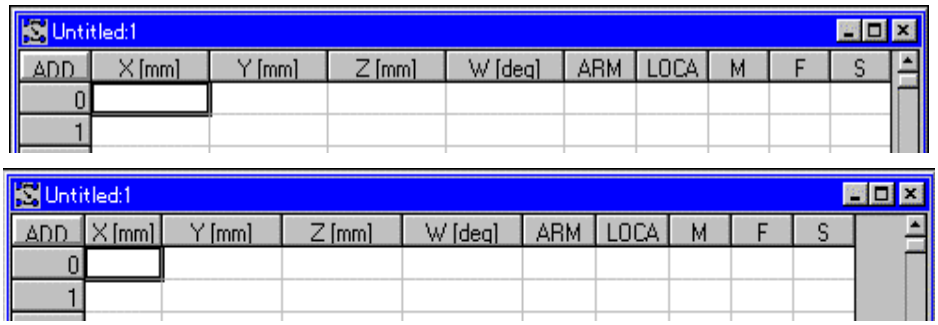
Kind of Data	Changeable	Range	Default
Position of X axis	Changeable	Depends on stroke type	0.000
Position of Y axis	Changeable	Depends on stroke type	0.000
Position of Z axis	Changeable	Depends on stroke type	0.000
Position of H axis	Changeable	Depends on stroke type	0.000
Position of T axis	Changeable	Depends on stroke type	0.000
Position of S axis	Changeable	Depends on stroke type	0.000
μ data	Changeable	Depends on stroke type	0.000
Pose of robot arm	Not changeable	Elbow("R" or "L" + "R" or "L") + Wrist("U" or "D")	"RRU"
Round flag	Not changeable	"P" or "Z" or "M"	"PPPP"
Sign flag	Not changeable	"p" or "m"	"p"
Enable flag	Not changeable	"E" or "N"	"E"
Type of coordinates	Changeable	0～3	0
M data	Changeable	0～99(end point:"??")	"??"
F code	Changeable	0～99	99
S code	Changeable	0～99	0

Input Comment

You can to input any string to the cell of the comment column.
You can enter 50 characters maximum for the comment.

Change Width of Column

In the sheet, you can change the width of column by dragging the bar between columns.
The example to drag the bar between “X” and “Y” to left is as follows.



14.9. Select Cells

There are the following types to select cells.

(1) Selection of only one cell
(2) Selection of serial cells named as “cell block”
(3) Selection of discrete cells
(4) Selection by searching

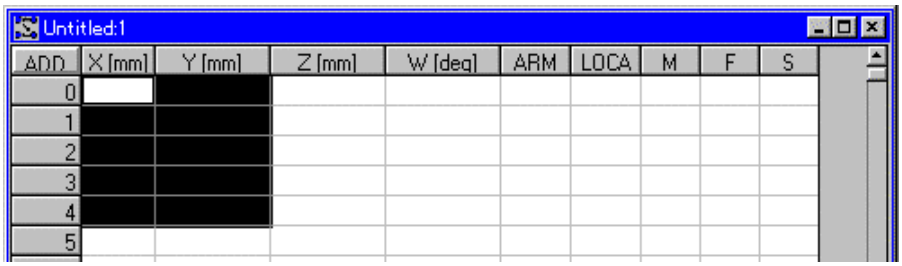
Selection of Only One Cell

Click a cell to select and it is activated.

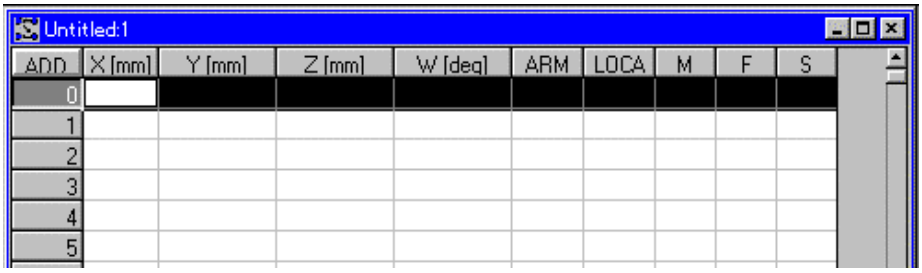
Selection of Serial Cells Named as “Cell Block”

You can select the cell block as follows.

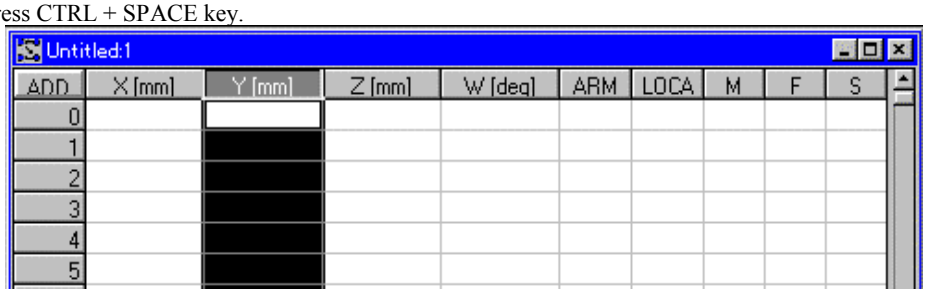
Select a cell in the upper left corner of the cell block and drag the mouse to the lower right corner of the cell block.



You can select all cells of a row (a row block) to click the title of a row. Also you can select a row block to press SHIFT + SPACE key.



You can select all cells of a column (a column block) to click the title of a column. Also you can select a column block to press CTRL + SPACE key.



To press SHIFT + cursor key or to press SHIFT + clicking mouse, you can change the selection area of the cells.

Selection of Discrete Cells

Click a cell pressing CTRL key to select discrete cells.
You can select more than two cell blocks discretely to select a cell block pressing CTRL key.

ADD	X [mm]	Y [mm]	Z [mm]	W [deg]	ARM	LOCA	M
0	435.400	181.660	3.000	0.000	R	0	5
1	435.290	181.710	33.000	0.000	R	0	6
2	435.400	181.660	3.000	0.000	R	0	7
3	0.000	0.000	0.000	0.000	R	0	??
4	0.000	0.000	0.000	0.000	R	0	??
5	460.150	260.040	3.000	0.000	R	0	8
6	460.150	260.040	13.000	0.000	R	0	9
7	460.150	260.040	3.000	0.000	R	0	10
8	0.000	0.000	0.000	0.000	R	0	??
9	0.000	0.000	0.000	0.000	R	0	??
10	311.500	539.290	45.980	0.000	R	0	1
11	41.350	627.760	45.980	0.000	R	0	1

After selecting discrete cells or cell blocks, if you click any cell without pressing CTRL key, the discrete selections are canceled.

Selection by Searching

Click [Edit]-[Select Cells] in the menu to select cells by searching.
You can execute the following selections.

- To select one row by specifying a position address
- To select cells by specifying logical conditions of searching

See "Search Data" about how to use the searching dialog.

Operation after Selecting Cells

After selecting cells by the above-mentioned operation, you can apply the following operation to the selected cells.

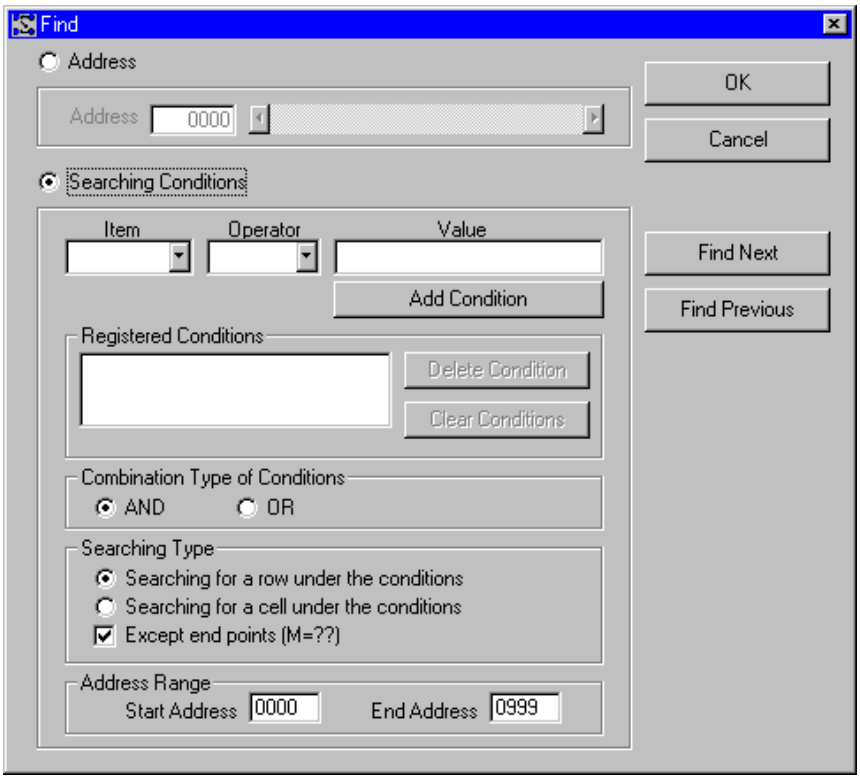
- Cut, Copy, Paste and Delete
  Note) In case that you have selected the discrete cells, these operation are not available showing the message as "Cannot operate for multiple selected blocks".
- Calculation
- Print

14.10. Search Data

You can search data by the following types

- Searching by position address
- Searching by logical conditions

Click [Edit]-[Find] in the menu or  button in the tool bar to show the searching dialog.
Also, Click [Edit]-[Select Cells] to show the searching dialog.



[Address] is automatically selected for the searching type.

Searching by Position Address

Enter the address number and click [OK] button.
The row of the specified address is activated.

Searching by Logical Conditions

You can search the value of cell data to specify the searching logical conditions.
A searching condition consists of “Item”, “Operator” and “Value”.
“Item” is the target data item to search.
“Value” is the value to compare with the item by the operator. You can enter a decimal value.
You can select the following symbols for the operator of a condition.

Symbol	Explanation
=	“Item” is equal to “Value”.
>	“Item” is greater than “Value”.
<	“Item” is less than “Value”.
>=	“Item” is greater than and equal to “Value”.
<=	“Item” is less than and equal to “Value”.
Not=	“Item” is not equal to “Value”.

In case that there is only one condition, you can execute searching to click [OK] button after specifying “Item”,

“Operator” and “Value”.
In case that there are more than two conditions, click [Add Condition] button after specifying “Item”, “Operator” and “Value”. After addition of the current condition to the list box [Registered Condition], you can set the new condition. The last settings of the condition are remained, so you may change only a setting that you want to enter for the new condition. The condition that is equal to one already registered is not added newly.
There is no limit of the number of the registered conditions.
You can delete a registered condition to click [Delete Condition] button after selecting the condition in the list box.
You can delete all registered conditions to click [Clear Conditions] button.
In case that there are more than two conditions, you must select [Combination Type of Conditions]. [AND] is selected automatically as default.

• AND
All conditions are combined with each other by [AND] logic to judge for searching. So, data that fulfills all registered conditions will be searched.
• OR
All conditions are combined with each other by [OR] logic to judge for searching. So, data that fulfills at least one of registered conditions will be searched.

The examples to search conditions are as follows.
(Example 1) Search X axis data that has the value from 100 to 105.

Item	Operator	Value
X [mm]	>=	100
X [mm]	<=	105

Select [AND] for the combination type of the conditions.
(Example 2) Search Y axis data that has the minus value or greater than 200.

Item	Operator	Value
Y [mm]	<	0
Y [mm]	>	200

Select [OR] for the combination type of the conditions.
(Example 3) Search the row in that Y axis value is 10.25 and Z axis value is 23.4.

Item	Operator	Value
Y [mm]	=	10.25
Z [mm]	=	23.4

Select [AND] for the combination type of the conditions.
(Example 4) Search the row in that Y axis value is 10.25 or Z axis value is 23.4.

Item	Operator	Value
Y [mm]	=	10.25
Z [mm]	=	23.4

Select [OR] for the combination type of the conditions.

You can select the way that the specified conditions apply to data by [Searching Type].

• Searching for a row under the conditions
A whole row that includes the cell under the specified conditions is searched.
For example, (Example 3) searches for the position addresses in which X is 10.25 and Y is 23.4.
(Example 4) searches for the position addresses in which X is 10.25 or Y is 23.4.
In case of [Edit]-[Find] selected, the top cell (X axis cell) of the found row becomes activated.
In case of [Edit]-[Select Cells] selected, the whole row becomes the selected mode.

• Searching for a cell under the conditions
A single cell under the specified conditions is searched. When you have registered the conditions that consist of the different “Item” such as (Example 3) or (Example 4), this option cannot be selected.
In case of [Edit]-[Find] selected, the found cell becomes activated.
In case of [Edit]-[Select Cells] selected, the found cell becomes the selected mode.

• Except end points (M=??)
When this check-box is ON, the end points addresses (M=??) are neglected to search.

Note) The conditions such as the following example are invalid logically, but it is not checked for such conditions

when you set.

(Example 5) Search the cell in that X axis value is 10 and X axis value is 20.

Item	Operator	Value
X [mm]	=	10
X [mm]	=	20

Select [AND] for the combination type of the conditions.

After searching under these conditions, the message “Cannot find” will be shown.

You can set the address range for searching by [Address Range]. All addresses are automatically selected as default.

After settings of the conditions, the combination type, the searching type and the address range, click [OK] or [Find Next] button to start searching in the forward direction from the current activated cell closing the dialog. Click [Find Previous] button to start searching in the backward direction from the current activated cell.
During the execution to search, the message “Searching…” is shown.
You can stop searching to press ESC key.
In case that the row cannot be found, the message “Cannot find the row under specified conditions” will be shown.
In case that the cell cannot be found, the message “Cannot find the cell under specified conditions” will be shown.

After the dialog is closed, select [Edit]-[Find Next] in the menu or press F3 key to search by the current specified conditions in the forward direction from the current activated cell.
Also, select [Edit]-[Find Previous] in the menu or press SHIFT+F3 key to search by the current specified conditions in the backward direction from the current activated cell.
If the conditions are not registered, the message “Searching condition not defined” is shown and you cannot search.

14.11. Cut Data

You can cut data in the sheet. and the cells you have cut are filled with default data.

1. Select cells to cut. (See "Select Cells".)

C:¥temp¥HARLTST¥mori.pos

ADD	X [mm]	Y [mm]	Z [mm]	W [deg]	ARM	LOCA	M	F	S
0	21.016	0.000	8.459	0.000	L	0	0	99	0
1	420.000	0.000	5.000	0.000	L	0	1	99	0
2	21.010	0.000	8.450	0.000	L	0	0	99	0
3	0.000	0.000	0.000	0.000	L	0	??	99	0
4	0.000	0.000	0.000	0.000	L	0	??	99	0

2. Click [Edit]-[Cut] or click  button in the tool bar. Then the selected cells are cut and the default data is set to the cells. Also you can select [Cut] in the pop up menu by clicking the right button of the mouse.

C:¥temp¥HARLTST¥mori.pos

ADD	X [mm]	Y [mm]	Z [mm]	W [deg]	ARM	LOCA	M	F	S
0	21.016	0.000	8.459	0.000	L	0	0	99	0
1	420.000	0.000	0.000	0.000	R	0	??	0	0
2	21.010	0.000	8.450	0.000	L	0	0	99	0
3	0.000	0.000	0.000	0.000	L	0	??	99	0
4	0.000	0.000	0.000	0.000	L	0	??	99	0

Note) You cannot cut the data that has not been entered yet.

14.12. Copy Data

You can copy the selected cells in the sheet to the clipboard.

1. Select cells to copy. (See "Select Cells".)

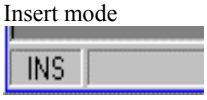
2. Click [Edit]-[Copy] or click  button. Also you can select [Copy] in the pop up menu by clicking the right button of the mouse. Then the selected cells are copied to the clipboard.

Note) You cannot copy the data that has not been entered yet.

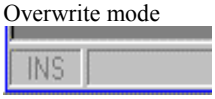
14.13. Paste Data

You can paste the clipboard data to the selected cells in the sheet. Pasting has two types as insert mode and overwrite mode according to INS key status. You can check INS key status in the status bar that shows “INS”.

Insert mode



Overwrite mode



Pasting on Insert Mode

If you paste data on insert mode, the pasted data is inserted to the specified address and the all data below the inserted address is shifted down. So, when the sheet is fully filled with the position data, the data at the end (address 7999) of the sheet is overflowed.

Example) Copy address 0000 - 0002 and paste to address 0500 on insert mode.

Before Pasting		After Pasting
Add. 0000: Data 0000		Data 0000
Add. 0001: Data 0001		Data 0001
Add. 0002: Data 0002		Data 0002
…		…
Add. 0500: Data 0500		Data 0000
Add. 0501: Data 0501	==>	Data 0001
Add. 0502: Data 0502		Data 0002
Add. 0503: Data 0503		Data 0500
…		…
Add. 7997: Data 7997		Data 7994
Add. 7998: Data 7998		Data 7995
Add. 7999: Data 7999		Data 7996

When pasted on insert mode, the data in the columns except pasted column is set by default data.

1. Copy data for pasting. (See “Copy Data”.)

2. In case of overwrite mode, press INS key to transfer to insert mode.

3. Select destination cells to paste. (See “Select Cells”.)

4. Click [Edit]-[Paste] or click  button. Also you can select [Paste] in the pop up menu by clicking the right button of the mouse.

Pasting on Overwrite Mode

If you paste data on overwrite mode, the pasted data is overwritten to the specified address. So the data is changed as much as pasted.

Exaple) Copy address 0000 - 0002 and paste to address 0500 on overwrite mode.

Before Pasting		After Pasting
Add. 0000: Data 0000		Data 0000
Add. 0001: Data 0001		Data 0001
Add. 0002: Data 0002		Data 0002
…		…
Add. 0500: Data 0500		Data 0000
Add. 0501: Data 0501	==>	Data 0001
Add. 0502: Data 0502		Data 0002
Add. 0503: Data 0503		Data 0003
…		…
Add. 7997: Data 7997		Data 7997
Add. 7998: Data 7998		Data 7998

Add. 7999: Data 7999 Data 7999

When pasted on overwrite mode, if the row data of the destination address has not been entered yet, the data in the columns except pasted column is set by default data.

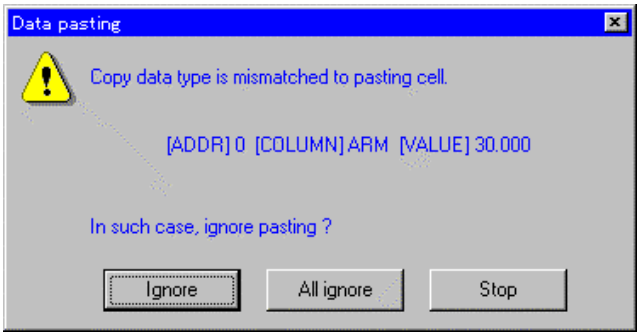
1. Copy data for pasting. (See "Copy Data".)

2. In case of insert mode, press INS key to transfer to overwrite mode.

3. Select destination cells to paste. (See "Select Cells".)

4. Click [Edit]-[Paste] or click  button. Also you can select [Paste] in the pop up menu by clicking the right button of the mouse.

In case you paste more than two cells , you must specify the destination cells that have the same range of row and column number, or you must specify a single cell.
When pasting, Position Editor checks that the type of the pasting data matches the destination. If data type is mismatched or out of range, the dialog box to confirm is shown.



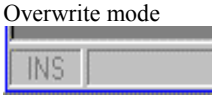
[Ignore] button clicked, the error cell will not be pasted and next pasting is continued. [All ignore] clicked, the cells in which error is detected subsequently will not be pasted. [Stop] clicked, current pasting is aborted.

14.14. Delete Data

You can delete data of the current selected row in the sheet and the deleted row is filled with vacant data. Deleting has two types as insert mode and overwrite mode according to INS key status. You can check INS key status on the status bar that shows “INS”.

Insert mode

Overwrite mode



Deleting on Insert Mode

If you delete data on insert mode, all data below the deleted address is shifted up. And the data at the end (address 7999) of the sheet is filled with vacant data.

Example) Delete address 0000-0002 on insert mode.

Before Deleting		After Deleting
Add. 0000: Data 0000		Data 0003
Add. 0001: Data 0001		Data 0004
Add. 0002: Data 0002		Data 0005
…		…
Add. 0500: Data 0500		Data 0503
Add. 0501: Data 0501	== >	Data 0504
Add. 0502: Data 0502		Data 0505
Add. 0503: Data 0503		Data 0506
…		…
Add. 7997: Data 7997		Vacant data
Add. 7998: Data 7998		Vacant data
Add. 7999: Data 7999		Vacant data

1.Select rows to delete. (See “Select Cells”.)

2.In case of overwrite mode, press INS key to transfer to insert mode.

3. Click [Edit]-[Del] or click  button. Also you can select [Del] in the pop up menu by clicking the right button of the mouse.

Deleting on Overwrite Mode

If you delete data on overwrite mode, the deleted row is filled with vacant data.

Example) Delete address 0000-0002 on overwrite mode.

Before Deleting		After Deleting
Add. 0000: Data 0000		Vacant data
Add. 0001: Data 0001		Vacant data
Add. 0002: Data 0002		Vacant data
…		…
Add. 0500: Data 0500		Data 0500
Add. 0501: Data 0501	== >	Data 0501
Add. 0502: Data 0502		Data 0502
Add. 0503: Data 0503		Data 0503
…		…
Add. 7997: Data 7997		Data 7997
Add. 7998: Data 7998		Data 7998
Add. 7999: Data 7999		Data 7999

1.Select rows to delete. (See "Select Cells".)

2. In case of insert mode, press INS key to transfer to overwrite mode.

3. Click [Edit]-[Del] or click  button. Also you can select [Del] in the pop up menu by clicking the right button of the mouse.

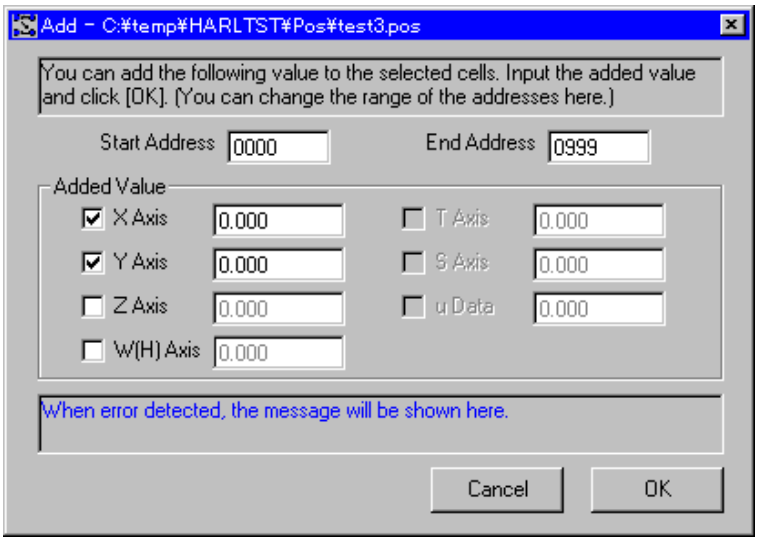
14.15. Add, Subtract, Multiply, Divide Position Data

You can add, subtract, multiply or divide the axis value of the position data by specifying the calculating value by selecting [Edit]-[Calculate] in the editing window for the position data.

The operation is as follows.

1. Select the single cell or the cell block to calculate. (See "Select Cells".)

2. Select the calculation type in [Edit]-[Calculate] of the menu or select it of the pop-up menu shown by clicking the right button of the mouse at the editing window. And then the following window (the calculating window) is shown.



3. The address range of the currently selected cells is shown in [Start Address] and [End Address]. If you want to change the range, input the new address here.

4. Enter the calculating value to [Added Value] (or [Subtracted Value], [Multiplied Value], [Divided Value]). When the calculating window is opened, "0.000" for adding or subtracting or "1.000" for multiplying or dividing is shown as the default calculating value. And when the calculating window is opened, the axes of the selected cells are enabled. If you want to change the calculating axis, click the check box for the axis.

5. Click [OK] button to start the calculation. During the calculation, the cursor becomes an hourglass. When the calculation is finished for all the selected positions, the calculating window is closed automatically.

Note) The rows that have not been entered yet are not calculated.

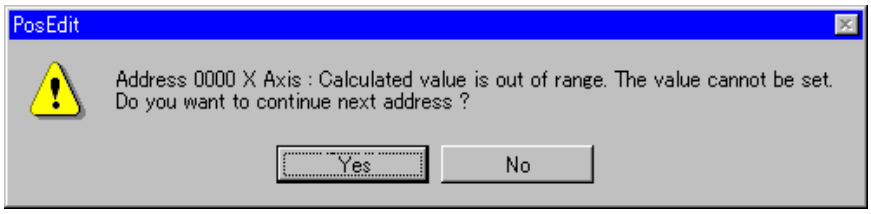
Restrictions to Input Data

There are the following restrictions to input data to the start address, the end address and the calculating value.
These are checked when [OK] button clicked and if the NG detected, the message is shown.
(See "Error Message of Position Editor".)

- The end address must be bugger than the start address.
- The start address or the end address must be within the range for the selected controller type.
- The expression of the floating value must have the appropriate format.
- In the case of division, you cannot divide the data by zero.

Error for Calculation

If the result of the calculation is out of the range that is permitted for the axis data, the following message is shown.



[Yes] clicked, the data of the next address will be calculated.
[No] clicked, the calculation will be aborted and return to the calculating window. In this case, the calculating window will show the next address automatically and you can restart to calculate the next address by clicking [OK] button.

Note) Whether you select [Yes] or [No], the calculated values without errors till this message have been set to the cells.

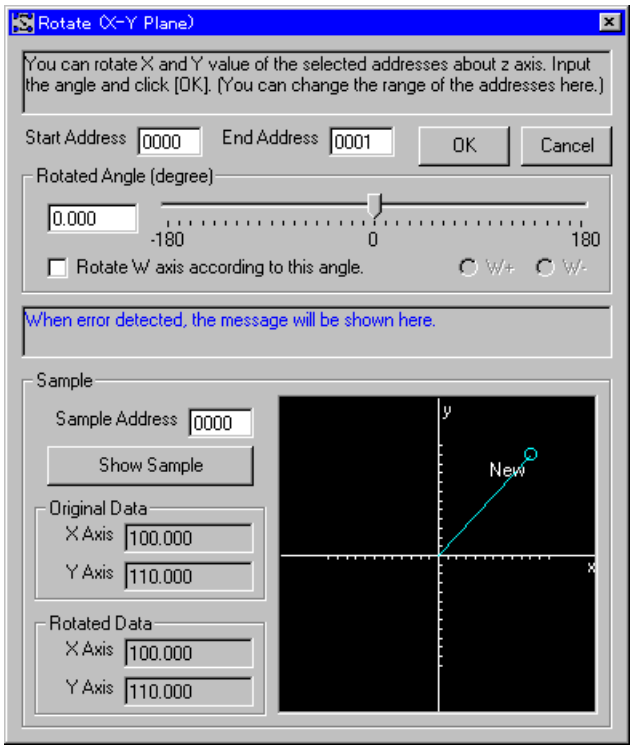
14.16. Rotate Position Data in X-Y Plane

You can calculate data of the rotation of X-Y plane about the Z axis by selecting [Edit]-[Calculate]-[Rotate (X-Y Plane)] in the editing window for the position data.

The operation is as follows.

1. Select the single cell or the cell block to calculate. (See "Select Cells".) You can select the cells besides X axis or Y axis, because the calculation is executed about the addresses that contain the selected cells.

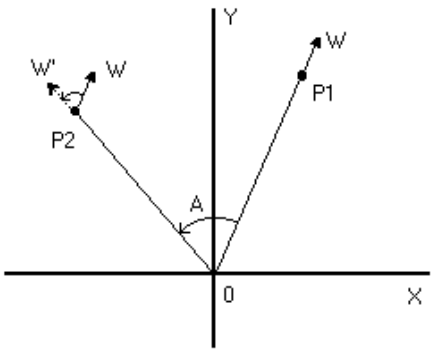
2. Select [Edit]-[Calculate] -[Rotate (X-Y Plane)] of the menu or select it of the pop-up menu shown by clicking the right button of the mouse at the editing window. And then the following window (the calculating window) is shown.



3. The address range of the currently selected cells is shown in [Start Address] and [End Address]. If you want to change the range, input the new address here.

4. Enter the rotated angle value to [Rotated Angle]. When the calculating window is opened, "0.000" is shown as the default value.

5. If the W axis data is not changed, the W axis direction in the space of coordinates is the same as before the rotation. If you check [Rotate W axis according to this angle] check box, the W axis data is automatically rotated by the same angle that is specified for X-Y rotation. After this operation, for the example, you can fix the W axis direction for the robot posture.



In this figure, suppose that P1 is rotated to P2 by angle A. In the case that W axis data is not changed, the W axis

direction of P2 will be [W] that is the same of P1 in the figure. It is because that the robot treats the W axis value as the angle on the basis of the coordinate of the space. If you check [Rotate W axis according to this angle] check box, the W axis value is automatically rotated to the direction [W'].
In case of [Rotate W axis according to this angle] checked to ON, as default, [W+] option box is selected automatically and the W axis value is added by the rotated angle value. But this case is available in the case that the plus direction of the rotated angle is the same as the plus direction of W axis of the robot. There is the case that the plus direction of the rotated angle is converse from the plus direction of W axis of the robot. In this case, select [W-] option box.

Note) When you rotate X-Y positions with W axis rotation, please confirm the direction of W axis of the using robot. Then specify the correct value of the angle and select [W+] or [W-] appropriately.

6. In [Sample], the lowest address among the selected addresses is selected and the figure of X-Y plane before and after the rotation is shown except the case that the position data is vacant or the case that the values of X and Y axis are zero. If you change the rotated angle, the sample figure is also changed. If you want to change the sample address, enter the new address to [Sample Address] and click [Show Sample].

7. Click [OK] button to start the calculation. During the calculation, the cursor becomes an hourglass. When the calculation is finished for all the selected positions, the calculating window is closed automatically.

Note) The rows that have not been entered yet are not calculated.

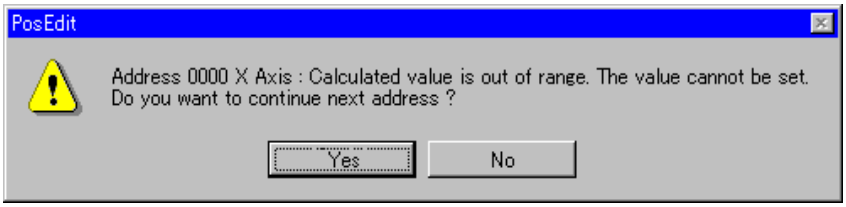
Restrictions to Input Data

There are the following restrictions to input data to the start address, the end address and the rotated angle.
These are checked when [OK] button clicked and if the NG detected, the message is shown.
(See "Error Message of Position Editor".)

- The end address must be bugger than the start address.
- The start address or the end address must be within the range for the selected controller type.
- The expression of the floating value must have the appropriate format.

Error for Calculation

If the result of the calculation is out of the range that is permitted for the axis data, the following message is shown.



[Yes] clicked, the data of the next address will be calculated.
[No] clicked, the calculation will be aborted and return to the calculating window. In this case, the calculating window will show the next address automatically and you can restart to calculate the next address by clicking [OK] button.

Note) Whether you select [Yes] or [No], the calculated values without errors till this message have been set to the cells.

14.17. Undo, Redo Operation to Edit Position Data

When editing the position data, the following operation can be stored for 16 times maximum.

• Input to the cell from the keyboard
• Cut the data
• Paste the data
• Delete the data
• Calculation to add, subtract, multiply, divide
• Rotation in the X-Y plane

You can undo these operation to click [Undo] in the [Edit] menu and the data is restored to the values before the operation.
After undoing the operation, if you want to execute the operation again, click [Redo] in the [Edit] menu.
When the number of operations is over 16 times, the oldest operation is deleted and the newest operation is stored.

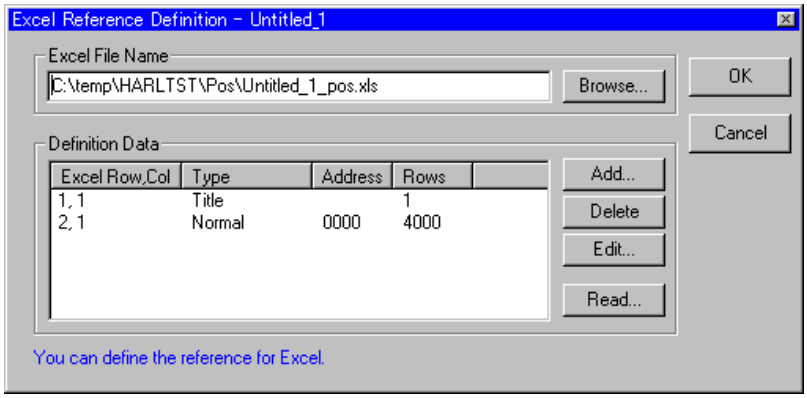
14.18. Excel Reference Definition

You can operate the following function to select [Tool]-[Excel Reference] in the menu for the current active window of the position data.
Note) Active window means that the window has the focus among the opened windows.

- Define Excel reference
- Read from Excel worksheet according to Excel reference definition
- Write to Excel worksheet according to Excel reference definition

These functions cannot be available on the computer in which Excel has not been installed.

You can define the relation between Excel worksheet and the cells of the editor.
Select [Tool]-[Excel Reference]-[Excel Reference Definition] to show the following dialog.



In case that you have never set the Excel reference definition for the current active position data, the default definition is shown automatically.

Excel File Name

Specify the file name of Excel worksheet to read or write to [Excel File Name] text box.
“Position data file name_pos.xls” is automatically selected as default.

Definition Data

You can see the list of Excel reference definition records in [Definition Data]. The following records are already set as default.

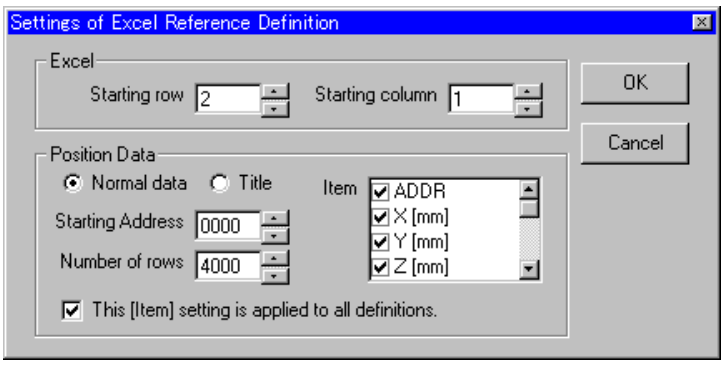
- The Excel cell of row no. 1 and column no.1 is related to the first cell of the title (such as “ADDR”, “X[mm]” and so on).
- The Excel cell of row no. 2 and column no. 1 is related to the first cell of the position data form address 0000 to maximum address.

Delete Definition Data Record

After you have selected the definition record to click the [Excel Row,Col] of the record, you can delete the record to click [Delete] button.
If you want to cancel deleting, click [Cancel] button to exit without saving.

Edit Definition Data Record

After you have selected the definition record to click the [Excel Row,Col] of the record, you can edit the record to click [Edit] button.
Then, the following dialog is shown.



• Excel

You can specify the starting row number of Excel worksheet to [Starting row]. You must specify the value more than 1.

You can specify the starting column number of Excel worksheet to [Starting column]. You must specify the value more than 1.

• Position Data

You must select whether normal data or title.

In case of title, the Excel cells of the row specified by [Starting row] with the starting column number specified by [Starting column] are related sequentially to the title names of items selected in [Item].

You cannot specify [Starting address] and [Number of rows] in case of title.

In case of normal data, the Excel cells of a row with the starting column number specified by [Starting column] are related sequentially to the position data of an address.

The Excel rows are related sequentially to the position data from the address specified by [Starting address]. The number of rows can be specified by [Number of rows].

The Excel columns are related only to the items selected in [Item].

• This [Item] setting is applied to all definitions

When you have selected [This [Item] setting is applied to all definition] check-box to ON, this selection of items will be applied to all definition records.

Click [OK] button to renew the definition record.

Add Definition Data Record

After you have selected the definition record to click the [Excel Row,Col] of the record, you can add the record to click [Add] button.

Then the editing dialog is shown as the same as described in "**Edit Definition Data Record**".

See "**Edit Definition Data Record**" about setting of the definition record.

Read Definition Data

You can read the Excel reference definition of other position data to click [Read] button. After reading other definition, the current definition will be overwritten.

Save Definition Data

The definition data is renewed to click [OK] button in the Excel reference definition dialog.

Click [Cancel] button to exit without renewal of the current definition.

Saving the definition data to the file is executed at the same time when the position data is saved to the file.

The file that saves the Excel reference definition data is the comment information file.

See "Save Position Data" about the comment information file.

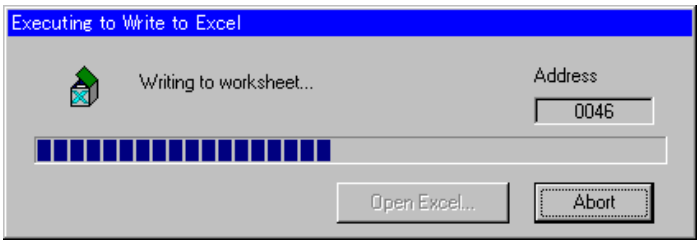
14.19. Read from or Write to Excel Worksheet

You can write the active position data to Excel worksheet according to the Excel reference definition to select [Tool]-[Excel reference]-[Write to Excel] in the menu.
Also you can read the position data from Excel worksheet according to the Excel reference definition to select [Tool]-[Excel reference]-[Read from Excel] in the menu.
These functions cannot be available on the computer in which Excel has not been installed.

After selecting [Tool]-[Excel reference]-[Write to Excel] in the menu, the Excel reference definition dialog is shown. Click [OK] button to activate Excel and write the position data to Excel worksheet according to the current displayed Excel reference definition.
You can modify the Excel reference definition in this dialog.
See "Excel Reference Definition" about editing the Excel reference definition.

The operation of reading from Excel is as the same as writing.

After starting to read or write, the following progress dialog is shown.



Click [Abort] button to stop reading or writing.

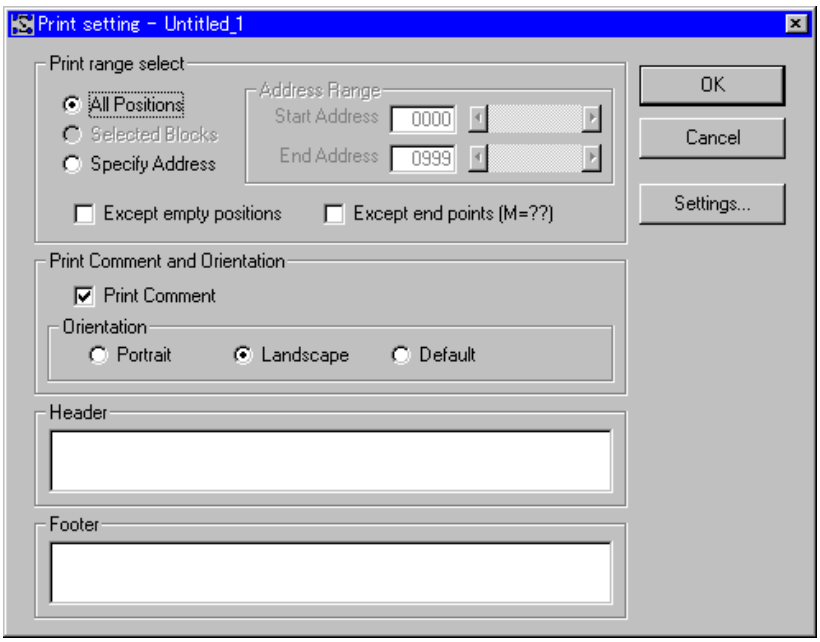
When reading or writing is completed, Excel shows the dialog that asks to save the worksheet. Select action in the dialog. Then [Open Excel] button is enabled, you can open the Excel worksheet to click [Open Excel] button in the progress dialog.

14.20. Print Position Data

You can print position data with the various range as follows.

Print position data of all addresses.
Print position data selected currently.
Print position data with specified address.

1. Click [File]-[Print]. Then the printing dialog box is shown.



2. To print position data of all addresses, click [All] radio button. To print position data selected currently, click [Selected range] radio button. To print position data with specified address, click [Address set] radio button and set [Start Address] , [End Address] that you want to print.

When [Except empty positions] checked to ON, the empty rows are not printed.
When [Except end points (M=??)] checked to ON, the rows of end point data are not printed.

3. You can select whether the comments for the position data will be printed or not by checking [Print Comment]. If the comments printed, the printing orientation is selected to Landscape as default. If the comments not printed, the printing orientation is selected to Portrait as default. You can change the orientation to click the option button.

4. You can print comment at the upper area (header) or the lower area (footer) of a page to input comment to [Header] or [Footer] box. Multiple line comment is possible to input a return. This comment is printed in all pages. The header and footer will be saved to the file. (See "Save Position Data".) In the case that you have never edit the position data, after you enter the header or footer, the confirming message of saving the file will be shown when the editing window is terminated.

5. Click [OK] button to start printing. Click [Cancel] button to exit this dialog box.

Also you can print by clicking  button in the tool bar.

Note) When printing position data, Position Editor uses the current settings of printer. To change the settings of printer, click [File]-[Printer Setting] or click [Set] button in the printing dialog box before execution of printing.

14.21. Save Position Data

Save to Overwrite

Click [File]-[Save]. Then the edited position data is saved to overwrite.

Also you can save to overwrite by clicking  button in the tool bar.
The overwritten file is saved to the backup file.

Note) In case of position data created newly, the file name setting dialog box is shown. Enter a file name and click [Save] button.

Save as Another Name

1. Click [File]-[Save As]. Then the file name setting dialog box is shown.

2. Enter a saved file name and click [Save] button. Then the edited position data is written to the specified file.

If the same name file exists, this file is saved to the backup file.

Created Files

The files that are created when saving the data are the position data file, the comment information file and the backup file. These files are created at the robot data directory that is specified in [Set Up]-[Project Settings]-[Directory] of Main Menu.
The file names are as follows.

Position data file	Specified-Name.pos
Comment information file	Specified-Name.psx
Backup file	Original-Name_bak.pos

14.22. Save Position Data to Memory Card

You can save the current opened position data to the robot memory card.
There are two saving operation as “Save (to overwrite)” and “Save As (another name)”.

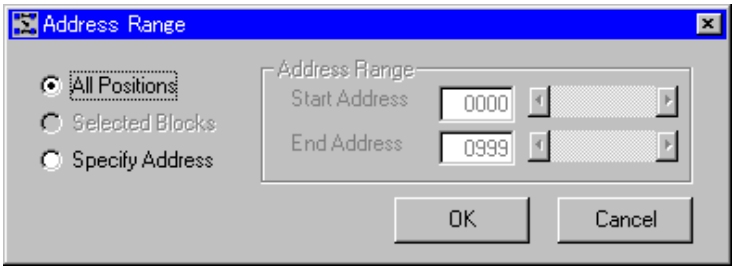
Save to Overwrite

Select [File]-[Memory Card]-[Save] in the menu.
If you have opened the file saved in the computer, you cannot select this menu.
After the confirmation dialog to overwrite is shown, select [Yes] or [No].
In case of [Yes] selected, the current opened data overwrites the memory card file.

Save as Another Name

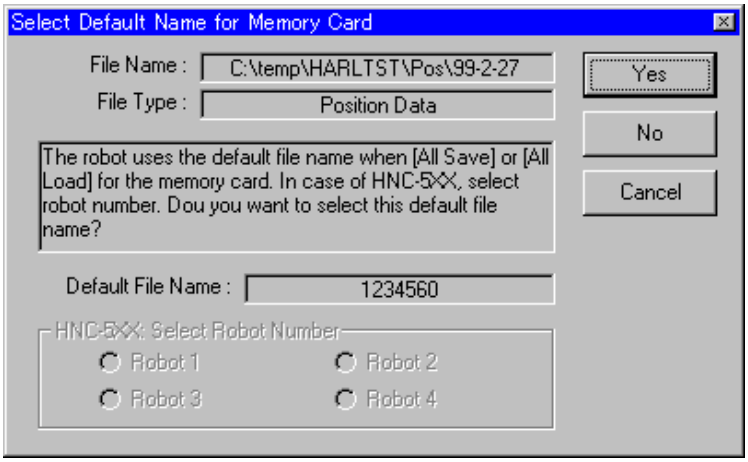
Select [File]-[Memory Card]-[Save As] in the menu.

1. The following address range dialog is shown.
After you have selected cells, [Selected Blocks] option is enabled.



Specify the range of the addresses that you want to save and then click [OK] button.

2. The dialog for the default name of the memory card file is shown.



The default file name is used when the robot controller executes “ALL SAVE” or “ALL LOAD” for the memory card.
In case of HNC-5XX type controller, the different default file name is used according to the robot number. In this case, you must select the robot number of the target.
Click [Yes] button to show the saving dialog with this default file name.
Click [No] button to show the saving dialog with the vacant file name.

3. The saving dialog is shown.
Enter or confirm the file name, and then click [Save] button to save the current opened data to the memory card as the specified file.
Only seven numeral characters are allowed as the saving file name.

14.23. Close Editing Window of Position Data

Click [File]-[Close]. Then the position data editing window is closed.

Note) In case you have not saved the edited position data in the editing window yet, the asking dialog to save or not is shown. And in case you have not yet save position data opened from the memory card to the file in the computer though you have not edit at all, the same dialog is shown.

14.24. Exit Editing of Position Data

Click [File]-[Exit]. Then the main window of Position Editor is terminated.

Note) In case you have not saved the edited position data in the editing window yet, the asking window to save or not is shown. And in case you have not yet save position data opened from the memory card to the file in the computer though you have not edit at all, the same dialog is shown.

14.25. Error Messages of Position Editor

File Error Messages

Error Message	Explanation and Action
Cannot open file. [File Name]	The file cannot be opened. Check the attribution of the file in the property. When the other process has already opened the file, terminate the process.
Controller type invalid. [File Name]	First line in the Position/S.G./S.P data file is invalid controller type.
File data is illegal. (Addr:AddrNo [Data]) Ignore error to continue ?	When reading data file, illegal data format is found. [Ignore] clicked, the error is ignored to continue reading. [All ignore] clicked, the all subsequent errors are ignored to continue reading. [Stop] clicked, reading is aborted.
Cannot save file. [File Name]	The file cannot be saved. It may be caused by disk space exhausted. Delete useless files or change the save drive and retry saving.

Data Input Error Message

Error Message	Explanation and Action
Cannot paste, out of range.	When pasting, the number of data copied in the clipboard is not the same as the number of cells selected as the destination for pasting. Select the destination to paste again.
Cannot paste, bad data in clipboard.	When pasting, invalid data is found in the clipboard. Copy the valid data to the clipboard.
Copy data type is mismatched to pasting cell. [ADDR] AddrNo [COLUMN] ColName [VALUE] Val In such case, ignore pasting ?	When pasting ‘Val’ to ‘AddrNo’, ’ColName’ cell, data cannot be paste since data type is mismatched or out of range. [Ignore] clicked, the error cell is not pasted. [All ignore] clicked, the cells in which error is detected subsequently will not be pasted.
Start/End address out of range.	Position address is out of range. Enter the value of address from 0000 to 7999.
Start address is bigger than end address.	Start address of position is bigger than end address. Enter the start address less than the end address.

Calculation Error Message

Error Message	Explanation and Action
Start/End address not specified.	Enter the start address or the end address.
Value not specified.	Enter the calculating value.
Angle not specified.	Enter the rotated angle.
Start/End address is out of range.	The start address or the end address is out of the range according to the controller type. Specify the value within the range.
Start address is bigger than end address.	Start address of position is bigger than end address. Enter the start address less than the end address.
Bad floating expression.	Enter the correct expression for the floating value. Correct Example: -10.002 0.003 123 -123
Bad floating expression of angle.	Enter the correct expression for the floating value. Correct Example: -10.002 0.003 123 -123
Cannot specify zero to divide.	Specify the value except zero to divide.
Calculated value is out of range. The value cannot be set.	The result of the calculation is out of the range for the stroke. Undo to calculate again or enter the correct value.
Angle is out of range.	Specify the rotated angle from -180 to 180 degree.
Sample address is out of range.	The sample address is out of the range according to the controller type. Specify the value within the range.
Sample address is not between start address and end address. Is it sure to show the sample ?	The sample address is not between the specified start address and the end address. Click [Yes] to show the sample for this address.

15. Edit Robot Settings Data

15.1. Introduction to Robot Settings Data Editor

You can use Robot Settings Data Editor (S.G. Editor, S.P. Editor, Configuration Editor, Servo Parameter Editor, Expanded Parameter Editor) to show and edit the robot settings data (S.G. data, S.P. data, configuration, servo parameter, expanded parameter) uploaded from a robot. And you can create a new robot settings data file by Robot Settings Data Editor.
If the computer has the PC card slot, you can read data saved in the memory card or write data to the memory card.
Note 1) The robot memory card does not support configuration data.
You have to start an different type editor for robot settings data according to the data type you want to edit.
You can operate the editor of all types similarly.
When editing, Robot Settings Data Editor uses the definition file in which the data structure is defined. (See "Definition File for Robot Settings Data".)

S.G. Editor starts by following operation.
(1) Select [S.G. Editor] of [HrBasic Developing Environment X.XX] group in the start menu of Windows.
(2) Select [File]-[S.G. Data] in Main Menu.

(3) Select  button in Main Menu.

S.P. Editor starts by following operation.
(1) Select [S.P. Editor] of [HrBasic Developing Environment X.XX] group in the start menu of Windows.
(2) Select [File]-[S.P. Data] in Main Menu.

(3) Select  button in Main Menu.

Configuration Editor starts by following operation.
(1) Select [Configuration Editor] of [HrBasic Developing Environment X.XX] group in the start menu of Windows.
(2) Select [File]-[Configuration] in Main Menu.

(3) Select  button in Main Menu.

Servo Parameter Editor starts by following operation.
(1) Select [Servo Parameter Editor] of [HrBasic Developing Environment X.XX] group in the start menu of Windows.
(2) Select [File]-[Servo Parameter] in Main Menu.

(3) Select  button in Main Menu.

Expanded Parameter Editor starts by following operation.
(1) Select [Expanded Parameter Editor] of [HrBasic Developing Environment X.XX] group in the start menu of Windows.
(2) Select [File]-[Expanded Parameter] in Main Menu.

(3) Select  button in Main Menu.

Note 2) Configuration, servo parameter and expanded parameter are supported only for HNC-5XX (max. 6 axes) type controller.
Note 3) Servo Parameter Editor can support memory data of HNC-1XX,2XX,3XX,544.

Table of Data Types

Data Type	Access Type	HNC-1XX, 2XX, 3XX, 544	HNC-5XX	Editor
S.G. Data	Communication	OK	OK	S.G. Editor
	Memory Card	OK	OK	S.G. Editor
S.P. Data	Communication	OK	OK	S.P. Editor
	Memory Card	OK	OK	S.P. Editor
Configuration	Communication	----	OK	Configuration Editor
	Memory Card	----	NG *2	Configuration Editor
Servo Parameter	Communication	OK *1	OK	Servo Parameter Editor
	Memory Card	OK *1	OK	Servo Parameter Editor
Expanded Parameter	Communication	----	OK	Expanded Parameter Editor
	Memory Card	----	OK	Expanded Parameter Editor

OK: Robot holds this data and HR Editor can access it.

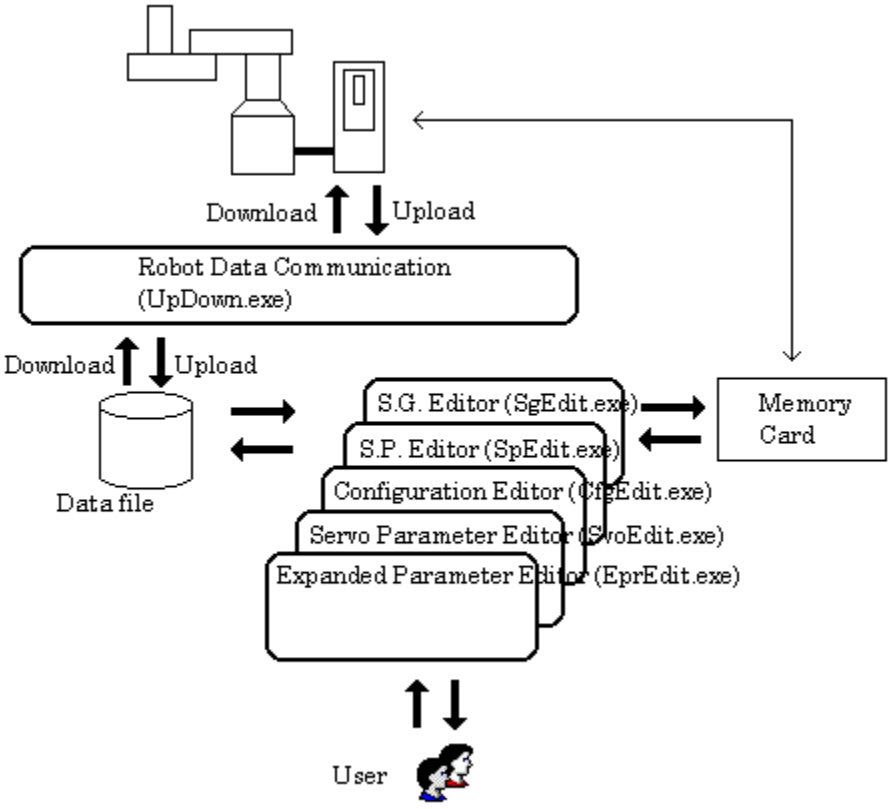
----: Robot does not hold this data.

NG: Robot holds this data but HR Editor can not access it.

*1) HR Editor treats servo parameter of HNC-1XX,2XX,3XX,544 as “Memory Data”.

*2) Robot controller has no function to read or write to the memory card for this data.

Function Structure of Robot Settings Data Editor



15.2. Start Editing of Robot Settings Data

You can start Robot Settings Data Editor by one of the following operations.

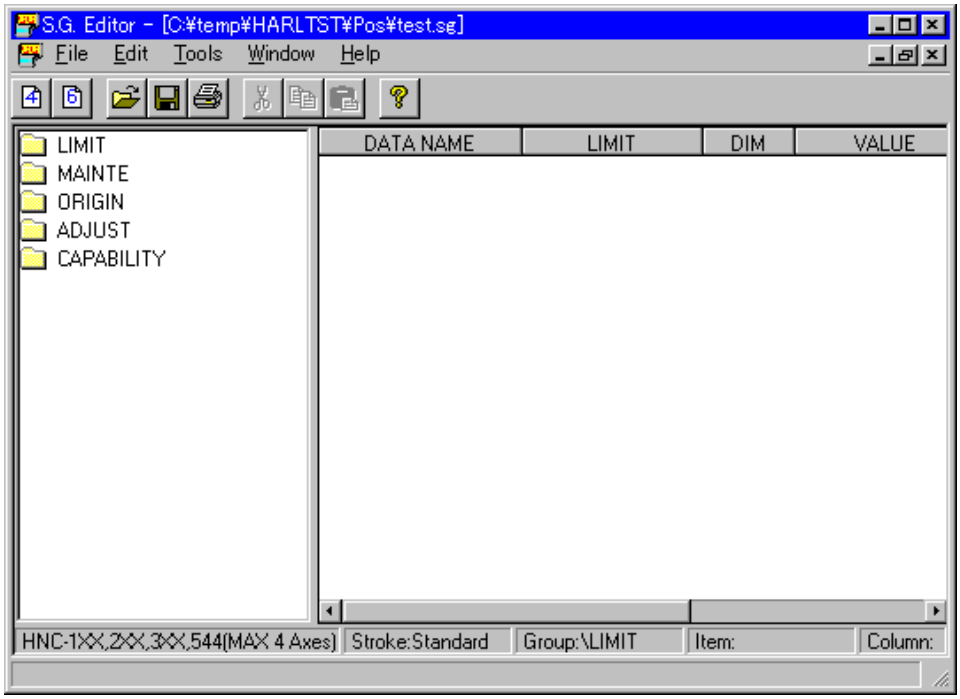
1. Select [File]-[Data-Type] in Main Menu. Then you must select to open a new file or an existing file. In case of opening an existing file, specify the file to open.

2. Select [Data-Type Editor] of [HrBasic Developing Environment X.XX] group in the start menu of Windows.

3. Select an each data file by Windows Explore and double-click it.

Subsequent explanation uses S.G data for example.

Note) After installation, first starting of Robot Settings Data Editor must be selected by Main Menu.



When Robot Settings Data Editor starting, a new editing window opens for the specified controller type defined in parameter file 'harl.dat'. (See "harl.dat File".)

About creating a new file for the other controller type, see "Create New System Data File".

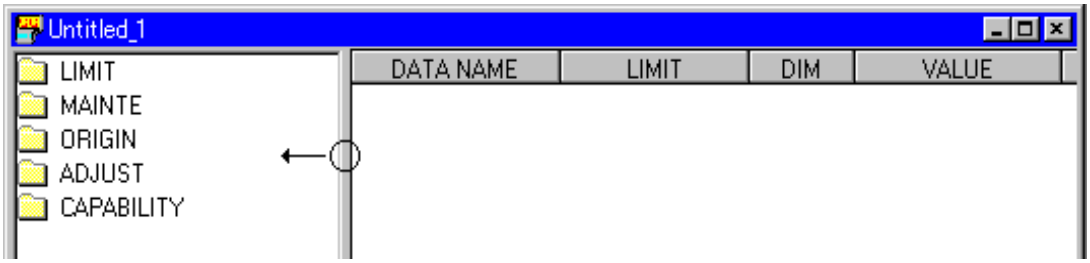
When starting, a child window of Robot Settings Editor is maximized.

15.3. View of Robot Settings Data Editor

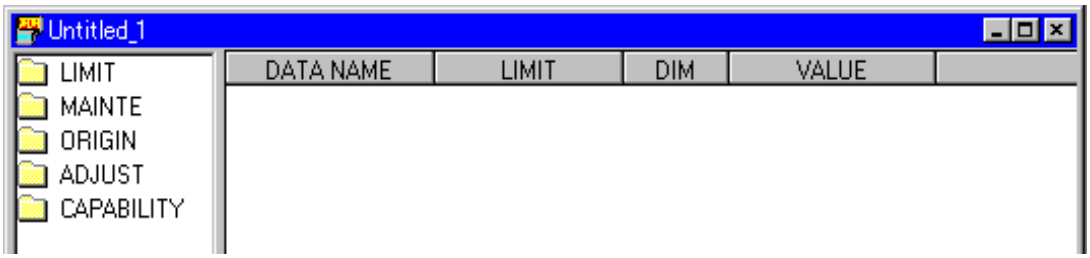
You can open more than two windows to edit robot settings data in the main window. And you can arrange editing windows or icons by the [Window] menu.

The tree view of robot settings data groups is shown at the left side of the editing window. And the robot settings data list of the group selected in the tree view is shown at the right side. You can set each data in the data list. See "Show and Select Group of Robot Settings Data" about operation of the tree view. And see "Input Robot Settings Data" about operation of the data list.

You can change the size of the tree view and the data list to drag the bar between the tree view and the data list.



After dragging the bar to left as follows.



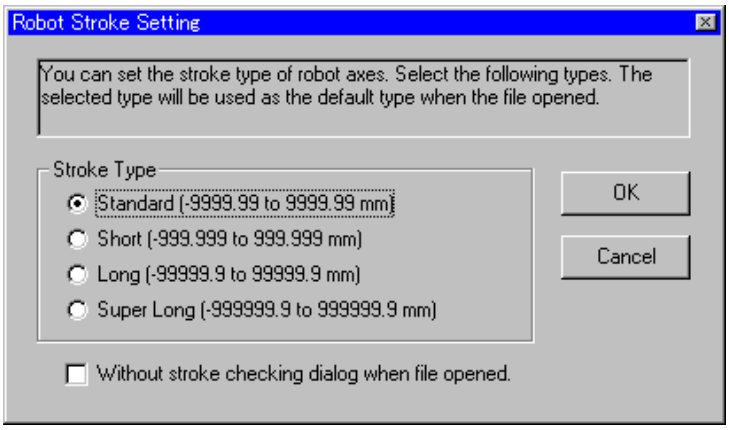
Status Bar in The Editing Window

The following information is shown in the status bar (the bar at the lowest area of the window) in the editing window for the each robot settings data file.

- Controller type
- Stroke type
- Group name selected currently
- Item name of the group at the active cell
- Column name of the active cell

15.4. Stroke Type Setting

You can set the default stroke type applied to editing to select [Tool]-[Option]-[Stroke Setting] in the menu.
Note) See "Operating Environment" about stroke types.



The stroke type selected here will be used as the default value of the stroke checking dialog opened when the following operation is executed.

(1) Create a new data file.
(2) Open the existing data file.
(3) Open the data file saved in memory card.

To select [Without stroke checking dialog when file opened] check-box to ON, the stroke checking dialog will not be shown when (1)-(3) is operated and the stroke type selected here will be applied to editing.

In case of S.G./S.P. Data Editor, if you set the wrong stroke type that differs from the type of actual data, there will be the following result.
In case of Configuration Editor, Servo Parameter Editor or Expanded Parameter Editor, HR Editor does not refer to the stroke type although you can set the stroke type.

(1) After creating new position file.
You cannot enter the floating value (the value with the decimal point) out of the stroke limit.
(2) After opening position file.
If there is a floating value out of the stroke limit in the opened file, it is able to read but you cannot edit this value.
And you cannot enter the new floating value out of the limit of the stroke.
(3) After opening position file saved in memory card.

HNC-1XX, 2XX, 3XX, 544 (4 axes)	If there is a floating value out of the stroke limit in the opened file, it is able to read but you cannot edit this value. And you cannot enter the new floating value out of the limit of the stroke.
HNC-5XX (6 axes)	The decimal point is shifted. The displayed value of an floating data is x10, x100, x1000 or 1/10, 1/100, 1/1000 from the actual data. And you cannot enter the new floating value out of the limit of the stroke.

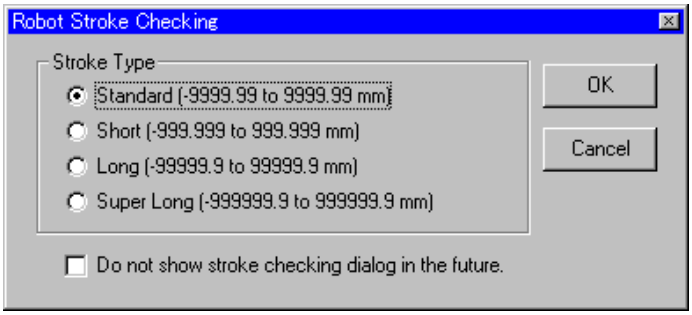
15.5. Create New Robot Settings Data File

Click [File]-[New HNC-xxx] according to the controller type to create the new data file. Then an editing window for the new data is opened in the main window.

Also you can open the new editing window to click the button such as  .

Stroke Checking Dialog

If [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu is selected to OFF, the following stroke checking dialog is shown. The initial displayed type is the stroke that has been selected in [Tool]-[Option]-[Stroke Setting] of the menu.



Select the stroke type for the file to create.

To select [Do not show stroke checking dialog in the future] check-box to ON, this dialog will be never shown when the opening or creating position file. And the default stroke type set in [Tool]-[Option]-[Stroke Setting] will be applied automatically.
If you want to show this dialog again, select [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu to OFF.

See "Stroke Type Setting" about other explanation.

Note) In case of Configuration Editor, Servo Parameter Editor or Expanded Parameter Editor, HR Editor does not refer to the stroke type although you can set the stroke type.

15.6. Open Robot Settings Data File

1. Click [File]-[Open] to show the file selection dialog box.

2. Select the file in the list view to open and click [Open] button. Then the editing window for the specified file is opened.

Also you can open the editing window for the existing file to click  button.

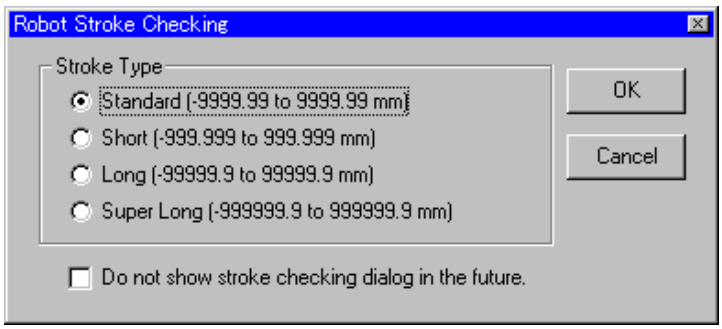
The list of recent opened files is shown at the lower area of [File] menu. Click the file name of this list to open the file.

Note) Extension of each type file name is as follows.

Data Type	Extension
S.G. data	.sg
S.P. data	.sp
Configuration	.cfg
Servo parameter	HNC-1XX,2XX,3XX,544: .mem HNC-5XX: .svo
Expanded parameter	.epr

Stroke Checking Dialog

If [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu is selected to OFF, the following stroke checking dialog is shown. The initial displayed type is the stroke that has been selected in [Tool]-[Option]-[Stroke Setting] of the menu.



Select the stroke type for the file to open.

To select [Do not show stroke checking dialog in the future] check-box to ON, this dialog will be never shown when the opening or creating position file. And the default stroke type set in [Tool]-[Option]-[Stroke Setting] will be applied automatically.
If you want to show this dialog again, select [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu to OFF.

See "Stroke Type Setting" about other explanation.

Note) In case of Configuration Editor, Servo Parameter Editor or Expanded Parameter Editor, HR Editor does not refer to the stroke type although you can set the stroke type.

15.7. Open Robot Settings Data File Saved in Memory Card

Note) Because a robot controller cannot save configuration data to a memory card, you cannot use this function for Configuration Editor.

1. Insert the memory card to a memory card slot of the computer.
In case of "New hardware detection" from Windows, install the memory card driver by the operation described at "Install Memory Card Driver".

2. Select [File]-[Memory Card]-[Open] in the menu to show the file selection dialog for the memory card.
Select the file to open in the list and click [Open] button.
There is the case that the following message is shown just after you have inserted the memory card to the card slot.

In this case, click [OK] button and then click [Cancel] button in the file selection dialog.
Wait for few seconds and select [File]-[Memory Card]-[Open] in the menu again.

In case that this message is shown several times and you cannot access the memory card, confirm the hardware name of the memory card. If the hardware name is correct, terminate HR Editor and other application program and then reboot the computer to let the memory card in the card slot. If the hardware name is wrong, change memory card driver of Windows. (See "Install Memory Card Driver".)

If you select the file that the editor cannot read, the error message is shown and the file cannot be opened.

3. After showing the robot type dialog, HR Editor reads the specified file to show the editing window.

Memory Card Removal

You can remove the memory card from the computer unless HR Editor is currently accessing the memory card.
The access to memory card means that
- the file selection dialog for the memory card is shown.
- HR Editor reads or writes the memory card file.

Concerning safety, it is recommended that you remove the memory card after HR Editor is terminated.

Note) After operating as follows, a Windows fatal exception error occurs on some type computer. In this case, you have to reset the computer. And you must not operate as follows, but you can remove the memory card directly. Although [Unexpected PC Card Removal] message is shown, there is no problem for the memory card unless HR Editor is currently accessing the memory card.

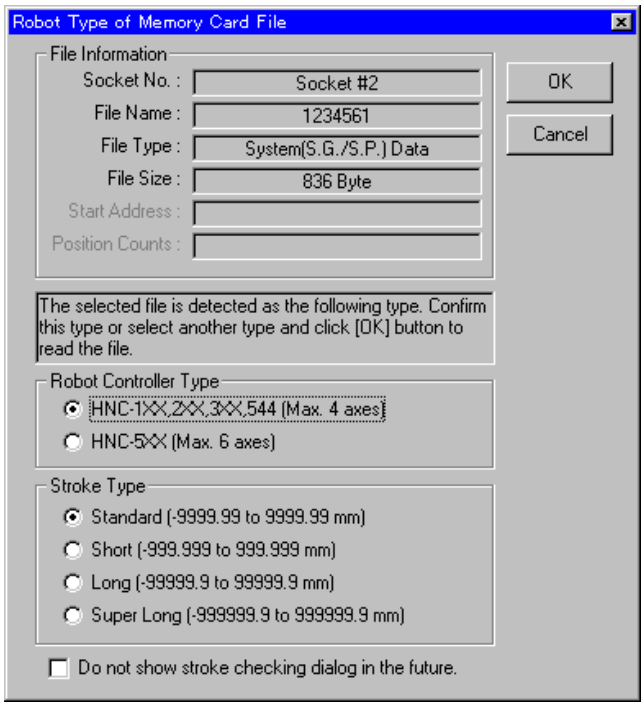
(1) Click the card icon in the task tray of Windows.

(2) After [Stop HNC SRAM Memory Card] menu is shown, click to select it.
(3) After [You may safely remove this device.] message is shown, click [OK] button.
(4) Remove the memory card from the card slot.

Robot Type Dialog

After selecting the file saved in the memory card, the following robot type dialog is shown.

The information of the specified file is shown in [File Information].
And the robot controller type decided by this information is shown.
You need not change the displayed controller type ordinarily.



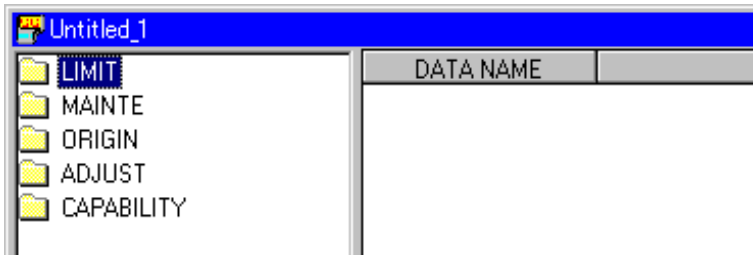
If [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu is selected to OFF, the stroke type checking message is shown. The initial displayed type is the stroke that has been selected in [Tool]-[Option]-[Stroke Setting] of the menu.
Select the stroke type for the file to open.
To select [Do not show stroke checking dialog in the future] check-box to ON, this dialog will be never shown when the opening or creating position file. And the default stroke type set in [Tool]-[Option]-[Stroke Setting] will be applied automatically.
If you want to show this dialog again, select [Without stroke checking dialog when file opened] check-box in [Tool]-[Option]-[Stroke Setting] of the menu to OFF.

See "Stroke Type Setting" about other explanation.

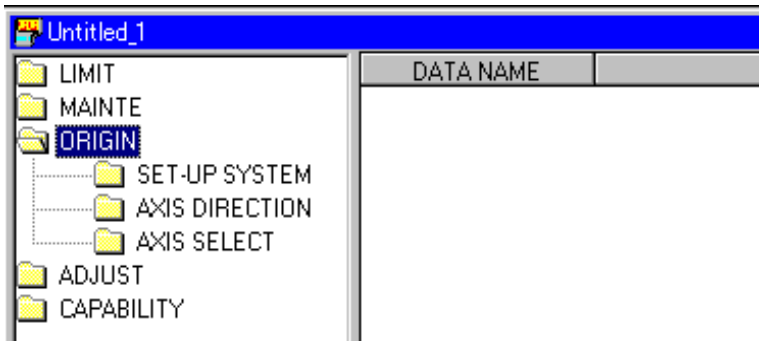
Note) In case of Servo Parameter Editor or Expanded Parameter Editor, HR Editor does not refer to the stroke type although you can set the stroke type.

15.8. Show and Select Group of Robot Settings Data

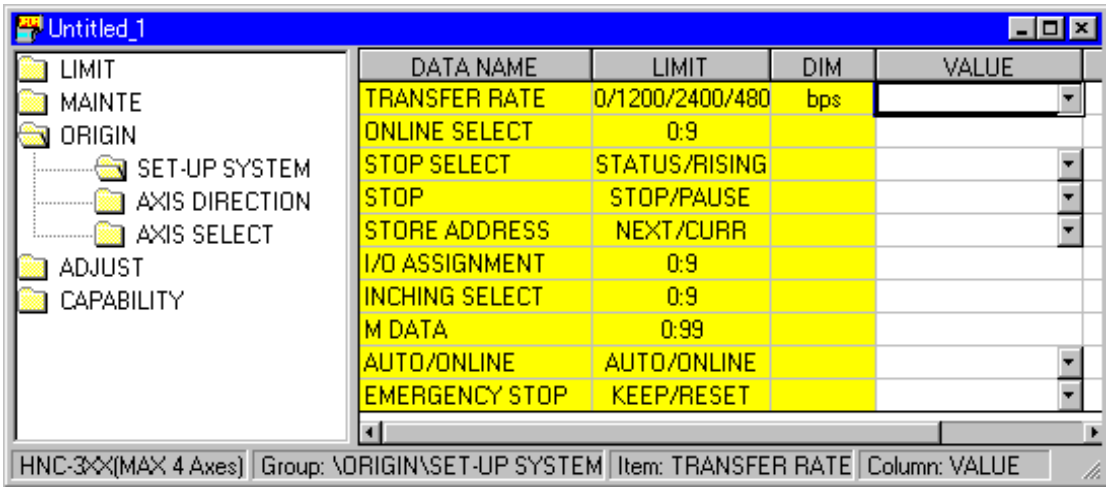
The tree view of robot settings data groups is shown at the left side of the editing window. robot settings data groups have two levels. After the robot settings editing window shown, only first level is shown as nodes in the tree view.



When a first level node is expanded, the icon of a first level node is shown as , but when it is not expanded, it is shown as . If is double-clicked, the first level node is expanded and the second level nodes is shown.



If is double-clicked, the second level is closed.
The second level node is clicked, the data list of the selected group is shown in the right side of the editing window.



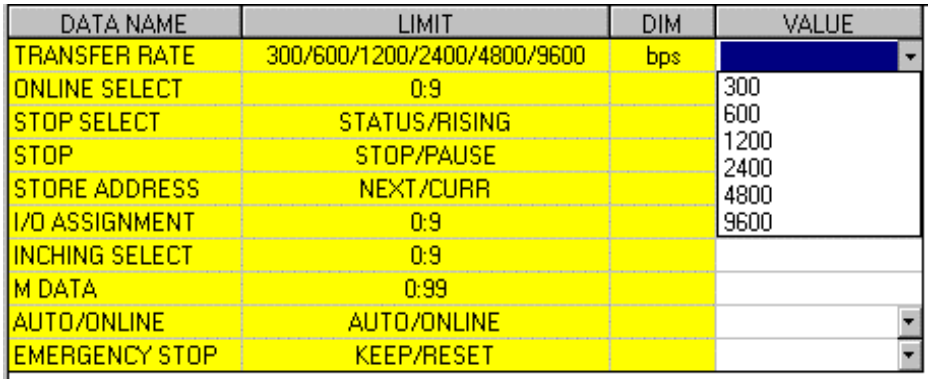
When the second level node is double-clicked, you can input the data in the data list. See “Input Robot Settings Data” about data input.

15.9. Input Robot Settings Data

You can input robot settings data in the data list at the right side of the robot settings editing window.
Select a cell for data input and input data to the cell. In case there is the range definition of the value, you must input a value within the range.
Key functions are as follows.

Key	Function
Cursor Up or RETURN	Activate a upper cell.
Cursor Down	Activate a lower cell.
ESC	Undo the value of an active cell.
BS	Delete a character before cursor.
DEL	Delete a character after cursor.

In case of some kind of data, you must select an item in the list. Click the combo box to show the list and click an item of the list to select the data.

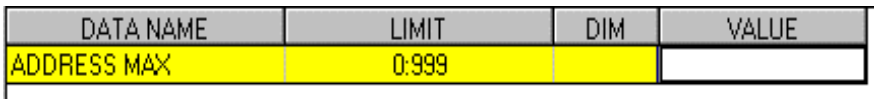


Input Comment

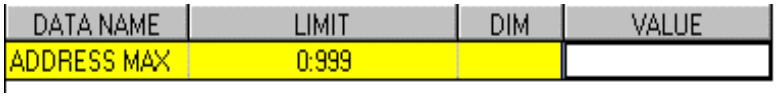
You can to input any string to the cell of the comment column.
You can enter 50 characters maximum for the comment.

Change Width of Column

You can change the width of a column to drag the bar between columns.



For example, dragging the bar between ‘DATANAME’ and ‘LIMIT’ to left.



15.10. Undo, Redo Operation to Edit Robot Settings Data

When editing the robot settings data, the following operation can be stored as a cell operation up to 64 times maximum.

• Input to the cell from the keyboard
• Cut the data
• Paste the data

You can undo these operations to click [Undo] in the [Edit] menu and the data is restored to the values before the operation.
After undoing the operation, if you want to execute the operation again, click [Redo] in the [Edit] menu.
When the number of operations is over 64 times as a cell operation, the oldest operation is deleted and the newest operation is stored.

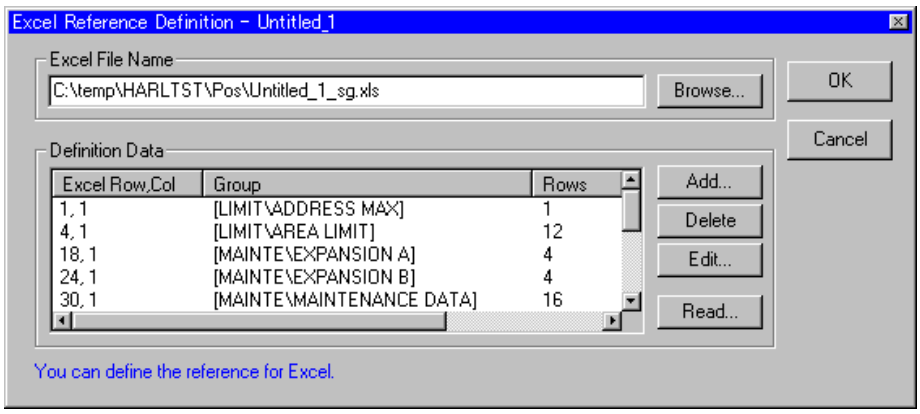
15.11. Excel Reference Definition

You can operate the following function to select [Tool]-[Excel Reference] in the menu for the current active window of the position data.
Note) Active window means that the window has the focus among the opened windows.

- Define Excel reference
- Read from Excel worksheet according to Excel reference definition
- Write to Excel worksheet according to Excel reference definition

These functions cannot be available on the computer in which Excel has not been installed.

You can define the relation between Excel worksheet and the cells of the editor.
Select [Tool]-[Excel Reference]-[Excel Reference Definition] to show the following dialog.



In case that you have never set the Excel reference definition for the current active position data, the default definition is shown automatically.

Excel File Name

Specify the file name of Excel worksheet to read or write to [Excel File Name] text box.
The following file name for each data type is automatically selected as default.

Data Type	Default Worksheet File Name
S.G. data	S.G. data file name_sg.xls
S.P. data	S.P. data file name_sp.xls
Configuration	Configuration file name_cfg.xls
Servo parameter	Servo parameter or memory data file name_svo.xls
Expanded parameter	Expanded parameter file name_epr.xls

Definition Data

You can see the list of Excel reference definition records in [Definition Data]. The following records are already set as default.

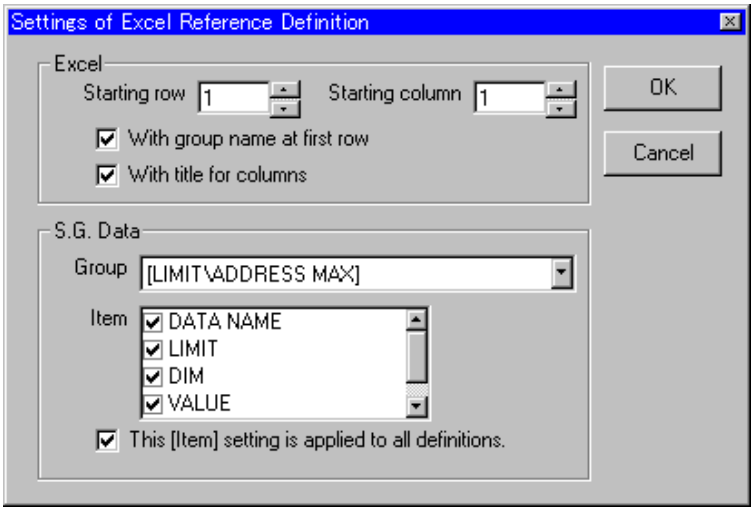
- One Excel row is related to one item of robot settings data.
- One row for the data group name is added to the head of data group rows of Excel.
- One row for the item title (such as “Data Name”, “Limit” or “Dim”) is added after the next row of data group name.

Delete Definition Data Record

After you have selected the definition record to click the [Excel Row,Col] of the record, you can delete the record to click [Delete] button.
If you want to cancel deleting, click [Cancel] button to exit without saving.

Edit Definition Data Record

After you have selected the definition record to click the [Excel Row,Col] of the record, you can edit the record to click [Edit] button.
Then, the following dialog is shown.



• Excel
You can specify the starting row number of Excel worksheet to [Starting row]. You must specify the value more than 1.
You can specify the starting column number of Excel worksheet to [Starting column]. You must specify the value more than 1.
To select [With group name at first row] check-box to ON, the data group name such as “[LIMIT¥ADDRESS MAX]” is added to the first of the group rows.
To select [With title for columns] check-box to ON, the column title such as “Data Name”, “Limit” is added to the next of the group name row.

• Each Data
Select the data group in [Group] list-box that you want to relate to a row and a column specified at [Excel].
The Excel columns with the starting column number specified by [Starting column] are related sequentially to the items only selected in [Item].
The Excel rows are related sequentially to the items of the data group specified in [Group] from the row with the number specified in [Starting row] or from [Starting row] + max. 2 rows (one row added by selecting [With group name at first row] or [With title for columns] to ON).

• This [Item] setting is applied to all definitions
When you have selected [This [Item] setting is applied to all definition] check-box to ON, this selection of items will be applied to all definition records.

Click [OK] button to renew the definition record.

Add Definition Data Record

After you have selected the definition record to click the [Excel Row,Col] of the record, you can add the record to click [Add] button.
Then the editing dialog is shown as the same as described in "**Edit Definition Data Record**".
See "**Edit Definition Data Record**" about setting of the definition record.

Read Definition Data

You can read the Excel reference definition of other robot settings data to click [Read] button. After reading other definition, the current definition will be overwritten.

Save Definition Data

The definition data is renewed to click [OK] button in the Excel reference definition dialog.
Click [Cancel] button to exit without renewal of the current definition.
Saving the definition data to the file is executed at the same time when the robot settings data is saved to the file.
The file that saves the Excel reference definition data is the comment information file.
See "Save Robot Settings Data" about the comment information file.

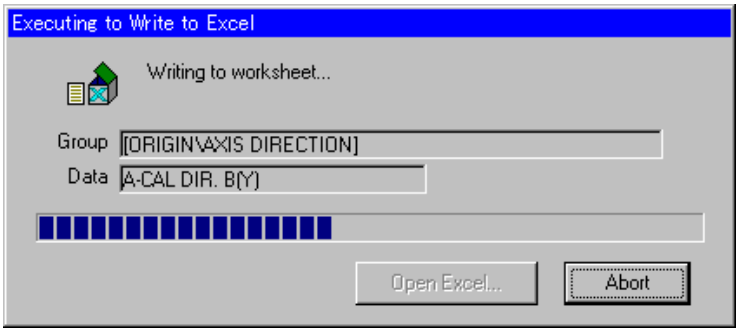
15.12. Read from or Write to Excel Worksheet

You can write the active robot settings data to Excel worksheet according to the Excel reference definition to select [Tool]-[Excel reference]-[Write to Excel] in the menu.
Also you can read the robot settings data from Excel worksheet according to the Excel reference definition to select [Tool]-[Excel reference]-[Read from Excel] in the menu.
These functions cannot be available on the computer in which Excel has not been installed.

After selecting [Tool]-[Excel reference]-[Write to Excel] in the menu, the Excel reference definition dialog is shown. Click [OK] button to activate Excel and write the robot settings data to Excel worksheet according to the current displayed Excel reference definition.
You can modify the Excel reference definition in this dialog.
See "Excel Reference Definition" about editing the Excel reference definition.

The operation of reading from Excel is as the same as writing.

After starting to read or write, the following progress dialog is shown.



Click [Abort] button to stop reading or writing.

When reading or writing is completed, Excel shows the dialog that asks to save the worksheet. Select action in the dialog. Then [Open Excel] button is enabled, you can open the Excel worksheet to click [Open Excel] button in the progress dialog.

15.13. Check Configuration

Configuration Editor can check the propriety of the configuration data.
Select [Tools]-[Check Configuration] in the menu to check the propriety of the current active configuration data.
If the checking result falls under one of the following conditions, HR Editor decides that the configuration data is invalid.

1. Null data (there is a vacant item.)
2. Motor configuration checking
   (1) Revolution number of a used motor is less than zero.
   (2) Pulse number of a used motor is less than zero.
   (3) Lead length of a used motor is less than zero.
   (4) Motor code of a used motor is less than zero.
3. Robot configuration checking
   (1) Max. position of a used robot is zero.
   (2) Max. position of a used robot is over 4000.
   (3) Max. position of a used robot is not multiple of 1000.
   (4) Motor number of a used robot is more than 16.
   (5) A motor of a used robot is already used in other axis.
   (6) A motor of a used robot is already used in other robot.
   (7) A motor of a used robot is not registered in motor configuration.
   (8) Acceleration value of a used robot is zero.
   (9) Motor is not assigned at all for a used robot.
   (10) Sum of max. position is over 8000.

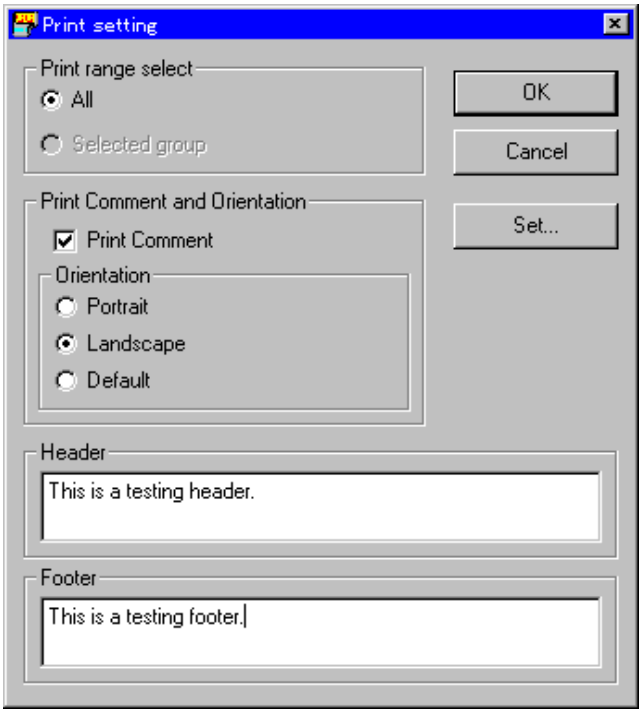
If the error is detected, the message that includes data group name, data item name and explanation is shown as follows.

Configuration Editor checks the propriety automatically when the data saving.
In case that the error is detected, the data cannot be saved showing the message.
This is the same when you terminate Configuration Editor after you have changed the data.

15.14. Print Robot Settings Data

You can print all groups or a currently selected group of robot settings data.

1. Click [File]-[Print]. Then the printing dialog box is shown.



2. To print all groups, click [All] radio button. To print a currently selected group, click [Selected group] radio button.

3. You can select whether the comments for the robot settings data will be printed or not by checking [Print Comment]. If the comments printed, the printing orientation is selected to Landscape as default. If the comments not printed, the printing orientation is selected to Portrait as default. You can change the orientation to click the option button.

4. You can print comment at the upper area (header) or the lower area (footer) of a page to input comment to [Header] or [Footer] box. Multiple line comment is possible to input a return. This comment is printed in all pages. The header and footer will be saved to the file. (See "Save Robot Settings Data".) In the case that you have never edit the robot settings data, after you enter the header or footer, the confirming message of saving the file will be shown when the editing window is terminated.

5. Click [OK] button to start printing. Click [Cancel] button to exit this dialog box.

Also you can print by clicking  button in the tool bar.

Note) When printing robot settings data, Robot Settings Data Editor uses the current settings of printer. To change the settings of printer, click [File]-[Printer Setting] or click [Set] button in the printing dialog box before execution of printing.

15.15. Save Robot Settings Data

Save to Overwrite

Click [File]-[Save]. Then the edited robot settings data is saved to overwrite.

Also you can save to overwrite by clicking  button in the tool bar.

The overwritten file is saved to the backup file.

Note) In case of robot settings data created newly, the file name setting dialog box is shown. Enter a file name and click [Save] button.

Save as Another Name

1. Click [File]-[Save As]. Then the file name setting dialog box is shown.

2. Enter a saved file name and click [Save] button. Then the edited robot settings data is written to the specified file.

If the same name file exists, this file is saved to the backup file.

Created Files

The files that are created when saving the data are the robot settings data file, the comment information file and the backup file. These files are created at the robot data directory that is specified in [Set Up]-[Project Settings]-[Directory] of Main Menu.
The file names are as follows.

• S.G. data

S.G. data file	Specified-Name.sg
Comment information file	Specified-Name.sgx
Backup file	Original-Name_bak.sg

• S.P. data

S.P. data file	Specified-Name.sp
Comment information file	Specified-Name.spx
Backup file	Original-Name_bak.sp

• Configuration

Configuration file	Specified-Name.cfg
Comment information file	Specified-Name.cfx
Backup file	Original-Name_bak.cfg

• Servo parameter

Servo parameter file	Specified-Name.svo
Comment information file	Specified-Name.svx
Backup file	Original-Name_bak.svo

• HNC-1XX,2XX,3XX,544 memory data

Servo parameter file	Specified-Name.mem
Comment information file	Specified-Name.mex
Backup file	Original-Name_bak.mem

• Expanded parameter

Expanded parameter file	Specified-Name.epr
Comment information file	Specified-Name.epx
Backup file	Original-Name_bak.epr

Automatic Configuration Checking

In case of Configuration Editor, the propriety of current configuration data is checked automatically before saving the data.

15.16. Save Robot Settings Data to Memory Card

You can save the current opened robot settings data to the robot memory card.
There are two saving operation as “Save (to overwrite)” and “Save As (another name)”.

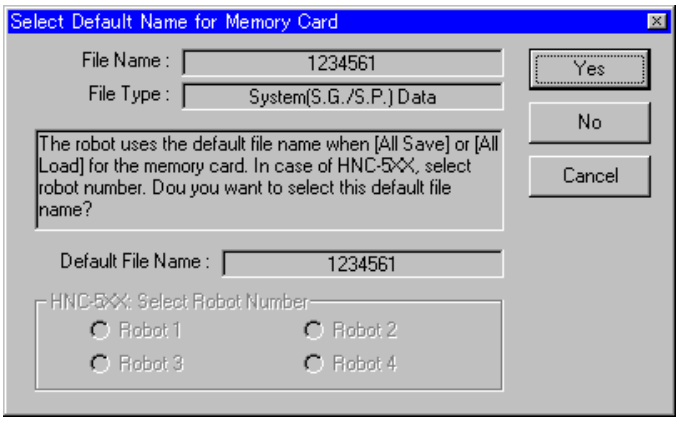
Save to Overwrite

Select [File]-[Memory Card]-[Save] in the menu.
If you have opened the file saved in the computer, you cannot select this menu.
After the confirmation dialog to overwrite is shown, select [Yes] or [No].
In case of [Yes] selected, the current opened data overwrites the memory card file.

Save as Another Name

Select [File]-[Memory Card]-[Save As] in the menu.

1. The dialog for the default name of the memory card file is shown.

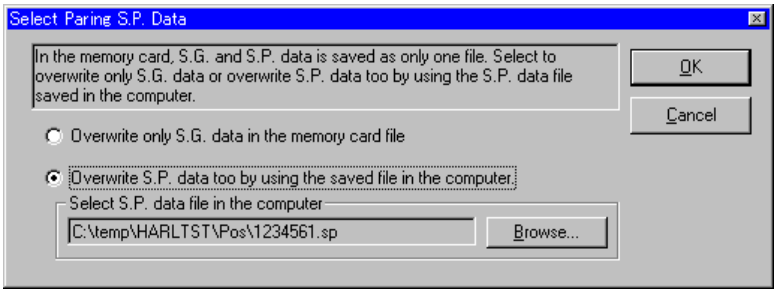


The default file name is used when the robot controller executes “ALL SAVE” or “ALL LOAD” for the memory card.
In case of HNC-5XX type controller, the different default file name is used according to the robot number. In this case, you must select the robot number of the target.
Click [Yes] button to show the saving dialog with this default file name.
Click [No] button to show the saving dialog with the vacant file name.

2. The saving dialog is shown.
Enter or confirm the file name, and then click [Save] button to save the current opened data to the memory card as the specified file.
Only seven numeral characters are allowed as the saving file name.

Pairing Data When Saving S.G./S.P. Data

S.G. data and S.P. data is managed as one file in the memory card.
Therefore, you need to specify the pairing data when you want to save S.G. data or S.P. data to the memory card.
Before the execution of saving S.G. data or S.P. data, the following dialog is shown.



In case of overwriting the file in the memory card, [Overwrite only S.G./S.P. data in the memory card] option is enabled. In case that the specified file is absent in the memory card, [Overwrite only S.G./S.P. data in the memory card] option is disabled and you cannot select it.

- Overwrite only S.G./S.P. data in the memory card
  Only S.G. data or S.P. data currently opened is saved to the memory card file. The pairing data in the memory card file is not overwritten.

- Overwrite S.G./S.P. data too by using the saved file in the computer
  After reading the pairing data file saved in the computer, the current opened data and the pairing data is save to the memory card file. If the file extension or the controller type described in the file is invalid, the error message is shown and you cannot save data.

Therefore, it is necessary that the pairing file must exists in the computer when you want to save data as the file name that is absent in the memory card.

15.17. Close Editing of Robot Settings Data

Click [File]-[Close]. Then the robot settings data editing window is closed.

Note) In case you have not saved the edited robot settings data in the editing window yet, the confirming window to save or not is shown. And in case you have not yet save the data opened from the memory card to the file in the computer though you have not edit at all, the same dialog is shown.

15.18. Exit Editing of Robot Settings Data

Click [File]-[Exit]. Then the main window of Robot Settings Editor is terminated.

Note) In case you have not saved the edited robot settings data in the editing window yet, the confirming window to save or not is shown. And in case you have not yet save the data opened from the memory card to the file in the computer though you have not edit at all, the same dialog is shown.

15.19. Error Messages of Robot Settings Data Editor

Definition File Error Messages

Error Message	Explanation and Action
Cannot open data definition file. [File Name]	The data definition file cannot be opened. Check the attribution of the file in the property. When the other process has already opened the file, terminate the process. In case of the data definition file not found, this error occurs.
Description in data definition file is illegal. [File Name]	Description in the data definition file is illegal. See "Definition File for Robot Settings Data" and correct description.

Data File Error Messages

Error Message	Explanation and Action
Cannot open file. [File Name]	The file cannot be opened. Check the attribution of the file in the property. When the other process has already opened the file, terminate the process.
Controller type invalid. [File Name]	First line in the data file is invalid controller type.
Group name is undefined. [Group Name]	A group name undefined in the data definition file is found in the data file.
File data is illegal. [Group Name, Data Value]	There is an inconsistency between the data file and the data definition file. The probable causes are as follows. • Data type is different. • Data length is different. • Data range is different.
Data is Null. [Group Name, Data Name]	If there is a vacant data, the file cannot be saved. Input data and retry saving.
Cannot save file. [File Name]	The file cannot be saved. It may be caused by disk space exhausted. Delete useless files or change the save drive and retry saving.

Configuration Checking Error Messages

Error Message	Explanation and Action
Data is null.	A data item is vacant. Enter some value to the item.
Specified value is invalid.	Specified value is less than zero. Enter the value over zero.
Specified position max. is invalid.	Specified max. position in robot configuration is less than zero. Enter the value over zero.
Specified position max. is not multiple of 1000.	Enter max. position in robot configuration by multiple of 1000 such as 1000, 2000 …
Specified position max. is out of range.	Max. position in robot configuration is over 4000. Enter the value less than 4000.
Specified motor no. is out of range.	Enter the value from 1 to 16 to the motor number in robot configuration.
Specified motor no. is used for other axis.	The motor number specified in robot configuration is used for the other axis in the same robot. Enter another motor number.
Specified motor no. is used in other robot.	The motor number specified in robot configuration is used for the other robot. Enter another motor number.
Specified motor no. is not registered in motor configuration.	Register the specified motor to motor configuration.
Accel/decel value is not specified.	Acceleration and deceleration value is zero. Enter the value over zero.
Motor is not assigned at all for robot.	Motor is not assigned at all in robot configuration. Assign a motor at least to a axis in robot configuration.
Sum of position max. is overflow.	Enter max. position value as the sum of all used robot positions is less than 8000.

15.20. Definition File for Robot Settings Data

What Is Definition File?

Structure and attributes of Robot Settings Data (S.G. Data, S.P. Data, configuration, servo parameter and expanded parameter) have variety according to the type of the robot controller. Robot Settings Data Editor uses the data definition file that defines the structure of data and the attributions of data item. By means of this file, Robot Settings Data Editor can treat the various type of the robot controller. So, if you want to treat Robot Settings Data of a robot controller, a data definition file corresponded to the robot controller must be existing.

Definition File Name

A data definition file must exist at the directory where HR Editor system has installed.
After HR Editor installed, there are following files at the installed directory.

Definition file for System Generation(S.G.) Data --- “xxxx.dag”
- a) HNC-1XX,2XX,3XX,544 (max. 4 axes) ---- “variable.dag”
- b) HNC-5XX (max. 6 axes): Standard, With URL ---- “vari_6.dag”
- c) HNC-5XX (max. 6 axes): For semiconductor ---- “vari_6_semicon.dag”

Definition file for System Parameter (S.P.) Data --- “xxxx.dap”
- a) HNC-1XX,2XX,3XX,544 (max. 4 axes) ---- “variable.dap”
- b) HNC-5XX (max. 6 axes) ---- “vari_6.dap”

Definition file for Configuration --- “xxxx.dac”
- a) HNC-5XX (max. 6 axes) ---- “vari_6.dac”

Definition file for Servo Parameter --- “xxxx.das”
- a) HNC-5XX (max. 6 axes) ---- “vari_6.das”

Definition file for HNC-1XX,2XX,3XX,544 Memory Data --- “xxxx.dam”
- a) A-CAL DISTANCE ---- “variable_1.dam”
- b) A-CAL DISTANCE + EPI ---- “variable_2.dam”
- c) A-CAL DISTANCE + Servo Parameter ---- “variable_3.dam”
- d) A-CAL DISTANCE + EPI + Servo Parameter ---- “variable_4.dam”

Definition file for Expanded Parameter --- “xxxx.dae”
- a) HNC-5XX (max. 6 axes) ---- “vari_6.dae”

Structure of Definition File

Group Name
Data
.
.
.
Group Name
Data
.
.
.

Format

1. Group Name

Group Name is described as the path of two levels. Level name is separated by a back slash (¥). Group Name is put in brackets ([ ]).
Example) [ORIGIN¥SET-UP SYSTEM]

2. Data

Data is described by the following format.

Relative Memory Address, Data Name, Data Type, Unit, Range or Selection [@FIX]

Example) Short=0,"ADDRESS MAX",3I,,0:999
Long=0,"UPPER A",7F3|6F3|7F2|8F2,"mm"
Long=1,"LOWER A",7F3|6F3|7F2|8F2,"mm",0:
Short=91,"STOP SEL",S,,"STATUS"|"RISING"

< Relative Memory Address >

This parameter is only used in S.G. data or S.G. data definition. This parameter defines the relative memory address form the top of the S.G./S.P. data area in the robot memory. This definition is used when HR Editor access the memory card. A robot maintains S.G./S.P. data in the 4 bytes long word area and the 2 bytes short word area.

In case of long word data, specify the relative memory address of long word area as the following format.

Long=Relative Address (>=0)

In case of short word data, specify the relative memory address of short word area as the following format.

Short=Relative Address (>=0)

< Data Name >

Data Name is put in double quotations (“ ”). *Data Name* can be described by max. 18 characters. (Except double quotations) *Data Name* cannot be omitted.

< Data Type >

Data Types can be specified as integer, float or character type. Each of types has the following format.

In case of integer, *Data Type* is described as “nI”. “n” is the number of digits and max. 8 digits is allowed. “n” can be omitted. When “n” omitted, you can input -99999999 to 99999999 into the cell of a S.G./S.P. editing window. But if the range explained later is defined, this range is preferred.

Example) 1I, 3I

In case of float, *Data Type* is described as “nFm”. “n” is the number of full digits (except a sign and a decimal point) and max. 7 digits is allowed. “m” is the number of digits of decimal fraction and must not be over the number of full digits. “n” or “m” can be omitted. When “n”, ”m” are omitted, you can input -99999999.99 to 99999999.99 into the cell of a S.G./S.P. editing window. If the range explained later is defined, this range is preferred.

Example) 6F2, 4F1

In case of float, if the precision is different by stroke type, specify the definitions for each stroke type as the following format.

Standard|Short|Long|Super Long

Example) 7F3|6F3|7F2|8F2

Note) In case of HNC-5XX, if the definition is not for each stroke type, the decimal point of data value may be different form the actual value after reading from the memory card.

In case of character, *Data Type* is described as “S”.

Data Type cannot be omitted.

< Unit >

Unit is put in double quotations (“ ”). *Unit* can be described by max. 8 characters. (except double quotations) If the data does not have a unit, *Unit* can be omitted.

< Range or Selection >

Range or Selection is described to display and check the range of data or to select the values in the editing window. If the data does not have a range or strings to select, *Range* can be omitted.

In case of the range, *Range or Selection* is described as “Value1:Value2”. “Value1” is the minimum value of the data and “Value2” is the maximum value of the data. If the data has only one limit, “Value1” or “Value2” can be omitted. “Value1” or “Value2” is ordinarily numerical, but it can be described as string in order to only display the limit in the S.G./S.P. editing window without checking the range. (max. 8 characters)

Example) 0:100 'Range of 0 to 100
5: 'Range of more than 5
0: "Z STROKE" 'Range of more than 0 ("Z STROKE" is displayed only)

In case of the selection, *Range or Selection* is described as “Value1|Value2|....”. “Value” can be specified as many as needed. “Value” can be numerical or characters but cannot be omitted.

Example) 0|100 'Select 0 or 1
"HOLD"|"NOT HOLD" 'Select “HOLD” or “NOT HOLD”
"1200"|"2400"|"4800"|"9600" 'Select “1200”,”2400”,”4800” or “9600”

Note) For all robot types, in case of strings, the defined order of strings must be the sequence of the numerical values that the robot maintains in the software running in the controller. If the defined order of strings does not correspond to the sequence of the values, the different value will be send to the memory card or the robot.

< *@FIX* >

You can omit this command. It needs to put a space or a tab character in front of this command. This command forbids an editor application to change data. An editor application display the data cell with yellow color and you cannot enter this data.

3. Comment

Comments begin with the character “ ’ “ (single quotation).

4. Description for Example

Description of “variable.dag” file

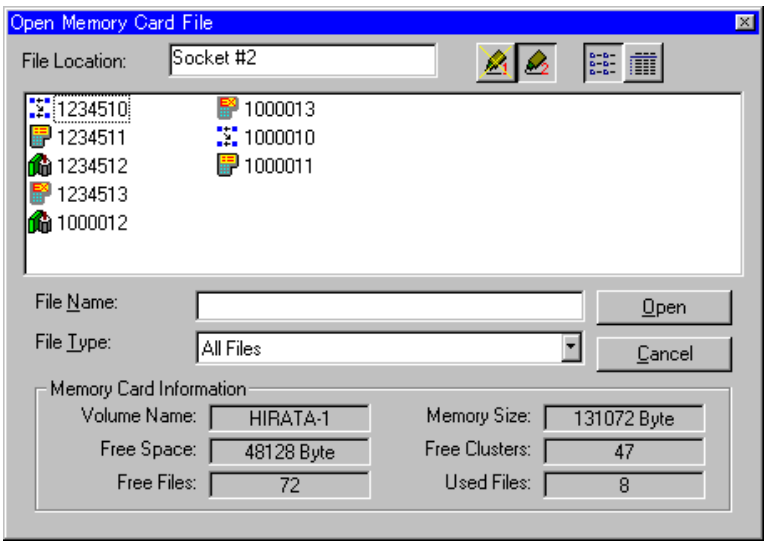
```
[LIMIT¥ADDRESS MAX]
        Short=0,"ADDRESS MAX",3I,,0:999

[LIMIT¥AREA LIMIT]
        Long=0,"UPPER LMT X(A)",7F3|6F3|7F2|8F2,"mm"
        Long=1,"LOWER LMT X(A)",7F3|6F3|7F2|8F2,"mm"
        …….

[MAINTE¥EXPANSION A]
        Long=8,"CPC GAIN Z",7I
        Long=9,"CPC GAIN W",7I
        …….

[MAINTE¥EXPANSION B]
        Long=12,"INITIAL W",6F3
        Long=13,"LENGTH W",6F3
        …….

[MAINTE¥MAINTENANCE DATA]
        Short=1,"CPC SELECT",3I
        Short=2,"CPC LOOP TIME",3I
        …….

[ORIGIN¥SET-UP SYSTEM]
        Short=5,"TRANSFER RATE",S,"bps","300"|"600"|"1200"|"2400"|"4800"|"9600"|"19200"|"38400"
        Short=6,"ONLINE SELECT",1I,,0:9
        …….

[ORIGIN¥AXIS DIRECTION]
        Long=81,"A-CAL SEQ.",6I
        Short=8,"A-CAL DIR. A(X)",S,,"PLUS"|"MINUS"
        …….

[ORIGIN¥AXIS SELECT]
        Short=87,"A(X) AXIS TYPE",S,,"NOT USED"|"USED"
        Short=88,"A(X) AXIS SEL",S,,"NOT HOLD"|"HOLD"
```

```
        …….

[ADJUST¥AR TYPE ADJUST]
        Long=16,"INITIAL A",7F3|6F3|7F2|8F2,"deg"
        Long=17,"INITIAL B1",7F3|6F3|7F2|8F2,"deg"
        …….

[ADJUST¥MB TYPE ADJUST]
        Long=18,"Y INITIAL",7F3|6F3|7F2|8F2,"deg"
        Short=23,"MB COMBINATION",1I,,0:3

[CAPABILITY¥ROBOT CAPABILITY]
        Long=82,"ENC. PULSE A",7I
        Long=83,"ENC. PULSE B",7I
        …….

[CAPABILITY¥EXPANSION A]
        Long=86,"EXPANSION 0",6I
        Long=87,"EXPANSION 1",6I
        …….
```

16. Memory Card Operation

16.1. Open File in Memory Card

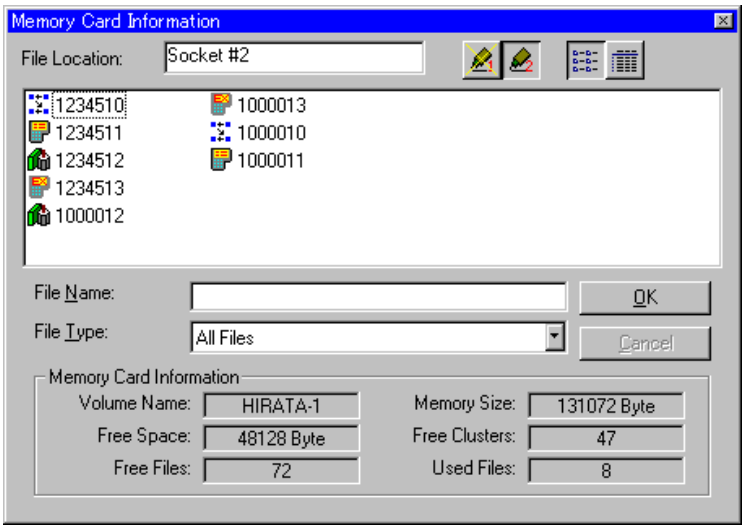
Select [Memory Card]-[Open File] in Main Menu.
The dialog window to select a memory card file is shown.
If the memory card is invalid or not inserted to the slot, the error message is shown.



Select and click an icon of a file, or select a file and click [Open] button.
Then an editor application related to the file type starts to open the selected file.

16.2. Memory Card Information

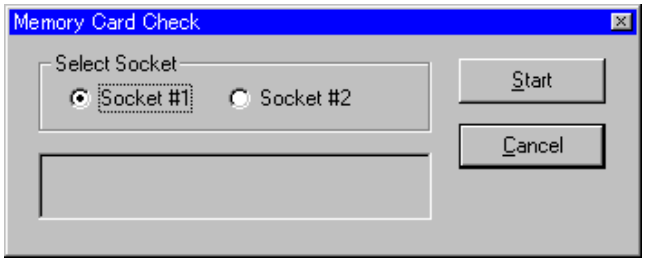
Select [Memory Card]-[Memory Card Information] in Main Menu.
Some information for the memory card is shown.



Click [Detail] button at the upper right in this dialog to show file size and file type in the file list.
You can see the management data of the memory card in [Memory Card Information].

16.3. Memory Card Check

Select [Memory Card]-[Memory Card Check] in Main Menu.
The following dialog window is shown.



Select a socket.
Normally, the lower socket is “Socket #1” and the upper socket is “Socket #2” in the computer that has two card slots.
Click [Start] button to start checking.
Click [Cancel] to terminate this dialog window.

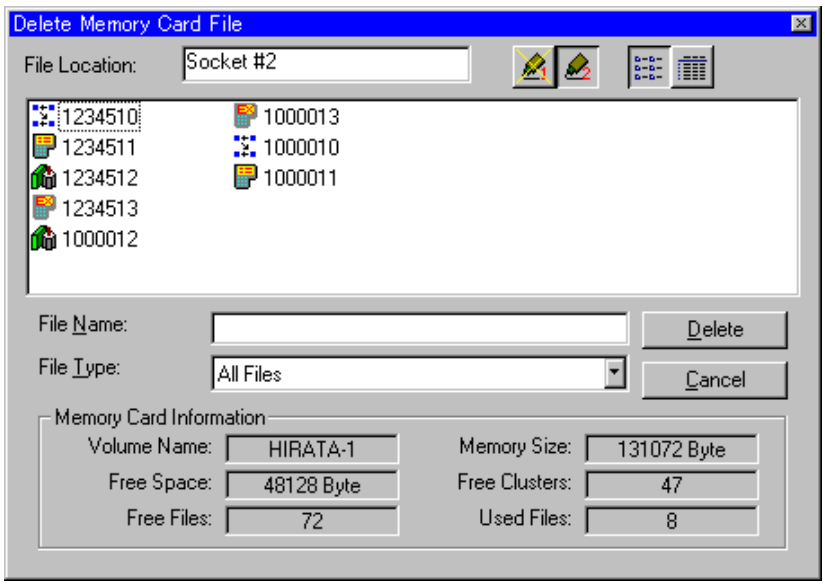
The validity of the memory card is checked as follows.

- Formatted or not.
- FAT testing.
- Check-sum testing.

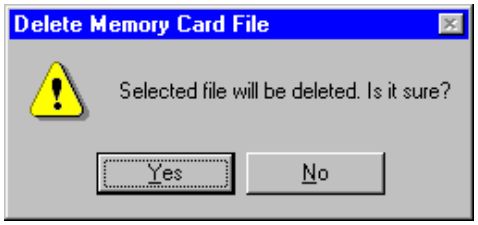
The checking result is shown after the execution of checking.
In case of the memory card valid, The message “Memory card OK.” will be show.

16.4. Delete File in Memory Card

Select [Memory Card]-[Delete File] in Main Menu.
The dialog window to select a memory card file is shown.
If the memory card is invalid or not inserted to the slot, the error message is shown.



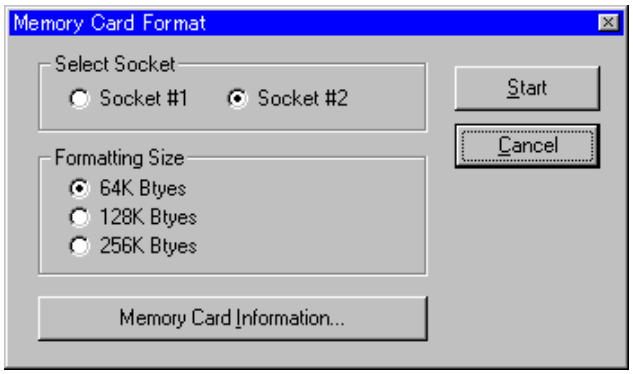
Click [Cancel] button to terminate this dialog window.
Select a file and double-click the icon of the file, or select a file and click [Delete] button.
Then the confirmation window will be shown as follows.



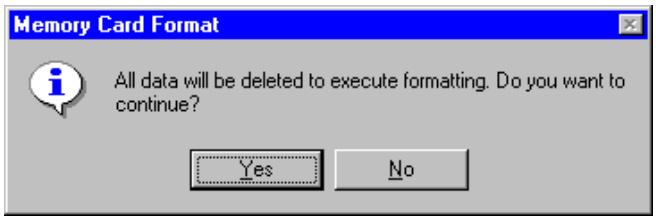
Click [Yes] button to execute deleting the file. Click [No] button to cancel deleting.
After the execution of deleting, the file list is renewed of the dialog window.

16.5. Memory Card Format

Select [Memory Card]-[Memory Card Format] in Main Menu.
The following dialog for memory card formatting is shown.

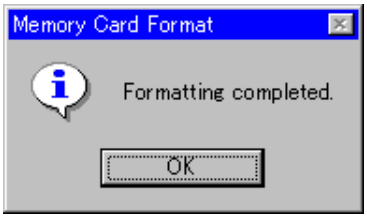


Click [Cancel] button to terminate this dialog window. Click [Memory Card Information] button to show the memory card information.
If the memory card is inserted to the card slot, the socket of this card is automatically selected.
Select formatting size.
You must select the formatting size less than the capacity of the memory card.
After [Start] button clicked, the following confirmation message will be shown.



Click [Yes] button to start formatting. Click [No] button to quit without deleting.
If you have specified the formatting size more than the capacity of the memory card, the following message is shown.

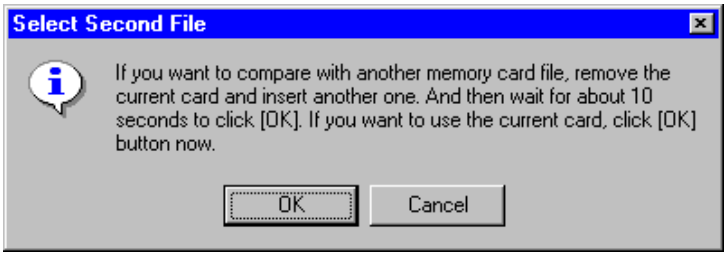
Specify the proper size and retry formatting.
When the formatting is correct, the following message is shown.



16.6. Binary Comparison of Memory Card Files

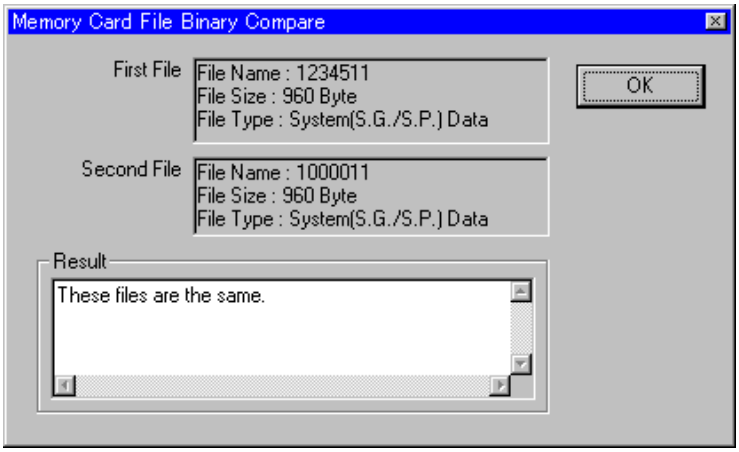
Select [Memory Card]-[Binary Compare] in Main Menu.
You can execute binary comparison of two files save in the memory card.
Binary comparison means to compare data of the files for each byte.

After the file-selecting dialog is shown, select the first file.
Then the following message is shown.



If you want to compare with another memory card, exchange the memory card and then wait for about 10 seconds. And click [OK] button.
If you want to use the current card, click [OK] button immediately.
After the file-selecting dialog is shown, select the second file to start comparison.
If the file types of two files are different, the error message is shown and the comparison cannot be executed. In this case, the second file selection dialog is automatically shown again to select the second file with proper types.

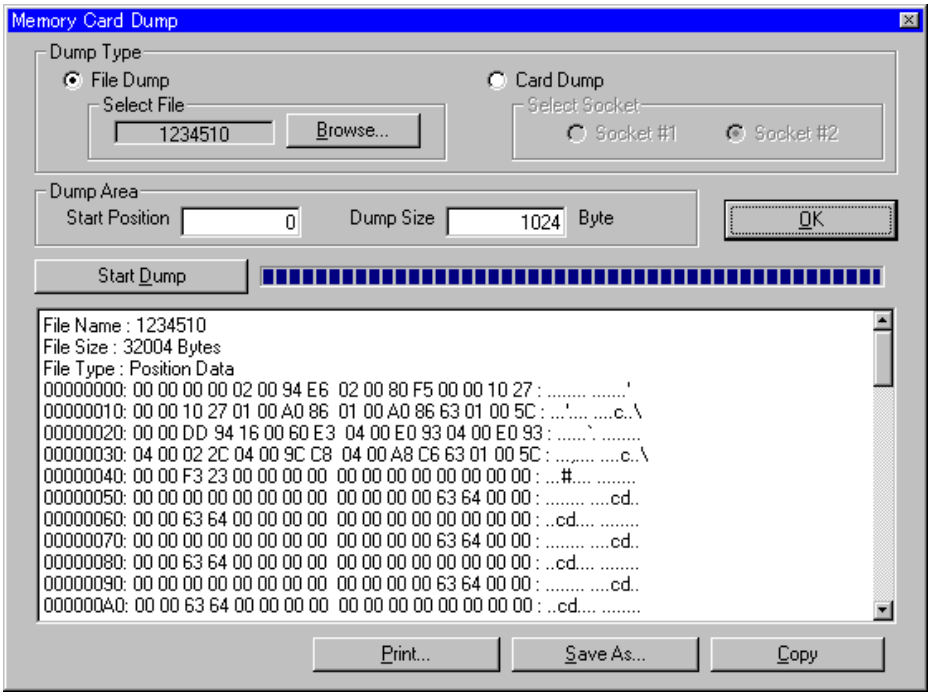
After comparison, the result dialog will be shown.



In case that the two files are different, Result shows the byte position and the hexadecimal dump of different data.

16.7. Dump of Memory Card

Select [Memory Card]-[Dump] in Main Menu.
The following dump dialog is shown.
Note) The following figure is the sample after the dump executed once.



You must select [Dump Type] whether data dump of a file or memory dump of the memory card.
In case of [File Dump], select a file in the memory card by [Browse] button.
You must set [Dump Area] that contains the start position (unit of byte) of dump area and the dump size. Zero (head position of dump area) has been set in the start position and 1024 bytes is set in the dump size as default.
Click [Start Dump] button to show the result of dump.
If you have set the start position value over the size of the file or the memory card, the error message is shown.
If the value of the start position + the dump size is over the size of the file or the memory card, the result shows the dump list of the size limit.
During the dump execution,

- you can see the dump progress by the progress bar.
- after dump started, [OK] or [Cancel] button is changed to [Abort] button. You can stop the dump execution to click [Abort] button. The result shows the dump list till the dump aborted.
- you cannot click [Print], [Save As] and [Copy] button.

The dump result shows 16 bytes data by one text line. A text line contains the following items.

- Address described by eight-digit hexadecimal expression.
- 16 bytes binary data by two-digit hexadecimal expression for each byte.
- 16 bytes ASCII characters are converted from binary data. Binary data that cannot be represented by ASCII characters are shown as periods.

Note) Word length data of two bytes is shown as the upper and the lower byte is reversed.

After the dump execution, you can

- copy the dump result to clipboard by [Copy] button.
- save the dump result as a text file by [Save As] button.
- print the dump result by [Print] button.

17. Fieldbus Network

17.1. Overview of Fieldbus Network

You can use fieldbus network in case that the STP version is 5.40 or later.
The following type of fieldbus is available for the network.

- InterBus
- PROFIBUS

HrBasic program can communicate with other STP or equipment in the network.

STP board has Communication Module board named as COM made by Hilscher in Germany. STP supports the following types of COM board.

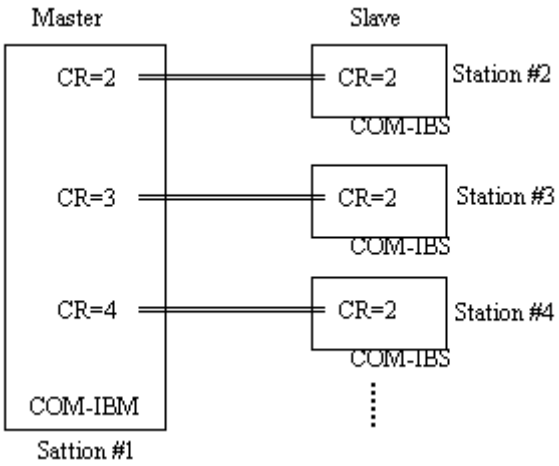
InterBus	COM-IBM: InterBus master COM-IBS: InterBus slave
PROFIBUS	COM-FMS: PROFIBUS FMS master COM-PB: PROFIBUS FMS/DP master

Communication Reference (CR) Number

Under the specification of InterBus or PROFIBUS, communication reference number manages a logical relation for the communication. In the following explanation, “CR” represents communication reference.
In a station, a CR number is assigned to a connection with another station.
When data communication, CR number must be specified as the destination to communicate.
The same CR number cannot be assigned to the different destinations for communication.

Network Topology for InterBus

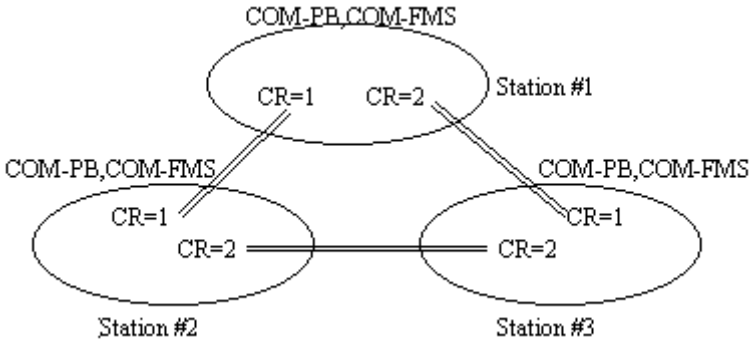
The following figure shows the logical network topology for InterBus.
Note) This topology is different from the electrical connection of the network, because it is the logical connection software recognizes.



- A master is needed in the network.
- A slave must be connected to the master. The communication between slaves is not available.
- There cannot be more than two masters in the network.
- The range of CR number is 2 through 64.
- A slave can use only one CR number 2.

Network Topology for PROFIBUS

The following figure shows the logical network topology for PROFIBUS.
Note) This topology is different from the electrical connection of the network, because it is the logical connection software recognizes.



• A station that can communicate with each other is only master. A slave cannot communicate
• The range of CR number is 1 through 32.

Network Definition of HrBasic

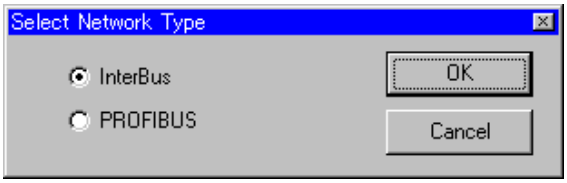
In HrBasic, a station number manages stations.
HrBasic program can communicate using a station number instead of a CR number.
For this reason, a table that describes the relationship between a CR number and a station number is needed in each STP.
A user can define this relationship as network definition by HBDE.

Network Definition File of HBDE

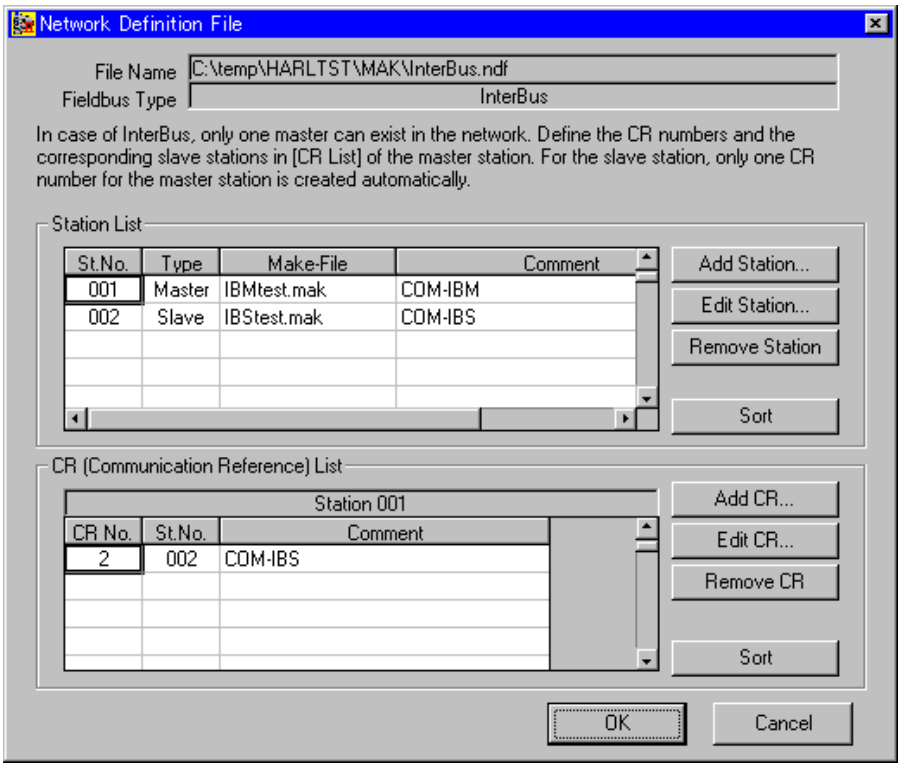
In case that a HrBasic program uses the function for fieldbus network, a network definition file must be created by HBDE.
You can create and edit the network definition file to select [File]-[Network Definition] in Main Menu. The created network definition file will be saved to the make-file directory specified in [Setup]-[Project Settings]-[Directory] of Main Menu.
You must define all stations in the network to the only one definition file.
And you can relate the created network definition file to the make-file to specify the name of the network definition file in the make-file editor.
This relationship causes that the network definition is automatically downloaded when you download the HrBasic program.

17.2. Network Definition File

To click [File]-[Network Definition] in Main Menu, the dialog [Open network definition file] is shown.
The default directory displayed here is the directory which you have set for make file in [Set-up]-[Project Settings]-[Directory] in Main Menu.
You can open the network definition file to select the existing file.
If you specify a file name that does not exist, a new file opened as the network definition file.
When a new file opened, select the type of fieldbus after the following dialog is shown.



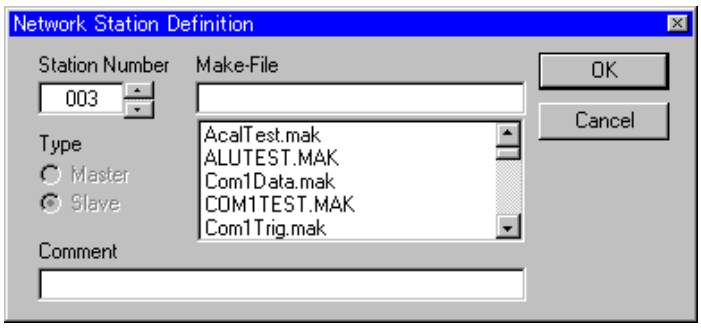
After specifying an existing file name or a new file name, the following editing window according to the fieldbus type.



Outline of how to define is described below.
(1) Define all STP in the network to “Station List”.
(2) For each STP station, define the CR number and the station number that the station will communicate with.

Definition of Station List

If you want to add a new station to the station list, click [Add Station] button.
To edit the already defined station, click [Edit Station] button after selecting the station in the station list.
After this operation, the following window to define the station will be shown.



[Station Number]

In case of addition, an undefined number is displayed automatically.

In case of editing, the defined station number is displayed, but you cannot edit it. If you want to change the station number, remove the station and add a new station.

The number 0 to 999 is available as the station number.

[Make-File]

In the list, select a make file which registers the programs to download for the selected station.

[Type]

Select master or slave as the station type.

In case of InterBus, if the master station has already defined, slave is selected compulsively.

In case of PROFIBUS, master is selected compulsively.

[Comment]

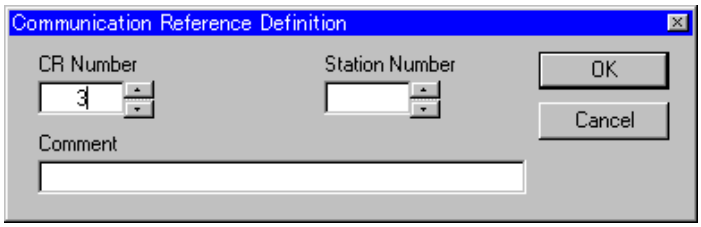
You may attach comment for the selected station. There is no limit for the number of characters. You may leave here as blank.

After [OK] button clicked, an error message will be shown in the following condition.
Correct the setting.

- Blank as station number
- Blank as make file
- Make file name contains more than 8 characters except the file extension.
- The extension of make file is not ".mak".
- Specified make file does not exist in PC.

Definition of CR List

When you select the station in the station list, CR list for the station is shown in [CR List].
Click [Add CR] button to add a new CR number.
To edit the already defined CR, click [Edit CR] button after selecting the CR in the CR list.
After this operation, the following window to define the CR will be shown.



[CR Number]

In case of addition, an undefined number is displayed automatically.

In case of editing, the defined CR number is displayed, but you cannot edit it. If you want to change the CR number, remove the CR and add a new CR.

The number 2 to 63 is available for InterBus.

The number 1 to 32 is available for PROFIBUS.

[Station Number]
Enter the station number that the current selected station will communicate with.

[Comment]
You may attach comment for the CR. There is no limit for the number of characters. You may leave here as blank.

After [OK] button clicked, an error message will be shown in the following condition.
Correct the setting.
- Blank as CR number
- Blank as station number
- CR number is out of range.
- Station number for communication is the number of itself.

Termination of Network Definition

After [OK] button in the network definition window, consistency of the definition will be checked.
The following case raises an error to display the message.

[Station List]
- There is no master station.
- Multiple definition of make files.
- Multiple definition of station numbers.
- Specified make file does not exists in PC.

[CR List]
- Station number for communication is the number of itself.
- Multiple definition of station numbers.
- Specified station is not found in the station list.
- The CR definition for a reverse direction is not found in the CR list of the specified station.

If the error occurs, correct the definition.

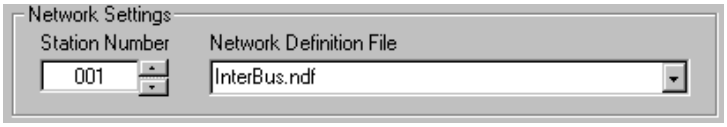
If the definition is valid, the dialog to save to the file will be shown.
The extension of the network definition file is ".ndf".
Enter the file name and save it.

17.3. Make File and Network Definition

After the creation of the network definition file, to use the fieldbus function by HrBasic program running in STP needs that the network definition has been downloaded to STP.
For HBDE, you can download the network definition automatically when program downloaded to register the network definition file to the make file.

Registration of Network Definition to Make File

Open the make file editing window to select [File]-[Make] in Main Menu.
You can see [Network Settings] in the lower part of the window.



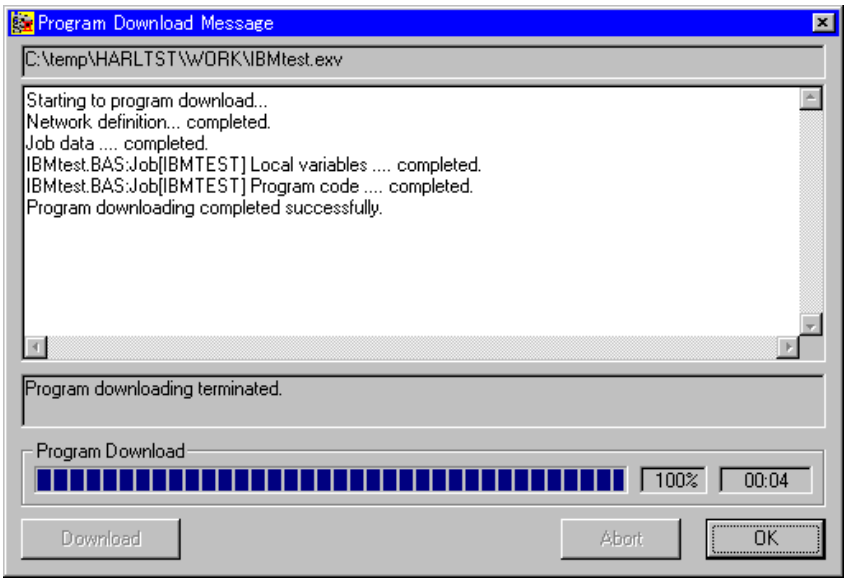
[Station Number]
Enter station number to set for STP.
When downloading programs, the specified station number will be written to STP.

[Network Definition File]
Specify the network definition file to download.
You may select it in the file list.

If you set blank to [Station Number] and [Network Definition File], downloading of the network definition will not be executed when program downloaded.
If you specify the network definition file, you must specify the station number.
If you specify the station number with blank for the network definition file, only writing the station number will be executed when program downloaded.

Downloading Network Definition when Program Downloaded

If the network definition file has been registered to the make file, the network definition is downloaded when HrBasic program is downloaded.
If the registration of the network file in the make file has been blank, downloading the network definition is not executed. But in this case, if STP version is 5.40 or later, the network definition contained in STP is cleared.
Downloading the network definition will be executed before downloading the program.
In the program download window, the message will be shown as follows.



After the message “Network definition... completed” is displayed, the following registration in the make file
• Writing the station number
• Downloading the network definition
are completed successfully.
In STP, the network definition downloaded is contained in the battery backup memory.

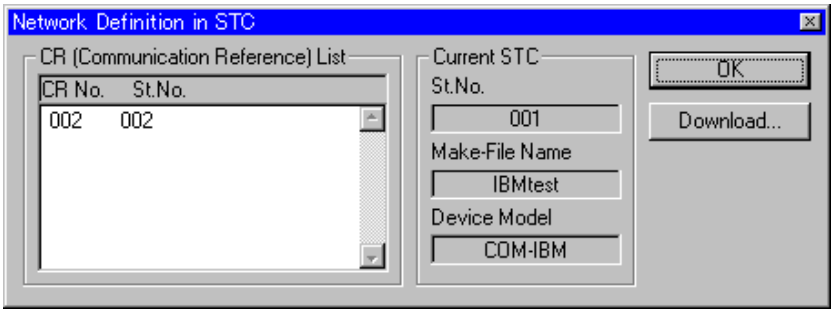
In the following case, downloading will be stopped to show the error message.
• STP version is less than 5.40.
• There is invalid data in the network definition file.
• The network type of the network definition differs from the type that STP has detected.

It is noted that any error does not occur if there is not the network definition for the station with the number that has been specified in the make file. In this case, the network definition in STP is cleared when downloading.

17.4. Read or Write Network Definition

Read Network Definition from STP

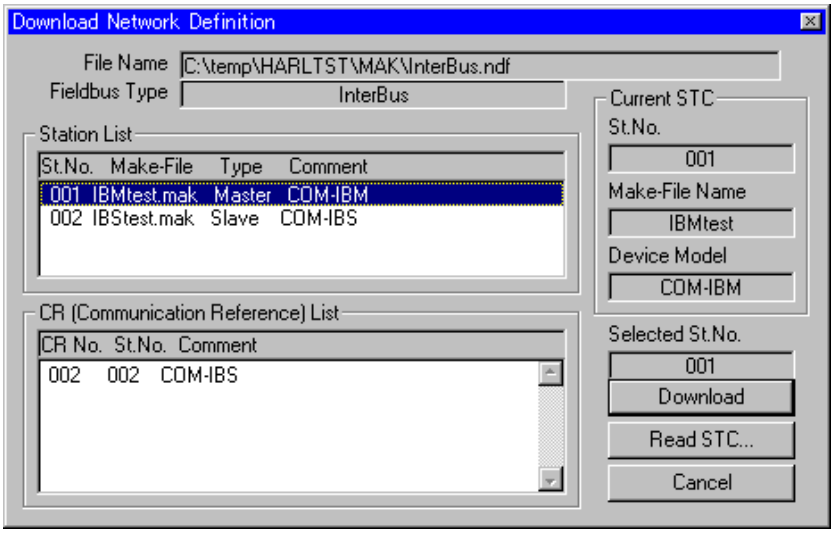
You can read the current network definition in STP to select [Maintenance]-[Fieldbus]-[Network Definition in STP] in Main Menu.



CR list contained in STP is shown in [CR List].
The following information in current STP is shown in [Current STP].
• Station number
• Name of make file for program running currently
• Name of device model of fieldbus network

Write Network Definition to STP

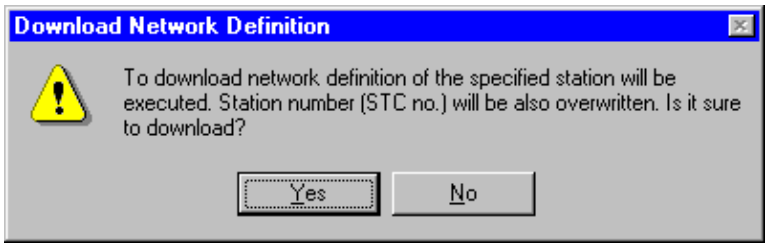
Not when program downloaded, if you want to write the network definition to STP, click [Download] button in the window shown above or select [Maintenance]-[Fieldbus]-[Download Network Definition] in Main Menu.
Then the dialog to specify the network definition file is shown, specify the file.
And then the following window is shown.



The following information in current STP is shown in [Current STP].
• Station number
• Name of make file for program running currently
• Name of device model of fieldbus network

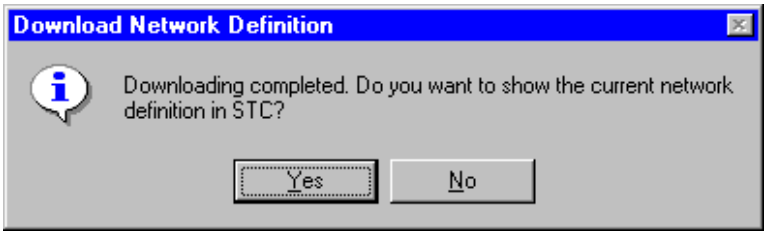
When you select the station in [Station List], CR list of the selected station is shown in [CR List].
You can read the current network definition in STP to click [Read STP] button showing “Network Definition in STP” window.

After you have selected the station in [Station List], click [Download] button to write the network definition of the selected station.
Confirmation message dialog is shown as follows.



Click [Yes] button to download CR list of the current selected station to STP.
And also the selected station number shown in [Selected St. No] overwrites the station number in STP.

When the downloading completed, the following message is shown.



Click [Yes] button to show “Network Definition in STP” window.

17.5. Monitor of Current Network State

You can see the current network state in STP to select [Maintenance]-[Fieldbus] menu in Main Menu.
These functions are available in case of STP version 5.40 or later.

• Management Information
shows the various state that STP OS manages or controls.

• Device Information
shows the device information by reading from the fieldbus module (COM module).

• Parameter Information
shows the parameters set in the fieldbus module (COM module).

• Task Information
shows the state of software running in the fieldbus module (COM module).

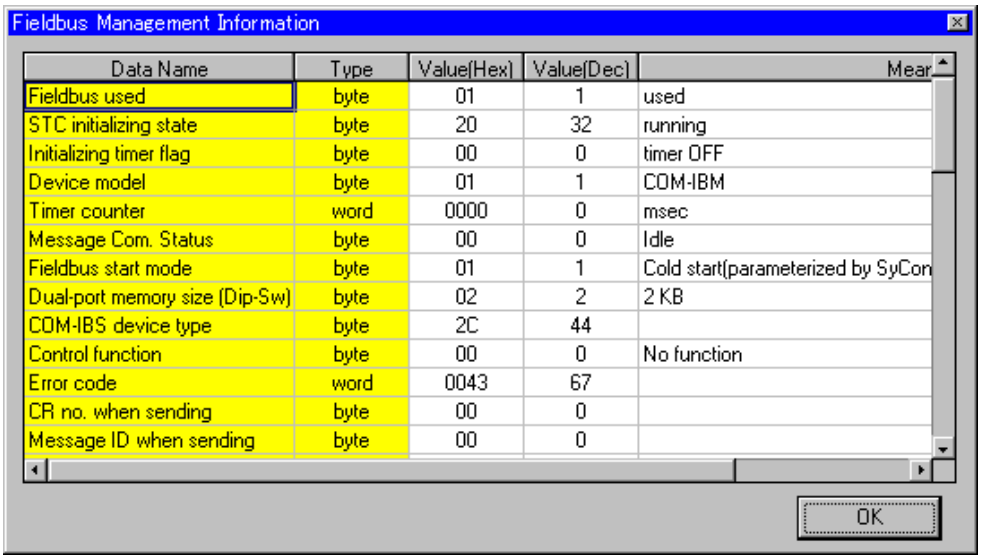
• Operating System Information
shows the state of operating system running in the fieldbus module (COM module).

• Read State
shows the fieldbus network state that is watched by the fieldbus module (COM module).

• Watch Control Flags
shows the current control flag that is exchanged between STP and the fieldbus module (COM module).

17.6. [Fieldbus]-[Management Information]

This function is available in case of STP version 5.40 or later.
Click [Maintenance]-[Fieldbus]-[Management Information] in Main Menu to show the following window.



Fieldbus used

Whether STP uses fieldbus network or not.
This indicates the setting of dip-switch #2-4 on the STP board.
0: Not used 1: Used

STP initializing state

Initializing state of the fieldbus module by STP OS
00h: Starting of STP
10h: Deciding device model of the fieldbus module
20h: Running

Initializing timer flag

Flag of temporary timer used when STP OS initializes fieldbus module

Device model

Device model of fieldbus module
00h: COM-IBSM (InterBus master of old type)
01h: COM-IBM (InterBus master)
02h: COM-DPM (PROFIBUS-DP master)
03h: COM-FMS (PROFIBUS-FMS)
04h: COM-PB (PROFIBUS-FMS/DP master)
33h: COM-IBS (InterBus slave)
34h: COM-DPS (PROFIBUS-DP slave)

Timer counter

1 msec timer counter used when STP OS initializes fieldbus module

Message Com. Status

Status of message communication that STP manages
00h: Idle
0Ah: Receiving
0Bh: Waiting for confirmation
14h: Sending

15h: Sending response
16h: Sending delivery
64h: Waiting for completion to delete database
65h: Completion to delete database
66h: Initializing after database deleted
6Eh: Downloading VFD
6Fh: Download CR list header
70h: Download CR list table
71h: Appending Object Description
72h: Waiting for READY ON

Fieldbus start mode

This indicates the setting of dip-switch #2-3 on the STP board.
00h: Warm start (Fieldbus module starts with parameters set by STP OS.)
01h: Cold start (Fieldbus module starts with parameters in database set by SyCon.)

Dual-port memory size (Dip-Sw)

KB size of dual-port memory used for the interface between STP OS and fieldbus module.
This indicates the setting of dip-switch #2-2 on the STP board.
It is only available whether 2 KB or 8 KB.

COM-IBS device type

No meaning except COM-IBS
00h: Digital I/O (Message communication is not available.)
01h: with PCP channel (Message communication is available.)

Control function

Function code for fieldbus module requested by STP OS
00h: No function
01h: Delete database for COM-IBS
02h: Set PCP parameters for COM-IBS

Error code

- Error code notified from fieldbus module
  1 to 255: Refer detail of error code to interface manual of each fieldbus module.
- Error code that STP OS raises
  1001 (03E9h): Indication received when waiting for confirmation
  1002 (03EAh): Invalid CR number in the received confirmation
  1003 (03EBh): Invalid message ID in the received confirmation
  1004 (03ECh): Receiving time-out for confirmation
  2001 (07D1h): Confirmation received when idle

CR no. when sending

CR number when sending a message

Message ID when sending

Message ID when sending a message

Timer counter for confirmation

1 msec timer counter to watch confirmation received

Delay timer counter

1 msec timer counter to delay when sending response

1 msec tick count

1 msec counts from filedbus module initialized

If this counter becomes more than 2147483647 (about 596.6 hours), it is reset to zero to count up again.

Starting date

Date when fieldbus module initialized and started

Starting time

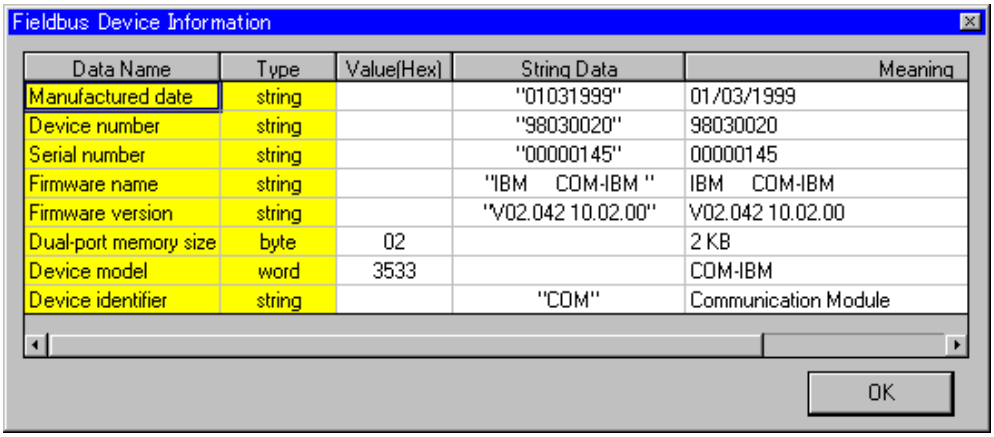
Time when fieldbus module initialized and started

Sending count to retry

Counter to retry sending a message

17.7. [Fieldbus]-[Device Information]

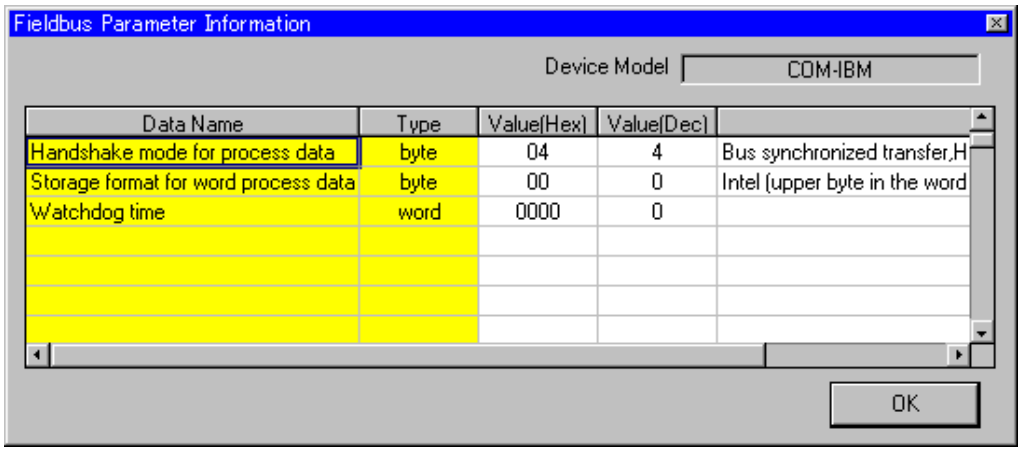
This function is available in case of STP version 5.40 or later.
Click [Maintenance]-[Fieldbus]-[Device Information] in Main Menu to show the following window.



Displayed information is directly read from the fieldbus module.
You can see the information about the manufacture of the fieldbus module and about the fundamental module type.

17.8. [Fieldbus]-[Parameter Information]

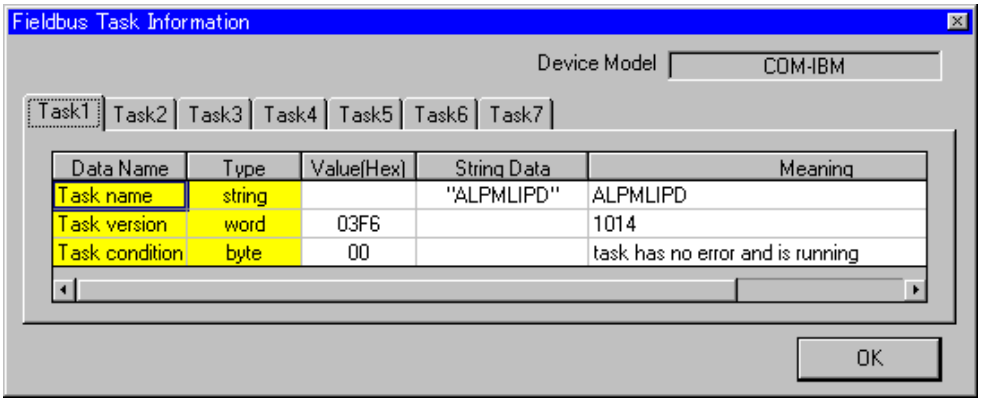
This function is available in case of STP version 5.40 or later.
Click [Maintenance]-[Fieldbus]-[Parameter Information] in Main Menu to show the following window.



Displayed information is directly read from the fieldbus module.
The contents of the information differ according to the type of device model.
You can see the parameters that prescribe the fieldbus module.

17.9. [Fieldbus]-[Task Information]

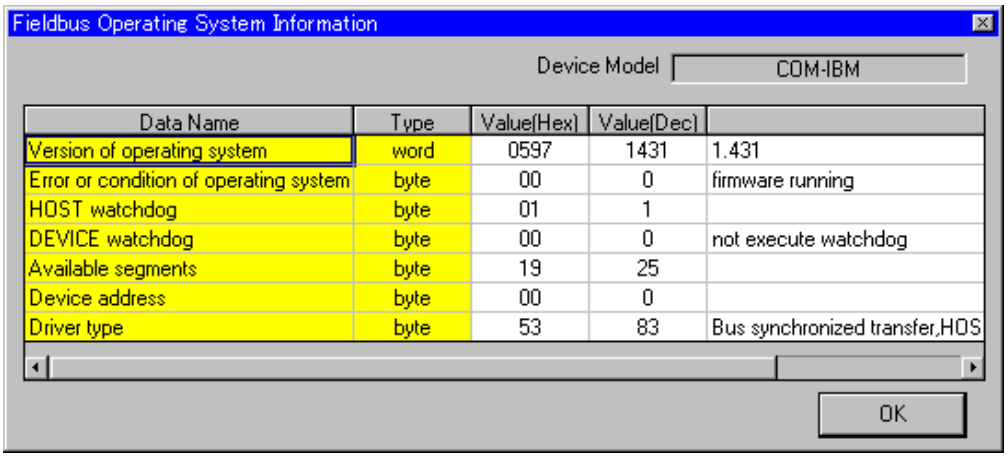
This function is available in case of STP version 5.40 or later.
Click [Maintenance]-[Fieldbus]-[Task Information] in Main Menu to show the following window.



Displayed information is directly read from the fieldbus module.
The contents of the information differ according to the type of device model.
You can see the information of tasks (software) running in the fieldbus module.

17.10. [Fieldbus]-[Operating System Information]

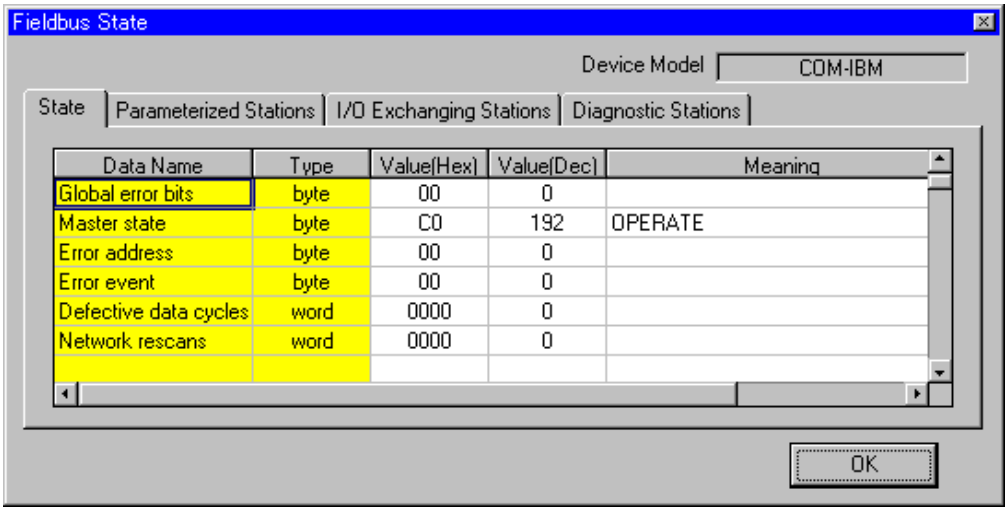
This function is available in case of STP version 5.40 or later.
Click [Maintenance]-[Fieldbus]-[Operating System Information] in Main Menu to show the following window.



Displayed information is directly read from the fieldbus module.
You can see the information of operating system running in the fieldbus module.

17.11. [Fieldbus]-[Read State]

This function is available in case of STP version 5.40 or later.
Click [Maintenance]-[Fieldbus]-[Read State] in Main Menu to show the following window.

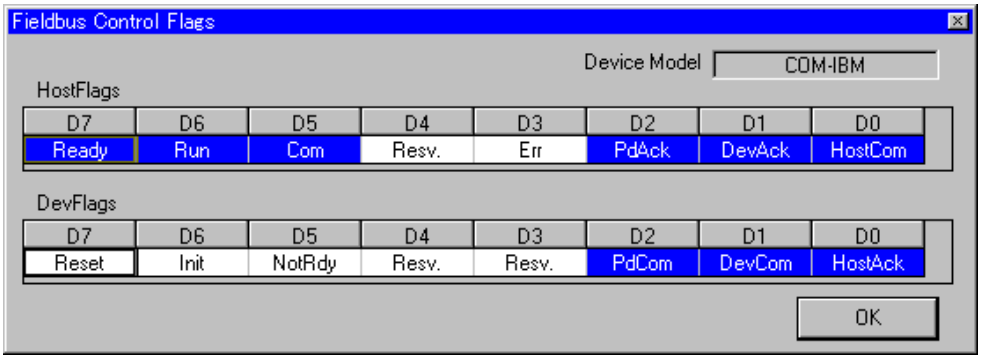


Displayed information is directly read from the fieldbus module.
The contents of the information differ according to the type of device model.
You can see the fieldbus state that the fieldbus module watches.

In case that there is a trouble in the network, you can see the value of not zero in “Global error bits” or “Error event”.
Refer to interface manual for each fieldbus module about details of an error.

17.12. [Fieldbus]-[Watch Control Flags]

This function is available in case of STP version 5.40 or later.
Click [Maintenance]-[Fieldbus]-[Watch Control Flags] in Main Menu to show the following window.



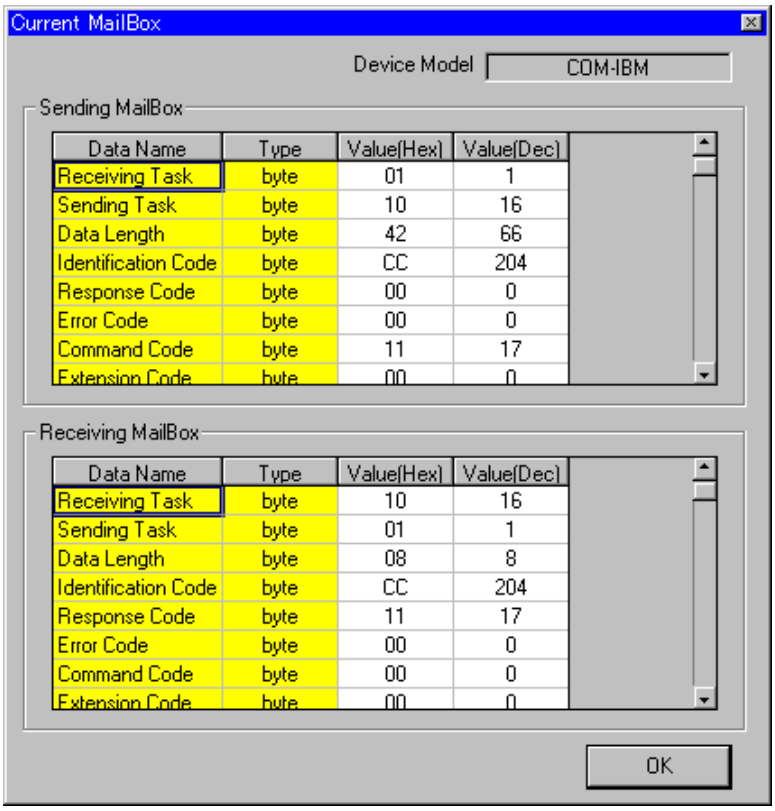
Displayed information is directly read from the fieldbus module.
You can see the current control flag that is exchanged between STP and the fieldbus module.
“HostFlags” is the information and controlled byte written by the module for STP OS.
“DevFlags” is the information and controlled byte written by STP OS for the module.
You can see the explanation of a bit to double-click the cell of a bit.

17.13. Watch Mailbox

When HrBasic program communicates with another station in the network using the message, STP OS sends or receives data through the interface area named as “mailbox”.
There are two types for the mailbox.

- Sending mailbox
- Receiving mailbox

Select [Maintenance]-[Fieldbus]-[Watch Mailbox] in Main Menu to watch the current contents of the mailbox showing the following window.
But this function is available in case of STP version 5.40 or later.



The following area forms each mailbox.

- Message header of 8 bytes
- Telegram header of 8 bytes
- User data of maximum 247 bytes

In this window, only 58 bytes of user data is displayed.

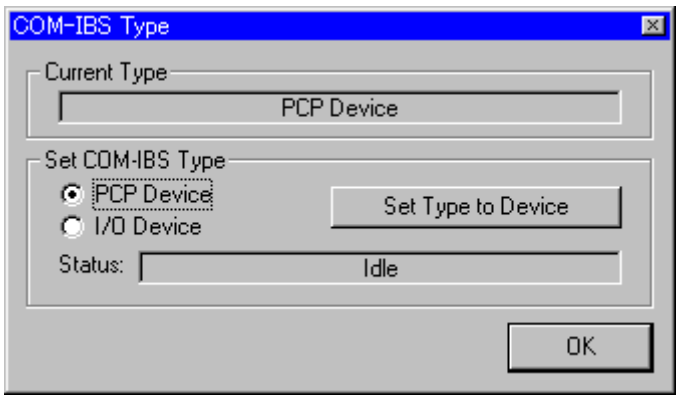
17.14. Change COM-IBS Type

You can select the following device type for the fieldbus module COM-IBS (InterBus slave).

• Digital I/O device
  This is the default setting when shipment by Hilscher.
  Only I/O channel is available. The message communication is disabled.
• Device with PCP channel
  I/O channel and PCP channel are available. You can communicate the message by PCP channel.

If you want to communicate the message by HrBasic program using COM-IBS, once at least you must set that PCP channel becomes enabled before the HrBasic program runs.

You can see or set this device type to select [Maintenance]-[Fieldbus]-[COM-IBS Type] in Main Menu.
But this function is available in case of STP version 5.40 or later.
And this function is not available in case that the device type is not COM-IBS showing the error.



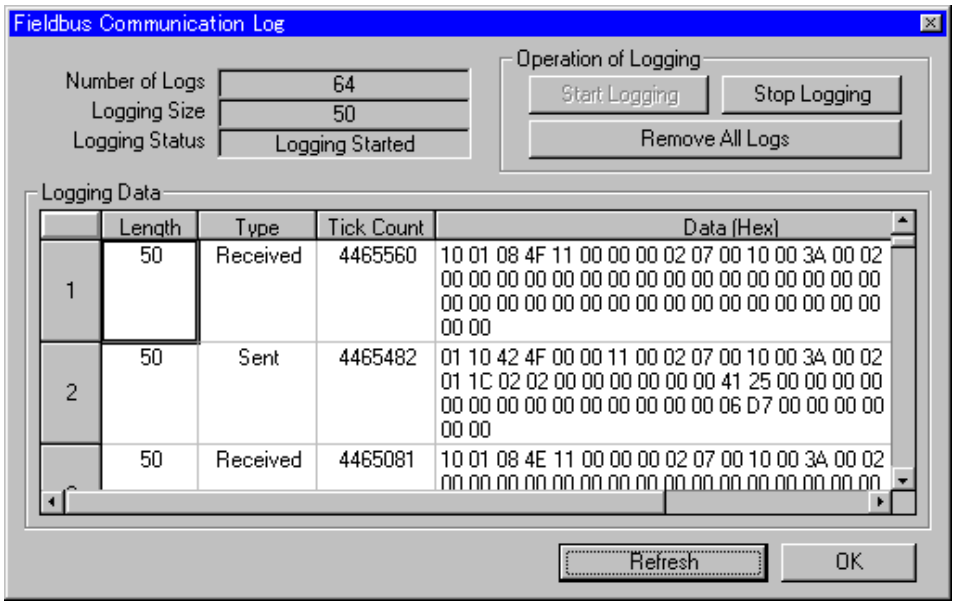
[Current Type]
  Shows the current device type that STP OS currently detects.

[Set COM-IBS Type]
  After PCP device or I/O device selected, click [Set Type to Device] button to change the device type of COM-IBS.
  You can see the status of progress in [Status].
  After the completion message shown, reset the power of STP board.

STP memorizes the device type of COM-IBS in the battery backup memory.
If some reason such as the drop of battery voltage destroys the contents of the memory, you have to set the type again.

17.15. Communication Log for Fieldbus Network

You can show the data log of the communication between STP OS and the fieldbus module to select [Maintenance]-[Fieldbus]-[Communication Log] in Main Menu.
But this function is available in case of STP version 5.40 or later.



Displayed Records

Maximum 64 records are held in STP as logging data. If the number of records exceeds 64, the oldest record is removed to memorize a new record.
"Tick Count" shows the passing time from the filedbus module initialized by msec. You can estimate the period between each communications. And you can know date and time of logging to add the value of "Tick Count" to the date and the time displayed as "Stating date" and "Starting time" in the window selecting [Maintenance]-[Fieldbus]-[Management Information].
If "Tick Count" becomes more than 2147483647 (about 596.6 hours), it is reset to zero to count up again.
"Data" shows first 50 bytes data as hexadecimal value of the sent or received mailbox.

Operation of Logging

A user can select whether logging is executed or not.
Click [Start Logging] button to start logging.
Click [Stop Logging] button to stop logging.

This window is never refreshed since the window was opened and the logging data was shown.
If you want to show the newest log, click [Refresh] button.

When [Remove All Logs] button clicked, you can remove all logging records in STP after the confirmation dialog is shown.

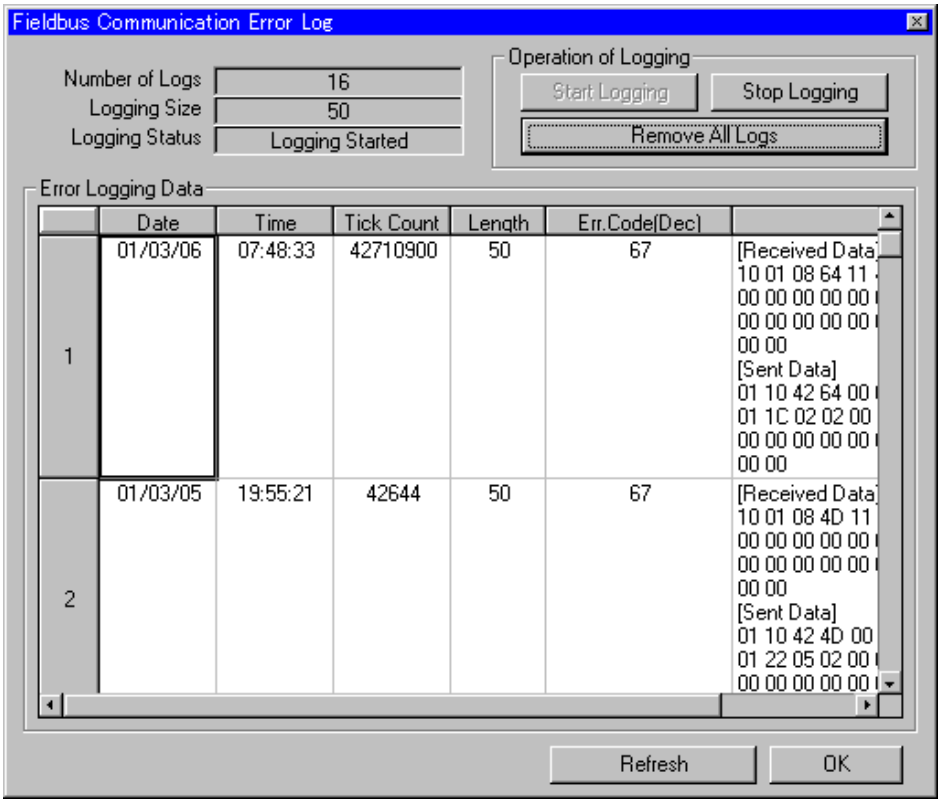
The state of logging stopped is automatically set after STP power is reset or HrBasic program is downloaded. And at the same time, all logging records are removed automatically.

Important!

The execution of communication log reduces the performance of HrBasic program running. You had better stop the logging if you need not log.

17.16. Error Log for Fieldbus Network

You can show the error log of the communication in the fieldbus network to select [Maintenance]-[Fieldbus]-[Error Log] in Main Menu.
But this function is available in case of STP version 5.40 or later.



Displayed Records

Maximum 16 records are held in STP as logging data. If the number of records exceeds 16, the oldest record is removed to memorize a new record.
“Date” shows the date when the error occurs by the format YY/MM/DD.
“Time” shows the time when the error occurs by the format HH:MM:SS.
“Tick Count” shows the passing time from the filedbus module initialized by msec. You can estimate the period between each error.
If “Tick Count” becomes more than 2147483647 (about 596.6 hours), it is reset to zero to count up again.
“Data” shows first 50 bytes data as hexadecimal value of the sent or received mailbox.

Error Code

STP OS detects the error when the message is received from the fieldbus module.
Therefore, the date and time of logging indicates when the displayed “Received Data” was received actually.
“Sent Data” is the data set in the sending mailbox when the error is detected.
It is noted that the actual time at which the “Sent Data” was sent is earlier than the time of logging.

There are two types of the error code
• The error code is detected in the sixth byte in the received data. (error code in the message header)
  This error code has the value of 1 to 255.
  Refer the interface manual for each fieldbus module about the meaning of the error code.
• The error code that STP OS decides.
  For example, when STP OS decides that the received message is cannot be accepted under the some state that STP OS has managed, STP OS raises the error.

See “[Fieldbus]-[Management Information]” about the error code.

When the error occurs, the error code is set to “Error Code” in “[Fieldbus]-[Management Information]”.

Operation of Logging

A user can select whether logging is executed or not.
Click [Start Logging] button to start logging.
Click [Stop Logging] button to stop logging.

This window is never refreshed since the window was opened and the logging data was shown.
If you want to show the newest log, click [Refresh] button.

When [Remove All Logs] button clicked, you can remove all logging records in STP after the confirmation dialog is shown.

The state of logging started is automatically set after STP power is reset.

Important!

If the network trouble occurs, the error logging is the important information to investigate the cause.
Please do not stop the error logging normally.

18. Format Detail

18.1. harl.dat File

[Position Editor](PosEdit.exe), [S.G. Editor](SgEdit.exe), [S.P. Editor](SpEdit.exe) or [Robot Data Communication](UpDown.exe) in the start menu of Windows can edit robot data and communicate with a robot by reading and using the parameters from 'harl.dat' file. 'harl.dat' file includes a language type, directories, communication parameters. You cat set the parameters to 'harl.dat' using [Set Up] of Main Menu.

'harl.dat' does not exist at the installation of HBDE. It is created when Main Menu starts by [HrBasic Developing Environment X.XX] after the installation. 'harl.dat' is written when the settings is changed by Main Menu, but never deleted. After the installation, you must start up [HrBasic Developing Environment X.XX] first before you select [Position Editor], [S.G. Editor], [S.P. Editor] or [Robot Data Communication] of the start menu. (See "Install HBDE")

Contents of the parameter file 'harl.dat' are as follows. HR Editor uses the data with '*' mark.

Line #1		Version
Line #2		Date of release
Line #3	*	Language (E:English J:Japanese)
Line #4		Not used
Line #5		Not used
Line #6	*	Directory of system files
Line #7		Directory of editor files
Line #8		Directory of work files
Line #9		Directory of source files
Line #10		Directory of header files
Line #11		Directory of make files
Line #12		Directory of macro files
Line #13	*	Directory of position, S.G., S.P. data files
Line #14	*	PC COM speed (4800,9600,19200,38400)
Line #15	*	PC COM parity (E,O,N)
Line #16	*	PC COM data length (7,8)
Line #17	*	PC COM stop bits (1,2)
Line #18	*	Communication format (0:STX-ETX-LRC, 1:STX-CR-LF)
Line #19	*	Communication error retry number (more than 0)
Line #20	*	Communication time out seconds (more than 0)
Line #21	*	STP Station Number (000 to 255)
Line #22	*	Not used
Line #23	*	Not used
Line #24	*	Not used
Line #25	*	Not used
Line #26		HrBasic editor file
Line #27		Not used
Line #28	*	Current used PC COM (1 to 6)
Line #29		Reserved
Line #30		Reserved
Line #31	*	Communicated with STP or robot (0:robot, 1:STP)
Line #32	*	COM number in STP (0,1,2,3,8, If Line #31 is robot, null is set.)
Line #33	*	Robot number
Line #34	*	Controller type (0:HNC-3XX,1:HNC-5XX with URL,2:HNC-5XX without URL)
Line #35	*	Stopping jobs for STP COM communication (0:Stopping jobs,1:Not stopping jobs)
Line #36	*	COM released timer for STP COM communication (seconds)
Line #37		Not used
Line #38		Not used

Line #39		Not used
Line #40	*	STP COM1: Using current RS232C parameters in STP (0:Not using,1:Using)
Line #41	*	STP COM1: Speed (1200,2400,4800,9600,19200,38400)
Line #42	*	STP COM1: Parity (E,O,N)
Line #43	*	STP COM1: Data length (7,8)
Line #44	*	STP COM1: Stop bits (1,2)
Line #45	*	STP COM1: Robot number
Line #46	*	STP COM1: Controller type(0:HNC-3XX,1:HNC-5XX with URL,2:HNC-5XX without URL,100:other device,Null:not used)
Line #47	*	STP COM1: COM name
Line #48		Not used
Line #49		Not used
Line #50	*	STP COM2: Using current RS232C parameters in STP (0:Not using,1:Using)
Line #51	*	STP COM2: Speed (1200,2400,4800,9600,19200,38400)
Line #52	*	STP COM2: Parity (E,O,N)
Line #53	*	STP COM2: Data length (7,8)
Line #54	*	STP COM2: Stop bits (1,2)
Line #55	*	STP COM2: Robot number
Line #56	*	STP COM2: Controller type(0:HNC-3XX,1:HNC-5XX with URL,2:HNC-5XX without URL,100:other device,Null:not used)
Line #57	*	STP COM2: COM name
Line #58		Not used
Line #59		Not used
Line #60	*	STP COM3: Using current RS232C parameters in STP (0:Not using,1:Using)
Line #61	*	STP COM3: Speed (1200,2400,4800,9600,19200,38400)
Line #62	*	STP COM3: Parity (E,O,N)
Line #63	*	STP COM3: Data length (7,8)
Line #64	*	STP COM3: Stop bits (1,2)
Line #65	*	STP COM3: Robot number
Line #66	*	STP COM3: Controller type(0:HNC-3XX,1:HNC-5XX with URL,2:HNC-5XX without URL,100:other device,Null:not used)
Line #67	*	STP COM3: COM name
Line #68		Not used
Line #69		Not used
Line #70	*	STP COM8: Using current RS232C parameters in STP (0:Not using,1:Using)
Line #71	*	STP COM8: Speed (1200,2400,4800,9600,19200,38400)
Line #72	*	STP COM8: Parity (E,O,N)
Line #73	*	STP COM8: Data length (7,8)
Line #74	*	STP COM8: Stop bits (1,2)
Line #75	*	STP COM8: Robot number
Line #76	*	STP COM8: Controller type(0:HNC-3XX,1:HNC-5XX with URL,2:HNC-5XX without URL,100:other device,Null:not used)
Line #77	*	STP COM8: COM name
Line #78		Not used
Line #79		Not used

18.2. harl.ini File

File ‘harl.ini’ defines the language and the font of Main Menu. Main Menu reads this file when starting. File format is as follows.

[System]

Language	=Japanese	:Display Japanese for Main Menu
	=English	:Display English for Main Menu

[Font]

Name	=font name	
Size	=font size	
Bold	=True	: Font is bold.
	=False	: Font is not bold
Italic	=True	: Font is italic.
	=False	: Font is not italic.
StrikeThrough	=True	: Font is struck through.
	=False	: Font is not struck through.
UnderLine	=True	: Font has underline.
	=False	: Font does not have underline.

18.3. comtest.ini File

'comtest.ini' file defines patterns of the communication test. Format is as follows.

```
timeout=1
retry=0
;
9600,8,N,1
9600,7,E,1
19200,8,N,1
19200,7,E,1
      .
      .
      .
```

• timeout

Specify the wait time for the response from a robot or STP by second unit.
If a robot or STP cannot respond for the specified period, Communication Test retries to send a command as times as the number specified by "retry".
You cannot describe a space or tab before or after "=".
You must describe this sentence at the first line in the file.

• retry

Specify retry number when a communication error occurs. If the first sending is failed without a response or with some error, Communication Test retries to send a command as times as the specified number. To retry the specified times is failed, the testing result is NG.
You cannot describe a space or tab before or after "=".
You must describe this sentence at the first line in the file.

• RS232C parameters

Speed, Data Length, Parity, Stop Bits
Speed : 300,600,1200,2400,4800, 9600, 19200, 38400
Data Length : 7, 8
Parity : E, O, N
Stop Bits : 1, 2

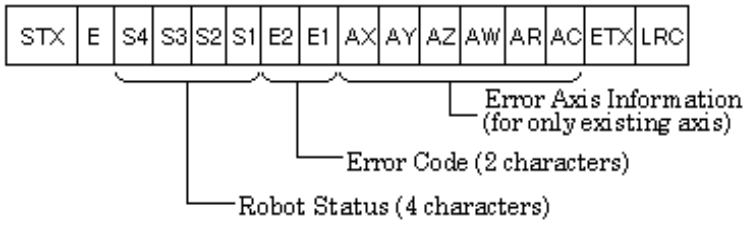
Testing is executed in order of this descriptions.

• Comment

Description after ";" is regarded as a comment.
If you want to describe a whole line as a comment, ";" must be described at the head of a line.

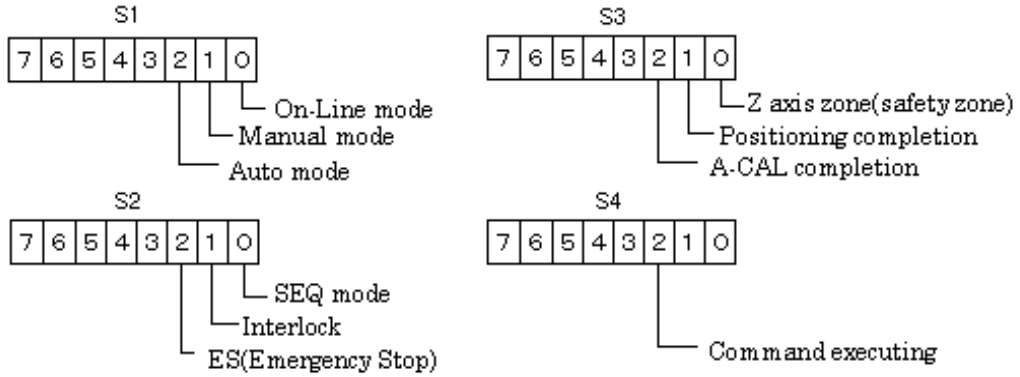
18.4. HRCS Robot Error Format

If a robot responds with an error, the receiving data has the following format in which the top character is “E”.



Robot Status

Robot Status contains 4 characters. Each character expresses the hexadecimal value that means the following bits of byte data.



Note)

- Manual mode means KEY-IN, RO-TEACH, LI-TEACH or CHECK mode.
- In the figure, invalid bits hold “0”. Valid bits hold “1” when the status described in the figure has occurred.
  Example: S1 = ”4” = 34H --- Auto mode.
  S2 = “6” = 36H --- ES and interlock on.
  S3 = “6” = 36H --- A-CAL and positioning completed.
  S4 = “4” = 34H --- Command executing now.

Error Code

Error code contains two characters by hexadecimal expression. To see details, select [Tool]-[Robot Error Code] in the Main Menu.

Error Axis Information

Error axis information contains characters that have the size corresponding to the number of robot axes. Error axis information shows the detail which axis and what kind of error. Some kind of error does not contains error axis information. In this case the error axis information holds “0”. Cases that the error axis information is available are as follows.

(1)When A-CAL error (error code 20H), the error axis information is set by “0” to “7”.
“0” : OK
“1” : Origin sensor not found when moving to origin.
“2” : Origin sensor not off. Cannot return to working area.
“3” : Limit sensor on when moving to origin.
“4” : Counter not zero.
“5” : Counter reset lower.
“6” : Counter reset upper.
“7” : Counter minus.

(2)When overrun (error code 51H), the error axis information is set by “0” to “3”.
“0” : OK
“1” : Origin side.
“2” : Overrun side.
“3” : Both side

(3)When positioning data out of limit (error code 64H), the error axis information is set by “0” to “2”.
“0” : OK
“1” : Lower side.
“2” : Upper side

(4)When servo error (error code 70H), the error axis information is set by “0” to “1”.
“0” : OK
“1” : NG

19. Trouble Shooting When Uploading or Downloading Robot Data

19.1. Trouble Shooting When Uploading or Downloading Robot Data

There are three levels of error when HR Editor uploading or downloading communicated with the robot.
(1) Data file invalid
(2) Communication trouble with the robot
(3) Error response from the robot

1. Data file invalid

When starting to upload or download, HR Editor checks that the specified data file is valid or not. The following error message will be shown when the data file is invalid.

<Uploading Error Message>

Error Message	Explanation and Action
Cannot save file. [File Name]	The file cannot be saved. It may be caused by disk space exhausted. Delete useless files or change the save drive and retry uploading.

<Downloading Error Messages>

Error Message	Explanation and Action
Position data of start address not found.	When downloading position data, the data of the specified start address cannot be found in the position data file. Enter the correct start address that exists in the file.
Position data not found. Address nnnn - NNNN position data downloaded.	For example, though the specified range of position data is 0100 to 0200 for downloading, address 0000 to 0150 data has been found in the file. In this case, this message is shown and downloading 0100 to 0150 data is completed successfully.
Controller type invalid. [File Name]	The First line in the data file is invalid controller type. It may be that the file is destroyed. The first line must be one of the following texts. “VARIABLE”, “VARI_6”, “VARI_6,NOURL”

2. Communication trouble with the robot

HR Editor checks that the ability of the RS232C communication with the robot. If HR Editor cannot communicate with the robot, the following message will be shown.

<Typical Case>

Error Message	Explanation and Action
• Receiving time out	• The communication settings of the project do not correspond with the robot or STP. Check the settings of the communication speed, data length, stop bits, parity and the STP or robot number. Note1) The RS232C settings when the robot at the shipment. Data length: 7 bit (fixed) Stop bits: 1 bit (fixed) Parity: Even (fixed) HNC-1XX,2XX,3XX,544 transfer rate: 9600 bps HNC-5XX transfer rate: 19200 bps See “[Set Up]-[Project Settings]-[RS232C Port]”. You can see the transfer rate of the robot to operate as follows by the

teaching pendant showing [ORIGIN]-[SET-UP SYSTEM]-[TRANSFER RATE].
(1) Press [FUNC/HIGH]+[s.g/7] key.
(2) Press [mot/3] key.
(3) Press [cal/1] key.
It needs power OFF/ON to activate the new setting of the transfer rate changed by the teaching pendant.

Note2) Controller type and robot number
You must specify the robot number in case of HNC-5XX.
In case of standard HNC-1XX,2XX,3XX,544, you must not specify the robot number to select [Without robot no.].
But there is a special type HNC-1XX,2XX,3XX,544 that needs the robot number.
See "[Set Up]-[Project Settings]-[COM Format]".

Note3) To use the robot number, you must specify the value set in the robot that you can show at [MAINTENANCE]-[MAINTENANCE DATA]-[STATION NO.] by the teaching pendant.
(1) Press [FUNC/HIGH]+[s.g/7] key.
(2) Press [task/2] key.
(3) Press [mot/3] key.
(4) Press several times [up/DOWN] key.

• The cable is disconnected.
Check the connection of the cable or the wiring of the cable.
See "Connection with Robot Controller" about the wiring of the cable.

<Rare Case>

Error Message	Explanation and Action
• LRC error when receiving • NAK received • Parity error when receiving	• There is a possibility of the noise. Remove the source of the noise or shield the cable.
• Receiving frame error	• The environment of the communication of Windows system is not be tuned adequately. Change the communication setting of Windows system. (See "Change Communication Setting of Windows System".) • There is a possibility of the noise. Remove the source of the noise or shield the cable.
• Overrun when receiving • Sending buffer full • Receiving buffer overrun	• The environment of the communication of Windows system is not be tuned adequately. Change the communication setting of Windows system. (See "Change Communication Setting of Windows System".)
• Break status	• The computer hardware is troubled. Use an another computer. • There is a possibility that the cable is broken. Check the wiring of the cable.
• General I/O error	• The computer hardware is troubled. Use an another computer.
• Sending time out	• The cable is disconnected. Check the connection of the cable or the wiring of the cable.

3. Error response from the robot

Although the communication with the robot is good, if the robot has been under error status, the robot cannot accept the command from HR Editor to send the error response. After HR Editor receives the error response, it breaks uploading or downloading to show the error message.

The following robot status is recommended when uploading or downloading robot data.

- Without moving (Key-In mode the best)

Some type of robots cannot be downloaded or uploaded when an error occurs such as emergency stop, servo error or overrun.

The robot errors are listed as follows.

<Typical Case>

Error Code(HEX)	Error Message	Explanation and Action
10	Emergency stop	Remove the cause of the emergency stop.
30	Address out of limit	Specified address of position data exceeds the range set in the robot controller. The message will be shown and invalid addresses will be neglected.
40	Position data out of area limit	Change the area limit of the system data of the robot by teach-pendant. Or check and renew the position data. Note) Some type of SCARA robot sends this error when the zero axis value have been downloaded. See "Download from Computer to Robot" about this.
51	Overrun of robot	Move the robot inside the area limited by the overrun sensor. And check teaching of the robot.
63	System data (SG, SP) destroyed	Some reason causes that the data memory of the robot has been destroyed. You must execute DEFAULY COPY by Teaching Pendant. See "How to Recover from System Data Destroyed".
64	Position data destroyed	Some reason causes that the data memory of the robot has been destroyed. You must execute initialization of positions by Teaching Pendant. See "How to Recover from Position Data Destroyed".
70	Servo error	The trouble of the servo motor. The encoder pulse changes without moving. Or the encoder pulse cannot change with moving. Check the encoder line, the motor line or the servo driver. Refer to the user's guide of the controller.
A0	Servo driver error	The robot detects the trouble of the servo driver. Check the servo driver. Refer to the user's guide of the controller.
60	Communication format error	(1) When uploading, there is a possibility that some positions in the robot controller have not been initialized. Refer to "Upload from Robot to Computer". (2) In case of communication with HNC-1XX,2XX,3XX,544 type, specified address of position data exceeds the range set in the robot controller.

61	Communication command error	Confirm the robot controller type to communicate and the HR Editor setting of the robot controller type. The possible reasons as follows. (1) Communicating with a standard HNC-1XX,2XX,3XX,544 with the robot number set in HR Editor. (2) Reading the robot version from HNC-1XX,2XX,3XX,544. (3) Uploading or downloading the data that HNC-1XX,2XX,3XX,544 can not treat.

<Rare Case>

Refer to the operation manual of the robot or user's guide of the controller about the following errors.

09h:Positioning error
11h:Dead man switch ON
20h:A-CAL incomplete
31h:M data error
32h:Sensor not found
33h:Spline error
34h:EPI retry error
62h:Illegal command
65h:Online communication data error
66h:Watch dog timer time out
80h:Comamnd duplicated
90h:Impossible error
91h:Overflow
92h:Underflow
93h:Over speed
94h:M number error
95h:X-Y conversion error
96h:Positioning error
99h:Start motion error
B0h:Encoder disconnected

19.2. Change Communication Setting of Windows System

When communicated with STP or robot, in the case of the following errors occurred, the communication reliability may be improved to change the communication setting of the Windows system.

• Receiving frame error
• Overrun when receiving
• Sending buffer full
• Receiving buffer overrun

You can change the communication setting of the Windows system as follows.

1. Open [Settings]-[Control Panel] in the start menu of Windows and open [System] in [Control Panel].

2. Click [Device Manager] tab to select.

3. Double-click [Ports (COM & LPT)] in the tree view to expand the node showing the devices.

4. Click the [Communication Port] (normally COM1 or COM2) that is used for HR Editor.

5. After selecting COM, click [Properties] button displayed at the lower part of the current window to open [Communication Port Properties] window for the selected COM.

6. Click [Port Settings] tab. The settings of bits per second, data bits, etc. are shown in this window but you must leave these settings as it was. Then click [Advanced] button.

7. After the window of the advanced port settings for the port is opened, set the performance for the receive buffer and the transmit buffer to the lowest level. And then click [OK] button.

19.3. How to Recover from System Data Destroyed

In case that the robot is under the situation “System data (SG, SP) destroyed”, the following status occurs.
• You can see “SYSTEM DATA ERROR” on the teaching pendant.
• When HR editor uploads or downloads the data, the message “System data (SG, SP) destroyed” is shown.

You can recover the system data in the robot by downloading the HR Editor saved data in the computer to operate as follows.
Note) If you recover by the memory card, you must insert the memory card to the robot controller and operate “ALL LOAD” by the teaching pendant. Refer robot operation manual about details.

The following operation must be executed after you have confirmed surely that the robot is now under the situation of system data destroyed and the saved data is correct for the robot.
After the following operation, the system data of the robot will be overwritten by the save data. If the save data is not correct, the robot cannot run properly.

1. You must execute DEFAULT COPY by Teaching Pendant of the robot.
(1) Press [SHIFT] key to turn the SHIFT lamp ON.
(2) Press [FUNC/HIGH] + [READ] key to show [OK?] message.
(“+” means the simultaneous key operation.)
(3) Press [ENTER] key.

2. Then you must set the using of the axes by Teaching Pendant.
(1) Press [FUNC/HIGH] + [s.g/7] key to show the data group menu.
(2) Press [mot/3] to select [ORIGINE] group. And then sub-group menu is shown.
(3) Press [mot/3] to select [AXIS SELECT] sub-group.
(4) Set the unused axis to “NOT USED”. You can move the cursor using [up/down] key and select “USED” or “NOT USED” to press [io/SEL] key. After selection, press [ENTER] key twice.

3. Power OFF and ON of the robot controller.

4. Download S.G/S.P data to the robot by HR Editor.

5. Power OFF and ON of the robot controller again.

19.4. How to Recover from Position Data Destroyed

In case that the robot is under the situation “Position data destroyed”, the following status occurs.

- You may see “??????” as the value of axis data on the teaching pendant. Although the numerical value is displayed, there is a possibility that the position data is destroyed. Confirm the current position data to compare with the saved data.
- When HR editor uploads or downloads the data, the message “Position data destroyed” is shown.

You can recover the position data in the robot by downloading the HR Editor saved data in the computer to operate as follows.

Note) If you recover by the memory card, you must insert the memory card to the robot controller and operate “ALL LOAD” by the teaching pendant. Refer robot operation manual about details.

The following operation must be executed after you have confirmed surely that the robot is now under the situation of position data destroyed and the saved data is correct for the robot.

After the following operation, the position data of the robot will be overwritten by the save data. If the save data is not correct, the robot cannot run properly.

1. You must execute initialization of positions by Teaching Pendant of the robot.
   (1) Press [FUNC/HIGH] + [s.ed/4] (or [p.ed/5]) key to show “POSITION COMMAND”.
   (2) Set “000” to “START ADDRESS”. And press [ENTER] key twice.
   (You can move the cursor using [up/down] key.)
   (3) Set “999” to “END ADDRESS”. And press [ENTER] key twice.
   (4) Set “000” to “SET ADDRESS”. And press [ENTER] key twice.
   (5) Select [INIT] mode by pressing [io/SEL] key several times.
   (6) Press [END] key. And then press [ENTER] key.

2. Download position data to the robot by HR Editor.

3. Power OFF and ON of the robot controller.