

BS Configurator 2 Operation Manual

Introduction

Thank you very much for purchasing our Servo press.

This manual describes the hardware scheme, installation procedures, connections, running, operations, communication, status display and daily inspections.

Make sure to thoroughly understand the contents and use the product properly.

Request

We have taken all possible measures to ensure the contents of this instruction manual, however, please contact us if you have any questions or find any errors.

The product names, etc. are generally registered trademarks of various companies.

* To secure safety and quality, never fail to refer to this manual.

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1. Special Feature of System

The special feature of this servo press system is explained briefly.

1.1. The upper controller of MR-J3A

It functions as an upper controller of Mitsubishi Electric servo system MR-J3A.

1.2. Correspondence to data collection.

Data collection of a maximum of 31 spindles is possible by BS Configurator which is exclusive application.

1.3. High-speed network

A controller is equipped with Ethernet and data collection is performed quickly.

1.4. FA network

The expansion bus can be equipped with the option card of Anybus standard. Thereby, it can correspond to various FA networks including CC-Link.

1.5. The substantial monitor function

It has abundant system monitor functions. It is utilizable for systems analysis, such as tool speed, power supply voltage, motor current, regeneration resistance temperature, a regeneration generating state, electronic thermal, and a program execution step.

1.6. Maintenance function

The information about maintenance, such as an exchange date of a backup battery, net backup time is managed inside.

1.7. New program language

Since it corresponded to the various usage, program language was made new. In the former, the impossible fine control is possible.

1.8. Zone judging

A judgment zone is set up in the domain of stroke-load and a continuous judgment of O.K./NG is possible. A zone table can be set up to 32 pieces and can create a zone easily from real operation data.

1.9. Various tables

It has a position, load, and the speed table 32 pieces, respectively. If it describes that a program sets up various parameters on a table, parameter change of a program can be simply performed by edit of a table.

2. Setup

2.1. PC and OS type

PC for installation of this software is IBM PC/AT compatible machine. Moreover, operation is checked by the following OS, Windows 2000/XP/VISTA/7. In Vista and 7, if installed in Program Files folder, trouble is in operation of various files. Please be careful.

2.2. Environment of operation

Give the recommendation value of OS as a standard about CPU clock and memory capacity. Hard disk availability 50MB or more is a standard. Moreover, LAN i/f is needed.

2.3. Installation

Please perform SETUP.EXE of an setup disk. When you use together with an old version, please set aside the folder of an installation place. If the same folder is chosen, an old version will be overwritten and it will become impossible using it.

2.4. Windows Firewall

Windows firewall displays warning about a communicative block at the time of the first starting after installation. Please choose "Unblock".When "Keep blocking" is chosen, the communication with a controller is impossible. In this case, please call the setting screen of Windows firewall from a control panel, and add the executive file -BS_CFG2.EXE of this application to the exceptions.

2.5. Possible operation

The following operations are possible.

- Monitor of sensors, I/O and a result.
- Data collection.
- Tool type setup.
- Edit of various tables and programs.
- Change of the parameter of a part of tool table.
- Proofreading of a load cell.
- Manual operation.
- Management of maintenance information.

2.6. Operation authority

Restrictions can be hung on a function by setting up operation authority.

Operation authority	Possible operation
Only monitor	Only monitor is possible.
All operations	All operations are possible. The default password is not set up.

Operation is restricted by un-displaying of a menu and an operation button. In

the following explanation, the screen in which all operations are possible is used. Please be careful.

2.7. Attachment of a backup battery

The contents of a setting to a controller are held by the backup battery. Although various setup is explained to below, when not equipped with the backup battery, if a control power supply is turned off, the contents of a setting will disappear in some dozens of seconds. Please equip with a backup battery and check normal backup operation first.

2.7.1. The method of equipping

Wearing of a backup battery should be performed in the state of control power supply ON. If it equips with a backup battery in the state of control power supply off, a backup circuit will not carry out normal operation, but superfluous consumption of a battery will be caused.

Please equip CN11 of the front panel lower part with a backup battery. Please equip for a red lead to turn up.

2.7.2. Check of operation

The check with normal backup operation is performed after attaining the communication between a controller and PC. It is explained by the last of a communication setup of Chapter 3

3. Communication setup

A communication setup with a controller and PC is explained.

3.1. Cable

We recommend you selection of LAN connection. Although connection is possible with a serial port, compared with LAN, it is far inferior in respect of communication speed. Moreover, a serial port may be occupied by other option articles.

Please use a cross cable, when you make direct connection of between a controller and PC using LAN. Please use a straight cable, when you go via a hub.

3.2. The IP address by the side of a controller

The IP address of a controller is set up as follows.

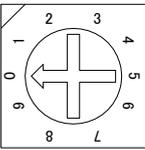
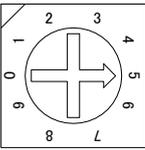
192.168 .(master number +14). (spindle number)

3.2.1. Master number

A master number is set up by the SW1 bits 0-3 on CPU board. A master number is defined as the binary value +1 of 4 bits of SW1 low ranks. SW1 is visible if the cover of an expansion bus is removed. The front panel side of SW1 is a low rank bit. The master number at the time of shipment is set as 1. Since the controller of a different master number is not connectable with one communication system, please be careful.

3.2.2. Spindle number

CPS controller is connectable with the same communication system to 31 sets. In this case, in order to discriminate each controller, it is necessary to set up a spindle number.

How to set up an spindle number	
<p>The front of a controller</p> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="margin-right: 10px;">IDx10</div>  </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">IDx1</div>  </div> </div>	<p>With the left figure, it has set up with the axial number 5.</p> <p>IDx10 is the beam of 10. IDx1 is the beam of 1.</p> <p>Please set up an axial number in one communication system not to overlap. Duplication of an axial number starts a communication error.</p> <p>Please set up the number between 01-31. In the other setup, it becomes an error.</p>

* When a group number and a spindle number are changed, a new number becomes effective after re-starting of a controller.

3.3. The IP address by the side of PC

Please set the IP address by the side of PC as a fixed IP address. Be careful for it not to overlap with the IP address by the side of a controller.

Example of a setting	IP address	192.168.1.1
	Subnet mask	255.255.0.0

A subnet mask is set up to 255.255.255.0 as the default value. This setup can also communicate normally except for a part of function. The part of function is a function which uses broadcasting commands, such as alarm reset and battery reset.

3.4. Setup of operational authority

Operation authority can be set to BS Configurator. All operations are attained by setting it as "All ". If setup-operation authority is chosen with a pull down menu, an operation authority screen (Fig. 3-1) will be displayed. The radio button of "All" is turned ON, a password is inputted, and O.K. button is clicked. The initial value of a password is none.



Fig.3-1 Operational authority screen

3.5. The IP address by the side of application

It is necessary to specify the controller for communication also by the application side. The setting method is explained.

Selection of a pull down menu Setup-Data collection-Communication setup of a main screen displays a figure 3-2 Communication setup screen.

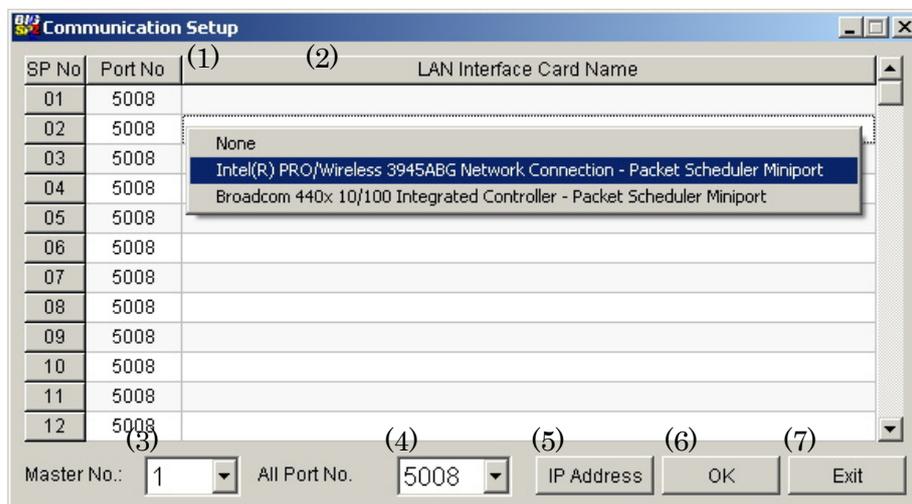


Fig.3-2 Communication setup screen

No.	Item	Explanation
(1)	Port No.	Please specify LAN port number. A floating window is displayed by a right click. 5008 to 50011 can be set up.
(2)	LAN Interface Card Name	The network interface card used for the communication between this application and BS controller can be specified. The network interface card name is displayed on a floating window by right click. It is convenient if you use this function in PC equipped with two or more network interface cards.
(3)	Master No.	An IP address is decided as follows by the master number. 192.168 .(master number +14). (spindle number) Please refer to the IP address by the side of the controller of Chapter 3 [2].
(4)	All Port No.	The port number of all spindles is set up collectively.
(5)	IP Address	It is used when setting arbitrary IP addresses to a controller. Refer to 7-7-1 for the details about this.
(7)	OK	A setup is reflected and a screen closes.
(8)	Exit	A setup is canceled and a screen closes.

3.6. Communication check

If a communication setup is completed, it will check that communication is actually performed normally.

Selection of the pull down menu Setup-Data Collection-Receive Filter of a main screen displays a figure 3-3 Receive Filter screen. The object spindle of data collection is set up on the receive filter screen. In order to collect data, polling of the

status of an object spindle is carried out at intervals of fixed time. In Fig. 3-3, it is a setup which collects data to the spindle number 1.

The data items collected differs by the software versions of a controller. Please set up the version suitable for the controller of each spindles correctly. When the version is not set up correctly, data collection is not performed normally. The software version of a controller can be checked on the maintenance information screen and the connected spidles list screen.

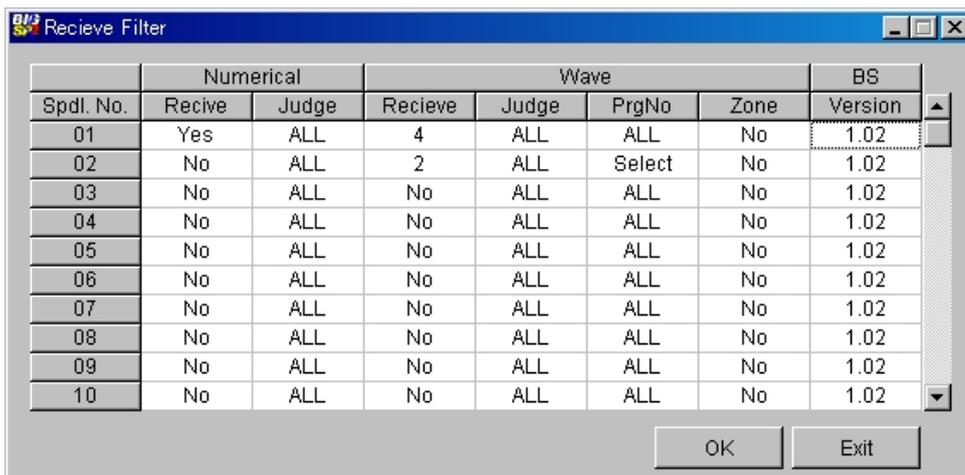


Fig.3-3 Receive Filter screen

Next, a check is put into pull down menu Setup-Data Collection-Collection of a main screen. Please refer to Fig. 3-4 Collect. Data collection is started by this setup.

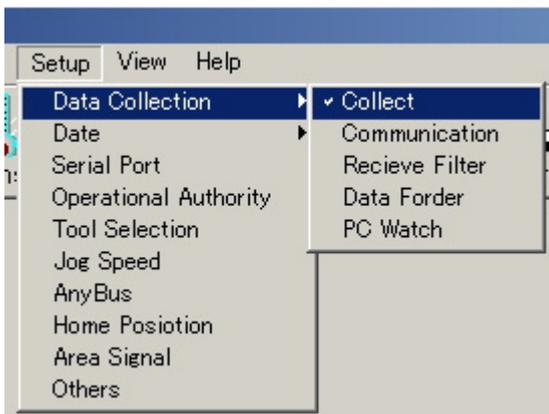


Fig. 3-4 Collect

If the status bar of the screen lower part is displayed as shown in Fig. 3-5, communication is performed normally. Although various alarms are displayed when no setup for BS controller is performed, there is no problem. As shown in Fig. 3-6,

when status is displayed, communication is not performed normally. Please improve a setup from the beginning of Chapter 3.

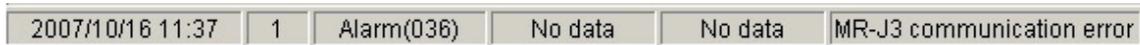


Fig.3-5 Status bar Alarm state



Fig.3-6 Status bar Communication error state

3.7. Correspondence to abnormalities

3.7.1. Reset operation

If a power supply is switched on, without setting a tool type etc. to a controller, various errors may come out. Please cancel these by error reset operation. It is reset by Manual-Alarm reset of the pull down menu. Moreover, when it equips with a backup battery first, it may be in a battery unusual state. This is resettable by Manual-Battery alarm reset of the pull down menu. Battery alarm remains, unless reset operation is carried out. Trouble is not in operation in the state of battery alarm.

3.7.2. Check of operation

Backup operation is checked by the clock function. A figure 3-5 Date Setup screen is displayed by Setup-Date-Setup Date of the pull down menu. If the spindle number is set up and a Send button is pushed, the time of PC will be set as a controller. Please turn off a power supply and wait 1 minute or more. A power supply is re-switched on after that, and if the time of a controller and the time of PC are in agreement, the backup function will operate normally.

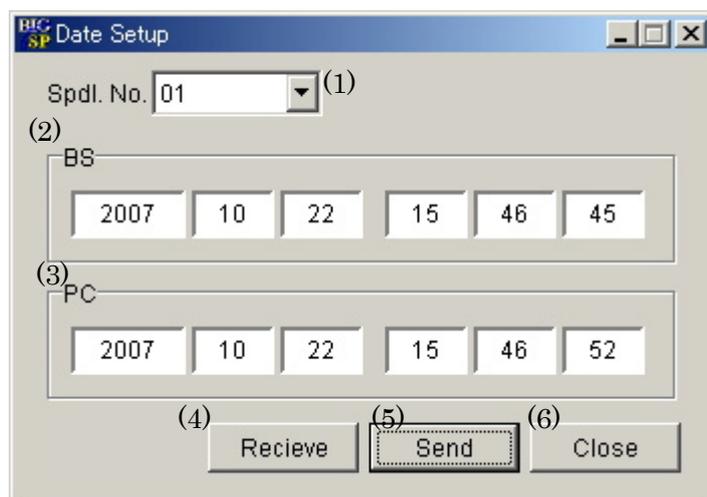


Fig. 3-5 Date Setup screen

No.	Item	Explanation
(1)	Spindle number	The spindle number for communication is chosen.
(2)	Controller date	The date of a controller is displayed.
(3)	PC date	The date of PC is displayed. *
(4)	Recieve	The date of a controller is received.
(5)	Send	The date of PC is transmitted to a controller.
(6)	Close	The screen is closed.

* Although a date and the display form of time can be arbitrarily set up with PC, please set it as the following display form in this system. Unless it chooses the right display form, a date cannot be set up to a controller.

Date yy/MM/dd

Time H:mm:ss

4. Operation Procedure

Procedure required in order to work a system is explained. Refer to Chapter 10 of BS Controller Instruction Manual for the starting procedure about wiring of hardware, and a setup. Here, operation procedure is explained focusing on the usage of BS Configurator.

4.1. Setup of a clock

Please Refer to chapter 3 Communication Setup 7 Correspondence to Abnormalities 2 Operation Check .

4.2. A tool type setup

The figure 4-1 Tool Selection screen opens by Setup-Tool Selection of the pull down menu. Please choose the tool type connected to the controller from the list. Selection of a tool type fixes the numerical value of other items in the screen. These numerical values are read from the tool table on PC. The Max. Stroke, Acceleration Time, and Deceleration Time are correctable on this screen. If a Send button is pushed after changing numerical values if needed, it will be set to a controller.

When a tool type is changed, please turn off a power supply at once. Please switch on a control power supply again, and if you can check that communication has resumed by the status bar of the main screen lower part, push the Recieve button of the Tool Selection screen. If the latest setup is read as it is, a setup is performed normally.

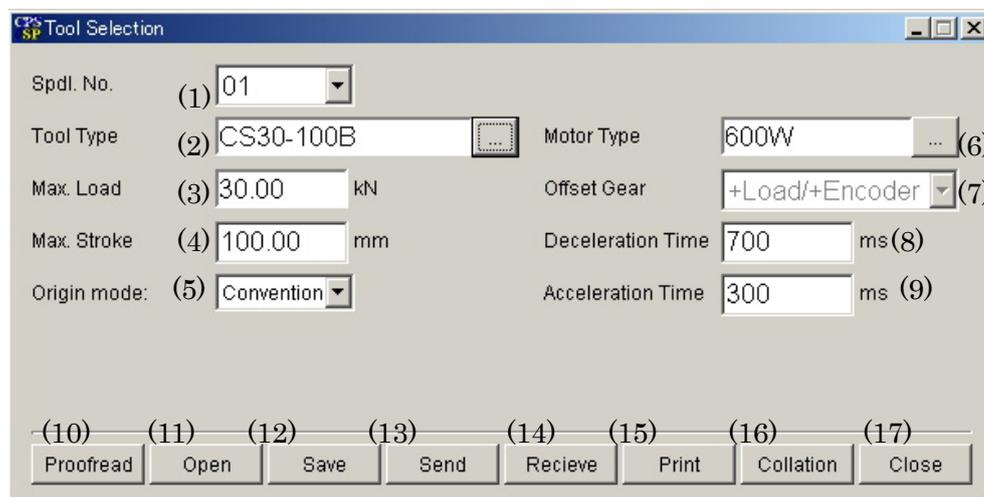


Fig. 4-1 Tool Selection screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is chosen.
(2)	Tool Type	A tool type is chosen. The list of tool types is a list of the tool table in the predetermined folder of PC. Please choose the same form as the tool connected to the controller.
(3)	Max. Load	The maximum load which can be used with the tool of (2)

		is shown.
(4)	Max. Stroke	The maximum stroke of the tool of (2) is shown. It can change.
(5)	Origin mode	The sequence of origin is chosen. As for the conventional mode case, the ram goes to +direction at maximum of 20mm from the origin point. As for the contacted mode case, the ram goes to -direction at maximum of 10mm from the origin point.
(6)	Motor Type	The motor type of the tool of (2) is shown.
(7)	Offset Gear	The offset gear of the tool of (2) is shown.
(8)	Deceleration Time	The time required by the time it stops from the maximum speed of the tool of (2) is set up per ms. Since the generating frequency of regeneration electric discharge will go up if a numerical value smaller than initial value is set up, please be careful.
(9)	Acceleration Time	Time until it reaches top speed from the stop state of the tool of (2) is set up per ms. If you set it as a numerical value smaller than initial value, load should increase, and since there is a possibility of shortening the life of a system, please be careful.
(10)	Proofread	The proofreading screen of a load cell is called. A proofreading screen changes with tool types.
(11)	Open	The setting value of a tool can be saved at the file other than the original tool table. It is opened.
(12)	Save	The setting value of a tool is saved at the file other than the original tool table.
(13)	Send	The parameter about a tool is transmitted to a controller.
(14)	Recieve	The parameter about a tool is received from a controller.
(15)	Print	The details of the tool currently displayed on the screen are printed.
(16)	Collation	A setup of a controller is compared with the contents currently displayed on this screen.
(17)	Close	The screen is ended.

4.3. Proofreading of a tool

Two kinds of tools are connectable with BS controller. Proofreading screens differ, respectively.

4.3.1. Intelligent type tool

It is the tool of the type with which the microcomputer is carried in load cell amplifier. Tool ID, a tool name, the proofreading value of a load cell, etc. are memorized by the microcomputer. Since proofreading value is loaded from a tool microcomputer when BS controller and a tool name are compared and it has agreed, a user does not need to proofread.

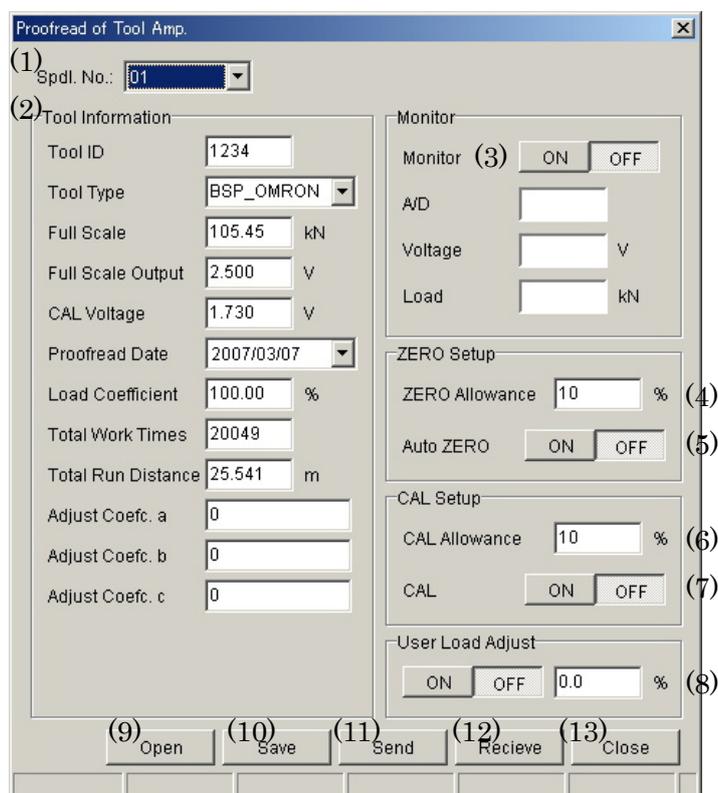


Fig. 4-3 Prrofreed of Tool Amp. screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is chosen.
(2)	Tool information	Various setting value of a tool can be checked. Change is impossible.
(3)	Monitor	It acts as the monitor of a load cell output.
(4)	ZERO Allowance	The permissible value of the load cell output at the time of no-load is shown.
(5)	Auto ZERO	Auto ZERO is operated manually. The output at the time of turning on serves as zero.
(6)	CAL Allowance	The output permissible value at the time of a calibration is shown. It is based on CAL Voltage.
(7)	CAL	Calibration is operated manually. Please operate

		Calibration after auto ZERO operation.
(8)	User Load Adjust	What multiplied Full Scale value by the compensation ratio can be treated as full-scale value. The ON/OFF control and a compensation ratio are set up.
(9)	Open	The setting value of a tool can be saved at the file other than the original tool table. It is opened.
(10)	Save	The setting value of a tool is saved at the file other than the original tool table.
(11)	Send	The parameter about a tool is transmitted to a controller.
(12)	Recieve	The parameter about a tool is received from a controller.
(13)	Close	The screen is closed.

4.3.2. Load-sensor-less type tool

It is the tool of the type which computes load from motor current. The microcomputer is carried for tool ID and tool name discernment. Load accuracy is $\pm 15\%$.

4.4. Setup of a program

A figure 4-4 editor screen opens by Program-Editor-New Editor of the pull down menu. A program is edited on this screen and it transmits to a controller. Please refer to the Chapter 5 program language about the grammar of a program. Two or more editor screens can be opened. The program of 31 is storable in a controller. Within a controller, a program is managed by the program number. The number of the maximum steps of a program is 128.

Please also refer to Chapter 7 [3] program (6) Automatic Generation about creation of a program. A program can be created in simple only by numerical setup.

(1)

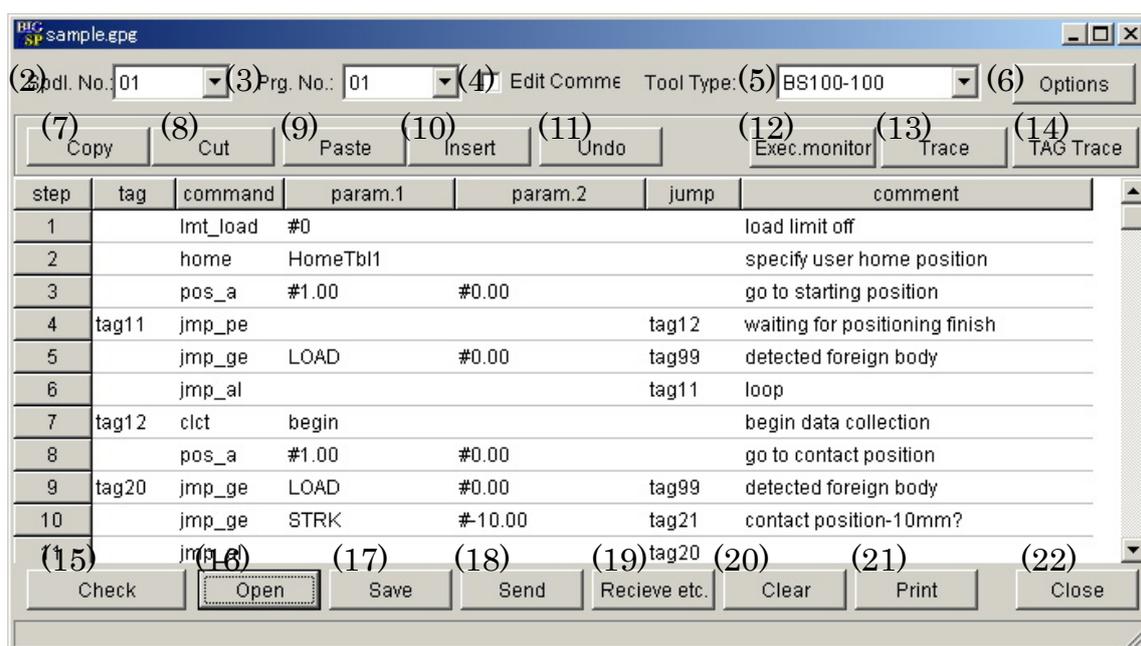


Fig.4-4 Editor screen

No.	Item	Explanation
(1)	File name	The file name under edit is shown.
(2)	Spindle No.	The spindle number for operation is chosen.
(3)	Program No.	The program management number within a controller is shown.
(4)	Edit Comment	An input assistant function is turned off in the state of a check. Please change into a check state at the time of the input of a comment.
(5)	Tool Type	The tool type for control is shown. It is transmitted also to a controller as header information on a program.
(6)	Optoin	This option can cancel restriction of the input range of load.
(7)	Copy	A copy function is performed.
(8)	Cut	A cut function is performed.
(9)	Paste	A paste function is performed.
(10)	Insert	An insertion function is performed.
(11)	Undo	Undo is effective once.
(12)	Exec. monitor	The background color of the step under execution is shown

		by yellow. Since the updating interval of data is 0.2 seconds, although a fine motion cannot be followed, the number of steps does not have restriction.
(13)	Trace	An execution monitor's result is reproducible with this function.
(14)	TAG Trace	An execution result is traceable by tag number with this function. Only when tag number is updated, tag number is recorded to a trace buffer. Therefore, a loop portion is not recorded. However, performed tag number can be traced, without leaking.
(15)	Check	The grammar of a program is checked. When there is an error, the part which has an error as shown in Fig. 4-5 is pointed out.
(16)	Open	The program file in PC is opened.
(17)	Save	It saves as a file at PC.
(18)	Send	A program is sent to a controller. Before sending, a program is surely checked. When there is an error, it cannot send to a controller.
(19)	Receive etc.	The program list in a controller is displayed.(Fig. 4-6)
(20)	Clear	The contents of an editor screen are all eliminated.
(21)	Print	The contents of an editor screen are printed.
(22)	Close	The screen is closed.

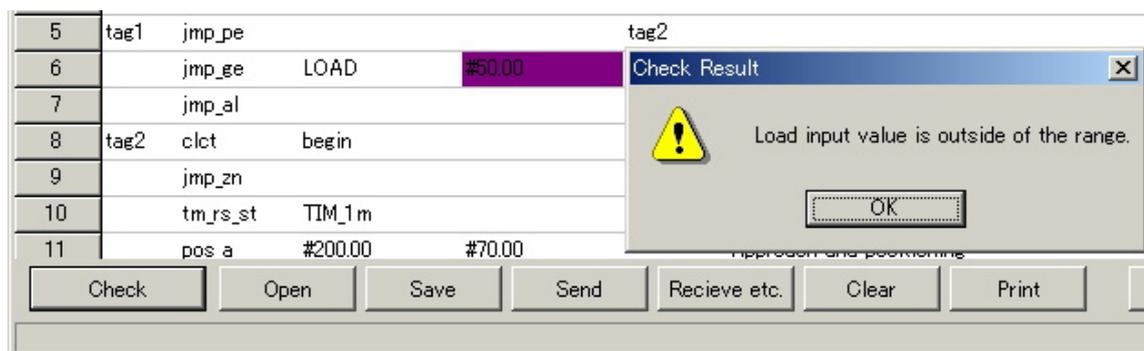


Fig.4-5 Program check result

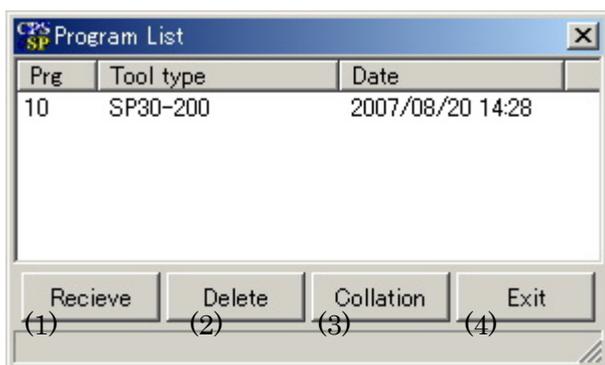


Fig.4-6 Program list

No.	Item	Explanation
(1)	Recieve	The selected program is received from a controller and it displays on an editor screen.
(2)	Delete	The selected program is deleted from a controller.
(3)	Collation	The selected program is compared with the program currently displayed by the present editor. When there is disagreement, a collation result is displayed as shown in Fig. 4-7.
(4)	Exit	The screen is closed.

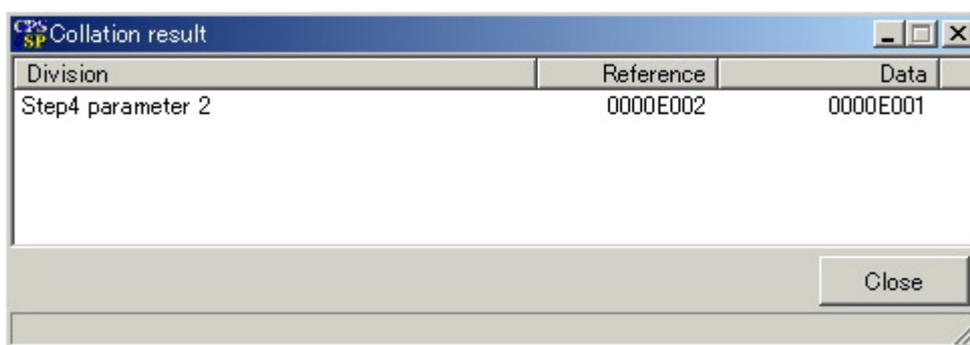


Fig.4-7 Program collation result

4.5. Setup of a result monitor

If a setup about data collection is performed, the monitor of a numerical value and a waveform is possible at the time of program execution. It sets up with the Setup-Data Collection-Receive filter of the pull down menu. Please refer to the figure 3-3 Receive filter screen of 3-6.

4.6. Execution of a program

Although execution of a program is usually controlled by PI/O, if a program execution function is used, even when neither wiring of PI/O nor the sequence by

PLC will be completed at the time of system starting, operation with a servo press simple substance can be checked. Fig 4-8 Execute Program screen opens by Program- Execute Program of the pull down menu.

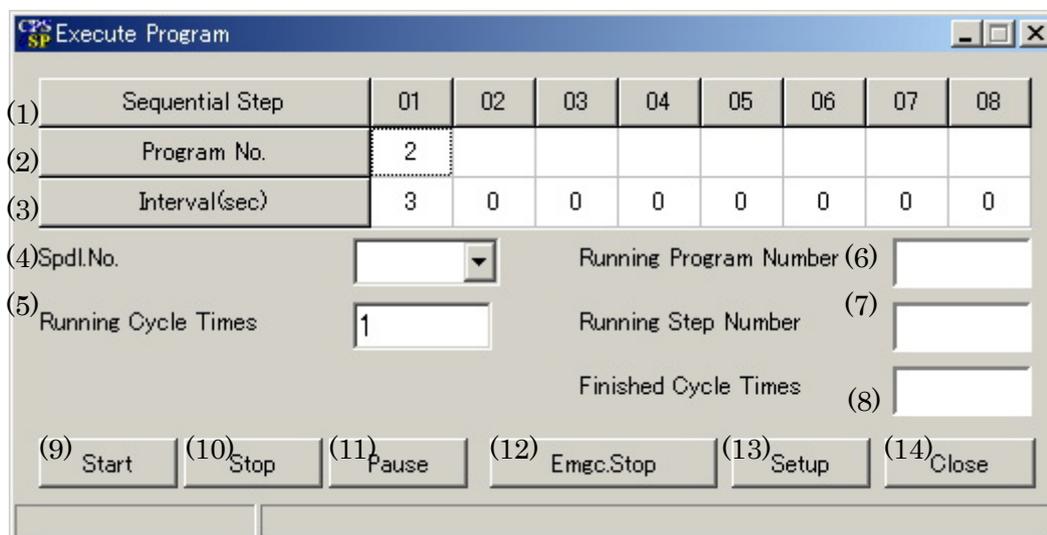


Fig4-8 Execute Program screen

No.	Item	Explanation
(1)	Sequential step	Eight programs are controllable within a sequence.
(2)	Program No.	The program number performed at each step is shown.
(3)	Interval	The execution waiting time between steps is shown.
(4)	Spindle No.	The spindle number for control is shown.
(5)	Running Cycle Times	The number of cycles to perform is set up.
(6)	Running Program Number	The program number currently performed is shown.
(7)	Running Step Number	The step number in the program currently performed is shown.
(8)	Finishe Cycle Times	The already performed number of cycles is shown.
(9)	Start	Execution of a sequence is started.
(10)	Stop	Execution of a sequence is stopped per cycle.
(11)	Pause	Execution of a sequence is paused per step. Pause button is clicked again or a click of a Start button, then execution of a sequence are resumed.
(12)	Emergency Stop	Execution of a sequence is stopped immediately.
(13)	Setup	The screen which sets up the disposal in NG judging is opened.
(14)	Close	The screen is closed.

4.7. Check of a result

If a program is performed in the state of data collection execution, numerical monitors, such as peak load and a peak stroke, and waveform monitors, such as the load of program execution process and a stroke, are possible. Refer to the Chapter 7-2 Monitor for the details about them.

5. Program Language

5.1. Outline

A program consists of a maximum of 128 steps. Each step consists of tag number, a command code, a parameter 1, a parameter 2, and a jump address. A tag number serves as the target address of a jump command. Various commands go into a command code. As a kind of command, there are data preservation control, judgment control, mode specification of operation, a limit value setup, jump control, loading to a register, general-purpose input-and-output control, numerical operation, and timer control. Internal variables, such as speed, a position, and load, and various tables go into parameters 1 and 2. A tag number used as the jump place of a jump command goes into a jump address.

5.2. Internal variable

Numerical values, such as speed, a position, and load, are treated in a program as an internal variable of a peculiar name. All the sizes of an internal variable are 32 bits.

5.2.1. The internal variables by which the contents are updated by real time

Name	Explanation
SPD	Speed.
STRK	It is a position absolutely.
LOAD	Load.
LDRT	Changing rate of load
EX_STRK	External position *
PINn	General-purpose input ch_n(n=1,2).32 bits is assigned by 1ch.
POUTn	General-purpose output ch_n(n=1,2).32 bits is assigned by 1ch.
USR_IN	What rearranged the user input in the order of the number. What can be used is only USR_IN.LL.
USR_OUT	What rearranged the user input in the order of the number. What can be used is only USR_OUT.LL.

* Offset calculation of the external position EX_STRK is internally carried out so that it may become equivalent to STRK at the time of CAL execution.

5.2.2. The internal variables by which peak value is held

Name	Explanation
P_STRK	Peak absolute stroke
P_LOAD	Peak load
P_LDRT	Peak changing rate of load
P_EX_STRK	Peak external stroke

A peak can be set as arbitrary value by load command in a program.

5.2.3. The internal variable where the minimum value is saved

Name	Explanation
B_LOAD	Bottom load

Bottom load can be set as arbitrary value by load command in a program.

5.2.4. The internal variables saved as the final value

Name	Explanation
F_STRK	The final absolute stroke
F_LOAD	The final load
F_LDRT *	The final changing rate of load
F_EX_STRK	The final external stroke

The last value is determined by the thing of the earliest timing of the following case.

1. The end command of data collection was executed in the program.
2. The end command was executed.
3. Program execution was interrupted for the error.

* F_LDRT can be used as B_LDRT by option setup. It can be used when the version of BS controller is 1.02.31 or more.

5.3. Ornamentation of I/O

About the unit of treatment of I/O, it corresponds to a bit, a byte, word, and long word. Although discernment is unnecessary since, as for operation of a bit, the command itself turns into a bit operation command, operation of a byte, word, and long word embellishes I/O, in order to discriminate. PIN1 is mentioned as an example and explained.

Expression	The unit of treatment	Bit range to mean
PIN1	long word	0-31
PIN1.H	word	16-31
PIN1.L	word	0-15
PIN1.HH	byte	24-31
PIN1.HL	byte	16-23
PIN1.LH	byte	8-15
PIN1.LL	byte	0-7

This ornamentation can be used to general-purpose input and output and I/O register. Please embellish after loading the target variable to I/O register, when it embellishes other variables.

5.4. Internal variable register

The exclusive registers for saving, calculating and outputting an internal variable are prepared. Those data sizes are 32 bits. Four registers are prepared at a time about all internal variables. It is the range of n=1-4.

5.4.1. Numerical preservation

The register of n= 1 is saved as numerical data. Moreover, only within load and a stroke, the register of n= 2 is also saved as numerical data.

5.4.2. Allotment to a judgment table

The register of n= 1 has the allotment to a judgment table, and is applicable to a judgment of O.K./NG. Moreover, only within load and a stroke, the register of n= 2 also has the allotment to a judgment table.

Name	Explanation
SPD_Rn	Speed register
STRK_Rn	Stroke register
LOAD_Rn	Load register
LDRT_Rn	Load rate register
IO_Rn	IO register

5.5. Timer

The timer is prepared three kinds. The data size of a timer is 32 bits and is treated without a mark.

Name	Explanation
TIM_1s	The timer in a cycle of 1 second.
TIM_10m	The timer in a cycle of 10 m seconds.
TIM_1m	The timer in a cycle of 1 m seconds.

5.6. Judgment register

It is the register where a judgment result is saved.

Name	Explanation
JR_TABLE	The judgment result by the judgment table is saved.
JR_STRK	The stroke value set to NG by the zone judging is saved.
JR_LOAD	The load value set to NG by the zone judging is saved.

5.6.1. Composition of a judgment register

A corresponding bit is set to 1 when judged as NG by each judgment item.

Item	Bit position	Explanation	Item	Bit position	Explanation
ZONE_JDG+	0	Zone judging +NG	ZONE_JDG-	16	Zone judging -NG
P_LOAD+	1	Peak load +NG	P_LOAD-	17	Peak load -NG
F_LOAD+	2	Final load +NG	F_LOAD-	18	Final load -NG
B_LOAD+	3	Bottom load +NG	B_LOAD-	19	Bottom load -NG
P_STRK+	4	Peak stroke +NG	P_STRK-	20	Peak stroke -NG
F_STRK+	5	Final stroke +NG	F_STRK-	21	Final stroke -NG
P_LDRT+	6	Peak load rate +NG	P_LDRT-	22	Peak load rate -NG
F_LDRT+	7	Final load rate +NG	F_LDRT-	23	Final load rate -NG
R1_LOAD+	8	Load register 1 +NG	R1_LOAD-	24	Load register 1 -NG
R1_STRK+	9	Stroke register 1 +NG	R1_STRK-	25	Stroke register 1 -NG
R1_SPD+	10	Speed register 1 +NG	R1_SPD-	26	Speed register 1 -NG
R1_LDRT+	11	Load rate register 1 +NG	R1_LDRT-	27	Load rate register 1 -NG
R2_LOAD+	12	Load register 2 +NG	R2_LOAD-	28	Load register 2 -NG
R2_STRK+	13	Stroke register 2 +NG	R2_STRK-	29	Stroke register 2 -NG
P_EX_STRK+	14	Peak external stroke +NG	P_EX_STRK-	30	Peak external stroke -NG
F_EX_STRK+	15	Final external stroke +NG	F_EX_STRK-	31	Final external stroke -NG

5.7. Table

5.7.1. Judgment table

It is the table which sets up the judgment range or specifies the output bit at the time of NG to various internal variables. 32 tables can be set up in a controller. The example of a setting of a judgment table is shown below.

It can set up whether it is used about each judgment item. NG output shows the user bit output position at the time of becoming NG judging. 1-7 are setting ranges.

Judgment item	Use	Lower limit		Upper limit		Explanation
		Value	NG output	Value	NG output	
ZONE_JDG	YES		1		2	Zone judging result. A setup of a lower and upper limit value is invalid. When not using a zone judging, a result is always set to OKing.
P_LOAD	NO					Peak load
F_LOAD	YES	20.3	3	24.8	4	Final load
B_LOAD	YES	10.3	No	15.4	No	Bottom load
P_STRK	NO					Peak stroke
F_STRK	NO					Final stroke
P_LDRT	NO					Peak load rate
F_LDRT	NO					Final load rate
R1_LOAD	NO					Load register 1
R1_STRK	NO					Stroke register 1
R1_SPD	NO					Speed register 1
R1_LDRT	NO					Load rate register 1
R2_LOAD	NO					Load register 2
R2_STRK	NO					Stroke register 2
P_EX_STRK	NO					Peak external stroke
F_EX_STRK	NO					Final external stroke

5.7.2. Speed table

32 speed value can be set up. It can be used in a program by name called SpdTbln (n=1-32). If it is used for a speed parameter, a motion of a program can be changed by change of a speed table.

5.7.3. Load table

32 load value can be set up. It can be used in a program by name called LoadTbln (n=1-32). If it is used for a load parameter, a motion of a program can be changed by change of a load table.

5.7.4. Position table

32 stroke value can be set up. It can be used in a program by name called PosTbln (n=1-32). If it is used for a position parameter, a motion of a program can be changed by change of a position table.

5.8. Home position

Two home positions are defined. One is a system home (sys_home) common to the whole system. The remainder is the user home (usr_home) specified within a program. The starting point of usr_home is sys_home. Usr_home is specified in a program using a home position table. 32 position data is contained by the home position table. All the position data treated in a program starts from usr_home. Specification of usr_home remains in the effective state also after a program end. Please be sure to specify usr_home at the head of a program.

5.9. Brake

An electromagnetic brake is attached to a tool as an option. Please control the brake by the system side. BS controller is not concerned with control of the brake.

This brake is prepared for position maintenance and is not an object for braking. If used for a braking use, it will exhaust for a short time. Please be careful.

5.10. Command description

5.10.1. Data preservation

Command	clct
Meaning	Start or an end of data collection is performed.
The example 1	clct,begin
Description 1	Data collection is started. Moreover, the increment of the index is carried out.
The example 2	clct,end
Description 2	Data collection is ended.
Caution	One pair of clct,begin/end is surely required in a program.

5.10.2. Judgment control

Command	zone
Meaning	Start of a zone judging and an end are performed.
The example 1	zone,ZoneTbl2
Description 1	A zone judging is started using the zone table 2.
The example 2	zone,off
Description 2	A zone judging is ended. When “zone,off” are omitted, a zone judging is ended by “clct,end”.
Caution 1	The effective stroke range is set to the zone table. A zone judging is not performed out of the range.
Caution 2	Start of a zone judging and an end do not have restriction in the number of times of description in a program. However, the number of the zones used for a judgment at once is one. The zone table specified later becomes effective.
Caution 3	When jumping a program at NG processing in the case of zone

	judging NG, a jump command can describe. Please refer to a jump command.
Caution 4	Although the stroke in the case of zone judging NG and load are saved at the register of exclusive use, an exclusive register is overwritten when execution of a program is continued.

Command	judge
Meaning	It judges.
The example 1	judge,JT31
Description 1	It judges using the judgment table 31.
Caution	If judge command is executed, the numerical data saved as a result will be decided. Please be sure to describe in a program only once.

5.10.3. Mode specification

Command	origin
Meaning	Origin is performed.
The example 1	origin
Description 1	The following step is not performed until origin is completed.
Caution	

Command	spd
Meaning	It operates at the specified speed.
The example 1	spd,SpdTbl5,ACC_ON
Description 1	It operates at the speed specified on the speed table 5. It accelerates using the acceleration (acceleration time, deceleration time) specified on the tool selection screen.
The example 2	spd,#10.5,ACC_OFF
Description 2	It operate at 10.5 mm/s. The acceleration (acceleration time, deceleration time) specified on the tool selection screen is not used, but shifts to specification speed immediately.
Caution	If a sudden slowdown is carried out in ACC_OFF, excessive regeneration electric power may occur, and regeneration discharging may become impossible. Moreover, since there is a risk of giving a damage also mechanically, please be careful enough. A shock will be eased if lmt_load-load restrictions is used.

Command	pos_a
Meaning	It positions by position specification absolutely.
The example 1	pos_a,SpdTbl6,PosTbl3
Description	At the speed specified on the speed table 6, it moves to the

1	position specified on the position table 3.
The example 2	pos_a,#20,#56
Description 2	It moves in position of 56mm by 20mm/s in speed.
Caution 1	About specification of a position, a user home is a starting point.
Caution 2	In positioning, the acceleration (acceleration time, deceleration time) specified on the tool selection screen is surely used.

Command	pos_r
Meaning	It positions by relative position specification.
The example 1	pos_r,SpdTbl6,PosTbl3
Description 1	It moves to the position which applied the position specified to be the present position on the table 3 at the speed specified on the speed table 6.
The example 2	pos_r,#20,#56
Description 2	It is in 20mm/s in speed, and moves in position of 56mm from the present position.
Caution 1	In positioning, the acceleration (acceleration time, deceleration time) specified on the tool selection screen is surely used.

Command	srv_off
Meaning	A controller will be in a ser vo off state.
The example 1	srv_off
Description 1	A controller will be in a ser vo off state.
Caution 1	In an end of a program, it will not be in a servo off state automatically.
Caution 2	If srv_off is performed while ram operates, it will be in a free run state and there is danger of a collision.

Command	zero_cal
Meaning	A check of ZERO value and CAL value are performed.
The example 1	zero_cal
Description 1	A check of ZERO value and CAL value are performed.
Caution 1	Usually, although execution of ZERO and CAL is performed before program execution according to a setup of a tool table, it is controllable also within a program.
Caution 2	When you use it, please be sure to describe at the head of a program.

5.10.4. A setup of limit value, others

Command	lmt_load
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Meaning	Output load is restricted.
The example 1	lmt_load,LoadTbl32
Description 1	An output is restricted to the load specified on the load table 32. Immediate value can also be used for specification of load value.
Caution 1	It is that load restrictions become effective from the mode command after this command description.
Caution 2	If zero are specified with load restrictions, the load computed from the maximum rated torque specified on the motor table will serve as restriction value.
Caution 3	Acceleration of ram may become blunt if load restrictions are set up small. Load restrictions are because it has realized with motor current restrictions internally.

Command	lmt_pos+
Meaning	Specify stroke restrictions of + direction.
The example 1	lmt_pos+,PosTbl16
Description 1	The position specified on the position table 16 is considered as a limit of the direction of +. Specification of a position is possible also at immediate value.
Caution 1	A starting point is a user home position.
Caution 2	Although a setup which exceeds the maximum stroke specified on the tool table is possible, it does not act effectively.
Caution 3	The starting point of the maximum stroke specified on the tool table is a origin sensor.
Caution 4	This setup becomes invalid after a program end.
Caution 5	When it compares with lmt_pos- and inconsistency arises, it becomes an error at the time of mode command execution.
Caution 6	When there is no specification into a program, the maximum stroke specified on the tool table becomes a limit of the direction of +.

Command	lmt_pos-
Meaning	Specify stroke restrictions of - direction.
The example 1	lmt_pos-,#20
Description 1	The position of 20mm is considered as a limit of the direction of - from a user home position. A position table is also possible for specification of a position.
Caution 1	A starting point is a user home position.
Caution 2	When it compares with lmt_pos+ and inconsistency arises, it becomes an error at the time of mode command execution.
Caution 3	This setup becomes invalid after a program end.
Caution 4	When there is no specification into a program, -5mm becomes a limit of the direction of -. This is a position on the basis of a origin sensor.

Command	home
Meaning	A user home position is specified.

The example 1	home,HomeTbl8
Description 1	The position specified on the home position table 8 is specified to a user home.
Caution 1	A starting point is a system home position. The amount of offset from the origin sensor of a user home position becomes what applied the specification value in home command to the system home position.
Caution 2	Only a home position table is possible for specification of a position.
Caution 3	This setup is effective after completing a program.

5.10.5. Branch control

Command	jmp_al
Meaning	An unconditional jump (always)
The example 1	jmp_al,tag10
Description 1	It jumps unconditionally to the step of tag10.

Command	jmp_eq
Meaning	Comparison = jump (equal)
The example 1	jmp_eq,STRK,#30,tag2
Description 1	When a stroke is 30mm, it jumps to the step of tag2.

Command	jmp_gt
Meaning	Comparison > jump (greater than)
The example 1	jmp_gt,STRK,#30,tag2
Description 1	When a stroke is larger than 30mm, it jumps to the step of tag2.

Command	jmp_ge
Meaning	Comparison >= jump (greater or equal)
The example 1	jmp_ge,LOAD,#10,tag8
Description 1	When load is 10kN or more, it jumps to the step of tag8.

Command	jmp_st
Meaning	Comparison < jump (smaller than)
The example 1	jmp_st,SPD,#3.6,tag8
Description 1	When speed is less than 3.6mm/s, it jumps to the step of tag8.

Command	jmp_se
Meaning	Comparison <= jump (smaller or equal)
The example 1	jmp_se,P_LOAD,#12.3,tag8
Description 1	When peak load is 12.3kN or less, it jumps to the step of tag8.

Command	jmp_pe
Meaning	Positioning end jump (positioning end)
The example 1	jmp_pe,tag8
Description 1	When positioning is completed, it jumps to the step of tag8.

Command	jmp_of
Meaning	Servo off jump (off)
The example 1	jmp_of,tag8
Description 1	In servo off, it jumps to the step of tag8.

Command	jmp_bh
Meaning	Bit high check & jump (bit high)
The example 1	jmp_bh,PIN1.LH,#0,tag8
Description 1	When the bit 8 of the general-purpose input ch1 is high, it jumps to the step of tag8.
Caution 1	The object of a bit check is restricted to general-purpose input and output and IO register.

Command	jmp_bl
Meaning	Bit low check & jump (bit low)
The example 1	jmp_bl,PIN1,#14,tag8
Description 1	When the bit 14 of the general-purpose input ch1 is low, it jumps to the step of tag8.
Caution 1	The object of a bit check is restricted to general-purpose input and output and IO register.

Command	jmp_zn
Meaning	Jump tag specification at the time of zone judging NG (zone)
The example 1	jmp_zn,tag100
Description 1	The jump place at the time of being set to NG by zone judging is set to tag100.
Caution 1	When you carry out operation other than usual by zone judging in the case of NG, please specify a jump place by this command. When there is no description of this command, even if zone judging NG occurs, it becomes the same program execution as

	the time of normal.
Caution 2	A jmp_zn command always acts effectively after the step it was described to be in the program. It is processed in the background like processing of a zone judging.

5.10.6. Variable operation

Command	load
Meaning	A numerical value is set to a register etc.
The example 1	load,LOAD_R1,LOAD
Description 1	The present load value is substituted for the load register 1.
The example 2	load,P_LOAD,#0
Description 2	Peak load value is set as zero.
Caution 1	

5.10.7. General-purpose input and output

Command	out
Meaning	It outputs to a general-purpose output.
The example 1	out,POUT1.LH,#16
Description 1	16 is outputted to the bit 15-8 of the general-purpose output ch1.
The example 2	out,POUT2,P_LOAD
Description 2	Peak load value is outputted to the general-purpose output ch2.
The example 3	out,POUT2.L,IO_R1.H
Description 3	The bit 31-16 of the IO register 1 is outputted to the bit 15-0 of the general-purpose output ch2.
Caution 1	It can be used only to a general-purpose output.
Caution 2	Please arrange the bit width of an outputting agency and an output place. Operation when bit width is uneven is unfixed.
Caution 3	Please use IO register, when you output an internal variable per a byte and word.
Caution 4	When an output place is a system allotment bit, the state of the concerned bit does not change.

Command	in
Meaning	It inputs from a general-purpose input.
The example 1	in,IO_R2.HH,PIN1.LH
Description 1	The bit 15-8 of the general-purpose input ch1 is inputted into the bit 31-24 of the IO register 2.
The example 2	in,IO_R3.H,PIN2.L

Description 2	The low rank word of the general-purpose input ch2 is inputted into the higher rank word of the IO register 3.
Caution 1	IO register and a general-purpose input are operation objects.
Caution 2	An inputting agency is inputted also except a user input.
Caution 3	Please arrange the bit width of an outputting agency and an output place. Operation when bit width is uneven is unfixed.

5.10.8. Bit operation

Command	orb
Meaning	Logic sum operation for every bit is performed.
The example 1	orb,POUT1.LH,0x8
Description 1	The bit 15-8 of the general-purpose output ch1 and the logic sum of 0x8 are calculated, and a result is reflected in the bit 15-8 of the general-purpose output ch1.
The example 2	orb,IO_R1.L,PIN1.L
Description 2	The logic sum of the low rank word of the IO register 1 and the low rank word of the general-purpose input ch1 is calculated, and it is reflected in the low rank word of the IO register 1.
Caution 1	IO register and a general-purpose input are operation objects.
Caution 2	Please arrange the bit width of two parameters.Operation when bit width is uneven is unfixed.

Command	andb
Meaning	Logic product operation for every bit is performed.
The example 1	andb,POUT1.LH,0x8
Description 1	The bit 15-8 of the general-purpose output ch1 and the logic product of 0x8 are calculated, and a result is reflected in the bit 15-8 of the general-purpose output ch1.
The example 2	andb,IO_R1.L,PIN1.L
Description 2	The logic product of the low rank word of the IO register 1 and the low rank word of the general-purpose input ch1 is calculated, and it is reflected in the low rank word of the IO register 1.
Caution 1	IO register and a general-purpose input are operation objects.
Caution 2	Please arrange the bit width of two parameters.Operation when bit width is uneven is unfixed.
Caution 3	A result is not reflected in the system allotment bit of a general-purpose output.

Command	setb
Meaning	The specified bit is set to high.
The example 1	setb,POUT1.LH,#0
Description 1	The bit 8 of the general-purpose output ch1 is set to high.
The	setb,IO_R2,#19

example 2	
Description 2	The bit 19 of the IO register 2 is set to high.
Caution 1	IO register and a general-purpose output are operation objects.
Caution 2	A result is not reflected in the system allotment bit of a general-purpose output.

Command	rstb
Meaning	The specified bit is set to low.
The example 1	rstb,POUT1.LH,#5
Description 1	The bit 13 of the general-purpose output ch1 is set to low.
The example 2	rstb,IO_R2,#26
Description 2	The bit 26 of the IO register 2 is set to low.
Caution 1	IO register and a general-purpose output are operation objects.
Caution 2	A result is not reflected in the system allotment bit of a general-purpose output.

5.10.9. Four arithmetical operations

Command	add
Meaning	It adds.
The example 1	add,LOAD_R2,#2.5
Description 1	2.5 is added to the load register 2.
Caution 1	An internal variable register can be used for a parameter 1, and an internal variable, an internal variable register, and immediate value can be used for a parameter 2.

Command	sub
Meaning	It subtracts.
The example 1	sub,STRK_R3,STRK
Description 1	Stroke value is pulled from the Stroke register 3.
Caution 1	An internal variable register can be used for a parameter 1, and an internal variable, an internal variable register, and immediate value can be used for a parameter 2.

Command	mul
Meaning	Multiplication is performed.
The example 1	mul,SPD_R2,#1.5
Description 1	1.5 is applied to the speed register 2.

Caution 1	An internal variable register can be used for a parameter 1, and an internal variable, an internal variable register, and immediate value can be used for a parameter 2.
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Command	div
Meaning	Division is performed.
The example 1	div,LOAD_R1,#1.8
Description 1	The load register 1 is divided by 1.8.
Caution 1	An internal variable register can be used for a parameter 1, and an internal variable, an internal variable register, and immediate value can be used for a parameter 2.

5.10.10. Timer control

Command	tm_rs_st
Meaning	A timer is reset and started.
The example 1	tm_rs_st,TIM_10m
Description 1	"10 m second timer" is reset and calculation is started simultaneously.

Command	tm_stp
Meaning	A timer is suspended.
The example 1	tm_stp,TIM_1m
Description 1	The calculation of "1m second Timer" is stopped.

Command	tm_sta
Meaning	A timer is started.
The example 1	tm_sta,TIM_1s
Description 1	The calculation of a "1 second timer" is started.

5.10.11. End

Command	end
Meaning	A program is ended.
The example 1	end
Description 1	It is one or more places necessity in a program.

5.11. The example of programs

5.11.1. Waiting for fixed time

tag	command	Para. 1	Para. 2	jump	Explanation
	tm_rs_st	TIM_10m			"10ms timer" is reset and started.
tag1	jmp_st	TIM_10m	50	tag1	When "10ms timer" is less than 50 (less than 500ms), it jumps to tag1. If it becomes 50 or more, it will progress to the following step (tag2).
tag2	nop				Nothing is performed.

5.11.2. Positioning and the waiting for completion of positioning

tag	command	Para. 1	Para. 2	jump	Explanation
	pos_a	#20.00	#35.00		It is positioning execution to 35.00mm in 20mm/s in speed.
tag1	jmp_pe			tag2	If positioning is completed, it will jump to tag2. When positioning has not been completed, it is to the following step.
	jmp_al			tag1	It jumps to tag1 unconditionally.
tag2	nop				Nothing is performed.

5.11.3. Waiting for a bit input

tag	command	Para. 1	Para. 2	jump	Explanation
tag1	jmp_bl	USR_IN.LL	#1	tag1	When USR_IN1 is Low, it jumps to tag1. If it is Hi, it progresses to the following step.
	nop				Nothing is performed.

5.11.4. Speed mode specification and waiting for load condition

tag	command	Para. 1	Para. 2	jump	Explanation
	spd	#40.00	ACC_ON		40mm/s in speed is specified by control of acceleration.
tag1	jmp_st	LOAD	#2.0	tag1	If load value is less than 2.0 kNs, it jumps to tag1. If it is 2.0kN or more , progress to the following step.
	nop				Nothing is performed.

6. Menu Outline

main	sub1	sub2	Function	
File	File Manager		The various files used with this application are managed.	
	Data File Merge		The file of a numerical value and waveform data is merged.	
	Data Complement		The data which has not been collected with the obstacle of PC etc. is collected from the buffer of controllers.	
	Data Convert		The file of Ver1.01 form is changed into Ver1.02 form.	
	Disp. Setup File	Read		A setup of a receive filter, a work position name, etc. is read from a file.
		Save		A setup of a receive filter, a work position name, etc. is saved at a file.
	Close		Application is ended.	
Monitor	Num. Monitor		It acts as the monitor of the numerical value of a program execution result.	
	Wave Monitor		It acts as the monitor of the waveform of a program execution result.	
	I/O		It acts as the monitor of the general-purpose input and output.	
	Sensor		It acts as the monitor of the various sensors.	
	Index		It acts as the monitor of the number of times of program execution.	
	MR-J3A I/O		It acts as the monitor of i/o between MR-J3A and BS-M3A-1B.	
	Serial Com.		It acts as the monitor of the contents of communication of serial ports.	
	Connected Spdls.		It acts as the monitor of the connection situation of each spindle, and the software version.	
	Wave Monitor(Multi)		The waveform monitor of 4 screens or 8 screens can be done simultaneously.	
	Work Position		The judgment result of O.K./NG for every work position is displayed on the picture of a work.	
	Anybus Monitor		It acts as the monitor of the contents of communication between PLC and BS controllers via Anybus i/f.	
Viewer	Num. Viewer		The numerical file saved at PC is perused.	
	Wave Viewer		The waveform file saved at PC is perused.	
Program	Editor		An editor is started.	
	Execute		A program is executed.	
	Program Tables		Tables are edited.	
	Judgment table		A judgment table is edited.	

	Zone		A zone is created.
	Automatic generation		A program is automatically generated by setup of few parameters.
	Exec. Multi		A program is simultaneously performed to two or more spindles.
Manual	I/O		General-purpose input and output are operated manually.
	Tool Operation		A tool is operated manually.
	Alarm Reset		Alarm is reset.
	Battery Reset		Battery alarm is reset.
	Brake		A brake is operated manually.
Maintenance	Information		Preservation information is managed.
	Backup		A setup of a controller is backed up.
	Alarm history		It acts as the monitor of the alarm history.
	MR-J3A Alarm history		It acts as the monitor of the alarm history for MR-J3A.
	MR-J3A Proofread		Torque restriction voltage to MR-J3A is proofread.
	Operation history		It acts as the monitor of the operation history to a controller.
Setup	Data collection	Collect	Collection is started or it stops.
		Communication	The communication method between PC-controllers is set up.
		Reciev Filter	The filter of the data to collect is set up.
		Data Forder	The preservation holder of collected data is set up.
		PC Watch	It sets up about the surveillance of PC of operation.
	Date	Setup Date	A clock is set up.
		Format	A date format is set up.
	Serial Port		The serial port of a controller is set up.
	Operation authority		Operation authority is set up.
	Tool Select		A tool type is set up.
	JOG		JOG speed is set up.
	Others		Others are set up.
	Anybus		Anybus is set up.
	Home		A home position is set up.
	Area Signal		Area signal is set up.
View	Tool Bar		A tool bar is customized.
	Icon		All display screens are icon-ized.
	Startup Display		When application is started, the monitoring screens displayed automatically are set up.
	All Close		All display screens are closed.
Help	Help		A help is displayed.

7. Functional Details

7.1. File

7.1.1. File Manager

Although many files were treated in this application, the management function of a file was collected.

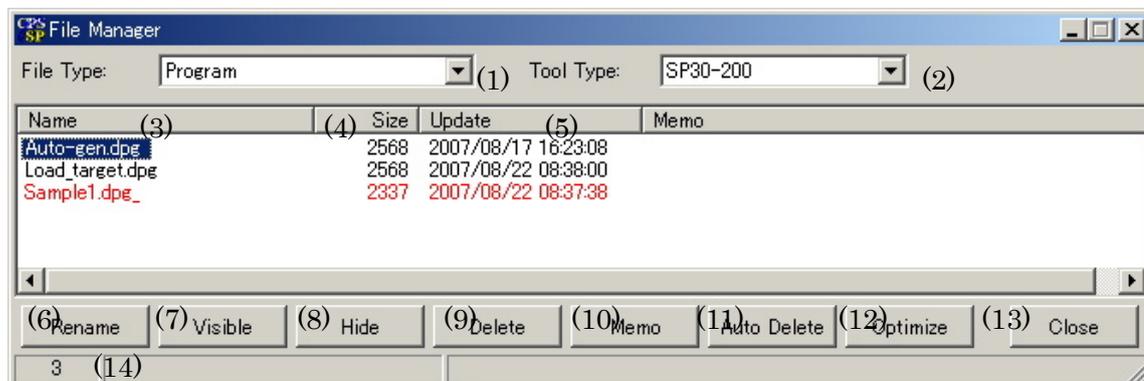


Fig.7-1-1 File manager screen

No.	Item	Explanation
(1)	File Type	The file type for operation is set up.
(2)	Tool Type	The tool type for operation is set up. A program file is managed by another folder for every tool type.
(3)	Name	A file list is sorted by the name.
(4)	Size	A file list is sorted in file size.
(5)	Update	A file list is sorted under a date.
(6)	Rename	The name of the selected file is changed.
(7)	Visible	The selected file is setup visible.
(8)	Hide	The selected file is setup hidden. The hidden file is expressed in red as this screen. Moreover, '_' is added to the end of an extension and it is un-displaying in the file selection dialog of each function.
(9)	Delete	The selected file is deleted. Since it does not go into the garbage box of OS, please be careful.
(10)	Memo	The memorandum of the selected file is edited.
(11)	Auto Deletion	The automatic deletion setting screen of a waveform file opens.(Fig. 7-1-2)
(12)	Optimize	The memorandum without necessity is deleted.
(13)	Close	The screen is ended.
(14)	The number of files	The number of files currently displayed on the file list is shown.

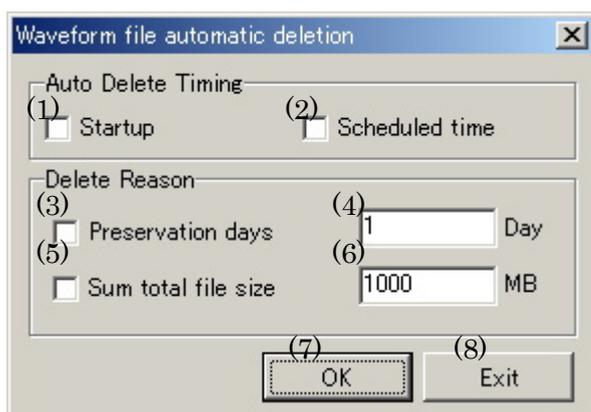


Fig.7-1-2 Waveform file automatic deletion setting screen

A waveform file has the size of a maximum of 16KB by one data, and if it saves much waveform data, it may occupy many domains of HDD. This is a setup about the function to delete a waveform file automatically per file.

No.	Item	Explanation
(1)	Startup	If a check is put in, file deletion processing will be carried out at the time of application starting.
(2)	Scheduled time	If a check is put in, when a date changes, file deletion processing is carried out.
(3)	Preservation days	If a check is put in, the file for deletion will be decided by preservation days.
(4)	Day	A file older than the set-up days is set as the deletion object.
(5)	Sum total file size	If a check is put in, deletion processing will be carried out in the sum total size of a waveform file.
(6)	Size	Deletion is carried out when the sum total size of a waveform file exceeds setting size. It is deleted in the order of a date of a file.
(7)	OK	The screen is ended reflecting a setup.
(8)	Exit	A setup is canceled and the screen is ended.

7.1.2. Data File Merge

Two or more data files are merged into one file.

No.	Item	Explanation
(1)	Open	The file dialog which chooses the file to merge opens.
(2)	Merge	The files currently displayed on the list are merged. The file dialog which inputs the file name of the file which is merged and is newly created opens.
(3)	Delete	The file chosen in the list is deleted from the list.
(4)	Clear	All the contents of a list are deleted.
(5)	Close	The screen is closed.

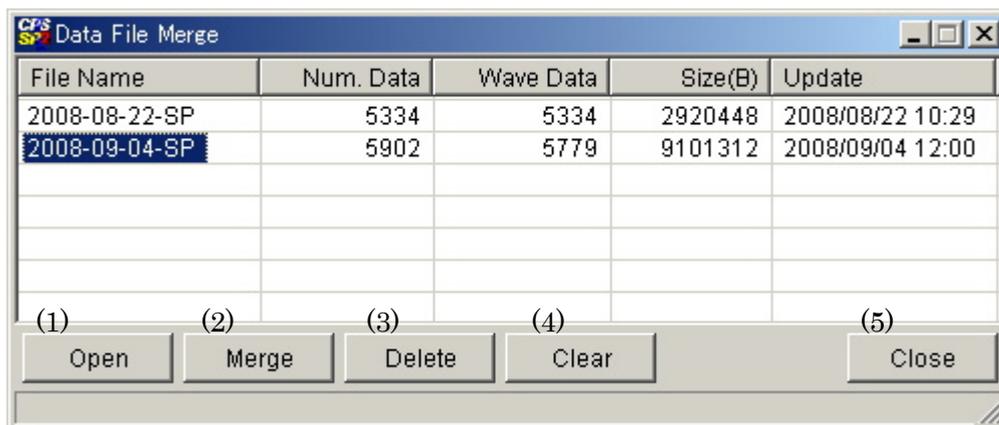


Fig. 7-1-3 Data file merge screen

7.1.3. Data Complement

This is the function which reads the data from the buffer of a controller which has not been collected in the trouble of PC or a network during data collection, and complements a data file. The controller to access follows a setup of a receiving filter.

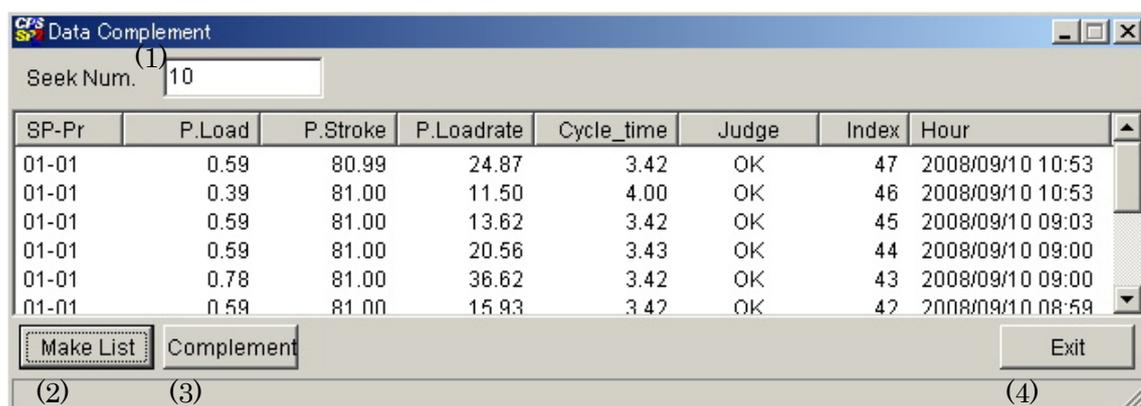


Fig. 7-1-4 Data complement screen

No.	Item	Explanation
(1)	Seek Num.	The number of the buffers for which this function seeks is set up. Maximum is 25 affairs. 25 or more complements cannot be performed.
(2)	Make List	The list of the data which has not been collected is created.
(3)	Complement	The additional writing of the data currently displayed in a list is carried out at a data file.
(4)	Exit	The screen is closed.

7.1.4. Data Convert

The file of Ver1.01 form is changed into the file of Ver1.02 form. The file of Ver1.01 form cannot be displayed directly with the viewers. Please use this function, and have a look with a viewer after changing into Ver1.02 form. In Ver1.01, numerical data and waveform data are saved at the separate files. In Ver1.02, numerical data and waveform data are saved at the same file. In changing into Ver1.02, please choose either a numerical data file or a waveform data file. The remaining file of the same name is searched automatically and changed into the file of Ver1.02 form in a perfect form.

7.1.5. Disp. Setup File

A setup of a receive filter, a work position name, etc. is saved at a file, or is read. It is convenient when copying a complicated display setup to other PCs.

7.1.6. Close

Application is ended.

7.2. Monitor

7.2.1. Numerical Monitor

It acts as the monitor of the numerical data of a program execution result.

Serial No	Work Pos	Spindle	Program	Index	P.Load	F.Load	F.Stroke	Judge	Jt
CORETE 3202	EX-1	01	20	12	15.51	13.78	7.83	OK	
CORETE 3201	EX-1	01	20	11	15.55	13.93	7.83	OK	
CORETE 3200	IN-2	01	20	10	15.36	13.71	7.73	OK	
CORETE 3199	IN-2	01	20	9	15.55	14.23	7.83	OK	
CORETE 3198	IN-2	01	20	8	15.40	13.82	7.78	NG	
CORETE 3196		01	20	7	15.43	13.86	7.83	OK	
CORETE 3195		01	20	6	15.51	14.08	7.84	OK	

Recv. Order (1) WP. Setup (2) Recieve (3) Disp. Items (4) Filter (5) Close (6)

Fig.7-2-1 Numerical Monitor screen

No.	Item	Explanation
(1)	Display style selection	Display style is chosen. In the case of Recieve Order, the data received newly is displayed on the top line. The existing datas are shifted downward. In the case of Spindle No., a display position is decided for every spindle number, and only the newest data of each spindle is displayed. In the case of Work Position, a display position is decided for every Work Position, and only the newest data of each Work Position is displayed.
(2)	WP Setup	The screen which sets up Work Position name for every display position opens. (Figure 7-2-15-2 Work Position Name Setup screen) It is used with a waveform monitor(multi) 's Work Position Name Setup screen in common.
(3)	Recieve	The numerical data of a maximum of 2700 affairs currently held in the controller is received, and they are displayed on a figure 7-2-3 Numerical Viewer screen. The number of receiving data can be specified arbitrarily. The newest data to the data of the number of specification are received.
(4)	Display item	The screen for setting up the display item of the screen opens.(Fig. 7-2-2)
(5)	Filter	The filter setting screen of display data opens.(Fig. 7-2-3)
(6)	Close	The screen is ended.

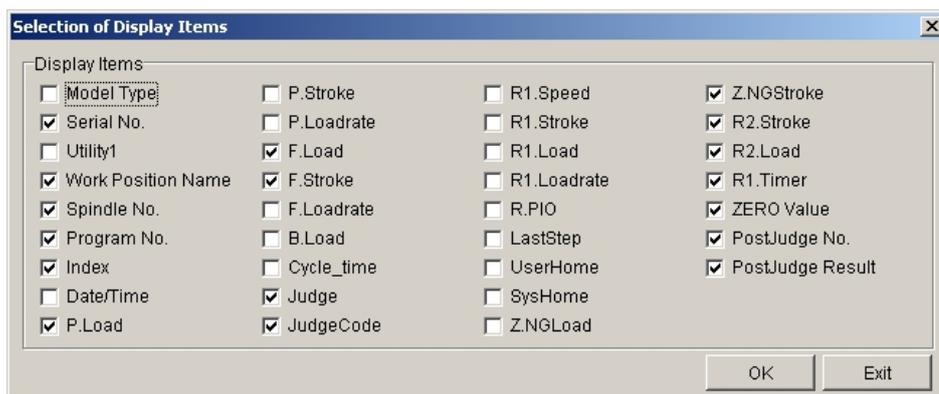


Fig. 7-2-2 Display item selection screen

A check is put into the item to display. It does not have influence on the data collected from a controller. It is restricted to a setup of the display on PC.

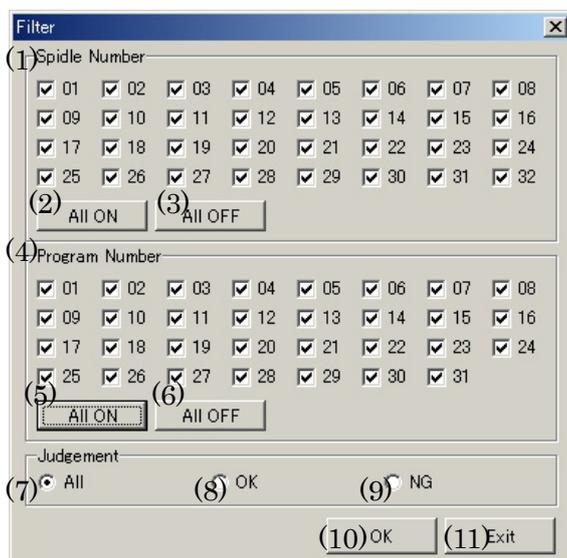


Fig. 7-2-3 Filter screen

No.	Item	Explanation
(1)	Spindle Number	The numerical data of the spindle containing the check is displayed.
(2)	All ON	A check goes into all spindle numbers.
(3)	All OFF	The check of all spindle numbers turns off.
(4)	Program Number	The numerical data of a program number containing the check is displayed.
(5)	All ON	All program numbers will be in ON state.
(6)	All OFF	All program numbers will be in OFF state.
(7)	All	When displaying regardless of a judgment result, it turns ON.
(8)	OK	When displaying only the numerical data of judgment O.K., it turns ON.
(9)	NG	When displaying only the numerical data of judgment NG,

		it turns ON.
(10)	OK	The screen is ended reflecting a setup.
(11)	Exit	A setup is canceled and the screen is ended.

Cautions 1 A filter function is restricted to a display and is unrelated to collection of data.

Cautions 2 A display of a numerical monitoring screen and data collection are unrelated. If it is a setup to which data collection is carried out even if it is not displayed, numerical data is saved at PC.

7.2.2. Waveform monitor

It acts as the monitor of load, the stroke, etc., and displays them by the waveform. 30 graph is displayed at the maximum. A monitor is possible for four kinds of waveforms. Load and a stroke are fixed. Remaining two are an extended function and the kind of data can be chosen.

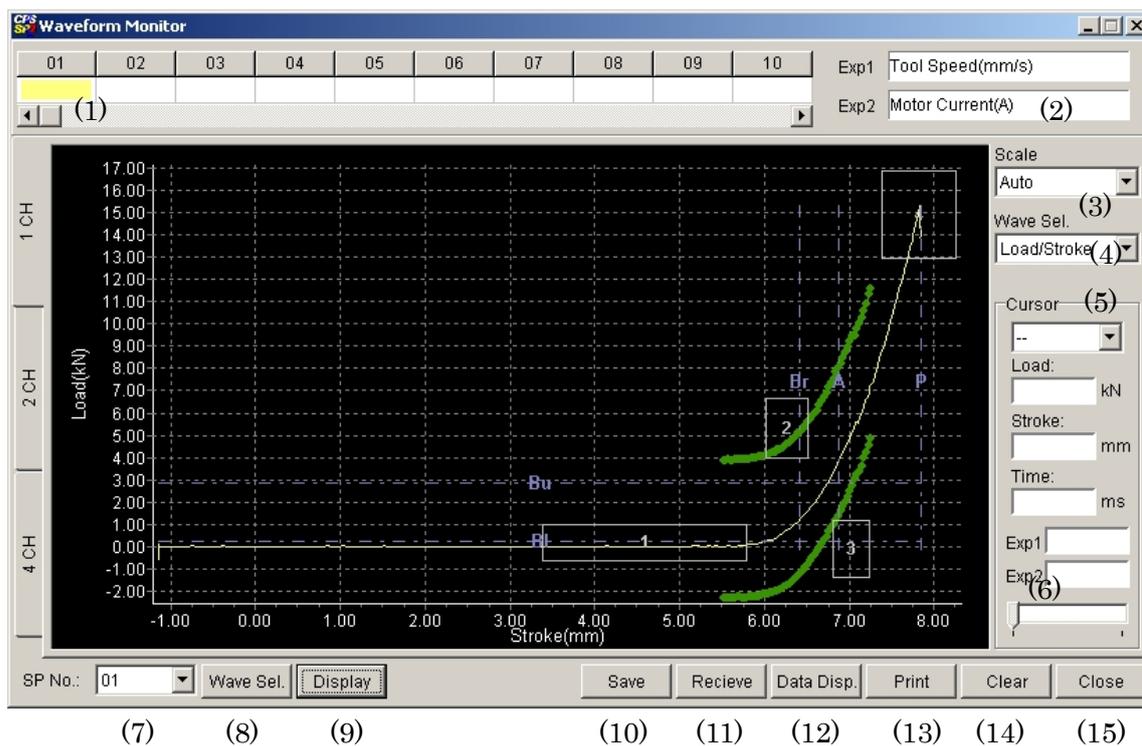


Fig. 7-2-4 Waveform monitoring screen

No.	Item	Explanation
(1)	Waveform No.	A waveform number and its drawing color are shown. The newest waveform is No. 1.
(2)	Extended waveform name	The data name chosen by the extended waveform data 1 and 2 is shown.
(3)	Scale	A scale setup of graph is performed. Three kinds of setup,

		Auto, Data, and Manual, is possible for a scale. You can set up a scale by drug operation of a mouse as another method. Graph is expanded with the drug to the direction of the lower right. A scale returns to Auto with the drug to the direction of the upper left. Graph is scrolled with the drug in a right click.
(4)	Waveform selection	The waveform displayed on graph is chosen. Four kinds of data loads, a stroke, the extension 1, and extended 2- can be drawn with a time-axis base or a stroke axis base.
(5)	Cursor	A waveform number is chosen and a numerical value can be read with cursor.
(6)	Cursor operation	Cursor is moved. Movement of cursor is possible by left click.
(7)	Spindle Number	A spindle number is chosen. When "Select" is chosen, the spindle number selection screen opens. Only the newest data is overwritten in the waveform data of the spindle number chosen on the screen. (Multi- spindles type display) When one of spindle numbers is chosen, it becomes a history type display.
(8)	Waveform selection	The screen which chooses the data of the extended waveforms 1 and 2 is displayed. Please refer to a figure 7-2-5 waveform selection screen.
(9)	Display	The screen which sets up the color of graph, the number of data collection, a sampling cycle, etc. is displayed. Please refer to Fig. 7-2-6-1 - 4 display setting screen.
(10)	Save	The waveform currently displayed is saved at a waveform file .
(11)	Recieve	The waveform data saved in the controller is received.
(12)	Data Disp.	The numerical data of the waveform currently displayed is displayed.
(13)	Print	The graph currently displayed is printed.
(14)	Clear	Graph is eliminated.
(15)	Close	The screen is ended.

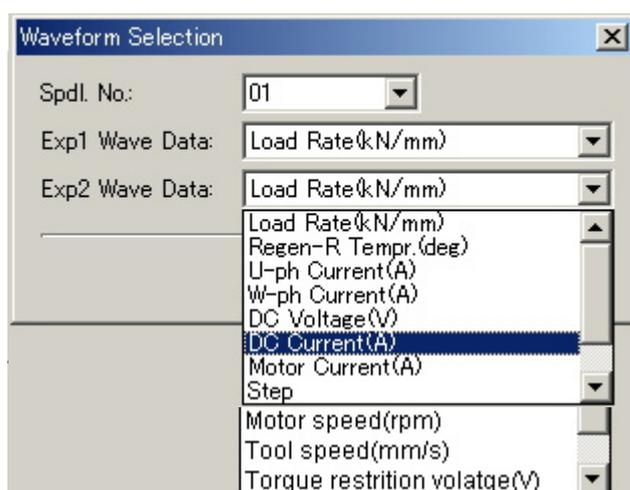


Fig. 7-2-5 Waveform selection screen

Some typical waveforms are explained.

Name	Explanation
------	-------------

Changing Rate of Load	It is the changing rate of load. Suitable filter processing needs to be set up.
Regen. load rate	The load rate of regeneration resistance is shown by %.
Real time torque	Instantaneous motor current is shown. It becomes 100% in rated output.
Average torque	The execution value of motor current is shown. It becomes 100% in rated output.
Peak load rate	The peak value of motor current is shown. It becomes 100% in rated output.
Mother line voltage	It is the voltage of the both ends of the capacitor after rectifying AC input. The unit is V.
Error pulse	The difference of instruction pulse value and the encoder value of a motor is shown.
Step	It is the execution step of a program. It can use for the analysis of a program by acting as a monitor combining other waveforms.
Motor speed (rpm)	The rotation speed of the output axis of a motor is shown. The unit is rpm.
Tool speed(mm/s)	It is the speed of ram. It can use for the action analysis of a tool against to load change etc.
Torque restriction value	The torque restriction voltage to MR-J3A is shown. The maximum rating is equivalent to 10V.
Instruction speed to motor(rpm)	The instruction value of motor speed is shown. . The unit is rpm.
Instruction speed to tool(mm/s)	The instruction value of ram speed is shown. The unit is mm/s.

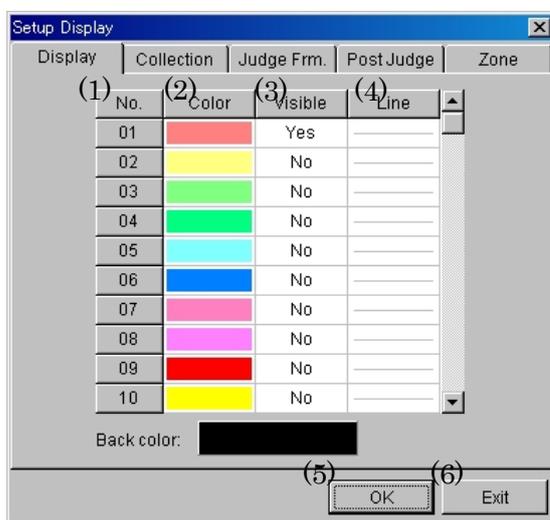


Fig. 7-2-6-1 Setup Display screen-Display

A setup about graph drawing of a waveform screen is performed.

No.	Item	Explanation
(1)	Number	As for the case of a multi-spindle type display, it means a spindle number. In a single spindle display, it shows a history number. No. 1 becomes the newest data.

(2)	Color	The drawing color of graph is set up.
(3)	Visible	The graph set as "Yes" is displayed.
(4)	Line	The width of the line of graph is set up.
(5)	OK	The screen is closed reflecting a setup.
(6)	Exit	A setup is canceled and the screen is closed.

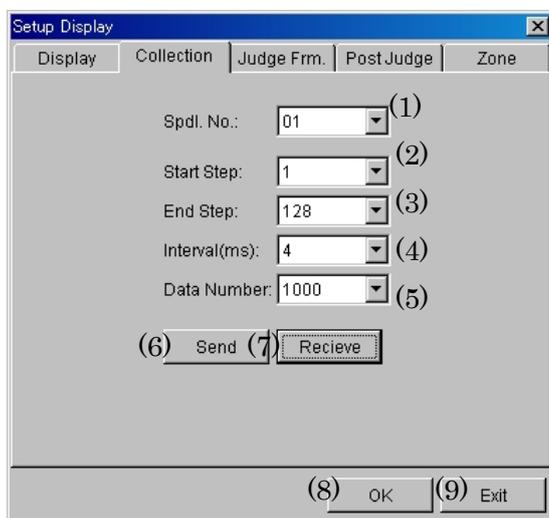


Fig. 7-2-6-2 Setup Display screen-collection

A setup about waveform data reception of a waveform screen is performed.

No.	Item	Explanation
(1)	Spindle Number	The spindle number for a setup is chosen.
(2)	Start Step	The step number in the user program which starts waveform data preservation is set up.
(3)	End Step	The step number in the user program which ends waveform data preservation is set up.
(4)	Interval	The sampling cycle of data is set up per ms.
(5)	Data Number	The maximum number of waveform data which receives is set up.
(6)	Send	A setup is sent to the controller of an appointed spindle number.
(7)	Recieve	A setup is received from the controller of an appointed spindle number.
(8)	OK	The screen is ended reflecting a setup.
(9)	Exit	A setup is canceled and the screen is ended.

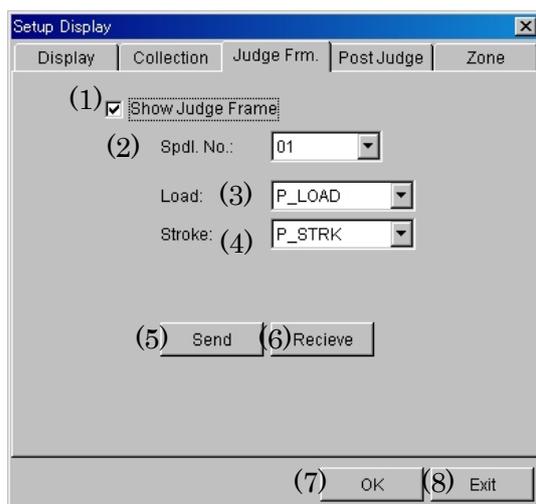


Fig. 7-2-6-4 Setup Display screen-Judging Frame

Judgment area can be drawn on a waveform screen by choosing a stroke and load from a judgment table. A setup about it is performed. Judgment area is drawn when both selected stroke and / load item are set as "YES" on the judgment table. Please check on the judgment table used by the program performed.

No.	Item	Explanation
(1)	Show Judge Frame	Check it, when displaying a judge frame.
(2)	Spindle Number	The spindle number for a setup is chosen.
(3)	Load	It chooses from the variable which expresses load on a judgment table. Peak load, Final load, Bottom load, load register 1, and load register 2 are selection candidates.
(4)	Stroke	It chooses from the variable which expresses a stroke on a judgment table. Peak stroke, Final stroke, stroke register 1, and stroke register 2 are selection candidates.
(5)	Send	A setup is sent to the controller of an appointed spindle number.
(6)	Recieve	A setup is received from the controller of an appointed spindle number.
(7)	OK	The screen is ended reflecting a setup.
(8)	Exit	A setup is canceled and the screen is ended.

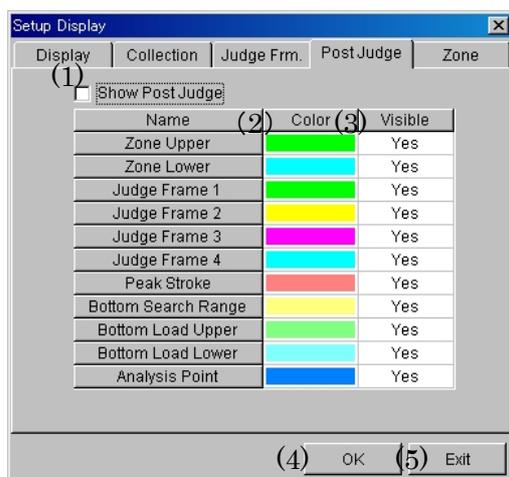


Fig. 7-2-6-5 Setup Display screen-Post Judge

On this screen, it sets up about a display of the judgment base line at the time of using the Post Judge function.

No.	Item	Explanation
(1)	Show Post Judge	Check it, when displaying judgment base line of Post Judge function.
(2)	Color	The drawing color of each lines are set up.
(3)	Visible	The line set as "Yes" is displayed.
(4)	OK	The screen is ended reflecting a setup.
(5)	Exit	A setup is canceled and the screen is ended.

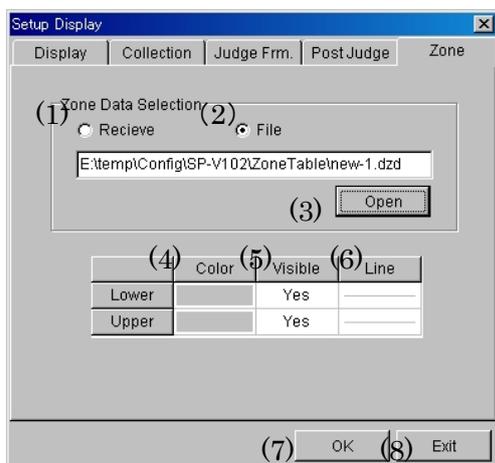


Fig. 7-2-6-5 Setup Display screen-Post Judge

On this screen, it sets up about a display of the judgment base line at the time of using the Post Judge function.

No.	Item	Explanation
(1)	Recieve	Please choose this “Recieve” button, when you want to display the zone used in a program.
(2)	File	Please choose this “File”button, when you want to display a zone file in PC.
(3)	Open	The screen which chooses a zone file opens.
(4)	Color	The drawing color of each lines are set up.
(5)	Visible	The line set as "Yes" is displayed.
(6)	Line	The width of the line of graph is set up.
(7)	OK	The screen is ended reflecting a setup.
(8)	Exit	A setup is canceled and the screen is ended.

7.2.3. Sensor

It acts as the monitor of the information on various sensors.

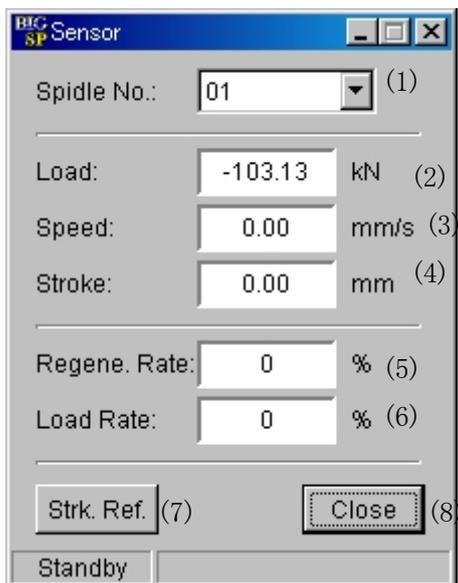


Fig. 7-2-9 Sensor screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number which acts as a monitor is chosen.
(2)	Load	It acts as the monitor of the load value.
(3)	Speed	It acts as the monitor of the ram speed.
(4)	Stroke	It acts as the monitor of the stroke.
(5)	Regen. Rate	It acts as the monitor of the rate of regeneration load. 100% is the maximum.
(6)	Load Rate	It acts as the monitor of the rate of effective load.
(7)	Strk. Ref.	The screen which determines the starting point of the stroke opens. (Fig. 7-5-3)
(8)	Close	The screen is ended.

7.2.4. I/O

The monitor of I/O can be done.

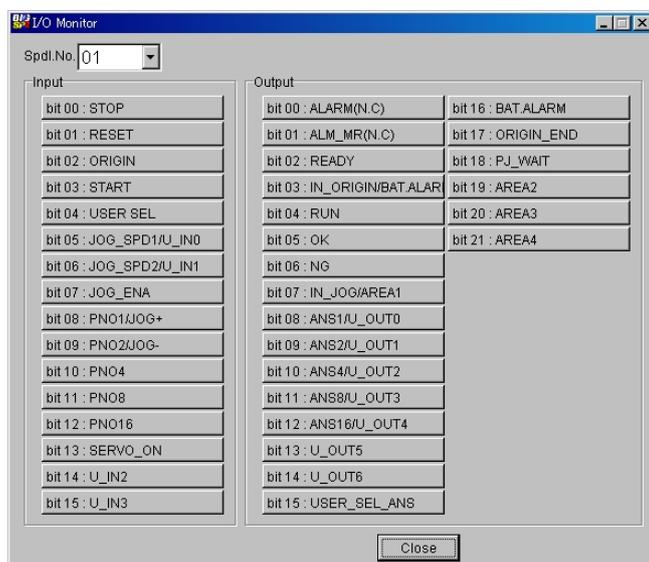


Fig. 7-2-10 I/O monitoring screen

7.2.5. Index

An index is the reference number which shows the number of times of execution of programs. An index number is held in a controller and used continuously. Updating of a date sets index to 1. In a numerical data file and a waveform data file, unless a user pre-sets, an index number is unique.

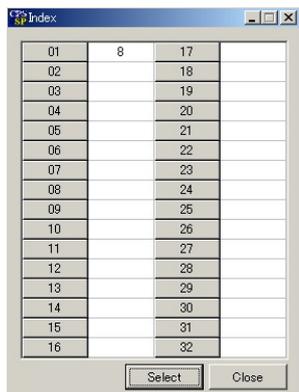


Fig. 7-2-11 Index monitoring screen

7.2.6. MR-J3A I/O

The monitor of the I/O between BS controller and MR-J3A is able.

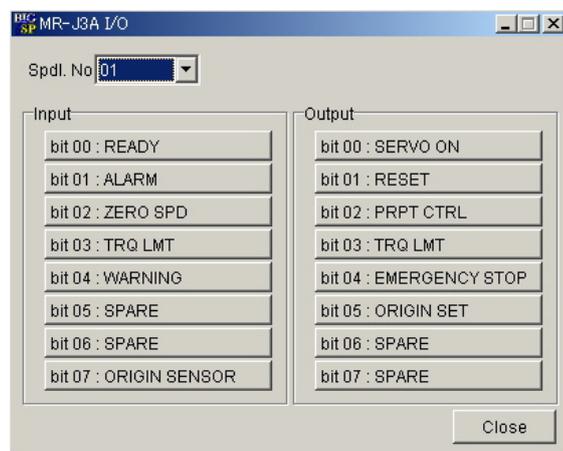


Fig.7-2-12 MR-J3A I/O

7.2.7. Serial communication

It acts as the monitor of the contents of communication of a serial port.

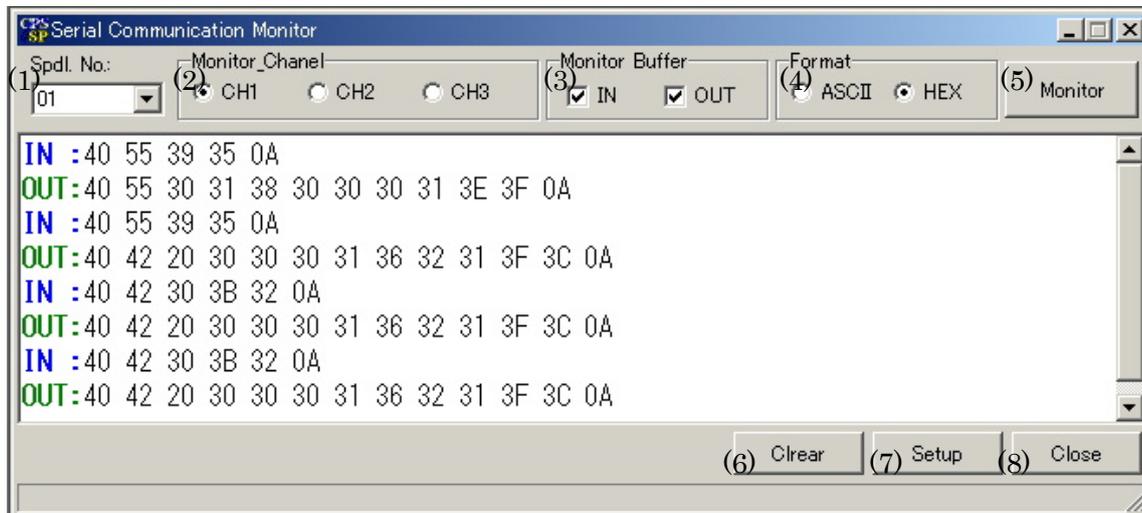


Fig.7-2-13 Serial communication monitor screen

No.	Item	Explanation
(1)	Spindle number	The spindle number for a monitor is chosen.
(2)	Monitor Chanel	The serial port for a monitor is chosen.
(3)	Monitor buffer	A check is put into the buffer for a monitor.
(4)	Format	It chooses whether a monitor result is displayed in written form or it displays in hex code.
(5)	Monitor	A monitor is carried out in the state where it was depressed.
(6)	Clear	A monitor result is eliminated.
(7)	Setup	The screen which sets up a communicative header and a delimiter opens.
(8)	Close	The screen ends.

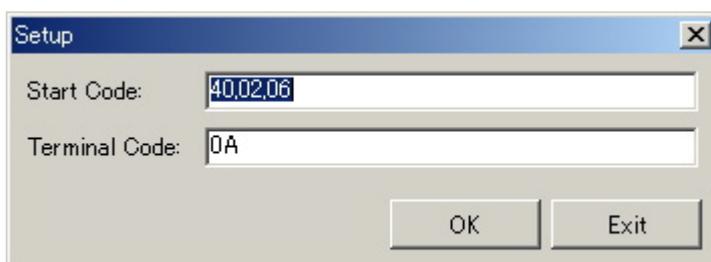


Fig.7-2-14 Serial communication monitor setup screen

The start code of serial communication and a terminus code are set up. Two or more codes can be set up. Please divide by ',' between codes. Please describe a code by the number expression of hex.

7.2.8. Wave Monitor(Multi)

The monitor of 4 or 8 waveforms is possible simultaneously. If switched by tab operation, display of 32 waveforms is possible at the maximum.

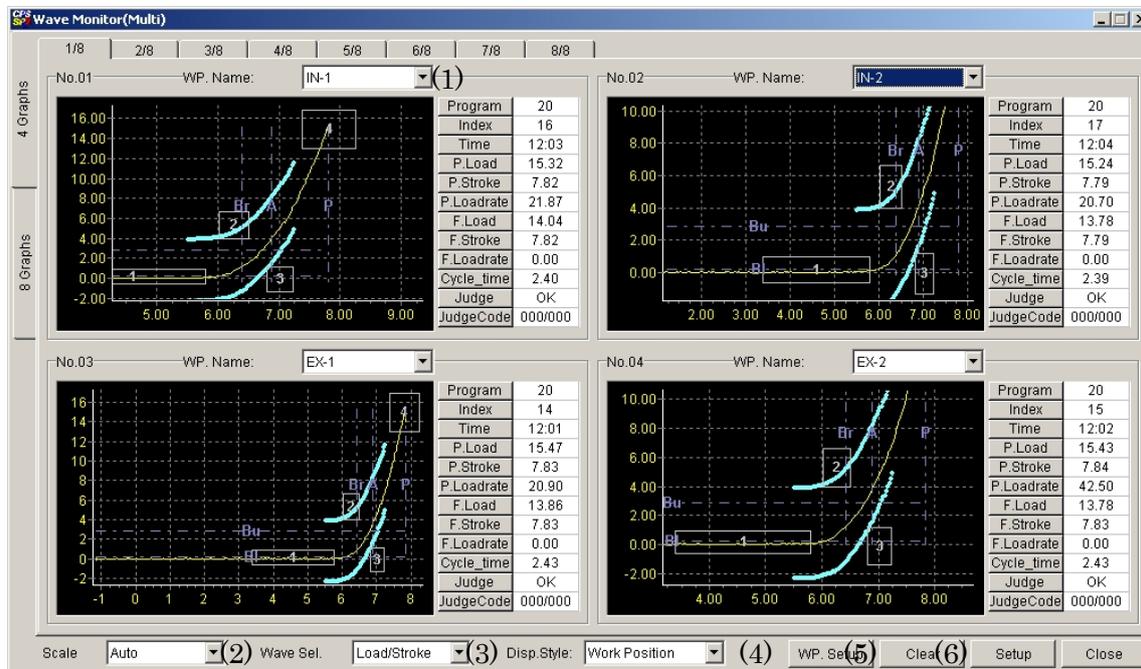
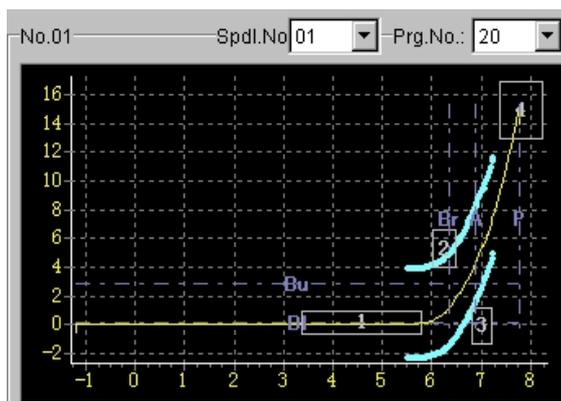


Fig.7-2-15 Wave Monitor(Multi) screen

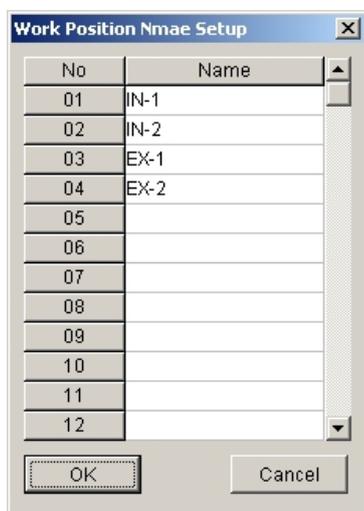
No.	Item	Explanation
(1)	WP Name	When (3)Displ.Style is selected as Work Position, select the work position name which are set up by (4) WP. Setup. When (3)Displ.Style is selected as Spdl.No-Prg.No, select a spindle number and a program number as shown in Fig. 7-2-15-1.
(2)	Wave Sel.	The waveform displayed on graph is chosen. Four kinds of data loads, a stroke, the extension 1, and extended 2- can be drawn with a time-axis base or a stroke axis base.
(3)	Disp. Style	Please set up the specification method of the waveform source displayed on each graph screen. Work Position or Spdl.No + Prg.No is chosen.
(4)	WP. Setup	The Work Position Name Setup screen of Fig. 7-2-15-2 opens.The work position name set up here must be the same name as what is set to the controller via Anybus i/f from PLC.A waveform is not displayed when work position names differ.
(5)	Clear	All the graph currently displayed is eliminated.
(6)	Setup	The setup screen about drawing color of graph or a judgment refernce line opens.

Caution A Work Position Name is a part of a numerical data set up to a contoller via Anybus i/f from PLC.



When Disp. Style is selected as Spdl.No-Prg.No, an appointed waveform is drawn by specifying a spindle number and a program number.

Fig.7-2-15-1 A screen selected Spdl.No-Prg.No



A work position name is set to each graph number. The work position name set up here must be the same name as what is set to the controller via Anybus i/f from PLC. A waveform is not displayed when work position names differ.

Fig.7-2-15-2 Work Position Name Setup screen

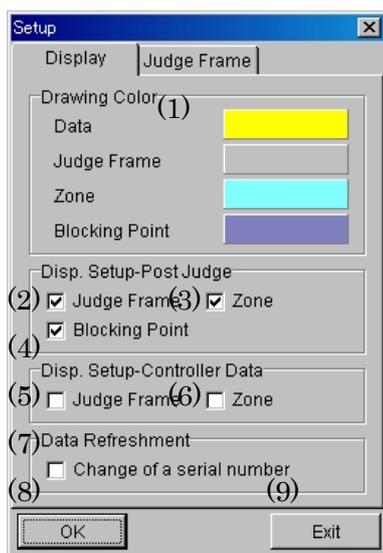


Fig.7-2-15-3 Wave Monitor(Multi) Setup screen-Display tab

No.	Item	Explanation
(1)	Drawing Color	The drawing color of waveform data, a judgment frame, a zone, and a blocking point is set up.
(2)	Judge Frame	A check is put in when displaying the judgment frame by the post judgment.
(3)	Zone	A check is put in when displaying the zone by the post judgment.
(4)	Blocking Point	A check is put in when displaying the blocking point by the post judgment.
(5)	Judge Farme	A check is put in when displaying the judgment frame by the judgment table of a controller.
(6)	Zone	A check is put in when displaying the zone line by zone judging of a controller.
(7)	Change of a serial number	A check is put in when once eliminating the whole graph by change of a serial number. A serial number means a part of numerical data set up to a contoroller via Anybus i/f from PLC.
(8)	OK	The screen is ended reflecting a setup.
(9)	Exit	A setup is canceled and the screen is ended.

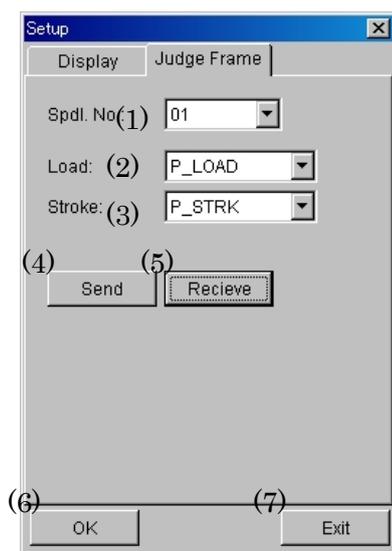


Fig.7-2-15-5 Wave Monitor(Multi) Setup screen-Judge Frame tab

It is a setting screen in the case of drawing a judgment frame according to the setting value of the judgment table in a controller.

No.	Item	Explanation
(1)	Spdl.No.	An spindle number to set up is chosen.
(2)	Load	It chooses from the variable which expresses load on a judgment table. Peak load, Final load, Bottom load, load register 1, and load register 2 are selection candidates.
(3)	Stroke	It chooses from the variable which expresses a stroke on a judgment table. Peak stroke, Final stroke, stroke register 1, and stroke register 2 are selection candidates.
(4)	Send	A setup is sent to the controller of an appointed spindle number.
(5)	Recieve	A setup is received from the controller of an appointed spindle number.
(6)	OK	The screen is ended reflecting a setup.

7.2.9. Work Position Monitor

O.K. / NG judging of each work position or each spindle number are displayed on the picture of a work.

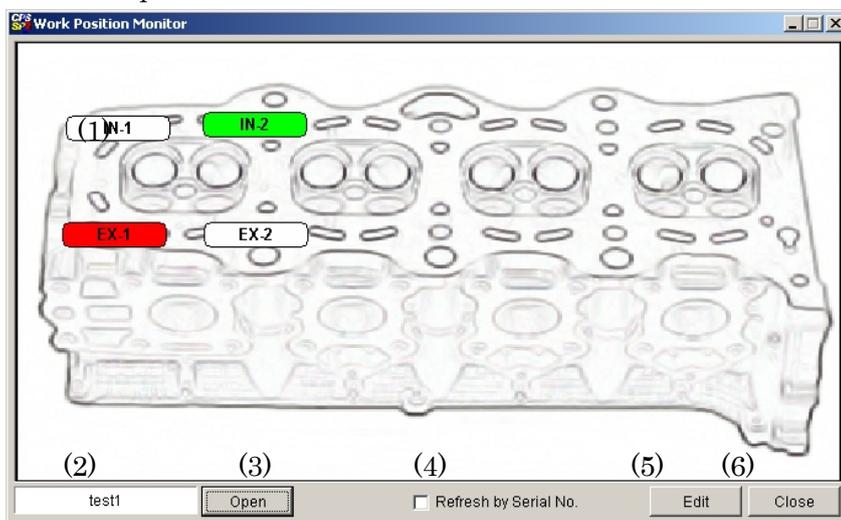


Fig.7-2-16 Work Position Monitor screen

No.	Item	Explanation
(1)	Judgement display	When a program execution result is O.K., it is displayed green. In the case of NG, it is displayed on red. If the judgment display is right-clicked, the floating menu which refers to numerical data and waveform data will be displayed.
(2)	File Name	The name of a work position monitor file on display is shown.
(3)	Open	The screen which chooses the work position monitor file to display opens.
(4)	Refresh by Serial No.	It is a setup about reset of a judgment display. A check is put in when resetting a judgment display to the timing from which the serial number of a work changed. A serial number means a part of numerical data set up to a controller via Anybus i/f from PLC.
(5)	Edit	The edit screen of a work position monitor file opens. (Fig. 7-2-16-1)
(6)	Close	The screen is closed.

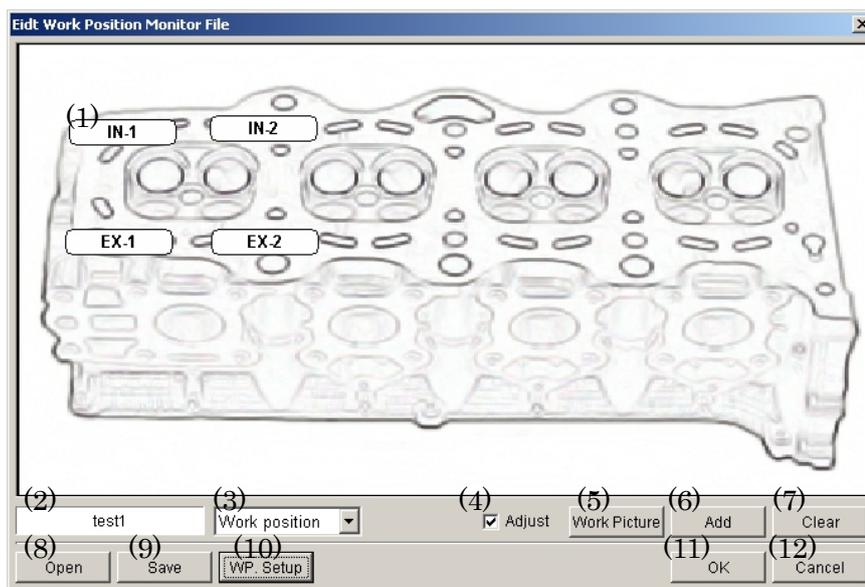


Fig.7-2-16-1 Work Position Monitor File Edit screen

No.	Item	Explanation
(1)	Judgment display	It can arrange in arbitrary positions with a drag. A judgment display setting screen is displayed if it is right-clicked. (Fig. 7-2-16-2)
(2)	File name	The name of the work position monitor file under edit is shown.
(3)	Selection of a display method	It chooses whether the display method of a judgment display is made by Work Position name, or it is made by a spindle number + program number.
(4)	Adjust	A check is put in when bmp file chosen by (5) is adjusted to screen size.
(5)	Work Picture	The screen which chooses the file of bmp form opens. The selected file is displayed as a work form picture.
(6)	Add	Please click, when you add a judgment display. A judgment display setting screen (Fig. 7-2-16-2) opens.
(7)	Clear	All the contents of a setting are cleared.
(8)	Open	The screen which chooses a work position monitor file opens.
(9)	Save	The contents on display are saved. A file dialog opens.
(10)	WP. Setup	A work position name setting screen opens. (Fig. 7-2-16-3) The work position name set up here must be the same name as what is set to the controller via Anybus i/f from PLC. When a work position name is not right, a judgment display does not work well.
(11)	OK	The screen is ended reflecting a setup.
(12)	Cancel	A setup is canceled and the screen is ended.

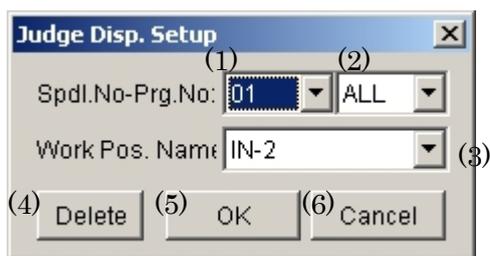
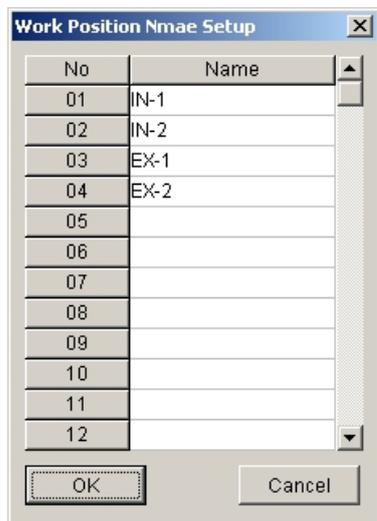


Fig..7-2-16-2 Judge Disp.Setup

No.	Item	Explanation
(1)	Spdl.No	The judgment result of the spindle chosen on this screen is displayed.
(2)	Prg.No	The judgment result of the program chosen on this screen is displayed.
(3)	Work Pos. Name	The name set up on the work position name setup screen(Fig..7-2-16-3) is displayed in a list. The judgment result of the work position chosen from the list is displayed.
(4)	Delete	A judgment display is deleted and a screen is ended.
(5)	OK	The screen is ended reflecting a setup.
(6)	Cancel	A setup is canceled and the screen is ended.



This is the same as that of the work position name setup screen of Fig.7-2-15-2. No. is the internal management number of a judgment display. This is also a graph number of waveform monitor (multi) . The work position name set up here must be the same name as what is set to the controller via Anybus i/f from PLC. When a work position name is not right, a judgment display does not work well.

Fig.7-2-16-3 Work Position Name Setup screen

7.2.10. Connection table of spindles

A list display of BS controller connected to the same communication system is possible.

A tool type, a microcomputer software version, and a communication state are displayed in a list for every spindle.

When it is in the state where the spindle scan button was depressed, scan of each spindles is carried out.

A software version consists of the numerical value of 6 figures, and is divided 2 figures at a time by the period. It becomes a major version and middle version and a minor version from left-hand side. The version is added also like this application BS Configurator. Transmission (setup) is impossible although reception is possible when more than a middle version is not in agreement with a controller and application. Please use BS Configurator of a suitable version after arranging the middle version of a controller, and a major version, when the system of multi-spindles composition is built.

Spdl.No.	Tool Type	Version	Connection	Spdl.No.	Tool Type	Version	Connection
01	CNN20SS	1.01.18	OK	17			
02			ERROR	18			
03			ERROR	19			
04			ERROR	20			
05			ERROR	21			
06			ERROR	22			
07			ERROR	23			
08			ERROR	24			
09			ERROR	25			
10			ERROR	26			
11				27			
12				28			
13				29			
14				30			
15				31			
16							

Fig.7-2-17 Connection table of spindles screen

7.2.11. Anybus Monitor

This screen acts as the monitor of the contents of communication between PLC and BS controllers via Anybus i/f. The display is updated when the contents of the control part or the data part change. The display is not updated when both the control part and the data part are zero altogether.

The lower picture is the screen of 4 times extension specification. The number

of data to link is recognized automatically and a suitable screen is displayed.

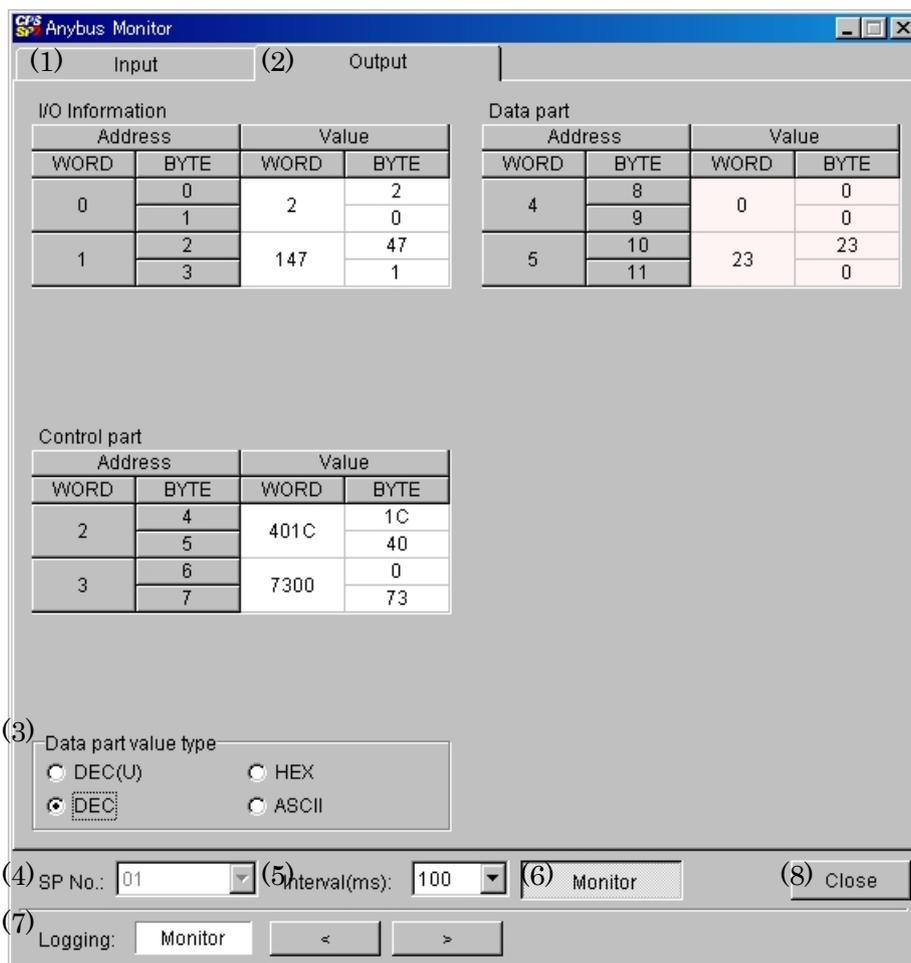


Fig 7-2-18 AnybusMonitor screen

No.	Item	Explanation
(1)	Input	The output from PLC is displayed.
(2)	Output	The output from BS controller is displayed.
(3)	Data part value type	The display form of the numerical value of the data part is chosen.
(4)	SP No.	Please choose the spindle number for monitoring.
(5)	Interval(ms)	A time interval to access BS controller is set up. Generally data communication of CC-Link etc. is performed at intervals of some dozens of Milli second. Since the shortest time of this screen is 100ms, all the contents of data are not necessarily displayed.
(6)	Monitor	The monitor is performed where this button is depressed.
(7)	Logging	The data for the past 10 times is saved.
(8)	Close	The screen is end.

7.3. Viewer

7.3.1. Numerical viewer

The numerical data which was collected by PC and saved at the file can be seen.



Fig. 7-3-1 Numerical viewer screen

No.	Item	Explanation
(1)	Open	A numerical data file is chosen.
(2)	Save	The contents of a display are saved.
(3)	Filter	The filter setup screen of display data opens. (Fig. 7-3-2)
(4)	Print	The contents of a display are printed.
(5)	Delete	The data of the selected line is deleted.
(6)	CSV	The contents of a display are formed into CSV file.
(7)	Display Items	The screen for setting up the item to display opens.
(8)	Wave View	Selected data can be seen with the Waveform Viewer. (Fig. 7-3-3)
(9)	Close	A screen is ended.
(10)	File name	A file name on display is shown.
(11)	Data number	The number of records on display is shown.

It is the filter setup screen of the display data of a numerical viewer screen. When a file is opened by the numerical viewer, all filter setup is invalid. Please set up a required item, put in a check and push an execution button. The filtered data is displayed on a numerical viewer screen. Wild card "*" and "?" can be used for a product model name, serial number, and work position name.

Cation When "%" and "_" are contained in a product model name, serial number, and work position name, a filter may not function correctly.

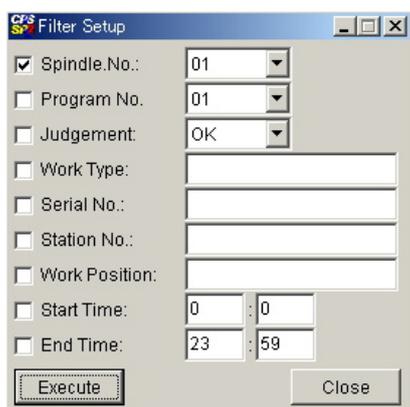


Fig. 7-3-2 Numerical viewer Filter setup screen

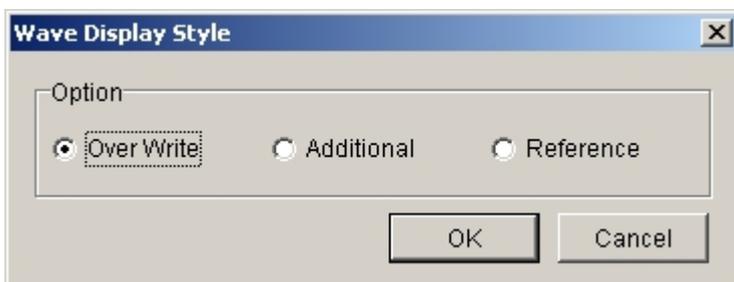


Fig. 7-3-3 Waveform display function

In the case of Over Write, waveforms are displayed from the head of a waveform number only for the number of selected data. In the case of Additional, selected data is displayed from the next of the waveform already displayed. In the case of Reference, only two waveforms are displayed on the domain which is not rewritten by Over Write or Additional.

7.3.2. Waveform viewer

The waveform data saved as a file at PC can be displayed. A screen is almost the same as that of a figure 7-2-4 waveform monitoring screen. Please make a reversal display the data which you want to display. Please push the Open button. Then, the waveform of selected data will be displayed.

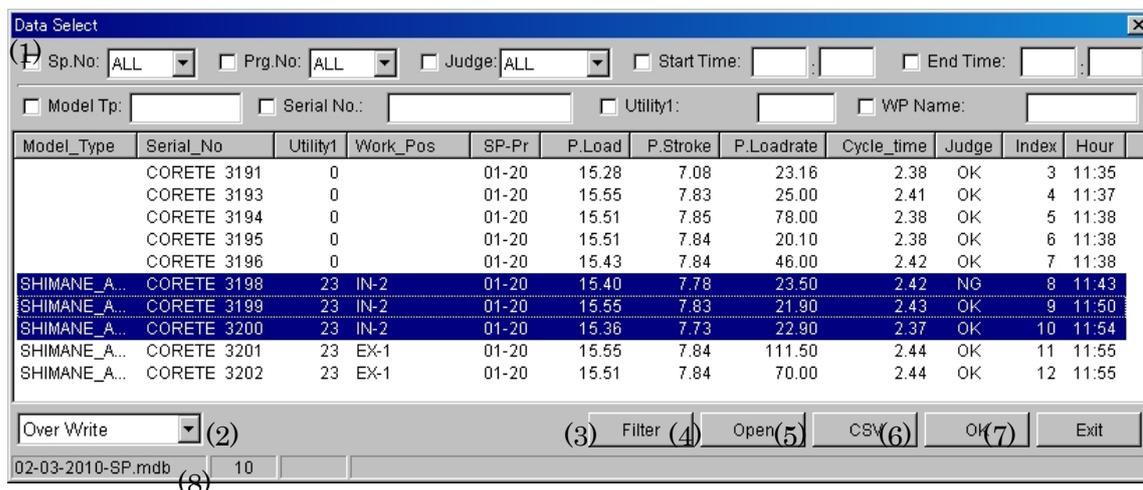


Fig. 7-3-4 Data selection screen

No.	Item	Explanation
(1)	Filter setup	Please set up the filter of the data displayed on a data list. The item which put in the check becomes effective. Wild card "*" and "?" can be used for a Model Tp , Serial No., and WP. Name.
(2)	Display style	The display style of waveform data is set up. In the case of Over Write, waveforms are displayed from the head of a waveform number only for the number of selected data . In the case of Additional, selected data is displayed from the next of the waveform already displayed. In the case of Reference, only two waveforms are displayed on the domain which is not rewritten by Over Write or Additional.
(3)	Filter	A filter is applied to the file specified by the contents set up by (1).
(4)	Open	A data file is chosen.* When a zone file (ggz) is chosen, both lines of the upper and lower of a zone are displayed as reference waveforms.
(5)	CSV	Selected data is formed into CSV file. One CSV file per data is created. A file name is given automatically. Example of a file name: 03-05-2010-SP_02_0076.csv
(6)	OK	Selected data is displayed on the waveform viewer.
(7)	Exit	The screen is ended.
(8)	File name	A file name on display is shown. Also the number of data contained in a file on display is shown.

* The file of Ver1.01 form cannot be displayed. Please use a data conversion function and change into Ver1.02 form.

7.4. Program

7.4.1. Editor

About the editor, the basic function is explained at the Chapter 4 operation procedure [4]a setup of a program. Here, the other function is explained.

1. Operation of Line

A floating menu is displayed by right click in step number of an editor.

Clear All the contents of the line are deleted.

Insert One line is newly inserted in the line.

Delete The line is deleted.

Remark The line is comment-ized. The comment-ized line is disregarded at the time of program execution. The comment-ized line is displayed in red.

Macro A macro is inputted.

step	tag	command	para
1		lmt_load	#0.00
2		home	HomeTt
3		brake	off
4		e_a	#200.00
5		o_pe	
6		o_ge	LOAD
7		p_al	
8	tagz	cict	begin

Fig. 7-4-1 Operation of line

2. Input Assistance

The input candidate of a floating menu is displayed by right click of a command code and the parameters 1 and 2. For example, if a positioning command is inputted into a command code, only a speed parameter can be inputted no longer into a parameter 1, and only a position parameter can be inputted no longer into a parameter 2.

step	tag	command	param.1	param.2	jump	
1		lmt_load	#0.00			Limit load
2		home	HomeTbl1			User home position
3		brake	off			brake off
4		pos				go to start position
5	tag1	jmp.			tag2	
6		jmp.			tag99	Over speed change loc
7		jmp.			tag1	
8	tag2	clct				
9		jmp.				
10		tm_r				
11		pos				

none end data preservation judgement mode specification restriction, others branch control register PI/O bit operation four arithmetical operations timer control	origin : return to origin spd : speed mode pos_a : positioning mode(absolute) pos_r : positioning mode(relative) srv_off : servo off
---	---

Fig. 7-4-2 Input assistance

7.4.2. Execution

Please refer to the Chapter 4 operation procedure [6] execution of program.

7.4.3. Tables

If the position, speed, and a load parameter in a program are indirectly specified on a table, operation of a program can be changed by change of the table value. The contents of a table are rewritable with Anybus. If a system which rewrites table value by PLC, the touch panel, etc. is designed, it can correspond also to multi-kind production. Please refer to BS CTRL Instruction Manual Volume Anybus for details.

Specification of a user home position is possible only by the home position table.

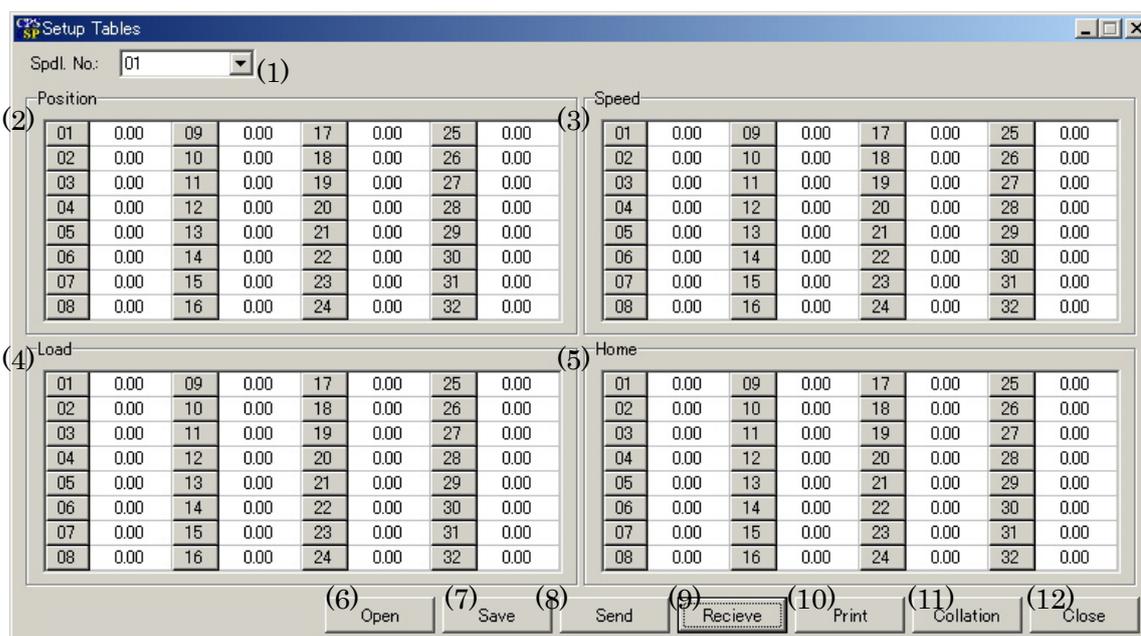


Fig. 7-4-3 Table setting screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is set up.
(2)	Position	A position table is displayed.
(3)	Speed	A speed table is displayed.
(4)	Load	A load table is displayed.
(5)	Home	A home position table is displayed.
(6)	Open	A table is read from a file. A file selection screen opens.
(7)	Save	A table is saved at a file. A file selection screen opens.
(8)	Send	A table is sent to a controller.
(9)	Recieve	A table is received from a controller.
(10)	Print	A table on display is printed.
(11)	Collation	The contents on display are compared with the table in the controller specified by the spindle number.
(12)	Close	The screen is ended.

7.4.4. Judgment table

A judgment table is used when judging a result. Use, a maximum, minimum value, and the output place at the time of NG are set to the judgment table about each internal variable. 32 judgment tables can be saved for a controller. The user output at the time of NG can use USER 0-6.

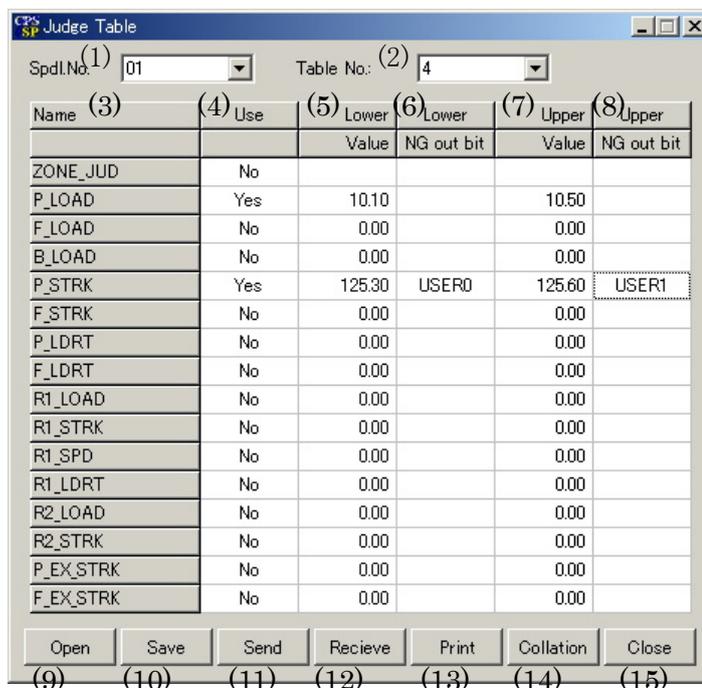


Fig. 7-4-4 Judgment table screen

No.	Item	Explanation
(1)	Spimdle No.	The spindle number for operation is set up.
(2)	Table No.	The table number to edit is set up.
(3)	Name	It is the internal variable name used for a judgment.
(4)	Use	When using this internal variable for a judgment, it is set as "Yes."
(5)	Lower Value	The minimum value of a judgment of this internal variable is set up.
(6)	Lower NG out bit	A user output number when an internal variable is less than minimum value is set up.
(7)	Upper Value	The maximum value of a judgment of this internal variable is set up.
(8)	Upper NG out bit	A user output number when an internal variable exceeds maximum value is set up.
(9)	Open	The judgment table saved at PC is opened.
(10)	Save	A judgment table on display is saved at PC.
(11)	Send	A judgment table on display is sent to a controller.
(12)	Recieve	A judgment table is received from a controller.
(13)	Print	A judgment table on display is printed.
(14)	Collation	A judgment table on display and the judgment table in a controller are compared.
(15)	Close	The screen is ended.

7.4.5. Zone

A zone is the judgment area created based on an actual waveform of operation. It can judge continuously in the domain of stroke-load. A controller can hold 32 zones. By using zone command in a user program, 32 zones can be used arbitrarily. Creation of a zone and the usage are explained briefly.

1. Operate a servo press on actual conditions of operation, and acquire the sample of waveform data.
2. Choose the waveform data used as the standard of a zone. Please refer to a figure 7-4-6 waveform file selection screen.
3. Set up zone creation conditions. Effective stroke range, the margins of a zone maximum and a minimum, automatic creation mark, etc. are set up. Please refer to a figure 7-4-7 zone operation screen.
4. Send the created zone to a controller.
5. Describe that a zone is used in the user program.
6. Verify by operating the user program.
7. If you are necessity, please add a new standard waveform or correct a zone manually.

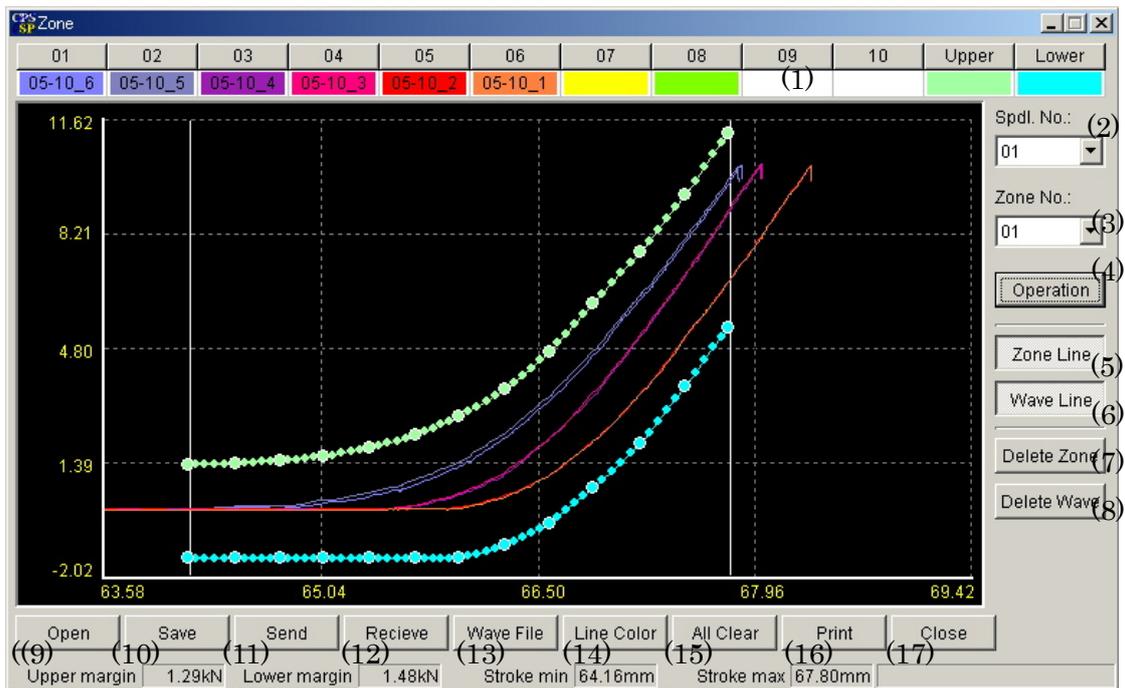


Fig. 7-4-5 Zone creation screen

No.	Item	Explanation
(1)	Data ID, Color	Data ID of waveform graph and a color are shown. ID serves as an spindle number-program number-index number.
(2)	Spindle No.	The spindle number for operation is set up.

(3)	Zone No.	A zone number is set up. 1-32 can be set up.
(4)	Operation	The screen which operates a setup of a zone opens.
(5)	Zone line	A zone is displayed as two lines.
(6)	Wave line	Standard waveforms are displayed.
(7)	Delete Zone	The maximum/minimum of a zone are eliminated.
(8)	Delete Wave	A waveform display is erased and standard waveform data is also eliminated.
(9)	Open	The zone saved at PC is called.
(10)	Save	A zone on display is saved to PC. Standard waveform data is also saved in the same file.
(11)	Send	A zone on display is sent to a controller.
(12)	Receive/Delete	The zones in a controller are displayed in a list.
(13)	Wave File	The waveform file used as the standard of a zone is chosen.
(14)	Line Color	The screen which performs many setup about zone creation opens.
(15)	All Clear	All the data in a screen is eliminated.
(16)	Print	A zone on display is printed.
(17)	Close	The screen is ended.

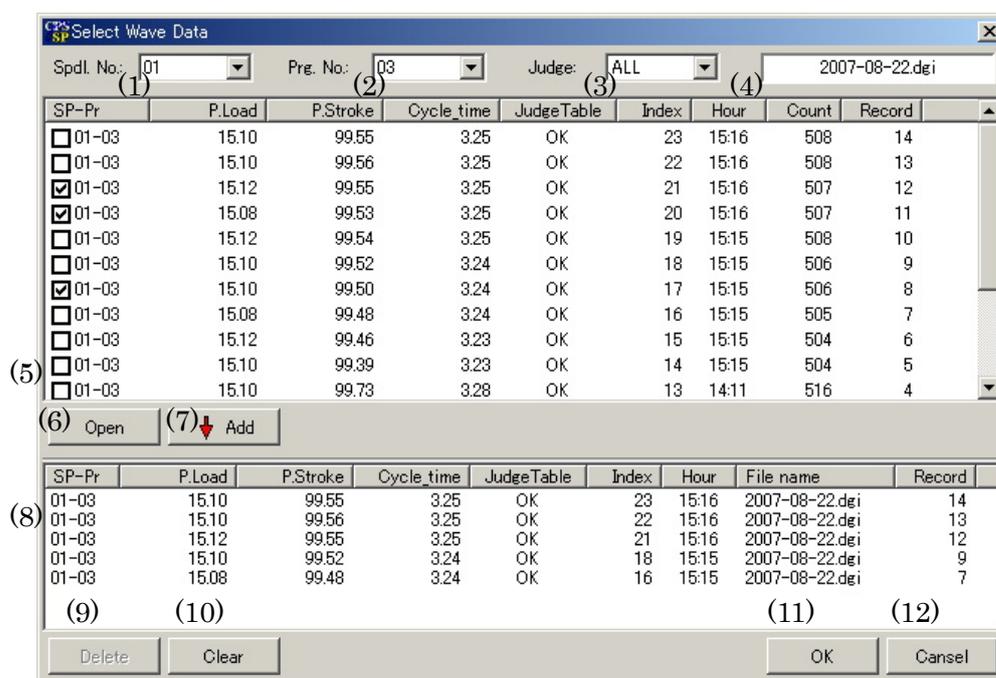


Fig. 7-4-6 Waveform file selection screen

No.	Item	Explanation
(1)	Spindle No.	A filter by spindle number is applied to the waveform data.
(2)	Program No.	A filter by program number is applied to the waveform data.
(3)	Judge	A filter by judgement result is applied to the waveform data.
(4)	File name	The selected waveform file name is shown.
(5)	Waveform data selection	The waveform data suitable for the conditions of (1) - (3) is displayed in a list, and a check is put in to what is made into the standard waveform of a zone.
(6)	Open	A waveform file is chosen.

(7)	Add	The waveform data checked in the area of (5) is added to the area of (8).
(8)	Standard waveform data	The waveform data chosen as a standard waveform of a zone is displayed in a list.
(9)	Delete	Selected waveform in the area of (8) is deleted.
(10)	Clear	All the waveform data in the area of (8) is deleted.
(11)	OK	The screen is ended reflecting a setup.
(12)	Cancel	A setup is canceled and the screen is ended.

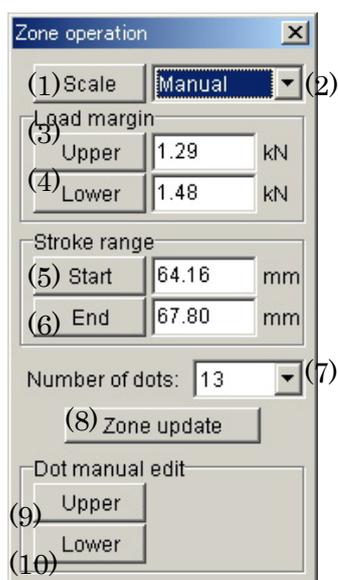


Fig. 7-4-7 Zone operation screen

No.	Item	Explanation
(1)	Scale	If graph is dragged when this button is depressed, the drug range will be set as a manual scale.
(2)	Scale	The scale of graph is chosen. It can choose from Auto and Manual.
(3)	Upper	The upper margin of load is set up by left click, when this button is depressed.
(4)	Lower	The lower margin of load is set up by left click, when this button is depressed.
(5)	Start	The point of a zone start will be set up by left click, when this button is depressed.
(6)	End	The point of a zone end will be set up by left click, when this button is depressed.
(7)	Number of dots	The number of basic dots of a zone line is set up.
(8)	Zone update	A zone is updated according to the contents of the operation screen.
(9)	Upper	When this button is depressed, the upper dots of a zone can be dragged.
(10)	Lower	When this button is depressed, the lower dots of a zone can be dragged.

7.4.6. Automatic generation

It is the simple creation function of a program. A program will be created if the numerical value is set up according to the guide screen displayed. If a tool type, a program number, and a judgment table number are chosen and a "next" button is clicked, a course selection screen will be displayed. A course can be chosen from simplicity, general, and proofreading.

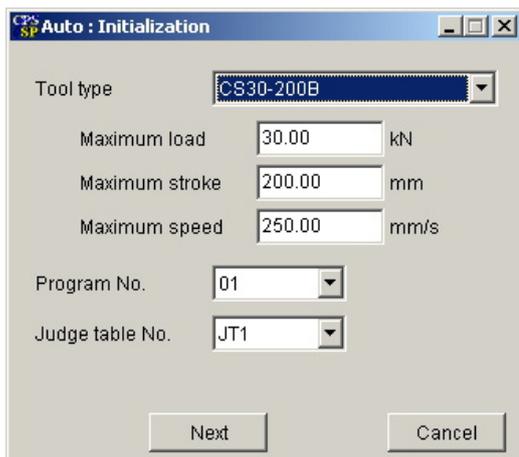


Fig.7-4-8 Initialize screen

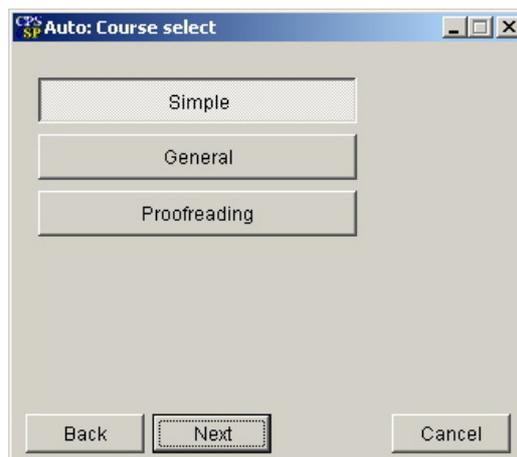


Fig.7-4-9 Course selection screen

In the case of a simple course, there is two choices, a load target and a stroke target. A standard program can be obtained only by all setting up five parameters. Approach speed, pressing speed, etc. are set up with the value decided beforehand. These parameters should edit the generated program directly and should change it into the numerical value suitable for the purpose. Moreover, if a general course is chosen, these parameters can also be set up arbitrarily.

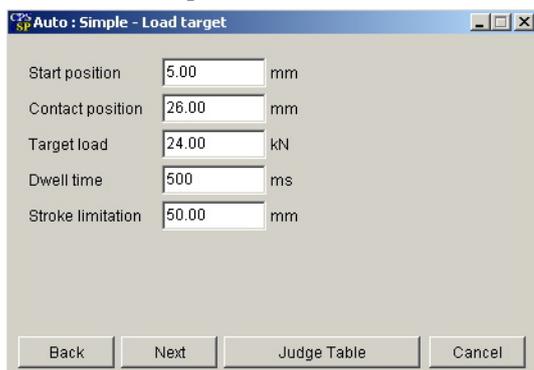


Fig.7-4-10 Load target screen

In addition to the load target and the stroke target, through the general course, four choice called the position keep after pressing and load keep is prepared. The position keep after pressing is the program which performs operation which holds a position until it gives a trigger in a user input after pressing of a stroke target. Load keep is a program holding the defined load value during the time on which it decided.

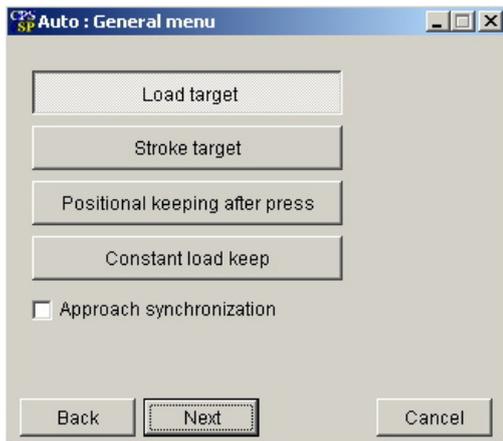


Fig.7-4-11 General course screen

Through a general course, the parameters of important points are set up on the operational chart of speed-load. Therefore, the program of operation more detailed than a simple course can be obtained.

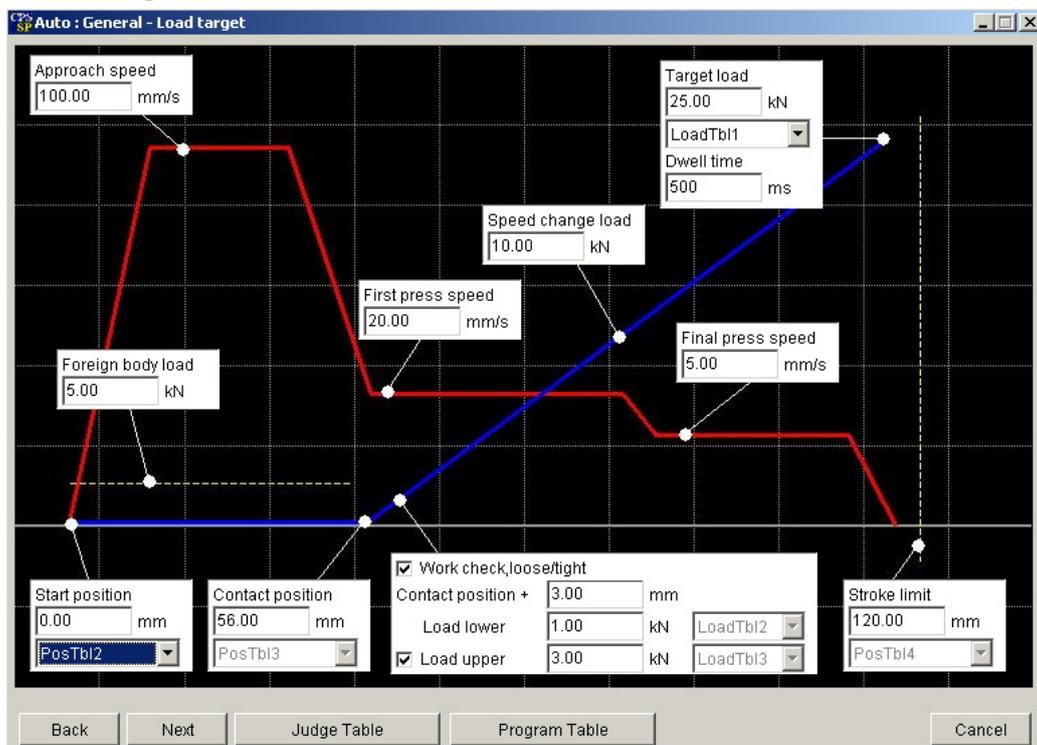


Fig.7-4-12 General course -Load target screen

Through a proofreading course, the program used when inspecting the load of a tool and stroke accuracy where a standard load cell and a linear scale are attached outside can be obtained. The outline of the program obtained by the load target is as follows. It starts pressing in speed of 0.3mm/s from 1mm of the upper parts of a standard load cell. Load proofreading can be performed by comparing peak load between BS controller and a standard load cell.

Moreover, in a stroke target, the program which performs 0.2mm positioning down can be obtained from the contact position of a standard load cell. In this program, repetition positioning accuracy and repetition load accuracy can be checked in case there is some load.

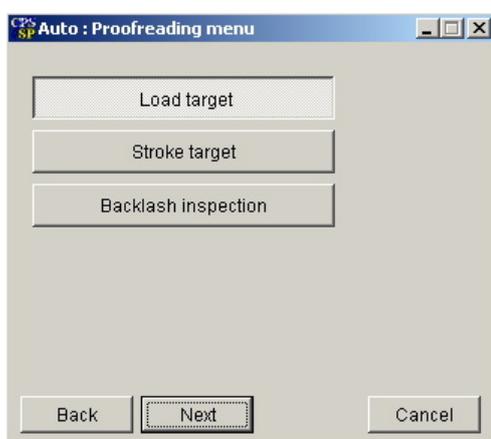


Fig.7-4-13 Proofread course

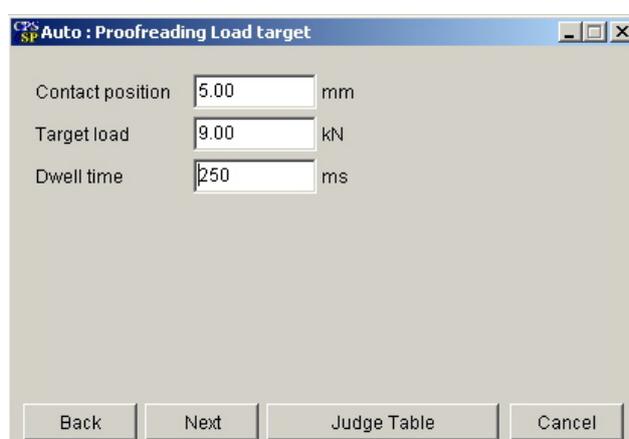


Fig.7-4-14 Proofread-Load target screen

Important

1. When using an automatic generation function, if the contact position with a work is not set up correctly, there is a risk of leading to breakage of a tool, a work, and a system. Please be careful enough.
2. If a predetermined numerical value is not set as a program table, in the case of the program of table reference form, it becomes the motion different from expectation, and it has the same danger as the above.
3. Since two or more programs may be referring to one program table, please pay attention enough to rewriting them.

7.4.7. Post Judge

It is the function to take in a waveform to PC, to analyze a waveform within PC, and to return a result to CPS controller. The requirements for composition for using a post judgment function are as follows.

BS Configurator Ver.1.02.18 or more

BS-M3A-1B Ver. 1.02.23 or more

Anybus i/f CC-Link,DeviceNet,Profibus-DP

The contents of waveform analysis are three kinds, Judge Frame, Zone, and Blocking Point.

Judge Frame Four judgment frames can be set up. The kind of judgment is three kinds, pass frame, non-pass frame, and peak frame.

Zone What set up the up-and-down load margin to standard waveforms and stroke range is called zone. If a waveform is settled in a zone, it will be judged as O.K. This differs from the zone which analyzes on real time within a controller.

Blocking Points It is based on a peak stroke. It judges with a load rate of change and load value in a certain position in front of a peak stroke.

The Post judge's using procedure

1. Create a post judgment file and register with PC.
2. Set a post judgment number to BS controller via Anybus i/f from PLC.
3. Start a program.
4. PC takes in waveform data and analyze it.
5. PC returns an analysis result to BS controller.
6. Output O.K./NG to IO on the basis of the analysis result of the judgment in CPS controller, and PC.

Creation procedure of a post judgment file

1. Choose standard waveforms.
2. Set up the contents of analysis of Judge Frame, Zzone, and Blocking Point.
3. Perform a simulation and check the contents of analysis.
4. Save the file.
5. Register a Post judge number.

Result check of Post Judge

er	PJ No	PJ Result
	1	30
	1	30
	1	30

A result of Post Judge can be checked by PJ No and PJ Result of a numerical monitor or numerical viewer. PJ No shows the used Post Judge number. PJ Result shows the details of a judgment result.

judgment result.

Name	Judge
Judge frame 1	OK
Judge frame 2	OK
Judge frame 3	NG
Judge frame 4	NG
Zone	NG
Bottom load	OK
Loadrate	OK
COM Timeout	OK
Postjudge number	OK

If the display domain of PJ Result is left-clicked, the judgment result screen will be displayed. These data can be read into PLC via Anybus i/f. A result of Post Judge is not reflected in the conventional Judge Code.

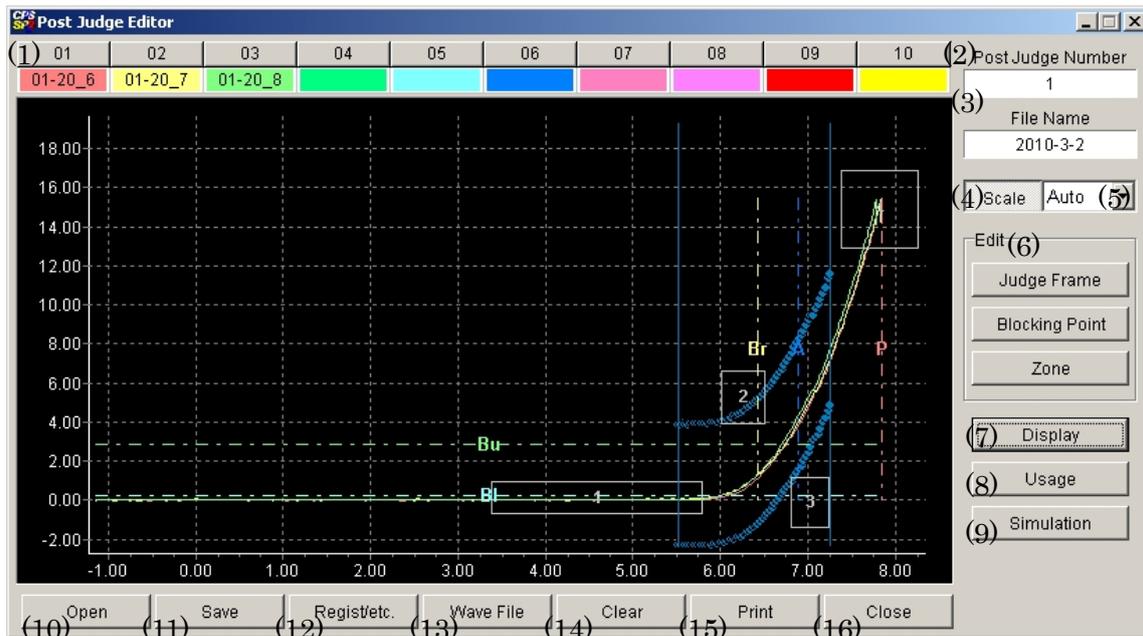


Fig.7-4-15 Posy Judge Editor screen

No.	Item	Explanation
(1)	Reference Wave information	The information about a standard waveform is displayed.
(2)	Post Judge Number	The Post Judge number registered into PC currently used is displayed.
(3)	File Name	A Post Judge file name on display is displayed.
(4)	Scale	A scale setup of the graph by drug operation is possible in the state where this button was pushed in. Scrolling of

		graph is also possible by drug operation with right click.
(5)	Scale	The scale of a graph screen is chosen. In Auto, the optimum scale for display data is set up automatically. In Data, it becomes a scale setup as which display data is displayed on the maximum.
(6)	Edit	The operation dialog of each judgment item opens.(Fig.7-4-15-1,2,3)
(7)	Display	The screen which sets up a display of a judgment base line and a waveform and a drawing color opens.(Fig.7-4-15-4)
(8)	Usage	The screen which sets up usage of each judgment item opens. (Fig.7-4-15-5)
(9)	Simulation	A simulation is possible with the post judgment file on display to the existing waveform data. (Fig.7-4-15-6)
(10)	Open	A post judgment file is opened.
(11)	Save	The contents of a display are saved at a file.
(12)	Regist/etc	The post judgment number and post judgment file which have already been registered are displayed in a list. Registration of a post judgment, release, etc. are possible.(Fig.7-4-15-7)
(13)	Wave File	The screen which chooses a standard waveform opens. (Fig.7-4-6)
(14)	Clear	All the contents of a display are eliminated.
(15)	Print	The contents of a display are printed.
(16)	Close	The screen is ended.

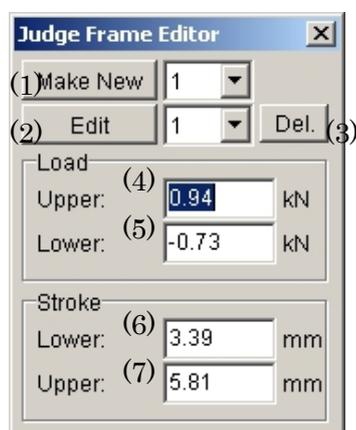


Fig.7-4-15-1 Post Judge-Judge Frame Editor screen

Four judgment frames can be used. There is three kinds of usage of a frame.

- 1.Pass When a waveform passes two sides of right and left of a frame, it is judged as O.K.
- 2.Non-Pass When a waveform does not pass through the inside of a frame, it is judged as O.K.
- 3.Peak When the point which recorded peak load exists in a frame, it is judged as O.K.

The usage is set up on a usage screen (Fig. 7-4-15-5).

The drawing color of a frame and a display are set up on a display screen (Fig. 7-4-15-4).

No.	Item	Explanation
(1)	Make New	Where this button is pushed in, the frame of the number specified is created newly by drag operation of the mouse on the graph of an editor screen.
(2)	Edit	Where this button is pushed in, the position and size of a frame can be edited by drag operation of a mouse.
(3)	Del.	The judgment frame of the specified number is deleted.
(4)	Load-Upper	The upper load value of the specified judgment frame is shown. It is also possible to input a value directly by clicking the editing box.
(5)	Load-Lower	The lower load value of the specified judgment frame is shown. It is also possible to input a value directly by clicking the editing box.
(6)	Stroke-Upper	The upper stroke value of the specified judgment frame is shown. It is also possible to input a value directly by clicking the editing box.
(7)	Stroke-Lower	The lower stroke value of the specified judgment frame is shown. It is also possible to input a value directly by clicking the editing box.

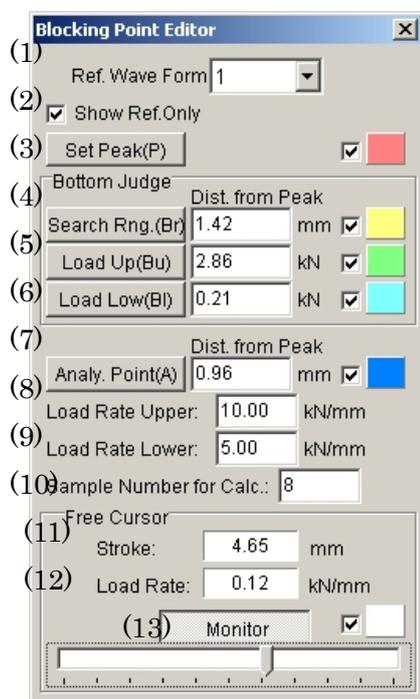


Fig.7-4-15-2 Post Judge-Blocking Point Editor screen

There are two kinds of analyses of a blocking point. One is a changing rate of load in an analysis point. An analysis point means the position from which an appointed distance was deducted from the peak stroke.

Another is the range of bottom load. The bottom search range is specified on the basis of a peak stroke. The lowest load value of the bottom search range is bottom load.

When the check is put in the check box on the right of each operation button, the judgment base line of the corresponding item is drawn on the graph of the editor. Control of the right shows the drawing color of a judgment base line. It can be set as arbitrary colors by left click.

No.	Item	Explanation
(1)	Ref. Waveform	The waveform used as the standard of a peak is specified.
(2)	Show Ref. Only	Only a reference waveform will be displayed if a check is put in.
(3)	Set Peak(P)	The peak value of a standard waveform is searched.
(4)	Search Rng.(Br)	Where this button is pushed in, if left click is given on the graph of the editor screen ,the search range of bottom load will be set up.
(5)	Load Up(Bu)	Where this button is pushed in, if left click is given on the graph of the editor screen ,the maximum value of bottom load will be set up.
(6)	Load Low(Bl)	Where this button is pushed in, if left click is given on the graph of the editor screen ,the minimum value of bottom load will be set up.
(7)	Analy.Point(A)	Where this button is pushed in, if left click is given on the graph of the editor screen , the analysis point of the load rate will be set up.
(8)	Load Rate Upper	The upper value of a changing rate of load is set up. Please click the editing box and input numerical value directly.
(9)	Load Rate Lower	The lower value of a changing rate of load is set up. Please click the editing box and input numerical value directly.
(10)	Sample Number for Calc.	The number of data used in order to compute a load rate is set up. Although the correspondence to change of graph will become good if the number of data is small, smoothness falls victim.
(11)	Stroke	The stroke value of the monitor cursor is displayed.
(12)	Load Rate	The load rate of monitor cursor is displayed.
(13)	Monitor	Where this button is pushed in, if left click is given on the graph of the editor screen , monitor cursor will move. Monitor cursor is movable also in lower slide control. When a focus is in the slide control, the monitor cursor can be moved by the arrow key of a keyboard.

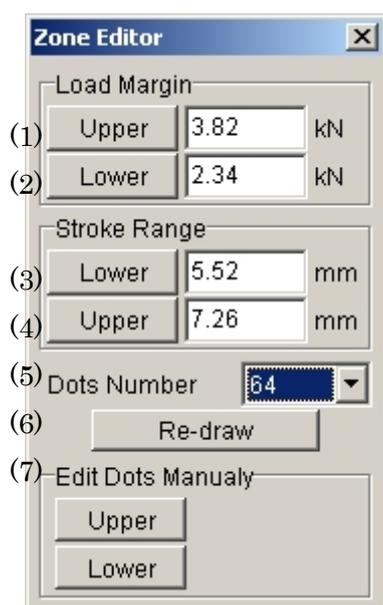
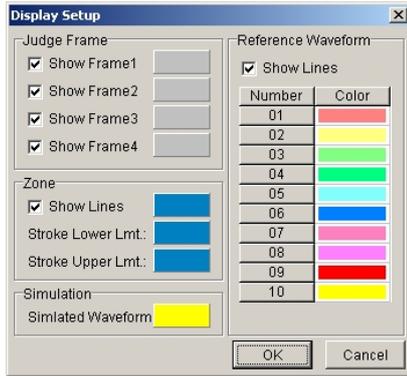


Fig.7-4-15-3 Post Judge-Zone Editor screen

What set up the up-and-down load margin to reference waveforms and stroke range is called zone. The line of a zone is drawn in accordance with the envelope form of reference waveforms.

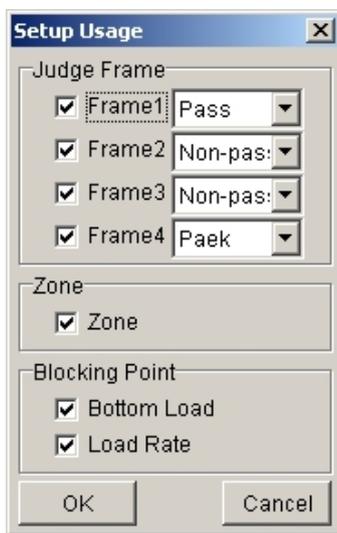
Caution Although a zone judgment is performed on real time inside the BS controller, the zone explained here is another with it.

No.	Item	Explanation
(1)	Load Margin Upper	Where this button is pushed in, if left click is given on the graph of the editor screen , the upper value of a load margin will be set up.
(2)	Load Margin Lower	Where this button is pushed in, if left click is given on the graph of the editor screen , the lower value of a load margin will be set up.
(3)	Stroke Range Upper	Where this button is pushed in, if left click is given on the graph of the editor screen , the upper value of a stroke range will be set up.
(4)	Stroke Range Lower	Where this button is pushed in, if left click is given on the graph of the editor screen , the lower value of a stroke range will be set up.
(5)	Dots Number	The number of dots which constitutes zone lines is set up.
(6)	Re-draw	A zone lines are redrawn. The result manually edited by the dot edit function is reset.
(7)	Edit Dots Manually	Where these buttons are pushed in, the dots of a zone can be edited by drug operation.



A setup about the display except the blocking point is performed. Please put a check into the line to display.

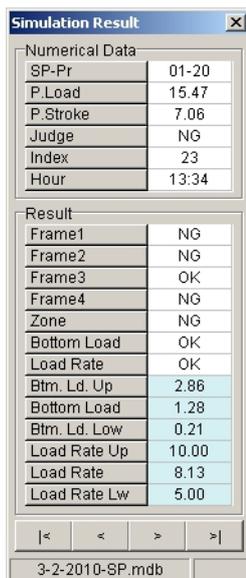
Fig.7-4-15-4 Post Judge-Display screen



The usage setup screen of each judgment item—a judgment frame, a blocking point, and a zone opens. Please put a check into the item used for a judgment. Three kinds of usage of a frame can be chosen about a judgment frame.

- 1.Pass When a waveform passes two sides of right and left of a frame, it is judged as O.K.
- 2.Non-Pass When a waveform does not pass through the inside of a frame, it is judged as O.K.
- 3.Peak When the point which recorded peak load exists in a frame, it is judged as O.K.

Fig.7-4-15-5 Post Judge-Usage screen



According to the contents of a judgment set up on the editor screen, a simulation can be performed to arbitrary waveforms. If a simulation button is clicked, the screen which chooses a waveform file and waveform data will open one by one, and if selection of waveform data is completed, a simulation result as shown in the left figure will be displayed. Moreover, selected waveform data and each selected judgment standard line are displayed on the editor screen.

A simulation is performed to the waveform data before and after the waveform file chosen if the arrow button of the screen lower part is clicked.

Fig.7-4-15-6 Post Judge-Simulation Result screen



Fig.7-4-15-7 Post Judge-Regist/etc. screen

No.	Item	Explanation
(1)	Open	The post judgment file chosen in the list is opened.
(2)	Regist	The post judgment file currently displayed on the editor screen is registered into the post judgment number specified in the list. The post judgment file needs to be saved with a name. The maximum of a post judgment number is 255.
(3)	Unregist	Registration of the post judgment number chosen in the list is canceled.
(4)	Delete	The post judgment file chosen in the list is deleted, and registration is also canceled.
(5)	Close	The screen is ended.

7.5. Manual

7.5.1. I/O

General-purpose input and output can be operated by the manual. Although the same screen as a figure 7-2-10 I/O monitoring screen are used, an operation object is chosen by lower left I/O operation combobox. When operating an input, emulation processing by communication is performed within a controller.

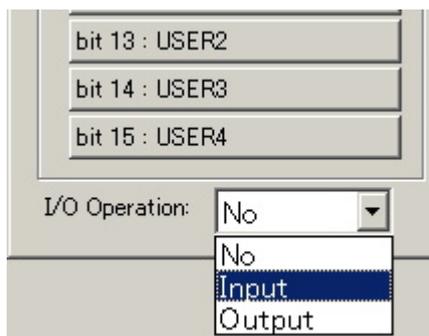


Fig. 7-5-1 I/O operation screen

7.5.2. Tool operation

A tool can be operated manually.

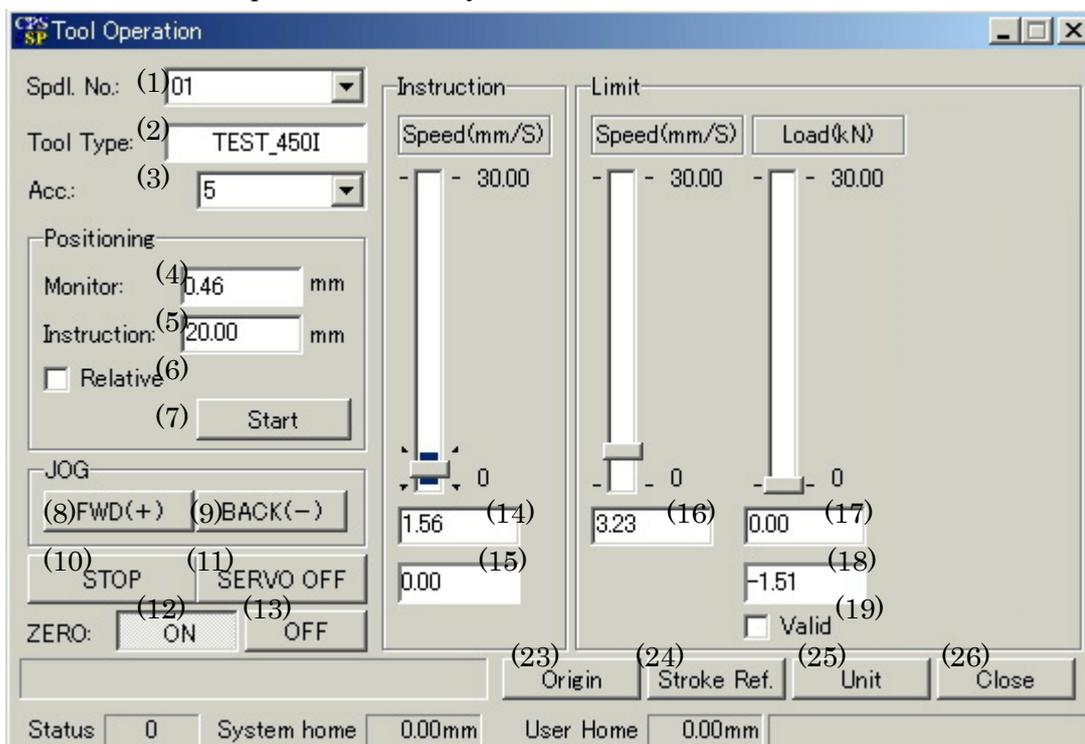


Fig. 7-5-2 Tool operation screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is set up.
(2)	Tool Type	The tool type for operation is shown.

(3)	Acc	The acceleration in JOG operation is specified. Although "NO" is the specification without acceleration, since there is a possibility of giving a mechanical damage to a tool or over-current, please use it only at the time of low-speed operation.
(4)	Monitor	The present position of a tool is shown. The standard of a position is set up in (24) stroke reference.
(5)	Instruction	The target stroke of positioning is specified.
(6)	Relative	In positioning of relative position specification, a check is put in.
(7)	START	Positioning is started. It is toggle operation.
(8)	FWD(+)	JOG operation (the direction of +) is started.
(9)	BACK(-)	JOG operation (the direction of -) is started.
(10)	STOP	It becomes speed zero. Servo on state is maintained.
(11)	SERVO OFF	It will be in a servo off state.
(12)	ZERO ON	ZERO compensation of load value and the motor current value is carried out.
(13)	ZERO OFF	ZERO compensation is canceled for load value and motor current value.
(14)	Instruction	A speed of operation is specified.
(15)	Monitor	It is a monitor display of speed.
(16)	Speed limit value	Speed limit value is set up.
(17)	Load limit value	Load limit value is set up.
(18)	Load monitor	It is a monitor display of load value.
(19)	Valid	Load limit will become effective if a check is put in.
(23)	Origin	Origin is started.
(24)	Stroke Ref.	The screen which chooses a standard position opens.(Fig. 7-5-3)
(25)	Unit	The screen which chooses the display unit of a position and speed opens. (Fig. 7-5-4)
(26)	Close	The screen is ended.

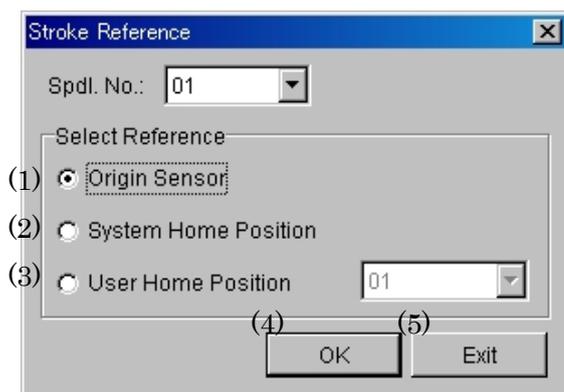


Fig.7-5-3 Stroke reference screen

The reference position of stroke calculation is set up.

No.	Item	Explanation
(1)	Origin Sensor	An origin sensor serves as the standard of a stroke.
(2)	System Home Position	A system home position serves as the standard of a stroke.
(3)	User Home Position	A user home position serves as the standard of a stroke.
(4)	OK	The screen is ended reflecting a setup.
(5)	Exit	A setup is canceled and the screen is ended.

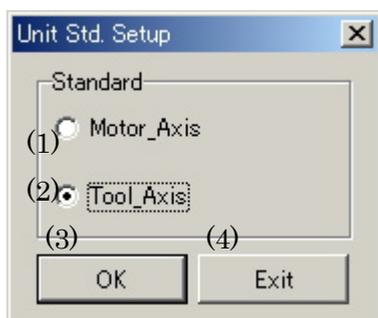


Fig. 7-5-4 Display unit setup screen

No.	Item	Explanation
(1)	Motor Axis	The unit of a stroke is the pulse of an encoder. The unit of speed is the rotation speed rpm of a motor axis.
(2)	Tool Axis	The unit of a stroke is the position mm of ram. The units of speed are the speed mm/s of ram.
(3)	OK	The screen is ended reflecting a setup.
(4)	Exit	A setup is canceled and the screen is ended.

7.5.3. Alarm reset

An alarm reset command is transmitted to all spindles.

7.5.4. Battery reset

A battery alarm reset command is transmitted to all spindles.

7.6. Maintenance

7.6.1. Information

Information, such as a version, is managed in a general information tab. In a memorandum tab, it can leave a memorandum in text form using the memory capacity of about 300 bytes. Since these informations are memorized by EEPROM, even if it extracts a backup battery, it is not eliminated.

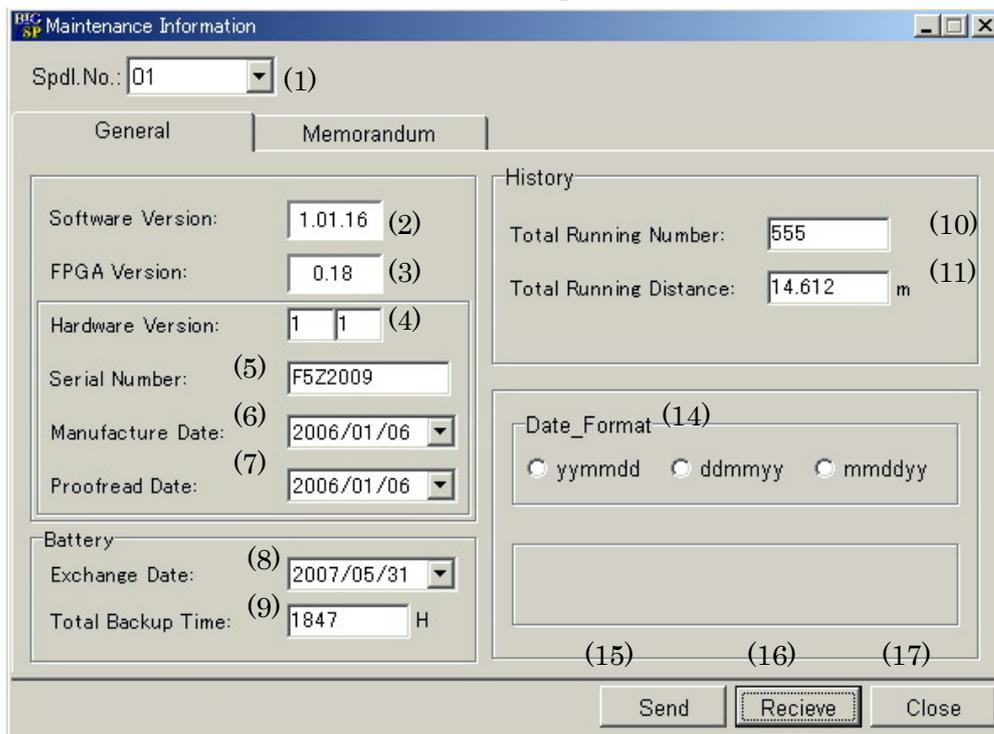


Fig. 7-6-1 Maintenance information screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is set up.
(2)	Software version	The software version of a microcomputer is displayed. Since it is the information described in the program code, rewriting is impossible.
(3)	FPGA version	The version of FPGA is displayed. Since it is the information described in the program, rewriting is impossible.
(4)	Hardware version	A hardware version is shown like this (CPU board version).(MR-J3A i/f board version).
(5)	Serial No.	A serial number is shown. As for rewriting, a user cannot do.
(6)	Manufacture date	A manufacture date is shown. As for rewriting, a user cannot do.
(7)	Proofreading date	The proofreading date of current amplifier is shown. As for rewriting, a user cannot do.
(8)	Exchange date	The exchange date of a backup battery is shown.
(9)	Total Backup Time	The accumulation backup time of a backup battery is shown.

(10)	Total Running Number	Accumulation of the number of times of execution of programs is shown.
(11)	Total Running Distance	The total of the mileage of ram is displayed.
(14)	Date Format	The display form of a date is chosen.
(15)	Send	The contents of a display are sent to a controller. Moreover, the contents of (10) and (11) which are the operation history of a tool are saved at the tool.
(16)	Recieve	Maintenance information is received from a controller.
(17)	Close	The screen is ended.

7.6.2. Backup

The tool type, programs, tables, various parameters, etc. are set as the controller backed up as a file to PC. Moreover, a backup file can be read and it can be set as a controller. If a detailed display function is used, the individual contents of a backup file or receiving data can be checked.

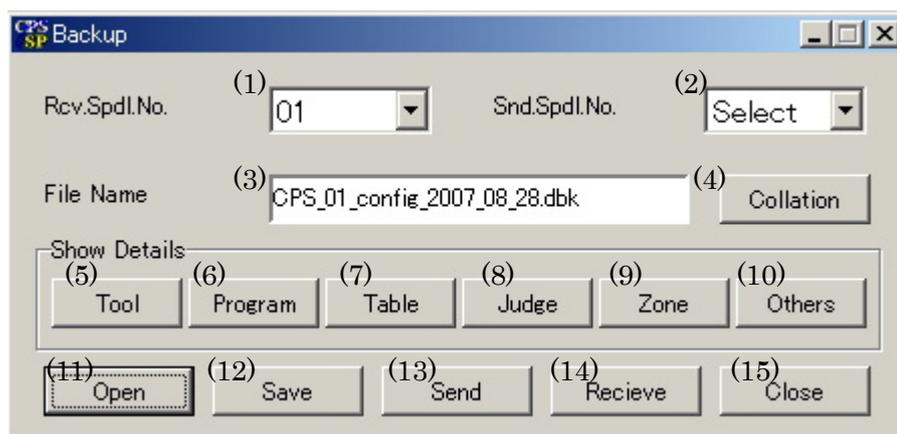


Fig. 7-6-3 Backup screen

No.	Item	Explanation
(1)	Receive Spindle Number	The spindle number for operation is set up.
(2)	Send Spindle Number	The spindle number to which the contents of a backup file are sent is set up. If Select is chosen, the spindle number selection screen will open. Simultaneous sending on the spindle chosen on the screen is possible.
(3)	File Name	A backup file name is displayed.
(4)	Collation	The selection screen of a backup file opens. The data of this screen and the selected file are compared. When there is disagreement as a result of collation, a figure 7-6-4 collation result screen is displayed.
(5)	Tool	A tool selection screen is displayed and the data of a backup screen is displayed there.
(6)	Program	An editor screen is displayed and the data which the backup screen has is displayed there. Please choose a

		program number.
(7)	Table	A table setting screen is displayed and the data which the backup screen has is displayed there.
(8)	Judge	A judgment table screen is displayed and the data which the backup screen has is displayed there. Please choose a table number.
(9)	Zone	A zone screen is displayed and the data which the backup screen has is displayed there. Please choose a zone number.
(10)	Other	The screen which displays other setting items is displayed and the data which the backup screen has is displayed there.
(11)	Open	The selection screen of a backup file opens.
(12)	Save	The contents received from the controller are saved at a file.
(13)	Send	A setup specified by the file name is sent to the controller specified by sending spindle number.
(14)	Recieve	The contents of a setting of the controller specified by (1) are received.
(15)	Close	The screen is ended.

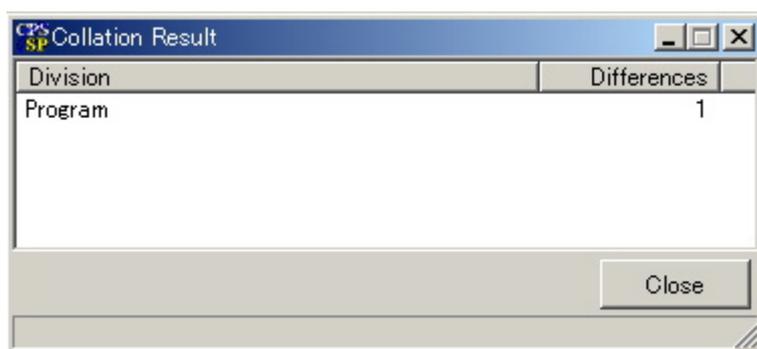


Fig.7-6-4 collation result screen

7.6.3. Alarm history

The 100 newest alarms are saved for a controller. It can be displayed in a list.

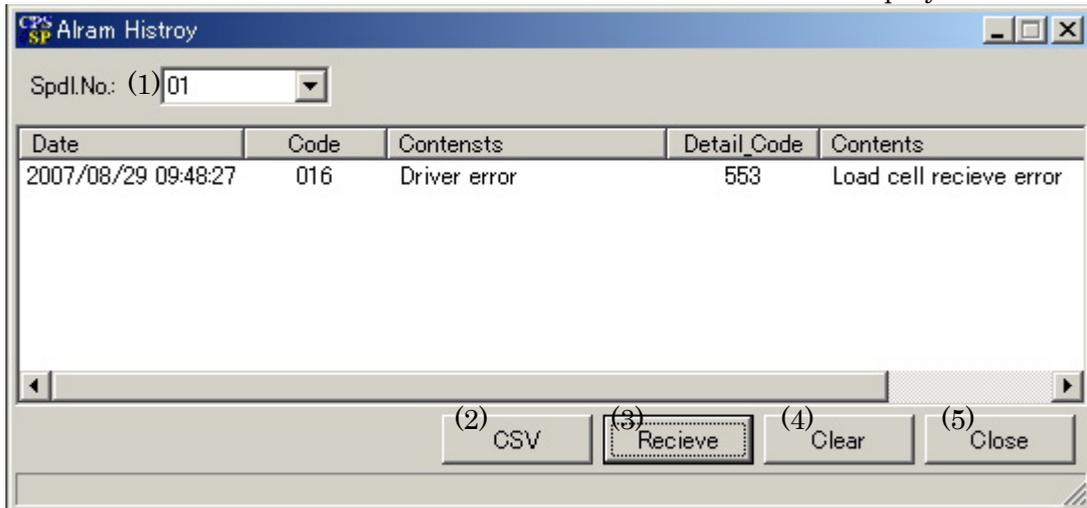


Fig. 7-6-5 Alarm history screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is set up.
(2)	CSV	The contents of a display of a screen are saved as a CSV file at the folder of specification of PC.
(3)	Recieve	An alarm history is received from a controller.
(4)	Clear	All the alarm histories in a controller are deleted.
(5)	Close	The screen is ended.

7.6.4. MR-J3A Alarm History

The alarm history of MR-J3A is displayed in a list.

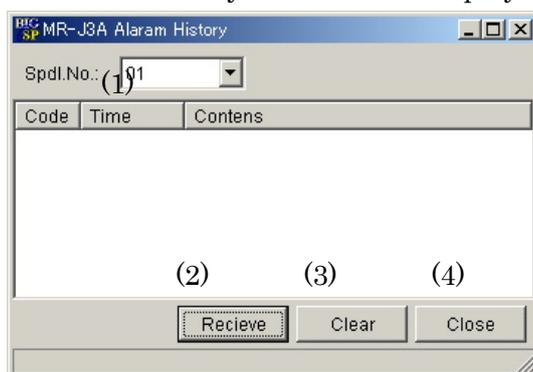


Fig 7-6-6 The alarm history of MR-J3A screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is set up.
(2)	Recieve	An alarm history is received from a controller.
(3)	Clear	All the alarm histories in a controller are deleted.
(4)	Close	The screen is ended.

7.6.5. MR-J3A Torque restriction voltage proofreading

BS controller outputs analog torque restriction voltage to MR-J3A. The check of it is able on this screen.

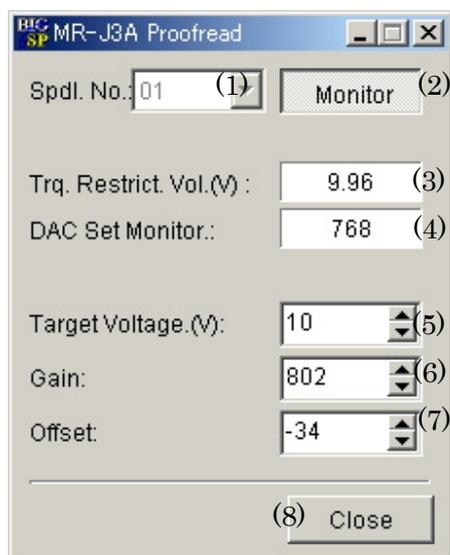


Fig 7-6-7 MR-J3AProofread screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is set up.
(2)	Monitor	Monitoring is performed in the state of ON of this button. Please do not monitor during operation of a tool. It is dangerous.
(3)	Torque restriction voltage	10V are equivalent to the maximum rated torque.
(4)	DAC setting value	It is the setting value of DAC. The range of 0-1023 can be set up.
(5)	Target Voltage	Please set up target voltage.
(6)	Gain	Please adjust gain and offset so that target voltage and output voltage are in agreement.
(7)	Offset	Please adjust gain and offset so that target voltage and output voltage are in agreement.
(8)	Close	The screen is ended.

7.7. Setup

7.7.1. Data collection

Collect

A check is put in when collecting data. When collecting data, data files are created newly whenever a date is updated by the predetermined folder of PC. The data size of each file is shown.

Numerical data 132 bytes / data.

Waveform data It is 4 bytes in one point of one waveform. If it collects 1000 point by four waveforms, it will become 16 K bytes.

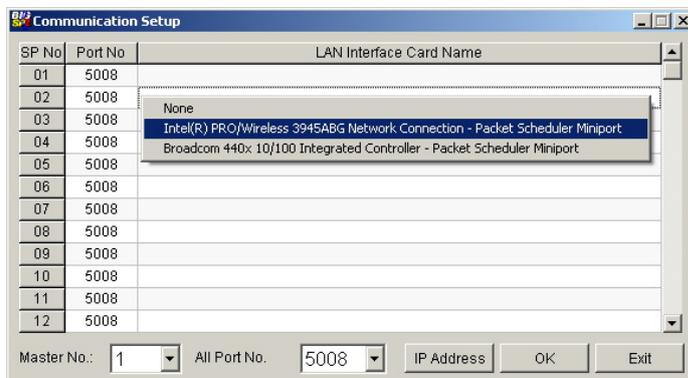
Waveform data is compressed and saved. When efficiency is the best, it becomes about 1/4 size.

Communication

The communication method between PC and a controller is set up. Please refer to Chapter 3-4 communication setting-The IP address by the side of application. Here, the port number of LAN and a route setup are explained.

It is also possible to install two BS Configurators in one PC, and to start simultaneously. Starting of the 2nd Configurator displays the message "the port cannot be used." It is because the 1st Configurator has already used the port number 5008 (default value). Then, at the 2nd Configurator, it is set up so that the port number except 5008 may be used. In the menu of the 2nd Configurator, Setup-Data collection-Communication is chosen, and the communication setting screen is opened.

Please choose 5009 at the list-box of All Port No. button, and click O.K. button. Please re-start the 2nd Configurator. Two Configurators can be used if the message about a port is not displayed. If two Configurators are used, data can be displayed by the station.



Moreover, when you set arbitrary IP addresses to a controller, please click IP Adrs. button of this screen. Then, an exclusive screen (Fig.7-7-1-2) opens.

Fig7-7-1-1 Communication Setup screen

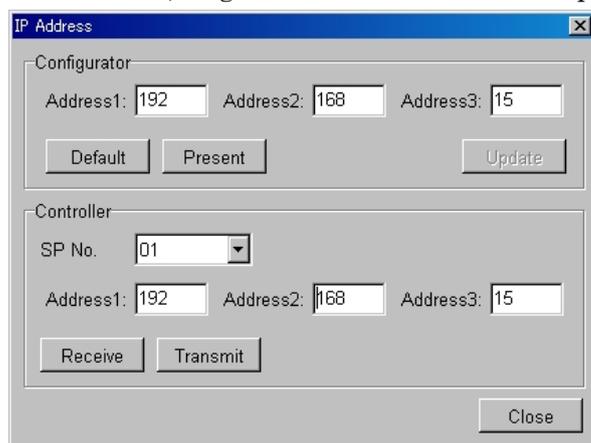
If LAN Interface Card Name in the Communication Setup screen of Fig7-7-1-1 is used, the communication route between a PC and controllers can be specified. Mixture of a network is avoidable if this function is used when using two or more network interface cards. Moreover, if two Configurators are started and data collection is performed by the separated network interface card, the time of data collection can be shortened.

As shown in Fig7-7-1-1, the network interface card names are displayed in a floating window by right click of the lower part of LAN Interface Card Name.

A setup will become effective, if LAN Interface Card Name of you wish is chosen and O.K. button is clicked.

Arbitrary IP address setup

Arbitrary IP addresses can be set up now to the controller of a version 1.02.26 or later. On Fig. 7-7-1-2 Communication Setup screen if IP Address button is clicked, Fig.7-7-1-2 IP Address Setup screen will open. The IP address of



Configurator and the IP address of a controller can be arbitrarily set up on this screen. Address 4 is decided by the spindle number. A spindle number is set up with the rotary SWs of the front upper part of a controller. The setting range of a spindle number is from 1 to 31.

Fig.7-7-1-2 IP Address Setup screen

Notes

Communication is impossible unless Configurator and a controller are the same IP addresses. Moreover, it is necessary to also change the IP address of the network interface card used with a personal computer. Please setup addresses 1 and 2 with the same addresses of a controller.

A setup of a controller becomes effective after a re-injection of a power supply.

The communication method with an IP address unknown controller

Please use a default fixed IP address to the controller with an unknown setup of an IP address. When a spindle number is set as 71 to 99 with the rotary SW of the upper part in front of a controller, the IP address of the controller is as follows.

192.168.15.(spindle number - 70)

A new IP address becomes effective by re-injection of a power supply.

Receive filter

The kind and its collection condition of the data saved as a file at PC are set up.

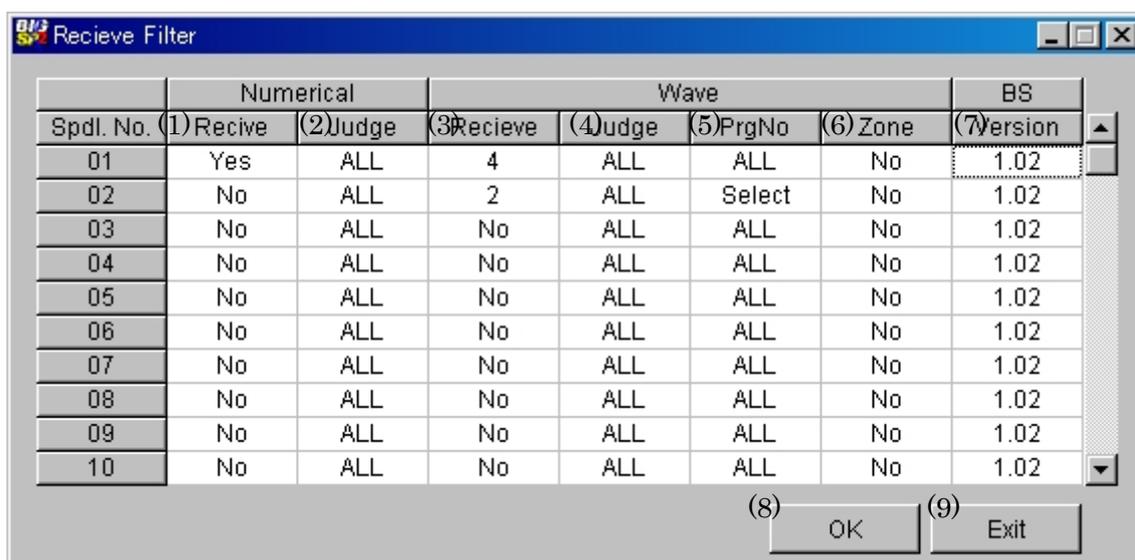


Fig. 7-7-2 Receive filter screen

No.	Item	Explanation
(1)	Numerical-Recieve	When receiving numerical data, it is set as "Yes."
(2)	Numerical-Judge	The receiving condition of the numerical data by judgment of a program execution result is set up. O.K. ... Only O.K. data is received. NG ... Only NG data is received. ALL ... All data is received.
(3)	Waveform-Recieve	A setup about reception of waveform data is carried out. NO ... Waveform data is not received. 2.... Two waveforms of torque and angle are received. 4.... Four waveforms of torque, angle, the Expansion1, and the Expansion2 are received.
(4)	Waveform-Judge	The receiving conditions of the waveform data by judgment of a program execution result are set up. O.K. ... Only O.K. data is received. NG ... Only NG data is received. ALL ... All data is received.
(5)	PrgNo	ALL ... The data of all program numbers is received. Select ... Only the data of the program number set up on the number selection screen is received. The number selection screen is displayed when a setup is changed into Select from ALL.
(6)	Zone	In the version 1.02.20 of Configurator, when a zone is

		used, it has been improved so that the zone to use might also be saved as data. The version of the controller corresponding to this function is 1.02.28 or more. The zone display method in a waveform monitor and a viewer is also changed. Note The zone pointed out here is a zone processed within a controller. It is not a post judgment's zone.
(7)	Version	The software version of a controller is set up. The numerical data items collected by Ver1.01 and Ver1.02 differ. Please check the version of a controller with the maintenance information screen or the connected spindles list screen, and set up correctly. When an error is in a version setup, data collection cannot be performed correctly.
(8)	OK	The screen is closed reflecting a setup.
(9)	Exit	A setup is canceled and the screen is closed.

Data folder

The folder which saves collected data is set up. Unless the data folder is set up correctly, numerical data and waveform data are not saved. Moreover, those monitor ability does not operate normally, either.

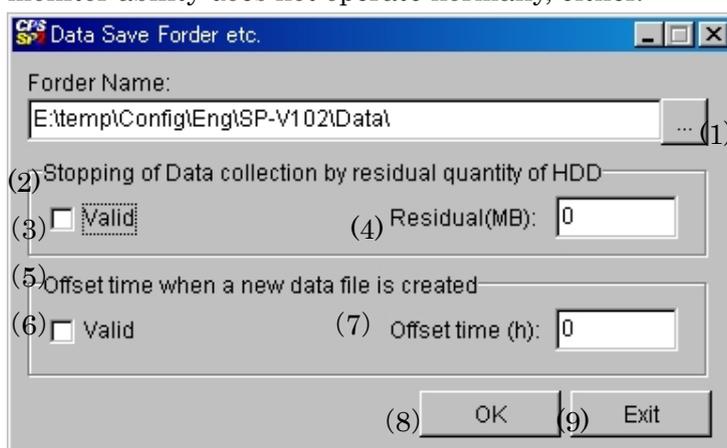


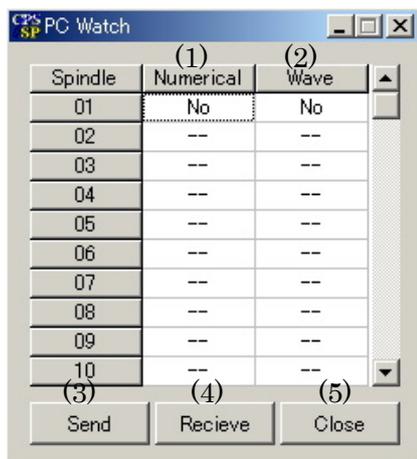
Fig.7-7-3 Data Save Folder etc. screen

No.	Item	Explanation
(1)	Folder Name	The preservation folder of data is set up.
(2)	Stopping of Data ...	When the residual quantity of HDD is less than setting value, it sets up about the function to stop data collection automatically.
(3)	Valid	A check is put in when using the function of (2).
(4)	Residual(MB)	The residual quantity of HDD which data collection stops is set up.
(5)	Offset time...	A data file is newly created at the timing by which the date of PC to save is updated. If this function is used, the creation timing of a data file can be set up arbitrarily.
(6)	Valid	A check is put in when using the function of (5).
(7)	Offset time(h)	Time to create a data file is set up.

(8)	OK	The screen is ended reflecting a setup.
(9)	Exit	A setup is canceled and the screen is ended.

PC Watch

When data is uncollectible in the trouble of PC, it is the function which outputs an error. While the controller set as Yes in PC watch performs a program, when there is no access from PC, it is regarded as the trouble of PC and an error is outputted.



☒ 7-7-4 PC Watch screen

No.	Item	Explanation
(1)	Numerical	The access surveillance to numerical data is set up.
(2)	Wave	The access surveillance to waveform data is set up.
(3)	Send	The contents of a display are sent to a controller.
(4)	Recieve	The setting state of PC surveillance is received from a controller.
(5)	Close	The screen is ended.

7.7.2. Date

The controller has a clock function. The time of PC is copied to a controller.

7.7.3. Serial port

The baud rate of the serial port of a controller and a use are set up.

As a use, Printer, LED DISPLAY, PC Application, and PC Application (ASCII) can be chosen. When you perform reading/writing of a parameter using the serial communication unit of PLC, please choose PC Application (ASCII). Please refer to BS servo press contoroller handling description-communication section about a communicative protocol.

7.7.4. Operation authority

Please refer to Chapter 2-5-2 setup-restriction matter-operation authority about the authority in each operation level. A password setup of each operation level and a setup of the operation level at the time of application starting are

possible.

7.7.5. Tool selection

Please refer to a Chapter 4-2 operation procedure-tool type setup.

7.7.6. JOG Speed

JOG speed is set up. JOG speed is switched to four stages. The output limitation in JOG operation were implemented to BS controller after Ver1.02.15. The output at the time of JOG operation can be restricted by setting up the ratio to the maximum output. This setting value can be rewritten from PLC, when BS controller is equipped with Anybus option. Please refer to “BS CTRL for SP Instruction Manual Vol Anybus” for details. This setting value does not have influence on the time of program execution. The lmt_load value set up within the program acts as output restrictions at the time of program execution.

Note Setup of output limitation is invalid to the controller ver1.02.14 or less.

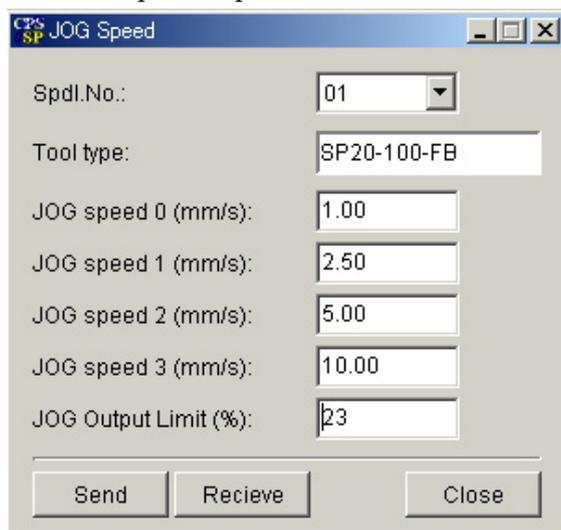


Fig. 7-7-5 JOG speed setup screen

7.7.7. Others

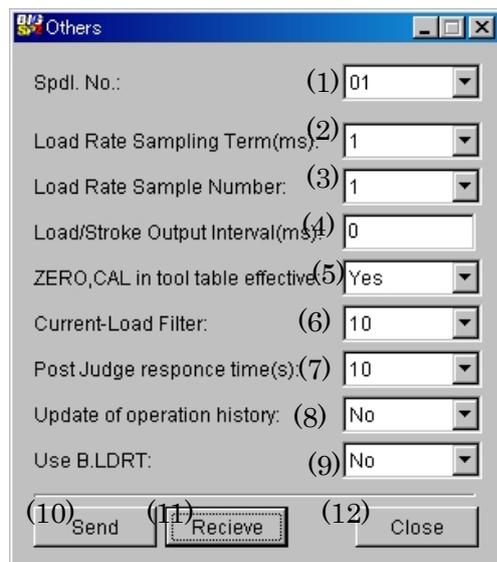


Fig. 7-7-6 Others setup screens

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is chosen.
(2)	Load Rate Sampling Term	It is used as a filter of processing the changing rate of load. The sampling interval of data is set up. A changing rate of load become more smooth as a sampling interval is longer, however delay becomes larger.
(3)	Load Rate Sample Number	It is used as a filter of processing the changing rate of load. The number of samples for asking for an approximation curve is set up. A changing rate of load become more smooth as a sampling number is bigger, however delay becomes larger.
(4)	Load/Stroke Output Interval	When PC Application (ASCII) is chosen for the use of a port, load and position data are outputted from a serial port at intervals of specification time. The time interval is set up.It will not be outputted if 0 is set up.
(5)	ZERO,CAL in tool table effective	The validity of ZERO and CAL described by the tool table is set up. Usually, please choose Yes. The program start from the state to which load is applied may serve as an error with the check of ZERO and CAL. In such a case, please choose No and describe a zero_cal command in a program if needed.
(6)	Current-Load Filter	In a load-cell-less type tool, the filter constant is set up which is used to change a motor current into load. The setting range is 1 to 64, and load becomes smoother as a numerical value is larger.
(7)	Post Judge Response Time(s)	After program execution ending inside a controller, the maximum value of time until a judgment of a post judgment returns from PC is set up. When setting value is exceeded, it becomes the alarm of a "post-judgment

		response error" (alarm code 51).
(8)	Update of operation history	Please choose "Yes", when you record the operation history of a tool to the tool. The operation history in a controller is transmitted to a tool after a power supply injection each time. Be careful not to turn off a power supply in the meantime. There is a risk of data peculiar to a tool disappearing. Transmission is ended in about 2 seconds. Although there is such no danger when "No" is chosen, the operation history of a tool remains only in a controller. When the version of a controller is 1.02.28 or less, an operation history is transmitted to a tool irrespective of this setup.
(9)	Use B.LDRT	When Yes is chosen, the item of F.LDRT is treated as a bottom changing rate of load. It can be used when the version of BS controller is 1.02.31 or more.
(10)	Send	The contents of a display are sent to a controller.
(11)	Recieve	A setup is received from a controller.
(12)	Close	The screen is ended.

7.7.8. Anybus

BS controller is equipped with i/f of Anybus standard made from HMS. In Anybus, various i / f cards for FA networks, such as DeviceNet, are offered. It can correspond to various FA networks by equipping with Anybus card. When using Anybus, general-purpose input and output become invalid.

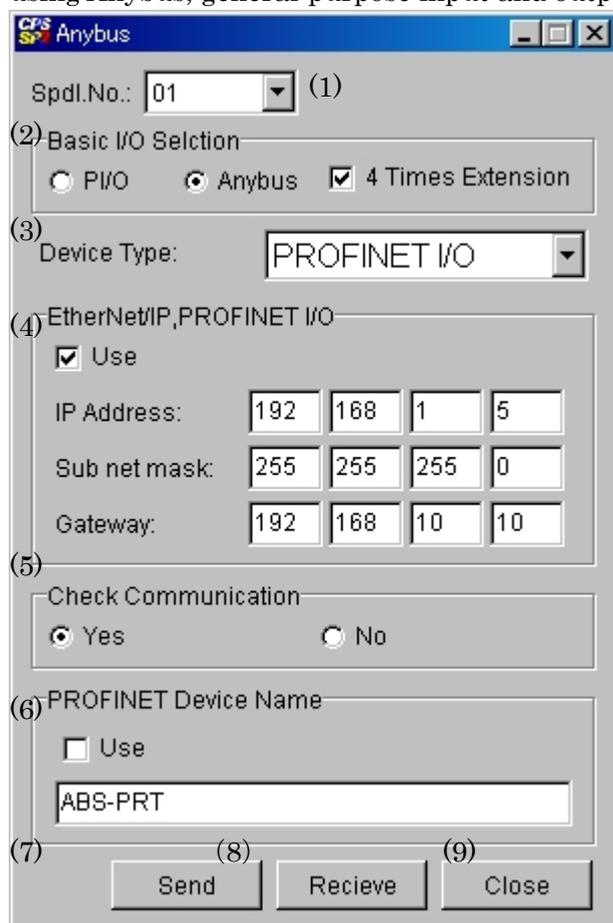


Fig. 7-7-7 Anybus screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is chosen.
(2)	Basic IO Selection	Basic input and output are chosen. When Anybus is chosen, I/O allotment of basic input and output shifts to Anybus, and PI/O becomes invalid. If 4 times extension is chosen, the number of the devices for communication will increase 4 times. Therefore, high-speed communication is possible.
(3)	Device Type	The type of Anybus card to use is set up.
(4)	Ethernet/IP,PROFINET I/O	In the case of using Ethernet/IP or PROFINET I/O, a setup of an IP address, a subnet mask, and a gateway are required. In the case of EtherNet/IP, please put a check into "Use". The IP Address set up here becomes effective.

		In the case of PROFINET I/O, IP Address may be set up from a master side. In that case, please do not put a check into "Use".
(5)	Check communication	This is a communication monitoring function with the master machine at the time of choosing Anybus. Alarm is generated when the communication with a master stops.
(6)	PROFINET Device Name	In the case of PROFINET I/O, it is necessary to assign a unique device name to each station. When you set up a device name using an application for a master, please do not put a check into "Use". A device name is memorized to the non-volatile domain on Anybus card. A device name cannot be read by click of the receive button.
(7)	Send	The contents of a display are sent to a controller.
(8)	Receive	A setup is received from a controller.
(9)	Close	The screen is ended.

7.7.9. Home position

Refer to the Chapter 5 program language [8] home position for explanation of a home position. On this screen, a setup of a system home and a user home and a check are possible.

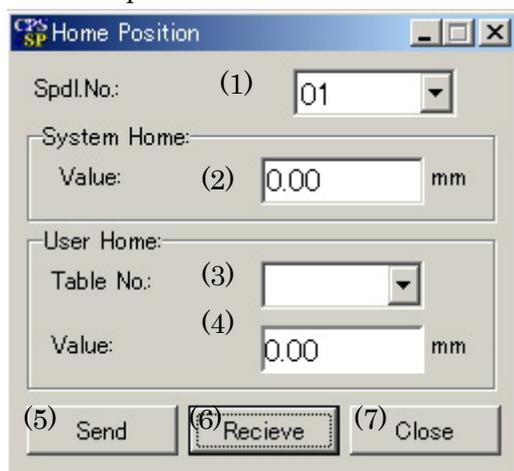


Fig. 7-7-8 Home position screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is chosen.
(2)	System home	The value of a system home is shown.
(3)	Table number	A home position table number is shown.
(4)	Value	The setting value of the home position table shown by (3) is shown.
(5)	Send	The contents of a display are sent to a controller.
(6)	Recieve	A setup is received from a controller.
(7)	Close	The screen is ended.

7.7.10. Area Signal

The area signal is prepared for the interlock with other apparatus by the position of ram. When ram is in the installed stroke range, an area signal turns on. An area signal is not outputted before origin.

Note A stroke of the servo press is calculated from the encoder pulse of a motor. When the timing belt cuts, a stroke of the servo press and the position of actual ram are not in agreement.

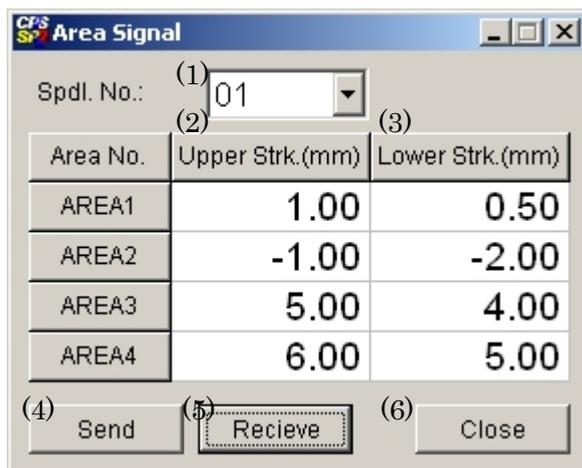


Fig.7-7-9 Area Signal screen

No.	Item	Explanation
(1)	Spindle No.	The spindle number for operation is chosen.
(2)	Upper Strk.(mm)	The maximum value of the stroke which an area signal turns on is set up.
(3)	Lower Strk.(mm)	The minimum value of the stroke which an area signal turns on is set up.
(4)	Send	The contents of a display are sent to a controller.
(5)	Recieve	A setup is received from a controller.
(6)	Close	The screen is ended.

* In BS controller of Ver1.02.31, the area signal was extended to four.

7.8. View

7.8.1. Tool bar

All the items of a pull down menu are iconized to the tool bar, and can be displayed on it. Please customize a required function and display on the tool bar.

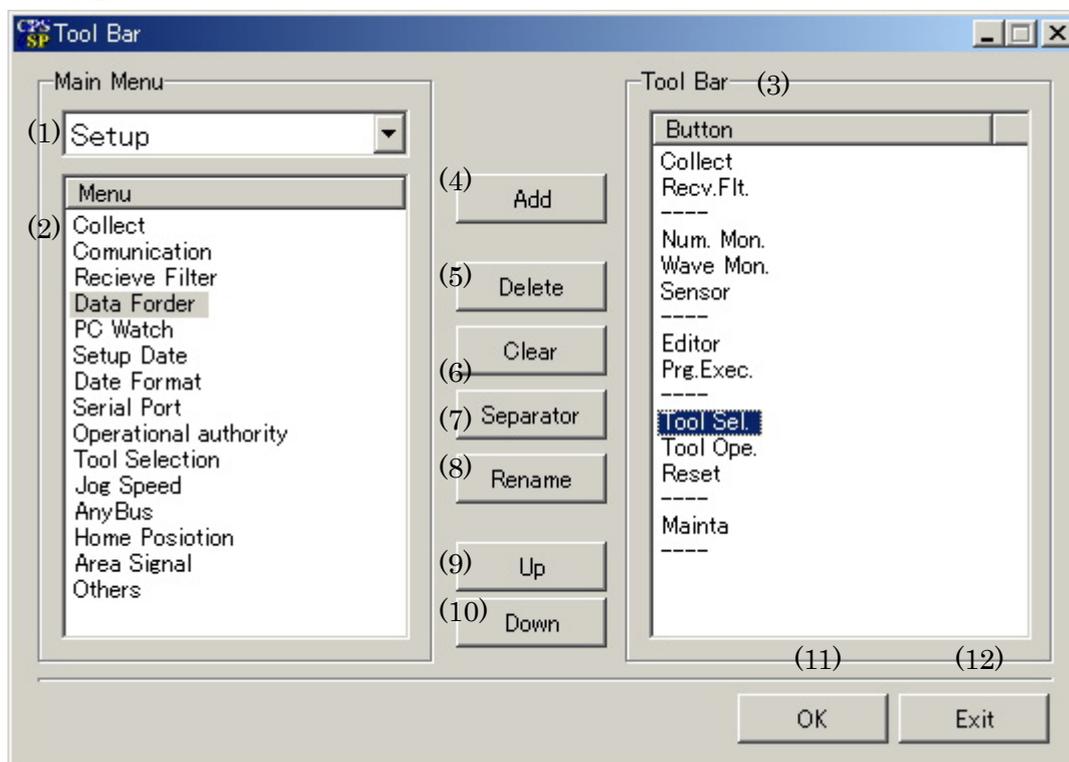


Fig. 7-8-1 Tool bar setup screen

No.	Item	Explanation
(1)	Main Menu	The item of a main menu is chosen.
(2)	Menu name	The sub menu of the item chosen by (1) is displayed in a list.
(3)	Tool Bar	The display item of a tool bar is shown.
(4)	Add	If the item of a menu name is chosen and this button is pushed, it will be added to (3).
(5)	Delete	If the item of (3) is chosen and this button is pushed, it will be deleted from (3).
(6)	Clear	All the contents of (3) are eliminated.
(7)	Separator	A separation line is inserted in (3).
(8)	Rename	A name can be changed, if the item of (3) is chosen and this button is pushed.
(9)	Up	If the item of (3) is chosen and this button is pushed once, it will move to up side by one line.
(10)	Down	If the item of (3) is chosen and this button is pushed once, it will move to down side by one line.
(11)	OK	The screen is ended reflecting the contents of a display.
(12)	Exit	The contents of the display are canceled and the screen is ended.

7.8.2. Icon

All the screens currently displayed are icon-ized.

7.8.3. All close

All the screens currently displayed are ended.

7.8.4. Startup Display

Please set up the screen to display when this application starts.

The characters set at Caption are displayed on a title following the application name. It is convenient when using two or more Configurators.

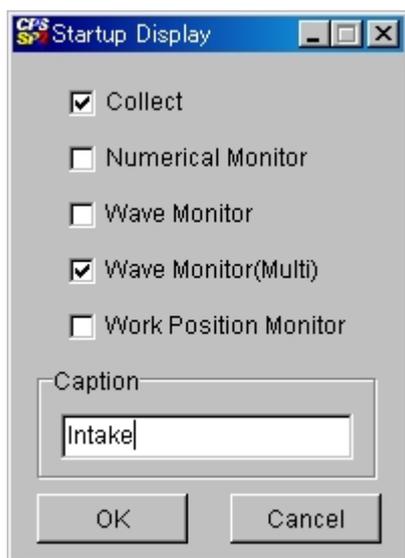


Fig. 7-8-2 Startup Display screen

7.9. Help

The help file is described by HTML. The default browser of PC starts and the help file is displayed.