

SJT-02

Instructions Manual



HOURS
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 **WARNING**

- * Do not use this product in the presence of flammable gas, explosives, or corrosive substances, in areas exposed to high levels of moisture or humidity, in poorly ventilated areas, or near flammable materials.
- * Do not connect or check the product while the power is on.
- * Do not bend, pull, damage, or modify the power or connecting cables.
- * Do not touch the internal parts of the products. Do not disassemble or remodel the device.
- * Should you notice an unusual smell, overheat, or unusual noises coming from the product, turn off the power immediately.
- * Have it checked or repaired by us before turning the power on in the event that it has received a strong physical shock as the result of a fall or other accident.
- * Use dry cloth only for cleaning the equipment.

 **CAUTION**

- * Do not leave the product in an enclosed area or in areas in which it would be exposed to direct sunlight or vibration.
- * Do not touch the product when your hands are wet.
- * Do not obstruct the product's air vents or other openings.
- * When unplugging the product, pull on the plug rather than the cord.
- * Because some electrical charge remains after the power has been cut, do not touch the input or output terminals right after the product has been turned off.
- * Turn off the power before connecting the product to other devices.
- * Before turning the equipment on (or when beginning operations), be sure that you can turn the power off immediately in the event that an abnormality occur.

CONTENTS

<i>Disclaimer of Liability</i>	1
1. BEFORE YOU BEGIN	5
1-1 DEVICE OVERVIEW	5
1-2 PACKAGE CONTENTS	5
1-3 NAME AND FUNCTION OF EACH PART	5
1-4 CONNECTING TO CONTROLLER GSC-02A/SHOT-602 AND POWER SUPPLY	7
1-5 SYSTM CRASH ! ! DISPLAY	7
1-6 OPERATION MODE AND MODE SHIFT	8
1-7 COORDINATES DISPLAY	8
2. MANUAL MODE	9
2-1 STAGE OPERATION IN MANUAL MODE	9
2-2 STAGE ORIGIN RETURN USING MANUAL MODE	10
2-3 FORCIBLE ZERO CLEAR OF CURRENT POSITION DISPLAY	10
2-4 CHANGE DRIVING SPEED	10
3. TEACHING MODE	11
3-1 REGISTER POSITION DATA IN TEACHING MODE	11
4. EDIT MODE	14
4-1 PROGRAM DATA INPUT/EDIT IN EDIT MODE	14
4-2 PROGRAM DATA RESET IN EDIT MODE	17
4-3 AN EXAMPLE OF PROGRAM REGISTRATION IN EDIT MODE (PROGRAM NO 1)	17
4-4 PROGRAM DATA WHICH CAN BE REGISTERED IN EDIT MODE	19
5. PROG RUN MODE	19
5-1 INITIAL SCREEN IN PROG RUN MODE	19
5-2 RUN SCREEN IN PROG RUN MODE	20
5-3 CLOSE SCREEN IN PROG RUN MODE	21
6. MEM SW SET MODE	21
6-1 INITIAL SCREEN IN MEM SW SET MODE	21
6-2 OPERATION IN MEM SW SET MODE	23
6-3 MEMORY SWITCH NO.	24
A UNIT SPECIFICATIONS	26

A.1 GENERAL SPECIFICATIONS..... 26
A.2 PERFORMANCES..... 27

1. Before you begin

1-1 Device Overview

The device enables simple operation for programming, program-editing and program-run as well as manual operation. Programming function enables motorized stage operation for up to 2 axes without PC connection. This unit is compatible with GSC-02A/SHOT-602 only. Please be noted that this unit cannot be connected to other controllers or PC. Please refer to instructions manual for GSC-02A/SHOT-602 if needed.

1-2 Package Contents

Purchasers of this product are advised to find that the package contains the items listed below. Contact our International Sales Division as soon as possible in the event that you find that any item is missing or damaged.

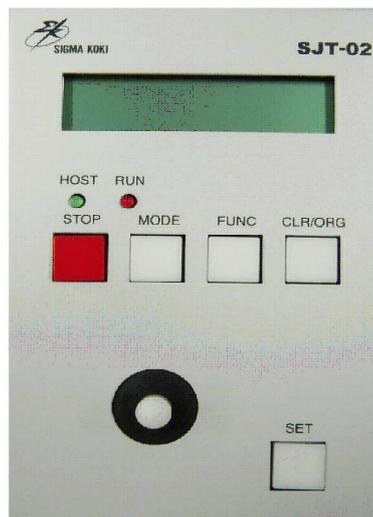
<input type="checkbox"/>	SJT-02 Controller main unit	1 EA
<input type="checkbox"/>	Connecting cable	1 EA
<input type="checkbox"/>	Instructions Manual (What you are reading now)	1 EA

1-3 Name and Function of Each Part

Name and function of each part on the SJT-02 main unit are described below.

An LCD panel, 2 LED operation indicators, 5 operation switches, and a JOG are equipped on operator panel.

Fig.1 SJT-02 Operator Panel



Main Functions of Each Part

- LCD Panel** Displays the states such as the operational state of this unit, the positions of the stages, etc.
Stage positions displayed on the panel are the values returned from GSC-02A/SHOT-602.
If a unit other than pulses is set, the program converts the values for the display.
- HOST LED (Green)** It blinks when this unit is communicating with GSC-02A/SHOT-602. Communication goes on when positions of the stages are displayed, and it will blink.
- RUN LED (Red)** Lights up when the stages are driven.
- STOP Button** Immediately stops driving the stages currently being operated. Equivalent of L:E of GSC-02A/SHOT-602.
- MODE Button** Use this button to change or set operating modes for this unit. Each pressing of this button changes the modes sequentially. If you press the MODE Button when you finished data input in each mode, you can exit. In this case, select to discard the input data or save it in memory. (Pressing down SET button will save the data in memory. Pressing down CLR button will discard the data.)
- FUNC Button** If you press FUNC Button while JOG operation or CLR button is pressed, it expands the meaning of button.
If FUNC and MODE buttons are pressed at the same time in Manual Mode, the mode will be changed to Memory Switch SET Mode. If you press only MODE button in Manual mode, the mode will be changed to Teaching Mode.
- CLR Button** Use this button for Origin Return, to clear positions of the stages, or to set operating mode. It can clear or discard the operating mode while setting up.
- SET Button** Use this button to confirm mode input operation or to set operating mode. When setting operating mode, it can confirm or validate operating mode that has been input.
- JOG**
- X+ (Right)** Use this button for JOG operation or setting this unit.
 - X- (Left)** Use this button for JOG operation or setting this unit.
 - Y+ (Up)** Use this button for JOG operation or setting this unit.
 - Y- (Down)** Use this button for JOG operation or setting this unit.

Note. 1 : The functions of buttons vary depending on operating modes. See the descriptions for each mode

1-4 Connecting to Controller GSC-02A/SHOT-602 and Power Supply

This unit can be connected to and used with Sigma Koki' s controllers GSC-02A/SHOT-602. This unit is not compatible with other controllers.

- (1) Make sure the power is turned OFF on the controllers GSC-02A/SHOT-602.
- (2) If there is PC or any other device connected to the RS232C terminal on GSC-02A/SHOT-602 controller, make sure to disconnect it.
GSC-02A cannot be connected to PC and SJT-02 at a time. (Otherwise, the device may get damaged.)
- (3) Connect the connector of this unit and the SCT602/PC-5K terminal on the GSC-02A/SHOT-602 controller using cable that comes with this unit. Fasten the connector fixing screws to prevent the disconnection during the use.
- (4) Set the baud rate to 4800, 9600 or 19200 and AXIS OF ORIGIN to BOTH AXIS for GSC-02A/SHOT-602. The system is not operable with baud rate setting 2400. Recommended value when connected to SJT-02 is 19200bps.
- (5) Turn ON the power of GSC-02A/SHOT-602.
- (6) The power turns ON on this unit and typical SJT-02 Startup window is displayed on the LCD panel. On the 2nd row, it displays version and baud rate in communication with GSC-02A/SHOT-602. Communication baud rate is automatically identified by this unit. 「—————b」 is displayed when automatic identification is failed and communication baud rate was not able to be confirmed. Switch GSC-02A/SHOT-602 ON again after checking DIP SW controller setting and whether cable in (3) is connected properly.

					S	J	T	-	0	2					
V	1	.	0	0	-	0	0	1		1	9	2	0	0	b

Typical SJT-02 Startup Window (example of Ver.1.00-001)

- (7) Always use correctly in accordance with this manual and the GSC-02A/SHOT-602 controllers instructions manuals.
- (8) Turning OFF the power of GSC-02A/SHOT-602 also turns OFF the power of this unit.

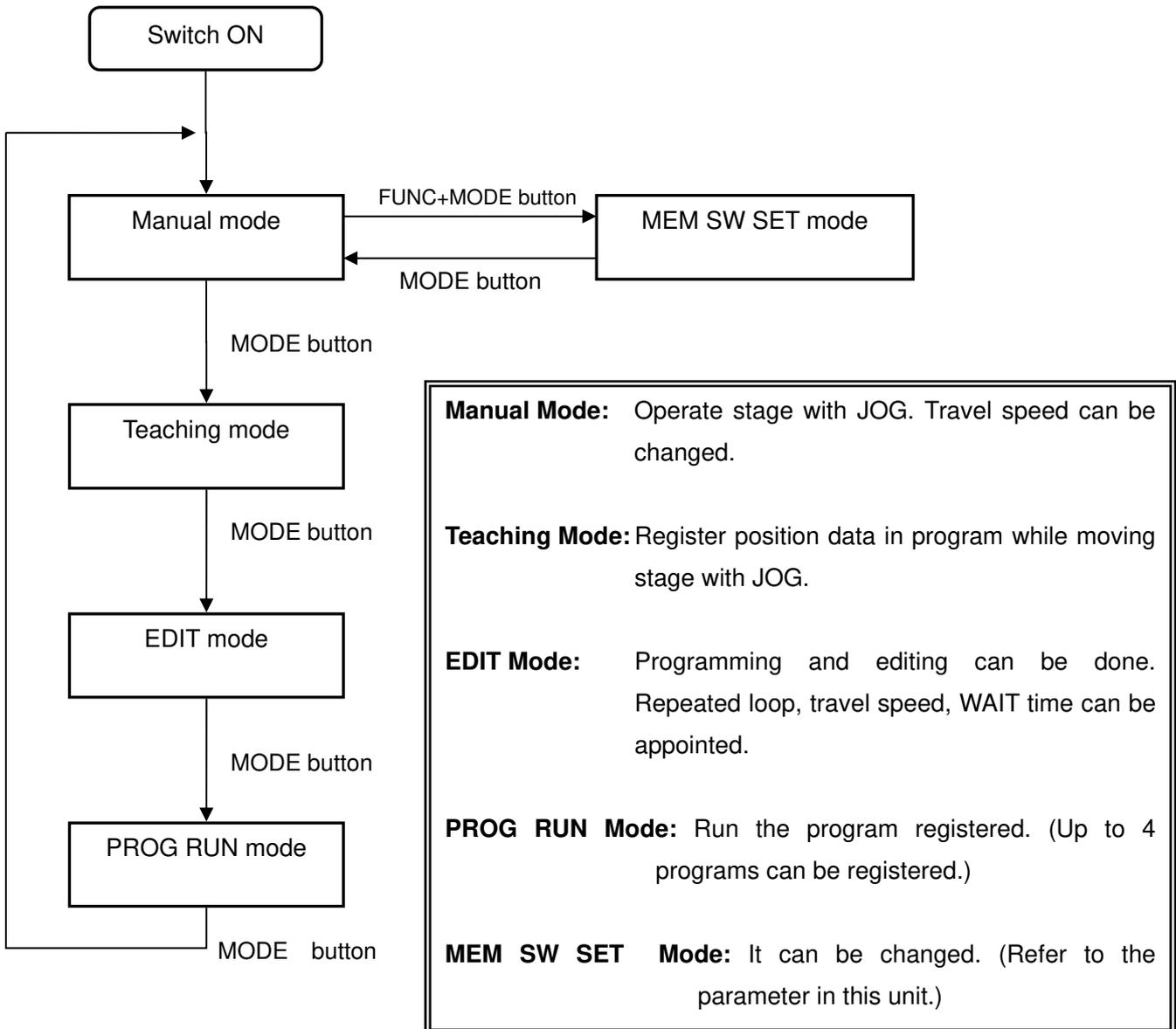
1-5 SYSTM CRASH ! ! Display

[SYSTM CRASH!! XX] displayed on the 2nd line in LCD panel when fatal error has been detected in this unit. XX shows the cause of error by 2 digit numbers.

When this display is shown, check whether cable connection is loose and switch ON again. If above display frequently occurs after re-supplying power, the unit may have been damaged. In such case, please contact our International Division.

1-6 Operation Mode and Mode Shift

Initial screen for each mode is displayed by pressing MODE button. Each pressing changes the mode in order of **Manual Mode**→ **Teaching Mode**→ **EDIT Mode**→ **PROG RUN Mode**→ **Manual Mode**. When MODE button is pressed while FUNC button is pressed, initial screen of Memory Switch SET Mode is displayed.



1-7 Coordinates Display

Usually absolute coordinates of X axis are displayed in 8th to 16th digit on 1st line in LCD panel and Y axis in 8th to 16th digit on 2nd line. Coordinates unit displayed is according to what has been appointed in No34 and 35(UT) in memory switch. 0, 1, and 4 decimal places are displayed when PLS, um, and deg is appointed respectively.

2. Manual Mode

2-1 Stage Operation in Manual Mode

You can manually operate stages connected to GSC-02A/SHOT-602 using this unit. The operation is equivalent of the **M command** of GSC-02A/SHOT-602. The stages accelerate/decelerate according to the selected speed parameters. Note that if a too high speed has been set, the stage may malfunction due to the possible desynchronization of the motor or noises may be generated depending on conditions. Select a lower speed in such cases. If you force to operate without getting out of the async state, the stage or controller may be damaged.

Operating Procedure in Manual Mode

- (1) Set to the Manual Mode by pressing “MODE” button. The mode display on the LCD panel changes to M. Absolute coordinates of X axis are displayed in 8th to 16th digit on 1st line in LCD panel and Y axis in 8th to 16th digit on 2nd line. S5 on 2nd line means Speed No. 5. Note that Manual Mode is set when powered ON.

M						X									0
S	5					Y									0

Manual Mode Display

- (2) Default value for speed in manual mode is the speed No. appointed to No1 in memory switch. To change the speeds in manual mode, press the “Y+” or “Y-“ buttons while keeping the “FUNC” button pressed down. The speed parameters change sequentially. Speed No. means Speed parameter No. appointed in Memory Switch. (See 6-3.)
- (3) Move the stage by operating the arrow buttons. (Press the button to move the stage, or release to stop.) The stage moves in the positive X direction by pressing “X+(right)”, negative by “X-(left)”, in the positive Y direction by “Y+(up)”, or negative by “Y-(down)”. Travel is made by only 1 pulse when ON time in JOG operation is smaller than the value set in Memory Switch #40 (JOG TIM). It can be used for fine adjustment of number of travel pulse.
- (4) If limit sensor has been detected, “L” will appear right before each coordinate in the display. The stage cannot be moved any further in a direction that limit sensor was detected.

M					L	X		1	6	7	7	7	2	1	4
S	5				L	Y	-	1	6	7	7	7	2	1	4

Screen Display example when Limit Sensor is detected

(“L” is displayed when limit sensor is detected.)

2-2 Stage Origin Return using Manual Mode

You can make origin return of the motorized stages by operating buttons. This is equivalent to H command of GSC-02A/SHOT-602.

Set the DIP switch #5 (Origin-Returnable Axis) on GSC-02A/SHOT-602 to "BOTH AXES". (Enabling one axis only may cause malfunction even if you set to BOTH AXES in the SJT-02 setup.)

- (1) Press the "CLR" button while keeping "FUNC" button pressed down.
- (2) The stages set as the Origin Returnable Axes will be origin returned. The RUN LED (red) lights up while the stages move.
- (3) When Origin Return is complete, the RUN indicator turns OFF and the coordinate value of the Origin Return Axis will be cleared Zero.

Note 1: Although both axes (ORGE1 and ORGE2) are configured to be Origin Returnable in the factory setting, it can be changed in the "MEM SW SET mode" to configure only X axis or Y axis is Origin Returnable.

2-3 Forcible Zero Clear of Current Position Display

You can clear the stage position display in the LCD panel on this unit "0" at your discretion. This corresponds to the R command of GSC-02A/SHOT-602 in terms of function.

- (1) Press "CLR" button at the position you want to zero clear the display. The current position is cleared.

Note 1: You cannot clear only X or Y coordinate selectively.

2-4 Change Driving Speed

Select one of the preset driving speeds in manual mode. Note that you cannot change speeds while stages are operated. The stages are accelerated/decelerated according to the preset speed parameters. The speed parameters 0-9 are preset, and their contents can be changed in "MEM SW SET mode". (Refer to 6-3.)

- (1) To change speeds, press "Y+" or "Y-" while keeping the "FUNC" button pressed down. Every pressing of either of the buttons will change speed parameter indices.

Note 1 : If you select a too high speed, stages may desynchronize, generate noises, or vibrate without getting started. In that case, select a slower speed parameter to specify a speed range where the synchronization of the stages can be kept. If you force to operate without getting out of the async state, the stages or the controller may be damaged.

(3) Coordinates of X/Y axis are displayed when each stage is moved using JOG. Travel is made by only 1 pulse when ON time in JOG operation is smaller than the value set in Memory Switch #40 (JOG TIM). It can be used for fine adjustment of number of travel pulse. Default value for travel speed is the Speed No. set in Memory Switch No.1. Travel speed of stage can be switched by FUNC button and Y+/Y- JOG operation, however, speed set as program is always the Speed No. set in Memory Switch No.1. Change of Travel Speed No. in program is available in EDIT mode.

(4) If "SET button" is pressed after positioning is complete, following screen is displayed.

T	1			1		X						2	0	0	0
S	5	S	E	T	?	Y						2	0	0	0

Teaching Mode Data Screen (2)

If SET button is pressed again here, Data Screen display is changed as below (Teaching Mode Data Screen(3)) and data is registered in Program Line No.1. Also, 3rd to 5th program line No. on the 1st line is automatically added for next data input. (See Teaching Mode Data Screen (3). In this example, you can see that the line No. is changed from 1 to 2. When FUNC+SET button are pressed instead of SET button only, program line No. will decrease.) Pressing CLR button here will release SET button, and it enables repetition of operation in (3).

T	1			2		X						2	0	0	0
S	5					Y						2	0	0	0

Teaching Mode Data Screen (3)

Set required program line No. by repeating above operation.

(5) Press “MODE” button when data input for required program line No. is complete.

O	K	(	S	E	T	)	,	N	G	(	C	L	R)	
S	5					Y						2	0	0	0

Teaching Mode Data Screen (4)

Above message is displayed on 1st line.

When SET button is pressed, 「**PROG Writing...**」 is displayed on the 2nd line, and the data which has been input till now will be saved in program No. which is nonvolatile memory.

When save is complete, it turns into EDIT Mode. (Refer to EDIT mode.)

If CLR button is pressed instead, it will turn to the Initial Screen in Teaching Mode (1) without saving in nonvolatile memory.

4. EDIT Mode

4-1 Program data input/edit in EDIT mode

This feature enables you to input/edit program data. The data registered in program No.1 to 4 is available for input/edit.

(1) Press the “MODE” button to change to the EDIT mode. The mode display on the LCD panel is as screen below.

E	D	I	T		M	O	D	E							
P	R	O	G	=	1			L	I	N	E	=			1

EDIT Mode Initial Screen

Movement forward positive and negative directions on X axis moves the cursor between PROG and LINE. Movement forward positive and negative directions on Y axis changes Program No. or Line No., at the time of operation starts.

(2) When SET button is pressed, in order to make it editable, program is loaded from appointed program No. which is non volatile memory, and it turns to EDIT Mode Screen (1).

E	1			1	M	X								1	0
S	5		1	5		Y							-	2	0

EDIT Mode Screen (1)

- E in the 1st digit on the 1st line It shows EDIT mode is being used.
- 1 in the 2nd digit on the 1st line It shows program No.(1 to 4) is 1.
- 1 in the 3rd to 5th digit on the 1st line It shows program line No. (1 to 128) is 1. When displaying/editing next/former lines, place cursor at this position and move it forward positive/negative direction on Y axis.
- M in the 6th digit on the 1st line It shows program command used is M.
See the table below for the kinds of commands that can be appointed.

command	X axis data	Y axis data	Speed data	WAIT data	Explanation
M	Effective	Effective	Effective	Effective	Travel will be made by appointed No. of relative pulse in appointed speed.
H	-	-	-	Effective	Origin Return will be made. Origin Return speed is set to be either of S:500pps, F:5000pps, R:200ms and it cannot be changed due to the controller restriction.
F	Number of repetition	-	-	-	Multiple commands consisted of F and N commands will be implemented repeatedly as appointed. Number up to 99999999 can be appointed. Multiple repeated loops are not available. Use it as single repeated loop.
N	-	-	-	-	NOP (No Operation)
Y	-	-	-	-	Exits program run.

10 in the 8th to 16th digit on the 1st line

S5 in the 1st to 2nd digit on the 2nd line

15 in the 3rd to 5th digit on the 2nd line

-20 in the 8th to 16th digit on the 2nd line

Appoint 10pulse as relative movement travel pulse of program **command M**.

It shows Speed No. is 5.

Appoint WAIT time after program command M is implemented. (0 to 255 can be appointed as WAIT, in 100ms) (1.5 seconds is appointed in the above table.)

-20pulse is appointed as relative movement pulse of Y axis in program **command M**.

Operation button for EDIT Mode Screen (1) (Operation Screen in EDIT mode)

- **X+, X-** Place the cursor at the position where you want to input data. Invalidated data area is skipped depending on the kind of command, for example, X axis data area in H command, etc. Therefore, please move to the required data area after confirming command of each line.
- **Y+, Y-** Data value increased by Y+ and decreases by Y-.
- **CLR (INS function)** **N command** is inserted to the current Line No. and all lines after the current one will be pushed back by a line. Data in 128th line will be deleted.
- **FUNC+CLR (DEL function)** Command line of current line No. will be deleted. All lines after the current one will be pulled up by a line. N command will be inserted in data in 128th line.
- **SET (Line No.+ 1)** 1 is added to the current line No. It shows the command of line No. after the current one.
- **FUNC+SET (Line No.- 1)** 1 is deducted from the current line No. It shows the command of line No. before the current one.
- **Change of Line No.** In case when changing program line No., move the cursor to 3rd to 5th digit on the 1st line by X+/X- operation, then change the line No. by Y+/Y- operation.
- **MODE** It is used to exit EDIT mode. Below screen is displayed.

O	K	(	S	E	T	)	,	N	G	(	C	L	R)	
S	5					Y						2	0	0	0

EDIT Mode Data Screen (2)

Above message is displayed on the 1st line.

When SET button is pressed, 「PROG Writing...」 is displayed on the 2nd line and the data which has been input will be saved in the appointed program No. that is nonvolatile memory. When save is complete, it will turn to Manual Mode. (See 2-1.)

If CLR button is pressed instead, edited data will be discarded without saving in nonvolatile memory, then, it will turn to Manual Mode.

4-2 Program data reset in EDIT Mode

(3) When FUNC+CLR buttons are pressed in the initial screen in EDIT Mode, clear screen for the appointed program No. is displayed.

E	D	I	T		M	O	D	E							
P	R	O	G	=	1		C	L	R	?	O	K	/	N	G

EDIT Mode Data Screen (3)

If SET button is pressed here, 「PROG = X CLEAR...」 is displayed and appointed all lines (1 to 128) of program No. will be cleared by **Y command**. By this operation, appointed program No. that is nonvolatile memory will also be cleared by **Y command**.

However, if CLR button is pressed instead, program will not be cleared and it will turn to initial screen.

4-3 An example of program registration in EDIT mode (program No 1)

The 2nd, 5th, and 6th digits on 1st line show program No., Line No. of program, and command respectively.

(1)

E	1			1	H	X									
S			1	0		Y							-	2	0

(2)

E	1			2	F	X							1	0	0
S						Y									

(3)

E	1			3	M	X							2	0	0	0
S	5		1	0		Y							2	0	0	0

(4)

E	1			4	M	X					-	2	0	0	0
S	5		1	0		Y					-	2	0	0	0

(5)

E	1			5	N	X									
S						Y									

(6)

E	1			6	Y	X									
S						Y									

- (1) Wait for 1 second (0.1 second x 10) after completing Origin Return.
- (2) Repeat 100 times of loop appointed between **F command** and **N command** in (5), which is **M command** in (3) and (4).
- (3) Move 2000pulse with speed No.5 in X and Y direction. Wait for 1 second after movement is complete. (Always appoint pulse No. in EDIT Mode regardless of what is appointed for No.34(UT1)and 35(UT2).
- (4) Move -2000pulse with speed No.5 in X and Y direction. Wait for 1 second after movement is complete. (Always appoint pulse No. in EDIT Mode regardless of what is appointed for No.34(UT1)and 35(UT2).
- (5) It shows the finish point of repeated loop.
- (6) It shows the end of this program.

4-4 Program data which can be registered in EDIT Mode

Data range that can be registered in EDIT Mode is as below.

- (1) Line No. : 1 to 128
- (2) Relative movement on X axis : -16777214 to 16777214pulse (Due to the restriction of controller GSC-02A/SHOT-602)
Number of F command repetition can be selected from 1 to 99999999.
- (3) Relative movement on Y axis : -16777214 to 16777214 pulse(Due to the restriction of controller GSC-02A/SHOT-602)
- (4) WAIT time : 0 to 255 (0 to 25.5 seconds)
- (5) speed No. : 0 to 9

5. PROG RUN mode

PROG RUN mode enables motorized operation of stage based on the registered program in this unit. Input/Edit are available in Teaching Mode/EDIT Mode of this program. 4 kinds of programs can be saved and Max. 128 lines per program can be registered.

5-1 Initial Screen in PROG RUN mode

P	R	O	G		R	U	N		M	O	D	E			
P	R	O	G	=	1										

PROG RUN Mode Initial Screen

- (1) Press “MODE” button and switch into PROG RUN mode. Mode display in LCD panel is as screen above.
- (2) Operate Y+/Y- and select program No. to run.
- (3) If SET button is pressed, program is loaded from appointed program No. that is nonvolatile memory. Then program will start from line No.1. (Program cannot be run from the lines in the middle.)

5-2 Run Screen in PROG RUN mode

R	1		2	5		X					1	2	3	4	5
S	5		1	9		Y				-	9	8	7	6	5

PROG RUN Mode RUN Screen

R in the 1st digit on the 1st line
 1 in the 2nd digit on the 1st line
 25 in the 3rd to 5th digit on the 1st line
 12345 in the 8th to 16th digit on the 1st line

S5 in the 1st to 2nd digit on the 2nd line
 19 in the 3rd to 5th digit on the 2nd line

-98765 in the 8th to 16th digit on the 2nd line

It shows PROG RUN mode is in use.
 It shows program No.(1 to 4) is 1.
 It shows the line No. 25 is being run.
 It shows absolute coordinates of X axis. 0,1, and 4 decimal places are displayed when pulse, um, and deg is appointed respectively.
 It shows Speed No.5.
 3 digits from the very last among remaining number of loop are displayed when number of repeated loop was appointed in PROG RUN Mode. (WAIT time is appointed in EDIT Mode and PROG RUN mode.) (Note that the display contents differ between EDIT mode and PROG RUN mode.) Nothing will be displayed if repeated loop was not appointed. Upper digit will not be displayed due to the insufficient display space. Therefore, note that if number of remaining loop is 1000 or greater, 999 is displayed after 000. (When the number of remaining loop is 99 or smaller, the upper digit 0 is not displayed. Thus, 99 will be displayed rather than 099. By doing this, whether the number of remaining loop is 99 or over 1098, can be distinguished.)
 It shows absolute coordinates of Y axis. 0, 1, and 4 decimal places are displayed when pulse, um. And deg is appointed respectively.

To stop the program being run, press STOP button. The program will stop after finishing the command of line No. currently in order.

5-3 Close Screen in PROG RUN mode

R	1		8	5		X					2	0	0	0	0
S	5	E	N	D		Y				-	5	0	0	0	0

PROG RUN Mode Close Screen

As screen above, END is displayed on the 2nd line, and the program will stop.

If MODE button is pressed here, it will turn to Manual Mode.

If SET button is pressed here, it will turn to the initial screen of PROG RUN mode.

6. MEM SW SET Mode

When FUNC and MODE button are pressed at a time in Manual mode, it will turn to Memory Switch SET mode (MEM SW SET mode). Note that it will turn to Teaching Mode rather than MEM SW SET mode when only MODE button is pressed in Manual Mode.

Memory Switch data can be set and changed in MEM SW SET mode. As the data is saved in nonvolatile memory, the data set will not be deleted even after power goes OFF.

6-1 Initial Screen in MEM SW SET Mode

M	E	M		S	W		S	E	T		M	O	D	E	

MEM SW SET Mode Initial Screen

If SET button is pressed in the above initial screen, it will turn to operation screen of MEM SW SET mode.
 If MODE button is pressed in the initial screen instead, it will turn to Manual Mode.

M	E	M	R	Y		S	W	I	T	C	H			0	1
S	P	D		S	E	L	:								5

MEM SW SET Mode Operation Screen

15th and 16th digits on 1st line

Memory Switch No.

1st to 8th digits on 2nd line

Item name of memory switch.

12th to 16th digits on 2nd line

Data in memory switch.

When data is numerical value, cursor is displayed as shown in the screen above. In this case, cursor will be moved by X+/X- operation and numerical value of the digit will be increased / decreased by pressing FUNC Y+ or FUNC Y-.

Instead, FUNC and CLR buttons are pressed in the initial screen, it will turn to Default Value settings (Factory settings) screen for memory switch.

M	E	M	R	Y		S	W	I	T	C	H			0	1
M	E	M	O	R	Y		C	L	R	?	O	K	/	N	G

MEM SW SET Mode Default Value Settings Screen

If SET button is pressed in the screen above,「MEMORY CLEAR...」will be displayed and memory switch will be cleared to default value under factory settings. (See 6-3 default value.) If CLR button is pressed instead, it will turn to the initial screen of MEM SW SET mode.

6-2 Operation in MEM SW SET Mode

Following operations are available in operation screen in MEM SW SET mode.

- **X+,X-** Cursor will be moved to the position where to input data.
- **Y+,Y-** Memory Switch No. will be increased/decreased by Y+/Y-.
- **FUNC and Y+** Data value in data item will be increased.
- **FUNC and Y-** Data value in data item will be decreased.
- **MODE** It is used to exit memory switch mode. Following screen will be displayed.

O	K	(	S	E	T	)	,	C	A	N	(	C	L	R)
S	P	D		S	E	L	:								5

MEM SW SET Mode Operation Screen

If SET button is pressed here, 「MEM WRITING...」 will be displayed, then, the data set will be saved in nonvolatile memory and it will turn to Manual Mode.

If CLR button is pressed, data set will be discarded and it will turn to Manual Mode.

6-3 Memory switch No.

No.	Item	Contents	Setting Range/ Item selected	default value
1	SPD SEL	Initial setting for Speed No.	0 to 9	5
2	SPD0 S	speed parameter S for #0	1 to 20000	5(pulse/sec)
3	SPD0 F	speed parameter F for #0	1 to 20000	10(pulse/sec)
4	SPD0 R	speed parameter R for #0	0 to 1000	10(ms)
5	SPD1 S	speed parameter S for #1	1 to 20000	20(pulse/sec)
6	SPD1 F	speed parameter F for #1	1 to 20000	100(pulse/sec)
7	SPD1 R	speed parameter R for #1	0 to 1000	10(ms)
8	SPD2 S	speed parameter S for #2	1 to 20000	50(pulse/sec)
9	SPD2 F	speed parameter F for #2	1 to 20000	500(pulse/sec)
10	SPD2 R	speed parameter R for #2	0 to 1000	20(ms)
11	SPD3 S	speed parameter S for #3	1 to 20000	200(pulse/sec)
12	SPD3 F	speed parameter F for #3	1 to 20000	1000(pulse/sec)
13	SPD3 R	speed parameter R for #3	0 to 1000	20(ms)
14	SPD4 S	speed parameter S for #4	1 to 20000	1000(pulse/sec)
15	SPD4 F	speed parameter F for #4	1 to 20000	2000(pulse/sec)
16	SPD4 R	speed parameter R for #4	0 to 1000	50(ms)
17	SPD5 S	speed parameter S for #5	1 to 20000	1000(pulse/sec)
18	SPD5 F	speed parameter F for #5	1 to 20000	3000(pulse/sec)
19	SPD5R	speed parameter R for #5	0 to 1000	50(ms)
20	SPD6 S	speed parameter S for #6	1 to 20000	1000(pulse/sec)
21	SPD6 F	speed parameter F for #6	1 to 20000	4000(pulse/sec)
22	SPD6 R	speed parameter R for #6	0 to 1000	100(ms)
23	SPD7 S	speed parameter S for #7	1 to 20000	1000(pulse/sec)
24	SPD7 F	speed parameter F for #7	1 to 20000	5000(pulse/sec)
25	SPD7 R	speed parameter R for #7	0 to 1000	150(ms)
26	SPD8 S	speed parameter S for #8	1 to 20000	1000(pulse/sec)
27	SPD8 F	speed parameter F for #8	1 to 20000	6000(pulse/sec)
28	SPD8 R	speed parameter R for #8	0 to 1000	250(ms)
29	SPD9 S	speed parameter S for #9	1 to 20000	1000(pulse/sec)
30	SPD9 F	speed parameter F for #9	1 to 20000	7000(pulse/sec)
31	SPD9 R	speed parameter R for #9	0 to 1000	250(ms)

No.	Item	Contents	Setting Range/ Item selected	default value
30	SPD9 F	speed parameter F for #9	1 to 20000	7000(pulse/sec)
31	SPD9 R	speed parameter R for #9	0 to 1000	250(ms)
32	MOVE1	Movement direction of X axis	POS/NEG	POS
33	MOVE2	Movement direction of Y axis	POS/NEG	POS
34	UT1	Display unit for X axis	PLS/um/deg	PLS
35	UT2	Display unit for Y axis	PLS/um/deg	PLS
36	ORGE1	Origin Return of X axis	OFF/ON	ON
37	ORGE2	Origin Return of Y axis	OFF/ON	ON
38	BRATE1	Base rate of X axis	1 to 10000	20
39	BRATE2	Base rate of Y axis	1 to 10000	20
40	JOG TIM	JOG Timer	10 to 1000	200(ms)

Note 1 : SPD SEL (No1) is default value of speed No. What is appointed here is set to be speed No. as default value after power is supplied

Note 2 : Select initial speed and closing speed in SPDxS and SPDxF (No2 to 31) respectively. SPD x R sets accelerating / decelerating times in ms unit. When closing speed is set to 200 or over, initial speed is required to be 50 or over according to due to the restriction of controllers GSC-02A/SHOT-602. If not, speed settings cannot be completed correctly. Also, in case accelerating/decelerating time has been set to 0, initial and closing speeds are required to be set to the same value. (Refer to Instructions Manuals of GSC-02A/SHOT-602 controller for further details.)

Note 3 : When NEG is set in MOVE (No32,33), movement direction of stage and origin position will be opposite of when POS is set. Usually POS is set.

Note 4 : Appoint display unit of coordinates in UT (No34 and 35). 0, 1, and 4 decimal places are displayed when PLS, um, and deg is appointed respectively.

Note 5 : Origin Return is not available when OFF is set for ORGE (No36 and 37).

Note 6 : Base Rate (No38 to 39) is to be used when display unit for axis is appointed to um and deg. Base Rate for linear stage is the travel per pulse under full step drive. Note that its unit is in 0.1um. (For rotation stage, travel angle per pulse is set in 0.0001deg. Please set 50 for Standard rotation stages.)

Note 7 : When moving stage in Manual Mode or Teaching Mode, movement by 1pulse is made for fine adjustment sometimes. In case On time of JOG is shorter than appointed in JOG TIM (No40), it is interpreted as operation for 1 pulse movement.

A Unit Specifications

A.1 General Specifications

Applicable Controller	GSC-02A/GSC-02/SHOT-602 by Sigma Koki		
Operation/Display System	Display	LCD panel: 16 characters x 2 lines	1
		HOST LED (green)	1
	RUN LED (red)	1	
	Operation Switch	STOP button switch	1
		MODE button switch	1
		FUNC button switch	1
		CLR/ORG button switch	1
		SET button switch	1
JOG switch	1		
Power Supply	+24V, MAX60mA (supplied from exclusive use cable)		
Operating Temperature	5 to 40 deg C.		
Storage temperature	-20 to 60 deg C.		
Ambient Humidity	20 to 80 %RH (without condensation)		
Altitude	up to 2000m		
Indoor use only			
Installation category	II		
Pollution degree	2		
Dimensions	94(W) × 30(H) × 140(D) [mm] (excluding protrusions)		
Weight	Approx. 450g (main unit),		
	Approx. 150g (attached cable)		
Communication I/F	Serial Communication		
Communication Speed	19200, 9600, 4800 [bps]		
Connection Cable	Use special cable coming with this unit (disconnectable)		

A.2 Performances

Number of Controllable Axes	Max. 2 axes	
Operation Mode	Manual mode (M) Teaching mode (T) PROG RUN mode (R) EDIT mode (E) MEM SW SET mode	
Unit in Display	[PLS], [μ m], [deg]	
Coordinate Input Range	X axis	Equivalent to -16777214 to +16777214 [pulse]
	Y axis	Equivalent to -16777214 to +16777214 [pulse]
Coordinate Display Range	X axis	Equivalent to -99999999 to +99999999 [pulse]
	Y axis	Equivalent to -99999999 to +99999999 [pulse]
* Display ranges change depending on resolution/unit settings.		
* If coordinate overflows, high order digit is discarded and count/display continues from zero in all digits.		
Limit Sensor Display	X axis	Display in the left of coordinates ("L" displayed when limit sensor detected)
	Y axis	Display in the right of coordinates ("L" displayed when limit sensor detected)
Speed Parameter	10 steps preset from S0 to S9 (editable)	
Speed Parameter Range	Min. speed S	1 to 20,000 [pps]
	Max. speed F	1 to 20,000 [pps]
	Acceleration/deceleration time R	0 to 1,000 [mS]
Program Storage Capacity	128 steps × 4 CHs	
Parameter in Program	Waiting time	0 to 25.5[seconds] (in 0.1 seconds)
	Number of repetition	0 to 99999999[times]
Origin-Returnable Axis	Switchable in the order of X axis only/ Y axis only /Both	
Motor Rotating Direction	X axis	Switchable between forward (POS) / reverse (NEG)
	Y axis	Switchable between forward (POS) / reverse (NEG)