

***Cuty Axis***

Sanmei Invention Servo  
***Sí servo***

# Operation Manual

## Serial Communication Part

Revision 2007.8.20

# Contents

1. Before being Used .....	1
2. Serial Communication Function.....	2
2-1. Serial Communication Specifications. ....	2
2-2. Serial Communication Protocol.....	3
2-2-1. Single Axis Command Communication .....	3
2-2-2. All Axis Command Communication.....	4
2-2-3. Format of the Numeric Data Character .....	4
2-3. Reply of Communication Error .....	5
2-4. Serial Communication Command List.....	6
2-5. Details of the Serial Communication Command.....	9
2-5-1. Parameter/Point Table Setting Command.....	9
2-5-1-1. [PRMR] Parameter Reading .....	9
2-5-1-2. [PRMW] Parameter Writing .....	9
2-5-1-3. [TBLR] Point-Table Reading (Cuty2 Specification Point-Table) .....	10
2-5-1-4. [TBLW] Point-Table Writing (Cuty2 Specification Point-Table).....	11
2-5-1-5. [TR] Point-Table Reading.....	12
2-5-1-6. [TW] Point-Table Writing.....	13
2-5-1-7. [FLASH] EEPROM Writing .....	13
2-5-2. Basic Operation Command.....	14
2-5-2-1. [SVON][SVOFF] Servo-ON/OFF.....	14
2-5-2-2. [EMCON][EMCOFF] Emergency Stop ON/OFF .....	15
2-5-2-3. [STRON][STROFF][STRP] Point-Table Start ON/OFF .....	16
2-5-2-4. [ZSTRON][ZSTROFF][ZSTRP] Zero-Point-Return Start ON/OFF .....	17
2-5-2-5. [STOP] Operation Stop .....	18
2-5-2-6. [DECON][DECOFF] Zero Slowdown LS ON/OFF .....	18
2-5-2-7. [HOLDON][HOLDOFF] HOLD ON/ OFF .....	18
2-5-2-8. [SBKON][SBKOFF] Single-Block ON/OFF .....	19
2-5-2-9. [EXINON][EXINOFF][EXIN1ON][EXIN1OFF] [EXIN2ON][EXIN2OFF][EXIN3ON][EXIN3OFF] Input Branch ON/ OFF .....	20
2-5-2-10. [PJOG][NJOG][JOGOFF] JOG Operation.....	21
2-5-2-11. [TDIN] Teaching.....	22
2-5-2-12. [ARST] Alarm Reset .....	22
2-5-2-13. [PNT] Point Specification.....	23
2-5-2-14. [HCL] Alarm History Clearance .....	23
2-5-2-15. [RESET] CPU Reset.....	24
2-5-2-16. [ZSET] Mechanical Origin Rewriting .....	24
2-5-2-17. [ESET] Positional Error Counter Set .....	24
2-5-2-18. [RSELON][RSELOFF] Resolution Selection .....	25
2-5-2-19. [TSELON][TSELOFF][TSEL1ON][TSEL2ON][TSEL3ON][TSEL4ON] Torque Selection.....	26
2-5-2-20. [MFINON][MFINOFF] M-Completion ON/OFF.....	27
2-5-2-21. [STEPON][STEPOFF][STEP0ON][STEP1ON][STEP2ON][STEP3ON] STEP Feed .....	27
2-5-3. Monitor Command.....	28
2-5-3-1. [MON] Numerical Monitor.....	28
2-5-3-2. [ALM] Alarm Occurrence Situation .....	30
2-5-3-3. [IO] I/O Monitor (Cuty2 Specification).....	31
2-5-3-4. [IO2] I/O Monitor 2.....	31

# 1. Before being Used

- This manual "Cuty Axis and Si servo Operation Manual [Serial Communication Part] SH035D053" explains serial communication function of Cuty Axis and Si servo. Before using this product, read "Cuty Axis Operation manual [Main Part] SG972D001" and "Si servo Operation Manual [Main Part] SH035D001", "Cuty Axis and Si servo Operation Manual [Point-Table Part] SH035D002" as well as other brochure attached to the driver and the motor. Before using the product, make sure to understand the proper operating procedures.
- Especially keep in mind the "Notes about Insurance" in "Cuty Axis Operation manual [Main Part] SG972D001" and "Si servo Operation Manual [Main Part] SH035D001". Ensure that you understand the manual and do not forget the proper procedures. In addition, be careful not to mishandle this product in any case. If care is not taken, in the worst case serious accidents or even loss of life may occur.
- After reading this Operating Manual and the brochures attached to the driver and the motor, keep them displayed where the operator can them at all times.

**This document applies to the following servo driver models:**

<b>Cuty Axis</b>	<b>RT-0P3AXE</b> <b>RT-0P5AXE</b> <b>RT-001AXE</b> <b>RT-002AXE</b> <b>RT-004AXE</b> <b>RT-008AXE</b>
<b>Si servo</b>	<b>Si-02LDE</b> <b>Si-02DE</b> <b>Si-05LDE</b> <b>Si-05DE</b>

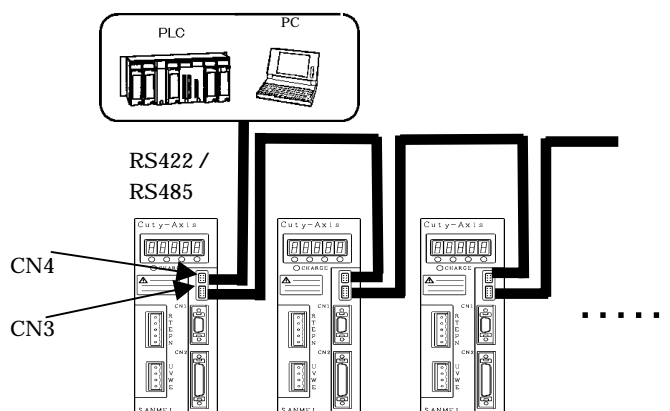
## 2. Serial Communication Function

Cuty Axis can control multi axes with the multidrop link with RS422 (4 wire system) or RS485 (2 wire system). Si servo can control multi axes with the multidrop link with RS485 (2 wire system).

The following is an example of Cuty Axis, and it is also applied to Si servo.

In this example, Cuty Axis and Si servo are referred to collectively as "servo driver".

### 2-1. Serial Communication Specifications.



Conformity Standard	RS422 (see note 1), RS485
Communication System	Asynchronous
	Character System
	Half Duplex Communication
Baud Rate (see note 2)	9600,19200,38400 57600,115200 bps
Start Bit	1bit
Data Format	8bit ASCII code HEX
Parity	1bit (even)
Stop Bit	1bit
Sum Check	None
The Maximum Wire Length	20m
Range of Axis Address	Cuty Axis: 0~15 Si servo: 0~14

Note 1: RS422 can only be set in Cuty Axis.

(Default setting of Cuty Axis is RS422)

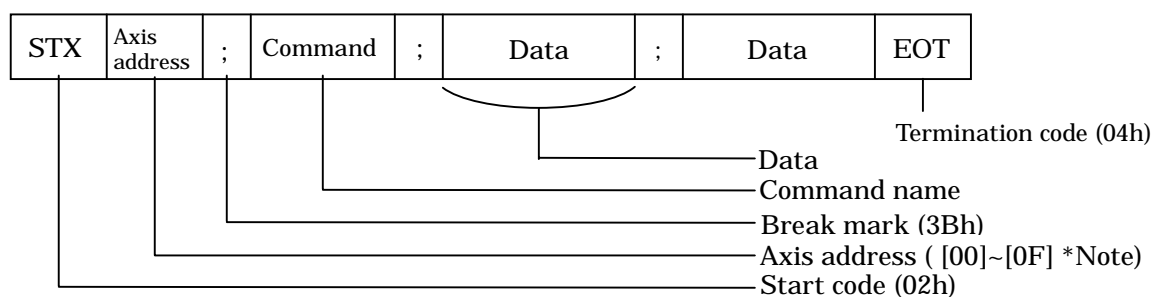
Note 2: The baud rate is switched according to a servo driver's parameter.

## 2-2. Serial Communication Protocol

### 2-2-1. Single Axis Command Communication

The command is transmitted from the host controller to one arbitrary axis among the servo drivers with whom two or more axes are connected. Only the specified (axis address is corresponding) axis executes the command, and the result replies to the host controller.

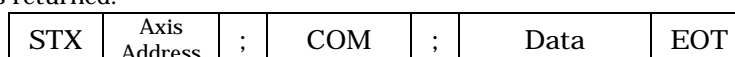
#### 1. Transmission (from: host controller to: servo driver)



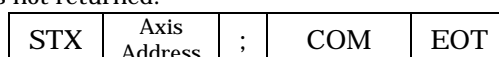
Note: In case of Si servo, [00]~[0E]

#### 2. Reply (from: servo driver to: host controller)

When data is returned:



When data is not returned:

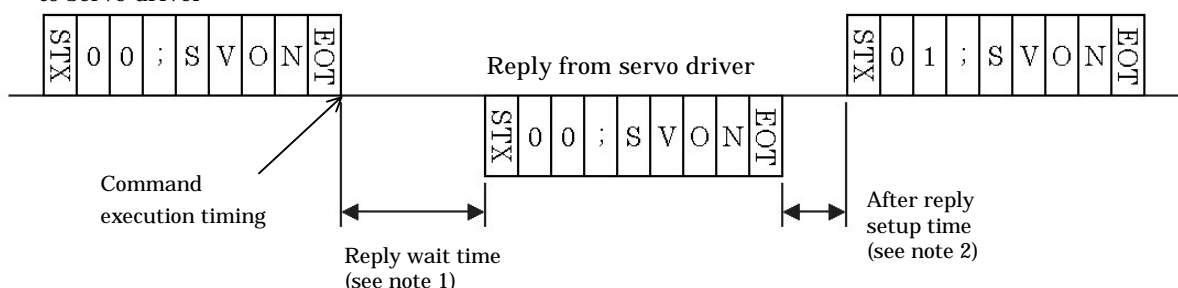


The serial communication system is a half-duplex system. The host controller must transmit the following command after finishing receiving all replies from the servo driver.

Example: The following is multidrop serial communication of two axes:

- 1) Servo-on of the Axis address 00 is executed.
- 2) Servo-on of the Axis address 01 is executed.

Transmission from host controller  
to servo driver



note1: After a servo receives a character string and executes a command, time until it starts a reply is set to the servo driver's parameter "Reply Wait Time" in units of ms.  
parameter : No.55 ( Cuty Axis ) No.44 ( Si servo )

note2: **In case of RS485(2 wire system)**

transmit the following command after the time of 2ms or more after the reply from the servo driver ends.

## 2-2-2. All Axis Command Communication

If "7F" is specified as the axis address, all connected the servo drivers execute the command. In this case, the reply from the servo driver to the host controller is not done including the communication error at all.

Transmission (from: host controller to: servo driver)

STX	7	F	;	COM	;	Data	;	Data	EOT
-----	---	---	---	-----	---	------	---	------	-----

## 2-2-3. Format of the Numeric Data Character

The hexadecimal character of numerical values other than the axis address when transmitting a command to a servo driver from a host controller can be expressed with the number of characters required in order to express a numeric value (not necessary to add [0] to a head to display numbers in fixed length). In case of a negative value, the host controller must transmit by eight characters.

Example) Both of [00000100] and [100] are interpreted as a numerical value "256".

The numerical value "-1" describes [FFFFFFFF]. [FFFF] is interpreted as a numerical value "65535".

The hexadecimal character of the numerical value in the reply character string from the servo driver to the host controller is replied by the fixed number of characters of each command.

Refer to "2-5. Details of Serial Communication Command" for the details.



## 2-4. Serial Communication Command List

	Function	Command	Contents
Parameter & Point-Table	Parameter Reading	PRMR	Reading data of parameter of specified number
	Parameter Writing	PRMW	Writing data of parameter of specified number
	Point-Table Reading (Transposition with the Old Specification) (Only Cuty Axis)	TBLR	<ul style="list-style-type: none"> <li>- Point-table number (0~7)</li> <li>- Abs/inc (0: Absolute value ,1: incremental value)</li> <li>- Amount of movement [Pulse]</li> <li>- Speed [rpm]</li> <li>- Accel/decel time const. [ms]</li> <li>- Wait time [ms]</li> </ul>
	Point-Table Writing (Transposition with the Old Specification) (Only Cuty Axis)	TBLW	<ul style="list-style-type: none"> <li>- Continuation (0: none, 1: effective)</li> <li>- Normal branching destination (0~7, 99 of termination)</li> <li>- S-curve accel/decel (0: off, 1: on)</li> <li>- Extended Item 1</li> <li>- Extended Item 2</li> </ul> <p>Only 8 tables can be used in [TBLR] and [TBLW].</p>
	Point Table Reading	TR	<ul style="list-style-type: none"> <li>- Point-table number (0~255)</li> <li>- Amount of movement [Pulse]</li> <li>- Speed [rpm]</li> <li>- Accel/decel time const. [ms]</li> <li>- Wait time [ms]</li> <li>- Normal branching destination (0~255, 256 of termination, +1000 of SBK)</li> <li>- Bit instructions <ul style="list-style-type: none"> <li>BIT0: abs/inc (0: absolute value ,1: incremental value)</li> <li>BIT1: continuation (0: none, 1: effective)</li> <li>BIT2: S-curve accel/decel (0: off, 1: on)</li> <li>BIT3: Sensor</li> <li>BIT4: Sensor</li> <li>BIT6: -</li> <li>BIT7: -</li> <li>BIT8: M-code</li> <li>BIT9: M-code</li> <li>BITA: M-code</li> <li>BITB: M-output select</li> </ul> </li> </ul>
	Point-Table Writing	TW	<ul style="list-style-type: none"> <li>- Input branching destination (see note) (0~255, 256 of termination, +1000 of SBK)</li> <li>- Input branching destination 2 (see note) (0~255, 256 of termination, +1000 of SBK)</li> <li>- Input branching destination 3 (see note) (0~255, 256 of termination, +1000 of SBK)</li> <li>- Loop Count</li> <li>- After loop branching destination (0~255, 256 of termination, +1000 of SBK)</li> <li>- Torque (0: none, 1~300:torque limitation by % unit)</li> <li>- Loop clearance (-1: none 0~255: loop counter clearance of the point number)</li> </ul> <p>Note: Input branch destination, 2, 3: setting "-1", when not using it.</p>
Basic Operation	EEPROM Writing	FLASH	Writing data to nonvolatile memory
	Servo-ON *	SVON	Equivalent to the function of control input signal SVON.
	Servo-OFF *	SVOFF	
	Emergency Stop ON	EMCON	Equivalent to the function of control input signal EMC. (With no data or data 0: dynamic brake 1: servo-free 2: control damping)
	Emergency Stop OFF	EMCOFF	
	Start-ON *	STRON	Equivalent to the function of control input signal STR.
	Start-OFF *	STROFF	
	Start-ON Edge *	STRP	Equivalent to the function of control input signal STRP
	ZRTN Start-ON *	ZSTRON	Equivalent to the function of control input signal ZSTR.
	ZRTN Start-OFF *	ZSTROFF	
	ZRTN Start-On Edge *	ZSTRP	Equivalent to the function of control input signal ZSTRP.
	Operation Stop	STOP	Equivalent to the function of control input signal STP.
	Zero Slowdown ON	DECON	Equivalent to the function of control input signal DEC.
	Zero Slowdown OFF	DECOFF	
	HOLD-ON	HOLDON	Equivalent to the function of control input signal HOLD.
	HOLD-OFF	HOLDOFF	



Function		Command	Contents
Basic Operation	Single-Block ON	SBKON	Equivalent to the function of control input signal SBK.
	Single-Block-OFF	SBKOFF	
	Input Branch ON	EXINON	Selecting 1~3 as data. Equivalent function to command [EXIN1ON]~[EXIN3ON], [EXIN1OFF] ~[EXIN3OFF]. [EXIN1ON] [EXIN1OFF] is executed with no data.
	Input Branch OFF	EXINOFF	
	Input Branch 1 ON	EXIN1ON	Equivalent to the function of control input signal EXIN.
	Input Branch 1 OFF	EXIN1OFF	
	Input Branch 2 ON	EXIN2ON	Equivalent to the function of control input signal EXIN1.
	Input Branch 2 OFF	EXIN2OFF	
	Input Branch 3 ON	EXIN3ON	Equivalent to the function of control input signal EXIN2.
	Input Branch 3 OFF	EXIN3OFF	
	Forward JOG	PJOG	Executing forward JOG operation.
	Reverse JOG	NJOG	Executing reverse JOG operation.
	JOG OFF	JOGOFF	Suspending JOG operation.
	Teaching	TDIN	Memorizing current position to the specified point-table by communication command [PNT].
	Alarm Reset	ARST	Equivalent to the function of control input signal ARST.
	Point Specification *	PNT	Equivalent to the function of control input signal P0IN~P7IN.
	History Clearance	HCL	Clearing 8 alarm histories
	CPU Reset	RESET	The same operation as reboot (power supply off-on)
	Mechanical Origin Rewriting	ZSET	Specifying current position (rewriting mechanical origin)
	Positional Error Counter Set	ESET	Executing setting/clearance of positional error counter.
	Resolution Selection *	RSELON	Switching the magnification of reference pulse train input.
		RSELOFF	
	Torque Selection *	TSELON	Selecting 0~3 as data. Equivalent function to command [TSEL0ON]~[TSEL4ON]. [TSEL0ON] is executed with no data.
	Torque Selection OFF *	TSELOFF	The torque limitation is released.
	Torque Selection 0 ON *	TSEL0ON	Equivalent to the function of control input signal TSEL0.
	Torque Selection 1 ON *	TSEL1ON	Equivalent to the function of control input signal TSEL1.
	Torque Selection 2 ON *	TSEL2ON	Equivalent to the function of control input signal TSEL2.
	Torque Selection 3 ON *	TSEL3ON	Equivalent to the function of control input signal TSEL3.
	Torque Selection 4 ON *	TSEL4ON	Equivalent to the function of control input signal TSEL4.
	M Completion ON	MFINON	Equivalent to the function of control input signal MFIN.
	M Completion OFF	MFINOFF	
	STEP Feed	STEPON	Selecting 0~3 as data. Equivalent function to command [STEP0ON]~[3ON]. The same operation as [STEP0ON] is executed with no data.
	STEP Feed Stop	STEPOFF	Suspending STEP feed operation.
	STEP Feed0	STEP0ON	Distance movement of number of pulses of "STEP pulse 0". Speed and accel/decel time const. are the same as JOG operation. In Cuty Axis, distance movement of "JOG Feed Pulse".
	STEP Feed1	STEP1ON	Distance movement of number of pulses of "STEP pulse 1". Speed and accel/decel time const. are the same as JOG operation.
	STEP Feed2	STEP2ON	Distance movement of number of pulses of "STEP pulse 2". Speed and accel/decel time const. are the same as JOG operation.
	STEP Feed3	STEP3ON	Distance movement of number of pulses of "STEP pulse 3". Speed and accel/decel time const. are the same as JOG operation.
	Torque Peak Reset	TRST	Resetting torque-peak

Function		Command	Contents
Monitor	Numerical Monitor	MON	<ul style="list-style-type: none"> <li>- Current position</li> <li>- Reference position</li> <li>- Positional error</li> <li>- Ref. position remains (in point-table operation)</li> <li>- Present speed (motor rotational frequency)</li> <li>- Reference speed</li> <li>- Torque instructions</li> <li>- Incremental reference</li> <li>- Sensor position</li> <li>- Torque peak</li> <li>- Present point-table</li> <li>- DEC-Z distance</li> <li>- COM command status</li> <li>- Servo status</li> </ul>
	Alarm Occurrence Situation	ALM	Sending reply of present alarm and eight time history in the past. Bit status corresponding to occurred alarm number
	I/O Monitor (Only Cuty Axis)	IO	Input (bit0~15); output (bit16~31) (Transposition with Cuty2)
	I/O Monitor 2	IO2	Input (Bit0~15); output (bit16~31)

Note: Those command with \* must specify "Communication command" for the servo driver's parameter "Input Method Select"

Parameter: No.30 (Cuty Axis) No.45 (Si servo)

## 2-5. Details of the Serial Communication Command

### 2-5-1. Parameter/Point Table Setting Command

Note) The hexadecimal character of numerical values other than the axis address when transmitting a command to a servo driver from a host controller can be expressed with the number of characters required in order to express a numeric value (not necessary to add [0] to a head to display numbers in fixed length). In case of a negative value, the host controller must transmit by eight characters.

Example) Both of [00000100] and [100] are interpreted as the numerical value "256".

The numerical value "-1" describes [FFFFFFFF]. [FFFF] is interpreted as the numerical value "65535".

The hexadecimal character of the numerical value in the reply character string from the servo driver to the host controller is replied by the fixed number of characters of each command.

#### 2-5-1-1. [PRMR] Parameter Reading

The following is an example of reading the contents of parameter No.0~79 of servo driver.

Example: Reading parameter No.26 from servo driver of axis address No.3

From: host controller To: servo driver

Axis address				Command				Parameter No [No.26(1Ah)]				
STX	0	3	;	P	R	M	R	;	1	A	EOT	
(ASCII code	02	30	33	3B	50	52	4D	52	3B	31	41	04)

From: servo driver To: host controller

Contents of parameter [8 characters of hexadecimal]																	
STX	0	3	;	P	R	M	R	;	0	0	0	0	0	0	1	E	EOT
(Reading result "30")																	

#### 2-5-1-2. [PRMW] Parameter Writing

Rewriting the contents of parameter No.0~79 of servo driver. Parameter data set by this command are not held after the power supply is turned OFF. To save set values, execute the [FLASH] command.

Example: Writing "30" (1Eh) in parameter No.26 of servo driver of axis address No. 3

From: host controller To: servo driver

Axis address				Command				Parameter No [No.26(1Ah)]			
STX	0	3	;	P	R	M	W	;	1	A	
(ASCII code)	02	30	33	3B	50	52	4D	57	3B	31	41
Contents of parameter [8 characters of hexadecimal]											
;	0	0	0	0	0	0	0	0	1	E	EOT
3B	30	30	30	30	30	30	30	30	31	45	04)

From: servo driver To: host controller

STX	0	3	;	P	R	M	W	EOT
-----	---	---	---	---	---	---	---	-----

## 2-5-1-3. [TBLR] Point-Table Reading (Cuty2 Specification Point-Table)

Reading the contents of point-table from Cuty Axis.

Note: The point-table can be specified only for the range from 0 to 7 in this command.

Note: This command can be used only when "Cuty2 specification point-table" is selected by Cuty Axis.

Example: Reading point-table No.2 from servo driver of axis address No.3.

From: host controller To: servo driver

	Axis address				Command				Point-table No.			
(ASCII code	STX	0	3	;	T	B	L	R	;	0	2	EOT
	02	30	33	3B	54	42	4C	52	3B	30	32	04)

From: servo driver To: host controller

Axis address								Abs / inc										
STX	0	3	;	T	B	L	R	;	0	0	;							
Amount of movement								Speed				Accel/ decel time const.						
0	0	0	2	E	3	1	1	;	0	0	1	E	;	0	0	1	E	;
Wait time				Continuation				Branch				S-curve						
0	B	B	8	;	0	1	;	0	7	;	0	1	;					
Extended 1								Extended 2 (see note)										
0	5	;	0	0	0	7	EOT											

Note: Extended 1 and Extended 2 items are read according to the following table.

Extended item setting table		
Function	Extended 1	Extended 2
None	[00]	[0000]
Setting input condition jump	[01]	Jump destination [0000] ~ [0007] : Point 0~7 [0063] :Termination of operation [0064] ~ [0071] : Point 0~7 (Single-block operation)
Setting loop operation	Loop count [02]~[64]	
Setting torque limitation	[FF]	Torque setting [%] [0001] ~ [012C]
Loop counter clearance	[7F]	Counter number to clear [0000] ~ [0007]

## 2-5-1-4. [TBLW] Point-Table Writing (Cuty2 Specification Point-Table)

Rewriting the contents of point-table of Cuty Axis.

Note: The point-table can be specified only for the range from 0 to 7 in this command.

Note: Point-table data set by this command is not held after power supply OFF. To save a set value, [FLASH] command is executed.

Note: This command can be used only when "Cuty2 specification point-table" is selected by Cuty Axis.

Example: To specify the point-table No.2 of servo driver of the axis address No.3 as follows.

Abs/inc : 0 (absolute value)  
 Amount of movement : 189201 (2E311h) [Pulse]  
 Speed : 1000 (3E8h) [rpm]  
 Accel/decel time const. : 500 (1F4h) [ms]  
 Wait time : 2000 (7D0h) [msec]  
 Continuation : 1 (effective)  
 Branching destination : No.5  
 S-curve : 1 (ON)

From: host controller To: servo driver

Axis address				Command				Point-table No.				Abs/ Inc			
STX	0	3	;	T	B	L	W	;	0	2	;	0	0	;	
(ASCII code)	02	30	33	3B	54	42	4C	57	3B	30	32	3B	30	30	3B
Amount of movement								Speed				Accel/decel time const.			
0	0	0	2	E	3	1	1	;	0	3	E	8	;	0	1
30	30	30	32	45	33	31	31	3B	30	33	45	38	3B	30	31
Wait time				Continuation				Branch				S-curve			
0	7	D	0	;	0	1	;	0	5	;	0	1	EOT		
30	37	44	30	3B	30	31	3B	30	35	3B	30	31	04)		

From: servo driver To: host controller

STX	0	3	;	T	B	L	W	EOT
-----	---	---	---	---	---	---	---	-----

If no branching destination is specified, [63] is set to for "branching destination".

\*If "extended" is set, "Extended 1" and "Extended 2" are added to the end of the transmission character string as follows.

				Branch			S-curve				
STX				;	0	5	;	0	1	;	
				Extended 1			Extended 2				
				F	F	;	0	0	1	E	EOT

Refer to the Extended item setting table for details of the setting.

## 2-5-1-5. [TR] Point-Table Reading

Reading the contents of point-table No.0~255 from servo-driver.

Note1: Some data such as "abs/inc" is collectively treated as "Bit instructions".

Refer to the following table below [Details of bit instructions] for more details.

Note2: If "Cut2 specification point-table" has been selected in Cuty Axis, this command cannot be used.

Details of bit instructions

Bit Position	Item	Contents	
		0	1
BIT0	Abs/ inc	Absolute value	incremental value
BIT1	Continuation	Invalid	Effective
BIT2	S-curve accel/decel	Invalid	Effective
BIT3	Sensor	BIT4,3 00: Invalid	
BIT4		01: Sensor positioning mode 1 10: Sensor positioning mode 2	
BIT5	-	-	-
BIT6	-	-	-
BIT7	-	-	-
BIT8 BIT9 BITA	M-code	BIT8, 9, A 000: Invalid 001: M-code1 010: M-code2 011: M-code3 100: M-code4 101: M-code5 110: M-code6 111: M-code7	
BITB	M-output selection	Before point start	After point end
BITC	-	-	-
BITD	-	-	-
BITE	-	-	-
BITF	-	-	-

Example: Reading point-table No.154 from servo driver of axis address No.3.

From: host controller To: servo driver

Axis address					Point-table No				
STX	0	3	;	T	R	;	9	A	EOT
(ASCII code 02	30	33	3B	55	52	3B	39	3A	04)

From: servo driver To: host controller

Axis address					Amount of movement														
STX	0	3	;	T	R	;	0	0	0	2	E	3	1	1	;				
02	30	33	3B	55	52	3B	30	30	30	32	45	33	31	31	3B				
Speed					Accel/ decel					Wait time					Normal Branch				
0	1	F	4	;	0	0	6	4	;	0	3	E	8	;	0	0	0	C	;
30	31	46	34	3B	30	30	36	34	3B	30	33	45	38	3B	30	30	30	43	3B
Bit instructions <sup>note1)</sup>					Input branch 1					Input branch 2					Input branch 3				
0	2	0	7	;	F	F	F	F	;	F	F	F	F	;	F	F	F	F	;
30	32	30	37	3B	46	46	46	46	3B	46	46	46	46	3B	46	46	46	46	3B
Loop count					After loop branch					Torque					Loop clearance				
0	0	0	A	;	0	0	9	0	;	0	0	0	0	;	F	F	F	F	EOT
30	30	30	41	3B	30	30	39	30	3B	30	30	30	30	3B	46	46	46	46	04)

## 2-5-1-6. [TW] Point-Table Writing

Rewriting the contents of point-table No.0~255 of servo driver. Point-table data set by this command is not saved after power supply is turned OFF. To save a set value, execute the [FLASH].

Note1: Some data, such as "abs/inc", is collectively treated as "Bit instructions".

Refer to the [Details of bit instructions] table in "[TR] Point-Table Reading" for more details.

Note2: If "Cut2 specification point-table" has been selected in Cuty Axis, this command cannot be used.

Example: Writing in point-table No.2 of servo driver of axis address No.3.

From: host controller To: servo driver

		Axis address				Command				Point No.				Amount of movement												
(ASCII code)	STX	0	3	:	T	W	:	0	2	:	0	0	0	2	E	3	1	1	:							
	02	30	33	3B	54	57	3B	30	32	3B	30	30	30	32	45	33	31	31	3B							
		Speed				Accel/decel				Wait time				Normal Branch												
	0	0	0	2	:	E	3	1	1	:	0	3	E	8	:	0	1	F	4	:						
	30	30	30	32	3B	45	33	31	31	3B	30	33	45	38	3B	30	31	46	34	3B						
		Bit instructions <sup>Note1)</sup>										Input Branch 1														
	0	0	0	3	:	0	0	0	B	:																
	30	30	30	33	3B	30	30	30	42	3B																
		Input Branch2										Input Branch 3														
	F	F	F	F	F	F	F	F	:	F	F	F	F	F	F	F	F	F	:							
	46	46	46	46	46	46	46	46	3B	46	46	46	46	46	46	46	46	46	3B							
		Loop count				After loop branch				Torque																
	0	1	:	0	0	0	0	:	0	0	0	B	:													
	30	31	3B	30	30	30	30	3B	30	30	30	42	3B													
		Loop clearance																								
	F	F	F	F	F	F	F	F	EOT																	
	46	46	46	46	46	46	46	46	04)																	

From: servo driver To: host controller

STX	0	3	;	T	W	EOT
-----	---	---	---	---	---	-----

If "input branch destination (1~3)" and "loop clearance" are not used, "-1" ([FFFFFFF]) is set as the default.

## 2-5-1-7. [FLASH] EEPROM Writing

Data rewritten by the command [PRMW], [TBLW], [TW] and [TDIN] is saved in EEPROM (nonvolatile memory). After a power-off, the preserved data is saved.

Example: Saving data (parameter, point-table data) of servo driver of axis address No.3 in EEPROM.

From: host controller To: servo driver

STX	0	3	;	F	L	A	S	H	EOT
-----	---	---	---	---	---	---	---	---	-----

(ASCII code      02      30      33      3B      46      4C      41      53      48      04)

From: servo driver To: host controller

STX	0	3	;	F	L	A	S	H	EOT
-----	---	---	---	---	---	---	---	---	-----

## 2-5-2. Basic Operation Command

### 2-5-2-1. [SVON][SVOFF] Servo-ON/OFF

These commands are respectively equal to the functions ON/OFF for the control input signal SVON.

\* The [SVON] command is accepted only if BIT0/BIT1 of servo driver's parameter "Input Method Select" is set as below. If anything other than this is specified, the servo driver replies [ERR:04].

Setting of parameter "Input Method Select" (see note)

Function	BIT	Value	Selected device
Torque Selection	BIT13	-	-
	BIT12	-	
Reference pulse multiply	BIT11	-	-
	BIT10	-	
Point Specification	BIT9	-	-
	BIT8	-	
ZSTR	BIT7	-	-
	BIT6	-	
STR	BIT5	-	-
	BIT4	-	
JOG	BIT3	-	-
	BIT2	-	
SVON	BIT1	0	Communication command [SVON] [SVOFF]
	BIT0	1	

Note: Parameter No.30 (CutY Axis) No.45 (Si servo)

Example: Servo-on/servo-off about servo driver of axis address No.3.

[SVON] command

From: host controller To: servo driver

STX	0	3	;	S	V	O	N	EOT
(ASCII code 02	30	33	3B	53	56	4F	4E	04)

From: servo driver To: host controller

STX	0	3	;	S	V	O	N	EOT
-----	---	---	---	---	---	---	---	-----

[SVOFF] command

From: host controller To: servo driver

STX	0	3	;	S	V	O	F	F	EOT
(ASCII code 02	30	33	3B	53	56	4F	46	46	04)

From: servo driver To: host controller

STX	0	3	;	S	V	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	-----



## 2-5-2-2. [EMCON][EMCOFF] Emergency Stop ON/OFF

If the servo driver receives the [EMCON] command, the motor executes an emergency stop operation. The content of the emergency stop operation depends on the data applied after the command.

Transmitting character string	Si servo	Cuty Axis
EMCON	Emergency stop by servo-free	Emergency stop by dynamic brake
EMCON;0	Emergency stop by servo-free	Emergency stop by dynamic brake
EMCON;1	Emergency stop by servo-free	Emergency stop by servo-free
EMCON;2	Emergency stop by control damping	Emergency stop by control damping

In Si servo, because the dynamic brake function is not installed, an emergency stop is excuted by servo-free for no data, data "0", and "1".

Example: Emergency stop (control damping)/canceling about servo driver of axis address No. 3

[EMCON] command

From: host controller To: servo driver

From: host controller		To: servo driver										
	STX	0	3	;	E	M	C	O	N	;	2	EOT
(ASCII code	02	30	33	3B	45	4D	43	4F	4E	3B	32	04)

If this is omitted,  
it operates by [EMCON;0].

From: servo driver To: host controller

STX	0	3	;	E	M	C	O	N	EOT
-----	---	---	---	---	---	---	---	---	-----

[EMCOFF] command

From: host controller To: servo driver

	STX	0	3	;	E	M	C	O	F	F	EOT
(ASCII code	02	30	33	3B	45	4D	43	4F	46	46	04)

From: servo driver To: host controller

STX	0	3	;	E	M	C	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	---	-----

### 2-5-2-3. [STRON][STROFF][STRP] Point-Table Start ON/OFF

These commands are equal function respectively to ON/OFF of control input signal STR (STRP). It combines and is used with [PNT] command and is used. If the servo driver receives the [STRON] command, the execution of the point-table of the specified number is started.

If the servo driver receives the [STROFF] command while a point-table started by [STRON] is operating, the motor is beginning as for the deceleration stop. When the motor stops completely, the point-table positioning operation is interrupted, and the amount of the remainder movement is cleared.

[STOP] command is used to interrupt the point-table operation started by [STRP].

After the point-table operation started by [STRON] is completed normally or the operation is interrupted by an alarm or compulsorily by an emergency stop, you must execute [STROFF] before using [STRON] next time. [STROFF] is not required when starting with [STRP].

\* The [STRON] and [STRP] command are accepted only if BIT4/BIT5 of servo driver's parameter "Input Method Select" are set as below. If anything other is set, servo driver replies [ERR:04].

**Setting of parameter "Input Method Select" (note)**

Function	BIT	Value	Selected device
Torque Selection	BIT13	-	-
	BIT12	-	
Reference pulse multiply	BIT11	-	-
	BIT10	-	
Point Specification	BIT9	-	-
	BIT8	-	
ZSTR	BIT7	-	-
	BIT6	-	
STR	BIT5	0	Communication command [STRON] [STROFF] [STRP]
	BIT4	1	
JOG	BIT3	-	-
	BIT2	-	
SVON	BIT1	-	-
	BIT0	-	

Note: Parameter No.30 (Cutty Axis) No.45 (Si servo)

Example: Start/stop point-table No.5 about servo driver of axis address No.3

[PNT] command

From: host controller To: servo driver

	From: host controller				To: servo driver						
	STX	0	3	;	P	N	T	;	0	5	EOT
(ASCII code	02	30	33	3B	50	4E	54	3B	30	35	04)

From: servo driver To: host controller

STX	0	3	;	P	N	T	EOT
-----	---	---	---	---	---	---	-----

[STRON] command

From: host controller To: servo driver

	STX	0	3	;	S	T	R	O	N	EOT
(ASCII code	02	30	33	3B	53	54	52	4F	4E	04)

From: servo driver To: host controller

STX	0	3	;	S	T	R	O	N	EOT
-----	---	---	---	---	---	---	---	---	-----

[STROFF] command

From: host controller To: servo driver

	STX	0	3	;	S	T	R	O	F	F	EOT
(ASCII code	02	30	33	3B	53	54	52	4F	46	46	04)

From: servo driver To: host controller

STX	0	3	;	S	T	R	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	---	-----

[STRP] command

From: host controller To: servo driver

	From: host controller				To: server driver				
	STX	0	3	;	S	T	R	P	EOT
(ASCII code	02	30	33	3B	53	54	52	50	04)

From: servo driver To: host controller

STX	0	3	;	S	T	R	P	EOT
-----	---	---	---	---	---	---	---	-----

## 2-5-2-4. [ZSTRON][ZSTROFF][ZSTRP] Zero-Point-Return Start ON/OFF

These commands are equal respectively to the function to ON/OFF of control input signal ZSTR (ZSTRP) respectively. If the servo driver receives the [ZSTRON] command, zero-point-return operation is started according to the form selected by servo driver's parameter "Zero-Point-Return Form".

If the servo driver receives the [ZSTROFF] command while a zero-point-return started by [ZSTRON] is operating, the motor executes a deceleration stop. In this case, zero-point-return must not be completed, and zero-point-return must operate again.

The [STOP] command is used to interrupt the zero-point-return operation started by [ZSTRP].

After the zero-point-return operation started by [ZSTRON] is completed normally or the operation is interrupted by an alarm or compulsorily by an emergency stop, you must execute [ZSTROFF] before using [ZSTRON] next time. [ZSTROFF] is not required when starting with [ZSTRP].

\* [ZSTRON] and [ZSTRP] command are accepted only if BIT6/BIT7 of servo driver's parameter "Input Method Select" are set as below. If anything else is set, servo driver replies [ERR:04].

Setting of parameter "Input Method Select" (note)

Function	BIT	Value	Selected device
Torque Selection	BIT13	-	-
	BIT12	-	
Reference pulse multiply	BIT11	-	-
	BIT10	-	
Point Specification	BIT9	-	-
	BIT8	-	
ZSTR	BIT7	0	Communication command [ZSTRON] [ZSTROFF] [ZSTRP]
	BIT6	1	
STR	BIT5	-	-
	BIT4	-	
JOG	BIT3	-	-
	BIT2	-	
SVON	BIT1	-	-
	BIT0	-	

Note: Parameter No.30 (CutY Axis) No.45 (Si servo)

Example: Start/stop zero-point-return operation about servo driver of axis address No.3

## [ZSTRON] command

From: host controller To: servo driver

STX	0	3	;	Z	S	T	R	O	N	EOT
(ASCII code)	02	30	33	3B	5A	53	54	52	4F	4E 04)

From: servo driver To: host controller

STX	0	3	;	Z	S	T	R	O	N	EOT
-----	---	---	---	---	---	---	---	---	---	-----

## [ZSTROFF] command

From: host controller To: servo driver

STX	0	3	;	Z	S	T	R	O	F	F	EOT
(ASCII code)	02	30	33	3B	5A	53	54	52	4F	46 46	04)

From: servo driver To: host controller

STX	0	3	;	Z	S	T	R	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	---	---	-----

## [ZSTRP] command

From: controller To: servo driver

	STX	0	3	;	Z	S	T	R	P	EOT
(ASCII code	02	30	33	3B	5A	53	54	52	50	04)

From: servo driver To: host controller

STX	0	3	;	Z	S	T	R	P	EOT
-----	---	---	---	---	---	---	---	---	-----

### 2-5-2-5. [STOP] Operation Stop

This command is equal to function to control input signal STP.

If the servo driver receives the [STOP] command while the point-table operation, zero-point-return operation, or JOG operation, the operation is interrupted and the motor executes the deceleration stop.

After it stops, the amount of the remainder movement is cleared when the point-table is operating.

If in zero-point-return operation, zero-point-return is an incomplete end.

Example: Operation stop about servo driver of axis address No.3

From: host controller		To: servo driver							
(ASCII code	STX	0	3	;	S	T	O	P	EOT
	02	30	33	3B	53	54	4F	50	04)
From: servo driver		To: host controller							
	STX	0	3	;	S	T	O	P	EOT

### 2-5-2-6. [DECON][DECOFF] Zero Slowdown LS ON/OFF

These commands are equal respectively to the functions to ON/OFF of control input signal DEC respectively.

Example: ON/OFF of zero slowdown LS about servo driver of axis address No.3

[DECON] command

From: host controller		To: servo driver								
(ASCII code	STX	0	3	;	D	E	C	O	N	EOT
	02	30	33	3B	44	45	43	4F	4E	04)
From: servo driver		To: host controller								
	STX	0	3	;	D	E	C	O	N	EOT

[DECOFF] command

From: host controller		To: servo driver									
(ASCII code	STX	0	3	:	D	E	C	O	F	F	EOT
	02	30	33	3B	44	45	43	4F	46	46	04)
From: servo driver		To: host controller									
	STX	0	3	:	D	E	C	O	F	F	EOT

### 2-5-2-7. [HOLDON][HOLDOFF] HOLD ON/ OFF

These commands are respectively equal to the function to ON/OFF of control input signal HOLD respectively. If the servo driver receives the [HOLDON] command while point-table operation, it decelerates to stop holding the amount of the remainder movement. Then, it receives [HOLDOFF], the point table operation that had been executed before it stops temporarily is restarted.

Example: Suspend/restart of point-table operation about servo driver of axis address No.3

[HOLDON] command

From: host controller		To: servo driver									
(ASCII code	STX	0	3	;	H	O	L	D	O	N	EOT
	02	30	33	3B	48	4F	4C	44	4F	4E	04)
From: servo driver		To: host controller									
	STX	0	3	:	H	O	L	D	O	N	EOT

[HOLDOFF] command

From: host controller		To: servo driver										
(ASCII code	STX	0	3	;	H	O	L	D	O	F	F	EOT
	02	30	33	3B	48	4F	4C	44	4F	46	46	04)
From: servo driver		To: host controller										
	STX	0	3	;	H	O	L	D	O	F	F	EOT

## 2-5-2-8. [SBKON][SBKOFF] Single-Block ON/OFF

These commands are equal respectively to the function to ON/OFF of control input signal SBK respectively. "Normal/input branching destination" item of the point-table is set to either of 1000~1255, and the single-block operation can be executed by this command.

Example: ON/OFF of single-block signal input about servo driver of axis address No.3

## [SBKON] command

From: host controller To: servo driver

	STX	0	3	;	S	B	K	O	N	EOT
(ASCII code	02	30	33	3B	53	42	4B	4F	4E	04)

From: servo driver To: host controller

STX	0	3	;	S	B	K	O	N	EOT
-----	---	---	---	---	---	---	---	---	-----

## [SBKOFF] command

From: host controller To: servo driver

	STX	0	3	;	S	B	K	O	F	F	EOT
(ASCII code	02	30	33	3B	53	42	4B	4F	46	46	04)

From: servo driver To: host controller

STX	0	3	;	S	B	K	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	---	-----

## 2-5-2-9. [EXINON][EXINOFF][EXIN1ON][EXIN1OFF]

## [EXIN2ON][EXIN2OFF][EXIN3ON][EXIN3OFF] Input Branch ON/ OFF

These commands are equal respectively to the functions to ON/OFF of control input signal EXIN, EXIN2, and EXIN3 respectively. These commands are effective if the input condition jump ("Input branching destination" item) is set to the point table.

In the [EXINON] and [EXINOFF] commands, one of the following control input signals is selected according to the data (1~3) applied after the command: EXIN, EXIN2, or EXIN3..

Examples: ON/OFF of input branch 2 (EXIN2) signal about servo driver of axis address No.3

<Example 1> When EXIN2 is turned ON and OFF by [EXINON] and [EXINOFF] command

## [EXINON] command

From: host controller To: servo driver

	STX	0	3	;	E	X	I	N	O	N	;	2	EOT
(ASCII code	02	30	33	3B	45	58	49	4E	4F	4E	3B	32	04)

From: servo driver To: host controller

STX	0	3	;	E	X	I	N	O	N	EOT
-----	---	---	---	---	---	---	---	---	---	-----

## [EXINOFF] command

From: host controller To: servo driver

	STX	0	3	;	E	X	I	N	O	F	F	;	2	EOT
(ASCII code	02	30	33	3B	45	58	49	4E	4F	46	46	3B	32	04)

From: servo driver To: host controller

STX	0	3	;	E	X	I	N	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	---	---	-----

<Example2> When EXIN2 is turned ON and OFF by [EXIN2ON] and [EXIN2OFF] command

## [EXIN2ON] command

From: host controller To: servo driver

	STX	0	3	;	E	X	I	N	2	O	N	EOT
(ASCII code	02	30	33	3B	45	58	49	4E	32	4F	4E	04)

From: servo driver To: host controller

STX	0	3	;	E	X	I	N	2	O	N	EOT
-----	---	---	---	---	---	---	---	---	---	---	-----

## [EXIN2OFF] command

From: host controller To: servo driver

	STX	0	3	;	E	X	I	N	2	O	F	F	EOT
(ASCII code	02	30	33	3B	45	58	49	4E	32	4F	46	46	04)

From: servo driver To: host controller

STX	0	3	;	E	X	I	N	2	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	---	---	---	-----

## 2-5-2-10. [PJOG][NJOG][JOGOFF] JOG Operation

These commands are equal to the functions to control input signal PJOG and NJOG. The JOG operation is started in the forward direction if the "NJOG" command is received, and in the reverse direction if the servo driver receives the "PJOG" command during servo-on. If the servo driver receives the [JOGOFF] command during JOG operation, the motor executes a deceleration stop.

\* The [PJOG] and [NJOG] command are accepted only if BIT2/BIT3 of servo driver's parameter "Input Method Select" are set as below. If anything else is set, the servo driver replies [ERR:04].

Setting of parameter "Input Method Select" (note)

Function	BIT	Value	Selected device
Torque Selection	BIT13	-	-
	BIT12	-	
Reference pulse multiply	BIT11	-	-
	BIT10	-	
Point Specification	BIT9	-	-
	BIT8	-	
ZSTR	BIT7	-	-
	BIT6	-	
STR	BIT5	-	-
	BIT4	-	
JOG	BIT3	0	Communication command [PJOG] [NJOG] [JOGOFF]
	BIT2	1	
SVON	BIT1	-	-
	BIT0	-	

Note) Parameter No.30 (Cutty Axis) No.45 (Si servo)

Example: JOG operation about servo driver of axis address No.3

## [PJOG] command

From: host controller To: servo driver

STX	0	3	;	P	J	O	G	EOT
(ASCII code 02	30	33	3B	50	4A	4F	47	04)

From: servo driver To: host controller

STX	0	3	;	P	J	O	G	EOT
-----	---	---	---	---	---	---	---	-----

## [NJOG] command

From: host controller To: servo driver

STX	0	3	;	N	J	O	G	EOT
(ASCII code 02	30	33	3B	4E	4A	4F	47	04)

From: servo driver To: host controller

STX	0	3	;	N	J	O	G	EOT
-----	---	---	---	---	---	---	---	-----

## [JOGOFF] command

From: host controller To: servo driver

STX	0	3	;	J	O	G	O	F	F	EOT
(ASCII code 02	30	33	3B	4A	4F	47	4F	46	46	04)

From: servo driver To: host controller

STX	0	3	;	J	O	G	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	---	-----

## 2-5-2-11. [TDIN] Teaching

This command is equal to the function to control input signal TDIN. It combines with the [PNT] command and is used. When the servo driver receives the [TDIN] command, the current position is set (teaching) to "amount of movement" item of the point-table number specified by the [PNT] command. Moreover, the data of "abs/inc" of the point-table that did the teaching is automatically set to "0" (absolute). Position data set by this command is not held after the power supply is turned OFF as well as the [PRMW], [TBLW], [TW] commands. To save a set value, execute the [FLASH] command.

Example: Current position is taken into point-table No.5 when the servo driver of axis address No.3 is at the position of "123456" pulses ("123456" (1E240h) [Pulse] is set).

## [PNT] command

From: host controller To: servo driver

	STX	0	3	;	P	N	T	;	0	5	EOT
(ASCII code	02	30	33	3B	50	4E	54	3B	30	35	04)

From: servo driver To: host controller

STX	0	3	;	P	N	T	EOT
-----	---	---	---	---	---	---	-----

## [TDIN] command

From: host controller To: servo driver

	STX	0	3	;	T	D	I	N	EOT
(ASCII code	02	30	33	3B	54	44	49	4E	04)

From: servo driver To: host controller

STX	0	3	;	T	D	I	N
-----	---	---	---	---	---	---	---

;	0	5	;	0	0	0	1	E	2	4	0	EOT
---	---	---	---	---	---	---	---	---	---	---	---	-----

## 2-5-2-12. [ARST] Alarm Reset

The alarm that can be reset is reset when alarm is occurring.

## [ARST] command

From: host controller To: servo driver

	STX	0	3	;	A	R	S	T	EOT
(ASCII code	02	30	33	3B	41	52	53	54	04)

From: servo driver To: host controller

STX	0	3	;	A	R	S	T	EOT
-----	---	---	---	---	---	---	---	-----



### 2-5-2-13. [PNT] Point Specification

This command is equal to the function to control input signal P0\_IN~P7\_IN. The point-table number specified by this command is applied to the [STRON], [TDIN] commands.

\* This command is accepted only if BIT8/BIT9 of servo driver's parameter "Input Method Select" are set as below.  
If anything else is set, the servo driver replies [ERR:04].

Setting of parameter "Input Method Select" (note)

Function	BIT	Value	Selected device
Torque Selection	BIT13	-	-
	BIT12	-	
Reference pulse multiply	BIT11	-	-
	BIT10	-	
Point Specification	BIT9	0	Communication command [PNT]
	BIT8	1	
ZSTR	BIT7	-	-
	BIT6	-	
STR	BIT5	-	-
	BIT4	-	
JOG	BIT3	-	-
	BIT2	-	
SVON	BIT1	-	-
	BIT0	-	

Note) Parameter No.30 (Cuty Axis) No.45 (Si servo)

Example: Specifying point-table No.5 about servo driver of axis address No.3

[PNT] command

From: host controller To: servo driver

	STX	0	3	;	P	N	T	;	0	5	EOT
(ASCII code)	02	30	33	3B	50	4E	54	3B	30	35	04

From: servo driver To: host controller

STX	0	3	;	P	N	T	EOT
-----	---	---	---	---	---	---	-----

### 2-5-2-14. [HCL] Alarm History Clearance

The history of the last eight alarms is saved by the servo driver is cleared.

Example: Cleasring the alarm history for servo driver of axis address No.3

From: host controller To: servo driver

	STX	0	3	;	H	C	L	EOT
(ASCII code)	02	30	33	3B	48	43	4C	04

From: servo driver To: host controller

STX	0	3	;	H	C	L	EOT
-----	---	---	---	---	---	---	-----

## 2-5-2-15. [RESET] CPU Reset

If the servo driver receives this command during servo-off, the same operation as the re-turning on the power supply is done. (If the servo driver receives this command during servo-on, it sends [ERR;06]). After the [FLASH] command is executed, the [RESET] command is executed to save the data of rewritten point-tables and parameters. You must drive after executing zero-point-return operation again because the mechanical origin is also cleared by [RESET].

Because the reset operation is immediately (see note) executed when the servo driver receives this command, the reply from the servo to the host controller is not sent.

\* When the servo driver receives the [RESET] command while writing EEPROM is operating, the [RESET] command wait and is executed after EEPROM has completed writing.

Example: Executing CPU reset about servo driver of axis address No.3

From: host controller		To: servo driver									
		STX	0	3	;	R	E	S	E	T	EOT
(ASCII code		02	30	33	3B	52	45	53	45	54	04

## 2-5-2-16. [ZSET] Mechanical Origin Rewriting

If the servo driver receives this command, the mechanical origin is rewritten to that of the current position's becomes specified value.

If the servo driver receives this command while positional error is larger than a value set for the servo driver's parameter "In-Position Area", replies [ERR;02].

Example: Rewriting current position about servo driver of axis address No.3 to "300000" (493E0H) [Pulse]

From: host controller										To: servo driver																										
										Command										New value																
STX										0	3	:	Z	S	E	T	:	0	0	0	4	9	3	E	0	EOT										
(ASCII code	02		30		33		3B		5A		53		45		54		3B		30		30		30		34		39		33		45		30		04	
From: servo driver										To: host controller																										
STX										0	3	:	Z	S	E	T	EOT																			

## 2-5-2-17. [ESET] Positional Error Counter Set

If the servo driver receives this command, the positional error counter is set as the specified value. If data is assumed to be "0", the positional error counter is cleared.

Example: Setting "4000" (FA0H) [Pulse] to positional error counter about servo driver of axis address No.3

From: host controller										To: servo driver																										
										Command										Positional error pulse																
STX										0	3	:	E	S	E	T	:	0	0	0	0	0	0	F	A	0	EOT									
(ASCII code	02		30		33		3B		45		53		45		54		3B		30		30		30		30		30		46		41		30		04	
From: servo driver										To: host controller																										
STX										0	3	:	E	S	E	T	EOT																			

## 2-5-2-18. [RSELON][RSELOFF] Resolution Selection

These commands are respectively equal to the functions to ON/OFF of the control input signal RSEL respectively. The resolution of the reference pulse train (reference pulse multiply) changes by selecting these commands.

\* The [RSELON] and [RSELOFF] commands are accepted only if BIT10/BIT11 of servo driver's parameter "Input Method Select" are set as below. If anything else is set, the servo driver replies [ERR:04].

Setting of parameter "Input Method Select" (note)

Function	BIT	Value	Selected device
Torque Selection	BIT13	-	-
	BIT12	-	
Reference pulse multiply	BIT11	0	Communication command [RSELON] [RSELOFF]
	BIT10	1	
Point Specification	BIT9	-	-
	BIT8	-	
ZSTR	BIT7	-	-
	BIT6	-	
STR	BIT5	-	-
	BIT4	-	
JOG	BIT3	-	-
	BIT2	-	
SVON	BIT1	-	-
	BIT0	-	

Note) Parameter No.30 (Cutty Axis) No.45 (Si servo)

Example: Selecting resolution about servo driver of axis address No.3

## [RSELON] command

From: host controller To: servo driver

	STX	0	3	;	R	S	E	L	O	N	EOT
(ASCII code	02	30	33	3B	52	53	45	4C	4F	4E	04)

From: servo driver To: host controller

STX	0	3	;	R	S	E	L	O	N	EOT
-----	---	---	---	---	---	---	---	---	---	-----

## [RSELOFF] command

From: host controller To: servo driver

	STX	0	3	;	R	S	E	L	O	F	F	EOT
(ASCII code	02	30	33	3B	52	53	45	4C	4F	46	46	04)

From: servo driver To: host controller

STX	0	3	;	R	S	E	L	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	---	---	-----

## 2-5-2-19. [TSELON][TSELOFF][TSEL1ON][TSEL2ON][TSEL3ON][TSEL4ON]

## Torque Selection

These commands are equal to the function to control input signal TSEL0~TSEL4. The torque limitation value changes to the value set for servo driver's parameter "Torque Select 0"~"Torque Select 4" by selecting this command.

In the [TSELON] command, a torque limitation value between 0~4 is selected according to the data (0~4) applied after the command.

The [TSELOFF] command turns the control input signal TSEL0~TSEL4 to everything OFF (The torque limitation is released).

\* These commands are accepted only if BIT12/BIT13 of servo driver's parameter "Input Method Select" are set as follows. If anything is set, the servo driver replies [ERR:04].

Setting of parameter "Input Method Select" (note)

Function	BIT	Value	Selected device
Torque Selection	BIT13	0	Communication command [TSELON] [TSELOFF] etc.
	BIT12	1	
Reference pulse multiply	BIT11	-	-
	BIT10	-	
Point Specification	BIT9	-	-
	BIT8	-	
ZSTR	BIT7	-	-
	BIT6	-	
STR	BIT5	-	-
	BIT4	-	
JOG	BIT3	-	-
	BIT2	-	
SVON	BIT1	-	-
	BIT0	-	

Note: Parameter No.30 (Cutty Axis) No.45 (Si servo)

Example: Selecting torque limitation about servo driver of axis address No.3

<Example 1> When TSEL2 is turned ON by [TSEL] command

From: host controller To: servo driver

(ASCII code	STX	0	3	;	T	S	E	L	O	N	;	2	EOT	
	02	30	33	3B	54	53	45	4C	4F	4E	3B	32	04	

From: servo driver To: host controller

STX	0	3	;	T	S	E	L	O	N	EOT
-----	---	---	---	---	---	---	---	---	---	-----

<Example 2> When TSEL2 is turned ON by [TSEL2ON] command

From: host controller To: servo driver

(ASCII code	STX	0	3	;	T	S	E	L	2	O	N	EOT	
	02	30	33	3B	54	53	45	4C	32	4F	4E	04	

From: servo driver To: host controller

STX	0	3	;	T	S	E	L	2	O	N	EOT
-----	---	---	---	---	---	---	---	---	---	---	-----

[TSELOFF] command

From: host controller To: servo driver

(ASCII code	STX	0	3	;	T	S	E	L	O	F	F	EOT	
	02	30	33	3B	54	53	45	4C	4F	45	45	04	

From: servo driver To: host controller

STX	0	3	;	T	S	E	L	O	F	F	EOT
-----	---	---	---	---	---	---	---	---	---	---	-----

## 2-5-2-20. [MFINON][MFINOFF] M-Completion ON/OFF

These commands are respectively equal to the functions to ON/OFF of the control input signal MFIN.

Example: ON/OFF of M completion about servo driver of axis address No.3

[MFINON] command

From: host Controller		To: servo driver									
(ASCII code	STX	0	3	;	M	F	I	N	O	N	EOT
	02	30	33	3B	4D	46	49	4E	4F	4E	04
From: servo driver		To: host controller									
	STX	0	3	;	M	F	I	N	O	N	EOT

[MFINOFF] command

From: host controller To: servo driver												
	STX	0	3	:	M	F	I	N	O	F	F	EOT
(ASCII code	02	30	33	3B	4D	46	49	4E	4F	46	46	04
From: servo driver To: host controller												
	STX	0	3	:	M	F	I	N	O	F	F	EOT

## 2-5-2-21. [STEPON][STEPOFF][STEP0ON][STEP1ON][STEP2ON][STEP3ON]

STEP Feed

Starting/stopping STEP feed operation.

In the [STEPON] command, a "STEP Pulse" 0~3 is selected according to the data (0~3) applied after the command. In Cuty Axis, the pulse number of STEP feed 0 becomes the value of parameter 20 "JOG Feed Pulse".

If the servo driver receives the [STEPOFF] command STEP during the feed operation, the motor executes a deceleration stop.

Example: Start/stop STEP feed operation about servo driver of axis address No.3

<Example 1> When STEP feed 2 is started by "STEPON" command

[STEPON] command

From: host controller		To: servo driver											
(ASCII code	STX	0	3	:	S	T	E	P	O	N	:	2	EOT
	02	30	33	3B	53	54	45	50	4F	4E	3B	32	04)
From: servo driver		To: host controller											
	STX	0	3	:	S	T	E	P	O	N	EOT		

<Example 2> When STEP feed 2 is started by "STEP2ON" command

[STEP2ON] command

From: controller		To: servo driver											
(ASCII code	STX	0	3	;	S	T	E	P	2	O	N	EOT	
	02	30	33	3B	53	54	45	50	32	4F	4E	04)	
From: servo driver		To: host controller											
	STX	0	3	;	S	T	E	P	2	O	N	EOT	

[STEPOFF] command

From: host controller				To: servo driver									
(ASCII code	STX	0	3	;	S	T	E	P	O	F	F	EOT	
	02	30	33	3B	54	53	45	4C	4F	45	45	04	
From: servo driver				To: host controller									
	STX	0	3	;	S	T	E	P	O	F	F	EOT	

## 2-5-3. Monitor Command

## 2-5-3-1. [MON] Numerical Monitor

The value read by each monitor number is listed in the following table.

Number	Name	Contents
00	Current Position	Returning the current position (feedback pulse) of motor in units of reference pulses.
01	Reference Position	Returning the present reference position in units of reference pulse.
02	Positional Error	Returning the present positional error in units of motor encoder pulses.
03	Ref. Position Remains	Returning the amount of movement of the remainder at point-table positioning operation. Returning "0" excluding while point-table positioning.
04	Present Speed	Returning the present speed (computed from feedback pulse) in units of rpm.
05	Reference Speed	Returning the present reference speed in units of rpm.
06	Torque Instructions	Returning the present torque in units of a percentage of the rated torque (signed).
07	Incremental Reference	Returning the amount of movement of reference position from point-table positioning start.
08	Sensor Position	Returning distance from rising edge of the sensor to current position in the case of sensor positioning.
09	Torque Peak	Returning the torque peak in units of a percentage of the rated torque (absolute value).
0A	Present Point-Table	Returning point-table number executed now.
0B		
0C	DEC-Z Distance	Returning distance between zero slowdown LS and motor encoder Z pulse in units of motor encoder pulse. This value is updated if zero-point-return that detects Z pulse is executed.
0D	Effective Load Factor	Returning the effective load factor (only Cuty Axis).
0E	COM Command State	Returning the status of the command bit instructed by the serial communication command. Each bit "1" shows status of ON. Refer to the following table for correspondence of each bit.
0F	Detected Current	Returning the detected current in units of a percentage of the rated current (only Cuty Axis)
10	Servo Status	Returning the operating status of servo driver in bit. Refer to the following table for correspondence of each bit.

MON; 0C [COM command state] BIT table

BIT	status of servo	BIT	staus of servo
31	-	15	TSEL3
30	-	14	TSEL2
29	-	13	TSEL1
28	-	12	TSEL0
27	-	11	EXIN3
26	-	10	EXIN2
25	-	09	EXIN
24	-	08	SBK
23	-	07	HOLD
22	-	06	DEC
21	-	05	ZSTR
20	-	04	STR
19	-	03	EMC (servo-free )
18	RSEL	02	NJOG
17	EMCE (control damping )	01	PJOG
16	TSEL4	00	SVON

MON;10 [servo status] BIT table

BIT	status of servo	BIT	status of servo
31	Servo-on	15	RUN
30	-OT	14	-
29	-	13	-
28	Under EEPROM writing (only Cuty Axis)	12	-
27	EMC	11	ZRTN completion (ZFIN)
26	-	10	-
25	-	09	-
24	+OT	08	COIN (FIN)
23	Alarm	07	-
22	Speed limiter	06	BB (base block)
21	-	05	-
20	-	04	-
19	Torque limiter	03	In point-table operation
18	-	02	-
17	-	01	-
16	Positional error overflow	00	BR(under regeneration detected) (only Cuty Axis)

Example: Reading the reference position remains about servo driver of axis address No.3 (read value is "16550" (40A6H) pulse)

From: host controller		To: servo driver		Monitor number	
				[2 characters of hexadecimal]	
(ASCII code	STX	0	3	;	M O N ; 0 3 EOT
	02	30	33	3B	4D 4F 4E 3B 30 33 04
From: servo driver		To: host controller		Monitor number	
				[2 characters of hexadecimal]	
	STX	0	3	;	M O N ; 0 3
					;
					0 0 0 0 4 0 A 6 EOT

## 2-5-3-2. [ALM] Alarm Occurrence Situation

Reply the status of the occurring alarm and the history of last eight alarms. As for reply data, the bit corresponding to the occurring alarm becomes "1". Refer to each operation manual (main part) of Cuty Axis and Si Servo for the contents of alarm code.

Note: Keep in mind that the correspondence of BIT and content of the alarm code changes respectively in Cuty Axis and Si servo as shown in the following table.

BIT	Si servo Alarm Number	Cuty Axis Alarm Number	BIT	Si servo Alarm Number	Cuty Axis Alarm Number
BIT0	01	00	BIT8	09	08
BIT1	02	01	BIT9	10	09
BIT2	03	02	BIT10	11	10
BIT3	04	03	BIT11	12	11
BIT4	05	04	BIT12	13	12
BIT5	06	05	BIT13	14	13
BIT6	07	06	BIT14	15	14
BIT7	08	07	BIT15	-	15

Example: Reading alarm information about servo driver of axis address No.3 (detecting BIT5 and BIT6)

From: host controller To: servo driver

Command

(ASCII code	STX	0	3	;	A	L	M	EOT
	02	30	33	3B	41	4C	4D	04

From: servo driver To: host controller

Alarm occurrence situation

[4 characters of hexadecimal]

STX	0	3	;	A	L	M	;	0	0	6	0
-----	---	---	---	---	---	---	---	---	---	---	---

Alarm History 1

;	0	0	4	0
---	---	---	---	---

Alarm History 2

;	0	0	2	0
---	---	---	---	---

:

Alarm History 8

;	0	0	0	1	EOT
---	---	---	---	---	-----



## 2-5-3-3. [IO] I/O Monitor (Cuty2 Specification)

The status of the control I/O terminal is returned. As for reply data, upper 16 bit shows the status in the input terminal and lower 16 bit shows the status of the output terminal, the bit corresponding to the terminal of the close contact becomes "1".

Input		Output	
BIT	Device	BIT	Device
31	-	15	-
30	-	14	-
29	-	13	-
28	IN11	12	-
27	IN7	11	-
26	IN10	10	-
25	-	09	-
24	IN9	08	-
23	IN8	07	-
22	IN6	06	-
21	IN5	05	OUT5
20	IN4	04	OUT4
19	IN3	03	OUT3
18	IN2	02	OUT2
17	IN1	01	OUT1
16	IN0	00	OUT0

Example: Reading status of I/O terminal about servo driver of axis address No.3

From: host controller To: servo driver

STX	0	3	:	I	O	EOT
(ASCII code 02	30	33	3B	49	4F	04)

From: servo driver To: host controller

STX	0	3	:	I	O	:	0	5	9	1	0	0	3	9	EOT
-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-----

Input terminal    Output terminal

## 2-5-3-4. [IO2] I/O Monitor 2

The status of the control I/O terminal is returned. As for reply data, upper 16 bit shows the status in the input terminal and lower 16 bit shows the status of the output terminal, the bit corresponding to the terminal of the close contact becomes "1".

Input		Output	
BIT	Device	BIT	Device
31	-	15	-
30	-	14	-
29	-	13	-
28	-	12	-
27	IN11	11	-
26	IN10	10	-
25	IN9	09	-
24	IN8	08	-
23	IN7	07	-
22	IN6	06	-
21	IN5	05	OUT5
20	IN4	04	OUT4
19	IN3	03	OUT3
18	IN2	02	OUT2
17	IN1	01	OUT1
16	IN0	00	OUT0

Example: Reading status of I/O terminal about servo driver of axis address No.3

From: host controller To: servo driver

STX	0	3	:	I	O	2	EOT
(ASCII code 02	30	33	3B	49	4F	32	04)

From: servo driver To: host controller

STX	0	3	:	I	O	2	:	0	5	9	1	0	0	3	9	EOT
-----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	-----

Input terminal    Output terminal

++Reference ++

Sales Inquiring  
**Sanmei Co.,Inc.**

E-Mail : service@sanmei.co.jp

<u>Head Office</u>	: Post No. 424-0825	6-16, Matubaracho, Shimizu-ku, Shizuoka-shi, Shizuoka-ken TEL +81-54-353-3271 FAX +81-54-352-1648
<u>Tokyo Branch</u>	: Post No. 113-0033	Iwakata Building 6F 3-18-16, hongo, Bunkyo-ku, Tokyo TEL +81-3-5803-1621 FAX +81-3-3813-3431
<u>Hamamatsu Branch</u>	: Post No. 430-0911	658-1, Shinzu-cho, Hamamatsu-shi, Shizuoka-ken TEL +81-53-0461-1094 FAX +81-53-461-3879
<u>Kanagawa Office</u>	: Post No. 243-0035	1655, Aiko, Atsugi-shi, Kanagawa-ken TEL +81-46-228-0244 FAX +81-46-229-0339
<u>Kitakantou Office</u>	: Post No. 360-0045	1-94, Kawara-cho, Kumagaya-shi, Saitama-ken TEL +81-485-27-0780 FAX +81-485-27-1340
<u>Numazu Office</u>	: Post No. 410-0062	14-4, Miyamae-cho, Numazu-shi, Shizuoka-ken TEL +81-559-22-5333 FAX +81-559-22-3609
<u>Nagoya Office</u>	: Post No. 465-0096	Life maison zuiko-en 1F 1, Sakuragaoka, Meito-ku, Nagoya-shi, Aichi-ken TEL +81-52-783-3927 FAX +81-52-783-5134
<u>Osaka Office</u>	: Post No. 532-0011	The 3rd Nakajima building 10F 5-11-10, Nishi-nakajima, Yodogawa-ku, Osaka-shi, Osaka TEL +81-6-6309-5123 FAX +81-6-6305-0326
<u>Hachinohe Office</u>	: Post No. 031-0811	Yawata gyogyo building 1F 3-8-8, Shimminato, Hachinohe-shi, Aomori-ken TEL +81-178-31-4170 FAX +81-178-31-4180
<u>Nagano Office</u>	: Post No. 381-0036	1-22-3-201, Hirabayashi, Nagano-shi, Nagano-ken TEL +81-26-251-6422 FAX +81-26-251-6466
<u>Yamagata Office</u>	: Post No. 990-0023	Chitose clean heights no. 101 4-6-5, Matsunami, Yamagata-shi, Yamagata-ken TEL +81-23-629-6455 FAX +81-23-629-6456
<u>Hokuriku Office</u>	: Post No. 930-0966	Hirota building 1F 2-4-2, Ishigane, Toyama-shi, Toyama-ken TEL +81-76-420-6573 FAX +81-76-420-6574

Technical Inquiring  
**Sanmei Electronics Co., Ltd.**

E-Mail : si-cuty@sanmei-ele.co.jp

: Post No. 424-0924 2-2-1, Seikai, Shimizu-ku, Shizuoka-shi, Shizuoka-ken  
 TEL: +81-54-335-5588 FAX +81-54-335-7363

The content of this guide may be changed without notice due to product improvement.