

Sanmei Invention Servo
Sí servo 3

Instruction Manual

Point-Table part

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1. Before use

- "Si servo3 Instruction Manual (Point-Table part) SH2882D072" describes Point-Table functions of Si servo3. In addition to this manual, carefully read the related editions "Si servo3 Instruction Manual (Main part) SH2882D071", "Si servo3 Instruction Manual (Serial communication part) SH2882D073" and the booklet attached to the motor to understand the correct usage.
- In particular, be sure to understand and remember the contents of "Safety Precautions" described in "Si servo3 Instruction Manual (Main part) SH2882D071". Be careful not to mishandle the equipment in any case. Improper use may lead to serious accidents including death.
- After reading this instruction manual, the related editions, and the booklet attached to the motor, keep them in a place where you can access and read them whenever needed.

Servo driver models to which the contents of this manual apply

Si servo3	Si-02DT Si-05DT
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2. How to use Point-Table

2-1. Description of Point-Table items

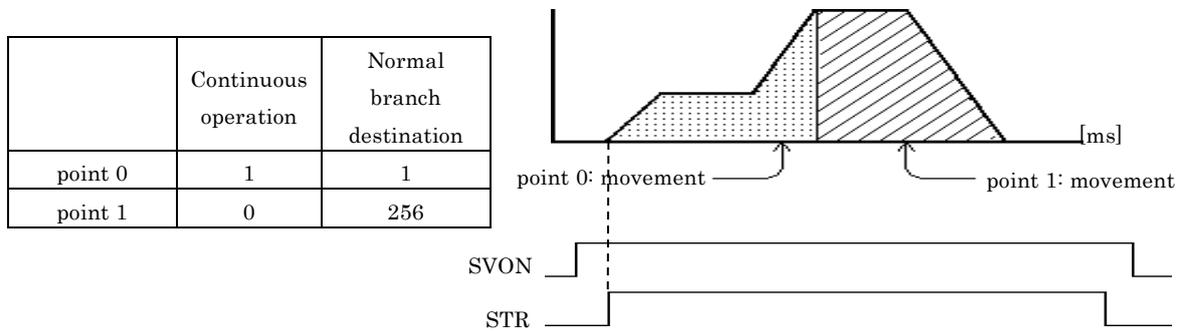
Use the communication commands [PTW] and [PTR] to set/reference the Point-Table data.

Point-Table setting items list (point number 0~255)

Set item	Content	Unit	Lower limit	Upper limit
Absolute value (abs) /Relative value (inc)	Set according to the value of "Position/Move amount" item as absolute position or relative move amount. 0: absolute position 1: relative move amount	-	0	1
Move amount	Set the position/move amount in pulses. *1)	Ref.unit	-2147483648	2147483647
Velocity	Set the motor velocity for positioning operation in min^{-1} .	min^{-1}	1	6000
Acceleration/deceleration time constant	Set the time of velocity increase slope during the acceleration to 3000 min^{-1} . ※When "Deceleration time constant" is set to "0", the set value of this item is applied to both acceleration and deceleration slopes.	ms	1	9999
Deceleration time constant	Set the time of velocity decrease slope during the deceleration from 3000 min^{-1} . ※If this item is set to "0", the set value of "Acceleration/deceleration time constant" item is also applied to the deceleration slope.	ms	0	9999
Wait time	When the branch destination point number item is set, specify the wait time before starting the next point operation in ms. This item is ignored when the branch destination point number is set to 256 (program end) and when the continuous operation is set to 1.	ms	0	9999
<p>Note) Even if the Wait time is set to 0[ms], wait for the positioning completion (INP signal) is executed before proceeding to the next point table execution.</p>				

Set item	Content	Unit	Lower limit	Upper limit
Continuous operation	When this item is set to 1, the current point and the next point operations are linked.	-	0	1

Example) When points 0 and 1 are set as follows, point 0 is specified and STR is executed

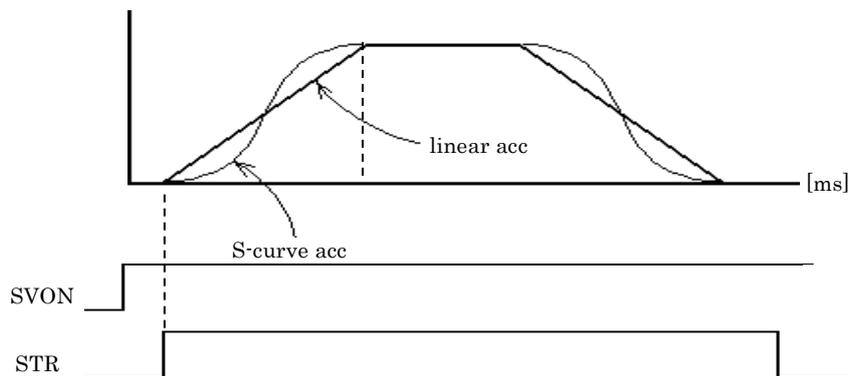


※When Si servo is set to a rotating coordinate system, the continuous operation function is invalid.

Normal branch destination point number	When this item is set, the branch destination point operation is automatically executed after previous point operation ends. Set to 256 to end the program.	-	0~256 1000~1255 *1)
--	---	---	---------------------------

S-curve acceleration/deceleration	Select whether to perform positioning operation with linear acceleration/deceleration or S-shaped acceleration/deceleration (sin curve). The actual acceleration/deceleration time does not change regardless of S-curve acceleration/deceleration or linear acceleration/deceleration selection. Therefore, if the acceleration/deceleration time constants are the same, the maximum acceleration/deceleration torque is greater in the case of S-curve acceleration/deceleration. 0: linear acceleration/deceleration 1: S-curve acceleration/deceleration	-	0	1
-----------------------------------	---	---	---	---

[S-curve acceleration/deceleration operation]



Set item	Content	Unit	Lower limit	Upper limit												
Input branch destination point number	When this item is set and there is an EXIN, EXIN2, or EXIN3 input, a jump to the corresponding point number (input branch destination point number) different from the "Normal branch destination point number" is executed. Set to "-1" when not using this function. Refer to "2 - 7. Input condition jump"	-	-1~256 1000~1255 *1)													
Input branch destination point number 2		-	-1~256 1000~1255 *1)													
Input branch destination point number 3		-	-1~256 1000~1255 *1)													
<table border="1"> <thead> <tr> <th>Input signal</th> <th>communication command</th> <th>Corresponding input branch destination point number</th> </tr> </thead> <tbody> <tr> <td>EXIN</td> <td>[EXIN1ON] [EXINON;1]</td> <td>Input branch destination point number</td> </tr> <tr> <td>EXIN2</td> <td>[EXIN2ON] [EXINON;2]</td> <td>Input branch destination point number 2</td> </tr> <tr> <td>EXIN3</td> <td>[EXIN3ON] [EXINON;3]</td> <td>Input branch destination point number 3</td> </tr> </tbody> </table>					Input signal	communication command	Corresponding input branch destination point number	EXIN	[EXIN1ON] [EXINON;1]	Input branch destination point number	EXIN2	[EXIN2ON] [EXINON;2]	Input branch destination point number 2	EXIN3	[EXIN3ON] [EXINON;3]	Input branch destination point number 3
Input signal	communication command	Corresponding input branch destination point number														
EXIN	[EXIN1ON] [EXINON;1]	Input branch destination point number														
EXIN2	[EXIN2ON] [EXINON;2]	Input branch destination point number 2														
EXIN3	[EXIN3ON] [EXINON;3]	Input branch destination point number 3														
Branch signal level input	Set whether the input jump function condition is the input signal edge or level input. 0: edge input operation during block operation 1: level input operation at the end of block operation	-	0	1												
Number of loops	When this item is set, after the point is executed the set number of times (number of loops), a jump to a point (Branch destination point number after loop) different from the "Normal branch destination point number" is executed. When not used, set the number of loops to "0". Refer to "2 - 8. Loop operation"	-	0	100												
Branch destination point number after loop		-	0~256 1000~1255 *1)													
Torque set	If this item is set, the torque is limited to the set value (0~200%) during the point execution, performing pushing operation. Set to 0 if not used. Refer to "2 - 9. Torque limit"	0.1%	0	2000												
Sensor	By this item, the sensor positioning operation is specified. 0: without sensor positioning 1: sensor positioning mode 1 2: sensor positioning mode 2 Refer to "2 - 10. Sensor positioning"	-	0	2												
M code	By this item, the M code output operation is specified. 0,8: without M code output operation 1~7: M code output before points start 9~15: M code output after points end Refer to "2 - 11. M code output"	-	0	15												
Loop counter clear	When this item is set, the number of loops of the set point number is cleared. Set to "-1" if not used. Refer to "2 - 8 - 2. Loop counter clear"	-	-1	255												

*1) When set to 1000~1255, a single block operation is enabled. For single block refer to "2 - 6. Single block".

2 – 2. Point-Table operation start

The Point-Table is operated by control inputs or communication commands.

The procedure is shown below.

1. Point number specify

In case of control input signal: set the point number to execute with P0_IN~P7_IN signals.

In case of communication command: set the point number to execute with [PNT] command.

Note) Whether to use the control input signal or communication command must be selected with the parameter N0006 "Command input method select". For details, see "Instruction Manual (Main part)" section 17. "Parameters".

2. Operation start

In case of control input signal: operation starts at the rising edge of STR, STRP input.

In case of communication command: operation starts by [STRON] [STRP] command. *1)

*1) When using the communication command [STRON], it is necessary to perform [STROFF] before the next [STRON].

Note) Whether to use the control input signal or communication command must be selected with the parameter N0006 "Command input method select". For details, see "Instruction Manual (Main part)" section 17. "Parameters".

Note) If the servo is OFF, the operation will not start until the servo is turned ON.

2 – 3. Interruption of table automatic operation

Turning STR OFF*1) during the Point-Table operation interrupts the Point-Table operation, the motor decelerates and stops and the driver returns to start waiting state. The point number for the next operation will be set to the last set point (start point).

*1) The following methods are available to turn STR OFF:

- Control input signal STR falling or communication command [STROFF]

Note) Whether to use the control input signal or communication command must be selected with the parameter N0006 "Command input method select". For details, see "Instruction Manual (Main part)" section 17. "Parameters".

- Control input signal STP or communication command [STOP]
- Servo OFF operation

2 – 4. Pause of Point-Table automatic operation

Point-Table automatic operation can be paused by the control input signal HOLD or communication command [HOLDON]. For details, see "Instruction Manual (Main part)" section 12. "Point-Table operation".

2 – 5. Teaching

The current position can be stored in the Point-Table by using control input signal TDIN or communication command [TDIN]. In addition, the "Absolute/relative value" of the point number where the teaching was performed is automatically set to 0 (absolute value)

For details on teaching procedure, see "Instruction Manual (Main part)" section 12. "Point-Table operation" subsection "12-2-7. "Teaching function".

2 – 6 . Single block

Single block function can be specified by adding 1000 to the Point-Table branch destinations 0~255 to produce branch destinations 1000~1255. At the point where the single block function is set, the operation is stopped after the block execution, and the next operation starts when the rising edge of control input signal SBK or the communication command [SBKON]*4) is received. Set/operate according to the following procedure.

Example) Procedure for operating with the single block function in the order of point 0 ⇒1 ⇒2

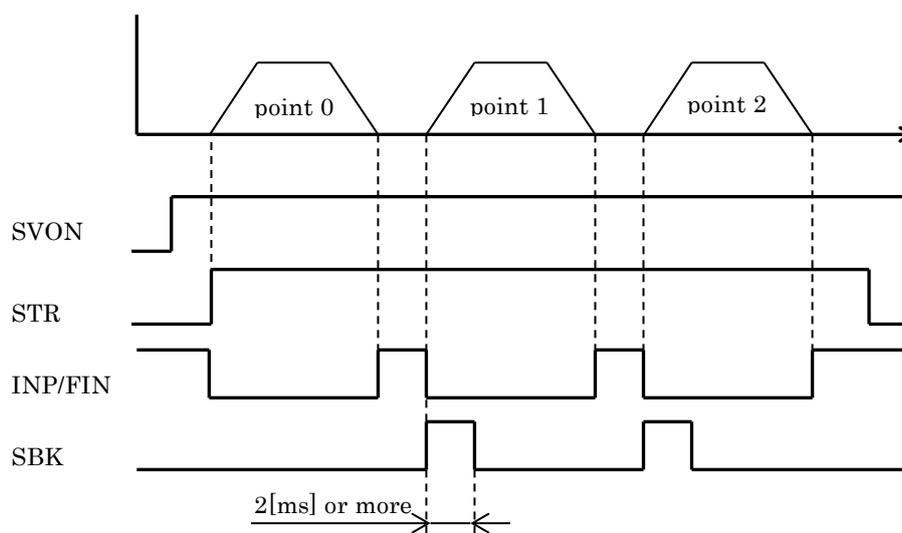
<Setting method>

- ① Set branch destination of point 0 to 1001, the branch destination of point 1 to 1002, and the branch destination of point 2 to 256 (end). (Single block function setting)
- ② Set wait time*1) to 0[ms] for both points 0 and 1.
- ③ Set continuous operation*2) to 0 for both points 0 and 1.

Point	Wait time	Continuous operation	Branch destination
0	0	0	1001
1	0	0	1002
2	arbitrary	arbitrary	256

<Operation>

- ① Start automatic operation from point 0.
- ② When the operation at point 0 is completed, SBK wait starts and the operation at point 1 is started by rising edge*3) of the control input signal SBK or by communication command [SBKON]*4).
- ③ When the operation at point 1 is completed, SBK wait starts and the operation at point 2 is started by rising edge*3) of the control input signal SBK or by communication command [SBKON]*4).
- ④ When the operation at point 2 is completed, the automatic operation ends.



*1) If wait time is set, SBK is ignored during the wait time

*2) When continuous operation is set to 1,

- continuous operation is performed when the next movement is in the same direction,
- when the next movement is in opposite direction, the operation stops and waits for SBK.

*3) Hold SBK high for 2[ms] or more.

*4) If communication command [SBKON] is used, the next [SBKON] command will not be accepted unless [SBKOFF] is executed.

2 – 7 . Input condition jump

When "Input branch destination point number, 2, 3" is set, the operation will branch to the corresponding "Input branch destination point number" at the end of the block operation with a rising edge of control input signals EXIN, 2, 3 or a communication command [EXINON;□], [EXIN□ON] (□:1~3) during the block operation.

At this time, the setting of "Normal branch destination point number" is ignored. If a rising edge of EXIN, 2, 3 or a communication command [EXINON;□] or [EXIN□ON] is not detected by the end of the block operation, the "Input branch destination point number" is ignored and the operation branches to "Normal branch destination point number".

It is also possible to set the "Single block function" to the input branch destination.

The points to set the input condition jump destination can be "000"~"255", "1000"~"1255" (single block function of "000"~"255"), or "256". Set to "-1" if not used.

※For single block refer to "2 – 6 . Single block".

"000"~"255"

With EXIN input, after completing the point execution the operation will jump to the set point in the range of "000"~"255". If there is no input, the operation will jump to the number set in "Normal branch destination point number".

"1000"~"1255" (point number+1000)

Sets the single block function to the jump destination. If EXIN input is present, after executing the point, the operation will jump to the set point by SBK input.

"256"

With EXIN input, the point positioning operation will end. ("Normal branch destination point number" is ignored)

"-1" (displayed as "---" on the Si-Wave screen)

When not using the input condition jump function, set the input branch destination point number to "-1".

Note) Hold EXIN high for 2[ms] or longer.

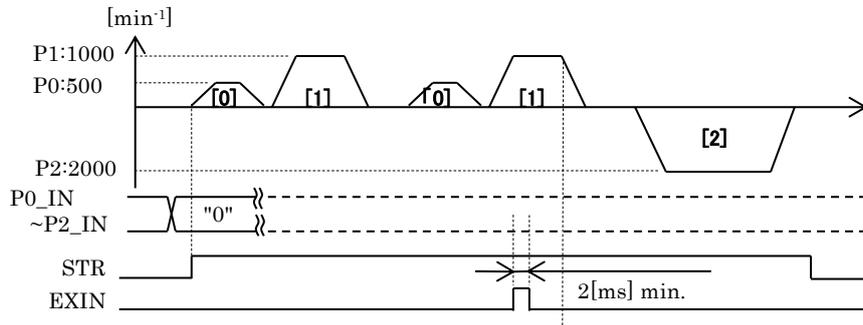
Note) If the communication command [EXINON;□] [EXIN□ON] is used, the next [EXINON;□] [EXIN□ON] command will not be accepted unless [EXINOFF;□][EXIN□OFF] is executed.

Example of input condition jump use

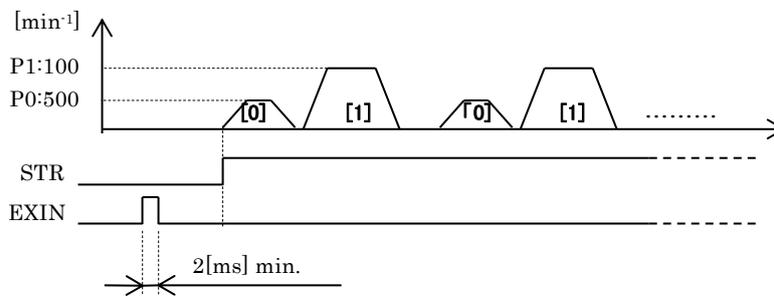
<Point-Table setting>

Point number	abs/inc	Move amount	Velocity	Wait time	Normal branch destination	Input branch destination
0	1	4000	500	300	1	-1
1	1	8000	1000	500	0	2
2	0	0	2000	500	0	-1
:	:	:	:		:	:
:	:	:	:		:	:

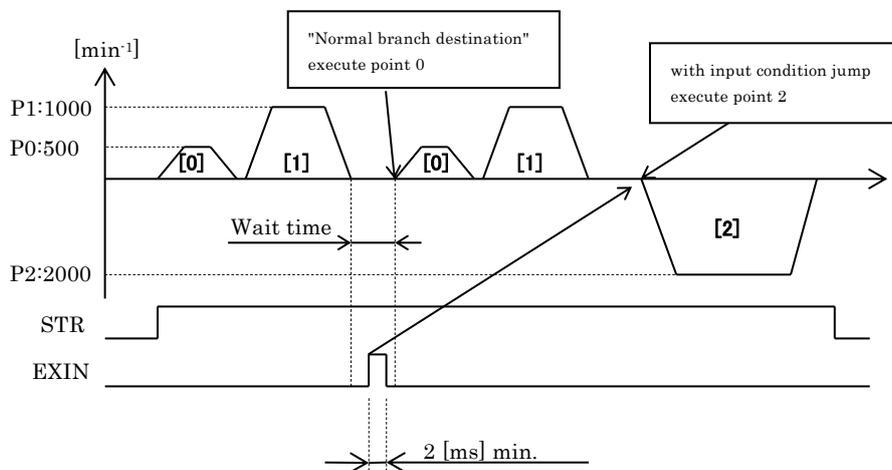
- (1) If EXIN input (rising edge) or communication command [EXINON;□] etc. is received before completing the movement by the positioning command to the point set by the "Input branch destination point number", a jump to the specified point is executed after the positioning is completed.



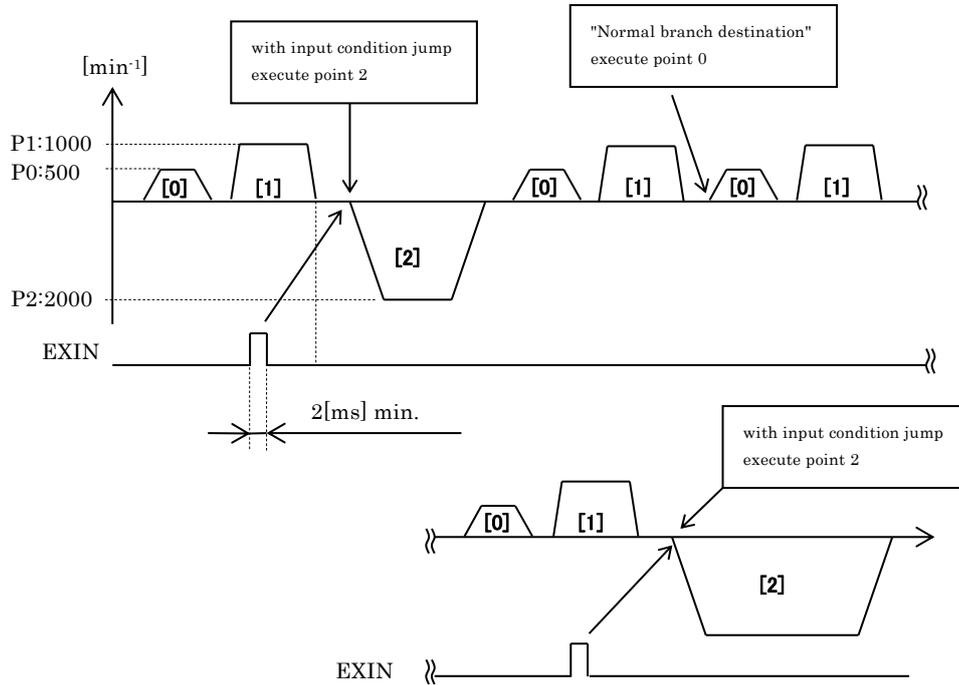
- (2) EXIN or communication commands [EXINON;□] etc. received before the STR input to start the point operation are ignored.



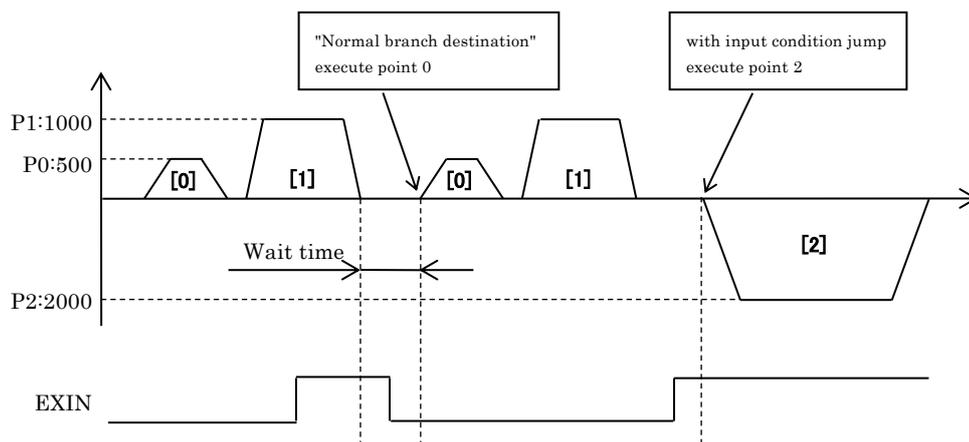
- (3) If "Wait time" is set for the point of "Input branch destination point number" and a control input signal EXIN rising edge or a communication command [EXINON;□] is received during the wait time, the input condition jump of that point is not executed, but the point set in "Normal branch destination point number" is executed. However, the EXIN input in this case is retained in the driver and becomes valid at the next execution of point with the input condition jump set.



- (4) When "Input condition jump" is executed by the control input signal EXIN rising edge or by the communication commands [EXINON;□] etc., the EXIN input is cleared. "Input condition jump" is not executed until EXIN is input again.



- (5) At the point where "Branch signal level input" is set to "1", if control input signal EXIN or communication command [EXIN;□] is ON when the positioning is completed and the wait time passed, the execution jumps to the point number set in "Input branch destination point number".



2 – 8 . Loop operation

2 – 8 – 1 . Loop operation

When "Number of loops" and "Branch destination point number after loop" are set, the corresponding block is repeated for the number of loops times, then the operation branches to the branch destination point number after loop. The setting of "Normal branch destination point number" is ignored.

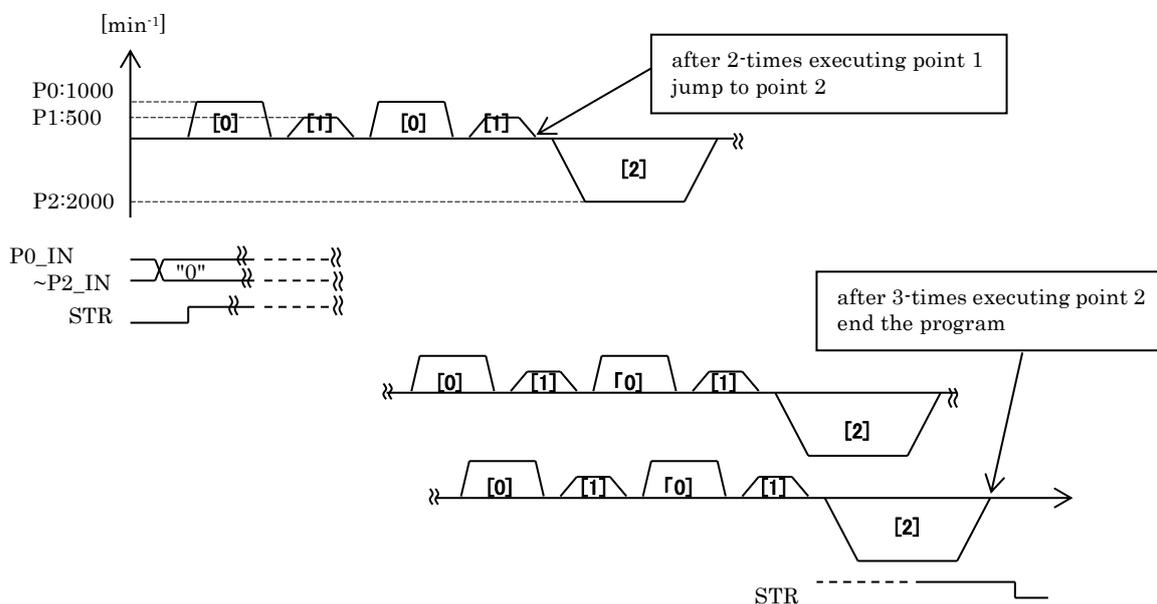
It is also possible to set the "Single block function" to the branch destination after loop. Also, it is possible to nest loops.

※For single block refer to "2 – 6 . Single block".

Example of loop setting use

<Point-Table setting>

Point	abs/inc	Move amount	Velocity	Normal branch destination	Number of loops	Branch destination after loop
0	1	8000	1000	1	0	0
1	1	4000	500	0	2	2
2	0	0	2000	0	3	256
:	:	:	:	:	:	:
:	:	:	:	:	:	:



2-8-2. Loop counter clear

Clear the value of loop counter of the set point number.

"000"~"255"

When the point for which the value is set is executed, the loop counter for that point number of the set value is cleared.

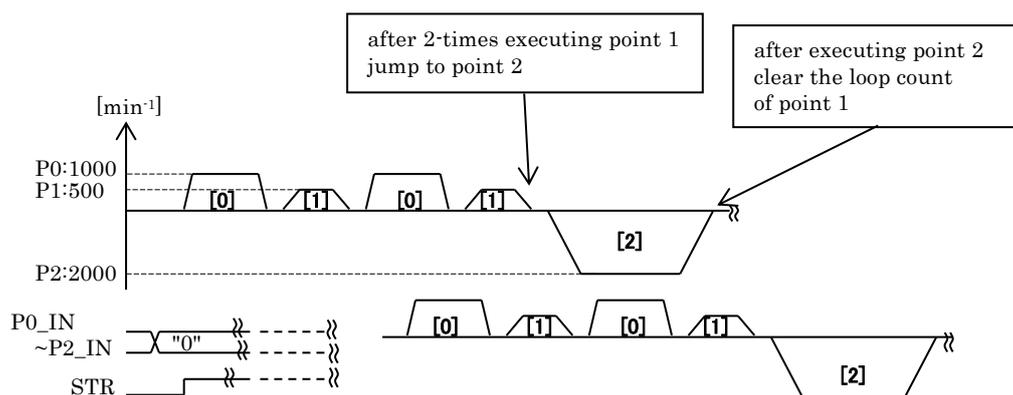
"-1" (displayed as "---" on the Si-Wave screen)

The loop counter clear function is not used.

Example of loop counter clear use

<Point-Table setting>

Point	abs/inc	Move amount	Velocity	Normal branch destination	Number of loops	Branch destination point after loop	Loop counter clear
0	1	8000	1000	1	0	0	-1
1	1	4000	500	0	2	2	-1
2	0	0	2000	0	0	0	1
:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:



2 – 9 . Torque limit

By setting the "Torque set", the torque can be limited and pushing operation can be performed when a point is executed. The torque setting range is 0~200% of the rated torque. Set to "0" if not used.

Note 1) When using the torque set, set completion signals FIN, PTFIN output to control output signals.

Note 2) This function limits the torque output during positioning operation in position control. It does not continuously output the specified torque.

Note 3) Since the torque is limited by detecting the current in the motor power line, an error of about $\pm 5\sim 10\%$ of the set value in the actual output torque during torque limitation will appear due to variations in the winding resistance of the motor or in the current detection element, temperature drift, etc.

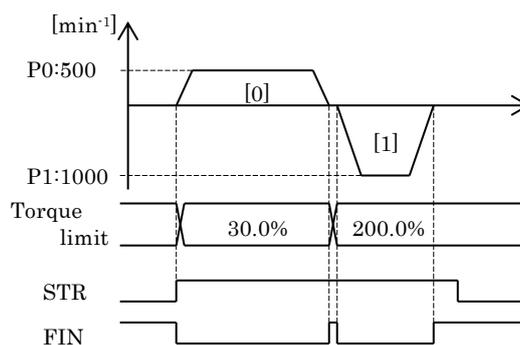
Note 4) If the torque limit is used when the continuous operation item is set to "1" (active), the torque limit value can be switched before reaching the specified position depending on the error pulse state.

The following operation is possible by combining the torque set function with the "Wait time" set.

2 – 9 – 1 . When "Wait time" is set to 0[ms]

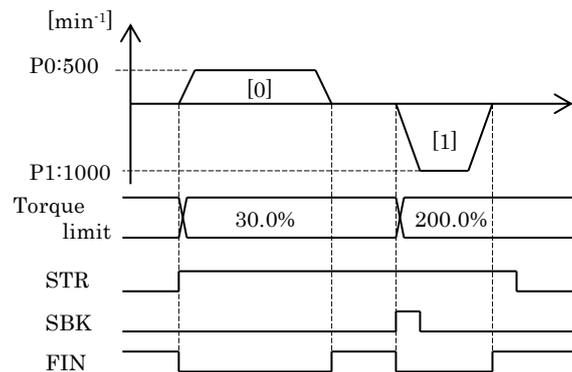
Example 1) FIN signal is output when position command movement is completed and position error pulse is within the parameter "In-position range". At the point where the torque limit is set, the torque limit for this point is released when FIN signal is output at the end of operation. The point operation for which the torque limit is set continues until the FIN signal is output.

Point	abs/inc	Move amount	Velocity	Wait time	Branch destination	Torque set
0	0	8000	500	0	1	300
1	0	0	1000	0	256	0
:	:	:	:	:	:	:



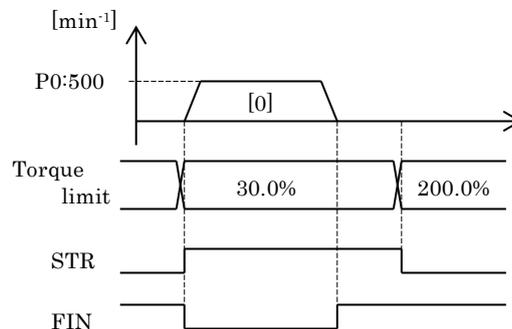
Example 2) When single block function is set for "Normal/input branch destination point number" in the point where torque limit is set, even after FIN signal is output the torque limit will remain active until SBK signal input.

Point	abs/inc	Move amount	Velocity	Wait time	Branch destination	Torque set
0	0	8000	500	0	1001	300
1	0	0	1000	0	256	0
:	:	:	:	:	:	:



Example 3) When "256" is set for "Normal/input branch destination point number" in the point where torque limit is set, after FIN signal is output the torque limit will be invalidated by turning OFF the STR input.

Point	abs/inc	Move amount	Velocity	Wait time	Branch destination	Torque set
0	0	8000	500	0	256	300
:	:	:	:	:	:	:



2 – 9 – 2. When "Wait time" is set to other value than 0[ms] (1~9999[ms])

After detecting the torque limit for the set time, the error pulse is cleared. This can be used for applications such as pressing a workpiece with a constant torque.

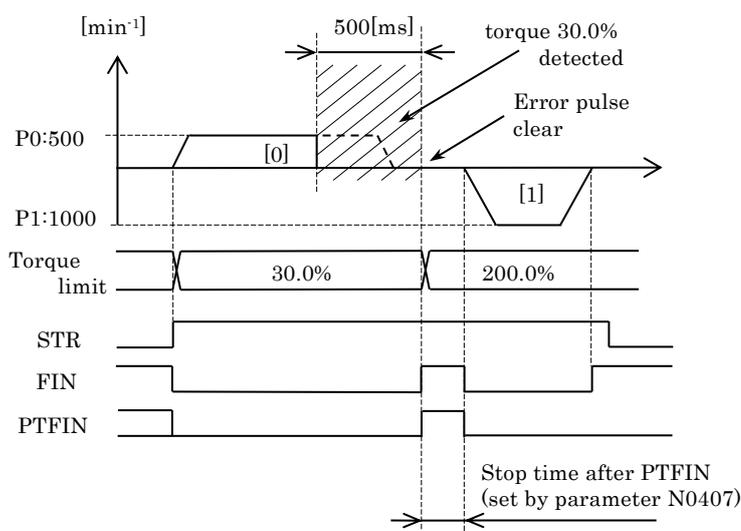
Also, when using this setting, be sure to specify 0 (absolute value) for "abs/inc" for the next point.

(If set to a relative value, the command position may deviate from the intended position due to error pulse clearing.)

Example 1) In the state when motor torque is limited by the value set in the "Torque" and motor velocity is below the parameter N0207 "Torque completed/VZR output range", the continued torque for the time set in "Wait time" is completed, then the FIN signal and PTFIN signal are output. At this time, the torque limit is released and the error pulse is automatically cleared.

If the setting is such that the next point is executed continuously after the error is cleared, the next point is activated after waiting stop time after PTFIN. The stop time after PTFIN is set by parameter N0407 "ZPLS output minimum time / Stop time after PTFIN".

Point	abs/inc	Move amount	Velocity	Wait time	Branch destination	Torque set
0	0	8000	500	500	1	300
1	0	0	1000	0	256	0
:	:	:	:	:	:	:



Precautions:

If positioning is completed within the time set in "Wait time" and the error pulse value falls within the in-position range, normal positioning is performed and the error pulse is not cleared.

The same applies to Example 2 and Example 3

※PTFIN signal turns ON in the point operation for which torque has been set only when torque completion occurs (error clear). This signal can be used to confirm that the workpiece has been pressed.

PTFIN signal will turn OFF when the new point operation starts or the STR input turns OFF.

※It is possible to judge whether moving to the target position (positioning completed) was completed or pushing for the set time (Torque completed) was completed by PTFIN output state when FIN output is ON.

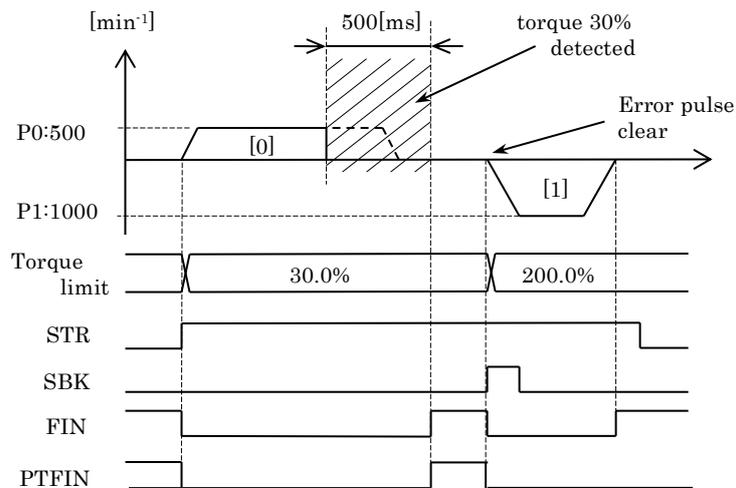
PTFIN signal when FIN is ON	Completion state
ON	Completed by pressing for the time set in "Wait time" (point table torque complete)
OFF	Positioning completed within the time set in "Wait time" (positioning complete)

※Torque completion condition can be selected by BIT1 of the parameter N0213 "Torque limit option function".

For details refer to "2 – 9 – 3. Torque completion condition set".

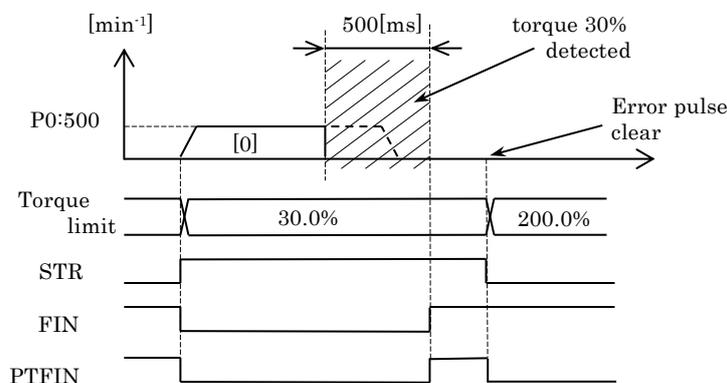
Example 2) When a single block function is set for "Normal/input branch destination point number" in the point where torque limit is set, after FIN signal is output, rise the control input signal SBK or send the communication command [SBKON]. As a result, the torque limit is released and the error pulse is cleared, and the next point operation is performed.

Point	abs/inc	Move amount	Velocity	Wait time	Branch destination	Torque
0	0	8000	500	500	1001	300
1	0	0	1000	0	256	0
:	:	:	:	:	:	:



Example 3) When "256" is set for "Normal/input branch destination point number" in the point where torque limit is set, after FIN signal is output the torque limit will be invalidated and error pulse will be cleared by turning OFF the STR input.

Point	abs/inc	Move amount	Velocity	Wait time	Normal branch destination	Torque
0	0	8000	500	500	256	300
:	:	:	:	:	:	:

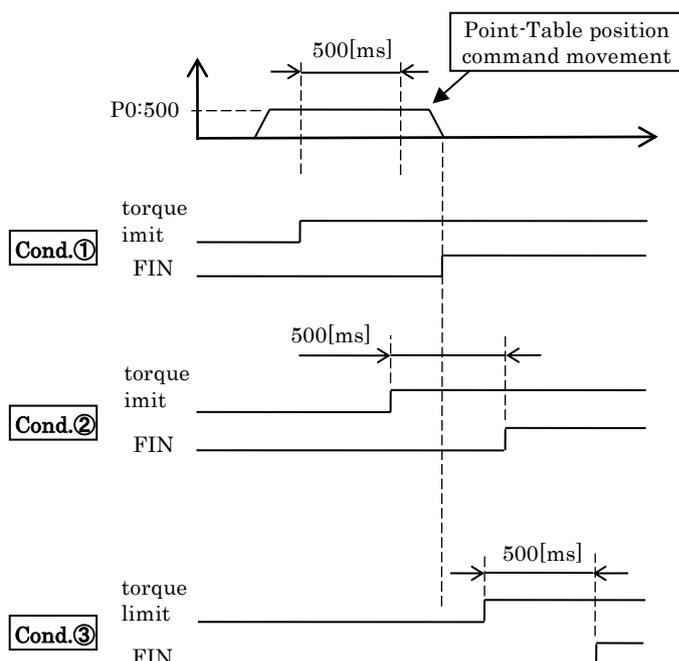


2 - 9 - 3 . Torque completion condition set

When wait time is set to other than 0[ms] the torque completion (error clear) condition can be selected by BIT1 of the parameter N0213 "Torque limit option function".

Set value	Setting	Content
1	TFIN compliant operation (★default setting)	1) Motor torque is limited by the value set in "Torque set", and 2) motor shaft rotation velocity is below the parameter N0207 "Torque completed/VZR output range" continuously for the time set in "Wait time", the error is cleared ※Completion of movement of point table position command is not included in the condition
0	Compatible to old models (linked to command completion)	1) Condition with the motor torque limited continues for the time set in "Wait time" 2) Movement of the point table position command is completed When both conditions are met, error is cleared ※Motor speed is not included in the conditions

○Details of error clearing (FIN output) conditions for old model compatible specifications



① When torque limit has already continued for the set time before the movement of position command is completed

FIN is output at the same time as the movement of position command is completed.

② When the movement of position command is completed and the torque limit is continuing (the set time has not been reached)

FIN is output when the continued torque limit reaches the time set in "Wait time"

③ When the torque is not limited and the movement of position command is completed

the torque limit is started and when "Wait time" set value is reached, FIN is output.

2 – 1 0 . Sensor positioning

The point for which "Sensor" setting item is set to "1" or "2" operates in "Sensor positioning [mode 1]" or "Sensor positioning [mode 2]".

In the sensor positioning mode, positioning is performed based on the external sensor input (SENS signal). Positioning is performed from the position where the rising edge of the SENS signal is detected to the position of the Point-Table set value "Move amount".

2 – 1 0 – 1 . Point-Table setting for sensor positioning

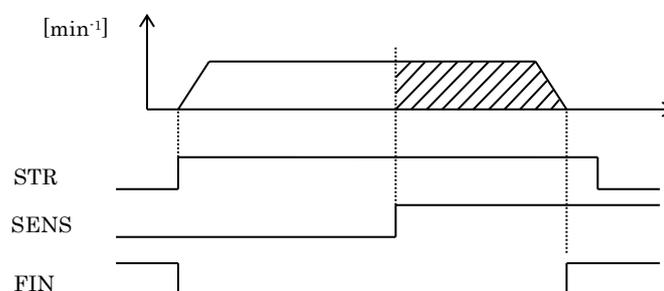
In the point where "Sensor" setting item is set, among the other setting items the following 4 items become valid: "Absolute/relative value" (specify the sensor search direction), "Move amount", "Velocity", and "Acceleration/deceleration time constant". Other settings are ignored.

Item	Setting content	Setting range
Abs/inc	Used to specify the sensor search direction.	0: Forward direction 1: Reverse direction
Move amount	Set the distance from the position of the sensor rising edge detection to the stop position.	-2147483648~2147483647 [reference unit]
Velocity	Set the rotation velocity of the motor	1~6000[min^{-1}]
Acc/dec time constant	Set the acceleration/deceleration time constant (acceleration time to 3000 min^{-1})	1~9999[ms]

2 – 1 0 – 2 . Sensor positioning function description

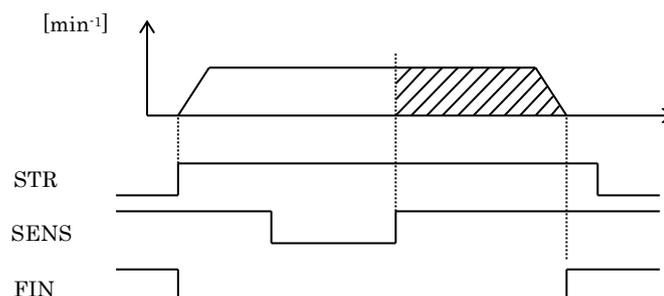
- (1) SENS signal is OFF at startup (common to [Mode 1] and [Mode 2])

Positioning is performed at the set move amount based on the rising edge of the SENS signal.



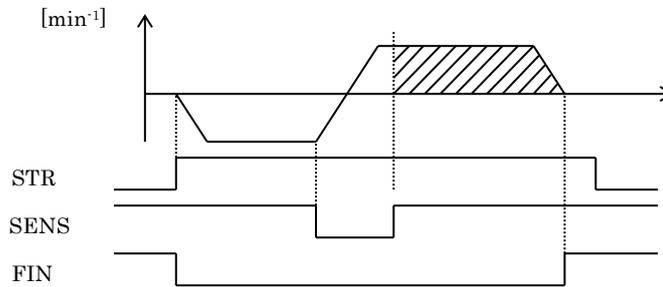
- (2) SENS signal is ON at startup ([Mode 1])

In [Mode 1], if SENS signal is ON when STR signal is input, the operation is performed in the direction set in "Absolute/relative value" item, and positioning is performed based on the next rising edge of SENS signal.



(3) SENS signal is ON at startup ([Mode 2])

In [Mode 2], if SENS signal is ON when STR signal is input, the operation will be first in opposite direction to the setting in "Absolute/relative value" item. After SENS signal is turned OFF, search for SENS signal in the direction set in "Absolute/relative value" and positioning based on the rising edge is performed.

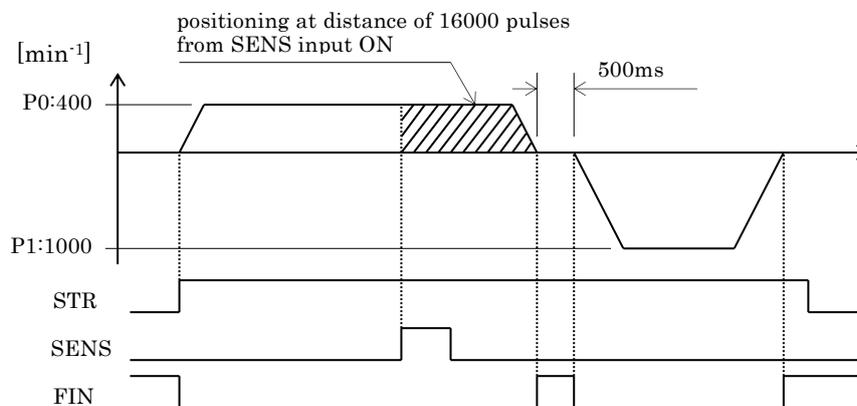


2 – 1 0 – 3 . Example of sensor positioning use

Both [Mode 1] and [Mode 2] can be used in combination with normal positioning point.

[Example] Positioning in sensor positioning [Mode 1] at a distance of 16000 pulses from the sensor, stopping for 500ms and then returning to the origin.

Point	abs/inc	Move amount	Velocity	Wait time	Normal branch destination	Sensor
0	0	16000	400	500	1	1
1	0	0	1000	0	256	0



2 – 1 1. M code output

M code output function can be used by setting the "M code" item.

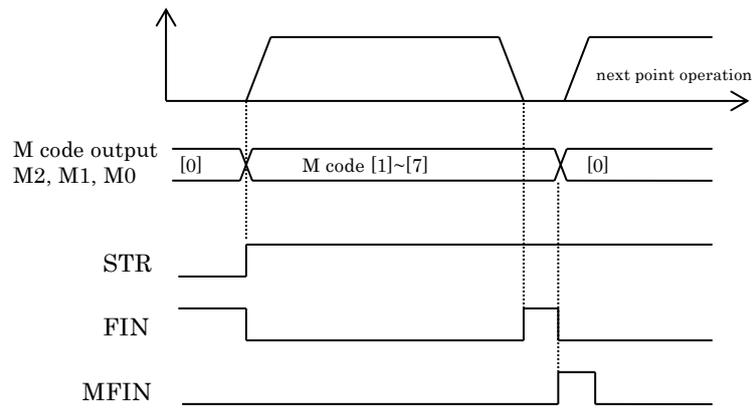
At the point where M code output is set, the following operation is performed.

- When "M code" item is set to 1~7 and the corresponding point operation has started, the M code (1~7) BITs are output to M2, M1 and M0 outputs.
- When "M code" item is set to 9~15 and after the operation of corresponding point has completed, the M code (1~7) BITs are output to M2, M1 and M0 outputs.
- M2, M1 and M0 outputs are turned OFF at the rising edge of the control input signal MFIN or at the communication command [MFINON].
- If a branch point is set in "Normal/input branch point number" item, the next operation is not performed until MFIN is input.
- After confirming M2, M1, M0 outputs = 0, turn OFF the MFIN input signal (or transmit [MFINOFF] in case of communication command).

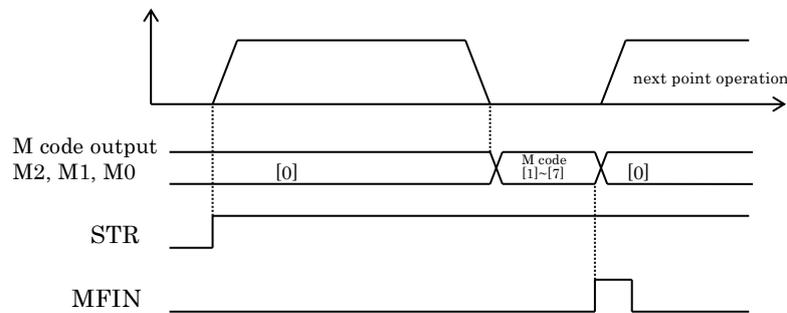
When not using the M code output function, set the "M code" item to 0.

Set M code	M2 output	M1 output	M0 output	Content
0	0	0	0	M code output function is not used
1	0	0	1	M code output at point start
2	0	1	0	
3	0	1	1	
4	1	0	0	
5	1	0	1	
6	1	1	0	
7	1	1	1	
8	0	0	0	M code output function is not used
9	0	0	1	M code output at point completion
10	0	1	0	
11	0	1	1	
12	1	0	0	
13	1	0	1	
14	1	1	0	
15	1	1	1	

2-11-1. M code output at point start
[when M code is set to 1~7]



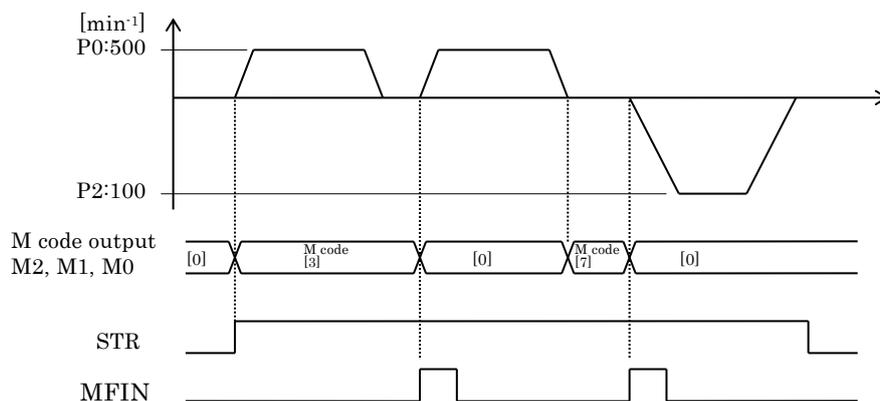
2-11-2. M code output at point completion
[when M code is set to 8~15]



2-11-3. Example of M code output function use

[Example] Set M code output to point 0 and point 1. Program operation by setting the branch destination point number.

Point	abs/inc	Move amount	Velocity	Branch destination	M code
0	0	16000	500	1	3 (M code: 3, output: at point start)
1	0	32000	500	2	15 (M code: 7, output: at point completion)
2	0	0	1000	256	0 (M code output function none)



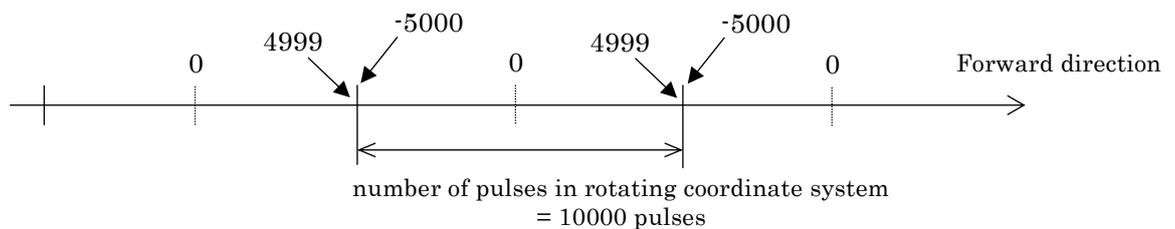
2 – 1 2 . Rotating coordinate system

2 – 1 2 – 1 . Function of rotating coordinate system

If a value other than 0 is set for either parameter N0417 "Rotating coordinate system lower limit" or N0418 "Rotating coordinate system upper limit", the servo driver coordinate system becomes the rotating coordinate system. When positioning by specifying an angle on a rotary table etc., set the number of pulses equivalent to one rotation of the rotary table. In the rotating coordinate system, the "Rotating coordinate system lower limit set value" and the "Rotating coordinate system upper limit set value - 1" are adjacent to each other, and in positioning by the Point-Table, the rotating direction that is the shortest is automatically selected. In addition, the command position and current position is displayed as a value in the range of Rotating coordinate system lower limit ~ Rotating coordinate system upper limit - 1.

Example of rotating coordinate system setting:

Number	Name	Set value
N0417	Rotating coordinate system lower limit	-5000
N0418	Rotating coordinate system upper limit	5000



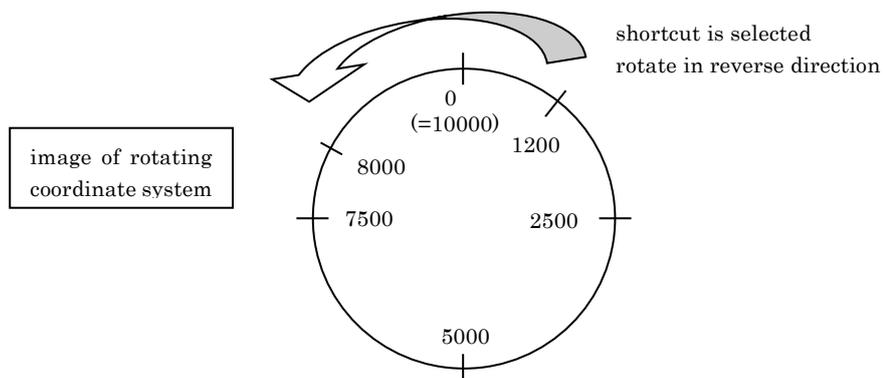
2 – 1 2 – 2 . Example of operation in rotating coordinate system

The following is an example of operation in the rotating coordinate system.

(Set: N0417 "Rotating coordinate system lower limit" = 0; N0418 "Rotating coordinate system upper limit" = 10000)

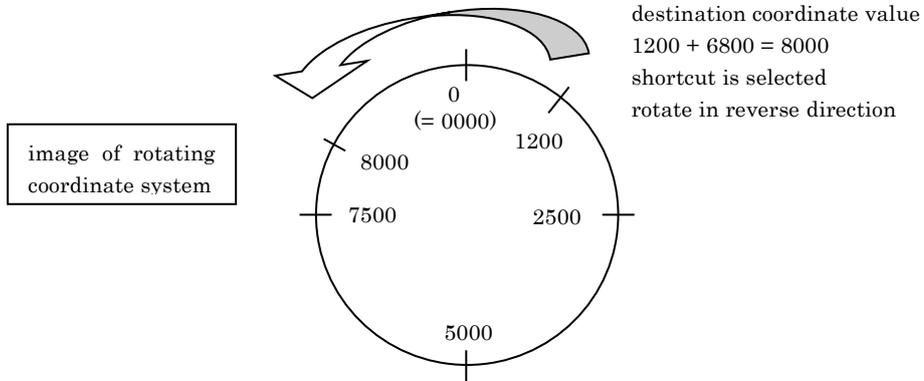
Example 1) Moving from coordinate position 1200 to the Point-Table absolute position 8000

Point	abs/inc	Move amount	Branch destination
0	0	8000	256



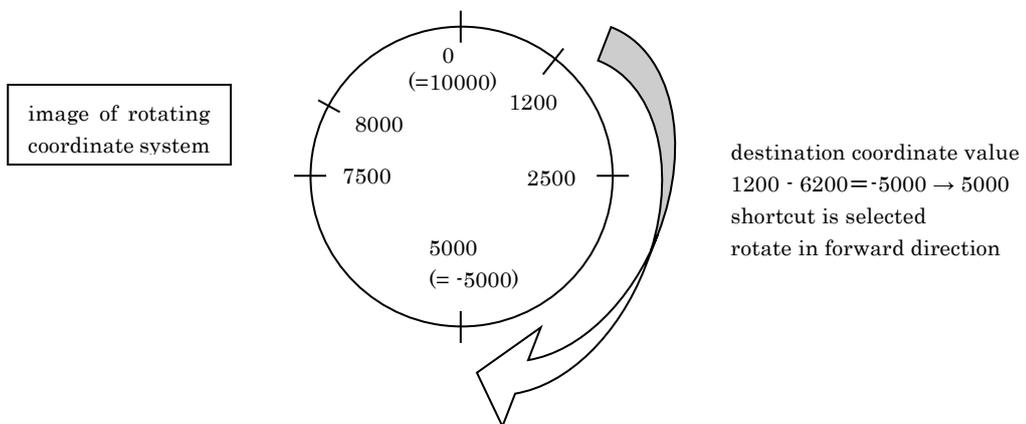
Example 2) Moving from coordinate position 1200 to the Point-Table relative position +6800

Point	abs/inc	Move amount	Branch destination
0	1	6800	256



Example 3) Moving from coordinate position 1200 to the Point-Table relative position -6200

Point	abs/inc	Move amount	Branch destination
0	1	-6200	256



2 – 1 2 – 3 . Precautions when setting the rotating coordinate system

- If move amount is half the circumference of the rotating coordinate system, rotation in reverse direction is selected.
- When rotating coordinate system is set, the setting of software OT is invalid.
- When "Absolute/relative value" item in Point-Table is set to "0" (absolute value), satisfy the condition
 "Rotating coordinate system lower limit" set value \leq "Position/move amount" set value $<$ "Rotating coordinate system upper limit" set value.
- When "Absolute/relative value" item in Point-Table is set to "1" (relative value), satisfy the condition
 ·Number of pulses in rotating coordinate system $<$ "Position/movement amount" set value $<$ Number of pulses in rotating coordinate system
 (Number of pulses in rotating coordinate system = "Rotating coordinate system upper limit" - "Rotating coordinate system lower limit").
 If the value does not fall within this range, movement for the remainder of "Move amount"/"Number of pulses in rotating coordinate system" is performed.
- When rotating coordinate system is set, a shortcut in the rotating coordinate system is always selected. Therefore, moving for more than half the circumference of the rotating coordinate system does not happen.

2 – 1 3 . Other notes

- The Point-Table operates by pre-reading the branch destination point of the point being executed and the branch destination point of that point. Therefore, if the point next to the point currently being executed or the point next to it is rewritten, the point table data before rewriting may still be valid depending on the case, so caution is advised.
- If the amount of movement is extremely small so that the point may be passed before the acceleration/deceleration time set in the branch destination point, the operation with faster acceleration/deceleration than the set acceleration/deceleration time is performed to prevent the specified point position from being exceeded.

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