GTRII

Controller and Teaching Pendant of GTRII, AB Type Model

Operation Manual

2nd Edition

株式会社 ニッセイ
NISSEI CORPORATION

This operation manual is intended for safety use of Teaching Pendant (TP) of Controller for GTR-II,AB type model.

Customers should read this manual and be familiar with the operation of Teaching Pendant before using.

This manual refers to the controller with the ROM after Version 1.0

Confirming the ROM Version Number
ROM Version Number will be indicated in 2 digits on TP for 1 second just after power is on.

Notice

- No part of this document may be reproduced, revised, or transmitted by any form except as may be expressly permitted in writing by Nissei Industries, Ltd.
- Customer shall refer and understand this operation manual to operate the device properly before installation, operation or service.
- Nissei Industries, Ltd. is not liable to the result of customer's exceptional operation or mis-operation.
- This document shall be furnished to the customer who actually uses this device.
- The information contained in this document is subject to change without notice.

Caution

To avoid electric hazard:

- Never touch terminals directly or internal parts of controller.
- Be sure to connect the ground terminal to the earth.
- Ensure that the AC power has been turned off for more than 5 minutes when wiring or inspecting.
- Never hurt, strain and press the cable.

To avoid burning and device trouble:

- Use a motor and a controller in appropriate combination.
- Use a specified genuine part cable for connecting a motor with a controller.
- Never use this device in corrosive circumstances, in water and/or oil splash, in flammable gas or by flammable material.
- Don't carry the device holding its cable.

To avoid scald and injury:

- Never touch motor, controller (driver) and peripherals in operation or just after shutting off the power due to its high temperature.
- Never touch rotating part of motor in operation.
- Shut off power before installation or maintenance.
- Don't touch the keyway of the output shaft or bore with bare hand when carrying.
- Be sure to turn off the power switch when the source accidentally shuts off due to power failure. If the switch not being off, dangerously the machine starts running again just after the recovery of the source.
- When you pull out Teaching Pendant connector from controller, switch the mode into "Monitor Mode" by pressing [MODE].

CONTENTS

GTRII

CONTENTS

CONTENTS

Chapter1

Basics of Controller and TP

■ *Use*

CONTROLLER ..... The device which controls the motor with memorized "Teaching Data."
External Operation can be done by the signal given to controller from PLC and so on.

TP (Teaching Pendant) ..... The hand-operated device provides teaching, editting and setting positioning data in controller.

■ *Notes on External Operation and TEACHING/EDIT*

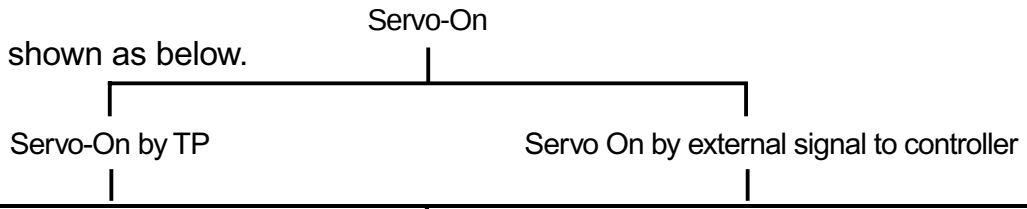
Function Mode will be decided as "External Operation" or "Teaching & Editing"

in accordance with which device turns servo on; Controller or TP.

EXTERNAL OPERATION ... To be enabled when S-ON signal inout on terminal of controller and the motor turns Servo on.

TEACHING/EDIT ..... To be enabled when the controller is switched Servo-On by TP.

Differences are shown as below.



TEACHING/EDIT	EXTERNAL OPERATION
FUNCTION	
teaching, edit and setting data * setting parameters * teaching * confirming position data * monitoring	Proceeds External Operation with stored positioning data in Teaching & Editting.
SERVO ON STATUS	
READY signal output is cancelled.	READY signal output is in progress.
RETURN TO ORIGIN	
Execute Return to Origin selecting the way; No.H0～H7	Returns to Origin by selected way in teaching. The positioning data, which is given in Parameter P5; Preset Group Number, is to be invoked in this case.
STATUS AFTER RETURN TO ORIGIN	
NO TEACHING DATA ACTIVATED You have to invoke an already-stored teaching data for editting.	TEACHING DATA ALREADY INVOKED Ready for External operation.
NOTES	
Do not input any signals into controller to avoid unexpected move. Except for RESET, ORG-IN terminal.	Do not touch any key of TP to avoid unexpected move. Except for [EMER-STOP], [+JOG] key.

■ *Method of Alternating between External Operation and TEACHING/EDIT*

• EXTERNAL OPERATION → TEACHING/EDIT

..... After effecting RESET or turn off the power once, turn servo on with TP.

• TEACHING/EDIT → EXTERNAL OPERATION

..... After effecting EMER-STOP of TP, turn servo on with external signal into controller.

Chapter 2

Getting Started

This chapter shows the basics of operation and also procedure for external operation through step-by-step exercises.

1. Connecting Devices
2. Commanding "Return to Origin" from TP
3. Teaching "Positioning Data"
4. Confirming "Positioning Data"
5. Memorizing "Positioning Data"
6. Commanding "Return to Origin" from Controller
7. External Operation

   #2 ～ 5: Operated by Teaching Pendant (TP)
   #6 ～ 7: Operated by Controller

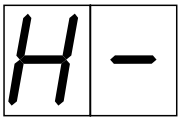
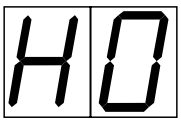
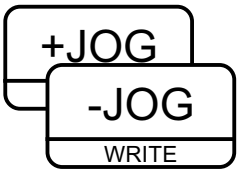
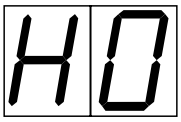
Example:

Following pages explain how to teach a controller about "positioning data" of 3 points for example by TP in order to operate connected motor

Notice:

Group No.0 is supposed to be used in this example. Therefore, use another unregistered group number if this No.0 has already been used for memorizing actual data.

1 Connecting Devices

OPERATION	DISPLAY	NOTES
1 Connecting Devices		
		• Connect controller with motor. • Connect TP with the controller. • Connect AC power cord with the controller. **Notice**: The motor must be fixed on a rigid place for safety.
2 Putting AC power on.		
	●TEACH ●MONITOR ●MAN.PLY ●MEMORY 	• Confirm the power-on LED of controller got lit If not lit, shut off the AC power promptly. Then check up the wiring and the voltage of AC power
3 Switching Servo On/Off		
	●TEACH ●MONITOR ●MAN.PLY ●MEMORY 	• In this "Servo-On" status, when [SHIFT] is pressed, the status will be altered to "Servo-Off".
4 Jogging CW/CCW		
	●TEACH ●MONITOR ●MAN.PLY ●MEMORY 	• Try to check whether [+JOG] and [-JOG] key is valid for revolving motor in cw and ccw direction. If not, check up the wiring.

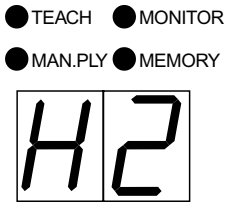
If all things have been done well without any problem to this point, let's forward a step.
When something failed, try again this step from the beginning

2 Commanding "Return to Origin" from TP

OPERATION	DISPLAY	NOTES

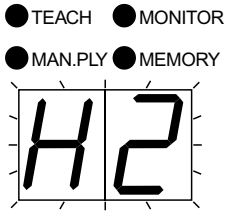
1 Select a kind of "Return to Origin"

You can select a kind of "return to origin". Now, let's select H2 (Sensor, CW).
Notice: In this exercise, prepare a wire for sensor input instead of using a true sensor



- To select a kind of "return to origin", press [SPEED].

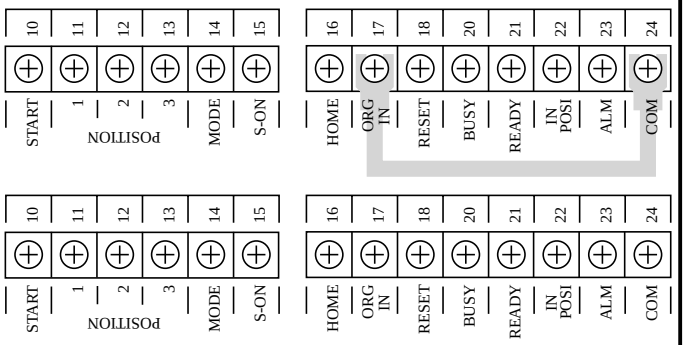
2 Execution of "Return to Origin."



Notice:
In case of operating Slide Base, to avoid striking of work base to the end block of motor, move the work base to opposite direction more than halfway by pressing [-JOG]

- To execute "return to origin", press [ENTER].

3 Inputting Sensing Signal

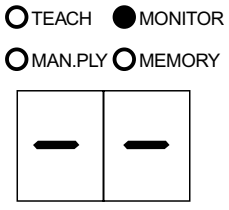


Connect Short

- Connect short between COM(24) and ORGIN(17) with a wire, then release after a few seconds.

Release

4 Completion of "Return to Origin"



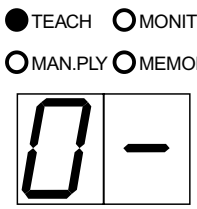
If all things have been done well without any problem to this point, let's forward a step. When something failed, try again this step from the beginning.

3 Teaching "Positioning Data"

OPERATION	DISPLAY	NOTES

1 Entering Mode of Positioning Data

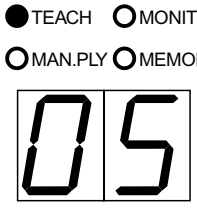
MODE



• Press [MODE] to switch to "TEACH" mode.

2 Setting Speed Number

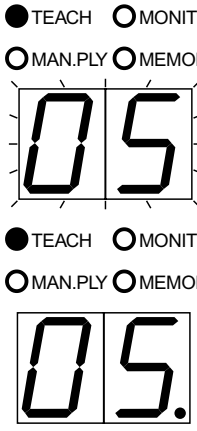
SPEED
EXISTENT



• To select speed number, press [SPEED] required number of times.
Let's select and use speed No.5 (varies 2,000 or 1,500rpm according to its motor type).
This indicates the number of the speed in moving to Point No.0.

3 Storing the Positioning Data of Point No.0 into RAM.

ENTER



• Once [ENTER] is pressed, the position data, the point No. and the speed No. will be stored in RAM as the point data at a time.

While the data is being stored, the indication keeps blinking.

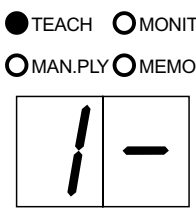
When storing Point Data is completed, a dot on the right below of the digit will be lit.

Notice:
When AC power is switched off or Emergency Stop is done, the stored data will be lost (reset) due to the memory is volatile RAM (Random Access Memory).

OPERATION	DISPLAY	NOTES

4 Select Point No.1

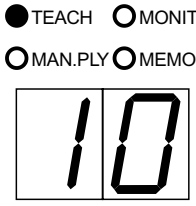
POINT
GROUP No.



- Press [POINT] to select the point No.1.

5 Select Speed Number

SPEED
EXISTENT

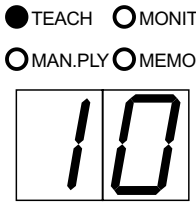


- Press [SPEED] to select a speed number.
  Let's use the speed No.0 (50rpm).

  This digit indicates the speed No. in moving to the point No.1.

6 Directing a Position

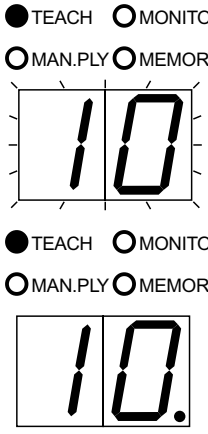
+JOG
-JOG
WRITE



- Move the motor to a required position by [+JOG] or [-JOG] key.

7 Storing the Positioning Data of Point No.1 into RAM

ENTER



- Once [ENTER] key is pressed, the position data, the point No. and the speed No. will be stored in RAM as the point data at a time.

While the data is being stored, the indication keeps blinking.

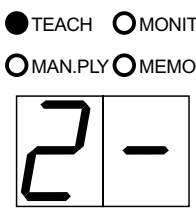
When storing Point Data is completed, a dot will be lit on the right below of the digit.

Notice:
When AC power is switched off or Emergency Stop is done, the stored data will be lost (reset) due to the memory is volatile RAM (Random Access Memory).

OPERATION	DISPLAY	NOTES

8 Select Point No.2

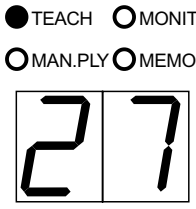
POINT
GROUP No.



- Press [POINT] key to select the point No.2.

9 Select Speed Number

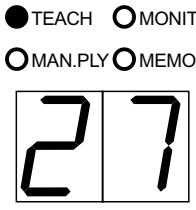
SPEED
EXISTENT



- Press [SPEED] to select a speed number.
  Let's use the speed No.7 (varies 2,000 or 1,500rpm according to its motor type).
  This indicates the number of the speed in moving to Point No.2.

10 Directing a Position

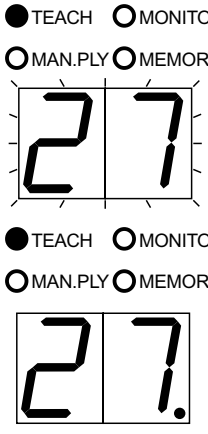
+JOG
-JOG
WRITE



- Move the motor to a required position by [+JOG] or [-JOG] key.

11 Storing the Positioning Data of Point No.2 into RAM

ENTER



- Once [ENTER] key is pressed, the position data, the point No. and the speed No. will be stored in RAM as the point data at a time.

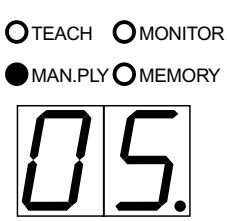
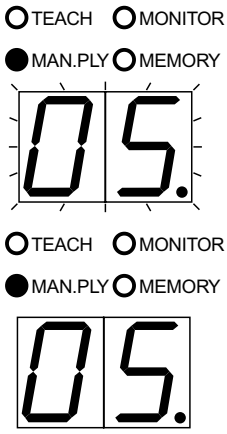
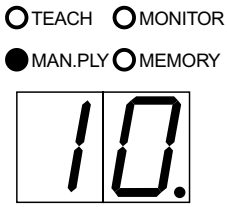
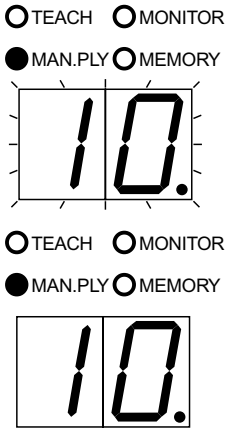
While the data is being stored, the indication keeps blinking.

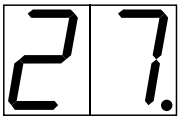
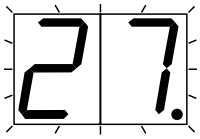
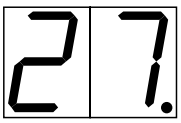
When storing Point Data is completed, a dot will be lit on the right below of the digit.

Notice:
When AC power is switched off or Emergency Stop is done,
the stored data will be lost (reset) due to the memory is volatile RAM
(Random Access Memory).

If all things have been done well without any problem to this point, let's forward a step. When something failed, try again this step from the beginning.

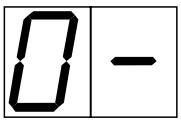
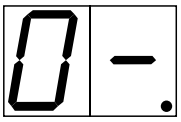
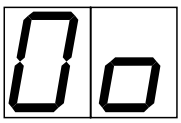
4 Confirming "Positioning Data"

OPERATION	DISPLAY	NOTES
1 "MAN.PLY"(Manual Play) Mode of Stored Teaching Data.		
MODE		• Press [MODE] key to switch to "MANPLY" (confirming) mode.
2 Positioning to the Point No.0		
ENTER		• Once the [ENTER] key is pressed, the motor moves to the point: No.0 in the speed: No.5. While the motor is positioning, the indication keeps blinking. When the positioning is completed, the blinking stops.
3 Switching to the Point No.1		
POINT / GROUP No.		• Press [POINT] to switch to point No.1.
4 Positioning to the point No.1.		
ENTER		• Once the [ENTER] is pressed, the motor moves to the point No.1 in the speed No.0. While the motor is positioning, the indication keeps blinking. After the positioning is completed, the blinking stops.

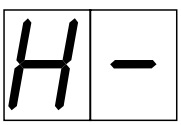
OPERATION	DISPLAY	NOTES
5 Switching to the Point No.2		
POINT GROUP No.	TEACH MONITOR MAN.PLY MEMORY 	• Press [POINT] to switch to point No.2.
6 Positioning to the point No.2.		
ENTER	TEACH MONITOR MAN.PLY MEMORY 	• Once the [ENTER] key is pressed, the motor moves to the point No.2 in the speed No.7. While the motor is positioning, the indication keeps blinking.
	TEACH MONITOR MAN.PLY MEMORY 	When the positioning is completed, the blinking stops.

If all things have been done well without any problem to this point, let's forward a step. When something failed, try again this step from the beginning.

5 Memorizing "Positioning Data"

OPERATION	DISPLAY	NOTES
1 "MEMORY" Mode of Stored Teaching Data.		
MODE	○TEACH ○MONITOR ○MAN.PLY ●MEMORY 	• Press [MODE] to switch to "MEMORY" mode.
2 Select "WRITE"		
-JOG WRITE	○TEACH ○MONITOR ○MAN.PLY ●MEMORY 	• Press [-JOG] (WRITE) key to select "WRITE". (In this sample, group No.0 is selected.)
3 Writing Teaching Data		
ENTER	○TEACH ○MONITOR ○MAN.PLY ●MEMORY 	• Once [ENTER] key is pressed, the teaching data will be stored in the group No.0 of EEPROM.

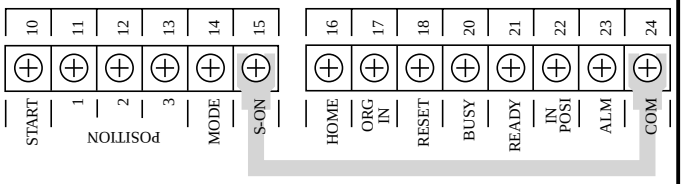
Now the teaching by TP has been completed.
Let's operate the motor using the teaching data with a controller.
When something failed, try again from the step 1.

4 Release the TP Accessing		
EMER STOP	●TEACH ●MONITOR ●MAN.PLY ●MEMORY 	• When the [EMER/STOP] is pressed, the status will get back as same as just after powered on.

6 Commanding "Return to Origin" from Controller

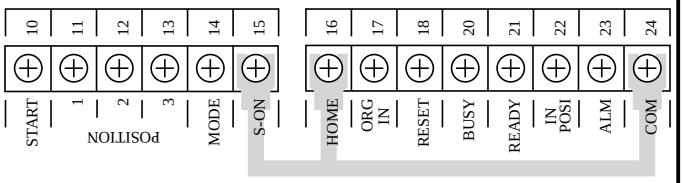
CONNECTING SEQUENCE	NOTES

1 Switching Servo On



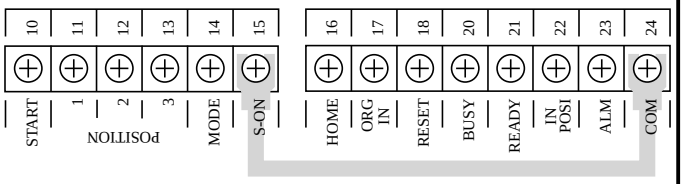
- Connect short between COM(24) and S-ON(15) with a wire.

2 Execution of "Return to Origin."

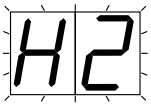


Connect Short

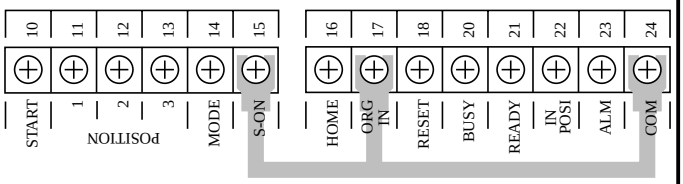
- Connect short between COM(24) and HOME(16) with a wire, then release after a few seconds.



Release

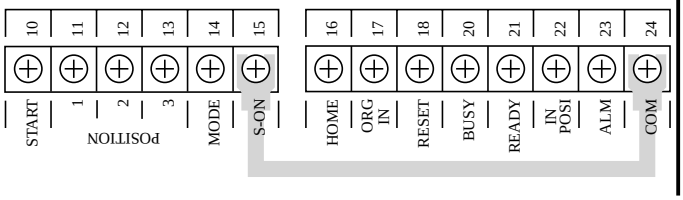


3 Inputting Sensing Signal

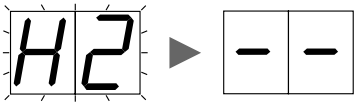


Connect Short

- Connect short between COM(24) and ORGIN(17) with a wire, then release after a few seconds.



Release



If all things have been done well without any problem to this point, let's forward a step. When something failed, try again this step from the beginning.

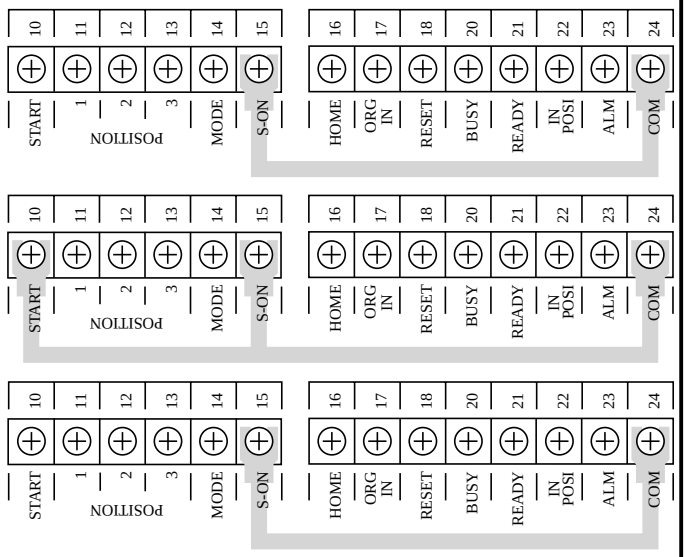
7 External Operation

Now three positioning data are stored in group No.0.

The terminal operation to move to each point is shown as follows:

CONNECTING SEQUENCE	NOTES

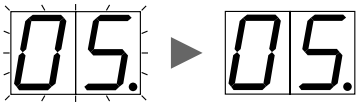
0 Moving to the position No.0.



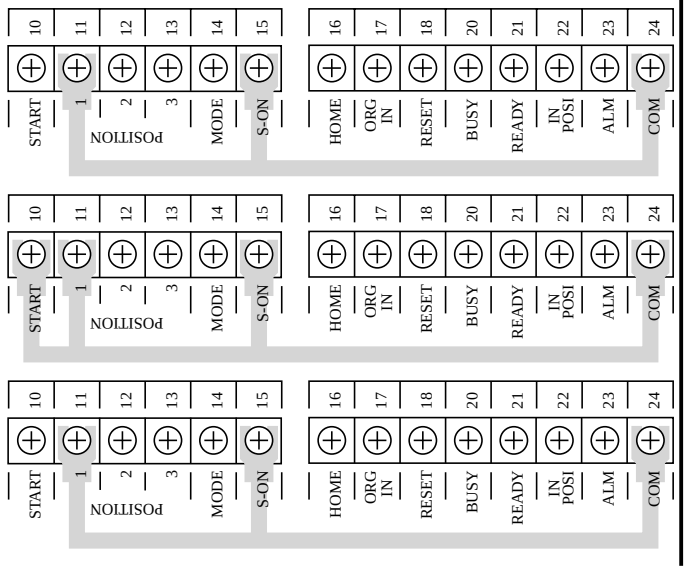
Connect Short

- Connect short between COM(24) and START(10) with a wire, then release after a few seconds.

Release



0 Moving to the position No.1.

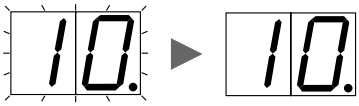


- Connect short between COM(24) and POSITION1(11) with a wire.

Connect Short

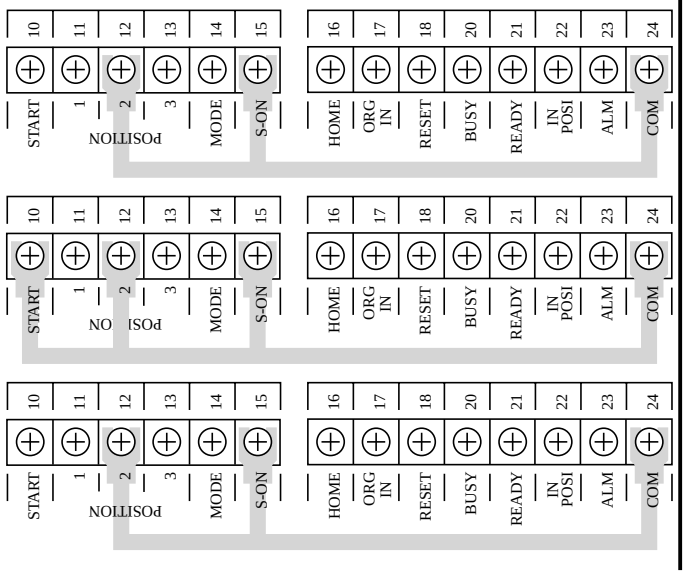
- Connect short between COM(24) and START(10) with a wire, then release after a few seconds.

Release



CONNECTING SEQUENCE	NOTES

0 Moving to the position No.2.

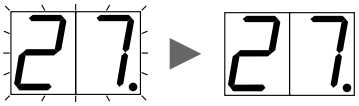


• Connect short between COM(24) and POSITION2(12) with a wire.

Connect Short

• Connect short between COM(24) and START(10) with a wire, then release after a few seconds.

Release



And there is the end of Chapter.2 "Getting Started".
Could you understand the basics of operation and also procedure for external operation through this step-by-step exercises?
Please try again the exercises to the point of full understanding.
Try to increase the points and edit stored data by yourself for your own exercise.
See Chapter 4. "Teaching Pendant" when you try to operate arbitrarily.

Chapter 3

Controller

This chapter describes specifications and functions of controller with timing chart.

1. Specifications
2. Timing Charts
3. Monitoring under External Operation

1 Specifications

■ *Basic Specifications*

SERIES	S·V		V	S	V			VR	
Motor's Output Power [W]	25·40	50·80	100	150	200	400	750	80	300
Short-time Rated Output [W]	–							80	300
Continuous Rated Output [W]	–							50	200
Voltage	Single-phase 200~220V ±10%								
Frequency	50Hz/60Hz								
Current	0.37	1.0	1.2	1.6	2.0	4.0	5.7	1.2	3.0
Encoder Feedback Pulse Rate [P/R]	300		400					300	400
Extensible Length between Motor and Control	30m								
Ambient Temperature	0~40℃								
Ambient Humidity	85% maximum (non condensing)								
Protection against Noise	**1500V 1μs**								

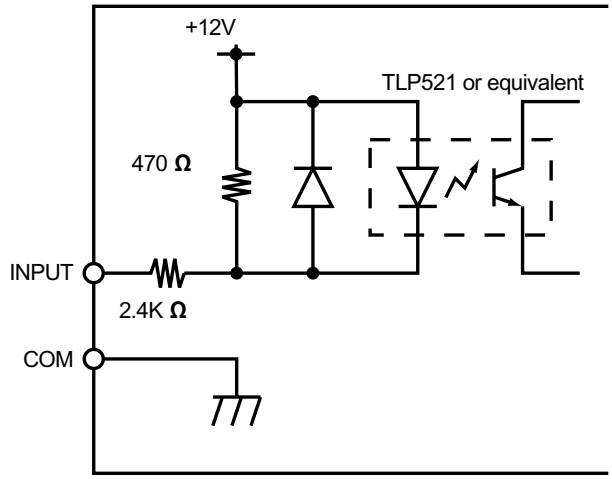
■ *Controller Specifications*

Motor Control System	Positioning Control Method	P.T.P. Semi-closed-loop
	Position Detection System	Incremental Encoder
	Return to Origin	Locking Stop and Sensor Stop
	Speed Selections	8 levels
	Acceleration/Deceleration Rate Selections	8 levels (0.06 sec~8 sec)
	Capacity of Positioning Data Stored	48 points by absolute/incremental (8 points x 6 groups)
	Teaching Method	Teaching Playback
	Data Storage	EEPROM
Input/Output Signals	System Input	9 Signals (Start/Stop, 3 Position-Select, Operation Mode, Servo On/Off, Home, Origin-Sensor, Reset)
	System Output	4 Signals (Busy, Ready, Positioning Completion, Alarm)
	Monitoring	Encoder's Phase A, B, Z Output (Open Collector Output)
Protection Functions	Alarm Items	Over Load, Over/Under-Voltage, Excessive Regeneration, Overheat Over Flow, Overcurrent, Error of Encoder or Pole Sensor, Malfunction of Command Pulses or CPU

■ *Input Circuits*

Input Signals	by Switch or NPN-Open Collector
On-Current	5mA or more
Off-Leak Current	1mA or less
On-Voltage	1.5V or more
Off-Voltage	From 9V to 12V

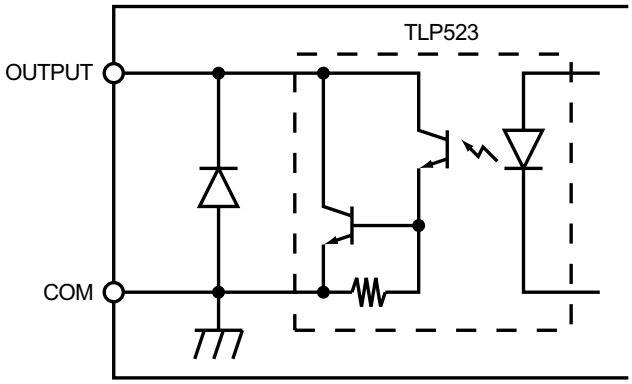
TERMINAL No.	SIGNAL NAME
10	START
11～13	POSITION1,2,3
14	MODE
15	S-ON
16	HOME
17	ORG-IN
18	RESET



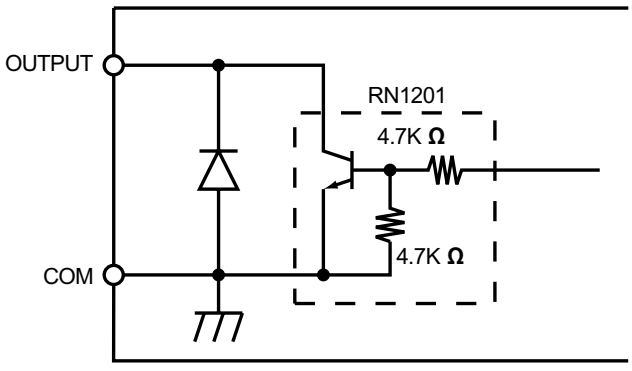
■ *Output Circuits*

Output Signals	NPN-Open Collector
Maximum Voltage Loaded	30V
Maximum Current Loaded	20mA

TERMINAL No.	SIGNAL NAME
20	BUSY
21	READY
22	IN-POSI



TERMINAL No.	SIGNAL NAME
23	ALM
30	AP
31	BP
32	ZP



■ *Descriptions of Operating Modes and Functions*

The controller has two basic operation modes and many functions as below. Many useful functions offer the best operation for your application.

- ***Speed Servo Mode***

  This mode offers speed control, which keep speed as instructed at any load.

- ***Positioning Servo Mode***

  This mode offers positioning control, particularly suited for Point-To-Point control.

NOTE: The mode is exclusive and decided by parameter. Can't be changed under operation.

- Descriptions of Functions for Positioning Servo Mode

Return to Origin (HOME Command)

When executed, motor detects the mechanical home position: *origin* for positioning control.

Random Operation

Moving to the position instructed by POSITION-SELECT at every time of START command.

Sequential Operation

Moving to the position in numerical order of positioning data automatically as like #0,1,2,...,7,0,... by every START command.

JOG Function

Let the motor run at the speed instructed by parameter beforehand when motor in servo on.

Instantaneous Hold

Whenever the motor runs under Random or Sequential Operation, the function offers INSTANTANEOUS HOLD of motor on the way to to the required point.
Moreover, when resume, CONTINUOUS MOVE or CANCELL MOVE is optional.

ex. After INSTANTANEOUS HOLD when the motor on the way to Point2

CONTINUOUS MOVE - restart moving to Point2 that was interrupted
CANCEL MOVE - canceled positioning to Point2 and hold there

NOTE: In SEQUENTIAL OPERATION, the motor will run to the next position in number when INSTANTANEOUS HOLD and CANCEL MOVE effected and then input START newly.

External Change of Group of Position Data

This function offers to invoke any group of positioning data as request.

Output Number of Current Positioning Data Group

This function offers to output and monitor the number of current positioning data group.

Releasing Brake

When motor is Servo-Off, the electromagnetic brake can be released, allowing the motor shaft to be turned by external force. This function is for the model with brake only.

■ *Table of Control Commands and Input Signals*

• Positioning Servo Mode

COMMAND		IMPLEMENTED			
		in SERVO OFF	in SERVO ON		under INSTANTANEOUS HOLDED
			BEFORE EXECUT HOME	AFTER HOME EXECUTED	
RESET CONTROLLER		✓	✓	✓	✓
EMRGENCY STOP		✓	✓	✓	✓
SERVO OFF			✓	✓	✓
SERVO ON		✓			
HOME -Return to Origin			✓		
RANDOM OPERATION	MOVE to POSITION 0			✓	
	MOVE to POSITION 1			✓	
	MOVE to POSITION 2			✓	
	MOVE to POSITION 3			✓	
	MOVE to POSITION 4			✓	
	MOVE to POSITION 5			✓	
	MOVE to POSITION 6			✓	
	MOVE to POSITION 7			✓	
SEQUENTIAL OPERATION				✓	
JOG	CW		✓	✓	
	CCW		✓	✓	
	not move				
INSTANTANEOUS HOLD				✓	
*2 RESUME AFTER INSTANTANEOUS HOLD	CONTINUOUS MOVE			✓	✓
	CANCELL MOVE			✓	✓
*3 EXTERNAL CHANGE OF POSITIONING DATA GROUP	to GROUP 0	✓		✓	
	to GROUP 1	✓		✓	
	to GROUP 2	✓		✓	
	to GROUP 3	✓		✓	
	to GROUP 4	✓		✓	
	to GROUP 5	✓		✓	
RELEASING BRAKE		✓			
OUTPUT NUMBER OF CURRENT POSITIONING DATA GROUP		✓		✓	

*1 For details, see TIMING CHART of INSTANTANEOUS HOLD in Chapter 3, 3.

*2 Parameter 9 of EXTERNAL CHANGE OF POSITIONING DATA GROUP must be as "enabled."

NOTIC: The functions of a terminal are multiple. Pay attention when give and clear signals.

INPUT TERMINAL No. & INDICATOR								
18	17	16	15	14	13	12	11	10
RESET	ORG IN	HOME	S-ON	MODE	POSITION			START
					3	2	1	
↑	-	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-
0	-	-	0	-	-	-	-	-
0	-	-	1	-	-	-	-	-
0	*1 -	↓	1	-	-	-	-	-
0	-	0	1	0	0	0	0	↓
0	-	0	1	0	0	0	1	↓
0	-	0	1	0	0	1	0	↓
0	-	0	1	0	0	1	1	↓
0	-	0	1	0	1	0	0	↓
0	-	0	1	0	1	0	1	↓
0	-	0	1	0	1	1	0	↓
0	-	0	1	0	1	1	1	↓
0	-	0	1	1	0	0	0	↓
0	-	0	1	1	-	0	1	1
0	-	0	1	1	-	1	0	1
0	-	0	1	1	-	1	1	-
0	-	0	1	1	1	-	-	-
0	-	0	1	One or both must be '0'		-	-	1
0	-	0	1			-	-	0
0	-	↓	-	-	0	0	0	-
0	-	↓	-	-	0	0	1	-
0	-	↓	-	-	0	1	0	-
0	-	↓	-	-	0	1	1	-
0	-	↓	-	-	1	0	0	-
0	-	↓	-	-	1	0	1	-
0	-	1	-	-	1	1	0	-
0	-	1	-	-	1	1	1	-

	OUTPUT TERMINAL No.		
POSITIONNIG DATA GROUP	22	21	20
	IN POSI	READY	BUSY
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1

Don't care -

*3 Used for Origin input terminal when return to origin by H2, H3,H6 or H7 method.

0 : open (disconnect from COM)

1 : drop to L level (connect to COM)

is terminal to execute the command.

• Speed Servo Mode

COMMAND			IMPLEMENTED	
			in SERVO OFF	in SERVO ON
RESET CONTROLLER			✓	✓
EMRGENCY STOP			✓	✓
RELEASING BRAKE			✓	
START	CW	fixed value No.0		✓
		fixed value No.1		✓
		fixed value No.2		✓
		fixed value No.3		✓
		fixed value No.4		✓
		fixed value No.5		✓
		fixed value No.6		✓
		fixed value No.7		✓
	CCW	fixed value No.0		✓
		fixed value No.1		✓
		fixed value No.2		✓
		fixed value No.3		✓
		fixed value No.4		✓
		fixed value No.5		✓
		fixed value No.6		✓
		fixed value No.7		✓
	CW	User Set value No.0		✓
		User Set value No.1		✓
		User Set value No.2		✓
		User Set value No.3		✓
		User Set value No.4		✓
		User Set value No.5		✓
		User Set value No.6		✓
		User Set value No.7		✓
	CCW	User Set value No.0		✓
		User Set value No.1		✓
		User Set value No.2		✓
		User Set value No.3		✓
		User Set value No.4		✓
		User Set value No.5		✓
		User Set value No.6		✓
		User Set value No.7		✓

INPUT TERMINAL No. & INDICATOR								
18	17	16	15	14	13	12	11	10
RESET	ORG IN	HOME	S-ON	MODE	POSITION			START
					3	2	1	
⌐↑	-	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-
0	1	-	0	-	-	-	-	-
0	0	0	1	0	0	0	0	1
0	0	0	1	0	0	0	1	1
0	0	0	1	0	0	1	0	1
0	0	0	1	0	0	1	1	1
0	0	0	1	0	1	0	0	1
0	0	0	1	0	1	0	1	1
0	0	0	1	0	1	1	0	1
0	0	0	1	0	1	1	1	1
0	0	0	1	1	0	0	0	1
0	0	0	1	1	0	0	1	1
0	0	0	1	1	0	1	0	1
0	0	0	1	1	0	1	1	1
0	0	0	1	1	1	0	0	1
0	0	0	1	1	1	0	1	1
0	0	0	1	1	1	1	0	1
0	0	0	1	1	1	1	1	1
0	0	1	1	0	0	0	0	1
0	0	1	1	0	0	0	1	1
0	0	1	1	0	0	1	0	1
0	0	1	1	0	0	1	1	1
0	0	1	1	0	1	0	0	1
0	0	1	1	0	1	0	1	1
0	0	1	1	0	1	1	0	1
0	0	1	1	0	1	1	1	1
0	0	1	1	1	0	0	0	1
0	0	1	1	1	0	0	1	1
0	0	1	1	1	0	1	0	1
0	0	1	1	1	0	1	1	1
0	0	1	1	1	1	0	0	1
0	0	1	1	1	1	0	1	1
0	0	1	1	1	1	1	0	1
0	0	1	1	1	1	1	1	1

Don't care -

⌐‾‾‾‾ 0 : open (disconnect from COM)

⌐__ 1 : drop to L level (connect to COM)

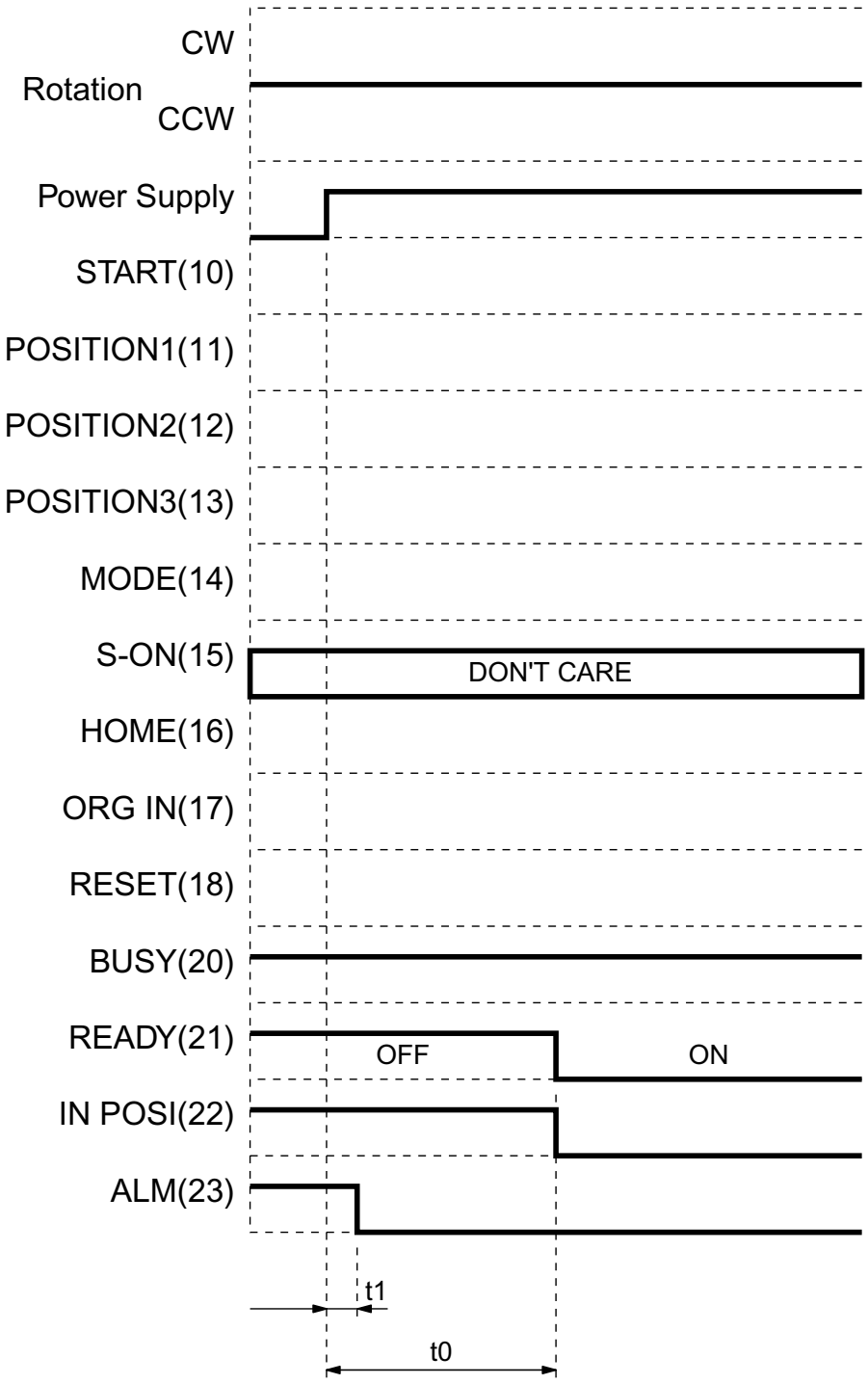
 is terminal to execute the command.

2 Timing Charts

Here described the followings functions with Timing Charts.

- Supplying Power & Servo-On
- Emergency Stop & Reset
- Reset Alarm
- JOG
- Return to Origin (ZP captured)
- Return to Origin (ZP neglected)
- Positioning Servo Mode (Sequential Operation)
- Positioning Servo Mode (Random Operation)
- Instantaneous Hold (Continuous Move)
- Instantaneous Hold (Cancel Move)
- External Change of Positioning Data Group (after HOME)
- External Change of Positioning Data Group (before HOME)
- Output Number of current Positioning Data Group
- Release Brake when Positioning Servo Mode
- Speed Servo Mode (at speed of fixed value)
- Speed Servo Mode (at speed of set value)
- Release Brake when Speed Servo Mode

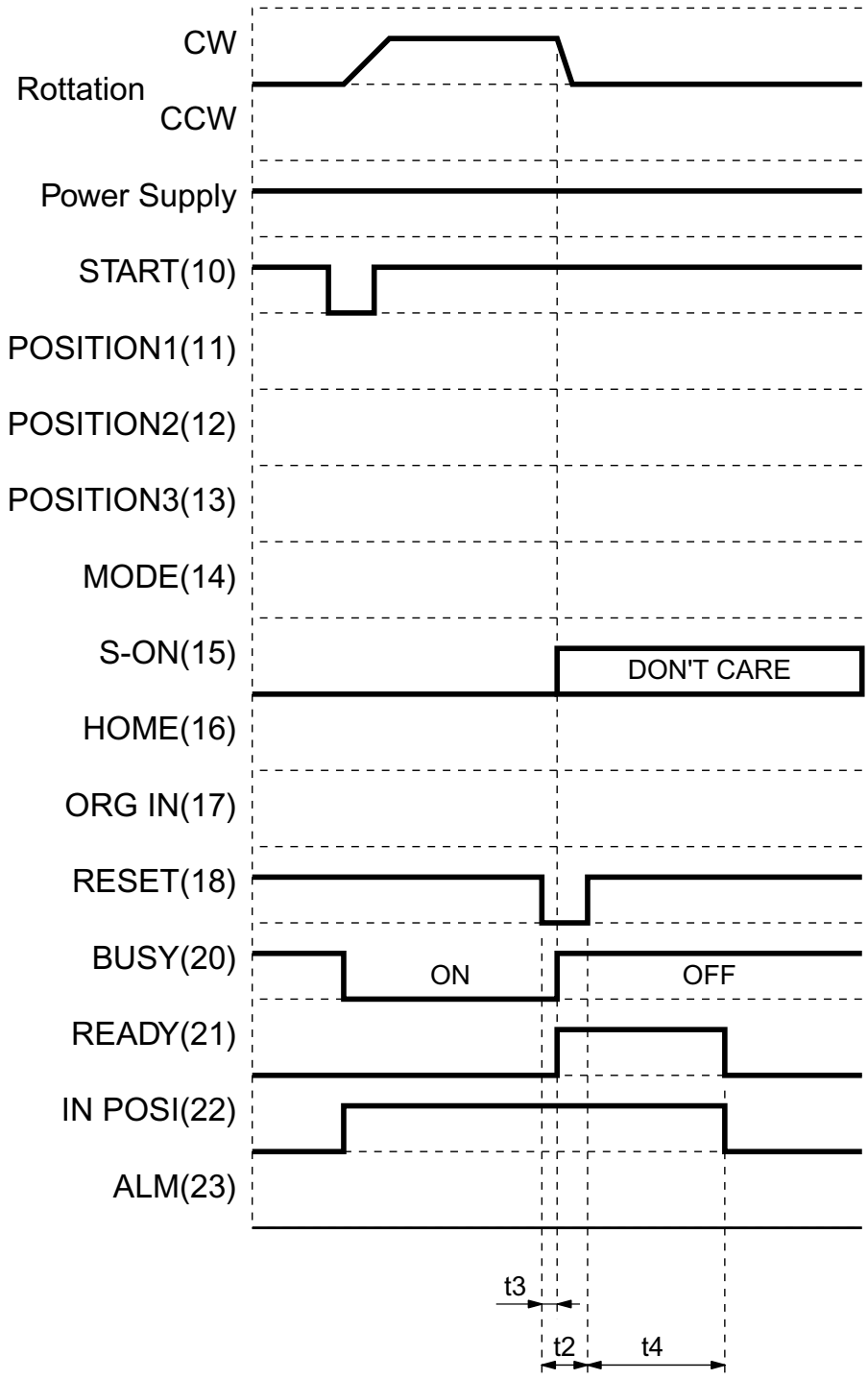
■ *Supplying Power & Servo-On*



t0 = 2sec or less Time between power supplying and READY output.
t1 = 10msec or less Time between power supplying and ALM canceled

Note1: Not interfered whether S-ON input activated before power supply or not.

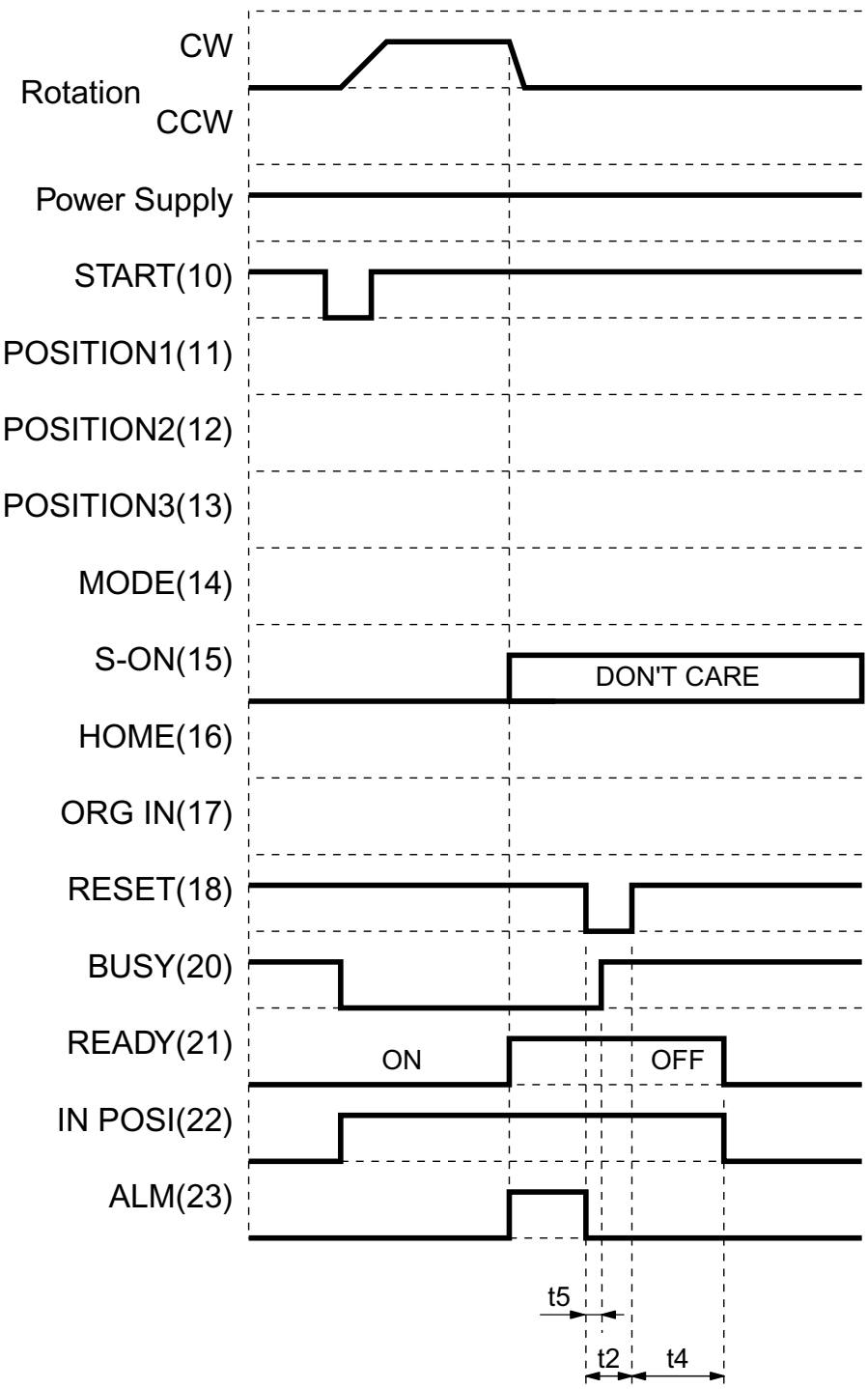
■ *Emergency Stop & Reset*



t2 = 10msec or more RESET (Emergency Stop) signal must be input as a single pulse of 't2.'
t3 = 5msec or less Time between RESET input and READY output
t4 = 2sec or less Time between canceling RESET input and READY output

Note1: The motor turns servo off during RESET output activated regardless of S-ON input.
Note2: In the case of using RESET input for emergency stop, for safety, S-ON input should be canceled before RESET input canceled.

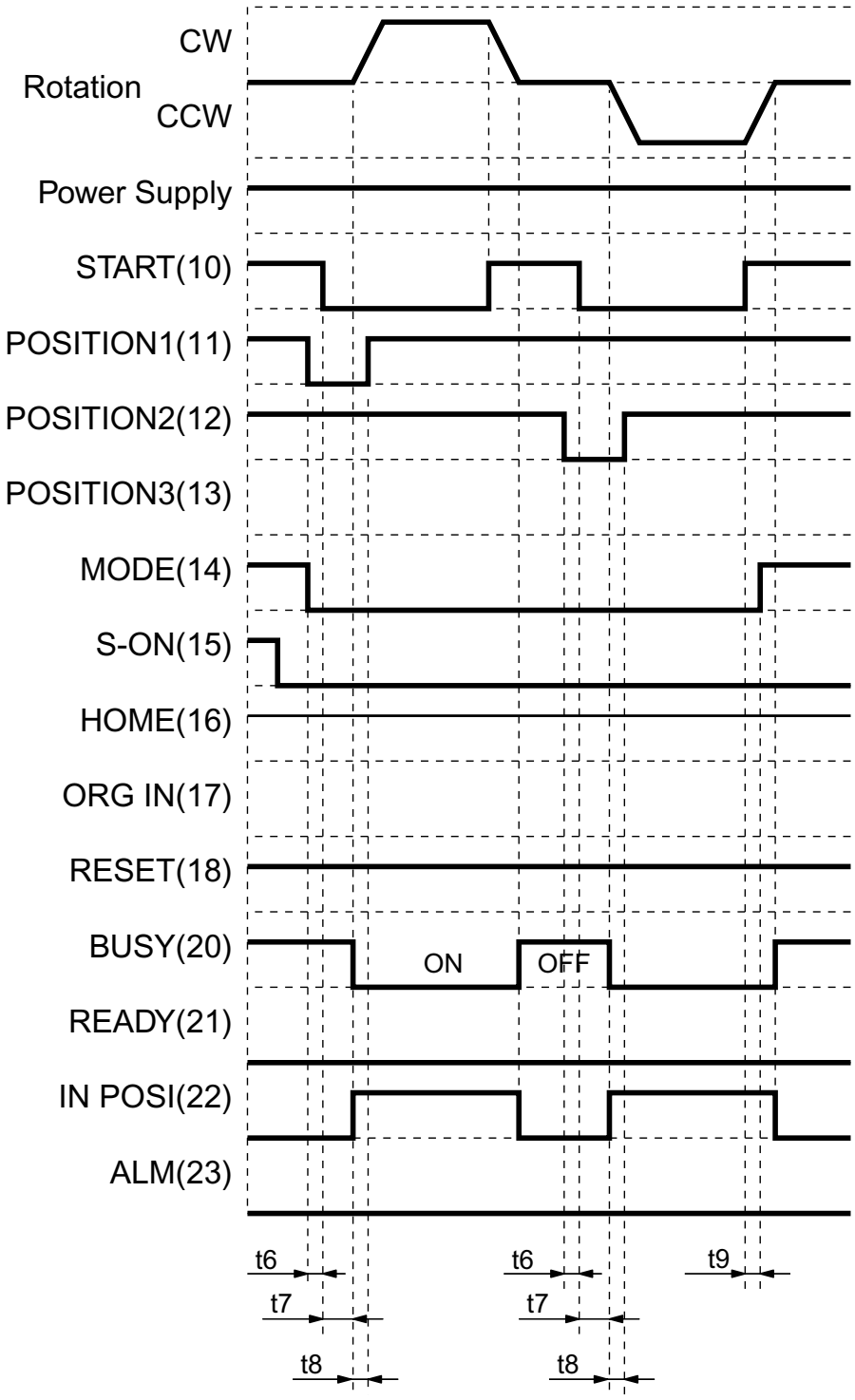
■ *Reset ALARM*



t2 = 10msec or more RESET (Emergency Stop) signal must be input as a single pulse of 't2.'
t4 = 2sec or less Time between canceling RESET input and READY output
t5 = 5msec or less Time between RESET input and BUSY output canceled

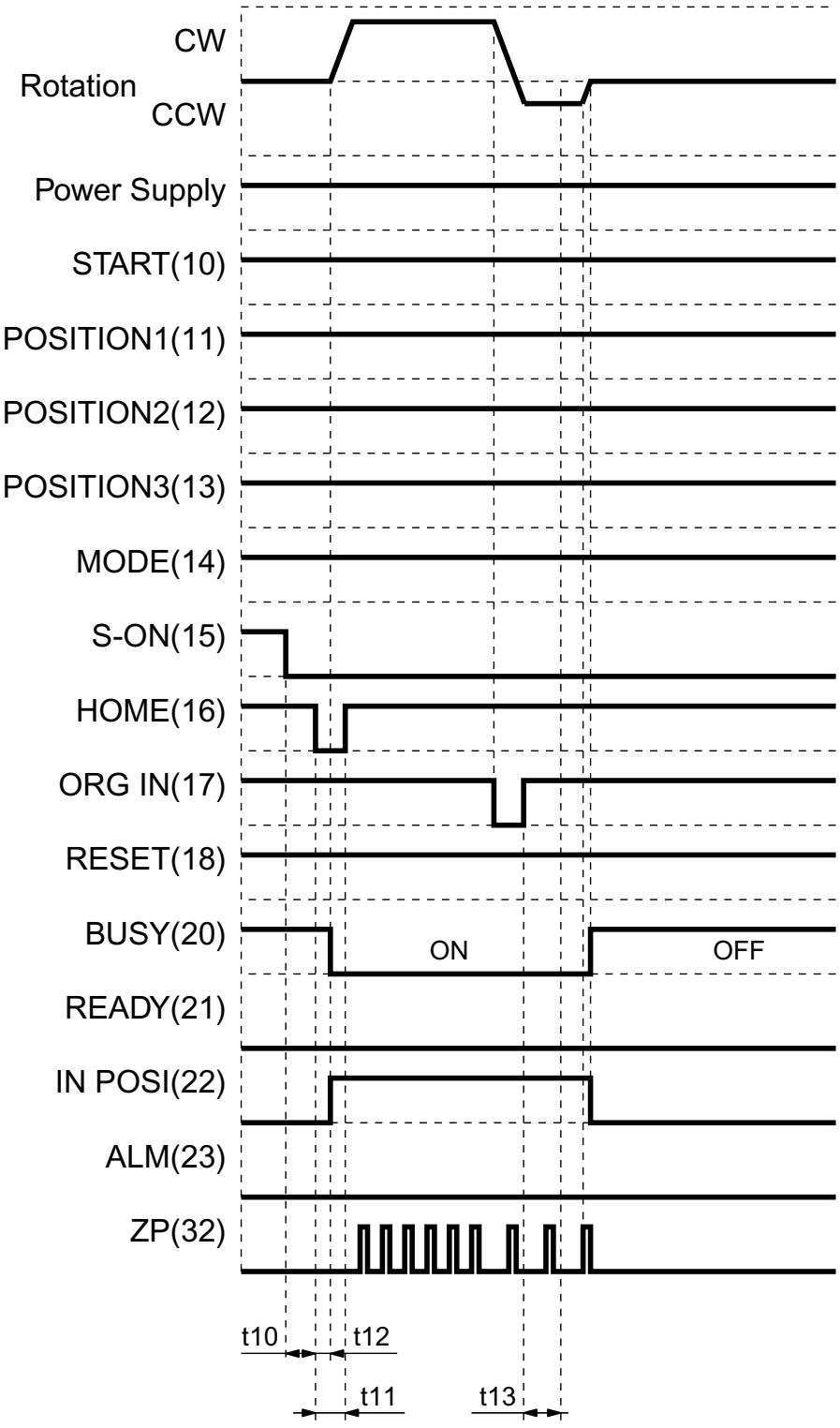
Note1: The motor turns servo off during ALM output activated by the problem regardless of S-ON input.
Note2: For safety, S-ON input should be canceled after canceling ALM output.

■ *JOG*



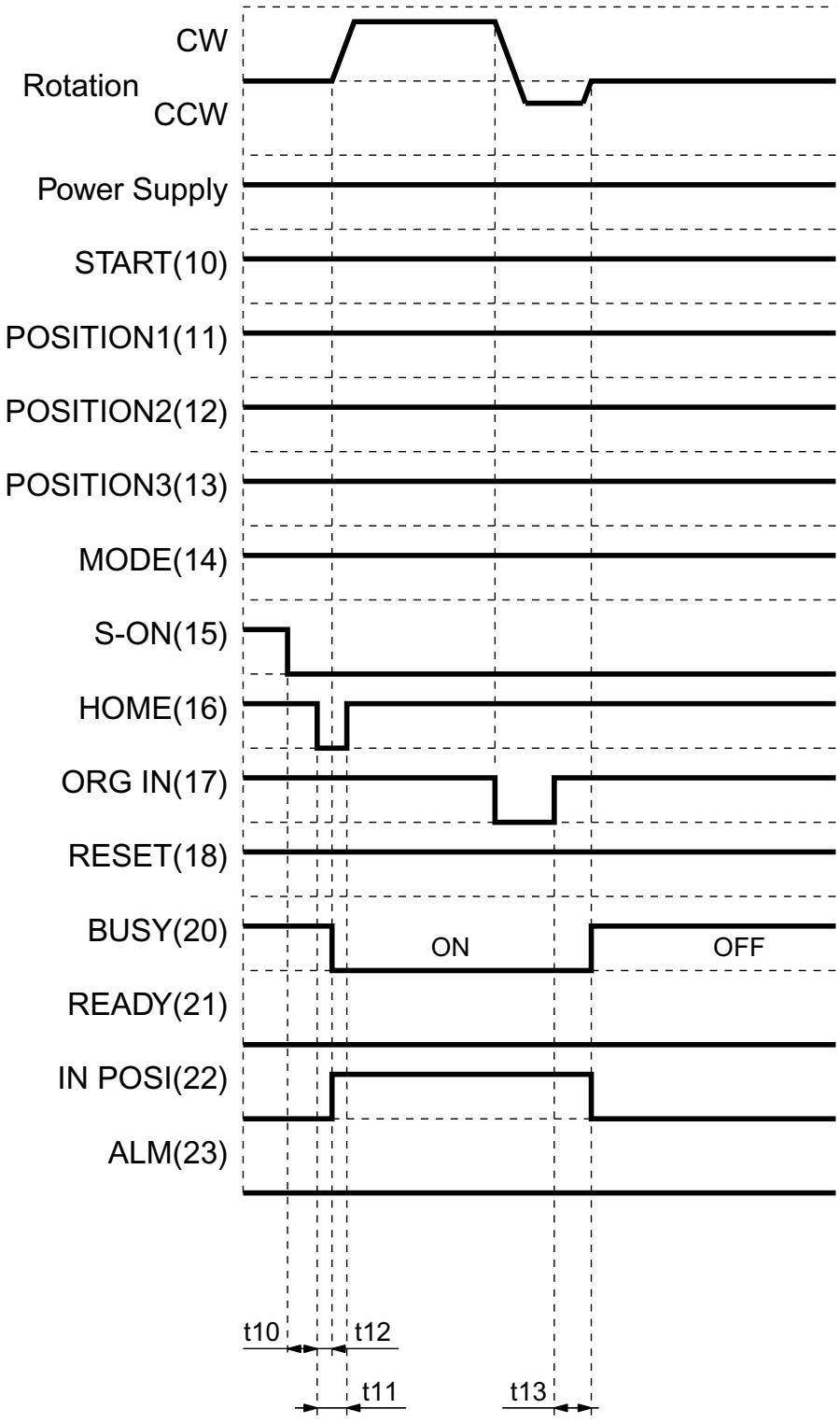
t6 = 0msec or more — The time must be elapsed from MODE input to START input.
t7 = set value — The time filtered off from a pulse width of START input signal according to the Parameter P3, 30msec is factory setting.
t8 = 0msec or more — The time must be elapsed from BUSY output to CW/CCW input canceled.
t9 = 0msec or more — The time must be elapsed from START canceled to MODE input canceled.

■ *Return to Origin (ZP captured)*



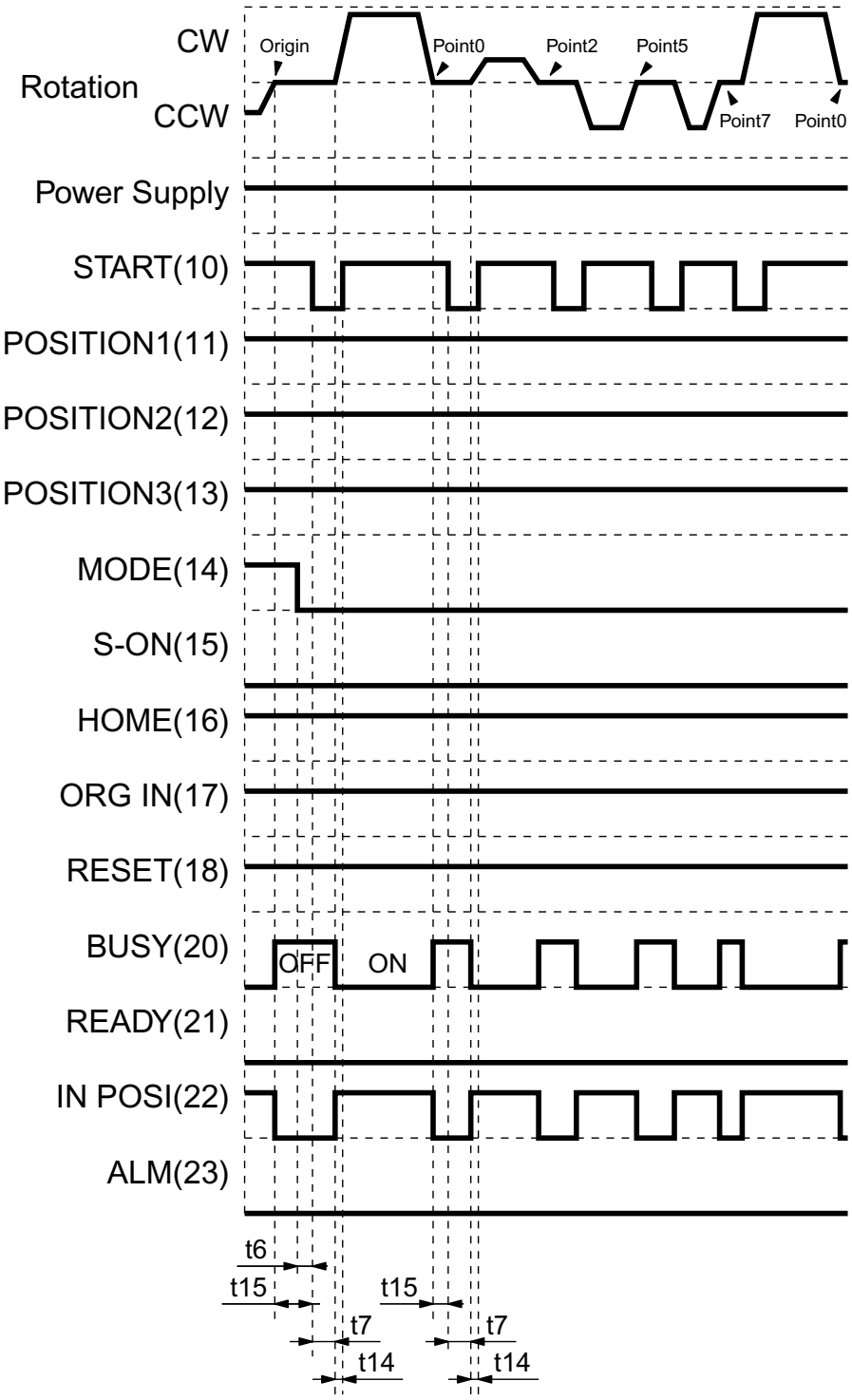
t10 = 30msec or more The time must be elapsed from S-ON input to HOME (Return to Origin) input.
t11 = 10msec or more HOME (Return to Origin) signal must be input as a single pulse of 't11.'
t12 = 15msec or less Time between HOME (Return to Origin) input and BUSY output

■ *Return to Origin (ZP neglected)*



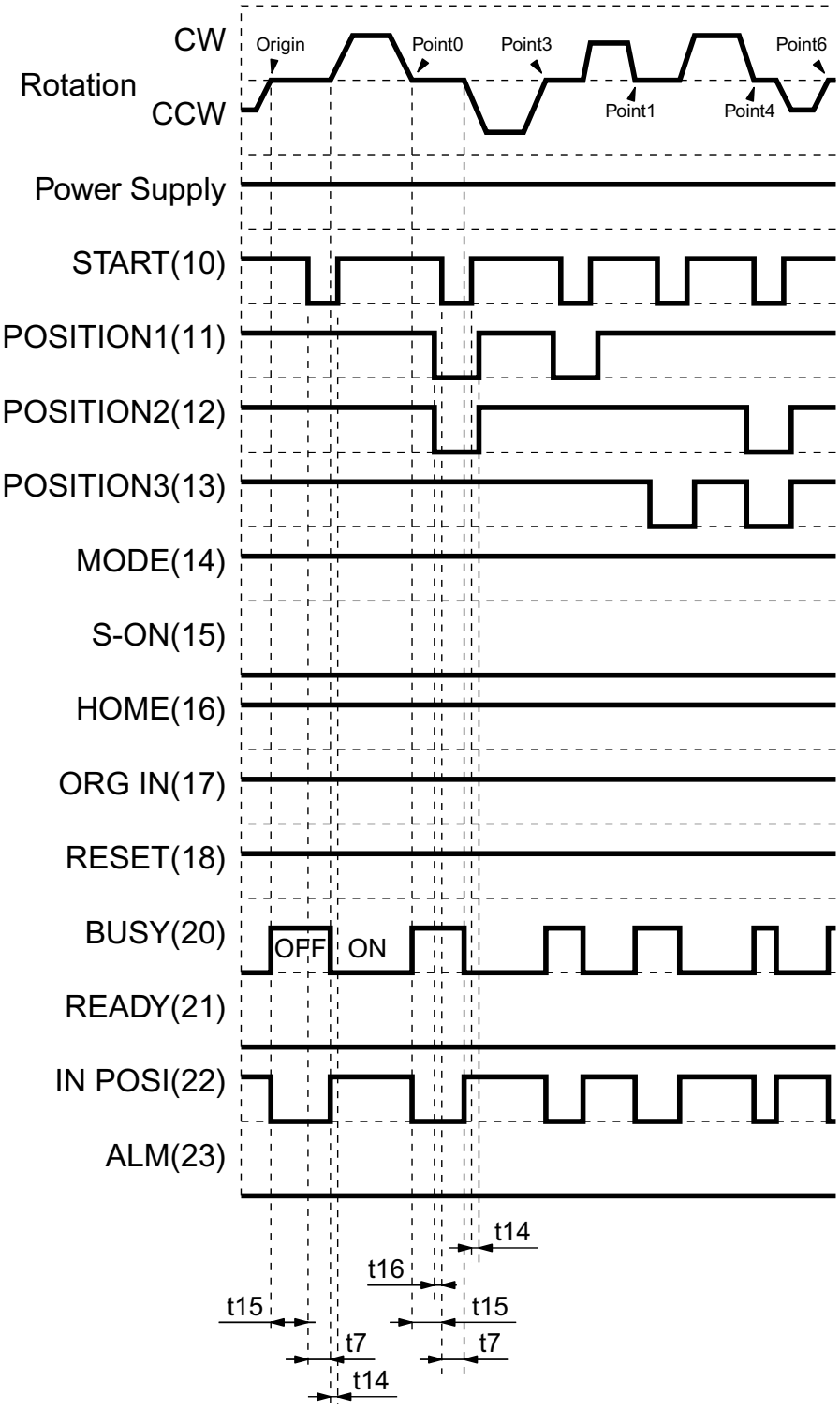
t10	= 30msec or more	The time must be elapsed from S-ON input to HOME (Return to Origin) input.
t11	= 10msec or more	HOME (Return to Origin) signal must be input as a single pulse of 't11.'
t12	= 15msec or less	Time between HOME (Return to Origin) input and BUSY output
t13	= set value 'α'	The time to travel for value 'α' in spite of ORG-IN turned off after ORG-IN input and reversing rotation. The factory setting of α is 123 pulses.

■ *Positioning Servo Mode (Sequential Operation)*



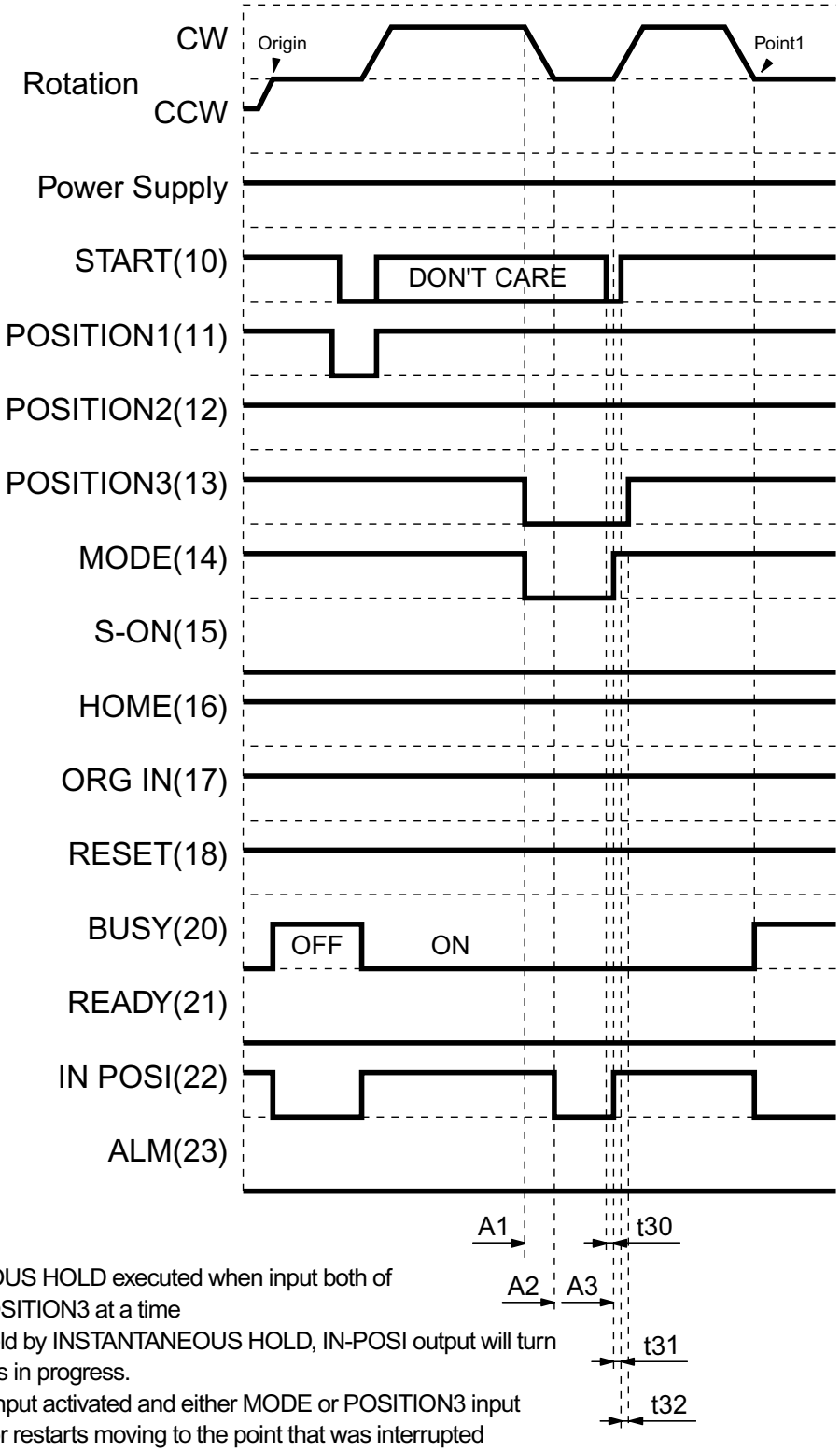
t6 = 0msec or more	The time must be elapsed from MODE input to START input.
t7 = set value	The time filtered off from a pulse width of START input according to the Parameter P3, 30msec is the factory setting.
t14 = 0msec or more	The time must be elapsed from BUSY output to START input canceled.
t15 = 50msec or more	The time must be elapsed from IN-POSI output to START input for the next position.

■ *Positioning Servo Mode (Random Operation)*



t7 = set value	The time filtered off from a pulse width of START input signal according to the Parameter P3, 30msec is the factory setting.
t14 = 0msec or more	The time must be elapsed from BUSY output to START input canceled.
t15 = 50msec or more	The time must be elapsed from IN-POSI output to START input for the next position.
t16 = 0msec or more	The time must be elapsed from POSITION input to START input.
t17 = 0msec or more	The time must be elapsed from START input canceled to POSITION input canceled.

■ *Instantaneous Hold (Continuous Move)*



A1: INSTANTANEOUS HOLD executed when input both of MODE and POSITION3 at a time

A2: When motor held by INSTANTANEOUS HOLD, IN-POSI output will turn on and BUSY is in progress.

A3: When START input activated and either MODE or POSITION3 input canceled, motor restarts moving to the point that was interrupted (CONTINUOUS MOVE). The IN-POSI output will be canceled then.

t30 = 0msec or more — The time START input should be in progress before either MODE or POSITION3 input canceled for CONTINUOUS MOVE.

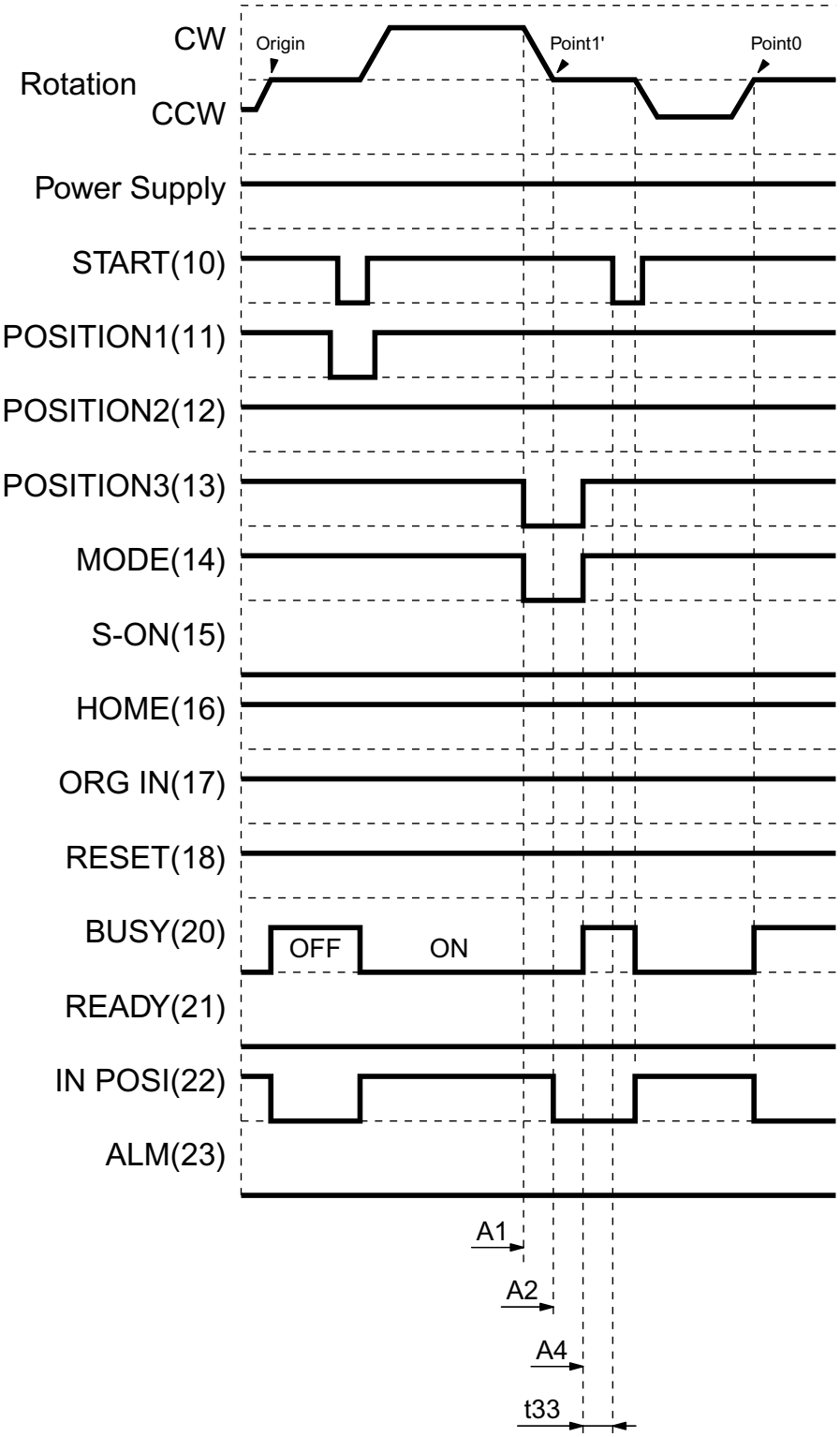
t31 = 0msec or more — The time must be elapsed from IN-POSI output canceled to START input canceled.

t32 = 0msec or more — The time must be elapsed from START input canceled to POSITION input canceled.

Note1: If both of MODE and POSITION3 input canceled with START canceling in the state of 'A2' above, START input don't effect CONTINUOUS MOVE.

Note2: When motor is decelerating to the instructed position, INSTANTANEOUS HOLD command isn't acceptable. Checking the logical product of MODE by POSITION3, BUSY and IN-POSI can confirm the state, under INSTANTANEOUS HOLD or not.

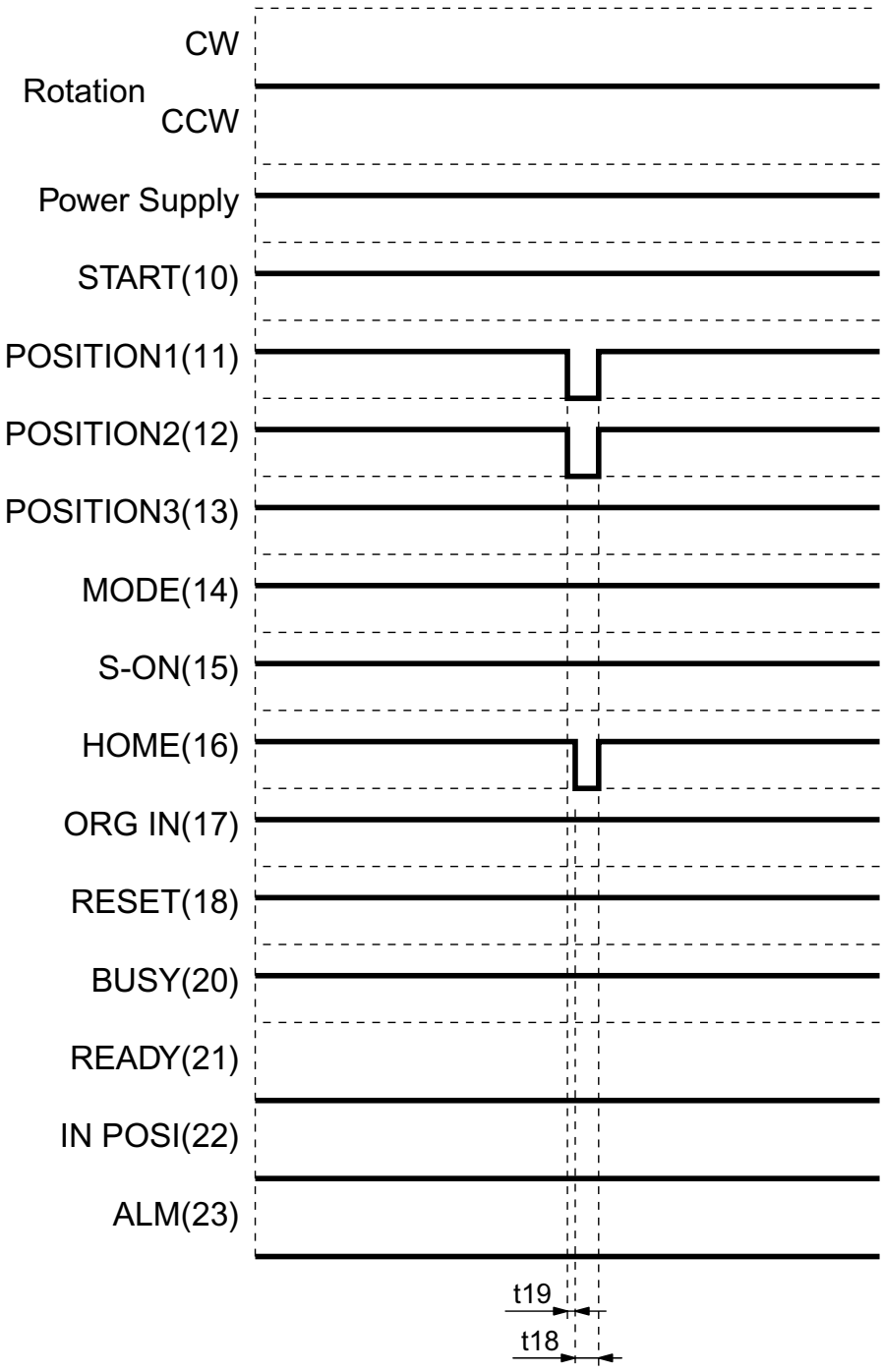
■ *Instantaneous Hold (Cancel Move)*



A1: INSTANTANEOUS HOLD executed when input both of MODE and POSITION3 at a time
A2: When motor held by INSTANTANEOUS HOLD, IN-POSI output will turn on and BUSY is in progress.
A4: When both of MODE and POSITION3 input turned off before START input, INSTANTANEOUS HOLD will be canceled (CANCEL MOVE) and hold there.

Note1: When motor is decelerating to the instructed position, INSTANTANEOUS HOLD command isn't acceptable.
Checking the logical product of MODE by POSITION3, BUSY and IN-POSI can confirm the state, under INSTANTANEOUS HOLD or not.

■ *External Change of Positioning Data Group (before HOME)*

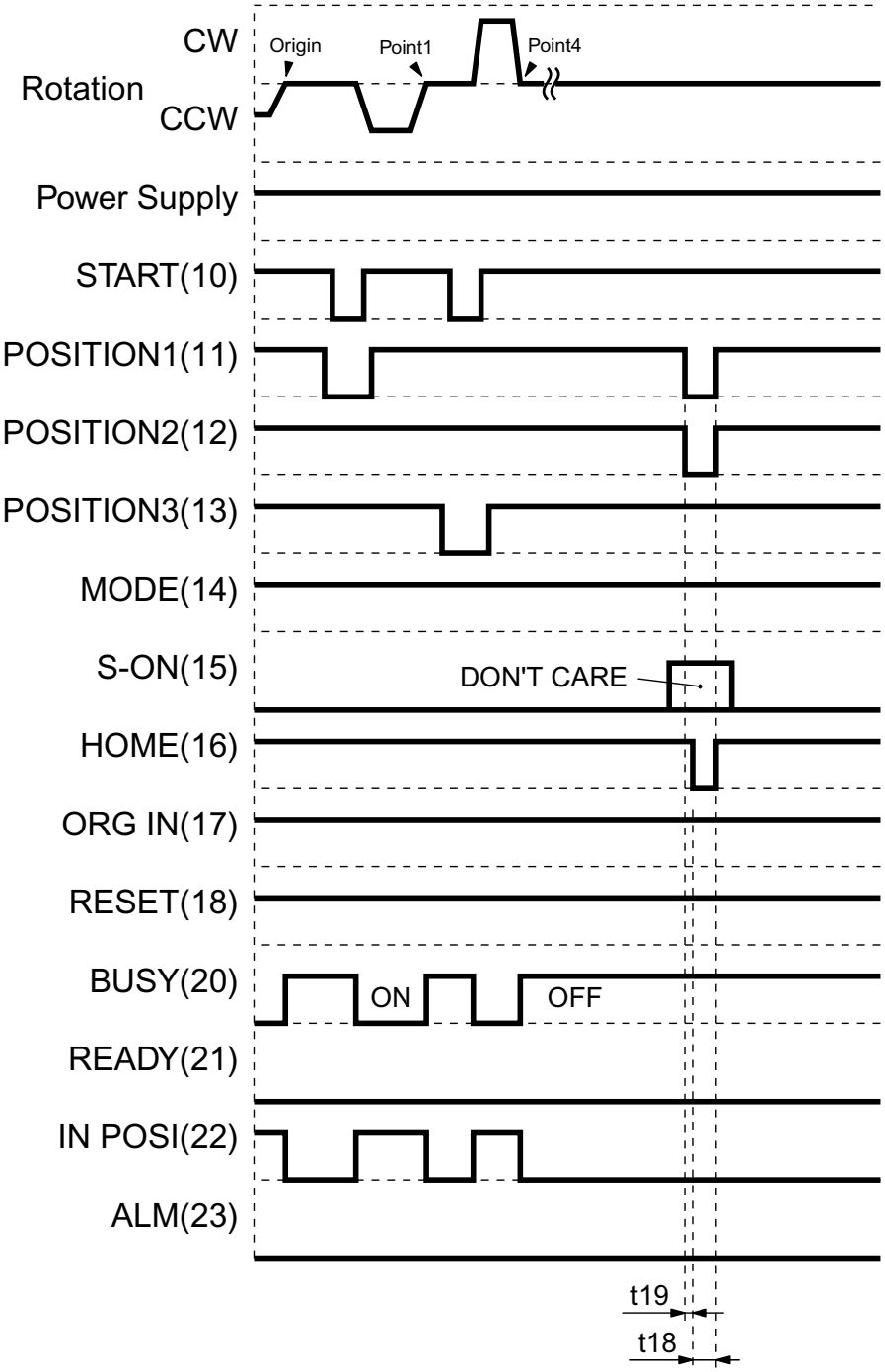


t18 = 10msec or more	HOME (Return to Origin) signal must be input as a single pulse of 't18.'
t19 = 1 scanning time or more of PLC	The time must be elapsed from input of Group No. instruction to HOME input.

Note1: The Parameter P9 must be value of '1' to execute EXTERNAL CHANGE OF POSITIONING DATA GROUP.

Note2: EXTERNAL CHANGE OF POSITIONING DATA GROUP before HOME is available only when Servo-Off.

■ *External Change of Positioning Data Group (after HOME)*



t18 = 10msec or more — HOME (Return to Origin) signal must be input as a single pulse of 't18.'

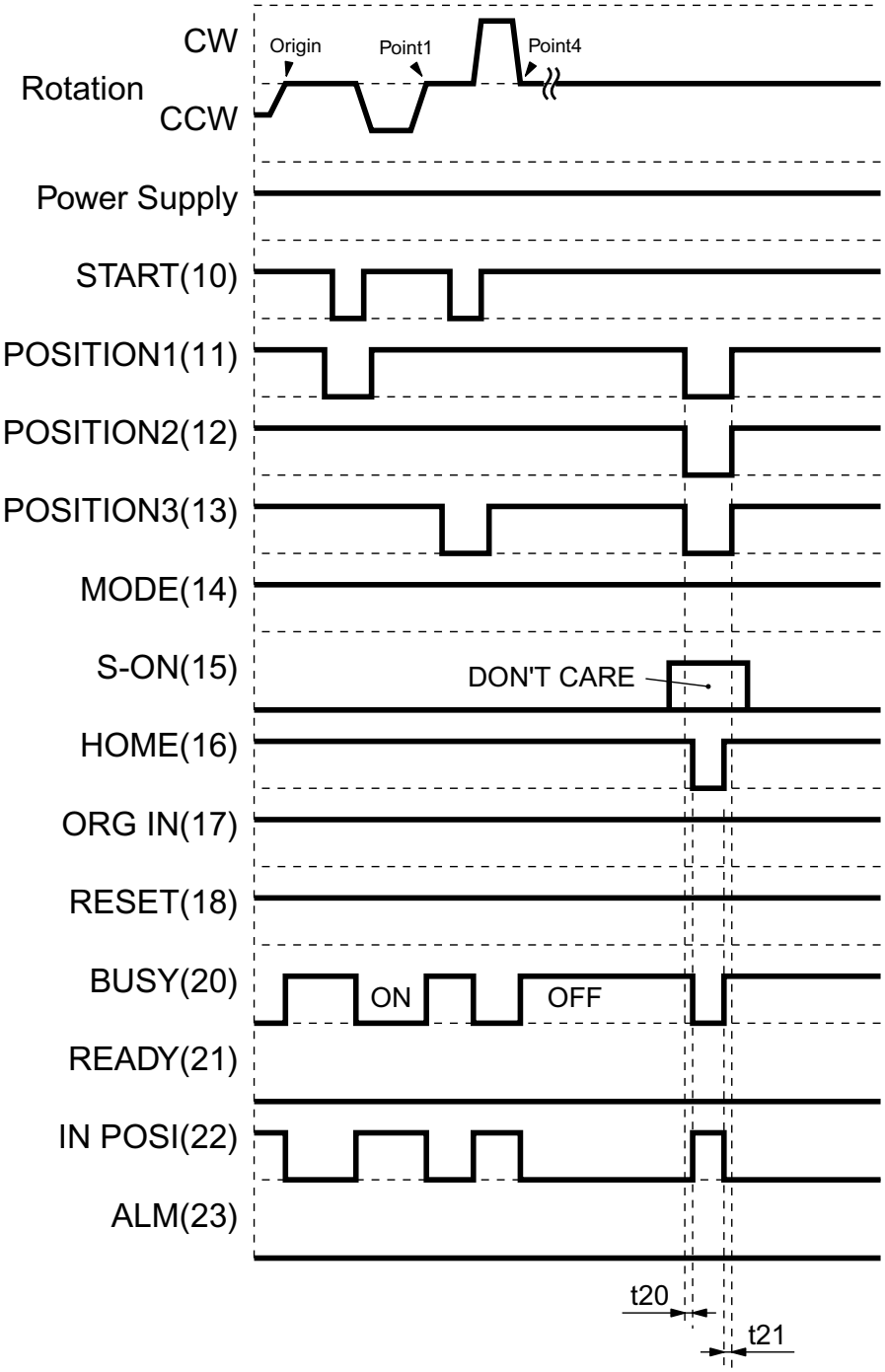
t19 = 1 scanning time or more of PLC — The time must be elapsed from input of Group No. instruction to HOME input.

Note1: The Parameter P9 must be value of '1' to execute EXTERNAL CHANGE OF POSITIONING DATA GROUP.

Note2: EXTERNAL CHANGE OF POSITIONING DATA GROUP after HOME is available whenever Servo-On or Off.

Note3: EXTERNAL CHANGE OF POSITIONING DATA GROUP after HOME can be effected only when both 'Return to Origin' alternated have the same 'Way to Stop' and 'Direction'

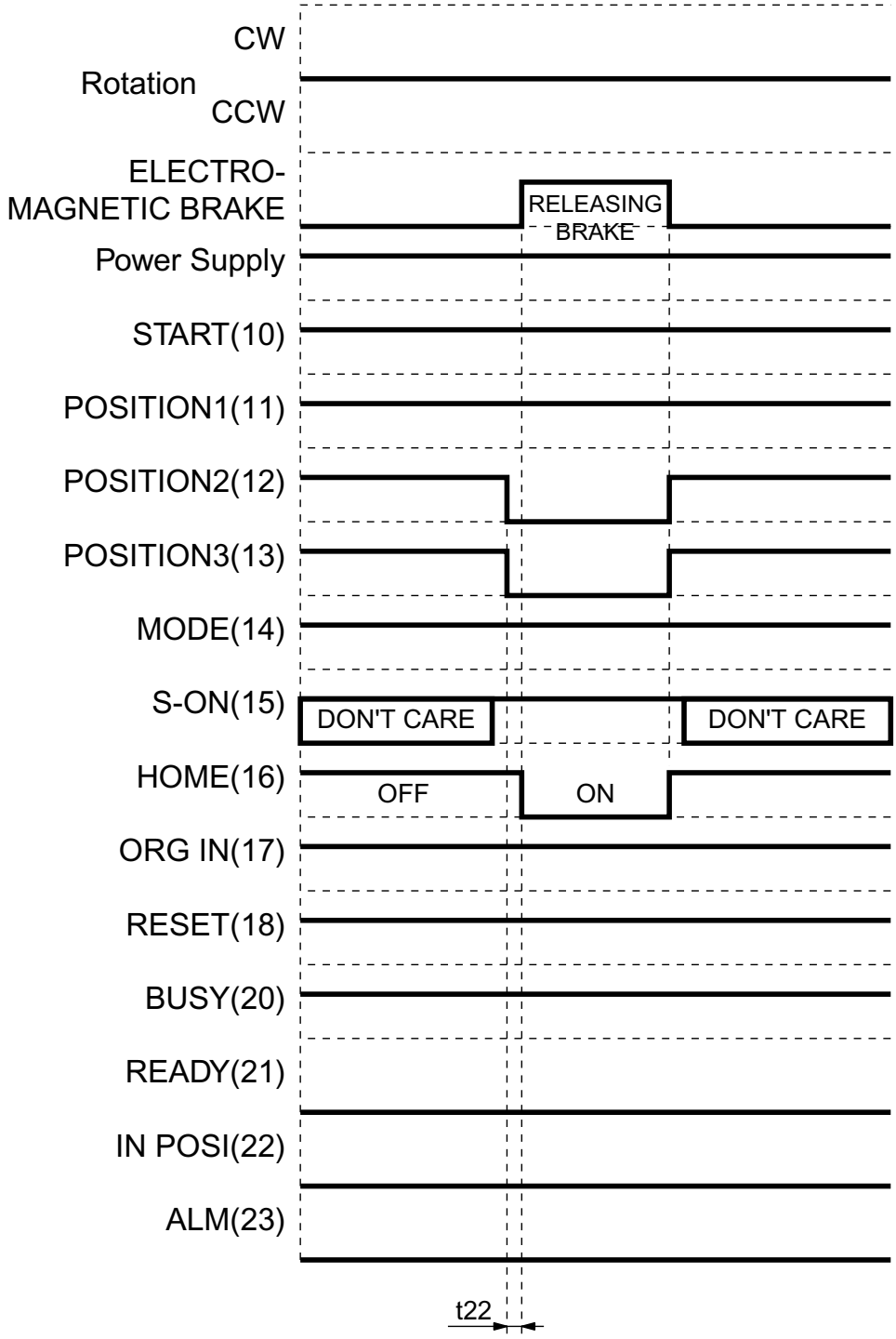
■ *Output Number of current Positioning Data Group*



t20 = 0msec or more The time must be elapsed from input of Group No. instruction to HOME input.
t21 = 0msec or more The time must be elapsed from HOME input canceled to Group No. instruction canceled.

Note1: Can be effected even if the Parameter P9 is value of '0'.
Note2: Can be effected whenever before or after HOME.
Note3: START input isn't effected during HOME input activated.
Note4: Be aware that BUSY, READY and IN-POSI output will change after GROUP No. output. Take care to interlock with these output signals.

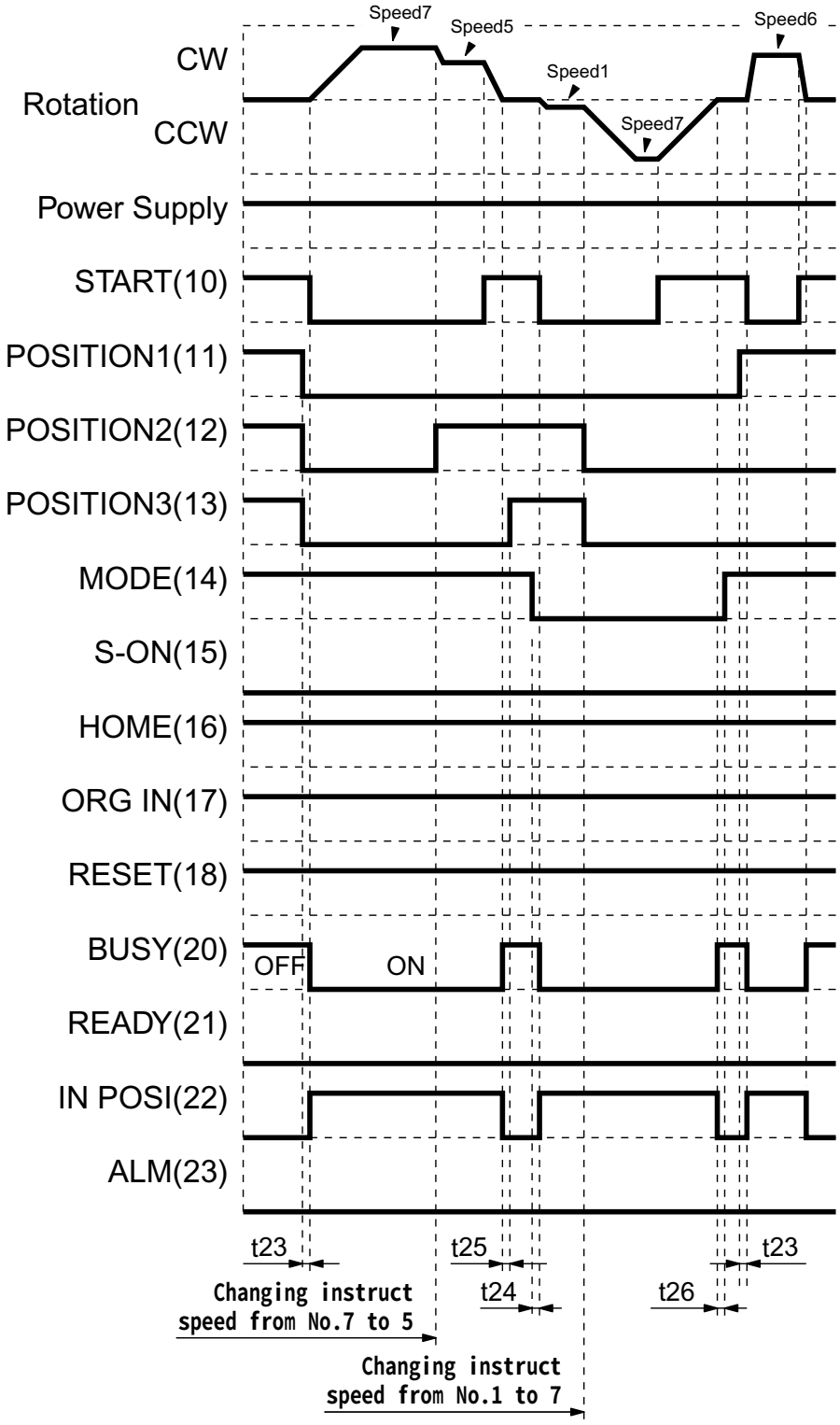
■ *Release Brake when Positioning Servo Mode*



t22 = 0msec or more The time must be elapsed from input of RELEASE BRAKE instruction to HOME input.

Note1: Can be effected even if the Parameter P9 is value of '0'.
Note2: Can be effected whenever before or after HOME.
Note3: START input isn't effected during HOME input activated.
Note4: RELEASE BRAKE is available only when Servo-Off.
Note5: If turning Servo Off during motor running and then RELEASE BRAKE executed, the electromagnetic brake is released allowing the motor shaft to be free.
Note6: Do not release brake during Servo-Off in applications such as vertical drive to avoid being in danger and damaged.

■ *Speed Servo Mode (at speed of fixed value)*



t23 = 0msec or more The time must be elapsed from input of SPEED SELECT to START input during motor held.

t24 = 0msec or more The time must be elapsed from MODE input for direction of rotation to START input.

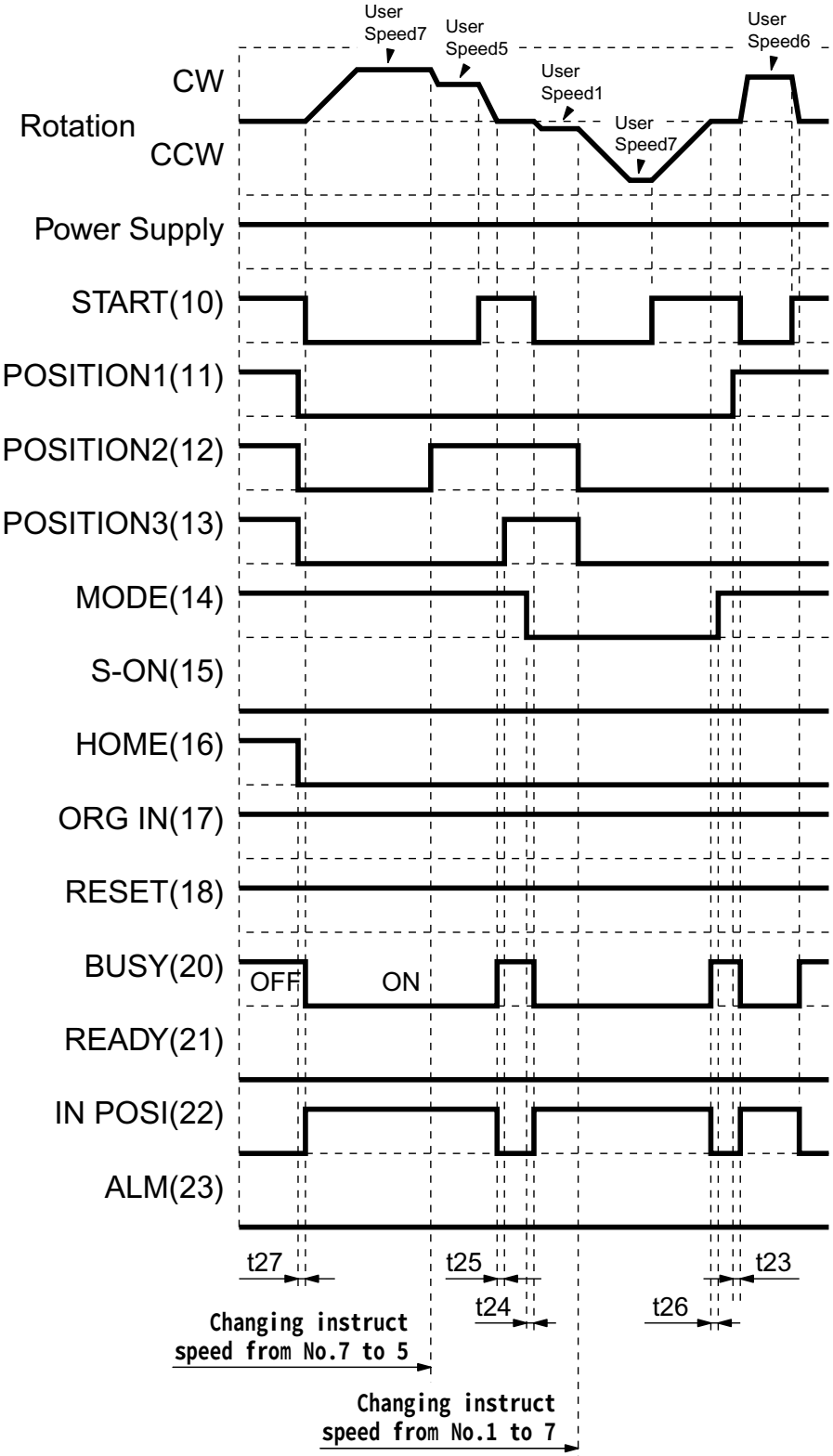
t25 = 0msec or more The time must be elapsed from IN-POSI output to SPEED SELECT canceled.

t26 = 0msec or more The time must be elapsed from IN-POSI output to MODE input canceled.

Note1: Do not change direction of rotation during the motor runs.

Note2: Do not turn Servo Off during the motor runs.

■ *Speed Servo Mode (at speed of set value)*



t23 = 0msec or more The time must be elapsed from input of SPEED SELECT to START input during motor held.

t24 = 0msec or more The time must be elapsed from MODE input for direction of rotation to START input.

t25 = 0msec or more The time must be elapsed from IN-POSI output to SPEED SELECT canceled.

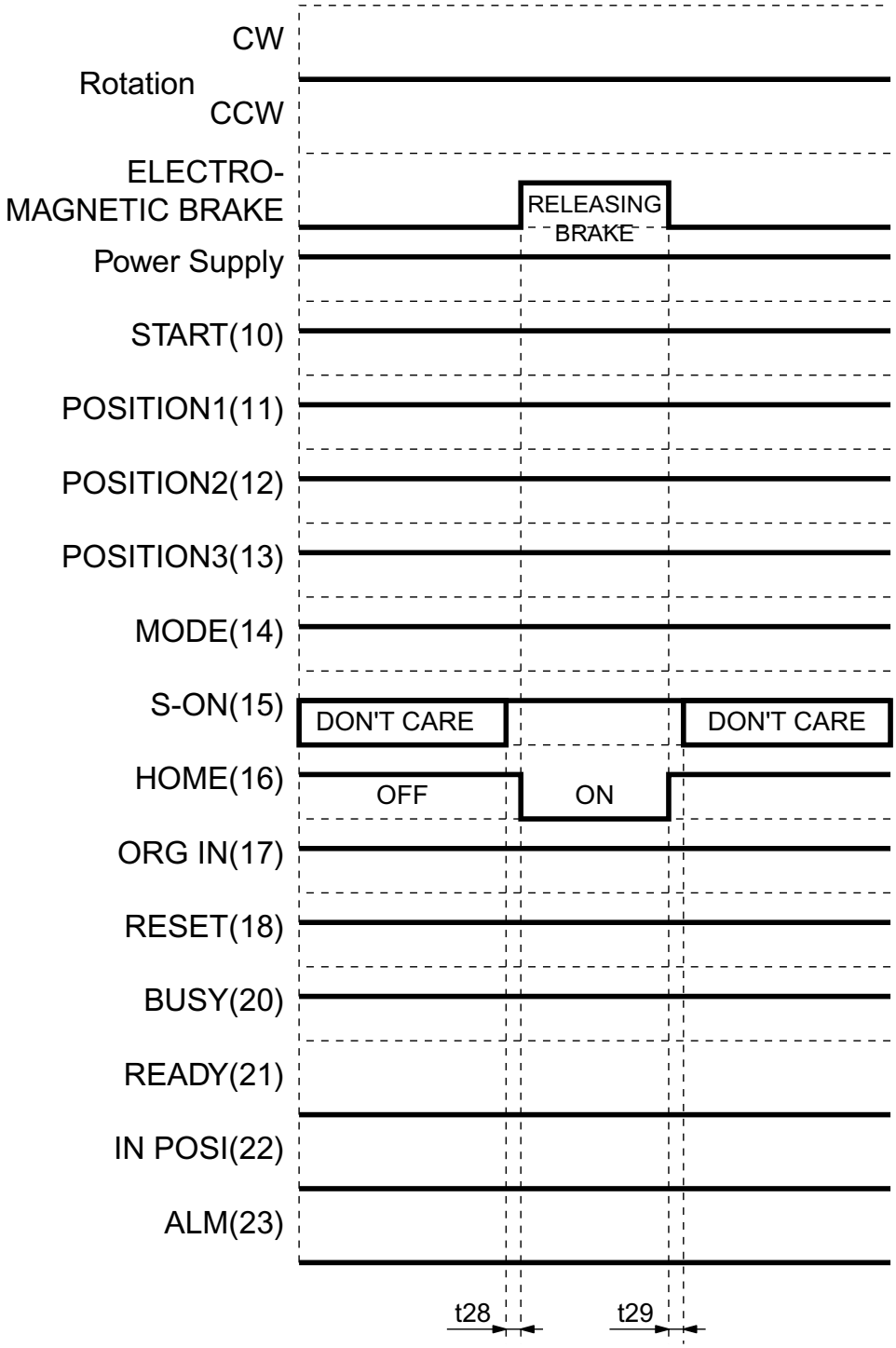
t26 = 0msec or more The time must be elapsed from IN-POSI output to MODE input canceled.

t27 = 0msec or more The time must be elapsed from HOME input for changing speed to START input.

Note1: Do not change direction of rotation during the motor runs.

Note2: Do not turn Servo Off during the motor runs.

■ *Release Brake when Speed Servo Mode*



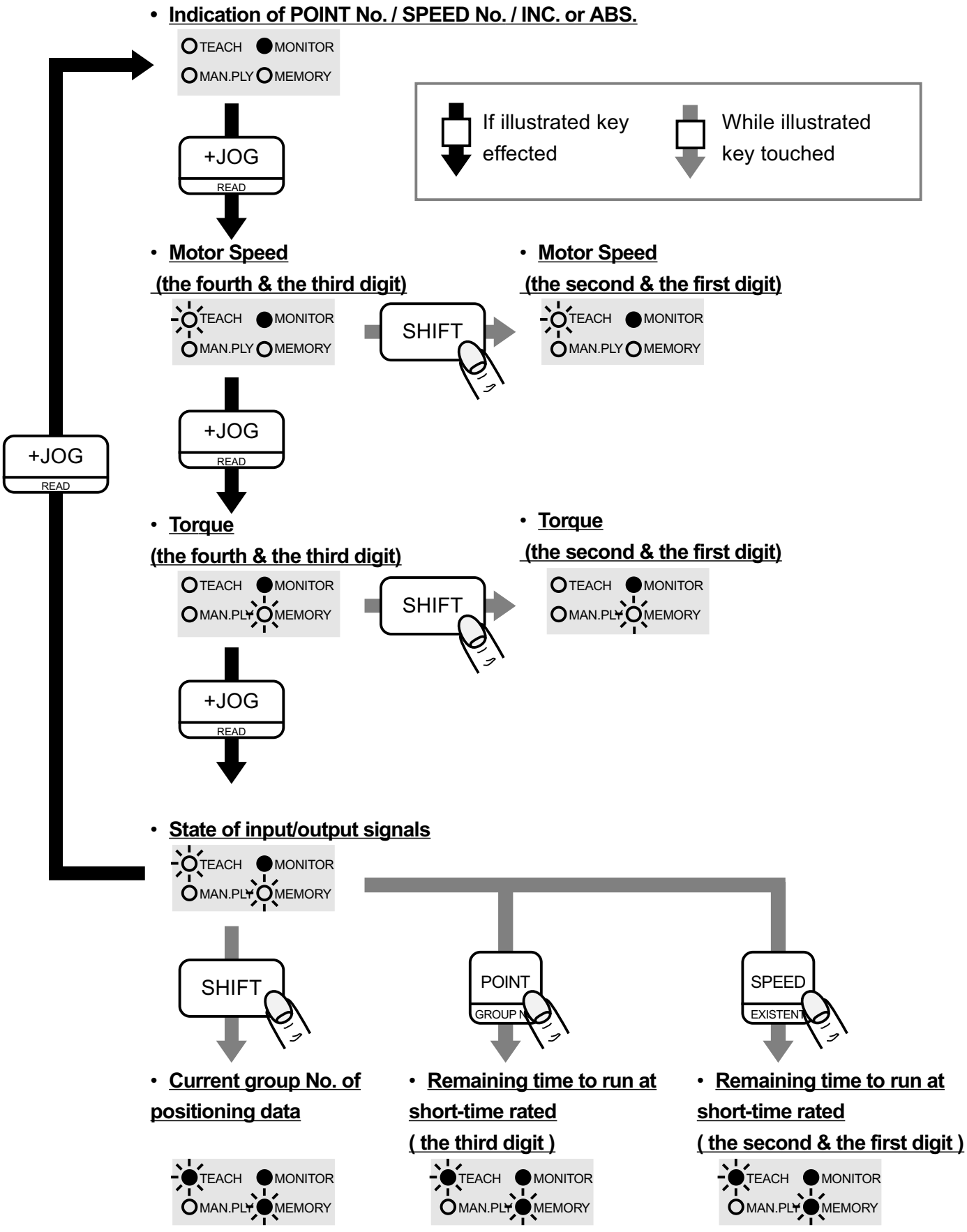
t28 = 0msec or more The time must be elapsed from S-ON input to ORG-IN input for releasing brake.
t29 = 0msec or more The time must be elapsed from ORG-IN input for releasing brake to S-ON input.

Note1: RELEASE BRAKE is available only when Servo-Off.

Note2: Do not release brake during Servo-Off in applications such as vertical drive to avoid being in danger and damaged.

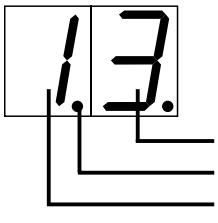
3 Monitoring for External Operation

■ *Monitoring Items for External Operation and Enabling*



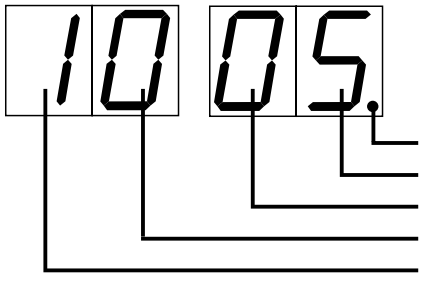
■ *Indication of Items*

• Sample Indication of POINT No. / SPEED No. / INC. or ABS.



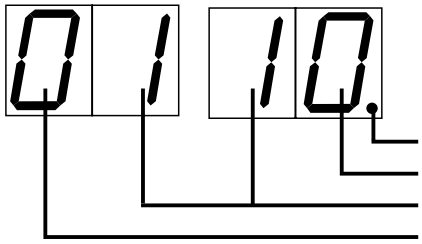
Point No.1
Speed No.3
INC in this case

• Sample Indication of Motor Speed



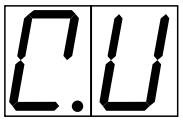
1005 rpm in this case

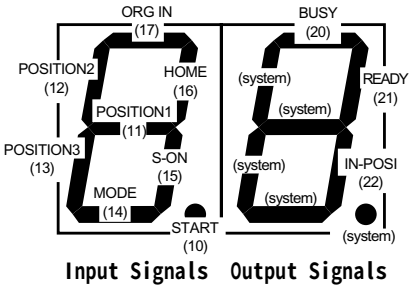
• Sample Indication of Torque



10 % of rated torque in this case

• Sample Indication of State of input/output signals

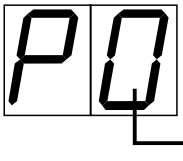




Segment turns off when signal is on and lights when off

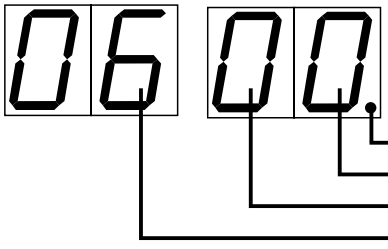
Note: 'system' means internal signal of controller

• Sample Indication of Current group No. of positioning data



Group No.0 in this case

• Sample Indication of Remaining time to run at short-time rated



600 sec remaining in this case
Only type 'VR' has short-time rate and this function is valid.

Chapter4

Teaching Pendant

This chapter explains about the functions of Teaching Pendant and the ways of its operation.

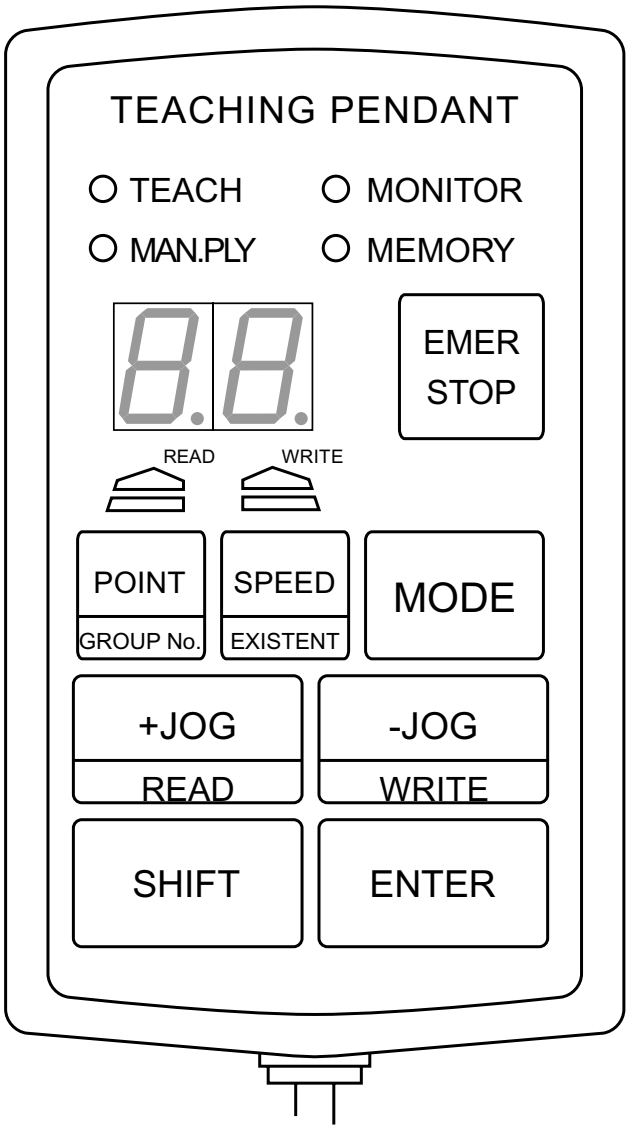
1. Specification
2. Operation

1 Specification

■ *Specification*

Indication	2 seven-segmented LEDs for digit indication 4 LEDs for mode status indication
Operation	By 8 pcs of Key Switch
Power Source	Supplied from Controller
Ambient Temp	0~40℃
Ambient Humidity	Less than 85% (Should be free from condensation)
Cable Length	2m

■ *Main functions of Operation Key*



LED

on (lit) ..... ●

off (not lit) ○

blinking ... ☼

..... Status is shown by combination of above indication.

[EMER / STOP]

..... Puts an emergency stop.

[MODE]

..... Switches over the mode status.

[Speed / Existent]

..... Increments the lower digit.

[POINT/GROUP No.]

..... Increments the upper digit.

[-JOG / WRITE]

..... Jogs in CCW direction.

[+JOG / READ]

..... Jogs in CW direction.

[ENTER]

..... Enters the data.

[SHIFT]

..... Alternates Servo On and Off. Used in combination with an other key.

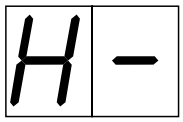
2 Operation

The operations explained in this section are as follows:

- Emergency Stop
- Servo-On and Servo-Off
- JOG
- Return to Origin (in Positioning Servo Mode)
  - Definition of "Return to Origin"
  - Varieties of "Return to Origin" Motion
  - Definition of " **α** " Value
  - Motion of "Return to Origin"
  - Execution of "Return to Origin"
  - Setting " **α** " Value
  - Offset
  - How to Set Offset Value
- Teaching (in Positioning Servo Mode)
  - On Teaching
  - Before Teaching Operation
  - Flow of Teaching
  - Teaching ABS (Absolute) Data by [+JOG] and [-JOG] (New Entry)
  - Modifying Memorized ABS (Absolute) Data Inputted by [+JOG] and [-JOG] Teaching
  - Teaching INC (Incremental) Data by [+JOG] and [-JOG]
  - Inputting Value (Pulse Count) of Position Data
  - Inputting Value (Pulse Count) of Position Data (Basic Operation)
  - Inputting Value (Pulse Count) of Position Data (New Entry)
  - Inputting the Value (Pulse Count) of Positioning Data
  - Confirming Teaching Data in Manual Play Mode
  - Memorizing the Teaching Data
  - Reading Out the Memorized Teaching Data
  - Deleting Teaching Data
    - Deleting one temporary positioning data(Temporary in RAM)
    - Deleting all temporary Teaching Data(Temporary in RAM)
    - Clearing one whole stored Teaching Data Group(stored in EEPROM)
      - Method of restoration cleared Teaching Data Group
  - Modifying the Acceleration/Deceleration (A/D) Rate
    - Modifying all the point data collectively
    - Modifying each point data
  - Modifying Gain Value
  - Modifying the Speed Data
    - Modifying in Teaching Mode
    - Modifying in Manual Play Mode
- Setting Speed,Acceleration/Deceleration Rate and Gain in Speed Servo Mode
  - Description of Speed Servo Mode
  - Flow of Setting Speed
  - Setting User Set Value of Speed,Ac-/deceleration Rate and Gain
  - Confirming Teaching Data
  - Memorizing the Teaching Data
  - Reading Out the Memorized Teaching Data

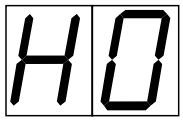
■ *Emergency Stop*

Servo-Off Mode

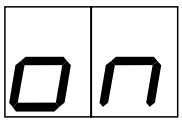


- While [EMER/STOP] is being pressed, the motor stays in servo-off status.
- When [EMER/STOP] has been released, the motor stays in servo-off status.

Servo-On Mode



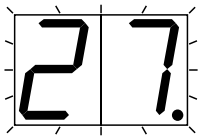
(In Positioning Servo Mode)



(In Speed Servo Mode)

- While [EMER/STOP] is pressed, the motor retains its position in servo-on status.
- When [EMER/STOP] is released, the motor gets into servo-off status.
  (In this case, if the connection between [S-ON] and [COM] terminal is short, the motor gets back to servo-on status in a moment.)

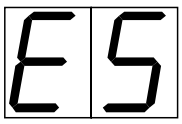
During Motor Operation



(Sample Indication in Positioning Servo Mode)

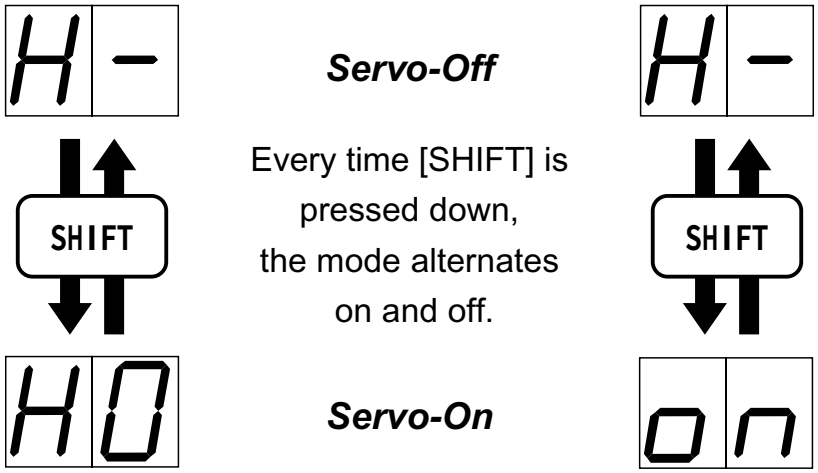
- When [EMER/STOP] is pressed, the motor stops rotating.
- While [EMER/STOP] is being pressed down,
  The motor retains its position in servo-on status.
- When [EMER/STOP] is released, the motor gets into servo-off status.
  (In this case, if the connection between [S-ON] and [COM] terminal is short, the motor gets back to servo-on status in a moment.)

While [EMER/STOP] is being pressed down, the indication is shown like below.



The emergency stop motion is the same in both positioning servo mode and speed servo mode.

■ *Servo-On / Servo-Off*



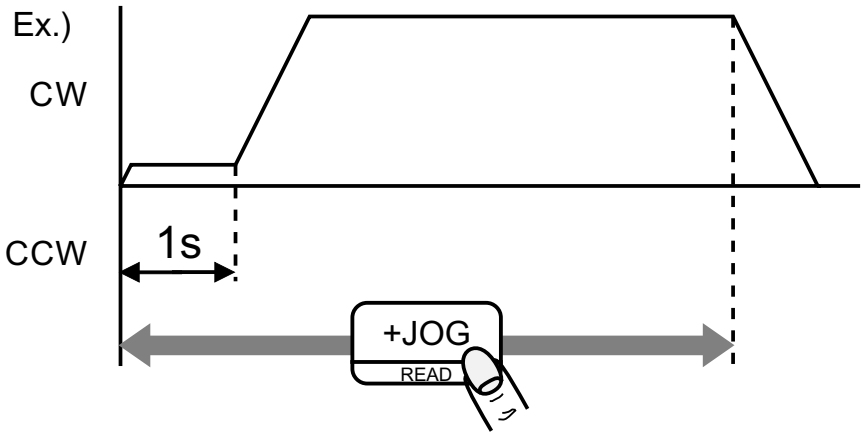
Indication in Positioning Servo Mode

Indication in Speed Servo Mode

■ *JOG*

You can jog the motor in servo-on mode. When you press [+JOG] or [-JOG], the motor starts moving in low speed (preset in parameter#1) in the beginning. With pressing down the key for more than 1 second, you can rotate the motor in high speed (preset in parameter#0).

[+JOG]: CW direction, [-JOG]: CCW direction



Above shows the case in CW direction.
You can operate in CCW direction by pressing [-JOG].

The jog motion is the same in both positioning servo mode and speed servo mode.

■ *Return to Origin (Required in Positioning Servo Mode)*

• Definition of "Return to Origin" (RTO)

A motion to acquire the origin (home position) for position control.

• Varieties of "Return to Origin" Motion

There are 8 combinations of "Ways to Stop" (locking stop or sensor stop), "Directions" (CW or CCW) and "Z-Phase Mode" (captured or neglected).

Ways to Stop

Locking stop

The way to stop by sensing lock of motor.

E.g. Ways to stop against a stopper, against a stroke end, etc..

Sensor Stop

The way to stop by getting a sensor signal.

Connect a lead to ORG-IN(17) to acquire a sensor signal.

Directions

Select the direction of rotation: *CW* or *CCW*.

e.g. S Series Model

CW: Work-base approaches to the motor.

CCW: Work-base moves in the opposite direction from the motor.

V Series Model

Rotating direction varies in the different reduction ratio.

See related information on the product catalog.

Z Phase

captured

The way of utilizing Z phase signal.

neglected

The way of utilizing preset data (**α** value) without using Z phase signal.

NOTE: Z phase signal is generated and output from the encoder.
This signal comes out as a pulse per motor revolution.

• Definition of "α" Value

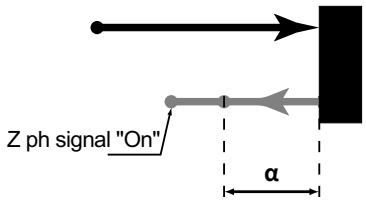
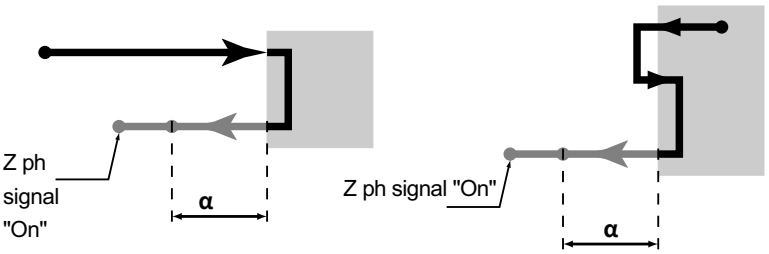
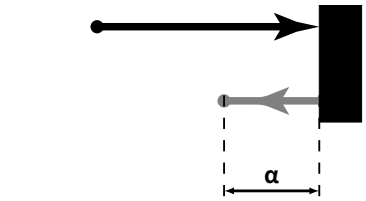
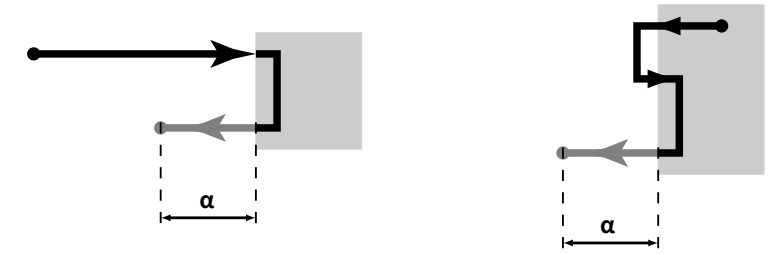
If the Z phase mode is "Captured":

The range where Z phase signal is neglected.

If the Z phase mode is "Neglected":

The movement after reversing.

• Motion of "Return to Origin" (RTO)

Z ph	Ways	Dir	No.	Motion
Captured	Locking Stop	CW	H0	
		CCW	H1	
	Sensor Stop	CW	H2	
		CCW	H3	
Neglected	Locking Stop	CW	H4	
		CCW	H5	
	Sensor Stop	CW	H6	
		CCW	H7	

Stroke End, Stopper, etc.

On-Range of ORG-IN(17) Terminal

Preset Data of Parameter-2 for "RTO" Speed Rate: High

Preset Data of Parameter-D for "RTO" Speed Rate: Low

The Rate of Acceleration and Deceleration in above motion:

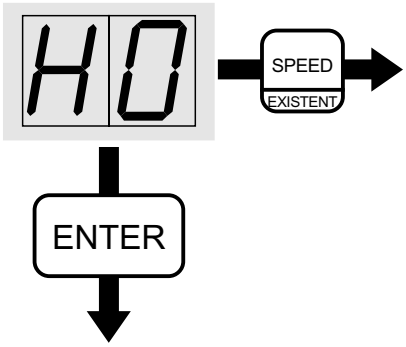
Locking Stop No.0 value of parameter-6: acceleration and deceleration rate.

Sensor Stop The value of parameter-C: acceleration and deceleration rate of jog.

• Execution of "Return to Origin" (RTO)

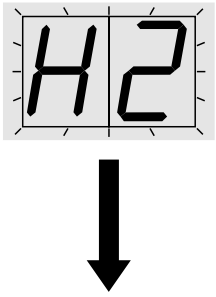
In the first place, decide the "return to origin" motion according to your application.

• **Selecting a Number of "RTO"**



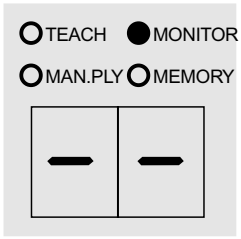
Every time [SPEED] is pressed, the number increments by 1 up to 7 cyclically. **(0,1,2,⋯,7,0,1,2⋯)**

• **Starts "RTO" in Selected Number**



While searching for the origin, seven-segmented LEDs blink.

• **"RTO" completed.**



Note:

If the completion position of "Return to Origin" differs from another:

In Z phase "captured" mode, you may solve it by changing the pulse value of **α**

In Z phase "neglected" mode,

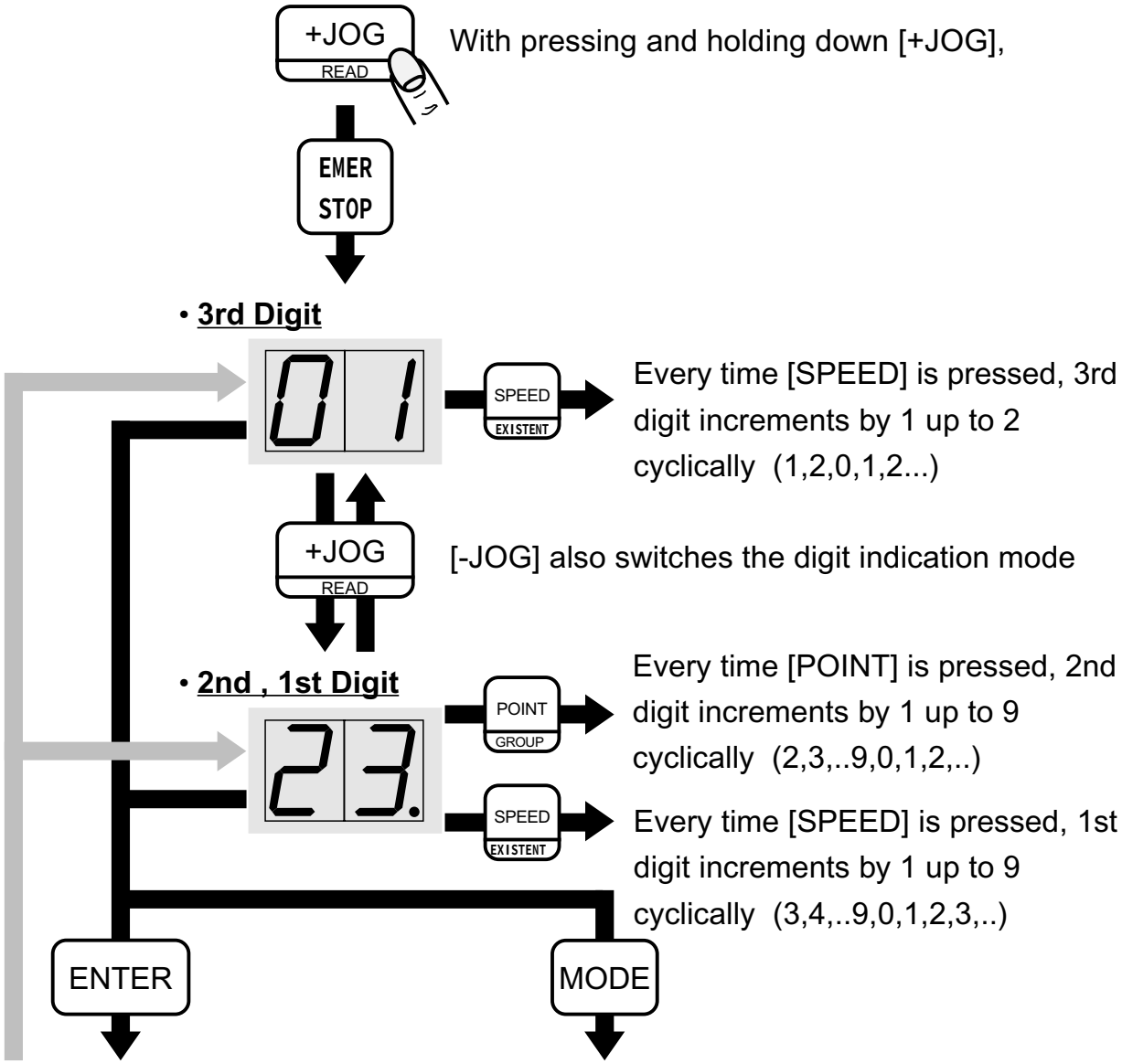
For sensor stop, adjust the sensitivity of equipped sensor or the position of a dog, because this is often derived from unstableness of sensing.

For locking stop, improve the rigidity of the stopper, because it may be not stiff enough.

• Setting "α" Value

You can set "α" value in the range: **0 ~ 255.**

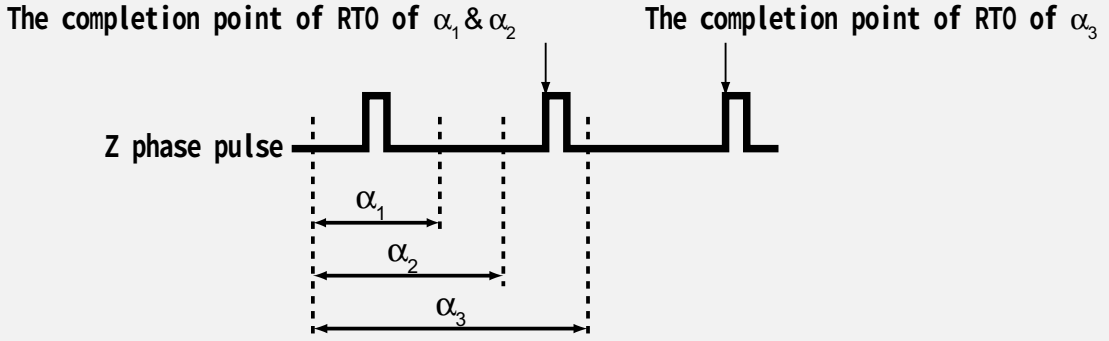
Supposing the initial value to be inputted is "123":



Stores the value inputted as above by [SPEED] and [POINT].

Escapes from this mode.

Notice: Generally, in the motion of "Return to Origin"(RTO), changing "α" value is effective to shift the origin, but if the motion is completed by capturing Z phase signal, chang ing value does not always affect the completion position.

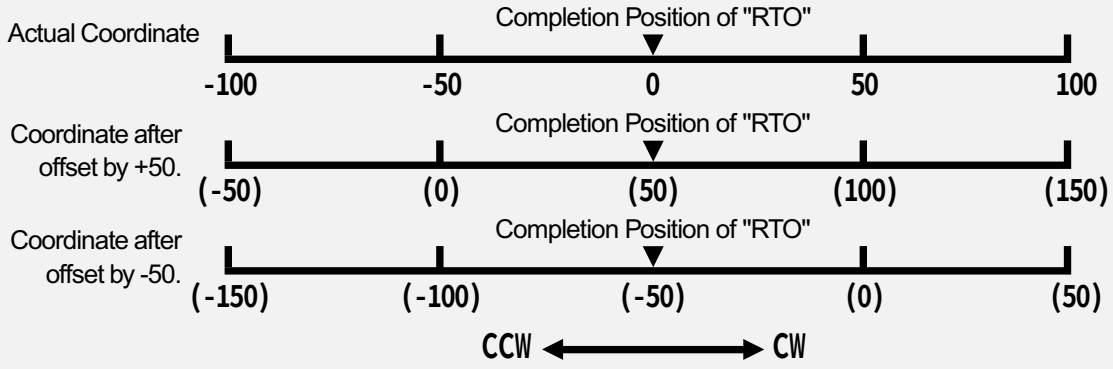


• Offset

Applied to offset the position without changing the stored "absolute" position data.
The origin will be offset by the given value.
The value can be inputted as pulse counts multiplied by 4 with "+"or "-" sign.

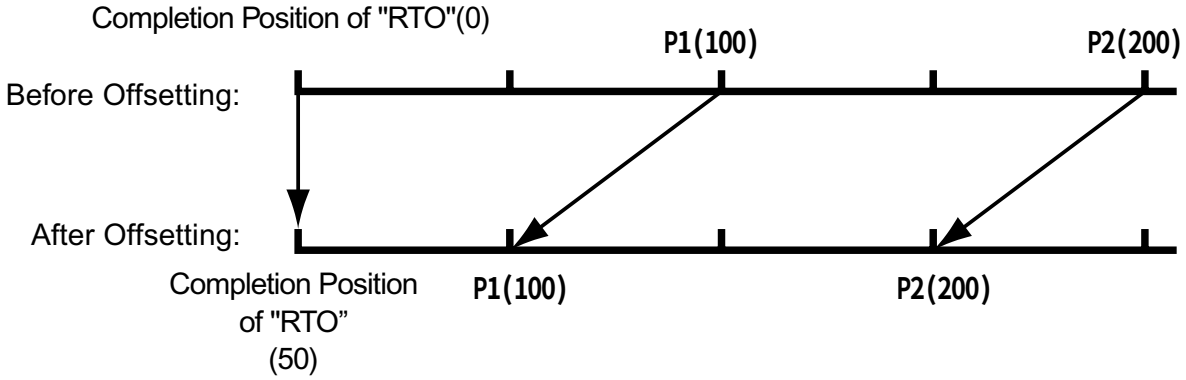
Important: Offset shall be applied to change the position of origin.

When you need to offset the position by 50 pulse to CCW direction, Set the value as "-50".
When you need to offset the position by 50 pulse to CCW direction, Set the value as "+50".



Notice: Offset value affects all the data contained in each point group except for the "Incremental" data.

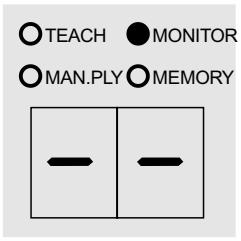
Ex.) When you set as below,
Position 1, 100pulse, Absolute Data
Position 2, 200pulse, Absolute Data
Offset Value: +50
Result will be shown as follows:

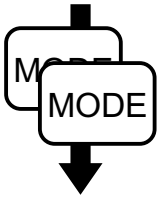


• How to Set Offset Value

Offset Value, which is obtained by multiplying the encoder pulse counts by 4, can be set within the range: **-7,999,999～+7,999,999.** Initial value is preset as "0".

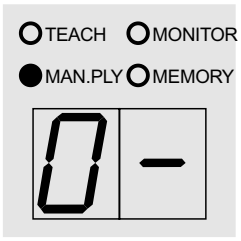
• **Indication just after Completion of "RTO"**



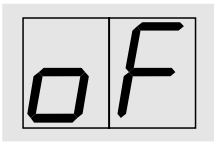


1 second later

• **Manual Play**

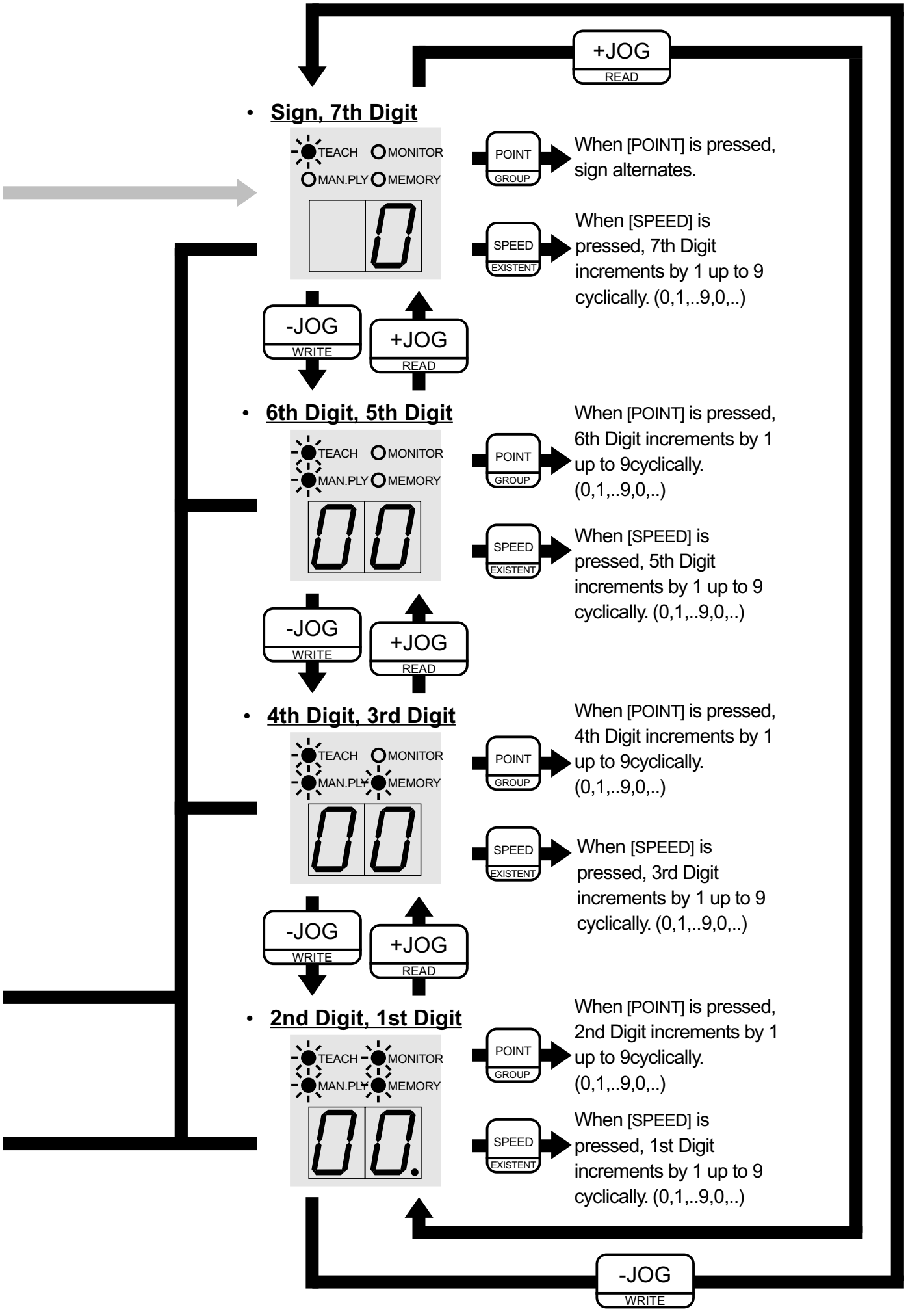


• **Offset Input**



Press [MODE] to escape from the operation.

Enters the data given by pressing [SPEED], [POINT].


+JOG
READ
• Sign, 7th Digit
TEACH
MONITOR
MAN.PLY
MEMORY
0
POINT
GROUP
When [POINT] is pressed, sign alternates.
SPEED
EXISTENT
When [SPEED] is pressed, 7th Digit increments by 1 up to 9 cyclically. (0,1,..9,0,..)
-JOG
WRITE
+JOG
READ
• 6th Digit, 5th Digit
TEACH
MONITOR
MAN.PLY
MEMORY
0 0
POINT
GROUP
When [POINT] is pressed, 6th Digit increments by 1 up to 9cyclically. (0,1,..9,0,..)
SPEED
EXISTENT
When [SPEED] is pressed, 5th Digit increments by 1 up to 9 cyclically. (0,1,..9,0,..)
-JOG
WRITE
+JOG
READ
• 4th Digit, 3rd Digit
TEACH
MONITOR
MAN.PLY
MEMORY
0 0
POINT
GROUP
When [POINT] is pressed, 4th Digit increments by 1 up to 9cyclically. (0,1,..9,0,..)
SPEED
EXISTENT
When [SPEED] is pressed, 3rd Digit increments by 1 up to 9 cyclically. (0,1,..9,0,..)
-JOG
WRITE
+JOG
READ
• 2nd Digit, 1st Digit
TEACH
MONITOR
MAN.PLY
MEMORY
0 0.
POINT
GROUP
When [POINT] is pressed, 2nd Digit increments by 1 up to 9cyclically. (0,1,..9,0,..)
SPEED
EXISTENT
When [SPEED] is pressed, 1st Digit increments by 1 up to 9 cyclically. (0,1,..9,0,..)
-JOG
WRITE

■ *Teaching Operation(Required only in Positioning Servo Mode)*

• On Teaching

Execution of "return to origin" and teaching by Teaching Pendant is required in positioning servo mode.

Teaching operation consists of:

1. Teaching position data and speed rate.
2. Modifying various parameters for acceleration, gain, etc.

Operation-1 is required at least to control positioning.
Operation-2 is for improving the motion after a trial operation.

• Before Teaching Operation

Return to Origin (RTO)

Execute "return to origin" in the same way as actual operation.
Remember that it's impossible to change the return-to-origin number after teaching.

Memorizable Point Number

8points/1group (max 6 groups) ***total: 48 points***
[It is impossible to get 6 groups together into one group.]

Speed

Rotation speed is divided into 8 steps. Correspondent Table is shown below:

Max RPM	0	1	2	3	4	5	6	7
3000rpm	50	250	500	1000	1500	2000	2500	3000
2500rpm	50	100	250	500	1000	1500	2000	2500

Max 3,000rpm for S type, 40/80W. Max 2,500rpm for other type models.

Position Data Format

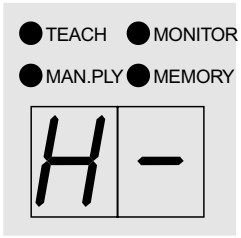
Consists of ABS (Absolute Data) and INC (Incremental Data).
They can coexist in a same group.

Notice:
The teaching data will be lost when you press [EMER/STOP], put power off or reset the controller without memorizing the data into EEPROM (Memory).

• Flow of Teaching

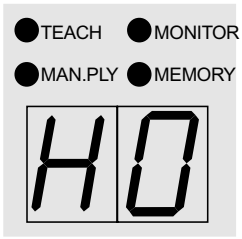
Notice:
Be sure to make "open" between COM and other input terminals.

• **Putting Power on to Controller**



SHIFT

• **Servo On**

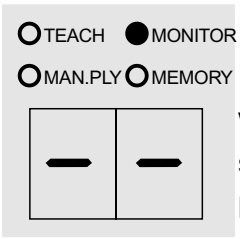


ENTER

• **Completion of Returning to Origin**

MODE

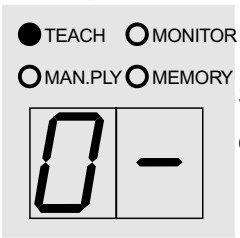
• **Monitor Mode**



Not utilized while teaching. Utilized for monitoring when the motor is put servo-on from the controller. (See 3-26)

MODE

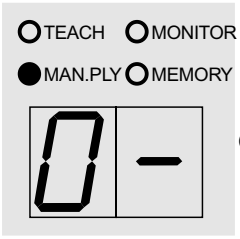
• **Teaching Mode**



Speed and position data can be inputted.

MODE

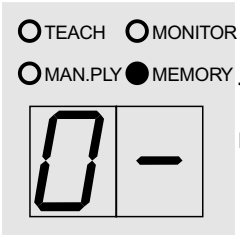
• **Manual Play Mode**



Inputted position data can be confirmed.

MODE

• **Memory Mode**

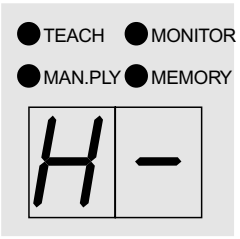


The position data can be memorized into EEPROM.

EMER STOP

• **Servo Off**

•**(Power On)**



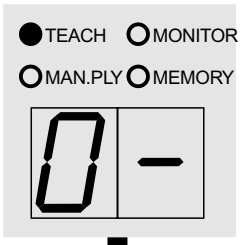
Notice:
The teaching data will be lost when you press [EMER/STOP] without memorizing the data into EEPROM (Memory).

• Teaching ABS (Absolute) Data by [+JOG] and [-JOG] (New Entry)

1. Return to origin in the same way and direction as actual operation.
2. Press [MODE] to get into Teaching Mode.
3. Proceed with teaching as follows.

Note: Press [POINT],[SPEED] with holding [SHIFT] down, then the value decreases by 1.

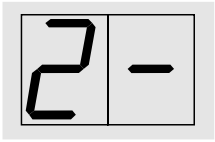
• **Select Point Number**



Every time [POINT] is pressed down,
Point Number increments by 1 up to 7 cyclically.
(0,1,..7,0,..)

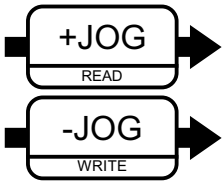
Note: You can delete the data in the indicated point number by pressing [ENTER] while "C" is selected for the speed number.

• **Select Speed Number**



Every time [SPEED] is pressed down,
Speed Number increments by 1 up to 7 cyclically.
(0,1,..7,C,0,..)

• **Move to the Required Position**



Move to the required position.

• **Storing Position & Speed Data in RAM**

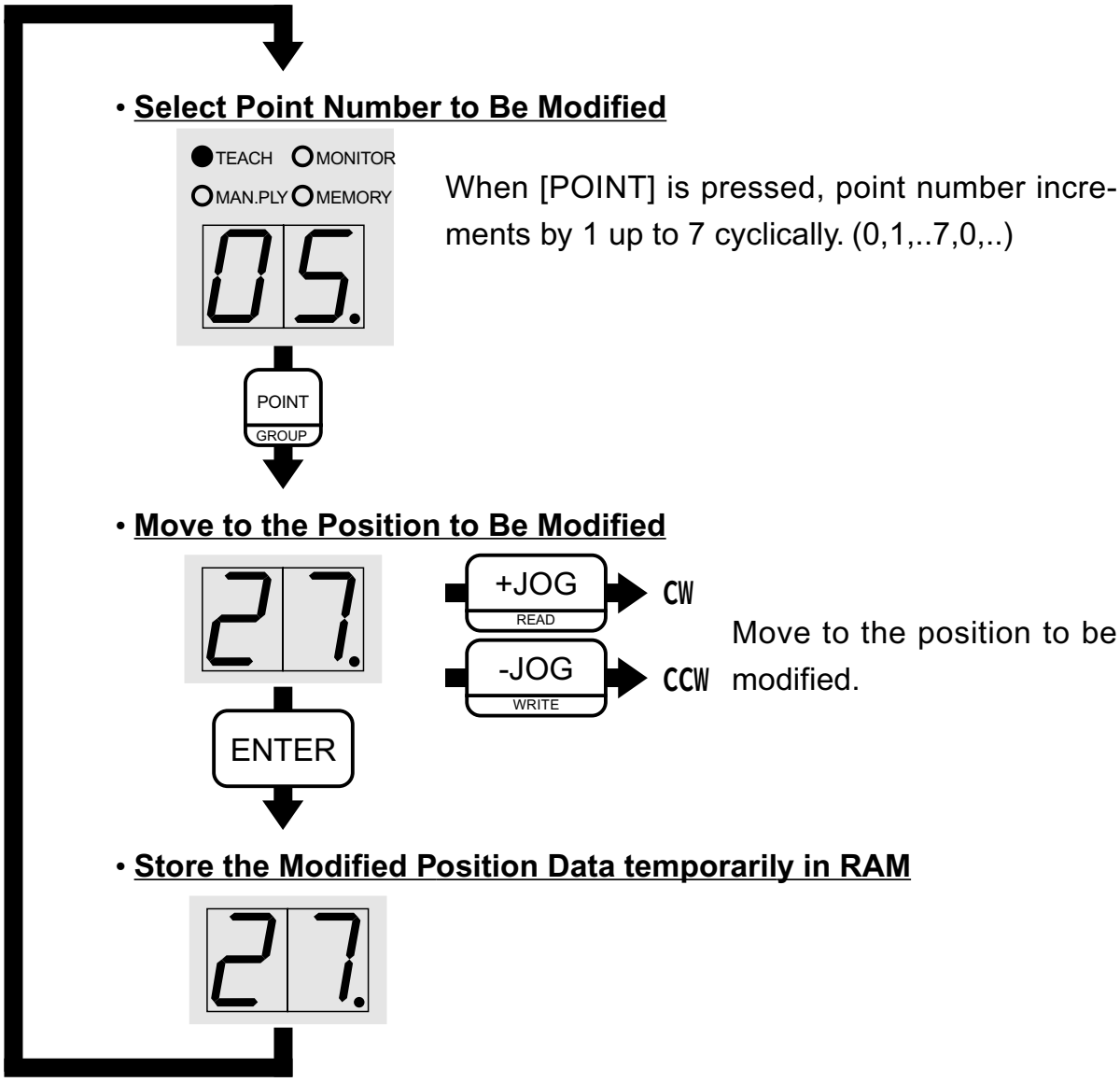
Storing data temporarily in RAM.
Lights up while the teaching data is stored.

Notice: Be sure to memorize the data, which is stored temporarily in RAM, into EEPROM in the Memory Mode. The stored data in RAM will be lost when you press [EMER/STOP], put power off or reset the controller.

• Modifying Memorized ABS Data Inputted by [+JOG] and [-JOG] Teaching

1. Return to origin in the same way and direction as memorized.
2. Invoke the position data, which is to be modified, from EEPROM into RAM per "Reading Out the Memorized Teaching Data". (See pp.4-24)

Note: You can avoid failing by moving the actuator to the required position per "Confirming the Teaching Data in Manual Play Mode" (See pp.4-22) prior to proceeding with following processes.

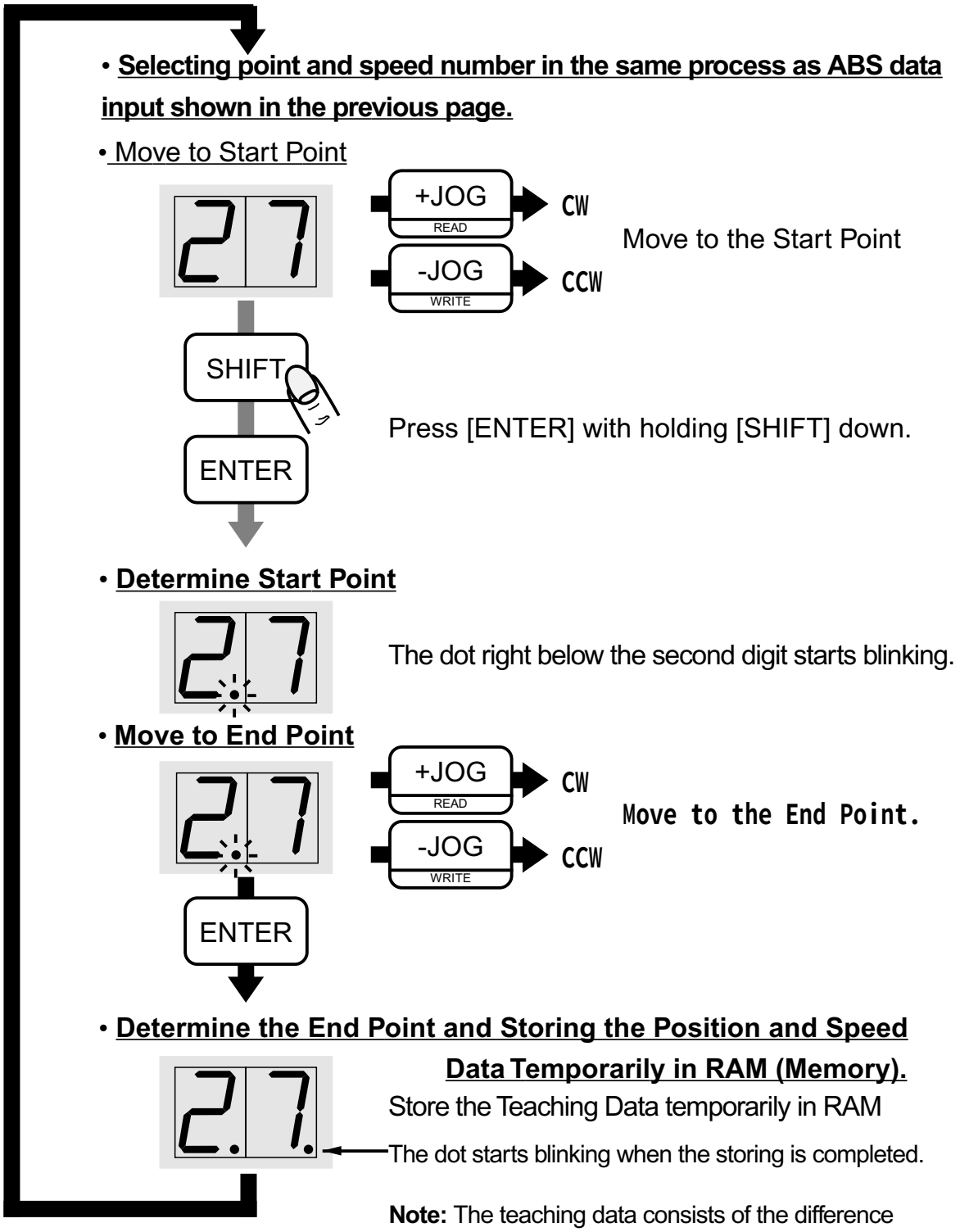


Notice: The existing position and speed data just when [ENTER] is pressed will be stored temporarily in RAM (Memory).
If you want to modify only the speed data, try per "Modifying Speed Data"(see pp.4-??).
If you want to proceed in the way shown above, be sure to move to the required position per "Confirming the Teaching Data" (See pp.4-22) in manual play mode in advance.

Notice: Be sure to memorize the data, which is stored temporarily in RAM, into EEPROM in the Memory Mode. The stored data in RAM will be lost when you press [EMER/STOP], put power off or reset the controller.

• Teaching INC (Incremental) Data by [+JOG] and [-JOG]

1. Return to origin in the same way and direction as actual operation.
2. Press [MODE] to get into Teaching Mode.
3. Proceed with teaching start point and end point as follows.



Note: The teaching data consists of the difference between start and end point pulse counts, and the direction from start to end point.

Notice: Be sure to memorize the data, which is stored temporarily in RAM, into EEPROM in the Memory Mode. The stored data in RAM will be lost when you press [EMER/STOP], put power off or reset the controller.

• Inputting Value (Pulse Count) of Position Data

- When exact data cannot be inputted by teaching with [JOG] or
- If you can obtain the value (pulse count) in advance,

utilize this function.

The pulse count can be calculated from reduction ratio or lead of screw.

Note: Encoder Pulse Count

Pulse count per revolution of motor (quadrupled value):

Under 80W ..... 1200 pulse (300pulse × 4)

More than 100W 1600 pulse (400pulse × 4)

Ex.)

Lead: 5mm

Encoder Pulse Count: 300pulse

Required pulse count for 125mm movement in S series model can be calculated as follows:

Movement Pulse Count = (distance-of-movement/lead)*(encoder-pulse-count)*4

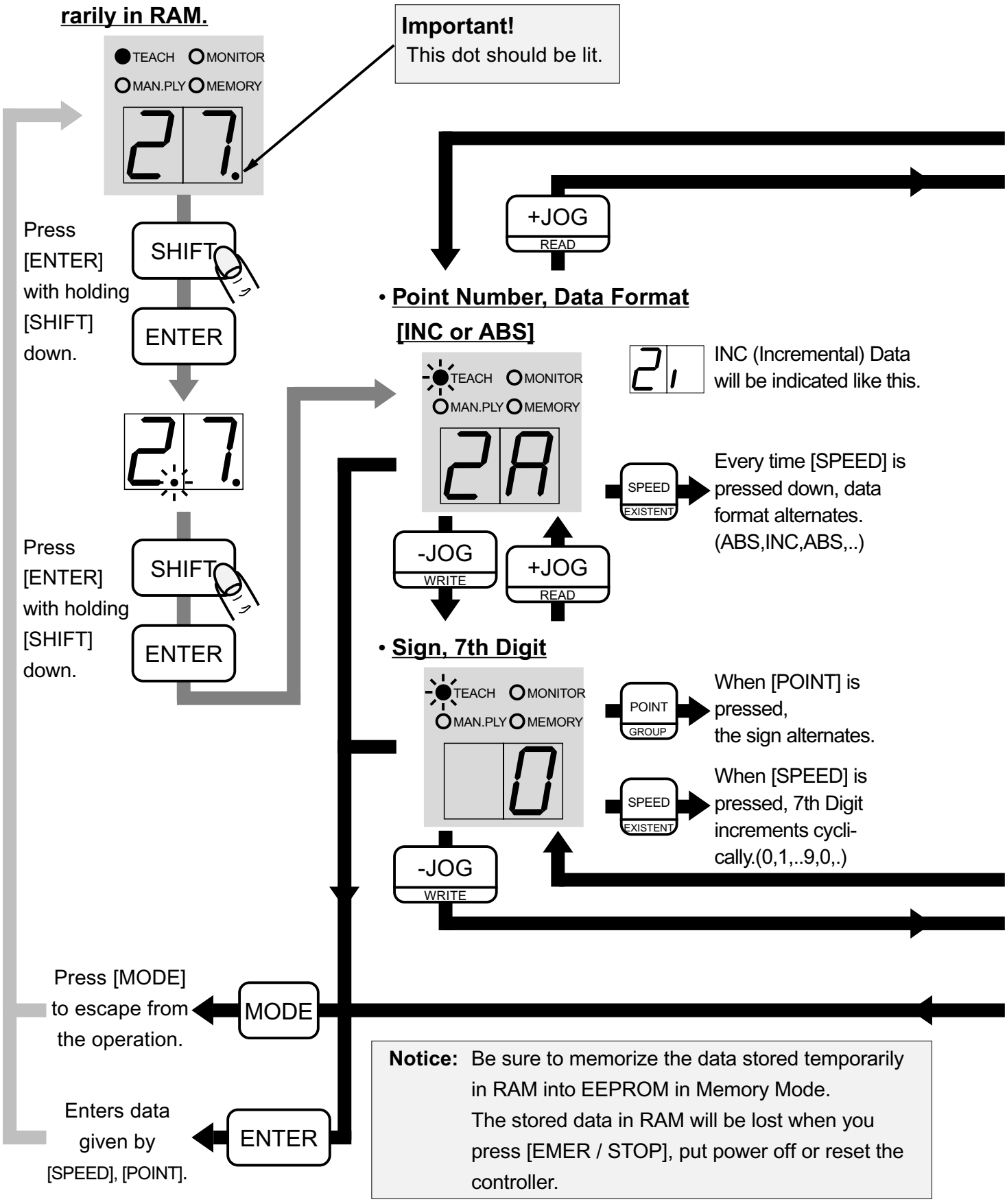
Movement Pulse Count = (125/5)*300*4 = 30,000

Movement Pulse Count = 30,000

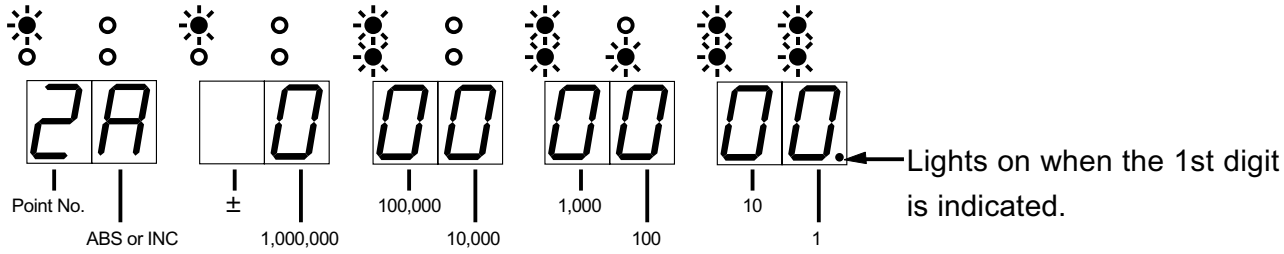
• Inputting Value (Pulse Count) of Position Data (Basic Operation)

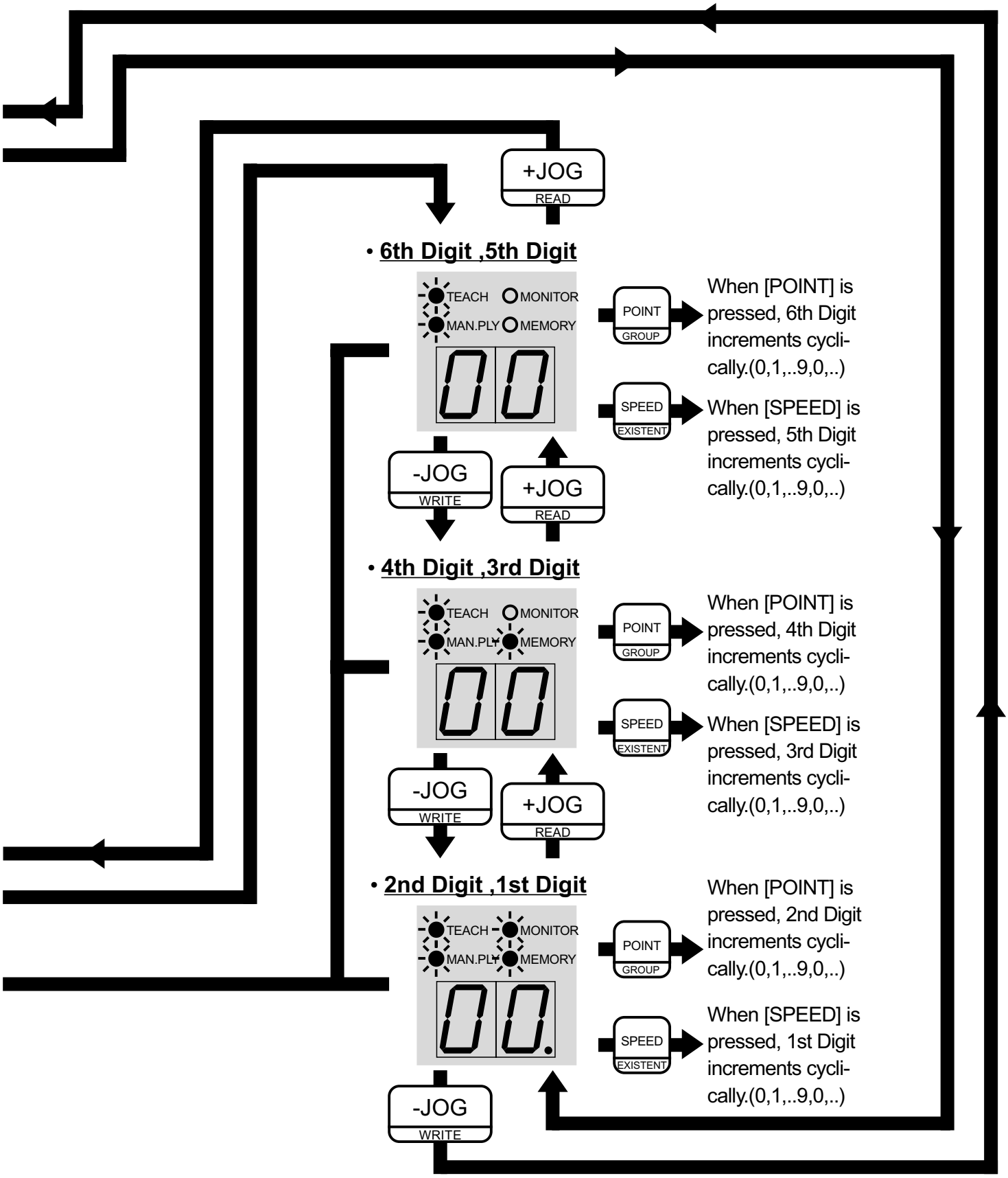
The operation prior to this basic operation is explained in pp4-20,21.

• **The Status in which the Teaching Data is Stored Temporarily in RAM.**



Notice: Be sure to memorize the data stored temporarily in RAM into EEPROM in Memory Mode. The stored data in RAM will be lost when you press [EMER / STOP], put power off or reset the controller.

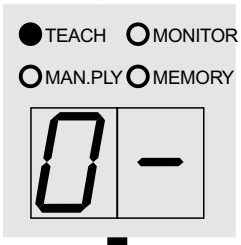

2A
0
00
00
00.
Point No.
ABS or INC
±
1,000,000
100,000
10,000
1,000
100
10
1
Lights on when the 1st digit is indicated.


+JOG
READ
• 6th Digit ,5th Digit
TEACH
MONITOR
MAN.PLY
MEMORY
00
POINT
GROUP
When [POINT] is pressed, 6th Digit increments cyclically.(0,1,..9,0,..)
SPEED
EXISTENT
When [SPEED] is pressed, 5th Digit increments cyclically.(0,1,..9,0,..)
-JOG
WRITE
+JOG
READ
• 4th Digit ,3rd Digit
TEACH
MONITOR
MAN.PLY
MEMORY
00
POINT
GROUP
When [POINT] is pressed, 4th Digit increments cyclically.(0,1,..9,0,..)
SPEED
EXISTENT
When [SPEED] is pressed, 3rd Digit increments cyclically.(0,1,..9,0,..)
-JOG
WRITE
+JOG
READ
• 2nd Digit ,1st Digit
TEACH
MONITOR
MAN.PLY
MEMORY
00.
POINT
GROUP
When [POINT] is pressed, 2nd Digit increments cyclically.(0,1,..9,0,..)
SPEED
EXISTENT
When [SPEED] is pressed, 1st Digit increments cyclically.(0,1,..9,0,..)
-JOG
WRITE

• Inputting Value (Pulse Count) of Position Data --- New Entry ---

1. Return to origin in the same way and direction as actual operation.
2. Press [MODE] to get into Teaching Mode.
3. Store the data of the point number and speed number of approximate positioning in following process.

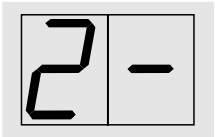
• **Selecting Point Number**



Every time [POINT] is pressed down, the point number increments by 1 up to 7 cyclically.
(0,1,..7,0,..)

Note: Press [POINT] and [SPEED] with holding [SHIFT] down, then the value willdecrement by 1.

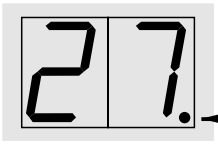
• **Selecting Speed Number**



Every time [SPEED] is pressed down, the speed number increments by 1 up to 7 cyclically.
(0,1,..7,C,0,..)

Store the data at approximate position.
(Exact positioning data will be inputted afterward.)

• **Store Point Number and Speed Data Temporarily in RAM.**

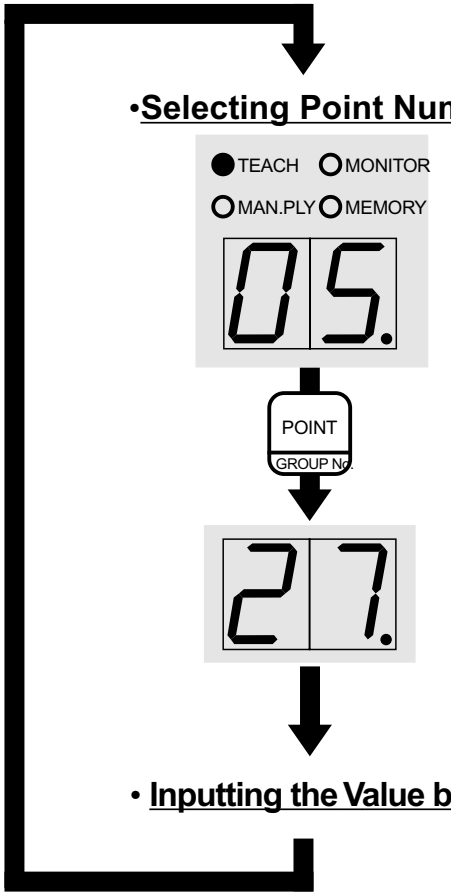


Lights up while the teaching data is stored temporarily.

• **Inputting the Value by the "Basic Operation" explained in pp.4-18,19.**

• Inputting the Value (Pulse Count) of Positioning Data

1. Return to origin in the same way and direction as actual operation.
2. Invoke the position data, which is to be modified, from EEPROM into RAM (Memory) per "Invoking Memorized Teaching Data". (See pp.4-24)
3. Press [MODE] to switch into teaching mode.



Every time [POINT] is pressed down, the point number increments by 1 up to 7 cyclically. (0,1,..7,0,..)

• Confirming Teaching Data in Manual Play Mode

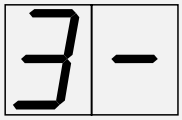
An operation to confirm the position and speed data inputted by teaching in actual running.

1. In the status when the teaching data is stored in RAM (Memory) temporarily: "Teaching ABS (Absolute) Data by [JOG] ", "Inputting the Value of Position Data" or "Reading Out Memorized Teaching Data "
2. Press [MODE] to switch into Manual Play Mode.
3. Confirm the teaching data by following process.

Every time [POINT] is pressed down, the point number increments by 1 up to 7 cyclically. (0,1,..7,0,..)

Note: Press [POINT] and [SPEED] with holding [SHIFT] down, then the value will decrement by 1.

When the teaching data does not exist, indication will be as below.



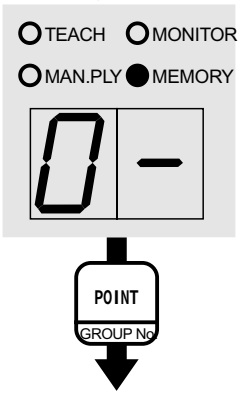
While the motor is running, the indication keeps blinking.

• Memorizing the Teaching Data

An operation to memorize the modified position and speed data by teaching into the EEPROM (Memory) of the controller.

1. In the status when the teaching data is stored in RAM (Memory) temporarily:
2. Press [MODE] to switch into Memory Mode.
3. Memorize the teaching data by following process.

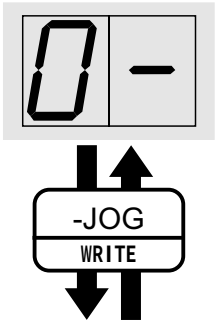
• **Selecting Group Number**



Every time [POINT] is pressed down, the group number increments by 1 up to 5 cyclically. (0,1,..5,0,..)

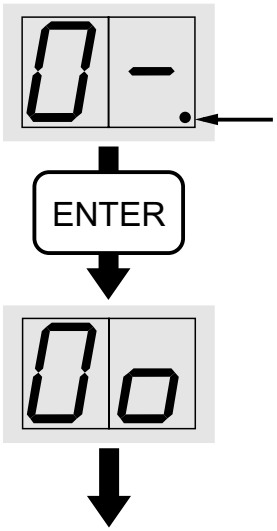
Note: When the teaching data is already memorized in the selected group number, the indication is like this.

• **Selecting Write Mode**



Every time [-JOG / WRITE] is pressed, the mode alternates "WRITE-Selected" and "WRITE-Not-Selected" with the dot being lit and not lit.

• **Executing "WRITE" (Memorize)**



Lit up in "WRITE-Selected" mode.

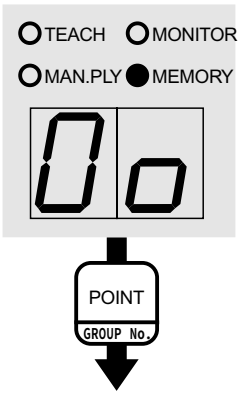
In this exercise, the teaching data was memorized in the group No.0.

• Reading Out the Memorized Teaching Data

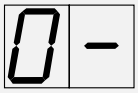
An operation to read out the memorized teaching data from the EEPROM (Memory) of the controller.

1.Return to origin in the same way and direction as teaching data.
2.Press [MODE] to get into Memory Mode.
3.Proceed with reading out the teaching data from the EEPROM as follows.

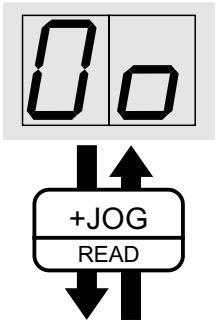
• **Selecting Group Number**



Every time [POINT] is pressed down, the group number increments by 1 up to 5 cyclically. (0,1,..5,0,..)

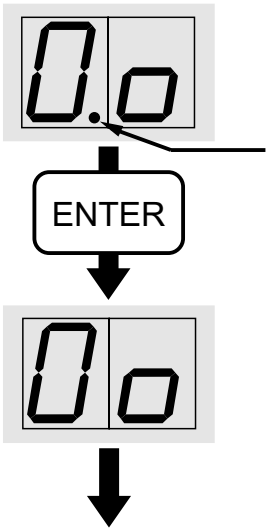
Note:  When stored Teaching Data doesn't exist, the indication shows “-” in lower digit like this.

• **Selecting Read Mode**



Every time [+JOG / READ] is pressed, the mode alternates " READ-Selected " and " READ-Not-Selected " with the dot being lit and not lit.

• **Executing "READ"**



Lit up in "READ-Selected" mode.

Data Memorizing Completed

In this exercise, the teaching data memorized in the group No.0 in EEPROM was read out into RAM (Memory).

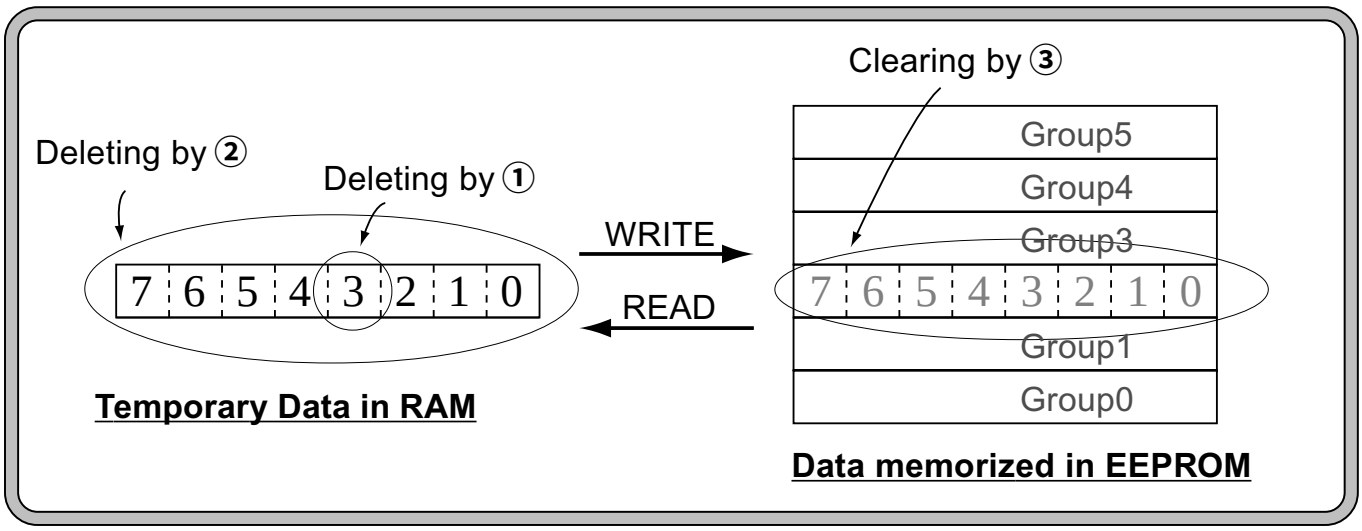
• Deleting Teaching Data

There are three kinds of ' DELETE ' command as follows.

① Deleting one temporary positioning data (Temporary in RAM)

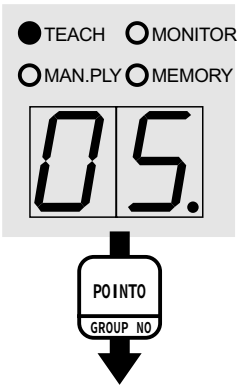
② Deleting all the temporary Teaching Data (Temporary in RAM)

③ Clearing whole memorized Teaching Data Group (in EEPROM)



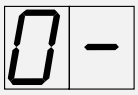
① Method of deleting a temporary positioning data

• **Select a POINT No. to be deleted**

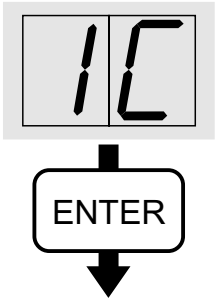


Every time [POINT] is pressed down, the POINT No. increments by 1 up to 7 cyclically.(0,1,..7,0,..)

Note: When the temporary Teaching Data doesn't exist, the indication shows "-" like this.

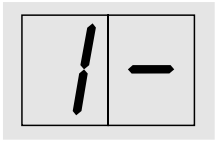


• **Select 'DELETE A POSITIONING DATA' command**



Indicate ' C ' by pressing [SPEED]. (...,7,C,0,..)

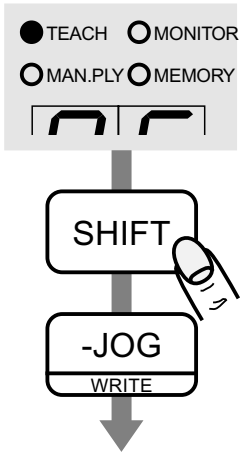
• **Deleting a Positioning DataCompleted**



Note: Temporary data in RAM can be memorized into EEPROM in the MEMORY MODE.
When [EMER/ STOP] is pressed or power turned off or controller reset, temporary Teaching Data in RAM will be lost.

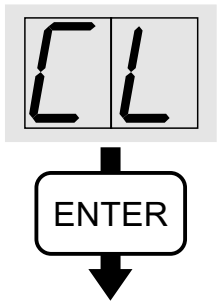
② Method of Deleting all temporary Teaching Data

• **Select 'DELETE ALL TEMPORARY TEACHING DATA' command**

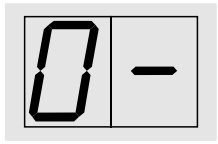


Press [SHIFT]+[-JOG].

• **Execute 'DELETE ALL TEMPORARY TEACHING DATA' command**



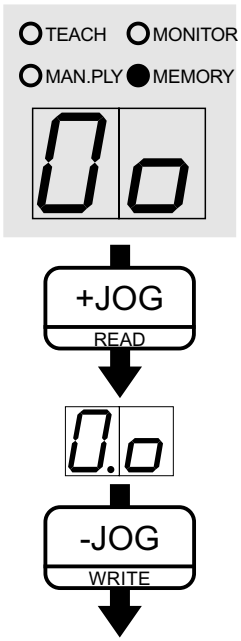
• **Completed deleting all temporary teaching data**



Note: Temporary data in RAM can be memorized into EEPROM in the MEMORY MODE. When [EMER STOP] is pressed or power turned off or controller reset, temporary Teaching Data in RAM will be lost.

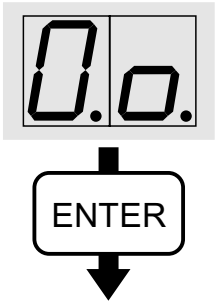
③ Method of clearing one whole stored Teaching Data Group (memorized in EEPROM)

• **Select 'CLEAR ONE WHOLE STORED TEACHING DATA GROUP' command**

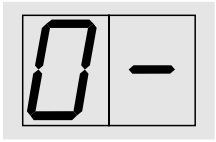


Note: When stored Teaching Data exists in selected group, the indication shows “o” in lower digit like this.

• **Execute 'CLEAR ONE WHOLE STORED TEACHING DATA GROUP'**

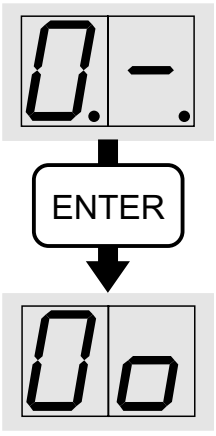


• **Clearing one Teaching Data Group Completed**



• Method of Restoring Cleared Teaching Data Group

The method is valid on the conditions as follows.
Condition1: Parameter PF shows 'Enable'. (see 'Extended Functions' on page P5-5)
Condition2: No data exists in the group due to all the Teaching Data Group was cleared.



Procedure1: Select the already-cleared Group No. to be restored.

Procedure2: Process again the method of clearing one whole stored Teaching Data Group, which has been cleared.

Restored !

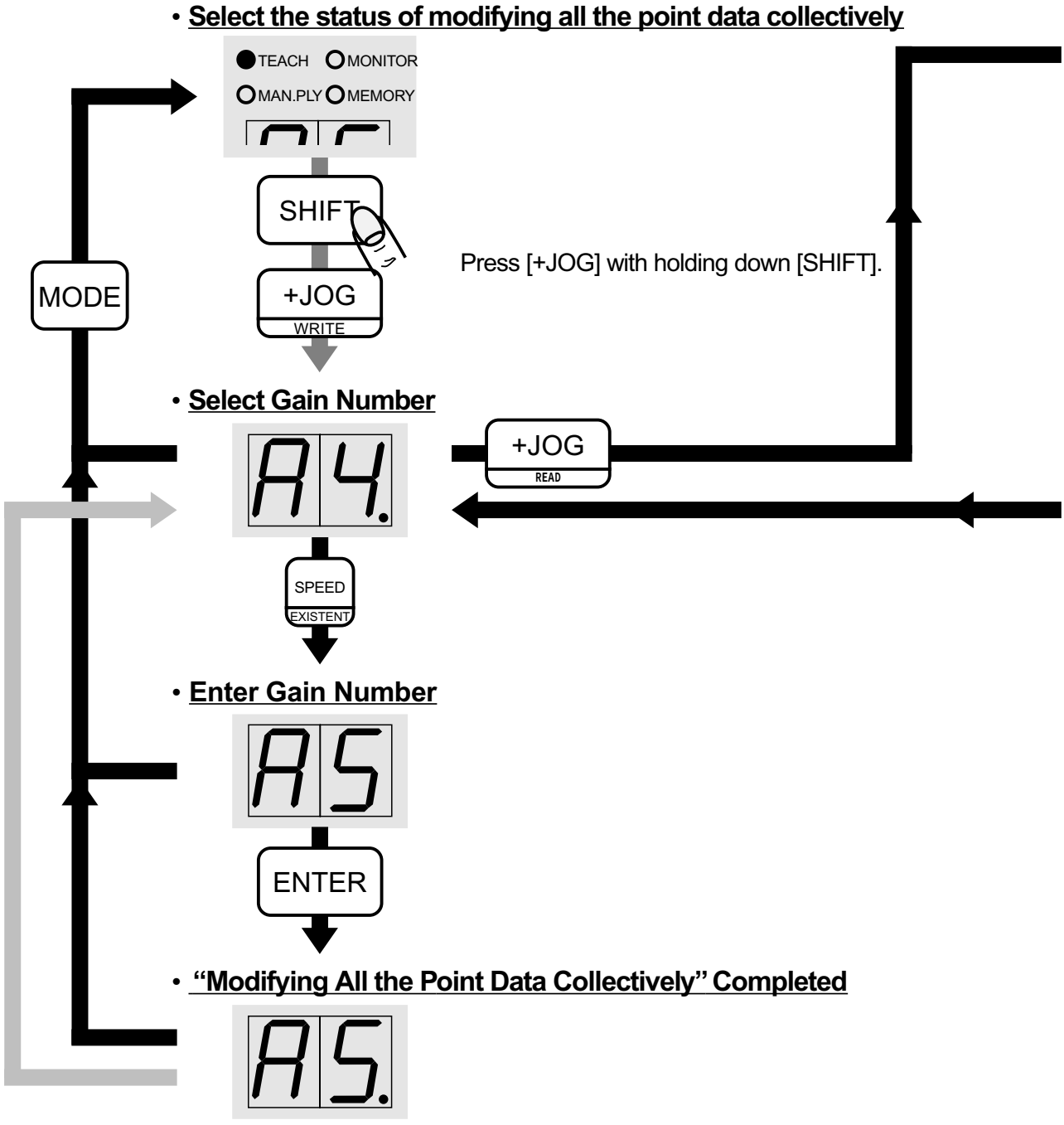
• Modifying the Acceleration/Deceleration (A/D) Rate

There are 2 ways to modify the A/D (Acceleration / Deceleration) rate as follows:
As for the data stored in RAM (Memory) temporarily:

① Modifying all the point data collectively
② Modifying each point data

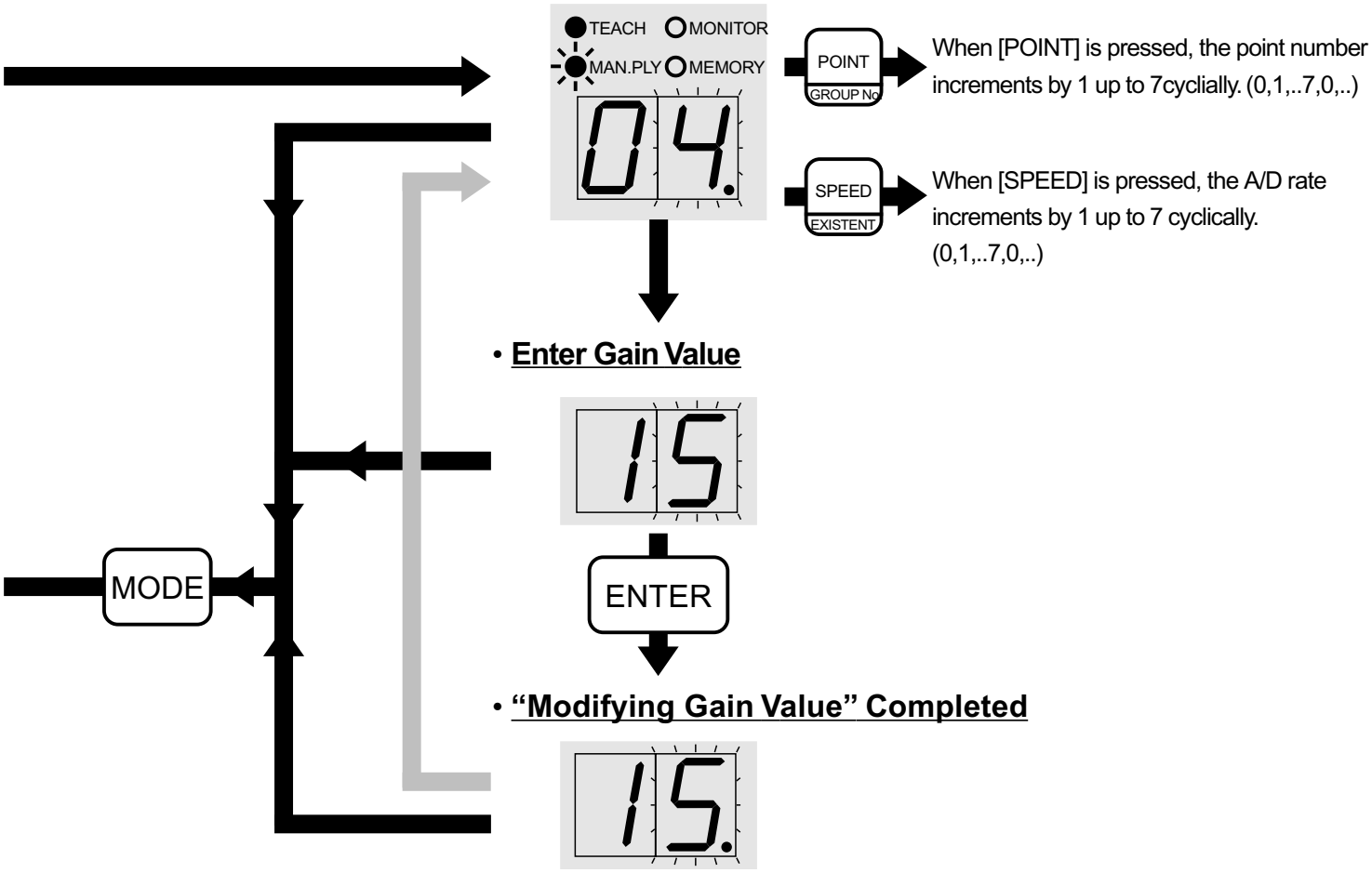
1. Return to origin in the same way and direction as actual operation.
2. Be in the status when the teaching data is stored in RAM (Memory) temporarily.
   If the data supposed to be memorized teaching data, read out the position data from EEPROM into RAM (Memory) per "Reading Out Memorized Teaching Data".
   (See pp.4-24)
3. Press [MODE] to switch into teaching mode.

① Modifying All the Point Data Collectively



② Modifying Each Point Data

• **Select the status of modifying each point data**



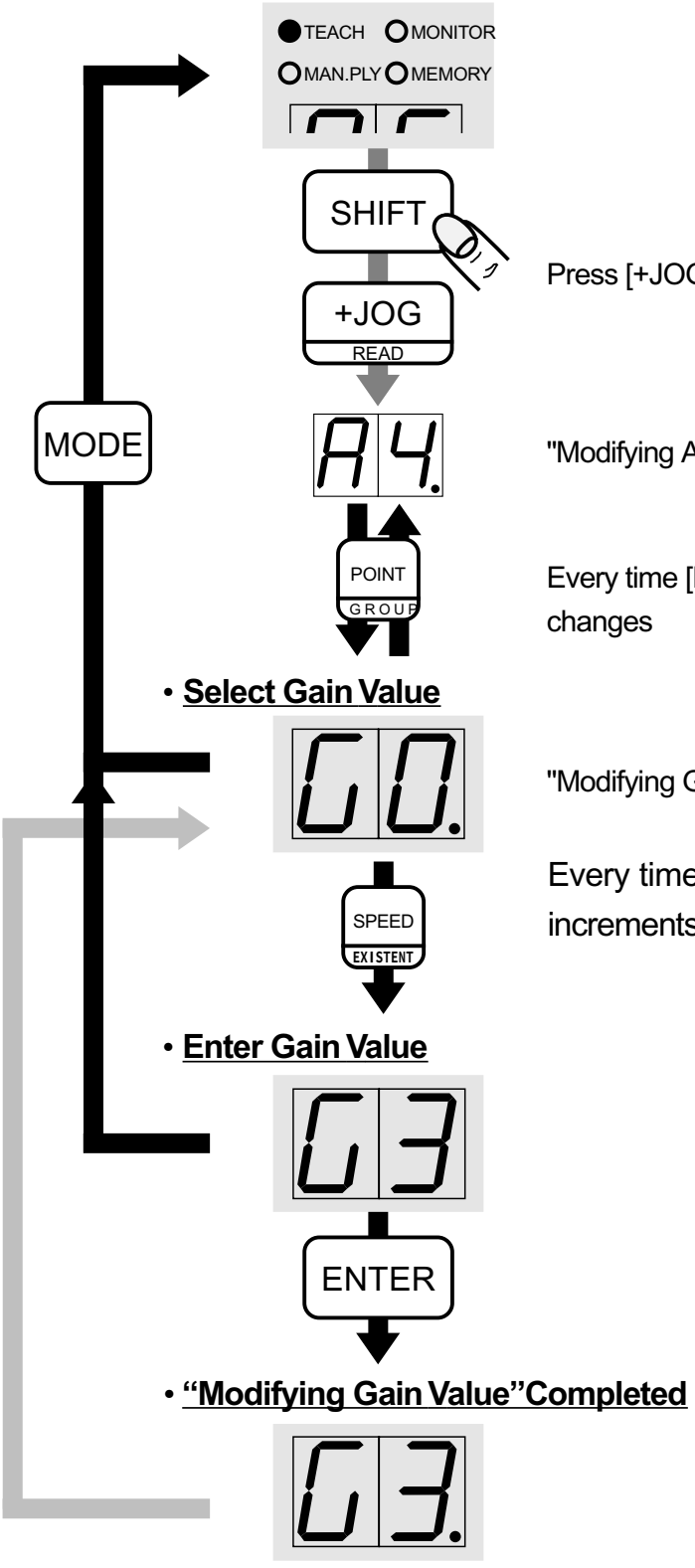
Notice: Be sure to memorize the data, which is stored temporarily in RAM, into EEPROM in the Memory Mode.
The stored data in RAM will be lost when you press [EMER/STOP], put power off, or reset the controller.

• Modifying Gain Value

Gain Value is to be set in group, not in each point.

1. Return to origin in the same way and direction as actual operation.
2. Be in the status when the teaching data is stored in RAM (Memory) temporarily.
   If the data supposed to be memorized teaching data, read out the position data from EEPROM into RAM (Memory) per "Reading Out Memorized Teaching Data".
   (See pp.4-24)
3. Press [MODE] to switch into teaching mode.

•Select the Status of Modifying Gain Value



Press [+JOG] with holding down [SHIFT].

"Modifying A/D Rate" Mode

Every time [POINT] is pressed, the Mode changes

• Select Gain Value

"Modifying Gain Value" Mode

Every time [SPEED] is pressed, the gain value increments by 1 up to 7 cyclically. (0,1,..7,C, 0,..)

• Enter Gain Value

• "Modifying Gain Value"Completed

Note: Press [SPEED] with holding [SHIFT] down, then the value will decrement by 1.

Notice: Be sure to memorize the data , which is stored temporarily in RAM,into EEPROM in the Memory Mode.
The stored data in RAM will be lost when you press [EMER/ STOP], put power off, or reset the controller.

• Modifying the Speed Data

There are 2 ways of modifying the speed data as follows.

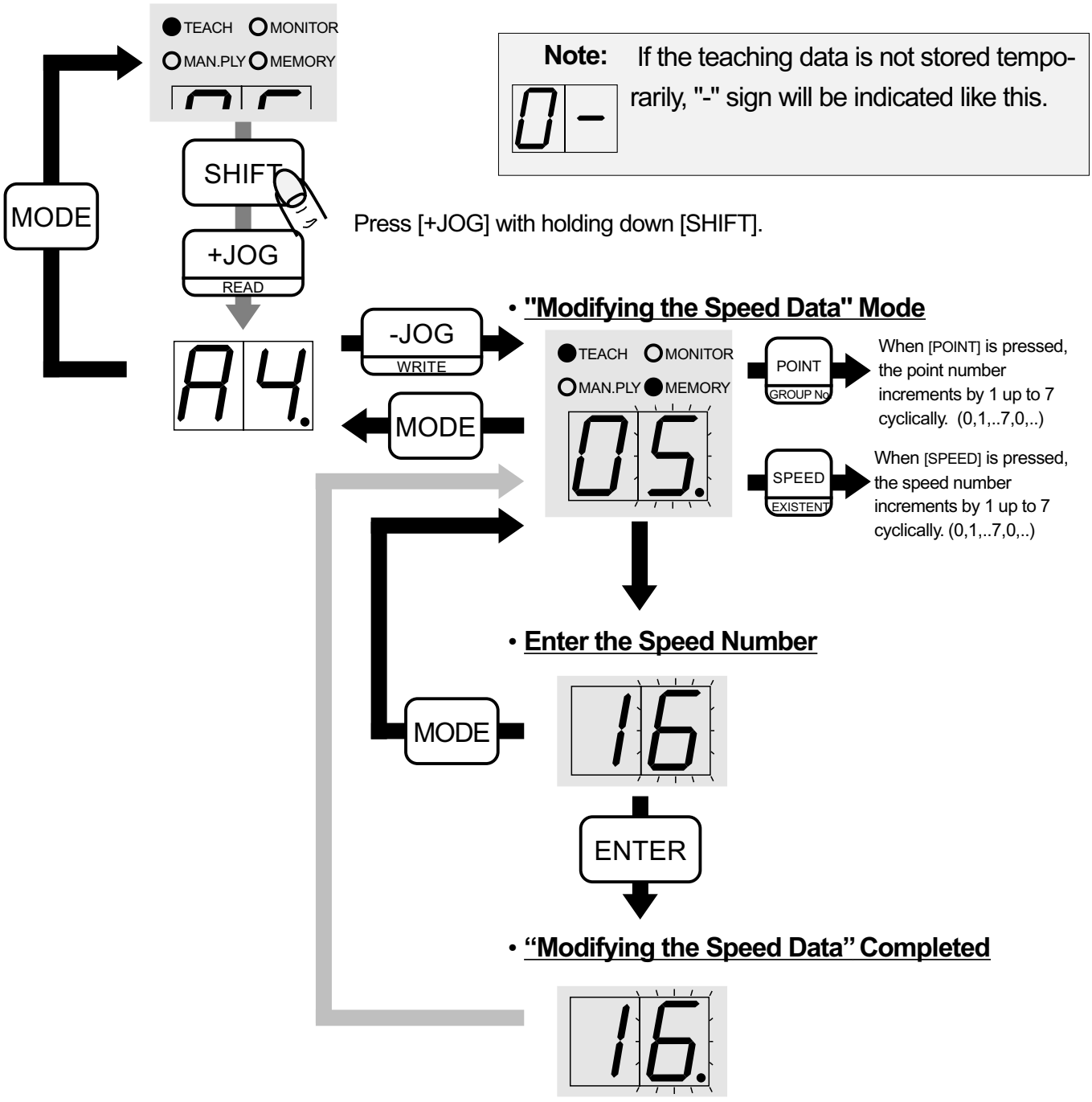
① Modifying in Teaching Mode

② Modifying in Manual Play Mode

1. Return to origin in the same way and direction as actual operation.
2. Be in the status when the teaching data is stored in RAM (Memory) temporarily.
   If the data supposed to be memorized teaching data, read out the position data from EEPROM into RAM (Memory) per "Reading Out Memorized Teaching Data".
   (See pp.4-24)

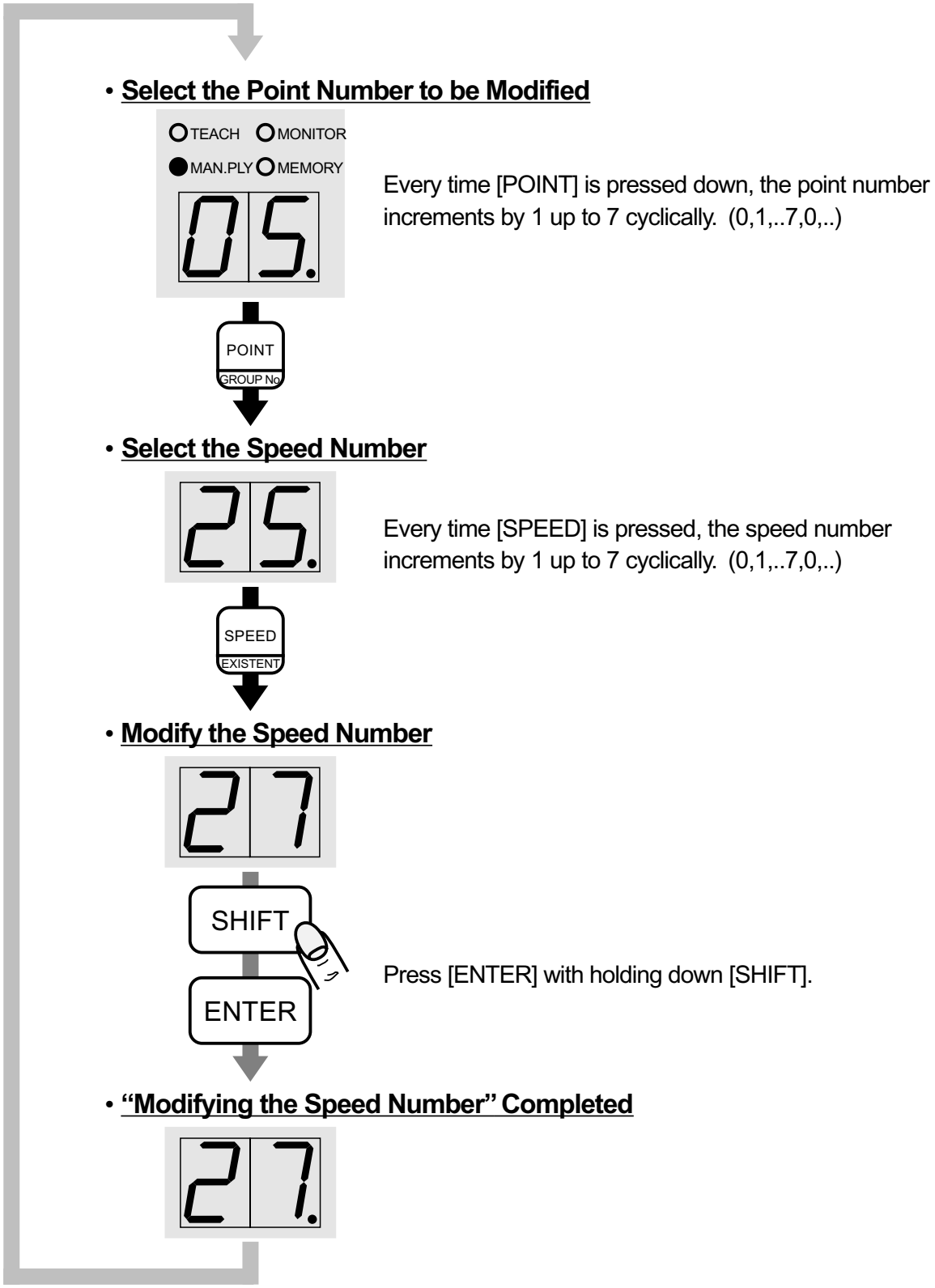
① Modifying in Teaching Mode

• **Teaching Mode**



Note: If the teaching data is not stored temporarily, "-" sign will be indicated like this.

② Modifying in Manual Play Mode



Notice: Be sure to memorize the data, which is stored temporarily in RAM, into EEPROM in the Memory Mode.
The stored data in RAM will be lost when you press [EMER/STOP], put power off, or reset the controller.

■ *Setting Speed, Acceleration/Deceleration Rate and Gain in Speed Servo Mode*

• Description of Speed Servo Mode

Selection of Servo Mode

Set the mode in Speed Servo Mode (See 'P8:Servo Mode Select' on page 5-3.)

Note: Speed and Positioning Servo Mode are mutually exclusive.

Returning to Origin

Can't do and not required.

Speed & Acceleration/Deceleration Rate

Speed

8 levels of user set value and 8 levels of fixed value are available.

User Set Value (0,1,2,3,4,5,6,7)

Speed No.	0	1	2	3	4	5	6	7
Speed [rpm]								

Don't set the value over the characterized maximum value of each model you use or fatal trouble may occur.

Fixed Value(0.,1.,2.,3.,4.,5.,6.,7.)

Speed No.	0.	1.	2.	3.	4.	5.	6.	7.
Model characterized 2500rpm at maximum [rpm]	50	100	250	500	1000	1500	2000	2500
Model characterized 3000rpm at maximum [rpm]	50	250	500	1000	1500	2000	2500	3000

S-series of 40&80W are characterized as 3000rpm at maximum and the others as 2500rpm.

Acceleration/Deceleration Rate

It can be related individually to each speed.

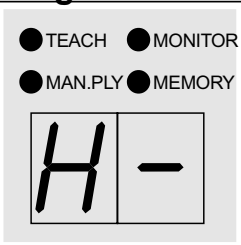
Default value depends on the set value of Parmeter6.

(See P6: Ac-/Deceleration Rate on page 5-2.)

• Flow of Setting Speed

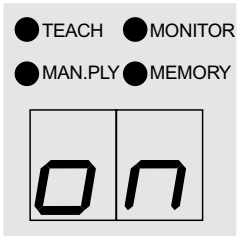
Notice: Be sure to make "open" between COM and other input terminals.

• **Putting Power on to Controller**



SHIFT

• **Servo On**

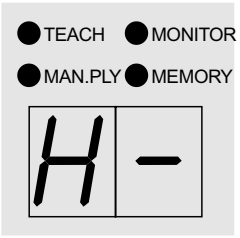


If “H0” is indicated at this step , ”Positioning servo” mode is activated.
Change the value of Parameter8 into 1 first of all.

EMER STOP

• **Servo -Off**

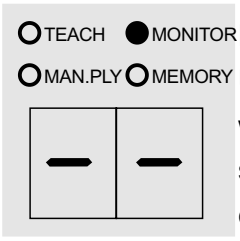
• **(Power On)**



MODE

MODE

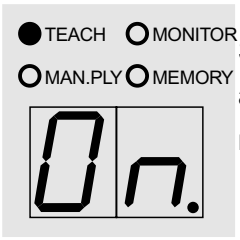
• **Monitor Mode**



Not utilized while teaching. Utilized for monitoring when the motor is put servo-on from the controller.(See page 3-26)

MODE

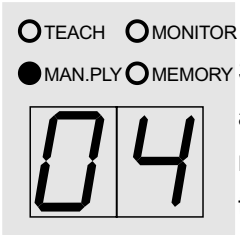
• **Teaching Mode**



Speed, ac-/deceleration rate and gain can be set in this mode.

MODE

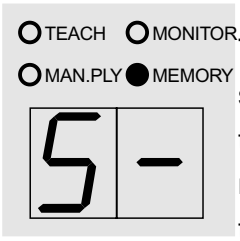
• **Manual Play Mode**



Speed, ac-/deceleration rate and gain set in the teaching mode can be confirmed in this mode.

MODE

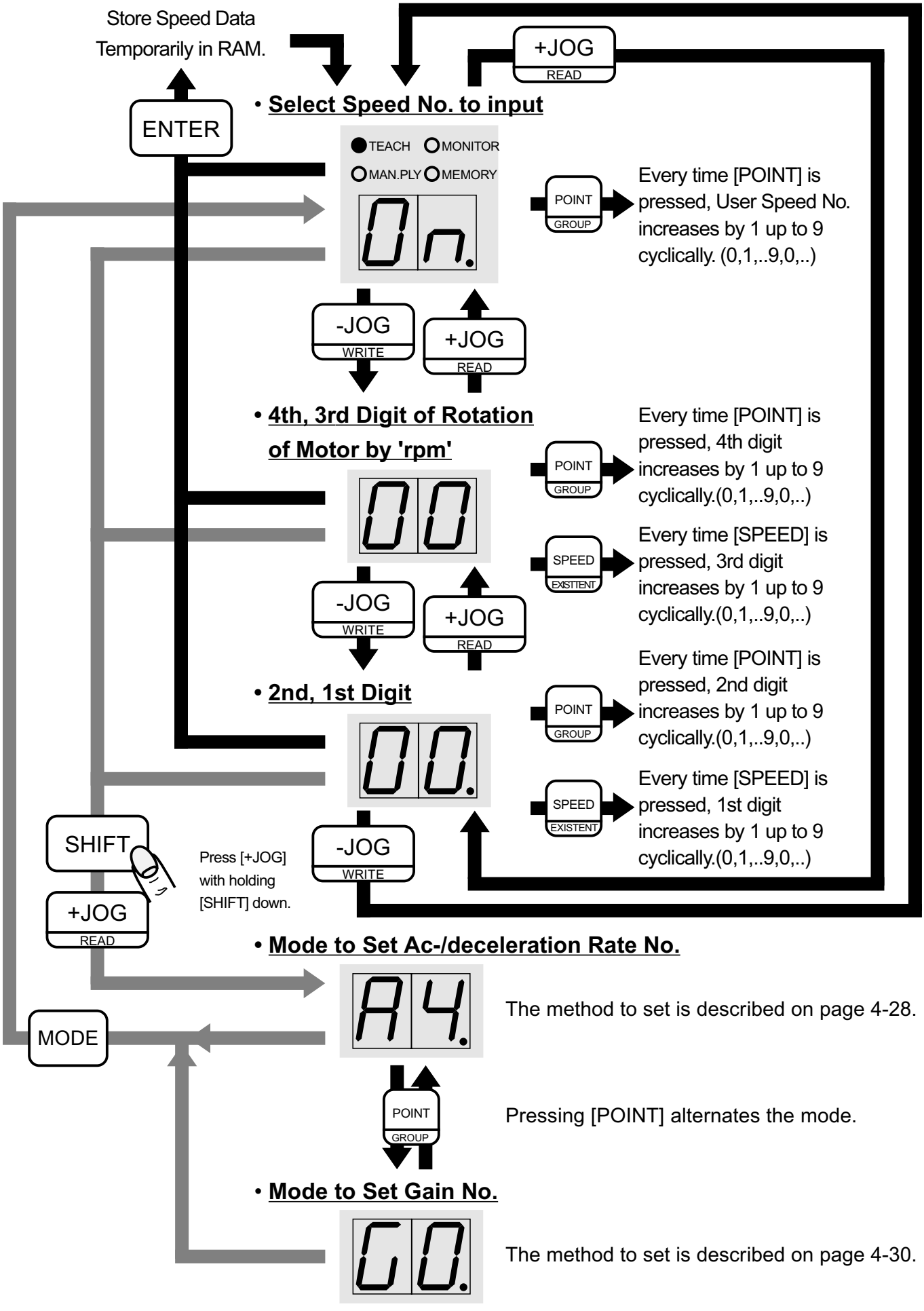
• **Memory Mode**



Teaching data which consists of speed, ac-/deceleration rate and gain can be memorized into EEPROM in this mode.

Note: The teaching data will be lost when you press [EMER/STOP] without memorizing the data into EEPROM(Memory).

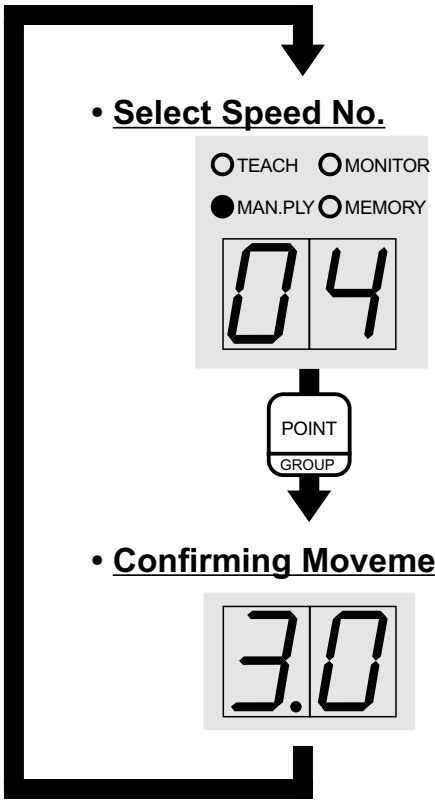
• Setting User Set Value of Speed, Ac-/deceleration Rate and Gain



• Confirming Teaching Data

The function provides confirming teaching data which consists of speed, ac-/deceleration rate and gain you set, letting actuator move.

Note: Pressing [POINT] with holding [SHIFT] down effects the value decreased by 1.
Note: User set value 0~7
Fixed value 0.~7.



Every time [POINT] is pressed, User Set Value of Speed Number increments by 1 from “0” up to “7”, then alternatively Fixed Value of Speed No. increments by 1 from “0.” up to “7.”. This indication repeats cyclically.

(0 → 1 · · · 7 → 0. → 1. · · · 7. → 0 → 1 · · ·)

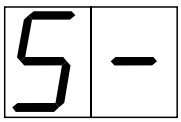
While [+JOG] or [-JOG] is pressed down, the actuator runs at the speed set.

• Memorizing the Teaching Data

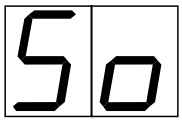
An operation to memorize the speed, ac-/deceleration rate and gain which was input, into the EEPROM(Memory) of the controller.

1. In the status when the teaching data is stored in RAM(Memory) temporarily.
2. Press [MODE] to switch into Memory Mode.
3. Memorize the teaching data by the process described in the section of 'Memorizing the Teaching Data' on page 4-23.

Notice: Teaching data of speed servo mode can be stored only into Group No.5.



Indicating no teaching data in group No.5



Indicating existence of teaching data in group No.5

• Reading Out the Memorized Teaching Data

An operation to read out the memorized teaching data from the EEPROM(Memory) of the controller.

1. Turn the motor servo on.
2. Press [MODE] to get into Memory Mode.
3. Read out the teaching data by the process described in the section of 'Reading Out the Memorized Teaching Data' on page 4-24.

Notice: Teaching data of speed servo mode can be stored only into Group No.5.

Chapter5

Parameters

This chapter describes functions and setting of the parameters.

1. Description of Functions
2. Setting Method
3. Initializing

1 Description of Functions

- **P0 JOG Speed (High)**

  Motor Speed-High at JOG operation

  Factory setting: -2

Indication	-0	-1	-2	-3
Motor Speed(rpm)	250	500	750	1000

- **P1 JOG Speed (Low)**

  Motor Speed-Low at JOG operation

  Factory setting: -2

Note: Do not set the same value as Parameter PD into P1 and P2 to avoid trouble of positioning.

Indication	-0	-1	-2	-3
Motor Speed(rpm)	10	25	50	100

- **P2 Speed of Returning to Origin(High)**

  Motor Speed-High at Returning to Origin

  Factory setting: -2

Indication	-0	-1	-2	-3
Sensor Stop(rpm)	100	200	500	1000
Locking Stop(rpm)	50	100	250	500

- **P3 Filter for START Signal**

  The time filtered off from pulse width of START signal input.It provides START signal input with protection against noise such as chattering.START input would be ignored if pulse width is shorter than value of P3.

  Factory setting: -2

Indication	-0	-1	-2	-3
Filtered Time(ms)	0	10	30	60

• P4 Width of IN-POSI

Allowance of accumulated pulses, which the deviation counter indicates, to output signal of IN-POSI; completion of positioning.
When motor reaches within the allowance for positioning point, the IN-POSI(No.22) output signal is activated.
If the motor over- /undershoots on stopping, IN-POSI signal will be output several times.

Factory setting: -2

Indication	-0	-1	-2	-3
Width of IN-POSI by pulse	±5	±10	±20	±50

ex. For S-series as lead: 6mm
Number of encoder pluses 300pulse
Width of IN-POSI ±10pulses

$$\frac{360^{\circ}}{300pulse \times 4} \times \pm 10\,pulse = \pm 3^{\circ}$$

$$\frac{\pm 3^{\circ}}{360^{\circ}} \times 6mm = \pm 0.05mm$$

The IN-POSI output signal is activated when motor reaches within ± 0.05mm to instructed point.

• P5 Preset Group Number

This parameter indicates the group of positioning data to be invoked at first of system reset done when external operation.No.

Factory setting for Positioning Servo Mode: -0
for Speed Servo Mode: -5

• P6 Acceleration/Deceleration Rate

Default ac-/deceleration rate by time

Factory setting: -4

Indication	-0	-1	-2	-3	-4	-5	-6	-7
Acceleration Rate [sec]/0〜2500rpm	8	4	2	1	0.5	0.25	0.13	0.06
Deceleration Rate [sec]/0〜3000rpm	2.4	1.2	0.6	0.3	0.156	0.072	0.036	0.024

Note: Change of this parameter doesn't effect on Teaching Data which is already stored but on Teaching Data which will be set later.

When ac-/deceleration Rate of Teaching Data already stored must be changed, see the section 'Modifying Acceleration/Deceleration Rate' on page 4-28.

• P7 Gain

Default servo-gain value for positioning control

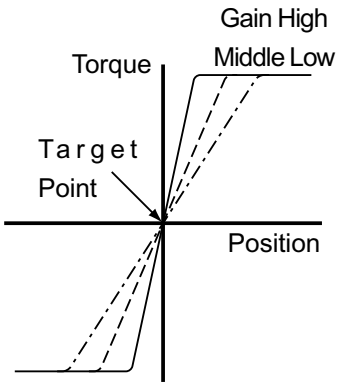
The value is adjusted for each model at factory. Do not change the value if not for any problems.

Factory setting: Differently from each model

Indication	-0	-1	-2	-3	-4	-5	-6	-7
Gain No.	0	1	2	3	4	5	6	7

Low ← Gain → High

Outline of gain effect



Note: With unsuitable value for the application, the motor may vibrates and it may result damage of motor and facilities.

Note: Change of this parameter doesn't effect on Teaching Data which is already stored but on Teaching Data which will be set later.
When the gain of Teaching Data already stored must be changed,

see the section 'Modifying Gain' on page 4-30.

• P8 Servo Mode Select

Alternating between Positioning and Speed Servo Mode

Factory setting: -0

Indication	-0	-1
Servo Mode	Positioning Servo	Speed Servo

If positioning servo mode is selected, Preset Group Number will be No.0. Whereas No.5 if speed servo mode selected.

• P9 External Change Of Positioning Data Group

This parameter makes the function of EXTERNAL CHANGE OF POSITIONING DATA GROUP by external signal enabled.

Factory setting: -0

Indication	-0	-1
Change by external signal	Disable	Enable

• PA Function of BUSY Terminal

Select substance of signal output from BUSY terminal(20)

Factory setting: -0

Indication	signal name	function
-0	BUSY	In progress while control system generates pulses for motor.
-1	Torque	In progress while loaded torque exceeds 100% rated.
-2	Error	Activated when an error occurs
-3	Alarm	Output signal synchronizing with POWER LED when alarm

• PB RS232C

Never change this value from '-0'. This parameter would extend functions in the future.

Factory setting: -0

Indication	-0	-1
RS232C Function	Disable	Enable

• PC Acceleration/Deceleration Rate at JOG

Ac-/deceleration rate at JOG by time

Factory setting: -4

Indication	-0	-1	-2	-3	-4	-5	-6	-7
Acceleration Rate [sec]/0～2500rpm	8	4	2	1	0.5	0.25	0.13	0.06
Deceleration Rate [sec]/0～3000rpm	2.4	1.2	0.6	0.3	0.156	0.072	0.036	0.024

• PD Speed of Returning to Origin(Low)

Motor Speed-Low at Returning to Origin

Factory setting: 9rpm

Indication	0～99
Motor Speed(rpm)	Set in number

Note: Do not set the same value as Parameter P1 and P2 into PD to avoid trouble of positioning.

• PE S-Curve Modulation

This parameter makes S-Curve-Modulated Ac-/Deceleration enabled.

Factory setting: -0

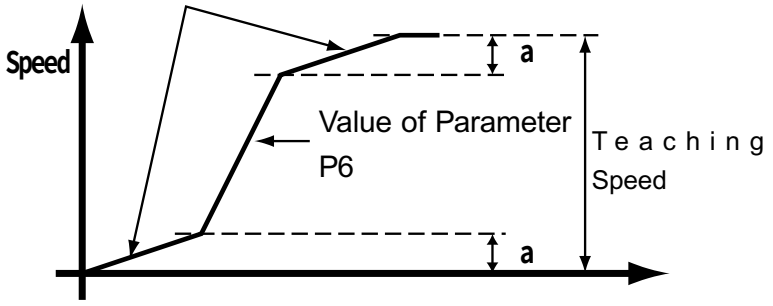
Indication	-0	-1
S-Curve Modulation	Disable	Enable

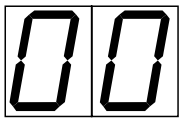
When S-Curve Modulation enabled, the motor ac-/decelerates as the chart shown below. The ac-/deceleration rate depends on parameter P5 and the value referred to the table below.

	Indication	0	1	2	3
Upper Digit	S-Curve-Modulated Ac-/Decelerates Rate at Lower Speed	P6×2	P6×3	P6×4	P6×5
Lower Digit	Proportion of Turning Point to Teaching Speed	1/24	1/12	1/6	1/3

[Ac-/decelerates Rate]=[Value of Parameter P6]x[S-Curve-Modulated Ac-/Decelerates Rate at Lower Speed]

a = [Teaching Speed]x[Proportion of Turning Point to Teaching Speed]





Proportion of Turning Point to Teaching Speed

S-Curve-Modulated Ac-/Decelerates Rate at Lower Speed

• PF Extended Functions

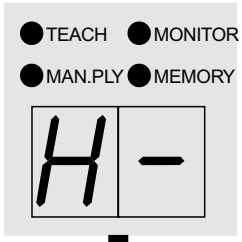
This parameter makes the Extended Functions enabled.

Factory setting: -2

Indication	-0	-1
Extended Functions	Disable	Enable

2 Setting Parameters

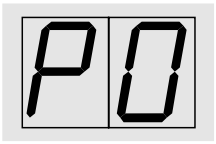
• **Power Supply to Controller**



Turn servo off to set parameters.

MODE

• **Select No. of Parameter**



SPEED
EXISTENT

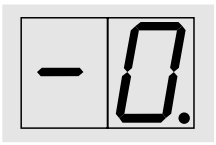
The No. is increased every pressing [SPEED].
(0,1,..E,F,0,..)

Note: The No. is decreased every pressing [SHIFT]+[SPEED].

ENTER

MODE

• **Settle No. of Parameter**

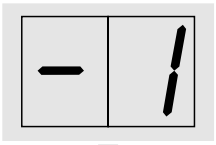


Existing value is indicated.

SPEED
EXISTENT

The value is increased every pressing [SPEED].

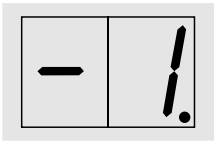
• **Changing Value**



Set new value.

ENTER

• **Settle Value**



The value is changed completely.

4 Extension Mode

The extended functions may help to make good use if parameters P0 - PE are not effective.

When use,be sure to understand well reading the following.

The parameter PF must be change ‘0’ into ‘1’ before use.

Function

item	Function	Display on TP -1 at seeting
AC-/Deceleration rate No.8	Set free AC-/Decelerate as you like.	A8
AC-/Deceleration rate No.9	Set free AC-/Decelerate as you like.	A9
Speed No.9	Set free Speed as you like.	n8
Speed No.9	Set free Speed as you like.	n9
Jog Speed(High) No.4	Set free Speed as you like.	JH
servo-On Origin *1	Make origin immediately when Servo-On.	
Undelete *2	See 'Method of Restoring Cleared Teaching Data Group' on P 4-27.	

*1 One variation of ‘Return to Origin’ Notion added.

The functions of *1 and *2 will be availabk just by setting parameter PF into ‘1’. Others must be set value to be available.

The relation between A8 and A9 is described as following formula.

S series A=64

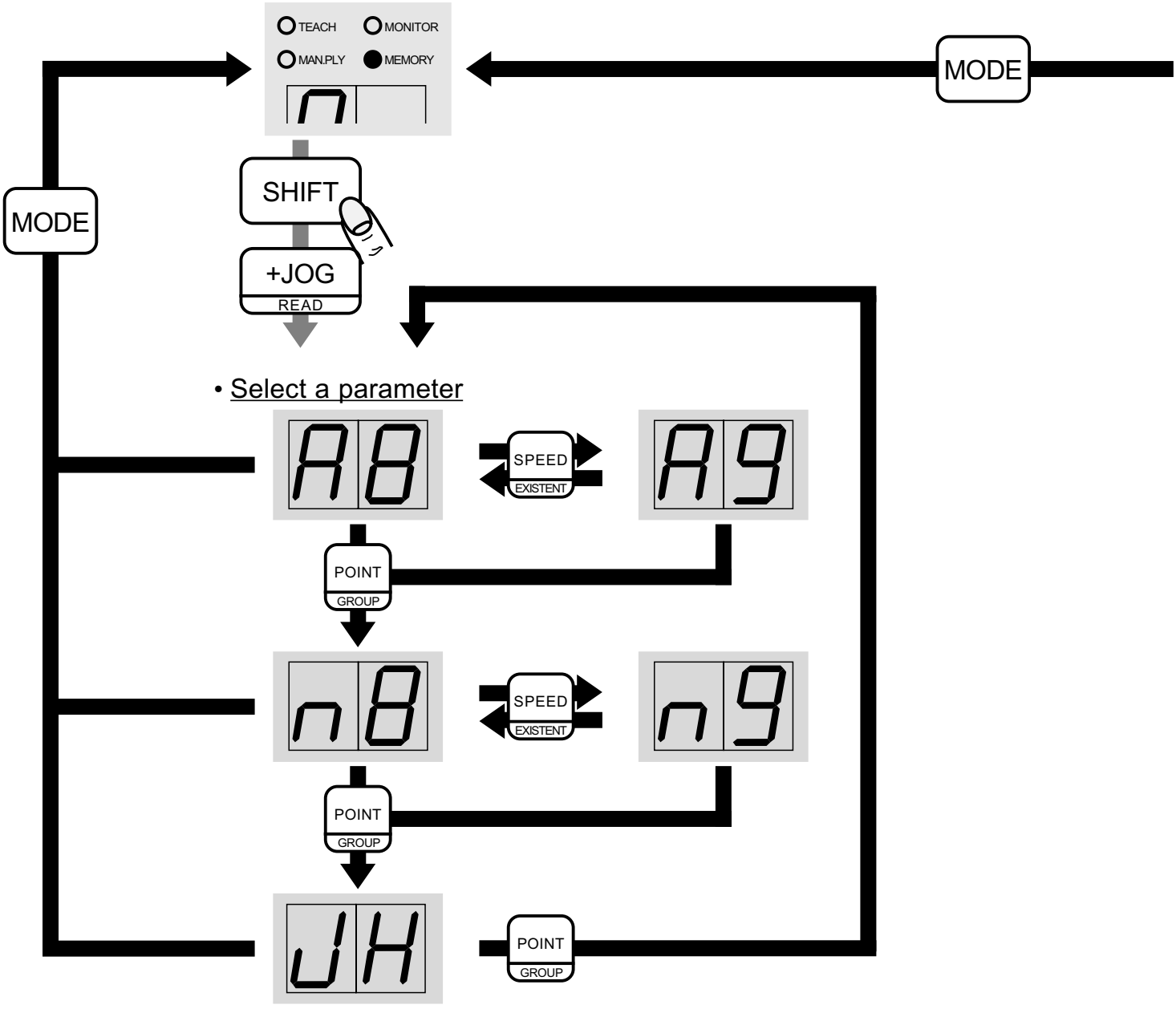
V series A=256

$$Time\_for\_Ac-/Deceleration = \frac{A \times value \times speed}{19,660,800}(\text{sec})$$

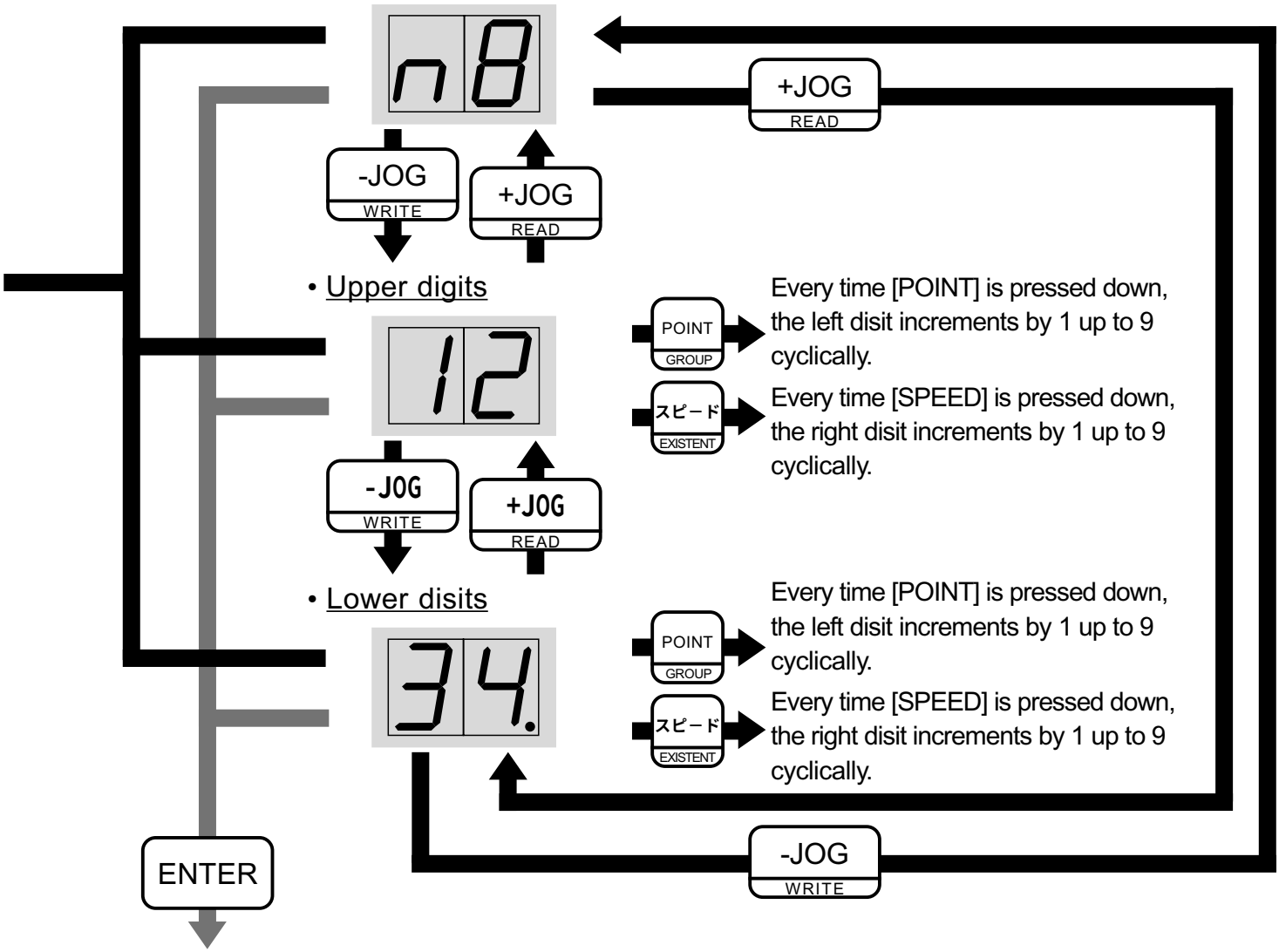
Set value of rotation speed at motor for n8,n9 and JH.

- **Setting exteasion paramaters**

  - **Set ‘1’ into parameter PF by the procedure on page P5-6.**
  - **Execute Return-to-Origin command and let it completed.**
  - **Switch into Memory Mode.**
  - Status for settle of extension parameters.



• Modifying the parameter selected.

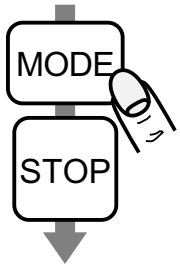


Set values are memorized into EEPROM and display shows what it was at the beginning.

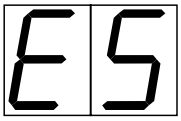
4 Initializing

Parameters can be initialized to be factory setting all at once.
Take notice that all teaching data will be vanished after initializing.

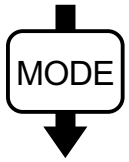
• **Select command to initialize**



Press [STOP] with holding [MODE] down.

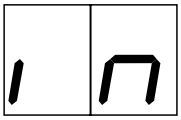


The status will be in Emergency stop.



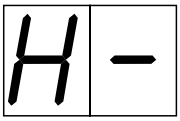
Release [STOP] with holding [MODE] down.

• **Execut initializing**



If any key except [ENTER] is pressed,initializing command will be cancelled.

• **Completed initializing**



Chapter6

Processing ALARM & ERROR

This chapter describes the alarm and error indications including causes and countermeasures.

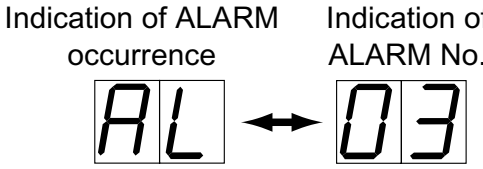
1. Description of ALARM and ERROR
2. List of ALARM and Causes, Countermeasures
3. List of ERROR and Causes, Countermeasures

1 Description of ALARM and ERROR

ALARM

The ALARM signal indicates that one of the driver's protection functions has activated. When a serious fault is detected, an ALARM signal will be outputted and the motor come to halt.

The Process of ALARM



Followings are simultaneous with ALARM.

- The motor come to a natural stop.
- The motor turns servo off.
- ALM terminal (23) is activated; come to ON.
- The ALARM LED turns ON.
- The POWER LED blinks. The ALARM No. is indicated by the counts of blink of the POWER LED in a cycle.
- 'AL' and ALARM No. are indicated on TP (Teaching Pendant) by turns.

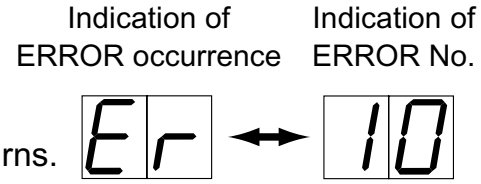
Cancelling ALARM Signal Output

Confirm the ALARM No. to correct the problem that caused the ALARM.
Reset the controller or turn off the power, and then turn the power on again.
Turning on the power cancels the ALARM signal.

ERROR

The ERROR occurs when an irregular operation is done mainly during teaching.

The Process of ERROR



Followings are simultaneous with ALARM.

- The POWER LED blinks in constant cycle.
- 'Er' and ERROR No. are indicated on TP by turns.

Cancelling ERROR

Confirm the ERROR No. to do proper Teaching.
Press [ENTER] on TP for approximately 1 sec and then release.
The controller and TP resume state as before.
Once the controller is reset, turned off or [EMER STOP] is pressed, 'Returning to Origin' must be done.

2 List of ALARM and Causes, Countermeasures

No	ALARM NAME	CAUSE	COUNTERMEASURE
0	Overload	1)Loaded torque exceeds rated continuously for more than the specified time: V…10 sec S…3 sec 2)Unreleased brake by the breaking of brake-wire.	1)Reconsider motor power. • Reconsider reduction ratio. • Perform mechanical interference check. • Reconsider the cycle of START/STOP operation. 2)Perform extension cable check, such as misconnection and the breaking of wire.
	Overload (for VR series)	1)Overload: Loaded torque exceeds short-time-rated continuously for more than 3 sec. 1)Overtime: Loaded torque exceeds continuous-rated continuously for more than allowed time in short-time region.	
1	Input Voltage Problem	1)The input voltage is too high or too low. For 200V:in the case of outside of AC170V to 250V range 2)Momentary power off for more than 50ms. 3)The power is supplied to several drivers from one source line; burst of current into capacitor in the driver causes voltage's falling down.	1)Regulate voltage using transformer. 2)Apply voltage to the driver through a stabilized power unit. 3)Use thicker power line.
2	Excessive Regeneration	1)Internal voltage exceeded by the regeneration. • Subjected to sudden starts/stops or reverse. • Subjected to sudden stop under large inertia.	1)Install an additional discharge resistor.
3	Driver Overheating	1)Abnormal overheating of the driver exceeding 80℃.	1)Improve the radiation of heat from the driver. 1)Remove any sources of heat from around the driver.
4	Overflow: Accumulated pulses in deviation counter overflowed.	1)The motor may have been locked or overloaded. 2)Misconnection or the breaking of extension cable. 3)The ac-/deceleration rate is set too fast.	1)Perform mechanical interference check to avoid motor locked. 2)Use Robot-Cable which is excellent bending resistance. 3)Set the ac-/deceleration rate slower.
5	Abnormal Current	1)The short on the motor coil because of extreme overheat 2)Misconnection or the breaking of extension cable.	1)Perform the resistance check between every two wires of the three of motor coil as U-V, U-W and V-W The resistance must be uniform. If they indicates 0Ω or open, the motor must be short-circuited. 2)Use Robot-Cable which is excellent bending resistance.
6	Encoder Error	Phase A and B may be open. Or both phase A and B have changed simultaneously. 1)Noise from equipment or elements outside such as a relay. 2)The FG terminal is not grounded. 3)The signal line isn't shielded form power line if not using genuine Nissei extension cable. 4)Misconnection or the breaking of extension cable.	1)Install the Protective Element in series between contacts of the relay. 2)Confirm FG terminal grounded. 3)Use genuine Nissei extension cable. 4)Use Robot-Cable which is excellent bending resistance.
7	Pole Sensor Error	Pole sensor output is detected under an unlikely combination. 1)The motor is not connected to the driver. 2)Pole sensor malfunction. 3)Misconnection or the breaking of extension cable.	1)Confirm the connection between the motor and drive 3)Use Robot-Cable which is excellent bending resistance.
8	Command Signal Pulse Problem	This problem occurs inside the driver.	When this alarm occurs frequently, contact supplier or Nissei.
9	CPU Problem		

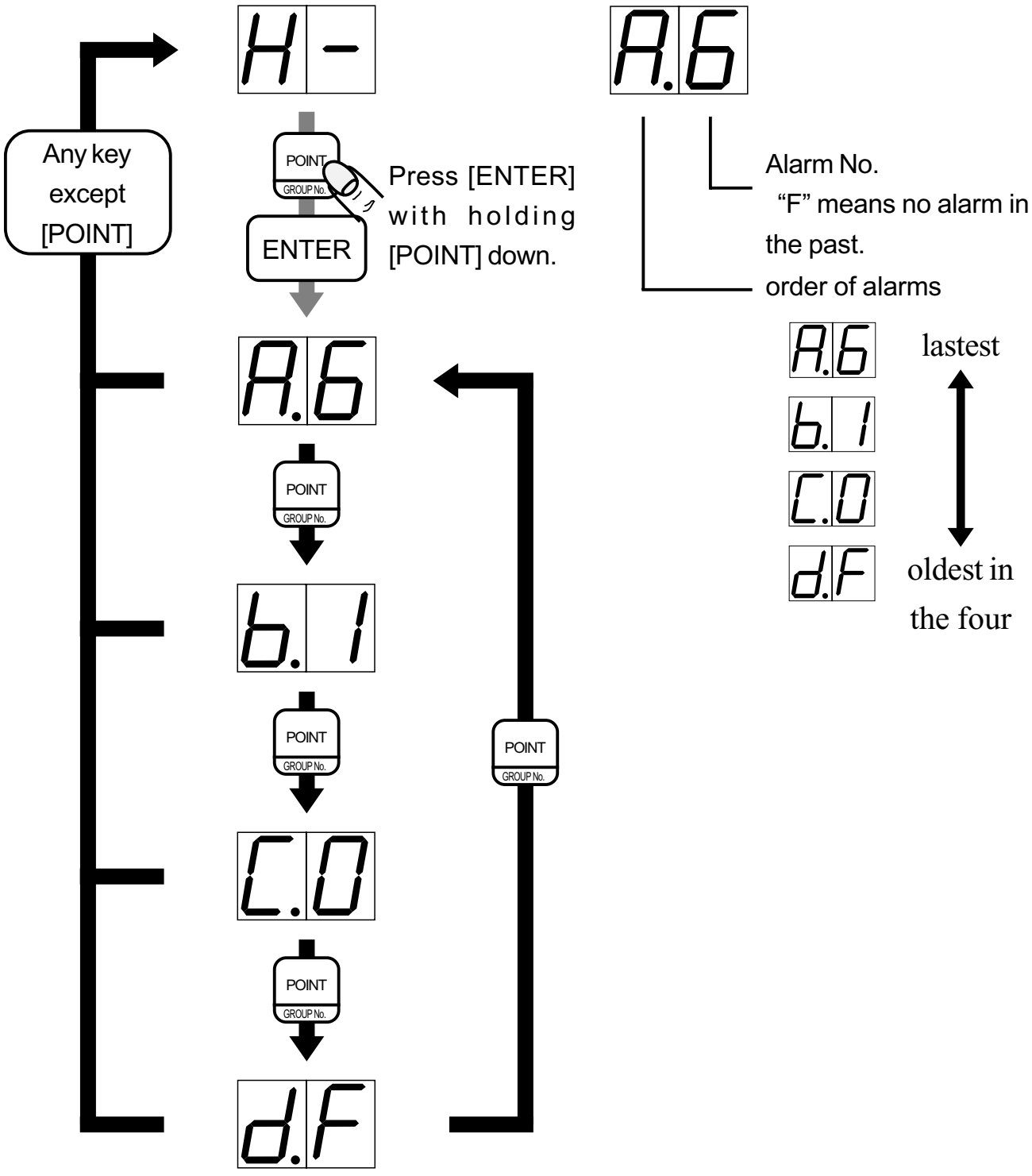
3 List of ERROR and Causes, Countermeasures

No.	SITUATION of TP	CAUSE
1	Initializing	There's no Teaching Data in the group of preset No.
10	Return to Origin	Attempting to Return to Origin under Servo-Off
20	Teaching	Attempting to do Teaching under Servo-Off.
30	Monitoring	Attempting to let the motor run under Servo-Off.
41	Transferring Data to/from Memory	Indefinite whether WIRTE or READ
42		Attempting to read data group which has no Teaching Data.
43		The way of Return to Origin in Teaching Data to read discords with the way already executed actually.
44		Attempting to write data group which has no Teaching Data yet.
50	Monitoring	Attempting to let the motor run with no Teaching Data activated.
51		Attempting to let the motor move under Sequential Operation with no Teaching Data activated.
60	Jog	Attempting to Jog under Servo-Off.
91	Hardware	Malfunction EEPROM to be wrote

4 Referring the alarm history

The alarm history (4 alarms) is automatically memorized in the controller.
When consult us about alarm , please check up the history.If no history ,
“F” will be indicated.

• **How to check up the history**



GTR II

NISSEI CORPORATION

Sales Offices in Japan

HEADQUARTERS

1-1, Inoue, Izumi-cho, Anjo, Aichi-Pref.,444-1297
FAX: +81-566-92-7418

TOKYO BRANCH OFFICE

2-8-9, Iwamoto-cho, Chiyoda-ku, Tokyo, 101-0032
FAX: +81-3-3865-7693

OSAKA BRANCH OFFICE

1-18, Ikutamamae-machi, Tennoji-ku, Osaka, 543-0072
FAX: +81-6-6772-0406

World Wide Web

http://www.nissei-gtr.co.jp