CKD

INSTRUCTION MANUAL

ABSODEX
TEACHING PENDANT

AX0180

TS/TH-Type Driver Common

- Before operating the product, read this instruction manual without fail.
- Among all, carefully read the description related to safety.
- Keep this instruction manual in a safe place so that you can read it at any time when necessary.

3rd Edition
CKD Corporation

2026/6/30 Discontinued

⚠ For safety operation of product

Read before starting operation.

When designing or manufacturing equipment incorporating ABSODEX, check that the mechanism of the equipment and the electric control for controlling the mechanism assure the safety of the system, to manufacture safe equipment.

To operate our product safely, selection, operation and handling of the product as well as adequate maintenance procedures are important.

Be sure to observe the description given under DANGER, WARNING and CAUTION to assure safety of the equipment.

⚠ **DANGER:**	**Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**
⚠ **WARNING:**	**Indicates a potentially hazardous situation, if not avoided, could result in death or serious injury.**
⚠ **CAUTION:**	**Indicates a potentially hazardous situation, if not avoided, may result in minor or moderate injury or ABSODEX and its peripheral equipment damage.**

The word or words that designate a degree or level of safety alerting.

SIGNAL WORD used in this manual is classified into the following three levels in accordance with the degree of injury or equipment damage.

Utmost care is required for higher degree of SIGNAL WORD.

Even items described under "CAUTION" may cause serious results.

Observe without fail because these safety precautions are important.

The product specification of a custom product may differ from the description given in this instruction manual.

Check the specification drawing or the like for each product.

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⚠ DANGER:

- DO NOT TOUCH the terminal strip in the front panel of the driver, as it is charged with high voltage, when power is ON. Also do not touch the terminal for about 5 minutes after power is turned off until the internal condenser discharges high voltage.
- TURN OFF POWER before mounting or dismounting connectors as equipment malfunction, damage, and electrical shock can be caused.
- Do not operate in explosive or fire atmosphere.

⚠ WARNING:

- Servo off including emergency stop and alarm and brake off with rotational force is applied e.g. by gravity may cause the actuator to rotate. Operate the actuator in the balanced condition so that rotational force is not applied for these operations after all safety aspects are confirmed.
- Keep hands away from the rotating part as sudden motion may take place during gain adjustments or trial run.
  Make sure of the safety in the full revolution of the actuator before turning it on to adjust.
- When auto tuning is executed, the actuator rotates and the load is estimated. Make sure that the safety is assured to operate the actuator.
- Make sure that the safety is assured to operate the actuator in case the unit is operated from the place unable to confirm the motion.
- DO NOT TOUCH the actuator and the driver during operation or just after stopped. There is a risk to get burned. Keep away from actuators and drivers during operation or immediately after operation is stopped.
  Otherwise you may suffer from burns.
- Do not remove devices until the safety is confirmed.

⚠ CAUTION:

- The product is supplied for use by the persons who have proper expertise in electrical or mechanical engineering. CKD will not be liable for bodily injuries or accident caused by the use by the people who has no or little knowledge in electrical and mechanical fields, and by the people who is not thoroughly trained for using ABSODEX.
- Connect Teaching Pendant to CN1 of ABSODEX Driver before turning the power on.
- After connecting the CN1 terminal, tighten the screws without fail to lock the connector.
  If the connector is disconnected or ABSODEX is turned off during program transmission, program failures and/or malfunction will be caused.
- Connect Teaching Pendant with the driver only when it is used. Leave it unconnected when it is not used.
- Do not give a large pressure or impact on the machine. Otherwise failure will be caused.
- Do not press the displaying unit forcibly.
- Keep the product at a place where the temperature is low and humidity is less with no direct sunshine.
- This Teaching Pendant is for the TS, TH, GS, S, GH and H type ABSODEX Drivers.
  Some functions are unavailable if it is used for the C type or earlier type drivers.
- Some communication codes are not supported with some versions of ABSODEX Driver.
- Teaching Pendant, driver and actuator (except for AX8000 Series) are not water or oil proof.
  Take measures against water and oil when using it in an environment susceptible to water or oil splashes.
- External noise may distort the display. Please restart the control power if the display becomes distorted.

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Terms of warranty

The warranty period and the scope of warranty are described below.

1) Period
The warranty period of the product is one year since the date of delivery. (However, the period assumes eight hours of operation per day. As well, if the durability limit is reached within one year, the period to the durability limit is the warranty period.)

2) Scope
If failure is caused in the above warranty period due to poor workmanship of our product, we will repair the product without charge without delay.
However, the scope of warranty shall not cover the following cases.

① Operation under the conditions or in the environment derailing from those specified in the product specifications

② Failure caused by lack of attention or erroneous control

③ Failure caused by other than the delivered product

④ Failure caused by operation derailing from the purposes for which the product is designed

⑤ Failure caused by modification in the structure, performance, specification or other features made by other than us after delivery, or failure caused by repairs done by other than our designated contractor

⑥ Loss in our product assembled to your machine or equipment, which would be avoided if your machine or equipment were provided with general functions, structures or other features common in the industry

⑦ Failure caused by reason that is unforeseeable with technology put into practical use at the time of delivery

⑧ Failure caused by fire, earthquake, flood, lightning, or other acts of God, earth shock, pollution, salt hazard, gas intoxication, excessive voltage, or other external causes

The warranty mentioned here covers the discrete delivered product.
Only the scope of warranty shall not cover losses induced by the failure of the delivered product.

3) Warranty of product exported outside Japan

① We will repair the product sent back to our factory or company or factory designated by us. Work and cost necessary for transportation shall not be compensated for.

② The repaired product will be packed according to the domestic packing specification and delivered to a designated site inside Japan.

4) Others
This warranty terms describe basic items. Priority will be given to specification drawings and specification sheets if warranty description given on such specification drawings or specification sheets is different from the warranty terms given herein.

Contents

ABSODEX Teaching pendant

AX0180 Instruction Manual No. SMB-66E

Created on Dec. 2010
Revised on Jul. 2011

1. TOPICS RELATED TO PRODUCT

1.1 Feature

1) Creation of equal segment programs is made easy.
You can handle operations ranging from creation of equal segment programs up to actuator control even if you are a novice about NC codes and operation codes. Equal segment programs can be created through interactive operation.

2) No need for special power supply
The power is supplied from ABSODEX.

3) Program and parameter backing
Capacitors are used to back the memory. Programs and parameters are retained for three hours after the power is turned off.
This feature is useful when the program is copied to another ABSODEX unit.
The program memory capacity is 16K bytes.

4) Five operation modes

a) Edit mode
Through interactive operation, you can edit the program for performing equal segment actions. In addition, you can use NC codes to edit the program.
Only one editing program is stored. (Memory backup time: 3 hours)
Up to 2000 characters can be entered in the program.
Nine sample programs are registered, and you can edit the desired sample program to create the desired program.

b) Display mode
The input/output statuses of input/output signals at CN3 of the ABSODEX driver are displayed as well as the current actuator position, alarm state, etc.

c) Parameter mode
Parameters can be monitored or entered.
With serial communication interface TS/TH-type drivers, relevant settings such as the station number and baud rate can be configured.

d) Motion mode
Program starting/stopping and number selection, resetting, single block operation, MDI operation, brake application/release, offset value entry, communication through terminal inputs, and home return can be conducted.

e) Copy mode
All programs and parameters can be copied from ABSODEX driver to another driver.

f) Tuning mode(function for TS-type driver only)

ABSODEX is adjusted using the auto tuning function of ABSODEX.

5) Simple operation
Hold in the left hand and use the thumb of the left hand to operate the SHIFT key while entering number and letter keys with the right hand.

6) Simple program change
The angle and speed in the program can be modified without difficulty in the edit mode.

7) Comprehensive communication functions
Note: The program capacity and directory display are limited.

8) stop function

1.2 Specifications

1.2.1 Major operations

Mode		Item	Description
Editing	Equal segment	Program number	0 to 999
	NC program	Program number	0 to 999
		Program capacity	2000 characters
	Sample	Number of programs	9
Display		-	I/O ON/OFF and real-time view of actuator position (pulse/angle) (Note1)
Parameters		Current data of parameters 18 and 24	Real-time display (Entry impossible)
		Parameters 1 to 17, 19 to 23 , 27 to 29, 33 to 39, 42 , 45 to 57 , 62 to 67, 70 to72(Note2) (Except for 49 and 55)	Can be keyed-in
Operation	MDI	Number of entered characters	256
	Origin offset	Setting	Enter the current value converted in the range between -540672 and 540671.
	Terminal	Number of input characters	256
		Number of output characters	256
Copy		Program capacity	16KB
		Parameter	Parameters 1 to 17, 19 to 23, 27 to 29, 33 to 39, 42 , 45 to 57 , 62 to 67, 70 to72(Note2) (Except for 49 and 55)

Note1 : The position displayed during actuator rotation and ON/OFF changes in the I/O are reflected in the displaying sampling time intervals.

Note 2: The parameters compatible with GS/S, GH/H type are parameter no. 1 to 17, 19 to 23, 42, 62 to 67, 70 and 71. (42 is available for GS/S type only)

1.2.2 Hardware

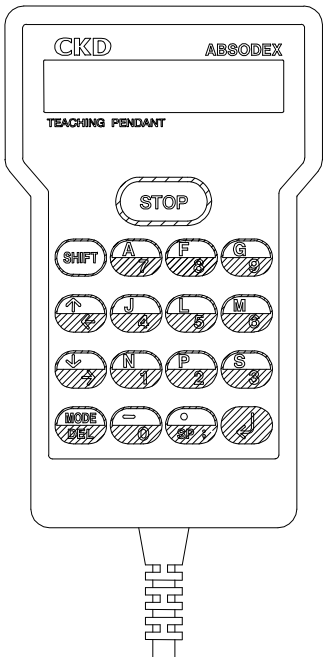
Item	Description
Display (LCD)	16 characters x 2 lines
Input key	17 keys (Emergency stop: 1. Control keys: 5. Letter and number keys: 11)
Memory backup	Super capacitor
Backup time	3 hours
Power supply	+5V, 100mA (Supplied from ABSODEX driver)
Dimensions	86 (W) × 140 (H) × 24 (D) (without connector) Cable: 2m
Weight	Main body only: 140g

1.2.3 Environment

Item	Description
Operating temperature	5 to 45°C
Storage temperature	-15 to 65°C
Relative humidity	20 to 90% (no condensation allowed)

2. TOPICS RELATED TO OPERATION

2.1 Name and Function of Displaying and Operation Sections



① Displaying window : Max. 16 characters x 2 lines

② [↵] : Return key
Use the key to determine the menu or command or to execute a process.

③ [SP ;] : Space/Semi-colon key
Use the key as a space key in the MDI operation or terminal mode.
Use it as a semi-colon key (;) in the NC programming mode.
The key is invalid in the other instances.

④ [DEL] : Delete key
The character at the cursor is deleted.
If there is no character at the cursor, the character immediately before the cursor is deleted. (The space is handled as a character.)

<Examples>

(1) A 1 3 0 . . . . . → [DEL] → A 1 0 . . . . . .

(2) A 1 3 0 → [DEL] → A 1 3

⑤ [MODE] : Mode key
Use the key in each mode to cancel a process.
Press the key to return to the previous menu screen.

⑥ [→] [←] : Cursor move key
The cursor moves in the arrow direction.

⑦ [↓] [↑] : Scroll key
A block of data scrolls in the arrow direction.

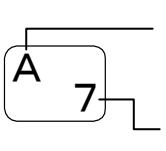
⑧ SHIFT : Shift key

Use the key to enter the letter, ↓, ↑, MODE, −, or • key.

⑨ STOP : Stop key

Program execution is stopped and the actuator is immediately stopped.
(Alarm E is caused.)

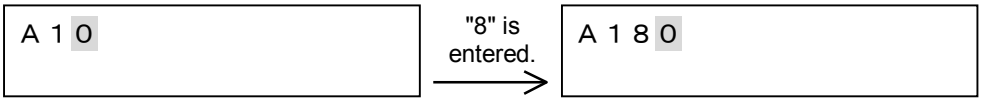
2.2 How to Enter the Letter or Symbol Character



To enter "A", press this key while holding down the SHIFT key.

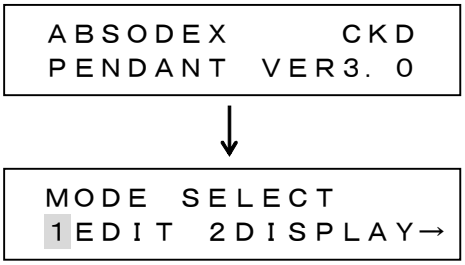
To enter "7", press this key.

Note: The letter and symbol characters are inserted before the cursor position.



2.3 Selecting the Mode

Turn the power on.
Following the opening message shown to the right, the mode selection screen is displayed.



The following six execution modes are provided for the Teaching Pendant.

1: Edit mode ·····You can edit the program.
2: Display mode·····You can monitor the status of input / output signals or actuator position.
3: Parameter mode····You can change parameters.
You can make serial communication settings.
4: Motion mode·····You can launch the program.
5: Copy mode·····You can copy all programs and parameters to another ABSODEX driver.
6: Tuning mode·····You can make adjustments to ABSODEX(function for TS-type driver only)

Follow the procedure below to select the desired mode.

2.3.1 Mode selection procedure

1) Move the cursor to the number corresponding to the mode to be selected.
Use one of the following two methods.
   a) Enter the mode number directly.
   b) Use → or ← to move the cursor.
2) After moving, press ↵. The mode is started.

2.4 Edit Mode

The edit mode includes nine menu options.

Each function is described below.

1: EQL SEG ····· A new equal segment action program is automatically created through interactive entry procedure.

2: NC ····· A new program is created in the NC language.

3: READ ····· The program is loaded from the ABSODEX driver and edited.

4: CNT ····· The program stored in the Teaching Pendant is edited continuously.

5: STORE ····· The edited program is saved in the ABSODEX driver.

6: LIST ····· A list of program numbers stored in the ABSODEX driver is displayed.

7: NO. ····· The program number is changed.

a) The number of the program being edited at the Teaching Pendant is changed.

b) The number of the program stored in the ABSODEX driver is changed.

8: DEL ····· The designated program is deleted from the ABSODEX driver.

9: SAMPL ····· Nine sample programs (NC) are loaded.

2.4.1 Creation procedure of equal segment action program

1) Select "1 EQL SEG" from the edit mode menu.

※ Follow the mode selection procedure to select.

```
EDIT MODE
1EQL SEG   2NC →
```

2) Next, a list of programs stored in the ABSODEX driver is displayed.
Press [→] to view all numbers.
"←" next to a number indicates the last number.
After checking, press [↵].

```
STORED PRGM
 1  2  991  992←
```

※ If the number of displayed program number characters exceeds 400, the following message is displayed.
While numbers are displayed as in the regular case, numbers later than 400 characters are not displayed.

★If the number of displayed characters exceeds 400.

```
INCOME BUFF OV
1EQL SEG   2NC →
```

3) Enter the desired program number to be created, in the range from 0 to 999, and press [↵].

```
EQL SEG: NEW
PRGM NO.    [  ]
```

4) Select the pre-start home position and press [↵].

※ "-" next to the number indicates the currently selected option.
(The rule is similar to later steps 10) and 11).)

```
EQL SEG:HMR POSI
1-HME      2 INDX
```

5) Select the home return direction from the following list and enter the corresponding number.

```
EQL SEG: RTN DIR
1～3      [1] CW
```

1: CW

2: CCW

3: Random access (Except for T-type drivers, this can be selected only if "2 INDX" is selected in step 4 on the previous page)

After entering, press [↵].

6) Enter the home return speed and press [↵].

```
EQL SEG:RTCT SPD
        [    ] RPM
```

Setting range: 1.0 to 20.0(T-type)

Setting range: 1.0 to 100.0(Other)

a) If the home return position is one revolution

The value of parameter 5 (home return speed) is changed.
If nothing is entered, home return is made at the speed having been specified in parameter 5.

b) If the home return position is the indexing position

Not only the maximum rotation speed (RPM) but also the time (seconds) can be entered.
Press [SHIFT] + [N 1] to change to seconds, or press [SHIFT] + [P 2] to change to RPM.

Note1: The data will be deleted if the unit is changed after data entry.

Note2: A program that does not return to origin can be created by setting the HME POSI to INDX, RTN DIR to CW or CCW and RTCT SPD to seconds.

7) After the home shift amount is entered, the user coordinate system is established.
The user coordinate system is offset by the distance to the actuator coordinate origin.

※ The home shift amount can be entered only if "2 INDX" is selected as a home return position.

The data may be an angle or pulses.

```
EQL SEG: HMESHFT
   [          ] DEG
```

Press [SHIFT] + [N 1] to change to the angle, or [SHIFT] + [P 2] to change to pulses.

Setting range
Angel : -360.00 to 360.00
Pulses : - 540672 to 540671

Note: The data will be deleted if the unit is changed after data entry.

8) Enter the number of segments and press [↵].

```
EQL SEG: SEG NO.
        [    ]
```

Setting range: 1 to 255

9) Enter the traveling time per segment and press [↵].

Setting range: 0.01 to 20 (T-type)
Setting range: 0.01 to 100 (Other)

```
EQL SEG: MOV'G
TIME [    ] SEC
```

※ The maximum rotation speed is checked according to the number of segments, traveling time and cam curve.
If the maximum rotation speed exceeds the operating range, the following message is displayed and the traveling time is automatically corrected.
After confirming, press [↵].

★To correct the traveling time to 0.53 seconds after calculation

```
MOV'G TIME KEY
```

↑↓ Alternately displayed

```
PRESS RTN KEY
```

↓ [↵]

```
MOV'G TIME REV
TO 0.53 SEC
```

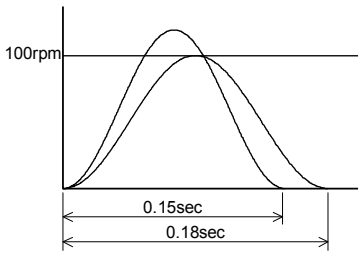
↑↓ Alternately displayed

```
PRESS RTN KEY
```

↓ [↵]

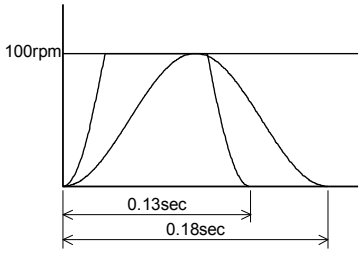
```
EQL SEG: MOV'G
TIME [ 0.53] SEC
```

[Example of correction of traveling time, cam curve and indexing time]



- Enter the MS curve, 6 segments and traveling time 0.15 seconds. The maximum rotation speed exceeds 100rpm and therefore the time is automatically corrected to 0.18 seconds.

  Note: For systems where the maximum rotation speed is 100rpm



- Enter the MS curve, 6 segments and traveling time 0.18 seconds and perform parameter change to change to the MC curve. The traveling time does not change to maximum speed 0.13 seconds.

※ The maximum rotation speed varies according to the actuator.

10) Select the direction of rotation of the actuator and press ↵.

```
EQL SEG:ROT' NDIR
1 CW        2-CCW
```

11) Select the post-positioning stopping process and press ↵.

```
EQL SEG:  STOP
1-STNDY   2 DWEL
```

a) Selecting "2 DWEL"

Enter the dwelling time and press ↵.

Setting range: 0.01 to 99.99

```
EQL SEG:  DWEL
     [     ] SEC
```

12) Select whether the brake is used or not, and press ↵.

```
EQL SEG:  BRK
1-USED   2 UNUSED
```

a) Selecting "1 USED"

Enter the delay timer time and press ↵.

Setting range: 0.01 to 99.99

```
EQL SEG:  DWEL
     [     ] SEC
```

※ The delay timer indicates the time from the end of positioning to brake application. Specify the delay timer to improve the accuracy even in a system of small rigidity where the time to settle is rather longer. The delay timer is inserted in the NC program in the dwell command.

※ Specify the time after brake release to rotation command issuance upon a travel command, in parameter 27 (delay time after brake output). If the time is not specified, actuator rotation is commanded immediately after brake release, that is, rotation is commanded while the brake remains applied, thereby causing vibration and/or oscillation.

13) Select the M code process from the following options and enter the corresponding number.

1: M CODE

2: SG POSI

3: NON USE

After entering, press ↵.

```
EQL SEG:  M CODE
1~3     [1] M CODE
```

a) Selecting "1 M CODE"

The bit corresponding to the units digit of M code 20 to 27 to be output is input.

```
EQL SEG:  M CODE
0~7bit  [ ][ ][ ]
```

b) Selecting "2 SG POSI"

The current segment position is output in an M code.

14) Select whether the parameter value is entered or not, and press [↵].

```
EQL SEG:PARA SET
?                [Y/N]
```

a) Selecting "Y"

The parameter entry screen is displayed. Enter only the necessary parameters.
To refrain from entry, leave the entry field blank and press [↵].

※ The parameter list is shown below. For the setting range of each, refer to Section 4.1 "Parameters and Contents."

<Parameter>
- Cam curve
- Acceleration/Deceleration time of MC2 curve (Entered only if "MC2" is selected as a cam curve)
- Torque limit
- Index in-process output 1
- Index in-process output 2
- Answer input after M code
- Answer input in response to positioning or home return
- Segment position range width of equal segment designation

```
EQL SEG:CAM CURV
1～5          [ ]
```

⋮

```
EQL SEG:POSI RNG
     [       ] PLS
```

↓ [↵]

```
  EDIT MODE
←4CNT      5STORE→
```

b) Selecting "N"

The editing process is terminated and "5 STORE" in the edit mode menu is displayed.

```
  EDIT MODE
←4CNT      5STORE→
```

After all settings are entered, the program storage process starts.

※ Refer to Section 2.4.5 "Procedure for storing the editing program to the ABSODEX driver."

[Reference]

1. You can always press [MODE] on the entry screen to return to the menu.
2. Press [↑] or [↓] to open the previous or later entry screen.
   However, if these keys are pressed after entry of a setting, the entered value is canceled.
   To settle the entered value, press [↵].

Note: If the beginning part of an equal indexing program is repeated, alarm C (software limit over) may occur. In such case, read the program installed into the driver (Display type: NC), then change G91 to G91.1 in the program.

2.4.2 NC program creation procedure

1) Select "2 NC" from the edit mode menu.

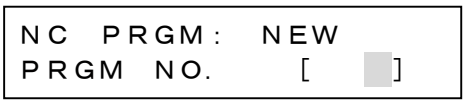
※ Follow the mode selection procedure for the selection method.

```
  EDIT MODE
 1EQL SEG   2NC →
```

2) Next, the program numbers stored in the ABSODEX driver are displayed.
Press [→] to view all numbers.
"←" next to a number indicates the last number.
After checking, press [↵].

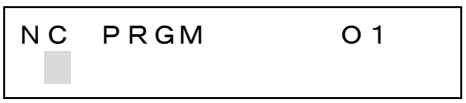
```
STORED PRGM
  1  2  3←
```

3) Enter the program number to be created (0 to 999), and press the [↵] key.



4) The NC program entry screen is displayed.
Enter the NC program.

※ For the NC codes, refer to Section 3.3 "Code List."



2.4.2.1 Key operation for NC program entry

- [SP ;] key

  Enter ";" at the end of a block to feed a line and move the cursor to the next block.

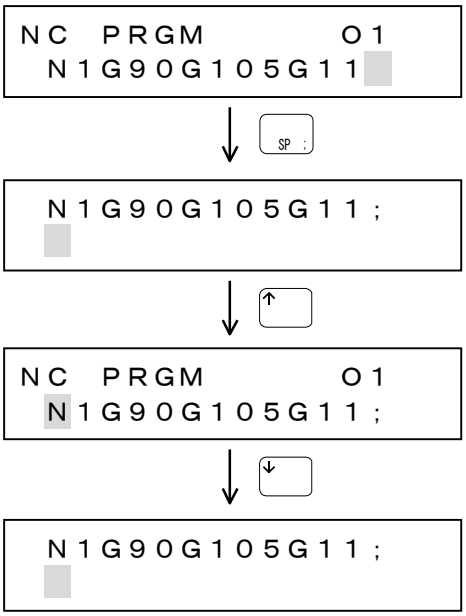
- [↑] key

  The cursor moves to the previous block.

- [↓] key

  The cursor moves to the next block.

  ※ The cursor does not move if ";" is missing at the end of the current block.

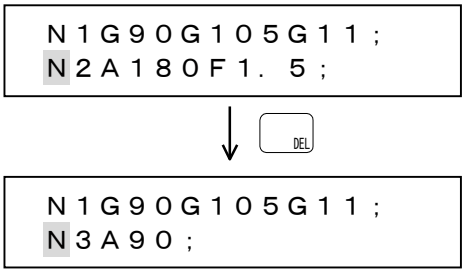


- [DEL] key

  One character at the cursor is deleted.

  ※ Single block delete
  Move the cursor to the "N" position at the start of the block, and press the [DEL] key to delete the block (line).

★To delete the N2 block



- [↵] key

  Press to exit from program entry.
  The editing process is terminated and "5 STORE" in the edit mode menu starts.

  ※ Refer to Section 2.4.5 "Procedure for storing the editing program to the ABSODEX driver."

- [MODE] key

  Press to interrupt program entry.
  The editing process is interrupted and "4 CNT" in the edit mode menu starts.

  ※ Refer to Section 2.4.4 "Program editing continuation procedure."

2.4.3 Procedure for loading programs from ABSODEX driver

1) Select "3 READ" from the edit mode menu.

   ※ For the selection method, follow the mode selection procedure.

```
 EDIT MODE
←2NC        3READ →
```

2) A list of program numbers stored in the ABSODEX driver is displayed.
   Press [→] to view all numbers.
   "←" at the end of the number indicates the last number.
   After checking, press [↵].

```
 STORED PRGM
  1  2  3  992←
```

3) Enter the program number to be created, and press [↵].

```
READ
PRGM NO.      [   ]
```

   ※ If a program number not found in the driver is entered, the following error message is displayed.

★If program number 9 is not found

```
NO PRGM NO.
PRGM NO.      [   9]
```

   ※ If the number of characters of the loaded program exceeds 2000, the following message is displayed.
   The program is displayed as in regular cases, while you cannot edit the 2000th and later characters in the program.

★If program 3 contains more than 2000 characters

```
INCOME BUFF OV
PRGM NO.      [   3]
```

4) Select the display type on the next screen.

   a) Selecting "1 AUTO"
   If the entered number is an equal segment program, the program is displayed in the interactive format of Teaching Pendant.
   If the program is created with NC codes, NC codes are displayed.

   b) Selecting "2 NC"
   The program is displayed in NC codes.

```
READ
PRGM NO.      [   ]
```

★If AUTO (EQL SEG) is selected

```
NO PRGM NO.
PRGM NO.      [   9]
```

★If AUTO (NC) and NC are selected

```
INCOME BUFF OV
PRGM NO.      [   3]
```

※ Edit the program in the later steps according to the corresponding program creation procedure (Section 2.4.1 "Creation procedure of equal segment action program" and "Section 2.4.2 "NC program creation procedure").

2.4.4 Program editing continuation procedure

1) Select "4 CNT" from the edit mode menu.

※ For the selection method, follow the mode selection procedure.

※If the Teaching Pendant has no program memory, an error message is displayed.

```
  EDIT MODE
←3 READ     4 CNT    →
```

★If the Teaching Pendant has no program memory

```
NO CNT DATA
←3 READ   4 CNT   →
```

2) Edit the program stored in the Teaching Pendant.

★If the Teaching Pendant has no program memory

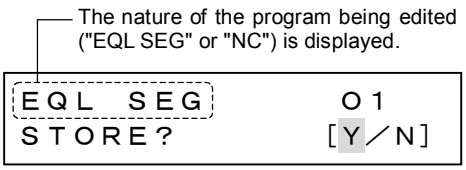
```
NO CNT DATA
←3 READ   4 CNT   →
```

2.4.5 Procedure for storing the editing program to the ABSODEX driver

1) Select "5 STORE" from the edit mode menu.

※ For the selection method, follow the mode selection procedure.

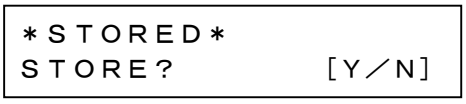
2) The nature of the program being edited (either "EQL SEG" or "NC") is displayed.



3) Select whether or not to store, and press ↵.

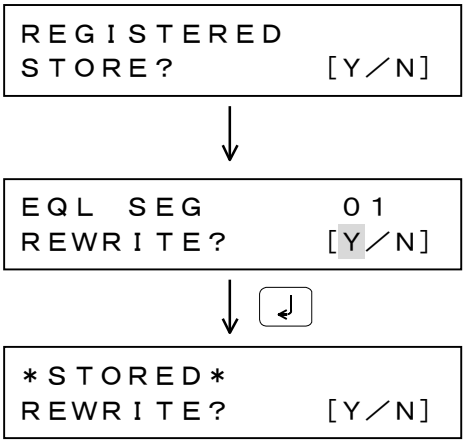
a) Selecting "Y"

- In case of registration of a new program
  The program is stored in the ABSODEX driver.



- If the program labeled with the same number already exists
  A message is displayed to indicate that the designated number is already registered.
  Select again whether or not to store, and press ↵.

  If "Y" is selected
  The same message as that displayed during registration of a new program is displayed, and the program is overwritten in the ABSODEX driver.



b) Selecting "N"

"5 STORE" in the edit mode menu starts.

4) After the program is stored, the following screen is displayed.

a) If the stored program is "EQL SEG"

Select whether or not to execute the stored program, and press [↵].

★After equal segment program is stored

```
EQL SEG   PRGM TO
EXE?        [Y/N]
```

- Selecting "Y"
  Teaching Pendant automatically selects the execution program. A message is displayed. Next, the motion mode process begins. Press [1] to start.

★If "Y" is selected

```
PRGM NO.    [  1]
SELECTED
```

↓

```
1START   2STOP
3NO.     4RESET
```

※ Because the number is automatically designated to the ABSODEX driver, number designation in the motion mode is unnecessary.
After program execution, the procedure does not return to the previously designated number. Designate the number if necessary.

- Selecting "N"
  The mode selection menu is displayed again.

★If "N" is selected

```
 MODE SELECT
1EDIT 2DISPLAY→
```

b) If the stored program is "NC program"

The mode selection menu is displayed again.

★After an NC program is stored

```
 MODE SELECT
1EDIT 2DISPLAY→
```

※ To check or edit the program again after storing it, select "4 CNT" from the edit mode menu.

2.4.5.1 If a program error is caused when the program is stored

The error number and the block number causing the error are displayed.

※ Refer to Section 3.5 "Error Code List."

After confirming, press [↵].
Current alarm 0 is reset and the "4 CNT" screen in the menu is displayed.
Correct the error.

```
PRGM ERROR    5
BLOCK         1
```

↑↓ Displayed alternately

```
PRESS RTN KEY
```

↓ [↵]

```
 EDIT MODE
←4CNT    5STORE→
```

2.4.6 Program number list displaying procedure

1) Select "6 LIST" from the edit mode menu.

   ※ For the selection method, follow the mode selection procedure.

```
  EDIT MODE
←5STORE   6LIST →
```

2) A list of program numbers stored in the ABSODEX driver is displayed.
   Press [→] to view all numbers.
   "←" next to the number indicates the last number.

```
 STORED PRGM
  1  2  3  992←
```

3) After checking, press [↵] or [MODE] to return to the edit mode selection menu.

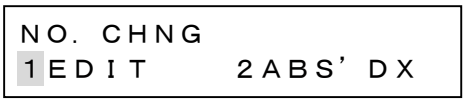
```
  EDIT MODE
←5STORE   6LIST →
```

2.4.7 Edit program number changing procedure

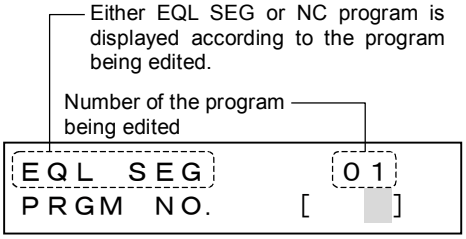
1) Select "7 NO." from the edit mode menu.

   ※ For the selection method, follow the mode selection procedure.

2) Select "1 EDIT" from the following menu.

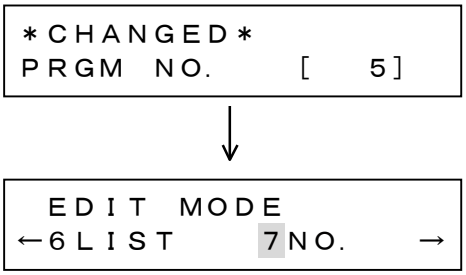


3) The number of the program being edited is displayed at the upper right.
   Enter the new number and press ↵.



4) The following message is displayed and the number changes.
   The edit mode selection menu is displayed again.

★If the new number is "5"



2.4.8 ABSODEX driver program number changing procedure

1) Select "7 NO." from the edit mode menu.

※ For the selection method, follow the mode selection procedure.

```
  EDIT MODE
←6LIST      7NO.      →
```

2) Select "2 ABS'DX" from the following menu.

```
NO. CHNG
1EDIT       2ABS'DX
```

3) Enter the previous number and press [↵].

```
NO. CHNG
BEF [     ] →AF [     ]
```

※ If a number not found in the ABSODEX driver is entered, the following error message is displayed. Enter the number again.

★If program number "3" is not found

```
NO PRGM NO.
BEF [    3] →AF [     ]
```

4) Enter a new number (one not registered in ABSODEX) and press [↵].

★If "2" is entered as an old number

```
NO. CHNG
BEF [    2] →AF [     ]
```

※ If a number found in the ABSODEX driver is entered, the following error message is displayed. Enter a new number.

★If program number "1" is found

```
REGISTERED
BEF [    2] →AF [    1]
```

5) The following message is displayed and the new number is registered to the ABSODEX driver.
The edit mode selection menu is displayed again.

★To enter "5" as a new number

```
*CHANGED*
BEF [    2] →AF [    5]
```

↓

```
  EDIT MODE
←6LIST      7NO.      →
```

[Reference]

1. Press [MODE] to return to the menu.
2. Press [←] during entry of a new number to return to the state before the change.

2.4.9 Program number deletion procedure

1) Select "8 DEL" from the edit mode menu.

※ For the selection method, follow the mode selection procedure.

```
  EDIT MODE
←7NO.      8DEL  →
```

2) Enter the desired program number and press [↵].

```
DEL
PRGM NO.     [   ]
```

※ If a number not found in the ABSODEX driver is entered, the following error message is displayed. Enter the number again.

★If program number "8" is not found

```
NO PRGM NO.
PRGM NO.     [  8]
```

※ To delete all programs from the ABSODEX driver, enter "999" and press [9].

★To delete all programs

```
DEL
PRGM NO.     [999]
```

↓ Press [9]

To delete all programs, select "Y." Otherwise select "N." Press [↵].

```
DEL ALL?
            [Y/N]
```

3) The following message is displayed and the designated program(s) is (are) deleted from the ABSODEX driver.

★If program number "5" has been deleted

```
*DELETED*
PRGM NO.     [  5]
```

4) The edit mode selection menu is displayed again.

```
  EDIT MODE
←7NO.      8DEL  →
```

[Reference]

1. Press [MODE] to return to the menu.

2.4.10 Sample program execution procedure

1) Select "9 SAMPL" from the edit mode menu.

   ※ For the selection method, follow the mode selection procedure.

```
  EDIT MODE
←8DEL      9SAMPL
```

2) The sample program name is displayed.
   Press ↓ or ↑ to select the desired program name, and press ↵.

```
SAMPL PRGM
1 ABSOLUTE
```

↑ ↓

```
SAMPL PRGM
2 1−ABSOLUTE
```

⋮

```
SAMPL PRGM
8 SEG NO. /POSI
```

↑ ↓

```
SAMPL PRGM
9 BRK MOTION
```

3) Edit the selected program.
   Follow the NC program editing procedure to modify the program if necessary.
   After editing, press ↵.

```
NC PRGM:    O1
 N1G90G105G11;
```

   ※ Change the program number if necessary, before storing the edited program. (Refer to Section 2.4.7 "Edit program number changing procedure.")

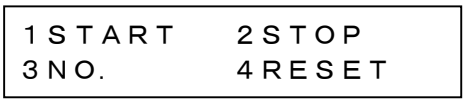
4) Select "5 STORE" from the edit mode menu, and press ↵.
   The program is stored in the ABSODEX driver.

```
  EDIT MODE
←4CNT      5STORE→
```

   ※ "4 INDX" and "10 Sub Call" needs the corresponding subprogram (100 index sub and 200 sub program). Store the corresponding subprogram before launching the sample program.

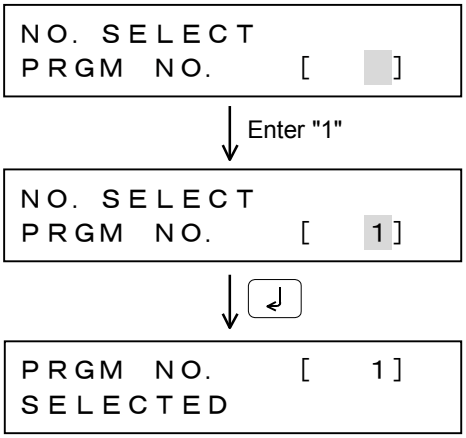
5) Select "4 MOTION" from the mode selection menu, and press [↵].

6) The motion menu is displayed. Press [3] to select "3 NO."

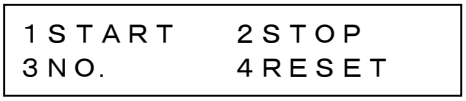


7) The number selection screen is displayed. Enter the stored number and press [↵].

★To select program number "1"



8) The motion menu is displayed again. Press [1] to execute.



2.5 Display Mode

The display mode includes the following three menu options.

Each function is described below.

1: I/O ····· Checking the status of I/O signals

2: POSI····· Checking the actuator position or temperature of electronic thermometer

3: ALARM····· Checking the current alarm

4 : INFO····· Checking the information on ABSODEX for troubleshooting, etc.

2.5.1 I/O status displaying procedure

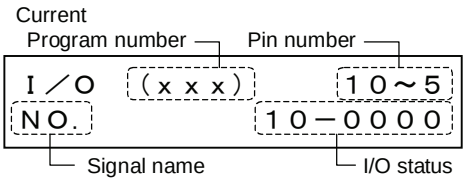
1) Select "1 I/O" from the display mode menu.

2) Next, the "signal name," "pin number" and "I/O status" are displayed. ("1" in the I/O status indicates a valid signal, while "0" indicates an invalid signal.) Press [↓] or [↑] to view the I/O status of other signals.

※When connected to a TS/TH-type driver, the displayed “signal name” changes automatically according to the selected I/O function.

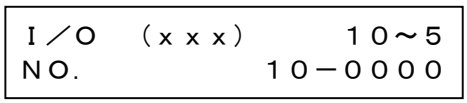
※For serial communication interface (such as CC-Link), press [↓] to scroll down and display the status of TB3 (emergency stop input 2).

★Program number selection display



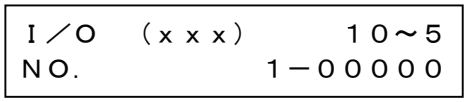
2.5.1.1 Program number selection display

a) If the I/O program selection method changeover (parameter 36) is "1" or "2"



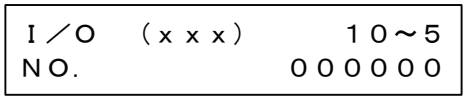
- I/O status: Starting at the leftmost position of the display,
  - ・Second digit of program number input
  - ・First digit of program number input
  - ・Program number selection input (bits 3 to 0)

b) If I/O program selection method changeover (parameter 36) is "3"



- I/O status: Starting at the leftmost position of the display,
  - ・Program number input
  - ・Program number selection input (bits 4 to 0)

c) If I/O program selection method changeover (parameter 36) is “4” or “5”



- I/O status: Starting at the leftmost position of the display,
  - ・Program number selection input (bits 5 to 0)

※ If the emergency stop input is OFF (during regular operation), the displayed I/O status is "0."
If the emergency stop input is ON (upon emergency stop), the displayed I/O status is "1."

2.5.2 Actuator position displaying procedure

1) Select "2 POSI" from the display mode menu.

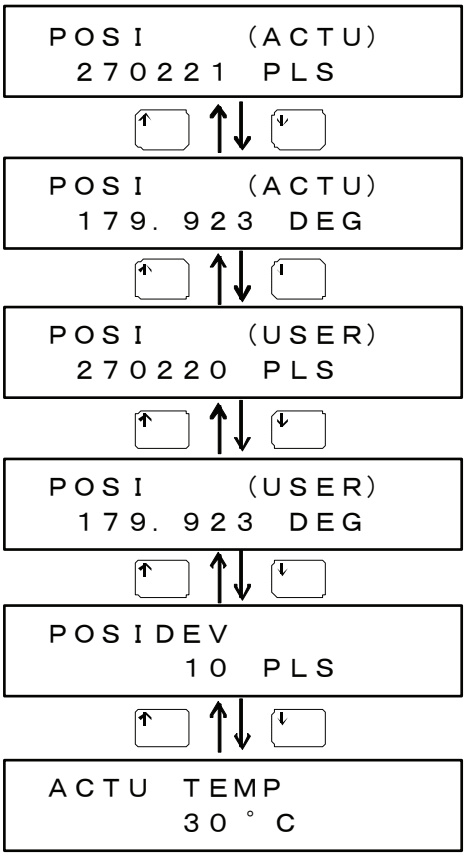
2) Then, the current actuator coordinate in pulse units is displayed.

Following information can be displayed in the position displaying menu.

Coordinate	Unit
1: ACTU	PLS
2: ACTU	DEG
3: USER	PLS
4: USER	DEG
5: POSIDEV	PLS
6: ACTU TEMP	DEG

※ Actuator temperature will display the temperature calculated by the electronic thermometer.

Press ↓ or ↑ to switch between the information to display.

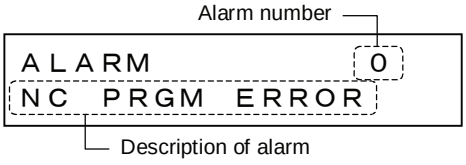


2.5.3 Alarm displaying procedure

1) Select "3 ALARM" from the display mode menu.

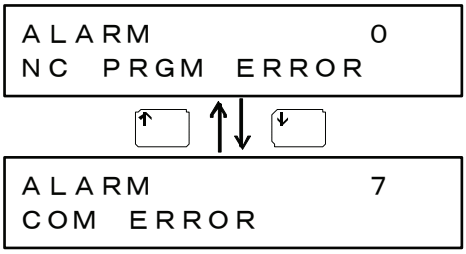
2) Next, the current alarm data is displayed.

※ Refer to Section 5.1 "Alarm display and Description."



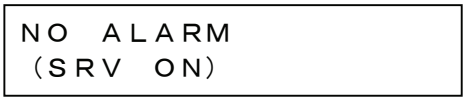
If there are multiple alarms, press ↓ or ↑ to display another alarm.

★If there are alarms 0 and 7



If there is no alarm, the following is displayed.

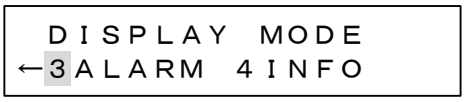
★If there is no alarm



[SMB-66E]

2.5.4 ABSODEX information displaying procedure [Function for TS/TH-type driver only]

1) Select “4 INFO” from the display mode menu.



※If a driver other than TS/TH-type is connected, the message on the right is displayed, and the mode selection menu is displayed again.

2) Information to be displayed is selected from the following.

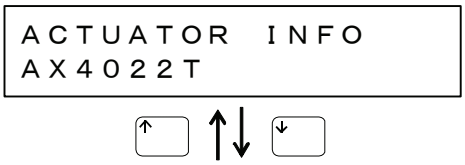
1: ACTU Displays actuator information
2: DRIV Displays driver information
3:PENDANT Displays teaching pendant information

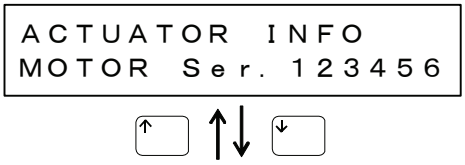
2.5.4.1 Actuator information displaying procedure

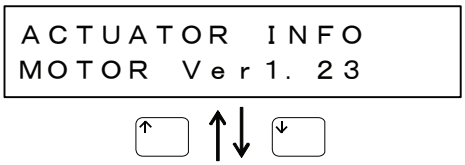
1) Select “1 ACTU” from the ABSODEX information menu.

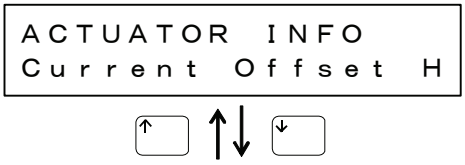
2) Then,the actuator model number is displayed.

Following information can be displayed in the actuator information menu.
1: Actuator model number (exc. options)
2: Actuator serial number
3: Actuator resolver revolution
4: Software version of actuator-side CB
5: Offset value of electrical angle
6: Offset value of mechanical angle









Press ↓ or ↑ to switch between the information to display.

Press ↓ or ↑ to view reception data exceeding 16 characters.

Press MODE to return to the menu screen.

2.5.4.2 Driver information displaying procedure

1) Select “2 DRIV” from the ABSODEX information menu.

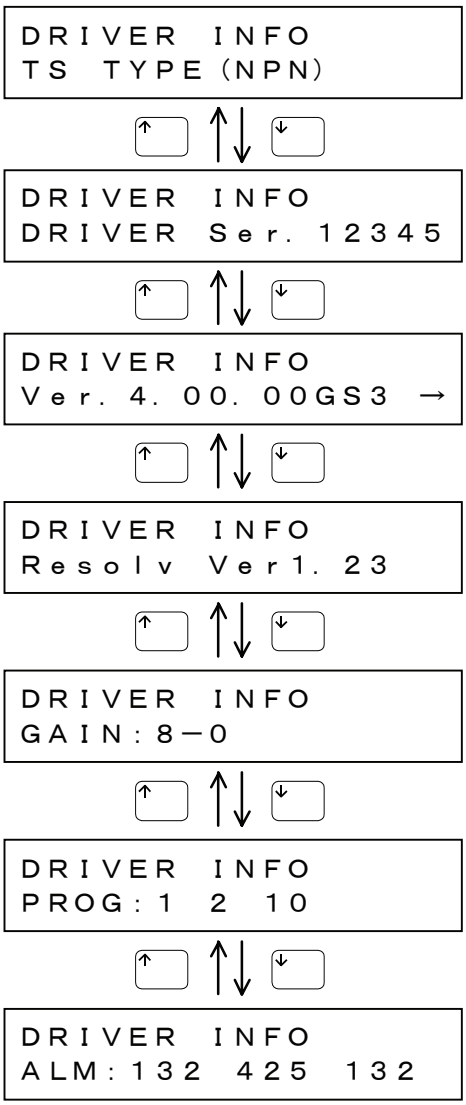
2) Then, the driver type is displayed.

Following information can be displayed in the driver information menu.
1: Driver type
2: Serial number of the actuator connected at the time program or parameters were set
3: Main software version
4: Software version of driver-side CB
5: Gain switch settings
6: Stored program numbers
7: History of triggered alarms
※When there is an alarm, above information may not be displayed correctly.

Press ↓ or ↑ to switch between the information to display.

Press ↓ or ↑ to view reception data exceeding 16 characters.

Press MODE to return to the menu screen.



2.5.4.3 Teaching pendant information displaying procedure

1) Select “3 PENDANT” from the ABSODEX information menu.

2) Then, the software version of the teaching pendant is displayed.
Press MODE to return to the menu screen.

2.6 Parameter Mode

The ABSODEX driver has two memory types (RAM and FLASH MEMORY) and parameter data is stored in each of them.In the parameter mode, you can change the parameter data.Each function is described below.

1: READ ····· All parameters are loaded from FLASH MEMORY to Teaching Pendant and refreshed.

2: CNT ····· Parameters stored in Teaching Pendant are modified continuously.

3: STORE ····· Parameters are stored from Teaching Pendant to both FLASH MEMORY and RAM.

4: INITIA ····· Parameters stored in FLASH MEMORY and RAM are initialized.

5: RAM ····· The designated parameter data in RAM is changed.

6 : CCLink/PROFI/DvNet ··· Serial communication settings, including the station number, are configured for TS/TH-type drivers.

Even if a parameter is changed, the parameter data stored in FLASH MEMORY and RAM of the ABSODEX driver remains unchanged until "3 STORE" in the menu is executed. (However, this is not the case for initial values and RAM data.)

※1. For the description of each parameter, refer to Section 4.1 "Parameters and Contents."

**※2. New parameters may be added to the main body of the driver for improvement of the function of ABSODEX. Refer to "ABSODEX Instruction Manual," too.
Enter or modify new parameters at the Terminal in the motion mode.
(Refer to Section 2.7.13 "Terminal operation procedure.")**

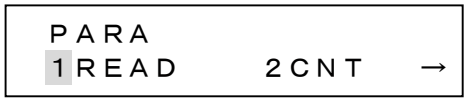
※3. Even if RAM data is changed, the RAM data and parameters in the driver are overwritten by the FLASH MEMORY parameters if the FLASH MEMORY is changed and the power is turned on again.

2.6.1 Parameter data changing procedure

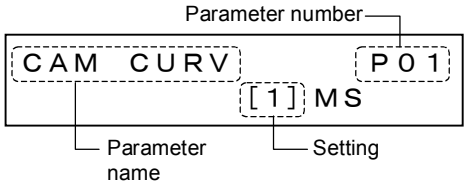
To change parameter data, follow one of the two methods below.

a) Execute "1 READ" to load parameters from the ABSODEX driver.

b) Execute "2 CNT" and change the parameter stored in Teaching Pendant.

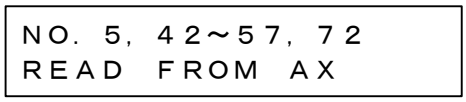


After being selected, the selected parameter is displayed.



**※ If the Teaching Pendant keeps no parameter data, the following message is displayed.
In case of continuation, load data from the ABSODEX driver first to store parameters in Teaching Pendant.**

※ If the teaching pendant which contains parameters for one type of driver is connected to another type driver and "2CNT" is executed, the message on the right is displayed. For the parameters indicated, data loaded from the connected driver is displayed.



※ If "2 CNT" is selected and parameters are edited, unchanged parameters having been kept in Teaching Pendant overwrite those in the driver. Take care of the fact.

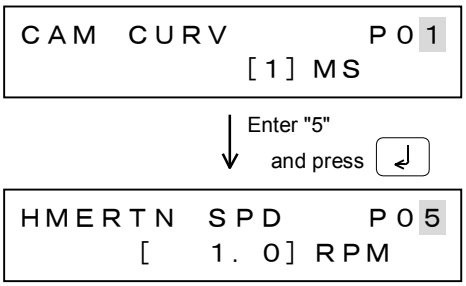
2.6.1.1 Changing the displayed parameter to another parameter

There are the following two methods for changing the parameter display mode.

a) Entering the parameter number

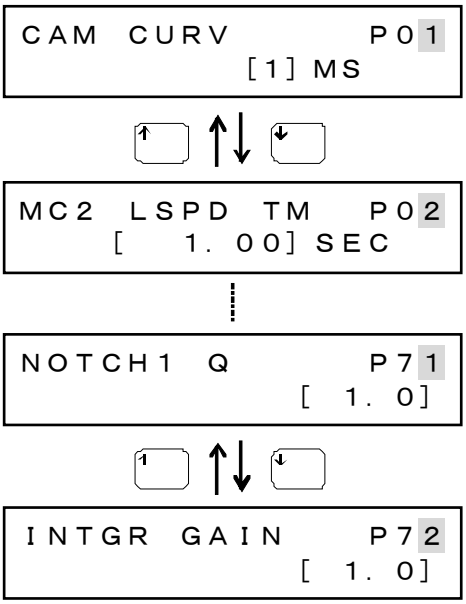
When the cursor is located at the parameter number, enter the desired parameter number and press [↵].

★Changing the displayed parameter number to "5"



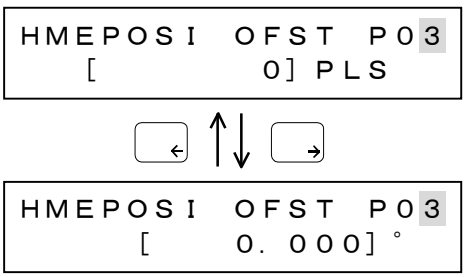
b) Pressing [↓] or [↑] to switch the display

When the cursor is located at the parameter number, press [↓] or [↑] to display the previous or next parameter.



2.6.1.2 Changing the input unit of parameter 3, 8, 9, 16, 19, 37, 45, 46

1) Select parameter (PRM 3, 8, 9, 16, 19, 37, 45, 46).The initial unit is pulses.
2) When the cursor is located at the parameter number, press [→].
   The unit changes to angle (°).
3) Press [←] to return to pulses.



2.6.1.3 Changing the parameter data

1) When the cursor is located at the parameter number, press [↵].

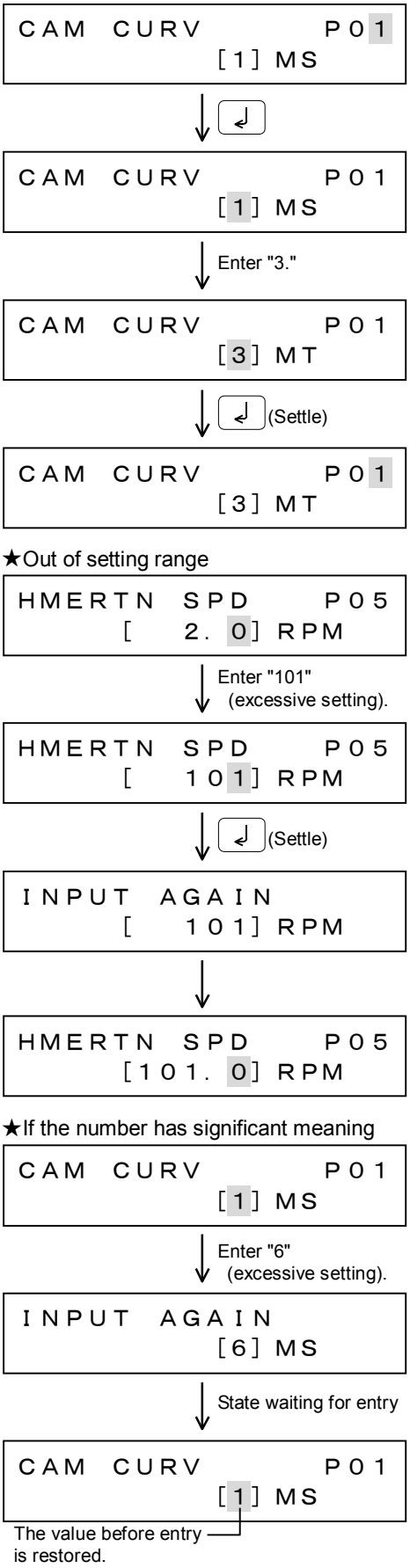
2) The cursor moves to the data entry position. Enter data and press [↵].

※ The cursor does not move if the parameter is locked.

3) The entered data is stored in Teaching Pendant and the cursor moves back to the parameter number.

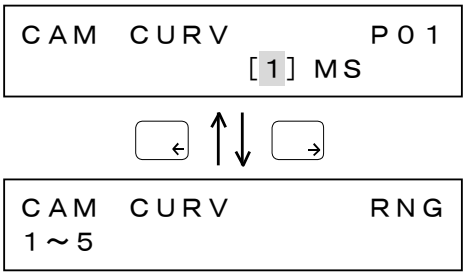
※ Each parameter has the corresponding setting range. If excessive data is entered, an error message is displayed. Even if this happens, the entered value remains on the screen.

However, with settings such as "parameter 1" where the number has a significant meaning, the value before entry is restored.



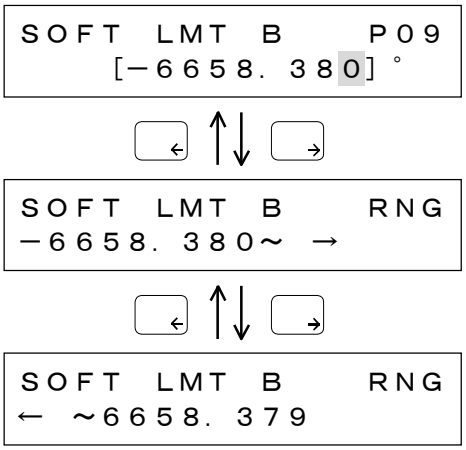
2.6.1.4 Checking the setting range of the parameter

Press [→] during data entry to display the setting range of the parameter.
Press [←] to return to the original screen.



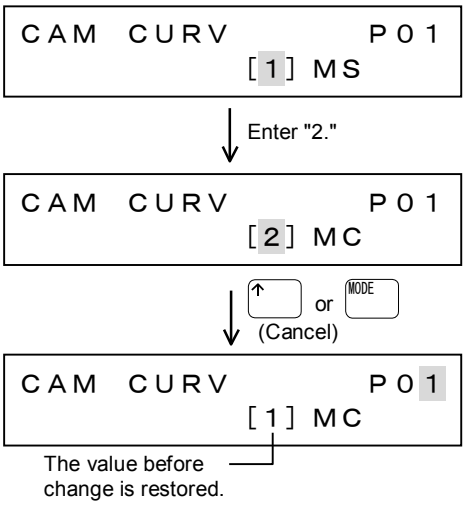
※ If the setting range of the parameter is not displayed at a time, a continuation mark ("→") is displayed at the parameter setting range (lower limit value).
Press [→] to display the upper limit value of the parameter setting range.
Press [←] to return to the previous screen.

★If the setting range is not displayed at a time



2.6.1.5 Canceling entered data

Press [↑] or [MODE] during data entry.
The entered data is canceled.

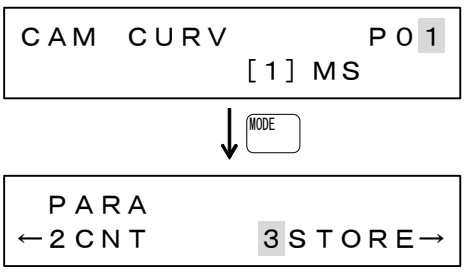


2.6.1.6 After changing parameter data

1) Press [MODE] when the cursor is located at the parameter number position.

2) The parameter mode menu is displayed and the cursor moves to "3 STORE."

※ The new data is valid only in Teaching Pendant.
To store the new data to the ABSODEX driver, execute "3 STORE."

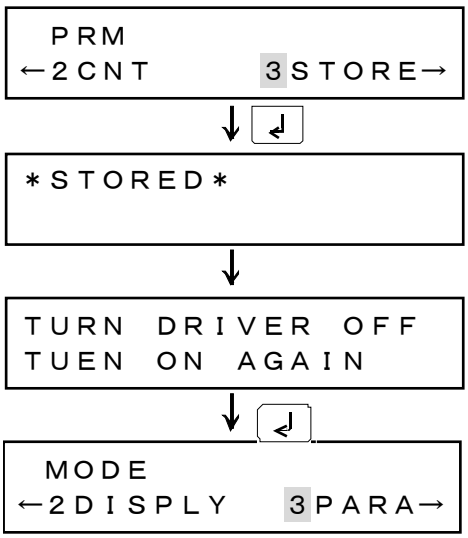


2.6.2 Parameter data storage procedure

1) Select "3 STORE" from the parameter menu and press ↵.

2) A message is displayed to indicate that the parameters kept in Teaching Pendant is stored in both the FLASH MEMORY and RAM.

※ Control power must be restarted to make all parameter settings effective. Press ↵ after confirming the following message.

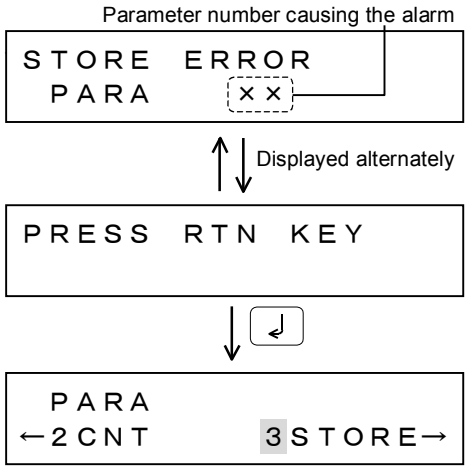


3) After the data is stored, the mode selection menu is displayed again.

※ If no parameter is kept in Teaching Pendant, the following message is displayed.
Load parameters from the ABSODEX driver to Teaching Pendant first before storing parameters.

※ If the teaching pendant which contains parameters for one type of driver is connected to another type driver and "2CNT" is executed, the message on the right is displayed.For the parameters indicated, data loaded from the connected driver is displayed.

※ If an alarm is caused while data is stored, two messages are displayed alternately.
After checking, press ↵.
The alarm is removed and the parameter menu screen is displayed again.
Enter the displayed parameter number again.



2.6.3 Parameter data initialization procedure

All the parameters stored in the driver are initialized (deleted) after the procedure described here. Record parameters before proceeding.

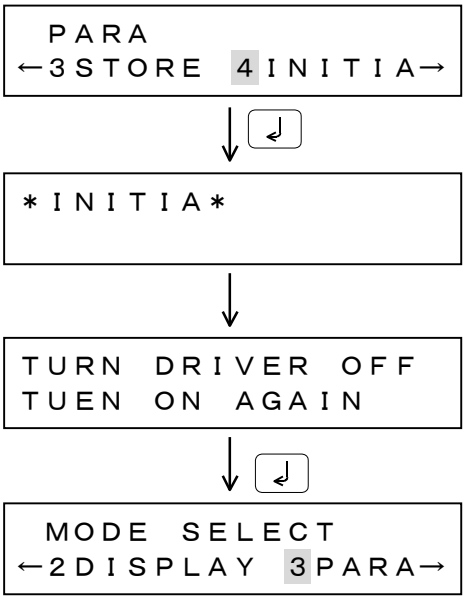
1) Select "4 INITIA" from the parameter menu and press ↲.

2) Parameters in the FLASH MEMORY and RAM of the driver are initialized.
Parameters kept in the Teaching Pendant are not deleted.

   ※ **For the initial values, refer to Section 4.1 "Parameters and Contents."**

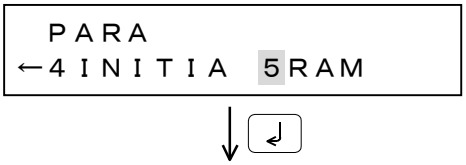
   ※ **Control power must be restarted to return to default settings. Press ↲ after confirming the following message.**

3) The mode selection menu is displayed again.

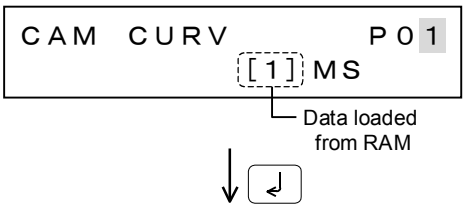


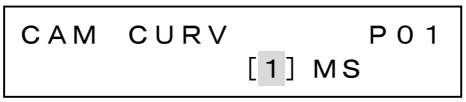
2.6.4 RAM data changing procedure

1) Select "5 RAM" from the parameter menu and press ↲.



2) The same screen as the parameter data changing process screen is displayed.
Follow the regular data entry procedure to enter.

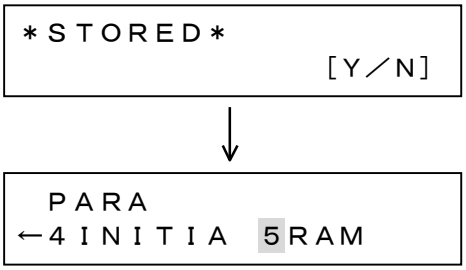




Enter "5."

However, the RAM changing process stores each parameter to the RAM, so that the following screen is displayed after the data settles.
Select whether or not to store, and press ↲.

a) Selecting "Y"
The following message is displayed and the parameter menu is displayed again.



b) Selecting "N"
The parameter entry state is displayed again.

2.6.5 Procedure for setting CCLink/PROFI/DvNet [For serial communication interface TS/TH-type driver only]

Serial communication settings, including the station number, are configured by following this procedure.
If the connected driver does not support this function, the mode for setting CCLink/PROFI/DvNet is not displayed.

2.6.5.1 CC-Link Communication

1) Select "6 CCLink" from the parameter menu and press [↵].

```
  PARA
←5RAM     6CCLink
```

2) Currently set station number is displayed. Following items can be set for CC-Link communication.
1: Station number
2: Baud rate

```
CC−Link
ST NO.          [ 1]
```

Press [↓] or [↑] to switch between the items that can be set.

```
CC−Link
B. RATE [0] 158kbps
```

Press [→] during data entry to display the setting range for that item.
Press [←] to return to the original screen.

```
CC−Link
ST NO.          [ 1]
```

```
CC−Link          RNG
ST NO.          1～63
```

※When a value outside of the setting range is entered, the message on the right is displayed.

```
INPUTO AGAIN
ST NO.          [99]
```

Press [MODE] after configuring the settings.

3) When [MODE] is pressed, the message on the right is displayed.

```
CC−Link
REGISTERE?    [Y／N]
```

a) **Selecting "Y"**
After the configured settings are stored in the driver, the message on the right is displayed, and the parameter menu is displayed again.

```
CC−Link
＊REGISTERED＊
```

※ Control power must be restarted to validate the settings. Press [↵] after confirming the following message.

```
TURN DRIVER OFF
TUEN ON AGAIN
```

b) **Selecting "N"**
The parameter menu is displayed again without storing the configured settings in the driver.

2.6.5.2 PROFIBUS-DP Communication

1) Select “6 PROFI” from the parameter menu and press [↵].

```
  PARA
←5RAM      6PROFI
```

2) Currently set station number is displayed. The station number can be set for PROFIBUS-DP communication.
It is not necessary to set the baud rate since it is set through the auto baud rate function.

```
PROFIBUS
ST NO.          [   0]
```

Press [→] during data entry to display the setting range for that item.
Press [←] to return to the original screen.

```
PROFIBUS
ST NO.          [   0]
```

[←] [↑↓] [→]

```
PROFIBUS        RNG
ST NO.        0～125
```

※When a value outside of the setting range is entered, the message on the right is displayed.

```
INPUTO AGAIN
ST NO.          [999]
```

Press [MODE] after configuring the settings.

3) When [MODE] is pressed, the message on the right is displayed.

```
PROFIBUS
REGISTERE?     [Y／N]
```

c) **Selecting “Y”**
After the configured settings are stored in the driver, the message on the right is displayed, and the parameter menu is displayed again.

```
PROFIBUS
*REGISTERED*
```

※ Control power must be restarted to validate the settings. Press [↵] after confirming the following message.

```
TURN DRIVER OFF
TUEN ON AGAIN
```

d) **Selecting “N”**
The parameter menu is displayed again without storing the configured settings in the driver.

2.6.5.3 DeviceNet Communication

1) Select “6 DvNet” from the parameter menu and press [↵].

```
 PARA
←5RAM      6DvNet
```

2) Currently set station number is displayed. Following items can be set for DeviceNet communication.
1: Station number
2: Baud rate
3: I/O size

Press [↓] or [↑] to switch between the items that can be set.

```
DeviceNet
ST NO.          [ 0
```

[↑] [↑↓] [↓]

```
DeviceNet
B. RATE [0] 125kbps
```

[↑] [↑↓] [↓]

```
DeviceNet
I/O SIZE [0] 8byte
```

Press [→] during data entry to display the setting range for that item.
Press [←] to return to the original screen.

```
DeviceNet
ST NO.          [ 0]
```

[←] [↑↓] [→]

```
DeviceNet       RNG
ST NO.        0～63
```

※When a value outside of the setting range is entered, the message on the right is displayed.

```
INPUTO AGAIN
ST NO.          [99]
```

Press [MODE] after configuring the settings.

3) When [MODE] is pressed, the message on the right is displayed.

```
DeviceNet
REGISTERE?   [Y/N]
```

e) **Selecting “Y”**
After the configured settings are stored in the driver, the message on the right is displayed, and the parameter menu is displayed again.

```
DeviceNet
*REGISTERED*
```

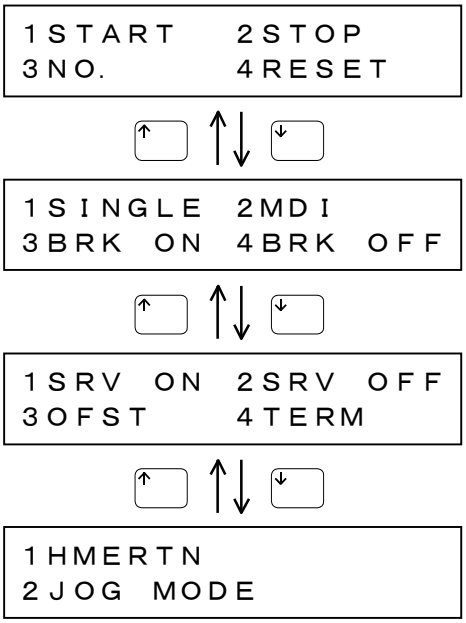
※ Control power must be restarted to validate the settings. Press [↵] after confirming the following message.

```
TURN DRIVER OFF
TUEN ON AGAIN
```

f) **Selecting “N”**
The parameter menu is displayed again without storing the configured settings in the driver.

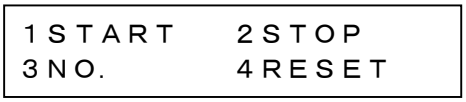
2.7 Motion Mode

The motion mode is provided with 14 menu options.
To switch among menu options, press ↓ or ↑.
To execute the desired option, scroll until the desired menu option is displayed, and key-in the number.



2.7.1 Program starting procedure

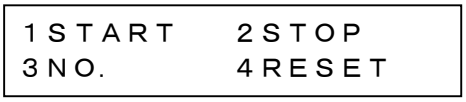
Press ↓ or ↑ and press 1 to display the "1 START" menu option.
Automatic operation of the program currently selected in the ABSODEX driver begins. (Same function as communication code "S1")
The cursor blinks in the position of "1."



※ If no program number is designated in the ABSODEX driver, the following message is displayed.
After designating the number, start.

2.7.2 Program stopping procedure

Press ↓ or ↑ until "2 STOP" is displayed, and press 2.
The currently running program is stopped.
(Same function as communication code "S2")
The cursor blinks in the position of "2."



2.7.3 Execution program selection procedure

1) Press ↓ or ↑ until "3 NO." is displayed, and press 3.

```
1 START    2 STOP
3 NO.      4 RESET
```

2) Enter the program number to be started, and press ↵.

★If program number "1" is selected

```
NO. SELECT
PRGM NO.      [  1]
```

Enter "1" and press ↵

3) A message is displayed and the menu is displayed again.

```
PRGM NO.      [  1]
SELECTED
```

※ If the program number is not registered to the ABSODEX driver, the following message is displayed.
Enter the registered number.

★If program number "10" not registered is selected

```
NO PRGM NO.
PRGM NO.      [ 10]
```

State waiting for data entry

```
NO. SELECT
PRGM NO.      [ 10]
```

2.7.4 Alarm resetting procedure

1) Press ↓ or ↑ until "4 RESET" is displayed, and press 4.

```
1 START    2 STOP
3 NO.      4 RESET
```

2) Data about the current alarm is displayed. Check. If there are two or more alarms, press ↓ or ↑ to scroll.

Alarm number

```
ALARM              7
COM ERROR
```

Alarm description

※ If there is an alarm, you cannot execute "START," "SINGLE" or "MDI."
The following message is displayed. Determine the cause of the alarm and remove it.
For the alarm, refer to Section 5.1 "Alarms and Contents."

```
ALARM GENERATED
3 NO.      4 RESET
```

3) Next, press ↵ to reset.
A message is displayed and the menu is displayed again.

```
*RESET*
COM ERROR
```

※ To refrain from resetting, press MODE while alarm data is displayed.
You can return to the menu.

2.7.5 Single block program operation procedure

Press [↓] or [↑] until "1 SINGLE" is displayed, and press [1].
Each time the key is pressed, a single block of the program is executed.
(Same function as communication codes "M2" + "S1")
The cursor blinks in the position of "1."

```
1 S I N G L E   2 M D I
3 B R K   O N   4 B R K   O F F
```

2.7.6 Manual data input (MDI) mode execution procedure

In the MDI mode, you can enter and immediately execute NC codes.

1) Press [↓] or [↑] until "2 MDI" is displayed, and press [2].

```
1 S I N G L E   2 M D I
3 B R K   O N   4 B R K   O F F
```

2) Enter NC codes and press [↵].
The NC codes are executed immediately and the menu is displayed again. (For the NC code, refer to Section 3.3 "Code List.")

```
M D I   D A T A
>
```

※If execution does not start, press the [MODE] key. The menu is displayed again.

2.7.7 Brake application procedure

Press [↓] or [↑] until "3 BRK ON" is displayed, and press [3].
Electromagnetic brake is turned off.
(Same function as M code "M68")
The cursor blinks in the position of "3."

```
1 S I N G L E   2 M D I
3 B R K   O N   4 B R K   O F F
```

2.7.8 Brake releasing procedure

Press [↓] or [↑] until "4 BRK OFF" is displayed, and press [4].
Electromagnetic brake is turned on.
(Same function as M code "M69")
The cursor blinks in the position of "4."

```
1 S I N G L E   2 M D I
3 B R K   O N   4 B R K   O F F
```

2.7.9 Servo activation procedure

Press [↓] or [↑] until "1 SRV ON" is displayed, and press [1].
The servo is turned on.
The cursor blinks in the position of "1."

```
1 S R V   O N   2 S R V   O F F
3 O F S T       4 T E R M
```

2.7.10 Servo deactivation procedure

Press ↓ or ↑ until "2 SRV OFF" is displayed, and press 2.
The servo is turned off.
The cursor blinks in the position of "2."

```
1 SRV  ON   2 SRV  OFF
3 OFST      4 TERM
```

※ If "START," "STOP," "SINGLE," "MDI," "BRK ON," "BRK OFF" or "HME RTN" is selected in the servo-off state, the following message is displayed.
Execute "SRV ON" to execute these commands.

```
SRV  ON
```

※ If "SRV OFF" is executed with the actuator installed sidewise, the output shaft may rotate due to the load weight, possibly causing danger.
Do not use this procedure but use MDI or other commands to align the position in the servo-on state.

2.7.11 Home position offset entry procedure

1) Turn the servo off.
   ※ Refer to Section 2.7.10 "Servo deactivation procedure."

2) Turn the output shaft of the actuator manually to align the mechanical origin with the assumed output shaft origin of the actuator.

3) Press ↓ or ↑ until "3 OFST" is displayed, and press 3.

4) Select whether or not to enter the parameter, and press ↵. The origin offset amount is entered.

5) Turn the servo on.
   ※ Refer to Section 2.7.9 "Servo activation procedure."
   ※ The entered origin offset amount becomes valid after the control power is turned off then on again or after a home return is executed.

★If the origin offset amount before data entry is "0"

```
1 SRV  ON   2 SRV  OFF
3 OFST      4 TERM
```

↓ 3

```
PARA  SET        [Y/N]
          0      PLS
```

Origin offset amount entered in parameter

2.7.12 Offset zeroing procedure

1) Select "3 PARA" from the mode selection menu.

2) Select "1 READ" from the parameter mode menu.

3) While the cursor is located at the parameter number, enter "3" and press [↵].
The origin offset amount entry screen is displayed.

4) Next, press [↵]. The cursor moves to the position of the setting. Enter "0" and press [↵].

5) Press [MODE] to return to the menu, and select "3 STORE" and press [↵].
The offset amount is reset to zero.

※ The new origin offset amount becomes valid after the control power is turned off then on again or after a home return is executed.

★Suppose that the origin offset amount is "98000 pulses."

```
  MODE  SELECT
←2DISPLAY  3PARA→
```

↓ [↵]

```
  PARA
 1READ      2CNT    →
```

↓ [↵]

```
CAM  CURV          P01
          [1] MS
```

↓ Enter "3" and press [↵]

```
HMEPOSI  OFST  P03
   [   98000] PLS
```

↓ [↵]

```
HMEPOSI  OFST  P03
   [   98000] PLS
```

↓ Enter "0" and press [↵]

```
HMEPOSI  OFST  P03
   [          0] PLS
```

↓ [MODE]

```
  PARA
←2CNT       3STORE→
```

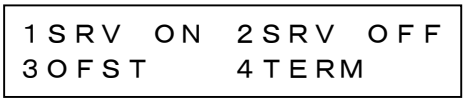
↓ [↵]

```
*STORED*
```

2.7.13 Terminal operation procedure

In the terminal mode, communication codes are used to exchange data directly with the ABSODEX driver.

1) Press [↓] or [↑] in the motion mode until "4 TERM" is displayed, and press [4].



2) The entry screen is displayed. Enter desired transmission data (communication codes) and press [↵].

   ※ **For the communication code, refer to Section 6.1 "Communication Code List."**

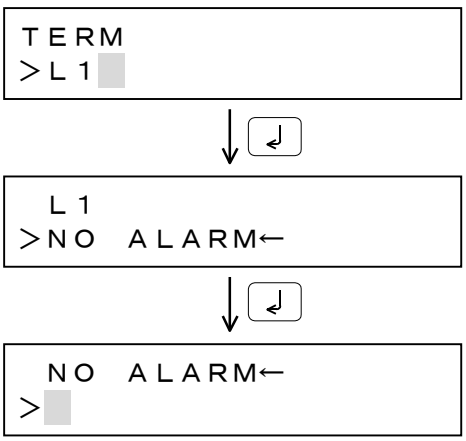
3) The entered transmission data moves to the upper line and the data sent back from the ABSODEX driver is displayed in the lower line. "←" in the received data indicates the end of data.

4) After checking, press [↵].
   The received data moves to the upper line and Teaching Pendant waits for other transmission data.

   ※ **To return to the motion mode menu, press [MODE].**

   ※ **press [↑] to display and edit previously entered data**

★To send "L1"



2.7.13.1 Communication data

a) Up to 256 characters can be entered in communication data.

b) The cursor moves character by character each time [→] or [←] is pressed. (Press and hold [→] or [←] for 0.5 seconds or more to keep moving the cursor while the key is held down.)

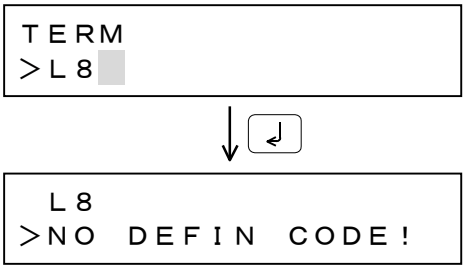
2.7.13.2 Reception data

a) To view reception data exceeding 15 characters, press [→] or [←].

b) During transmission, the following codes are checked.
If other codes are entered, the following message is displayed.

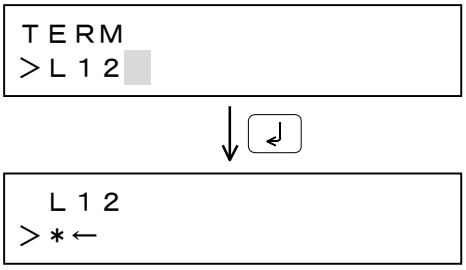
<Codes that can be sent>
- M1 to M6
- S1 to S7,S20
- L1 to L21
  (However, L8 and L14 are excluded.)

★If "L8" is sent



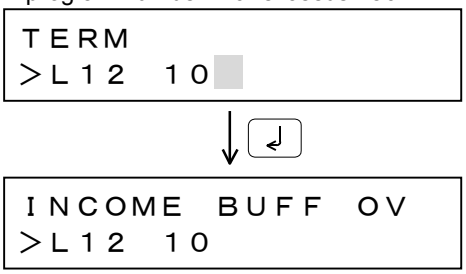
c) Various values are sent back in response to the code starting with "L." If there is no predetermined value, "0" (during normal operation) is displayed.
If the entry format of the code is wrong, "∗" is sent back.
(At this time, an alarm is caused.)

★If "L12" is sent



d) If the received data exceeds 256 characters, the following message is displayed.
Thereafter reception data is displayed as in regular cases, but the part later than 256 characters is not displayed.

★If the number of program characters of program number "10" exceeds 256



2.7.13.3 Parameter entry method in terminal mode

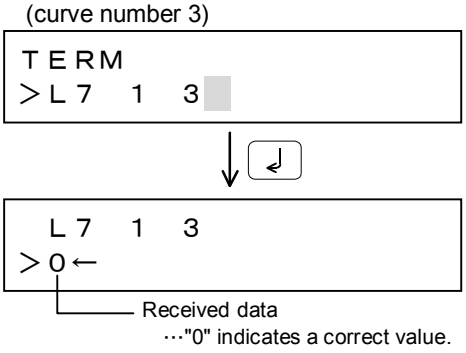
In the terminal mode, ABSODEX parameters can be modified directly.

[Code to be used and data format]

L7 _ [parameter number] _ [data]

a) As an example, the method for changing the cam curve (parameter number 1) into a deformed trapezoid (curve number 3) is described.

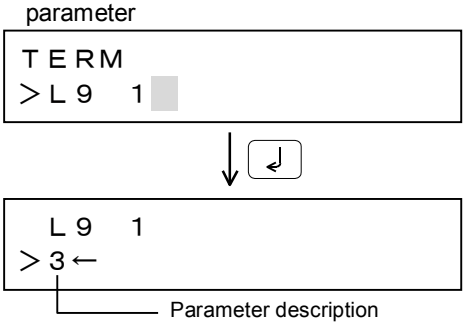
★To change the cam curve (parameter number 1) into deformed trapezoid (curve number 3)



b) For the description of the parameter, use the following code.

L9 _ [parameter number]

★To check the description of the parameter



2.7.14 Home return procedure

Press ↓ or ↑ until "1 HMERTN" is displayed, and press 1.
A home return is executed. (Same function as G code "G28")
The cursor blinks in the position of "1."

```
1 HMERTN
2 JOG  MODE
```

2.7.15 Jogging procedure

2.7.15.1 Confirmation before starting jog operation

1) Gain adjustment confirmation
2) Confirmation of poor torque or the like caused by eccentric load
3) Confirmation of periphery of equipment (breakage of equipment during rotation in jog mode, etc.)

2.7.15.2 Motion mode check

1) Servo-on
   In case of servo-off, start the motion mode and turn the servo on.
2) Brake release
   If the brake is applied, start the motion mode and release the brake.

2.7.15.3 Jogging method

1) Press [↓] or [↑] until 2 JOG MODE" is displayed, and press [2].

```
1 HMERTN
2 JOG  MODE
```

2) Enter the jogging speed parameter (PRM14). Enter the jogging speed and press [↵].

```
JOG  SPD
P14 [   2. 00]  RPM
```

↓ [↵]

```
*STORED*
P14 [   2. 00]  RPM
```

3) Enter the jog acceleration/deceleration time parameter (PRM15). Enter the jog acceleration/deceleration time and press [↵].

```
JOG  LSPD
P15      [1. 0]  SEC
```

↓ [↵]

```
*STORED*
P15      [1. 0]  SEC
```

4) Press [4] or [6] to select the direction of rotation of jogging operation.
   To exit from the jog mode, press [0].

```
4 : CCW          6 : CW
0 : END
```

※ While [4] is held down, "4 CCW" blinks and CCW rotation is caused.
While [6] is held down, "6 CW" blinks and CW rotation is caused.
Release [4] or [6] to return to the state ready to accept [4], [6] or [0].
Press [0] to exit from the jog mode to the motion menu and to start the automatic operation mode (M1).

2.8 Copy Mode

In the copy mode, one of the following is copied from the ABSODEX driver to another driver.

1: All programs

2: All parameters

3: Both all programs and all parameters

In the copying process, the designated data (above 1 to 3) is loaded from the ABSODEX driver to Teaching Pendant.

Connect Teaching Pendant to the destination driver and execute the storage process.
The "READ" and "STORE" procedures are described.

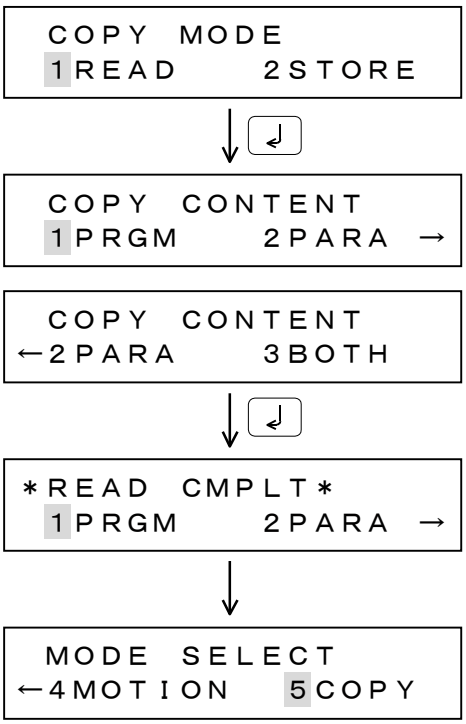
2.8.1 Procedure for loading from ABSODEX driver to Teaching Pendant

1) After the copy mode is selected, the following screen is displayed.
   Select "1 READ" and press [↲].

2) Next, select the data type to be loaded, and press [↲].

3) After data is loaded, a message is displayed and the data is stored in Teaching Pendant.

4) The mode selection menu is displayed again.



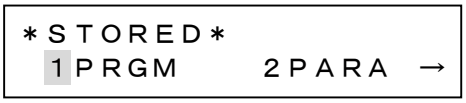
2.8.2 Procedure for storing from Teaching Pendant to ABSODEX driver

1) After the copy mode is selected, the following screen is displayed.
Select "2 STORE" and press [↵].

2) Next, select the data type to be stored, and press [↵].

3) The message on the right is displayed before any parameters are stored. Select “Y” to store the indicated parameter(s); otherwise, select “N”.

4) The message on the right is displayed before any parameters are stored. "Y" to store the indicated parameters otherwise, select "N".

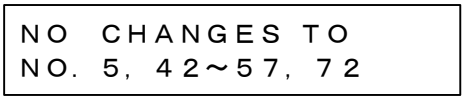


※ If data not found in Teaching Pendant is designated, the following message is displayed.

★If program data is not found

★If parameter data is not found

**※ If the teaching pendant which contains parameters for one type of driver is connected to another type driver and “2 CNT” is executed, the message on the right is displayed.
For the parameters indicated, data loaded from the connected driver is displayed.**



5) The mode selection menu is displayed again.

※ In the copy mode, all programs in the driver is cleared before the program is stored.

2.9 Tuning Mode (Function for TS-type driver only)

The TUNING mode includes three menu options.

Each function is described below.

1 : TUNING····· After the load size is estimated using the auto-tuning function, the gain is assigned.

2 : GAIN····· Response is adjusted by changing the gain assignment using the semi-auto tuning function.
※This function can be used after “1 TUNING” is done.

3 : TEST····· The traveling angle and traveling time are specified, and a trial run of the ABSODEX is conducted.

⚠ WARNING :

- Servo off (including emergency stop and alarm) and brake off with rotational force is applied e.g. by gravity may cause the actuator to rotate.
  Operate the actuator in the balanced condition so that rotational force is not applied for these operations after all safety aspects are confirmed.
- When auto tuning is executed, the actuator rotates and the load is estimated. Make sure that the safety is assured to operate the actuator.
- Keep hands away from the rotating part as sudden motion may take place during gain adjustments or trial run.
  Make sure of the safety in the full revolution of the actuator before turning it on to adjust.
- Make sure that the safety is assured to operate the actuator in case the unit is operated from the place unable to confirm the motion.
- When changing the gain adjustment switches (G1, G2) on the front panel of the driver to “0-0”, rotate each switch one position at a time while the actuator is not in motion or change them while the driver is turned off. In doing so, the DIP switches should be turned in a counterclockwise direction (i.e., →2→1→0), not in a clockwise direction (i.e., →E→F→0). Also, do not turn them beyond position “0” (i.e., →1→0→F).
  In the factory shipped condition, the torque cannot be output when the switches are set to “0-0”. Before turning the power on, make sure the actuator is at equilibrium where no rotational force can be applied.
- Unless the actuator or load table is fixed firmly, fierce vibration may occur.
  Make sure these are firmly fixed, and make adjustments with the actual using load condition or very close to such condition.

⚠ CAUTION :

- If the load is changed, gain adjustment (TUNING) must be executed again.

2.9.1 Tuning Procedure

1) Select “6 TUNING” from the mode selection menu.

```
MODE SELECT
←5COPY  6TUNING
```

※If a driver other than TS-type is connected, the message on the right is displayed, and the mode selection menu is displayed again.

```
THIS MODE IS FOR
TS TYPE ONLY
```

2) Select “1 TUNING” from the TUNING mode menu.

```
TUNING MODE
1TUNING  2GAIN→
```

※If the gain adjustment switches (G1, G2) on the font panel of the driver are set to other than “0-0”, the message on the right is displayed.
Set the gain switches to “0-0” and select “1 TUNING” again.
※The actuator may widely oscillate, freerun, and alarm may go off during setting.
Confirm safety before operating.

```
ADJUST GAIN−SW
TO 0−0
```

3) The friction load is set (small, medium, large).
Select a larger value for larger friction load.

```
TUNING: FRICTION
1～3     [2] MEDIUM
```

4) The oscillation angle is set (small, medium, large).
Normally, “3 LARGE” is entered.
Select a smaller value for smaller oscillation angle.

```
TUNING: ANGLE
1～3     [3] LARGE
```

5) The response is set (1 to 32).
Normally, “10” is entered.
The response changes according to the input value as follows.
[1 to 10: soft, 11 to 22: medium, 23 to 32: hard]

```
TUNING: RESPONSE
1～32   [10] SOFT
```

6) The servo is turned off.
After all safety aspects are confirmed (e.g., the actuator is at equilibrium), select “Y”.
Select “N” to discontinue.

```
OK TO TURN
SERVO OFF?  [Y/N]
```

※ If the servo cannot be turned off because for example a program is running, the message on the right is displayed.

```
COULD NOT TURN
SERVO OFF
```

7) Confirmation for beginning oscillation.
Confirmation is required before beginning oscillation.
After all safety aspects are confirmed (e.g., the rotation of moving parts will not cause any problems), select “Y”.
Select “N” to discontinue.

```
OK TO
OSCILLATE?  [Y/N]
```

The message on the right is displayed while auto tuning is running.
※If the actuator does not stop oscillating after 1 minute, turn off the driver and manually adjust the gain after turning the power back on.

```
AUTO TUNING IS
RUNNING
```

※When auto tuning is canceled, the message on the right is displayed.

```
AUTO TUNING IS
CANCELED
```

[SMB-66E]

8) Completion of TUNING.
The message on the right is displayed when TUNING is finished.
After all safety aspects are confirmed (e.g., the rotation of moving parts will not cause any problems), press [↵].
If the actuator oscillates, manually adjust the gain.

```
AUTO TUNING IS
FINISHED
```

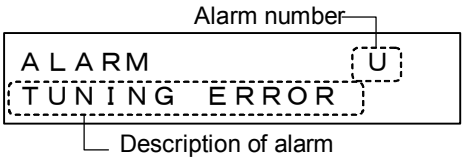
※If the actuator does not turn servo on, the message on the right is displayed.

```
COULD NOT TURN
SERVO ON
```

When auto tuning is finished, the TUNING mode menu is displayed and the cursor moves to “3 TEST”.
※Refer to Section 2.9.3 “TEST Procedure”.

```
  TUNING MODE
←2GAIN      3TEST
```

When an alarm is present, data of an alarm currently in presence is displayed.
※Refer to Section 5.1 “Alarm Display and Description”.



If there are multiple alarms, press [↑] or [↓] to display other alarms.

★If there are alarms 4 and U

```
ALARM 4
ACTU OVERLODO
```

[↑] [↓]

```
ALARM U
TUNING ERROR
```

Press [↵] to reset the alarm.
Remove the cause of the alarm and redo “1 TUNING”.
※To return to the menu without resetting the alarm, press [MODE] while the alarm data is displayed.

```
*RESET*
```

2.9.2 Gain Procedure

1) Select “2 GAIN” from the TUNING mode menu.

```
  TUNING  MODE
 1TUNING   2GAIN→
```

If auto tuning has not been executed in the TUNING mode, following the message on the right, the TUNING mode menu with the cursor at “1 TUNING” is displayed.

```
EXECUTE  AUTO
TUNING  FIRST
```

2) The gain (response) is set.
Currently set value is displayed.
Use → or ← key so change the values in increments of 1 or press ↵ after inputting numbers.
Larger the set value, greater the convergence at motion completion and holding rigidity at stops.

```
GAIN                    [10]
L■■■□□□□□H     1～32
```

※Increasing this value rapidly can cause the actuator to vibrate violently and pose a danger.
After all safety aspects are confirmed, increase the value by 1, 2, or 3.
※During gain adjustments, the actuator may oscillate greatly or an alarm may generate and cause a coast-to-stop. If the rigidity of the equipment is small, strong vibration may be caused. Confirm all safety aspects before operating.

3) Confirmation for rewriting data.
Select “Y” to rewrite the value.
Select “N” to return to the previous screen and redo the value setting procedure.

```
CHANGE  GAIN?
              [Y／N]
```

4) Completion of gain (response) setting.
The message on the right is displayed when the gain (response) has been changed. Rotate the actuator and check the adjustment.
If the actuator oscillates, enter a lower value for the gain.

```
＊CHANGED＊
```

2.9.3 Test Procedure

1) Select “3 TEST” from the TUNING mode menu.

```
  TUNING  MODE
←2GAIN      3TEST
```

If auto tuning has not been executed in the TUNING mode, following the message on the right, the TUNING mode menu with the cursor at “1 TUNING” is displayed.

```
EXECUTE  AUTO
TUNING  FIRST
```

2) Moving angle for the TEST is set.
(RANGE: 0.01 to 360.00 DEG)

```
MOV'G  ANGLE
[       90]°
```

3) Moving time for the TEST is set.
(RANGE: 0.01 to 10.00 SEC)

```
MOV'G  ANGLE
[   2.5] SEC
```

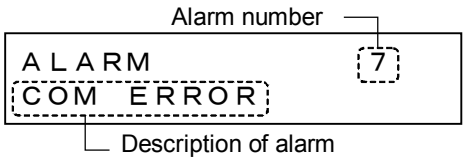
The message on the right is displayed after the above settings are made.

```
1:CW        2:CCW
3:GAIN      4:RESET
```

When “1 CW” is selected, the actuator rotates in a clockwise direction according to the above conditions.
When “2 CCW” is selected, the actuator rotates in a counterclockwise direction according to the above conditions.
When “3 GAIN” is selected, the gain is adjusted.
※Refer to Section 2.9.2 “GAIN Procedure”.
When “4 RESET” is selected, the alarm is reset.

Press [MODE] to return to the menu.
※In the “TEST” menu, some G code is set by the MDI mode(M3).
Control power must be restarted to avoid malfunctions.

Select “4 RESET” to reset the alarm.
Once the data of an alarm currently in presence is displayed, check it.
If there are multiple alarms, press [↑] or [↓] to scroll.



※If there is an alarm, “1 CW” and “2 CCW” cannot be executed.
The message on the right is displayed. Determine the cause of the alarm and remove it.
Refer to Section 5.1 “Alarm Display and Description” for alarms.

```
ALARM  GENERATED
```

Next, press [↵] to reset the alarm.
Following the message on the right which indicates that the alarm has been reset, the menu is displayed.

```
*RESET*
```

※To return to the menu without resetting the alarm, press [MODE] while the alarm data is displayed.

--- MEMO ---

3. PROGRAM

ABSODEX driver with the controller system will enable free setting of actuator rotation angle, moving time, and timer setting. Also M code output enables communication with external sequencer (PLC).

3.1 Program Format

NC program starts with "O" at the head of the program, which is followed by the program number.
N is followed by sequence number, NC code, data and the semi-colon (;) at the last.
The section separated by the semi-colon (;) is called a block, and the sequence number is sometimes called the block number.

O□□
N□□G□□P□□A□□F□□M□□L□□J□□;
N□□G□□P□□A□□F□□M□□L□□J□□;
⋮
N□□M30;

※ □□:denotes numeral data.

3.2 Cautionary Items

1) Two or more G codes and M codes belonging to different groups can be written in a single block. However, two or more NC codes belonging to the same group may not be specified in a single block.
For the group of the NC code, refer to Section 3.3 "Code List."

2) When the M codes (M20 to M27) in group D is issued, an M code including the bit corresponding to the numeral of the units digit (0 to 7) and an M code strobe signal are issued from CN3.
If two or more M codes in group A (up to three codes) are specified in a single block, the M code output signal is issued simultaneously.
Do not specify the M code in group D together with M codes in other groups in a single block.

3) If two or more M codes in different groups (other than group D) are specified in a single block, the M codes are executed in the order they are specified.
However, M30 is executed at the last, and segment position output M70 is output first.

4) G101 in group C may not be used simultaneously with G codes in group A in a single block.

5) M30 (end of program) must be specified in the last block of the program.

6) Sequence number "N□□" is not compulsory.
The program is executed from the top without relations to the sequence number.
However, the sequence number is necessary at the beginning of the destination block of a jump specified with a J code.

7) If merely the A code (traveling amount) is not specified in a single block, the "F" value (traveling time or speed) specified in the previous block is assumed.
If the "F" value has not been specified in previous blocks, an NC program error is caused.

8) Angle input

G105A123	Indicates 123°.
G105A123.	Indicates 123°.
G105A.123	Indicates 0.123°.
G1050.123	Indicates 0.123°.

9) If the rotation speed determined by the traveling amount specified with "A" and the traveling time specified with "F" exceed the maximum rotation speed of ABSODEX, the traveling time is automatically extended so that the rotation speed is contained within the maximum limit.

10) If the traveling command and jump instruction are in the same block, the operation program may be locked against modification. If this is the case, separate the traveling command from the jump instruction in separate blocks.

G91A180F0.4J1; → G91A180F0.4;J1;

11) Specify "G92" coordinate system determination and M miscellaneous function codes in separate blocks.
If they are in the same block, the M code output signal will not be issued.

12) The maximum program length that can be entered is 3970, including the number of letters, semi-colons and numbers and the number of entered NC programs.

<Example of NC program length count>

Program →	O	1	;	G	101	A	7	;	G	91.1	A	1	F	0.5	;	M	30
Count →	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

The above count plus the number of programs, that is, one, 18 in total, is the NC program length.

13) If there is no description of G codes in group C, D or E in the program, the previously executed G code is valid.
If G codes are specified in some programs, specify the G codes in each program.

3.3 Code List

1) NC Code

Code	Function		Data Range	Remarks
O	Program number		0 to 999	0 to 255 can be selected from I/O. "o" is automatically added.
N	Sequence number		0 to 999	Can be omitted.
G	Preparation function		0 to 999	Refer to Section "2) G Code."
A	Instruction to move coordinate axis	G90, G91, G91.1	±9999999	Unit: pulse
			±6658.380	Unit: angle
			±4716	Unit: number of indexes
		G90.1, G90.2, G90.3	±540672	Unit: pulse
			±360.000	Unit: angle
			1 to Designated number of segments	Unit: number of indexes
	Designation of segment numbers		1 to 255	
	Continuous rotation speed		±80.00 (Note)	Unit: rpm
F	Designation of speed		0.11 to 300.00 (Note)	Unit: rpm
			0.01 to 100.00	Unit: sec
M	Auxiliary function		0 to 99	Refer to Section "3) M Code."
P	Dwell		0.01 to 99.99	Unit: sec G4P□□. □□
	Designation of sub-program number		0 to 999	Program No. M98P□□□
	Gain magnification		0, 50 to 200	Unit: % G12P□□□ 0% input will set servo-off.
	Acceleration and deceleration for continuous rotation		0.01 to 50	Unit: sec G8P□□□ G9P□□□
	Parameter data setting		Range defined by parameters	Unit: the unit defined by each parameter; G79S□□P□□□
L	Numbers of repetition		1 to 999	Repeats the block as specified.
J	Jump		0 to 999	J0 causes a return to the top of the program.
S	Parameter data setting		1 to 99	Setting parameter No.; G79S□□P□□□

Note : The minimum rotation speed of the actuator is 0.11rpm.
The rotation speed varies among models.
For details, refer to "ACTUATOR SPECIFICATIONS" in the driver instruction manual.

2) G Code

Group	Code	Function	Description
A ＊	G1 (G01)	Positioning	To position at A with speed F. <Input Method> A□□ F□□; G1 can be omitted.
	G7 (G07)	Continuous rotation	Under continuous rotation at the speed A (rpm). <Input Method> G7 A±□□; Unit of A: rpm "+" indicates clockwise rotation, while "-" indicates counterclockwise rotation. Note: Select less than 80 rpm for G7(G07) continuous rotation.
	G28	Home positioning	Enable home positioning
	G72	Pulse string input	Motion with accordance with the pulse string input by CN3. The program stop input or start input will terminate the execution of G72.
	G92	Setting of coordinate system	Enables setting or changing coordinate system. Like G92A0, with the code A suffixed to G code, the coordinate system is set so that the current position is the value to follow A.
	G92.1	Setting of coordinate system	To set the home position of G92 user coordinate at power-on is the value which follows A.
B	G4 (G04)	Dwell	Delay to shift to the next block. <Input Method> G4 P□□.□□;
	G8 (G08)	Acceleration time for continuous rotation	Acceleration takes place for the time specified by P for continuous rotation. <Input Method> G8 P0.5; acceleration time 0.5sec.
	G9 (G09)	Deceleration time for continuous rotation	Deceleration takes place for the time specified by P for continuous rotation. <Input Method> G9 P0.5; deceleration time 0.5sec.
	G12	Change of Gain Magnification Rate	Gain magnification rate determined by Switch Gain 1, 2 <Input Method> G12 P100; 100% G12 P0; cause servo-off at 0%.
	G79	Parameter data setting	Substitute the parameter number with "S" for the value of P. <Input Method> G79S1P2; To substitute the parameter 1 for 2.
C	G101	Designation of Segment Numbers	One rotation is equally segmented to set A unit to index number G106. <Input Method> G101A10; ← One rotation = 10 segments G1A1; ← Unit of A is index number Note: "G101" may not be used together with A-group in a single block.
	G104	Designation of pulses	Unit of A is pulse.
＊	G105	Designation of angles	Unit of A is angle.
	G106	Designation of index	Unit of A is numbers of index. If not set by G101, program error will occur.

The asterisk (＊) indicates the power-on setting.

Group	Code	Function	Description
D	G10	Designation of rotation number	Unit of F is rpm. Moving speed is specified by the maximum rotation number.
*	G11	Designation of time	Unit of F is second. Moving time is specified.
E *	G90	Absolute dimension	The value of A to be made absolute value from the home position of coordinates.
	G90.1	One rotation absolute dimension	The actuator moves to the nearer direction with the value A as the one (1) rotation absolute value from the coordinate home position. The user coordinate after completion of positioning is adjusted within -180° to 179.999°. The specified range of A is within ±360°. Specifying 180° will cause the actuator to rotate CCW.
	G90.2	CW direction absolute dimension	The actuator moves to the CW direction with the value A as the one (1) rotation absolute value from the coordinate home position. The user coordinate after completion of positioning is adjusted within -180° to 179.999°. The specified range of A is within ±360°. (The actuator motions between 0 to 360° in the CW direction.)
	G90.3	CCW direction absolute dimension	The actuator moves to the CCW direction with the value A as the one (1) rotation absolute value from the coordinate home position. Same as G90.2 except for the rotation direction changes to CCW. The user coordinate after completion of positioning is adjusted within -180° to 179.999°. The specified range of A is within ±360°. (The actuator motions between 0 to 360° in the CCW direction.)
	G91	Incremental dimension	The value of A to be made incremental value from the current position. Designate the direction of rotation, using the sign attached to the value following "A". A positive value (without a sign) indicates clockwise rotation, while a negative value (-) indicates counterclockwise rotation.
	G91.1	One rotation incremental dimension	The value of A is the incremental value from the current position. Designate the direction of rotation, using the sign attached to the value following "A". A positive value (without a sign) indicates clockwise rotation, while a negative value (-) indicates counterclockwise rotation. The user coordinate after completion of positioning is adjusted within -180° to 179.999°.

The asterisk (*) indicates the power-on setting.

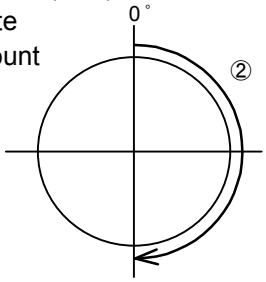
3) M Code

Group	Code	Function	Description
A	M0 (M00)	Program Stop	After completion of the current block, the program stops. When the start signal is input again, program execution starts with the next block.
	M30	End of Program	The program terminates to return the head block of the program.
B	M98	Sub-program call	Executes sub-program. <Input Method> M98 P□□□ ← sub-program number Nest is feasible up to four times.
	M99	End of sub-program	Indicates the end of sub-program. After executing the block containing M99, the main program is resumed.
C	M68	Braking Motion	Electromagnetic brake for the brake and dose not make servo system integral control. Turn off across the BK+ and BK- terminals of the driver.
	M69	Brake Releasing	Electromagnetic brake for the brake and makes servo system integral control. Turn on (24VDC) across the BK+ and BK- terminals of the driver.
D	M20 to M27	I/O Output	M signal in bit corresponding to the first digit is output to CN3, and M code strobe output will turn ON simultaneously. Three (3) M codes can be written in the same block, and can be output simultaneously.
E	M70	Segment position output	When "G101" is used, the M code output corresponding to the indexing position (bits 0 to 7: binary format) and segment position strobe output are issued simultaneously at CN3. The segment position for n segmentation is expressed 1 to n.

3.4 Sample Programs

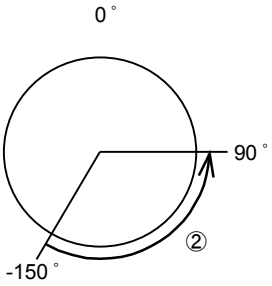
Sample programs and resultant actions are described.

1) Absolute dimension (G90), angle designation (G105) and time designation (G11)
Create an indexing program, using angle and time units at the absolute user coordinate position defined with a home position offset amount (parameter 3).



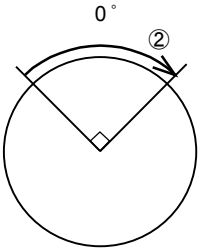
Program	Explanation
N1G90G105G11;	①Absolute, angle, time
N2A180F1.5;	②Travel to the 180° position in 1.5 sec.
M3M30;	③End of program

2) Full revolution absolute dimension (G90.1)
Do not rotate beyond 180° (shortest route travel).



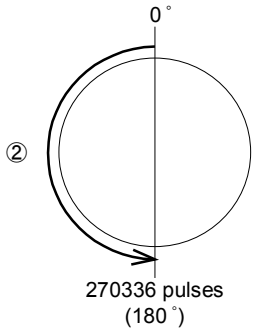
Program	Explanation
N1G90.1G105G11;	①Full revolution absolute, angle, time
N2A90F1. 5;	②Travel to the 90° absolute coordinate position in 1.5 sec. on the shortest route.
N3M30;	③End of program

3) Full revolution incremental dimension (G91.1)
Travel from the current position by an angle.



Program	Explanation
N1G91.1G105G11;	①Full revolution incremental, angle, time
N2A90F1;	②Travel from the current position clockwise to the 90° position in 1 sec.
N3M30;	③End of program

4) Pulse designation (G104)
Designate the traveling amount in pulses.

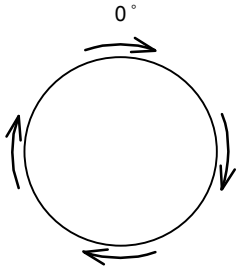


Program	Explanation
N1G90.1G104G11;	①Full revolution absolute, pulse designation, time
N2A270336F2;	②Travel to the 270336-pulse (180°) position in 2 sec.
N3M30;	③End of program

※ The 180° travel with G90.1 (shortest route) causes counterclockwise rotation.

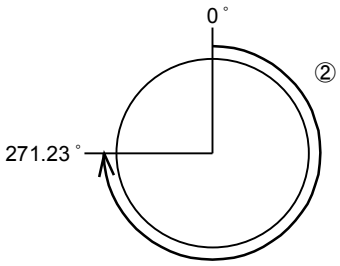
5) Continuous rotation (G07), continuous rotation acceleration time (G08), continuous rotation deceleration time (G09)
After supplying a start signal, rotate at the rotation speed specified with G07.
The acceleration/deceleration time at the time follows the settings of G08 and G09.

Program	Explanation
N1G105;	①Angle designation
N2G08P1;	②Acceleration in 1 sec.
N3G09P0.5;	③Deceleration in 0.5 sec.
N4G07A10;	④Continuous rotation 10rpm
N5M30;	⑤End of program



6) Rotation speed designation (G10)
Specify the unit of F at the maximum rotation speed.

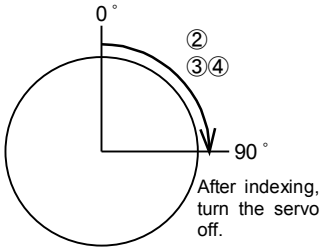
Program	Explanation
N1G90G105G10;	①Absolute, angle, rotation speed
N2A271.23F30;	②Travel to the 271.23° position at 30rpm.
N3M30;	③End of program



※ If the rotation speed is high and the traveling amount is smaller, the acceleration may become too large to cause alarm 1 (position deviation over). If this happens, use MC2 cam curve.

7) Gain multiplication change (G12), dwell (G04)
Use the gain multiplication change function to index and turn the servo off.

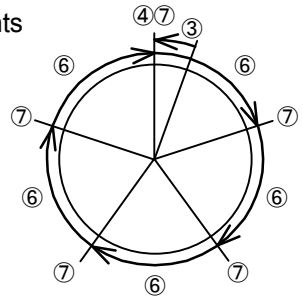
Program	Explanation
N1G90.1G105G11;	①Full revolution absolute, angle, time
N2A90F1;	②Travel to the 90° position in 1 sec.
N3G04P0.2;	③Dwell 0.2 sec.
N4G12P0;	④Change the gain multiplication to 0% (servo-off).
N5M30;	⑤End of program



※ In the program executed after the servo is turned off, a gain multiplication change command such as "G12P100" is necessary before the travel instruction so that servo-off is reset.

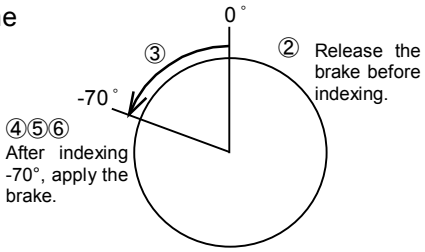
8) Segment number designation (G101), segment position output (M70), start input wait (M0) and jump (J)
After indexing into equal segments, use a segment position output to output the current position to an external programmable logic controller in a binary format.

Program	Explanation
N1G101A5;	①Segment number designation, 5 segments
N2G11;	②Time designation
N3G91A0F1;	③Travel to the nearest indexing position in 1 sec.
N4M70;	④Segment position output
N5M0;	⑤Start input wait
N6G91.1A1F1;	⑥Travel clockwise by a segment in 1 sec.
N7M70;	⑦Segment position output
N8M0;	⑧Start input wait
N9J6;	⑨Jump to sequence No. 6
N10M30;	⑩End of program



9) Brake application (M68), brake release (M69) and M code output
Control the brake of ABSODEX equipped with a brake. Issue an M code after an action to notify the external programmable logic controller of completion of the action.

Program	Explanation
N1G90. 1G105G11;	①Full revolution absolute, angle, time
N2M69;	②Release the brake.
N3A-70F0. 5;	③Travel to the -70° position in 0.5 sec.
N4G04P0. 1;	④Dwell 0.1 sec. (Note)
N5M68;	⑤Apply the brake.
N6M20;	⑥Output M code bit 0.
N7M30;	⑦End of program



Note : The dwell after the indexing cycle is added to settle at the target position.
The settling time is about 0.05 to 0.2 sec. though it varies according to the operation conditions.
When the brake is used, position deviation may result due to a timing issue of brake application.
The positioning completion signal is issued after the in-position range and sampling frequency conditions specified in parameters are satisfied.

3.5 Error Code List

If a problem is found in the NC program when it is stored, a number indicating the description of the error and the block number are displayed.

The block number indicates the block including the problem.

(The first block is supposed to be block 1.)

<Example> If an undefined code is found in block 1

```
PRGM ERROR    5
BLOCK         1
```

Error code	Description of error
0	Undefined
1	There is no program number. The M30 code is missing.
2	Codes in the same group, simultaneous existence of which is prohibited, are in the same block.
3	The data exceeds the setting range or the program memory overflows.
4	There is no speed designation.
5	Undefined code
6	An already registered program number is designated.
7	A duplicate O code is specified in the same program.
8	P code usage is wrong.
9	Code with missing data, or data with missing code

※ Enter the program only when program selection inputs (CN3-9 and 10) are turned off.

4. PARAMETER

Various parameters are available for ABSODEX to set motion conditions.
The setting is retained even after the power is turned off.

4.1 Parameters and Contents

Parameter No.	Description	Setting Range	Initial Value	Unit
1	**Cam curve** Selects a cam curve. 1 to 5 corresponds to the following curves. 1:MS, 2:MC, 3:MT, 4:TR, 5:MC2	1 to 5	1	—
2	**Acceleration and deceleration time of MC 2 curve** Sets acceleration and deceleration times of MC 2 curve. Acceleration and deceleration zones will form the characteristics of MS curve.	0.01 to 50.0	1	sec
3	**Home position offset amount** The home position of the user coordinate system at power-on shifts to the actuator home position.	-540672 to 540671	0	Pulse
4	**Home positioning direction** Selects the direction of rotation of home positioning action. 1:CW, 2:CCW, 3: Shortest route	1 to 3	1	—
5	**Home Positioning speed** Sets the maximum home positioning speed. Communication code "S4", home positioning instruction input, and NC code "G28" will enable home positioning.	1.0 to 100.0	2.0	rpm
6 (Note)	**Acceleration and deceleration time for home positioning** Sets acceleration and deceleration times for home positioning. Acceleration and deceleration take place in accordance with the curve.	0.1 to 2.0	1.0	sec
7	**Home return stop** Determines if the home return is to be made by "stop" input. 1: Stop, 2: Invalid	1 to 2	2	—
8	**Software limit coordinate A** Sets the motion range in the (+) direction.	-9999998 to 9999999	9999999 (6658.380°)	Pulse
9	**Software limit coordinate B** Sets the motion range in the (-) direction.	-9999999 to 9999998	-9999999 (-6658.380°)	Pulse
10	**Software limit effective or not effective** 1: Effective, 2: Not effective Even with not effective, alarm will be given if the range -9999999 to +9999999 (pulse) (±18 rotations) is exceeded.	1 to 2	2	—

Note : Before entering or editing parameters, be sure to select "3 PARA" and execute "1 READ" to obtain initial values suitable for the corresponding model.

Parameter No.	Description		Setting Range	Initial Value	Unit
11	**No answer time** Sets the answer input waiting time. Alarm is given, if there is no answer for the set time. Effective only when parameters 12 and 13 are set to require an answer. When 999 is set, waiting is infinite.		1 to 100 999	999	sec
12	**M answer setting** 1: Required : Answer input will turn M code output OFF. 2: Not Required : M code output is made at 100msec.		1 to 2	2	—
13	**Answer input for positioning and home position return** 1: Required: Answer input will turn positioning completion output OFF. 2: Not Required: Positioning completion output is made at100msec. The output time can be changed with PRM47 (output time of positioning completion signal).		1 to 2	2	—
14	**Jog speed** Sets the maximum jog motion speed.		0.01 to 100.0	2.0	rpm
15	**Jog acceleration and deceleration times** Sets acceleration and deceleration times.		0.1 to 2.0	1.0	sec
16	**In-position range** Sets allowable accuracy of positioning.		1 to 10000	2000 (1.332°)	Pulse
17	**In-position sampling times** Sets numbers of confirmation times when at in-position. Confirming in-position for specified sampling times will output positioning completion and in-position signals.		1 to 2000	1	Time
(Note1) 18	**Position deviation amount** Indicates the current position deviation amount.		Setting not feasible	—	Pulse
(Note2) 19	**Upper limit for position deviation amount** Parameter 18 exceeding this value will cause Alarm 1.		1 to 540672	10000 (6.658°)	Pulse
(Note3) 20	**Speed over limit** The motion amount [pulse] exceeding the set value for every 2msec will cause Alarm 1.	AX2006TS AX2012TS AX2018TS	1 to 5947	5947 (about 330rpm)	Pulse
		AX1022TS AX1045TS AX4009TS AX4022TS AX4045TS	1 to 4886	4866 (about 270rpm)	
		AX1075TS AX4075TS	1 to 2883	2883 (about 160rpm)	
		AX1150TH AX1210TH	1 to 2552	2522 (about 140rpm)	
		AX4150TH AX4300TH	1 to 1982	1982 (about 110rpm)	
		AX4500TH	1 to 1441	1441 (about 80rpm)	
		AX410WTH	1 to 630	630 (about 35rpm)	

Note1 : Monitoring in parameter mode only; parameter entry is impossible.

Note2 : If the settings of parameters 19, 20 and 39 are too small, alarm 1 will be caused, and the actuator may not start.

Note3 : Before entering or editing parameters, be sure to select "3 PARA" and execute "1 READ" to obtain initial values suitable for the corresponding model.

Parameter No.	Description		Setting Range	Initial Value	Unit
21	**Deceleration rate for emergency stop** Speed deceleration will take place for every 1msec for an emergency stop. The time t until rotation stops by an emergency stop while rotating at N rpm can be calculated by the following formula: T= 18.0224 × N/(PRM21) [msec] [GH] Even if the inertia torque Ti during deceleration exceeds the maximum torque of the actuator, alarm 1 is not caused while the maximum torque is kept output until deceleration and stop are achieved. In this case, time t until stoppage due to emergency stop is longer than the above description.		1 to 180 999	999	p/ms^2
22	**Servo-off delay after emergency stop** Sets delay time for servo-off by emergency stop (CN3-17) input causing deceleration and stop when PRM 23 is set to 3 (servo-off after stop).		0 to 2000	1000	msec
(Note1) 23	**Emergency stop input** 1: Maintain servo-on state after stop. 2: Not effective 3: Servo-off after stop		1 to 3	3	—
(Note2) 24	**Actuator temperature rise** Temperature rise of the actuator calculated by electronic thermal.		Setting not feasible	—	℃
(Note2) 25	**Upper limit of actuator temperature rise** Parameter 24 exceeding the set temperature will cause the alarm 4.		Setting not feasible	70	℃
(Note4) 27	**Delay time after brake output** Motion to be delayed when motion instruction after brake release is specified by M69.	AX4075TS AX4150TH AX4300TH AX4500TH AX410WTH	0 to 1000	250	msec
		Others		100	
28	**Brake initial status** Sets whether or not the brake is released upon power-on. 1: Brake on, 2: Release		1 to 2	2	—
29	**Mode setting for power-on** 1: Auto run 2: Single block 6: Pulse string input		1, 2, 6	1	—

Note1 : If the stop button of Teaching Pendant is pressed, the setting of parameter 23 is not used but "servo-on after stop" is caused.

Note2 : Monitoring in parameter mode only; parameter entry is impossible.

Note3 : Teaching Pendant is not designed to effectively use this function.
Leave this parameter at "1" (No output).

Note4 : Before entering or editing parameters, be sure to select "3 PARA" and execute "1 READ" to obtain initial values suitable for the corresponding model.
If parameters are edited though they are not loaded in advance, initial value 100 of Teaching Pendant will be written. Be careful especially for systems equipped with an electromagnetic brake.

Parameter No.	Description	Setting Range	Initial Value	Unit
33	**Output 1 during indexing** Enables to set the output 1 (CN3-46) to be made at what percentage of motion during positioning motion. 0% setting for no output.	0 to 99	0	%
34	**Output 2 during indexing** Enables to set the output 2 (CN3-47) to be made at what percentage of motion during positioning motion. 0% setting for no output.	0 to 99	0	%
35	**Pulse rate change** Enables to set multiplier of pulses in the G72 and M6 pulse string input modes. 1: 1 time, 2: 2 times, 3: 4 times, 4: 8 times, 5: 16times The setting enables to determine pulses of actuator movement for 1 pulse of pulse string input.	1 to 5	1	—
36	**Selection switching of I/O program numbers** Enables to select program numbers: 1: 4 bit 2 times (BCD) (No. range 0 to 99) 2: 4 bit 2 times (Binary) (No. range 0 to 255) 3: 5 bit 1 time (Binary) (No. range 0 to 31) 4: 6 bit with start (Binary) (Program number is not set after emergency stop)(No. range 0 to 63) 5: 6-bit with start (Binary) (Program number is set after emergency stop)(No. range 0 to 63)	1 to 5	1	—
37	**Segment position range width for equal segment designation** Sets the vicinity of segment position of equal segment (G101).	1 to 270336	1500	Pulse
38	**Rotation direction for equal segment designation** Specifies rotation direction for G91A0F□□ of equal segment designation (G101). 1: CW 2: CCW 3: Nearer head direction 4: Alarm C outside the vicinity of equal segment position	1 to 4	3	—
39 (Note)	**Torque limit** Enables to set the upper limit of torque output by percentage against the maximum torque.	1 to 100	100	%

Note : If the settings of parameters 19, 20 and 39 are too small, alarm 1 will be caused, and the actuator may not start.

Parameter No.	Description	Setting Range	Initial Value	Unit
42	**Pulse string input** 1: Pulse/Direction 2: UP/DOWN 3: A/B phase 4 times 4: A/B phase 2 times	1 to 4	1	–
45	**Power-on coordinate recognition range** Specify the power-on coordinate recognition range. The output axis is supposed to be located at a position between "setting - 540671" and setting when the power is turned on.	0 to 540671	270335	Pulse
46	**Home position output (Z-phase output) range** Enter the output range of the home position output (pulse string mode only). With default value 2000, the home position output remains turned on during travel for ±2000 pulses before and after the user home position. Enter "0" to turn on the home position output at exactly 0 pulse in the user coordinate.	0 to 10000	2000	Pulse
47	**Positioning completion output time** Specify the interval in which the positioning completion output is issued.	0 to 1000	100	msec
48	**Controlled stop upon alarm** Select whether the controlled stop function is validated or invalidated upon an alarm. 1: Valid. 2: Invalid	1 to 2	2	–
50	**Encoder output resolution** Specify the resolution of encoder output. Enter the number of output pulses of the pulse string output signal.The A-/B-phase output pulse of the driver counted in four multiples is 4 to 270336 pulses/rev.If PRM50 = 67584, the maximum rotation speed is limited at 50rpm.After entering, turn the power off then on again to validate the setting.	0 to 8448 16896 33792 67584	33792	pulse/ rev
51	**In-position signal output mode** Select the in-position signal output mode. 0: Output even during rotation (Output if the position deviation is within the in-position range.) 1: Do not output during rotation (Output if the position deviation is within the in-position range and if the position command is "0.") After setting, turn the power off then on again to validate the setting.	0 to 1	0	–

Note1 : Avoid using the parameter together with G07,G90.1, G90.2, G90.3, G91.1, G92, G92.1 and other codes that determine the coordinate system.

Parameter No.	Description	Setting Range	Initial Value	Unit
52	**Function selection of I/O input signal CN3-14 (bit 9)** 0: Servo-on input 1: Program stop input After setting, turn the power off then on again to validate the setting.	0 to 1	0	—
53	**Function selection of I/O input signal CN3-15(bit 10)** 0: Ready return input 1: Continuous rotation stop input After setting, turn the power off then on again to validate the setting.	0 to 1	0	—
54	**Function selection of I/O input signal CN3-16(bit 11)** 0: Answer input 1: Position deviation counter reset input After setting, turn the power off then on again to validate the setting.	0 to 1	0	—
56	**Function selection of I/O output signal CN3-46 (bit 13)** 0: Output during indexing 1 1: Home position output After setting, turn the power off then on again to validate the setting.	0 to 1	0	—
57	**Function selection of I/O output signal CN3-47 (bit 14)** 0: Output during indexing 2 1: Servo state output After setting, turn the power off then on again to validate the setting.	0 to 1	0	—

Parameter No.	Description		Setting Range	Initial Value	Unit
(Note1) 62	**Cut-off frequency for low pass filter 1**	AX4150TH AX4300TH AX4500TH AX410WTH	10 to 1000	100	Hz
		Others		200	
63	**Cut-off frequency for low pass filter 2**		10 to 1000	500	Hz
64	**Cut-off frequency for notch filter 1**		10 to 1000	500	Hz
65	**Cut-off frequency for notch filter 2**		10 to 1000	500	Hz
66	**Filter switch** Switches to determine if filters are used.		0 to 15	1	—
67	**Integral limiter** Integral limiter in the controller. A smaller value reduces the overshoot immediately before stoppage and improves stability of a system with a large inertia moment load. The best integration limiter setting varies according to gain adjustment.		1 to 540672	100000	Pulse
70	**Q value of notch filter 1** Sets the band width of notch filter 1.		0.1 to 9.9	1	—
71	**Q value of notch filter 2** Sets the band width of notch filter 2.		0.1 to 9.9	1	—
72	**Integral gain multiplier** The multiplier of the integral gain can be changed. A smaller value improves stability for large inertia loads and/or less rigid loads. A larger value shorten the convergence time, it deteriorates the stability of the control system. The new setting becomes effective after the power is turned off and then turned on again.	AX4150TH AX4300TH AX4500TH AX410WTH	0.1 to 10.0	0.3	—
		Others		1.0	

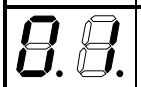
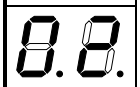
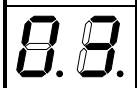
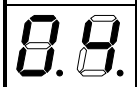
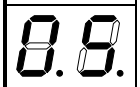
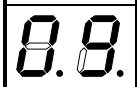
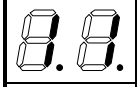
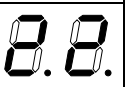
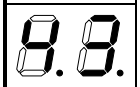
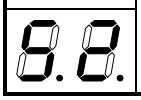
Note1 : Before entering or editing parameters, be sure to select "3 PARA" and execute "1 READ" to obtain initial values suitable for the corresponding model.

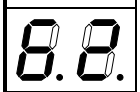
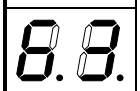
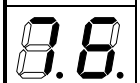
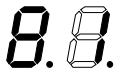
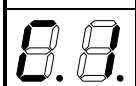
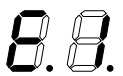
Parameter No.	Description	Setting Range	Initial Value	Unit
80	**Integral gain** The integral gain of the result of auto tuning is stored.	0.0 to 32.0	0.0	—
81	**Proportional gain** The proportional gain of the result of auto tuning is stored.	0.0 to 512.0	0.0	—
82	**Differential gain** The differential gain of the result of auto tuning is stored.	0.0 to 2048.0	0.0	—
83	**Auto tuning command** In the servo-off mode, write a number between "1" and "32" in this parameter to execute auto tuning. Write "10" in regular cases.Default value "0" indicates no execution of auto tuning.	1 to 32	0	—
87	**Auto tuning torque** Designate the torque of auto tuning action. If the friction load is too large to cause alarm U, increase the parameter in 100 increments. The default value is "1000" with AX4000T Series and other models with 75N·m or larger maximum torque, or "500" with other models.	0 to 8192	500, 1000	—
88	**Auto tuning measurement termination speed** Auto tuning data collection starting speed. Do not change the setting in regular cases.	0 to 1000	100 (about 11rpm)	Pulse /msec
89	**Auto tuning measurement termination speed** Auto tuning data collection termination speed. Do not change the setting in regular cases. Do not enter 200 or a smaller setting.	0 to 1000	700 (about 80rpm)	Pulse /msec

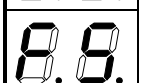
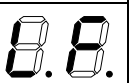
5. ALARMS

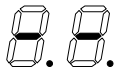
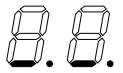
An error to ABSODEX will display an alarm number in the 7 segment LED on the front of the driver.
At the same time, alarm outputs of I/O (CN3-44 and 45) will also be ON.
(Alarm output is made with the negative logic.)

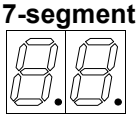
5.1 Alarm Display and Description

LED Display	ALARM No.	Description	ALARM Output	Remarks
	0	NC program error	Alarm1	Program data error (M1 mode)
				Program selection error
				Program data error (M3 mode)
				The I/O number is entered while the program is stored.
				Answer input command S10 is executed while no answer is waited for.
				Time expiration in pulse travel mode
				Other program errors
	1	Position deviation over	Alarm 1 Alarm 2	Setting of PRM 19 (upper limit of position deviation amount) is exceeded.
		Speed limit over		Setting of PRM 20 (speed over limit) is exceeded.
		Encoder output max. frequency over		The maximum encoder output frequency is exceeded.
	2	Regenerative resistor overheat	Alarm 1 Alarm 2	The power is turned on in a regenerative resistor overheat error.
				A regenerative resistor overheat error is caused during operation.
	4	Actuator overload	Alarm 1 Alarm 2	Error caused by electronic thermal overload calculation
				Error caused by electronic thermal overload calculation (The electronic thermal value is 110°C or over.)
				The power module protective function is activated.
	5	Power module abnormal	Alarm 1 Alarm 2	The power is turned on in the presence of an over-current or a fault signal sent from the power module.
				An over-current or a fault signal from the power module is sent during operation.

LED Display	ALARM No.	Description	ALARM Output	Remarks
	6	Main power abnormal	Alarm 1 Alarm 2	A travel command is generated in the low-voltage error state. A low-voltage error is caused during travel.
				The power is turned on in a state with an over-voltage error.
				An over-voltage error is caused during operation.
	7	Communication error	Alarm 1	Data input error
				Settings are not written in the parameter writing cycle.
				An M-code is sent during operation.
				The parameter number is not specified in the parameter loading/writing cycle.
				Other communication errors
				
	8	Control PCB abnormal	(Indefinite)	Hardware of CPU in the driver may be faulty.
	9	An emergency stop input has been made.	Alarm 2	An emergency stop input has been supplied when the servo-on-after-stop parameter (PRM23) is set at "1."
				An emergency stop input is supplied when the servo-on-after-stop parameter (PRM23) is set at "1."
				An emergency stop input has been supplied when the servo-off-after-stop parameter (PRM23) is set at "3."
				An emergency stop input is supplied when the servo-off-after-stop parameter (PRM23) is set at "3."
	A	Brake abnormal	Alarm 2	A travel command is generated after a brake command (M68) is executed.
				A travel command is generated under brake application with the I/O brake release input turned off.
	C	Software limit over	Alarm 2	PRM 8 and 9 settings are exceeded. Or ±18 revolutions are exceeded.
				Segment range error with PRM38 (direction of rotation at equal segment designation) being "4"
	E	Emergency stop by Teaching Pendant	Alarm 2	An emergency stop is supplied from the dialogue terminal.

LED Display	ALARM No.	Description	ALARM Output	Remarks
	F	Resolver abnormal	Alarm 1 Alarm 2	The resolver data has suddenly changed during indexing operation.
				The resolver data has suddenly changed during other than above operation.
				An error generates in the electric angle during indexing operation.
				An error generates during other than above operation
				There is no consistency between signals sent from two resolvers.
				The resolver data is instable at power-on.
				Other resolver errors
				
				
	H	No answer error	Alarm 2	The no-answer time after an M-code output exceeds the PRM11 setting.
				The no-answer time at positioning completion output exceeds the PRM11 setting.
				A start input is supplied while an answer is waited for.
				A home return input is supplied while an answer is waited for.
	L	Actuator communication abnormal	Alarm 1 Alarm 2	Actuator data reception error
				Connection of inapplicable actuator
		Drive PCB abnormal		A hardware failure in the drive PCB is probable.
	P	Memory abnormal	Alarm 2	Data writing error to internal memory
	U	Auto tuning abnormal	Alarm 1 Alarm 2	Acceleration is impossible up to the auto tuning end speed.
				An error generates in auto tuning operation.
				An electronic thermal error generates in auto tuning.

LED Display	ALARM No.	Description	ALARM Output	Remarks
	3	Actuator/Driver combination abnormal	Alarm 1	An actuator different from the previous one is connected (model error).
				An actuator different from the previous one is connected (serial number error in same model).
	(Hyphen)	Activation of safety function		Wait for ready return input after activation of safety function
	(Under score)			During activation of safety function

- **The 7-segment LED on the left side shows**  **(an r and a dot) without an alarm. The 7-segment LED on the right side shows the operation mode.**
- **For reduced wiring specification (option -U2, -U3, or -U4 is selected in the model number), a serial communication station number (a 2-digit number without dots) is displayed instead of the operation mode in the 7-segment LED.**
- **For servo off (M5 executed),**  **(dot only) will be displayed.**

Note : If Teaching Pendant is connected to the H type driver shipped in 1998 or earlier, alarm 7 (communication error) may be caused. Reset to continue to operate.

6. COMMUNICATION FUNCTIONS

Through RS-232C port (CN1), operation mode switching and data setting can be done with a dedicated Teaching Pendant or a personal computer.

6.1 Communication Code List

1) Operation Mode Switching

Code	Description	Input Data Type	Remarks
M1	Automatic mode	M1 ↵	Power-on mode. (Note) Mode in which programs are run continuously.
M2	Single block mode	M2 ↵	Mode in which programs are executed block by block.
M3	MDI (Manual Data Input) mode	M3 ↵	Mode in which NC code input through RS232C port is instantaneously executed.
M4	Jog mode	M4 ↵	Communication codes S5 and S6 enable job motion.
M5	Servo off mode	M5 ↵	Selecting M1 to M4 and M6 will turn the servo ON.
M6	Pulse string input mode.	M6 ↵	Mode of action following pulse string input signal. Disable motions by using the NC program, and changing parameters. To change, switch to M1 to M5.

2) Motion Instructions

Code	Description	Input Data Type	Remarks
S1	Start	S1 ↵	Same function as CN3 program start input (Auto run mode, single block mode)
S2	Program stop	S2 ↵	Same function as CN3 program stop input
S3	MDI & execution	S3_[NC code] ↵ Example: S3_A100F0.5 ↵	One block of NC code is input and executed.
S4	Home return	S4 ↵	Same function as home return instruction input.
S5	Jog (CW)	S5 ↵	Rotation continues according to parameters 14 and 15 until S2 (CN3 program stop input) or S20 (continuous rotation stop input) communication codes is supplied.
S6	Jog (CCW)	S6 ↵	
S7	Alarm reset	S7 ↵	Effective only for alarm. Same function as CN3 reset input.
S10	Answer response	S10 ↵	Valid only when an answer is waited for. Same function as CN3 reset input.
S20	Continuous rotation stop	S20 ↵	Continuous rotation G7 jog action stop Same function as CN3 continuous rotation stop input.

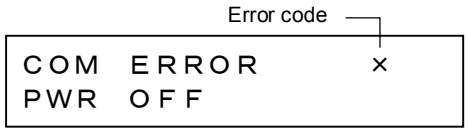
3) Data Input and Output

Code	Description	Input Data Type	Output Data Type
L1	Alarm Number Output	L1 ↵	[Alarm Number]← Example: ALM1_ALM2···← NO ALARM←
L2	I/O Status Output	Supplied automatically in "Display mode"	
L3	Current Position Output Unit: Pulse Coordinate: Actuator coordinate	L3 ↵	[Position Data]← 6 digit maximum (0 to 540671) Example: 1234←
L4	Current Position Output Unit: Degree Coordinate: Actuator coordinate	L4 ↵	[Position Data]← 7 digit maximum (0 to 359.999) Example: 180.001←
L5	Current Position Output Unit: Pulse Coordinate: G92 coordinate	L5 ↵	[Position Data]← 8 digit maximum (-9999999 to +9999999) Example: 4321←
L6	Current Position Output Unit: Degree Coordinate: G92 coordinate	L6 ↵	[Position Data]← 9 digit maximum (-6658.380 to +6658.380)
L7	Parameter Data Input	L7_[Parameter Number]_[Data] ↵ Example: L7_1_3 ↵ "3" is set in parameter 1.	0←
L8	Not to be used		
L9	Parameter Data Output	L9_[Parameter Number] ↵ Example: L9_1 ↵	[Data]← Example: 3←
L10	Program Number Output	L10 ↵	[Currently selected program number]←
L11	NC Program Input	Supplied in "Edit mode"	
L12	NC Program Output	L12_[NC Program Number] ↵ Example: L12_200 ↵	[NC Data]← Example: o200N1G90A0F2M1;M30;←
L13	NC Program Number Directory Output	L13 ↵	[Using Memory Capacity] [NC Program Number]← Example: 2[%]1 2 5 10···←

Code	Description	Input Data Type	Output Data Type
L14	Not to be used		
L15	Not to be used		
L16	Designation of Program Number	L16_[Program Number] ↵ Example: L16_100 ↵	0←
L17	Delete of Program Number	L17_[Program Number] ↵ Setting program number to 9999 will delete all programs. Program number 12345 will initialize the system.	0←
L18	Change of Program Number	L18_[Current Program Number] _[New program number] ↵ Example: L18_100_200 ↵ o100 changed to o200.	0←
L19	Output of the Next Block of Program to be Executed	L19 ↵	[NC Program]←
L20	Not to be used		
L21	Mode Output	L21 ↵	[Mode]← Example: M1←
L22 to L88	Not to be used		
L89	Serial actuator number output	L89 ↵	[Serial number]← Example: Ser.1234567←

6.2 Communication Error

When an error is caused due to communications during Teaching Pendant operation, the following error message is displayed.



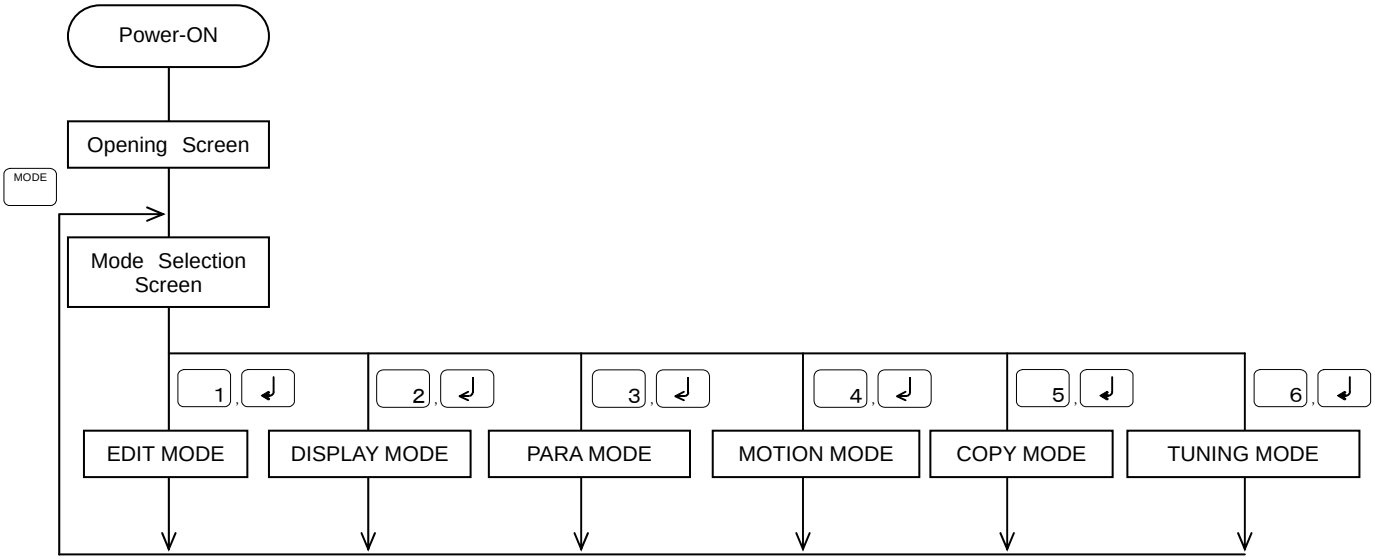
The displayed error message includes an error code. Refer to the following table and check.

Error code	Description of error
1	Reception data does not reach for 10 seconds from ABSODEX driver after data is sent.
2	The reception action is not stopped for 60 seconds or over even after the storage buffer capacity is surpassed.
3	Reception data does not reach for 10 seconds while the program is loaded in the copy mode.
4	"∗" is sent back during reception while the program is loaded in the copy mode.
5	"∗" is sent back during reception while the program is stored in the copy mode.

※ After checking, turn the control power off.

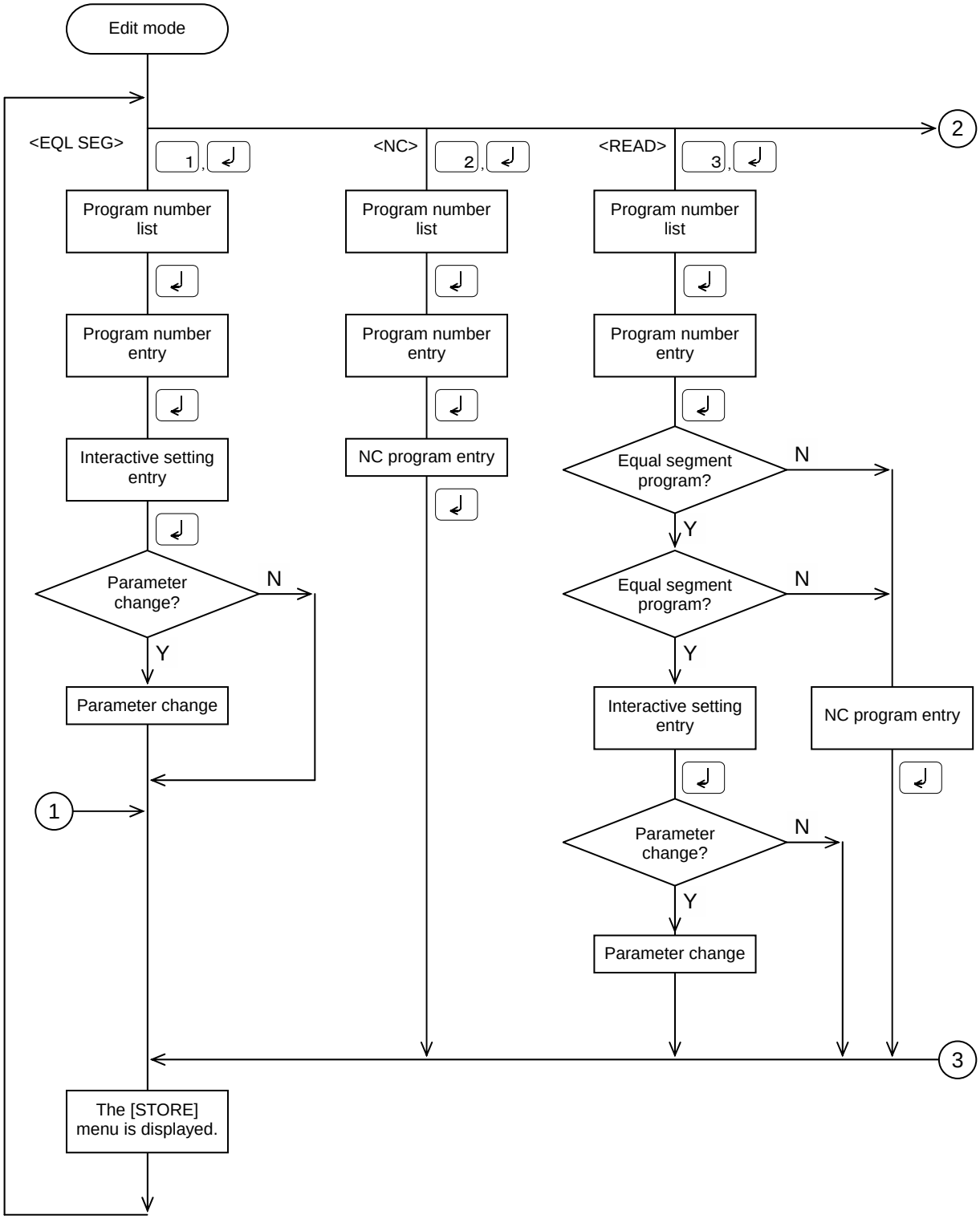
7. PROCESS FLOW

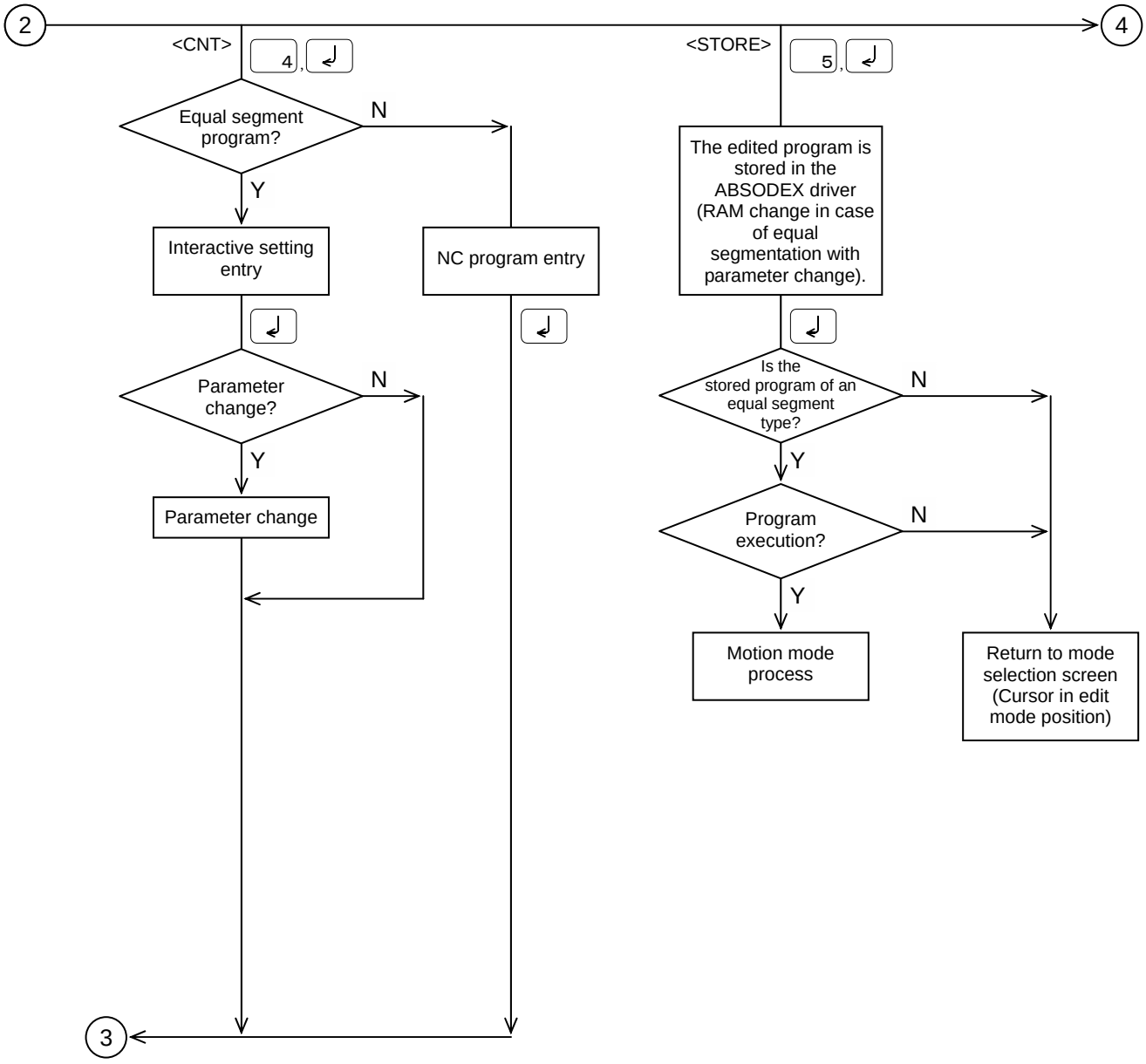
7.1 Power-on

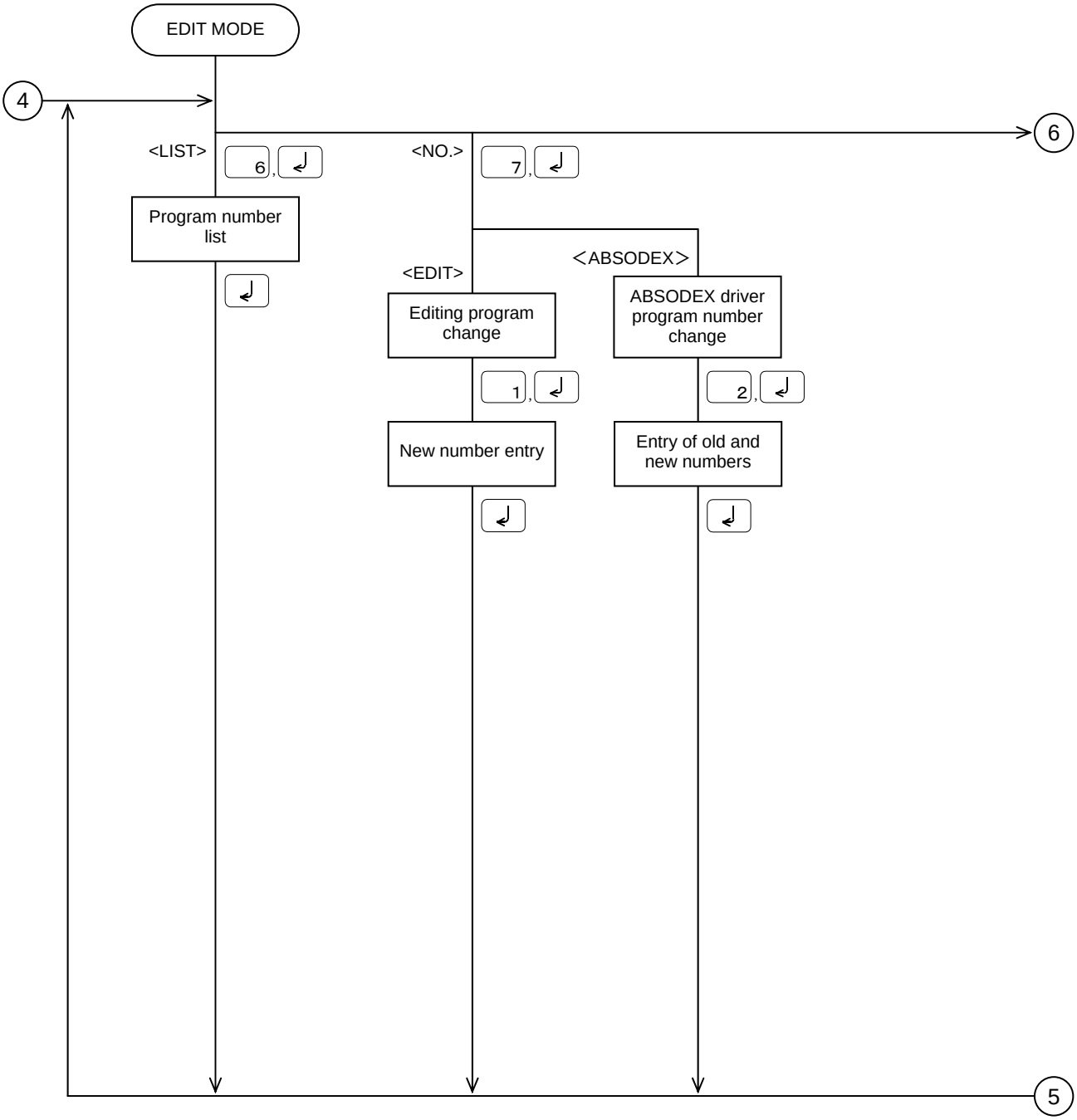


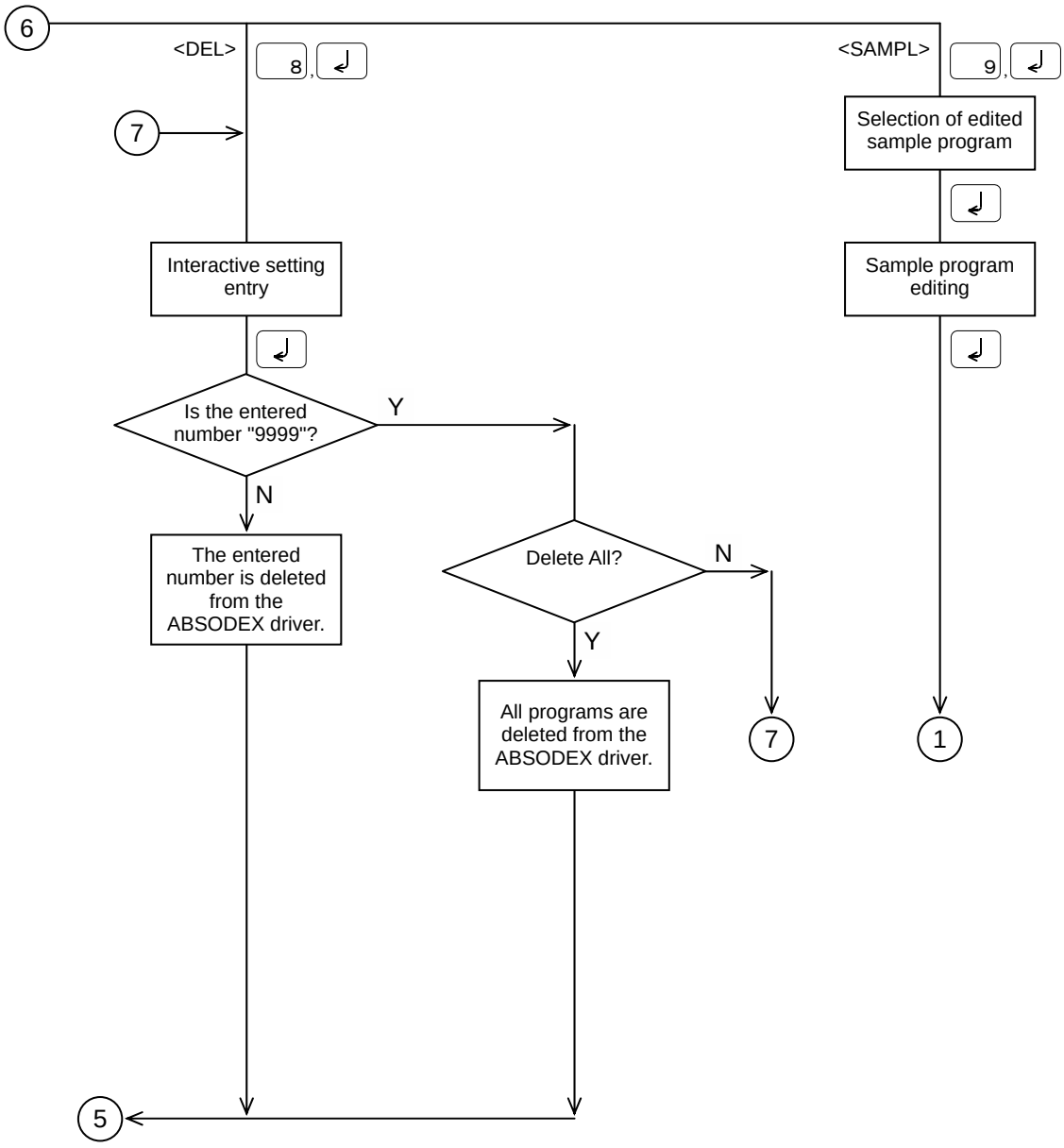
--- MEMO ---

7.2 Edit Mode

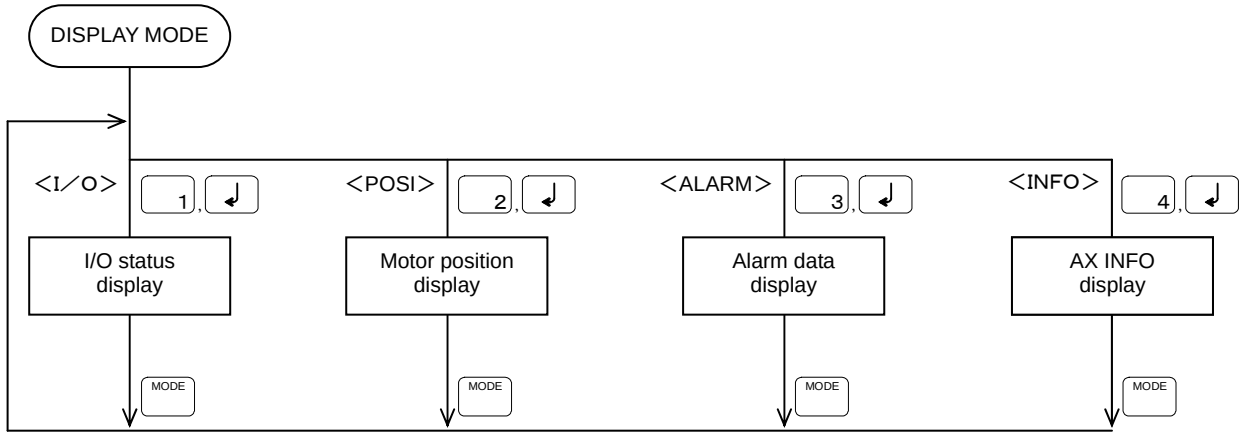








7.3 Display Mode



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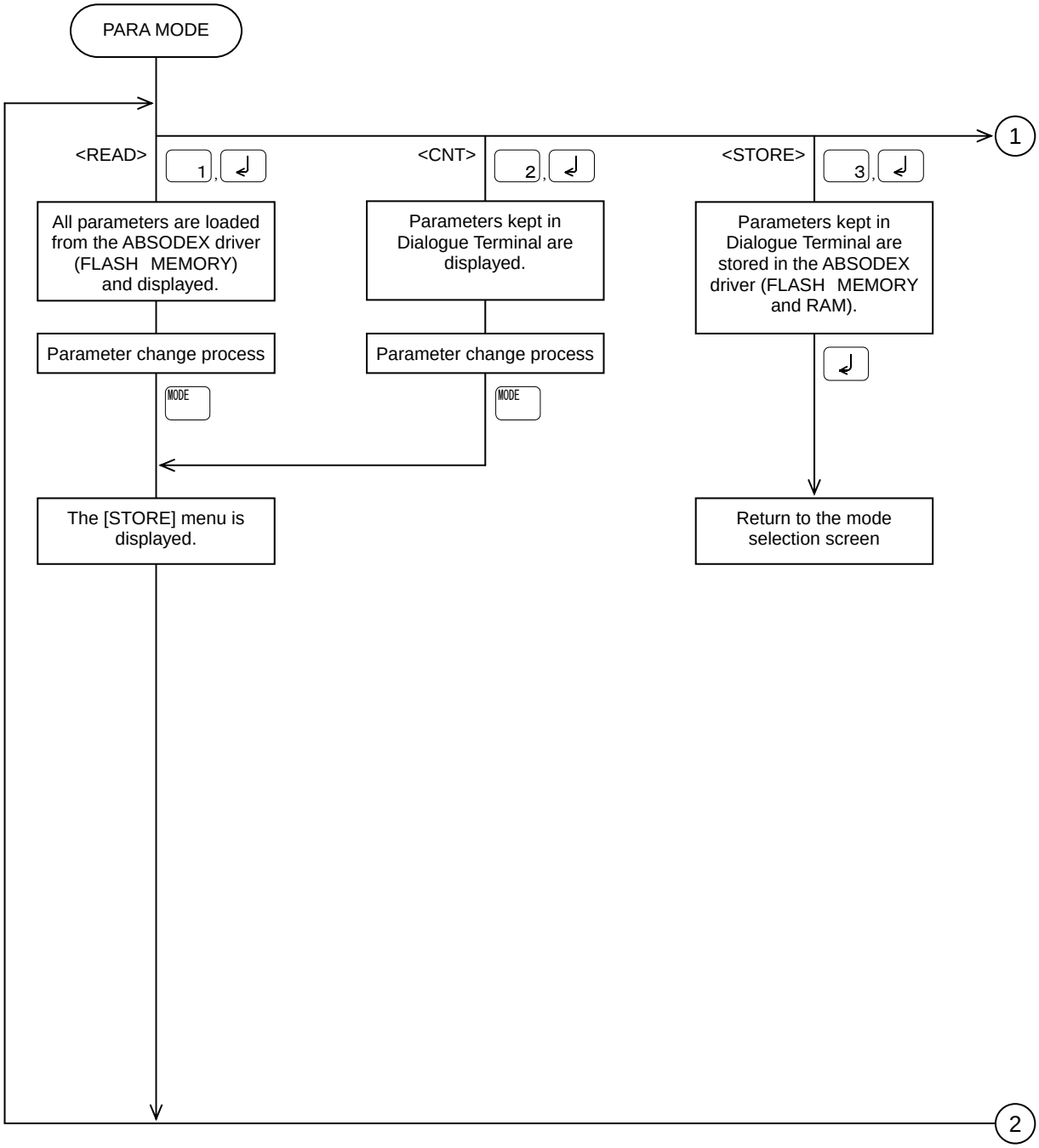
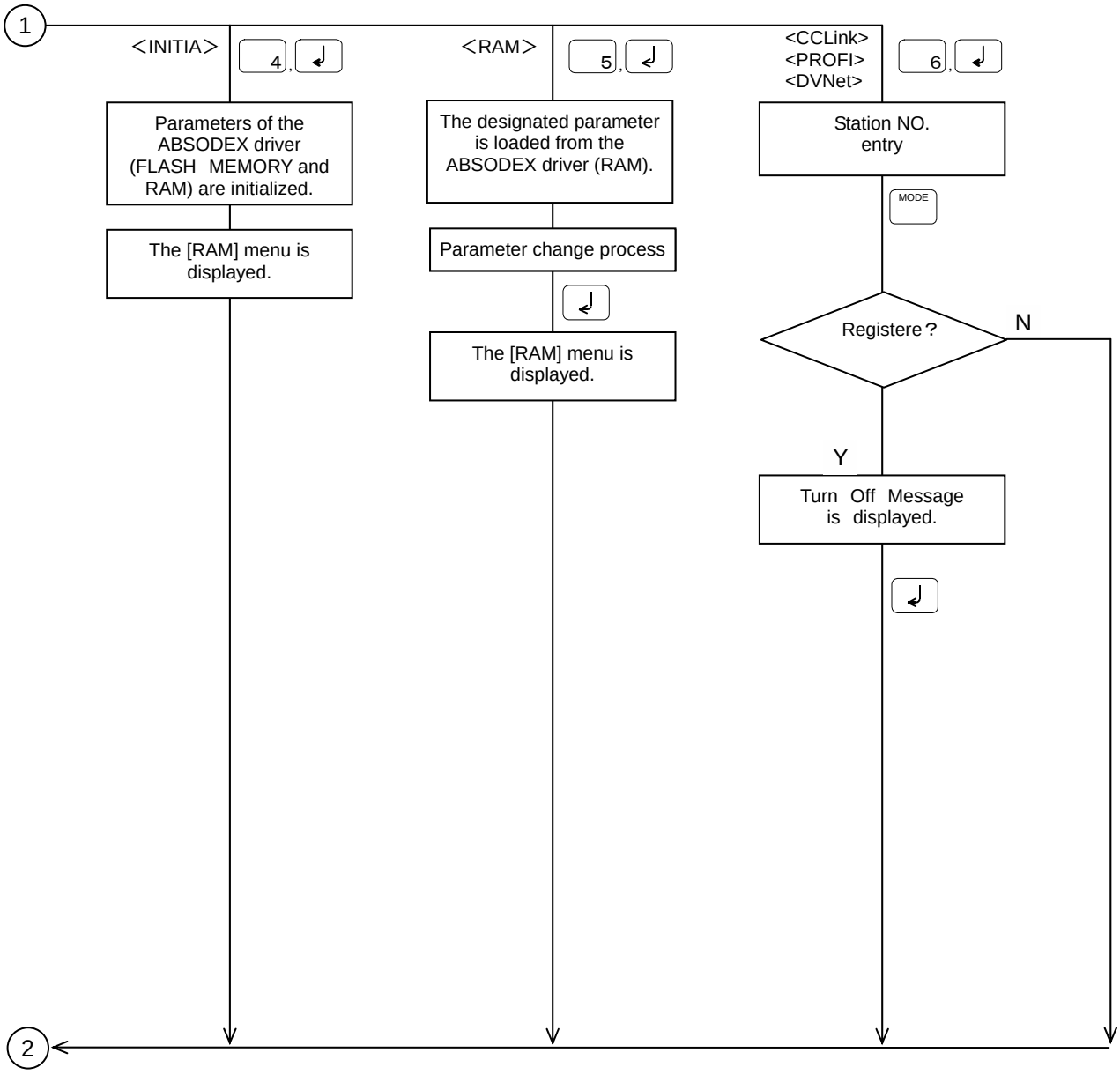
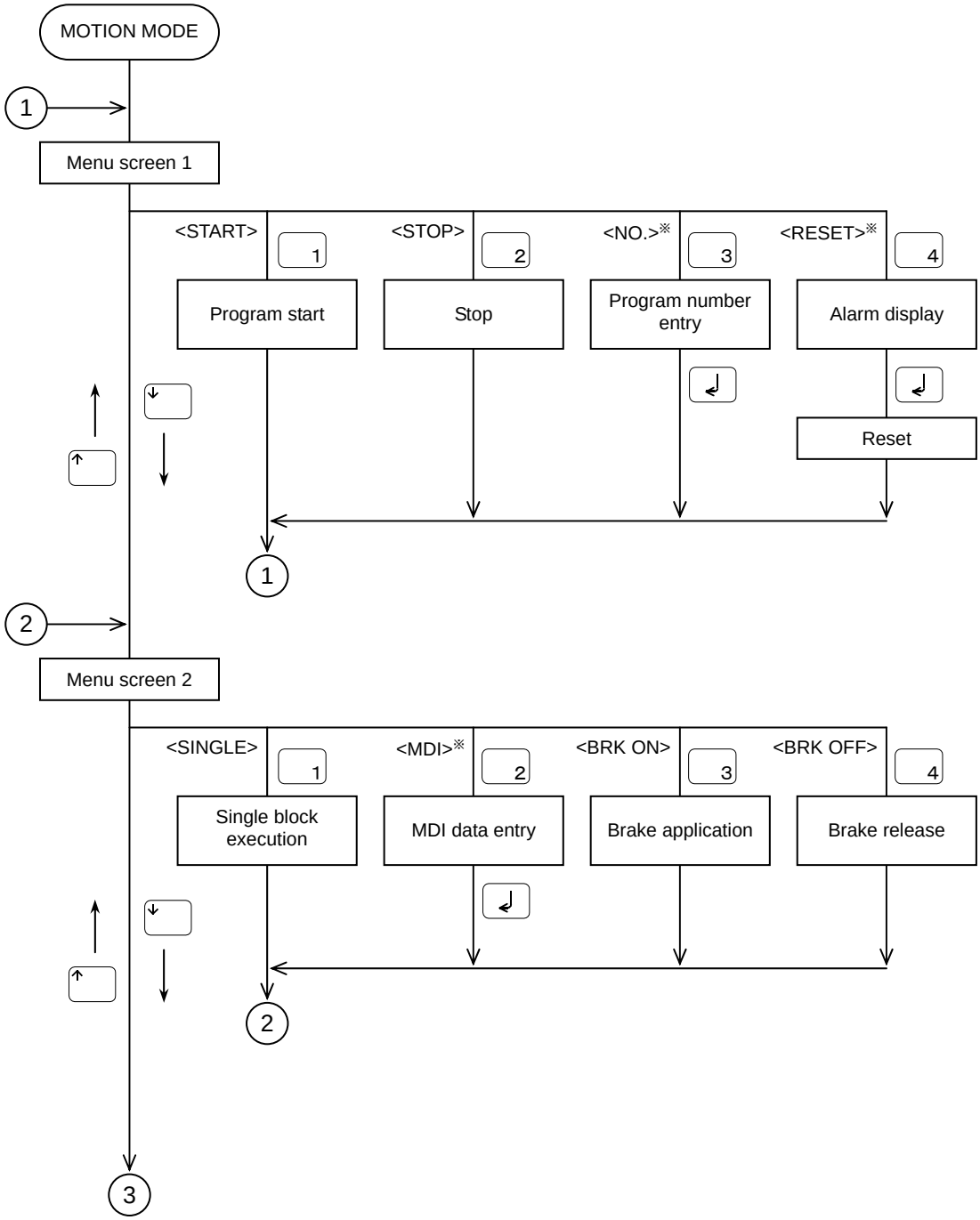
7.4 Parameter Mode

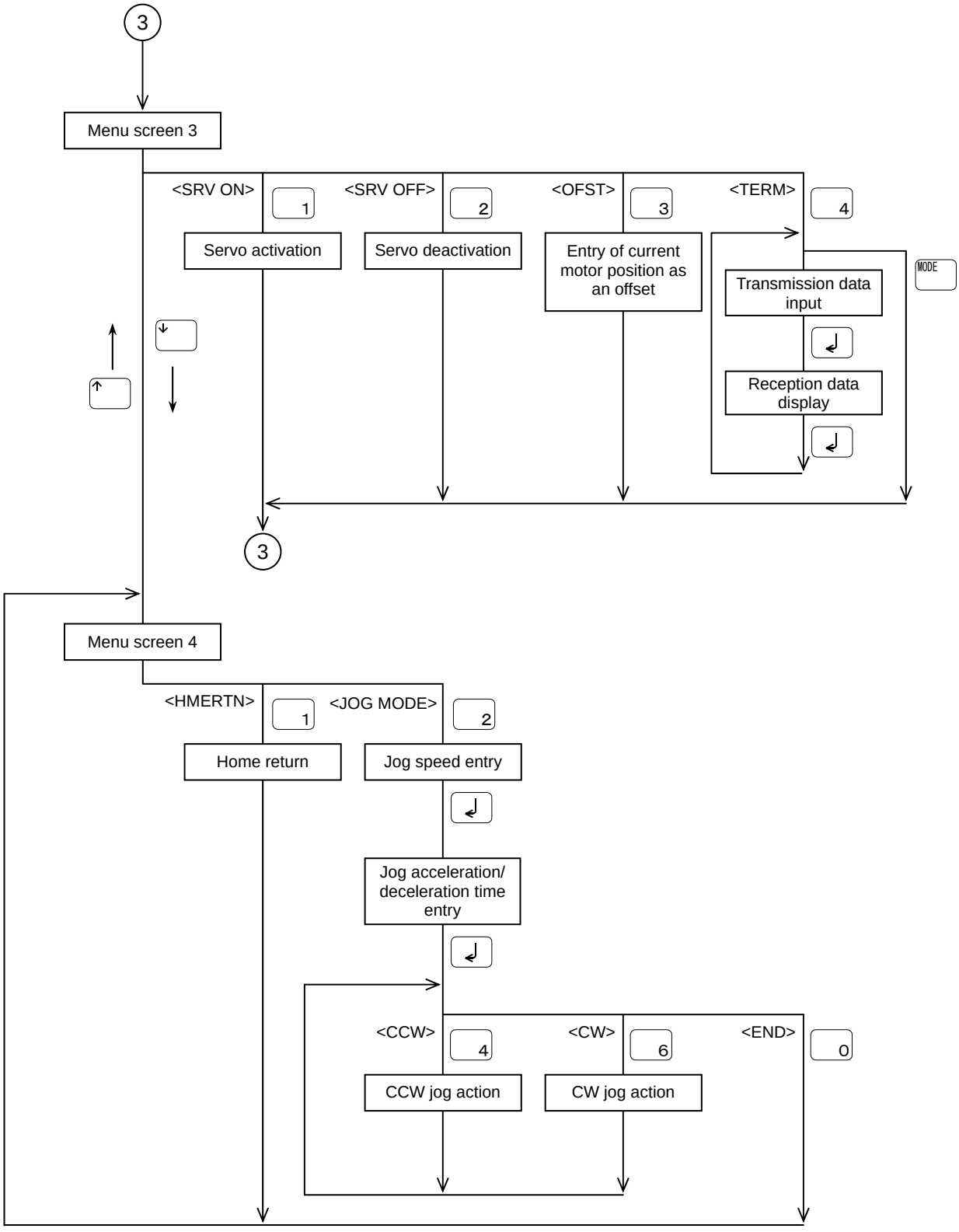




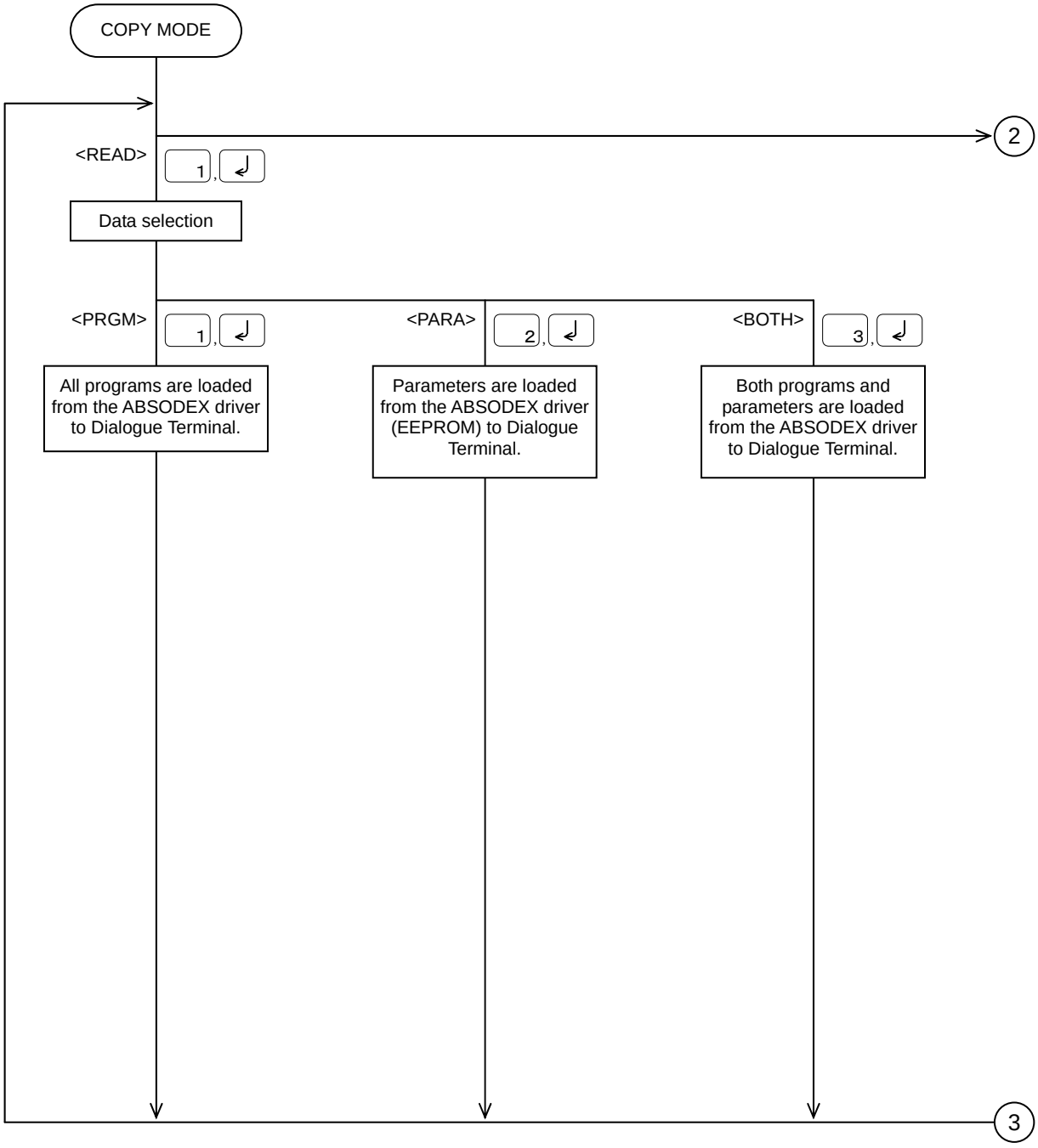
7.5 Motion Mode

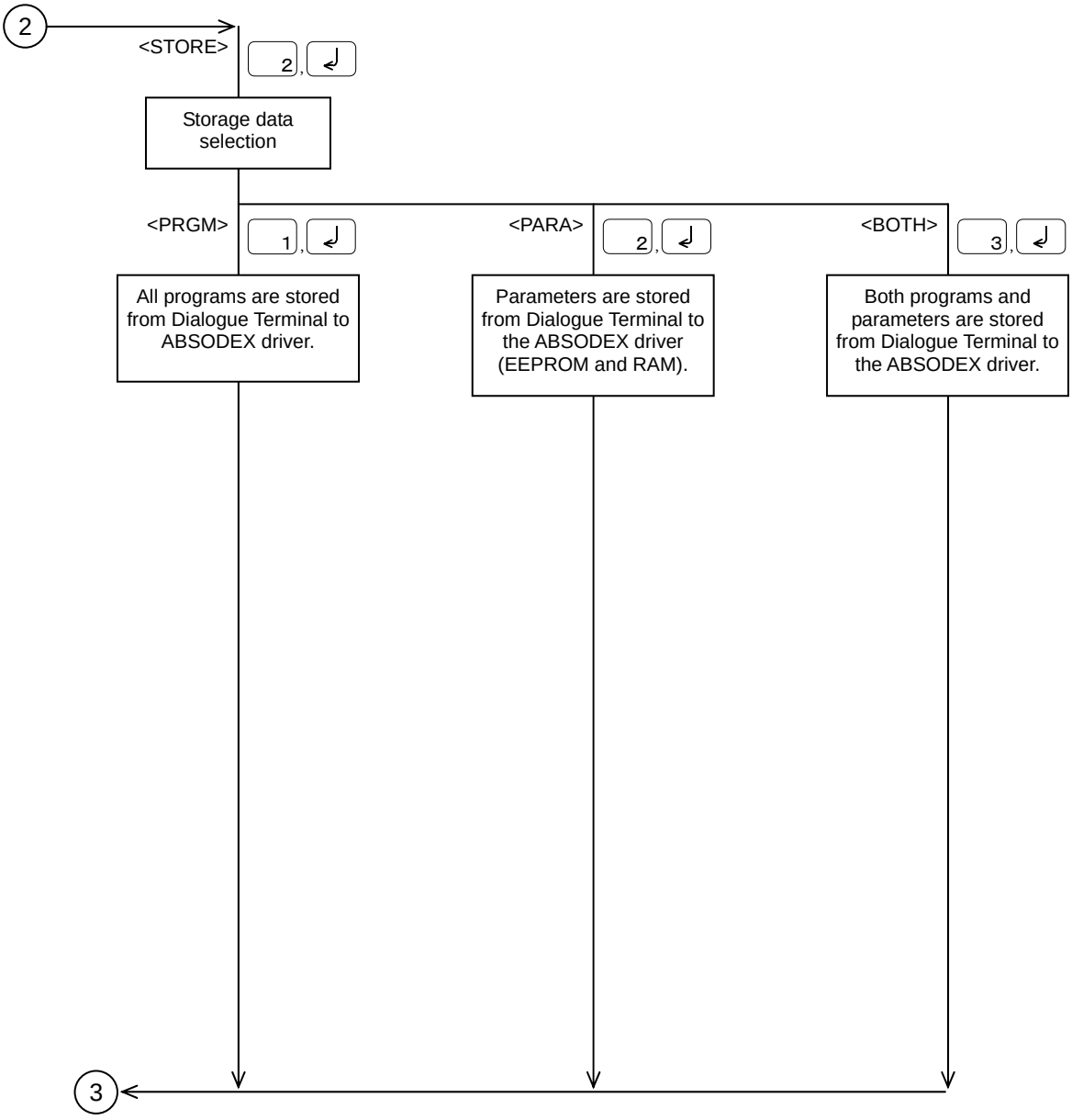


※ Press MODE on the <NO.>, <RESET> or <MDI> screen to return to the menu screen.

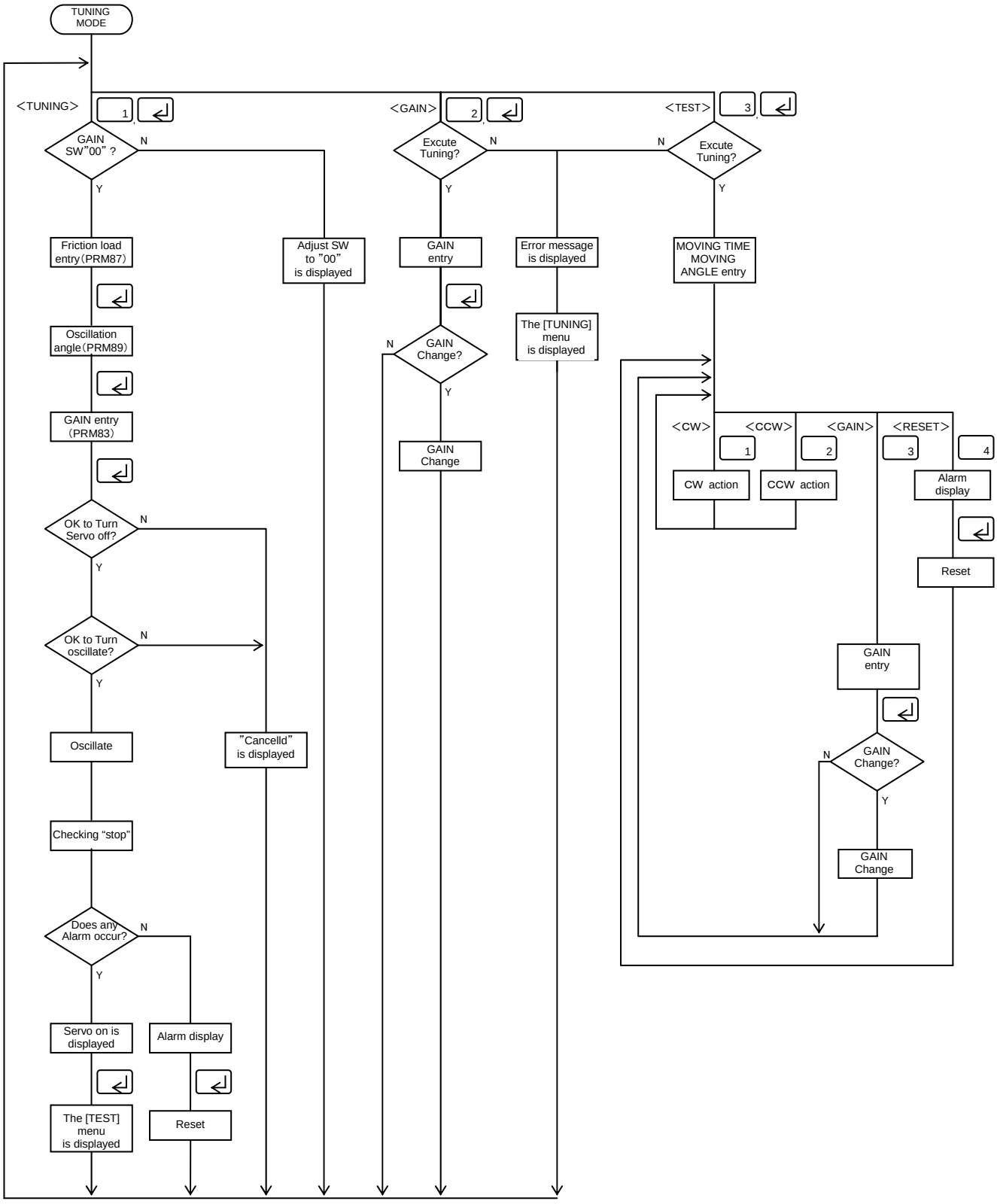


7.6 Copy Mode





7.7 Tuning Mode



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REVISIONS

Print Data	Edition	Chapter	Revision
2010.12	1st	—	First Edition
2011.6	2nd	2	2.5 The description in Display Mode is modified.