KOHZU

Stepping Motor Controller

SC-021　RC-010

RoHS

Introduction Manual

- **Thank you for purchasing this product.**
- **Before operating this product, carefully review this Manual in its entirety to ensure its proper and safe use. Always keep this Manual in a convenient location, for future reference.**

Ver. 1.00

Note: this version does not correspond with the latest controller version.

Pioneering the door to the future with a commitment to technology

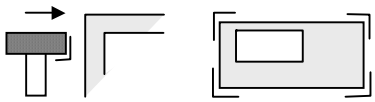
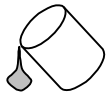
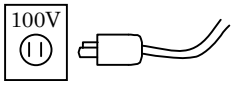
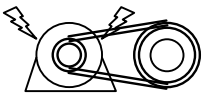
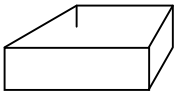
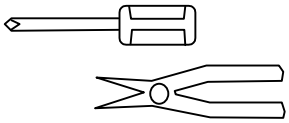
KOHZU Precision Co., Ltd.

Introduction

Greeting

Thank you for purchasing Kohzu's Stepping Motor Controller, model SC-021 / RC-010. This manual covers safe handling, operating procedures and precautions for the SC series controller. For proper and safe use of this product, carefully review this manual in its entirety. Always keep this manual in a convenient location, for future reference.

To use safely

Prohibition		Avoid crushing, dropping, or any strong impact. Do not use in an area subject to frequent vibrations.
Prohibition		Avoid operating in an area where any liquids or chemicals can spill on the unit. This can cause series injury and/or product failure.
Caution		Use 100V AC (50/60Hz) as a power supply.
Prohibition		This product is an electronic, high-precision piece of equipment. Avoid operating near large machinery, high voltage equipment, or equipment generating strong magnetism. Doing so can results in product malfunction or failure.
Prohibition		Do not unnecessarily remove the fixed panel and cover except in cases where adjustment or setting of the integrated driver must be adjusted.
Prohibition		Never attempt to modify, rework or replace parts yourself. This should only be done by a Kohzu technician.
Caution		Pay close attention when connecting the motor driven stage or a motor other than those specified by Kohzu.

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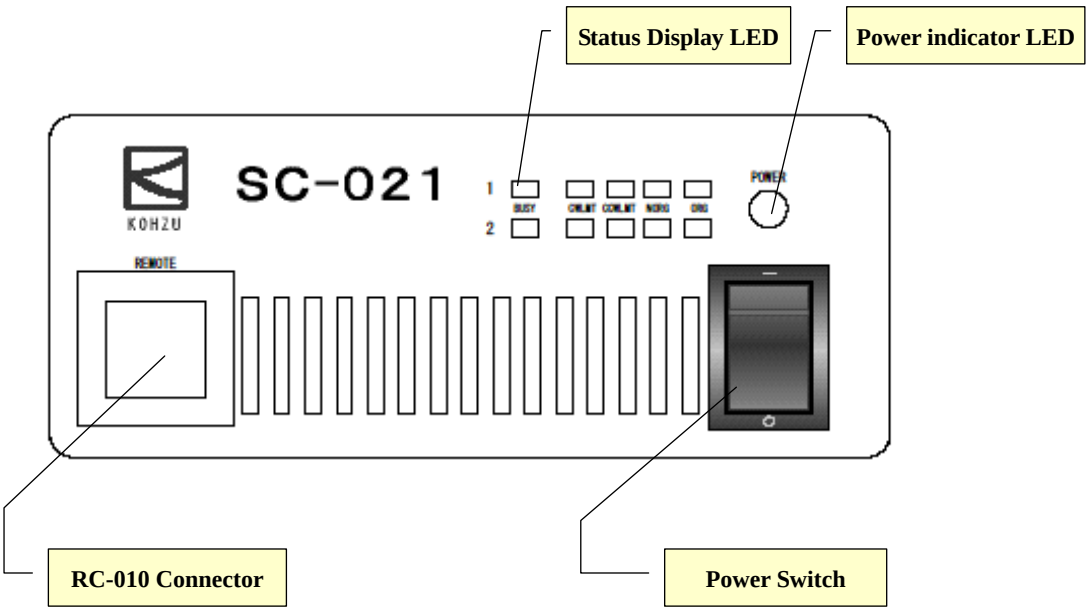
I. Basic Version

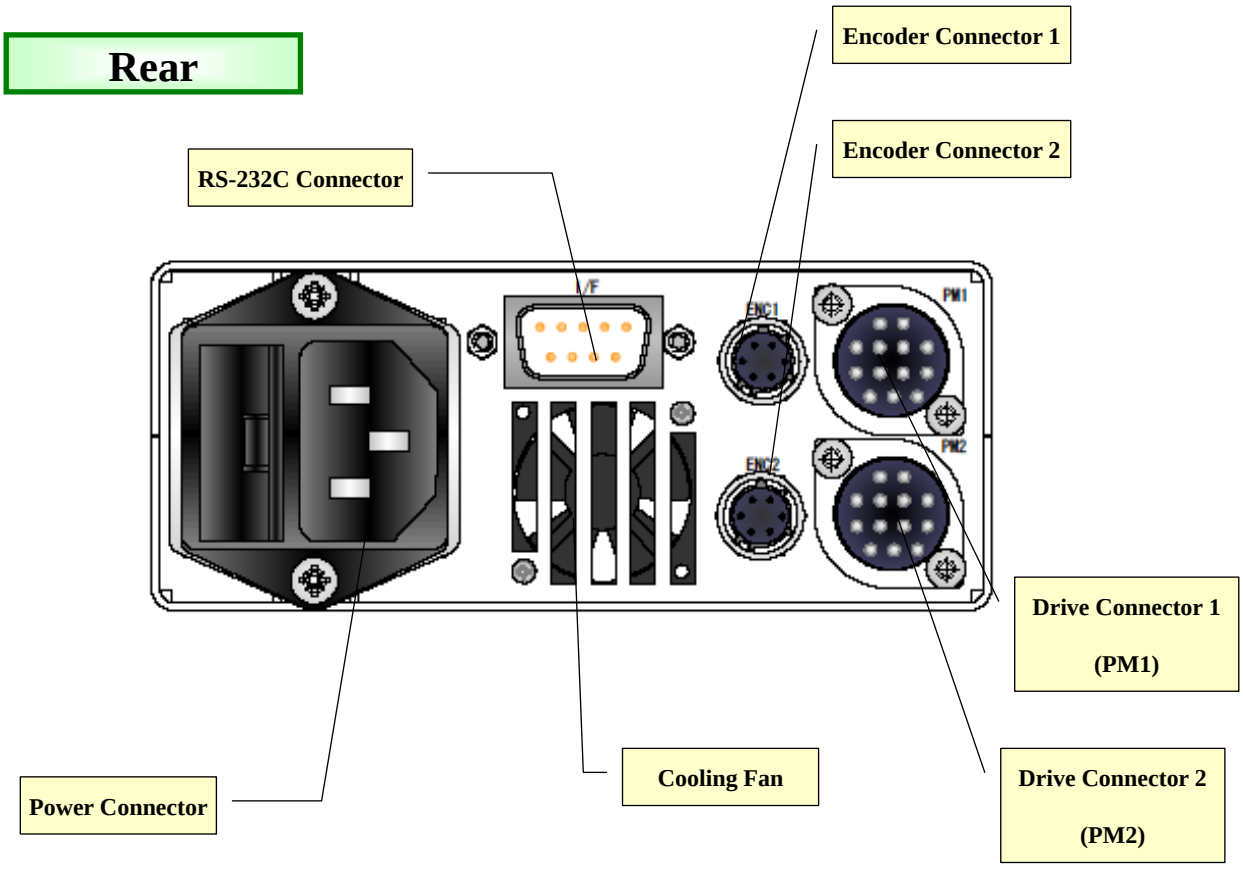
0-0. Part Identification

Model: SC-021

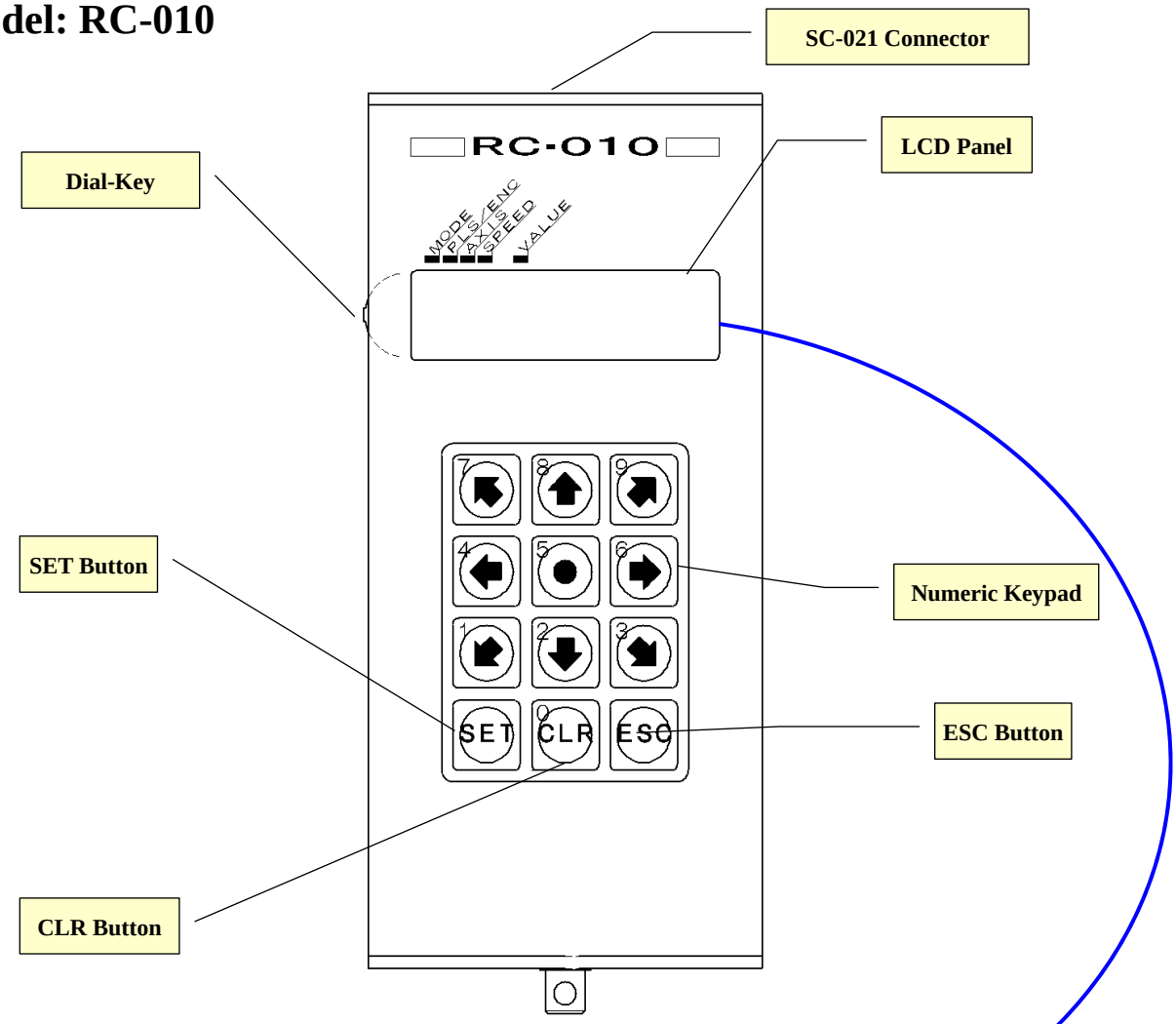
Front



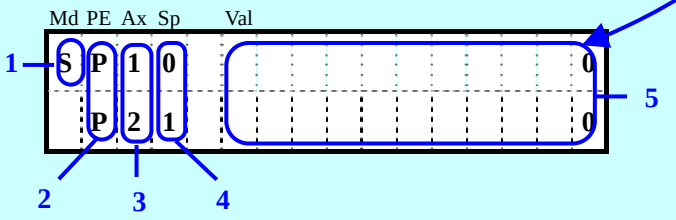
Rear



Model: RC-010



LCD Panel Display Magnified View (Example)



1.Drive Operation
- S: Scan
- O: Origin Return
- A: Absolute Position Movement
- R: Relative Position Movement

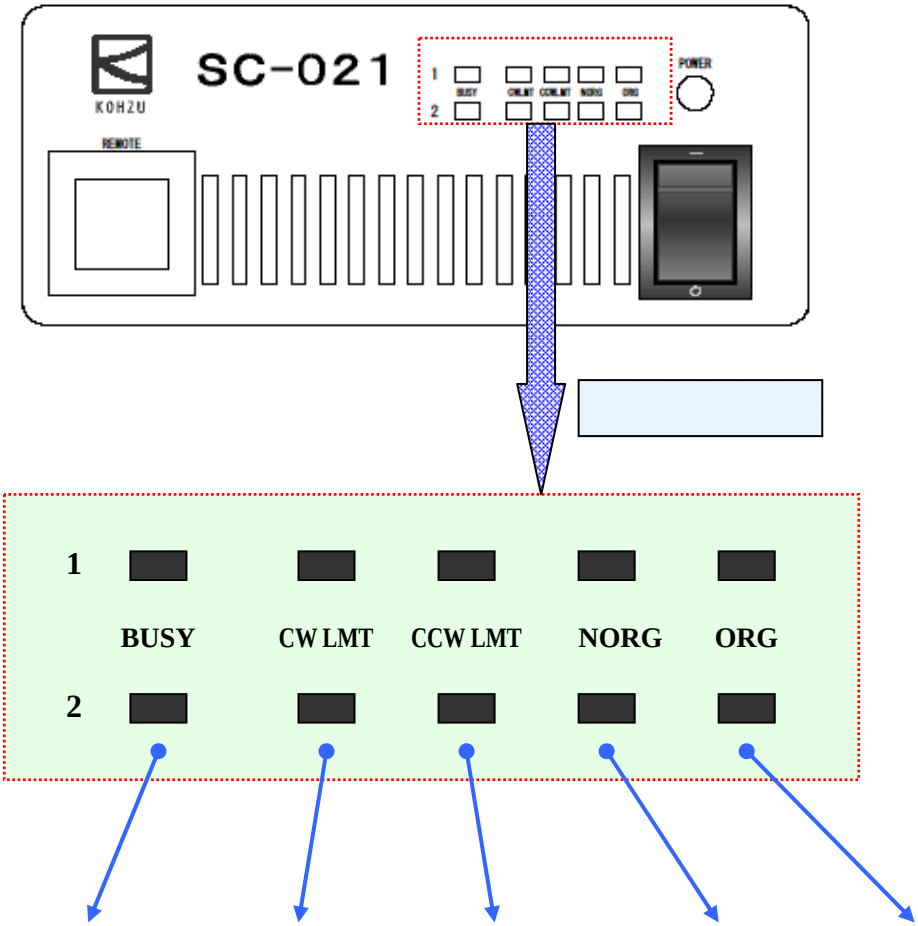
2.Pulse/Encoder Display
- P: Amount of Motor-Pulses
- p: Conversion Data Relating to Motor-Pulses
- E: Amount of Encoder-Pulses
- e: Conversion Data Relating to Encoder

3.Drive Axis No.
1/2

4.Drive Speed
0 to 9

5.Readout Numbers

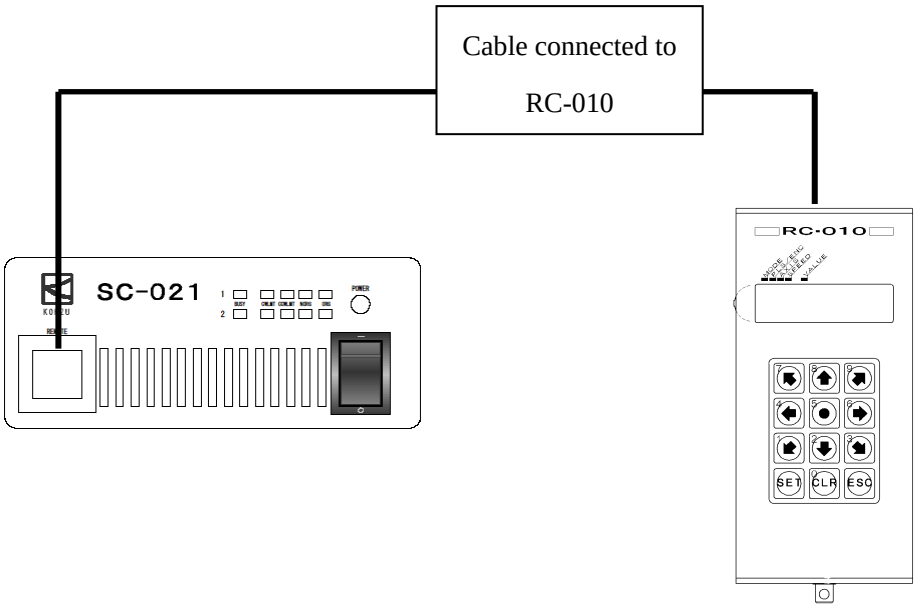
0-1. Status Display LED



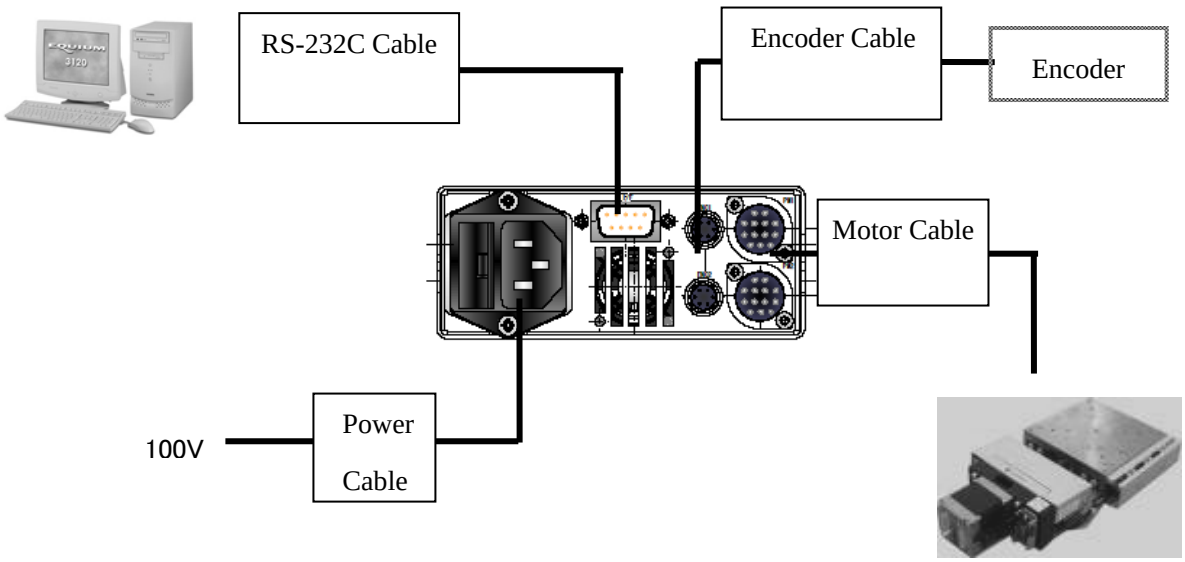
Status	BUSY	CW LMT (CW Limit)	CCW LMT (CCW Limit)	NORG (NORG Sensor)	ORG (ORG Sensor)
Light On	**On driving**	**ON**	**ON**	**ON**	**ON**
Light Off	**Waiting for command**	**OFF**	**OFF**	**OFF**	**OFF**

0-2. Connection Method

SC-021 Front



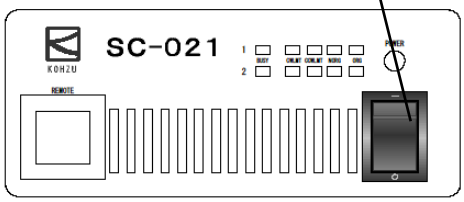
SC-021 Rear



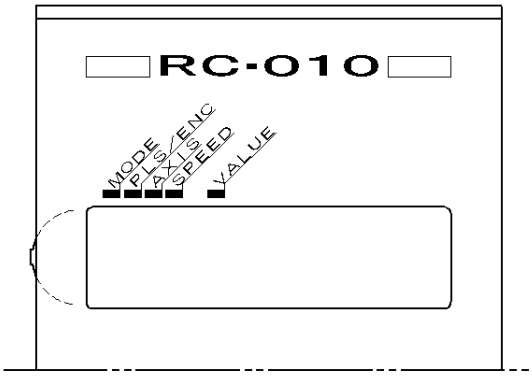
0-3. Turning on Power and Starting Up

SC-021 Front

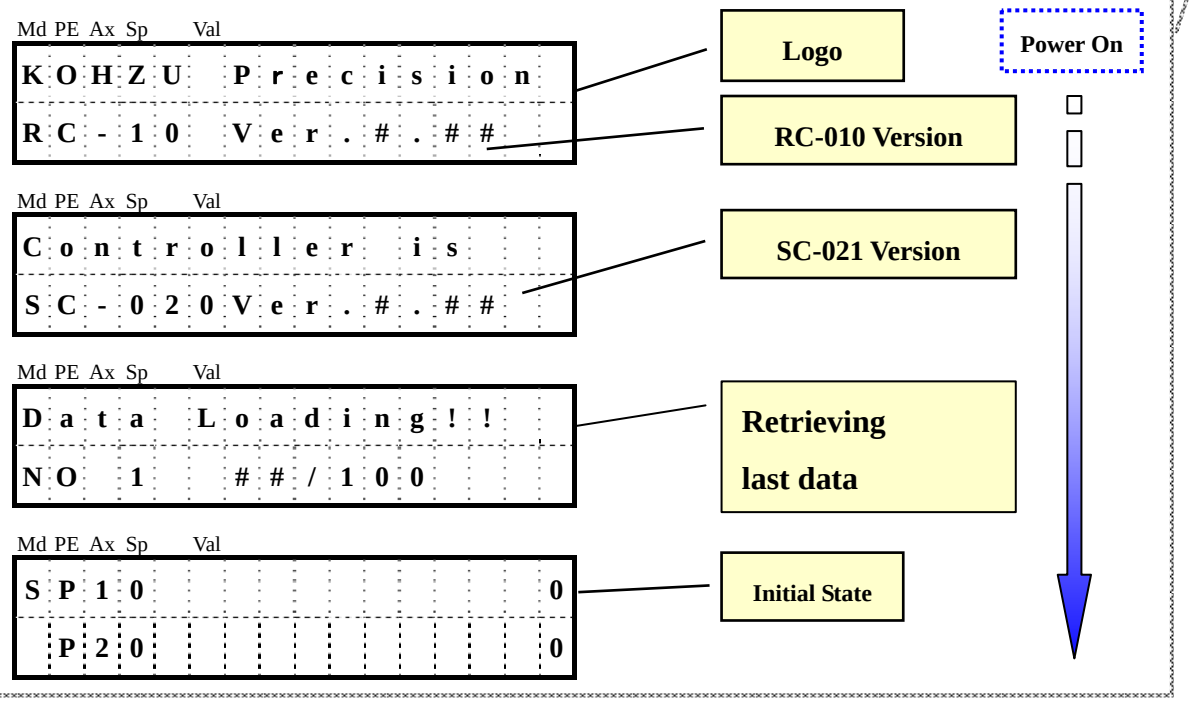
Power Switch



RC-010 LCD Panel



Display on screen after power is turned on



Sequence of Events at Start-Up:

Power ON, Logo, Version, Controller Information, Message and Initial State are displayed in this order.

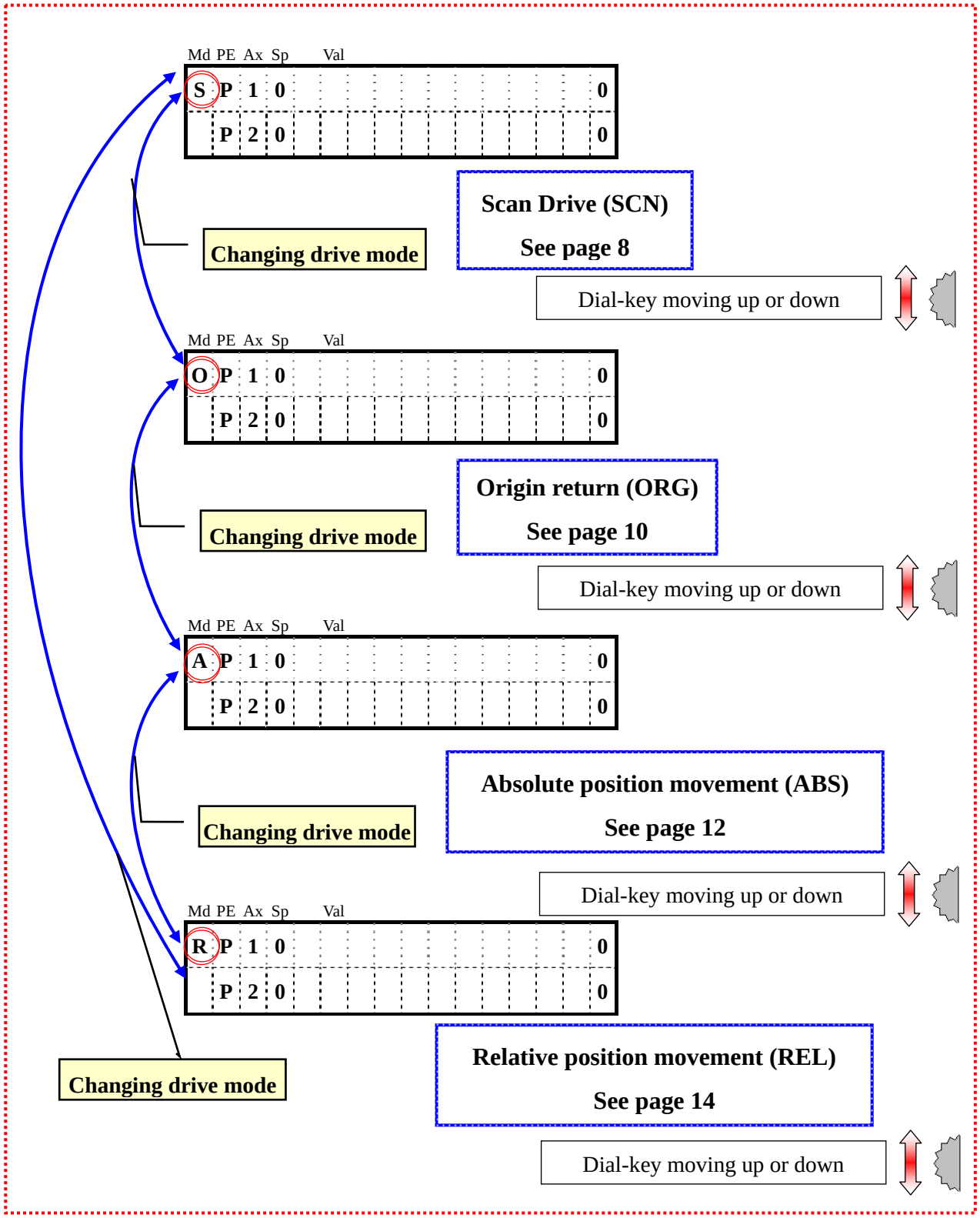
(Once Initial Status is displayed, the initialization of SC Series is complete.)

Note:

Kohzu SC series controller will always default to the last saved information. Therefore, the initial state information may differ from what is shown above.

1-0. Manually Actuating a Stage

- **This controller has four drive modes… Scan, Origin Return, Absolute Position Movement, and Relative Position Movement.**
- **When changing drive modes at drive setting status, navigate up or down using the dial-key.**

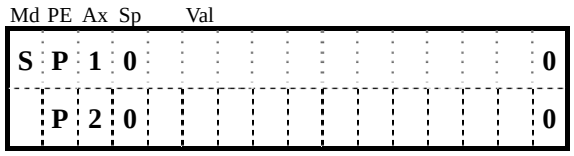


1-1. Performing a Manual Scan Drive

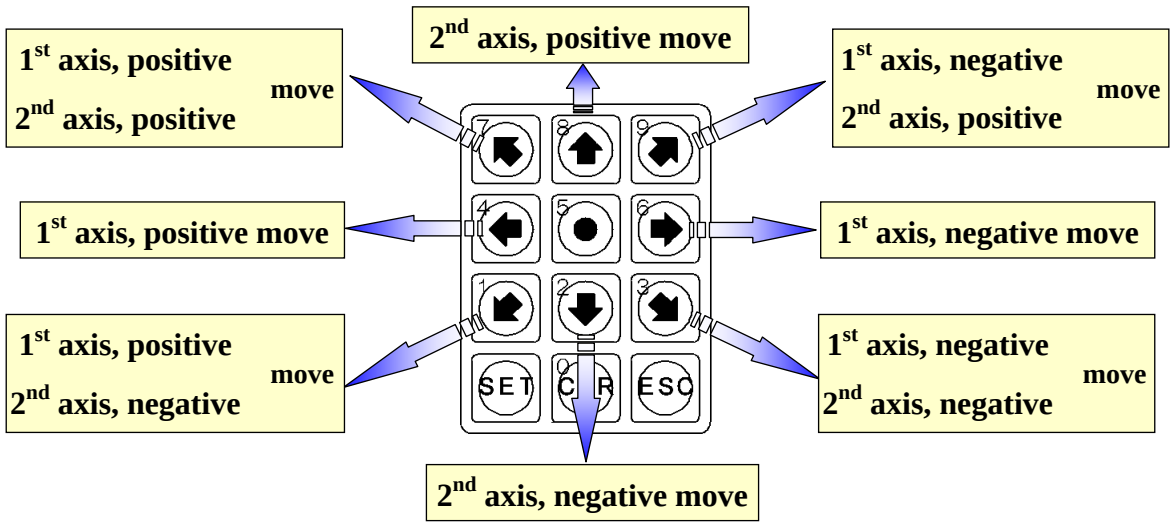
SCN

《Scan Drive Operation》

➢ **Switch to Scan Drive mode at the Drive Setting Status screen by moving dial-key up or down.**



➢ **To start scan, press and hold one of the directional keys on the key pad(see diagram below).**



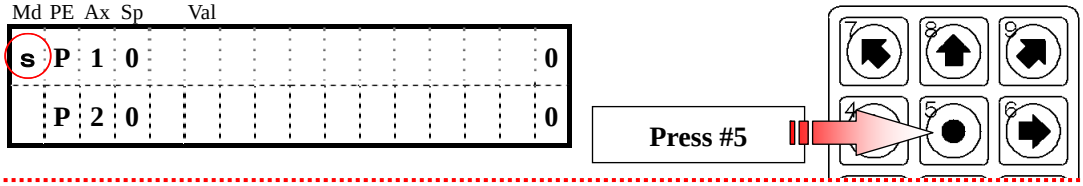
➢ **To stop scan, release the key.** Note: Once a button is pressed, don't press any other button until completion of last movement. Pushing buttons in succession causes misleading pulses in system.

Pulse Scanning

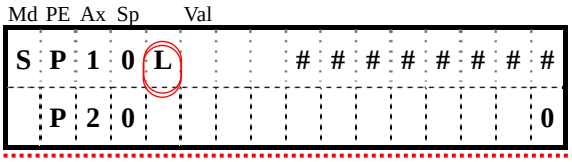
➢ While in the Setting Status screen, press #5 to switch to Pulse Drive. By default, pressing any button repeatedly will drive only 1 pulse at a time. See page 53 to assign a set number of pulses.

➢ Once the number of pulses is set, as with the Manual Scan Drive, press and hold the applicable direction key to start. Release to stop.

➢ When finished, return to Manual Scan Drive mode by pressing #5 button again.



➢ **When either a CW or CCW limit is triggered, an "L" will automatically appear in display.**

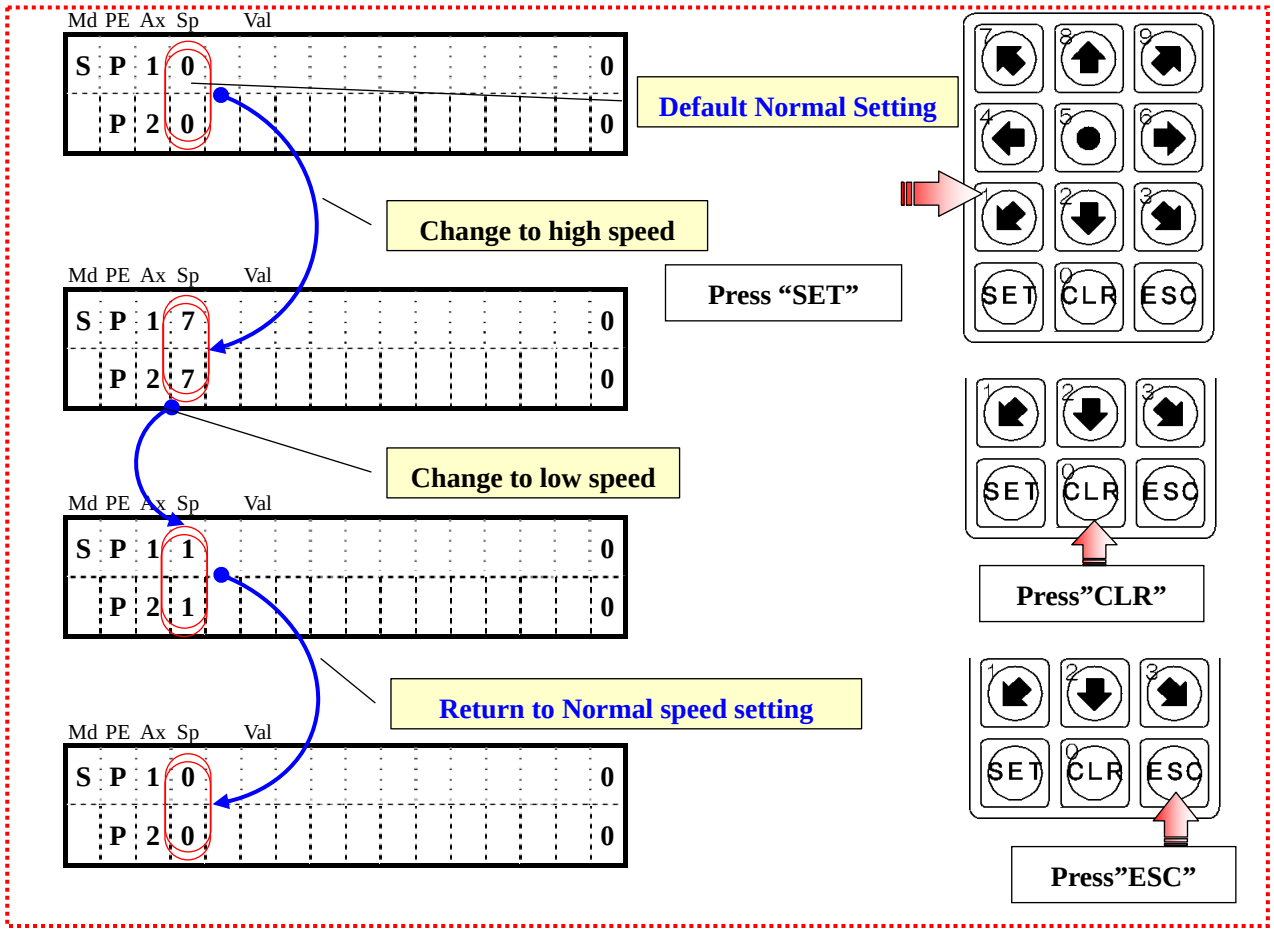


《Using the Default Scan Speeds 》

- While in the Manual Scan Drive mode, you can quickly switch between the default High, Low and Normal speeds
- Press “SET” button to drive in Manual High Speed (Default speed: #7 on Speed settings table below).
- Press “CLR” button to drive in Manual Low Speed (Default speed: #1 on Speed setting table below).
- Press “ESC” button to return to Normal speed (Default speed: #0 on Speed setting table below).

Note: For individual axes, see Section 1-2 “Performing a Manual Origin Return Operation “ on page 11.

You can also program additional speed settings within the default High and Low settings. See pages 20-21 for more information.



<Speed settings>

Display on panel	Top Speed	Startup time	Display on panel	Top Speed	Startup time
0	5000[pps]	24[ms]	5	6000[pps]	25[ms]
1	2000[pps]	21[ms]	6	7000[pps]	26[ms]
2	3000[pps]	22[ms]	7	8000[pps]	27[ms]
3	4000[pps]	23[ms]	8	9000[pps]	28[ms]
4	5000[pps]	24[ms]	9	10000[pps]	29[ms]

(The values above are default values. See page 26 for additional information.)

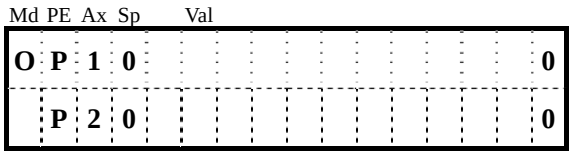
1-2. Performing a Manual Origin Return

ORG

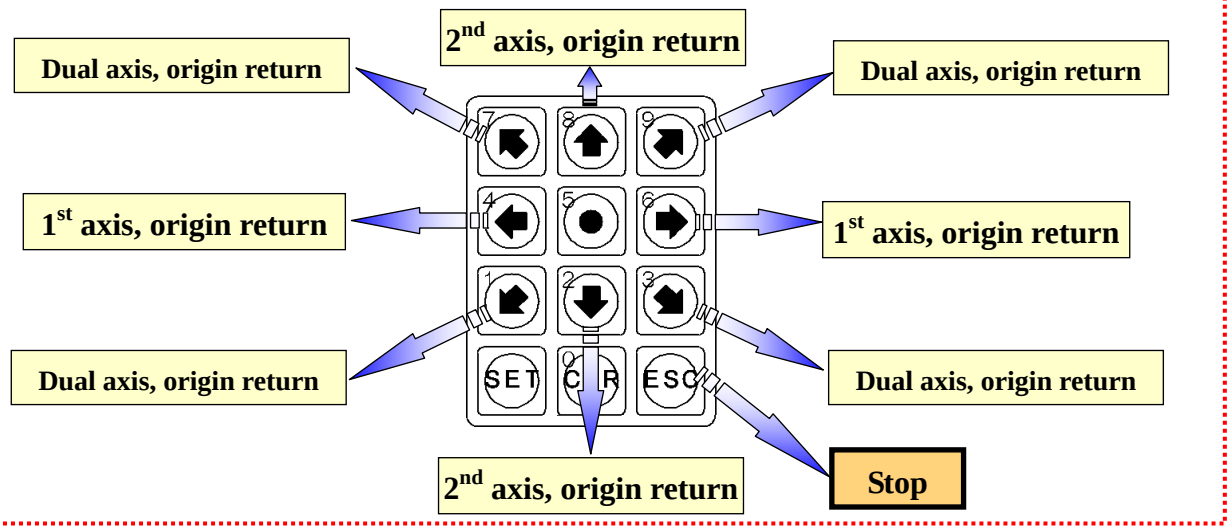
《Origin Return Operation》

- **Note: Operator has the option of using the Default Scan Mode Speeds, explained on page 9 of Section 1-1, or setting own default speed values, explained on page 11 of this section.**

- **Switch to Origin Return mode at the Drive Setting Status screen by moving the dial-key up or down.**



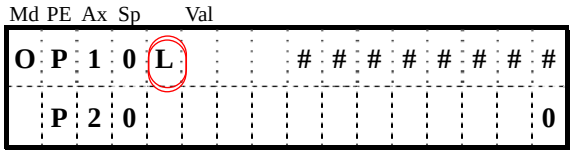
- **To start drive, press one of the directional keys on the keypad (see diagram below).**



- **To stop drive, press the same key or the "ESC" button.**

> **《Note》**
>
> The Origin Return Mode value is setting **No.3 (Norg + Org)** in the System Setting screen.
>
> See pages **34 - 35** for additional information.

- **When either a CW or CCW limit is triggered, an "L" will automatically appear in display.**



《Setting Your Own Default Drive Speeds for Individual Axes》

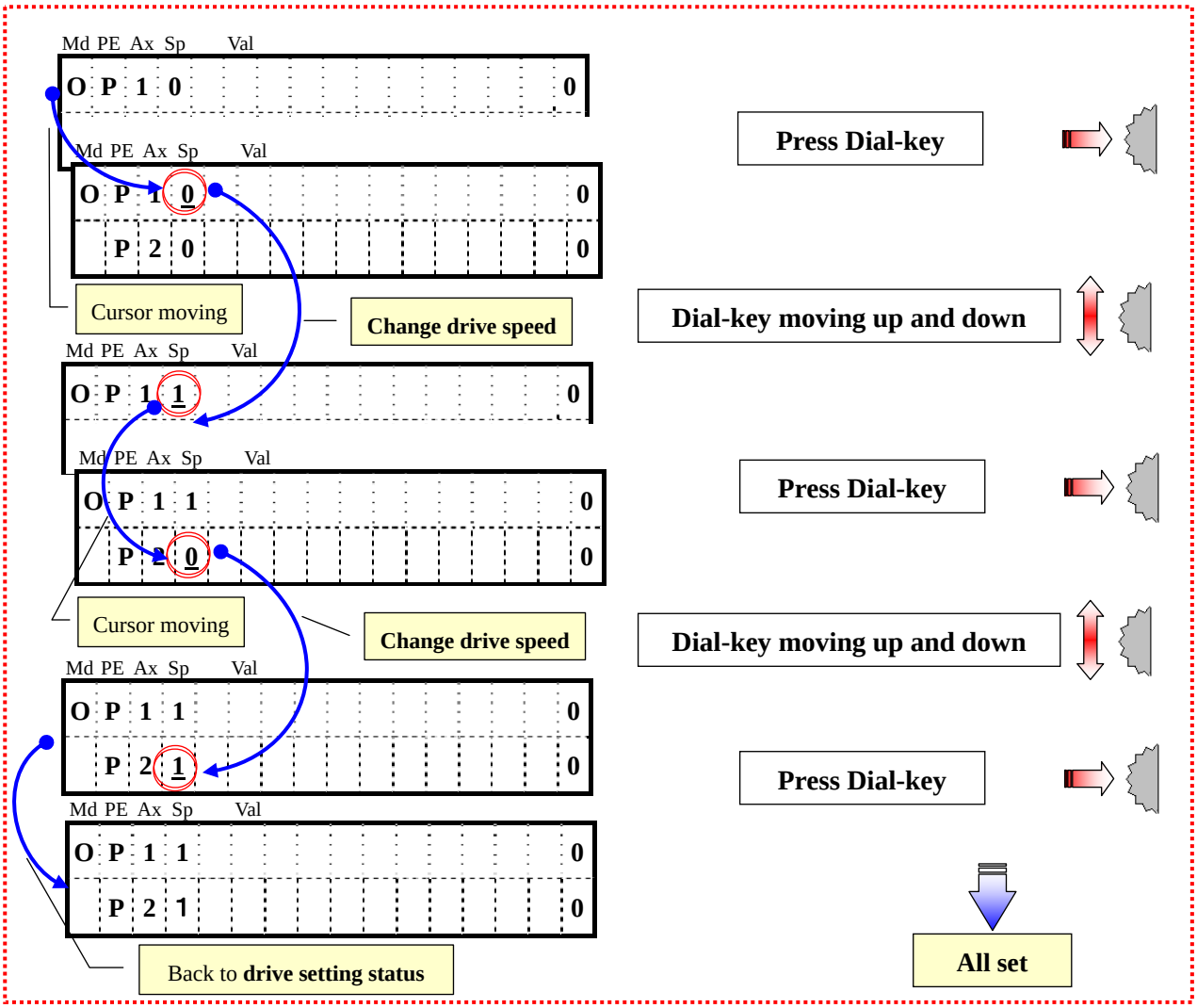
ⅰ) Press dial-key at the **Drive Setting Status screen** until the cursor reaches the **1st axis** speed setting position.

ⅱ) Set the **1st axis** speed by moving the dial-key up or down.

ⅲ) Press dial-key at the Drive Setting Status screen until the cursor reaches the **2nd axis** speed setting position.

ⅳ) Set the **2nd axis** speed by moving the dial-key up or down.

ⅴ) When finished, press the dial-key to return to the **Drive Setting status.**



Note: To set one speed for **multiple axes**, see **Section 1-1 "Manually Actuating a Stage" on page 9.**

<Speed Settings>

Display on panel	Top Speed	Startup time	Display on panel	Top Speed	Startup time
0	**5000**[pps]	**24**[ms]	**5**	**6000**[pps]	**25**[ms]
1	**2000**[pps]	**21**[ms]	**6**	**7000**[pps]	**26**[ms]
2	**3000**[pps]	**22**[ms]	**7**	**8000**[pps]	**27**[ms]
3	**4000**[pps]	**23**[ms]	**8**	**9000**[pps]	**28**[ms]
4	**5000**[pps]	**24**[ms]	**9**	**10000**[pps]	**29**[ms]

(The values above are default values. See page 26 for additional information.)

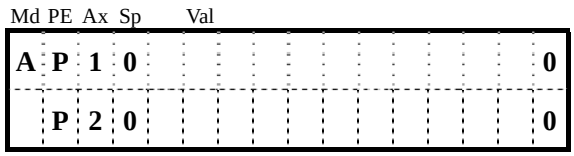
1-3. Performing a Manual Absolute Position Movement

ABS

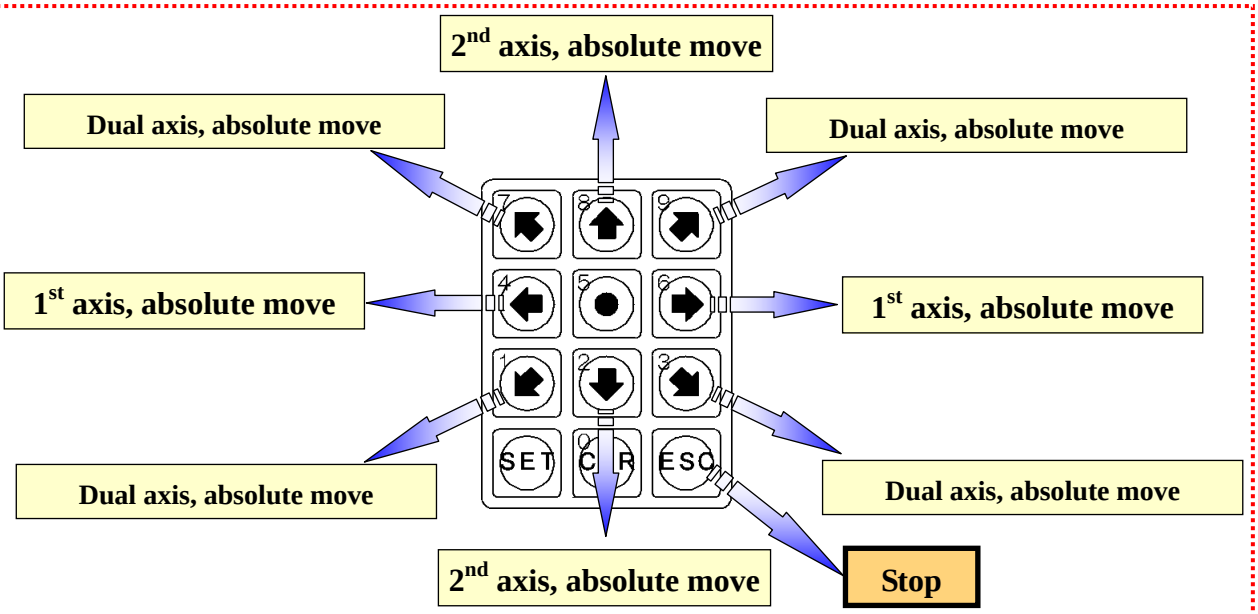
《Absolute Position Movement Operation》

- **Note: Operator has the option of using the Default Scan Mode Speeds, explained on page 9 of Section 1-1, or setting own default speed values, explained on page 11 of Section 1-2.**

- **Switch to Absolute Position mode at the Drive Setting Status screen by moving the dial-key up or down**

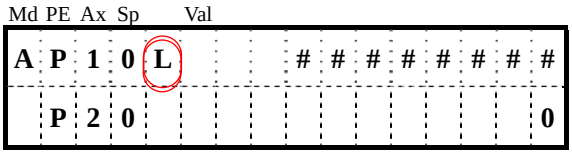


- **To start drive, press one of the directional keys on the keypad (see diagram below).**



- **To stop drive, press the same key or the "ESC" button.**

- **When either a CW or CCW limit is triggered, an "L" will automatically appear in display.**



《Setting Movement Position – 1st Axis》

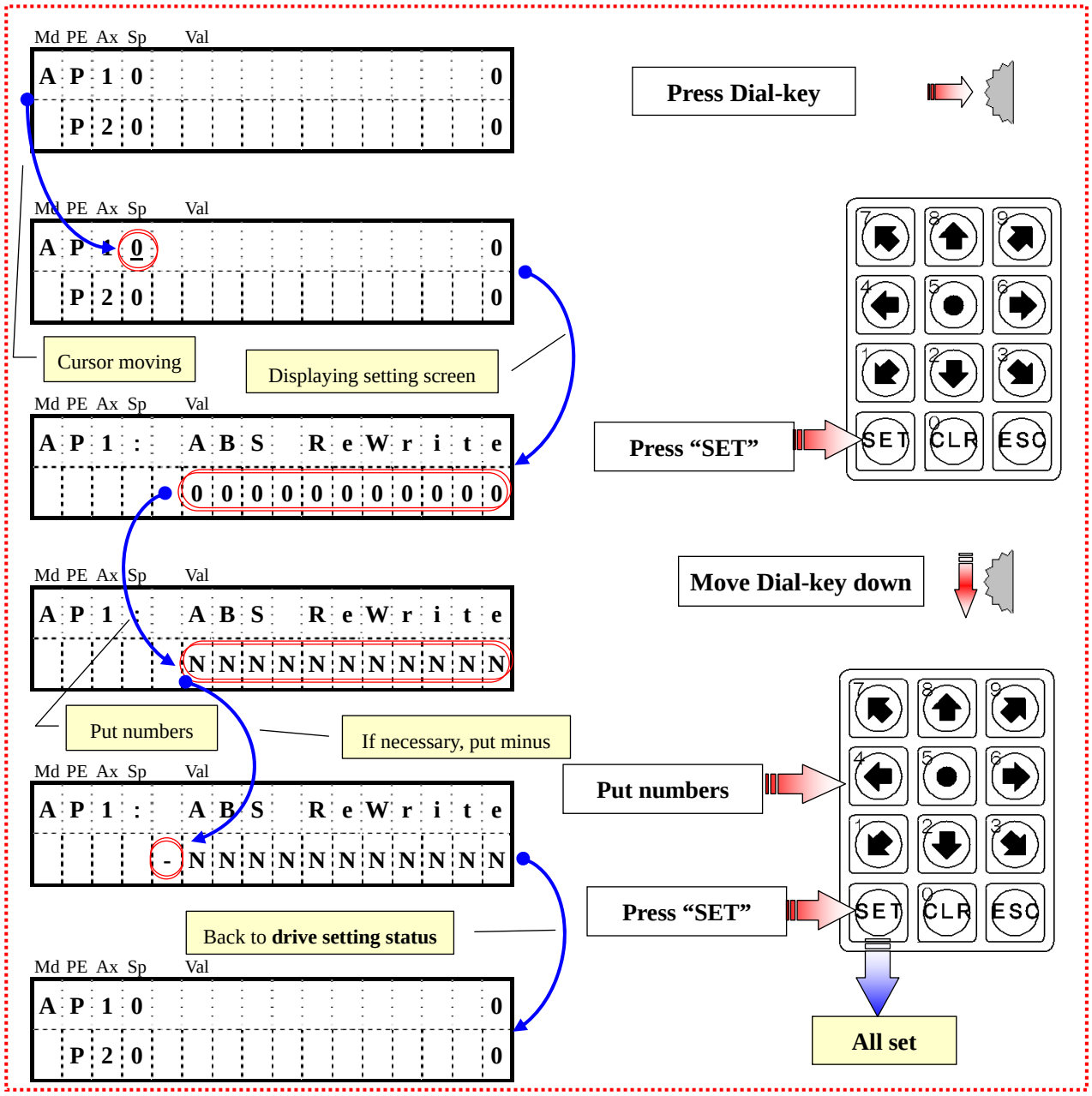
ⅰ) Press dial-key at **the Drive Setting Status screen** until the cursor reaches the **1st axis** speed setting position.

ⅱ) Press the **SET** button to display the setting screen.

ⅲ) Set numbers using the keypad. Move the dial-key down to select **a negative (-) number.**

ⅳ) When finished, press the **SET** button again to return to **the Drive Setting Status.**

ⅴ) To set the movement position for the **2nd axis**, select the **2nd axis** at **step i** and repeat **steps ii - iv.**



《Speed Setting》

To program Speed Settings, refer to **page 11**... **Setting Your Own Default Drive Speeds for Individual Axes**, in **Section 1-2**.

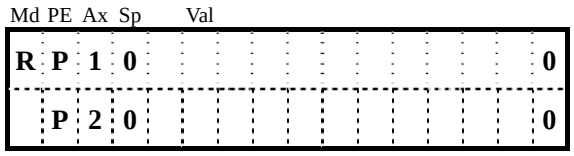
1-4. Performing a Manual Relative Position Movement

REL

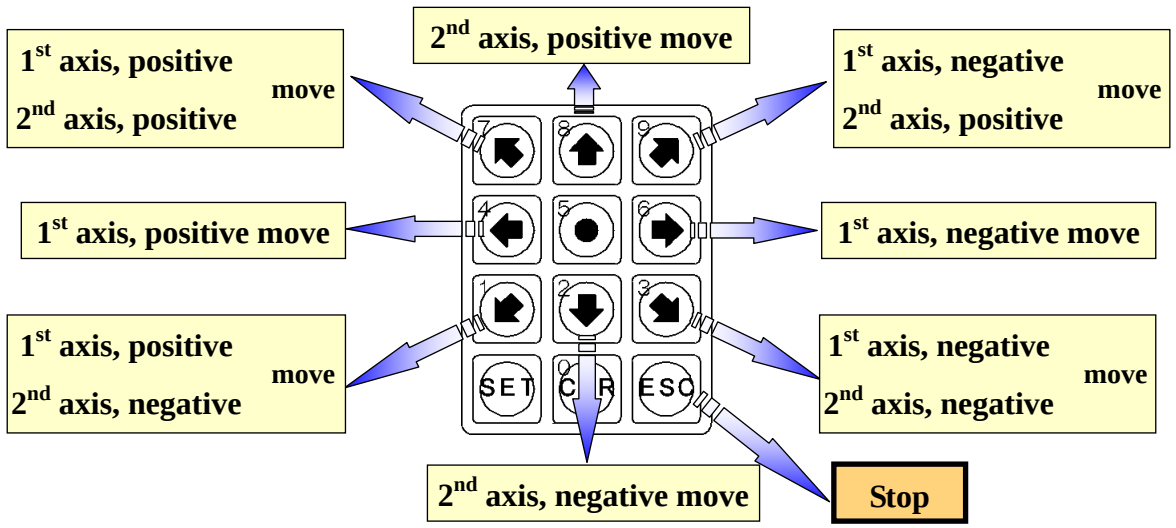
《Relative Position Movement Operation》

- **Note: Operator has the option of using the Default Scan Mode Speeds, explained on page 9 of Section 1-1, or setting own default speed values, explained on page 11 of Section 1-2.**

- **Switch to Absolute Position mode at the Drive Setting Status screen by moving the dial-key up or down**

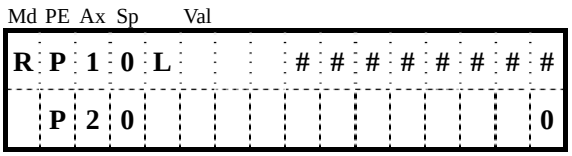


- **To start drive, press one of the directional keys on the keypad (see diagram below).**



- **To stop drive, press the same key or the "ESC" button.**

- **When either a CW or CCW limit is triggered, an "L" will automatically appear in display.**



《Setting Movement Position – 1st Axis》

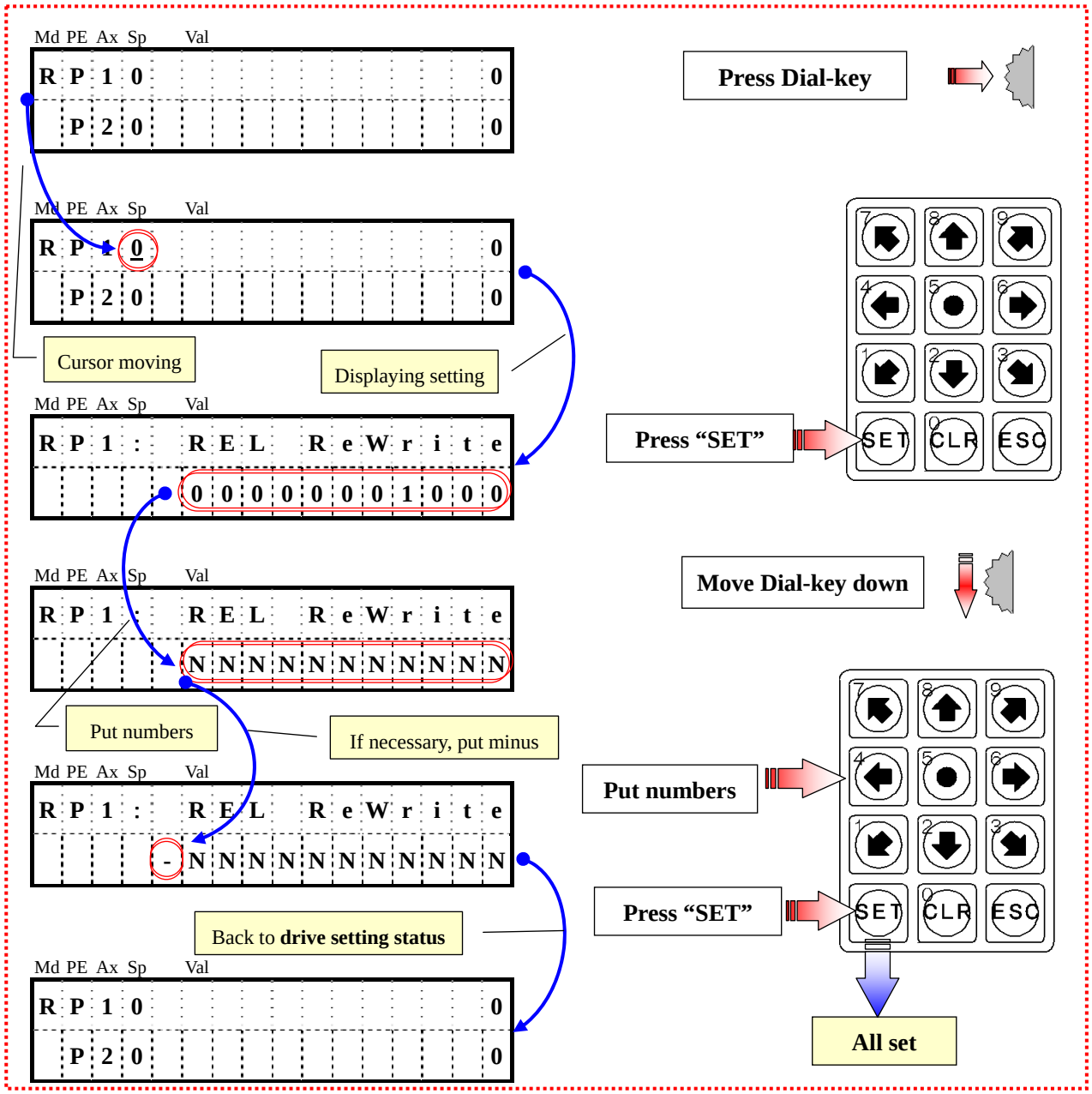
ⅰ) Press dial-key at **the Drive Setting Status screen** until the cursor reaches the **1st axis** speed setting position.

ⅱ) Press the **SET** button to display the setting screen.

ⅲ) Set numbers using the keypad. Move the dial-key down to select **a negative (-) number.**

ⅳ) When finished, press the **SET** button again to return to **the Drive Setting Status.**

ⅴ) To set the movement position for the **2nd axis**, select the **2nd axis** at **step i** and repeat **steps ii - iv.**



《Speed Setting》

To program Speed Settings, refer to **page 11**... **Setting Your Own Default Drive Speeds for Individual Axes**, in **Section 1-2**.

2-0. Manually Rewriting Present Position

《Setting of Rewriting Present Position》

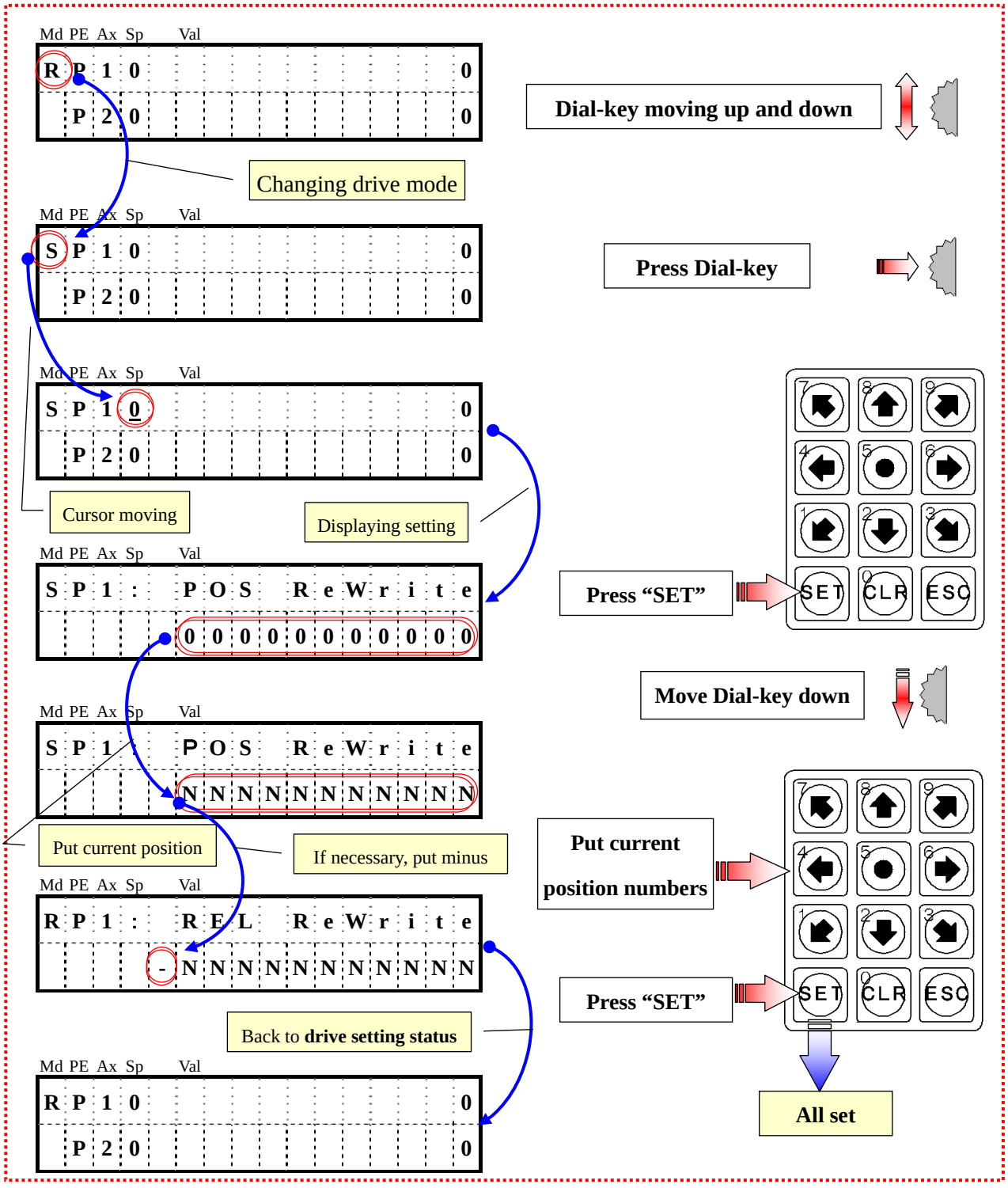
ⅰ) Switch to **Scan Drive mode** at Drive Setting Status screen by moving dial-key up or down.

ⅱ) Press dial-key at **the Drive Setting Status screen** until the cursor reaches the **1st axis** speed setting position.

ⅲ) Press the **SET** button to display the setting screen.

ⅳ) Set numbers using the keypad. Move the dial-key down to select **a negative (-) number.**

ⅴ) When finished, press the **SET** button again to return to **the Drive Setting Status.**



II. Practical Version

0. Introduction to Detailed Setting Functions

Kohzu's SC series controllers can be programmed to perform various functions for stages and incorporated equipment.

● Drive Speed Settings for supporting various automatic stages

<Speeds for relative position/absolute position/origin return movement>

- **Available in ten speed levels (SP0 to SP9)**.
- **Each speed level within the default table** (SP1 through SP9) can be changed using a coefficient.
- The **speed level 0** can be **arbitrarily set**.

<Speeds for relative position/absolute position/origin return movement>

Display	Top Speed	Accelerating and decelerating time	Display	Top Speed	Accelerating and decelerating time
SP0	5000[pps]	24[ms]	SP5	6000[pps]	25[ms]
SP1	2000[pps]	21[ms]	SP6	7000[pps]	26[ms]
SP2	3000[pps]	22[ms]	SP7	8000[pps]	27[ms]
SP3	4000[pps]	23[ms]	SP8	9000[pps]	28[ms]
SP4	5000[pps]	24[ms]	SP9	10000[pps]	29[ms]

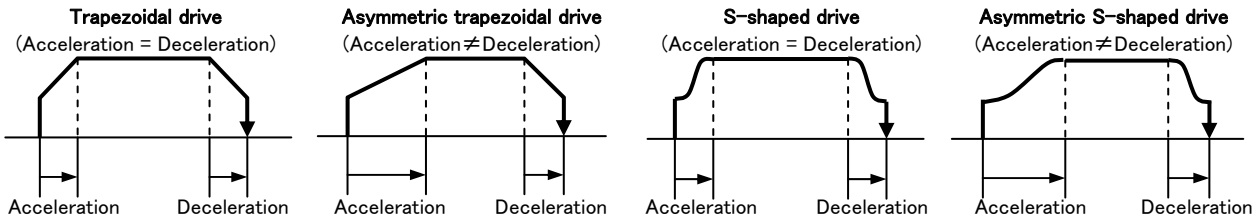
(The values in the above specifications are default values)

● Acceleration and Deceleration Settings for a smooth drive

- Four accelerating and decelerating modes are available: **Trapezoidal / Asymmetric Trapezoidal / S-shaped / Asymmetric S-shaped drives**.

Trapezoidal drive ・・・ Increases/decreases the acceleration/deceleration at a **constant acceleration and deceleration ratio**.

S-shaped drive ・・・ Provides a smooth movement by **accelerating and decelerating on a quadric curve**.



● **Origin Return Settings** supports various automatic stages

- **15** origin return modes are available.

<Origin return mode>

No.	Origin Return Mode	No.	Origin Return Mode
1	Return direction is determined and origin is detected by zone sensor.	**9**	Only origin sensor is used.
2	Edge of the zone sensor is set to the origin position.	**10**	The present position is set to the origin position.
3	Origin located in proximity of origin is set to the origin position.	**11**	After returning to the origin by method 5, and moving to the set position, this position is set to the origin.
4	One sensor located in moving zone is set to the origin position.	**12**	After returning to the origin by method 6, and moving to the set position, this position is set to the origin.
5	Origin in proximity of CW limit is set to the origin position.	**13**	After returning to the origin by method 7, and moving to the set position, this position is set to the origin.
6	Origin in proximity of CCW limit is set to the origin position.	**14**	After returning to the origin by method 8, and moving to the set position, this position is set to the origin.
7	Edge of CW limit is set to the origin position.	**15**	Reference signal of the encoder is set to the origin position.
8	Edge of CCW limit is set to the origin position.		

● **Pulse Conversion Setting** converts real fed pulse into real distance/angle and display.

● **Encoder Conversion Setting** converts encoder value into real distance/angle and display.

- Conversion coefficient is **respectively set for numerator and denominator** as **(numerator)/(denominator)**.
- Displays to **eight decimal places**.

● **Encoder and Backlash Correction** allows precise positioning.

<Encoder Correction>

- **Three** correcting modes available: **no correction / one-time correction / continuous correction**.
- **Encoder's** count signal can be **multiplied by 1, 2 or 4**.
- **Completion conditions** for correction can be changed.

<Backlash Correction>

- **Number** of pulses can be set arbitrarily during correction.
- **Five** correcting modes are available:

<Backlash correction commands>

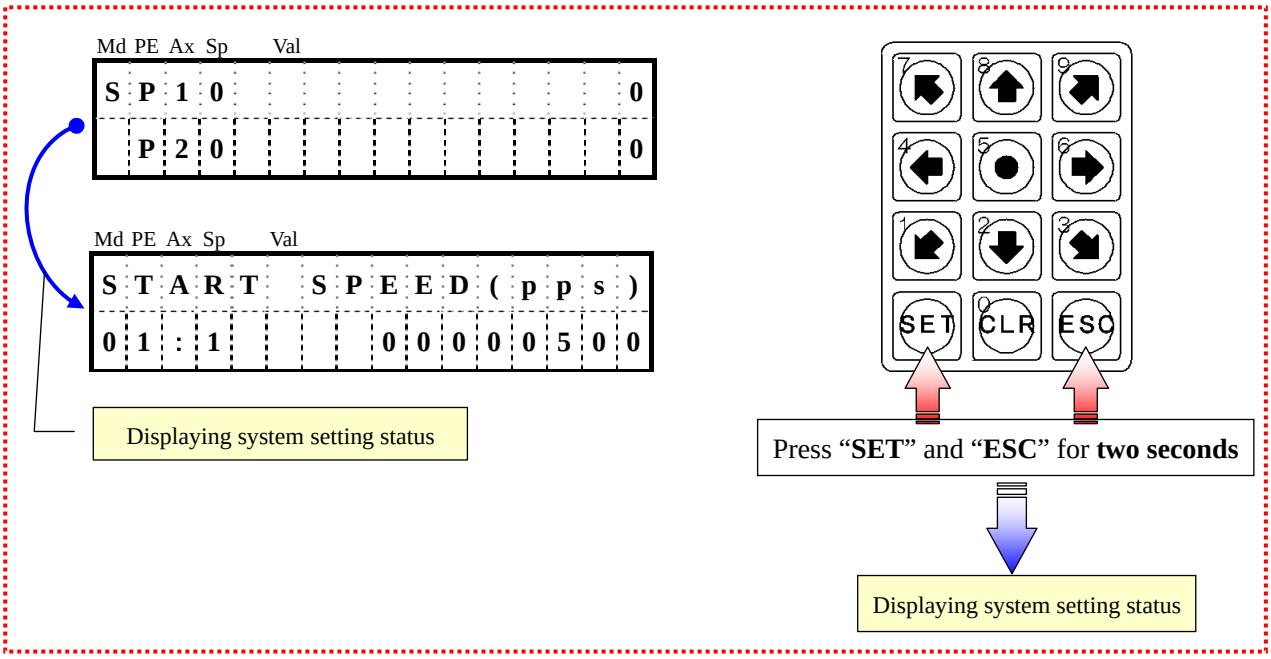
No.	Description of backlash correction
0	The backlash correction is **null**.
1	When reversing from CW to CCW direction, **reciprocating movements** are performed by the **correction pulse numbers before moving**.
2	When reversing from CCW to CW direction, **reciprocating movements** are performed by the **correction pulse numbers before moving**.
3	In CCW direction, **reciprocating movements** are performed by the **correction pulse numbers after moving is ended**.
4	In CW direction, **reciprocating movements** are performed by the **correction pulse numbers after moving is ended**.

1. Accessing the System Setting Screen

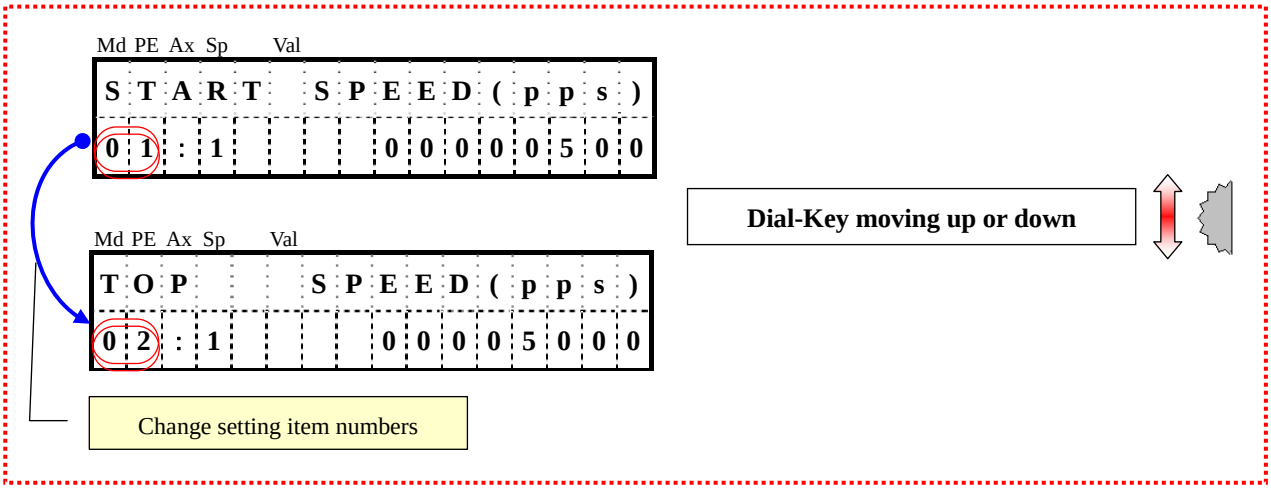
Before any of the Item Codes can be programmed, follow these basic steps to utilize the System Setting Screen.

A list of System Setting Item Codes and their functions are found on pages 24 & 25.

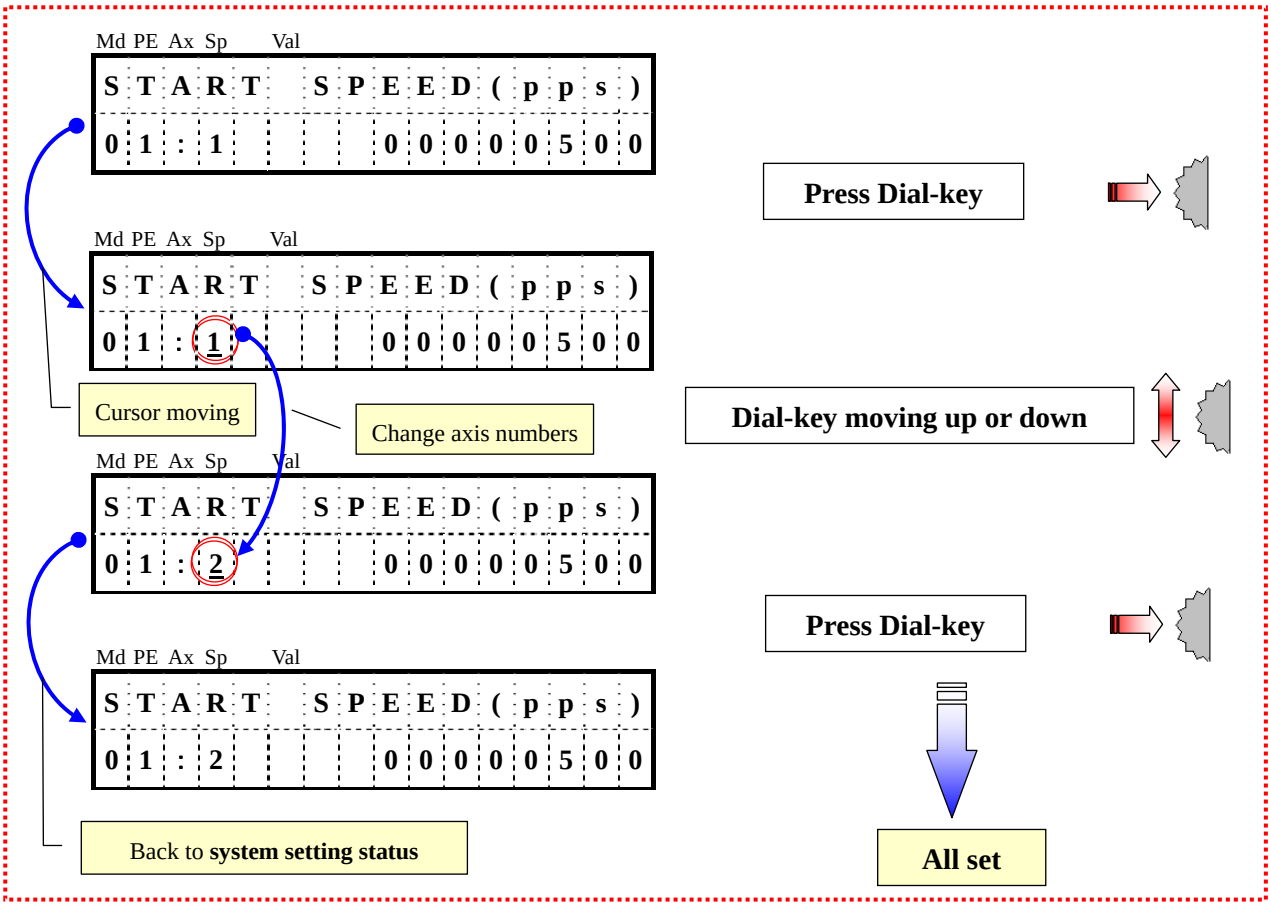
- **At the Drive Setting Status screen, press and hold the SET and ESC buttons simultaneously for two seconds. System setting status screen is displayed.**



- **From here, select desired System Setting Item code (see pages 24-25) by moving the dial-key up or down.**



- **To change axes, first press the dial-key then move up or down. Press dial-key again to set.**

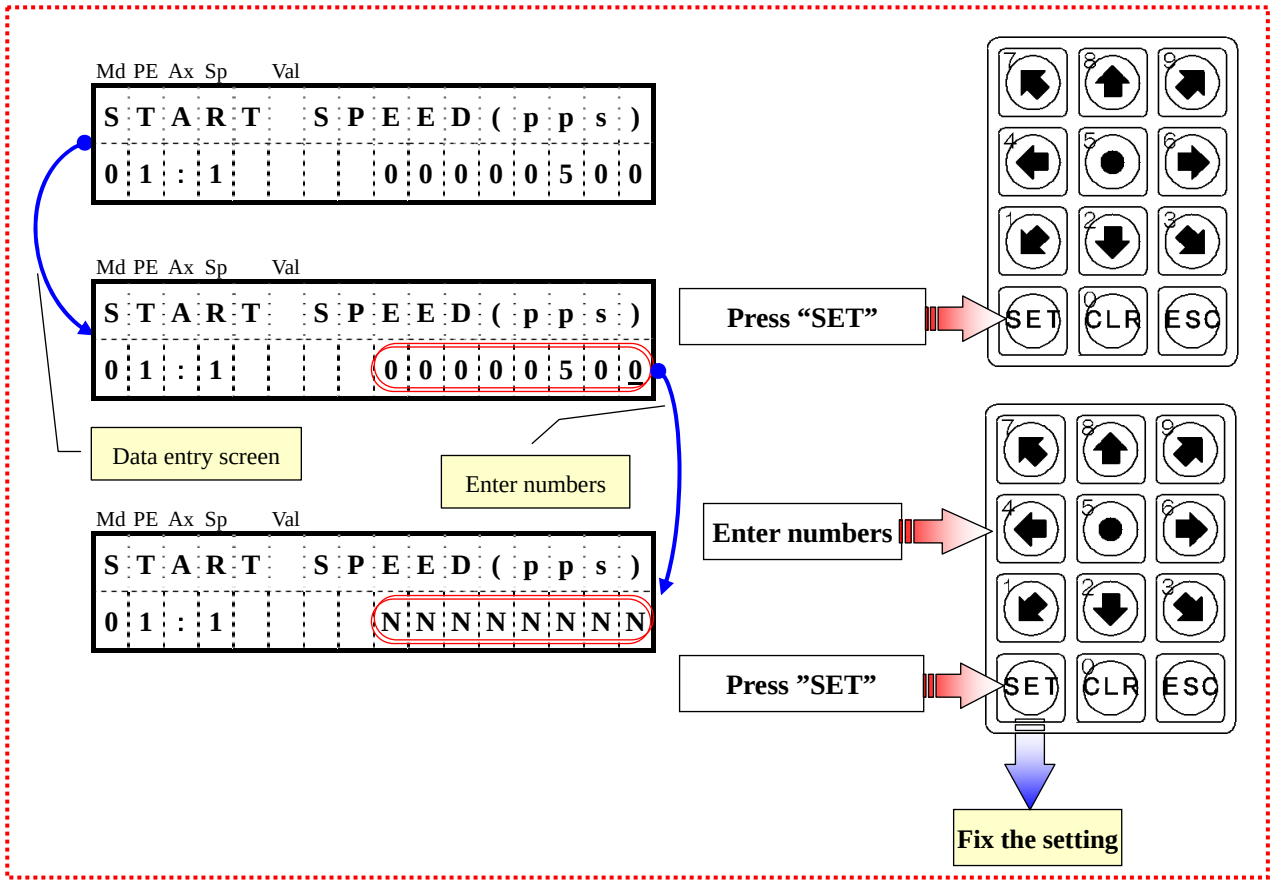


《Setting the Item Code Values》

ⅰ) Press "**SET**" button at System Setting Status to access the data entry screen.

ⅱ) Set numbers using the keypad. Move the dial-key down to select a negative (-) number.

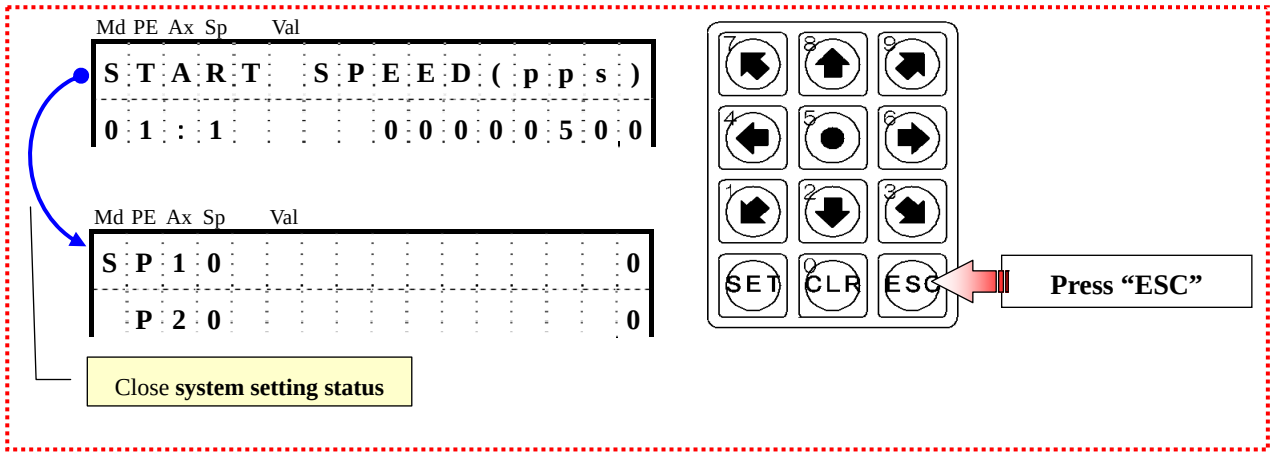
ⅲ) Press "**SET**" button again when finished.



- You can switch to another system setting item, without having to return to the Drive Setting Status screen, by moving the dial-key up or down.

- If the values entered are out of the setting range, the following error message will appear: **Data NG !** . If this happens, return to the data entry screen by pressing ESC and re-enter values that are within the setting range.

- Pressing ESC button will close the System Setting Status Screen and return to the Drive Setting Status screen.



《List of System Setting Items and Item Codes》

No.	Display on LCD	Functional description	Default
1	START SPEED (pps)	Setting of start speed for speed table No. 0	500
2	TOP SPEED (pps)	Setting of maximum speed for speed table No. 0	5000
3	ACC TIME (10ms)	Setting of accelerating time for speed table No. 0	24
4	DEC TIME (10ms)	Setting of decelerating time for speed table No. 0	24
5	ORG PRESET DATA	Setting of coordinate value/origin preset value after origin return	0
6	PM PRESCALE	Setting of prescaler	0
7	BACKLASH PULSE	Setting of pulse number at backlash correction	0
8	BACKLASH TYPE 0-4	Setting of backlash correcting method (0: invalid, 1 to 4: Method selection)	0
9	ORG TYPE 1-15	Setting of origin return method	3
10	PLS CAL DIV 1/N	Setting of denominator of the angle conversion coefficient for feed pulse amount	1
11	PLS CAL DIV N/1	Setting of numerator of the angle conversion coefficient for feed pulse amount	1
12	PLS RND OFF 0-9	Setting of displayed valid digit numbers of displayed value after angle conversion	2
13	STOP EMG:0 SLW:1	Setting of limit stop method (0: Emergency stop, 1: Decelerating stop)	0
14	OFFSET DATA	Setting of optical offset value	0
15	PM ROTATE CHANGE	Changing and setting of rotating direction	0
16	CWL NON:0 INV:1	Changing and setting of CW limit signal logic	0
17	CCWL NON:0 INV:1	Changing and setting of CCW limit signal logic	0
18	NORG NON:0 INV:1	Changing and setting of NORG sensor signal logic	0
19	ORG NON:0 INV:1	Changing and setting of ORG sensor signal logic	0
20	LMT SWAP N:0 Y:1	Setting of CCW limit	0
21	COFF ON:0 OFF:1	Setting of motor excitation (0: Excitation ON, 1: Excitation OFF)	0
22	ACC CURVE 1-5	Setting of accelerating and decelerating method 1: Rectangular drive 2: Trapezoidal drive 3: Asymmetric trapezoidal drive 4: S-shaped drive 5: Asymmetric S-shaped drive	2
23	CONSTANT PULSE	Setting of low speed moving pulse amount from deceleration to stop	0
24	ENC CAL DIV 1/N	Setting of denominator of the angle conversion coefficient for encoder value	1
25	ENC CAL DIV N/1	Setting of numerator of the angle conversion coefficient for encoder value	1
26	ENC MULTIPLI 1-4	Setting of multiplication (1: Multiplication by 1, 2: Multiplication by 2, 4: Multiplication by 4)	1

No.	Display on LCD	Functional description	Default
27	ENC PRESCALE	Setting of zero clear position when high speed table is used	0
28	ENC RND OFF 0-9	Setting of display valid digit number of displayed value after angle conversion	2
29	FEEDBACK TYPE 0-2	Setting of encoder correcting method 0: No correction 1: Correction only in positioning 2: Constant correction	0
30	PERMIT RANGE PULSE	Setting of allowable range pulse amount when encoder is corrected	1
31	RETRY COUNT	Setting of retry number when encoder is corrected	100
32	WAIT TIME (1ms)	Setting of stop standby time before encoder is corrected	100
33	ENC ROTATE CHANGE	Setting of adding direction of encoder count	0
34	PM&ENC SYNC WRITE	Setting of encoder coordinate synchronization	0
35	SPD TABLE 1-300	Setting of speed table rewriting	1
36	SYS Refresh!!	Execution of system initialization	0
37	Line-1 Edit Axis	Setting of axis No. on first line on LCD panel	1
38	Line-1 Edit P E	Setting of conversion display on first line 0: Pulse **non** converted display 1: Pulse converted display 2: Encoder **non** converted display 3: Encoder converted display	0
39	Line-2 Edit Axis	Setting of axis No. on second line on LCD panel	2
40	Line-2 Edit P E	Setting of conversion display on second line 0: Pulse **non** converted display 1: Pulse converted display 2: Encoder **non** converted display 3: Encoder converted display	0
41	Manual Hi Speed	Speed table No. Set by "**SET**" button at **scan mode operation**	7
42	Manual Lo Speed	Speed table No. Set by "**CLR**" button at **scan mode operation**	1
43	Scan Pulse Val	Setting of pulse value driven by pressing just one time at scan mode operation	1

2. Manually Setting the Drive Speed

《Rewriting of Speed Tables 1 to 9 (SP1 to SP9)》 System Setting Item 35

This process allows operator to rewrite the default speed setting for the entire Speed Table (SP1 through SP9) simultaneously by using a single coefficient.

ⅰ) Change setting item number to **"No.35"** at **System Setting Status** by moving dial-key or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad and the sample formula below, enter the coefficient for the speed level. The result will be the actual maximum drive speed.

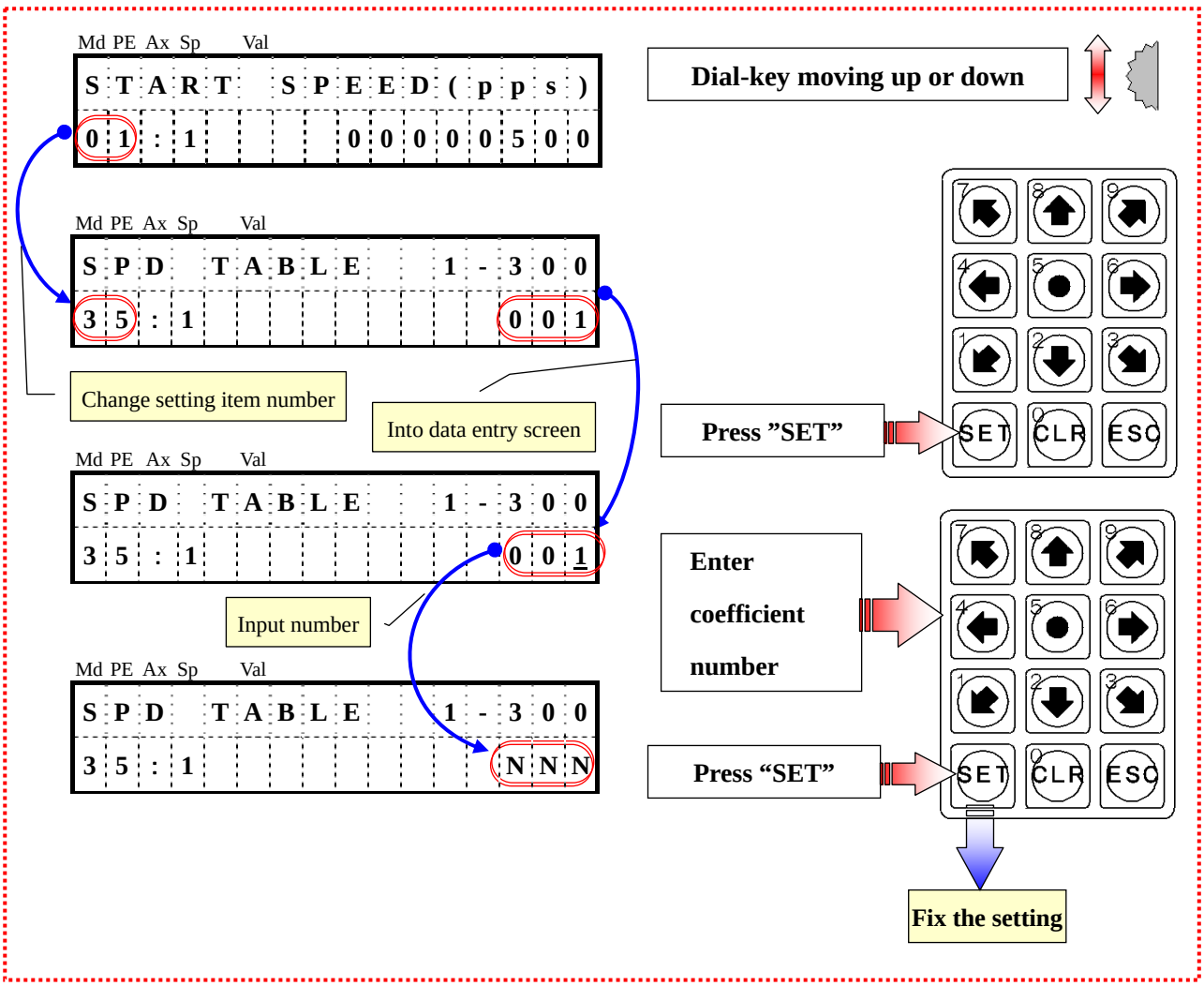
ⅳ) Press "**SET**" button again when finished.

<Relation between speed table and operating speed>

Maximum speed of speed table	x	Coefficient of speed table	=	Actual drive maximum speed

<Example of setting>

SP1: **2,000**[pps] SP2: **3,000**[pps] SP3: **4,000**[pps] SP4: **5,000**[pps] SP5: **6,000**[pps] SP6: **7,000**[pps] SP7: **8,000**[pps] SP8: **9,000**[pps] SP9: **10,000**[pps]	x	**20** (Enter a single coefficient from 1 to 300)	=	SP1: **40,000**[pps] SP2: **60,000**[pps] SP3: **80,000**[pps] SP4: **100,000**[pps] SP5: **120,000**[pps] SP6: **140,000**[pps] SP7: **160,000**[pps] SP8: **180,000**[pps] SP9: **200,000**[pps]


Md PE Ax Sp Val
START SPEED(pps)
01:1 0000500
Md PE Ax Sp Val
SPD TABLE 1-300
35:1 001
Change setting item number
Into data entry screen
Md PE Ax Sp Val
SPD TABLE 1-300
35:1 001
Input number
Md PE Ax Sp Val
SPD TABLE 1-300
35:1 NNN
Dial-key moving up or down
Press "SET"
SET
CLR
ESC
Enter coefficient number
Press "SET"
SET
CLR
ESC
Fix the setting

《Rewriting of Speed Table 0 (SP0)》System Setting Items 1&2

This process allows operator to rewrite starting and maximum speeds for Speed Table 0.

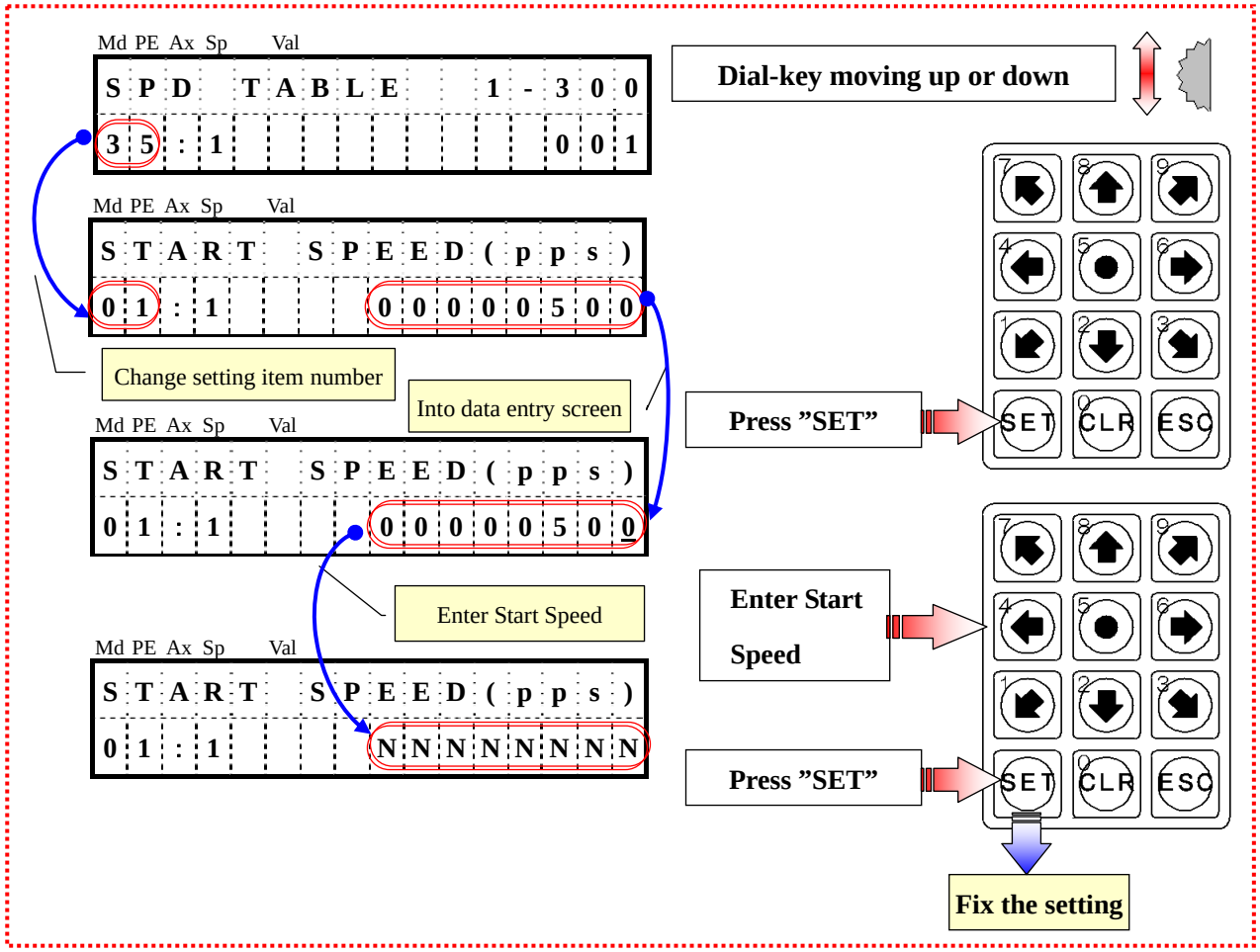
(A) Setting the Start Speed for Speed Table SP0. (System Setting Item 1)

ⅰ) Change setting item number to **"No.1"** at **System Setting Status** by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired start speed.

ⅳ) Press "**SET**" button again when finished.



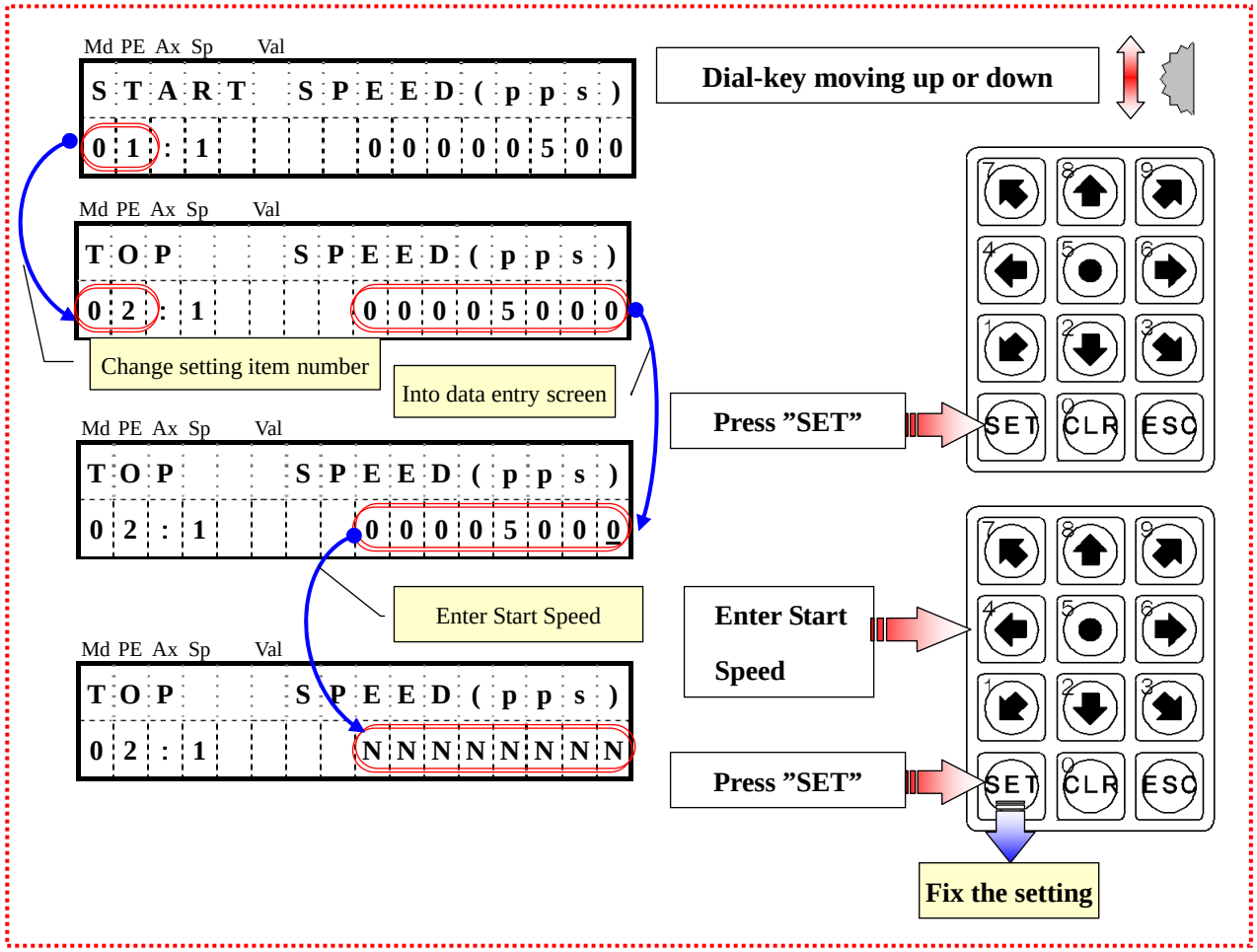
(B) Setting the Maximum Speed for Speed Table SP0. (System Setting Item 2)

ⅰ) Change setting item number to **“No.2”** at **System Setting Status** by moving dial-key up or down.

ⅱ) Press “**SET**” button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired maximum speed.

ⅳ) Press “**SET**” button again when finished.



《Setting of Acceleration and Deceleration Mode》System Setting Item 22

This process allows operator to select the acceleration/deceleration mode best suited for their application.

ⅰ) Change setting item number to **"No.22"** at system setting status by moving dial-key up or down.

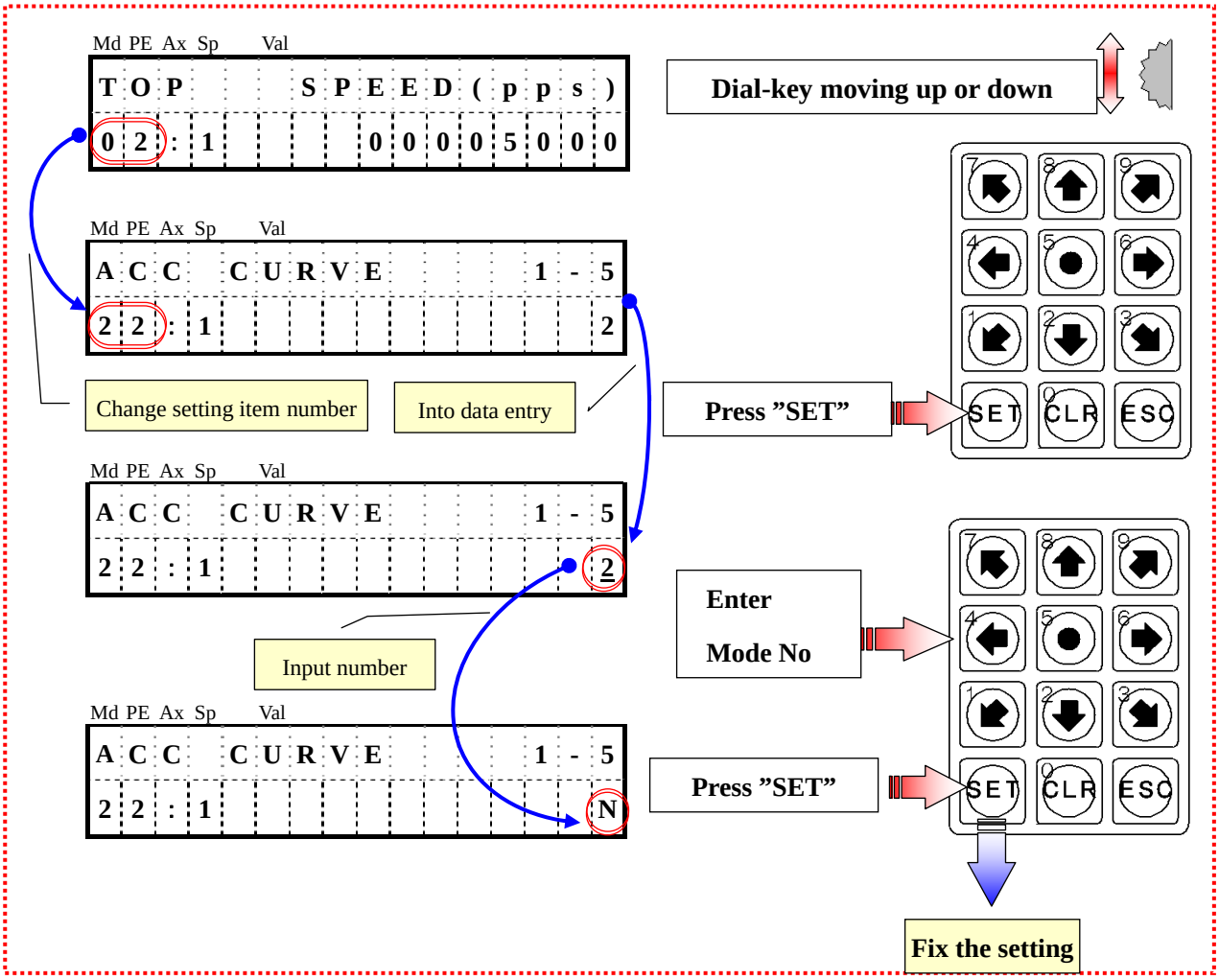
ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Referencing the table below, enter the desired Mode number using the keypad.

ⅳ) Press "**SET**" button again when finished.

<Accelerating and decelerating mode No.>

No.	Accelerating and decelerating mode	Mode description
1	**Rectangular drive**	A mode to drive **at maximum speed from the start** and not to perform gradual acceleration/deceleration.
2	**Trapezoidal drive**	A mode to perform acceleration/deceleration **at constant acceleration/deceleration ratios with the same values**.
3	**Asymmetric trapezoidal drive**	A mode to perform acceleration/deceleration **at constant acceleration/deceleration ratios with different values**.
4	**S-shaped drive**	A mode to perform acceleration/deceleration **at acceleration/deceleration ratios on the same quadric curves**.
5	**Asymmetric S-shaped drive**	A mode to perform acceleration/deceleration **at acceleration/deceleration ratios on different quadric curves**.



《MEMO》

《Rewriting Acceleration and Deceleration Times for Speed Table 0 (SP0)》

System Setting Items 3 & 4

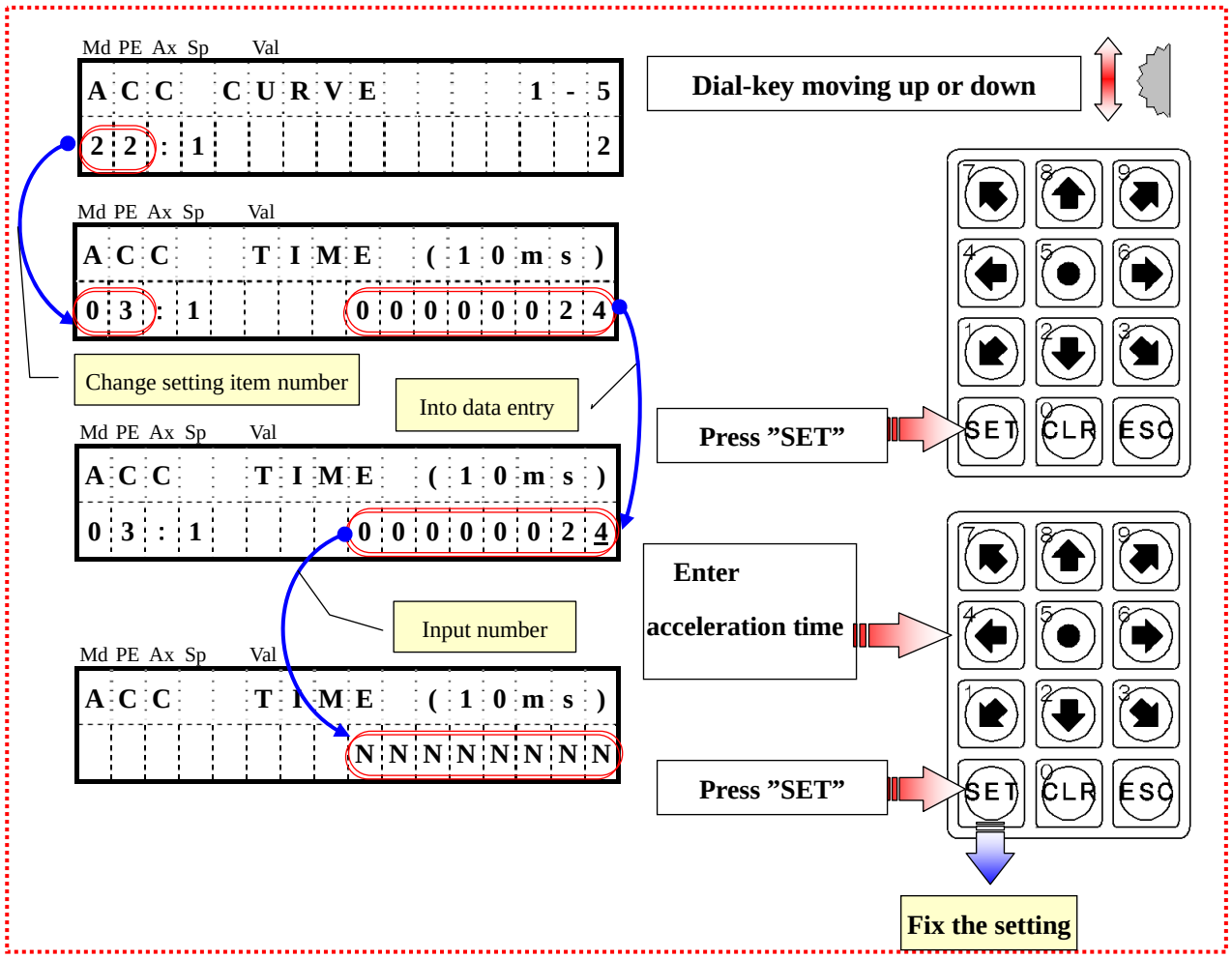
(A) Setting Acceleration Time (System Setting Item 3)

ⅰ) Change setting item number to **"No.3"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired acceleration time.

ⅳ) Press "**SET**" button again when finished.



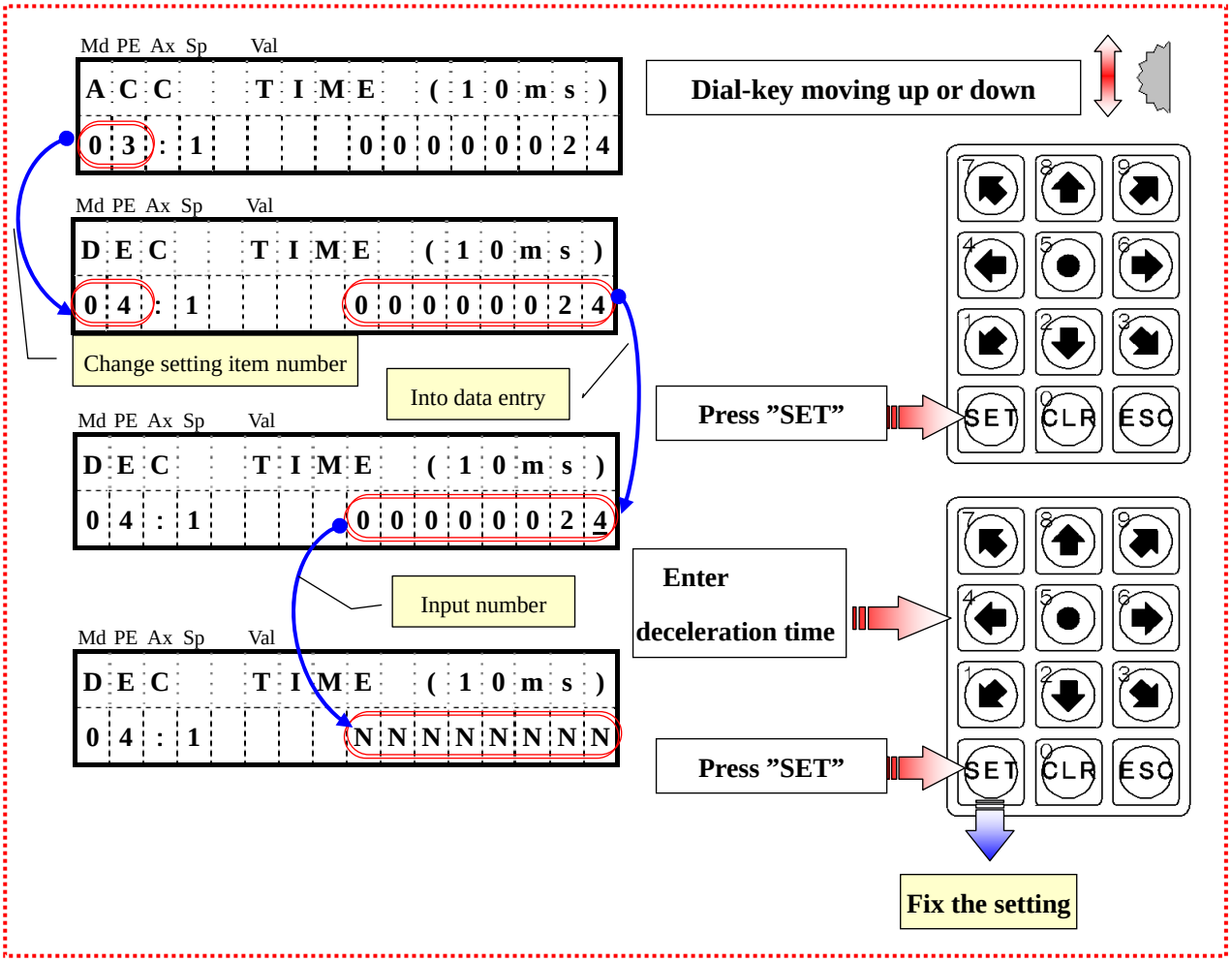
(B) Setting Deceleration Time (System Setting Item 4)

ⅰ) Change setting item number to **"No.4"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired deceleration time.

ⅳ) Press "**SET**" button again when finished.



3. Manually Setting Origin Return

《Setting Origin Return Mode》 System Setting Item 9

This process offers operator 15 mode selections for the return operation best suited for their application.

ⅰ) Change setting item number to **"No.9"** at system setting status by moving dial-key up or down.

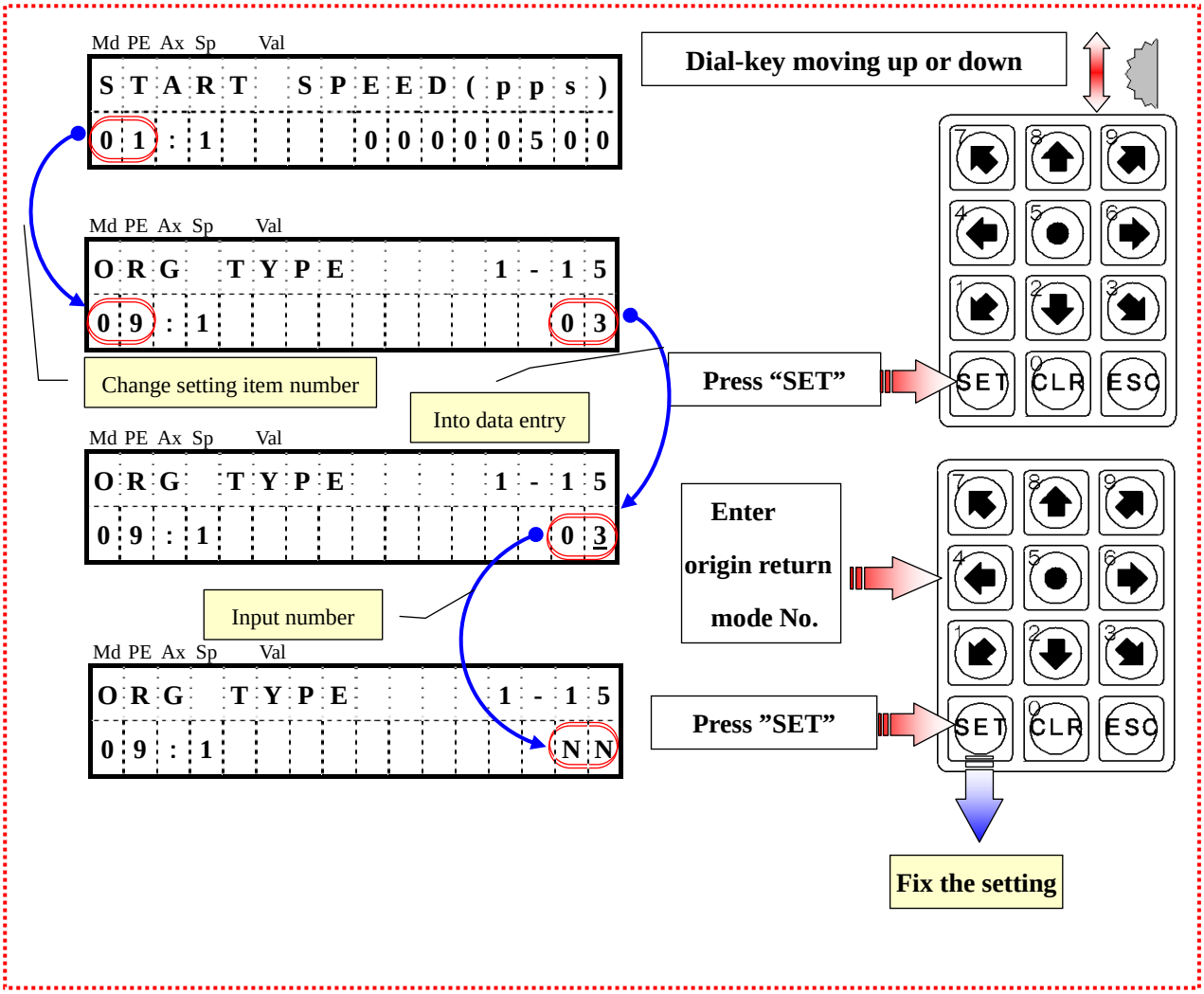
ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Referencing the table below, select the Origin return mode best suited for your application using the keypad

ⅳ) Press "**SET**" button again when finished.

<Origin return mode No.>

No.	Origin return mode	Mode description
1	**Datum + Org**	Return direction is determined and origin is detected with zone sensor.
2	**Datum**	Edge of the zone sensor is set to be the origin position.
3	**Norg + Org**	Origin located in proximity of origin is set to be the origin position.
4	**Norg**	One sensor located in the moving zone is set to be the origin position.
5	**CW Limit + Org**	Origin in proximity of CW limit is set to be the origin position.
6	**CCW Limit + Org**	Origin in proximity of CCW limit is set to be the origin position.
7	**CW Limit**	Edge of CW limit is set to be the origin position.
8	**CCW Limit**	Edge of CCW limit is set to be the origin position.
9	**Org**	Only origin sensor is used.
10	**Now Position**	The present position is set to be the origin position.
11	**CW Limit + Org & Go to Zero**	After returning to the origin position by method 5, and moving to the set position, this position is set to be the origin position.
12	**CCW Limit + Org & Go to Zero**	After returning to the origin position by method 6, and moving to the set position, this position is set to be the origin position.
13	**CW Limit & Go to Zero**	After returning to the origin position by method 7, and moving to the set position, this position is set to be the origin position.
14	**CCW Limit & Go to Zero**	After returning to the origin position by method 8, and moving to the set position, this position is set to be the origin position.


Md PE Ax Sp Val
START SPEED(pps)
01:1 00000500
Md PE Ax Sp Val
ORG TYPE 1-15
09:1 03
Change setting item number
Into data entry
Md PE Ax Sp Val
ORG TYPE 1-15
09:1 03
Input number
Md PE Ax Sp Val
ORG TYPE 1-15
09:1 NN
Dial-key moving up or down
Press "SET"
Enter origin return mode No.
Press "SET"
SET
CLR
ESC
Fix the setting

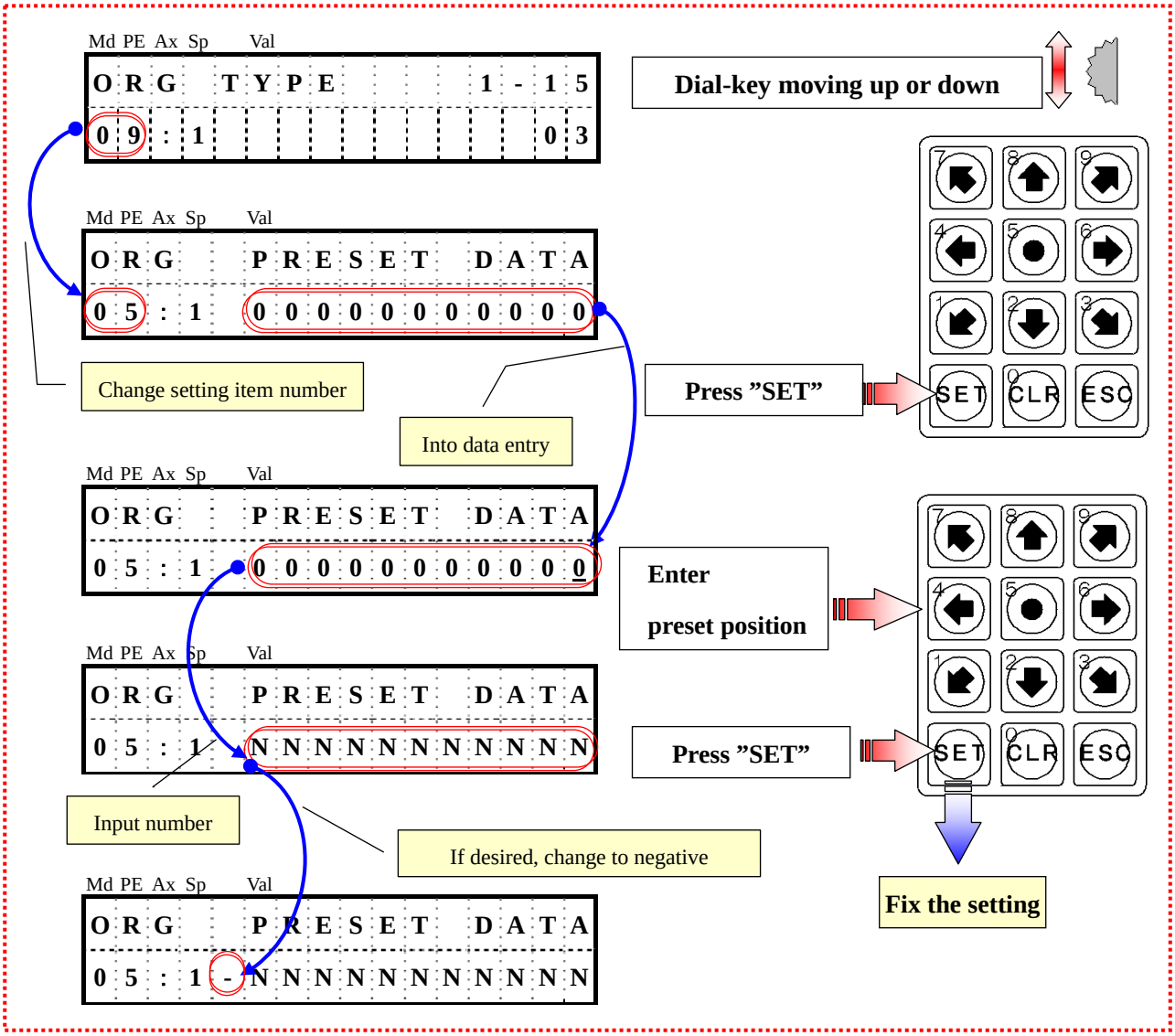
《Setting Preset Position》System Setting Item 5

ⅰ) Change setting item number to **"No.5"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired preset position. Move dial-key down to select a negative (-) number.

ⅳ) Press "**SET**" button again when finished.



4. Converting Pulse Number to Real Distance/Angle

This process allows operator to convert fed pulse into real travel distance/angle. Process must be completed prior to changing display data, explained on pages 50-52.

Caution: The default setting for the number of digits to be displayed is set to (2). Conversion results that exceed two digits will be displayed incorrectly. To increase the number of digits displayed, see page 39 "Setting Number of Displayed Digits".

《Setting Conversion Coefficient》 System Setting Items 10 & 11

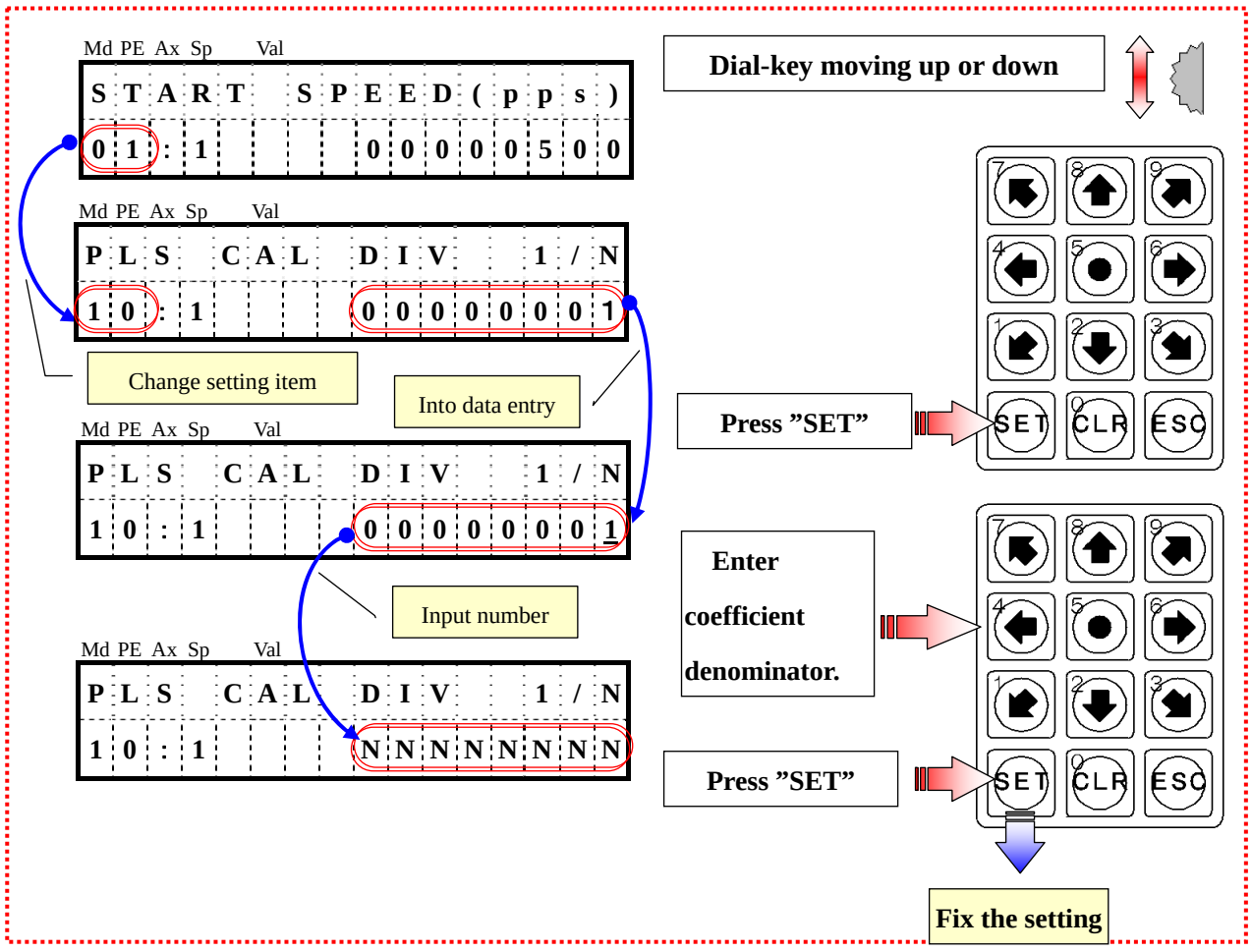
(A) Setting Conversion Coefficient Denominator (System Setting Item 10)

ⅰ) Change setting item number to **"No.10"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired coefficient denominator.

ⅳ) Press "**SET**" button again when finished.



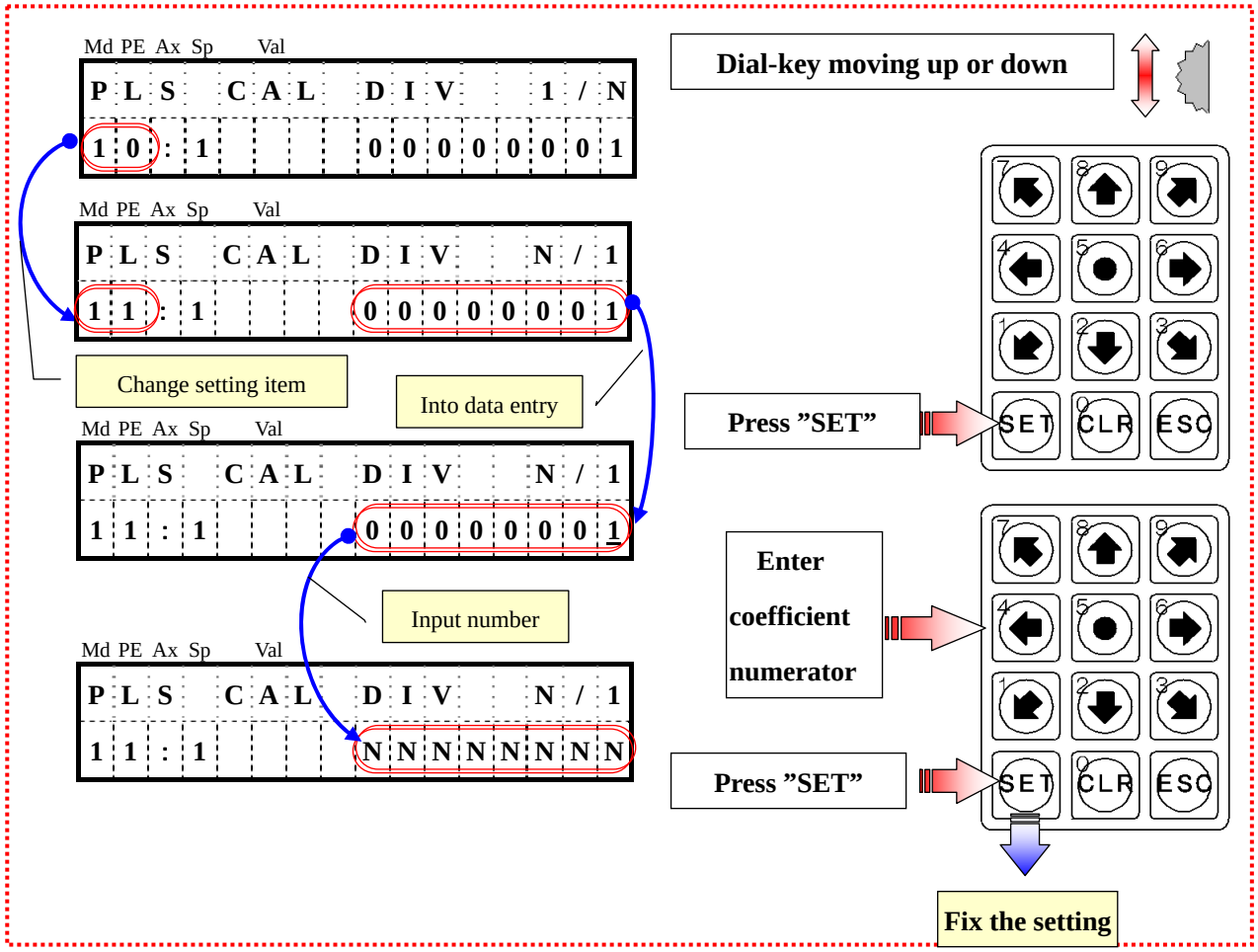
(B) Setting Conversion Coefficient Numerator (System Setting Item 11)

ⅰ) Change setting item number to **"No.11"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired coefficient numerator

ⅳ) Press "**SET**" button again when finished.



Conversion Coefficient

$$\text{Conversion data} = \frac{\text{Numerator of the conversion coefficient}}{\text{Denominator of the conversion coefficient}} \times \text{Pulse number}$$

Once this conversion is complete, you can now format your LCD to display this data. See Section 8, on pages 50-52.

《Setting Number of Digits for Displayed Data》System Setting Item 12

Prior to performing the pulse number conversion explained on pages 37-38, the operator must determine the number of digits that can be displayed on the remote control unit.

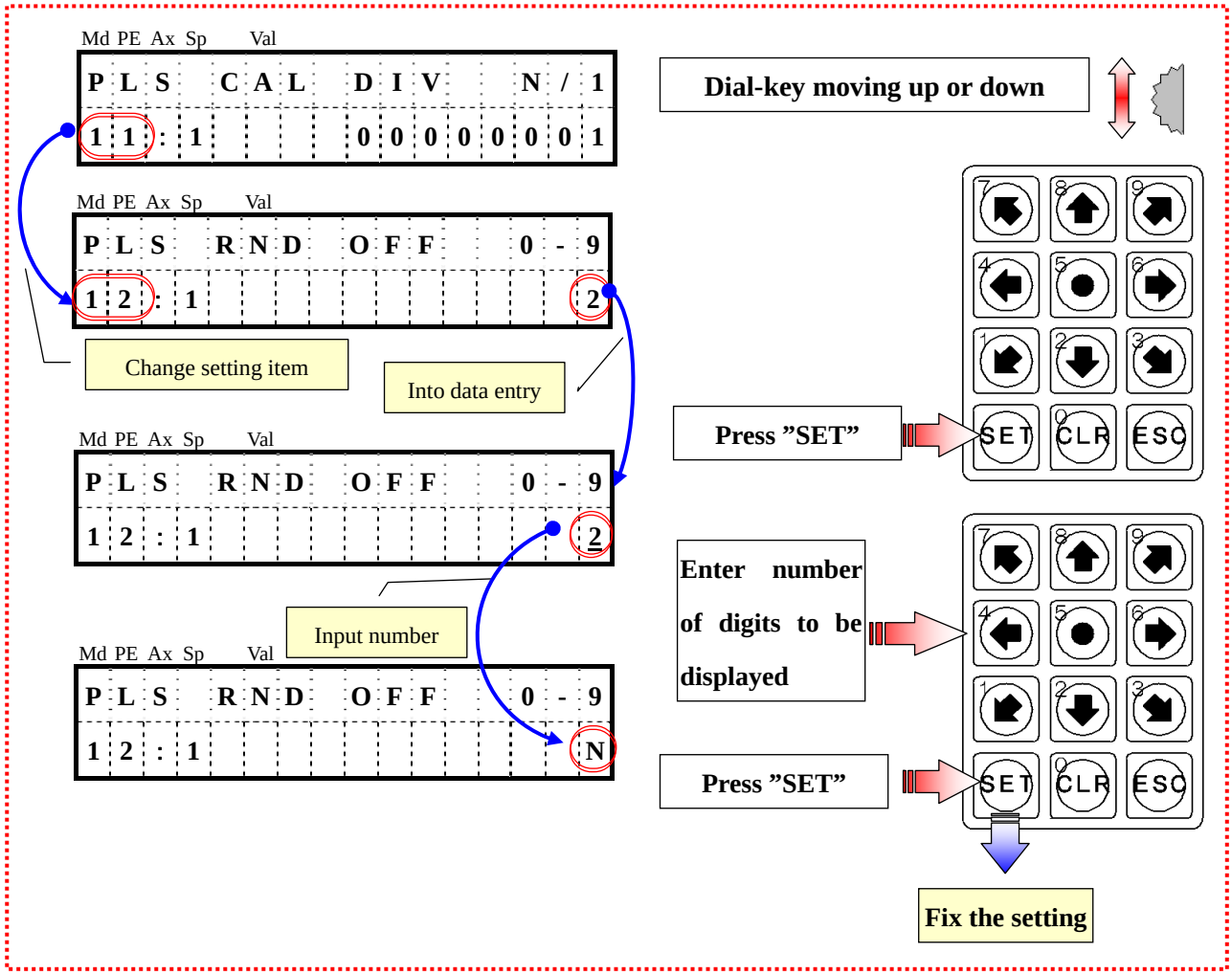
The default setting for the displayed number of digits is set to (2). Conversion results that exceed two digits will be displayed incorrectly. The following steps explain how to increase the displayed number of digits.

ⅰ) Change setting item number to **"No.12"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired number of digits (between 0-9) to be displayed.

ⅳ) Press "**SET**" button again when finished.



5. Converting Encoder Value to Real Distance/Angle

This process allows operator to convert encoder value into real travel distance/angle. Process must be completed prior to changing display data, explained on pages 50-52.

Caution: The default setting for the number of digits to be displayed is set to (2). Conversion results that exceed two digits will be displayed incorrectly. To increase the number of digits displayed, see page 39 "Setting Number of Displayed Digits".

《Setting Conversion Coefficient》 System Setting Items 24 & 25

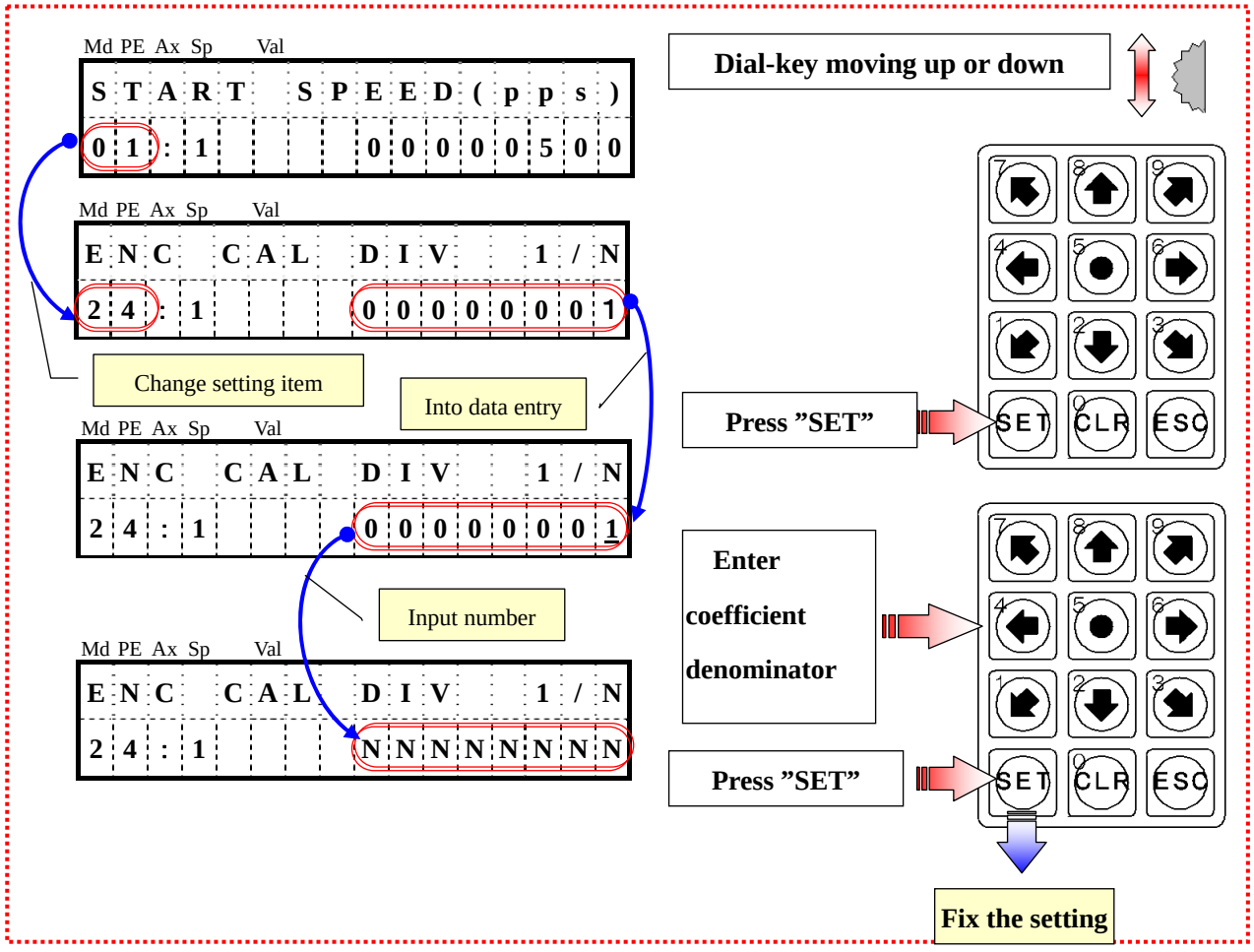
(A) Setting Conversion Coefficient Denominator (System Setting Item 24)

ⅰ) Change setting item number to **"No.24"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired coefficient denominator.

ⅳ) Press "**SET**" button again when finished.



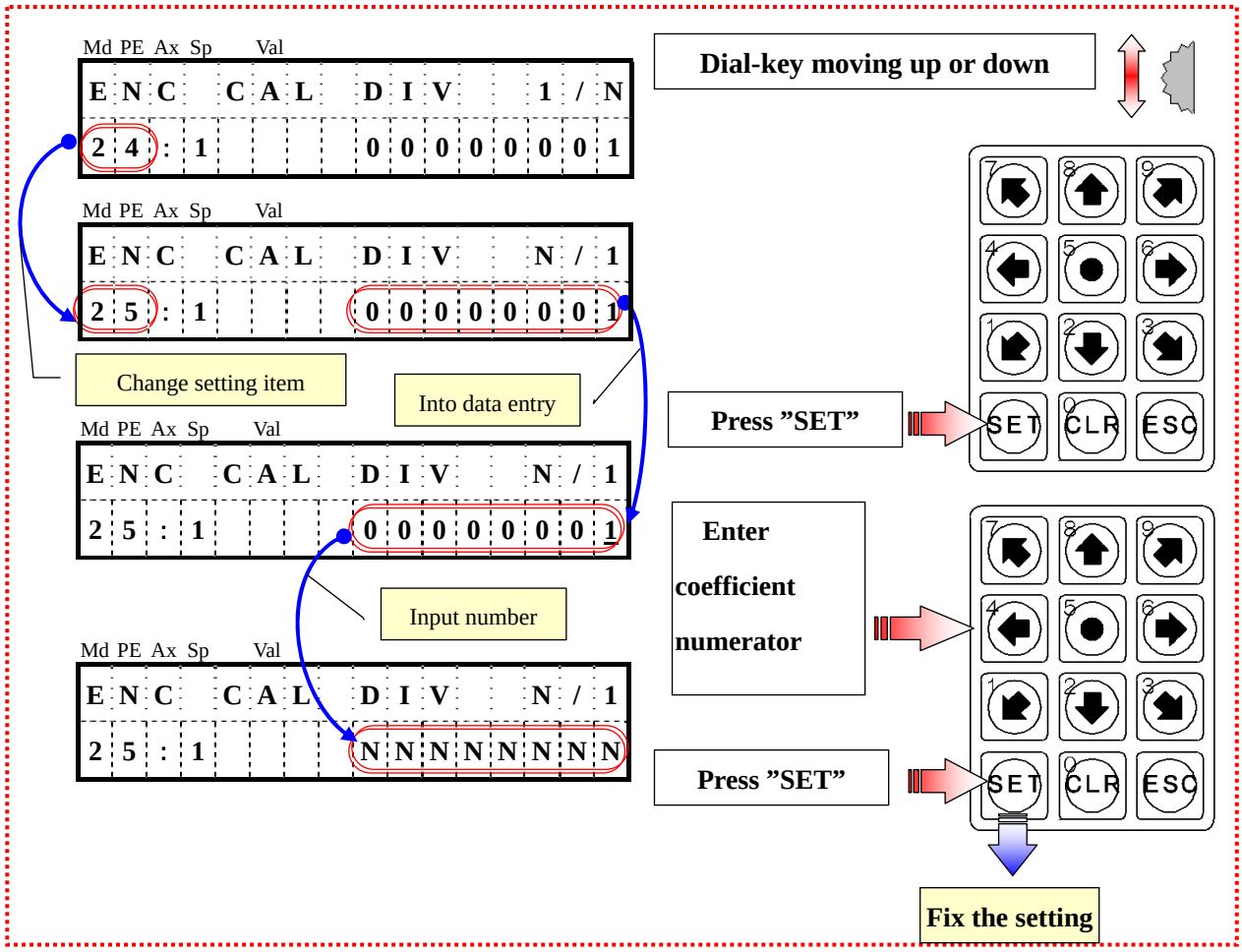
(B) Setting Conversion Coefficient Numerator (System Setting Item 25)

ⅰ) Change setting item number to **"No.25"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired coefficient numerator.

ⅳ) Press "**SET**" button again when finished.



Conversion Coefficient

$$\text{Conversion data} = \frac{\text{Numerator of the conversion coefficient}}{\text{Denominator of the conversion coefficient}} \times \text{Pulse number}$$

Once this conversion is complete, you can now format your LCD to display this data. See Section 8, on pages 50-52.

《Setting Number of Digits for Displayed Data》 System Setting Item 28

Prior to performing the encoder value conversion explained on pages 40-41, the operator must determine the number of digits that can be displayed on the remote control unit.

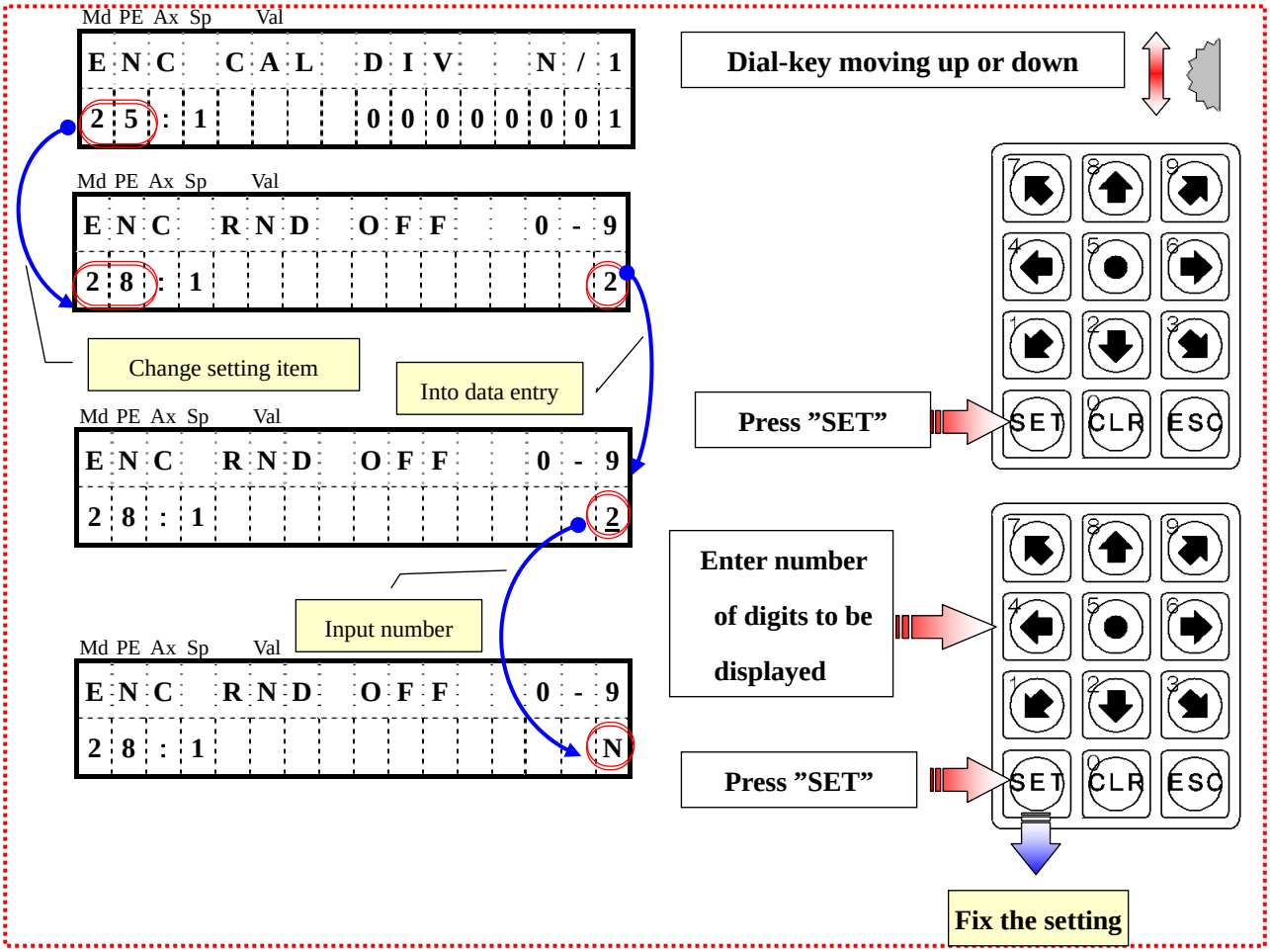
The default setting for the displayed number of digits is set to (2). Conversion results that exceed two digits will be displayed incorrectly. The following steps explain how to increase the displayed number of digits.

ⅰ) Change setting item number to **"No.28"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired number of digits (between 0-9) to be displayed.

ⅳ) Press "**SET**" button again when finished.



《Setting Encoder Pulse Multiplier》System Setting Item 26

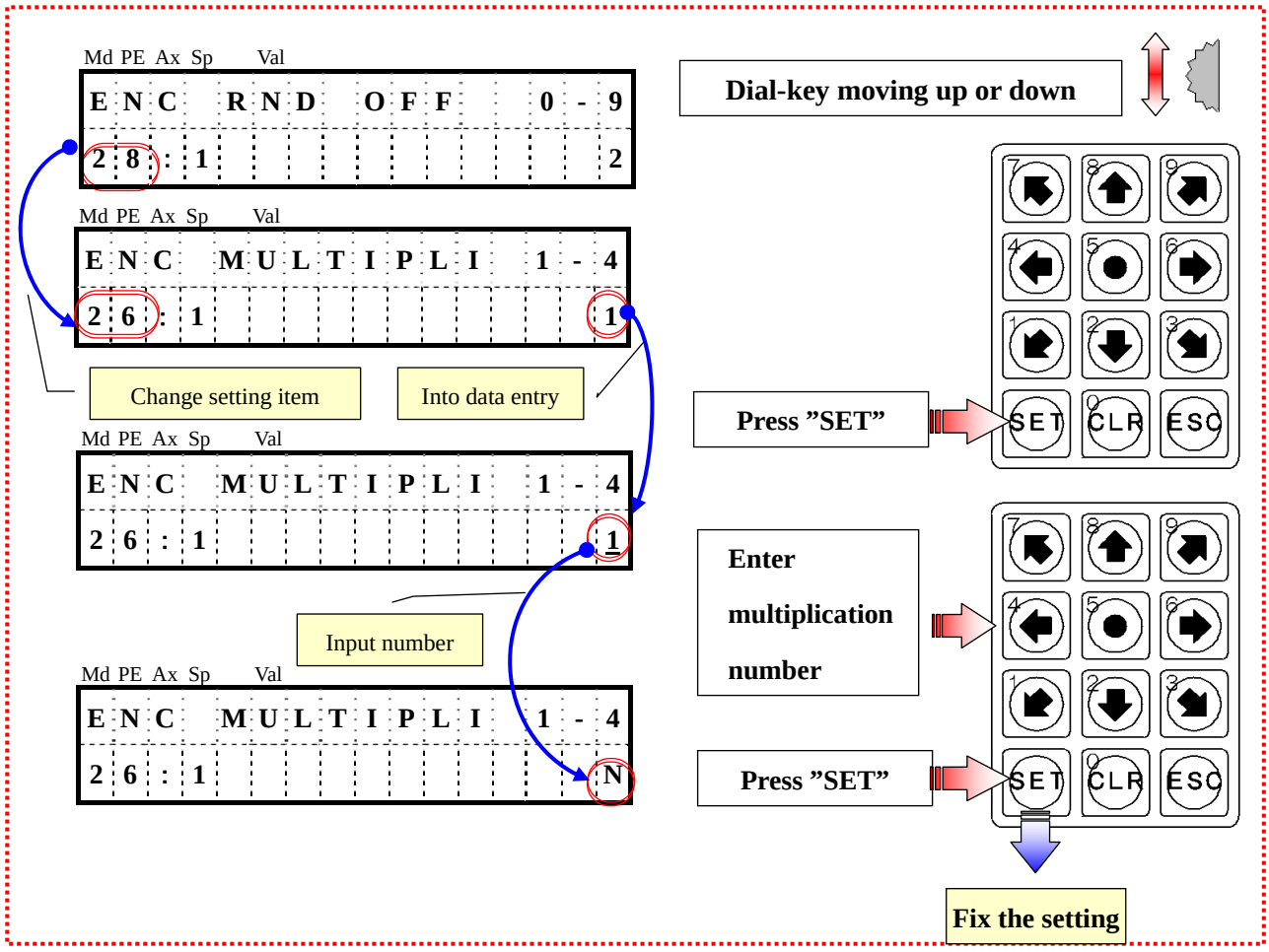
This process allows operator to determine the multiplication of a single pulse, in multiples of 1,2 or 4.

ⅰ) Change setting item number to **"No.26"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Referencing the System Setting Item Code on page 24, enter the desired multiplier number 1,2 or 4 using the keypad.

ⅳ) Press "**SET**" button again when finished.



6. Manually Performing Encoder Correction

《Setting Encoder Correction》 System Setting Item 29

《Caution》

Before setting the Encoder Correction code, be sure the remote is set up to display the same number of digits as set for the pulse conversions. See pages 39 and 42 (System Setting Item Codes 12 & 28) for these steps.

ⅰ) Change setting item number to **"No.29"** at system setting status by moving dial-key up or down.

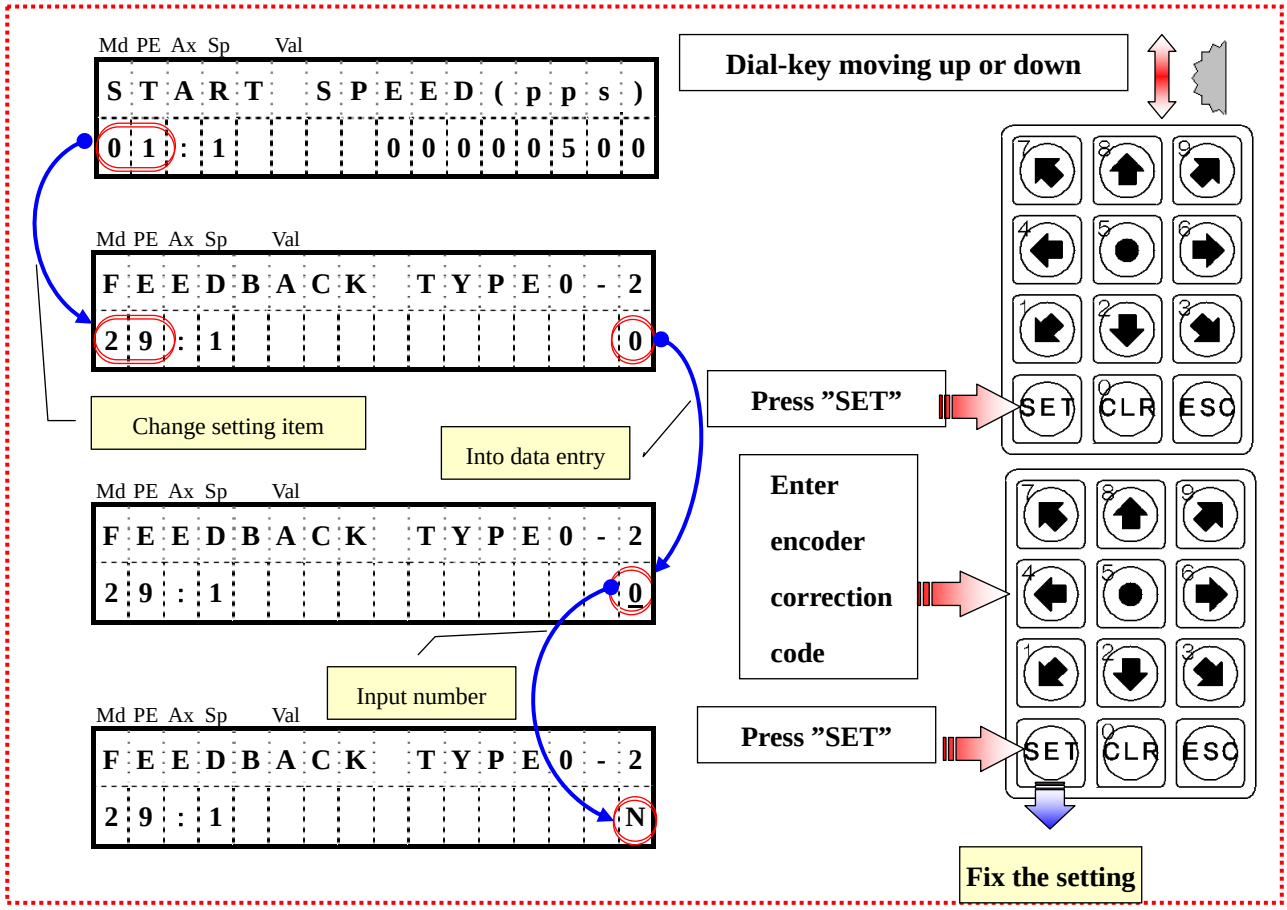
ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Referencing the table below, enter the desired encoder correction code using the keypad.

ⅳ) Press "**SET**" button again when finished.

<Correction Code>

No.	Description of encoder correction
0	Encoder correction is **null**.
1	**Encoder correction** is performed **only once** after moving is ended.
2	**Encoder correction** is **continuously** performed after moving is completed.



《Solutions to Encoder Correction Conditions》 System Setting Items 30, 31, 32

The table below and following pages explain solutions for certain conditions that may arise during the encoder correction process.

Symptom after driving	Solution
The pulse conversion value and encoder conversion value are not the same.	Set the **allowable range** slightly **larger** (see item code 30, below).
Correction does not end for a long time.	Set the **retry numbers** slightly **smaller** (see item code 31, page 46).
Driving distance at one time is too long.	Set the correction completion **standby time** slightly longer (see item code 32, page 47).

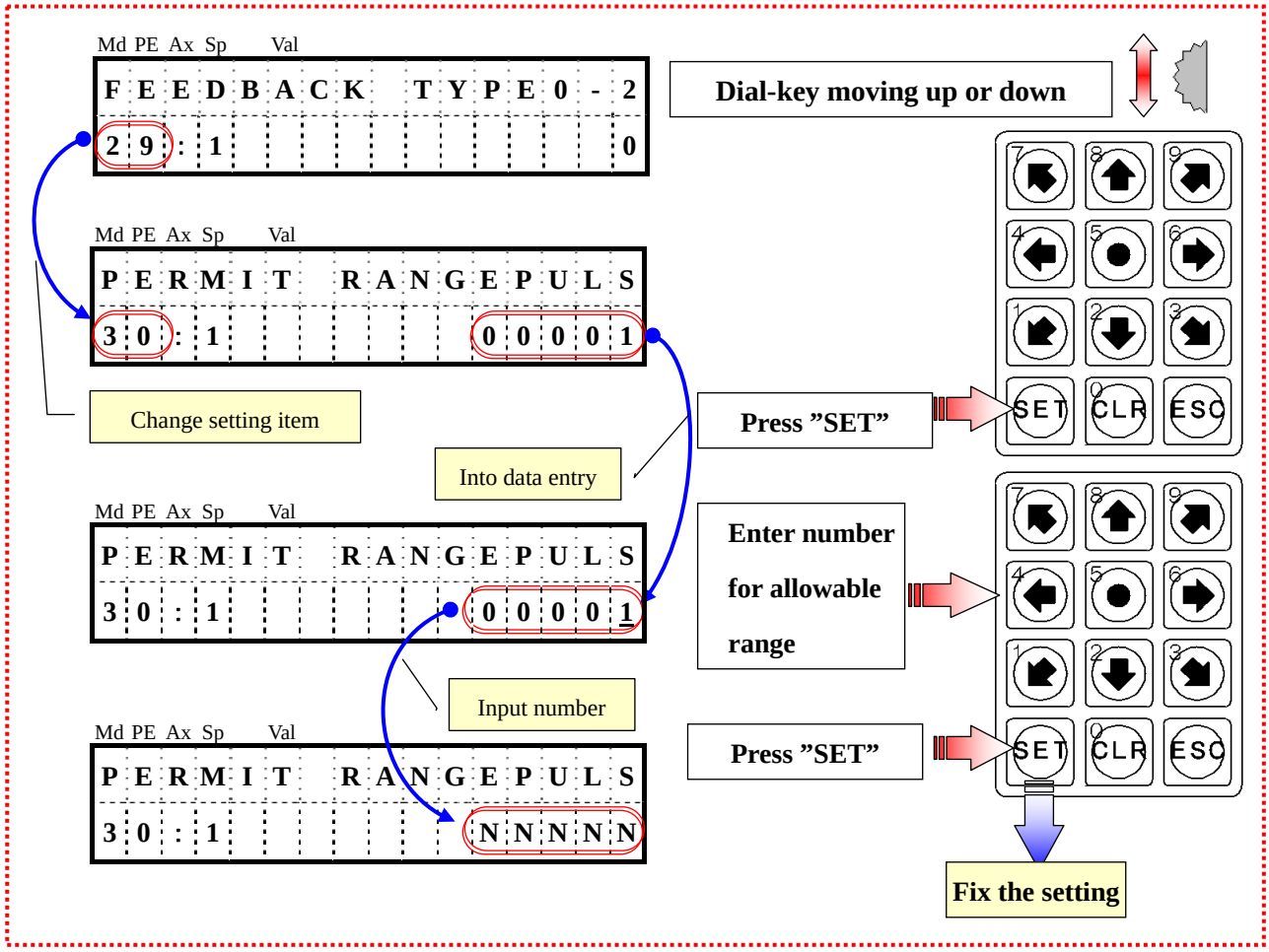
(A) Setting the Allowable Range (System Setting Item 30)

ⅰ) Change setting item number to **"No.30"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the number for allowable range (default is set to 1).

ⅳ) Press "**SET**" button again when finished.



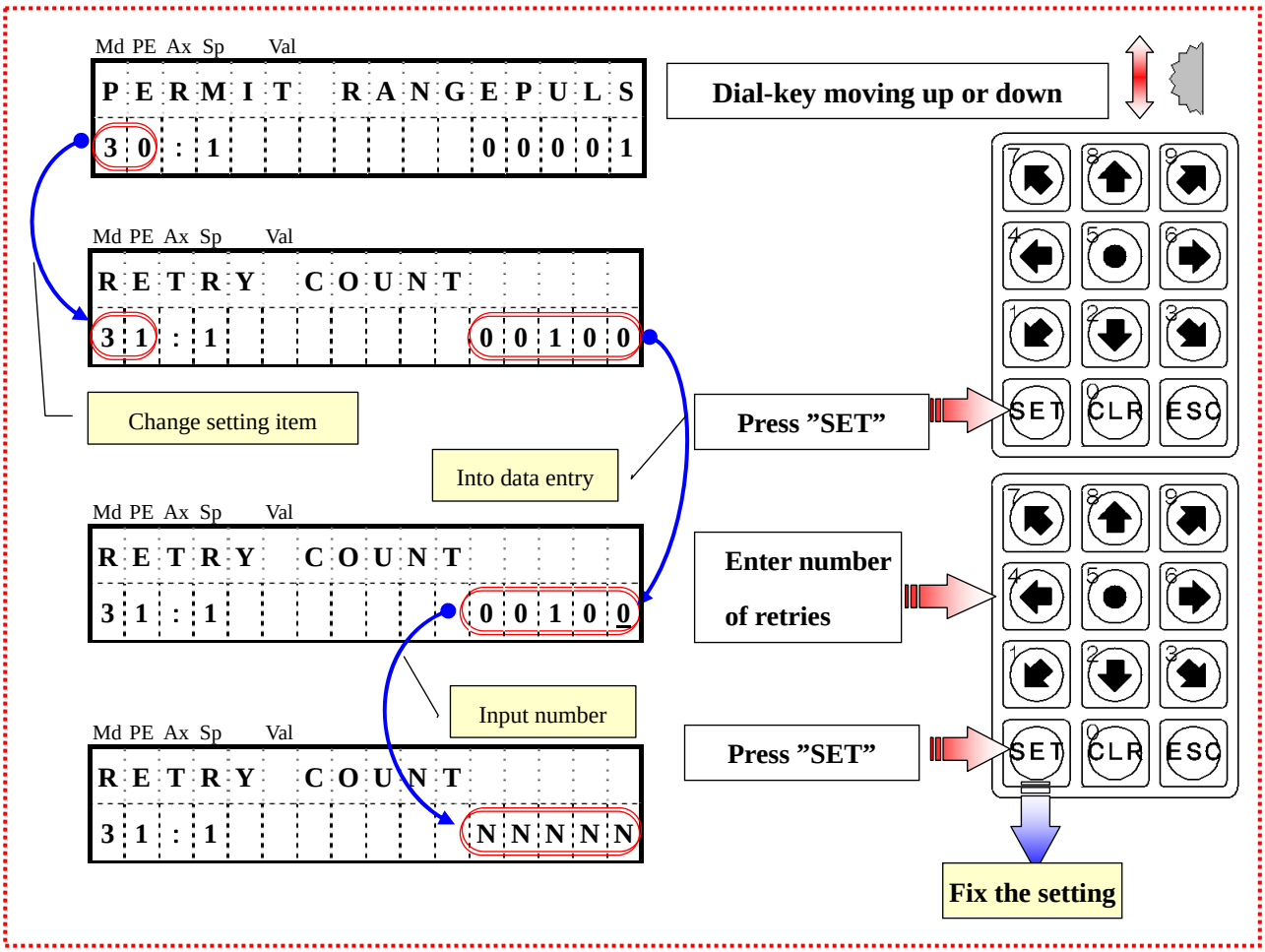
(B) Setting Encoder Correction Number of Retries (System Setting Item 31)

ⅰ) Change setting item number to **"No.31"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired number of retry attempts (default is set to 100).

ⅳ) Press "**SET**" button again when finished.



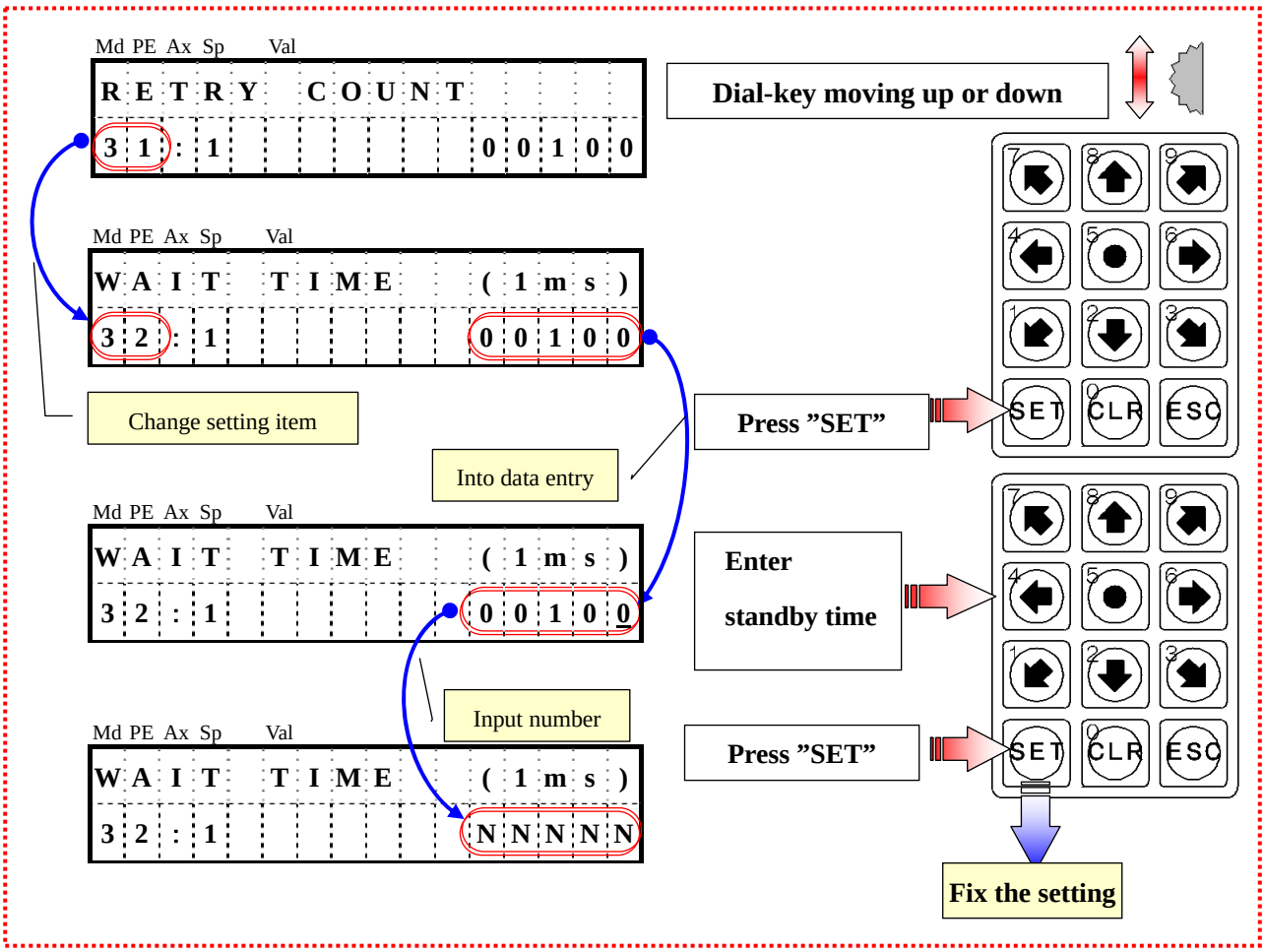
(C) Setting the Standby Time Before Correction (System Setting Item 32)

ⅰ) Change setting item number to **"No.32"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired standby time (default is set to 100ms)

ⅳ) Press "**SET**" button again when finished.



7. Manually Performing Backlash Correction

《Setting Backlash Correction Command》System Setting Item 8

ⅰ) Change setting item number to **"No.8"** at system setting status by moving dial-key up or down.

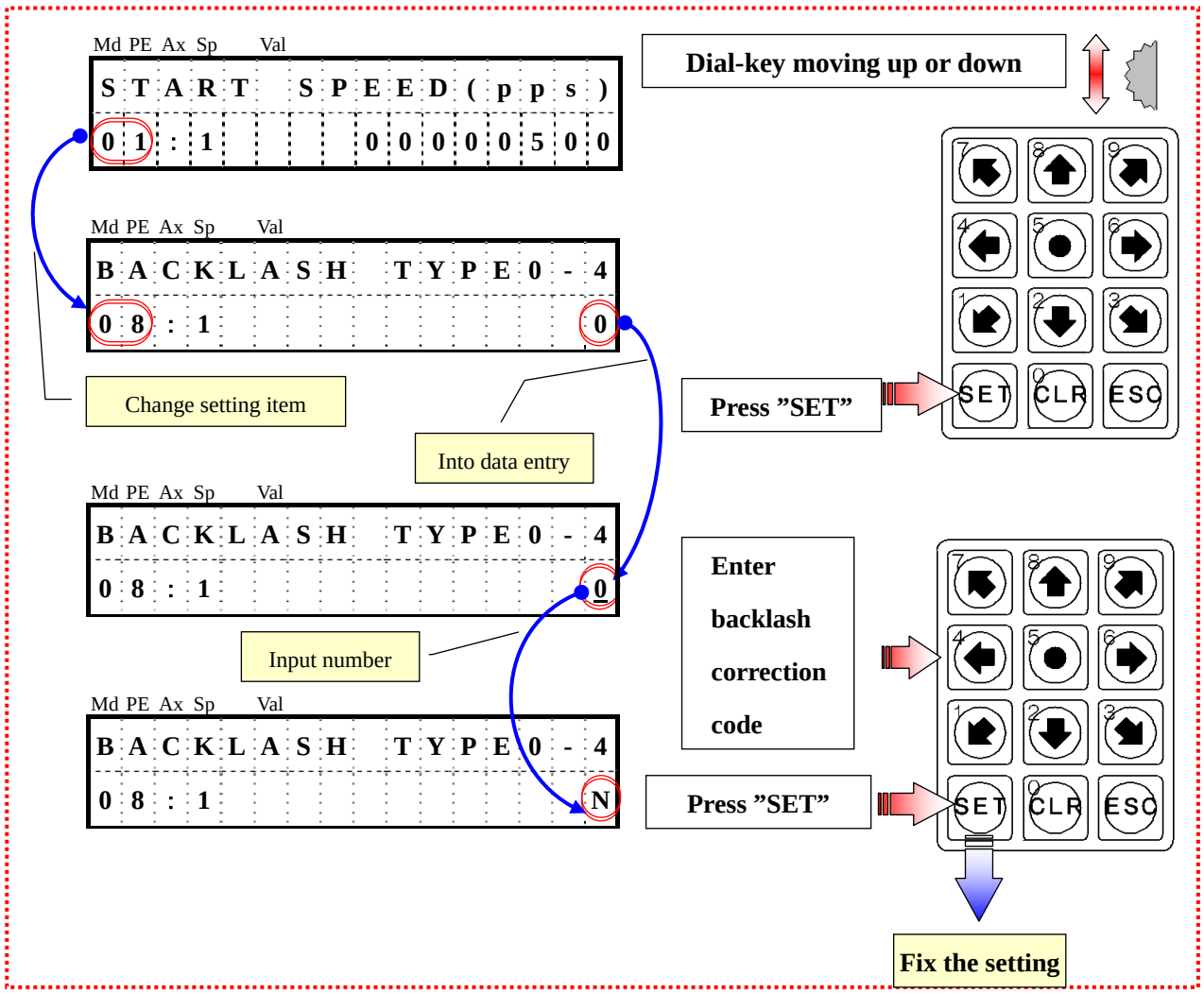
ⅱ) Press "**SET**" button to access into **data entry screen**.

ⅲ) Referring to the table below, enter the desired **backlash correction code** using the keypad (default is set to 0)

ⅳ) Press "**SET**" button again when finished.

<Backlash correction commands>

No.	Description of backlash correction
0	The backlash correction is **null**.
1	When reversing from CW to CCW direction, **reciprocating movements** are performed by the **correction pulse numbers before moving**.
2	When reversing from CCW to CW direction, **reciprocating movements** are performed by the **correction pulse numbers before moving**.
3	In CCW direction, **reciprocating movements** are performed by the **correction pulse numbers after moving is ended**.
4	In CW direction, **reciprocating movements** are performed by the **correction pulse numbers after moving is ended**.



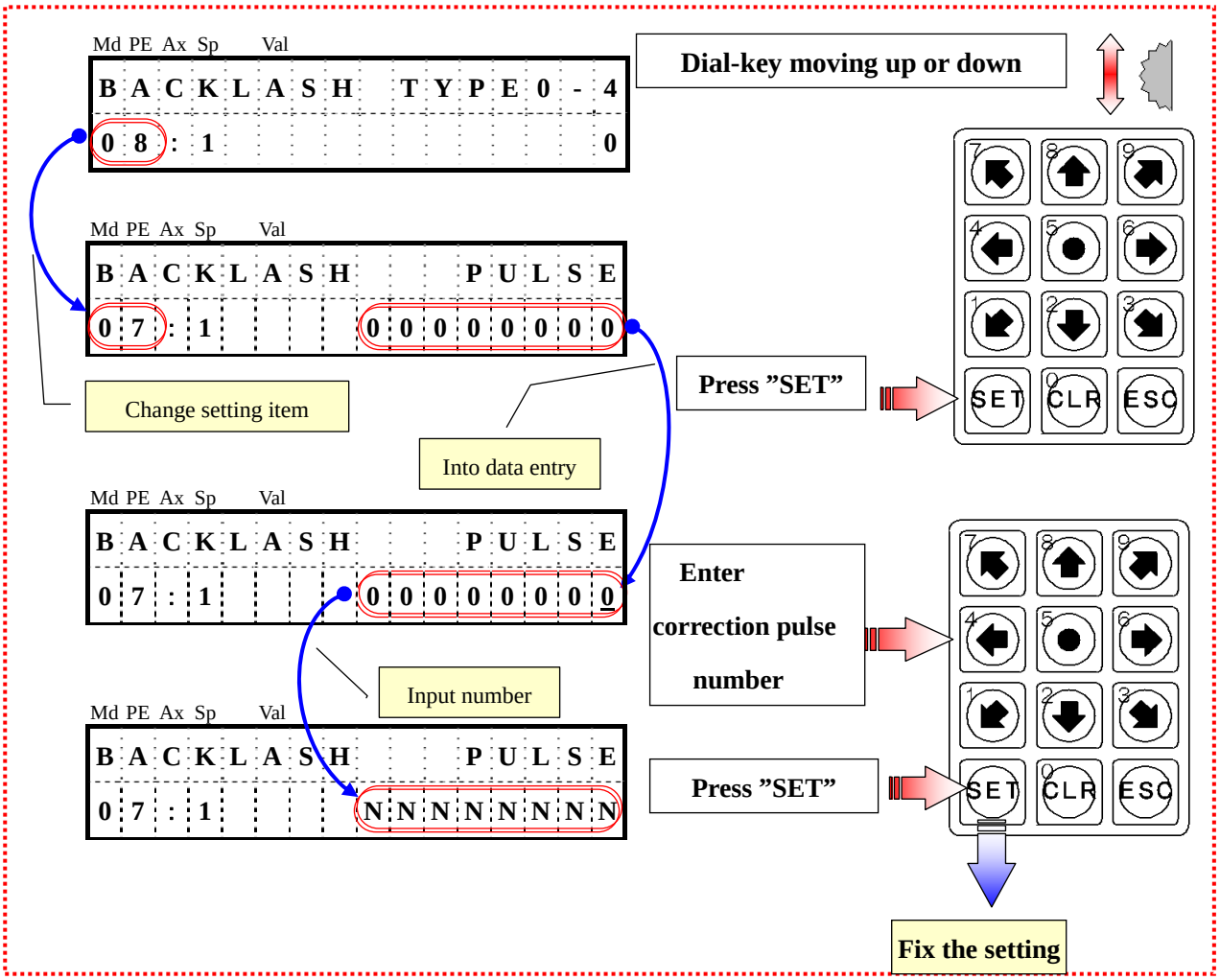
《Setting Number of Pulses for Backlash Correction》 System Setting Item 7

ⅰ) Change setting item number to **"No.7"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired correction pulse number (default is set to 0).

ⅳ) Press "**SET**" button again when finished.



8. Changing How Data is Displayed on LCD

《Changing First Data Line》 System Setting Items 37 & 38

This process allows the operator to change how the data is displayed on the LCD unit.

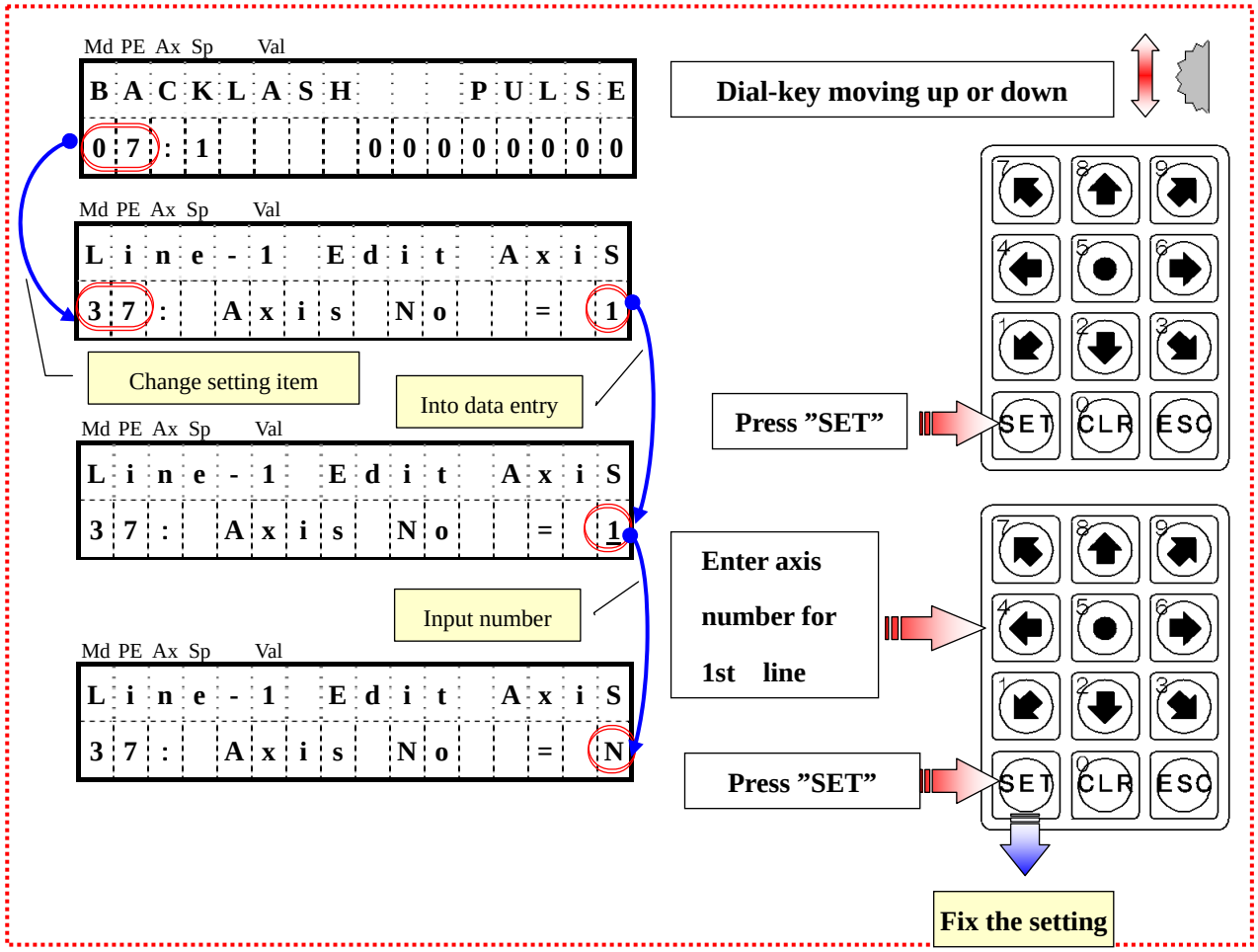
(A) Displaying Axis No. on lst Line (System Setting Item 37)

ⅰ) Change setting item number to **"No.37"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the axis number to appear on the first line.

ⅳ) Press "**SET**" button again when finished.



(B) Displaying Conversion Data on lst Line. (System Setting Item 38)

Before proceeding, be sure Steps 4 & 5 on pages 37 & 40 are completed. Otherwise data will not display correctly.

ⅰ) Change setting item number to **"No.38"** at system setting status by moving dial-key up or down.

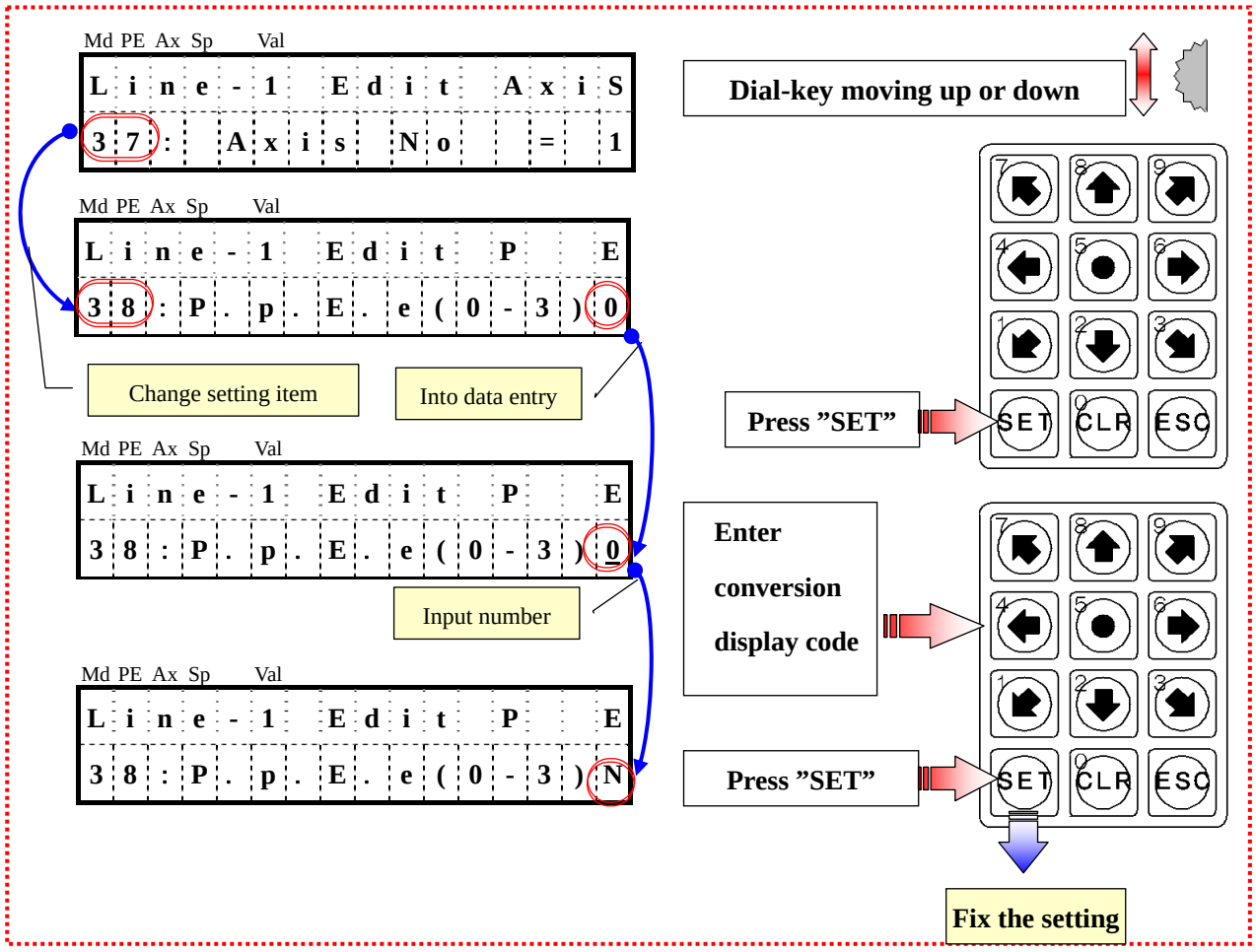
ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Referring to the table below, enter the desired conversion display code using the keypad.

ⅳ) Press "**SET**" button again when finished.

<Setting of conversion display>

No.	Description of conversion display number	Conversion display at drive mode
0	Pulse conversion display is **not performed**	**P**
1	Pulse conversion display is **performed**	**p**
2	Encoder conversion display is **not performed**	**E**
3	Encoder conversion display is **performed**	**e**



《Changing Second Data Line》(System Setting Items 39 & 40)

(A) Displaying Axis No. on 2nd Line (System Setting Item 39)

- Change System Setting item number to **"No.39"** at system setting status screen by moving the dial-key up or down..
- Repeat steps ii - iv, as explained on page 50.

(B) Displaying Conversion Data on 2nd Line (System Setting Item 40)

- Change System Setting item number to **"No.40"** at system setting status screen by moving the dial-key up or down..
- Repeat steps ii - iv, as explained on page 51.

9. Manually Setting Pulse Number in Scan Drive Operation

《Setting Number of Pulses in SCN Mode… Scan Drive Operation》 System Setting Item 43

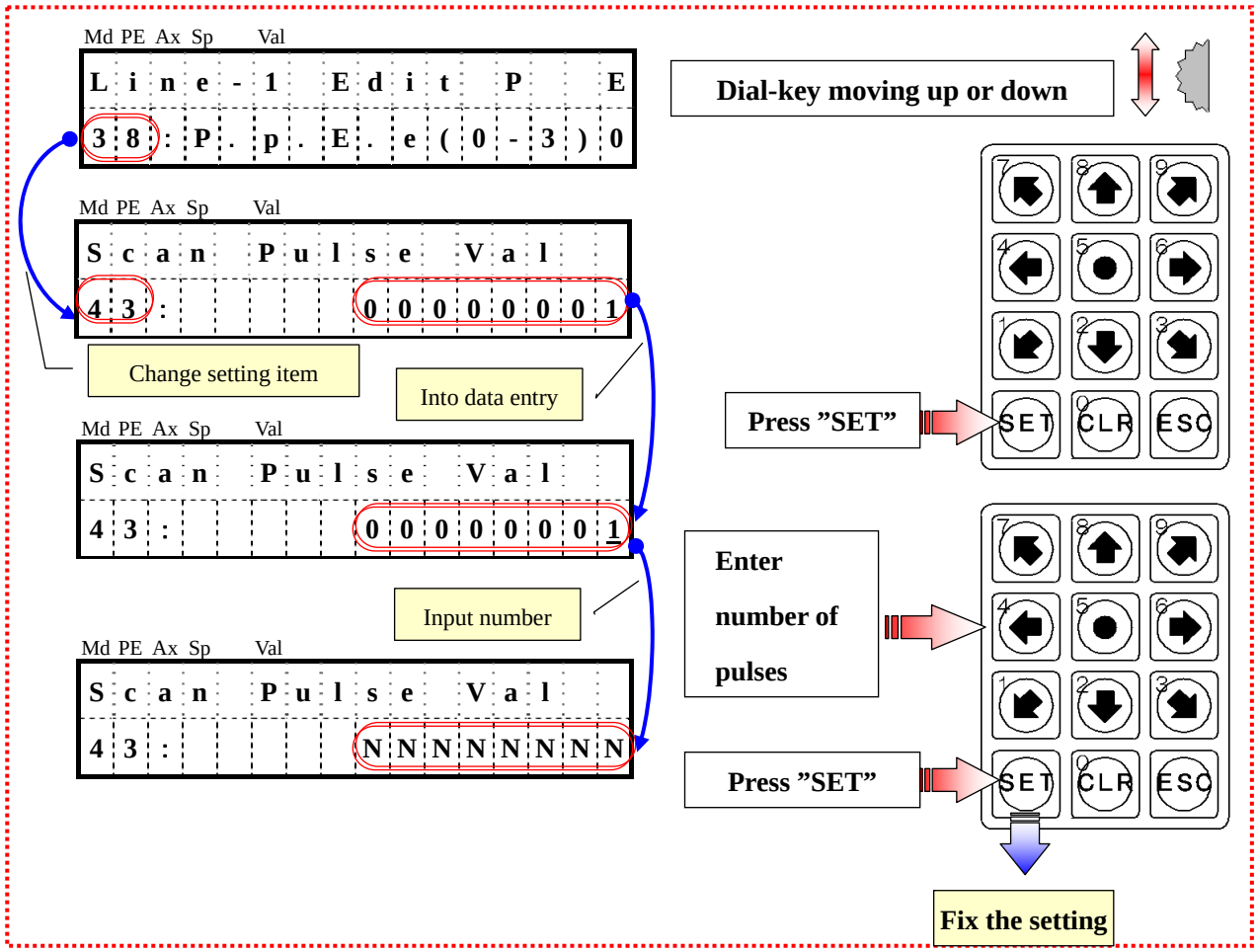
This process allows operator to run a set number of pulses during the scan drive operation at the push of a single button…keypad #5 . See page 8 for additional instructions.

ⅰ) Change setting item number to **"No.43"** at system setting status by moving dial-key up or down.

ⅱ) Press "**SET**" button to access **data entry screen**.

ⅲ) Using the keypad, enter the desired number of pulses to be performed during the scan drive operation.

ⅳ) Press "**SET**" button again when finished.



《MEMO》