NIKKI AC SERVO CONTROLLER
N E X S R T

N C S － FI3 TYPE
N C S － FS3 TYPE
N C S R － FI3 TYPE
N C S R － FS3 TYPE

＜ VOLUME:DEDICATED FUNCTION＞

INSTRUCTION MANUAL
Ver. 1. 21

NIKKI DENSO CO.,LTD.

Manual No. TIE-12420C

❗ Compulsion

① Store units in a place of no sun-shine but controlled temperature / humidity within specified range.
② If storage term became quite long, please consult purchased or nearest sales office before using them.

【Transportation】

⚠Caution

① Do not hold a cable and a motor shaft during transporting units.
『Injury or failure may occur.』

❗ Compulsion

① Comply with proper suggestion and avoid excess amount transportation which may break the whole package.

【Installation】

⚠Caution

① Do not climb or put any heavy thing on this unit.
『Injury or failure may occur.』
② Do not disturb or choke intake / outlet air holes with foreign thing.
『Fire may occur.』
③ Use specified direction for installation.
『Fire or failure may occur.』
④ Keep specified distance between this unit and control panel inside or other equipment.
『Fire or failure may occur.』
⑤ Never apply heavy shock to this unit.
『This unit may be damaged.』
⑥ Conduct proper attachment suitable for the output or weight of this unit.
『This unit may be damaged.』
⑦ Attach this unit to non-flammable thing as metal.
『Fire may occur.』

【Wiring】

⚠Caution

① Be sure to conduct correct wiring.
『Running away, burning of a motor, injury or fire may occur.』
② To prevent this unit from noise influence, use specified length treated (shielded / twisted, etc.) cables.
『Running away of a motor, injury or machine damage may occur.』
③ To prevent this unit (NC servo controller) from noise influence, use separate control I/O cables of the unit from other power cables.
『Running away of a motor, injury or machine damage may occur.』
④ To avoid electric shock and noise influence, be sure to make proper grounding (earthing).
『Running away of a motor, electric shock, injury or machine damage may occur.』

Cautions for Safety

Before conducting installation, running, maintenance, and inspection, please deeply understand this manual, and all associated manuals / materials as well as the knowledge of all the applied equipment and information for safety and then use this unit properly.

In this manual, cautions for safety are ranked as 『Danger』 and 『Caution』.
And cautions for handling are divided into 『Prohibition』 and 『Compulsion』 which are defined (Action not to be done) and (Action to be done.), respectively.

⚠Danger : If mis-handling is made, dangerous situation as death or serious injury could occur.

⚠Caution : If mis-handling is made, dangerous situation as medium or light injury and mechanical damage could occur.

However, (Caution) marked item could cause serious results depending on the actual situation. Since both of the above description include important contents, please be sure to follow them.

Prohibition : Prohibited action

If this caution is ignored, this unit does not perform properly.

Compulsion : Compulsory action

If this is ignored, this unit does not perform properly.

【Operation・Run】

⚠Caution

① There is no applicable protection to motors. For the protection, over-current protector, earth leakage breaker, over-heat protector, and emergency stop device shall be provided.
『Injury or fire may occur.』

② Confirm that power source specification is correct.
『Injury, fire or machine damage may occur.』

③ At test run, fix a motor to a place separating from its machine system and confirm the motion, then connect the motor to the machine.
『Injury or machine damage may occur.』

④ Since the brake is only for holding machine position, do not use it for safety system of your machine.
『Injury or machine damage may occur.』

⑤ Since excess adjustment change may cause this unit unstable, avoid this situation.
『Injury or machine damage may occur.』

⑥ When an alarm occurs, eliminate the cause, reset the alarm and then resume this unit.
『Injury or machine damage may occur.』

⑦ When power recovers from black out status, since sudden restart may occur, do not approach the machine.
(Machine system design shall be considered to maintain safety of workers against the restart.)
『Injury may occur.』

⃠ Prohibition

① Do not apply power in the motor turning or vibrating status.
『Running away of a motor, injury or machine damage may occur.』

② Since the brake installed on a motor is only for holding, do not use it for actual braking.

❗ Compulsion

① Provide external shut down circuit in order to stop running and shut the power off, immediately.

【Maintenance・Inspection】

⚠Caution

① Capacity of condensers in the power line will be deteriorated.
To prevent secondary damage caused by condenser failure, we recommend to replace them for about every 5 years.
『Failure may occur.』

② Cooling efficiency of a cooling motor will be deteriorated as time going.
To prevent secondary damage caused by condenser failure, we recommend to replace them for about every 5 years.
『Failure may occur.』

⃠ Prohibition

① Overhaul / repair shall be conducted only by us or suggested shop.

【Cautions when using unit】

⚠Danger

☆ Since electric shock and injury may occur, please comply with the following suggestions.

① Never touch inside of this unit (NC servo controller) and terminal blocks.
『Electric shock may occur.』

② Be sure to make grounding of an earth terminal or lead wire of this unit (NC servo controller).
Use larger earth cables for JIS Class 3 or better grounding.
『Electric shock may occur.』

③ Transportation, wiring, maintenance, and inspection shall be conducted stipulated time after confirming complete lit off condition of front panel display, by power off.
『Electric shock may occur.』

④ Do not damage, force excessively, put on heavy thing, or nip cables.
『Electric shock may occur.』

⑤ Never touch rotating section of a running motor.
『Injury may occur.』

⚠Caution

① Use specified motor and this unit (NC servo controller).
『Fire or failure may occur.』

② Never use in the atmosphere such as water splash, corrosive or low flashing point gas and near flammable things.
『Fire or failure may occur.』

③ Since temperature of a motor, this unit (NC servo controller), and peripherals raises quite high, do not touch them.
『Burn of a worker may occur.』

④ In supplying power, or for a while after shutting power off, since a radiator, a regenerative unit, a motor etc. could be very hot, do not touch them.
『Burn of a worker may occur.』

【Receiving and checking of packages】

⚠Caution

① When you receive ordered units, please check contents. if wrong thing is found or quantity is wrong, please do not use them and inform the status to our sales man.
『Electric shock, injury, damage or failure may occur.』

② If packages of our products are broken, do not un-pack them and inform the fact to our sales man.
『Electric shock, injury, damage or failure may occur.』

【Storage】

⃠ Prohibition

① Do not store units in a place of raining, water dripping, and harmful gas /liquid.

Contents

Chapter 1 Outline

1－1 Feature

NCS-FI/FS 3 and NCSR-FI/FS (Hereafter, this unit or controller is used.) is corresponding to the following 2 types which function and operation are identical.
NCS/NCSR-FI 3 type : AC servo controller for induction AC servo motor
NCS/NCSR-FS 3 type : AC servo controller for synchronous AC servo motor

<NCSR－FI／FS series>This driver works as AC servo controller in motor run, and as electric regenerative energy unit in regenerative status. When a servomotor runs as a generator at braking,
this driver can return 90 % of the generated energy to a power company.
In the other words, this works as a dual servo driver and saves energy

1－1－1 NCS-FI/FS type

<NEXSRT NCS-FI/FS 3 and NCSR-FI/FS type> is an integrated 『NC servo controller』 consists of AC servo driver and 1 axis positioning unit for general purpose and multiple functions. This unit has several following features suitable for positioning control of various industrial machines.

【NCS-FI/FS type features】

① By combining 1 axis positioning unit with AC servo driver, less wiring system and compact size were realized.

② Full digital control achieved less temperature drift, fine adjustment, strengthened Man-machine interface, etc., seeking for better reliability and easier operation.

③ The custom made LCD module supports each Monitoring, Alarm history record, Self-diagnostic function, etc.. And reliability and maintenance method are improved.

④ Many custom made LSIs and less wiring structure improved reliability and realized compact size of this unit.

⑤ Adoption of IPM (IGBT) in the power switching section, improved servo performance and lowered noise.

⑥ Either Positioning run, or Pulse train run mode can be selected for wide range of application requirements.

⑦ Program run by internally stored data (280 points) can be conducted.

⑧ External trigger positioning can be conducted.

⑨ Position data and speed data can be set by Index data.

⑩ Control such as Linear / S shape curve Accel./ Decel., Feed-forward, Torque command filter, gain change at stop status or Decel., R2 compensation, Non-coherence control, etc. can be conducted by advanced software servo suitable for machine rigidity.

⑪ By setting a parameter, one unit can be available for various AC servo motor types.

⑫ By setting a parameter, "full closed loop control" by feedback pulses using measuring encoder output can be conducted.

⑬ Through Serial communication, peripheral as a touch panel, main computer, MDI, servo display, etc. can be interfaced.

⑭ Zero return is not necessary by using an optional absolute encoder.

⑮ Auto. tuning function

⑯ Torque control and Speed control can be conducted by commands.

⑰ Pulse train run of max. 10 axes synchronized to a command value can be conducted.

⑱ Either induction servo motor or synchronous servo motor can be controlled by same operation.

【NCS-FI/FS 3 and NCSR-FI/FS 3 types】

NCS-FI/FS 30 andNCSR-FI/FS 30
It controls with internally stored data by commands from a main controller.
I/O points 「Input : 28 points output : 8 points」

NCS-FI/FS 31 and NCSR-FI/FS 31
It controls with internally stored data by commands from a main controller.
I/O points 「Input : 37 points output : 18 points」

NCS-FI/FS 32 and NCSR-FI/FS32
: It controls with internally stored data controlled by remote sequence.

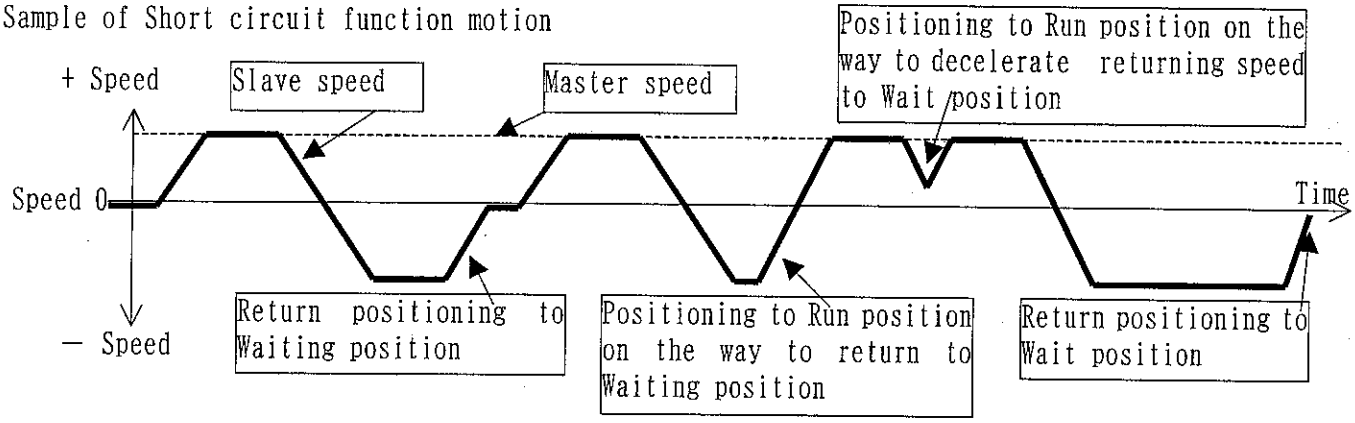
NCS-FI/FS 33 and NCSR-FI/FS33
: It controls with Remote sequence control
combination of NCS-FI/FS13 and a remote I/O unit, max. 15 units can be connected.

NCS-FI/FS 34 and NCSR-FI/FS34
: It controls with Remote sequence control

1-1-2 Short circuit Outline

This manual is a production specification sheets of NCS-F3E unit (Hereunder, this unit is used.) NCS-FS3 (Hereunder, standard unit is used.) to which Short cut function is added is this type.
In BRS command (Reciprocating run positioning, single) motion, if Positioning to Run position is required on the way to return to Wait position, Short cut function cancels return motion to Wait position and conducts Positioning to Run position.

Sample of Short circuit function motion



In order to utilize the short cut function easily, the next functions are added.
① When a cut position (Run positioning position) is near the end of slave motion, a signal is outputted. By the signal, a master controller can stop a work line or lower speed so that Run positioning can be continued in slave motion movable range.
② When BRS command resumes after once BRS command is completed, Run positioning can be continued.

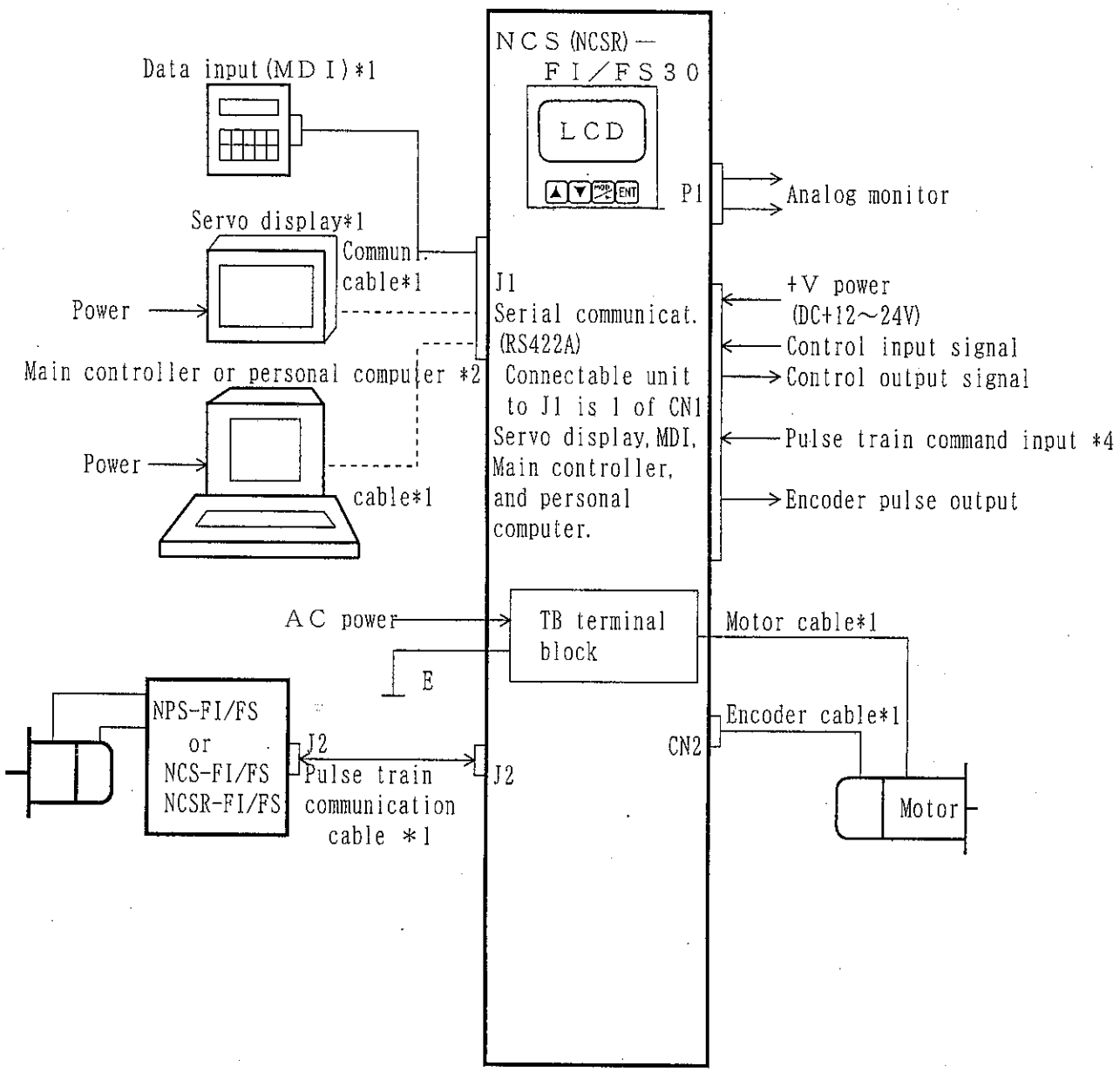
Type display of this unit in LCD section in Diagnosis display mode is as follows.
[FS 3 m E] : For synchronous motor types
[FI 3 m E] : For induction motor types

Contents not described in this book, please refer to the instruction manual [NCS-F3].

1－2　System configuration

1－2－1　NCS-FI/FS30 NCSR-FI/FS30　type

Peripheral system configuration of NCS-FI/FS 30, NCSR-FI/FS 30 unit is as [Fig. 1－1].



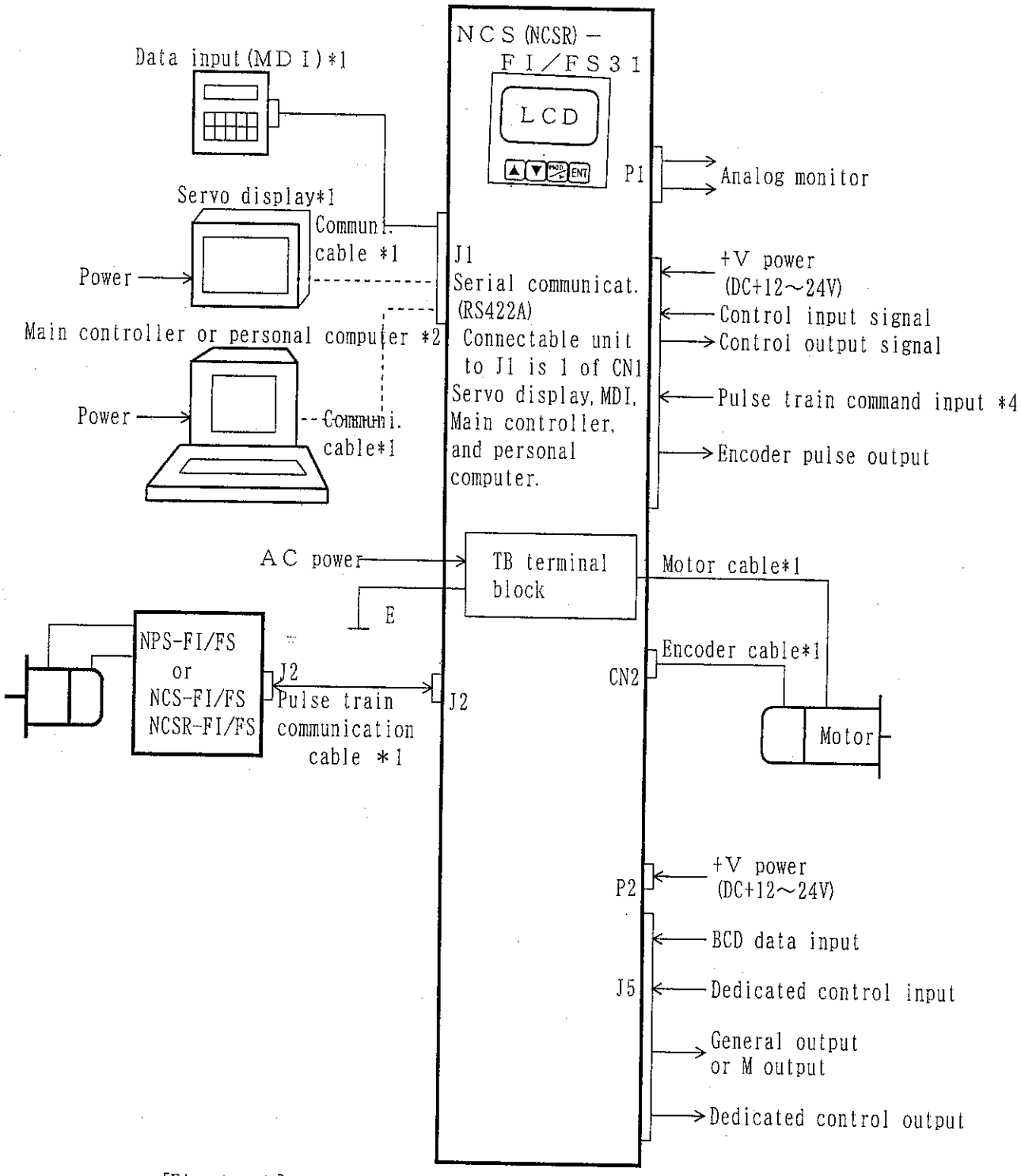
[Fig. 1－1]　NCS-FI/FS30, NCSR-FI/FS30 type system configuration

※ Caution 1 : Our optional unit is available for the item with *1 mark.
Please use an unit on the general market for the item with *2 mark.
NPS (NPSR) -FI/FS with *3 mark is a controller for Speed control, Torque control, and Pulse train control.
The item with mark *4 can be changed to feedback pulse input from a measuring encoder by parameter setting which enables full closed loop control.

※ Caution 2 : Our optional "Data edit software for a personal computer" can be available.

1－2－2　NCS-FI/FS31 NCSR-FI/FS 31type

Peripheral system configuration of NCS-FI/FS 31, NCSR-FI/FS 31 unit is as [Fig. 1－2].



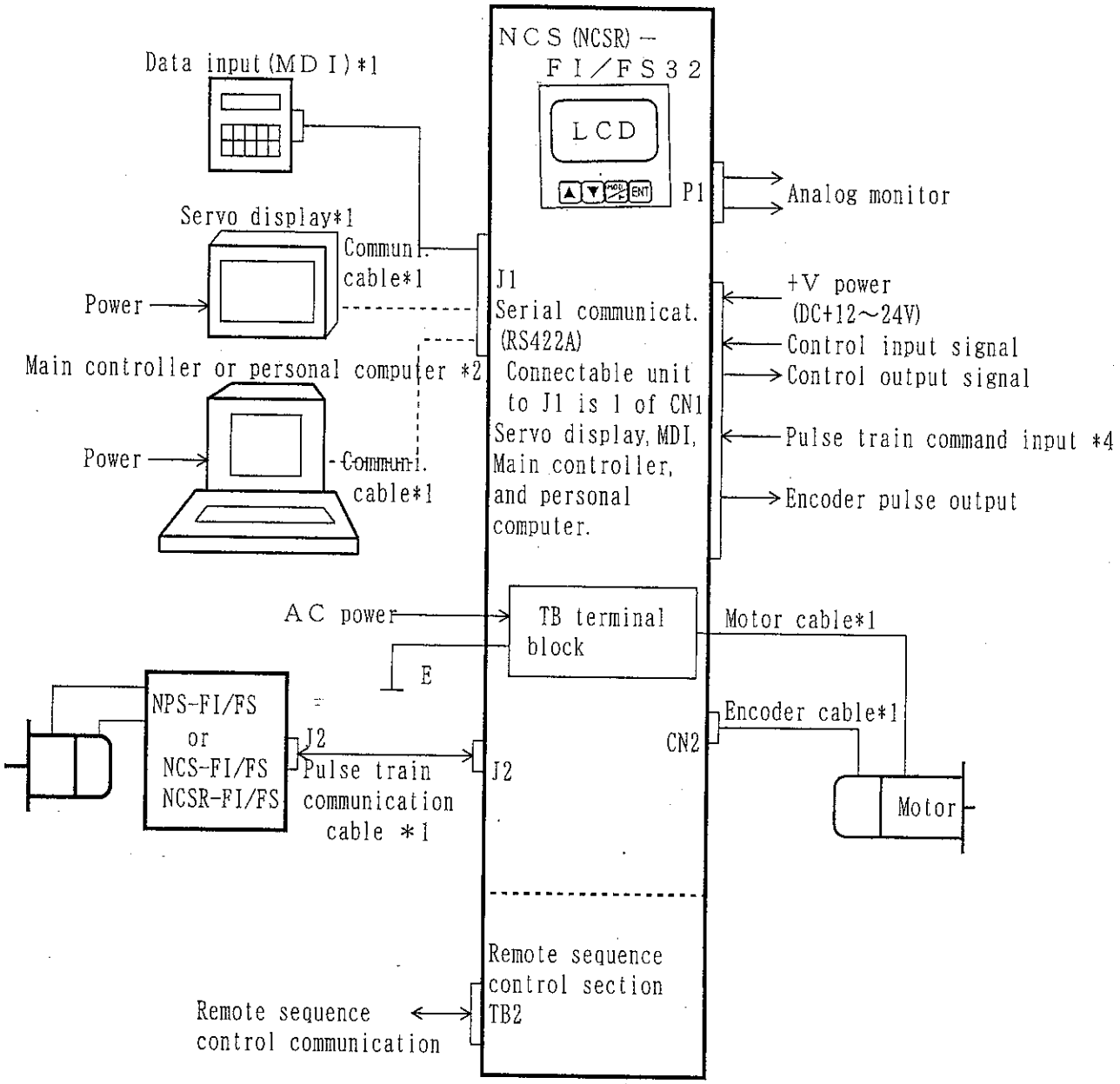
[Fig. 1－2]　NCS-FI/FS31 NCSR-FI/FS31type system configuration

※ Caution 1 : Our optional unit is available for the item with *1 mark.
Please use an unit on the general market for the item with *2 mark.
NPS (NPSR) -FI/FS with *3 mark is a controller for Speed control, Torque control, and Pulse train control.
The item with mark *4 can be changed to feedback pulse input from a measuring encoder by parameter setting which enables full closed loop control.

※ Caution 2 : Our optional "Data edit software for a personal computer" can be available.

1－2－3　NCS-FI/FS32 NCSR-FI/FS 32 type

Peripheral system configuration of NCS-FI/FS 32 , NCSR-FI/FS 32 unit is as [Fig. 1－3] .



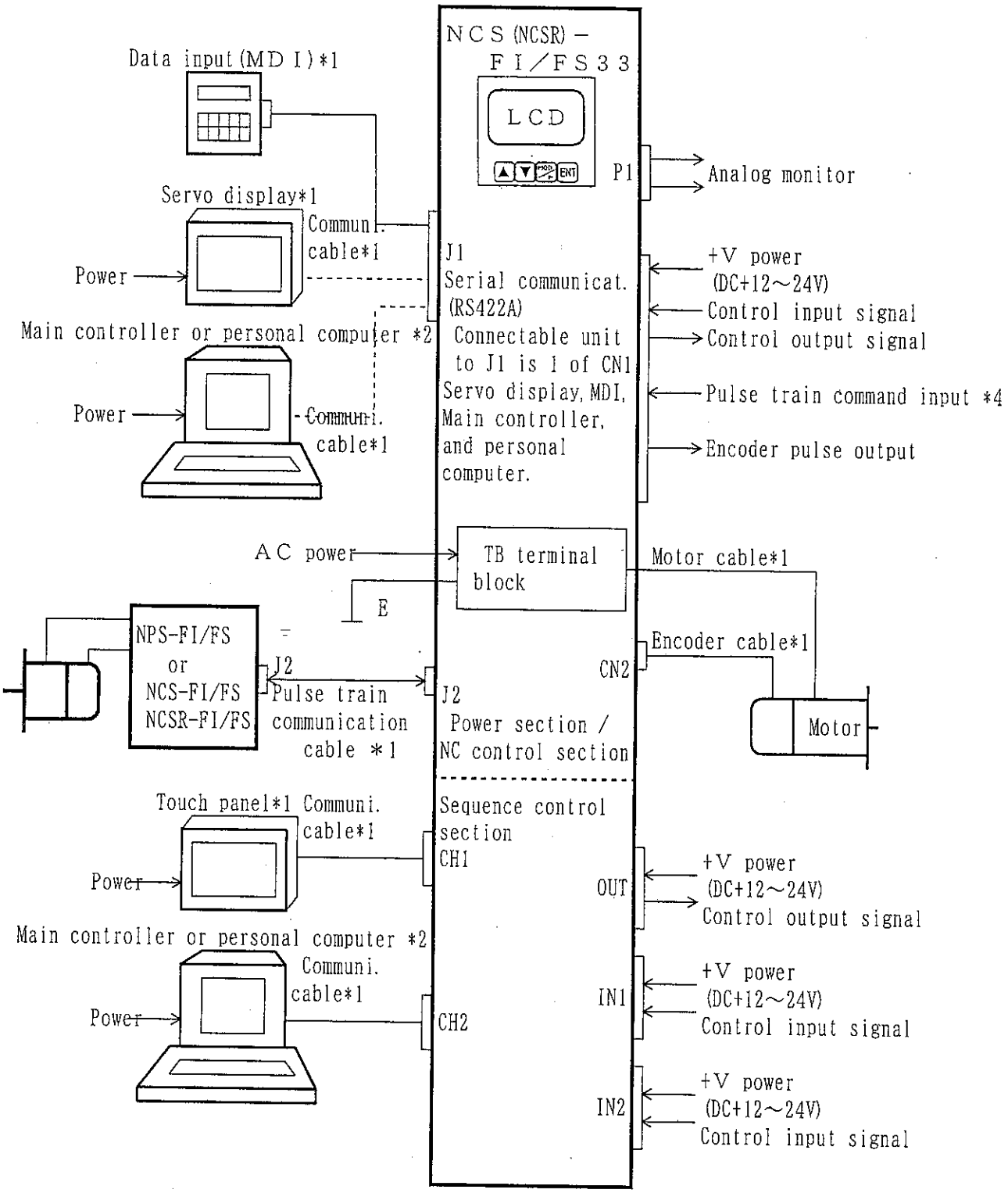
[Fig. 1－3]　NCS-FI/FS32, NCSR-FI/FS32 type system configuration

※ Caution 1 : Our optional unit is available for the item with *1 mark.
Please use an unit on the general market for the item with *2 mark.
NPS (NPSR) -FI/FS with *3 mark is a controller for Speed control, Torque control, and Pulse train control.
The item with mark *4 can be changed to feedback pulse input from a measuring encoder by parameter setting which enables full closed loop control.

※ Caution 2 : Our optional "Data edit software for a personal computer" can be available.

1－2－4　NCS-FI/FS22 NCSR-FI/FS22 type

Peripheral system configuration of NCS-FI/FS 33 , NCSR-FI/FS 33 unit is as [Fig. 1－4] .



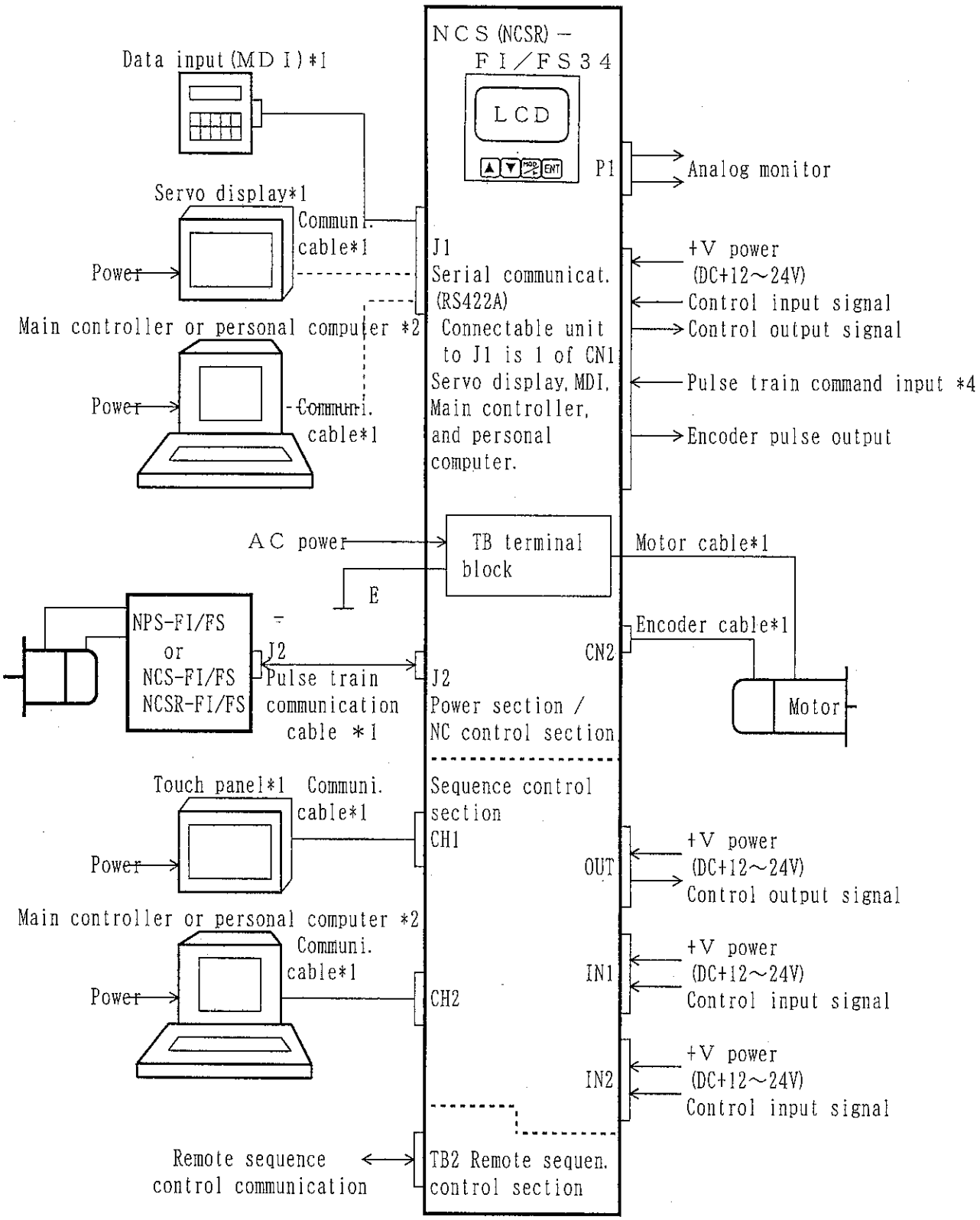
[Fig. 1－4]　NCS-FI/FS33 , NCSR-FI/FS34 type system configuration

※ Caution 1 : Our optional unit is available for the item with *1 mark.
Please use an unit on the general market for the item with *2 mark.
NPS (NCSR) -FI/FS with *3 mark is a controller for Speed control, Torque control, and Pulse train control.
The item with mark *4 can be changed to feedback pulse input from a measuring encoder by parameter setting which enables full closed loop control.

※ Caution 2 : Our optional "Data edit software for a personal computer" can be available.

1－2－5　NCS-FI/FS34　NCSR-FI/FS34 type

Peripheral system configuration of NCS-FI/FS 34 NCSR-FI/FS 34 unit is as [Fig. 1－5].



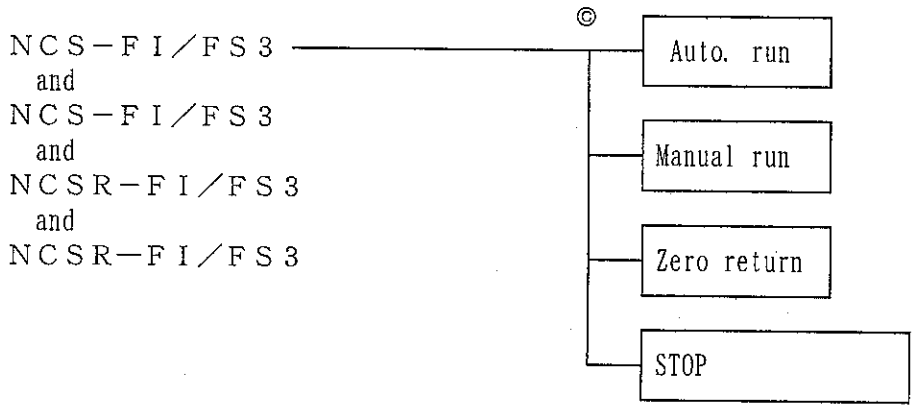
[Fig. 1－5]　NCS-FI/FS34, NCSR-FI/FS34 type system configuration

※ Caution 1 : Our optional unit is available for the item with *1 mark.
Please use an unit on the general market for the item with *2 mark.
NPS (NPSR) -FI/FS with *3 mark is a controller for Speed control, Torque control, and Pulse train control.
The item with mark *4 can be changed to feedback pulse input from a measuring encoder by parameter setting which enables full closed loop control.

※ Caution 2 : Our optional "Data edit software for a personal computer" can be available.

1－3 Mode configuration

[1] Run mode



And there are modes which change the condition to enable External input signal or Remote input signal by Control input signal as follows. (Change by Control input signal 「PC」.)

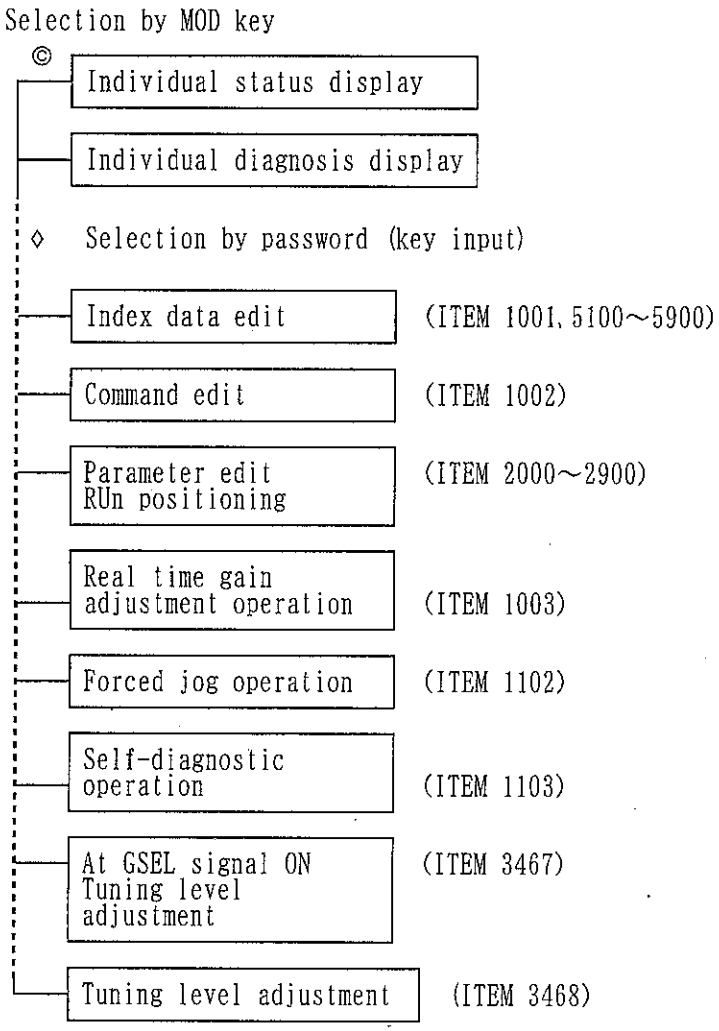
* Local mode : Control as individual Run mode selection, Motion start / stop, etc. is conducted in Local run by an effective Control input signal in accordance with External input disable selection parameters (P516, P518).

* Remote mode : Control as individual Run mode selection, Motion start / stop, etc. is conducted in Remote run by an effective Control input signal in accordance with External input disable selection parameters (P517, P519).

And Remote input signal is the interface to conduct control as External input signal of a controller by using Serial communication or Sequence control section.

[2] Operation mode

Operation block figure by LCD section or MDI



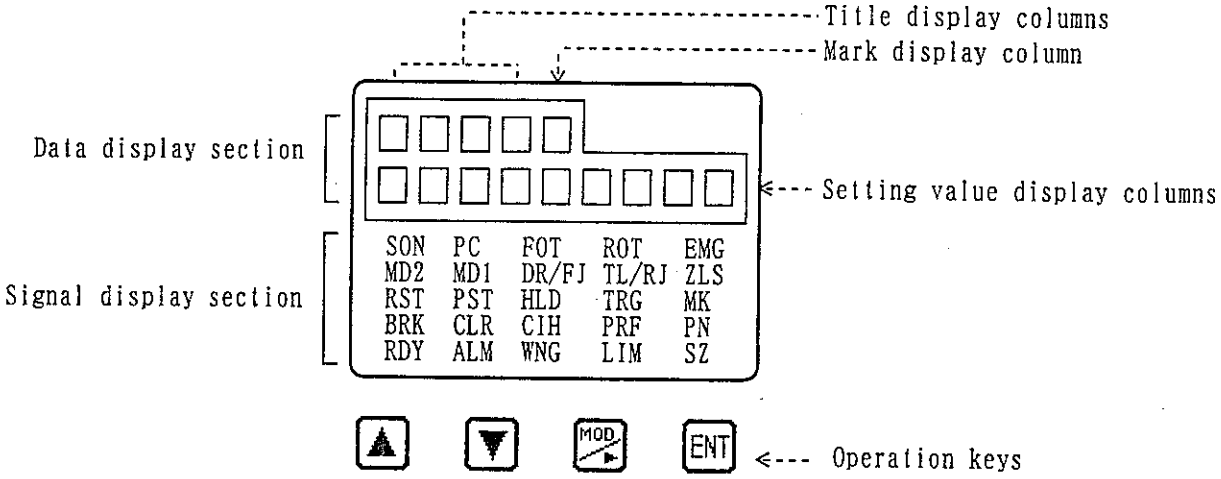
Chapter 2 Setting and display

2－1 ＬＣＤ module operation

2－1－1 ＬＣＤ module each component function

Various parameters and data are set by key input of ＬＣＤ module in the controller front panel.
Since parameters deeply influence motion of machine system and whole system, pay special attention to set.

[1] ＬＣＤ module outlook



[Fig. 2－1] ＬＣＤ module outlook

[2] Display contents of each display section

Display section		Display contents
Data display section	Title display columns	Subject item title (name, No.), message (Alarm, /WNG, /Error), etc. when Protective function works, are displayed.
	Mark display column	Contents as mark, etc, of subject item data are displayed. 「□」 indicates positive direct data. 「－」 indicates negative direct data. 「＊」 indicates Index data set. 「／」 indicates setting data are invalid.
	Setting value display column	Subject item data (setting value / status / Diagnosis results / Alarm name, etc.) are displayed.
Signal display section		I/O signal status is displayed. When a signal is inputted or outputted, corresponding letter is lit. Details can be referred to the separate manual 『Volume: Basic function』.

[Tab. 2－1] Display contents of each display section

[3] Each operation key function

Key	Function	
▲	Item select.	Displays next item.
	Data setting	Increases number (0～9), change of (□, －, ＊, ／) mark and displays next data value of menu data.
▼	Item select.	Displays back item.
	Data setting	Decreases number (0～9), change of (□, －, ＊, ／) mark and displays back data value of menu data.
MOD	Item select.	Displays top item of next subject mode.
	Data setting	Selects data setting columns.
ENT	Item select.	Moves to data setting status of subject item.
	Data setting	Enters display data (all columns) as new data.
▲▼	At Power ON	Initializes all the stored data. ※ Refer to the following caution.
	Data setting	Finishes data setting, forcibly. (Data are not changed, and back data are retained.)
▲ MOD ENT	Full time	Resets CPU by simultaneously pushing them for 3 sec.. 【Caution】 ① In case of NCS-FS type, since 「Encoder fault」 occurs by CPU fault, it can not be used. ② It is not accepted in Self-diagnostic or HALT.

[Tab. 2－2] Each operation key function

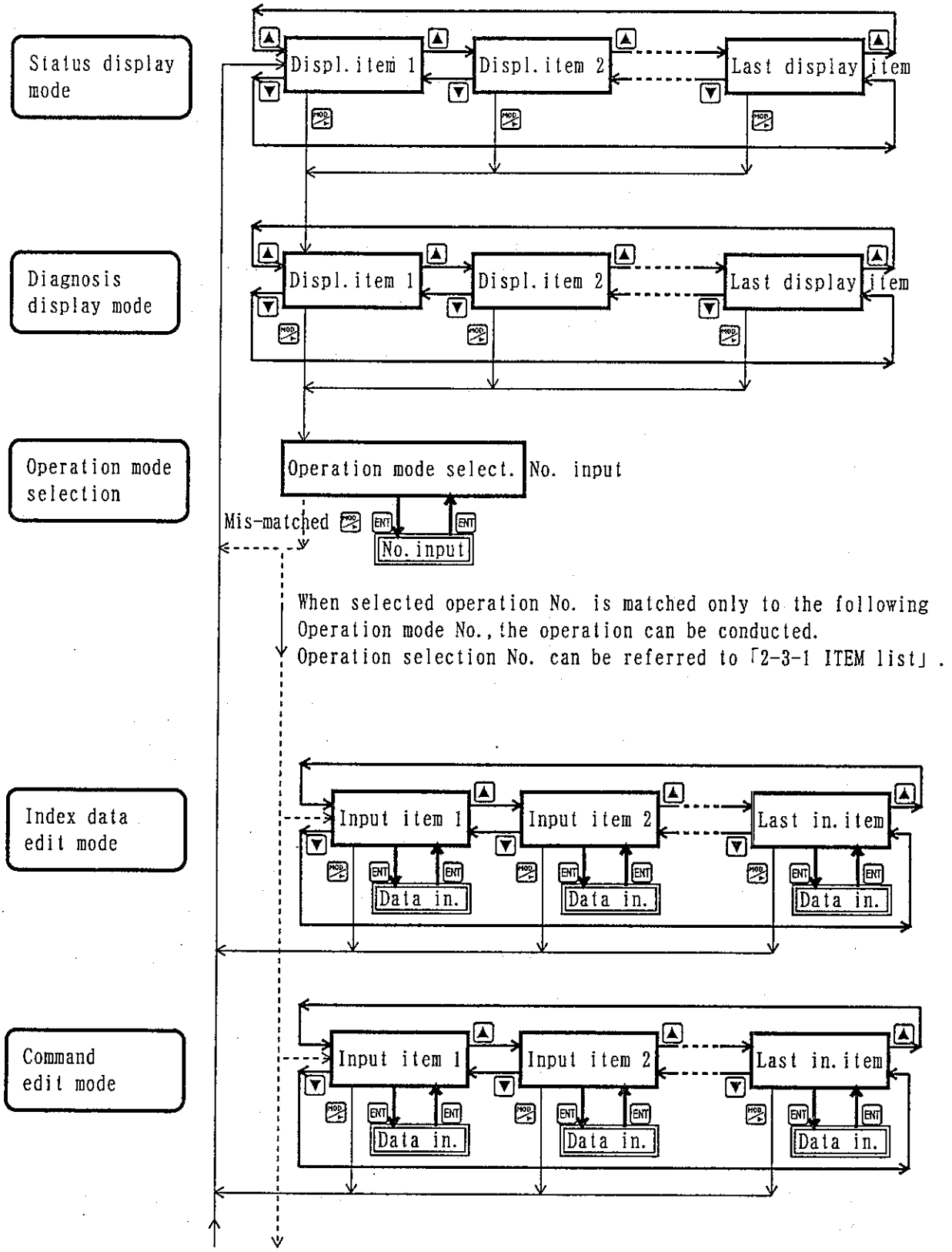
【Caution】
When unit power is ON by pushing ▲ and ▼ keys, simultaneously, all the stored data (parameter , etc.) are initialized.
And then, following figure is displayed in LCD data display section.

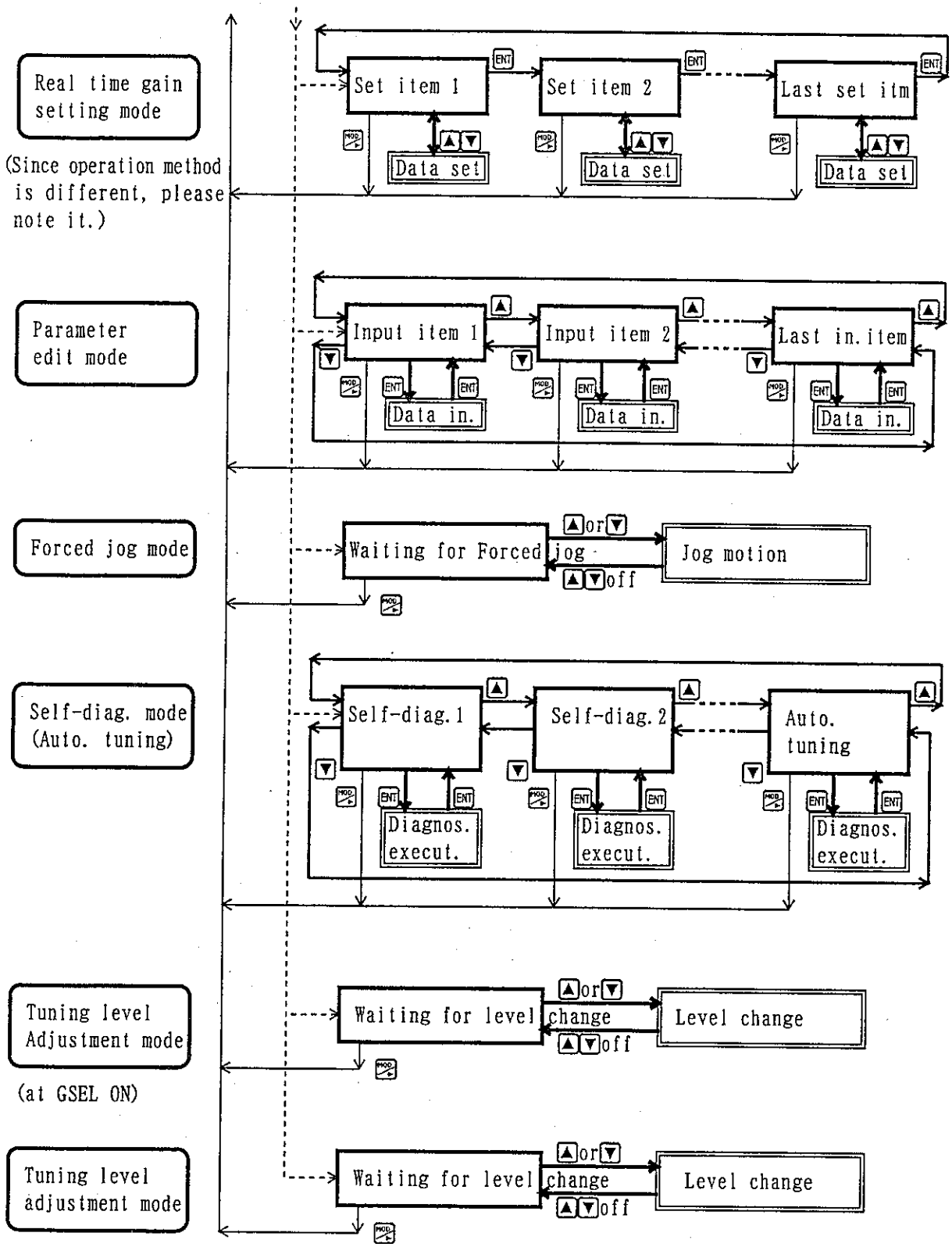
```
INIT DATA
```

We recommend you to save data before initializing the unit.
Backup of data by a personal computer can be conducted by our optional Data edit software.

2－1－2　LCD module operation procedure

Display & key operation and data setting flow chart is shown as below.



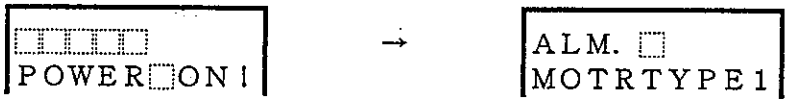


[Fig. 2－2]　Display & key operation flow chart

2－2　Display mode

2－2－1　Initial status Display

- During an unit is initialized when power source is turned ON, 『Power ON！』 is displayed.
- At the unit shipment, initial values are set to various parameters and data.
- Since a motor not selected by the parameter P000 can not run, at first [P000 : Motor type selection] and other parameter shall be set to meet the applied conditions.
- In order to confirm parameters and request resetting, soon after power source is turned ON for the first time, Motor not selected alarm 『ALM MOTOR TYPE1』 is displayed.
- Simultaneously, Alarm signal is outputted.
- Initial status display can be cleared by any of▲/▼/MOD/ENT key input.
- After display is cleared, contents can be confirmed by Alarm history.



[Fig. 2－3]　Initial status display

Display sample

《Motor torque is displayed.》

Actual torque is displayed in Status display (ST10).

1) By MOD, display mode changes in turns as Status display (ST00) → Diagnosis display (TYPE) → Operation selection (ITEM) → Status display (ST00) → Select Status display mode (ST00).
2) By ▼, Display item changes in turns as (ST00) → (ST01) →・・・. Select display item (ST10).
3) Selected data of (ST10) displays running motor torque.

《Alarm status is confirmed.》

When Alarm occurs. Alarm contents are displayed in Diagnosis display (ALM0).

1) By MOD, display mode changes in turns as Status display (ST00) → Diagnosis display (TYPE) → Operation selection (ITEM) → Status display (ST00) → Select Diagnosis display mode (TYPE).
2) By ▼, Display item changes in turns as (TYPE) → (MODE) →・・・. Select display item (ALM0).
3) Selected data of (ALM0) displays activated Alarm contents.

2－2－2　Status display mode

● In Title display columns, status No. (ST××) , in Setting value display columns, status data, and in Mark display column, a mark are displayed.

Dsp. No.	Display sample	Unit	Display Contents
1	ST00－ □□□□02000	rpm	Displays actual motor speed. In forward run : □, In reverse run: － Display range : -9999 ～ 9999
2	ST01－ 100000. 000	※1	Displays current position. Display contents can be set by [P502 : Current posi. display selection]. Display range : -99999999 ～99999999 ※2
3	ST02□ □□□□01000	Pls.	Displays Position deviation pulse. ＋deviation :□, －deviation : － Display range : -32767 ～ 32767
4	ST03－ □□□2000. 0	rpm	Displays External speed command input value by rpm. Forward cmmd. : □, Reverse cmmd. : － Display range : -99999 ～ 99999
5	ST04－ □□□□□□100	%	Displays External torque command input value by % to rated torque. Forward cmmd. : □, Reverse cmmd. : － Display range : -300 ～ 300
6	ST05－ □□□100. 00	Kpps	Displays Pulse train command input frequency Forward cmmd. : □, Reverse cmmd. : － Display range : -500.00 ～ 500.00
7	ST06－ □100000000	Pls.	Displays accumulated input pulse numbers of Pulse train command. Forward cmmd. : □, Reverse cmmd. : － Display rang : -99999999 ～ 99999999
8	ST07□ □□□□□100	%	Displays Forward torque limit command input value by % to rated torque. Display range : 0 ～ 300
9	ST08□ □□□□□100	%	Displays Reverse torque limit torque. Display range : 0 ～ 300
10	ST09□ □□□□□080	%	Displays thermal trip ratio by %. Display range : 0 ～ 100 When display exceeds 90 (90%), Overload warning and 100 (100%), Overload alarm occurs.

[Tab. 2－3 (a)] Display contents of Status display mode 1/2

● In this display mode, if [ENT] key is pushed once, display data are retained for 1 second, and continuously pushed, display is retained.

※1 : Unit can be set one of 「mm」 , 「° 」 , and 「in(inch)」 by the parameter [P301].

※2 : The decimal point location is set by the parameter [P302] .

Dsp. No.	Display sample	Unit	Display Contents
11	ST10· ·····100	%	Displays actual Torque command by % to rated torque. Display range : 0 ～ 300
12	ST11· ·····100	%	Displays peak Torque command by % to rated torque. (RST signal becomes 「000」.) Display range : 0 ～ 300
13	ST12· ····1500	rpm	Displays actual speed of a turning work. Forward cmmd. : ·, Reverse cmmd. : − Display range : -9999 ～ 9999
14	ST13− ·00100.00	※1	Displays actual speed of a machine. Forward cmmd. : ·, Reverse cmmd. : − Display range : -9999999 ～ 9999999 ※2
15	ST14 100000.00	※1	Cutting length measuring position (P803) Display range : 0 ～ 99999999 ※2
16	ST15 100000.00	※1	Cutting length measuring (P803) Current position Display range : 0 ～ 99999999 ※2
17	ST16 100000.00	※1	Cutting length measuring Signal Current position (D24) Display range : 0 ～ 99999999 ※ 2
18	ST17 100000.00	※1	Cutting length measuring Signal Current position Display range : 0 ～ 99999999※2

[Tab. 2－3 (b)] Display contents of Status display mode 2/

· In this display mode, if 「ENT」 key is pushed once, display data are retained for 1 second, and continuously pushed, display is retained.

※1 : Unit can be set one of 「mm」, 「° 」, and 「in(inch)」 by the parameter [P301].
※2 : The decimal point location is set by the parameter [P302].

2－2－3 Diagnosis display mode

● In data display section, message and data are displayed.

Dsp. NO.	Display sample	Unit	Display Contents
1	TYPE□ FI1m□STD.	—	Displays name of NCS-FI/FS series. Display sample : NCS－FI1
2	MODE□ □□□□LOCAL	—	Displays selection status of Remote / Local change (PC) signal for control signal. Display sample : Local mode
3	A012□ □□□□□□POS	—	Displays execution of Auto. run start, or executing address and its command. Display sample : POS command (Positioning command)
4	JSP1□ □00100. 00	※1	Displays Jog speed selected by Jog speed change signal Display range : 0 ～ 9999999 ※2
5	O. R. □ □□□□□150	%	Displays Speed override signal input status by Override ratio (%). Display range : 0 ～ 150
6	PSIN□ □01100101 SS1 SS2 SS3 PS4 PS5 PS6 PS7 PS8	—	Displays status of External input signals SS1～3, PS4～8. (1:ON / 0:OFF) Status of Input signals SS1～3, PS4～8 at input signal allocation can be confirmed. Display sample : SS1 and3 ON, PS6 and7 ON, others OFF
7	ORIN□ □□□□0110 OR1 OR2 OR3 OR4	—	Displays status of External input signals OR1～4 (1:ON / 0:OFF) Status of Input signals OR1～4 at input signal allocation can be confirmed. Display sample : OR2 and 3 ON, others OFF
8	CN1O□ □10110000 Rsvd. WNG Rsvd. SZ PN PRF BRK LIM	—	Displays status of External output signals which can be allocated to output signals. (1:ON / 0:OFF) Output signal status at output signal allocation can be confirmed. Display sample : PN, PRF and LIM ON, others OFF

[Tab. 2－4 (a)] Display contents of Diagnosis display mode 1/3

※1 : Unit can be set one of 「mm」 , 「° 」 , and 「in(inch)」 by the parameter [P301].

※2 : The decimal point location is set by the parameter [P302] .

Dsp. No.	Display sample	Unit	Display Contents
9	ALM0□ IPM ERR.	—	Displays latest Alarm contents. Display sample : IPM fault
10	ALM1□ □□ENCODER	—	Displays one time old Alarm contents. Display sample : Encoder fault
11	ALM2□ OVER□LOAD	—	Displays 2 times old Alarm contents. Display sample : Over load error
12	ALM3□ OVER□VOLT	—	Displays 3 times old Alarm contents. Display sample : Over voltage error
13	ALM4□ OVERSPEED	—	Displays 4 times old Alarm contents. Display sample : Over speed error
14	WNG0□ OVER□LOAD	—	Displays latest Warning contents. Display sample : Over load warning
15 ※3	SQB□□ STNo. 6203	—	Displays SQB status information. ※4 Display range : 0 ～ 9999 Display sample : 「Sum check error」 occurs.
16 ※3	SQB□□ Ver□□1. 00	—	Displays SQB software version. Max. display : 9.99

[Tab. 2－4 (b)] Display contents of Diagnosis display mode 2/3

※3 : NCS-FI/FS 10 and 12 types do not display.
※4 : SQB status information can be referred to the separate manual 『Volume: SQB』.

Dsp. No.	Display sample	Unit	Display Contents
17 ※5	EIO0□ □00100101 OUT1/M01 OUT2/M02 OUT3/M04 OUT4/M08 OUT5/M11 OUT6/M12 OUT7/M14 OUT8/M18	—	Displays an output to J5 connector or M output. (1:ON / 0:OFF) Display sample : In case of output, OUT1, OUT3 and OUT6 ON others OFF In case of M output, 25
18 ※5	EIO1□ □00000010 Rsvd. MFIN Rsvd. Rsvd. Rsvd. Rsvd. MSTB Rsvd.	—	Displays M strobe output and M complete input of J5 connector. (1:ON / 0:OFF) Display sample : MFIN ON, others OFF
19	HARD□ Ver□□0. 00	—	Displays hardware version. Max. display : 9.99
20	SOFT□ Ver□□1. 00	—	Displays software version. Max. display : 9.99

[Tab. 2－4 (c)] Display contents of Diagnosis display mode 3/3

※5 : NCS-FI/FS 10, 13, 22, and 23 types do not display.

2－3　Operation mode

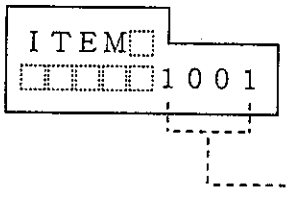
2－3－1　ＩＴＥＭ (Operation mode) list

Selection ITEM (Operation mode) is shown in Tab. 2－5.

ＩＴＥＭ Select. No.	Operation mode		
１００１	Index data edit mode (ＩＸ００～ＩＸ９９)		
１００２	Command edit mode		
１００３	Real time gain set mode		
１１０２	Forced jog mode (Refer to separate manual 『Volume: Basic function』).		
１１０３	Self-diag. mode (Refer to separate manual 『Volume: Basic function』).		
２０００	Group 0	Motor, encoder parameter	Parameter edit mode
２１００	Group 1	Driver adjustment parameter	
２２００	Group 2	ＮＣ adjustment parameter	
２３００	Group 3	Position adjustment parameter	
２４００	Group 4	Run motion parameter	
２５００	Group 5	Display, edit, communi., parameter	
２６００	Group 6	Pulse train input parameter	
２７００	Group 7	I/O signal parameter	
２８００	Group 8	Reciprocating run positioning 1	
２９００	Group 9	Reciprocating run. positioning 2	
５１００	ＩＸ１００ ～ ＩＸ１９９		Index data edit mode
５２００	ＩＸ２００ ～ ＩＸ２９９		
５３００	ＩＸ３００ ～ ＩＸ３９９		
５４００	ＩＸ４００ ～ ＩＸ４９９		
５５００	ＩＸ５００ ～ ＩＸ５９９		
５６００	ＩＸ６００ ～ ＩＸ６９９		
５７００	ＩＸ７００ ～ ＩＸ７９９		
５８００	ＩＸ８００ ～ ＩＸ８９９		
５９００	ＩＸ９００ ～ ＩＸ９９９		
３４６７	Auto. tuning level adjustment mode (At GSEL signal ON) (Refer to separate manual 『Volume: Basic function』)		
３４６８	Auto. tuning level adjustment mode (Refer to separate manual 『Volume: Basic function』)		

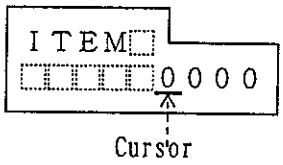
[Tab. 2－5]　ＩＴＥＭ (Operation mode) list

① Display sample



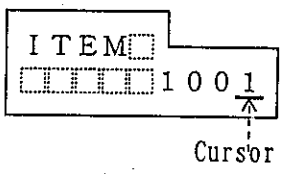
② Setting

◈ITEM No. input 1



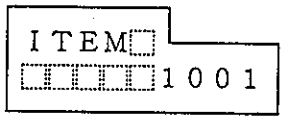
- When [ENT] key is pushed, a cursor appears and input can be conducted.
- When [▲] or [▼] key is pushed, numeric value or mark changes.
- When [MODE] key is pushed, a cursor moves.
- To cancel input data, push [▲][▼] keys, together.

◈ITEM No. input 2



- By the above operation, input ITEM No. 「Sample : 1001」.

◈ITEM No. setting



- When [ENT] key is pushed, a cursor disappears and ITEM No. is set.

2－3－2 Real time gain setting

[1] Function

Real time gain setting adjusts various unit gains in the dedicated mode in 'Real time', watching motor motion status.
In parameter edit mode, when[ENT]key is pushed, new gain works on actual motion but in Real time gain setting mode, when[▲]or[▼]key is pushed, ±1 step of gain changes and new gain immediately works on actual motion.

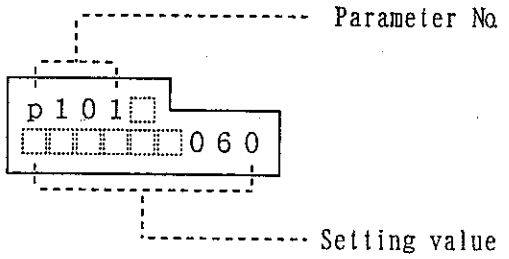
[2] Setting method

Parameters for Real time gain setting are shown in Tab. 2－6.

Para. No.	Parameter name	Initial value
p101	Speed loop gain	025
p102	Speed loop integral time constant	020 [ms]
p104	Torque command filter frequency	000 [Hz]
p105	Speed loop gain / Low speed gain range	025
p106	Speed loop integral time constant / Low speed gain range	020 [ms]
p108	Torque command filter frequency / Low speed gain range	000 [Hz]
p116	Speed loop gain / at GSEL signal ON	025
p117	Speed loop integral time constant / at GSEL signal ON	020 [ms]
p118	Torque command filter frequency / at GSEL signal ON	000 [Hz]
p200	Position loop gain	020 [1/S]
p201	Servo lock gain	020 [1/S]

[Tab. 2－6] Real time gain setting parameter

①ITEM [ENT]→1003 (Selection of Real time gain setting mode) →[ENT]→[MOD]
②p＊＊＊ [ENT] (Selection of setting parameter)
'-'-'-- ＊ mark is parameter No. (Refer to Tab. 2－6.)
③ Data setting of a selected parameter (gain adjustment)
+1 is added every time when[▲]key is pushed once.
-1 is deducted every time when[▼]key is pushed once.
④ When[MOD]key is pushed, this mode is escaped.
(At the time display becomes「Status display mode」.)
⑤ Display sample



※ In the display, in order to identify same item of Parameter edit mode, at the top of parameter No., small letter 'p' is used.

【Caution!!】

Though the gain value in setting, immediately works on actual motion, it is not written to backup memory. Write of setting data is conducted when[ENT]or[MOD]key is pushed.

Chapter 3 Parameter

3－1 Parameter list

No.	Name
P000	Motor type
P001	Encoder type selection
P002	Encoder pulse selection
P004	Encoder pulse output division value
P005	ABS encoder resolution selection
P006	ABS reference data
P007	ABS reference machine position
P008	Carrier frequency selection
P020	Motor type・ Number of poles
P021	Rated torque current
P022	Rated spd. (Field control base spd.)
P023	Max. transit torque ratio
P024	Number of exciting current
P026	Current loop coefficient
P028	R2 compensation change ratio
P030	Phase compensation angle
P037	Torque cmmnd. change limiter value
P040	Primary resistor
P041	Secondary resistor
P042	Primary self inductance
P043	Secondary self inductance
P044	Mutual inductance
P045	Leakage coefficient
P046	Dead time compensation time
P047	Current loop cut of frequency
P048	Current loop derivative time const.
P049	Torque constant
P059	Special encoder pulse number

No.	Name
P100	Low speed gain range
P101	Speed loop gain
P102	Speed loop integral time constant
P103	Speed loop derivative time constant
P104	Torque command filter frequency
P105	Speed loop gain / Low speed gain
P106	Speed loop integral time constant / Low speed gain
P107	Speed loop derivative time constant / Low speed gain
P108	Torque command filter frequency / Low speed gain
P109	Torque limit value 1＋
P110	Torque limit value 1－
P111	Torque limit value 2＋
P112	Torque limit value 2－
P113	Auto. tuning trial run direct. selec.
P114	Auto. tuning trial run speed ratio
P115	Torque limit select. at Alarm stop
P116	Speed loop gain / at GSEL signal ON
P117	Speed loop integral time constant / at GSEL signal ON
P118	Speed loop derivative time constant / at GSEL signal ON
P119	Torque command filter frequency / at GSEL signal ON
P120	R2 compensation selection
P121	Elect. thermal detection selection
P122	Non-coherence control Enable / Disable selection
P124	Speed command gain
P125	Speed command off-set
P126	Torque command off-set
P127	External speed limit Enable / Disable selection
P128	Speed limit value
P129	Spd. cmmnd. val. 1 (In Spd. cntrl. cmmd.)
P130	Spd. cmmnd. val. 2 (In Spd. cntrl. cmmd.)
P131	Spd. cmmnd. val. 3 (In Spd. cntrl. cmmd.)
P132	Spd. cmmnd. val. 4 (In Spd. cntrl. cmmd.)
P133	Spd. cmmnd. val. 5 (In Spd. cntrl. cmmd.)
P134	Spd. cmmnd. val. 6 (In Spd. cntrl. cmmd.)
P135	Spd. cmmnd. val. 7 (In Spd. cntrl. cmmd.)
P136	Trq. cmmnd val. 1 (In Trq. cntrl. cmmd.)
P137	Trq. comnd. val. 2 (In Trq. cntrl. cmmd.)
P138	Trq. commd. val. 3 (In Trq. cntrl. cmmd.)
P139	Speed loop P gain division ratio
P140	Inertia
P141	Viscosity friction
P142	Speed loop FF2 compensation ratio
P143	Max. speed
P144	Notch filter center frequency
P145	Notch filter band width

[Tab. 3－1 (a)] Parameter list 1/4

No.	Name
P200	Position loop gain
P201	Servo lock gain
P202	Positioning complete range
P203	Positioning time over
P204	Backlash compensation value
P205	Feed forward ratio
P206	Feed forward shift ratio
P207	Over-flow detection pulse
P208	Deviation error detection pulse
P209	Motion selection at Deviation error
P210	S shape Accel./Decel. time
P211	Acceleration time 1
P212	Acceleration time 2
P213	Acceleration time 3
P214	Deceleration time 1
P215	Deceleration time 2
P216	Deceleration time 3
P300	Rotating direction selection
P301	Setting unit selection
P302	Command unit
P303	Electronic gear ratio numerator
P304	Electronic gear ratio denominator
P305	Index positioning range
P306	Forward software OT limit
P307	Reverse software OT limit
P308	Max. Forward positioning amount
P309	Max. Reverse positioning amount
P310	Machine travel amount
P400	Jog speed 1
P401	Jog speed 2
P402	Zero return method selection
P403	Zero point marker selection
P404	Zero return Speed
P405	Zero return creep speed
P406	Zero point constant
P407	Zero point set distance
P408	Position data reference point
P409	Auto. run permit condition selection
P410	Decel. time of Zero return from OT
P411	External trigger level selection

No.	Name
P500	Reserved
P501	Reserved
P502	LCD current posi. display selection
P503	MDI current posi. display selection
P504	Dedicated operation selection for MDI Index data edit
P510	Communication function selection
P512	Communication ID No.
P513	Data length select. (Ser. communi.)
P514	Parity select. (Serial communicate.)
P515	Baud rate select. (Ser. communi.)
P516	Extnl. inp. disable select. 1 in Local
P517	Extnl. inp. enable select. 1 in Remote
P518	Extnl. inp. disable select. 2 in Local
P519	Extnl. inp. enable select. 2 in Remote
P520	Reserved
P521	Communication group ID set 1
P522	Communicat. group response yes/no 1
P523	Communication group ID set 2
P524	Communicate. group response yes/no 2
P525	Communication group ID set 3
P526	Communicate. group response yes/no 3
P527	Communication group ID set 4
P528	Communicate. group response yes/no 4
P529	Communication group ID set 5
P530	Communicate. group response yes/no 5
P600	CIH signal spec. selection
P601	Pls. train cmmnd. sequence change
P602	Pulse train command multiplication ratio selection
P603	Pulse train command compensation numerator
P604	Pulse train command compensation denominator
P605	Pulse train feed forward ratio
P606	Pls. train feed forward shift ratio
P607	Pulse train feed forward filter time constant
P608	Pulse train communication Received / Transmitted data selection

[Tab. 3 − 1 (b)] Parameter list 2/4

No.	Name
P700	Monitor 1 selection
P701	Monitor 2 selection
P702	Speed zero range
P703	Rough matching range
P704	SON signal logic selection
P705	Hard. OT Enable/ Disable selection
P706	Delay time of Mode change confirm.
P707	Software limit switch position 1
P708	Software limit switch position 2
P709	Software limit switch position 3
P710	Stop method of Emergency stop
P711	Decel. time at Emergency stop
P712	Servo OFF delay time after Emergency stop
P713	Stop method at AC power cut
P714	Digital switch input spec. selection
P715	ALM/WNG signal logic selection
P716	RDY signal spec. selection
P717	Output signal function selection 1
P718	Output signal function selection 2
P719	PN signal spec. selection
P720	SQB Write data 1
P721	SQB Write data 2
P722	SQB Write data 3
P723	SQB Write data 4
P724	SQB Read data 1
P725	SQB Read data 2
P726	SQB Read data 3
P727	SQB Read data 4
P728	SQB Read data 5
P729	SQB Read data 6
P730	Reserved
P731	Reserved
P732	Reserved
P733	Reserved
P734	Brake output delay time
P736	Motor overheat error detection Enable/ Disable selection
P737	Extnl. inp. sig. input allocation
P738	Extnl. inp. sig. input allocation
P739	Extnl. inp. sig. input allocation
P740	Extnl. out. sig. output allocation
P741	Extnl. out. sig. output allocation
P742	Reset signal spec. selection

No.	Name
P800	Short cut function
P801	Run positioning s shape accel/decel
P802	Synchronization deviation range
P803	Cutting length measuring positio n (for display)
P804	Reserved
P805	Forced synchronization end enable
P806	Out put position of terminal cut position signal
P807	Reserved
P808	Reserved
P809	Reserved
P810	Reserved
P811	Reserved
P812	Cut off control distance
P813	Numerator of speed increasecontrol coefficientDenominator of speed incr
P814	ease control coefficient
P815	Reserved
P816	Reserved
P817	Reserved
P818	Reserved
P819	Reserved
P820	Reserved
P821	Reserved
P822	Speed error compensation width for Master axis smoothing
P823	Speed error compensation time constant for Master axis smoothing
P824	Speed change width for Master axis smoothing
P825	Acceleration/deceleration limit for Master axis smoothing
P826	Speed smoothing filter time constant for Master axis smoothing
P827	Filter time constant of change speed smoothing for Master axis smoothing
P828	Reserved
P829	Reserved
P830	Internal master axis speed 1
P831	Internal master axis speed 2
P832	Internal master axis acceleration time
P833	Internal master axis deceleration time
P834	Master axis 0 speed range

[Tab. 3 − 1 (c)] Parameter list 3/4

No.	Name
P900	Synchronous angle 1
P901	Return speed 1
P902	Travel amount at acceleration 1
P903	Terminal synchronizing position 1
P904	Start position 1 of Run positioning general out put
P905	Terminal position 1 of run position ing general out put
P906	Start position 1 of holding master axis speed 1
P907	Terminal position 1 of holding maste r axis speed 1
P908	Initial work length 1 of constant le ngth 1
P909	Index data No. 1 for initial work len gth of constant length 1
P910	Mark delay extension 1
P911	Index data No. 1 for Mark delay exte nsion
P912	Index data No. 1 for Mark inhibition distance 1
P913	Wait position 1 for Rotating run po sitioning 1
P914	Cosine compensation cotrol range 1
P916	Acceleration/deceleration time 1 fo r short cut 1
P917	Acceleration/ deceleration time 1 for short cut in synchronizing 1
P920	Synchronous angle 2
P921	Return speed 2
P922	Travel amount at acceleration 2
P923	Terminal synchronizing position 2
P924	Start position 2 of Run positioning general out put
P925	Terminal position 2 of run positioni ng general out put
P926	Start position 2 of holding master a xis speed 2
P927	Terminal position 2 of holding maste r axis speed 2
P926	Initial work length 2 of constant le ngth 2
P929	Index data No. 2 for initial work len gth of constant length 2
P930	Mark delay extension 2
P931	Index data No. 2 for Mark delay exten sion
P932	Index data No. 2 for Mark inhibition distance
P933	Wait position 2 for Rotating run po sitioning 2
P934	Cosine compensation cotrol range 2
P936	Acceleration/deceleration time 2 fo r short cut
P937	Acceleration/ deceleration time 2 for short cut in synchronizing

No.	Name
P940	Synchronous angle 3
P941	Return speed 3
P942	Travel amount at acceleration 3
P943	Terminal synchronizing position 3
P944	Start position 3 of Run positioning general out put
P945	Terminal position 3 of run position ing general out put
P946	Start position 3 of holding master axis speed 3
P947	Terminal position 3 of holding maste r axis speed 3
P948	Initial work length 3 of constant le ngth 3
P949	Index data No. 3 for initial work len gth of constant length 3
P950	Mark delay extension 3
P951	Index data No. 3 for Mark delay exte nsion
P952	Index data No. 3 for Mark inhibition distance 3
P953	Wait position 3 for Rotating run po sitioning 3
P954	Cosine compensation cotrol range 3
P956	Acceleration/deceleration time 3 fo r short cut 3
P957	Acceleration/ deceleration time 3 for short cut in synchronizing 3

[Tab. 3－1 (d)] Parameter list 4/4

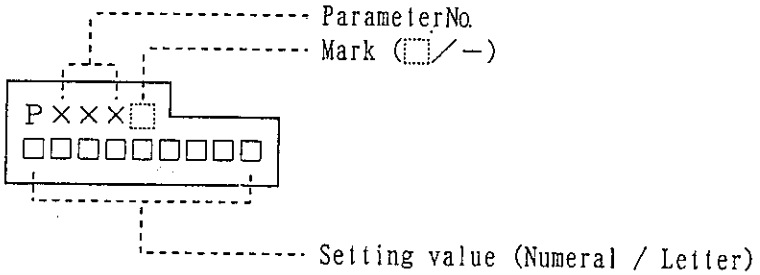
3－2 Parameter setting

[1] Parameter configuration

Group No.	Parameter No.	Grroup name
0	P000～	Motor, Encoder parameter
1	P100～	Driver adjustment parameter
2	P200～	NC adjustment parameter
3	P300～	Position adjustment parameter
4	P400～	Run motion parameter
5	P500～	Display,Edit,Communi.parameter
6	P600～	Pulse train input parameter
7	P700～	I/O signal parameter

[Tab. 3－2] Parameter configuration

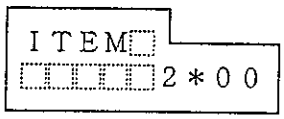
[2] Display



[3] Setting method

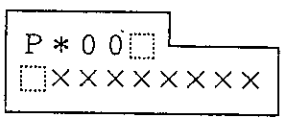
Parameter edition (Numeric input or menu selection) procedure is as follows.

① ITEM No. set



- Set ITEM No. 「2＊00」.
  ＊ mark is a group No. . (Refer to Tab.3-2.)
- After setting, when MODE key is pushed, it moves to ②.

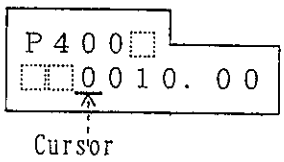
② Parameter selection



- Select a parameter to edit.
  When ▲key is pushed parameter No. increases.
  When ▼key is pushed parameter No. decreases.
- At the time, current setting data are displayed.

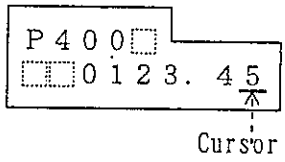
Ⓐ [In case of set by numeric input]

③ Data input 1



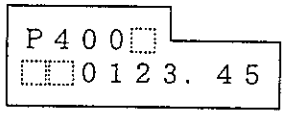
- When [ENT] key is pushed a cursor appears and input can be conducted.
- When [▲] or [▼] key is pushed, numeric value or mark changes.
- When [MOD] key is pushed a cursor moves.
- To cancel input data, push [▲][▼] keys, together.

④ Data input 2



- By the above operation, input setting data.

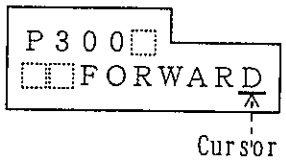
⑤ Data memory



- When [ENT] key is pushed, a cursor disappears and set data are memorized.

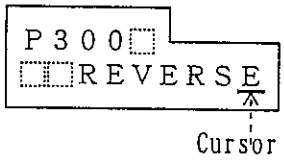
Ⓑ [In case of set by menu selection]

③ Data selection 1



- When [ENT] key is pushed a cursor appears and selection can be conducted.
- When [▲] or [▼] key is pushed, menu item is changed.
- To cancel selected data, push [▲][▼] keys, together.

④ Data selection 1



- By the above operation, select setting data.

⑤ Data memory

- When [ENT] key is pushed, a cursor disappears and set data are memorized.

3-3Differences between a standard unit and this unit

1) Differences of BRS command (Reciprocating run positioning, single)

By [P800] Short cut enable/ disable, this unit can execute BRS command (Reciprocating run positioning single) of Short cut enable/ disable.

Differences of Short cut enable/ disable related with BRS command between a standard unit and this unit are as follows。

<table>
<tr><th rowspan="2">Different item</th><th rowspan="2">Standard unit</th><th colspan="2">Short cut enable/ disable of this unit [P800]</th></tr>
<tr><th>Enable</th><th>Disable</th></tr>
<tr><td>①Run positioning on the</td><td colspan="2">Impossible</td><td>Possible</td></tr>
<tr><td>②Real time change of Wait position</td><td colspan="2">Possible</td><td>Impossible (Wait position follows the Wait position data at BRS command start.)</td></tr>
<tr><td>③Terminal cut position signal</td><td colspan="2">Invalid</td><td>When a cut position (work position) reaches to an output position of a terminal cut, this signal is outputted. This signal can be allocated by [P740, P741].</td></tr>
<tr><td rowspan="2">④[P801] Acceleration/ Deceleration ratio of S shape run</td><td>Control unit is 5 %</td><td>Control unit is 20% (same as RRAS, RRAC command).</td><td>Control unit is 10% in the range of 0 ～50%. And this S shape acceleration/ deceleration are conducted only when Positioning is completed.
Initial value: 10%</td></tr>
<tr><td>Initial value: 101%</td><td colspan="2">Initial value: 10%</td></tr>
<tr><td>⑤[P900, P920, P940] Synchronous angle</td><td colspan="2">Valid</td><td>Invalid Control by 0° synchronous angle</td></tr>
<tr><td>⑥[P902, P922, P942] Travel amount in acceleration</td><td colspan="2">Valid</td><td>Invalid All the acceleration/ deceleration conducted by this command are controlled by the setting time of [P916, P936, P956] and [P917, P937, P957].</td></tr>
<tr><td>⑦[P903, P923, P953] Terminal position of synchronization</td><td colspan="2">Setting distance from Wait position</td><td>Setting distance from Start position of synchronous speed</td></tr>
<tr><td>⑧[P904～907] [P924～927] [P954～957] Individual start and terminal position</td><td colspan="2">Distance from Wait position</td><td>Distance from Start position of synchronization</td></tr>
<tr><td>⑨Index data 100～199</td><td>General use area</td><td colspan="2">Area for Continuous run positioning
Even if an extension memory is added, data contents at power loss can not be retained</td></tr>
<tr><td>⑩Specification of cycle end</td><td colspan="2">It is received when synchronization is over and a motor returns to Wait position, then the function is finished。</td><td>It is received when synchronization is over or at Wait position and a motor can also conduct deceleration stop at the received position. Specification is selected by [P800].</td></tr>
</table>

2) Other differences

Differences of Short cut enable/ disable related with items other than BRS command between a standard unit and this unit are as follows.

Different item	Standard unit	Short cut enable/ disable of this unit [P800]	
		Enable	Disable
①BRC, RRAC, RRAS command	Motion is possible		Motion is possible
②[P914, P934, P954] Cosine compensation range	Control unit is 5°	Control unit is 10°	Motion is possible
③Parameter initial value	It complies with the manual	Next parameters are different from the standard unit. [P205] Feed forward ratio: 80% → 100% [P206] Feed forward shift ratio:1%→0%	
④Trigger positioning	Valid	Invalid	

3-3-1 Parameter

1) Run positioning parameter

When Short cut function is valid, Run positioning parameter contents of BRS command (Reciprocating run positioning, single) are as follows.)

Parameter No. -＊＊-	Parameter name	Activating time	Run mode: Auto (A)	Manual (M)	Zero return (Z)	Lock (L)	Level	Setting unit	Setting range	Standard shipment set (initial value)
								Function		
《Group 8 》 [Run positioning parameter1]										
P800 - addition -	Short cut function selection	R	A・・・				S	None	0～3	1

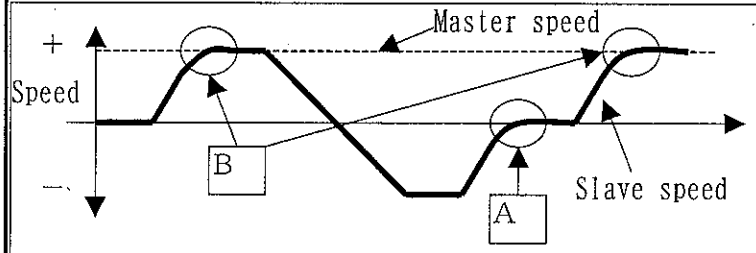
It selects terminating specification when Short cut function enable/ disable and Cycle end are finished. Specification of the individual setting is as follows.

Setting value	Short cut function	Specification of Cycle end
0	In Valid	It is received when synchronization is over and a motor returns to Wait position, then the function is finished。
1	Valid	Same as the above item.
2	Valid	It is received when synchronization is over and at Wait position and a motor returns to Wait position, then the function is finished.
3	Valid	It is received when synchronization is over and at Wait position and a motor conducts deceleration stop at the received position, then the function is finished. And if the motor has stopped, the function is finished at the position.

※ Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop

※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved

※ (－＊＊－) of a parameter No. item is parameter contents change type in Short cut function motion.

Parameter No. -＊＊-	Parameter name	Activating time	Run mode (Auto / Manual / Zero return / Lock) (A M Z L)	level	Setting unit	Setting range	Standard shipment set (initial value)
						Function	
《«Group 8 》[Run positioning parameter 1]							
P801 -change-	Run positioning S shape acceleration/ deceleration	R	A・・・	F	%	000 ～ 101	10
					It sets S shape acceleration/ deceleration ratio in Run positioning command motion. This S shape acceleration/ deceleration are conducted only when following A and B positioning are completed.  A : When Positioning to Wait position is completed B : When Run positioning is completed Note) Though 1% unit can be inputted to this parameter, 10% is applied to this unit. Note) Though up to 101% can be set to this parameter, when 50% is inputted, 50% control is achieved.			
P802	Synchronous deviation range	R	A・・・	F	mm/°/in	00000 ～ 30000	00100
					When synchronous motion is conducted in Run positioning command run, "In synchronizing" output signal is ON. during internal deviation amount is within this setting value.		
P803	Cut length measurement position	R	A・・・	F	mm/°/in	00000000 ～ 10000000	00000000
					It sets slave position when measuring cut length (work length) (status display mode ST14) in Run positioning cut motion. (A decimal point position depends on [P302 : command unit].) This setting value is the distance from a start position of synchronous speed.		

※ Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop

※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved

※ (－＊＊－) of a parameter No. item is parameter contents change type in Short cut function motion.

Parameter No. -＊＊-	Parameter name	Activating time	Run mode (Auto / Manual / Zero return / Lock) (A M Z L)	level	Setting unit	Setting range	Standard shipment set (initial value)
						Function	

《Group 8 》[Run positioning parameter1]

P805 - change -	Forced synchronization end enable/ disable	R	A・・・	F	None	Menu selection OFF／ON	OFF

It selects Forced synchronization end enable/ disable。
◎In case of OFF, it disables Forced synchronization end function and synchronizes to synchronization end position。
◎In case of ON, it enables Forced synchronization end, and finishes synchronization in accordance with an input signal of Forced synchronization end。
【Caution】 If an input signal of Forced synchronization end is not inputted when Forced synchronization end is enabled, Alarm is activated when a motor reaches to a synchronization end position。

P806 addition	Output position of terminal cut position signal	R	A・・・	F	mm/゜/in	00000000 ～ 99999999	00000000

It sets an output position of terminal cut position signal in Run positioning command motion.
Position is set by a slave axis position.
When target position of Run positioning on a master axis exceeds this position, terminal cut position signal is outputted。

P812	Cut off control distance	R	A・・・	F	mm/゜/in	000000 ～ 100000	000000

If Cut off control input signal is inputted in synchronizing, a slave axis additionally moves this setting amount. (A decimal point position depends on [P302 : command unit].)

P813 P814	Numerator of Speed increase control coefficient Denominator of Speed increase control coefficient	R	A・・・	F	None	00000 ～ 65535	00000

It sets Speed increase coefficient when Cut off control input signal is inputted in synchronizing.
Speed increase coefficient is set by
Numerator of Speed increase control coefficient (P813)
Denominator of Speed increase control coefficient (P814)

When Speed increase coefficient is multiplied by 1.5, setting is as follows.

1.5times → $\frac{1\ .}{5}$ → $\frac{15}{10}$ → Set to P813. / Set to P814.

When 0 is set to one of them or both, speed is not increased.
Setting value shall be P813 ≧ P814。

Parameter No. -＊＊-	Parameter name	Activating time	Run mode (Auto / Manual / Zero return / Lock)	level	Setting unit	Setting range	Standard shipment set (initial value)
			A M Z L		Function		
《Group 8 》[Run positioning parameter 1]							
P822	Speed error compensation width for Master axis smoothing	R	A・・・	F	mm/sec °/sec in/sec	000000 ～ 999999	000000
					It sets compensating speed range when speed error (occurred error within control range of P824～P827) is occurred in Master axis smoothing. (A decimal point position depends on [P302 : command unit].) Normally, initial value is set. When setting value is [0], compensating speed range is not limited. When cutting error is dispersed in Master axis acceleration/ deceleration, set about 1.2 times of setting value of P824。		
P823	Speed error compensation time constant for Master axis smoothing	R	A・・・	F	Sec	0.000 ～ 0.999	0.050
					It sets compensating time constant when speed error (occurred error within control range of P824～P827) is occurred in Master axis smoothing. If this setting value is small, a slave axis vibrates largely and cutting error occurs. Normally, initial value is set. When setting value is [0], compensating speed range is not limited. When cutting error is dispersed in Master axis acceleration/ deceleration, set large value.		

※ Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop

※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved

※ (－＊＊－) of a parameter No. item is parameter contents change type in Short cut function motion.

Parameter No. -＊＊-	Parameter name	Activating time	Run mode: Auto (A)	Manual (M)	Zero return (Z)	Lock (L)	Level	Setting unit	Setting range	Standard shipment set (initial value)
									Function	
《Group 8 》[Run positioning parameter 1]										
P824	Speed change width for Master axis smoothing	R	A・・・				F	mm/sec °/sec in/sec	000000 ～ 999999	001000
			It sets speed change width at rated master axis speed motion. Against speed change of this set, speed is smoothed by time constant set by P827.. (A decimal point position depends on [P302 : command unit].) Normally, initial value is set. When cutting error is occurred due to large speed change width at rated master axis speed motion, set about 1.2 times of the speed change。							
P825	Acceleration/ deceleration limit for Master axis smoothing	R	A・・・				F	mm/sec^2 °/sec^2 in/sec^2	000000 ～ 999999	000000
			It sets limit value of acceleration/ deceleration speed of a master axis. When larger acceleration/ deceleration speed value than this setting is inputted, the exceeded amount of this acceleration/ deceleration speed setting is smoothed by time constant set by P827 as error vibration. (A decimal point position depends on [P302 : command unit].) When setting value is [0], acceleration/ deceleration speed is not limited. Normally, initial value is set. When abnormal vibration is large, set about 1.2 times of maximum acceleration/ deceleration speed of a master axis. Note) (2) of unit display (mm/sec^2) is not displayed in MDI。							
P826	Speed smoothing filter time constant for Master axis smoothing	R	A・・・				F	sec	0.000 ～ 0.200	0.020
			It sets smoothing filter time constant for basic master speeds out of speed change width set by P824. Normally, initial value is set.。							
P827	Filter time constant of change speed smoothing for Master axis smoothing	R	A・・・				F	sec	0.000 ～ 0.200	0.050
			It sets smoothing filter time constant for speed change width set by P824. Normally, initial value is set.。							

Parameter No. -＊＊-	Parameter name	Activating time	Run mode: Auto (A)	Manual (M)	Zero return (Z)	Lock (L)	level	Setting unit	Setting range	Standard shipment set (initial value)
								Function		
《Group 8 》[Run positioning parameter 1]										
P830	Internal master axis speed 1	I	A・・・				F	Pulse/S	000000～ 250000	000000
								It sets Internal master axis speed 1 data (at MSSP signal OFF). Note) This value is the setting when [P602: Master axis multiplication ratio selection] is [×1].		
P831	Internal master axis speed 2	I	A・・・				F	Pulse/S	000000～ 250000	000000
								It sets Internal master axis speed 2 data (at MSSP signal ON). Note) This value is the setting when [P602: Master axis multiplication ratio selection] is [×1].		
P832	Internal master axis acceleration time	R	A・・・				F	Sec	00.000～ 99.999	00.000
								It sets Internal master axis acceleration time from 0 speed to 100kpps. Note) This value is the setting when [P602: Master axis multiplication ratio selection] is [×1]。		
P833	Internal master axis deceleration time	R	A・・・				F	sec	00.000～ 99.999	00.000
								It sets Internal master axis deceleration time from 100kpps to 0 speed. Note) This value is the setting when [P602: Master axis multiplication ratio selection] is [×1]。		
P834	Master axis 0 speed range	R	A・・・				F	Pulse/S	000000～ 250000	000000
								It sets output range of Master axis 0 speed range (MSZ)。		

※ Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop

※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved

※ (－＊＊－) of a parameter No. item is parameter contents change type in Short cut function motion.

《Group 9 》[Run positioning parameter 2]

P900 invalid	Synchronous angle 1	R	A・・・	F	°	00.0 ～ 80.0	00.0
					Invalid		
P901	Return speed 1	R	A・・・	F	mm/sec °/sec in/sec	0000001 ～ 9999999	010000
					It sets traveling speed to Wait position in Run positioning. (A decimal point position depends on [P302 : command unit].)		
P902 invalid	Travel amount at acceleration 1	R	A・・・	F	mm/°/in	00000001 ～ 99999999	00000001
					Invalid		
P903 -change-	Terminal synchronizing position 1	R	A・・・	F	mm/°/in	00000000 ～ 99999999	00000000
					It sets a start position of a slave axis return motion to Wait position in Run positioning. (A decimal point position depends on [P302 : command unit].) This setting value is the distance from a start position of synchronization。		
P904 -change-	Start poison 1 of Run positioning general output 1	R	A・・・	F	mm/°/in	00000000 ～ 99999999	00000000
					It sets ON position of Run positioning general output. (A decimal point position depends on [P302 : command unit].) This setting value is the distance from a start position of synchronization。		
P905 -change-	Terminal poison 1 of Run positioning general output 1	R	A・・・	F	mm/°/in	00000000 ～ 99999999	00000000
					It sets OFF position of Run positioning general output. (A decimal point position depends on [P302 : command unit].) This setting value is the distance from a start position of synchronization。		
P906 -change-	Start position 1 of holding master axis speed 1	R	A・・・	F	mm/°/in	00000000 ～ 99999999	00000000
					It sets Start position of holding master axis speed in Master axis speed smoothing control. (A decimal point position depends on [P302 : command unit].) This setting value is the distance from a start position of synchronization. Normally, initial value is set. Associated parameters: P826～6		
P907 -change-	Terminal position 1 of holding master axis speed 1	R	A・・・	F	mm/°/in	00000000 ～ 99999999	00000000
					It sets Terminal position of holding master axis speed in Master axis speed smoothing control. (A decimal point position depends on [P302 : command unit].) This setting value is the distance from a start position of synchronization. Normally, initial value is set. Associated parameters: P826～6		

Parameter No. -＊＊-	Parameter name	Activating time	Run mode: Auto (A)	Manual (M)	Zero return (Z)	Lock (L)	level	Setting unit	Setting range	Standard shipment set (initial value)
									Function	
《Group 9 》[[Run positioning parameter 2]										
P908 -change-	Initial work length 1 of constant length 1	R	A	・・・			F	mm/゜/in	00000000 ～ 99999999	00000000
								It sets work length at initial stage of Constant length run positioning command. (A decimal point position depends on [P302 : command unit].) When this setting value is 0, a unit executes work length specified by a command from a start position of Constant length run positioning. When this setting value is other than 0, a unit executes this work length when Constant length run positioning command starts. When top of a work is cut, distance between master axis sensor position and 0 position is set. At the time Run positioning point becomes the top of the work. 【Relation with Index data 1 [P909] , Initial work length of constant length】 ① When this setting value is 0, It adds work length of Index data value specified by Index data 1 (Initial stage work length of constant length) to work length specified by a command. ② When this setting value is other than 0, It adds work length of Index data value specified by Index data 1 (Initial stage work length of constant length) to this setting value. By this, Run positioning point can be set as a top of work position is 0. 【Control range】 Initial total work length of constant length shall be set larger than traveling amount of synchronous acceleration. And initial total work length of constant length is (Index value displayed by this setting value + Index data 1, for Initial work length of constant length).				
P909	Index data No 1 for Initial work length of constant length 1	R	A・・・				F	None	00 ～ 99	99
								It sets Index data No. which includes additional amount to Initial work length 1 of constant length. [P908]. A unit of data displayed in Index data is mm/ ° / in, and applied to Initial work length of constant length on real time. 【Relation with Initial work length of constant length [P908]】 Please refer to Initial work length 1of constant length				

《Group 9 》[Run positioning parameter 2]

P910	Mark delay extension 1	R	A・・・	F	mm/°/in	00000000 ～ 99999999	00000000
	It sets Mark delay extension amount in Run positioning command motion and at Mark start. (A decimal point position depends on [P302 : command unit].) Normally, distance between 0 absolute position and a mark sensor of a slave shaft is set. By this, Run positioning point becomes a detected mark position. 【Relation with Index data No. 1 for Mark delay extension [P911] 】 Complying with Index data value specified by Index data No. 1 for Mark delay extension is additionally extended. By this, Run positioning point can be set as Mark position is 0.						
P911	Index No. 1 for Mark delay extension 1	R	A・・・	F	None	00 ～ 99	99
	Additionally to Mark delay extension 1 [P910], another Index data No. with Mark delay extension is set. A unit of data displayed in Index data is mm/ ° / in, and applied to Mark delay extension on real time. 【Relation with Mark delay extension 1 [P910]】 Please refer to Mark delay extension 1。						
P912	Index data No. 1 for Mark inhibition distance 1	R	A・・・	F	None	00 ～ 99	98
	It sets Index data No. (unit: mm/ ° / in) which includes distance where next mark signal from the mark signal is not accepted when Mark signal is inputted.。						
P913 invalid -	Wait position 1 for Rotating run positioning 1	R	A・・・	F	mm/°/in	00000000 ～ 99999999	00000000
	None						
P914 invalid	Cosine compensation control range 1	R	A・・・	F	°	00.0 ～ 80.0	00.0
	None						
P916 - additio n-	Acceleration/ deceleration time 1 for Short cut 1	R	A・・・	F	sec	0.000 ～ 9.999	0.500
	It sets Acceleration/ deceleration time in Run positioning. Acceleration/ deceleration time sets time from motor stop status to rated speed and vise versa。						
P917 - additio n-	Acceleration/ deceleration time 1 for Short cut in synchronizing 1	R	A・・・	F	sec	0.000 ～ 9.999	0.000
	It sets acceleration/ deceleration time from return speed to synchronous speed in Run positioning. Acceleration/ deceleration time sets time from motor stop status to rated speed and vise versa. When this setting value is 0, acceleration/ deceleration time from return speed to synchronous speed becomes setting time of [P616]. Normally 0 is set。						

※ Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop
※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved
※ (－＊＊－) of a parameter No. item is parameter contents change type in Short cut function motion.

Parameter No. -＊＊-	Parameter name	Activating time	Run mode				level	Setting unit	Setting range	Standard shipment set (initial value)
			Auto	Manual	Zero return	Lock				
			A	M	Z	L				
			Function							
《Group 9 》[Run positioning parameter 2]										
P920	Synchronous angle 2	R	A・・・				F	°	00.0 ～ 80.0	00.0
			Function is identical to [P900 Synchronous angle 1]。							
P921	Return speed 2	R	A・・・				F	mm/sec °/sec in/sec	0000000 ～ 9999999	0010000
			Function is identical to [P901 Return speed 1]。							
P922	Travel amount at acceleration 2	R	A・・・				F	mm/°/in	00000001 ～ 99999999	00000001
			Function is identical to [P902 Travel amount at acceleration 1]。							
P923	Terminal synchronizing position 2	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
			Function is identical to [P903 Terminal synchronizing position 1].							
P924	Start poison 2 of Run positioning general output	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
			Function is identical to [P904 Start poison 1 of Run positioning general output].							
P925	Terminal poison 2 of Run positioning general output	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
			Function is identical to [P905 Terminal poison 1 of Run positioning general output].							
P926	Start position of 2 holding master axis speed2	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
			Function is identical to [P906 Start position 1 of holding master axis speed].							
P927	Terminal position 2 of holding master axis speed	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
			Function is identical to [P907 Terminal position 2 of holding master axis speed].							
P928	Initial work length 2 of constant length	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
			Function is identical to [P908 Initial work length 1 of constant length].							
P929	Index data No 2 for Initial work length of constant length	R	A・・・				F	None	00 ～ 99	99
			Function is identical to [P909 Index data No 1 for Initial work length of constant length].							

※ Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop
※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved

Parameter No. -＊＊-	Parameter name	Activating time	Run mode				Level	Setting unit	Setting range	Standard shipment set (initial value)
			Auto	Manual	Zero return	Lock				
			A	M	Z	L			Function	
《Group 9 》[Run positioning parameter 2]										
P930	Mark delay extension 2	R	A・・・			F		mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P910 Mark delay extension 1].		
P931	Index No. 2 for Mark delay extension	R	A・・・			F		None	00 ～ 99	99
								Function is identical to [P910 Mark delay extension 1].		
P932	Index data No. 2 for Mark inhibition distance	R	A・・・			F		None	00 ～ 99	98
								Function is identical to [P912 Index data No. 1 for Mark inhibition distance].		
P933	Wait position 2 for Rotating run positioning	R	A・・・			F		mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P913 Wait position 1 for Rotating run positioning].		
P934	Cosine compensation control range 2	R	A・・・			F		°	00.0 ～ 80.0	00.0
								Function is identical to [P914 Cosine compensation control range 1].		
P936	Acceleration/ deceleration time 2 for Short cut	R	A・・・			F		Sec	0.000 ～ 9.999	0.500
								Function is identical to [P916 Acceleration/ deceleration time 1 for Short cut].		
P937	Acceleration/ deceleration time 2 for Short cut in synchronizing	R	A・・・			F		Sec	0.000 ～ 9.999	0.000
								Function is identical to [P917 Acceleration/ deceleration time 1 for Short cut in synchronizing].		

※ Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop
※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved

Parameter No. -＊＊-	Parameter name	Activating time	Run mode				level	Setting unit	Setting range	Standard shipment set (initial value)
			Auto	Manual	Zero return	Lock				
			A	M	Z	L			Function	
《Group 9 》[Run positioning parameter 2]										
P940	Synchronous angle 3	R	A・・・				F	°	00.0 ～ 80.0	00.0
								Function is identical to [P900 Synchronous angle 1]		
P941	Return speed 3	R	A・・・				F	mm/sec °/sec in/sec	0000000 ～ 9999999	0010000
								Function is identical to [P901 Return speed 1].		
P942	Travel amount at acceleration 3	R	A・・・				F	mm/°/in	00000001 ～ 99999999	00000001
								Function is identical to [P902 Travel amount at acceleration 1].		
P943	Terminal synchronizing position 3	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P903 Terminal synchronizing position 1].		
P944	Start poison 3 of Run positioning general output	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P904 Start poison 1 of Run positioning general output].		
P945	Terminal poison 3 of Run positioning general output	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P905 Terminal poison 1 of Run positioning general output].		
P946	Start position 3 of holding master axis speed	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P906 Start position 1 of holding master axis speed].		
P947	Terminal position 3 of holding master axis speed	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P907 Terminal position 1 of holding master axis speed].		
P948	Initial work length 3 of constant length	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P908 Initial work length 1 of constant length].		
P949	Index data No 3 for Initial work length of constant length	R	A・・・				F	None	00 ～ 99	99
								Function is identical to [P909 Index data No 1 for Initial work length of constant length].		

※ Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop

※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved

Parameter No. -＊＊-	Parameter name	Activating time	Run mode: Auto (A)	Manual (M)	Zero return (Z)	Lock (L)	Level	Setting unit	Setting range	Standard shipment set (initial value)
									Function	
《Group 9 》[Run positioning parameter 2]										
P950	Mark delay extension 3	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P910 Mark delay extension 1].		
P951	Index No. 1 for Mark delay extension 3	R	A・・・				F	None	00 ～ 99	99
								Function is identical to [P910 Mark delay extension 1].		
P952	Index data No. 3 for Mark inhibition distance	R	A・・・				F	None	00 ～ 99	98
								Function is identical to [P912 Index data No. 1 for Mark inhibition distance].		
P953	Wait position 3 for Rotating run positioning	R	A・・・				F	mm/°/in	00000000 ～ 99999999	00000000
								Function is identical to [P913 Wait position 1 for Rotating run positioning].		
P954	Cosine compensation control range 3	R	A・・・				F	°	00.0 ～ 80.0	00.0
								Function is identical to [P914 Cosine compensation control range 1].		
P956	Acceleration/ deceleration time 3 for Short cut 1	R	A・・・				F	Sec	0.000 ～ 9.999	0.500
								Function is identical to [P916 Acceleration/ deceleration time 1 for Short cut].		
P957	Acceleration/ deceleration time 3 for Short cut in synchronizing	R	A・・・				F	Sec	0.000 ～ 9.999	0.000
								Function is identical to [P917 Acceleration/ deceleration time 1 for Short cut in synchronizing].		

※ Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop
※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved

Parameter No. -＊＊-	Parameter name	Activating time	Run mode: Auto (A)	Manual (M)	Zero return (Z)	Lock (L)	Level	Setting unit	Setting range	Standard shipment set (initial value)
									Function	

《Group 7 》[I/O signal parameter]

P740
P741

Output signal allocation list

Allocation No.	Mark	Signal name	Allocation No.	Mark	Signal name
01	MMOD	In Manual run mode	25	SLSA	Software limitA
02	HMOD	In Zero return run mode	26	SLSB	Software limitB
03	AMOD	In Automatic run mode	27		Reserved
04	PMOD	In Servo lock mode	28		Reserved
05	RMOD	In Remote control mode	29		Reserved
06	PEND	Program end	30	MSZ	Zero master axis speed
07	PRDY	Automatic control ready	31	ROUT1	Run positioning general output 1
08	OUT1	General output 1	32	ROUT2	Run positioning general output 2
09	OUT2	General output 2	33	ROUT3	Run positioning general output 3
10	OUT3	General output 3	34	ROUT4	Run positioning general output 4
11	OUT4	General output 4	35	ROUT5	Reserved
12	OUT5	General output 5	36	ROUT6	1 cycle end
13	OUT6	General output 6	37	ROUT7	Output in synchronizing
14	OUT7	General output 7	38	ROUT8	Output of Wait position
15	OUT8	General output 8	39	PRUN	In Automatic run
16	M01	M output 01	40	PRDY1	Automatic run ready 1
17	M02	M output 02	41	PRDY2	Automatic run ready 2
18	M04	M output 04	42	HCMP	Zero return completion
19	M08	M output 08	43	MLS	End of cut position
20	M11	M output 11			
21	M12	M output 12			
22	M14	M output 14			
23	M18	M output 18			
24	MSTB	M strobe			

※Item description [Activating time] I: Real time:/ R: Reset or Power ON/ P: Power ON/ S: Motor stop

※ Item description [Level] S: Setting is requires. / F] : Run can be done by initial value. / M: Reserved

Chapter 4 Index data

4－1 Index data list

Index data No.	Index data name	Type	Function
IX00 ～ IX49	Index data 0 0 ～ Index data 4 9	Hold	Index data which retains data against Power OFF. But re-writing is max. 10000 times.
IX50 ～ IX53	Index data 5 0 ～ Index data 5 3	0Clear	Voluntary Index data which do not retain data against Power OFF. It is 「0」 at Power ON.
IX54	Index data 5 4	0Clear	Index data for BCD 8 digits + mark and only for NCS-FI/FS12 type. For other types, it is voluntary Index data.
IX55 IX57	Index data 5 5 Index data 5 7		Index data for Digital switch unit (SWU-500 series) numeric number and only for NCS-FI/FS12 type. For other types, it is voluntary Index data.
IX58 ～ IX60	Index data 5 8 ～ Index data 6 0	0Clear	Voluntary Index data which do not retain data against Power OFF. It is 「0」 at Power ON.
IX61	Index data 6 1	0Clear	Index data to be off-set No. of Index data No. when Index data 1000～1999 is specified by Command item data.
IX62	Index data 6 2	0Clear	Index data for data of output voltage to Analog monitor. Data value : Output voltage relation -499:-10V, 0:0V, 499:+10V
IX63	Index data 6 3	0Clear	Index data for data of output voltage to Analog monitor . Data value : Output voltage relation -499:-10V, 0:0V, 499:+10V
IX64	Index data 6 4		Index data for Speed command analog input value. -1707:-10V, 1707:10V
IX65	Index data 6 5		Index data for Torque command analog input value. -2047:-10V, 2047:10V

[Tab. 4－1 (a)] Index data list 1/2

Index data No.	Index data name	Type	Function
IX66	Index data 6 6		Index data for current position
IX67	Index data 6 7	0Clear	Index data which counts number down every 10msec when inputted numeric value is other than 0.
IX68	Index data 6 8	0Clear	Voluntary Index data which do not retain data against Power OFF. It is 「0」 at Power ON.
IX69	Index data 6 9	0Clear	Index data for output data for General output signal.
IX70 〜 IX99	Index data 7 0 〜 Index data 9 9	0Clear	Voluntary Index data which do not retain data against Power OFF. It is 「0」 at Power ON.
IX100 〜 IX999	Index data 1 0 0 〜 Index data 9 9 9	0Clear / Hold	Voluntary Index data which do not retain data against Power OFF. It is 「0」 at Power ON. But if an extended memory (option) is equipped, data contents are retained against Power OFF. And at the time Re-write times are not limited.

[Tab. 4 − 1 (b)]　Index data list 2/2

[Tab. 4 − 1] Supplement of Index data list description

①Index data 6 1 (IX61)

Index data 61 is effective when 1000〜1999 is set at Index data setting of each command. In the case, 「Index data 61 contents +(Set Index data No. −1000)」 is actually referred Index data No.

Sample) When Index data 61 contents are 「200」 and Index data set is 「IX1030」, actually referred Index data are as follows.

Actually referred Index data
=Index data [Index data 61 contents +(Set Index data No. −1000)]
=Index data [200+(1030−1000)]
=Index data 230 (IX230)

If different motion of Positioning data, Speed, etc. is planned in the same sequence motion by this Index data, Index data No. change in a command is not required and only by Index data 61 contents change, it can be executed, which can simplify program steps.

② 「0 Clear」 in Type column

「0 Clear」 data in Type column do not retain Index data contents and conduct 0 Clear when power is OFF.

It is suitable for data which can be cleared when power is OFF or varying data as current position, etc. .

4－2 Index data setting

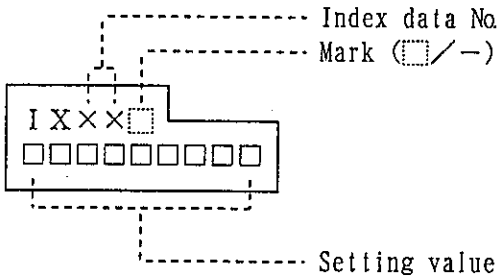
[1] Function

Index data are used on a command as Position/ Speed/ Time/ Output/ Address/ Looping time/ / Processing data and can be specified instead of numeric data.
When Index data are specified on a command, the unit executes the commandcontrols in accordance with numeric contents of the specified Index data.
Index data setting method can be referred to the individual command description.

[2] Unit, Setting range

① Unit : Depends on each command setting unit.
② Setting range : -99999999 ～ 99999999
(A decimal point position depends on [P302 : Command unit] .)
③ Initial value : 00000000

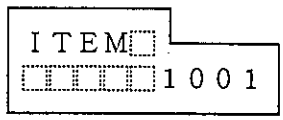
[3] Display



[4] Setting method

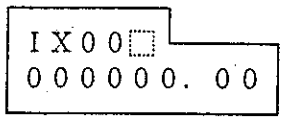
1) Index data edit (IX00～IX99) procedure is as follows.

①ITEM No. setting



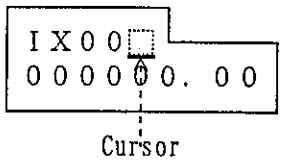
- Sets ITEM No. 「1001」.
- After setting, when MOD key is pushed, it moves to ②.

② Index data selection



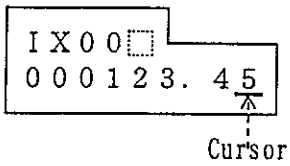
- Select Index data to edit.
- When ▲ key is pushed, Index data No. increases..
- When ▼ key is pushed, Index data No. decreases.
- At the time, currently set data are displayed.

③ Data input 1



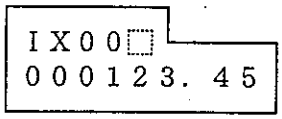
- When ENT key is pushed, a cursor appears and data can be inputted.
- When ▲ or ▼ key is pushed, numeric value or a mark in the cursor column changes.
- When MOD key is pushed, the cursor moves.
- To cancel input data, push ▲▼ keys at once.

④ Data input 2



- By the above operation, input setting data.

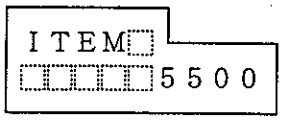
⑤ Data memory



- When ENT key is pushed, a cursor disappears and setting data is memorized.

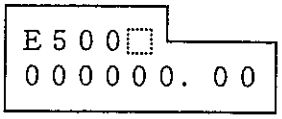
2) Index data edit (IX100～IX999) procedure is as follows.

①ITEM No. setting



- Set ITEM No. 「5500」 (IX500～IX599 edit).
- After setting, when MOD key is pushed, it moves to ②.

② Index data selection



- Select Index data to edit. (E500 is IX500.)
- When ▲ key is pushed, Index data No. increases.
- When ▼ key is pushed, Index data No. decreases.
- At the time, currently set data are displayed.

③ and below No. can be referred to Index data edit (IX00～IX99) procedure ③ and identical No. .

4－3 Index data specification (Handling on each command)

Setting item	Index data handling (Sample: 〔P302 : command unit〕 is 0.1.)
Positioning position (data with mark)	●Data are as setting value. 【Sample】 Index data setting -125.6 → Position -125.6mm
Positioning position (data without mark)	●When data are +, data are as setting value. 【Sample】 Index data setting 125.6 → Position 125.6° ●When data are -, data are as setting value without - mark. 【Sample】 Index data setting -325.6 → Position 325.6°
External trigger position (data without mark)	●When data are +, data are as setting value. 【Sample】 Index data setting 125.6 → Position 125.6mm ●When data are -, data are as setting value without - mark. 【Sample】 Index data setting -325.6 → Position 325.6mm
Speed (mm) (data without mark)	●When data are +, data are as setting value. 【Sample】 Index data setting 125.6 → Speed 125.6mm/s ●When data are -, data are as setting value without - mark. 【Sample】 Index data setting -325.6 → Speed 325.6mm/s ●When data are 0, data are min. setting unit speed. 【Sample】 Index data setting 0.0 → Speed 0.1mm/s ●When data exceed rated speed, data are rated speed.
Speed (rpm) (data with mark)	●Data are as setting value without a decimal point. 【Sample】 Index data setting -125.6 → Speed -1256rpm ●When data exceed rated speed, data are rated speed (rpm).
Time (data without mark)	●Data are as setting value without±mark and unit is 10msec.. 【Sample】 Index data setting -125.6 → Time 12.56sec ●When data exceed setting range, data are max. value.
General output (data without mark)	●Data are as setting value without a decimal point and ±, and are lower 8 bit binary numbers converted from decimal number. 【Sample】 Index data set -52.7 → General output ~~±0~~00001111 (binary)
M output (data without mark)	●Data are as setting value without a decimal point and ± and are lower 2 bit binary numbers 【Sample】 Index data setting -162.5 → M output 25
Address (data without mark)	●Data are as setting value without a decimal point. 【Sample】 Index data setting 1.2 → Address 12 ●When data exceed setting range or 「－」, Alarm stop occurs.
Looping times (data without mark)	●Data are as setting value without a decimal point and ±. 【Sample】 Index data setting -1.2 → Looping 12 ●When data exceed setting range, data are max. value.
Processing data (data with mark)	●Data are as setting value without a decimal point. 【Sample】 Index data setting -1.2 → Processing data -12 ●When processing data exceed Setting range, data are max. value.

〔Tab. 4－2〕 Index data handling

Chapter 5 Command

5－1 Command list

Group	Title	Command name	Function
0 Motion command	NOP	No function [No OPeration]	No motion
	POS	Positioning [POSitioning]	Executes Positioning.
	HOME	Zero return [HOME positioning]	Executes Zero return.
	INDX	Index Positioning [INDeX positioning]	Executes Positioning rotating work to shorter rotating direction.
1 No motion command	M	M output [M out]	Waits for M complete after sending M output and M strobe signals.
	TIME	Timer [TIMEr]	Waits for specified time.
	PEND	Program end [Program END]	Finishes executing Program.
	CALL	Subroutine call [sub-routine CALL]	Repeats Subroutine specified times.
	RET	Subroutine return [sub-routine RETurn]	Indicates completion of specified Subroutine and returns to caller address.
2 Processing command	IMOV	Transfer [Indirect MOVe]	Transfers specified data to Index data.
	ADD	Addition [ADDition]	Executes Addition and transfers the results to Index data.
	SUB	Subtraction [SUBtraction]	Executes Subtraction and transfers the results to Index data.
	MUL	Multiplication [MULtiplcation]	Executes Multiplication and transfers the results to Index data.
	DIV	Division [DIVision]	Executes Division and transfers the results to Index data.
	AND	Logical AND [AND]	Executes Logical AND and transfers the results to Index data.
	OR	Logical OR [OR]	Executes Logical OR and transfers the results to Index data.
	XOR	Exclusive logical OR [eXclusive OR]	Executes Exclusive logical OR and transfers the results to Index data.
3 Jump command	JMP	Un-conditional jump [JuMP]	Jumps to specified address without any condition.
	JZ	0 jump [Jump if Zero]	Jumps to specified address if branch decision (Index data) is 0.
	JNZ	Not 0 jump [Jump if Not Zero]	Jumps to specified address if branch decision (Index data) is not 0.
	JG	Greater than 1 jump [Jump if Greater than zero]	Jumps to specified address if branch decision (Index data) is 1 or greater.
	JL	Less than －1 jump [Jump if Less than zero]	Jumps to specified address if branch decision (Index data) is -1 or less.

[Tab. 5－1 (a)] Command list 1/3

Group	Title	Command name	Function
5 Continuous motion command	SPNS	Spin speed [SPiN Speed]	Achieves specified speed (rpm) for set Accel./ Decel. time.
	SPNT	Spin timer [SPiN Timer]	Retains rotating status reached by Spin speed command for specified time.
	SPNP	Spin positioning [SPiN POSitioning]	Executes Positioning from rotating status at Spin speed to specified position for set time.
	SPOS	Positioning [Sequential POSitioning]	Function is same as [POS] command and Program is continued even after the motion is completed.
	CONT	Simple continuous positioning [CONTinue POSitioning]	During this command continues, continues motion without stop. And if this is last or single command, function is same as SPOS.
	REPT	Repeat positioning [REPeaT POSitioning]	Repeats specified Positioning set times.
	SHOM	Zero return [Sequential HOME positioning]	Function is same as [HOME] command and Program is continued even after the motion is completed.
	SIND	Index Positioning [Sequential INDeX positioning]	Function is same as [INDX] command and Program is continued even after the motion is completed.

[Tab. 5 — 1 (b)] Command list 2/3

Group	Title	Command name	Function
6 Driver command	BRS	Between Run Single	Run positioning Single Round trip action Repeatedly action
	BRC	Between Run Continue	Run positioning Continue Round trip action Repeatedly action
	RRAS	Rotary Run All-sync Single	Rotary run positioning One direction turn Repeatedly action
	RRAC	Rotary Run All-sync Continue	Rotary run positioning Plural numerical value Repeatedly action
	WBR	Wait position Between Return	Zero return speed (parameterp404) Wait positioning Command: BRS BRC
	WRR	Wait position rotary Return	Zero return speed (parameterp404) Wait positioning Command: RRAS RRAC

[Tab. 5 – 1 (c)] Command list 3/3

5－2 Command setting

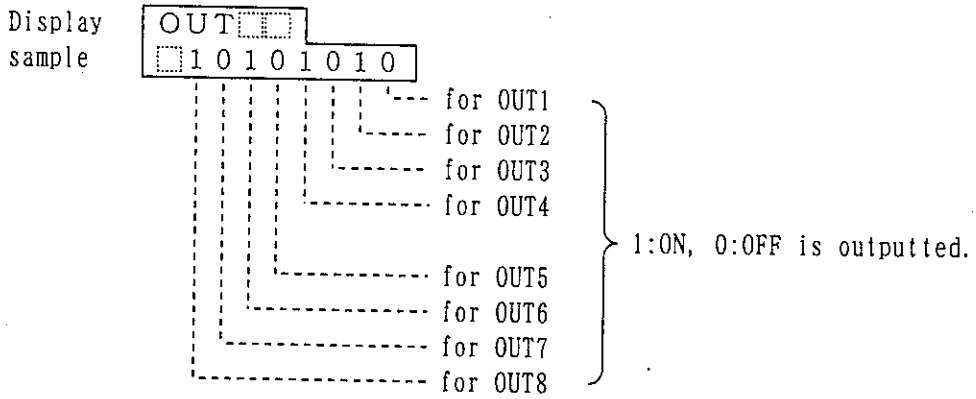
[1] Common setting items

① Accel./Decel. time selection
Conduct setting of Acceleration and Deceleration time by parameters and select a combination from the below tabulation.

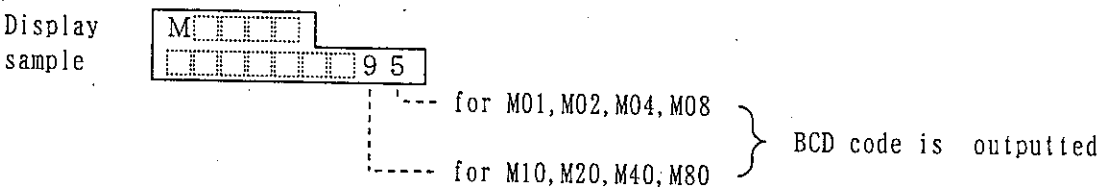
Accel./ Decel. time selection	Accel./ Decel time setting (parameter)
SEL. 1	Accel.time is set (P211 : Accel.time 1) . Decel.time is set (P214 : Decel.time 1) .
SEL. 2	Accel.time is set (P212 : Accel.time 2) . Decel.time is set (P215 : Decel.time 2) .
SEL. 3	Accel.time is set (P213 : Accel.time 3) . Decel.time is set (P216 : Decel.time 3) .

[Tab. 5－2] Combination of Accel./ Decel. time

② General output



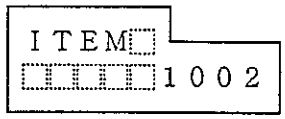
③ M output



[2] Setting method

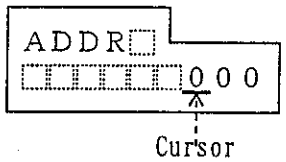
Command Edit procedure is as follows.

①ITEM No. setting



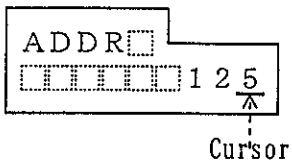
- Set ITEM No. 「1002」.
- After setting, when MOD key pushed, it moves to ②.

② Edit address input 1



- When ENT key is pushed, a cursor appears and data can be inputted.
- When ▲ or ▼ key is pushed, numeric value in the cursor column changes.
- When MOD key is pushed the cursor moves.
- To cancel input data, push ▲▼ keys at once.

③ Edit address input 2

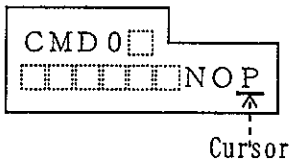


- By the above operation, input Edit address.

④ Edit address decision

- When ENT key is pushed, a cursor disappears and Edit address is decided.
- After decision, when ▲ key is pushed, it moves to ⑤.

⑤ Edit command selection



- When ENT key is pushed, a cursor appears and data can be inputted.
- Push MOD key to select command group.
- Push ▲ or ▼ key to select Edit command.

⑥ Edit command decision

- When ENT key is pushed, a cursor disappears and Edit command is decided.
- After decision, when ▲ key is pushed, it moves to ⑦.

⑦ Edit of each setting item of selected command

→ Refer to the command specification described from next page.
Edit (Numeric value input or menu selection) procedure of each setting item is identical to Parameter edit.

5－3 Command specification

Title	Command name	B S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 0 》 [Motion command]					
NOP	No function [No OPeration]	No ①	None	None	None
			・No motion		
POS	Positioning [POSitioning]	No ②	POS [Positioning position・direction]	mm/° /in	-99999999～99999999 IX0000～IX1999
			A/I [Absolute position /Relative position]	None	ABSOLUTE／INCREMENT
			F [Positioning speed]	mm, ° , in /sec	0000000～9999999 IX0000～IX1999
			UPDN [Accel./Decel. time]	None	SEL. 1／SEL. 2／SEL. 3
			TRG [External trigger position]	mm/° /in	00000000～99999999 IX0000～IX1999
			OUT [General output]	Binary number	00000000～11111111 IX0000～IX1999
			・Executes Positioning. ・External trigger positioning can be conducted. External trigger position sets travel amount from TRG signal input. ・General output can be sent when motion starts. ・Finishes Program after motion is completed.		
HOME	Zero return [HOME positioning]	No ②	TYPE [Zero return method]	None	STD. HOME／LS LESS／ STOP HOME／OT HOME
			DIR [Motion direction]	None	FORWARD／REVERSE
			OUT [General output]	Binary number	00000000～11111111 IX0000～IX1999
			・Executes Zero return. ・Zero return method and direction set can be conducted.・ Except command setting data, this follows Zero return associated parameters. ・General output can be sent when motion starts.。 ・Finishes Program after motion is completed.		

Title	Command name	B / S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 0 》 [Motion command]					
INDX	Index Positioning [INDeX positioning]	No ②	POS [Positioning position・direction]	mm/° /in	00000000～99999999 IX0000～IX1999
			F [Positioning speed]	mm, ° , in /sec	0000000～9999999 IX0000～IX1999
			UPDN [Accel./ Decel. time]	None	SEL. 1／SEL. 2／SEL. 3
			OUT [General output]	Binary number	00000000～11111111 IX0000～IX1999
			・Executes Positioning rotating work to shorter rotating direction. ・General output can be sent when motion starts. ・Finishes Program after motion is completed.		

Title	Command name	B S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 1 》 [No motion command]					
M	M output [M out]	Ys ①	M [M output]	None	00～99 IX0000～IX1999
			・Waits for M complete signal after sending M output and M strobe signal. ・Outputted M output retains data until a command in effective setting status for next M output is executed. ・If this command is executed with M complete input, M strobe is not outputted until the input signal is OFF.		
TIME	Timer [TIMEr]	Ys ①	Time [Timer time]	0.01sec	000000.00～999999.99 IX0000～IX1999
			Out [General output]	Binary number	00000000～11111111 IX0000～IX1999
			・Waits for specified time. ・General output can be sent when motion starts.		
PEND	Program end [Program END]	No ②	None	None	None
			・Finishes executing Program. ・When this command is completed, Program end signal (PEND) and Auto. run ready signal (PRDY) is outputted. ・General output and M output are retained.		
CALL	Subroutine call [sub-routine CALL]	Ys ④	CADR [Called address]	None	000～279 IX0000～IX1999
			REPT [Looping time]	None	00000～65535 IX0000～IX1999
			・Repeats Subroutine specified by CADR (REPT times). ・Nesting (Looping time of executing this command without conducting return) can be conducted max. 8 times. ・When Looping time is 「0」, this command is neglected and next command is executed.		
RET	Subroutine return [sub-routine RETurn]	Ys ①	None	None	None
			・Finishes called Subroutine and returns to caller address. ・When Subroutine is executed specified time, executing address is changed to next address of the caller.		

Title	Command name	B S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 2 》 [Processing command]					
IMOV	Transfer [Indirect MOVe]	No ①	DST [Transfer destination]	None	IX0000～IX1999
			SOC [Transfer origin data]	None	-99999999～99999999 IX0000～IX1999
			・Transfers specified data to Index data. Expression : DST (Index) ← SOC		
ADD	Addition [ADDition]	No ①	DST [Addition results transfer destination]	None	IX0000～IX1999
			SOC1 [Addition factor 1]	None	-99999999～99999999 IX0000～IX1999
			SOC2 [Addition factor 2]	None	-99999999～99999999 IX0000～IX1999
			・Executes Addition and transfers the results to Index data. ・In case of Index data, a decimal point is neglected and numeric value is handled as integer for processing. (Sample : 1.25 is handled as 125 for processing.) ・Processing results are clumped at±99999999. Expression : DST (Index) ← SOC1 + SOC2		
SUB	Subtraction [SUBtraction]	No ①	DST [Process. results transfer destination]	None	IX0000～IX1999
			SOC 1 [Subtraction factor1]	None	-99999999～99999999 IX0000～IX1999
			SOC 2 [Subtraction factor2]	None	-99999999～99999999 IX0000～IX1999
			・Executes Subtraction and transfers the results to Index data. ・In case of Index data, a decimal point is neglected and numeric value is handled as integer for processing. (Sample : 1.25 is handled as 125 for processing.) ・Processing results are clumped at±99999999. Expression : DST (Index) ← SOC1 − SOC2		

Title	Command name	B / S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 2 》 [Processing command]					
MUL	Multiplication [MULtiplication]	No ①	DST [Process. results transfer destination]	None	IX0000～IX1999
			SOC 1 [Multiplication factor1]	None	-99999999～99999999 IX0000～IX1999
			SOC 2 [Multiplication factor2]	None	-99999999～99999999 IX0000～IX1999
			・Executes Multiplication and transfers the results to Index data. ・In case of Index data, a decimal point is neglected and numeric value is handled as integer for processing. (Sample : 1.25 is handled as 125 for processing.) ・Processing results are clumped at±99999999. Expression : DST (Index) ← SOC 1 × SOC 2		
DIV	Division [DIVision]	No ①	DST 1 [Division remainder transfer destination]	None	IX0000～IX1999
			DST2 [Division quotient transfer destination]	None	IX0000～IX1999
			SOC 1 [Dividend]	None	-99999999～99999999 IX0000～IX1999
			SOC 2 [Divisor]	None	-99999999～99999999 IX0000～IX1999
			・Executes Division and transfers the results to Index data. ・In case of Index data, a decimal point is neglected and numeric value is handled as integer for processing. (Sample : 1.25 is handled as 125 for processing.) Expression : DST2 (Index) ← SOC1 ÷ SOC2 DST1 (Index) ← Remainder		
AND	Logical AND [AND]	No ①	DST [Process. results transfer destination]	None	IX0000～IX1999
			SOC 1 [Logical AND factor 1]	None	-99999999～99999999 IX0000～IX1999
			SOC 2 [Logical AND factor 2]	None	-99999999～99999999 IX0000～IX1999
			・Executes AND and transfers the results to Index data. ・In case of Index data, a decimal point is neglected and numeric value is handled as integer for processing. (Sample : 1.25 is handled as 125 for processing.) Expression : DST (Index) ← SOC1 AND SOC2		

Title	Command name	B / S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 2 》 [Processing command]					
OR	Logical OR [OR]	No ①	DST [Process. results transfer destination]	None	IX0000～IX1999
			SOC 1 [Logical OR factor1]	None	-99999999～99999999 IX0000～IX1999
			SOC 2 [Logical OR factor2]	None	-99999999～99999999 IX0000～IX1999
			・Executes OR and transfers the results to Index data. ・In case of Index data, a decimal point is neglected and numeric value is handled as integer for processing. (Sample : 1.25 is handled as 125 for processing.) Expression : DST (Index) ← SOC1 OR SOC2		
XOR	Exclusive logical OR [eXclusive OR]	No ①	DST [Process. results transfer destination]	None	IX0000～IX1999
			SOC 1 [Exclusive logical OR factor 1]	None	-99999999～99999999 IX0000～IX1999
			SOC 2 [Exclusive logical OR factor 2]	None	-99999999～99999999 IX0000～IX1999
			・Executes Exclusive OR and transfers the results to Index data. ・In case of Index data, a decimal point is neglected and numeric value is handled as integer for processing. (Sample : 1.25 is handled as 125 for processing.) Expression : DST (Index) ← SOC1 XOR SOC2		

Title	Command name	B S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 3 》 [Jump command]					
JMP	Un-conditional jump [JuMP]	Ys ①	JADR [Jump destination address]	None	000～279 IX0000～IX1999
			・Jumps to specified address without any condition.		
JZ	0 Jump [Jump if Zero]	Ys ①	JADR [Jump destination address]	None	000～279 IX0000～IX1999
			SOC [Branch condition decision data]	None	IX0000～IX1999
			・Jumps to specified address when Branch decision is 0.		
JNZ	Not 0 Jump [Jump if Not Zero]	Ys ①	JADR [Jump destination address]	None	000～279 IX0000～IX1999
			SOC [Branch condition decision data]	None	IX0000～IX1999
			・Jumps to specified address when Branch decision is not 0.		
JG	Greater than 1 jump [Jump if Greater than zero]	Ys ①	JADR [Jump destination address]	None	000～279 IX0000～IX1999
			SOC [Branch condition decision data]	None	IX0000～IX1999
			・Jumps to specified address when Branch decision is 1 or more.		
JL	Less than －1 jump [Jump if Less than zero]	Ys	JADR [Jump destination address]	None	000～279 IX0000～IX1999
			SOC [Branch condition decision data]	None	IX0000～IX1999
			・Jumps to specified address when Branch decision is －1 or less .		

Title	Command name	B / S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 5 》 [Continuous motion command]					
SPNS	Spin speed [SPiN Speed]	No ①	RPM [Speed]	rpm	-9999～9999 IX0000～IX1999
			TIME [Accel./ Decel. time]	0.01sec	000.00～655.35 IX0000～IX1999
			M [M output]	None	00～99 IX0000～IX1999
			・Achieves specified speed(rpm) for set Accel./Decel. time. But if Accel./ Decel. time setting exceeds the following stipulated max. value, Accel./ Decel. is conducted at the max. value, and the reached speed is constantly retained during excess time. Stipulated time : Max. Accel. time from 0 rpm to rated speed : 300.00 sec. Max. Decel. time from rated speed to 0 rpm. : 300.00 sec. ・Can send M output at Motion start and wait for M completion . ・When Hold (HLD) is inputted in executing this command, a motor decelerates and stops for [P214:Decel. time 1] and at restart M strobe signal output is OFF.		
SPNT	Spin timer [SPiN Timer]	No ①	TIME [Retaining time]	0.01sec	000000.00～999999.99 IX0000～IX1999
			M [M output]	None	00～99 IX0000～IX1999
			・Retains speed status at Spin speed for specified time. ・Can send M output at Motion start and wait for M completion . ・When Hold (HLD) is inputted in executing this command, a motor decelerates and stops for [P214:Decel. time 1] and at restart M strobe signal output is OFF.		
SPNP	Spin positioning [SPiN Positioning]	Ys ①	POS [Positioning position]	mm/° /in	00000000～99999999 IX0000～IX1999
			DOWN [Decel. time selection]	None	SEL. 1／SEL. 2／SEL. 3
			M [M output]	None	00～99 IX0000～IX1999
			・Executes Positioning from rotating status at Spin speed to specified position for set time. ・When Hold (HLD) is inputted in executing this command, a motor decelerates and stops for DOWN setting.		

Title	Command name	B / S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 5 》 [Continuous motion command]					
SPOS	Positioning [Sequential POSitioning]	Ys ①	POS [Positioning position・direction]	mm/° /in	-99999999～99999999 IX0000～IX1999
			A/I [Absolute position /Relative position]	None	ABSOLUTE／INCREMENT
			F [Positioning speed]	mm, ° , in /sec	0000000～9999999 IX0000～IX1999
			UPDN [Accel./Decel. time]	None	SEL. 1／SEL. 2／SEL. 3
			TRG [External trigger position]	mm/° /in	00000000～99999999 IX0000～IX1999
			OUT [General output]	Binary number	00000000～11111111 IX0000～IX1999
			・Motion is identical to POS (Positioning) command. But next address is executed after motion is completed.		
CONT	Simple continuous Positioning [CONTinue positioning]	Ys ②	POS [Positioning position・direction]	mm/° /in	-99999999～99999999 IX0000～IX1999
			A/I [Absolute position /Relative position]	None	ABSOLUTE／INCREMENT
			F [Positioning speed]	mm, ° , in /sec	0000000～9999999 IX0000～IX1999
			UPDN [Accel./Decel. time]	None	SEL. 1／SEL. 2／SEL. 3
			TRG [External trigger position]	mm/° /in	00000000～99999999 IX0000～IX1999
			OUT [General output]	Binary number	00000000～11111111 IX0000～IX1999
			・When this command continues and motion direction is unchanged, Positioning is continued without stop. ・When this command is single, function is same as SPOS. ・External trigger positioning can be conducted. And External trigger positioning sets travel amount from TRG input. ・General output can be sent when motion starts. ・Accel./Decel. time and External trigger positioning in Continuous motion follows start block of this motion 'UPDN' and 'TRG' .		

Title	Command name	B / S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 5 》 [Continuous motion command]					
REPT	Repeat Positioning [REPeaT positioning]	Ys ③	POS [Positioning position・direction]	mm/° /in	-99999999～99999999 IX0000～IX1999
			A/I [Absolute position /Relative position]	None	ABSOLUTE／INCREMENT
			F [Positioning speed]	mm, ° , in /sec	0000000～9999999 IX0000～IX1999
			UPDN [Accel./ Decel. time]	None	SEL. 1／SEL. 2／SEL. 3
			TRG [External trigger position]	mm/° /in	00000000～99999999 IX0000～IX1999
			M [M output]	None	00～99 IX0000～IX1999
			REPT [Looping time]	None	00000～65535 IX0000～IX1999
			・Repeats specified Positioning set times. ・External trigger positioning can be conducted. And External trigger positioning sets travel amount from TRG signal input. ・Can send M output at Motion start and wait for M completion . ・If Looping time is 「0」 , Repeat positioning is not conducted.		
SHOM	Zero return [Sequential HOMe positioning]	Ys ①	Type [Zero return method]	None	STD. HOME／LS LESS／ STOP HOME／OT HOME
			DIR [Motion direction]	None	FORWARD／REVERSE
			OUT [General output]	Binary number	00000000～11111111 IX0000～IX1999
			・Motion is identical to 0 HOME (Zero return) command. But next address is executed after motion is completed.		
SIND	Index Positioning [Sequential IND-ex positioning]	Ys ①	POS [Positioning position・direction]	mm/° /in	00000000～99999999 IX0000～IX1999
			F [Positioning speed]	mm, ° , in /sec	0000000～9999999 IX0000～IX1999
			UPDN [Accel./Decel. time]	None	SEL. 1／SEL. 2／SEL. 3
			OUT [General output]	Binary number	00000000～11111111 IX0000～IX1999
			・Motion is identical to INDX (Index Positioning) command. Program is finished after motion is completed.		

Title	Command name	B / S	Setting data: Data	Setting unit	Setting range (Direct data) (Index data)
			Function		
《Group 4 》 [Driver command]					
TRQ	Torque control [ToRQue]	Ys ①	TRQ [Torque command selection]	None	SEL0～SEL3
			M [M output]	None	00～99 IX0000～IX1999
			・Executes Torque control in accordance with Torque command selection. ・When 「SEL0」 is selected by Torque command selection, motion is conducted by External torque command ・When 「SEL1～3」 is selected by Torque command selection, motion is conducted by parameters [P136～P138: Torque command 1～3]. ・Sends M output at Motion start and becomes Complete motion by M completion (MFIN) input. ・Complete motion conducts Servo lock after Decel.stop and executes next command. ・When Hold (HLD) is inputted in executing this command, a motor decelerates and stops. ・Decel. stop at Complete motion and Hold (HLD) is conducted by [P216: Decel. time 3].		
SPD	Speed control [SPeeD]	Ys ①	SPD [Speed command selection]	None	SEL0～SEL7
			M [M output]	None	00～99 IX0000～IX1999
			・Executes Speed control in accordance with Speed command selection. ・When 「SEL0」 is selected by Speed command selection, motion is conducted by External speed command ・When 「SEL1～7」 is selected by Speed command selection, motion is conducted by parameters [P129～P135: Speed command 1～7]. ・Accel./ Decel. is conducted by [P213: Accel.time 3], [P216: Decel. time 3]. ・Sends M output at Motion start and becomes Complete motion by M completion (MFIN) input. ・Complete motion conducts Servo lock after Decel.stop and executes next command. ・When Hold (HLD) is inputted in executing this command, a motor decelerates and stops. ・Decel. stop at Complete motion and Hold (HLD) is conducted in accordance with [P216: Decel. time 3].		

Supplement of Command specification description

BS column indicates Block stop function at each command end.
(Block stop function executes stop motion at command end by Block stop signal (BTSP) in Auto. run.)

「No ①」 neglects Block stop signal and executes next address command.

「No ②」 neglects Block stop signal and executes commands to Program end.

「Ys ①」 makes wait condition for restart when a command is completed.
Next address command is executed by restart.

「Ys ②」 makes wait condition for restart when Continuous motion is completed and a motor stops.
Next address command of Block stop completion is executed by restart.

「Ys ③」 makes wait condition for restart when all the Repeat positioning is completed.
Next address command is executed by restart.

「Ys ④」 makes wait condition for restart after calling specified address.
Specified address command is executed by restart and this command is continued or restarted.

Cautions common to commands

Caution 1) Program run is terminated by input of one of 「POS」 / 「HOME」 / 「INDX」 / 「PEND」 commands.

Caution 2) Available range of General output and M output depends on a controller type.

Controller type	Local control output (connector:J5)	Serial communication (connector:J1)	Sequence control (aux. relay M)	Remote sequence control (output relay X)
NCS-FI/FS30	No	Yes ②	No	No
NCS-FI/FS31	Yes ①※1	Yes ②	No	No
NCS-FI/FS32	No	Yes ②	No	Yes ②※2
NCS-FI/FS33	No	Yes ②	Yes ②※2	No
NCS-FI/FS34	No	Yes ②	Yes ②※2	No

Yes ① : Either General outputs or M outputs can be outputted externally.
Yes ② : All of General outputs and M outputs can be outputted remotely.
No : General outputs and M outputs can not be outputted.

※1 : OUT or M output of Local control output may not be conducted by the parameter 〔P717 : Output signal function selection 1〕 setting.
Description can be referred to 「3-3 Parameter specification」.

※2 : External output can be conducted by sequence program.

Caution 3) More detailed specification than this manual can be referred to the separate manual 『Volume: Command』.

Chapter 6 Protective function

6－1 Protective function and error treatment

The controller has various Protective function to prevent a controller or a motor from damage, and Error treatment function to inform operation error, etc. .
Protective function consists of 「Alarm treatment」 and 「Warning treatment」
And Error treatment function has 「Error display」 .

① Alarm treatment
when an error is detected, a motor stops (sudden stop or Torque free based on an error type) and Alarm signal output and Alarm message display are conducted, simultaneously.

② Warning treatment
If it is supposed to probably become error if current operation is continued, Warning of error notice will be made.
The controller outputs Warning signal when Warning occurs and display Warning message but does not stop motor motion.

③ Error display
When operation error, input error, etc. occurs, Error message is displayed on the spot.

	Treatment description when Error occurs (detected).		
	Motor motion status	Control out. signal	LCD display
Alarm treat	Sudden stop or Torque free	Alarm signal ON	Alarm message
Warning treat.	Current motion continues.	Warning signal ON	Warning message
Error display	Current motion continues.	Un-changed	Error message

[Tab. 6－1] Error occurrence and treatment

6－2 Protective function list

6－2－1 Alarm list

Name / Display	Contents	Motion and output signal status	Way to release
IPM error ALM. □ IPM ERR.	Due to line-to-ground of motor or same and short-circuit of U,V,W cables between controller and motor over-current flows in main circuit transistor or cooling heat sink for power element is over-heated.	Motor torque free. Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input
Control power under voltage error ALM. □ UNDRVOLT1	Control power (+5V、+15 V) voltage dropped. DC+5V : About +4.75V or less DC+15V : About +13.5V or less	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input
Main power source under voltage error ALM. □ UNDRVOLT2	Main circuit DC bus voltage dropped less than 180[370]V. In [ ], value of 400V type (In case of controller combined with main power type detects Alarm.)	Motor stops and torq. free by [P713] . Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input
Over-voltage error ALM. □ OVER□VOLT	Due to excess load inertia, etc.at motor stop or decel. regenerative energy is beyond capacity and DC power voltage of main circuit exceeds about 400 [820]V. In [ ], value of 400V type	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input
Motor over-heat error ALM. □ OVERHEAT2	Motor temp. detection thermister is 150℃ or more.	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	Wait until motor becomes cool, then ①Power reinput ②Reset signal (RST) input
Disconnection of thermister ALM. □ THERMIST.	Cable of motor temp. detection thermister is broken or disconnected.	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	Confirm wiring, then ①Power reinput ②Reset signal (RST) input
Encoder fault ALM. □ □□ENCODER	①Encoder fault ②Disconnect. or break of encoder cable or loose fitness of connector. ③Wrong encoder selection by parameter, etc. occurred.	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	Confirm encoder, encoder cable and parameter 「P001」, then ①Power reinput

[Tab. 6－2 (a)] Alarm list 1/9

Name / Display	Contents	Motion and output signal status	Way to release
Motor shaft error at power input ALM. □ PW. ON□ENC	Motor shaft has been rotated or vibrated when power is turned ON. In t he case, encoder can not be initialized. [Detection only for NCS-FS type]	Motor torque free Alarm ON Warning OFF Servo ready OFF	Power reinput
Overspeed error ALM. □ OVERSPEED	Motor speed is more than about 130 % of rated speed.	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input
Over-load error ALM. □ OVER□LOAD	Due to over-load, or too frequent ON/OFF than allowable times, internal electric thermal is activated.	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input
AC loss detection error ALM. □ □□AC□DOWN	AC power voltage dropped less than about 145[290] V for 50ms or more. (Black out occurred.) In [ ], value of 400V type	Motor stops and torque free by[P713]. Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input
Deviation over-flow ALM. □ □OVERFLOW	Position deviation exceeds setting value of [P207 : Over-flow detection pulse] .	Sudden motor stop and torq. free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input
Deviation error ALM. □ VARI. OVER	Position deviation exceeds setting of [P208 : Deviation error detection pulse] . ※ But it is applied when 「STOP :Alarm stop」 is selected by [P209 : Motion selection at Deviation error] .	Sudden motor stop and Servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	①Power reinput ②Reset signal (RST) input

*1 : Status when 「RDY1」 is selected by [P716: RDY signal spec. selection] .
If other is selected, status could be different.

[Tab. 6 — 2 (b)] Alarm list 2/9

Name / Display	Contents	Motion and output signal status	Way to release
Forward over travel ALM. □ +HARD□OT.	Forward over travel signal(FOT) is detected.	Sudden motor stop and Servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	①Motor moves to reverse by Jog motion and release forward over-travel.
Reverse over travel ALM. □ −HARD□OT.	Reverse over travel signal(ROT) is detected.	Sudden motor stop and Servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	①Motor moves to forward by Jog motion and release reverse over-travel.
Forward software over travel ALM. □ +SOFT□OT.	Current position exceeds setting value of [P306 :Forward software OT limit] .	Sudden motor stop and Servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	①Motor moves to reverse travel limit by Jog motion.
Reverse software over travel ALM. □ −SOFT□OT.	Current position exceeds setting value of [P307 :Reverse software OT limit] .	Sudden motor stop and Servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	①Motor moves to forward travel limit by Jog motion.

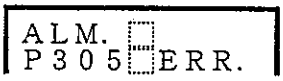
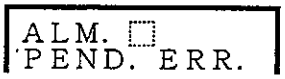
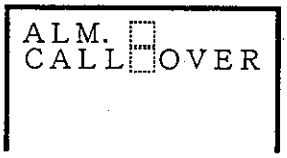
*1 : Status when 「RDY1」 is selected by [P716: RDY signal spec. selection] .
If other is selected, status could be different.

[Tab. 6 − 2 (c)] Alarm list 3/9

Name / Display	Contents	Motion and output signal status	Way to release
No set of motor type ALM. □ MOTRTYPE1	Setting of [P000 : Motor type] is 「000」.	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	Set motor type, then ①Power reinput
Motor type error ALM. □ MOTRTYPE2	Combination of motor and controller selected by [P000 : Motor type] is wrong.	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	Set motor type correctly, then ①Power reinput
Extended memory cell under voltage error ALM. □ RAM BATT.	Voltage of data hold cell for extended memory (option) dropped. (Only once, Alarm is outputted in power ON status.)	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Reset signal (RST) input. Immediate replacement of extended memory by us is required.
EEPROM (nan-volatile) write error ALM. □ WR. EEPROM	Write of data to EEPROM (in controller) was failed.	Sudden motor stop and Servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	①Power reinput ②Reset signal (RST) input
Rated speed command error 1 ALM. □ STD. SPD. 1	Speed at motor rated speed set by [P303,P304: Electric gear ratio] and [P310 : Machine travel amount] exceeds 2M (setting unit / sec).	Motor torque free Alarm ON Warning OFF Servo ready OFF Brake release OFF	Correct [P303, P304 : Electric gear ratio] and [P310 : Machine travel amount] , then ①Power reinput ②Reset signal (RST) input
Rated speed command error 2 ALM. □ STD. SPD. 2	Speed at motor rated speed set by [P303,P304: Electric gear ratio] and [P310 : Machine travel amount] is less than 100mm (setting unit / sec).		
Address set error ALM. □ ADDR□ERR.	Command out of 0～279 range was specified and tried.	Motor servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Correct to right address, then ①Power reinput ②Reset signal (RST) input

*1 : Status when 「RDY1」 is selected by [P716: RDY signal spec. selection] .
If other is selected, status could be different.

[Tab. 6 — 2 (d)] Alarm list 4/9

Name / Display	Contents	Motion and output signal status	Way to release
Positioning time over 	Positioning is not completed after set time 〔P203 : Positioning time over〕 passed.	A motor sudden stops and in servo lock. Alarm ON Warning OFF Servo ready ON *1 Brake release ON	①Power reinput ②Reset signal (RST) input
Positioning data over-flow 	Simple continuous positioning is tried to execute continuous travel distance out of range 2147483647～ -2147483647.	Motor in servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Set continuous travel distance in the range. ①Power reinput ②Reset signal (RST) input
No 1 rotation data set error 	Without setting of 〔P305 : Index positioning range〕, i.e. 「0」, Index positioning or Spin command is tried to execute.	Motor in servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Set 〔P305 : Index positioning range〕 correctly, then, ①Power reinput ②Reset signal (RST) input
No program end command set error 	In executing command other than 0, address becomes 280 due to no PEND command set.	A motor sudden stops and in servo lock. Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Input correct program, then, ①Power reinput ②Reset signal (RST) input
Subroutine call nesting over 	Subroutine call is tried to execute 9 times without executing Subroutine return.	Motor in servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Input correct program, then, ①Power reinput ②Reset signal (RST) input
Subroutine return error 	Subroutine call is tried to execute without executing Subroutine return.	Motor in servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Input correct program, then, ①Power reinput ②Reset signal (RST) input

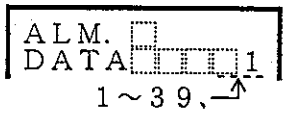
*1 : Status when 「RDY1」 is selected by [P716: RDY signal spec. selection].
If other is selected, status could be different.

[Tab. 6 − 2 (e)] Alarm list 5/9

Name / Display	Contents	Motion and output signal status	Way to release
Jump address error ALM. □ JUMP□ERR.	Jump to address or Subroutine addresses is set other than range 0～278 and was tried to execute the command.	Motor in servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Input correct address, then, ①Power reinput ②Reset signal (RST) input
Spin command error ALM. □ □SPN. ERR.	Without executing SPNS command, SPNT or SPNP is tried to execute. Or in Spinning, command other than SPNS, SPNT, SPNP is tried to execute. Or, SPNS or SPNT is executed by Address 279.	A motor sudden stops and in servo lock. Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Input correct program, then ①Power reinput ②Reset signal (RST) input
Division error ALM. □ 0DIV. ERR.	「0」 is tried to execute as divisor.	Motor in servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Input correct divisor, then ①Power reinput ②Reset signal (RST) input
Positioning amount error ALM. □ □POS□OVER	Positioning command is tried to execute by the setting over Parameter 〔P308 : Max. Forward positioning amount〕 or 〔P309 : Max. Reverse positioning amount〕 .	Motor in servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Input correct data, then, ①Power reinput ②Reset signal (RST) input
Error command ALM. □ CMND. ERR.	Command which can not be identified is tried to execute. (It occurs when an error command is registered by communication)	Motor in servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Input correct data, then, ①Power reinput ②Reset signal (RST) input
Index data No. error ALM. □ IXNO. ERR.	Command specified Index data No. out of 0～999 is tried to execute. (It occurs when Index data offset No. is used or error index data No. is registered by communication.)	Motor in servo lock Alarm ON Warning OFF Servo ready ON *1 Brake release ON	Input correct data, then, ①Power reinput ②Reset signal (RST) input

*1 : Status when 「RDY1」 is selected by 〔P716: RDY signal spec. selection〕.
If other is selected, status could be different.

〔Tab. 6－2 (f)〕 Alarm list 6/9

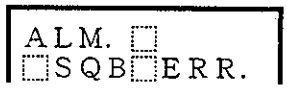
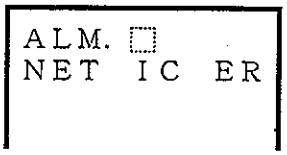
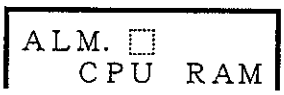
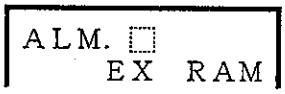
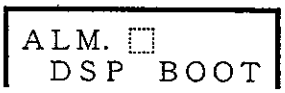
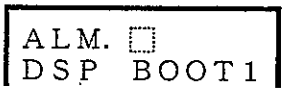
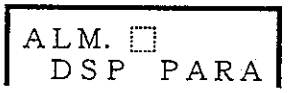
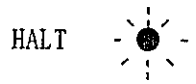
Name / Display	Contents	Motion and output signal status	Way to release
Stored data error 1～39, 42 	Stored data are broken.	Motor in torq. free Alarm ON Warning OFF Servo ready OFF Brake release OFF	Reset data, then ①Power reinput ②Reset signal (RST) input But since DATA39 error release is impossible, consult us.

Display	Description
DATA 1	Parameter data (Group0／P000～99) were broken.
DATA 2	Parameter data (Group1／P100～199) were broken.
DATA 3	Parameter data (Group2／P200～299) were broken.
DATA 4	Parameter data (Group3／P300～399) were broken.
DATA 5	Parameter data (Group4／P400～499) were broken.
DATA 6	Parameter data (Group5／P500～599) were broken.
DATA 7	Parameter data (Group6／P600～699) were broken.
DATA 8	Parameter data (Group7／P700～799) were broken.
DATA 9	Command data (Address 000～009) were broken.
DATA 10	Command data (Address 010～019) were broken.
DATA 11	Command data (Address 020～029) were broken.
DATA 12	Command data (Address 030～039) were broken.
DATA 13	Command data (Address 040～049) were broken.
DATA 14	Command data (Address 050～059) were broken.
DATA 15	Command data (Address 060～069) were broken.
DATA 16	Command data (Address 070～079) were broken.
DATA 17	Command data (Address 080～089) were broken.
DATA 18	Command data (Address 090～099) were broken.
DATA 19	Command data (Address 100～109) were broken.
DATA 20	Command data (Address 110～119) were broken.
DATA 21	Command data (Address 120～129) were broken.
DATA 22	Command data (Address 130～139) were broken.
DATA 23	Command data (Address 140～149) were broken.
DATA 24	Command data (Address 150～159) were broken.
DATA 25	Command data (Address 160～169) were broken.
DATA 26	Command data (Address 170～179) were broken.
DATA 27	Command data (Address 180～189) were broken.
DATA 28	Command data (Address 190～199) were broken.
DATA 29	Command data (Address 200～209) were broken.
DATA 30	Command data (Address 210～219) were broken.
DATA 31	Command data (Address 220～229) were broken.
DATA 32	Command data (Address 230～239) were broken.
DATA 33	Command data (Address 240～249) were broken.
DATA 34	Command data (Address 250～259) were broken.
DATA 35	Command data (Address 260～269) were broken.
DATA 36	Command data (Address 270～279) were broken.
DATA 37	Index data (IX00～IX49) were broken.
DATA 39	Adjustment data for unit shipment were broken.
DATA 42	Index data (IX100～IX999) were broken. Only units equipped with extended memory can detect.

[Tab. 6－2(g)] Alarm list 7/9

Name / Display	Contents	Motion and output signal status	Way to release
Absolute encoder preload error ALM. □ ABS. PRE. L	Preload is not completed after preload of Absolute encoder works. ※Applied when Absolute encoder is used.	Motor in servo lock Alarm ON Warning OFF Servo ready ON Brake released OFF	①Power reinput ②Reset signal (RST) input
Absolute encoder battery error ALM. □ ABS. BATT.	External battery voltage for Absolute encoder data back up dropped. 『Detected when power is turned ON.』 ※Applied when Absolute	Motor in torq. free Alarm ON Warning OFF Servo ready OFF Brake release OFF	Replace external battery, then, ①Power reinput ②Reset signal (RST) input
Absolute encoder count error ALM. □ ABS. COUNT	Counter error of Absolute encoder occurs. ※Applied when Absolute encoder is used.	Motor in torq. free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input
Absolute encoder over-flow error ALM. □ □ABS. OVER	Rotating amount of Absolute encoder is more than ±4095 turns. ※Applied when Absolute encoder is used.	Motor in torq. free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input Initialize setting of Absolute encoder.
Absolute encoder data back up error ALM. □ ABS. BAKUP	Absolute position data backed up in Absolute encoder is gone. ※Applied when Absolute encoder is used.	Motor in torq. free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input Initialize setting of Absolute encoder.
Absolute encoder communication error ALM. □ ABS. COMM.	Data Absolute encoder can not be received. ※Applied when Absolute encoder is used.	Motor in torq. free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Reset signal (RST) input

[Tab. 6 — 2 (h)] Alarm list 8/9

Name / Display	Contents	Motion and output signal status	Way to release
SQB (Sequence control section) Alarm 	①Access from SQB has been lost for 10 sec. at power ON, and 1 sec. in normal condition. ②Self-diagnostic or Forced jog mode is changed.	Motor in torq. free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput
Remote sequ.control IC fault 	IC part to control communication of Remote sequence control is broken.	Motor in torq. free Alarm ON Warning OFF Servo ready OFF	Repair it by our service sec. .
Remote sequ.cont.commun.error 	Communication of Remote sequence control can not be used. It occurs when power of a controller using Sequence control is turned OFF first.	Motor in torq. free Alarm ON Warning OFF Servo ready OFF	Reinput power to whole system where Sequence control is remotely connected.
CPU fault     	Unit is out of order.	Motor in torq. free Alarm flashes Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Replace or repair the unit by us.
CPU fault Front LED is lit. 	Due to fault of CPU, memory (ROM,RAM), etc. Watch dog timer alarm is activated.	Motor in torq. free Alarm ON Warning OFF Servo ready OFF Brake release OFF	①Power reinput ②Replace or repair the unit by us.

[Tab. 6 – 2 (i)] Alarm list 9/9

6－2－2 Warning list

Name / Display	Contents	Motion and output signal status	Way to release
Over load warning WNG. □ OVER. LOAD	If current running conditions are continued, Over-load error will occur.	Current motion continues. Alarm OFF Warning ON Servo ready ON Brake release ON	①Delete cause of Over-load.
Deviation error warning WNG. □ VARI. OVER	Position deviation exceeds set of [P208 : Deviation error detection pulse] . ※Applied when 『Continuous motion』 is selected by [P209:Motion selection at Deviation abnormal].	Current motion continues. Alarm OFF Warning ON Servo ready ON Brake release ON	①Delete cause of Deviation error. (Load increase, wrong setting ofgain, Accel./Decel/ time, etc.)
Main power under voltage detection warning WNG. □ UNDRVOLT2	Main circuit DC bus voltage becomes 180[370]V or less. In [ ], value of 400V type (In case of controller not combined with power source, this warning is detected.)	Motor in torq. free Alarm OFF Warning ON Servo ready OFF Brake release OFF	Recover main power source tonormal voltage range.
Zero return incomplete auto. start warning告 WNG. □ HOME. ERR.	Since Auto. run started in Zero return incomplete status, Start signal is ignored. ※When [P409 : Auto. run permit codit-ion selection] is no condition, this is not detected.	Neglects Auto. start signal. Alarm OFF Warning ON Servo ready ON Brake release ON	①Execute Zero return. (When mode other than Auto. modeis selected, Warning is OFF.)
Absolute encoder battery error warning WNG. □ ABS. BATT.	External battery voltage for Absolute encoder data back up dropped. 『Detected, always.』 ※Applied when Absolute encoder is used.	Current motion continues. Alarm OFF Warning ON Servo ready ON Brake release ON	①Replace external battery.
Absolute encoder preload incomplete warning WNG. □ ABS. PRE. L	Preload and preset of Absolute encoder is not completed. ※Applied when Absolute encoder is used.	Current motion continues. Alarm OFF Warning ON Servo ready ON Brake release ON	①Execute preload and preset program.
Remote sequence control commun. waiting warning WNG. □ NET NORDY	Communication for Remote sequence control is not started. This occurs when controller for Remote sequence control is not functioning.	Current motion continues. Alarm OFF Warning ON Servo ready ON	Turn power of control ON for Remote Sequence control.

[Tab. 6－3] Warning list

6－2－3)　Error list

Name Display	Contents	Motion and output signal status	Way to release
Data input range error ERR. ･ ･･･EDIT･1	Inputted parameter and data value is out of setting range.	In Edit mode, motor continues present motion. Output signal is not changed.	①Release error by input of any key and reset correct data.
Data setting value error ERR. ･ ･･･EDIT･2	Computed results with plural associated values are out of setting range.	In Edit mode, motor continues present motion. Output signal is not changed.	①Release error by input of any key and reset correct data.
Duplicate operation error ERR. ･ ･･･EDIT･3	Same address command is edited by LCD module and MDI, simultaneously.	In Edit mode, motor continues present motion. Output signal is not changed.	①Release error by input of any key and operate by only either one.

[Tab. 6－4]　Error list

6－2－4 Inspection method and measures when Protective function works.

When an error occurs, please confirm error contents by Alarm display, and take proper measures.
Before releasing Alarm, be sure to delete error cause.
If an error occurs repeatedly, the unit could be damaged.

Description	Cause	Corrective measures
【I P M fault】 ・Due to line-to-ground error of a motor, or the same error, short-circuit or mis-wiring of cables (U, V, W) between a controller and a motor, Overcurrent flows in main circuit transistors. ・AC power source voltage is out of spec. range. And Over-current flows in main circuit transistor	・Line-to-ground of a motor	・Replace the motor.
	・Line-to-ground and short-circuit between a controller and a motor	・Correct the wiring.
	・Current fluctuation due to unstable motor motion and vibration	・Adjust stability. (Adjust gain , improve machine system play, etc.)
	・Power source voltage is out of spec. range or fluctuates largely .	・Supply correct power.
	・Malfunction due to noise	・Remove noise source and take anti-noise measures.
【I P M fault】 ・Power elements are over-heated.	・High ambient temperature or bad ventilation	・Lower ambient temperature. Improve ventilation.
	・Stop of cooling fan	・Replace the cooling fan.
【Over-load error】 ・Due to over-load or too frequent motor ON / OFF than allowable times, an internal electric thermal is activated. ・Motor value different from the applied type is set to Parameters P000～P002.	・Excess load	・Decrease load.
	・Too frequent start and stop of a motor	・Decrease frequency of motor ON/ OFF.
	・Incorrect wiring (U, V, W) between a controller and a motor	・Correct wiring.
	・Encoder feedback signal is influenced by noise.	・Remove noise source and take anti-noise measures.
	・Encoder failure	・Replace the encoder.
	・Mechanical locking with a brake, etc.	・Release the brake. If there is a problem in machine system, fix it.
	・Current fluctuation due to unstable motor motion and vibration	・Adjust stability. (Adjust gain and improve play of machine system, looseness ofconnecting section, weak machinerigidity, etc. .)
	・ High ambient temperature or bad ventilation	・Lower ambient temperature. Improve ventilation.
	・ Wrong set of P000～P002	・Set correct value to P000～P002.

Description	Cause	Corrective measures
【Control power source under voltage error】 ・Control power source (+5V, +15V) voltage dropped. DC+5V : About+4.75V or less DC+15V : About+13.5V or less	・Power source voltage is low (Includes insufficient capacity). ・Power black out occurred for more than 10ms. ・Power cables are thin. ・Loose screw in power source terminals	・Supply power source, or reconsider power supply system, capacity and cable diameter.
	・Malfunction due to noise	・Delete noise source and take anti-noise measures.
【Main power source under voltage error】 ・Main circuit DC bus voltage becomes 180 [370] V or less. In [ ], value of 400V type	・Power source voltage is low (Includes insufficient capacity). ・Power black out occurred for more than 10ms. ・Power cables are thin. ・Loose screw in power source terminals	・Supply correct power source, or reconsider power supply system, capacity and cable diameter.
	・Malfunction due to noise	・Delete noise source and take anti-noise measures.
【Over-voltage error】 ・Due to excess load inertia, etc., at motor stop or decel., regenerative energy is beyond capacity and DC power voltage of main circuit exceeds about 400 [820] V or more. In [ ], value of 400V type	・Power source voltage is high.	・Supply correct power source.
	・Excessive regenerative energy due to too large load inertia	・Reduce load inertia or increase speed or set longer decel. time.
	・Malfunction due to noise	・Delete noise source and take anti-noise measures.
【Over speed error】 ・Motor speed exceeds 130% of rated speed.	・Incorrect wiring (U, V, W) between a controller and a motor. ・Incorrect wiring of Encoder feedback signal	・Correct wiring.
	・Encoder failure	・Replace the encoder.
	・Due to excess load inertia or in-adequate gain setting, Over-shoot is large.	・Reduce load inertia or increase accel. time. ・Adjust stability (Adjust gain and improve play of machine system, looseness of connecting section, weak machine rigidity, etc.)
	・Encoder feedback signal is influenced by noise.	・Delete noise source and take anti-noise measures.
【Encoder error】 ・Encoder is faulty, encoder cable is broken, not connected or a connector came out.	・Breaking, disconnection or incorrect wiring of Encoder cable	・Correct wiring.
	・A connector was inserted incorrectly.	・Insert the connector, securely.
	・Encoder failure	・Replace the encoder.
	・Wrong P001 setting	・Set correct value.

Description	Cause	Corrective measures
【Deviation over-flow】 【Deviation error】 ・Position deviation exceeds set of Parameter 〔P207:Over-flow detection pulse〕. ・Position deviation exceeds set of Parameter 〔P208: Deviation error detection pulse〕.	・Excess load	・Reduce load.
	・Due to excess load inertia or in-adequate gain setting, Over-shoot is large.	・Reduce load inertia or increase accel./decel. time. ・Adjust stability (Adjust gain and improve play of machine system, looseness of connecting section, weak machine rigidity, etc.)
	・Incorrect wiring (U, V, W) between a controller and a motor. ・Incorrect wiring of Encoder feedback signal	・Correct wiring.
	・Encoder failure	・Replace the encoder.
	・Encoder feedback signal or command pulse is influenced by noise.	・Delete noise source and take anti-noise measures.
【Positioning time over】 ・Positioning is not completed even after set time of Parameter 〔P203: Positioning time over〕 has passed.	・Mechanical block by a brake etc.	・Release the brake. If there is a problem in machine system, fix it.
	・Wrong parameter setting ・ Excess load	・Check associated parameters and reset correct values. ・Reduce load.
	・Sticking in machine system	・Fix the trouble in the machine system.
	・Gain setting is too low.	・Increase gain setting.
	・Wrong parameter setting	・Check associated parameters and reset correct values.
【Forward Over-travel】 【Reverse Over-travel】 ・Forward over-travel is detected. ・Reverse Over-travel is detected.	・Breaking, disconnection or incorrect wiring of Control signal cable	・Correct wiring.
	・A connector was inserted incorrectly.	・Insert the connector, securely.
	・Wrong Positioning data setting	・Reset correct value.
	・Wrong external sequence	・Correct the external sequence.
【Forward software limit】 【Reverse software limit】 ・Current position exceeds set of Parameter 〔P306: Forward software limit〕. ・Current position exceeds set of Parameter 〔P307: Reverse software limit〕.	・Wrong Positioning setting	・Reset correct value.
	・Wrong parameter setting	・Check associated parameters and reset correct values.
【EEPROM write error】 ・Write can not be conducted to non-volatile memory (EEPROM).	・Due to noise, Write of data can not be conducted to non-volatile memory (EEPROM).	・Delete noise source and take anti-noise measures.
【Positioning amount error】 ・In Positioning associated command, Positioning amount exceeds 〔P308:Max. Forward positioning amount〕 or 〔P309:Max. Reverse positioning amount〕.	・Wrong Positioning setting	・Reset correct value.
	・Wrong parameter setting	・Check associated parameters and reset correct values.
	・Malfunction due to noise	・Delete noise source and take anti-noise measures.

Description	Cause	Corrective measures
【CPU fault】 ・Due to CPU or memory fault, Watch dog timer is activated.	・Malfunction due to noise	・Delete noise source and take anti-noise measures.
	・Unit failure	・Replace the unit.
【Stored data error】 ・Error occurs in data contents.	・ Data is broken by noise.	・Delete noise source and take anti-noise measures.

[Tab. 9－5]　Inspection method and measures when Protective function works

⚠ Caution
①If Reset is repeatedly conducted when IPM fault or Over-load error occurs, it may cause controller damage and burning out of a motor. Be sure to delete the error cause and resume units.

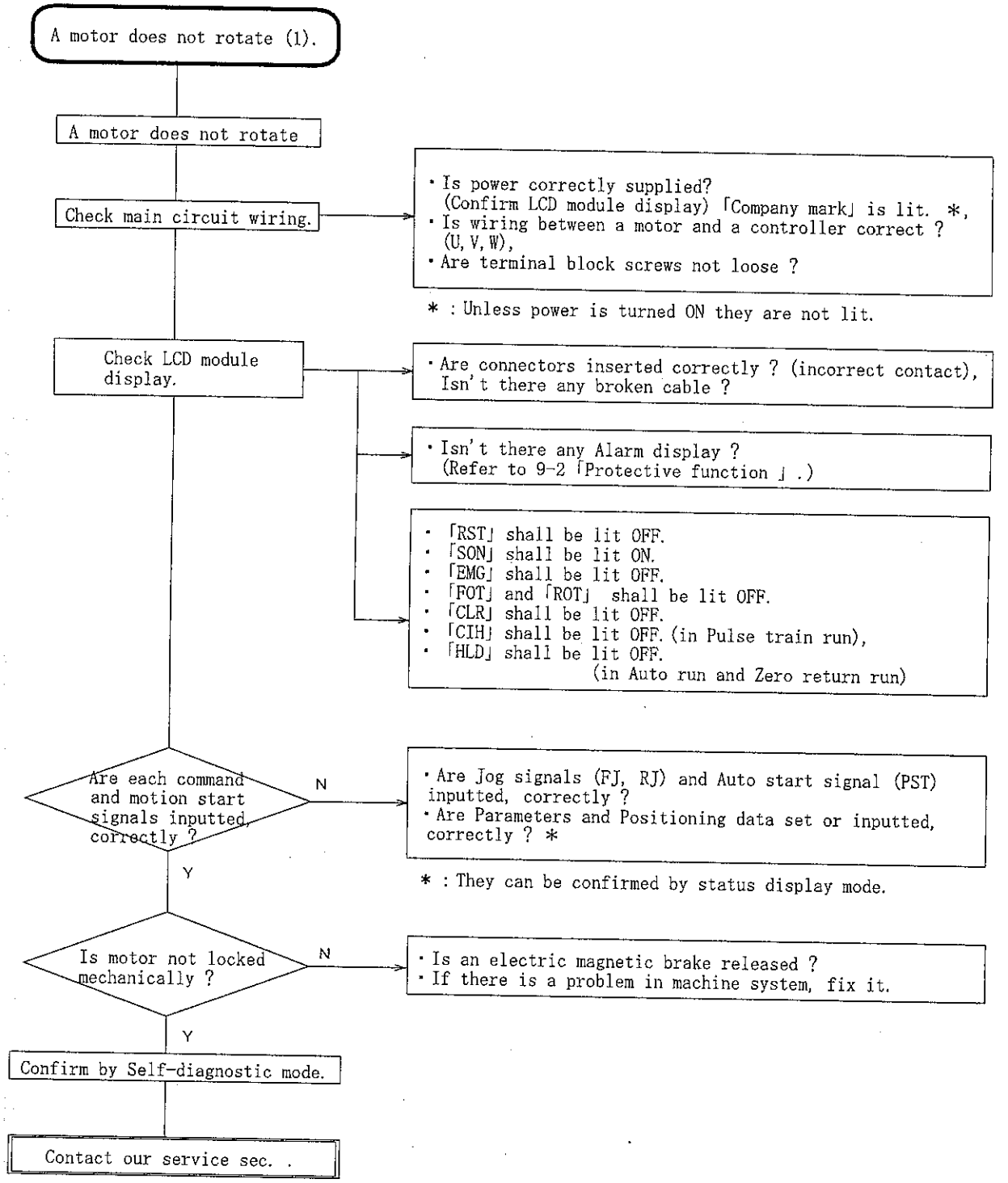
6－3 Trouble shooting

When an error occurs, investigate the cause and take proper corrective measures in accoordance with the following proceedure.

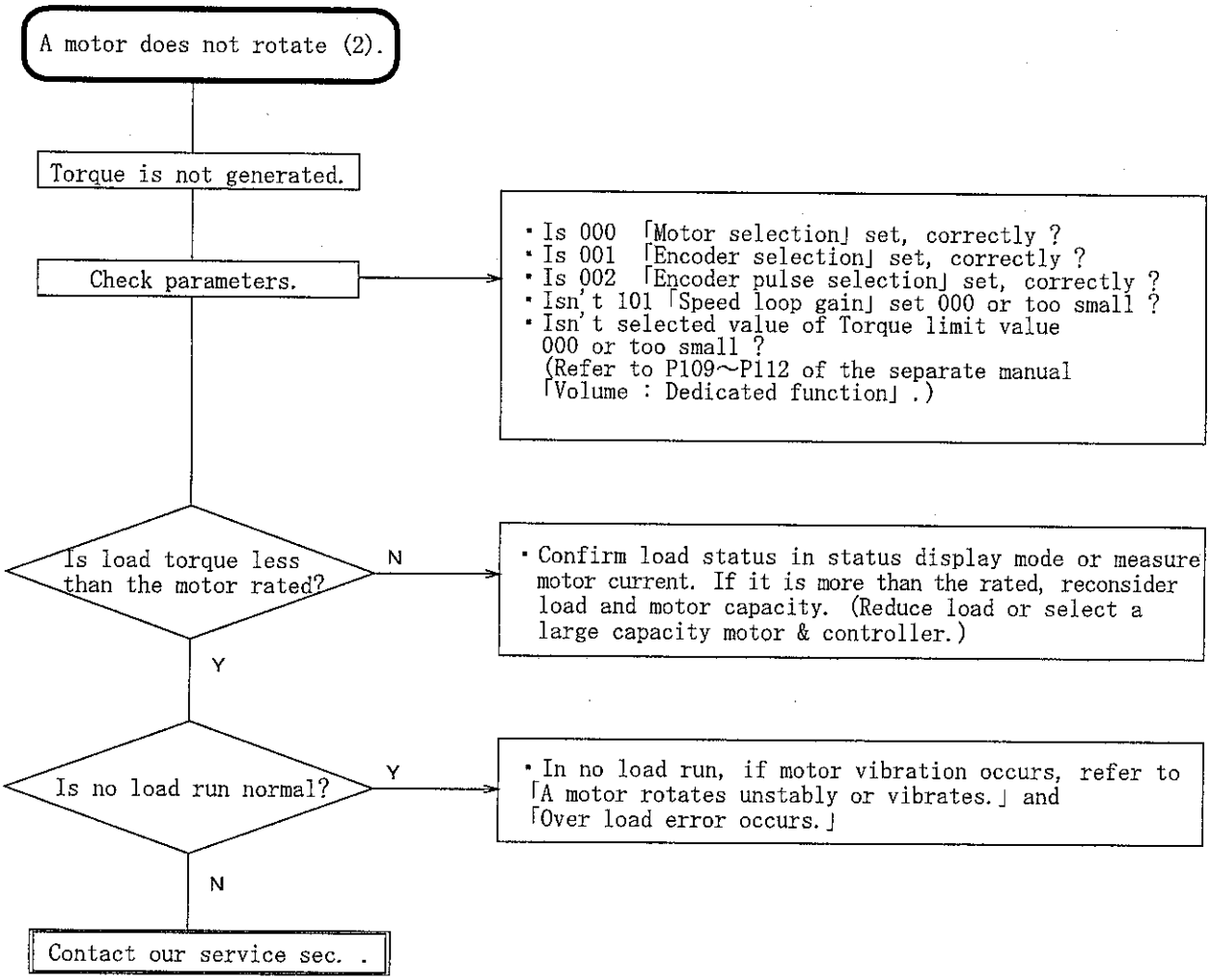
If the cause is none of the following cases, please contact our sales or service section, so on.

⚠ Caution

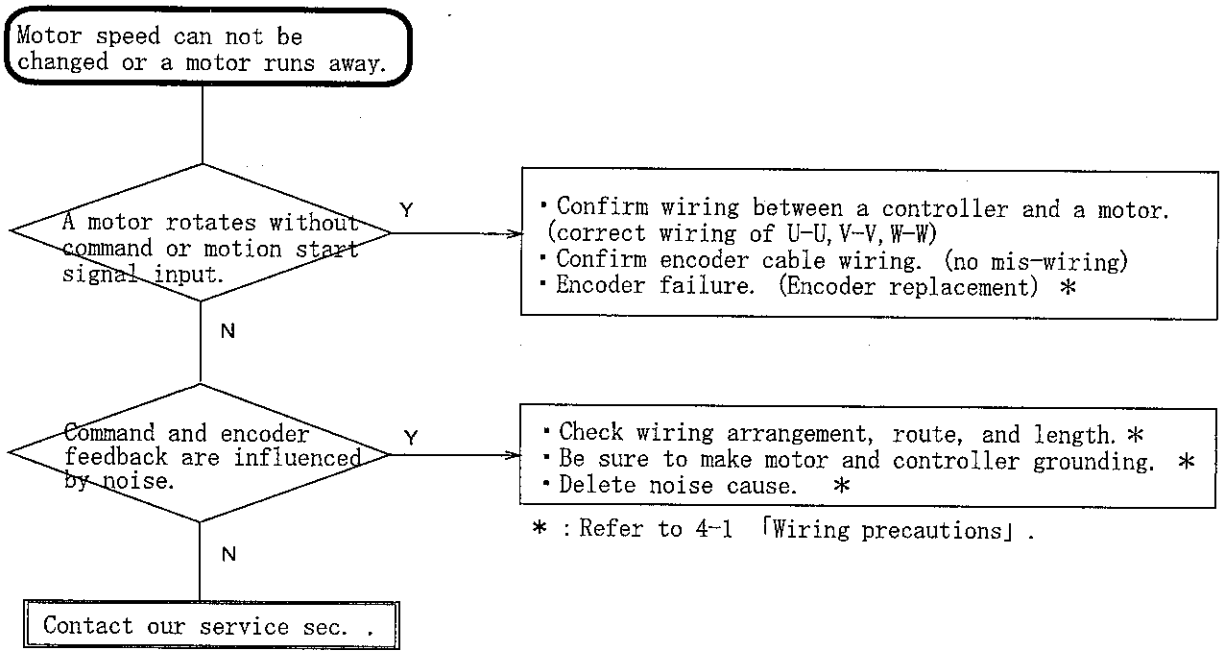
If a controller is coupled with a host control unit, separate the host unit, and inspect the following items only to a motor and the controller.



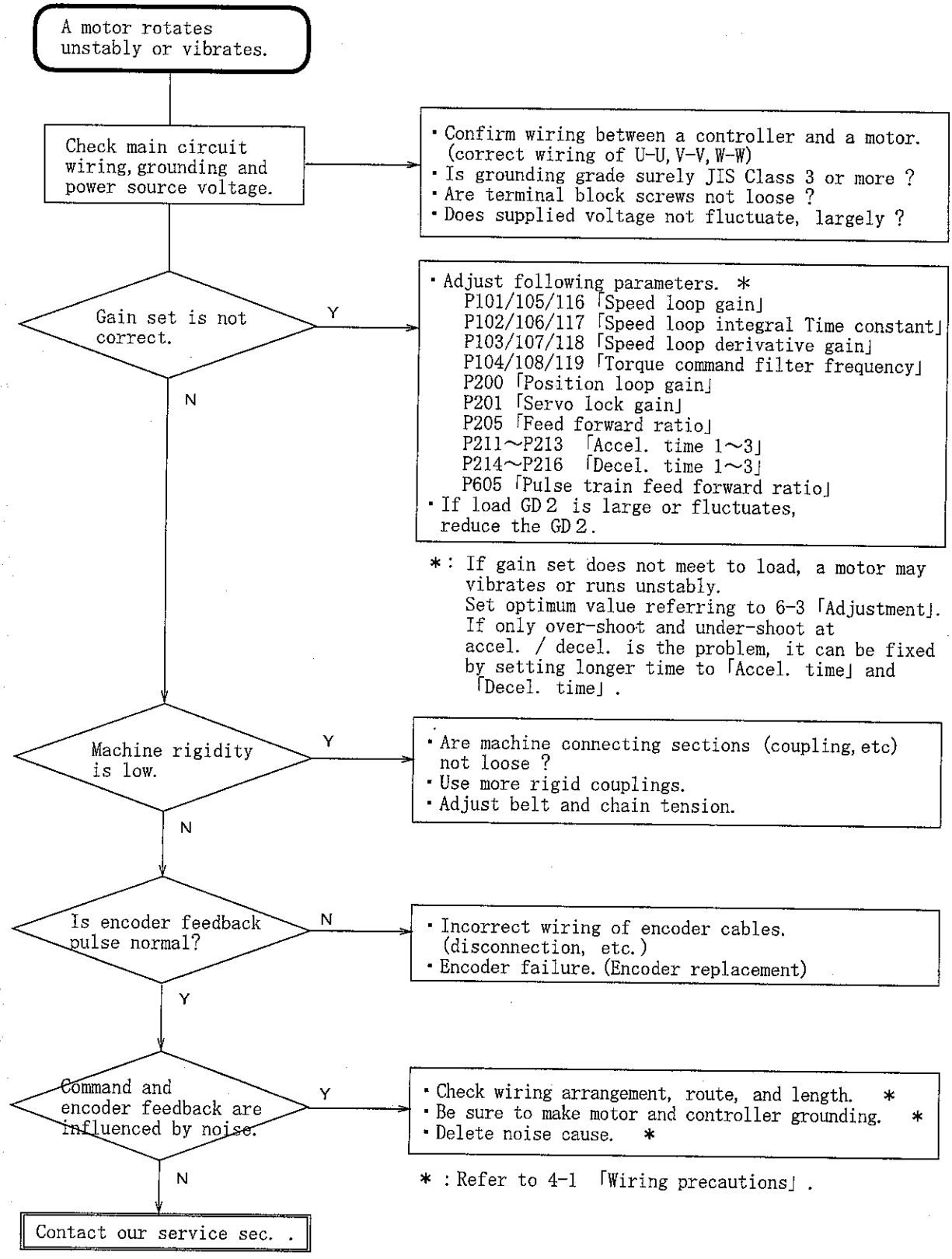
[Fig. 9－2] A motor does not rotate. (1)



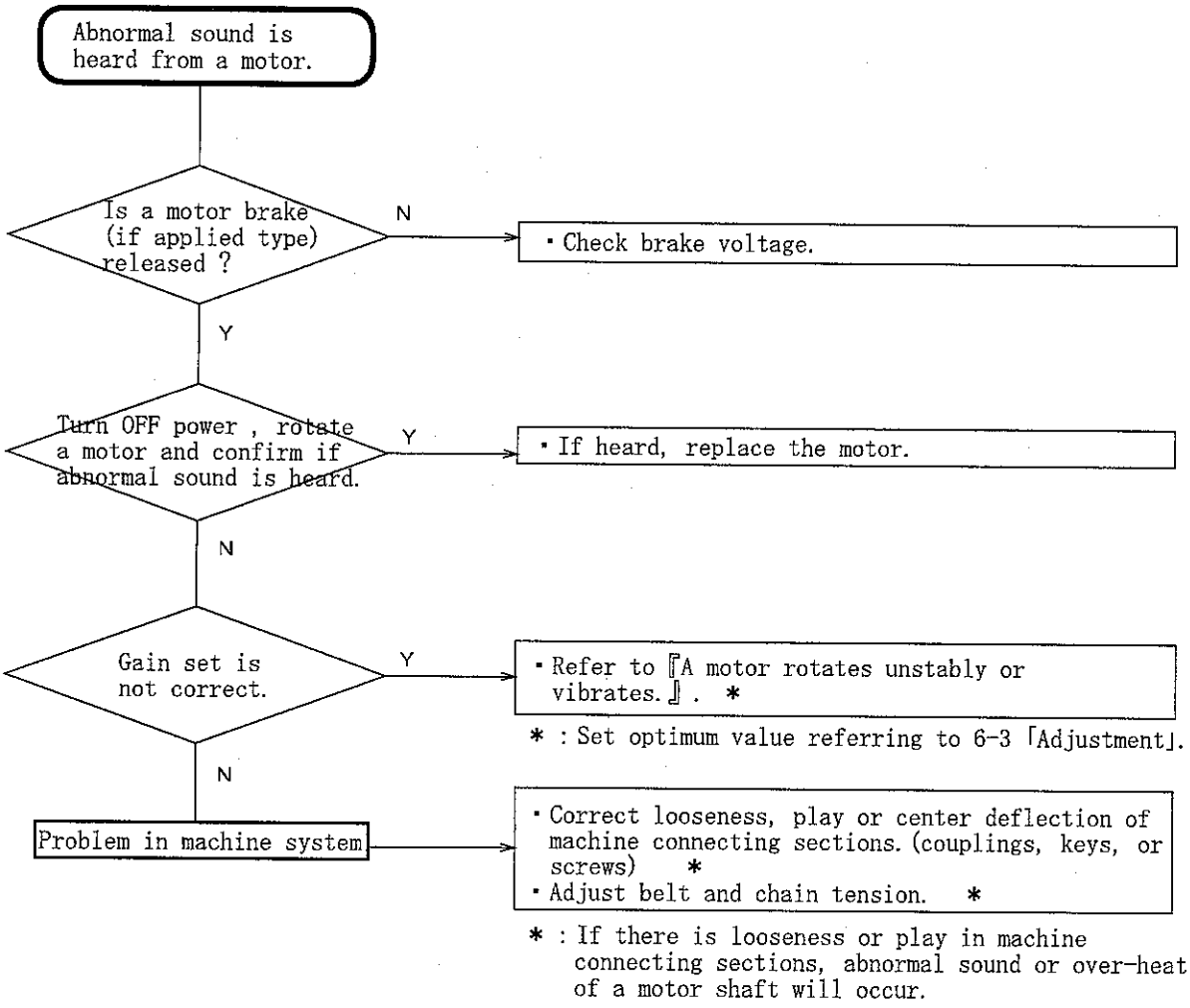
[Fig. 9－3]　A motor does not rotate. (2)



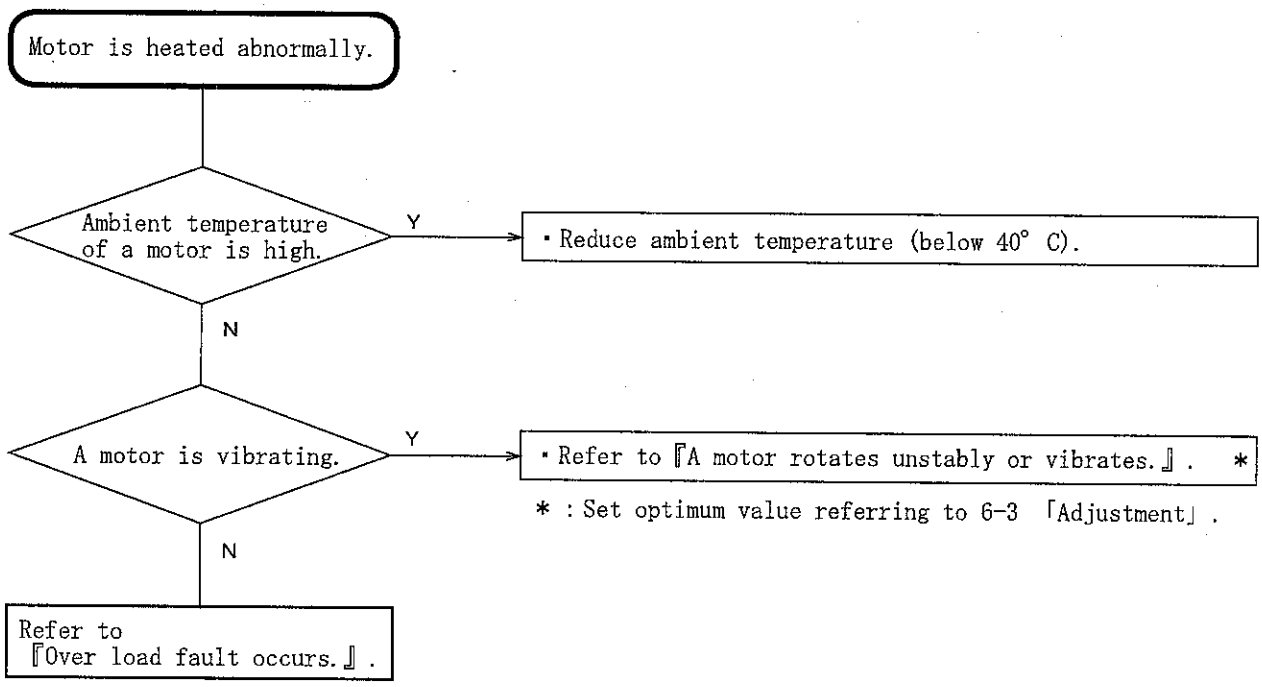
[Fig. 9－4]　Motor speed can not change or a motor runaways.



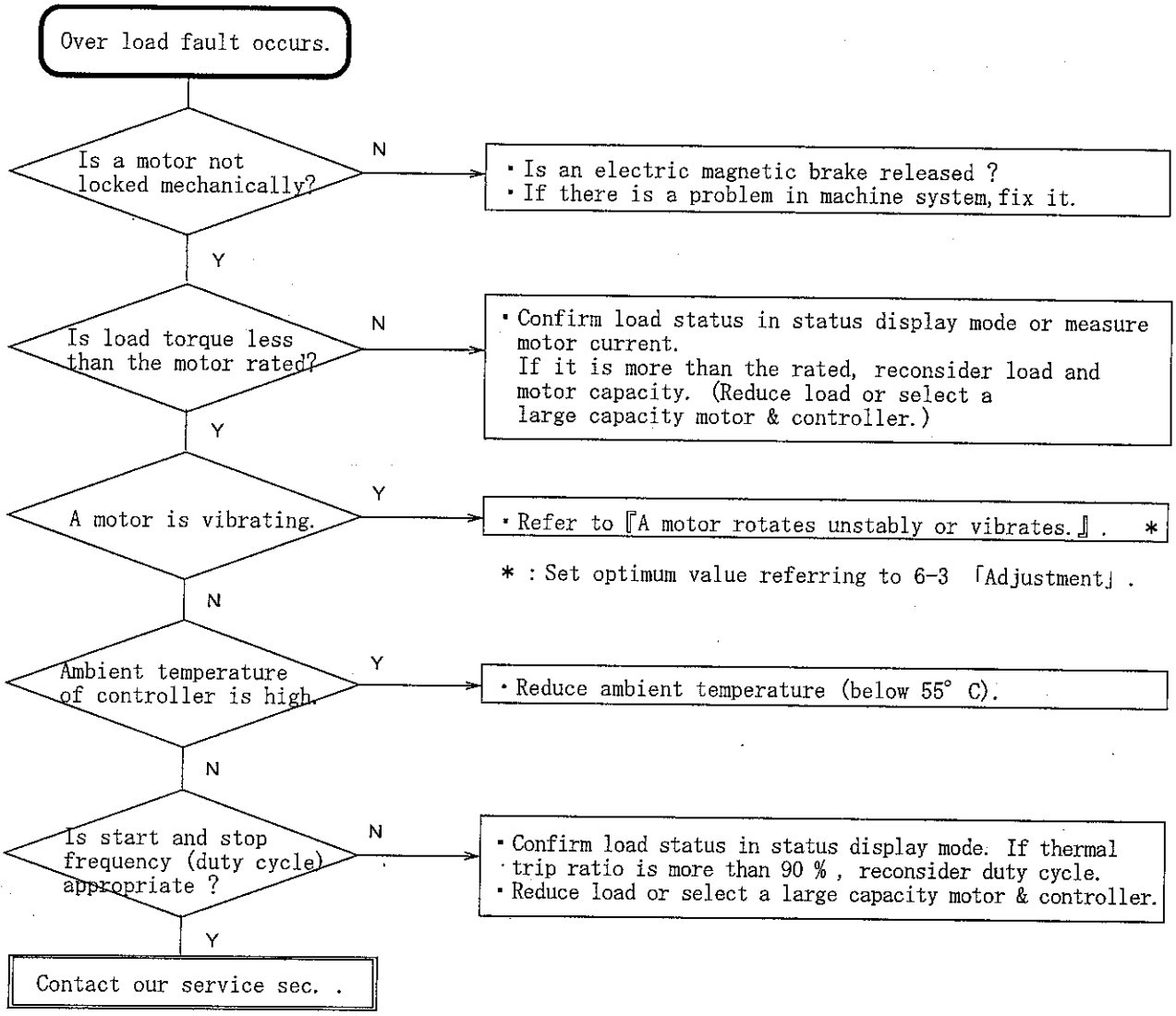
[Fig. 9－5] A motor rotates unstably or vibrates.



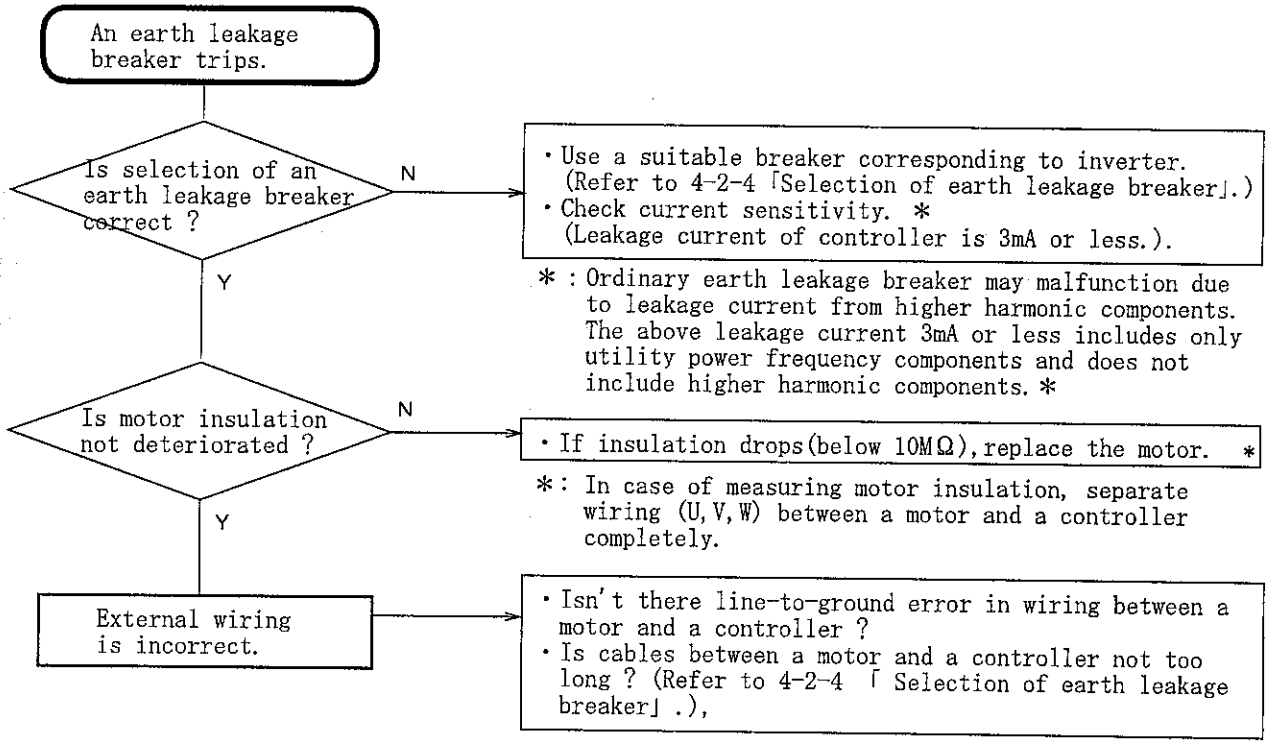
[Fig. 9－6] Abnormal sound is heard from a motor.



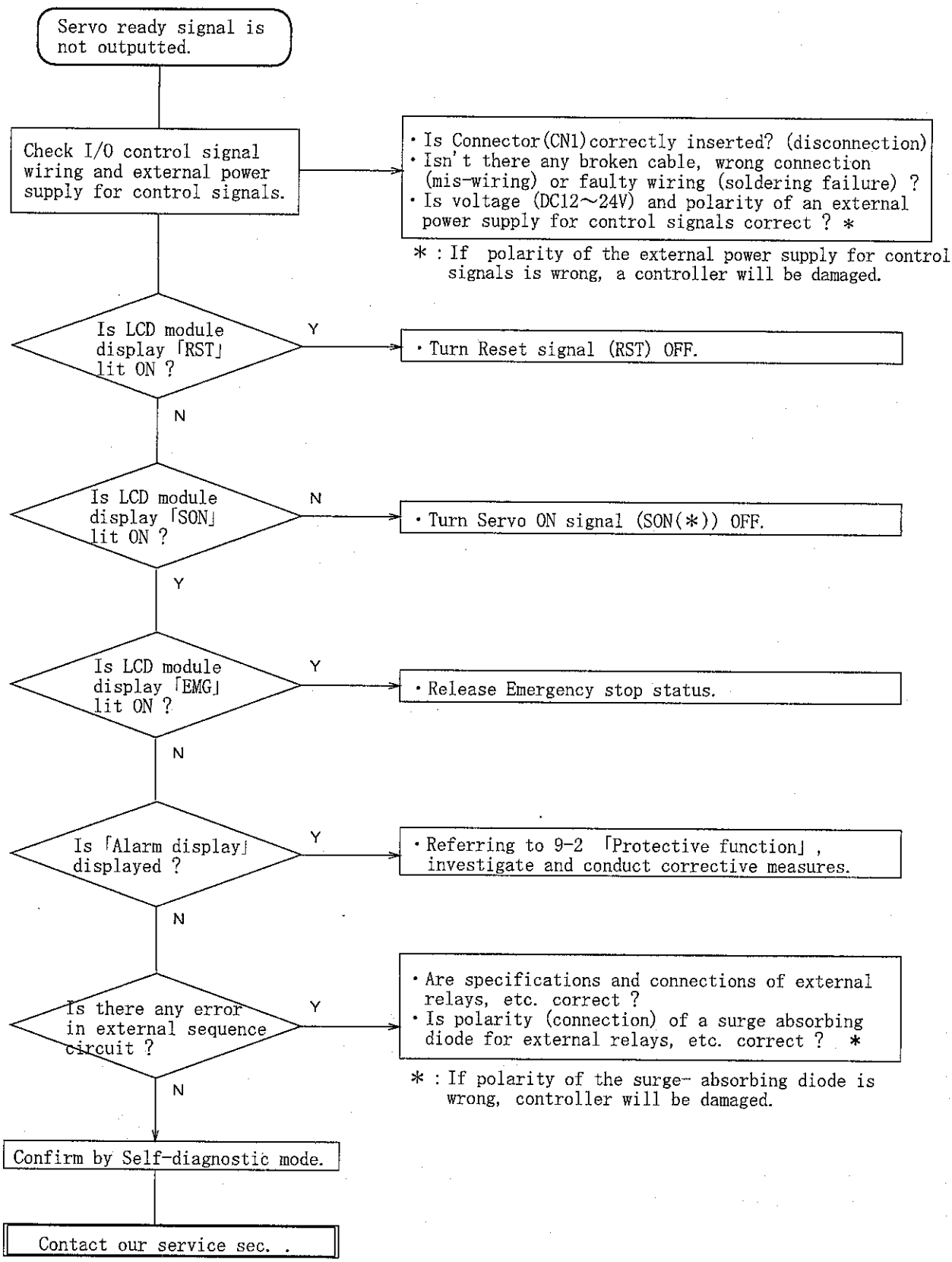
[Fig. 9－7] A motor is heated, abnormally.



[Fig. 9－8] Over-heat error occurs.



[Fig. 9－9] An earth leakage breker trips.



[Fig. 9－10] Servo ready signal is not outputted.

Appendix

Appendix－1 Input and output signal list

[1] Input signal

Signal name	Code	Inp./Out.	Device No.		
			Serial communi.	Sequence control	Remote sequence control
Reset	RST	Inp.	X0000	M9144	Ymn00
Emergency stop	EMG*		X0001	M9145	Ymn01
Servo ON	SON(*)		X0002	M9146	Ymn02
Auto. start	PST		X0003	M9147	Ymn03
Hold	HLD		X0004	M9148	Ymn04
Deviation clear	CLR		X0005	M9149	Ymn05
Forward O.T	FOT*		X0006	M9150	Ymn06
Reverse O.T	ROT*		X0007	M9151	Ymn07
Address set 1	SS1		X0008	M9152	Ymn10
Address set 2	SS2		X0009	M9153	Ymn11
Address set 3	SS3		X000A	M9154	Ymn12
Address set 4	PS4		X000B	M9155	Ymn13
Address set 5	PS5		X000C	M9156	Ymn14
Address set 6	PS6		X000D	M9157	Ymn15
Address set 7	PS7		X000E	M9158	Ymn16
Address set 8	PS8		X000F	M9159	Ymn17
Forward jog	FJ		X0018	M9168	Ymn30
Reverse jog	RJ		X0019	M9169	Ymn31
Speed override 1	OR1		X001C	M9172	Ymn34
Speed override 2	OR2		X001D	M9173	Ymn35
Speed override 3	OR3		X001E	M9174	Ymn36
Speed override 4	OR4		X001F	M9175	Ymn37
Mode select. 1	MD1		X0020	M9176	Ymn40
Mode select. 2	MD2		X0021	M9177	Ymn41
Jog speed selec.	JOSP		X0022	M9178	Ymn42
Torque limit	TL		X0023	M9179	Ymn43
Cmmd pls input inhibit	CIH(*)		X0024	M9180	Ymn44
M complete	MFIN		X0031	M9193	Ymn61
Block stop	BSTP		X0033	M9195	Ymn63
Block cancel	PCAN		X0034	M9196	Ymn64
Auto. start inh.	EPIH		X0035	M9197	Ymn65
Forced brake ON	BRON		X0036	M9198	Ymn66
Spd gain select.	GSEL	↓	X0037	M9199	Ymn67

※1 Device No. column shows a device number of Remote control data area corresponding to individual signal.

※2 And regardless to positive-true or negative-true logic, Remote control signal is "ON" to data "1" and "OFF" to data "0".

※3 Mn of Ymn device is 2 digit numeral displayed by octal number for connection node ID No.

[2] output signal

Signal name	Code	Inp./Out.	Device No.		
			Serial communi.	Sequence control	Remote sequence control
Alarm	ALM(*)	Out.	X0060	M9208	Xmn00
Warning	WNG(*)		X0061	M9209	Xmn01
Servo ready	RDY		X0062	M9210	Xmn02
Speed zero	SZ		X0063	M9211	Xmn03
Position. complete	PN		X0064	M9212	Xmn04
Rough matching	PRF		X0065	M9213	Xmn05
Brake release	BRK		X0066	M9214	Xmn06
In Torque limit	LIM		X0067	M9215	Xmn07
Program end	PEND		X0068	M9216	Xmn10
Auto. run ready	PRDY		X0069	M9217	Xmn11
In Manual run	MMOD		X006A	M9218	Xmn12
In Zero return run	HMOD		X006B	M9219	Xmn13
In Auto. run	AMOD		X006C	M9220	Xmn14
In Pulse train run	PMOD		X006D	M9221	Xmn15
In Remote control	RMOD		X006E	M9222	Xmn16
General output 1	OUT1		X0070	M9224	Xmn20
General output 2	OUT2		X0071	M9225	Xmn21
General output 3	OUT3		X0072	M9226	Xmn22
General output 4	OUT4		X0073	M9227	Xmn23
General output 5	OUT5		X0074	M9228	Xmn24
General output 6	OUT6		X0075	M9229	Xmn25
General output 7	OUT7		X0076	M9230	Xmn26
General output 8	OUT8		X0077	M9231	Xmn27
Soft.lim. switch A	SLSA		X007E	M9238	Xmn36
Soft.lim. switch B	SLSB		X007F	M9239	Xmn37
M output 01	M01		X0080	M9240	Xmn40
M output 02	M02		X0081	M9241	Xmn41
M output 04	M04		X0082	M9242	Xmn42
M output 08	M08		X0083	M9243	Xmn43
M output 10	M10		X0084	M9244	Xmn44
M output 20	M20		X0085	M9245	Xmn45
M output 40	M40		X0086	M9246	Xmn46
M output 80	M80		X0087	M9247	Xmn47
M strobe	MSTB	↓	X008E	M9254	Xmn56

※1 Device No. column shows a device number of Remote control data area corresponding to individual signal.

※2 And regardless to positive-true or negative-true logic, Remote control signal is "ON" to data "1" and "OFF" to data "0".

※3 Mn of Xmn device is 2 digit numeral displayed by octal number for connection node ID No.

Appendix－２　Applicable Motor List

ＮＣＳ－Ｆ１＊＊Ｍ－＊＊＊　controller

ＮＣＳＲ－Ｆ１＊＊Ｍ＊－＊＊＊controller

【２００Ｖ system controller applicable motor selection list】

Controller capasity	Ｐ０００ set value	Applicable motor Motor type	Rate out.	Rated speed	Peak torque
ＮＰＳ－ＦＩＭ＊－４０１ Capacity：０．４ｋｗ	２１１	NA30-13F-15	０．２ Kw	１５００ rpm	３００ %
	２１２	NA30-25F-15	０．４ Kw	１５００ rpm	３００ %
ＮＰＳ－ＦＩＭ＊－８０１ Capacity：０．８ｋｗ	２２１	NA100-20F	０．６ Kw	３０００ rpm	３００ %
	２２２	NA100-40F	０．８ Kw	２０００ rpm	３００ %
	２２３	NA100-75F-10	０．８ Kw	１０００ rpm	３００ %
	２２４	NA30-50F-15	０．８ Kw	１５００ rpm	３００ %
ＮＰＳ－ＦＩＭ＊－１２２ Capacity：１．５ｋｗ	２３１	NA100-75F	１．５ Kw	２０００ rpm	３００ %
	２３２	NA100-110F-10	１．２ Kw	１０００ rpm	２００ %
ＮＰＳ－ＦＩＭ＊－２４２ Capacity：２．２ｋｗ	２４１	NA100-110F	２．２ Kw	２０００ rpm	３００ %
	２４２	NA100-180F-10	１．９ Kw	１０００ rpm	３００ %
	２４３	NA30-110F-15	１．６ Kw	１５００ rpm	３００ %
ＮＰＳ－ＦＩＭ＊－４０２ Capacity：３．７ｋｗ	２５１	NA100-180F	３．７ Kw	２０００ rpm	２００ %
	２５２	NA100-270F-10	２．８ Kw	１０００ rpm	３００ %
	２５３	NA100-370F-10	３．７ Kw	１０００ rpm	２００ %
	２５４	NA30-180F-15	２．８ Kw	１５００ rpm	３００ %
ＮＰＳ－ＦＩＭ＊－７５２ Capacity：７．５ｋｗ	０１１	NA100-180F	３．７ Kw	２０００ rpm	３００ %
	０１２	NA100-270F	５．５ Kw	２０００ rpm	２００ %
	０１３	NA100-370AF	７．５ Kw	２０００ rpm	２００ %
	０１４	NA100-370F-10	３．７ Kw	１０００ rpm	３００ %
	０１５	NA100-550F-10	５．５ Kw	１０００ rpm	２００ %
	０１６	NA100-750F-10	７．５ Kw	１０００ rpm	２００ %
ＮＰＳ－ＦＩＭ＊－１１３ ＮＰＳＲ－ＦＩＭ＊－１１３ Capacity：１１ｋｗ	０２３	NA100-270F	５．５ Kw	２０００ rpm	３００ %
	０２４	NA100-550F-10	５．５ Kw	１０００ rpm	３００ %
	０２５	NA100-750F-10	７．５ Kw	１０００ rpm	２９０ %
	０２１	NA100-550AF	１１ kw	２０００ rpm	２００ %
	０２２	NA100-1100F-10	１１ kw	１０００ rpm	２００ %
ＮＰＳ－ＦＩＭ＊－１５３ ＮＰＳＲ－ＦＩＭ＊－１５３ Capacity：１５ｋｗ	０３４	NA100-370F	７．５ Kw	２０００ rpm	３００ %
	０３１	NA100-750AF	１５ kw	２０００ rpm	２００ %
	０３２	NA20-1500-10	１５ kw	１０００ rpm	２００ %
	０３３	NA100-550F	１１ kw	２０００ rpm	３００ %
ＮＰＳ－ＦＩＭ＊－２２３ ＮＰＳＲ－ＦＩＭ＊－２２３ Capacity：２２ｋｗ	０４１	NA100-1100AF	２２ kw	２０００ rpm	２００ %
	０４２	NA20-2200-10	２２ kw	１０００ rpm	２００ %
	０４３	NA100-750F	１５ kw	２０００ rpm	２９０ %
ＮＰＳ－ＦＩＭ＊－３０３ ＮＰＳＲ－ＦＩＭ＊－３０３ Capacity：３０ｋｗ	０５１	NA20-1500	３０ kw	２０００ rpm	２００ %
	０５２	NA20-2700-10	３０ kw	１０００ rpm	２００ %
	０５３	NA100-1100F	２２ kw	２０００ rpm	３００ %
ＮＰＳ－ＦＩＭ＊－３７３ ＮＰＳＲ－ＦＩＭ＊－３７３ Capacity：３７ｋｗ	０６１	NA20-1800	３７ kw	２０００ rpm	２００ %
	０６２	NA20-3700-10	３７ kw	１０００ rpm	１９０ %

NCS－FI＊＊H－＊＊＊ controller
NCSR－FI＊＊H＊－＊＊＊controller
【４００Ｖ system controller applicable motor selection list】

Controller capasity	P０００ set value	Applicable motor Motor type	Rate out.	Rated speed	Peak torque
NPS－FIH＊－１１３	１２１	NA100-550F-20H	１１ kw	２０００ rpm	２００ %
NPSR－FIH＊	１２２	NA100-1100F-10H	１１ kw	１０００ rpm	２００ %
－１１３	１２３	NA100-550F-20H	１１ kw	２０００ rpm	３００ %
Capacity：１１kw					
NPS－FIH＊－１５３	１３１	NA100-750F-20H	１５ kw	２０００ rpm	２００ %
NPSR－FIH＊	１３２	NA20-1500-10H	１５ kw	１０００ rpm	２００ %
－１５３					
Capacity：１５kw					
NPS－FIH＊－２２３	１４１	NA100-1100F-20H	２２ kw	２０００ rpm	２００ %
NPSR－FIH＊	１４２	NA20-2200-10H	２２ kw	１０００ rpm	２００ %
－２２３	１４３	NA100-750F-20H	１５ kw	２０００ rpm	３００ %
Capacity：２２kw					
NPS－FIH＊－３０３	１５１	NA20-1500-20H	３０ kw	２０００ rpm	２００ %
NPSR－FIH＊	１５２	NA20-2700-10H	３０ kw	１０００ rpm	２００ %
－３０３	１５３	NA100-1100F-20H	２２ kw	２０００ rpm	３００ %
Capacity ：３０kw					
NPS－FIH＊－３７３	１６１	NA20-1800-20H	３７ kw	２０００ rpm	２００ %
NPSR－FIH＊	１６２	NA20-3700-10H	３７ kw	１０００ rpm	２００ %
－３７３					
Capacity：３７kw					

NCS－FS＊＊M－＊＊＊ controller
NCSR－FS＊＊M＊－＊＊＊controller

【２００V system controller applicable motor selection list】

Controller capasity	P０００ set value	Applicable motor Motor type	Rate out.	Rated speed	Peak torque
NCS－FS＊＊M＊ －１２２ Capacity１．２kw In. voltage：２００V	５５１	NA720-122	１．２ kw	２０００ rpm	３００ %
NCS－FS＊＊M＊ －２４２ Capacity：２．４kw In. voltage：２００V	５７１	NA720-182	１．８ kw	２０００ rpm	３００ %
	５７２	NA720-242	２．４ kw	２０００ rpm	３００ %
NCS－FS＊＊M＊ －４０２ Capacity：４．０kw In. voltage：２００V	５８１	NA720-372	３．７ kw	２０００ rpm	２００ %
	５８２	NA720-402	４．０ kw	２０００ rpm	２００ %
NCS－FS＊＊M＊ －７５２ Capacity：７．５kw In. voltage：２００V	７０１	NA720-372	３．７ kw	２０００ rpm	３００ %
	７０２	NA720-402	４．０ kw	２０００ rpm	３００ %
	７０３	NA720-552	５．５ kw	２０００ rpm	２００ %
	７０４	NA720-752	７．５ kw	２０００ rpm	２００ %
NCS－FS＊＊M＊ －１１３ Capacity：１１kw In. voltage：２００V	７１１	NA720-552	５．５ kw	２０００ rpm	３００ %
	７１２	NA720-113	１１ kw	２０００ rpm	２００ %
NCS－FS＊＊M＊ －１５３ Capacity：１５kw In. voltage：２００V	７２１	NA720-752	７．５ kw	２０００ rpm	３００ %
	７２２	NA720-153	１５ kw	２０００ rpm	２００ %
NCS－FS＊＊M＊ －２２３ Capacity：２２kw In. voltage：２００V	７３１	NA720-223	２２ kw	２０００ rpm	２００ %

NIKKI DENSO CO., LTD.

Head office : 2-8-24, Arima, Miyamae-ku, Kawasaki-shi, Kanagawa-ken, 216-0003 JAPAN

Phone 044 (855) 4311 FAX. 044 (854) 7746

Overseas Operations Dept : 4-2, Osaku 1 chome, Sakura-shi, Chiba-ken, 285-0802 JAPAN

Phone 043 (498) 2315 FAX. 043 (498) 2327