MITSUBISHI

General-Purpose AC Servo

MR-J2-ðð D-S24

Specifications

BCN-B32105-016

CHANGE		
Rev.	Contents	Drawn by

CONTENTS

1. OUTLINE

This document explains about the turret control AC servo amplifier 'MR-J2- D-S24'.

Please refer to the "MELSERVO-J2-A Specifications and Installation Guide" for the matter not described to this specifications.

<Additional function from standard product>
Turret calculation

<Eliminated function from standard product>
- Positioning function by the line pulse input.
- Speed and torque control
- Test operation for JOG and positioning

<model Name>
The special number is added to end of servo amplifier model name.

MR-J2- D-S24
- This suffix means special software for MAZAK.
- This suffix means I/O is source type.

The special number is added to end of servo motor model name.

HA-FF43-EC
- This suffix means the CE specification motor.

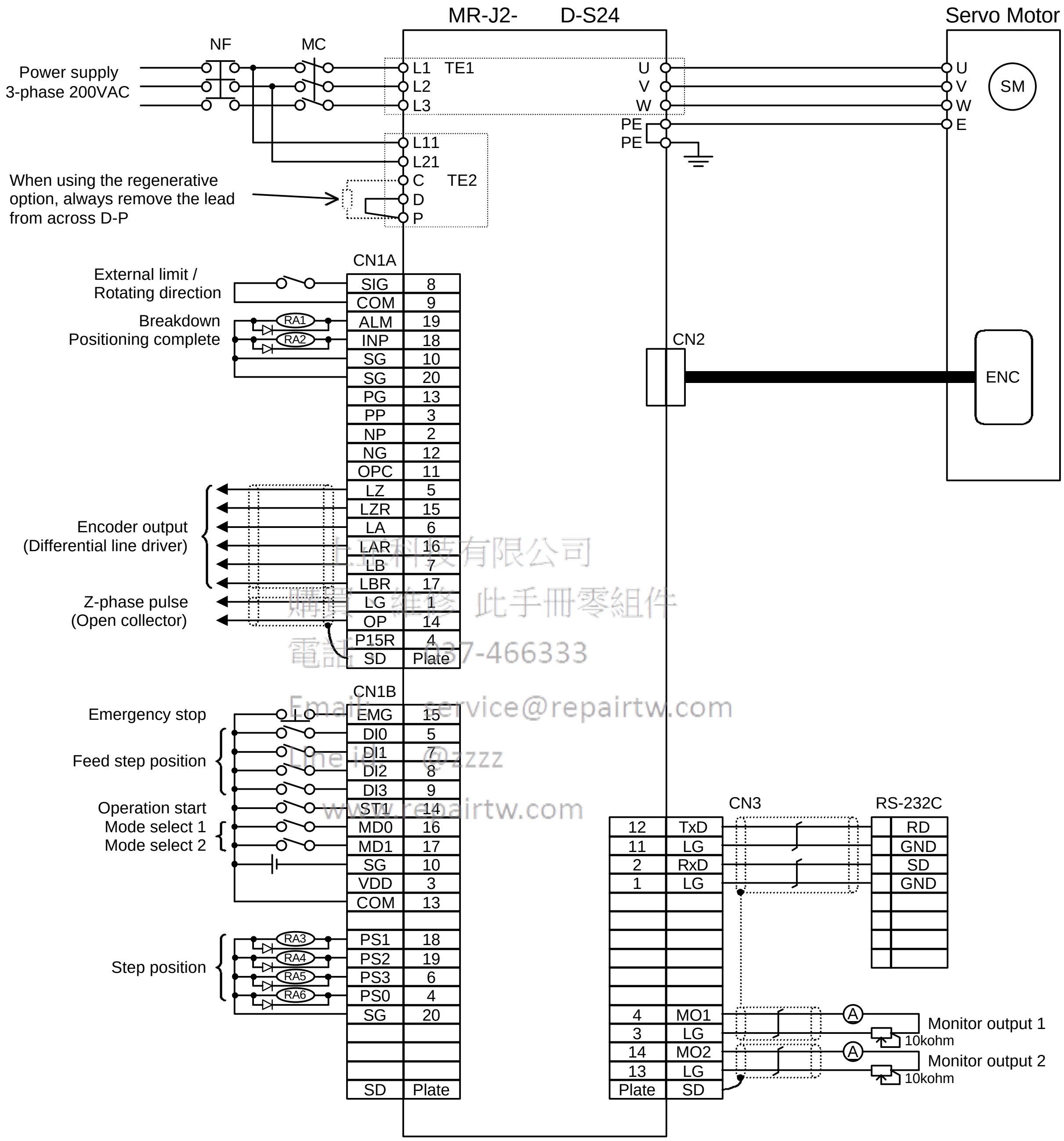
SPECIFICATIONS

(1) Servo Amplifier

Servo Amplifier					MR-J2-40D-S24	MR-J2-60D-S24
Power supply	Voltage / Frequency	Three phase 200 to 230VAC, 50/60Hz				
	Permissible voltage fluctuation	Three phase 170 to 253VAC, 50/60Hz				
	Permissible frequency fluctuation	±5%				
System		Sine-wave PWM control, current control system				
Dynamic brake		Built-in				
Protective functions		Over current shut-off, Regenerative over voltage shut-off, Overload shut-off (electronic thermal relay), Servo motor overheat protection, Encoder fault protection, Regenerative fault protection, Under voltage and instantaneous power failure protection, Over speed protection, Excessive error protection				
Structure		Open (IP00)				
Environment	Ambient temperature	0 to +55°C (non-freezing) Storage: -20 to +65°C (non-freezing)				
	Ambient humidity	90%HR or less (non-condensing) Storage: 90%HR or less (non-condensing)				
	Ambient	Indoors (no direct sunlight) Free from corrosive gas, flammable gas, oil mist, dust and dirt				
	Altitude	Max. 1000m (3280 ft) above sea level				
	Vibration	5.9 m/s2 {0.6G} or less				
Weight (kg)					1.1	1.1

(2) Servo Motor

2. CONNECTION



NOTE

CAUTION

1. Do not install a diode in the wrong polarity. If a diode is installed wrong polarity, servo amplifier may break and the protection circuit's of the emergency stop etc. dose not work.
2. Install the emergency stop button.

REQUIREMENT

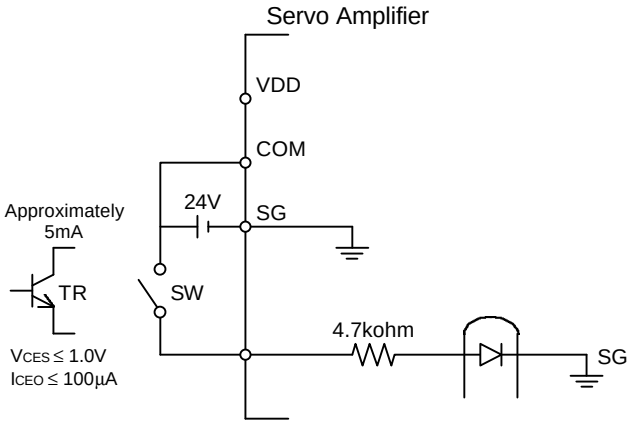
3. When using the regenerative brake option, always remove the lead from across D-P.
4. CN1A, CN1B and CN2 are same shape connector. Mis-connection causes breakdown.
5. Total current of external relays should be 80mA or less. Supply the interface power from outside if the total current of external relays is over than 80mA.

MEMO

6. Short the external emergency stop signal during driving. ('B' type contact is required)
7. The same name signals are connected inside.
8. The Breakdown signal (ALM) turns on electricity when the servo amplifier is normal condition (no alarm). When this signal turns off (alarm occurs), stop the controller signal by the sequence program.
9. Connect the shield wire to the plate (ground plate) of the connector.

(2) Digital input Interface

Input the signal by the miniature relay or the open collector transistor.



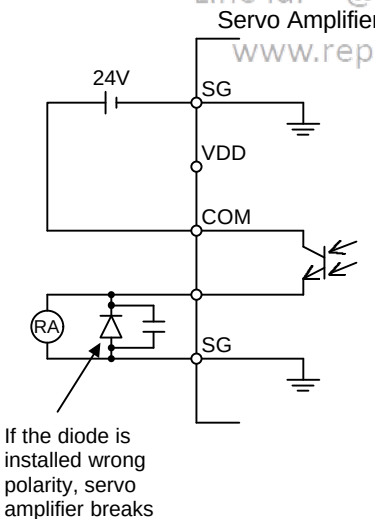
(3) Digital output interface

Possible to drive the lamp, relay and opt-coupler

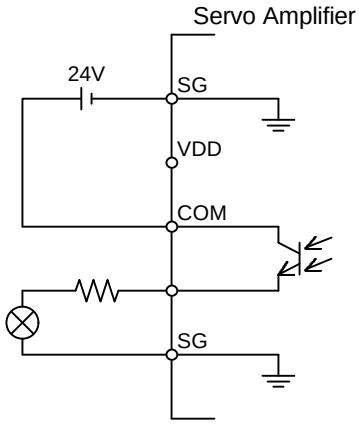
Permissible current 50mA or less
Rush current 100mA or less

(Note) Put the absorber (D,C) for inductive load and put the rush current suppressive resistor for lamp load.

(a) Inductive load



(b) Lamp load



3. I/O SIGNALS

CN1A, CN1B

<table>
<tr><th>Signal name</th><th>Symbol</th><th>Connector Pin number</th><th>Function and usage</th></tr>
<tr><td>Digital I/F
Power Input</td><td>COM</td><td>CN1A-9
CN1B-13</td><td>Power input terminals for digital interface driver. All ‘COM’ signals are connected internal.
Input 24VDC with at least 200mA if using external power supply.</td></tr>
<tr><td>Digital I/F
Common</td><td>SG</td><td>CN1A-10,20</td><td>24V common. This signal is isolated from the ‘LG’ signal</td></tr>
<tr><td>Control
Common</td><td>LG</td><td>CN1A-1
CN1B-1</td><td>Control signal common</td></tr>
<tr><td rowspan="2">Encoder
A-phase Pulse</td><td>LA</td><td>CN1A-6</td><td rowspan="4">Encoder A-phase and B-phase Pulse output terminals. Differential output.
Output signal is selectable by parameter.</td></tr>
<tr><td>LAR</td><td>CN1A-16</td></tr>
<tr><td rowspan="2">Encoder
B-phase Pulse</td><td>LB</td><td>CN1A-7</td></tr>
<tr><td>LBR</td><td>CN1A-17</td></tr>
<tr><td rowspan="3">Encoder
Z-phase Pulse</td><td>LZ</td><td>CN1A-5</td><td rowspan="3">Encoder Z-phase Pulse output terminals.
One pulse outputs per one rotation. Minimum pulse width is 444µsec.
‘LZ’ and ‘LZR’ are differential output. ‘OP’ is open collector output.</td></tr>
<tr><td>LZR</td><td>CN1A-15</td></tr>
<tr><td>OP</td><td>CN1A-14</td></tr>
<tr><td>External Limit /
Rotating Direction
Detection</td><td>SIG</td><td>CN1A-8</td><td>External Limit / Rotating Direction Detection signal input terminal.
This input becomes ‘External Limit’ or ‘Rotating Direction Detection’ according to operation mode.
<table>
<tr><th>MO0</th><th>MO1</th><th>Operation mode</th><th>SIG terminal</th></tr>
<tr><td>Open</td><td>Open</td><td>Reference point return mode</td><td>External limit signal for reference point return (Note 1)</td></tr>
<tr><td>Open</td><td>Short</td><td>Auto mode1 (specified direction)</td><td>Rotating direction detection signal</td></tr>
<tr><td>Short</td><td>Open</td><td>Manual mode</td><td>Rotating direction detection signal</td></tr>
<tr><td>Short</td><td>Short</td><td>Auto mode2 (Short direction)</td><td>---</td></tr>
</table>
Note 1 Valid for only dog type reference point return.
In case of the External Limit, external limit signal becomes ON when ‘SIG’ and ‘COM’ are connected outside of amplifier.
In case of the Rotating Direction Detection, rotating direction changes according to parameter No.01 (FTY).
<table>
<tr><th>Parameter No.01 Setting value</th><th>SIG terminal</th><th>Rotating direction</th></tr>
<tr><td>0</td><td>Open</td><td>CCW</td></tr>
<tr><td>0</td><td>Short</td><td>CW</td></tr>
<tr><td>1</td><td>Open</td><td>CW</td></tr>
<tr><td>1</td><td>Short</td><td>CCW</td></tr>
</table></td></tr>
<tr><td>Emergency Stop</td><td>EMG</td><td>CN1B-15</td><td>Emergency Stop signal input terminal. When opening between ‘EMG’ and ‘COM’, status becomes emergency and servo turns off and dynamic break works. When shorting between ‘EMG’ and ‘COM’, emergency status releases automatically,</td></tr>
<tr><td rowspan="4">Feed Step Position</td><td>DI0</td><td>CN1B-5</td><td rowspan="4">Feed step position signal input terminals.
Setting a turret position.
Setting value when ‘ST1’ signal is input becomes effective.
<table>
<tr><th>DI3</th><th>DI2</th><th>DI1</th><th>DI0</th><th>Feed Step Position</th></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Open</td><td>Step No.0</td></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Short</td><td>Step No.1</td></tr>
<tr><td>Open</td><td>Open</td><td>Short</td><td>Open</td><td>Step No.2</td></tr>
<tr><td>Open</td><td>Open</td><td>Short</td><td>Short</td><td>Step No.3</td></tr>
<tr><td>Open</td><td>Short</td><td>Open</td><td>Open</td><td>Step No.4</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>Short</td><td>Short</td><td>Open</td><td>Short</td><td>Step No.13</td></tr>
<tr><td>Short</td><td>Short</td><td>Short</td><td>Open</td><td>Step No.14</td></tr>
</table></td></tr>
<tr><td>DI1</td><td>CN1B-7</td></tr>
<tr><td>DI2</td><td>CN1B-8</td></tr>
<tr><td>DI3</td><td>CN1B-9</td></tr>
<tr><td>Operation Start</td><td>ST1</td><td>CN1B-14</td><td>Drive Start signal input terminal
When shorting between ‘ST1’ and ‘COM’, starts each operation modes.
<table>
<tr><th>MD0</th><th>MD1</th><th>Drive Start input terminal</th></tr>
<tr><td>Open</td><td>Open</td><td>Reference point return start</td></tr>
<tr><td>Open</td><td>Short</td><td>Auto mode1 (specified direction) start</td></tr>
<tr><td>Short</td><td>Open</td><td>Manual mode start</td></tr>
<tr><td>Short</td><td>Short</td><td>Auto mode2 (Short direction) start</td></tr>
</table></td></tr>
</table>

CN1A, CN1B

<table>
<tr><th>Signal name</th><th>Symbol</th><th>Connector Pin number</th><th>Function and usage</th></tr>
<tr><td rowspan="2">Mode Select</td><td>MD0</td><td>CN1B-16</td><td rowspan="2">Operation Mode Select input terminals.
Selecting the operation mode by combination of ‘MD0’-‘COM’ and ‘MD1’-‘COM’
<table>
<tr><td>MO0</td><td>MO1</td><td>Operation mode</td></tr>
<tr><td>Open</td><td>Open</td><td>Reference point return mode</td></tr>
<tr><td>Open</td><td>Short</td><td>Auto mode1 (specified direction)</td></tr>
<tr><td>Short</td><td>Open</td><td>Manual mode</td></tr>
<tr><td>Short</td><td>Short</td><td>Auto mode2 (Short direction)</td></tr>
</table></td></tr>
<tr><td>MD1</td><td>CN1B-17</td></tr>
<tr><td>Positioning Complete</td><td>INP</td><td>CN1A-18</td><td>Positioning Complete signal output terminal.
When the accumulation pulse are within the in-position range that is set to parameter, circuit shorts between ‘INP’ and ‘COM’.</td></tr>
<tr><td>Breakdown</td><td>ALM</td><td>CN1A-19</td><td>Breakdown signal output terminal.
Circuit opens between ‘ALM’ and ‘COM’ when power turns off, base shut off by working protection circuit, or alarm outputs.
At normal condition, between ‘ALM’ and ‘COM’ are shorted when power is turned on.</td></tr>
<tr><td rowspan="4">Step Position</td><td>PS0</td><td>CN1B-4</td><td rowspan="4">Step Position output terminals.
These signals are output same condition as ‘INP’ signal.
<table>
<tr><td>PS3</td><td>PS2</td><td>PS1</td><td>PS0</td><td>Step Position</td></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Open</td><td>Out of in-position</td></tr>
<tr><td>Short</td><td>Short</td><td>Short</td><td>Short</td><td>Step No.0</td></tr>
<tr><td>Short</td><td>Short</td><td>Short</td><td>Open</td><td>Step No.1</td></tr>
<tr><td>Short</td><td>Short</td><td>Open</td><td>Short</td><td>Step No.2</td></tr>
<tr><td>Short</td><td>Short</td><td>Open</td><td>Open</td><td>Step No.3</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>Open</td><td>Open</td><td>Short</td><td>Open</td><td>Step No.13</td></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Short</td><td>Step No.14</td></tr>
</table></td></tr>
<tr><td>PS1</td><td>CN1B-18</td></tr>
<tr><td>PS2</td><td>CN1B-19</td></tr>
<tr><td>PS3</td><td>CN1B-6</td></tr>
<tr><td>Shield</td><td>SD</td><td>Plate</td><td>Connecting shield wire.</td></tr>
</table>

CN3

Signal name	Symbol	Connector Pin number	Function and usage
Monitor Output	MO1	CN3-4	Monitor Output signal output terminal.
	MO2	CN3-14	Selected data by parameter is output with analog signal.
Monitor Common	LG	CN3-3,13	These signals are connected to control common (CN1A-1, CN1B-1).
Shield	SD	Plate	Connect shield wire.

Terminal Block

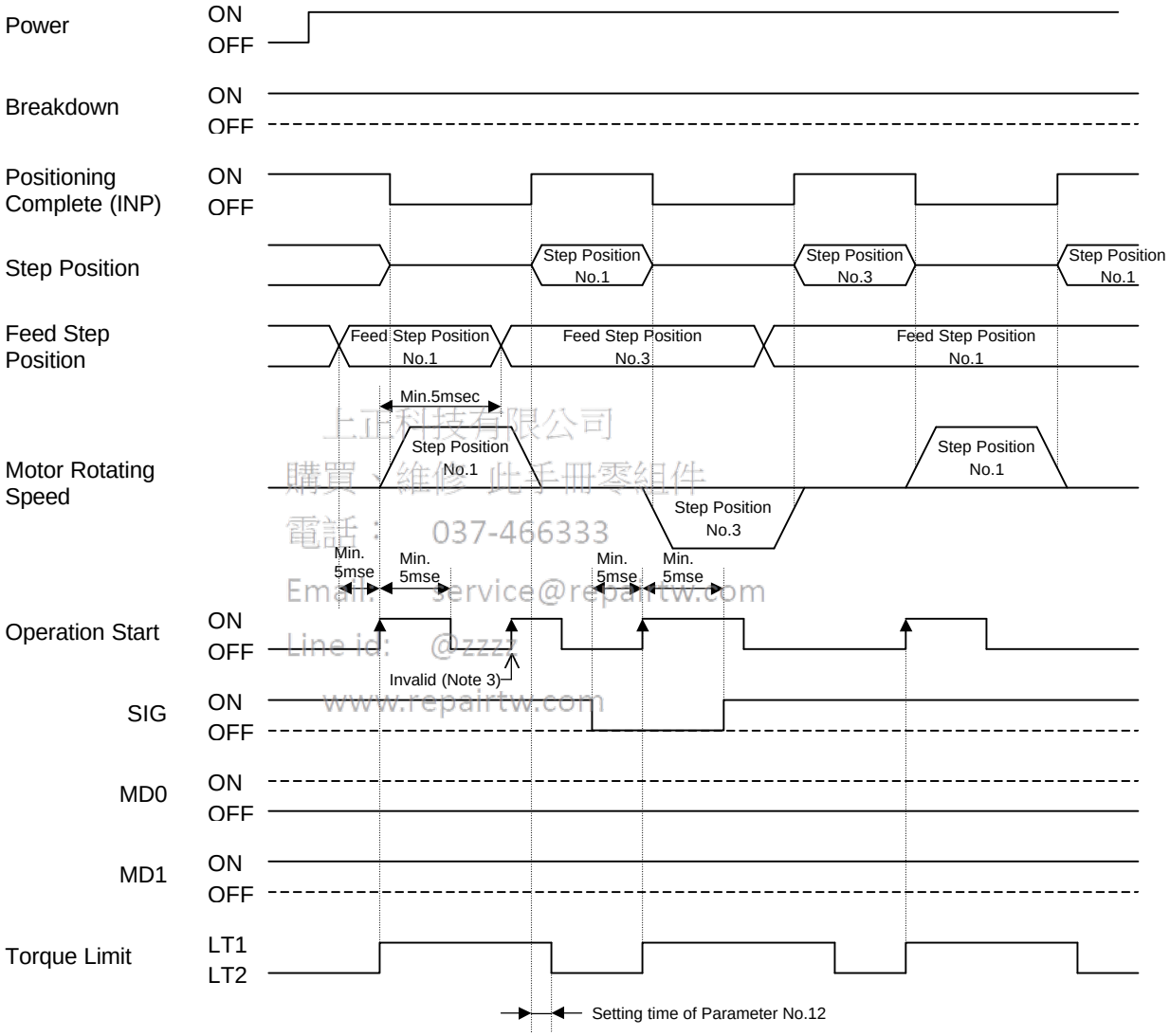
Signal name	Symbol	Connector Pin number	Function and usage
AC Current	L1, L2, L3	TE1	Connect three-phase 200 to 230VAC, 50/60Hz.
	L11, L21	TE2	Connect three-phase 200 to 230VAC, 50/60Hz. L11 and L21 should be in phase with L1 and L2, respectively.
Motor Output	U, V, W	TE1	Connect to the servo motor power supply terminals (U, V, W)
Regenerative Brake Resister	P, C, D	TE2	When using the regenerative brake option, remove wiring from across P-D and connect the regenerative brake option across P-C.
Protective Earth	PE	Chassis	Connect this terminal to the protective earth (PE) of the servo motor at single point.

5. OPERATING SEQUENCE

(1) Automatic operation mode 1 (Specified direction)

The amount of the movement is calculated from the current position and setting data of the Feed Step Position, and positioning is executed to specified feed step position by the specified rotating direction.

Set motor rotating speed to the parameter No. 08 (SP1) 'Auto positioning speed'.



Note) 1. If operating without reference point return, the Reference point return incomplete alarm occurs and Operation Start signal is ignored.

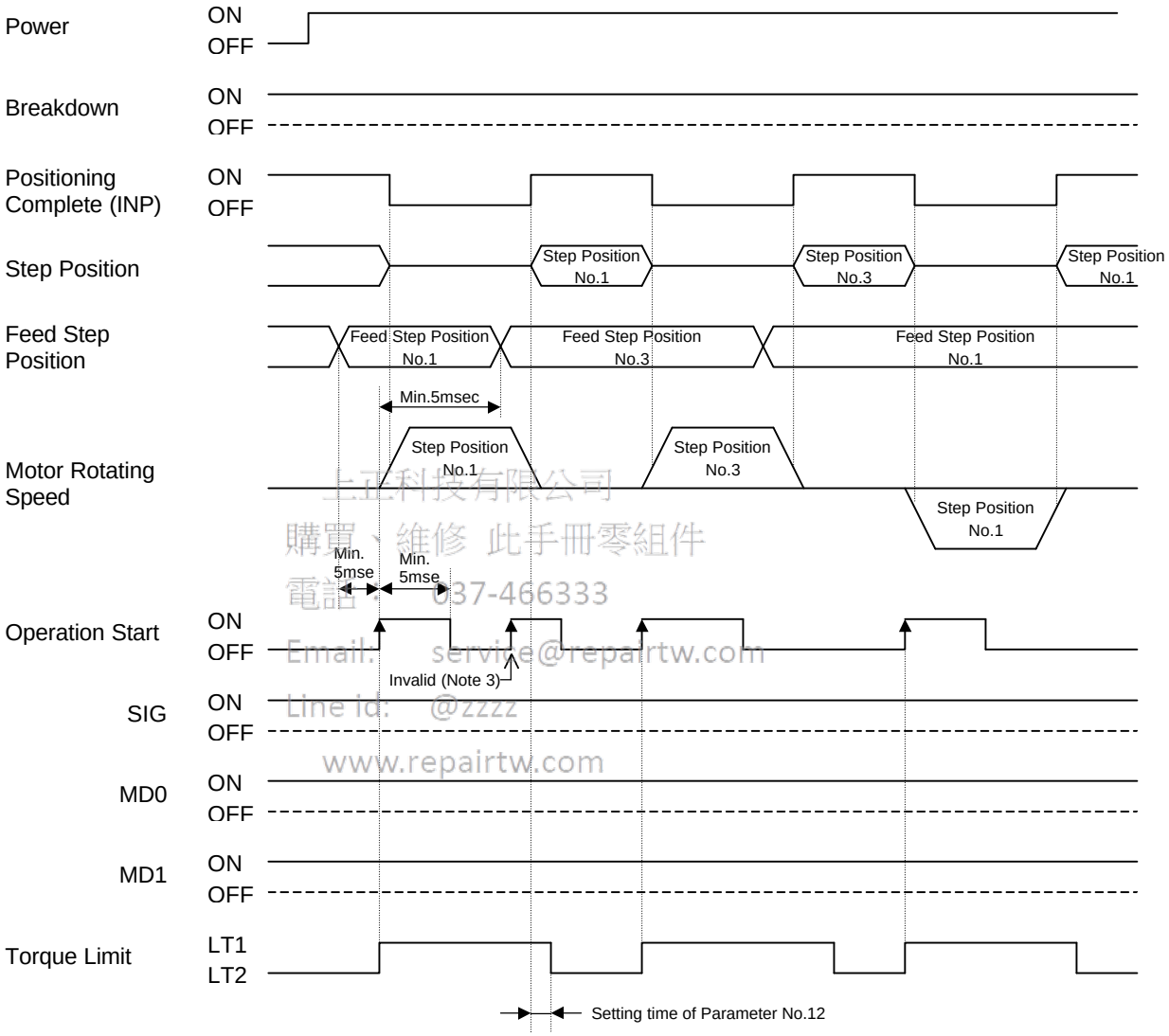
2. When the Feed Step Position is over than [setting value of Parameter No.10 (STN) – 1], the Feed Step Position alarm occurs and Operation Start signal is ignored.

3. When remaining amount of instructive movement is not equal zero, the operation Start signal is ignored.
Refer to "Note" of "(7) Positioning Complete, Step Position Output"

(2) Automatic operation mode 2 (Short direction)

The amount of the movement is calculated from the current position and setting data of the Feed Step Position, and positioning is executed to specified feed step position by the short rotating direction.

Set motor rotating speed to the parameter No. 08 (SP1) 'Auto positioning speed'.



Note) 1. If operating without reference point return, the Reference point return incomplete alarm occurs and Operation Start signal is ignored.

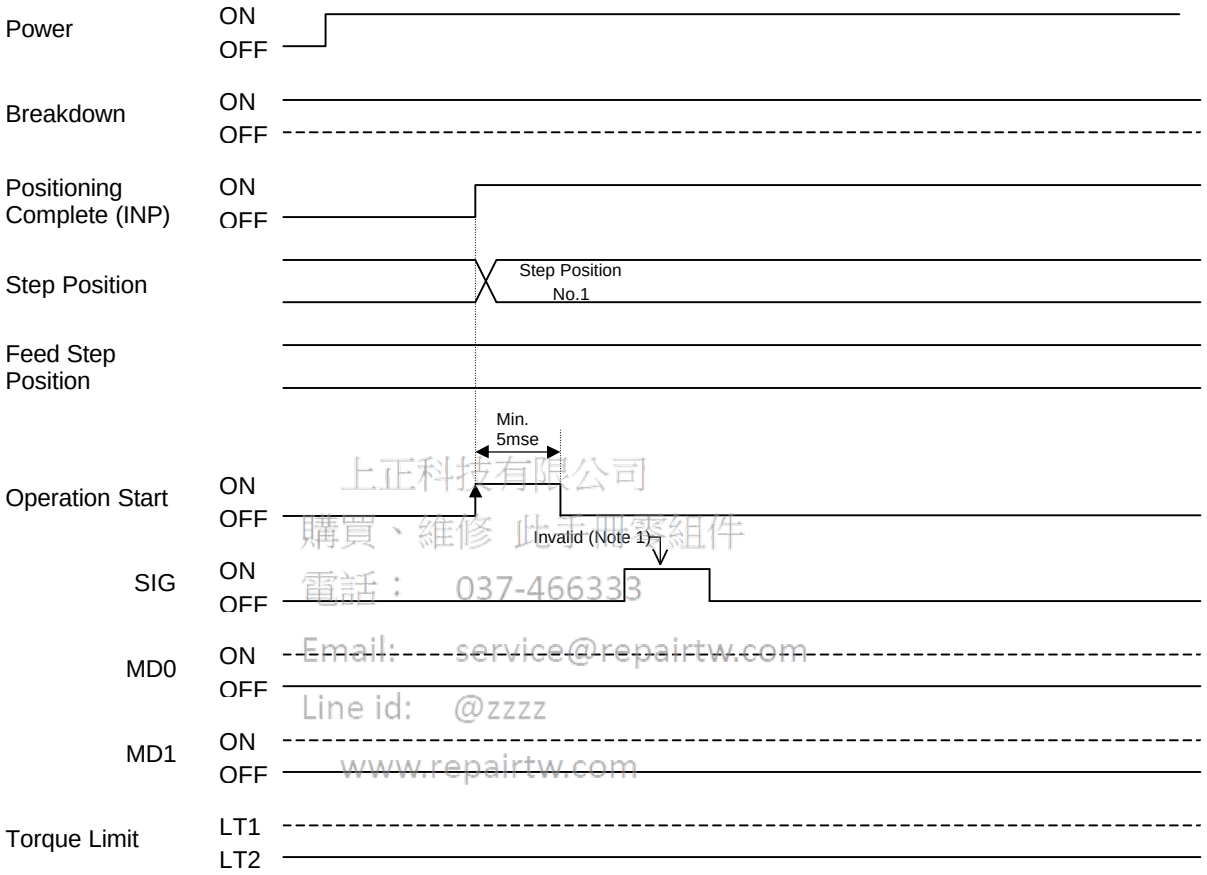
2. When the Feed Step Position is over than [setting value of Parameter No.10 (STN) – 1], the Feed Step Position alarm occurs and Operation Start signal is ignored.

3. When remaining amount of instructive movement is not equal zero, the operation Start signal is ignored.
Refer to "Note" of "(7) Positioning Complete, Step Position Output"

(3) Reference point return mode 1 (Data set method)

If setting [00 0] to the parameter No.02 (FTY), reference point return mode becomes data set method. When the reference return mode is selected, reference point is set by the operation start signal input.

The origin address (Origin shift amount) after reference point return is set by parameter No.24 (ZPS).



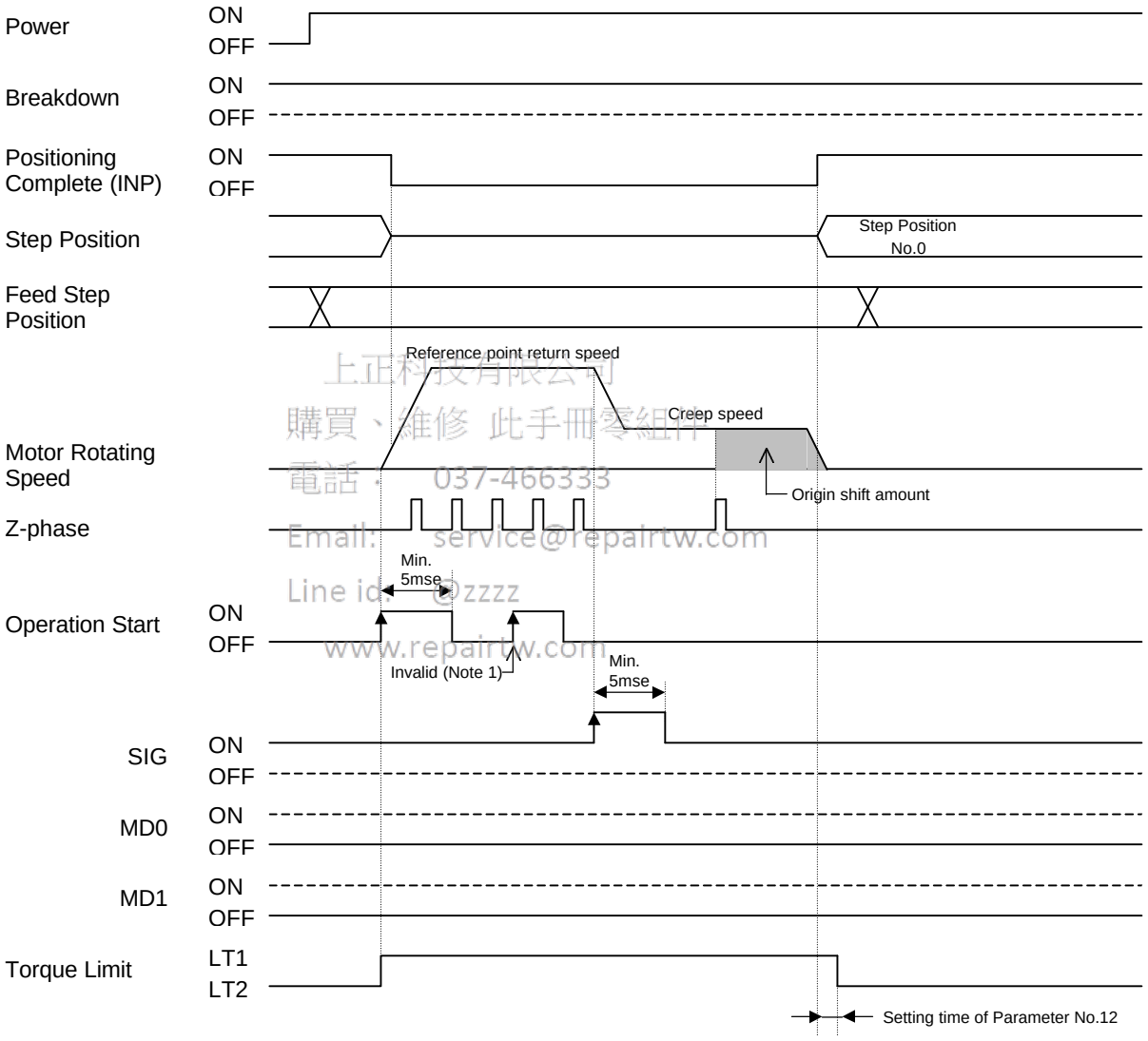
Note) 1. When select the data set method reference point return, 'SIG' signal is ignored.
2. The origin address is invalid just after the origin set. It becomes valid after power turns off and on again.
3. The origin address is a offset amount from position of the origin set.
If the origin address value is bigger than in-position range, the positioning complete signal dose not turn on when power turns on at first time after the origin set.

(4) Reference point return mode 2 (Dog method)

If setting [00 1] to the parameter No.02 (FTY), reference point return mode becomes dog method. When the reference return mode is selected, the reference point return starts by the operation start signal input.

The motor rotates at the specified speed by the parameter No.13 (ZRF) 'Reference Point Return Speed'. And when the Limit signal is shorted, rotating speed is down to the specified speed by the parameter No.14 'Creep Speed'. And motor stops at the Z-phase finally.

The motor stop position shifts specified distance by the parameter No.15 (ZST) 'Origin Shift Amount' from the Z-phase of the motor.



Note) 1. When remaining amount of instructive movement is not equal zero, the operation Start signal is ignored.
Refer to "Note" of "(7) Positioning Complete, Step Position Output"

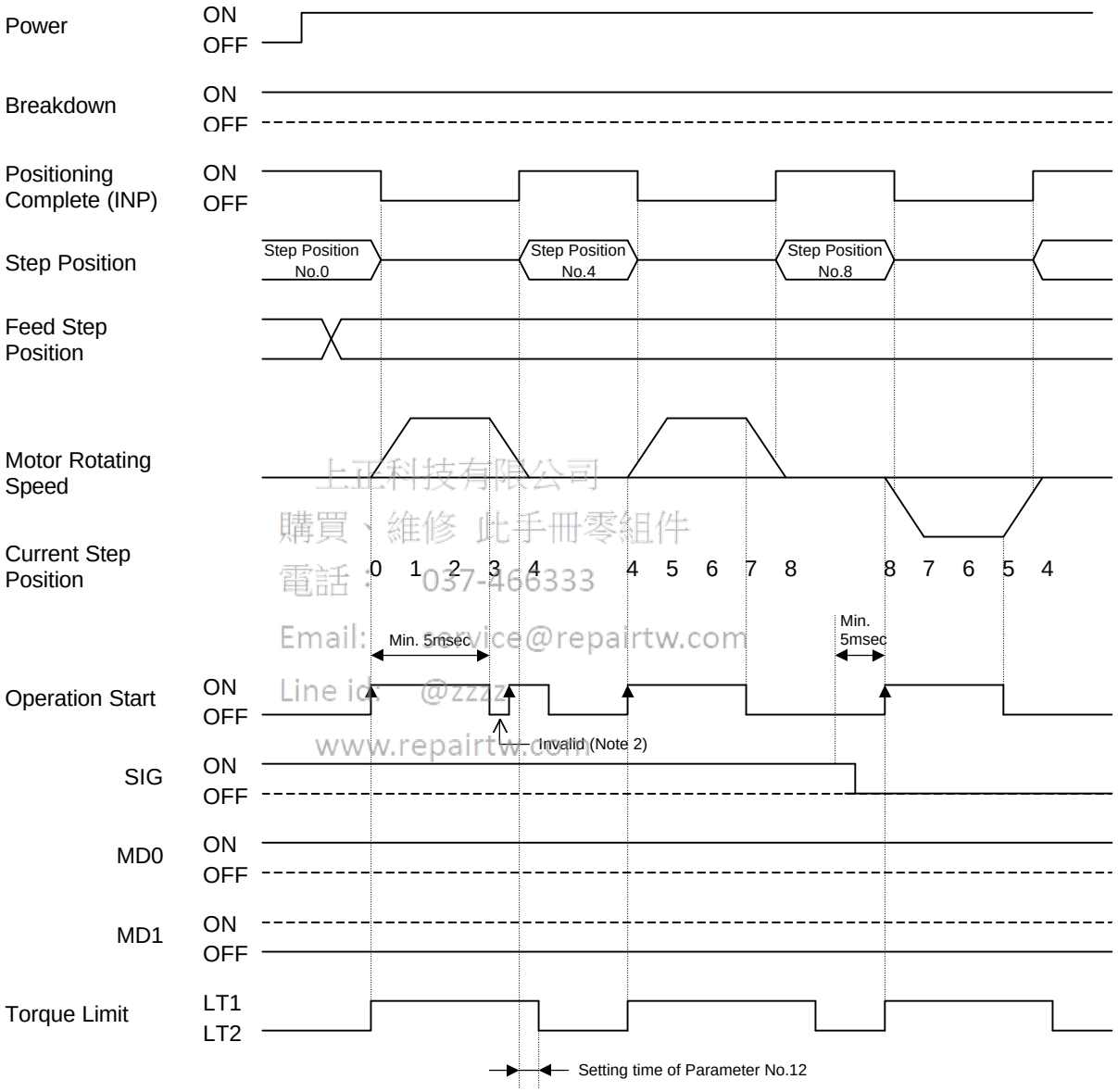
2. The origin address is invalid just after the origin set. It becomes valid after power turns off and on again.

3. The origin address is a offset amount from position of the origin set.
If the origin address value is bigger than in-position range, the positioning complete signal dose not turn on when power turns on at first time after the origin set.

(5) Manual operation mode

When the Operation Start signal is turned on, the motor rotates to specified direction by the 'Rotating Direction Detection'. And next, the Operation Start signal is turned off, the motor decelerates and stops nearest step position which can stop.

Set motor rotating speed to the parameter No. 09 (SP2) 'Manual positioning speed'.

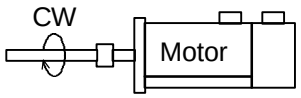


Note) 1. If operating without reference point return, the Reference point return incomplete alarm occurs and Operation Start signal is ignored.

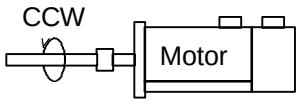
2. When remaining amount of instructive movement is not equal zero, the operation Start signal is ignored.
Refer to "Note" of "(7) Positioning Complete, Step Position Output"

(6) Feed Step No.

Parameter No.01 (FTY) Set = [0]
The origin set position is the Feed Step No.0. And according to the CW direction rotating of servo motor, the Feed Step No.2 and No.3 are appeared.



Parameter No.01 (FTY) Set = [1]
The origin set position is the Feed Step No.0. And according to the CCW direction rotating of servo motor, the Feed Step No.2 and No.3 are appeared.



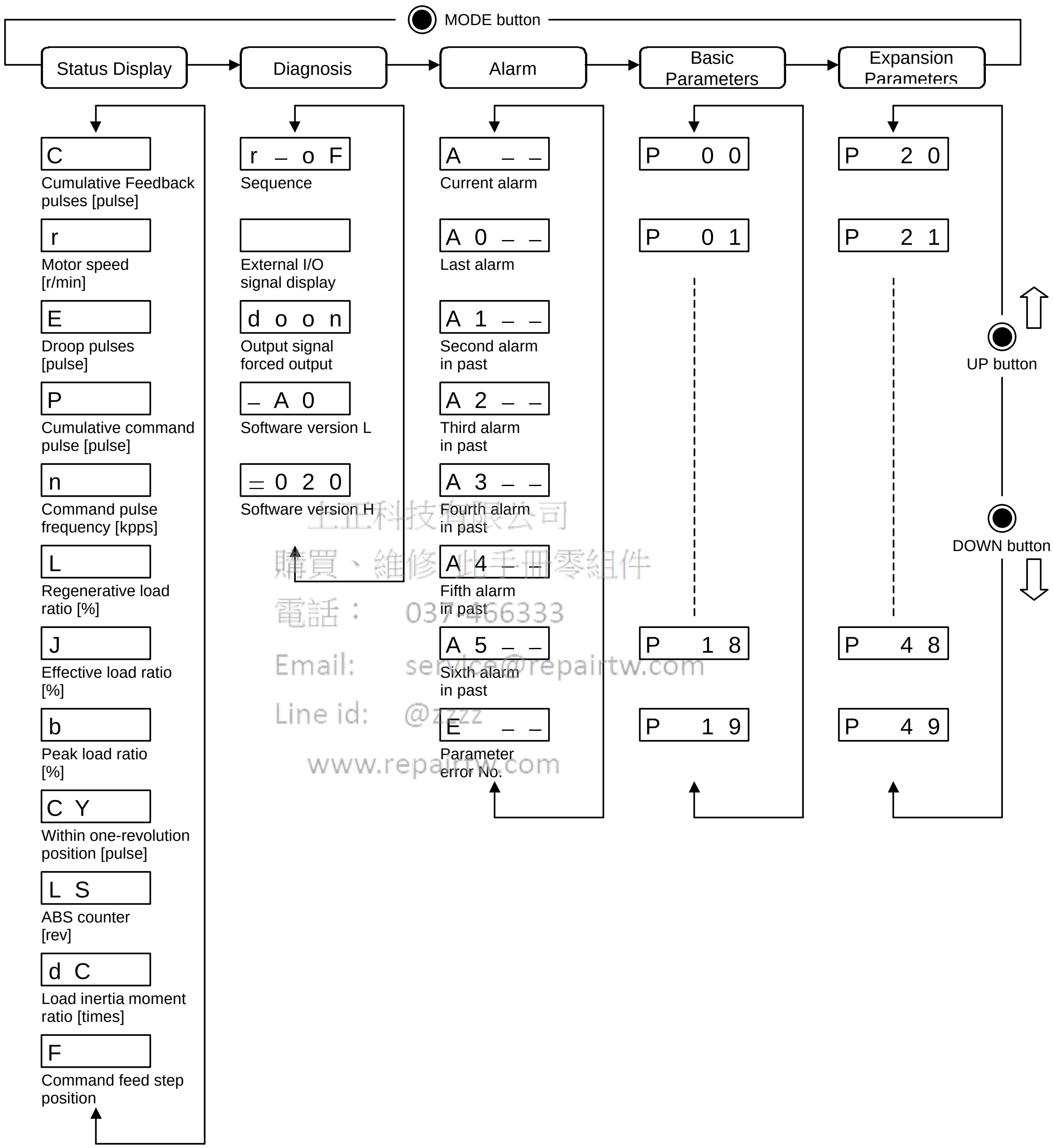
(7) Positioning Complete, Step Position, Torque Limit

1 At just after power on, during emergency stop or alarm, the Positioning Complete signal is turned on (Short) and the corresponded Step Position data is output if position is within in-position range of the Step Position.
2 At just after power on or during first operation by the Operation Start signal input after emergency stop reset, the Positioning Complete signal is turned on (Short) and the corresponded Step Position data is output if position is within in-position range of the target Step Position.
3 At just after power on or during first operation by the Manual Operation Mode after emergency stop reset, the Positioning Complete signal is turned on (Short) and the corresponded Step Position data is output if position is within in-position range of the target Step Position when the Operation Start signal is turned off.
4 At the Automatic Operation Mode 1, the Automatic Operation Mode 2, the Manual Operation Mode or the Dog Method Reference Point Return Mode, the Torque Limit is changed from TL2 to TL1 when the Operation Start signal is turned on.

Note) 1. During operation by the Automatic Mode or the Manual Mode, the Positioning Complete signal and the Step Position signals are keeping 'OFF' if the remaining movement amount of command is not equal zero even if position is within in-position range of the target Step Position.

6. DISPLAY

(1) Display flowchart



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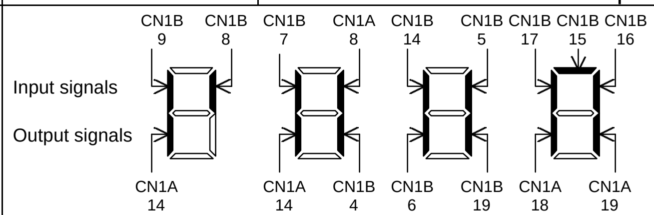
(2) Status Display

Name	Symbol	Display Range	Unit	Description
Cumulative feedback pulses	C	-9999 to 9999	pulse	Feedback pulses from the servo motor encoder are counted and displayed. When the value exceeds 9999, it begins with zero. Press the SET button to reset the display value to zero. When the servo motor is rotating in the reverse direction, the decimal points in the upper 3 digits are lit.
Servo motor speed	r	-5400 to 5400	r/min	The servo motor speed is displayed. When the servo motor is rotating in the reverse direction, the decimal points in the upper 3 digits are lit.
Droop pulses	E	-9999 to 9999	pulse	The number of droop pulses In the deviation counter is displayed. When the value exceeds ±9999, it begins with zero. When the servo motor is rotating in the reverse direction, the decimal points in the upper 3 digits are lit.
Cumulative command pulses	P	-9999 to 9999	pulse	The position command input pulses are counted and displayed. Press the SET button to reset the display value to zero. When the servo motor is rotating in the reverse direction, the decimal points in the upper 3 digits are lit.
Command pulse frequency	n	-400 to 400	kpps	The frequency of the position command input pulses is displayed. When the servo motor is rotating In the reverse direction, the decimal points In the upper 3 digits are lit
Regenerative load ratio	L	0 to 100	%	The ratio of regenerative power to permissible regenerative power is displayed in %.
Effective load ratio	J	0 to 300	%	The continuous effective load torque is displayed. When rated torque is generated, this value is 100%. The effective value for the past 15 seconds is displayed.
Peak load ratio	b	0 to 300	%	The maximum torque generated during acceleration/deceleration, etc. is displayed. When rated torque is generated, this value is 100%. The peak torque for the past 15 seconds is displayed.
Within one-revolution position	CY	0 to 9999	pulse	Position within one revolution is displayed In encoder pulses. When the value exceeds 9999, it begins with zero.
ABS counter	LS	-9999 to 9999	rev	Travel value from the home position (0) in the absolute position detection system is displayed in terms of the absolute position detector's counter value. When the value exceeds 9999, it begins with zero.
Load inertia moment ratio	dc	0.0 to 100.0	Times	The estimated ratio of the load inertia moment to the servo motor shaft inertia moment is displayed.
Command feed step position	F	0 to 14		The command feed step position is displayed. The stopping step position by the manual operation signal turning off is displayed during the manual operation mode.

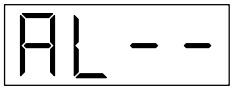
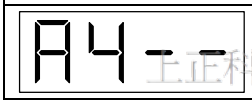
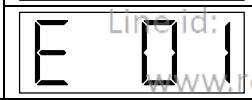
When the required data is selected, the corresponding symbol is displayed. The status is displayed when the SET button is pressed.
When the minus value is displayed, the decimal points in the upper 3 digits are lit. However, if it is value witch has the decimal point, the original decimal point is not lit.

(3) Diagnostic Mode

Name	Display	Description
Sequence	r-oF	Not ready Indicates that the servo amplifier is being initialized or an alarm has.
	r-on	Ready Indicates that the servo was switched on after completion of initialization and the servo amplifier is ready to operate.
External I/O signal display		Indicates the ON-OFF status of the external I/O signals.
Output signal forced output	doon	The digital output signal can be forced on/off.
Software version Low	-A0	Indicates the software version.
Software version High	=020	Indicates the system number of software.

The first digit decimal point is lit during checking the DO signal

(4) Alarm Mode

Name	Display	Description
Current alarm		Indicates no occurrence of an alarm.
		Indicates the no occurrence of alarm 33 (Overvoltage). Flickers at occurrence of the alarm.
Alarm history		Indicates that the last alarm is alarm 50 (Overload 1).
		Indicates that the second alarm in the past is alarm 33 (Overvoltage).
		Indicates that the third alarm in the past is alarm 10 (Undervoltage).
		Indicates that the fourth alarm in the past is alarm 31 (Overspeed).
		Indicates that there is no fifth alarm in the past.
		Indicates that there is no sixth alarm in the past.
Parameter error number		Indicates no occurrence of alarm 37 (Parameter error).
		Indicates that the data of parameter No. 1 is faulty.

Function at occurrence of an alarm

(1) Any mode screen displays the current alarm.
(2) The other screen is visible during occurrence of an alarm. At this time, the decimal point in the fourth digit flickers.
(3) To clear any alarm, switch power off, then on or press the SET button on the current alarm screen. Note that this should be done after removing the cause of the alarm,
(4) Use parameter No. 16 to clear the alarm history.

7. PARAMETERS

(1) Parameter List

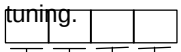
	No.	Symbol	Name and Function	Initial Value	unit	Note
Basic Parameters	00	*STY	Control mode, regenerative brake option selection	0000		
	01	*FTY	Feeding type	0000		
	02	*OP1	Function selection 1	1000		
	03	ATU	Auto tuning	1104		
	04	*CMX	Number of tooth of the machine side gear	20		
	05	*CDV	Number of tooth of the motor side gear	1		
	06	PG1	Position loop gain 1	108	rad/s	
	07	PST	Acceleration / deceleration time constant	150	msec	
	08	SP1	Auto positioning speed	3500	r/min	
	09	SP2	Manual positioning speed	1000	r/min	
	10	*STN	Number of division of one revolution	8	divide	
	11	INP	In-position range	400	pulse	
	12	INT	Torque limit delay time	100	msec	
	13	ZRF	Reference point return speed	0	r/min	
	14	CRF	Creep speed	0	r/min	
	15	ZST	Origin shift amount	0	pulse	
	16	*BPS	Communication baudrate selection, alarm history clear	0000		
	17	MOD	Analog monitor output	0100		
	18	*DMD	Status display selection	0000		
	19	*BLK	Parameter block	0000		
Expansion Parameters	20	*OP2	Function selection 2	0000		
	21	*OP3	Function selection 3	0000		
	22	*OP4	Function selection 4	0000		
	23	FFC	Feed forward gain	0	%	
	24	*ZPS	Origin address	0	pulse	
	25			0		
	26			0		
	27	*ENR	Encoder output pulse	4000	pulse	
	28	TL1	Internal torque limit 1	100	%	
	29	TL2	Internal torque limit 2	0	%	
	30		Spare	0		
	31	MO1	Analog monitor offset 1	0	mV	
	32	MO2	Analog monitor offset 2	0	mV	
	33		Spare	0		
	34	DG2	Ratio of load inertia moment to servo motor inertia moment	70	×0.1	
	35	PG2	Position loop gain 2	61	rad/s	
	36	VG1	Speed loop gain 1	648	rad/s	
	37	VG2	Speed loop gain 2	1428	rad/s	
	38	VIC	Speed integral compensation	23	msec	
	39	VDC	Speed differential compensation	980		
	40		Spare	0		
	41	LPF	Current command low path filter	0000		
	42	NCH	Machine resonance absorptive filter	0000		
	43	FR1	Friction compensation gain 1	0		
	44	FR2	Friction compensation gain 2	0		
	45	FRD	Friction compensation gain model speed	0		
	46		Spare	0		
	47			0		
	48			0		
	49			0		

For any parameter whose symbol is preceded by *, set the parameter and switch power off once, then switch it on again to make that parameter valid.

(2) Detailed Explanation of the Parameter

	No.	Symbol	Name and Function	Initial Value	unit	Setting range
Basic Parameters	00	*STY	Regenerative brake option selection Used to select the regenerative brake option. 0 | | 0 | 0 Select the regenerative brake option. 0 : Not used 2 : MR-RB032 3 : MR-RB12 4 : MR-RB32 5 : MR-RB34 6 : MR-RB54 Note) If the regenerative brake option selected is not for use with the servo amplifier, parameter error occurs.	0000		0000h ~ 0600h
	01	*FTY	Feeding type Used to select the feeding type. 0 | 0 | | | Select the reference point return method 0 : Data set method 1 : Dog method Select the feed step No. direction 0 : Feed step No. increases according to the CW direction rotation. 1 : Feed step No. increases according to the CCW direction rotation.	0000		0000h ~ 0011h
	02	*OP1	Function selection 1 Used to select the input signal filter, CN1B-pin 19's output signal and absolute position detection system. | 0 | 0 | | Input signal filter 0 : None 1 : 1.77msec 2 : 3.55msec Positioning system 0 : Used in incremental positioning system 1 : Used in absolute position detection system	1000		0000h ~ 1002h

For any parameter whose symbol is preceded by *, set the parameter and switch power off once, then switch it on again to make that parameter valid.

<table>
<tr><th></th><th>No.</th><th>Symbol</th><th>Name and Function</th><th>Initial Value</th><th>unit</th><th>Note</th></tr>
<tr><td rowspan="9">Basic Parameters</td><td>03</td><td>ATU</td><td>Auto tuning
Used to set the response level, etc. for execution of auto tuning.
 
Auto tuning response level setting
<table><tr><th>Set Value</th><th>Response Level</th></tr><tr><td>1</td><td>Low response</td></tr><tr><td>2</td><td>~</td></tr><tr><td>3</td><td>Middle response</td></tr><tr><td>4</td><td>~</td></tr><tr><td>5</td><td>High response</td></tr></table>Select the machine
0 : Normal
1 : Large friction machine
Auto tuning selection
0 : Interpolation axis control (Not use this setting normally)
1 : Executed for both position and speed loops
2 : Not use
Positioning time reduction
0 : Normal
1 : time reduction</td><td>1104</td><td></td><td>0001h
~
1215h</td></tr>
<tr><td>04</td><td>*CMX</td><td>Number of tooth of the machine side gear
Used to set the number of tooth of the machine side gear.</td><td>20</td><td></td><td>1~16384</td></tr>
<tr><td>05</td><td>*CDV</td><td>Number of tooth of the motor side gear
Used to set the number of tooth of the motor side gear.
‘CMX’ and ‘CDV’ are limited by following conditions.
(1) $\frac{1}{9999} < \frac{CMX}{CDV} < 9999$
(2) CDV × STN < 32767
(3) CMX × CDV < 100000</td><td>1</td><td></td><td>1~16384</td></tr>
<tr><td>06</td><td>PG1</td><td>Position loop gain 1
Used to set the gain of position loop 1.
Increase the gain to improve tractability in response to the position command.</td><td>108</td><td>rad/s</td><td>4~1000</td></tr>
<tr><td>07</td><td>PST</td><td>Acceleration / deceleration time constant
Used to set the time from the position command to the rating rotation speed.</td><td>150</td><td>msec</td><td>0~10000</td></tr>
<tr><td>08</td><td>SP1</td><td>Auto positioning speed
Used to set the motor speed for the auto operation mode1 and 2.</td><td>3500</td><td>r/min</td><td>0~
permissible
rotation
speed</td></tr>
<tr><td>09</td><td>SP2</td><td>Manual positioning speed
Used to set the motor speed for the manual operation mode.</td><td>1000</td><td>r/min</td><td>0~
permissible
rotation
speed</td></tr>
</table>

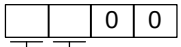
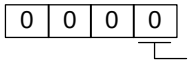
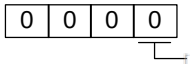
For any parameter whose symbol is preceded by *, set the parameter and switch power off once, then switch it on again to make that parameter valid.

	No.	Symbol	Name and Function	Initial Value	unit	Note
Basic Parameters	10	*STN	Number of division of one revolution Used to set the number of divided of one revolution (Number of calculating positions)	8	divide	1~15
	11	INP	In-position range Used to set the droop pulse range in witch the in-position (INP) signal will be output.	400	pulse	0~10000
	12	INT	Torque limit delay time Used to set the delay time from the positioning complete signal (INP) output to the torque limit becomes effective.	100	msec	0~1000
	13	ZRF	Reference point return speed Used to set the motor rotation speed for the reference point return.	0	r/min	0~ permissible rotation speed
	14	CRF	Creep speed Used to set the creep speed after the dog detection.	0	r/min	0~ permissible rotation speed
	15	ZST	Origin shift amount Used to set the shift amount from the encoder's Z-phase pulse detection position.	0	pulse	0~65535
	16	*BPS	Communication baudrate selection, alarm history clear Used to select the communication baudrate for the RS-232C and to clear the alarm history. 0 0 [ ] [ ] Selection of baudrate for RS-232C 0 : 9600 [bps] 1 : 19200 [bps] Alarm history clear 0 : Invalid 1 : Valid When alarm history clear is made valid, the alarm history is cleared at next power –on. After the alarm history is cleared, the setting is automatically made invalid (reset to 0).	0000		0000h ~ 0011h

For any parameter whose symbol is preceded by *, set the parameter and switch power off once, then switch it on again to make that parameter valid.

<table>
<tr><th></th><th>No.</th><th>Symbol</th><th>Name and Function</th><th>Initial Value</th><th>unit</th><th>Note</th></tr>
<tr><td rowspan="3">Basic Parameters</td><td>17</td><td>MOD</td><td>Analog monitor output
Used to set the signal output for analog monitor.
[0][ ][0][ ]
Analog monitor ch1 output
Selection the set values and their definitions are as in analog monitor ch2.
Analog monitor ch2 output
0 : Servo motor speed (±8V/max. speed)
1 : Torque (±8V/max. torque)
2 : Servo motor speed (+8V/max. speed)
3 : Torque (+8V/max. torque)
4 : Current command output (±8V/max. command current)
5 : Command pulse frequency (±8V/400kpps)
6 : Droop pulse (±10V/128 pulses)
7 : Droop pulse (±10V/2048 pulses)
8 : Droop pulse (±10V/8192 pulses)
9 : Droop pulse (±10V/32768 pulses)
A : Droop pulse (±10V/131072 pulses)</td><td>0100</td><td></td><td>0000h
~
0A0Ah</td></tr>
<tr><td>18</td><td>*DMD</td><td>Status display selection
Used to select the status display shown at power-on.
[0][0][0][ ]
Selection of status display at power-on
0 : Cumulative feedback pulses
1 : Servo motor "ad
2 : Droop pulses
3 : Cumulative command pulses
4 : Command pulse frequency
5 : Regenerative load ratio
6 : Effective load ratio
7 : Peak load ratio
8 : Within one-revolution position
9 : ABS counter
A : Load Inertia moment ratio
B : Command feed step position</td><td>0000</td><td></td><td>0000h
~
000Bh</td></tr>
<tr><td>19</td><td>*BLK</td><td>Parameter block
Used to select the reference and write ranges of the parameters.<table><tr><th>Set value</th><th>Reference range</th><th>Write Range</th></tr><tr><td>0000</td><td>Basic parameter (0~19)</td><td>Basic parameter (0~19)</td></tr><tr><td>000A</td><td>Parameter No. 19 only</td><td>Parameter No. 19 only</td></tr><tr><td>000B</td><td>Basic parameter (0~19)
+
Expansion parameter (20~49)</td><td>Basic parameter (0~19)</td></tr><tr><td>000C</td><td>Basic parameter (0~19)
+
Expansion parameter (20~49)</td><td>Basic parameter (0~19)
+
Expansion parameter (20~49)</td></tr></table>Except above table are follows;<table><tr><th>Reference range</th><th>Write Range</th></tr><tr><td>Basic parameter (0~19)</td><td>Basic parameter (0~19)</td></tr></table></td><td>0000</td><td></td><td>0000h
~
FFFFh</td></tr>
</table>

For any parameter whose symbol is preceded by *, set the parameter and switch power off once, then switch it on again to make that parameter valid.

	No.	Symbol	Name and Function	Initial Value	unit	Note
Expansion Parameters	20	*OP2	Function selection 2 Used to select the serial encoder cable type and slight vibration suppression control.  Slight vibration suppression control 0 : Invalid 1 : Valid Serial encoder cable type 0 : 2-wires type 1 : 4-wires type If setting wrong value, AL-16 and AL-20 occurs	0000		0000h ~ 1100h
	21	*OP3	Function selection 3  	0000		0000h ~ 0000h
	22	*OP4	Function selection 4  	0000		0000h ~ 0000h
	23	FFC	Feed forward gain Used to set the feed forward gain in position control. By setting 100% for constant-speed operation, droop pulses will not be generated. Note that sudden acceleration/deceleration will increase overshoot. When setting this parameter, always set auto tuning to “No” (parameter No. 3).	0	%	0~100
	24	*ZPS	Origin address Used to set the address of the reference point return position with unit of encoder [pulse] at the reference point return. The origin point can be shifted from reference point return position using this parameter. Note) 1. The origin address is invalid just after the origin set. It becomes valid after power turns off and on again. 2. The origin address is a offset amount from position of the origin set. If the origin address value is bigger than in-position range, the positioning complete signal dose not turn on when power turns on at first time after the origin set.	0	pulse	-999~999
	25 26		Spare	0		
	27	*ENR	Encoder output pulse Used to set the number of output pulses per encoder revolution output by the servo amplifier.	4000	pulse	5~16384
	28	TL1	Internal torque limit 1 Set this parameter to limit servo motor-generated torque on the assumption that the maximum torque is 100[%]. When 0 is set, torque is not produced.	100	%	0~100

For any parameter whose symbol is preceded by *, set the parameter and switch power off once, then switch it on again to make that parameter valid.

	No.	Symbol	Name and Function	Initial Value	unit	Note
Expansion Parameters	29	TL2	Internal torque limit 2 Set the generation torque at the condition by the parameter No. 07 on the assumption that the maximum torque is 100[%]. When 0 is set, torque is not produced.	0	%	0~100
	30		Spare	0		
	31	MO1	Analog monitor offset 1 Used to set the offset voltage of the analog monitor 1 output (MO1).	0	mV	-999~999
	32	MO2	Analog monitor offset 2 Used to set the offset voltage of the analog monitor 2 output (MO2).	0	mV	-999~999
	33		Spare	0		
	34	DG2	Ratio of load inertia moment to servo motor inertia moment Used to set the ratio of the load inertia moment to the servo motor inertia moment. Note that when auto tuning is selected, the result of auto tuning Is automatically set.	70	×0.1	0~1000
	35	PG2	Position loop gain 2 Used to set the gain of the position loop. Set this parameter to increase position response to load disturbance. Higher setting Increases the response level but is liable to generate vibration and/or noise. Note that when auto tuning is selected, the result of auto tuning Is automatically set.	61	rad/s	1~500
	36	VG1	Speed loop gain 1 Normally this parameter setting need not be changed. Higher setting Increases the response level but Is liable to generate vibration and/or noise. Note that when auto tuning is selected, the result of auto tuning Is automatically set.	648	rad/s	20~5000
	37	VG2	Speed loop gain 2 Set this parameter when vibration occurs on machines of low rigidity or large backlash. Higher setting increases the response but is liable to generate vibration and/or noise. Note that when auto tuning is selected, the result of auto tuning Is automatically set.	1428	rad/s	20~8000
	38	VIC	Speed integral compensation Used to set the constant of integral compensation. Note that when auto tuning is selected, the result of auto tuning Is automatically set.	23	msec	1~1000

For any parameter whose symbol is preceded by *, set the parameter and switch power off once, then switch it on again to make that parameter valid.

<table>
<tr><th></th><th>No.</th><th>Symbol</th><th>Name and Function</th><th>Initial Value</th><th>unit</th><th>Note</th></tr>
<tr><td rowspan="9">Expansion Parameters</td><td>39</td><td>VDC</td><td>Speed differential compensation
Used to set the differential compensation value.
If set 100, it is normal differential compensation value. If set small than 100, the differential compensation range extends.</td><td>980</td><td></td><td></td></tr>
<tr><td>40</td><td></td><td>Spare</td><td>0</td><td></td><td></td></tr>
<tr><td>41</td><td>LPF</td><td>Current command low path filter
[0][0][0][ ]
Low path filter for current command
<table>
<tr><th>Set Value</th><th>Filter</th></tr>
<tr><td>0</td><td>Not sue</td></tr>
<tr><td>1</td><td>Average 2 times</td></tr>
<tr><td>2</td><td>Average 4 times</td></tr>
<tr><td>3</td><td>Average 8 times</td></tr>
</table></td><td>0000</td><td></td><td>0000h
~
0003h</td></tr>
<tr><td>42</td><td>NCH</td><td>Machine resonance absorptive filter
[0][0][0][ ]
Used to set the corresponding frequency of the machine resonance frequency.
<table>
<tr><th>Set Value</th><th>Resonance frequency</th><th>Set Value</th><th>Resonance frequency</th></tr>
<tr><td>0</td><td>Not sue</td><td>8</td><td>281.2</td></tr>
<tr><td>1</td><td>2250</td><td>9</td><td>250</td></tr>
<tr><td>2</td><td>1125</td><td>A</td><td>225</td></tr>
<tr><td>3</td><td>750</td><td>B</td><td>204.5</td></tr>
<tr><td>4</td><td>562.5</td><td>C</td><td>187.5</td></tr>
<tr><td>5</td><td>450</td><td>D</td><td>178.1</td></tr>
<tr><td>6</td><td>375</td><td>E</td><td>160.7</td></tr>
<tr><td>7</td><td>321</td><td>F</td><td>150</td></tr>
</table>
Used to set the rate of the machine resonance absorptive filter.
<table>
<tr><th>Set Value</th><th>This time [%]</th></tr>
<tr><td>0</td><td>50</td></tr>
<tr><td>1</td><td>75</td></tr>
<tr><td>2</td><td>87.5</td></tr>
<tr><td>3</td><td>93.8</td></tr>
</table></td><td>0000</td><td></td><td>0000h
~
3F3Fh</td></tr>
<tr><td>43</td><td>FR1</td><td>Friction compensation gain 1
Used to set the friction compensation gain 1.</td><td>0</td><td></td><td>0~32767</td></tr>
<tr><td>44</td><td>FR2</td><td>Friction compensation gain 2
Used to set the friction compensation gain 2.</td><td>0</td><td></td><td>0~32767</td></tr>
<tr><td>45</td><td>FRD</td><td>Friction compensation gain model speed
Used to set the model speed level for the friction compensation beginning.</td><td>0</td><td></td><td>0~32767</td></tr>
<tr><td>46
47
48
49</td><td></td><td>Spare</td><td>0</td><td></td><td></td></tr>
</table>

For any parameter whose symbol is preceded by *, set the parameter and switch power off once, then switch it on again to make that parameter valid.

8. ALARMS AND WARNINGS

(1) Alarm, Warning list

	Display	Name
Alarms	A.10	Undervoltage
	A.11	Board error 1
	A.12	Memory error 1
	A.13	Clock error
	A.15	Memory error 2
	A.16	Encoder error 1
	A.17	Board error 2
	A.18	Board error 2
	A.20	Encoder error 2
	A.24	Main circuit error
	A.25	Absolute position erasw
	A.30	Regenerative error
	A.31	Overspeed
	A.32	Overcurrent
	A.33	Overvoltage
	A.37	Parameter error
	A.46	Servo motor overheat
	A.50	Overload 1
	A.51	Overload 2
	A.52	Error excessive
	A.8E	RS-232C error
	8888	Watchdog
Warnings	A.90	Reference point return incomplete warning
	A.92	Open battery cable warning
	A.96	Origin setting warning
	A.97	Feed step position warning
	A.9F	Battery warning
	A.E3	Absolute position counter warning
	A.E6	Servo emergency stop
	A.E9	Main circuit off warning

(2) Detailed explanation of alarms and warnings

The special alarms which were added or modified for MR-J2- D-S24 are explained at following table. The alarms other than being written on this table are the same as standard amplifier. Please refer to the "MELSERVO-J2-A Specifications and Installation Guide".

Display	Name	Definition	Cause	Action
A.90	Reference point return incomplete warning	Auto or manual operation command was given when the reference point return was incomplete.	1. Gave the auto operation command when the reference point return was incomplete. 2. Gave the manual operation command when the reference point return was incomplete.	Execute the reference point return.
A.96	Origin setting warning	The reference point return was unsuccessful.	1. It was impossible changing speed from the reference point return speed to the creep speed.	Reduce the reference point return speed
A.97	Feed step position warning	Auto operation command was given with wrong feed step position.	1. Gave the auto operation command with the feed step position over value than the 'setting value of the parameter No.10 (STN) – 1'.	Change setting value of the feed step position to equal or less than 'parameter No.10 (STN) – 1'.