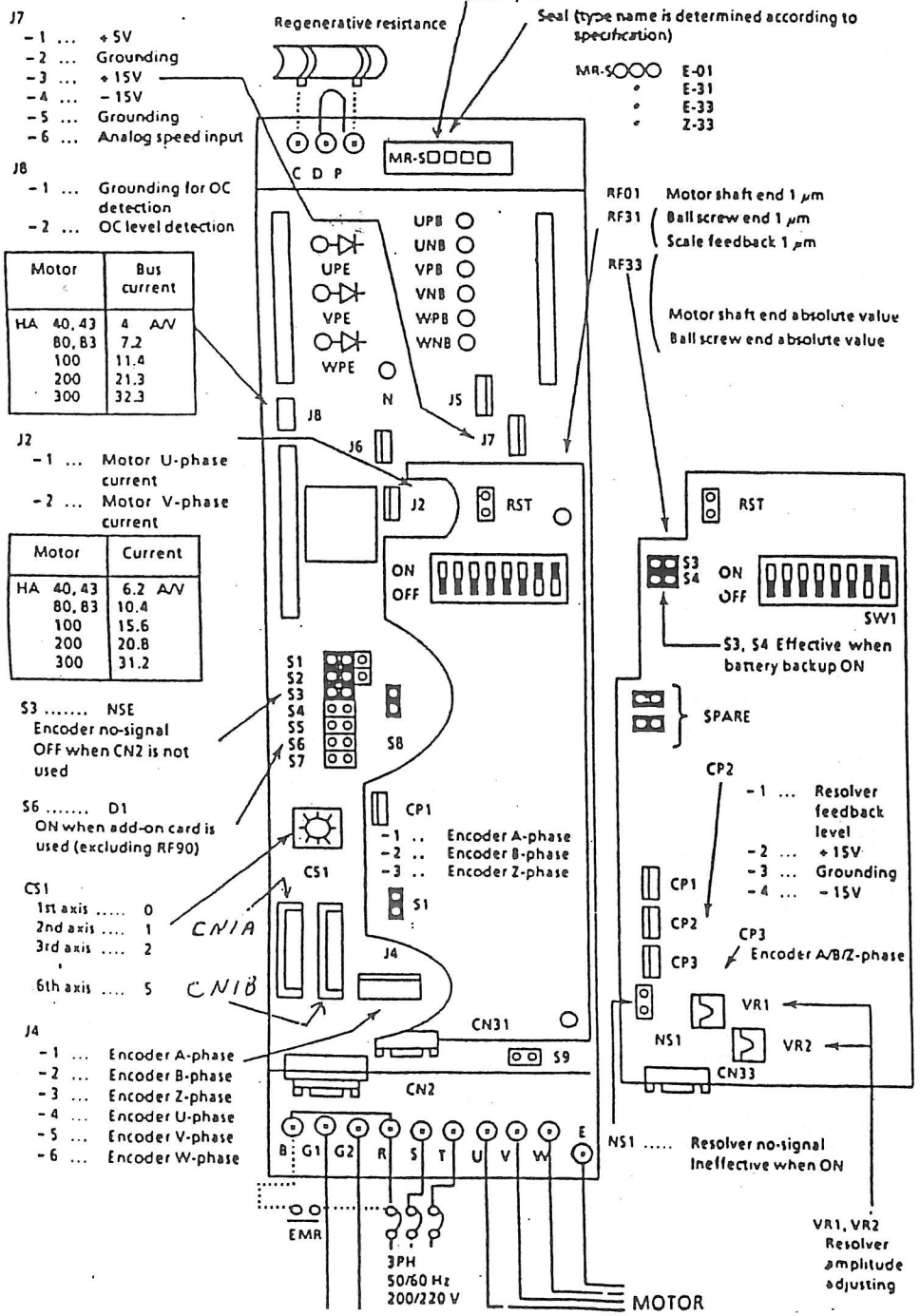
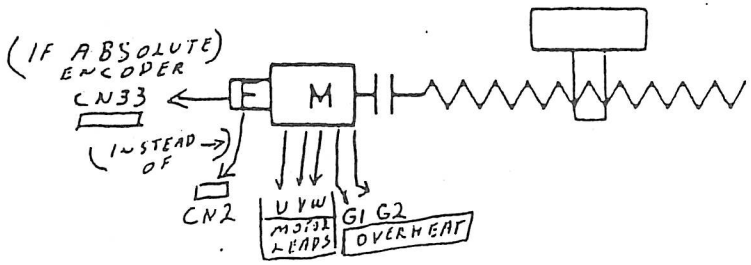
MRS & MRS1

TROUBLE-SHOOTING GUIDE

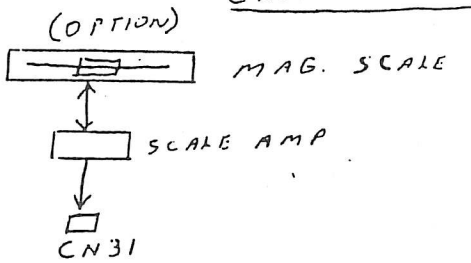
MR-S OR MR-S1



SEMI - CLOSED LOOP

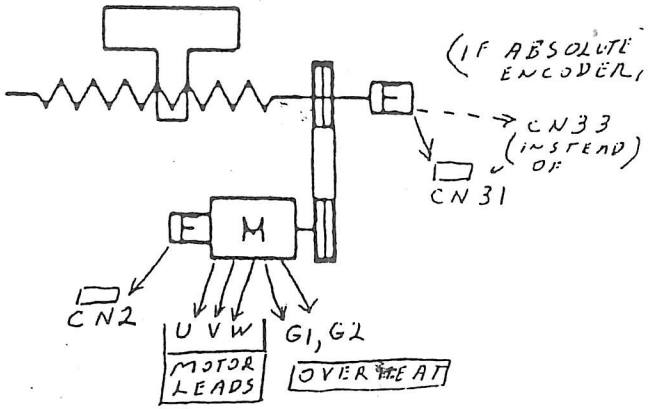


CLOSED LOOP



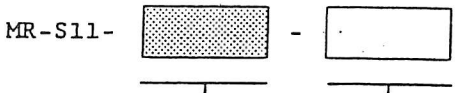
12-82

CLOSED LOOP



1. SPECIFICATIONS AND FUNCTIONS OF S11 SERIES (1-AXIS TYPE) SERVO AMPLIFIER

1.1 STRUCTURE OF UNITS NAME OF SERVO AMPLIFIER

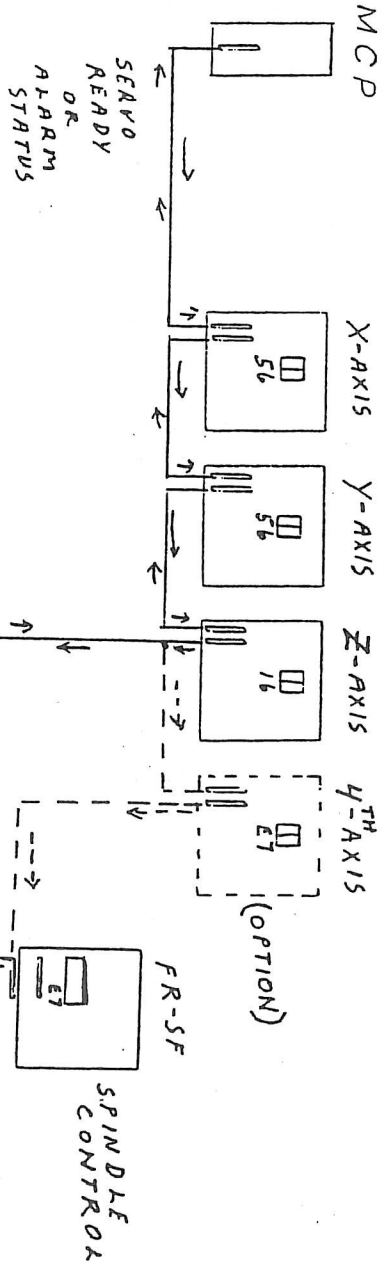


E01: Standard system
E31: Ball screw end, compatible with linear scale
E33: Ultra high accuracy encoder
Z33: Compatible with absolute value

Classification of motor power

33: HA23/33
40: HA40/43
80: HA80/83
100: HA100
103: HA103
200: HA200
300: HA203/300
700: HA700
900: HA900

ALARM CHECK SEQUENCE



ALARM #

56 PROBLEM IN OTHER AXIS

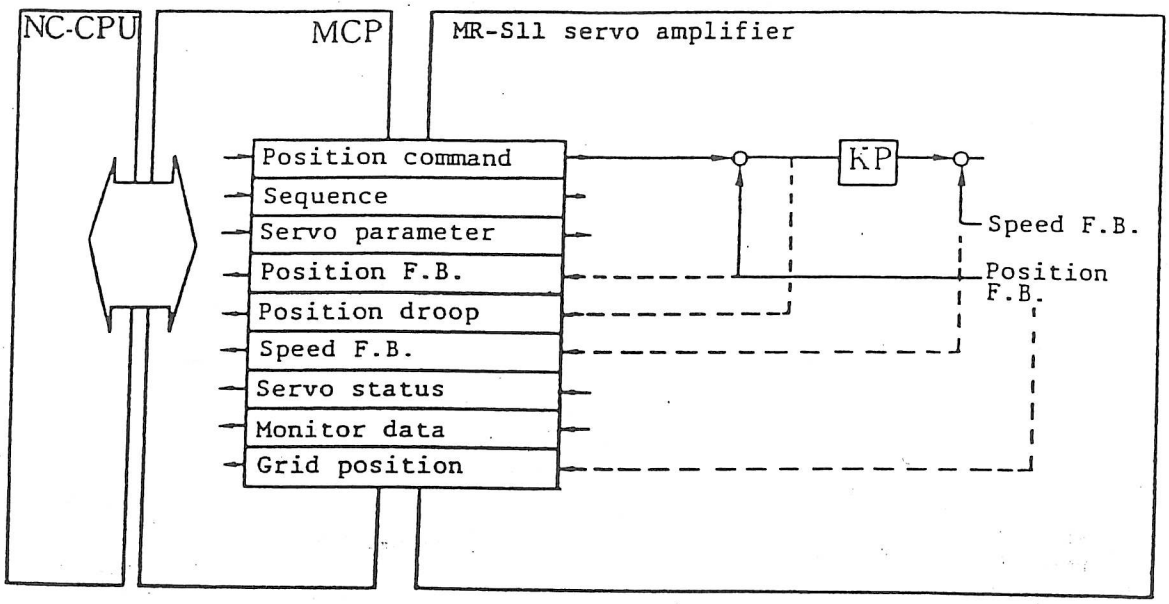
16 LOSS OF ENCODER FD/BK

E7 EMERGENCY STOP

1.3 PROTECTION FUNCTION AND WARNING FUNCTION

Data is indicated on the servo amplifier display as a code and transferred to NC.

Data between MR-S11 amplifier and NC



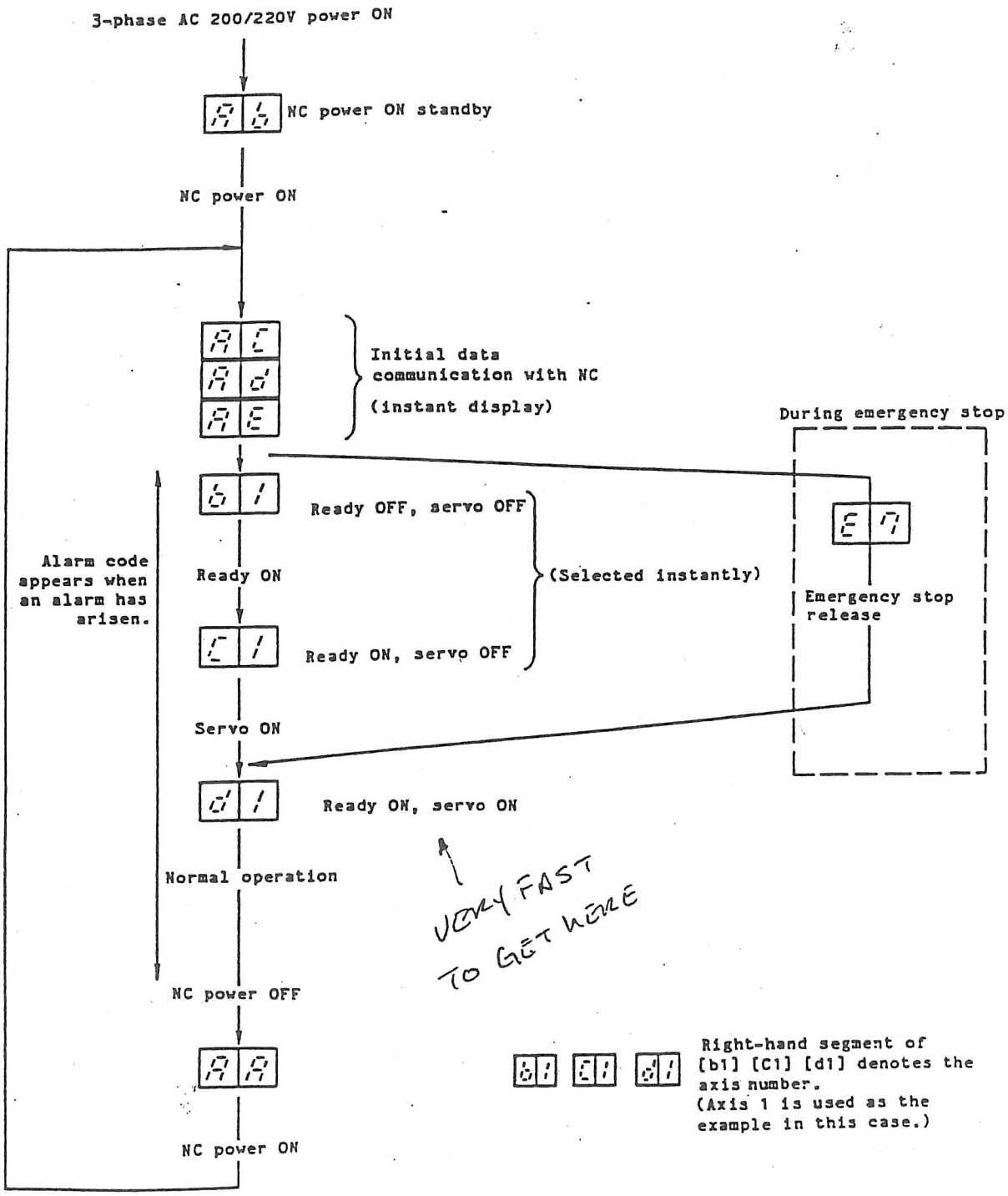
MR-S11 amplifier status display

#	Status	Description
AA	INITIALIZE	Waiting for NC power start up (NC power ON → OFF).
Ab	INITIALIZE	Waiting for NC power start up
AC	INITIALIZE	During parameter transfer request
Ad	INITIALIZE	Waiting for parameter conversion request
AE	INITIALIZE	Waiting for main servo IT start
b*	READY OFF	Ready OFF
C*	READY ON	Servo OFF
d*	SERVO ON	Servo ON
E*	WARNING	Warning
A*	WARNING	Warning
**	ALARM	Alarm
..	WD ERROR	WD error

*: Axis number *: Warning number (See next page.)
**: Alarm number (See next page.)

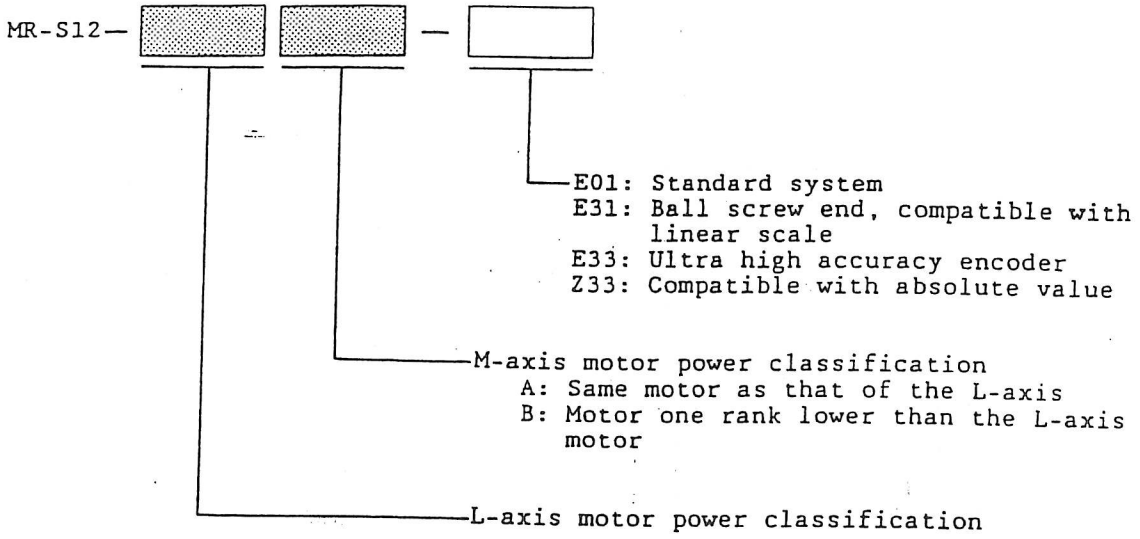
(2) After switching on the power

The normal 7-segment display appears after the power has been switched on.



1. SPECIFICATIONS AND FUNCTIONS OF S12 SERIES (2-AXIS TYPE) SERVO AMPLIFIER

1.1 STRUCTURE OF UNITS NAME OF SERVO AMPLIFIER



Servo amplifier and applicable motor

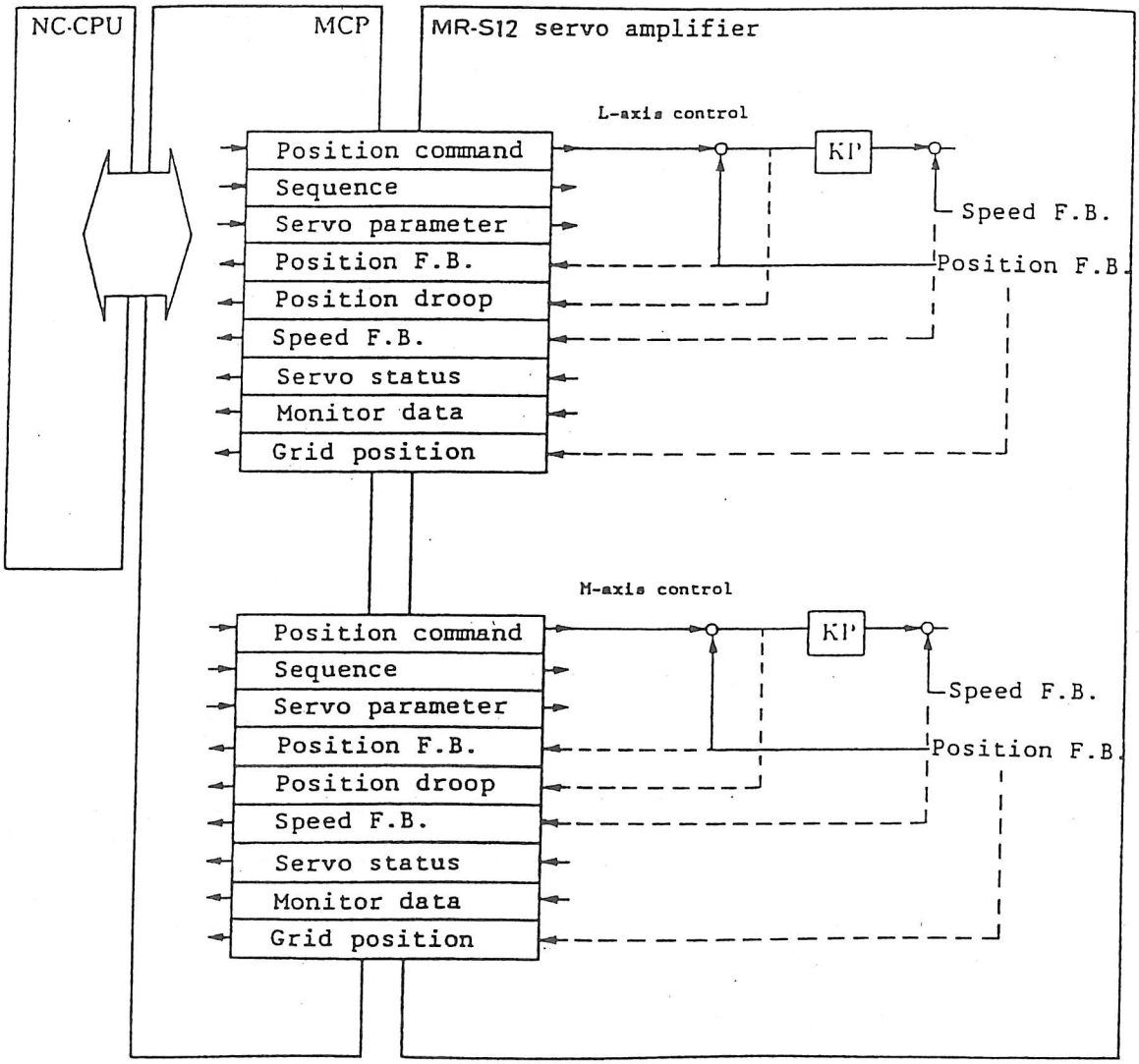
Servo amplifier	Applicable motor	
	L-axis	M-axis
MR-S12-13A	HA053/HA13	HA053/HA13
MR-S12-33A	HA23/33	HA23/33
MR-S12-40A	HA40/43	HA40/43
MR-S12-80B	HA80/83	HA40/HA43
MR-S12-80A	HA80/83	HA80/83
MR-S12-100B	HA100	HA80/83
MR-S12-100A	HA100	HA100

Note) Motors other than those shown above should never be installed.

1.3 PROTECTION FUNCTION AND WARNING FUNCTION

Data is indicated on the servo amplifier display as a code and transferred to NC.

Data between MR-S12 amplifier and NC

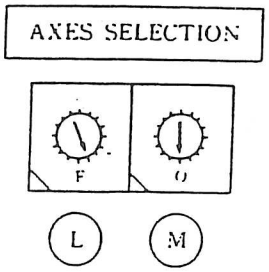


MR-S12 amplifier status display

Display	Status	Description
AA	INITIALIZE	Waiting for NC power start up (NC power ON → OFF).
Ab	INITIALIZE	Waiting for NC power start up (When the amplifier power is turned from OFF to ON and the NC power is OFF)
AC	INITIALIZE	During parameter transfer request
Ad	INITIALIZE	Waiting for parameter conversion request
AE	INITIALIZE	Waiting for main servo IT start
b#	READY OFF	Ready OFF
C#	READY ON	Servo OFF
d*	SERVO ON	Servo ON
F#→E*	WARNING	Warning being generated
F#→A*	WARNING	Warning being generated
F#→**	ALARM	Alarm being generated
FA	NO CONTROL L	L-axis not being controlled (Note 1)
Fb	NO CONTROL M	M-axis not being controlled (Note 2)

(Note 1) If the axes selection switch in the left upper section of RG201 is set to "F" and the servo amplifier power is turned on, no controls of that axis will be performed. When the L-axis is not to be used, the AXES SELECTION switch (L) should be set to "F", and when the M-axis is not to be used, switch (M) should be set to "F".
(No communication with INITIALIZE NC will occur, nor will any alarm be generated.)
In the case shown below, the L-axis will be an uncontrolled axis.

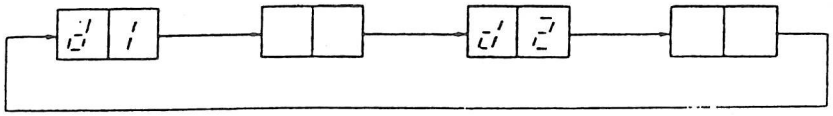
(Example)



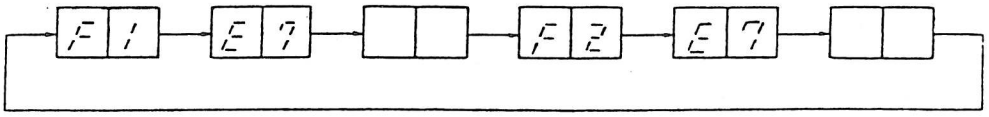
*: Axis number **: Warning number
***: Alarm number (See next page.)

State display after INITIALIZE is indicated orderly as the lighting and extinguishing are repeated for each axis. Some examples are shown below.

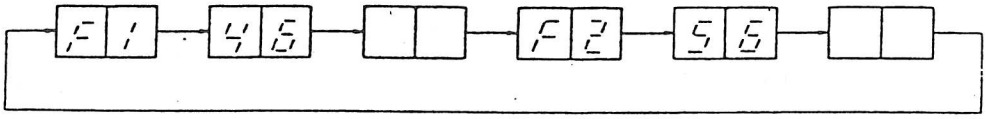
(Example 1) When the L axis is assigned to the No.1 axis (X axis) and the M axis to the No.2 axis (Y axis), it is servo On with both axes.



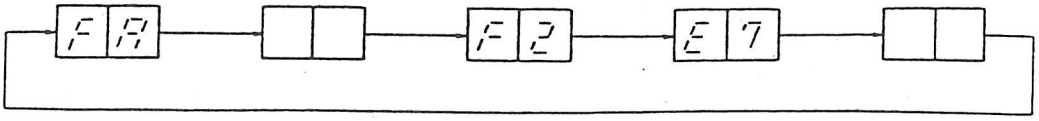
(Example 2) With the above axes designation, the emergency stop signal is input from NC.



(Example 3) With the above axes designation, when the motor overheat alarm (No.46) is given on the L axis (X axis), the following display will be indicated. (On the M axis (Y axis), the error on the other axis alarm is given.)



(Example 4) When the AXES SELECTION switch is set to "F" because the L axis is not used, and power is turned on. There is an emergency stop signal input to the M axis from NC.



Servo alarms and warnings

**	Abbreviation	Meaning	Reset	Axis/Cm
10	UV	Under Voltage	PR	C
(11)	AE	Axis Error	AR	A
12	MEI	Memory Error	AR	C
13	CE	External Clock Error	PR	C
14	WD	Watch Dog Error	PR	C
15	ME2	Memory Error	PR	A
16	RD	Rotor Position Detect Error	PR	A
17	BE	Board Error	PR	A
20	NS1	No Signal (main board)	PR	A
21	NS2	No Signal (add on board Enc)	PR	A
22	NS3	No Signal (add on board 1 X)	PR	A
24	PG	Phases Grounded Detect	PR	C
25	BA	Battery Alarm	AR	C
(26)	NA	No control Axis error	PR	C
(27)	ICE	Internal Clock Error	PR	C
30	OR	Over Regeneration	PR	C
31	OS	Over Speed (2400/3600rpm)	PR	A
32	OC	Over Current	PR	A
33	OV	Over Voltage	PR	C
34	DP	Data Parity	PR	C
35	DE	Data Error	PR	A
36	TE	Transfer Error	PR	C
37	PE	Parameter Error (initialize)	PR	A
42	FE1	Feedback Error 1	PR	A
43	FE2	Feedback Error 2	PR	A
45	OHF	Fin Over Heat	NR	C
46	OHM	Motor Over Heat	NR	A
50	OL1	Over Load (150% 1sec)	NR	A
51	OL2	Over Load (C.LIMIT 0.5sec)	NR	A
52	OD1	Over Droop 1	NR	A
(53)	OD2	Over Droop 2	NR	A
(54)	AOL	Amp Over Load	NR	C
55	EM	EMergency	NR	C
56	OA	Other Axis alarm	NR	C
57				
E0	WOR	Warning Over Regeneration	*	C
E1	WOR	Warning Over Load	*	A/C
E2				
E3	WAC	Warning Absolute Counter error	*	A
E4	WPE	Warning Parameter Error	*	A
E5	WAB	Warning ABsolute detect error	*	A
E6	WOT	Warning Over Travel	*	A
E7	NEC	NC Emergency	*	C
A0	WAT	Warning Absolute first Transmission	*	A
A1	WAS	Warning Absolute Serial signal	*	A
A2	WAV	Warning Absolute battery Voltage	*	C
A3	WAN	Warning Absolute cable No connection	*	A
A4	WAP	Warning Absolute Position error	*	A
A5	WAR	Warning Absolute Resolver	*	A

Note 1) Reset: PR: Reset occurs when NC power is turned off.
NR: Reset becomes valid when NC is reset.
AR: Reset occurs when servo amplifier power is turned off.
* : Warning is indicated, but servo OFF does not occur.

Note 2) Axis/Cm column legend:
A : Alarm generated in respective axis.
C : Alarm common within amplifier

Note 3) Those given an alarm number in parentheses are alarms existent in MR-S12 only.

5.4 BUILT-IN DIAGNOSIS

The diagnosis result is indicated on the display of the servo amplifier by codes and the data are transmitted to the NC unit. (see paragraph 2.4).

Reset classification
PR: Reset due to NC power off. NR: Reset due to NC reset AR: Reset due to amplifier power off (Servo not to be turned off.)
Alarm classification
**: Alarm existent in MR-S12 only
* : Asterisked alarm number means that the alarm shown is generated in the individual axis. Those not asterisked means that the alarm shown in generated in both axes.

No.	Abbre-viation	Name	Description
10	UV PR	Under voltage	The 200/220 VAC voltage decreases to 160 ± 5 V or less (Detected by the phases S and T).
11* **	AE AR	Axis error	Main card rotary switch is not correctly set.
12	ME1 AR	Memory error 1	EPROM check sum. SRAM, 2-port RAM check error. EPROM, SRAM, or 2-port RAM error may occur.
13	CE PR	External clock error	The data process of the position command from MAP is not terminated in a normal period of time, a timing signal (BCLK, SCLK) error from MCP may occur.
14	WD PR	Watchdog	The servo IT is not executed for 14 msec or more, the timing signal (BCLK, SCLK) from MCP and 2-port signal (A8, A9, and A10) may occur.
15*	ME2 PR	Memory error 2	2-port RAM check error or the initial parameter reception parity is detected. The cable of MCP or 2-port RAM may be defective.
16*	RD PR	Magnetic pole position detection error	When the initial magnetic pole position is detected, the magnetic pole position cannot be detected correctly (UVW phase error). The cable or encoder may be defective.
17*	BE PR	PCB error	In the initial state, if the value of the A/D converter is abnormal (± 0.5 V or more), the portion relating to the A/D converter may be defective.
20*	NS1 PR	No signal 1	Signal error of encoder connected to RF01 card (U, V, W, A, B, or Z error). The cable or encoder may be defective.
21*	NS2 PR	No signal 2	Signal error of encoder connected to RF31/33 card (A, B, or Z error). The cable or encoder may be defective.
22*	NS3 PR.	No signal 3	Signal error of resolver 1X connected to RF32/33 card. The cable, resolver, or excitation signal may be defective.
23			
24	PG PR	Ground fault detection	One of the U, V, and W phases of the amplifier outputs may be grounded.
25	BA PR	Battery alarm	The absolute value detection circuit backup battery of the RF32 and 33 cards drops. Since the absolute value may be lost, the zero point return operation is required.
26 **	NA PR	No-use axis alarm	Overcurrent took place in the power part of an unused axis possibly due to a defective power element.

No.	Abbre-viation	Name	Description
27 **	IcE PR	Internal clock error	Internal oscillator stops its operation.
30	OR PR	Over regeneration	The regeneration power transistor is frequently turned on and off (because the regeneration resistor overheats). Decrease the frequency of the acceleration/deceleration or the speed.
31*	OS PR	Over speed	In HA40, 80, 100, 200, 300, 700, or 900 the speed exceeds 2400 rpm. In HA053, 13, 23, 33, 43, 83, 103, or 203 the speed exceeds 3600 rpm. The commanded speed may be too fast or the overshoot may occur during acceleration.
32*	OC PR	Over current	If large current flows occur from the + side of the DC bus, the motor cable may be grounded or shortcircuited.
33	OV PR	Over voltage	If the DC bus voltage exceeds 400 V, the frequency of the acceleration/deceleration may exceed the regeneration performance. Alternatively, the cables may be mistakenly connected to the regeneration terminal box.
34	DP PR	Data parity	If a parity occurs in receiving data from MCP. The cable may be defective or noise may enter the system.
35*	DE PR	Data error	Excessive change of MCP command position. The commanded speed may be too high, the cable may be defective, or noise may enter the system.
36	TE PR	Transfer error	No communication is made with MCP. The cable may be defective, noise may enter the system, or MCP process error may occur.
37*	PE PR	Parameter error	The parameter being transferred in initial state is incorrect. Check the parameter.
40			
41			
42*	FE1 PR	Feedback error 1	Feedback error of motor end detector
43*	FE2 PR	Feedback error 2	In the full-closed loop, the position feedback value is incorrect.
44			
45	OHF NR	Fin overheat	The thermal protector of the fin of the amplifier power section works. The continuous output current of the amplifier may exceed the limit value. Decrease the load.
46*	OHM NR	Motor overheat	The thermal protector in the motor works. The continuous output current of the motor may exceed the limit. Decrease the load.
47			

No.	Abbre-viation	Name	Description
50*	OL1 NR	Over load 1	The period of time which exceeds the parameter OLL converted into the stall time constant exceeds the parameter OLT (over load time constant). The load inertia or friction may be too large. Alternatively, a hunting may occur due to incorrect parameter setting.
51*	OL2 NR	Over load 2	The current command which is 95 % or more of the current limit value lasts for 0.5 sec or more. The machine may collide or the load inertia may be too large.
52*	OD1 NR	Over deviation 1	The actual position of the command exceeds the parameter setting value OD1 (over deviation range when servo is ON) The inertia may be too large and the acceleration may too low. An overshoot or hunting may occur.
53*	OD2	Over deviation 2	The actual position of the command exceeded the parameter setting value OD2 (over deviation range when servo is OFF)
54 **	AOL	Amplifier over load	Total value of motor current connected to the amplifier exceeded the permissible standard value of the amplifier for more than the designated length of time possibly due to excessive total load inertia friction of both axes.
55	EM NR	External emergency stop	The terminals B and R being shrot-circuited are open.
56	OA NR	Other axis error	In one of the axes connected to CN1B, an alarm may occur or the termination connector has not been connected.
57			
E0	WOR *	Over regeneration warning	80 % of the over regeneration alarm occurs, and although the alarm does not immediately occur, make sure that the servo OFF does not occur.
E1	WOL *	Over load warning	80 % of the over load alarm occurs, and although the alarm does not immediately occur, make sure that the servo OFF does not occur.
E2			
E3*	WAC *	Absolute position counter warning	If the absolute position counter is incorrect, the absolute position detector, encoder, cable, or add-on card may be defective. Omission of the initial setting could be a possibility.
E4*	WPE *	Parameter error warning	If an invalid parameter is set, the invalid parameter and the following parameters are ignored. Check the parameter (servo ON does not occur).
E5*	WAB *	Absolute value detection warning	The value of 1X of the absolute value detection is abnormal. The absolute value detection is not correctly performed (servo OFF does not occur).
E6*	WOT *	Over travel warning	The over travel of the speed loop step stop occurs (servo OFF does not occur).
E7	NCE	NC emergency stop	The machine is emergency-stopped from NC.

No.	Abbre-viation	Name	Description
A0	WAT	Initial communication warning	When NC power is turned on, data received from the absolute value detector is abnormal.
	*		
A1	WAS	Serial signal warning	In the normal operation, data received from the absolute value detector is abnormal.
	*		
A2	WAV	Battery warning	The voltage of the battery mounted on RF37x drops.
	*		
A3	WAN	Battery cable breakage warning	The power supply voltage supplied to the absolute value detector drops.
	*		
A4	WAP	Feedback warning	The A phase and B phase of the are detector is defective.
	*		
A5	WAR	Resolver abnormal warning	The resolver and feedback signal are defective.
	*		