

4. TROUBLESHOOTING

4.1 7-SEGMENT DISPLAY

The state of the amplifier is indicated by the 7-segment display located at the center of the amplifier.
When an alarm occurs, the 7-segment display shows the related alarm number.

Status display of MR-S10 amplifier

| Display | |
|---------|---|
| AA | During initialization. Wait until the NC power is turned on (when the NC power is turned on and then turned off). |
| Ab | During initialization. Wait until the NC power is turned on (when the amplifier power is turned off and then turned on while the NC power is turned off). |
| AC | During initialization. Starts transferring data between NC and the amplifier. |
| Ad | During initialization. The initial parameters have been received. |
| AE | The initialization has been completed. |
| | |
| b# | Ready OFF |
| C# | Servo OFF |
| d# | Servo ON |
| E* | Warning |
| A* | Warning |
| ** | Alarm |
| .. | WD error |

: Axis number

* : Warning number (See the following table.)

** : Alarm number (See the following table.)

4. TROUBLESHOOTING

4.1 7-SEGMENT DISPLAY

Servo alarms and warnings

| ** | Abbreviation | Name | Reset | Axis/Cm |
|------|--------------|--------------------------------------|-------|---------|
| 10 | UV | Under Voltage | PR | C |
| (11) | AE | Axis Error | AR | A |
| 12 | ME1 | Memory Error 1 | AR | C |
| 13 | CE | external Clock Error | PR | C |
| 14 | WD | Watch Dog error | PR | C |
| 15 | ME2 | Memory Error 2 | PR | A |
| 16 | RD | Rotor position Detect error | PR | A |
| 17 | BE | Board Error | PR | A |
| 20 | NS1 | No Signal1 (main board) | PR | A |
| 21 | NS2 | No Signal2 (add on board Enc) | PR | A |
| 22 | NS3 | No Signal3 (add on board 1X) | 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 | OEM | Motor Over Heat | NR | A |
| 50 | OL1 | Over Load (250% 1min) | 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 | WOL | 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 | NCE | 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: When the NC power is turned off, the reset operation takes place.
NR: When the NC is reset, the reset becomes valid.
* : It shows a warnings rather than the servo OFF.

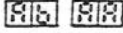
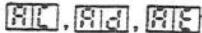

Note 2) Regarding Axis/Cm A: Alarm occurs at each axis, C: Common alarm within amplifier.


Note 3) Alarm No. in brackets indicates the alarm which exists only in MR-S12.

4.2 TROUBLESHOOTING

When a problem occurs, refer to the following items and take proper precautions.

- 4.2.1 When a servo alarm occurs:
- 4.2.2 When an "amplifier not mounted" alarm occurs (NC side alarm):
- 4.2.3 When the motor vibrates or generates a vibration sound:
- 4.2.4 When the cutting surface or circularity is poor:
- 4.2.5 When an overshoot occurs during positioning:
- 4.2.6 When a surge feed occurs in a pulse feed operation:
- 4.2.7 Even if the power is turned on, the 7-segment display does not show any data or it shows  :

- 4.2.8 Even if the NC power is turned on, the 7-segment display does not change from  or it momentarily shows  and then returns to .

Note 1) There are alarms which are limited to one axis only and alarms common to all axes. During troubleshooting, alarms which are related to the axes are indicated with the mark of *. When this mark is shown, make sure of which axis to examine. Please remember that the other axis alarm  occurs on the normal axes.

Note 2) In the subsequent explanation, the cards are assigned with the following code name.

| Name of servo amplifier | MR-S11 | | | MR-S12 | |
|-------------------------|-----------|---|------------|---------|------------------------|
| | Code name | 40 to 100 | 103 to 300 | 700/900 | 13A to 33A 40A to 100A |
| Main card | | RG101 | | | RG201 |
| Base card | | RG101 | | | RG221 |
| Power card | | RG11 | RG10 | None | RG21 RG20 |
| Add-on card | | Varies depending on the servo system. See paragraphs No.1, No.2. | | | |

4.2.1 WHEN A SERVO ALARM OCCURS:

(1) Alarm No. **10** : Under voltage

The voltage drop of the 3Ø 200/220 VAC is detected (in phases S and T).

| | Cause | Verification method | Remedy |
|---|--|---|----------------------------------|
| 1 | The voltage of 3Ø 200/220 VAC power drops below 160 V ($\pm 5\%$). | Check the input voltage using the volt meter. | Check the power supply facility. |
| 2 | The 3Ø 200/220 VAC power instantaneously stops. | Check that no instantaneous power failure occurs in the input voltage with the synchroscope for approx. 25 msec or more at 200 VAC. | |

(2) Alarm No. **11** : Axis error (Exists only on MR-S12)

It shows that an error is detected concerning the selection of the rotary switch in the amplifier.

| | Cause | Verification method | Remedy |
|---|---|---|----------------------|
| 1 | Rotary switch is set at 6 - E. | Confirm the rotary switch. | Correct the setting. |
| 2 | The same axis is selected with L axis and M axis. | Confirmation of rotary switch (Are the numbers duplicated?) | Correct the setting. |

(3) Alarm No. **12** : Memory error 1

During the initialization, an EPROM check sum error, SRAM error, or 2-port RAM error is detected.

| | Cause | Verification method | Remedy |
|---|---|--|-----------------------------------|
| 1 | A check sum error occurs in EPROM. | Replace the EPROM with a normal one of another axis. | Replace the EPROM with a new one. |
| 2 | A check error occurs in SRAM or 2-port RAM. | Replace the main card with a normal one of another axis. Change the CS1 switch. See 5.1, "Replacing Servo Amplifier Control Card." | Replace the main card. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

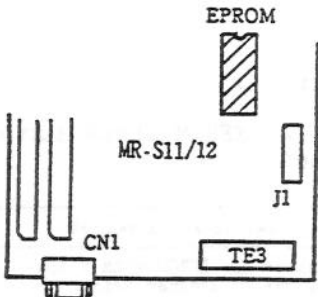
(4) Alarm No. 13 : External clock error

The clock sent from NC is abnormal. The software of the servo amplifier does not complete the process in the predetermined time.

| | Cause | Verification method | Remedy |
|---|--|--|------------------------------|
| 1 | The connector between NC and amplifier or between amplifiers is imperfectly connected. | Visually check the cable connections. • Main card CN1A, CN1B • NC side | Connect the cables properly. |
| 2 | The software of the servo amplifier does not operate properly. | | Replace the main card. |
| 3 | The cables between NC and the amplifier and/or between amplifiers are defective. | Replace the cables with those of another axis and test the alarm. | Replace the cables. |

(5) Alarm No. 14 : Watch dog error

The software of the servo amplifier does not complete the process in the predetermined time.

| | Cause | Verification method | Remedy |
|---|--|--|-----------------------------|
| 1 | EPROM has not been correctly mounted. | Visually check that EPROM has been mounted at the location described. Check that the pins of EPROM have not been bent.  | Correctly mount EPROM. |
| 2 | EPROM has been broken. | Replace EPROM with one from another axis. | Replace EPROM. |
| 3 | The main card or add-on card is defective. | Replace the card with one from another axis. At the time, it is necessary to change the CS1 switch position of the main card. For details, see 5.1, "Replacing Servo Amplifier Control Card." | Replace the defective card. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(6) Alarm No. 15: Memory error 2

While initial data is transferred with NC during the initialization, a parity error occurs or an error occurs in the 2-port RAM.

| | Cause | Verification method | Remedy |
|---|--|--|---|
| 1 | The cables between NC and the amplifier and between the amplifiers are defective. | Replace the cables with one from another axis and test the alarm. | Replace the defective cables. |
| 2 | A loud noise enters the cables between NC and the amplifier and/or between the amplifiers. | Remove the relays and connector which are turned on and off during the initialization. | Avoid noise. See 3.5, "Precautions for Installing Amplifier." |

(7) Alarm No. 16: Rotor position detect error

All the outputs of the phases U, V, and W of the OSESK-6-12-108 detector (mounted on the motor non-load side) become "H" or "L".

| | Cause | Verification method | Remedy |
|---|--|--|--|
| 1 | The connector of the detector has been removed. | Check that the connector is properly connected. • Main card CN2 • Detector side Cannon connector | Correctly connect the connector. |
| 2 | The cable between the amplifier and the detector has been imperfectly connected. | (1) In the emergency stop state observe the pins, 4, 5, and 6 of the main card J4 with the synchroscope and check whether all of them are "H" or "L" (move the cable to check). (2) Replace the cable with one from another axis. | Replace the cables between the amplifier and the detector. |
| 3 | The detector is defective. | Replace the detector with one from another axis (make sure that the zero point has moved lightly.) | Replace the detector. |
| 4 | The servo parameter STY has been incorrectly set. | When the detector has not been connected to the main card, the parameter has been set in the state where they are connected. | Correctly set the servo parameter STY. For details, see 7, "Detail Description of Servo Parameters." |
| 5 | The servo parameter MTY has been incorrectly set. | When the standard encoder (OSESK-6-12-108) has not been connected to the main card, the speed detector setting parameter (ENT) had been set to 0 or 1. | Correctly set the servo parameter STY. For details, see 7, "Detail Description of Servo Parameters." |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(8) Alarm No. 17*: Board error

During the initialization, the A/D converter on the main card does not operate correctly.

| | Cause | Verification method | Remedy |
|---|--------------------------------|---|-------------------|
| 1 | If the main card is defective: | Replace the main card with a normal one from another axis. Then, change the position of the switch CS1 of the main card. For details, see 5.1, "Replacing Servo Amplifier." | Replace the card. |

(9) Alarm No. 20*: No signal 1

Both the differential signals of the encoder connected to the main card become "H" or "L".

| | Cause | Verification method | Remedy |
|---|---|---|--------------------------------------|
| 1 | The connector of the detector is imperfectly connected. | Visually check the connector. • Main card CN2 • Detector side Cannon connector. | Connect the connector properly. |
| 2 | If the cable between the amplifier and the detector is defective: | Test the cable with a normal one from another axis. | Replace the cable with a new one. |
| 3 | If the detector is abnormal: | Test the detector with a normal one from another axis (note that the zero point deviates slightly.) | Replace the detector with a new one. |

(10) Alarm No. 21*: No signal 2

Both the differential signals connected to the add-on card become "H" or "L".

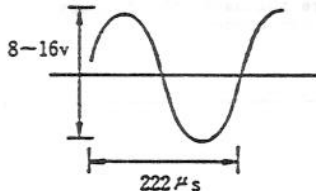
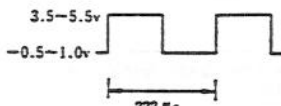
| | Cause | Verification method | Remedy |
|---|---|--|--------------------------------------|
| 1 | If the connector of the detector is imperfectly connected: | Visually check the following connector. • Detector connector of add-on card. • Detector side Cannon connector. | Connect the connector properly. |
| 2 | If the cable between the amplifier and the detector is defective: | Test the cable with a normal one from another axis. | Replace the cable with a new one. |
| 3 | If the detector is defective: | Test the detector with a normal one from another axis (note that the zero point deviates slightly.) | Replace the detector with a new one. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(11) Alarm No. 22*: No signal 3

The output voltage of the resolver connected to the RF33/332 card becomes 0 V.

| | Cause | Verification method | Remedy | | | | | | |
|-----------|---|--|--------------------------------------|------|-------------|-------|-------------|---|---|
| 1 | <p>If one of the cables of the detector is imperfectly connected.</p> <table border="1"> <thead> <tr> <th>Card name</th> <th>Check pin</th> </tr> </thead> <tbody> <tr> <td>RF33</td> <td>CP2-1 CP2-3</td> </tr> <tr> <td>RF332</td> <td>CP3-1 CP3-3</td> </tr> </tbody> </table> | Card name | Check pin | RF33 | CP2-1 CP2-3 | RF332 | CP3-1 CP3-3 | <p>(1) Visually check</p> <ul style="list-style-type: none"> • Detector connector of add-on card. • Detector side Cannon connector <p>(2) Check using a synchroscope.</p>  <p>(Emergency stop state)</p> | Correctly connect the cable. |
| Card name | Check pin | | | | | | | | |
| RF33 | CP2-1 CP2-3 | | | | | | | | |
| RF332 | CP3-1 CP3-3 | | | | | | | | |
| 2 | <p>If the cable between the amplifier and the detector is defective:</p> | Test the cable with a normal one from another axis. | Replace the cable with a new one. | | | | | | |
| | <p>If the RF33/332 card is defective:</p> <table border="1"> <thead> <tr> <th>Card name</th> <th>Check pin</th> </tr> </thead> <tbody> <tr> <td>RF33</td> <td>CP1-1 CP1-3</td> </tr> <tr> <td>RF332</td> <td>CP2-1 CP2-2</td> </tr> </tbody> </table> | Card name | Check pin | RF33 | CP1-1 CP1-3 | RF332 | CP2-1 CP2-2 | <p>(1) Check using the synchroscope.</p>  <p>(2) Same as 1-(2) (Emergency stop state)</p> | Replace the RF33/332 card with a new one. |
| Card name | Check pin | | | | | | | | |
| RF33 | CP1-1 CP1-3 | | | | | | | | |
| RF332 | CP2-1 CP2-2 | | | | | | | | |
| 4 | If the detector is defective: | Test the detector with a normal one from another axis. | Replace the detector with a new one. | | | | | | |

(12) Alarm No. 24: Phases grounded detect

If one of phases U, V, or W of the amplifier output is grounded:

| | Cause | Verification method | Remedy |
|---|--|--|---|
| 1 | If the motor cable is defective. | Check the resistance between the terminal block TE1 and each of phases U, V, and W using the circuit tester. | <p>(1) Check the cable connections of the phases U, V, and W of the terminal block.</p> <p>(2) Check that the motor connector and Cannon connector are free of oil.</p> <p>(3) Replace the motor cable with a normal one.</p> |
| 2 | If the base card is defective, Note 1. | Test the base card with a normal one. | Replace the base card with a new one. |

Note 1: In the case of MR-S11: Base card RG101
In the case of MR-S12: Base card RG22:

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(13) Alarm No. 25 : Battery alarm

If the battery voltage of the RF33/332 card drops:

| | Cause | Verification method | Remedy |
|---|---------------------------------|--|--|
| 1 | When the battery voltage drops. | Turn off the power and measure the voltage at both electrodes of the battery. When the voltage drops below 3.20 V, the battery alarm activates. | For two or three consecutive days, turn the power on for 8 hours a day. |
| 2 | The battery is defective. | Even if the above instructions are followed, the battery alarm occurs: | Replace the battery with a new one. For details of how to replace the battery, see 2.2. For details of operation after the replacement, see 8.4. |

(14) Alarm No. 26 : No control axis error (Exists only on MR-S12.)

Rotary switch on the main card is set at "F" and an overcurrent is conducted through the AC bus which is not controlled.

| | Cause | Verification method | Remedy |
|---|--|---|---|
| 1 | Setting error of rotary switch. | Visual (Upper left switch; of main card) | Straighten the matter. Remember that this error does not trigger the alarm without other cause(s). |
| 2 | Trouble concerning on the power of axis which is not used. | Same as the check method of alarm 32. | |
| 3 | Defective base card. | Try to exchange with the base card of another normal amplifier. | Replace the base card. |
| 4 | Defective main card. | Try to exchange with the main card of another normal amplifier. It is necessary to switch AXES SELECTION SW. | Replace the main card. |

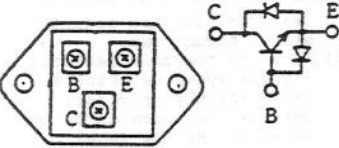
(15) Alarm No. 27 : Internal clock error (Exists only on MR-S12.)

Alarm occurs when the internal clock of the main card has stopped.

| | Cause | Verification method | Remedy |
|---|----------------------|---|------------------------|
| 1 | Defective main card. | Try to exchange with the base card of another normal amplifier. | Replace the main card. |

(16) Alarm No. **30** : Over Regeneration

Overheating of the regeneration resistor is detected. (Because overheating is detected by software, when the power of the servo amplifier is turned on and then turned off, the value being computed is cleared. Therefore, after the alarm occurs, when the power of the servo amplifier is repeatedly turned off and then on, the resistor may burn.)

| | Cause | Verification method | Remedy | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|---|--|---|------------|-------------------|---------------------|---|---|--------------------------|---------------------------|---|---|----------|---|---|---|--------------------------|---------------------------|---|---|----------|---|---|---|--------------------------|---------------------------|---|---|--------------------------|---------------------------|---|
| 1 | If the servo parameter ORT is incorrectly set: | ORT = 4680 (Absence of option regeneration resistor) ORT = 3010 (Presence of option regeneration resistor) | Correctly set the parameter. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | If the frequency of the acceleration/deceleration exceeds the value in the specification: | Using the operation program where the alarm has occurred, measure the number of acceleration times in the rapid traverse operation for one minute and check where the frequency is within the value in the specification. See Appendix 5, "Checking Positioning Repeatability." | (1) Decrease the repeatability frequency. (2) Decrease the rapid traverse rate. (3) If no option regeneration resistor was provided, mount one. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | If the regeneration power transistor is short-circuited and broken: | Check the resistance of the regeneration power transistor using the circuit tester. <table border="1"> <thead> <tr> <th>+ terminal</th><th>- terminal</th><th>Normal resistance</th><th>Abnormal resistance</th></tr> </thead> <tbody> <tr> <td>C</td><td>X</td><td>Several hundred Ω</td><td>Short-circuit or infinity</td></tr> <tr> <td>X</td><td>C</td><td>Infinity</td><td>Short-circuit or several hundred Ω</td></tr> <tr> <td>C</td><td>B</td><td>Several hundred Ω</td><td>Short-circuit or infinity</td></tr> <tr> <td>X</td><td>C</td><td>Infinity</td><td>Short-circuit or several hundred Ω</td></tr> <tr> <td>B</td><td>X</td><td>Several hundred Ω</td><td>Short-circuit or infinity</td></tr> <tr> <td>X</td><td>B</td><td>Several hundred Ω</td><td>Short-circuit or infinity</td></tr> </tbody> </table>  | + terminal | - terminal | Normal resistance | Abnormal resistance | C | X | Several hundred Ω | Short-circuit or infinity | X | C | Infinity | Short-circuit or several hundred Ω | C | B | Several hundred Ω | Short-circuit or infinity | X | C | Infinity | Short-circuit or several hundred Ω | B | X | Several hundred Ω | Short-circuit or infinity | X | B | Several hundred Ω | Short-circuit or infinity | Replace the regeneration power transistor with a new one or replace the entire unit with a new one. |
| + terminal | - terminal | Normal resistance | Abnormal resistance | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | X | Several hundred Ω | Short-circuit or infinity | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X | C | Infinity | Short-circuit or several hundred Ω | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | B | Several hundred Ω | Short-circuit or infinity | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X | C | Infinity | Short-circuit or several hundred Ω | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | X | Several hundred Ω | Short-circuit or infinity | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X | B | Several hundred Ω | Short-circuit or infinity | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(17) Alarm No. 31 : Over speed

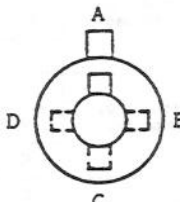
A speed exceeding the allowable value of the motor is detected.

| | Cause | Verification method | Remedy |
|---|--|--|---|
| 1 | If the servo parameter MTY is incorrectly set: | Check whether the parameter is set to a value for 3000 rpm rather than 2000 rpm. | Correctly set the parameter. For details, see 7, "Details of Servo Parameters." |
| 2 | If the servo parameter RNG is incorrectly set: | Check that the detector used for the position detector is correctly set: | Correctly set the parameter. For details, see 7, "Details of Servo Parameters." |
| 3 | If the servo parameter PIT is incorrectly set: | Check whether the lead of the ball screw is set in the unit of mm or degrees. In a special gear ratio, the parameter value does not always accord with the real speed. | Correctly set the parameter. |
| 4 | If the rapid traverse rate is too high: | Check whether or not $\text{Speed (rpm)} = \frac{\text{rapid traverse rate (mm/min)}}{\text{ball screw lead (mm)}}$ exceeds the motor specification value. | Decrease the rapid traverse rate. |
| 5 | If the acceleration/deceleration time constant is too small and an overshoot occurs: | Increase the acceleration/deceleration time constant. | Consider the acceleration/deceleration time constant. |
| 6 | If the servo system is unstable and an overshoot occurs: | Increase the high speed loop gain VG1 or decrease the position loop gain PGN. Note: In changing the position loop gain, it is necessary to change OD1 and OD2 so that they are reversely proportional to PGN. | Set the gain once again. |
| 7 | If the cable between the position detector and the servo amplifier is defective: | Check for erratic motion in the motor, even in a low speed feed operation. | Repair the cable. |
| 8 | If the position detector is defective: | (1) Test the position detector with a normal one. (2) When the position detector and the speed detector are independently provided, operate the servo motor by substituting the speed detector for the position detector. | Replace the detector with a new one. |
| 9 | If the minimum movement unit has been set to 0.1μ system instead of 1μ system: | Check the system specification. | Correctly set the parameter. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(18) Alarm No. 32: Over current

| | Cause | Verification method | Remedy | | | | | | |
|-------|--|--|---|--------------------|---|----|---|----|---|
| 1 | If the phases U, V and W of the servo amplifier outputs short-circuit each other: | Remove the cables of the phases U, V, and W from the terminal block, disconnect the Cannon connector of the motor, and use the circuit tester to check whether the phases short-circuit each other. | Arrange the cables so that they will not short-circuit. | | | | | | |
| 2 | If the phases U, V, and W of the servo amplifier outputs are grounded: | Check the resistance between each of the phases U, V, and W of the terminal block and the case using the circuit tester. | Arrange the cables so that they are not grounded. | | | | | | |
| 3 | If the speed detection cable is defective: | Test the cable with a normal cable. | Replace the cable with a new one. | | | | | | |
| 4 | If the mounting direction of the speed detector is not in accordance with the parameter value being set: | <p>The following table shows the relationship between the mounting direction of the motor/detector and the parameters.</p> <table border="1"> <thead> <tr> <th>Bit F</th> <th>Mounting direction</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>AC</td> </tr> <tr> <td>1</td> <td>BD</td> </tr> </tbody> </table>  | Bit F | Mounting direction | 0 | AC | 1 | BD | Correctly position the speed detector or change the parameter. For details, see 7, "Details of Servo Parameters, #17. STY." |
| Bit F | Mounting direction | | | | | | | | |
| 0 | AC | | | | | | | | |
| 1 | BD | | | | | | | | |
| 5 | If the speed detector is defective: | Test the detector with a normal one. | Replace the detector with a new one. | | | | | | |
| 6 | If the main card is defective: | | Replace the RF01 card with a new one. | | | | | | |
| 7 | Defective main card. | Try to exchange with a normal main card. | Replace the main card. | | | | | | |

Note) Where there is an overcurrent error, do not turn on the servo before the cause is clarified.

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

If the over current alarm occurs, the transistor module may be defective.

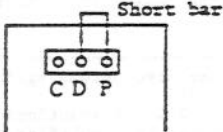
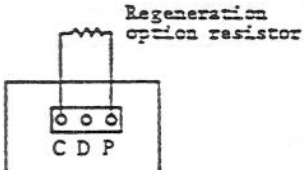
Before restoring the operation of the motor, check that the transistor module is normal using the following procedure:

Transistor module verification procedure

| No. | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|--|--------------------------------------|---------------------------------------|-------------------|---------------------|--------------------------------------|---------------------------------------|-------------------|---------------------|-------------------|---------------------|---|---|---|----|----------------------|---------------------------|---|----|----------------------|---------------------------|----|----|----|----|---|----------------------|---------------------------|---|----------|---------------------------------------|---|---|---|---|----|---|----------|---------------------------------------|----|---|----------|---------------------------------------|----|----|----|----|---|----------|---------------------------------------|---|----------------------|---------------------------|---|---|---|---|----|---|----------|---------------------------------------|----|---|----------|---------------------------------------|----|---|----|---|----|---|----|---|---|----|----------------------|---------------------------|---|----|----------------------|---------------------------|---|----|---|----|---|----|---|----|
| 1 | Turn off the 3Ø, 200/220 VAC power input. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Dismount the main card and remove all the screws which fasten the power card and the related parts. Dismount the power card from the frame. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | <p>Measure the resistance between each two pins of the transistor module using the circuit tester.</p> <table border="1"> <thead> <tr> <th colspan="2">Pin to be measured by circuit tester</th> <th rowspan="2">Normal resistance</th> <th rowspan="2">Abnormal resistance</th> <th colspan="2">Pin to be measured by circuit tester</th> <th rowspan="2">Normal resistance</th> <th rowspan="2">Abnormal resistance</th> </tr> <tr> <th>+</th><th>-</th><th>+</th><th>-</th></tr> </thead> <tbody> <tr> <td rowspan="6">P</td> <td>B1</td> <td rowspan="3">Several hundred ohms</td> <td rowspan="3">Short-circuit or infinity</td> <td rowspan="6">N</td> <td>B2</td> <td rowspan="3">Several hundred ohms</td> <td rowspan="3">Short-circuit or infinity</td> </tr> <tr> <td>B3</td> <td>B4</td> </tr> <tr> <td>B5</td> <td>B6</td> </tr> <tr> <td>U</td> <td rowspan="3">Several hundred ohms</td> <td rowspan="3">Short-circuit or infinity</td> <td>U</td> <td rowspan="3">Infinity</td> <td rowspan="3">Short-circuit or several hundred ohms</td> </tr> <tr> <td>V</td> <td>V</td> </tr> <tr> <td>W</td> <td>W</td> </tr> <tr> <td>B1</td> <td rowspan="6">P</td> <td rowspan="3">Infinity</td> <td rowspan="3">Short-circuit or several hundred ohms</td> <td>B2</td> <td rowspan="6">N</td> <td rowspan="3">Infinity</td> <td rowspan="3">Short-circuit or several hundred ohms</td> </tr> <tr> <td>B3</td> <td>B4</td> </tr> <tr> <td>B5</td> <td>B6</td> </tr> <tr> <td>U</td> <td rowspan="3">Infinity</td> <td rowspan="3">Short-circuit or several hundred ohms</td> <td>U</td> <td rowspan="3">Several hundred ohms</td> <td rowspan="3">Short-circuit or infinity</td> </tr> <tr> <td>V</td> <td>V</td> </tr> <tr> <td>W</td> <td>W</td> </tr> <tr> <td>B1</td> <td>U</td> <td rowspan="3">Infinity</td> <td rowspan="3">Short-circuit or several hundred ohms</td> <td>B2</td> <td>U</td> <td rowspan="3">Infinity</td> <td rowspan="3">Short-circuit or several hundred ohms</td> </tr> <tr> <td>B3</td> <td>V</td> <td>B4</td> <td>V</td> </tr> <tr> <td>B5</td> <td>W</td> <td>B6</td> <td>W</td> </tr> <tr> <td>U</td> <td>B1</td> <td rowspan="3">Several hundred ohms</td> <td rowspan="3">Short-circuit or infinity</td> <td>U</td> <td>B2</td> <td rowspan="3">Several hundred ohms</td> <td rowspan="3">Short-circuit or infinity</td> </tr> <tr> <td>V</td> <td>B3</td> <td>V</td> <td>B4</td> </tr> <tr> <td>W</td> <td>B5</td> <td>W</td> <td>B6</td> </tr> </tbody> </table> <p>(Circuit tester: x 10 ohm range)</p> <p>Measure the same terminal for each of the phases U, V, and W and check that all values are equal.</p> <p>If an abnormality is found in any portion, replace the transistor module with a new one. (Replace the amplifier with a new one.)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 10px; text-align: center;"> </div> </div> | Pin to be measured by circuit tester | | Normal resistance | Abnormal resistance | Pin to be measured by circuit tester | | Normal resistance | Abnormal resistance | + | - | + | - | P | B1 | Several hundred ohms | Short-circuit or infinity | N | B2 | Several hundred ohms | Short-circuit or infinity | B3 | B4 | B5 | B6 | U | Several hundred ohms | Short-circuit or infinity | U | Infinity | Short-circuit or several hundred ohms | V | V | W | W | B1 | P | Infinity | Short-circuit or several hundred ohms | B2 | N | Infinity | Short-circuit or several hundred ohms | B3 | B4 | B5 | B6 | U | Infinity | Short-circuit or several hundred ohms | U | Several hundred ohms | Short-circuit or infinity | V | V | W | W | B1 | U | Infinity | Short-circuit or several hundred ohms | B2 | U | Infinity | Short-circuit or several hundred ohms | B3 | V | B4 | V | B5 | W | B6 | W | U | B1 | Several hundred ohms | Short-circuit or infinity | U | B2 | Several hundred ohms | Short-circuit or infinity | V | B3 | V | B4 | W | B5 | W | B6 |
| Pin to be measured by circuit tester | | Normal resistance | Abnormal resistance | | | Pin to be measured by circuit tester | | | | Normal resistance | Abnormal resistance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| + | - | | | + | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | B1 | Several hundred ohms | Short-circuit or infinity | N | B2 | Several hundred ohms | Short-circuit or infinity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | B3 | | | | B4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | B5 | | | | B6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | U | Several hundred ohms | Short-circuit or infinity | | U | Infinity | Short-circuit or several hundred ohms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | V | | | | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | W | | | | W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B1 | P | Infinity | Short-circuit or several hundred ohms | B2 | N | Infinity | Short-circuit or several hundred ohms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B3 | | | | B4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B5 | | | | B6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U | | Infinity | Short-circuit or several hundred ohms | U | | Several hundred ohms | Short-circuit or infinity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V | | | | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | | | | W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B1 | U | Infinity | Short-circuit or several hundred ohms | B2 | U | Infinity | Short-circuit or several hundred ohms | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B3 | V | | | B4 | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B5 | W | | | B6 | W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U | B1 | Several hundred ohms | Short-circuit or infinity | U | B2 | Several hundred ohms | Short-circuit or infinity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V | B3 | | | V | B4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | B5 | | | W | B6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Restore the transistor module in the order of steps 2 and 1 above. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(19) Alarm No. 33 : Over voltage

The DC bus voltage in the unit exceeds the allowable value (around 400 V).

| | Cause | Verification method | Remedy |
|---|---|---|---|
| 1 | The cables are incorrectly connected to the terminal block. | <p>Connection when the regeneration option resistor is not used:</p>  <p>Connection when the regeneration option resistor is used:</p>  | Correctly connect the cables. |
| 2 | If the acceleration/deceleration frequency is excessive and the acceleration/deceleration time constant is too small: | (1) Increase the acceleration/deceleration time constant. (2) Decrease the acceleration/deceleration frequency. (3) Decrease the rapid traverse rate. | (1) Increase the acceleration/deceleration time constant. (2) Decrease the acceleration/deceleration frequency. (3) Decrease the rapid traverse rate. |
| 3 | When the vertical axis is unbalanced, the acceleration/deceleration time constant is small. | (1) Increase the acceleration/deceleration time constant. (2) Decrease the acceleration/deceleration frequency. (3) Decrease the rapid traverse rate. | (1) Increase the acceleration/deceleration time constant. (2) Decrease the acceleration/deceleration frequency. (3) Decrease the rapid traverse rate. |
| 4 | If the regeneration resistor is broken: | <p>Measure the resistance between terminals C and P of the terminal box using the circuit tester.</p> <p>P(+), C(-): Approx. 13 ohms</p> <p>Measure the resistance 3 minutes after the charge lamp goes out.</p> | |
| 5 | If the regeneration power transistor is broken: | Measure the resistance in the same manner as (12)-4. | |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(20) Alarm No. 34 : Data parity

If a parity error occurs in data which is received from NC:

| | Cause | Verification method | Remedy |
|---|--|---|---|
| 1 | The connectors CN1A and CN1B of the main card are not perfectly connected. | Check that they are perfectly connected. | Correctly connect the connectors and tighten them with screws. |
| 2 | If the cable between NC and the servo amplifier is defective: | Test the cable with a normal one. | Replace the cable with a new one. |
| 3 | If noise enters the cable between NC and the servo amplifier: | (1) Take precautions against noise. See 3.5, "Precautions for Installing Amplifier." (2) Check whether the noise occurs when a specific relay contractor in the power control box is turned on and off. | (1) Take precautions against noise. (2) Mount a spark killer, etc. |
| 4 | If a card on the NC side is defective (MC611, etc.) | Test the card with a normal one. | Replace the card with a new one. |

(21) Alarm No. 35 *: Data error

The amount of movement by the movement command from NC is excessive.

| | Cause | Verification method | Remedy |
|---|--|---|---|
| 1 | The connectors CN1A and CN1B of the main card are not perfectly connected. | Check that they are perfectly connected. | Correctly connect the connectors and tighten them with screws. |
| 2 | If the cable between NC and the servo amplifier is defective: | Test the cable with a normal one. | Replace the cable with a new one. |
| 3 | If noise enters the cable between NC and the servo amplifier: | (1) Take precautions against noise. See 3.5, "Precautions for Installing Amplifier." (2) Check whether the noise occurs when a specific relay contractor in the power control box is turned on and off. | (1) Take precautions against noise. (2) Mount a spark killer, etc. |
| 4 | If a card on the NC side is defective (MC611, etc.) | Test the card with a normal one. | Replace the card with a new one. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(22) Alarm No. 36 : Transfer error

A periodical data transfer from NC is stopped.

| | Cause | Verification method | Remedy |
|---|--|---|---|
| 1 | The connectors CN1A and CN1B of the main card are not perfectly connected. | Check that they are perfectly connected. | Correctly connect the connectors and tighten them with screws. |
| 2 | If the cable between NC and the servo amplifier is defective: | Test the cable with a normal one. | Replace the cable with a new one. |
| 3 | If noise enters the cable between NC and the servo amplifier: | (1) Take precautions against noise. See 3.5, "Precautions for Installing Amplifier." (2) Check whether the noise occurs when a specific relay contractor in the power control box is turned on and off. | (1) Take precautions against noise. (2) Mount a spark killer, etc. |
| 4 | If a card on the NC side is defective (MC611, etc.) | Test the card with a normal one. | Replace the card with a new one. |

(23) Alarm No. 37 : Parameter error

A servo parameter transferred from NC during initialization is abnormal.

| | Cause | Verification method | Remedy | | | | | | | | |
|--------------------|--|---|---|---------------|-------|------|--------------|------|--------------|----------------------|---|
| 1 | The data range is incorrect. | Check the upper and lower limit values of the setting values. NC indicates the incorrect parameter number. See 7, "Details of Servo Parameters." | Set the parameter once again and turn the power off and on. | | | | | | | | |
| 2 | If the servo parameter STY does not accord with the hardware setting: | <p>The following table shows the relationship between STY and the hardware setting.</p> <table><tr><th>Card configuration</th><th>Parameter STY</th></tr><tr><td>RG101</td><td>xxx0</td></tr><tr><td>RG101 + RF31</td><td>xxx4</td></tr><tr><td>RG101 + RF31</td><td>xxx5 xxx4 xxx1</td></tr></table> <p>NC indicates "17" as the incorrect parameter number.</p> | Card configuration | Parameter STY | RG101 | xxx0 | RG101 + RF31 | xxx4 | RG101 + RF31 | xxx5 xxx4 xxx1 | Set the parameter once again and turn the power off and on. |
| Card configuration | Parameter STY | | | | | | | | | | |
| RG101 | xxx0 | | | | | | | | | | |
| RG101 + RF31 | xxx4 | | | | | | | | | | |
| RG101 + RF31 | xxx5 xxx4 xxx1 | | | | | | | | | | |
| 3 | The combination of the servo parameter RNG, PIT, PC1, and PC2, and PCN is incorrect. | Check the upper and lower limit values of the setting values. NC indicates "34" as the incorrect parameter number. See (Note 1) of 7, "Details of Servo Parameters." | Set the parameter once again and turn the power off and on. | | | | | | | | |
| 4 | The unit conversion constant transferred from NC is set to 0. | NC indicates "33" as the incorrect parameter number. | The parameter is incorrectly set on the NC side. | | | | | | | | |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

| | Cause | Verification method | Remedy |
|---|--|--|--|
| 5 | The connectors CN1A and CN1B of the main card are not perfectly connected. | Check that they are perfectly connected. | Perfectly connect the connectors and tighten them with screws. |
| 6 | If the cable between NC and the servo amplifier is defective: | Test the cable with a normal one. | Replace the cable with a new one. |
| 7 | Noise enters the cable between NC and the servo amplifier: | (1) Take proper precautions against noise. See 3.5, "Precautions for Installing Amplifier." (2) Check whether the noise occurs when a specific relay contractor in the power control box is turned on and off. | (1) Take proper precautions against noise. (2) Mount a spark killer, etc. |
| 8 | If a card on the NC side is defective (MC611, etc.): | Test the card with a normal one. | Replace the card with a new one. |

(24) Alarm No. **42** *: Feedback error 1

If the feedback value of the motor shaft end detector is incorrect:

| | Cause | Verification method | Remedy |
|---|--|---|--|
| 1 | The cable between the amplifier and the detector is defective. | Test the cable with a normal one from another axis. | Replace the cable with a new one. |
| 2 | If the motor shaft end detector is defective: | Test the motor shaft end detector with a normal one from another axis. | Replace the motor shaft end detector with a new one. |
| 3 | If the main card (or add-on card) is defective: | Test the main card (or add-on card) with a normal one from another axis. Change the axis selection switch position of the main card. For details, see 5.1, "Replacing Servo Amplifier Control Card." | Replace the main card (or add-on card) with a new one. |

(25) Alarm No. **43** *: Feed back error 2

The feed back value in the fully closed loop is invalid.

| | Cause | Verification method | Remedy |
|---|--|--|--|
| 1 | If the cable between the amplifier and the detector on the machine shaft end is defective: | Test the cable with a normal one from another axis. | Replace the cable with a new one. |
| 2 | If the motor shaft end detector is defective: | Test the motor shaft end detector with a normal one from another axis. | Replace the cable with a new one. |
| 3 | If the machine shaft end detector is defective: | Test the machine shaft end detector with a normal one from another axis. | Replace the machine shaft end detector with a new one. |
| 4 | If the motor shaft end detector is defective: | Test the motor shaft end detector with a normal one from another axis. | Replace the motor shaft end detector with a new one. |
| 5 | If the add-on card is defective. | Test the add-on card with a normal one from another axis. | Replace the add-on card with a new one. |
| 6 | If the main card is defective: | Test the main card with a normal one from another axis. Change the axis selection switch position of the main card. For details, see 5.1, "Replacing Servo Amplifier Control Card." | Replace the main card with a new one. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(26) Alarm No. **45** : Fin over heat

The fin thermal protector in the unit is activated.

| | Cause | Verification method | Remedy |
|---|--|---|----------------------------------|
| 1 | If the motor current exceeds the continuous output current limit value of the amplifier: | Decrease the load amount. Decrease the acceleration/ deceleration frequency. Decrease the rapid traverse rate. Decrease the ratio of the heavy cutting time period. | Same as left hand column. |
| 2 | If the regeneration resistor and the regeneration power transistor are overloaded: | Decrease the acceleration/ deceleration frequency. Decrease the rapid traverse rate. | Same as left hand column. |
| 3 | If the thermal protector is defective: | Check whether or not the thermal protector is activated in the non-load state. | Replace the unit with a new one. |

(27) Alarm No. **46** : Motor over heat

The thermal protector in the motor is activated.

| | Cause | Verification method | Remedy |
|---|---|---|--|
| 1 | If the motor operation exceeds the continuous rating: | Check whether or not the motor is hot. Decrease the load amount. Decrease the acceleration/ deceleration frequency. Decrease the ratio of the heavy cutting time. | The load amount is decreased: |
| 2 | The cables are incorrectly connected to the terminal block. | Check whether or not the motor is cool: • The cables are incorrectly connected to the terminal blocks G1 and G2. • The cables are incorrectly connected to the Cannon connectors G1 and G2 of the motor. Check the continuity of G1 and G2 using the circuit tester. | Correctly connect the cables. |
| 3 | If the thermal protector is defective: | Check G1 and G2 of the motor using the circuit tester. | Replace the motor with a new one. |
| 4 | If the regeneration option unit MR-RB30 is overheated (only on the axis where the regeneration option unit is mounted). | Check whether or not the regeneration option unit is hot. It is possible to consider cause 2 or 3 of the alarm No.3 "Over-regeneration". For details, see "Over regeneration." | See "Over-regeneration." |
| 5 | If the thermal protector of the regeneration option unit MR-RB30 is defective (only on the axis where the regeneration option unit is mounted): | Check G3 and G4 of the regeneration option unit using the circuit tester. | Replace the regeneration option unit with a new one. |

Note) G1, G2 terminal application

| | |
|--------|--------------------|
| MR-S11 | G1, G2 |
| MR-S12 | LG1, LG2, MG1, MG2 |

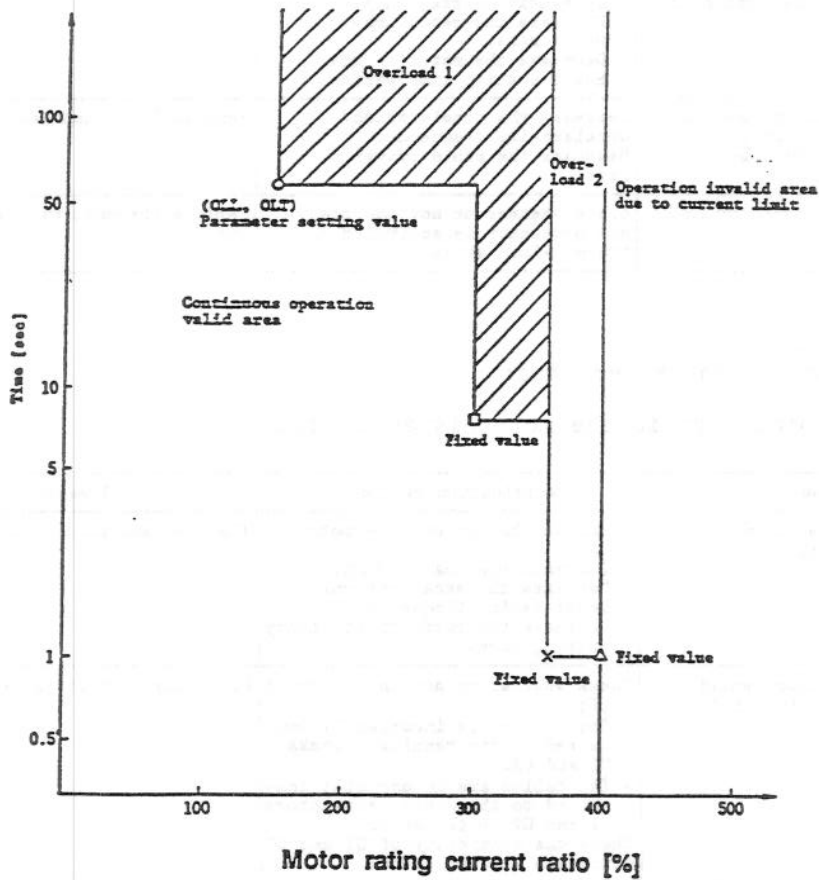
4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(28) Alarm No. **50**: Overload 1

The motor is operated in the hatched area of the following thermal characteristic:

The motor rating current and the time represented by O, □, ×, and Δ in the figure depend on the motor type. Refer to the following table.



| Motor | O | | □ | | × | | Δ | |
|----------|-------|-------------|-------|------|-------|------|-------|--|
| | Level | Time | Level | Time | Level | Time | Level | |
| HA053/13 | OLL | OLT/10 sec. | 250% | 10 | 320% | 1 | 355% | |
| 23/33 | OLL | OLT/10 | 250 | 10 | 355 | 1 | 375 | |
| 40 | OLL | OLT/10 | 250 | 10 | 500 | 1 | 555 | |
| 43 | OLL | OLT/10 | 250 | 10 | 360 | 1 | 400 | |
| 80 | OLL | OLT/10 | 250 | 10 | 410 | 1 | 455 | |
| 83 | OLL | OLT/10 | 250 | 10 | 305 | 1 | 340 | |
| 100 | OLL | OLT/10 | 250 | 10 | 290 | 1 | 320 | |
| 103 | OLL | OLT/10 | 220 | 5 | 305 | 1 | 340 | |
| 200 | OLL | OLT/10 | 200 | 5 | 270 | 1 | 300 | |
| 203 | OLL | OLT/10 | 190 | 5 | 265 | 1 | 295 | |
| 300/700 | OLL | OLT/10 | 180 | 5 | 245 | 1 | 270 | |
| 900 | OLL | OLT/10 | 180 | 5 | 270 | 1 | 300 | |

Note 1: Parameter standard setting value: OLL = 150% OLT/10 = 60 sec.

Note 2: In the case of (ILP = 1364, ILN = -1364), when the parameter values are changed, the level of Δ is correspondingly changed.

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

| | Cause | Verification method | Remedy |
|---|---|--|---|
| 1 | If the motor operation exceeds the continuous rating value: | Check whether or not the motor is hot: Decrease the load amount. Decrease the acceleration/ deceleration frequency. Decrease the rapid traverse rate. Decrease the ratio of the heavy cutting time, etc. | The load amount is decreased. |
| 2 | The motor collides with a machine. | Check whether or not the motor collides with the machine. | Separate the motor from the machine. Check that the soft limit operates correctly. |
| 3 | If the servo parameters OLL and OLT are incorrectly set: | Check that the parameters are set to the following standard values. OLL: 150, OLT: 600 | Correctly set the parameters. |
| 4 | If a hunting occurs by the reverse servo operation: | 1. The motor power cable connections are incorrect. 2. The servo parameter STY is incorrectly set. 3. The servo parameter MTY is incorrectly set. | Correct the cable connections and the parameters. For details, see 7, "Details of Servo Parameters." |
| 5 | The detection system is defective. | 1. If the detector is defective. Replace the detector with a normal one. 2. If the detector cable is defective: Replace the cable with a normal cable. | Correct the cable connections and the parameters. For details, see 7, "Details of Servo Parameters." |
| 6 | If a hunting occurs due to unstable servo system: | 1. The servo parameter PCN is incorrectly set. 2. The servo parameter PC1 is incorrectly set. 3. The servo parameter PC2 is incorrectly set. 4. The servo parameter RNG is incorrectly set. 5. The servo parameter VGI is incorrectly set. | Correct the cable connections and the parameters. For details, see 7, "Details of Servo Parameters." |

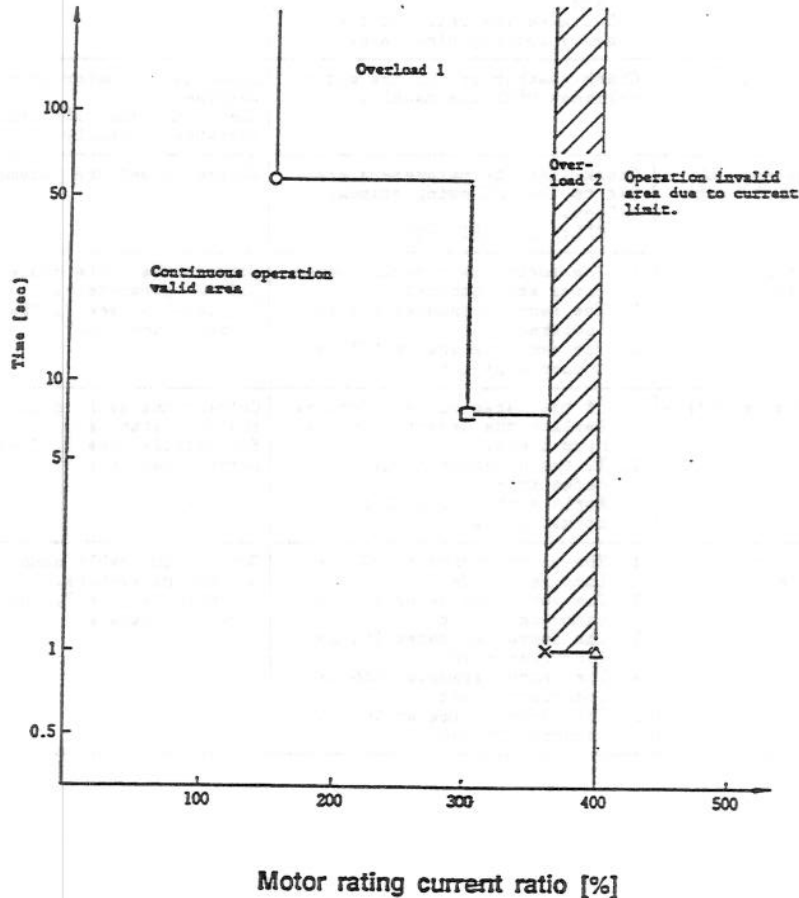
4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(29) Alarm No. 51 *: Overload 2

The motor is operated in the hatched area of the following thermal characteristic:

The motor rating current and the time represented by O, □, ×, and Δ in the figure depend on the motor type. Refer to the following table.





| Motor | ○ | | □ | | × | | Δ | |
|----------|-------|-------------|-------|------|-------|------|-------|--|
| | Level | Time | Level | Time | Level | Time | Level | |
| HA053/13 | OLL | OLT/10 sec. | 250% | 10 | 320% | 1 | 355% | |
| 23/33 | OLL | OLT/10 | 250 | 10 | 355 | 1 | 375 | |
| 40 | OLL | OLT/10 | 250 | 10 | 500 | 1 | 555 | |
| 43 | OLL | OLT/10 | 250 | 10 | 360 | 1 | 400 | |
| 80 | OLL | OLT/10 | 250 | 10 | 410 | 1 | 455 | |
| 83 | OLL | OLT/10 | 250 | 10 | 305 | 1 | 340 | |
| 100 | OLL | OLT/10 | 250 | 10 | 290 | 1 | 320 | |
| 103 | OLL | OLT/10 | 220 | 5 | 305 | 1 | 340 | |
| 200 | OLL | OLT/10 | 200 | 5 | 270 | 1 | 300 | |
| 203 | OLL | OLT/10 | 190 | 5 | 265 | 1 | 295 | |
| 300/700 | OLL | OLT/10 | 180 | 5 | 245 | 1 | 270 | |
| 900 | OLL | OLT/10 | 180 | 5 | 270 | 1 | 300 | |

Note 1: Parameter standard setting value: OLL = 150% OLT/10 = 60 sec.

Note 2: In the case of (ILP = 1364, ILN = -1364), when the parameter values are changed, the level of Δ is correspondingly changed.

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

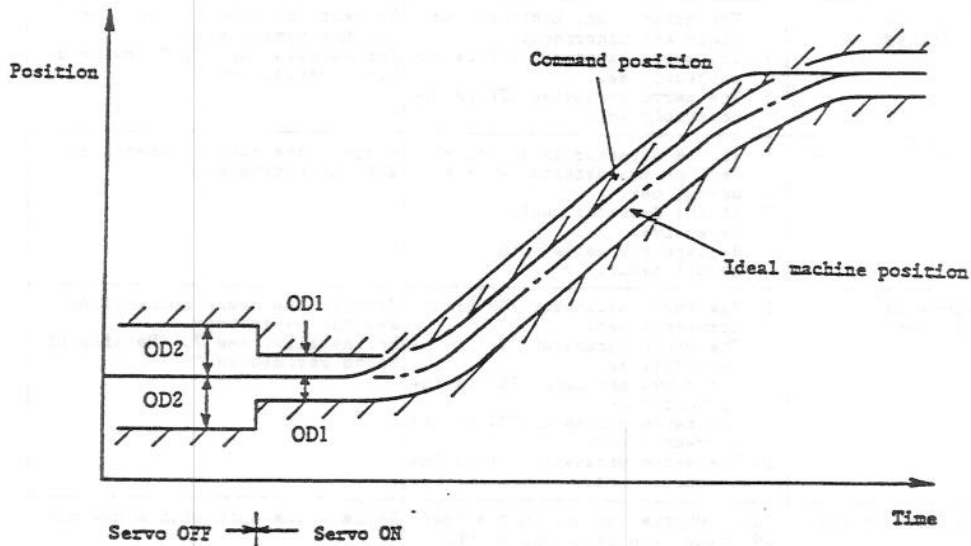
| | Cause | Verification method | Remedy |
|---|--|--|--|
| 1 | The motor collides with a machine. | Check whether or not the motor collides with the machine. | Separate the motor from the machine. |
| 2 | If the acceleration/deceleration time constant is too short: | Observe the current on the servo monitor screen and check whether or not the current exceeds the level marked with x on the preceding table for 1 sec or more. | Increase the acceleration/deceleration time constant. |
| 3 | If a hunting occurs by the reverse servo operation: | <ol style="list-style-type: none"> 1. The motor power cable connections are incorrect. 2. The servo parameter STY is incorrectly set. 3. The servo parameter MTY is incorrectly set. | Correct the cable connections and the parameters. For details, see 7, "Details of Servo Parameters." |
| 4 | The detection system is defective. | <ol style="list-style-type: none"> 1. If the detector is defective: Replace the detector with a normal one. 2. If the detector cable is defective: Replace the cable with a normal cable. | Correct the cable connections and the parameters. |
| 5 | If a hunting occurs due to unstable servo system: | <ol style="list-style-type: none"> 1. The servo parameter PGN is incorrectly set. 2. The servo parameter PC1 is incorrectly set. 3. The servo parameter PC2 is incorrectly set. 4. The servo parameter RNG is incorrectly set. 5. The servo parameter VG1 is incorrectly set. | Correct the cable connections and the parameters. For details, see 7, "Details of Servo Parameters." |
| 6 | If the DC bus voltage in the unit drops: | Check whether or not in the ready ON state, the neon lamp on the left side of the unit terminal block light up (the 7-segment display indicates  or ). | Replace the unit with a new one. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(30) Alarm No. **52**: Over droop

The real machine position deviates from the ideal machine position according to the command position set by OD1.
The machine position is in the hatched area of the following figure.



4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

| | Cause | Verification method | Remedy |
|---|--|--|---|
| 1 | If the acceleration/deceleration time constant is too short: | <p>Increase the acceleration/deceleration time constant. Obtain the minimum acceleration/deceleration time constant from the following equation.</p> $T_{s \min} = \frac{2\pi N(J_m - J_L)}{60 \times (\tau_m - \tau_L)}$ <p>where</p> <p>N : Rapid traverse rate [rpm] J_m: Motor inertia[kg·cm·S²] J_L: Load inertia [kg·cm·S²] τ_m: Maximum motor torque [kg·cm] τ_L: Maximum load torque of rapid traverse [kg·cm] T_{s min}: Minimum acceleration/deceleration time constant [S]</p> <p>For details of the motor constant, see Appendix 7.</p> | Increase the acceleration/deceleration time constant or decrease the rapid traverse rate. |
| 2 | If the current is excessively limited: | Check the servo parameters ILP and ILN. | Correct the servo parameters. |
| 3 | The motor collides with a machine. | Check whether the motor collides with the machine. | Separate the motor from the machine. |
| 4 | If a hunting occurs by the reverse servo operation: | <ol style="list-style-type: none"> 1. The motor power cable connections are incorrect. 2. The servo parameter STY is incorrectly set. 3. The servo parameter MTY is incorrectly set. | Correct the cable connections and the parameters. For details, see 7, "Details of Servo Parameters." |
| 5 | The detection system is defective. | <ol style="list-style-type: none"> 1. If the detector is defective: Replace the detector with a normal one. 2. If the detector cable is defective: Replace the cable with a normal cable. | Correct the cable connections and the parameters. |
| 6 | If a hunting occurs due to unstable servo system: | <ol style="list-style-type: none"> 1. The servo parameter PCN is incorrectly set. 2. The servo parameter PC1 is incorrectly set. 3. The servo parameter PC2 is incorrectly set. 4. The servo parameter RNG is incorrectly set. 5. The servo parameter VG1 is incorrectly set. | Correct the cable connections and the parameters. For details, see 7, "Details of Servo Parameters." |
| 7 | If the DC bus voltage in the unit drops: | Check whether or not in the ready ON state, the neon lamp on the left side of the unit terminal block lights up (the 7-segment display indicates or). | Replace the unit with a new one. |
| 8 | If the gain of the servo system is correct: | <ol style="list-style-type: none"> 1. Continuously increase the level of the servo parameter VG1 in the unit of 20. 2. Continuously decrease the level of the servo parameter PCN in the unit of 5. | <ol style="list-style-type: none"> 1. After the left-hand adjustment, observe the situation. 2. After the left-hand adjustment, set the interpolation axis value to the same value. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(31) Alarm No. **53** : Over-droop 2

Actual mechanical position has been displaced during servo off beyond the distance set by OD2 from the ideal mechanical position for the commanded position.

| | Cause | Verification method | Remedy |
|---|--|---|---|
| 1 | When the error offset during servo off was not arranged, the motor was operated beyond the value of parameter OD2. | Confirm the amount of mechanical movement during servo off. | |
| 2 | Inadequate insertion of CN1A, CN1B of main card into connectors. | Check the state of insertion. | Correct the insertion and insert into the groove. |
| 3 | Some trouble with the cable between NC and servo amplifier. | Try to replace the cable. | Replace the cable. |
| 4 | Noises exist on the cable between NC and servo amplifier. | (1) Arrange the noise prevention. - Refer to cautions for installation of the amplifier. (2) It is raised with the timing of On/Off of specific relay contactor in the power control box. | (1) Arrange the noise prevention. (2) Add the spark killer, etc. |
| 5 | Defective card at NC side (MC611, etc.) | Try to replace with a normal card. | Replace the card. |

(32) Alarm No. **54** : Amp. overload (Exists only on MS-S12.)

It was operated beyond a definite time when the total value of current of the motor which is connected with the motor, beyond the following level. The following table shows the current level and time.

| | Current level (A) | Time (min) |
|-------------|-------------------|------------|
| MR-S12-33A | 21 | 12 |
| MR-S12-40A | | |
| MR-S12-80B | | |
| MR-S12-80A | | |
| MR-S12-100B | 32 | |
| MR-S12-100A | | |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

| | Cause | Verification method | Remedy |
|---|--|--|--|
| 1 | The amplifier was operated beyond its rating of continued operation. | Try to reduce the load • Reduce the frequency of acceleration and deceleration. • Slow down the rapid traverse rate. • Reduce the rate of heavy cutting time. | Reduce the load. |
| 2 | Setting error of servo parameter MTY | Is servo parameter MTY identical to the motor's requirement? | Adjust accordingly. |
| 3 | Hunting by a reverse servo | 1. The wrong power cable is connected to the motor. 2. Setting error of servo parameter STY 3. Setting error of servo parameter MTY | Correct accordingly. See 7. Details of parameter. |
| 4 | Hunting by unstable servo line | 1. Setting error of servo parameter PGN. 2. Setting error of servo parameter PC1. 3. Setting error of servo parameter PC2. 4. Setting error of servo parameter PNG. 5. Setting error of servo parameter VC1. | Correct accordingly. See 7. Detail of parameter. |

(33) Alarm No. 55 : Emergency

The terminals B and R of the terminal block, which were short-circuited, are open. (These terminals may be linked to the emergency stop depending on the machine model.)
In the standard specification, the terminals are short-circuited in the terminal block.

| | Cause | Verification method | Remedy |
|---|--|--|-------------------------------------|
| 1 | If the emergency stop occurs: | When the emergency stop occurs, the terminals B and R are open. | Normal operation |
| 2 | The 200/220 VAC input voltage drops (in the phases R and S). | Check the input voltage using the volt meter. | Consider the power supply facility. |
| 3 | If the unit is struck by something: | When a force exceeding 5 G strikes the unit (for example the bottom of the unit is struck by a wooden hammer, etc.). | Remove the cause. |
| 4 | If a contactor in the unit is broken: | Check the continuity between each two contacts of the contactor (see the main circuit structural drawing). | Replace the unit with a new one. |

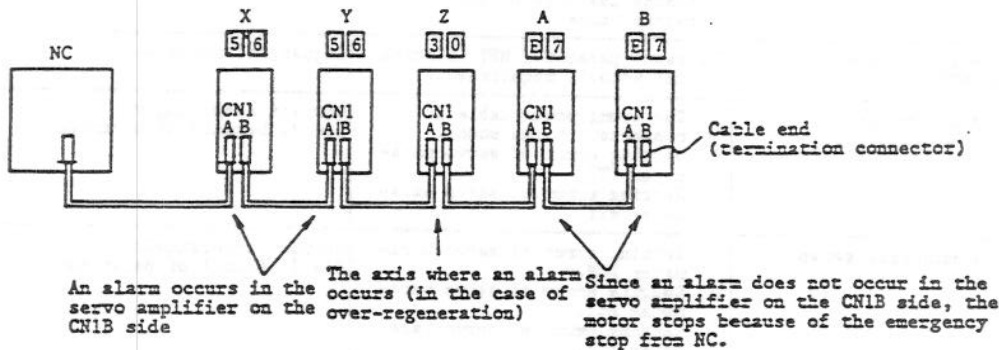
4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(34) Alarm No. **56** : Other axis alarm

An alarm occurs in the unit connected to CN1B, or the cable end (termination connector) is disconnected.

Example)



| | Cause | Verification method | Remedy |
|---|--|---|--|
| 1 | An alarm occurs in the servo amplifier on the CN1B side. | | Normal operation. |
| 2 | The cable end is disconnected. | | Correctly mount the cable end. |
| 3 | The power of the amplifier which is not used is not turned on. | In the above example, axis B is not used and the power input of the axis is disconnected. | In the left-hand example, 1. Turn on the power of axis B. 2. Connect the cable end to CN1B axis A. |

(35) Warning No. **E0** : Warning over regeneration

The 80 % level of the regeneration alarm is detected. Because it is not an alarm, the servo OFF does not occur. However, if the motor is operated in this condition, the regeneration alarm may occur. For details, see (12) "Over-regeneration."

Note: It is recommended that the precautions described in item 2, (12), "Over regeneration" be taken. Check that the value of the regeneration load on the servo monitor screen gradually increases while E0 appears. When it does, see (12), "Over regeneration."

(36) Warning No. **E1** : Warning overload

The 80 % level of the overload 1 alarm is detected. Because it is not an alarm, the servo OFF does not occur. However, if the motor is operated in this condition, the overload 1 alarm may occur. For details, see (22) "Overload 1".

(37) Warning No. **E3** : Absolute position counter warning

Occurs when the value of the absolute position counter is invalid. Although an alarm does not occur even if the motor is operated in this condition, when the NC power is turned on, zero return operation is required. This warning may occur just after the motor is installed or before the zero return operation is performed. At that time, perform the zero return operation. Check the absolute position detector, encoder, and add-on card (RF33/332) where cables are connected.

(38) Warning No. **E4** *: Warning parameter error

A parameter value which is not allowed has been set.
(For the setting range, see 7, "Details of Servo Parameters."
Any invalid parameter is ignored and the value before the invalid value was set will kept.
When a normal value is set, this warning disappears.
The servo OFF state does not occur.

(39) Warning No. **E5**: Warning absolute detect error

There is an error in the internal data for absolute position detection. The servo OFF state does not occur.

| | Cause | Verification method | Remedy |
|---|--|---|---|
| 1 | If the grid interval of the machine parameter is incorrectly set: | Check that the grid interval of the parameter is set to "20". | Correct the parameter as described in the left-hand column. |
| 2 | If the resolver data of the point where the dog type zero return is performed is abnormal: | When the value of 1X on the servo monitor screen is in the following range, the data is abnormal. 278 < 1X < 4722 5070 < 1X (See 8, "Absolute Position System.") | 1. Perform the dog type zero return operation once again. 2. When the data is in the left hand range even after taking the above countermeasure, replace the detector and the add-on card. |
| 3 | If the absolute value compensation data is abnormal: | | Replace the detector and the add-on card with new ones. |

For warnings relating to the absolute position system, see 8, "Absolute Position System."

(40) Warning No. **E6**: Warning over travel

When the speed loop step type is set for over-travel by the limit SW, a warning occurs while the speed loop is controlled in the over-travel state. The speed loop control time may be set by a parameter on the NC side.

| | Cause | Verification method | Remedy |
|---|-------------|---|------------------|
| 1 | Over-travel | Check whether or not the over-travel state takes place. | Normal operation |

(41) Warning No. **E7**: NC emergency

NC is in the emergency stop state.

| | Cause | Verification method | Remedy |
|---|------------------------------------|---------------------|------------------|
| 1 | NC is in the emergency stop state. | | Normal operation |

(42) Warning No. **A0**: Warning absolute first transmission

When the NC power is turned on, the data received from the absolute position detector (OAERSKC) is abnormal. However, even if the motor is operated in this condition, the servo OFF state does not occur.

| | Cause | Verification method | Remedy |
|---|---|---|---|
| 1 | If the cable between the amplifier and the absolute position detector is defective: | Test the cable with a normal one from another axis. | Replace the cable with a new one. |
| 2 | If the add-on card (RF37 <input type="checkbox"/>) is defective: | Test the add-on card with a normal one from another axis. | Replace the add-on card with a new one. |
| 3 | If the absolute position detector is defective: | Test the detector with a normal one from another axis. | Replace the detector with a new one. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(43) Warning No. **A1** : Warning absolute serial signal

In the normal operating state, the data received from the absolute position detector (OAER5KC) is abnormal. Even if the motor is operated in this condition, the servo OFF state does not occur.

| | Cause | Verification method | Remedy |
|---|---|---|---|
| 1 | If the cable between the amplifier and the absolute position detector is defective: | Test the cable with a normal one from another axis. | Replace the cable with a new one. |
| 2 | If the add-on card (RF37 <input type="checkbox"/>) is defective: | Test the add-on card with a normal one from another axis. | Replace the add-on card with a new one. |
| 3 | If the absolute position detector is defective: | Test the detector with a normal one from another axis. | Replace the detector with a new one. |

(44) Warning No. **A2** : Warning absolute battery voltage

When the power is turned on, the voltage of the battery on the add-on card (RF37☐) drops.

| | Cause | Verification method | Remedy |
|---|---|--|--|
| 1 | If the add-on card (RF37 <input type="checkbox"/>) is incorrectly set: | Visually check the add-on card, battery connection, and setting plug. (See 6.2) | Correctly set the setting plug. |
| 2 | If the battery voltage drops: | Check the voltage using the circuit tester. | Charge the battery for four hours or more. |
| 3 | If the battery is defective: | Charge the battery and check the voltage using the circuit tester. | Replace the battery with a new one. |
| 4 | If the cable is defective: | Test the cable with a normal one from another axis. | Replace the cable with a new one. |
| 5 | If the detector is defective: | Test the detector with a normal one from another axis. | Replace the detector with a new one. |
| 6 | If the add-on card (RF37 <input type="checkbox"/>) is defective: | Test the add-on card (RF37 <input type="checkbox"/>) with a normal one from another axis. | Replace the add-on card (RF37 <input type="checkbox"/>) with a new one. |

(45) Warning No. **A3** : Warning absolute cable No. connection

The power voltage applied to the absolute position detector (OAER5KC) drops. (Normally detected.)

Even if the motor is operated in this condition, the servo OFF state does not occur.

| | Cause | Verification method | Remedy |
|---|---|--|---|
| 1 | If the battery voltage drops: | Check the voltage using the circuit tester. | Charge the battery or replace it with a new one. |
| 2 | If the cable is broken: | Test the cable with a normal one from another axis or check the continuity. | Repair or replace the cable with a new one. |
| 3 | If the add-on card (RF37 <input type="checkbox"/>) is defective: | Test the add-on card (RF37 <input type="checkbox"/>) with a normal one from another axis. | Replace the add-on card (RF37 <input type="checkbox"/>) with a new one. |
| 4 | If the detector is defective: | Test the detector with a normal one from another axis. | Replace the detector with a good one (it is necessary to perform the initial set of the zero point return operation). |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

(46) Warning No. **A4** *: Warning absolute position error

The feedback pulse from the absolute position detector is abnormal. Even if the motor is operated in this condition, the servo OFF state does not occurs, however, the position deviates.

| | Cause | Verification method | Remedy |
|---|---|--|--|
| 1 | If a noise enters the cable between the amplifier and the detector: | Check whether or not the cable has been clamped. | Correctly clamp the cable. |
| 2 | | Check whether or not the power cable crosses the cable between the amplifier and the detector. | Separate the cables from each other. |
| 3 | If the detector is defective: | Test the detector with a normal one from another axis. | Replace the detector with a new one (it is necessary to perform the initial set of the zero point return operation). |

(47) Warning No. **A5** *: Warning absolute resolver

The feedback signal from the absolute position detector is abnormal. Even if the motor is operated in this condition, the servo OFF state does not occur.


| | Cause | Verification method | Remedy |
|---|---|--|--|
| 1 | If a noise enters the cable between the amplifier and the detector: | Check whether or not the cable has been clamped. | Correctly clamp the cable. |
| 2 | | Check whether or not the power cable crosses the cable between the amplifier and the detector. | Separate the cables from each other. |
| 3 | If the detector is defective: | Test the detector with a normal one from another axis. | Replace the detector with a new one (it is necessary to perform the initial set of the zero point return operation). |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

4.2.2 WHEN AN "AMPLIFIER NOT MOUNTED" ALARM OCCURS (NC SIDE ALARM):

The NC unit issues the "amplifier not mounted" alarm.

| | Cause | Verification method | Remedy |
|---|--|--|--|
| 1 | If the servo amplifier power is not turned on: | Check whether the 7-segment indicator of the servo amplifier lights up or not. | Turn on the power of the servo amplifier. |
| 2 | The power of the servo amplifier should be turned on after the power of NC is turned on. | Turn on the power of the servo amplifier after that of NC. | Perform the operation described in the left-hand column. |
| 3 | If the servo amplifier does not operate correctly. | Check whether or not the 7-segment indicator indicates  . | 1. Replace the EPROM with a new one. 2. Replace the main card with a new one. |
| 4 | If the cables between MCP and the amplifier, and between the amplifiers, are defective: | Test the cables with normal ones. | Replace the cables with new ones. |
| 5 | If the cable end (termination connector) is defective: | Test the cable end with a normal one. | Replace the cable end with a new one. |

4.2.3 WHEN THE MOTOR VIBRATES OR GENERATES A VIBRATION SOUND:

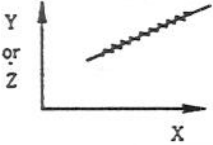

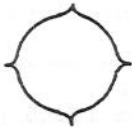
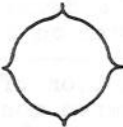

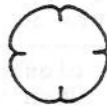
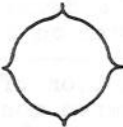

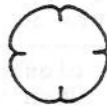
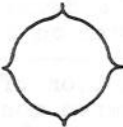

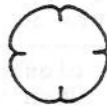
- (1) When touching the machine, if you feel small vibration or when you hear a howling vibration sound:

| Verification method and repair | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|---|-----------------|------------|------------|--|---|--|---|--|---|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Adjust the servo parameters. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <tr> <th colspan="2">Servo parameter</th> </tr> <tr> <td>①</td> <td>Decrement 5. VG1 by 50 (lower limit: 50)</td> </tr> <tr> <td>②</td> <td>Decrement 11. IQC by 50 (lower limit: 128)</td> </tr> <tr> <td>③</td> <td>Decrement 12. IDG by 50 (lower limit: 256)</td> </tr> <tr> <td>④</td> <td>Turn on 17. STY FBC (bit B).</td> </tr> <tr> <td>⑤</td> <td>Turn on 17. STY FBF 1 to 3 (bit 8 to A) in the following order.</td> </tr> </table> | Servo parameter | | ① | Decrement 5. VG1 by 50 (lower limit: 50) | ② | Decrement 11. IQC by 50 (lower limit: 128) | ③ | Decrement 12. IDG by 50 (lower limit: 256) | ④ | Turn on 17. STY FBC (bit B). | ⑤ | Turn on 17. STY FBF 1 to 3 (bit 8 to A) in the following order. | | | | | | | | | | | | | | | | | | | | |
| Servo parameter | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ① | Decrement 5. VG1 by 50 (lower limit: 50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ② | Decrement 11. IQC by 50 (lower limit: 128) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ③ | Decrement 12. IDG by 50 (lower limit: 256) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ④ | Turn on 17. STY FBC (bit B). | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⑤ | Turn on 17. STY FBF 1 to 3 (bit 8 to A) in the following order. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"> <tr> <th></th> <th>FBF3(bitA)</th> <th>FBF2(bit9)</th> <th>FBF1(bit8)</th> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>2</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>3</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>4</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>5</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>6</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>7</td> <td>1</td> <td>1</td> <td>1</td> </tr> </table> | | FBF3(bitA) | FBF2(bit9) | FBF1(bit8) | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 3 | 0 | 1 | 0 | 4 | 1 | 1 | 0 | 5 | 0 | 0 | 1 | 6 | 1 | 0 | 1 | 7 | 1 | 1 | 1 |
| | FBF3(bitA) | FBF2(bit9) | FBF1(bit8) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 1 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 1 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Note 5. VG1 is a parameter for response property of speed loop. When excessively decreasing the value of this parameter, the response property is degraded.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

- (2) When the motor vibrates or generates a vibration sound in the rapid traverse state:

| Verification method and repair | | | | | | | |
|--------------------------------|--|-----------------|--|---|---------------------------------------|---|--|
| 1 | Adjust the servo parameters. | | | | | | |
| | <table> <tr> <th colspan="2">Servo parameter</th></tr> <tr> <td>①</td><td>Take the same countermeasures as (1).</td></tr> <tr> <td>②</td><td>Set a value which is the cutting feed speed + 100 rpm to SP2 and set the same value as VG1 to VG2. Repeat the rapid traverse operation by decrementing VG2 by 10 (limit value: 0).</td></tr> </table> | Servo parameter | | ① | Take the same countermeasures as (1). | ② | Set a value which is the cutting feed speed + 100 rpm to SP2 and set the same value as VG1 to VG2. Repeat the rapid traverse operation by decrementing VG2 by 10 (limit value: 0). |
| Servo parameter | | | | | | | |
| ① | Take the same countermeasures as (1). | | | | | | |
| ② | Set a value which is the cutting feed speed + 100 rpm to SP2 and set the same value as VG1 to VG2. Repeat the rapid traverse operation by decrementing VG2 by 10 (limit value: 0). | | | | | | |

4.2.4 WHEN THE CUTTING SURFACE OR CIRCULARITY IS POOR:

| Verification method and repair | | | | | | | |
|--|---|-------------------------|--|--|--|--|--|
| 1 | <p>When the taper or the surface accuracy in the direction of 45° of an arc is poor:</p> <div style="text-align: center;">   </div> <table> <tr> <th colspan="2">Servo parameter</th></tr> <tr> <td colspan="2">Increment 5. VG1 by 20 (until a vibration or sound occurs in the stop state or in the rapid traverse state).</td></tr> </table> | Servo parameter | | Increment 5. VG1 by 20 (until a vibration or sound occurs in the stop state or in the rapid traverse state). | | | |
| Servo parameter | | | | | | | |
| Increment 5. VG1 by 20 (until a vibration or sound occurs in the stop state or in the rapid traverse state). | | | | | | | |
| 2 | <p>If there are noticeable projections at each quadrant change (noticeable joins):</p> <div style="text-align: center;">  </div> <table> <tr> <td colspan="2">Increment 5. VG1 by 20.</td></tr> <tr> <td colspan="2"> Turn on 17. STY SMC (bit E). Increment 16. TGN by 20 from 0. When the value of 16. TGN is excessively large, arcs get dented. </td></tr> <tr> <td colspan="2"> <div style="text-align: center;">    </div> <div style="display: flex; justify-content: space-around; align-items: center;"> 0 → Excessively large </div> </td></tr> </table> | Increment 5. VG1 by 20. | | Turn on 17. STY SMC (bit E). Increment 16. TGN by 20 from 0. When the value of 16. TGN is excessively large, arcs get dented. | | <div style="text-align: center;">    </div> <div style="display: flex; justify-content: space-around; align-items: center;"> 0 → Excessively large </div> | |
| Increment 5. VG1 by 20. | | | | | | | |
| Turn on 17. STY SMC (bit E). Increment 16. TGN by 20 from 0. When the value of 16. TGN is excessively large, arcs get dented. | | | | | | | |
| <div style="text-align: center;">    </div> <div style="display: flex; justify-content: space-around; align-items: center;"> 0 → Excessively large </div> | | | | | | | |


4.2.5 WHEN AN OVERSHOOT OCCURS DURING POSITIONING:

| Verification method and repair | | | | | | | | | | | | | | | |
|--------------------------------|--|-----------------|--|---|--|---|--|---|--|---|---|---|--|---|---|
| 1 | <p>In case of semi-closed loop:</p> <table border="1"> <thead> <tr> <th colspan="2">Servo parameter</th></tr> </thead> <tbody> <tr> <td>①</td><td>Increment 5. VG1 by 50 (until a vibration or sound occurs in the stop state or in the rapid traverse state).</td></tr> <tr> <td>②</td><td>Increment 8. VIA by 200 (upper limit: 2000).</td></tr> </tbody> </table> <p>Note 1: When the overshoot amount is excessively large (5μ or more), check whether the droop on the servo monitor screen is overshoot for the same amount, and when overshoot for the same amount, take the above countermeasures. When the situation cannot be improved in the above manner, increase the value of PGN for 20 or increase the acceleration/deceleration time constant in the axis specification. When the droop is not overshoot, the overshoot occurs in the mechanical system rather than the motor. At that time, check the mechanical system.</p> | Servo parameter | | ① | Increment 5. VG1 by 50 (until a vibration or sound occurs in the stop state or in the rapid traverse state). | ② | Increment 8. VIA by 200 (upper limit: 2000). | | | | | | | | |
| Servo parameter | | | | | | | | | | | | | | | |
| ① | Increment 5. VG1 by 50 (until a vibration or sound occurs in the stop state or in the rapid traverse state). | | | | | | | | | | | | | | |
| ② | Increment 8. VIA by 200 (upper limit: 2000). | | | | | | | | | | | | | | |
| 2 | <p>In case of a closed loop:</p> <table border="1"> <thead> <tr> <th colspan="2">Servo parameter</th></tr> </thead> <tbody> <tr> <td>①</td><td>Increment 5. VG1 by 50 (until a vibration or sound occurs in the stop state or in the rapid traverse state).</td></tr> <tr> <td>②</td><td>Increment 8. VIA by 200 (upper limit: 2000).</td></tr> <tr> <td>③</td><td>Decrement 3. PGN by 5 (Lower limit: approx. 20) However, in the simultaneous interpolation axis, the same value should be used.</td></tr> <tr> <td>④</td><td>Turn on 27. SSF PID (bit 0). Decrement 7. VIL by 5 from 10000 (lower limit: 9800).</td></tr> <tr> <td>⑤</td><td>Turn all of 27. SSF PID (bit 0), IDC (bit 1), and IDF (bit 2) and decrement VIL by 20 from 10000 (lower limit: 9500). Note) Although the overshoot and limit cycle are removed in step of ④ above, if the response property is degraded, try ⑤.</td></tr> <tr> <td>⑥</td><td>When a 1μ or 0.1μ scale is used, if a deviation within 1μ or 0.1μ occurs in the stop state, turn on SSF CNG (bit 11).</td></tr> </tbody> </table> <p>Note 2: In case of a closed loop, the description of Note 1 is also applicable. When the droop on the servo monitor screen is not overshoot, it will not be overshoot at the scale. It should be measured near the scale using the dial gauge, etc. When the droop is not overshoot near the scale, check the mechanical system.</p> | Servo parameter | | ① | Increment 5. VG1 by 50 (until a vibration or sound occurs in the stop state or in the rapid traverse state). | ② | Increment 8. VIA by 200 (upper limit: 2000). | ③ | Decrement 3. PGN by 5 (Lower limit: approx. 20) However, in the simultaneous interpolation axis, the same value should be used. | ④ | Turn on 27. SSF PID (bit 0). Decrement 7. VIL by 5 from 10000 (lower limit: 9800). | ⑤ | Turn all of 27. SSF PID (bit 0), IDC (bit 1), and IDF (bit 2) and decrement VIL by 20 from 10000 (lower limit: 9500). Note) Although the overshoot and limit cycle are removed in step of ④ above, if the response property is degraded, try ⑤. | ⑥ | When a 1μ or 0.1μ scale is used, if a deviation within 1μ or 0.1μ occurs in the stop state, turn on SSF CNG (bit 11). |
| Servo parameter | | | | | | | | | | | | | | | |
| ① | Increment 5. VG1 by 50 (until a vibration or sound occurs in the stop state or in the rapid traverse state). | | | | | | | | | | | | | | |
| ② | Increment 8. VIA by 200 (upper limit: 2000). | | | | | | | | | | | | | | |
| ③ | Decrement 3. PGN by 5 (Lower limit: approx. 20) However, in the simultaneous interpolation axis, the same value should be used. | | | | | | | | | | | | | | |
| ④ | Turn on 27. SSF PID (bit 0). Decrement 7. VIL by 5 from 10000 (lower limit: 9800). | | | | | | | | | | | | | | |
| ⑤ | Turn all of 27. SSF PID (bit 0), IDC (bit 1), and IDF (bit 2) and decrement VIL by 20 from 10000 (lower limit: 9500). Note) Although the overshoot and limit cycle are removed in step of ④ above, if the response property is degraded, try ⑤. | | | | | | | | | | | | | | |
| ⑥ | When a 1μ or 0.1μ scale is used, if a deviation within 1μ or 0.1μ occurs in the stop state, turn on SSF CNG (bit 11). | | | | | | | | | | | | | | |

4.2.6 WHEN A SURGE FEED OCCURS IN ONE PULSE FEED OPERATION:

| Verification method and repair | | | | | | | | | | | |
|--------------------------------|--|-----------------|--|---|------------------------|---|---|-----------------|--|---|-------------------------------|
| 1 | <p>When several pulses are input, if the motor is not operating, check whether or not the same amount of the droop occurs on the servo monitor screen.</p> <p>(1) When the droop occurs:</p> <table border="1"> <tr> <th colspan="2">Servo parameter</th></tr> <tr> <td>①</td><td>Increment 5. VG1 by 50</td></tr> <tr> <td>②</td><td>Increment 8. VIA by 200 (until a vibration or sound occurs in the stop state or in the rapid traverse state).</td></tr> </table> <p>Note) When SSF PID (bit 0) of the closed loop 27 is turned on.</p> <table border="1"> <tr> <th colspan="2">Servo parameter</th></tr> <tr> <td>①</td><td>Take countermeasures 4.2.3 ⑤.</td></tr> </table> <p>(2) When the droop does not occur: Since the motor or the ball screw end detector in the closed loop moves to the scale, the surge feed occurs somewhere else in the mechanical system. Check the mechanical system.</p> | Servo parameter | | ① | Increment 5. VG1 by 50 | ② | Increment 8. VIA by 200 (until a vibration or sound occurs in the stop state or in the rapid traverse state). | Servo parameter | | ① | Take countermeasures 4.2.3 ⑤. |
| Servo parameter | | | | | | | | | | | |
| ① | Increment 5. VG1 by 50 | | | | | | | | | | |
| ② | Increment 8. VIA by 200 (until a vibration or sound occurs in the stop state or in the rapid traverse state). | | | | | | | | | | |
| Servo parameter | | | | | | | | | | | |
| ① | Take countermeasures 4.2.3 ⑤. | | | | | | | | | | |

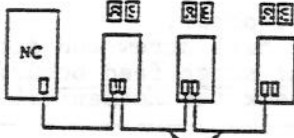
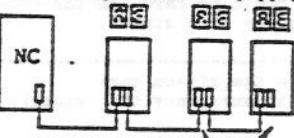
4.2.7 EVEN IF THE POWER IS TURNED ON, THE 7-SEGMENT DISPLAY DOES NOT SHOW ANY DATA OR IT SHOWS .

| | Cause | Verification method | Remedy |
|---|---|---|--|
| 1 | If the control power of the main card is short-circuited in the detector or the detector cable: | Disconnect the detector cable from the main card (in the emergency stop state). | Replace the detector or detector cable with a new one. |
| 2 | If the control power of the main card is short-circuited on the add-on card: | Remove the add-on card (in the emergency stop state). | Replace the add-on card with a new one. |
| 3 | If the EPROM of the main card is not correctly mounted: | <p>Visually check whether or not the EPROM is mounted in the location marked on it. Alternatively, check whether or not the pins of the EPROM are bent.</p>  | Correctly mount the EPROM. |

4. TROUBLESHOOTING

4.2 TROUBLESHOOTING

4.2.8 EVEN IF THE NC POWER IS TURNED ON, THE 7-SEGMENT DISPLAY DOES NOT CHANGE FROM **AB**, **BA** OR IT MOMENTARILY SHOWS **AL**, **BL**, **AL**, AND THEN RETURNS TO **AB** **AL**:

| | Cause | Verification method | Remedy |
|---|---|--|--|
| 1 | If the cables between NC and the amplifier, and between the amplifiers, are disconnected: | Visually check the following cables. • Cables connected to the main cards CN1A and CN1B. • Cables connected to the NC side. | Correctly connect the cables. |
| 2 | If the axis number selection CS1 of the main card is incorrectly set: | Check whether or not the same axis number is used for two axes, or an incorrect axis number is used. | Correctly set the axis number selection CS1. |
| 3 | If the cables between NC and the amplifier and between the amplifiers are defective: | In the order of the cables connected between NC and each axis, when the 7-segment display momentarily indicates AE , the cables that follow may be defective. Test the cables with normal ones. The 7-segment display momentarily indicates AE .  These cables may be defective. | Replace the cables with new ones. |
| 4 | The main card is defective. | In the order of the cables connected between NC and each axis, when the 7-segment display momentarily indicates AE , the cards that follow may be defective. Test the cards with normal ones. The 7-segment display momentarily indicates AE .  These cards may be defective. | Replace the cards with new ones. |
| 5 | The software or hardware of NC may be defective. | (1) Check whether NC is normally started up. (2) Test the card connected to the servo amplifier with a normal one. | Repair the NC side. Replace the card on the NC side with a new one (MC611 card, etc.) |