# OMRON MAINTENANCE MANUAL

# Sequence Controller

## Model SYSMAC-M1

OMRON TATEISI ELECTRONICS CO.

## TABLE OF CONTENTS

## 1. INTRODUCTION

This manual provides the instructions on the daily inspection of OMRON SYSMAC sequence controller Type SCY-M1, as well as the troubleshooting procedure required should the sequence controller fail to operate properly.

## 2. PERIODIC INSPECTION

### 2.1 Check Items

Check each item subject to periodic inspection according to the following table. Normally, the sequence controller is subject to inspection every 6 months to one year. The specific cycle of periodic inspection, however, should be determined according to environmental conditions and other factors. Should any abnormality occur in the sequence controller, immediately trouble-shoot and confirm that the performance of the sequence controller is within the prescribed criteria.

**Table 1 Periodic Inspection**

| No. | CHECK ITEM | DESCRIPTION OF INSPECTION | CRITERIA FOR JUDGING | REMARKS |
|---|---|---|---|---|
| 1 | AC power source<br>(1) Voltage<br>(2) Fluctuation | (1) Check the terminal block of the power supply unit to see if the AC power being supplied is within the criterion.<br>(2) Check the sequence controller for frequent momentary power failure or abrupt voltage drop or increase. | (1) AC100/110/220V +10%, −15%<br>AC110/120/220/240V ±10%<br>(2) Voltage fluctuation should be within above criteria.<br>Momentary power failure: 10msec max. | Tester<br>Synchroscope |
| 2 | Environmental conditions<br>(1) Temperature<br>(2) Humidity<br>(3) Vibration<br>(4) Dust, etc. | • Check the sequence controller to see if it satisfies the environmental requirements described on the right. | (1) 0 to 50°C<br>(2) 30 to 90% R.H.<br>(3) Must be free from vibration.<br>(4) Must be free from dust. | Thermometers for maximum and minimum temperature measurement |
| 3 | Power supply to I/O units<br>(1) Voltage<br>(2) Fluctuation (including percent ripple) | • Check the terminal block connector of each I/O unit to see that the power being supplied is within the criterion. | Rated voltage +10%, −15% (DC power includes percent ripple.)<br>Provided that I/O units using relays shall be: rated voltage +10%, −5% | Tester<br>Synchroscope |
| 4 | Mounted condition | (1) Check the base unit to see if it is firmly secured.<br>(2) Check the C I/O, D I/O, CPU and power supply unit respectively to see if each unit is mounted securely.<br>(3) Check the respective terminal block connectors and card connectors for proper insertion.<br>(4) Check the external wiring for loose screws.<br>(5) Check the external wiring for disconnected or broken cable. | (1) The base unit must not be loose.<br>(2) Each I/O unit must be securely attached to the base unit.<br>(3) Each connector must not be loose.<br>(4) Each screw must be tight.<br>(5) Each cable should be free from any defect. | Screwdriver for cross recessed head screw<br>Ditto<br>Visual inspection<br>Ditto<br>Ditto |
| 5 | Service life | • Check the input switches, output relays, etc. for service life.<br>SCY M1-OC201, -203<br>SCY M1-OC202, -204<br>SCY M1-ID021<br>SYC M1-IT021 | • Replace the defective part with new one. | Refer to the catalogs of the respective parts (G2K, LY1, G2L). |

## 3. TROUBLESHOOTING

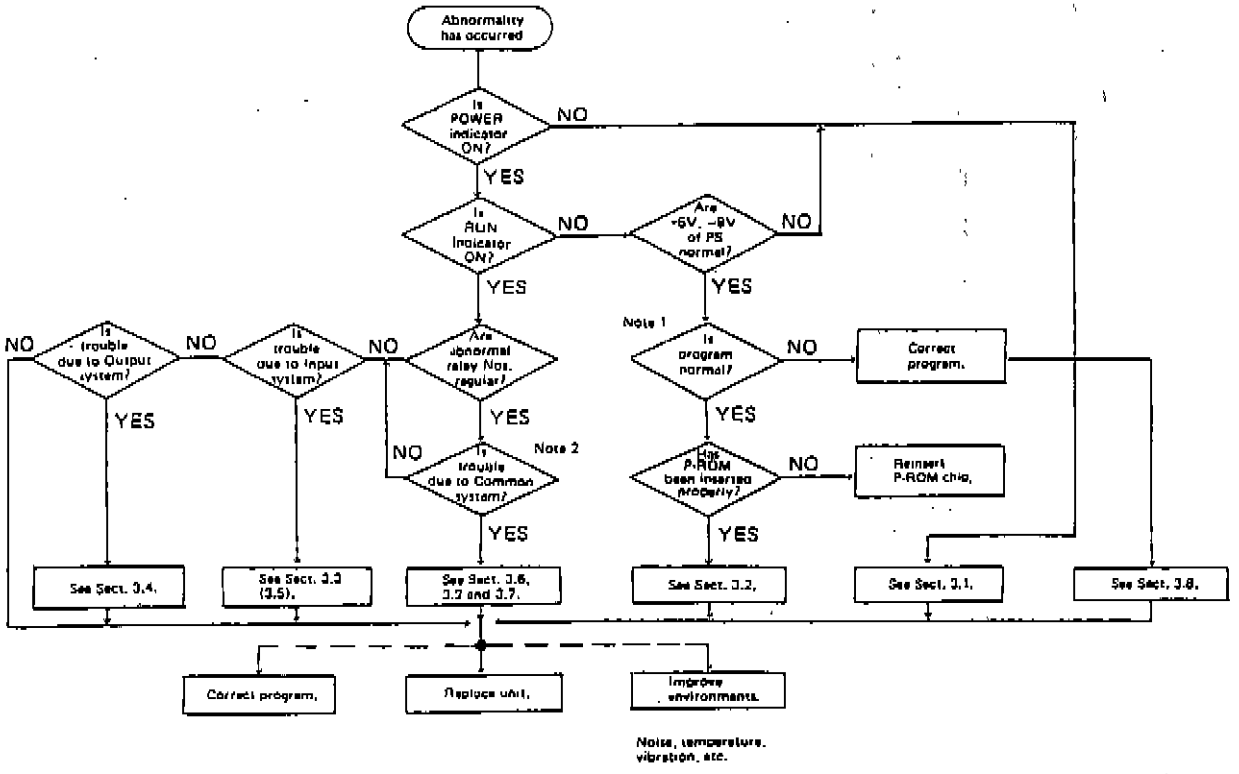
Abnormalities occurring in the sequence controller can normally be detected during the system debugging or while the sequence controller is in operation. This chapter describes the trouble-shooting procedure for each nature of trouble (abnormal phenomenon) when the sequence controller fails to operate properly (by giving an example of the case where trouble occurs in part of the user program).

Referring to the following flowchart and examples shown therein, dig into the abnormal phenomenon for detailed analysis and troubleshooting.

The troubleshooting procedure is divided into the following six sections.

(1) Abnormalities of the electrical system
(2) Abnormalities of the logic system
(3) Abnormalities of the input system
(4) Abnormalities of the output system
(5) Abnormalities of the common (bus line) system
(6) Abnormalities of the user programs

In each of these sections, a troubleshooting chart is provided with probable cause(s) of trouble and remedies for trouble.




NOTES: 1. Check the following points:
(a) Has the End instruction been written at the end of the program?
(b) Has the [IL] instruction been written after the [IL] instruction?
2. Check the following points:
(a) Do abnormal relay numbers occur every 8 bits?
(b) Does an abnormality occur in relay numbers after a specific relay channel?

To avoid duplication with the specification manual, operating instruction manual, etc., the matters described elsewhere have been omitted intentionally from this section. Therefore, please refer to other manuals also for the maintenance of the sequence controller.

## 3.1 Abnormalities Related to Power Supply Unit

**Table 2 Troubleshooting Chart of Power Supply Unit**

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 1 | POWER indicator does not light. | (1) AC power input is not supplied.<br>(2) Voltage selector terminal is not connected.<br>(3) Terminal block connector is not completely inserted or terminal block screws are loose.<br>(4) The fuse has blown out.<br>(5) Damaged or broken pattern. | (1) Supply the AC power.<br>(2) Connect COM to 110/120/220/240V.<br>(3) Reinsert the connector or retighten the loose screw.<br>(4) Replace the fuse with new one.<br>(5) Replace the defective PS unit with new one. | 250V 1A |
| 2 | Fuse blows out over and over again. | (1) Voltage selector terminal is connected erroneously.<br>(2) Pattern is short-circuited or damaged by burning. | (1) Check the wiring and correct it.<br>(2) Replace the defective PS unit. | |
| 3 | DC voltage output (+5V or −9V) is abnormal. | (1) Same as CAUSE 2 (1) above.<br>(2) Constant-voltage circuit is defective. | (1) Check the wiring and correct it.<br>(2) Replace the defective PS unit. | See Note 1.<br>5V ±5%<br>−9V ±5% |
| 4 | RUN contact does not close (but the RUN indicator of CPU is ON). | (1) Jack section (T.RES) is in poor contact.<br>(2) Relay or power circuit is defective. | (1) Wipe dust off the jack section.<br>(2) Replace the defective PS unit. | Waste moistened in industrial alcohol. |
| 5 | Timer does not operate. | (1) Jack section (CLOCK) is in poor contact.<br>(2) Oscillator circuit is defective. | Replace the defective PS unit. | See Note 2.<br>Applicable to CPU-01, -02 only. |
| 6 | Abnormal high temperature (radiation fins are too hot to touch). | (1) Operating temperature is outside the prescribed range (exceeds 50°C).<br>(2) DC power source is overloaded.<br>(3) Constant-voltage circuit is defective. | (1) Install a fan for forced cooling.<br>(2) Refer to Note 1, Table 3.<br>(3) Replace the defective PS unit. | 5V 1.5A max.<br>−9V 0.6A |

NOTES: 1. Current consumption (at 5V) per unit ±10%

**Table 3 Current Consumption of Each Unit**

| Unit Name | Current consumption | Unit Name | Current consumption | Unit Name | Current consumption |
|---|---|---|---|---|---|
| CPU 01 | 840mA | OA201 (202) | 12mA | DI001 | *175mA |
| CPU 03 | 1100mA | OD041 (041) | 24mA | DO001 | 25mA |
| | | OC201 (202) | 3mA | DI003 | 8mA |
| IA101 | 2mA | OC203 (204) | 18mA | DO003 | 70mA |
| ID021 | 25mA | | | | |
| ID022 | 2mA | IT021 (022) | 16mA | | |
| ID011 | 20mA | | | | |

* Value includes external input current.

Current consumption = CPU + (Current consumption of each unit x Number of units used + . . . . . )

2. Terminal arrangement

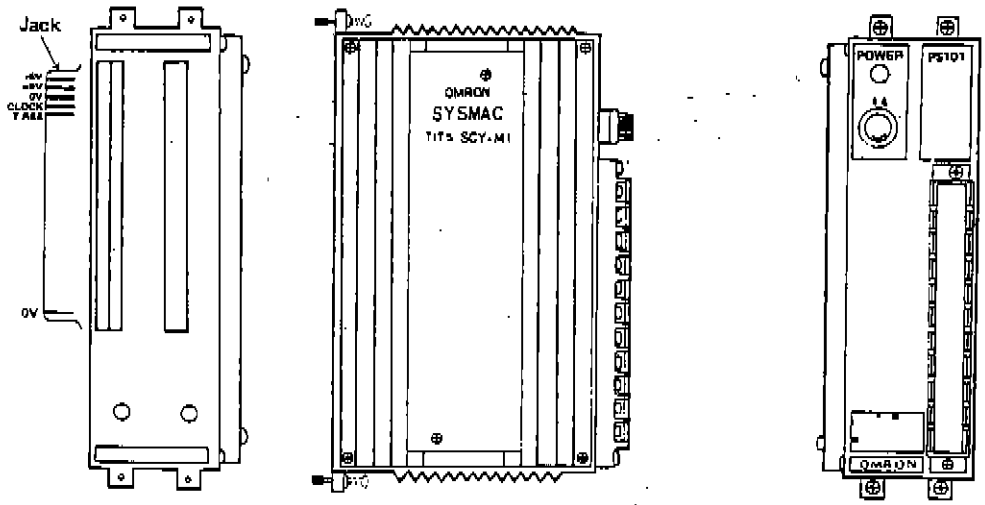



Fig. 1 External View of Power Supply Unit

## 3.2 Abnormalities Related to CPU

**Table 4 Troubleshooting Chart of CPU**

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 1 | RUN indicator does not light. | (1) DC power (+5, −9V) is not supplied.<br>(2) The flat cable between CPU card and P-ROM card is not inserted correctly.<br>(3) The inserting direction of a P-ROM chip (M58563S) is opposite.<br>(4) Programming error<br>(a) END instruction is not entered.<br>(b) IL instruction is not entered, following IL instruction.<br>(5) W.D.T circuit is defective.<br>(6) CPU malfunctions due to noise. | (1) Check the power supply unit.<br>(2) Reinsert the flat cable.<br>(3) Reinsert the P-ROM chip.<br>(4) Correct the program.<br>(5) Replace the defective CPU.<br>(6) Countermeasures against noise<br>(a) Install a surge suppressor.<br>(b) Install an insulating transformer, or<br>(c) Use shielded cables for wiring. | See Sect. 3.1.<br>See Fig. 2.<br>Refer to the Installation & Wiring instructions in the Specification Manual. |
| 2 | All output units of C I/O or D I/O do not operate. | (1) Jack section or connector cable (RES) is not in proper contact.<br>(2) RES signal, WRITE signal, or ENABLE signal is at an incorrect level. | (1) Wipe dust off the jack section with waste moistened in alcohol, or reinsert the connector.<br>(2) Replace the defective CPU. | |
| 3 | Specific bit inputs or outputs of C I/O or D I/O remain in the ON state.<br>(e.g., I/O failure occurring every 8 bits or 4 bits<br>00, 08, 10 . . . . .<br>C0, C1, C2 . . . . . ) | (1) Jack section or cable connector is not in proper contact. (Check each bus line.)<br>(2) I/O interface circuit is defective.<br>(3) IC RAM is defective. | (1) Wipe dust off the jack section with waste moistened in alcohol, or reinsert the connector.<br>(2) Replace the defective CPU.<br>(3) Replace the defective CPU. | |
| 4 | When a specific unit of C I/O or D I/O operates, another unit operates at the same time. | (1) Same as CAUSE 3 (1) above. (Address line)<br>(2) I/O channel designation circuit is defective. | (1) Same as REMEDY, 3 (1) above.<br>(2) Replace the defective CPU. | |
| 5 | All input units of C I/O or D I/O do not operate.<br>(but LEDs on the I/O display remain illuminating). | (1) READ signal is at an incorrect level.<br>(2) DIN signal is faulty. | (1) Replace the defective CPU.<br>(2) Replace the defective CPU. | |

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 6 | Program steps at specific addresses are not executed. (e.g., 80 ~ FF) | (1) P-ROM chip is not completely inserted or incorrectly inserted.<br>(2) Chip select circuit is defective. | (1) Reinsert the P-ROM chip.<br>(2) Replace the defective CPU. | |
| 7 | Specific relay numbers are not executed. (e.g., 40 ~ 4F<br>C0 ~ FF) | (1) P-ROM data circuit is defective. | (1) Replace the defective CPU. | |

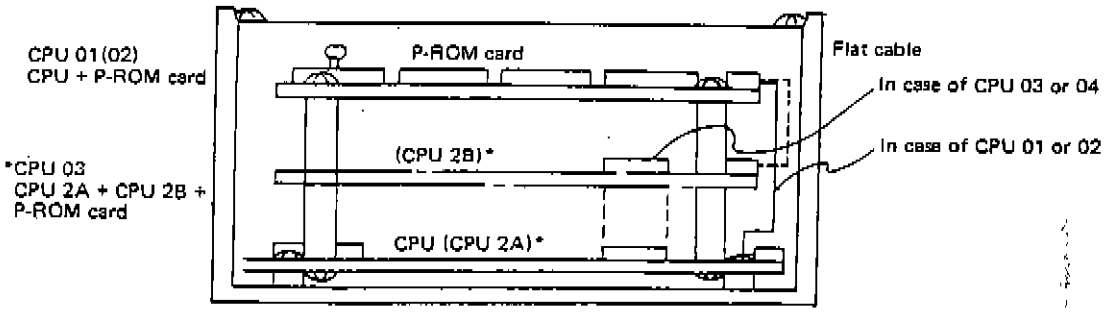



**Fig. 2 Internal Layout Drawing of CPU**

## 3.3 Abnormalities Related to C I/O and D I/O Input Units

**Table 5 Troubleshooting Chart of Input Units**

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 1 | All input units of C I/O or D I/O do not operate.<br>(1) LED operation indicators do not light.<br>(2) LED operation indicators remain illuminating. | (1)<br>(a) External input power is not supplied (or low voltage is supplied).<br>(b) External input power source is incorrectly connected with respect to polarity.<br>(2) READ signal or ENABLE signal is at an incorrect level. | (1)<br>(a) Supply the required power or increase the voltage.<br>(b) Check the wiring for proper polarity and correct the wiring.<br>(2) Remove all I/O units in use and reinsert each unit (one at a time) to detect a defective unit. | Applicable to all types except IA101. |
| 2 | Specific input units of C I/O or D I/O do not operate.<br>(e.g., 08 ~ 0F<br>C0 ~ C8) | (1) Same as CAUSE 1 (1) above.<br>(2) Terminal block screws are loose. | (1) Same as REMEDY, 1 (1) and (2) above. Replace the defective I/O unit.<br>(2) Retighten the loose screws. | |
| 3 | Specific input units of C I/O or D I/O do not turn off.<br>(e.g., 08 ~ 0F → ON) | (1) Gate circuit is defective.<br>(2) External power is not supplied. | (1) Replace the defective I/O unit.<br>(2) Supply the external power (+5V). | Applicable to Types DI001, DI002 and DM001 only. |
| 4 | The input of a specific relay No. in C I/O or D I/O does not turn on.<br>(e.g., 08 C0—1) | (1) Same as CAUSE 1 above. (Address line)<br>(2) Terminal block screws are loose.<br>(3) ON time of external input is short.<br>(4) Input circuit (photocoupler, etc.) is defective.<br>(5) Input relay No. is designated in the (R) (output) instruction of the program. | (1) Same as REMEDY 1 above.<br>(2) Retighten the loose screws.<br>(3) Adjust the external device.<br>(4) Replace the defective I/O unit.<br>(5) Correct the program. | |
| 5 | The input of a specific relay No. in C I/O or D I/O does not turn off. | (1) Input voltage is not reduced below dropout voltage due to leakage current.<br>(2) Jack section is in poor contact.<br>(3) Input circuit is defective.<br>(4) Input relay No. is designated in the (R) (output) instruction of the program. | (1) Replace the external device or add a dummy resistor.<br>(2) Wipe dust off the jack section with waste moistened in alcohol.<br>(3) Replace the defective I/O unit.<br>(4) Correct the program. | |
| 6 | Abnormal relay operation occurs every 8 bits.<br>(e.g.,<br>00, 08, 10 . . . . .<br>C0, C8, D0 . . . . .) | (1) Data bus signal is faulty.<br>(2) The IC RAM of CPU is defective. | (1) Remove all I/O units in use and reinsert each unit (one at a time) to detect a defective unit.<br>(2) Replace the defective CPU. | |

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 7 | Input turns on or off irregularly. | (1) External input voltage is low.<br>(2) External input voltage is not stabilized (ripple is excessively large).<br>(3) Input relay No. is designated in the Ⓡ (output) instruction of the program.<br>(4) I/O unit and channel No. are duplicate. (e.g., OCH is assigned to two different units.)<br>(5) Input malfunctions due to noise. | (1) Increase the external input voltage.<br>(2) Stabilize the external input voltage.<br>(3) Correct the program.<br>(4) Check each unit for proper channel assignment and correct accordingly.<br>(5) Countermeausres against noise<br>(a) Install a surge suppressor.<br>(b) Install an insulating transformer.<br>(c) Use shielded cables for wiring. | See Section 3.8. |
| 8 | Input operation display does not light (but input operation is normal). | (1) LED is defective. | (1) Correct the defective LED at the next periodic inspection or when there is time to spare, since this trouble has no serious effect on the input operation. | |

**Table 6 Electrical Characteristics of Input Units**

| Unit Name | IA101 | ID022 | ID021 | ID011 | DI001 | DI003 |
|---|---|---|---|---|---|---|
| Rated voltage | AC 100V $^{+10\%}_{-15\%}$ | DC 24V $^{+10\%}_{-15\%}$ | DC 24V $^{+10\%}_{-5\%}$ | (DC 12V) | DC 5V ±5% | DC 24V $^{+10\%}_{-10\%}$ |
| Input current | 15mA (50Hz)<br>18mA (60Hz) | 12mA | 16mA | 2 ~ 12mA | 5mA | 5mA |

NOTE: Depending on the program, the input power for the I/O unit must be supplied before supplying power to SYSMAC-M1, or output may be produced erroneously.

## 3.4 Abnormalities Related to C I/O and D I/O Output Units

**Table 7 Troubleshooting Chart of Output Units**

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 1 | All output units of C I/O or D I/O do not operate. | (1) External relay power source or load power source is not supplied.<br>(2) External relay power source or load power source is incorrectly connected with respect to polarity.<br>(3) ENABLE signal, WRITE signal, DIN signal, or RES signal is at an incorrect level. | (1) Supply the required power (or increase the voltage).<br>(2) Check the wiring for correct polarity and correct the wiring.<br>(3) Remove all I/O units in use, and reinsert each unit (one at a time) to detect a defective unit. | |
| 2 | Specific output units of C I/O or D I/O do not operate.<br>(e.g., 00 ~ 07<br>C0 ~ 07) | (1) Same as CAUSE 1 above.<br>(2) Terminal block screws are loose.<br>(3) Jack section (RES) is not in proper contact.<br>(4) The 10A fuse has blown out.<br>(5) The output unit channel No. is in duplication with that of input unit.<br>(6) F.F (flip-flop) circuit is defective. | (1) Same as REMEDY 1 above.<br>(2) Retighten the loose screws.<br>(3) Wipe dust off the jack section with waste moistened in alcohol.<br>(4) Replace the defective fuse.<br>(5) Check each unit for proper channel assignment and correct accordingly.<br>(6) Replace the defective I/O unit. | Applicable to Types OA202 and OD042 only. See Table 11 in Section 3.7. |
| 3 | Specific output units of C I/O or D I/O do not turn off. | (1) Jack section or connector is not in proper contact.<br>(2) Gate circuit is defective. | (1) Wipe dust off the jack section with waste moistened in alcohol, or reinsert the connector.<br>(2) Replace the defective I/O unit. | |
| 4 | The output of a specific relay No. in C I/O or D I/O does not turn on.<br>(1) LED operation indicator does not light.<br>(2) LED operation indicator lights. | (1)<br>(a) Output ON time is short.<br>(b) Relay No. in the Ⓡ (output) instruction of the program is in duplication with other relay.<br>(c) Power circuit is defective.<br>(2)<br>(a) External load wiring is disconnected.<br>(b) Service life of relay has expired.<br>(c) Terminal block screws are loose.<br>(d) Broken pattern. | (1)<br>(a) Correct the program.<br>(b) Correct the program.<br>(c) Replace the defective I/O unit.<br>(2)<br>(a) Replace the defective external load.<br>(b) Replace the defective I/O unit or relay.<br>(c) Retighten the loose screws.<br>(d) Replace the defective I/O unit. | |

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 5 | The output of a specific relay No. in C I/O or D I/O does not turn off.<br>(1) LED operation indicator does not go off.<br>(2) LED operation indicator goes off. | (1) Faulty reset due to leakage current or saturation voltage.<br>(2)<br>(a) Jack section is in poor contact.<br>(b) Relay No. in the Ⓡ (output) instruction of the program is in duplication with other relay.<br>(c) Power circuit is defective. | (1) Replace the external load or add a dummy resistor.<br>(2)<br>(a) Wipe dust off the jack section with waste moistened in alcohol.<br>(b) Correct the program.<br>(c) Replace the defective I/O unit. | |
| 6 | Abnormal relay operation occurs every 8 bits. (e.g., 00, 08 . . . . . C0, C8 . . . . . ) | (1) Data bus signal is faulty.<br>(2) The IC RAM of CPU is defective. | (1) Remove all I/O units and reinsert each unit (one at a time) to detect a defective unit.<br>(2) Replace the defective CPU. | |
| 7 | Output turns on or off irregularly. | (1) External load voltage is low.<br>(2) External load voltage is not stabilized.<br>(3) Relay No. in the Ⓡ (output) instruction of the program is in duplication with other relay.<br>(4) Output malfunctions due to noise. | (1) Increase the external load voltage.<br>(2) Stabilize the external load voltage.<br>(3) Correct the program.<br>(4) Countermeasures against noise<br>(a) Install a surge suppressor.<br>(b) Install an insulating transformer.<br>(c) Use shielded cables for wiring. | |
| 8 | Output operation display does not light (but output operation is normal). | (1) LED is defective. | (1) Correct the defective LED at the next periodic inspection or when there is time to spare, since this trouble has no serious effect on the output operation. | |

**Table 8 Electrical Characteristics of Output Units**

| Unit Name | Load Voltage | Load Switching Capacity | Leakage Current | Saturation Voltage |
|---|---|---|---|---|
| OC201 | AC 200V, DC 24V | 2A max. | | |
| CO202 | AC 200V, DC 24V | 2A max. | | |
| OC203 | AC 200V, DC 24V | 2A max. | | |
| OC204 | AC 200V, DC 24V | 2A max. | | |
| OA201 | AC 100/220V | 1A | (AC 100V 3mA max.,<br>AC 200V 6mA max.) | 1.5V |
| OA202 | AC 100/200V | 2A | | 1.5V |
| OD041 | DC 48V | 0.3A | 100μA | 1.5V |
| OD042 | DC 48V | 2A | 100μA | 1.5V |
| DO001 | DC 24V | 100mA | 1μA max. | 1.2V |
| DO003 | DC 24V | 100mA | 1μA max. | 1.2V |

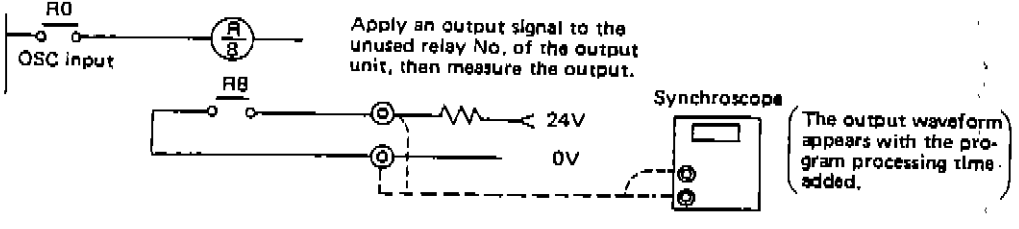
NOTE: Supply the power for loads and relays after the application of the AC input voltage to SYSMAC-M1 (i.e., after the closing of the RUN contact). Avoid turning on or off the load or relay power source prior to the application of the AC input voltage to SYSMAC-M1.

## 3.5 Abnormalities Related to Mixed Units (Input and Timer)

**Table 9 Troubleshooting Chart of Mixed Units**

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 1 | Oscillating time does not change after turning the internal variable resistor. | (1) The external device is short-circuited or the variable resistor is disconnected. | (1) Connect the variable resistor between the specified terminals. | Applicable to ITO021 only. |
| 2 | Oscillator does not generate pulses. | (1) Input relay No. is designated in the Ⓡ (output) instruction of the program.<br>(2) Oscillator circuit is defective. | (1) Correct the program.<br>(2) Replace the defective unit. | |

NOTES: 1. Refer to Section 3.3 for the abnormalities of the input section.
2. When the oscillating time is to be measured, observe the following procedure.




3. The input section becomes the high-order 4 bits (0 ~ 3 or 8 ~ B), whereas the oscillator section becomes the low-order 4 bits (4 ~ 7 or C ~ F).

## 3.6 Abnormalities Related to Base Unit and Connector Unit

**Table 10 Troubleshooting Chart of Base Unit and Connector Unit**

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 1 | Relays after a specific relay No. do not operate. | (1) Broken pattern.<br>(2) Improper soldering. | Check each bus line by buzzer and correct as required. | |
| 2 | Abnormal relay numbers occur in the extension base unit every 8 bits. | (1) Broken wiring.<br>(2) Improper soldering. | Check each bus line by buzzer and correct as required. | |
| 3 | Output (or input) of a specific relay No. is generated. | (1) Improperly soldered connector. | Check each bus line by buzzer and correct as required. | |
| 4 | All the relays of a specific unit do not operate. | (1) Same as above. | Check each bus line by buzzer and correct as required. | |
| 5 | Abnormalities due to faulty contact described in Sections 3.1 thru 3.5. | (1) Improper soldering.<br>(2) Faulty contact. | (1) Check each bus line by buzzer and correct as required.<br>(2) Wipe dust off the jack section with waste moistened in alcohol. | |

This portion of ME121 and MC121 is the same as MB121 with the exception of channel number designation.

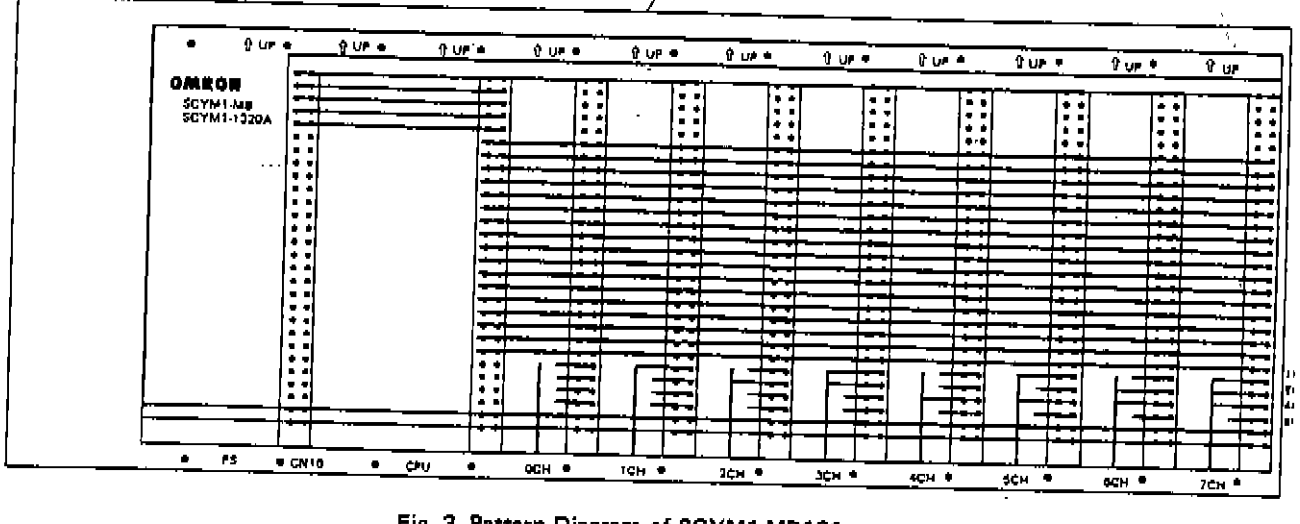
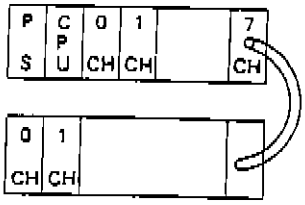
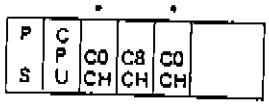
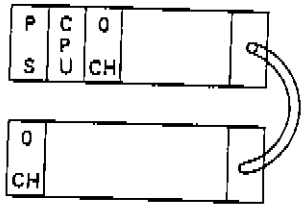



Fig. 3 Pattern Diagram of SCYM1-MB121

## 3.7 Abnormalities due to Base Unit and D I/O Channel Designations

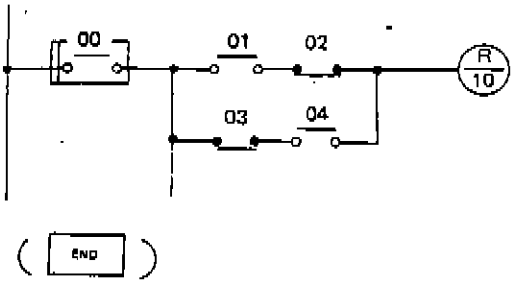
**Table 11 Troubleshooting Chart of Base Unit and D I/O Channel Designation**

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| 1 | A specific output unit of C I/O or D I/O does not generate output signals at all.<br>08 ~ 0F<br>C0 ~ C7 | (1) An input unit is inserted into the same channel position for an output unit. (Example)<br>  <br><br>Standard base unit (BB121): 0CH output unit<br>Extension base unit (BE121): 0CH input unit | Change the channel designation or change the unit location. | |
| 2 | A specific output unit of C I/O or D I/O generates output signals simultaneously with other output unit. | (1) Two output units designated to the same channel No. are inserted into different channel No. positions.<br>  <br><br>* Duplicate channel number | Same as above. | |
| 3 | A specific input unit of C I/O or D I/O does not operate. | (1) Two input units are inserted into the same channel No. positions. (Example)<br>  <br><br>When an input unit is inserted into the 0CH of the standard and extension base units, respectively, priority is given to the input in the OFF state.<br>Standard base unit:<br>0CH 1 bit ON<br>Extension base unit:<br>0CH 1 bit OFF<br>In the above case, 0CH 1 bit is regarded as OFF. | Same as above. | |

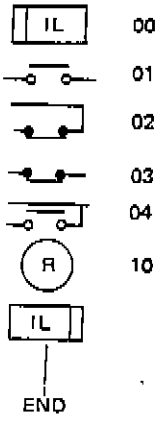
## 3.8 Abnormalities Related to Programs

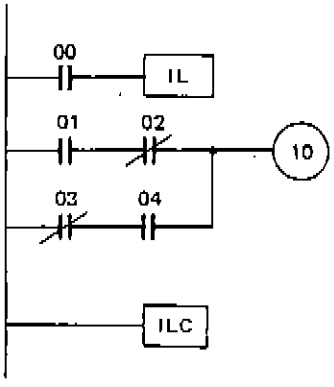
### (1) Abnormalities related to user program

[Example 1] The RUN indicator of the CPU goes off and all the program is reset.



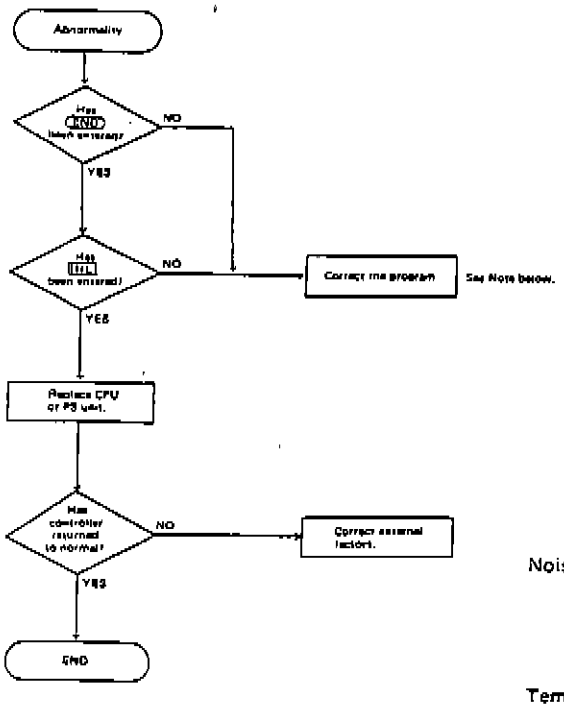

Example of program (Relay Symbolic Type)




Example of program (Logic Symbolic Type)

```
LD    00
IL
LD    01
ANN   02
LD    03
AND   04
LOR
OUT   10
ILC
 .
 .
 .
END
```

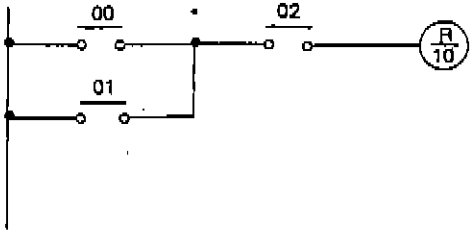


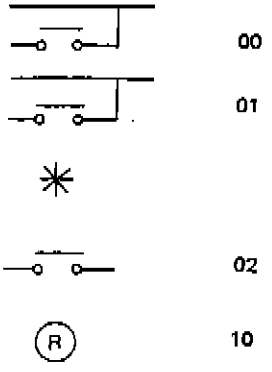

Noise:
- Install a surge suppressor.
- Install an insulating transformer.
- External wiring — Check the wiring route. / Use shielded cables.
- Grounding

Temperature: Install a fan for forced cooling, etc.

NOTE: In the above case, set the mode selector of the program console to the CHECK mode and depress the GO key and confirm that the ERROR indicator does not light.

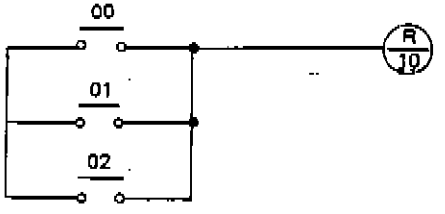
[Example 2] Output relay R10 operate when any of 00, 01 and 02 is ON or when all of 00, 01 and 02 are ON. (This example applied to the Relay Symbolic Type only.)



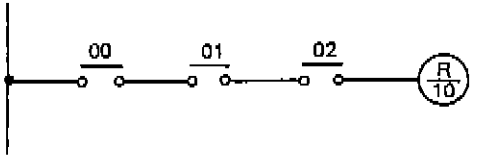




Normal program

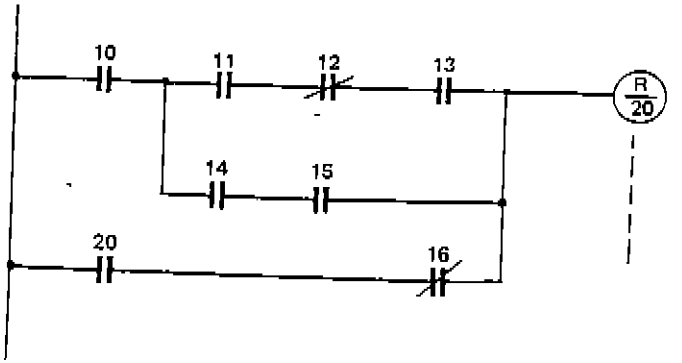
(a) In the absence of the ✳ instruction in the normal program, the relay operation will be as shown below.

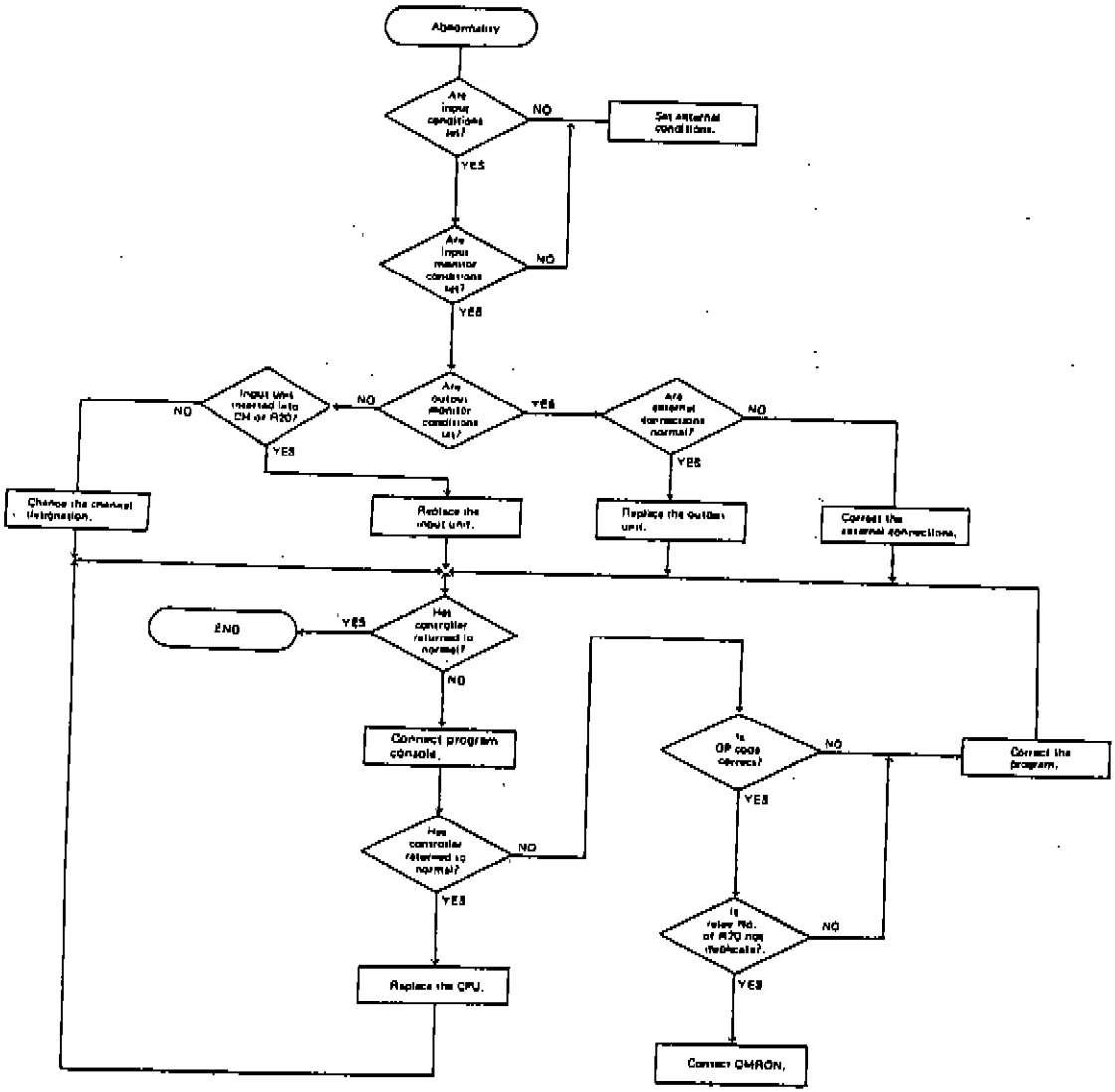



(b) If the 00 instruction is used in lieu of the 00 instruction in the normal program, the relay operation will be as shown below.

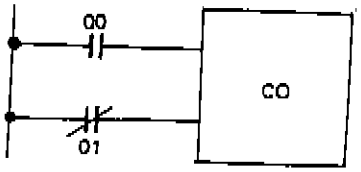


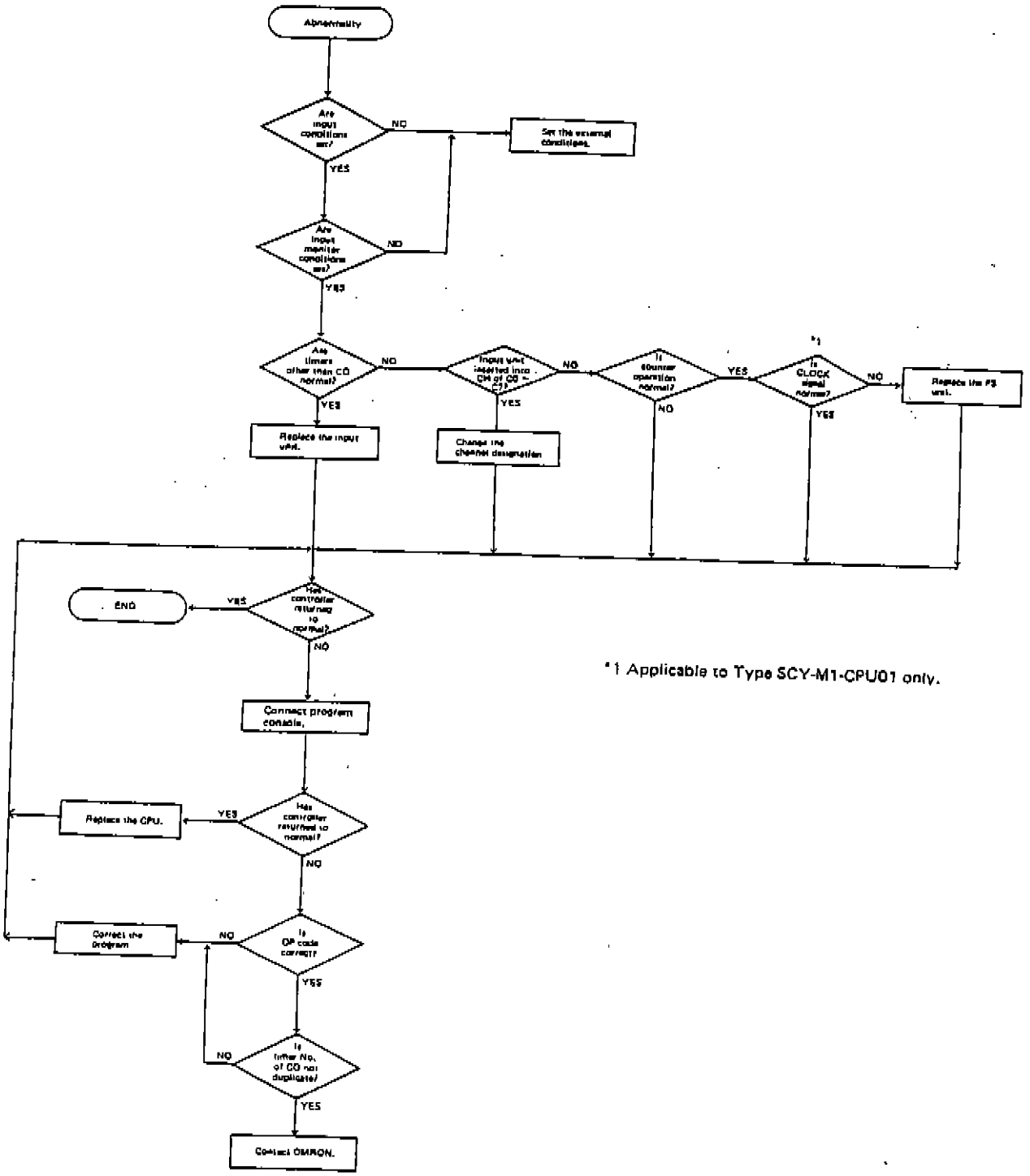
[Example 3] Output relay R20 does not operate.



[Example 4] Timer CO does not operate.




*1 Applicable to Type SCY-M1-CPU01 only.

(2) Abnormalities related to P-ROM

**Table 12 Troubleshooting Chart of P-ROM**

| No. | TROUBLE | PROBABLE CAUSE | REMEDY | REMARKS |
|---|---|---|---|---|
| | CPU stops running. Sepcific I/O operation is faulty. | (1) The erase time of P-ROM is inappropriate. | (1) Erase time: 18 ~ 20 minutes. Clean dirt off the element. | (1) Rewrite data after complete erasure. |
| | | (2) The P-ROM is used too frequently to erase and write. | (2) Try not to use more than 10 times. | (2) Replace the element with new one. |
| | | (3) Static electricity is applied to P-ROM. | (3) Do not touch the leg of the element by hand. Take antistatic measures. | (3) Replace the element with new one. |
| | | (4) The WRITE level of P-ROM is inappropriate. | (4) Write data at the level 2 of P-ROM writer (3Y33S-H92). | (4) Rewrite data after complete erasure. |
| | | (5) The P-ROM is not inserted completely or inserted incorrectly with respect to direction. (Note that improper contact will also result in CPU failure to run.) | (5) Reinsert the P-ROM correctly and securely. | |

## 4. HINTS ON CORRECT HANDLING

(1) Be sure to turn off the power switch prior to the replacement of any unit or the removal or attachment of any terminal block connector.

(2) If a unit is found to be defective and is consequently replaced with a new one, confirm again that the replaced unit is abnormal.

(3) When requesting the repair of a defective unit, return the defective unit with a tag describing abnormal phenomenon (nature of trouble) in detail, attached to the unit.

(4) In the event of improper jack or connector contact, wipe dust off the jack section or connector with pure cotton waste moistened in industrial alcohol. Reinsert the jack or connector after removing waste threads.

## 5. TOOLS, PARTS AND TESTING INSTRUMENTS

The following tools, parts and testing instruments are recommended for the maintenance of the SYSMAC-M1 sequence controller.

(1) Required tools and testing instruments

(a) Screwdriver for cross recessed head screw

(b) Tester or digital voltmeter

(c) Industrial alcohol

(d) Waste

(e) Soldering iron

(2) Testing instruments and parts not mandatory but recommended to facilitate maintenance

(a) Synchroscope

(b) Unit checker

(c) Spare units (for respective units)