Chapter 12. TROUBLE SHOOTING

The following explains contents, diagnosis and corrective actions for various errors that can occur during system operation

12.1 Basic Procedures of Troubleshooting

System reliability not only depends on reliable equipment but also on short down-times in the event of faults.

The short discovery and corrective action is needed for speedy operation of system.

The following shows the basic instructions for troubleshooting.

1) Visual checks

Check the following points

- Machine motion(In stop and operating status)
- Power ON or OFF
- Status of I/O devices
- Condition of wiring (I/O wires, extension and communications cables)
- Display states of various indicators(such as POWER LED, RUN LED, STOP LED and I/O LED). After checking them, connect the peripheral devices and check the operation status of the PLC and the program contents.

2) Trouble Check

Observe any change in the error conditions during the following.

- Set the mode setting switch to the STOP position, and then turn the power ON and OFF

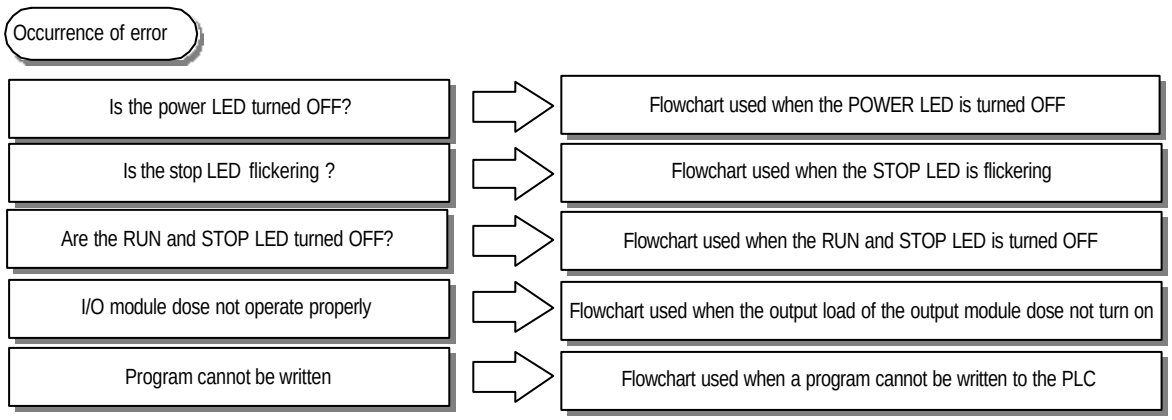
3) Narrow down the possible causes of the trouble

Deduce where the fault lies, i. e:

- Inside or outside of the PLC
- I/O module or another module
- PLC program ?

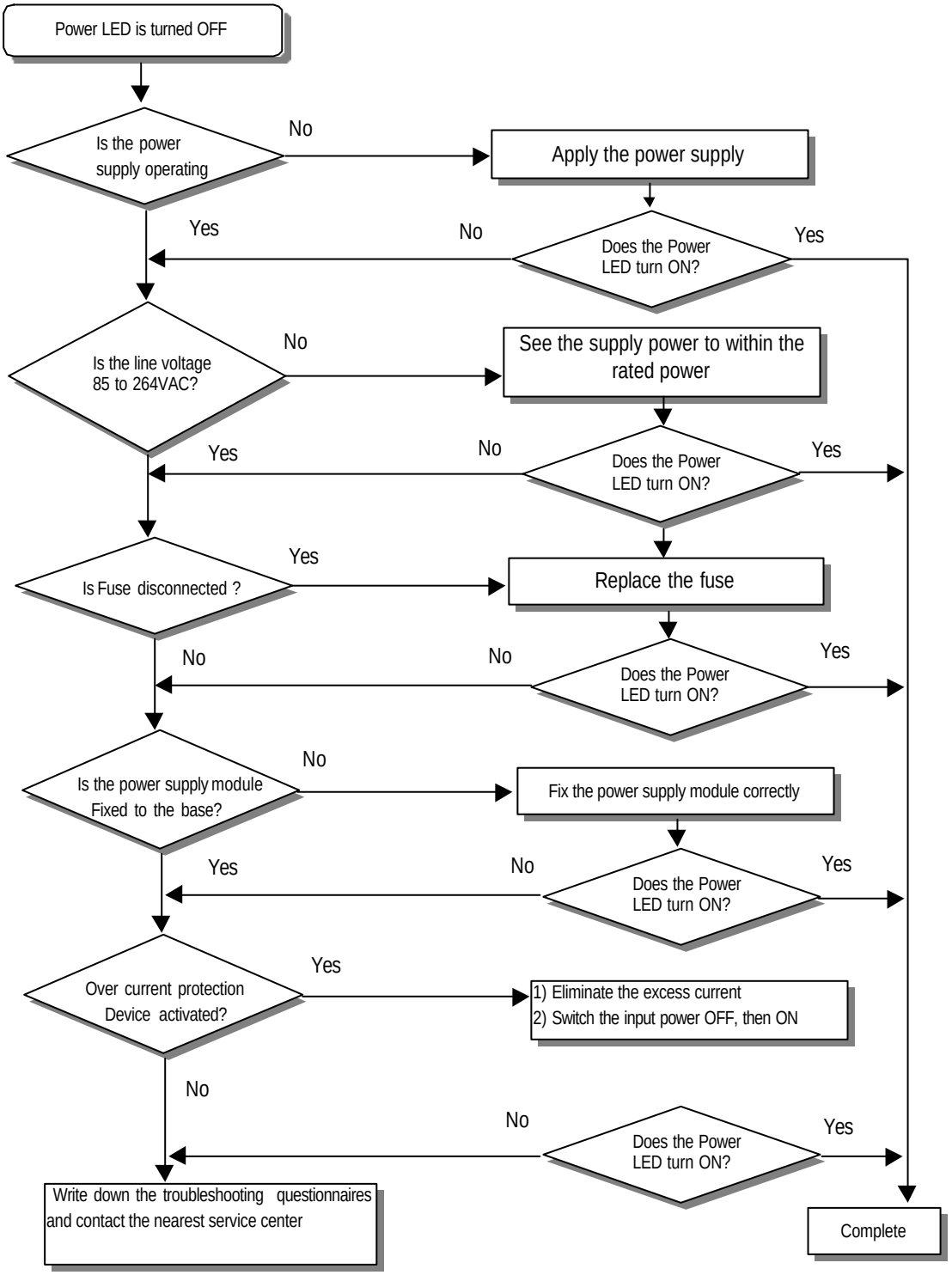
12.2 Troubleshooting

This section explains the procedure for determining the cause of troubles as well as the errors and corrective actions for the error codes.



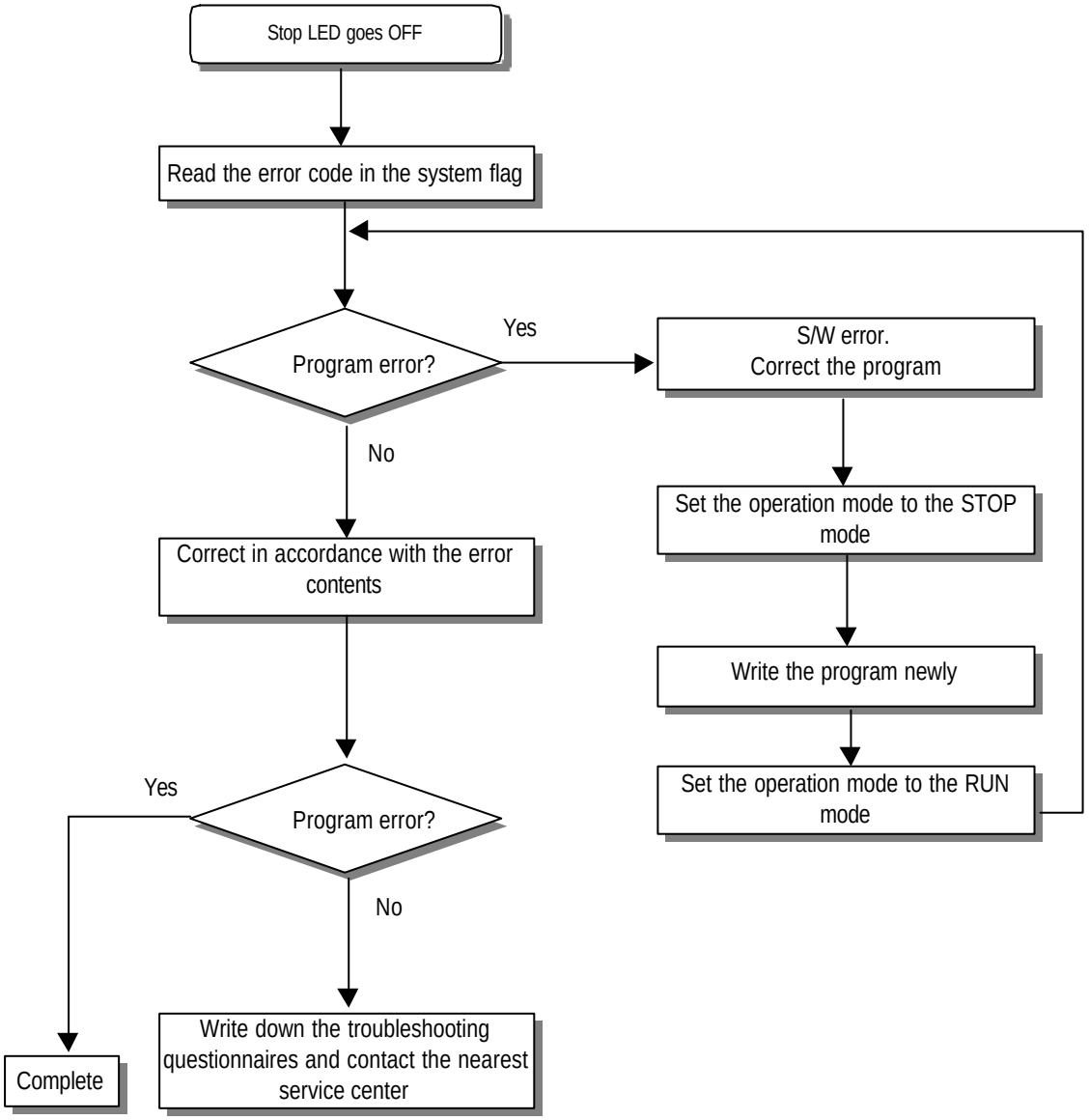
12.2.1 Troubleshooting flowchart used when the POWER LED turns OFF.

The following flowchart explains corrective action procedure used when the power is all lied or the POWER LED turns OFF during operation



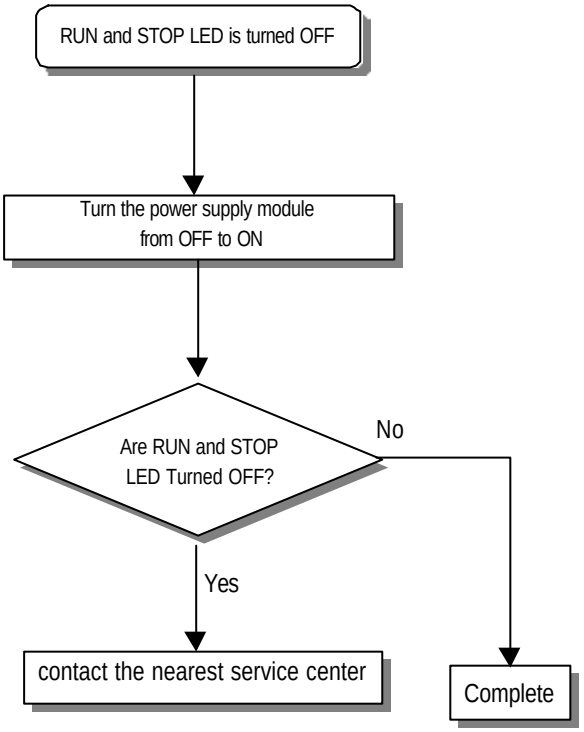
12.2.2 Troubleshooting flowchart used when the STOP LED is flickering

The following flowchart explains corrective action procedure use when the power is applied starts or the STOP LED is flickering during operation



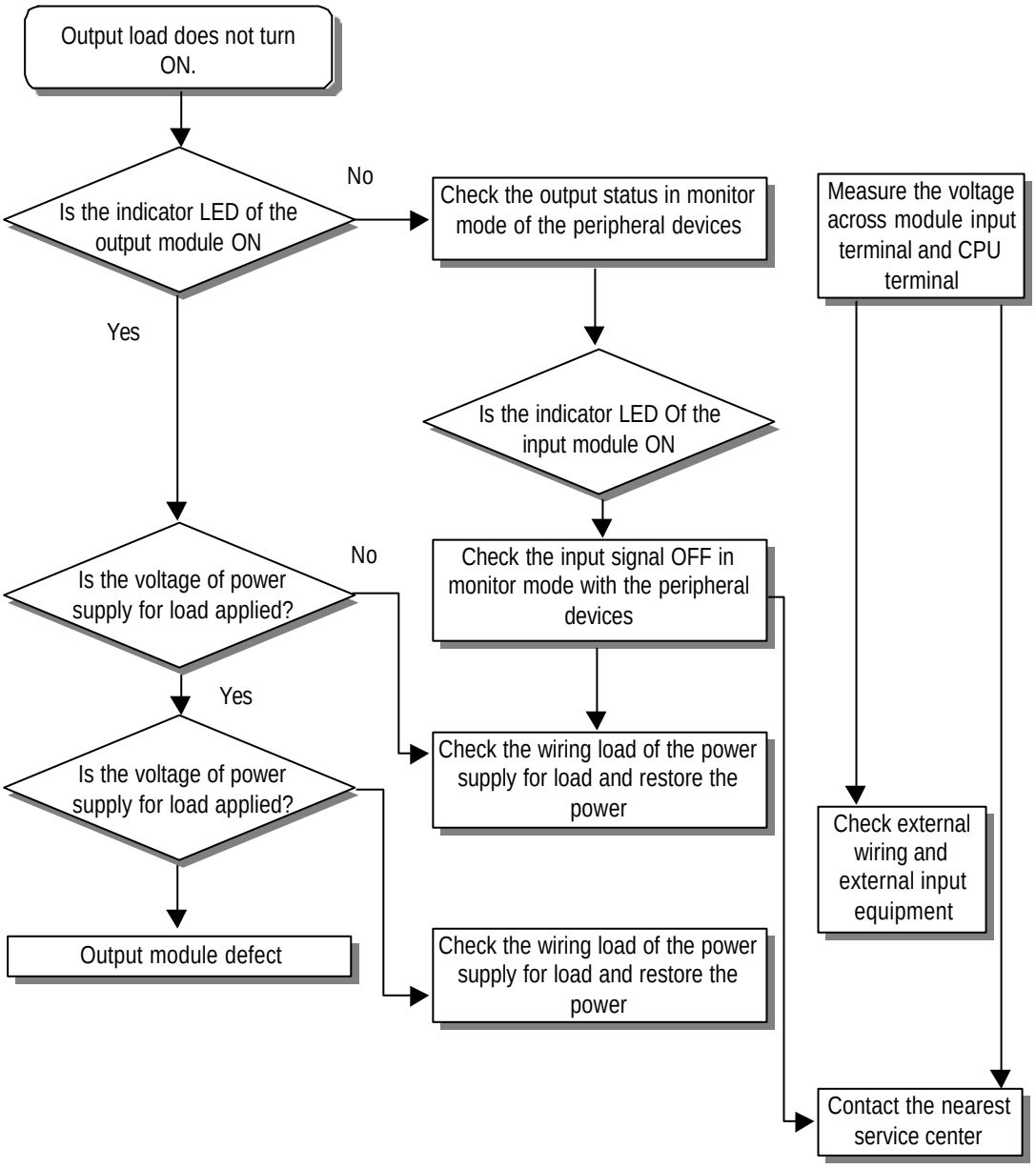
12.2.3 Troubleshooting flowchart used when the RUN and STOP LEDs turns off.

The following flowchart explains corrective action procedure use when the power is applied starts or the RUN and STOP LED is turned OFF is flickering during operation



12.2.4 Troubleshooting flowchart used when the output load of the output module does not turns on.

The following flowchart explains corrective action procedure used when the output load of the output module does not turn ON during operation

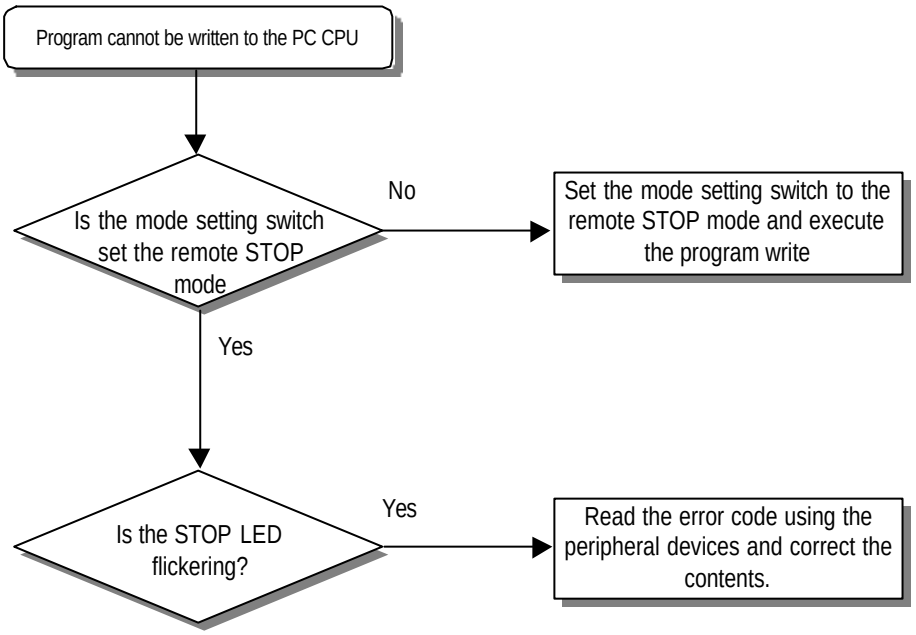


REMARK

1) If the input or load signals are not switched OFF, see Section 12.4.1

12.2.5 Troubleshooting flowchart used when a program cannot be written to the CPU module.

The following flowchart shows the corrective action procedure used when a program cannot be written to the PLC module



12.3 Troubleshooting Questionnaire

When problems have been met during operation of the GM6 series PLC, please write down this questionnaires and contact the service center via telephone or facsimile

- For errors relating to special or communications modules, use the questionnaire included in the user's Manual of the unit

1. Telephone & FAX No. Tel) _____
   FAX) _____
2. Used Equipment ( )
3. Details of used Equipment
   - CPU module : - OS version No.( ), - Serial No.( )
   - GMWIN version No. used to compile programs
4. General description of the device or system used as the control object

5. Operations used by the CPU module
   - Operation by the mode setting switch( ),
   - Operation by the GMWIN or communications. ( )
6. Is the STOP LED of the CPU module turned ON? Yes( ), No( )
7. GMWIN error message :
8. Used initialization program : initialization program( )
9. History of corrective actions for the error message in the article 7.
10. Other tried corrective actions
11. Error character sties
    - Repetitive( ) : Periodic( ), Related to a particular sequence( ), Related to environment( )
    - Sometimes( ) : General error assurance interval
12. Detailed Description of error contents :

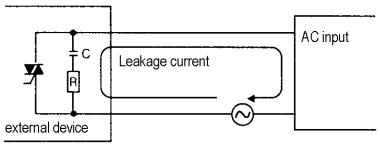
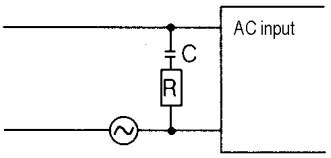
13. Configuration Diagram for the applied system :

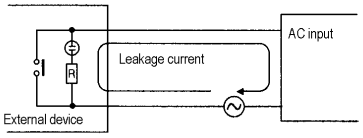
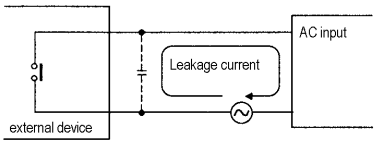
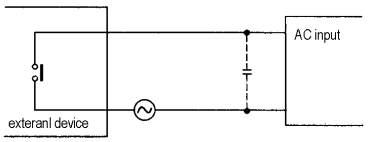
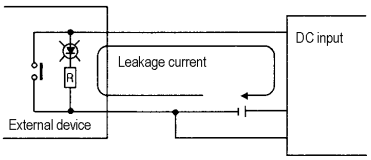
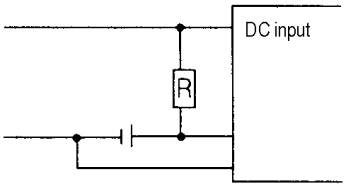
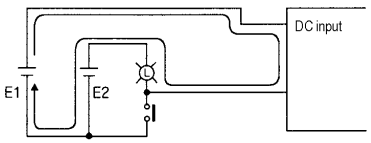
12.4 Troubleshooting Examples

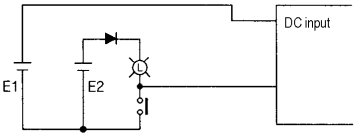
Possible troubles with various circuits and their corrective actions are explained.

12.4.1 Input circuit troubles and corrective actions

The followings describe possible troubles with input circuits, as well as corrective actions.

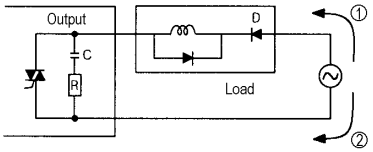
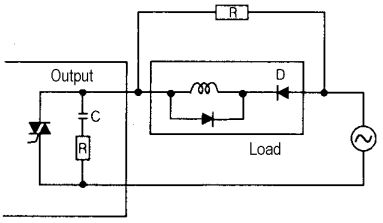
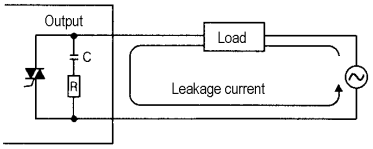
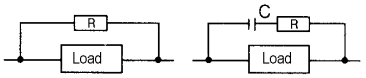
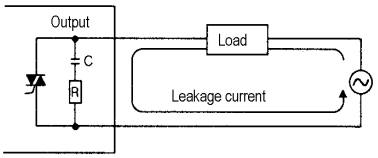
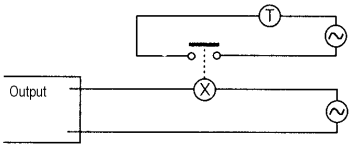
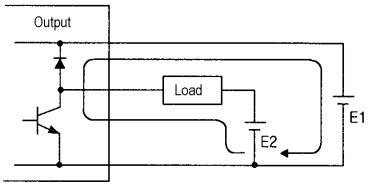
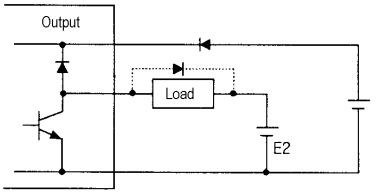
<table>
<tr><th>Condition</th><th>Cause</th><th>Corrective Action</th></tr>
<tr><td>Input signal close not turn OFF</td><td>Leakage current of external device (such as a drive by non-contact switch)
 
</td><td rowspan="2">• Connect an appropriate register and capacity which will make the voltage across the terminals of the input module lower than
 

• C and R values are determined by the leakage current value
- Reminded value C : 0.1 ~ 0.47 μF
R : 47 ~ 120Ω (1/2W)
Or make up another independent display circuit</td></tr>
<tr><td>Input signal does not turn OFF</td><td>Leakage current of external device (Drive by a limit switch with neon lamp)
 
</td></tr>
<tr><td>Input signal does not turn OFF</td><td>Leakage current due to line capacity of wiring cable
 
</td><td>• Power supply is located on the external device side as shown below
 
</td></tr>
<tr><td>Input signal does not turn OFF</td><td>Leakage current of external device (Drive by switch with LED indicator)
 
</td><td>• Connect an appropriate register which will make the voltage across input module terminal and common higher than the OFF voltage, as shown below
 
</td></tr>
<tr><td>Input signal does not turn OFF</td><td>• Sneak current due to the use of two different power supplies
 

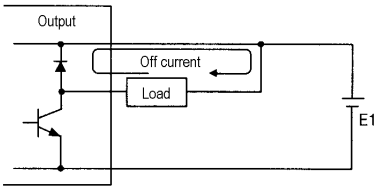
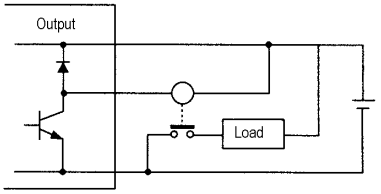
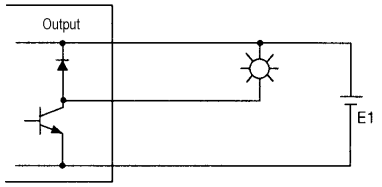
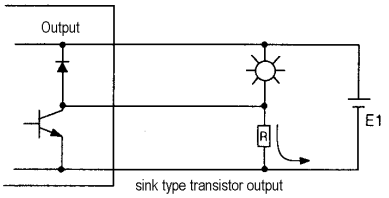
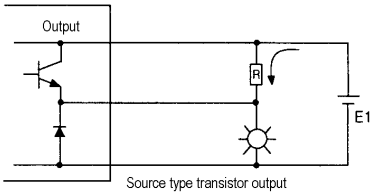
• E1 > E2, Sneaked</td><td>• Use only one power supply
• Connect a sneak current prevention diode, as shown below
 
</td></tr>
</table>

12.4.2 Output circuit troubles and corrective actions

The following desires possible troubles with output circuits, as well as corrective actions

Condition	Cause	Corrective Action
When the output is Off, excessive voltage is applied to the load	• Load is half-wave rectified inside (in some cases, it is true of a solenoid) • When the polarity of the power supply is as shown in ①, C is charged. When the polarity is as shown in②, the voltage charged in C plus the line voltage are applied across D. Max voltage is approx.  If a resistor is used in this way, it does not pose a problem to the output element. But it may make the performance of the diode(D), which is built in the load, drop to cause problems	• Connect registers of tens to hundreds kΩ across the load in parallel 
The load does not turn OFF	• Leakage current by surge absorbing circuit which is connected to output element in parallel 	• Connect C and R across the load, which are of registers of tens kΩ When the wiring distance from the output module to the load is long, there may be a leakage current due to the line capacity 
When the load is C-R type timer, time constant fluctuates	• Leakage current by surge absorbing circuit which is connected to output element in parallel 	• Drive the relay using a contact and drive the C-R type timer using the since contact • Use other timer than the C-R contact Some timers have half-ware rectified internal circuits therefore, be cautious . 
The load does not turn OFF	• Sneak current due to the use of two different power supplies  • E1 < E2 : sneak current • E1 is switched Off and E2 is switched ON : sneak current	• Use only one power supply • Connect a sneak current prevention diode(Figure below)  If the load is the relay, etc, connect a counter-electromotive voltage absorbing code as show by the dot line

Output circuit troubles and corrective actions(continued)

Condition	Cause	Corrective Action
The load off response time is long	• Over current at Off state [The large solenoid current fluidic load (L/R is large) such as is directly driven with the transistor output  • The off response time can be delayed by one or more second as some loads make the current flow across the diode at the off time of the transistor output	• Insert a small L/R magnetic contact and drive the load using the same contact 
Output transistor is destroyed	Surge current of the white lamp  A surge current of 10 times or more when turned ON.	• To suppress the surge current make the dark current of 1/3 to 1/5 rated current flow  sink type transistor output  Source type transistor output

12.5 Error code list

Error code	Cause	Corrective Action	Operation status	STOP LED Flickering cycle	Diagnosis time	Re-start mode
2	OS ROM error	Contact the service center if it reactively occurs when the power is re-applied.	Defect	0.4 sec	When power is applied	-
3	OS ROM error	"	Defect	0.4 sec	When power is applied	-
4	RTC fault	"	Defect	0.4 sec	When power is applied	-
5	Dedicated processor fault	"	Defect	0.4 sec	When power is applied	-
6	Program memory fault	"	Defect	0.4 sec	When power is applied	-
7	Data memory fault	"	Defect	0.4 sec	When power is applied	-
10	Watch dog error due to OS program congestion	RE-apply the power	Reset	0.4 sec	During run	Cold
20	Program memory backup error	Replace the battery if it has error check the program after cc-loading it, and if an error is detected replace the CPU module	STOP	0.4 sec	When power is applied	Cold
21	Memory module defect	Check and correct the memory module mounting condition Re-apply the power and if an error occurs, replace the memory module	STOP	0.4 sec	When power is applied	Cold
22	Memory module program fault	Correct the memory module program and re-operate the system	STOP	0.4 sec	Change into the RUN mode	Cold
23	An normal program	Re-load the program and start it	STOP	0.4 sec	Change into the RUN mode	Cold
30	Inconsistency between the specified modules by parameters and the loaded modules	Module type inconsistency error Refer to the flags(_IO_TYER,_IO_ DEER_N, _IO_TYER [n]) and correct the incorrective slot, and re-start the system	STOP	0.4 sec	Change into the RUN mode	Cold
31	Module dismounting or additional mounting during run	Module mounting/ dismounting error Refer to the flags(_IO_DEER,_IO_ DEER_N, *IO*_DEER [n]) and correct the in corrective slot, and re-start the system	STOP	0.4 sec	When scan completes	Cold
32	Fuse disconnection during run	Fuse disconnection error Refer to the flags(_FUSE_ER,_FUSE _ER_N, FUSE_ER[n]) and correct the in corrective slot, and re-start the system	STOP	0.4 sec	When scan completes	Cold
33	Abnormal I/D module data access during run	I/O module read/ write error Refer to the flags(IO_RWER, _IP_RWER_N, _IO_RWER [n]) and restart the system	STOP	0.4 sec	When scan completes During execution of program	cold
34	Abnormal special/ link module data access during run	Special/ link module interface error Refer to the flags(_SP_IFER,_IP_ IFER_N,_IP_IFER [n]) and restart the system	STOP	0.4 sec	When power is applied When scan completes During execution of program	cold
40	During run, Scan time over than the scan delay time specified by parameters	Check the scan delay time specified by parameters and correct the parameters or the program, and then re-start the program	STOP	0.4 sec	During execution of program	cold
41	Unreadable instructions in the user program	Re-load the program and re-start it	STOP	0.4 sec	During execution of program	cold
50	External device fatal error	Refer to the external device fatal error flags(_ANNUN_ER,_ANC_ERR[n]) and correct the fault devices and then re-start the system	STOP	0.4 sec	When scan completes	cold
60	The 'E-STOP' function has been executed	Correct the program so that the error elements that invoked the 'E_STOP' function can be eliminated in the program and re-start the system(Cold re-start)	STOP	-	During execution of program	cold
100	Communications module configuration error	If the number of computer 4communications module is included, then adjust the maximum number with in 8	STOP	0.4 sec	When power is applied	cold
101	Special/ Communications module initialization failure	Adjust the number of high speed communications modules loaded	STOP	0.4 sec	When power is applied	cold
500	Data memory backup error	If the battery has no error	RUN	-	When power is applied	cold
501	RTC data error	If the battery has no error, re-set the time using the GMWIN	RUN	2 sec	When power is applied When scan completes	-
502	Lower battery voltage	Replace the battery which the power is being applied.	RUN	4 sec	When power is applied When scan completes	-