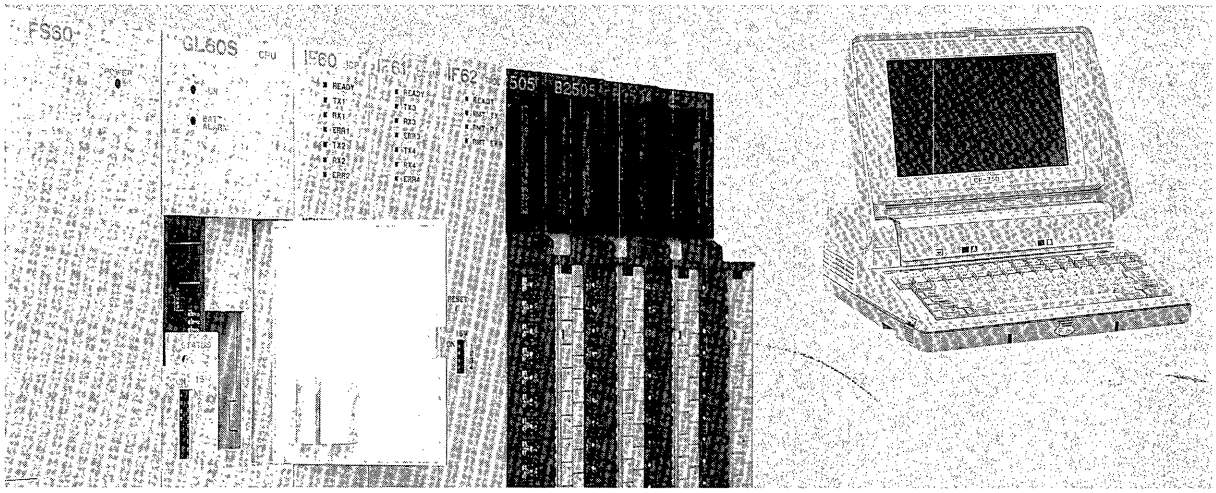
Control Pack CP-3300

SYSTEM CONTROLLER

MAINTENANCE MANUAL

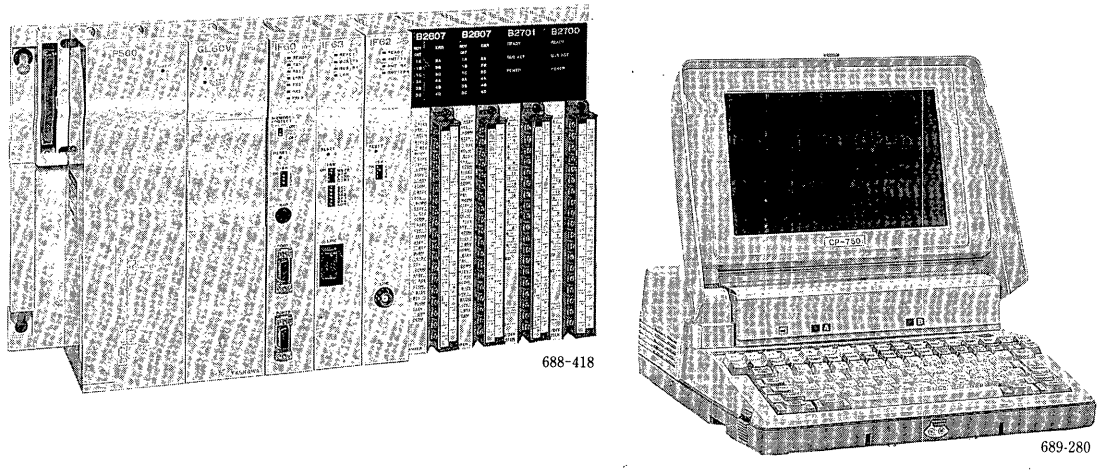


YASKAWA

This manual describes the handling and maintenance of the system controller Control Pack CP-3300 system (CP-3300).
The units and modules are subjected to stringent tests individually and also system tests in combination with peripheral equipment at the factory prior to shipment. Because the CP-3300 is a high-reliability, electronic product, maintain and inspect it as described in this manual to insure optimum operational conditions and long life. If the CP-3300 fails, contact your YASKAWA representative. Technical assistance and/or repair will be provided on a timely basis. This manual can be used to assist you in interim actions.

Documents related to the CP-3300

Name	No.
Control Pack CP-3300 (Catalog)	KAE-C873-20
Control Pack CP-3300 DESIGN HANDBOOK	SIE-C873-20.2
Control Pack CP-3300 PROGRAMMING PANEL OPERATOR'S MANUAL	SIE-C873-20.3
2000 Series I/O Modules	SIE-C815-13.3



Control Pack CP-3300

GENERAL PRECAUTIONS

ENVIRONMENTAL CONDITIONS

Item	Operation Conditions	Storage Conditions
Ambient Temperature	0 to 55°C	−20 to+85°C
Power Supply	85 to 132VAC 47.5 to 63Hz	——
Relative Humidity	30 to 95%RH non-condensing	
Environment	Free from inflammable and corrosive gases	

HANDLING PRECAUTIONS

- Do not insert or remove any module card while power ON. The component parts may be destroyed.
- Enclose spare modules, etc., in the conductive vinyl bag or wrap in aluminum foil and store in a clean place.
- Avoid contamination from foreign matter such as dust or fingerprints on the connectors of the module and mounting base in the panel.
  If foreign matter in present, clean with a cloth moistened with isopropyl alcohol.
  Don't remove the cover of unused connectors on the mounting base.

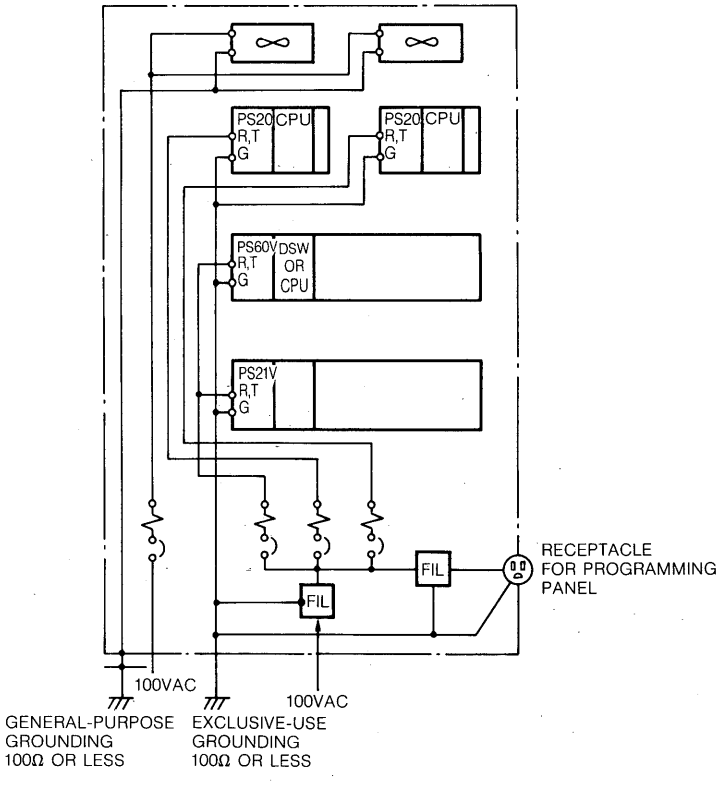
ELECTRIC PRODUCT CODE NUMBERS

Name and electric product code numbers are given to each module comprising the CP-3300. Always specify the code number and name when ordering or making inquires.

CONTENTS

1 INSTALLATION

The CP-3300 system is composed of many modules such as mounting bases, various modules, I/O cables, etc.
Fig. 1.1 shows the CP-3300 system configuration (block diagram) viewed from the power supply and grounding system.



Note: *The configuration of the remote I/O is also in accordance with the above figure.*

Fig. 1.1 Configuration of CP-3300 Power Supply and Grounding Systems

- Insulation from a panel such as a mounting base
  Cases of the mounting base and noise filter are installed, insulating them from the panel. It is not necessary to insulate the panel itself from the building.

- Exclusive-use grounding
  The grounding of the CP-3300 system is to be 100Ω or less independently from the other facilities. Should the grounding point be provided together with another facility, independent wiring to the grounding point must be installed.

- Power supply switch
  When dual CPU system is used, the power supply switches are provided to both CPUs. If one switch is shared, it is impossible to replace or investigate modules under operation of the system in case a fault occurs on one of the CPUs.
  For the same reason, it is recommended that a power supply switch be provided for each group of the I/O section in some kind of applications. Should an I/O module be defective, it is possible to turn OFF the power supply of that section to replace modules, etc.

- Cooling fan
  The CP-3300 CPU module requires forced air cooling by using a cooling fan. Intake and exhausted air flow of the CPU module must be 1.5m/s or more.
  An exclusive-use fan unit is available. See Table below.

Item	Specifications	
Code No.	EUX003460	EUX003480
Applications	For single CPU system	For dual CPU system
Power Supply	100/110VAC, 50/60Hz	
Others	With alarm contact output	

1.1 INSTALLATION OF MOUNTING BASE

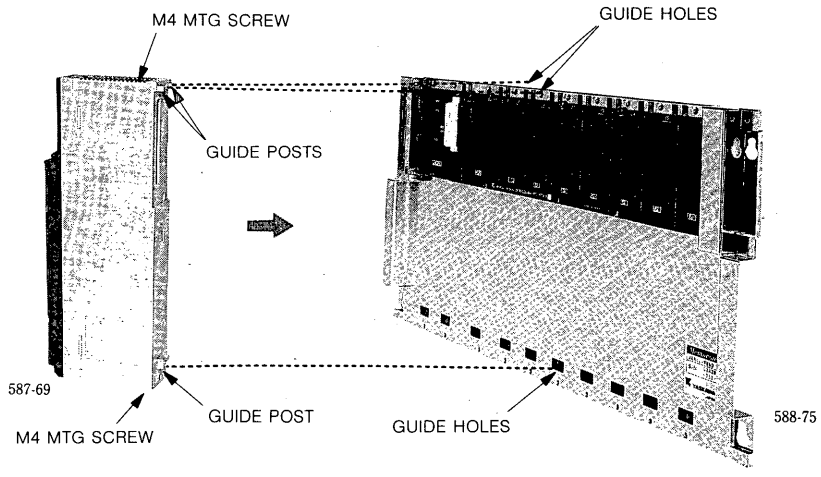
There are four types of mounting bases. Install the mounting base by fastening four M5 screws through the four holes provided.

NOTE

The mounting base connectors are covered. When installing the mounting bases, leave the cover on the connectors to protect them from foreign matter.

1.2 INSTALLATION OF MODULES

Install modules of the CP-3300 on the fixed mounting bases.
Fig. 1.2 shows how to install a module on a mounting base.



① Remove the connector cover.
② Fit the guide posts of the module straight to the mounting base.
③ Fix the module by fastening M4 screws with the module.

Note: *Don't remove the connector cover if no module is to be installed.*

Fig. 1.2 Module Mounting

The type of mounting base and the mounting location are determined depending on module types. Figs. 1.3 to 1.6 show mounting place of each module on the mounting base.

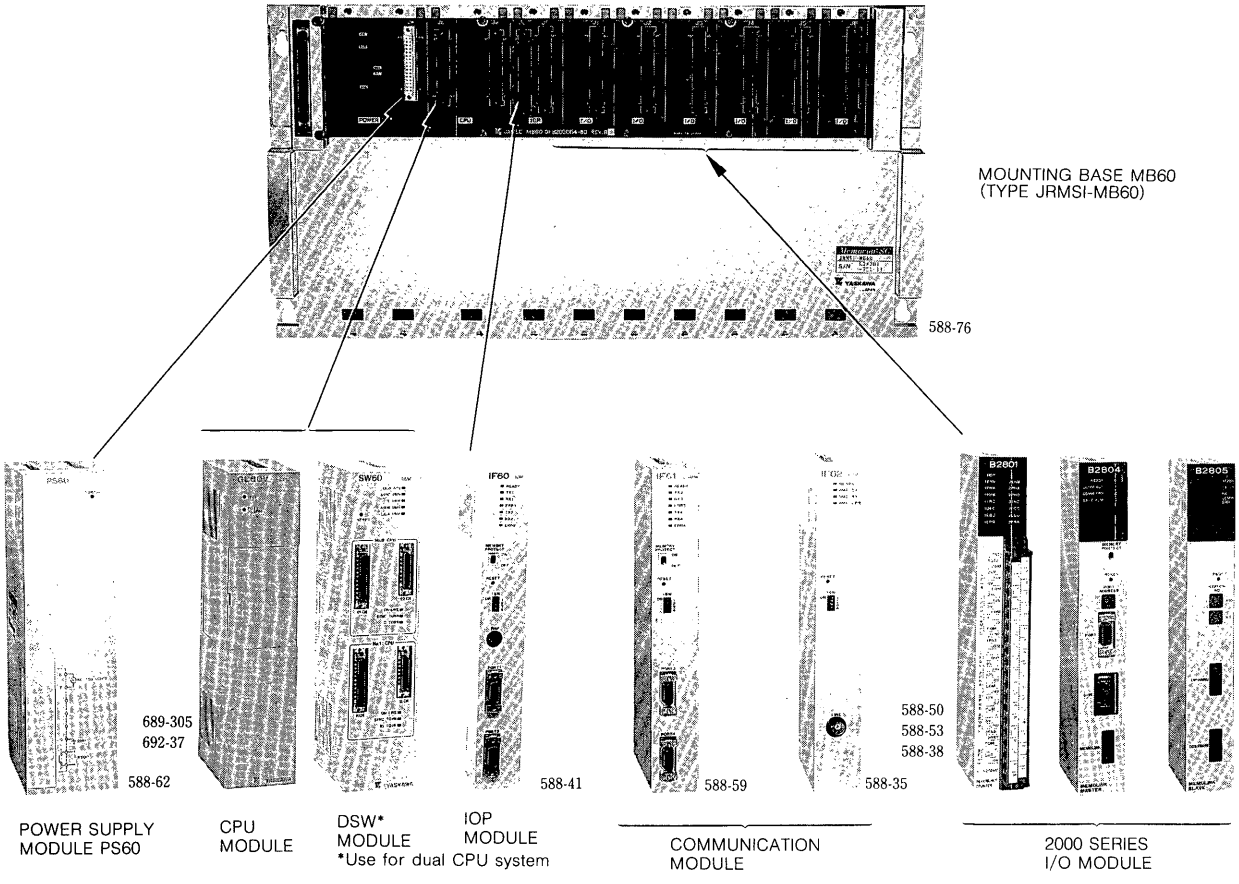


Fig. 1.3 Module Mounting on Mounting Base MB60

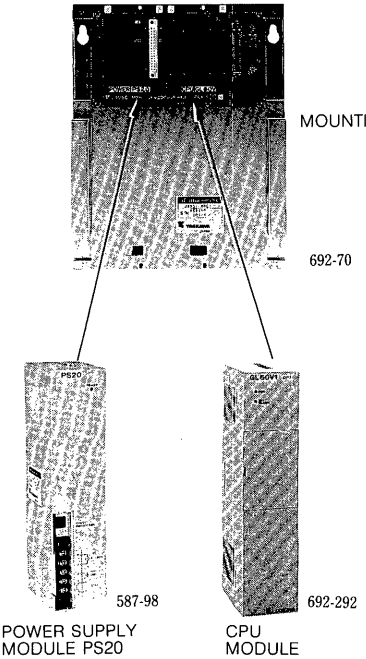


Fig. 1.4 Module Mounting on Mounting Base MB61

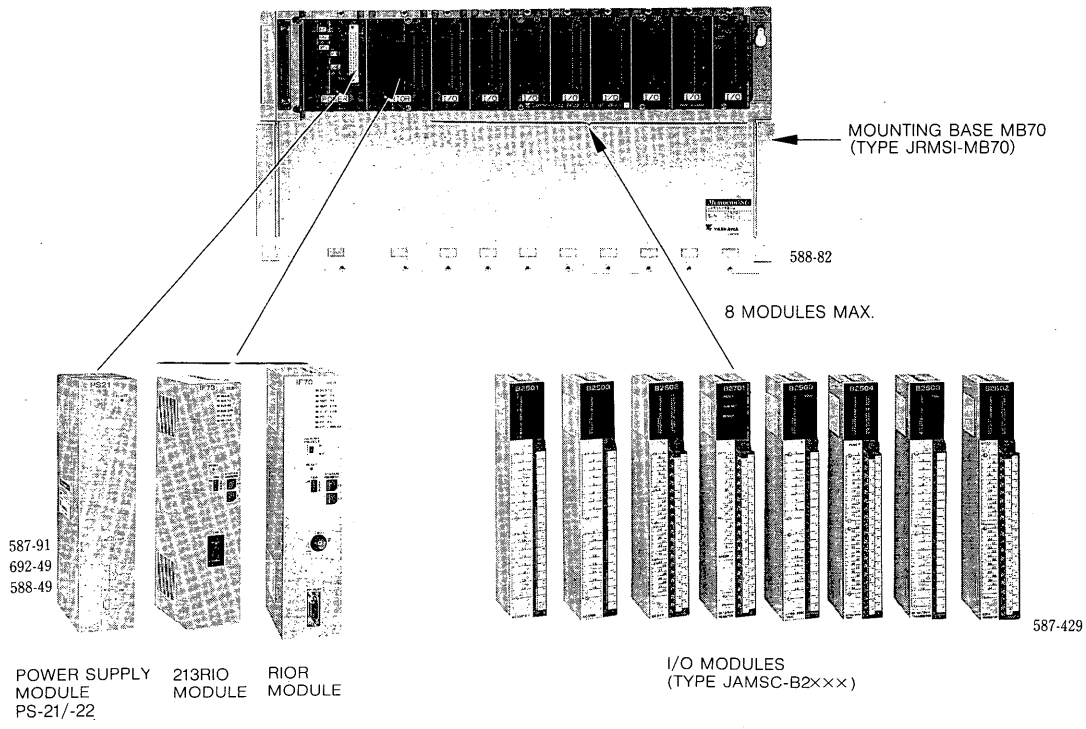


Fig. 1.5 Module Mounting on Mounting Base MB70

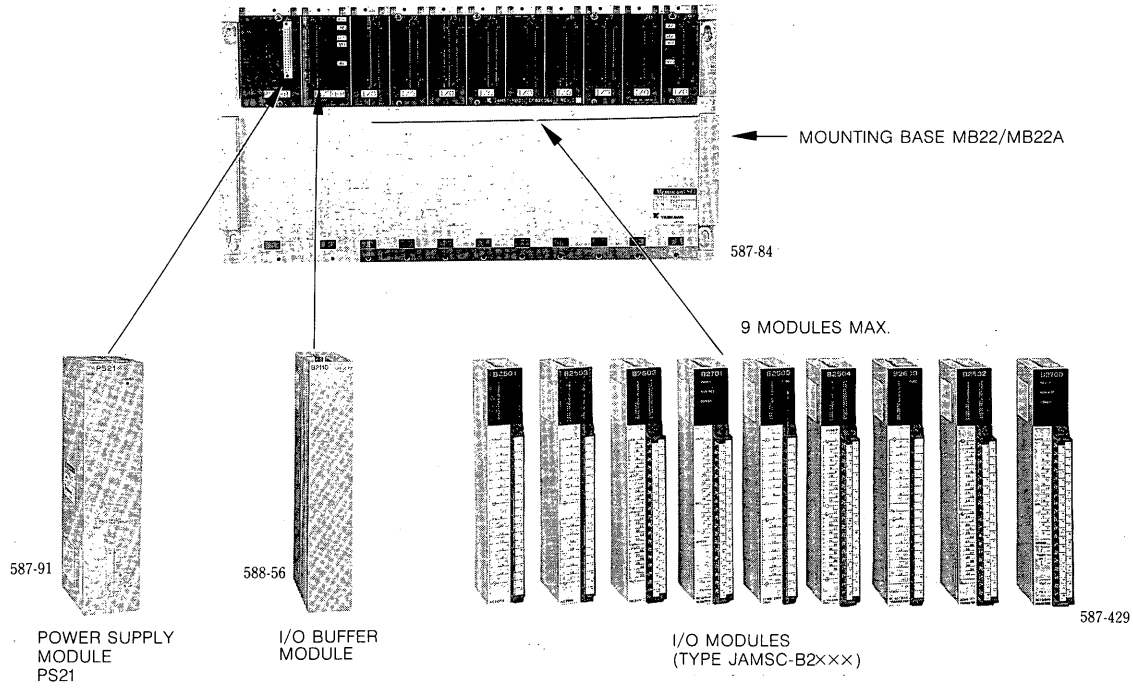


Fig. 1.6 Module Mounting on Mounting Base MB22/MB22A

1.3 CONNECTION OF CABLES BETWEEN MOUNTING BASES

When mounting modules is completed, use the following exclusive-use cables for connection between the mounting bases.

• CPU Connection Cable

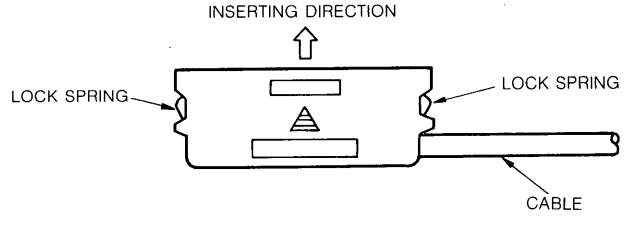
Model	Length	Connector Poles
JZMSZ-3300-2	90cm	36
JZMSZ-3301-2	90cm	50

When a dual CPU system is used, connect the CPU module and DSW module with the cable above. Use four cables, two for each CPU.

• I/O Cable

Model	Length
JZMSZ-W20-1 JZMSZ-W20-2	0.5m 1.5m

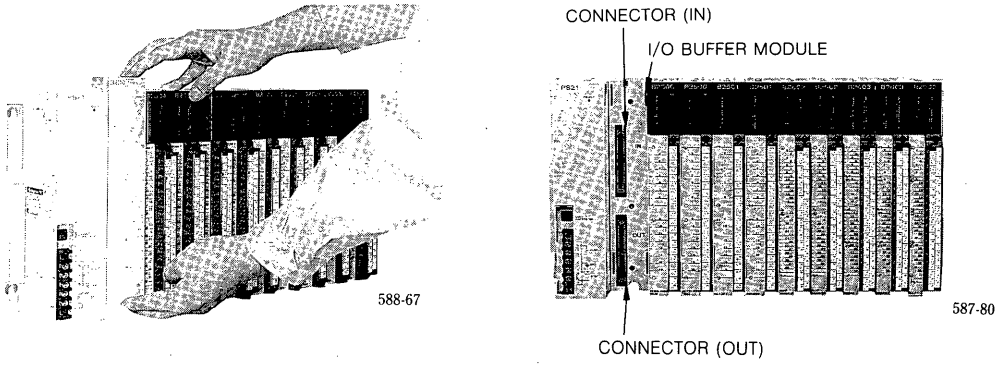
When mounting modules is completed, connect between the first rack and extension rack, and between the extension racks, with exclusive-use I/O cables.
Select the cable according to the conditions of installation.
Both ends of the I/O cable are provided with 50-pin connectors as shown in Fig. 1.7.



Notes: *1. Insert the I/O cable connector until a click is heard and it is locked.*
2. Depress the lock springs on both sides as you pull the I/O cable connector toward you.

Fig. 1.7 I/O Cable Connector

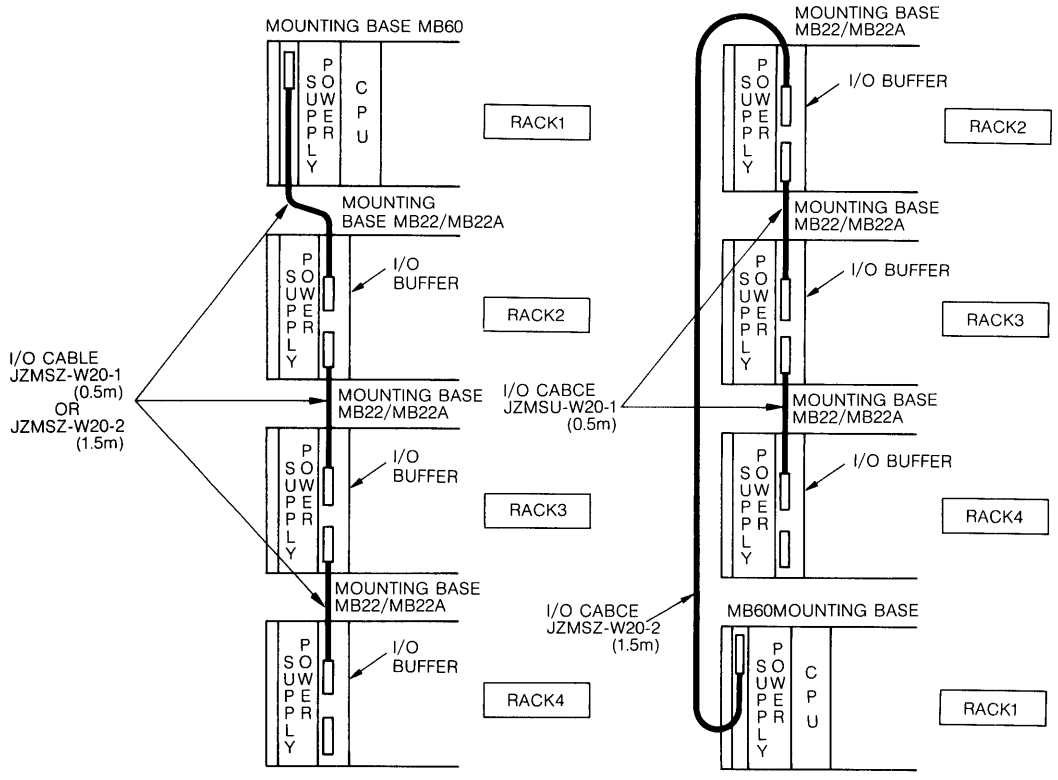
For I/O cable connection, the connector at the top left of the mounting base MB60 or MB70, and the connector at the front side of the I/O buffer module mounted on the mounting base MB22 are used. (I/O cable connector is not provided for the mounting base MB22.)
As shown in Fig. 1.8, when the I/O buffer module front cover is removed, two connectors (IN and OUT) can be seen.



(a) Removal of Front Cover (b) Front Cover Removed

Fig. 1.8 Connector for I/O Cable Connection of I/O Buffer Module

Connect the I/O cable so that the signal flow will be from OUT to IN. (See Fig. 1.9.)



(a) Rack 1 at the top (b) Rack 1 at the bottom

Notes: 1. *Insert the I/O cable connector until a click is heard and it is locked.*
2. *When connection of I/O cable is completed, place the cover on the I/O buffer module.*

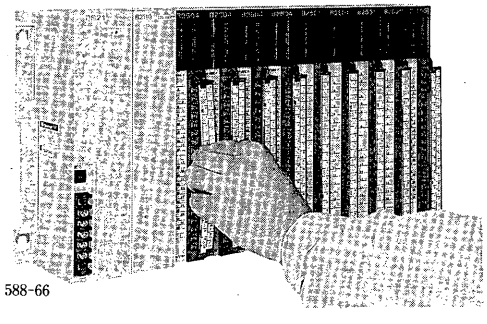
Fig. 1.9 I/O Cable Connection

1.4 WIRING OF MODULES

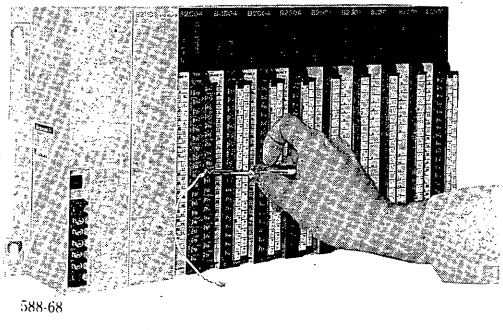
The power supply module and I/O modules have terminal blocks and connectors for connecting the power lines and I/O signals. See Table 1.1. The terminal block covers should be removed when connecting the wires to the connector terminals.

Table 1.1 Terminal Blocks

No. of Pins	Lead Size	Module Type	Connecting Method	Remarks
20	1.25mm²	B2500V B2501V	Pressure terminal • R type: R1.25-3.5 • Fork type: E1.25-3.5	Removable from module
38	1.25mm²	B2602V B2603V B2902V		
5	1.25mm²	PS20 PS21V PS60V	Pressure terminal • R type: R1.25-4 • Fork type: F1.25-4	Cannot be removed



(a) Removing of Terminal Block Cover



(b) Connecting the Wire to the Connector Terminal

Fig. 1.10 Connecting the Wire to the Connector Terminal

2 RUN OPERATION PROCEDURE

The run operation procedure of CP-3300 is shown in Fig. 2.1.
For details, see each paragraph.

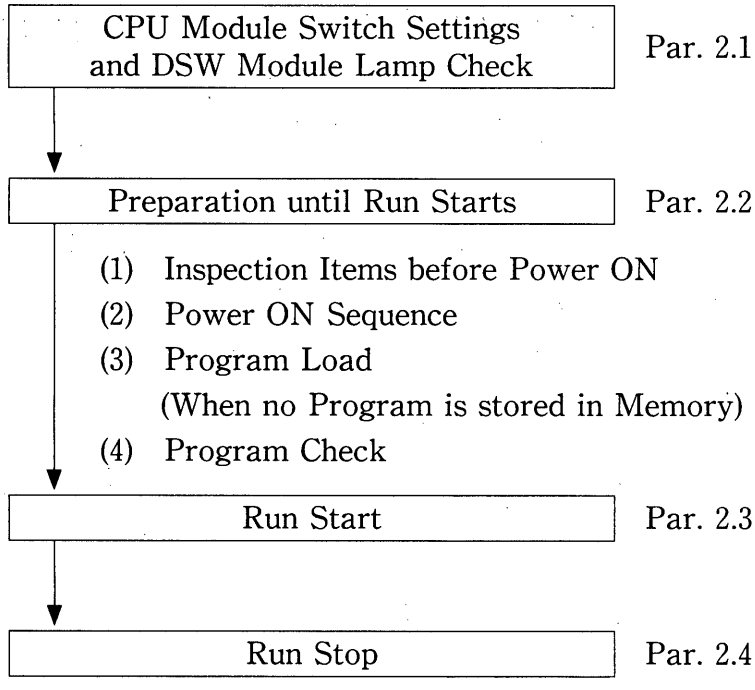


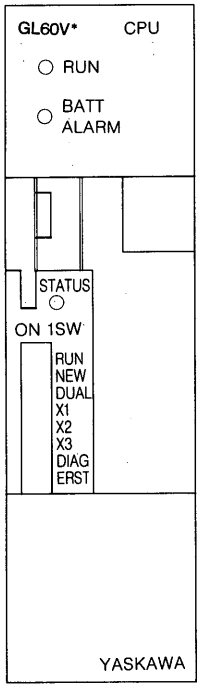
Fig. 2.1 Run Operation Procedure of CP-3300

2.1 CPU MODULE SWITCH SETTINGS AND DSW MODULE LAMP CHECK

The CP-3300 is operated by using the CPU module operation switches. Additionally, the CP-3300 operation status can be verified by the CPU indicator lamps. At dual system construction, verify the operation status also by using the DSW module indicator lamps.

The CPU switches must be operated with the CPU battery front cover open.

Figs. 2.2 and 2.3 show the module operation switches and indicator lamps, and DSW module indicator lamps, respectively. Tables 2.1, 2.2 and 2.3 show the functions.



*Dual CPU system uses GL60V1

Fig. 2.2 CPU Module (Battery Cover Open)

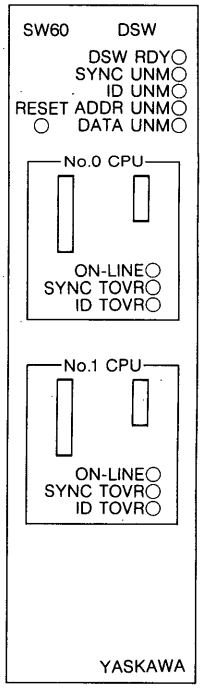


Fig. 2.3 DSW Module

Table 2.1 CPU Module Indicator Lamps

Name	Normal Status	Description of Function
RUN	Lit	Lights when CP-3300 operates normally.
BATT ALARM	Extinguished	Indicates provided battery voltage drop when lit. Replace battery (within one month).
STATUS	Extinguished	Blinks or lights when an error occurs.

Table 2.2 CPU Module Operation Switches

Name	Normal Status	Description of Function	
		Setting	Description
RUN	ON	ON	System running
		OFF	System halted
NEW	Depending on system	ON	Select newly started operation
		OFF	Select continuous start operation
DUAL	Depending on system	ON	Dual CPU system
		OFF	Single CPU system
X1	OFF	ON	Not used (Set to OFF.)
		OFF	
X2	OFF	ON	CPU reset
		OFF	——
X3	OFF	ON	Memory initialization (The memory is initialized when the CPU is started by turning ON the [X3] switch.)
		OFF	
DIAG	OFF	ON	(For in-house testing)
		OFF	
ERST	OFF	ON	To reset an error, turn ON this switch once and then turn it OFF.
		OFF	

Table 2.3 DSW Module Indicator Lamps

Name		Normal Status	Description of Function
DSW RDY		Lit	Lights when DSW module normal.
SYNC UNM		Extinguished	Indicates that synchronous levels are not matched between both CPUs.
ID UNM		Extinguished	Indicates that slave models selected by both CPUs are not matched at I/O operation.
ADDR UNM		Extinguished	Indicates that addresses from both CPUs are not matched at I/O operation.
DATA UNM		Extinguished	Indicates that data from both CPUs are not matched at I/O operation.
No. n CPU	ON-LINE	Lit	Indicates that No. n CPU is under online operation.
	SYNC TOVR	Extinguished	Indicates that level synchronization request has not come from the other CPU within a certain time.
	ID TOVR	Extinguished	Indicates that slave module selection request has not come from the other CPU within a certain time.

Note: *n=0 or 1, corresponding to CPU No.*

2.2 PREPARATION UNTIL RUN STARTS

(1) Inspection Items before Power ON

Before power ON, inspect the following items for each of the CPU and I/O units.

- Check that power supply connections in the unit are not loose and wiring is normal and not short-circuited.
- Check that lead-in power and power supply for the unit operation meet given specifications.
- Check that the switches of slave module (IFxx series) are set as defined by the system design.

(2) Power ON Sequence

Upon completion of inspection before power ON, turn power ON in the sequence described below. If the power is turned ON to the CPU and I/O units simultaneously at rerun, no trouble will be encountered.

Turn power ON to each I/O unit (containing remote I/O unit).

After power ON, check that the POWER indicating lamp on power supply unit of each rack is ON and the alarm indicators on the front of the I/O unit (such as fan stop, control power error, and temperature rise) are OFF.

Turn power CPU unit ON.

Turn power CPU unit ON after setting RUN switch on CPU unit to OFF. Then, check the following lamp status.

- The POWER indicating lamp on power supply unit of CPU rack is ON.
- The alarm indicators on the front of the CPU unit (such as fan stop, control power error, and temperature rise) are OFF.

NOTE

To first turn ON the power to the CPU (when no program is stored in memory), the CPU module must be initialized. Set the DIP switch [X3] on the front of the CPU module to ON before turning ON power to the CPU. After the CPU starts normally, reset [X3] to OFF.

Start up Programming panel.

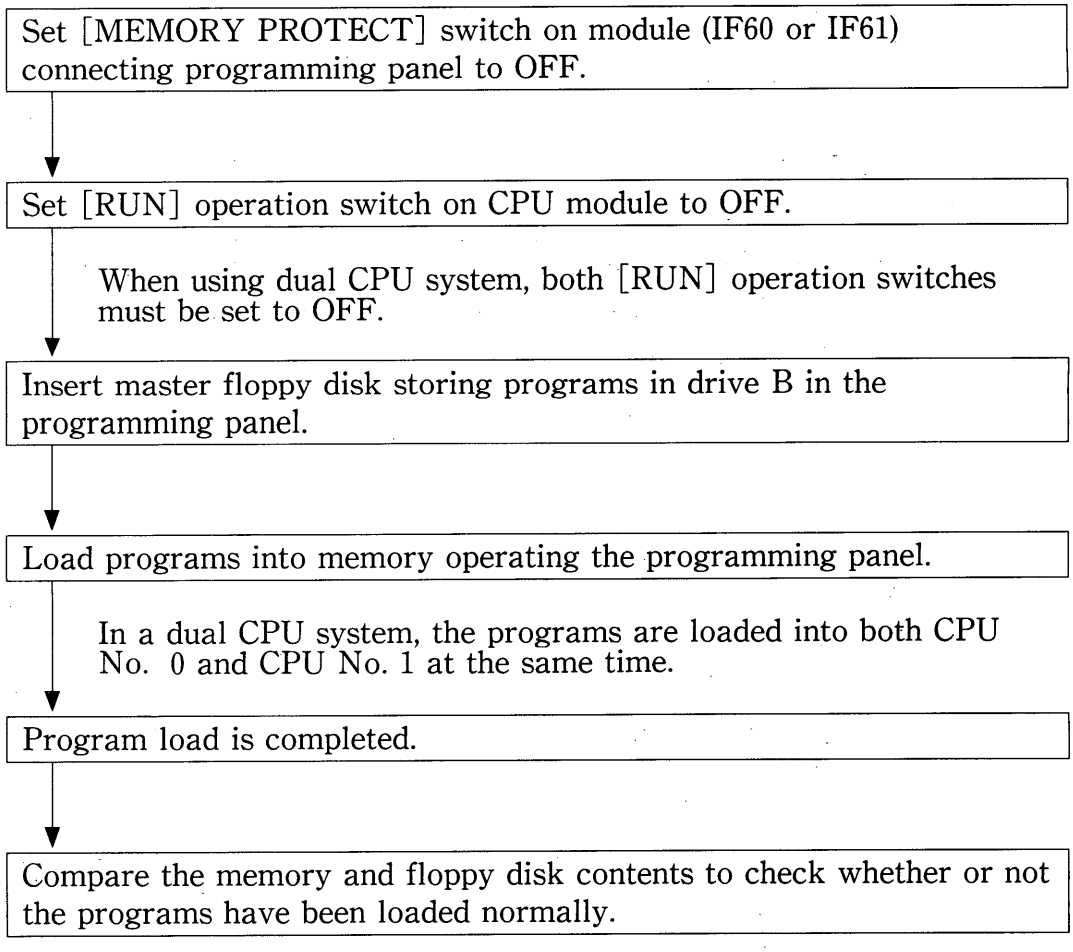
Connect the programming panel and IF60 (or IF61) module using a special cable. Insert system floppy disk in drive A, and depress the power switch on the rear of the programming panel. Automatically, the system program is read, then the menu is displayed on the programming panel.

(3) Program Load (When no Program is stored in Memory)

When no program is stored in the memory, programs must be loaded from the programming panel. Load the programs according to the following procedure.

[Refer to the Programming Panel Operator's Manual (SIE-C873-20.3) for the programming panel operation method.]

■Program load procedure



(4) Program Check

Using the programming panel, check the followings:

- Check whether or not each DWG/function can be executed.

> **NOTE**
> *The DWG/function with "D" in the PROGRAM MAP or function MAP cannot be executed. Using ENABLE key, delete "D" for the DWG/functions that must be executed.*

- Search the disabled coils (ON, OFF) in each program using [DIS LIST] function.
- Check that I/O specification in the I/O map matches I/O module location.
- When communicating to the peripheral equipment, check that the transmission specifications (e. g. transmission rate for each port, data frame construction) match those of peripheral equipment.
- Using the register list display, set the initial values of the system constants that must be initialized. Set machine zero position correction value, product initial data, etc., as required.

2.3 RUN START

Before starting CP-3300 run, set the continuous start switch ([NEW] CPU operation switch) appropriately. This switch defines the restart condition (Table 2.4) after the system stops due to a power failure, etc.

Table 2.4 CPU Restart Conditions

Continuous Start (Continuous Start Switch is ON: Right side)	The system normally runs until a power failure occurs. After the system is recovered from power failure, the program instruction following that which was executed is resumed, as normal run.
New Start (Continuous Start Switch is OFF: Left side)	After the system is recovered from power failure, the start processing drawing (DWG. A) immediately is executed, then regular run is resumed.

Note: *If CPU is idle (CPU error or stop by using [RUN] switch) at power failure, new start run is made regardless of how the continuous start switch is set.*

Start CP-3300 run according to the procedure described below. For external devices, sufficiently debug the programs before turning ON power. After the CP-3300 has once been run normally, it can be rerun by turning ON the CPU unit in batch.

■Single CPU system run start procedure

Turn power ON to the system according to "Par. 2.2 (2) Power ON Sequence."

↓

Check that the CPU and each slave module switched are set correctly.

↓

Check that the correct programs are stored in the CPU.

↓

Set [RUN] operation switch on CPU module to ON.

↓

After the start processing drawing (DWG. A) is executed, the CPU enters the regular run made. Check that the [RUN] lamp on CPU module is ON.

■Dual CPU system run start procedure

Check that the both CPU operation switches are set correctly.

↓

Check that the same program is stored in both CPUs.

↓

Start up one CPU (normally CPU NO. 0), next, start up the other CPU (normally CPU No. 1) as described above (single CPU system run start procedure).

↓

CAUTION

Start up dual CPU system in the system line stop state.

Copy data from the first CPU into the second CPU. Although the first CPU temporarily stops (about 1 second per 1 CPU) scan processing during data copy, system output is held.

↓

CAUTION

Copy the data when scan stop does not adversely affect the system.

After the data copy is complete, both the CPUs restart execution at the program following that which was executed by the first CPU, and enter the dual synchronous run mode.

2.4 RUN STOP

■Single CPU system run stop operation

In principle, turn OFF the following:

① CPU power supply
② I/O power supply

} They can be turned OFF simultaneously.

NOTE

Even if the I/O power supply is turned OFF first, the system will not be damaged. However, an I/O error occurs.

■Dual CPU system run stop operation

In principle, turn OFF the following:

① Power supply of both CPUs (Either CPU can be turned OFF first.)
② DSW power supply
③ I/O power supply

} All of them can be turned OFF simultaneously.

NOTE

If the DSW power supply is turned OFF first, operation will not start automatically when the power supplies are turned ON the next time. In this case, turning the CPU module ERST switch ON and then OFF starts operation.

3 MAINTENANCE

3.1 SPARE PARTS AND EXPENDABLES

Table 3.1 lists the spare parts and expendables used for the CP-3300 system.

For the modules used for the system, it is recommended that at least one spare part of each kind be provided for each.

Table 3.1 List of Spare Parts and Expendables

Parts Name	Specifications	YASKAWA Electric Product Code No. (Type)	Application
Fan Unit	100V 50/60Hz, 110V 60Hz	EUX003460	For single CPU configuration
		EUX003480	For dual CPU configuration
Floppy Disk	MF2DD, 3.5-inch double-sided	—	Programming panel
Cleaning Diskette	3.5-inch, double-sided	—	
Lithium Battery	BR 2/3A-1, 3V 1200mAh with connector	DE8411366-1	CPU module, ASCII module

3.2 DAILY INSPECTION

Main daily inspection is to verify the lighting status of the indicator lamps provided at the front side of each module. Table 3.2 outlines verification of the indicator lamps and other inspection items for your reference.

Table 3.2 Daily Inspection Items

Inspection Item		Normal Status	Faults		
			Abnormal Status	Cause, Others	
Indicator Lamp POWER (at each rack power supply module front side)		ON	OFF	(1) No AC power supplied (power loss) (2) Power supply module fault (3) Overload	
Indicator Lamp (at CPU module front side)	RUN	ON	OFF	(1) CPU module fault (2) User Program error	
	BATT ALARM	OFF	ON	Battery voltage drop (Battery must be replaced.)	
	STATUS	OFF	Blinking	The contents of error are displayed by the number of blinking times. (This indicator lamp can be seen by opening the battery cover.) Refer to Table 4.2.	
Indicator Lamp (at IOP module front side)	READY	ON	OFF or blinking	IOP module fault	
	ERR 1	OFF	ON or blinking	A transmission error occurs in port 1.	
	ERR 2	OFF	ON or blinking	A transmission error occurs in port 2.	
Cooling Fan Operation Status		Rotates without abnormal noise.	Stops or rotates with abnormal noise.	Fan motor fault	
Register Value	SW00050	0	Other than 0	A CPU error occurs.	Set the register value to 0 when the corrective action for the error is completed.
	SW00080 SW00082 SW00084 SW00088	0 or invariable	Variable (addition)	A calculation error occurs.	
	SW00100	0 or invariable	Variable (addition)	An I/O error occurs.	

3.3 SCHEDULED MAINTENANCE

Inspect the following items periodically (Six months or Annually)

- Program check (annually)
  Compare the program memory and master floppy disk contents (COMPARE) to check that they are the same.
  If they do not match, dump the program memory contents on a floppy disk (DUMP).
  Normally, more than one master floppy disk should be provided.
  Refer to the Programming Panel Operator's Manual (SIE-C873-20.3) for use of comparison (COMPARE) and dump (DUMP).
- Module card mount
  Check that module cards and cable connectors are securely mounted in each unit.
- Filter cleaning and replacement
  Clean the air filter attached on the front door of each unit. Wash by hand, pressing it in a neutral detergent. After the filter has been washed 10 times or so, replace it with a new filter.
- Unit bottom cleaning
  Remove dust at the bottom of each unit with a vacuum cleaner.

NOTE
Do not use a blower. Blown dust can adversely affect module operation.

- Floppy disk drive head cleaning (annually)
  Clean the heads of the two floppy disk drives in the programming panel.

■Procedure to clean the heads by using a cleaning floppy disk

Open the programming panel menu screen and select F8 (Exit).

↓ The prompt "A>" is displayed.

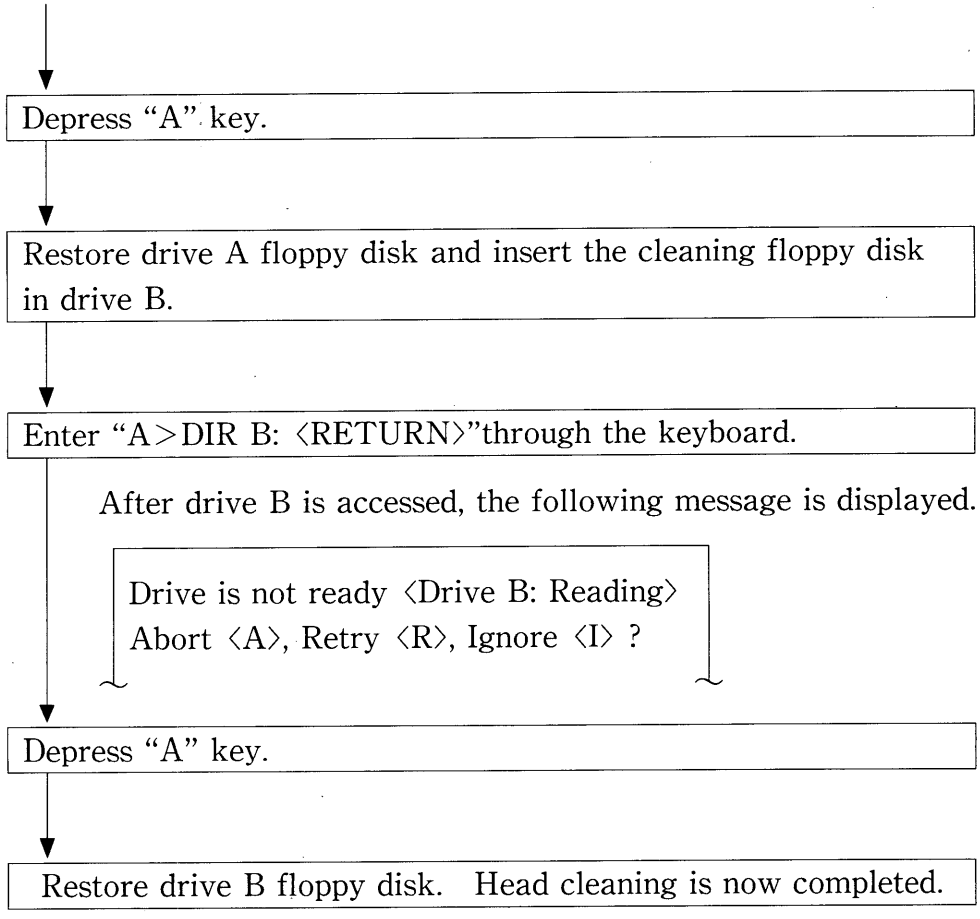
Insert the cleaning floppy disk in drive A.

↓

Enter "A>DIR A: <RETURN>"through the keyboard.

↓ After drive A is accessed, the following message is displayed.

Drive is not ready <Drive A: Reading>
Abort <A>, Retry <R>, Ignore <I> ?



NOTE

To use the programming panel for the CP-3300 again, enter "A>PP <RETURN>" through the keyboard after the head cleaning is completed. The menu screen will be displayed in a short time.

- Inspection of spare parts and expendables
  Inspect spare parts. Order spare parts and expendables from YASKAWA by specifying the electric product numbers and necessary quantities, referring to Table 3.1.

3.4 PREVENTIVE MAINTENANCE

For important facilities, it is recommended that the following preventive maintenance be performed.

- Replacement of power supply modules
  It is recommended that power supply module of each rack be replaced every 5 years even if a fault has not occurred.
- Replacement of lithium batteries
  It is recommended that lithium batteries installed on CPU modules and ASCII modules be replaced every 5 years even though a voltage drop alarm has not occurred.

3.5 HOW TO REPLACE MODULE OR BATTERY

(1) Replacement of Module

In order to keep the system down time as short as possible, detection and replacement of a defective module can be performed in a short period of time.

If a module malfunctions, detect the defective module by using each module indicator lamp or programming panel and replace it.

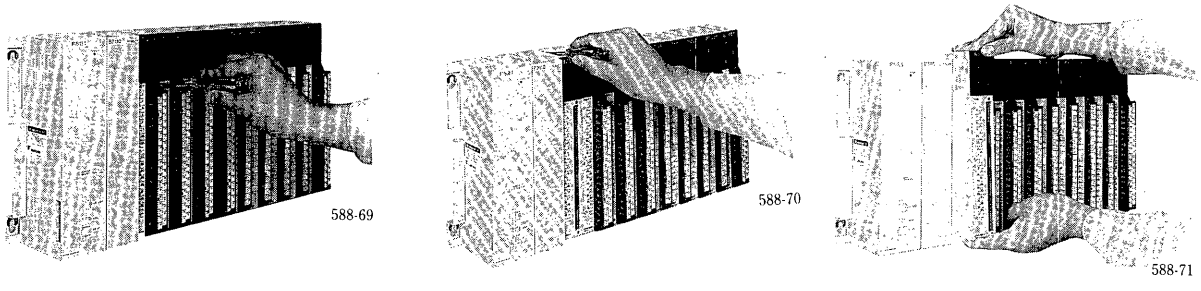
■Procedure of module replacement

① Turn OFF the power supply.
Turn OFF the AC power supply and external power supply for I/O module.

② Remove the terminal block. [See Fig. 3.1 (a).]
Wires to module do not have to be removed one by one, but the entire wiring can be removed with the terminal block. Remove the terminal block by loosening two mounting screws at the upper and lower parts of the terminal block. However, the terminal block of the power supply module cannot be removed. Therefore, the wiring must be removed one by one.

③ Loosen the module mounting screws. [See Fig. 3.1 (b).]
Loosen the mounting screws at the upper and lower parts, with which the module is mounted on the mounting base.

④ Remove the module. [See Fig. 3.1 (c).]
Lift the module by the upper and lower parts and pull it toward you to remove it.



(a) Removing Terminal Block (b) Loosing Module Mtg Screws (c) Removing Module

Fig. 3.1 Replacement of Module

⑤ Mount a new module.
Insert the module guide post into the mounting base hole fully with the guide post adjusted to the guide hole. Fasten the two mounting screws at the upper and lower parts of the module to mount the module on the mounting base.

⑥ Mount the terminal block.
Mount the terminal block which was removed in ② as it was.

⑦ Turn ON the power supply.
Turn ON the power supply after checking that the type of the module and wiring are proper.

(2) Replacement of Battery

The battery lifetime is up to 5 years, or until the total of momentary power loss time reaches one year.
Refer to the following periods to replace the battery according to the operation status of the CP-3300 (current conduction time).

Average 12 hours/day	every 2 years
Average 16 hours/day	every 3 years
Average 20 hours/day	every 4 years

Note:
Current conduction time is the total average operation time including holidays.

When the CPU module "BATT ALARM" indicator lamp lights, replace the battery within one month.
In principle, replace the battery with AC power supplied to the CP-3300 and with the CPU module on the mounting base.

NOTE
If the battery is removed without AC power supplied, the memory contents will be destroyed. However, the memory contents can be saved within a short period of time (2 minutes) after the AC power supply is turned OFF.

■Procedure for battery replacement

① Verify that the power supply module 1 "POWER" indicator lamp lights (AC power supply is turned ON).

② Open the CPU module front cover. [See Fig. 3.2 (a).]

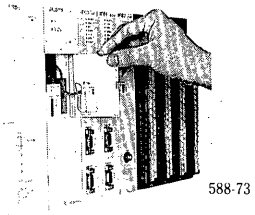
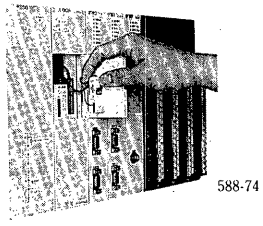
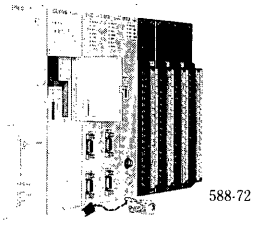


Fig. 3.2 (a) Opening the CPU Module Front Cover

③ Take the battery out of the battery holder and remove the connector mounted at the end of the lead from the CPU module. [See Figs. 3.2 (a) and (b).]



(b) Removing the Battery from Battery Holder



(c) Removing Connection Lead to CPU Module

Fig. 3.2 Replacement of Battery

④ Put a new battery in the battery holder and connect the connector at the end of the lead to the CPU Module connector.

⑤ Pull the ERST switch to the left once and then return it to the right. At this time, verify that the "BATT ALARM" indicator lamp is extinguished.

⑥ Close the battery cover to complete the replacement.

4 TROUBLESHOOTING

If an error occurs in the operation of CP-3300, locate the causes by checking the number of times the [STATUS] LED blinks and the contents of CP-3300 system error registers. Then, take appropriate corrective action. The following sub-sections describe the measures in details.

Note that the CPU which is serviced by the programming panel is shown in Table 4.1.

Table 4.1 CPU which is serviced by Programming Panel

<table>
<tr><th colspan="3">Serviced by Programming Panel / System Config. and Run State</th><th>Display</th><th>Write-in</th><th>Remarks</th></tr>
<tr><td colspan="3">Single CPU System</td><td>Objects specialized CPU No.</td><td>Objects specialized CPU No.</td><td>Either CPU No. 0 or 1 is permitted.</td></tr>
<tr><td rowspan="4">Dual CPU System</td><td>Synchronous Operation</td><td>Both CPUs run</td><td rowspan="4">Objects specialized CPU No.</td><td>Write-in simultaneously to both CPUs*1</td><td rowspan="4">——</td></tr>
<tr><td rowspan="2">One CPU run</td><td>CPU #0 run (CPU #1 stop)</td><td rowspan="2">Objects specialized CPU No.</td></tr>
<tr><td>CPU #1 run (CPU #0 stop)</td></tr>
<tr><td>Stop State*2</td><td>Both CPUs stop</td><td>Write-in simultaneously to both CPUs.</td></tr>
</table>

*1 If an error occurs in one CPU, the programming panel displays the error contents and the CPU Number.

*2 This means that the other CPU is in the following state.
- CPU breakdown
- Power ON at [RUN] module switch OFF.
- Power OFF

4.1 CORRECTIVE ACTIONS AT CPU ERROR

(1) For CPU Error

If an error occurs, each CPU indicates error information by [STATUS] LED and stores detailed error information in the system error register area (SW00050 to SW00069).
Locate the erroneous module and contents, and perform corrective actions as follows:

■Action flow for CPU error

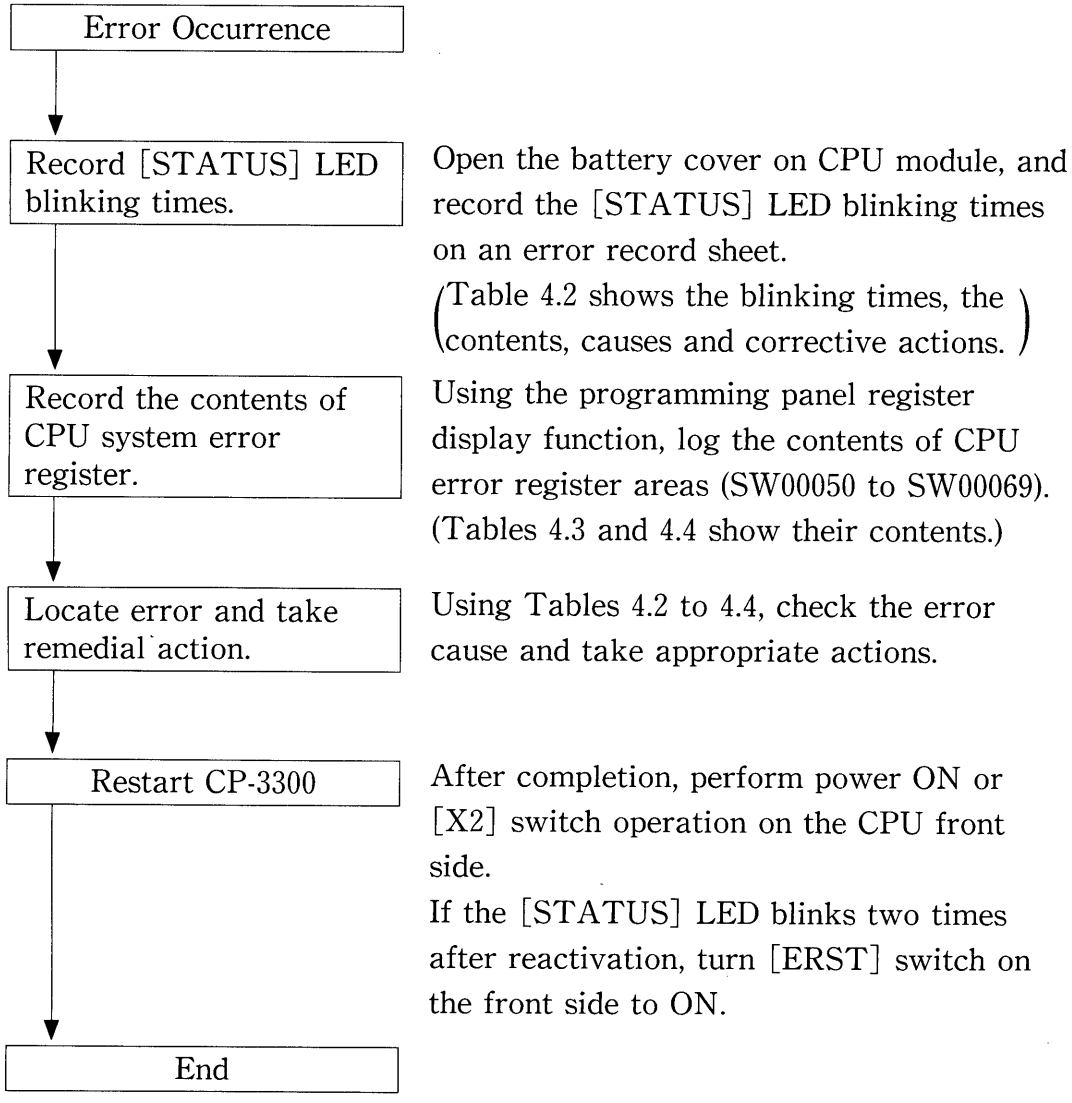


Table 4.2 shows the blinking times, the contents, causes and corrective actions. Table 4.3 shows the contents of system error registers (SW00050 to SW00069). Use these tables to locate an error cause.

Table 4.2 CPU Module Fault Display and Corrective Actions

[STATUS] LED Blinking Times	Fault Contents and Cause	Corrective Actions
2	**Error reset not executed** • CPU was in an error status before a momentary power loss or reactivation.	• When the corrective actions for the error is completed, turn ON the [ERST] SW on the CPU front side.
3	**Initialization error** • An error was found by diagnosis before CPU startup.	• Enter the OFF-LINE test mode and execute a detailed diagnosis to check the contents of system register (SW00070). Then replace the CPU module.
4	**System program error** • System program malfunctions because of a hardware fault. • System program processing is not correct.	• Inform your YASKAWA representative, using the fault record sheet. • As emergency repair: (1) Initialize the memory and execute program loading. (2) Replace it with hardware spare parts (CPU, DSW) if available.
5	**User program error** • Congestion of program execution or mismatch of both CPU programs at dual configuration can be considered.	• Refer to Par. 4.1.1 "Corrective Actions at User Program Errors" to correct the faulty program.
6	**Excessive Watchdog time** • Improper number of loop times or calculation error caused by improper suffix can be considered.	• Refer to Par. 4.1.1 "Corrective Actions at User Program Errors" to correct the faulty program.
7	**Memory check error** • An error was found by memory diagnosis at CPU startup.	• Replace the CPU module.
8	**PROM sum check error** • PROM sum check error was found by CPU self-diagnosis.	• Replace the CPU module.
9	**Execution of undefined command** • An attempt was made to execute a command which was not defined in the microprocessor.	• Replace the CPU module. • As an emergency repair, initialize the memory to reactivate.
10	**Microprocessor fault** • Numeric operation, bit operation or real number operation processor fault was found by CPU self-diagnosis.	• Replace the CPU module.

(Cont'd)

(Cont'd)

[STATUS] LED Blinking Times	Fault Contents and Cause	Corrective Actions
12	**Dual data receiving error** • An error occurs in follow-up CPU at dual follow-up startup. • Occurs when DWG programs of both CPUs are not matched.	• Compare the application programs of both CPUs and correct them.
13	**Dual synchronization error** • Refer to Par. 5.2 "Corrective Actions at Dual Synchronization Error Occurrence."	• Refer to Par. 5.2 "Corrective Actions at Dual Synchronization Error Occurrence.
15	**Operation conditions not established** • The CPU front side "RUN" switch is turned OFF during CP-3300 running.	

The [STATUS] LED lamp lights in a sequence as shown below.

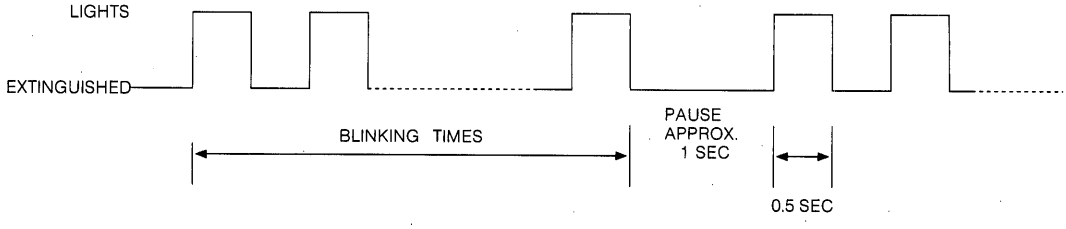


Table 4.3 Contents of CP-3300 System Error Registers

Name	Data Address	Contents
Error Type	SW00050	Error type (Refer to Table 4.4.)
Error Code	SW00051	For system error analysis
Error IP	SW00052	Program execution address at CPU down time
Error CS	SW00053	
Error Task	SW00054	Task during execution at CPU down time H 0C10: DWG A, H 0C30: DWG I H 0C50: DWG H, H 0C90: DWG L or DWG B Others: System
Program Level	SW00055	H 0000: System program H 0001: DWG program H 0002: Functional program
DWG STEP #	SW00056	Program step No. of function reference DWG when a function error occurs. Always 0 when a DWG error occurs.
DWG No.	SW00057	User drawing No. that breaks down when the program level is H 0001 or H 0002. Parent drawing: H C800 Child drawing: H XX00 (H XX: Child drawing No.) Grandchild drawing : H XXYY (H YY: Grandchild drawing No.) Note: Batch child drawing is expressed by adding H64.
Error Data 1	SW00058 to SW00065	Error data for system analysis when the error type is H 0054 or H 0062.
Error Data 2	SW00066	Synchronization level and module code at dual synchronization error
	SW00067	Program execution address where the normal CPU detects breakdown of the matching CPU. SW00067: IP SW00068: CS
	SW00068	
	SW00069	Program execution task when the master CPU detects breakdown of the matching CPU.

Note: *Description of "Hnnnn" is expressed in hexadecimal notation in the above table.*

Table 4.4 Contents of Error Type (SW00050)

Type	Error Name	[STATUS] Blinking Times	Error Contents
H 0006	Undefined operation code error	9	An attempt to execute a command that was not defined in the microprocessor was made.
H 0008	Double fault	4	More than one error occurred in the microprocessor.
H 000A	Task fault	4	Task could not be changed.
H 000B	Segment absence	4	Access was made to a memory which was not assigned.
H 0010	Real number operation register fault	10	Real number operation register fault
H 0040	Initialization error	3	An error occurred at system initialization.
H 0041	PROM sum check error	8	System program memory fault
H 0042	Memory R/W check error	7	An error was found by memory R/W check.
H 0043	Main CPU function check error	10	An error was found by the main CPU function check.
H 0044	Realnumber operation CPU function check error	10	An error was found by the realnumber operation processor diagnosis.
H 0045	Bit operation CPU function check error	10	An error was found by the bit operation processor diagnosis.
H 0050	CPU stop	15	The CPU module front side [RUN] switch was turned OFF.
H 0054	CPU execution congestion	4 or 5	CPU execution was congested because of undefined loop or improper scan time setting fault, etc.
H 0061	Dual sending error	11	Data were not received by the follow-up machine within a certain period of time at dual follow-up starting. Operation continues and the error is only reported.
H 0062	Dual receiving error	12	Data receiving error at dual follow-up starting
H 0063	Dual synchronization error	13	Dual synchronization operation error

(2) Corrective Actions for User Program Error

If a user program error occurs, check the erroneous program by using Tables 4.3 and 4.4. Then, correct the program as follows:

① Erroneous drawing check

Check the SW00054 (error task) and SW00057 (DWG No.) contents, and find the erroneous drawing by using Table 4.5.

Table 4.5 Identifying Erroneous Drawings

		SW00057 (DWG No.)			
		H C800	H XX00	H XXYY	Remarks
SW00054	H 0D10	DWG. A	DWG. AXX	DWG. AXX. YY	
	H 0D30	DWG. I	DWG. IXX	DWG. IXX. YY	
	H 0D50	DWG. H	DWG. HXX	DWG. HXX. YY	
	H 0D90	DWG. L	DWG. LXX	DWG. LXX. YY	XX<H64
	H 0D90	—	DWG. BXX	DWG. BXX. YY	XX>H64
	Others	Error occurred in system task			

SW00057 = H XX YY

YY — Grandchild drawing No.: Value obtained by expressing YY in decimal notation.

XX — Child drawing No.: Value obtained by expressing XX in decimal notation.

(When YY is 0, the faulty drawing is in the child drawing.)

(When both XX and YY are 0 and SW00053 is H00EF, the faulty drawing is in the operation error drawing.)

〈Example〉 How to obtain a faulty drawing

When SW00054=H 0C90 and SW00057=H 1201;

The faulty scan (SW00054=H 0C90) is low-speed scan.

The faulty user drawing is as follows, according to (SW00057=H1201);

Child drawing No.: Change to decimal notation because H12?? and DWGL18 is obtained.

Grandchild drawing No.: DWGL18. 01 is obtained because of H??01.

Therefore, the faulty user drawing is to be DWGL18. 01.

② Program level check

Check the SW00055 (program level) contents, and then, check whether the error occurred in drawing or user function by using Table 4.6.

Table 4.6 Program Level Table

No.	SW00055	Explanation
1	H 0001	Error occurs in the drawing found in (1) above.
2	H 0002	Error occurs in user function. The drawing found in (1) above is the reference source. A reference is made from the step contained in SW00056 (DWG Step#). Check erroneous function.

4.2 CORRECTIVE ACTIONS AT NUMERIC OPERATION ERROR

If an numeric operation error (underflow, overflow, division error, etc.) occurs in a user program (DWG or function), locate and correct the erroneous program as follows because the user program may not be executed normally.
Refer to CP-3300 Design Handbook (SIE-C873-20.2) for the operation error processing drawing programming method.

■Action flow for numeric operation error

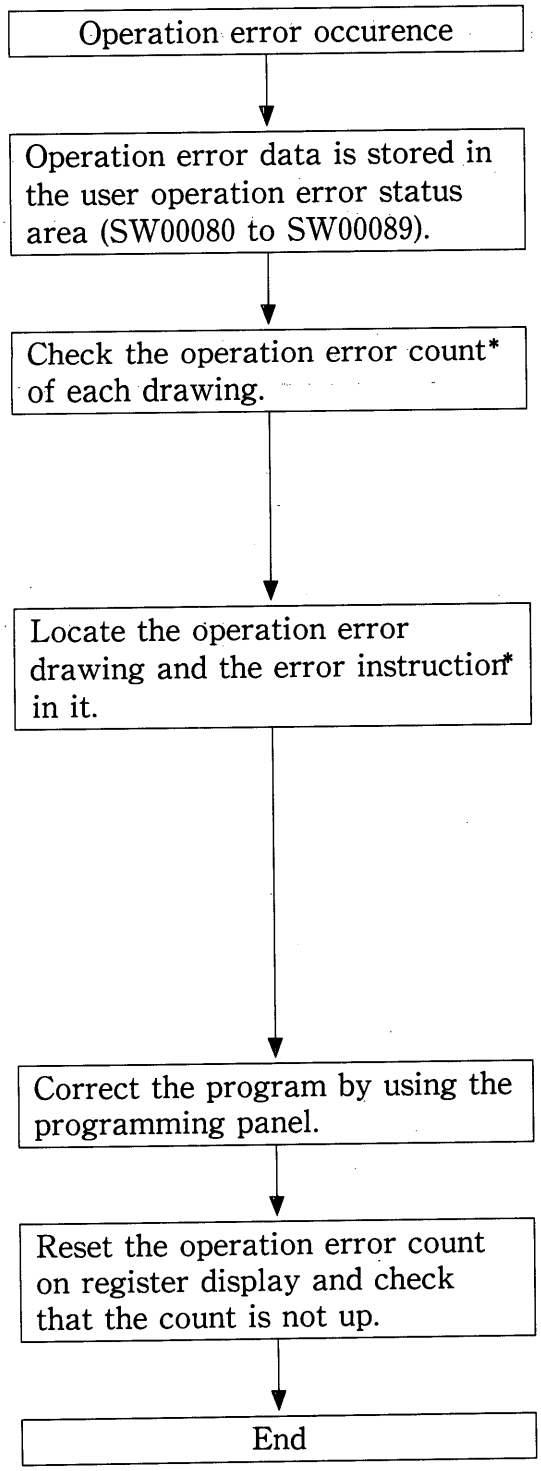


Table 4.7 User Operation Error Status (System Variable Area)

No.	Name	Data Address	Remarks
1	DWG. A Error count Error code	SW00080 SW00081	Error code: See Table 4.9. These registers are not cleared except for initialization. Be sure to clear the error count after correcting the program.
2	DWG. I Error count Error code	SW00082 SW00083	
3	DWG. H Error count Error code	SW00084 SW00085	
4	DWG. L Error count Error code	SW00088 SW00089	

Table 4.8 User Operation Error Status (DWG Internal Variable Area)

No.	Name	Data Address	Remarks
1	Error count	DW00000	*1 Error DWG Step # DWG function reference step at operation function error occurrence. *2 Error DWG No. Parent drawing: H C800 Child drawing: H XX00 Grandchild drawing: H XXYY (HXX: Child DWG No. (in decimal) HYY: Grandchild DWG No. (in decimal) Add 64H to batch child DWG No.)
2	Error code	DW00001	
3	Error A register	DW00002	
4	Change A register	DW00003	
5	Error F register	DW00004	
6		DW00005	
7	Store integer value (one word) Store real value (two words) Change F register (two words)	DW00006	
8		DW00007	
9	Error IP	DW00008	
10	Error CS	DW00009	
11	Error DWG Step #*1	DW00010	
12	Error DWG No.*2	DW00011	

Table 4.9 Operation Error Codes and System Default

	Err-Code	Error Contents	(Note) User	System Default
Integer Operation	H 0001	Integer operation underflow	○	−32768 [−32768]*
	H 0002	Integer operation overflow	○	+32767 [32767]*
	H 0003	Integer operation division error	○	Error intact [A Reg.]*
	H 010X	Integer operation error in operation error drawing	×	Default as above
Real Number Operation Error	H 0010	Integer store non-numeric	○	Not stored [00000]*
	H 0011	Integer store underflow	○	Not stored [−32768]*
	H 0012	Integer store overflow	○	Not stored [+32768]*
Real Number Operation	H 0021	Real number store underflow	○	Not stored [−1. 0E+38]*
	H 0022	Real number store overflow	○	Not stored [1. 0E+38]*
	H 0023	Real number store division by zero error	○	Operation not executed [F Reg.]*
Real Number Operation	H 0030	Real number operation invalid operation (non-numeric)	×	Operation not executed [F Reg.]*
	H 0031	Real number operation exponent underflow	×	0.0 (F register)
	H 0032	Real number operation exponent overflow	×	Maximum value (F register)
	H 0033	Real number operation division error (non-numeric, 0/0)	×	Operation not performed
	H 0034	Real number store exponent underflow	×	0.0 Store
Real Number Operation	H 0040 to H 0056	Real number operation error in system function	×	Operation is stopped, and 0.0 function output and F register become 0.0.
		H 0040: SQRT 0041: SIN 0042: COS 0043: TAN 0044: ASIN 0045: ACOS 0046: ATAN 0047: EXP H 0048 : LN 0049 : LOG 004A : DB-A 004B : DB-B 004C : LIM 004D : PI 004E : PD 004F : PID H 0050: LAG 0051: LLAG 0052: FGN 0053: IFGN 0054: LAU 0055: SLAU 0056: REM Add H1000 or H2000 for index error.		

*The numeric values in [ ] are set in DW00003, DW00006, DF00006 as default values by the system before user operation error drawing is executed.

Note: *Mark ○—Can set a value other than system default by using user program.*
Mark ×—Cannot set another value because the system default value is fixed.

Table 4.10 Error Code for Index Error

	Err-Code	Error Contents	User	System Default
Integer and Real Number Operation	H 1000	Index error in DWG	×	Executes at i, j=0 again.
	H 2000	Index error in functions	×	
Integer Operation		Index error in integer-type system functions	×	Operation terminates. Register A is intact.
	HX060 to HX077 X:1 or 2	H X060: START X061: IN X062: OUT X063: BIN X064: BCD X065: PARITY X066: ROTL X067: ROTR	H X068 : MOVB X069 : MOVW X06A : XCHG X06B : DZA X06C : DZB X06D : LIM X06E : PI X06F : PD	H X070: PID X071: LAG X072: LLAG X073: FGN X074: IFGN X075: LAU X076: SLAU X077: SMOV

Note: *If an error occurs, the system continues operation after the index values (i and j) are set to 0 temporarily. This status (i=j=0) remains until the operation is changed to relay operation with index from numeric operation with index, and vice versa. For the index register values (i and j) remain the same as before the error occurring. It can be changed into the error processing drawing.*

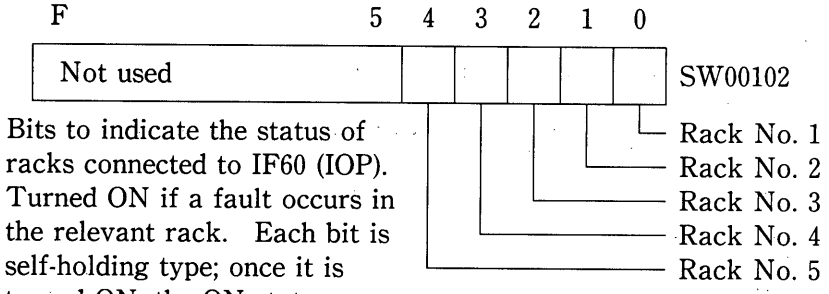
4.3 CORRECTIVE ACTIONS FOR I/O ERROR

If an error occurs in process I/O (local, remote, CP-213IF transmission, LINK transmission), the error information is stored in the system I/O status area. Use the programming panel register display function to display these statuses and check which module is faulty.

Table 4.11 System I/O Status

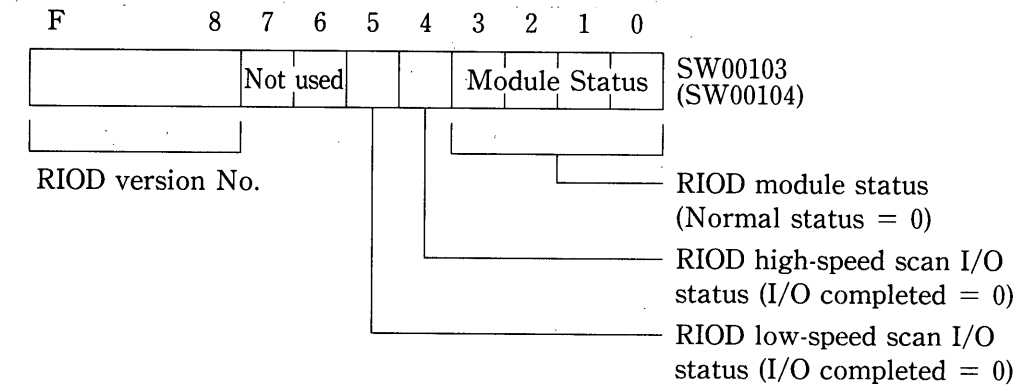
No.	Item	Data Address	Contents
1	Error count	SW00100	Only one added each time an error occurs.
2	Error address	SW00101	The latest occurring error I/O address is stored. When another I/O error occurs, the previously stored data are erased.
3	Local I/O rack status	SW00102	Indicates the status of local I/O racks Nos. 1 to 5.
4	Remote I/O status	SW00103 SW00104	Indicates IF62 (RIOD) module version No. and I/O status.
5	Communication module status	SW00105 SW00106	Indicates IF60 (IOP)/IF61 (COMM) module version No. and status.
6	CP-213IF (line 0) control word and status	SW00108 to SW00111	Indicates control word and status between IF63 (213IF) and CPU.
7	CP-213IF (line 1) control word and status	SW00112 to SW00115	
8	CP-213IF (line 2) control word and status	SW00116 to SW00119	
9	CP-213IF (line 3) control word and status	SW00120 to SW00123	
10	Word status (input data)	SB001300 to SB00385F	If an error occurs in the units of one-word input data, the relay is turned ON. When the input is executed properly, it is turned OFF. Input data are not changed by one error (previous data) but changed to 0 (all OFF) if errors occur twice continuously.
11	Word status (output data)	SB004000 to SB00655F	If an error occurs in the units of one-word output data, this relay is turned ON. When the output is executed properly, it is turned OFF.

(a) Local I/O rack status

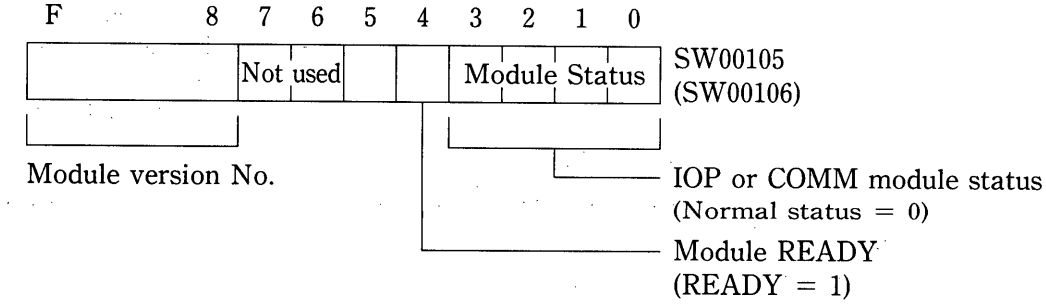


Bits to indicate the status of racks connected to IF60 (IOP). Turned ON if a fault occurs in the relevant rack. Each bit is self-holding type; once it is turned ON, the ON status continues unless the CPU is reset or it is reset by the user.

(b) Remote I/O status



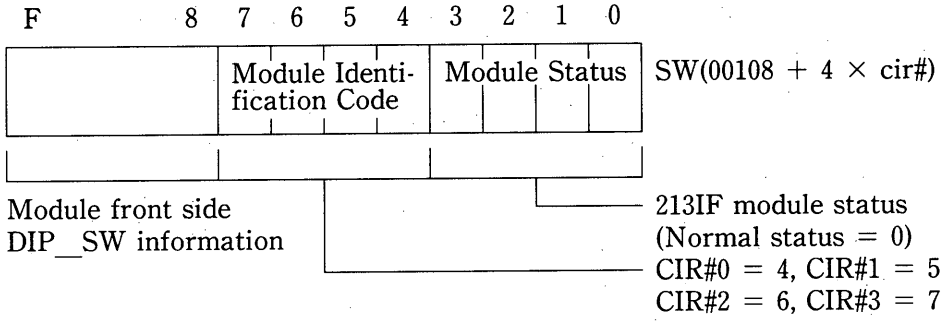
(c) Communication module status



To communicate with other machines using system function [COMM], activate system function [COMM] after SB001054 is turned ON when the IOP port is used or SB001064 is turned ON when the COMM port is used.

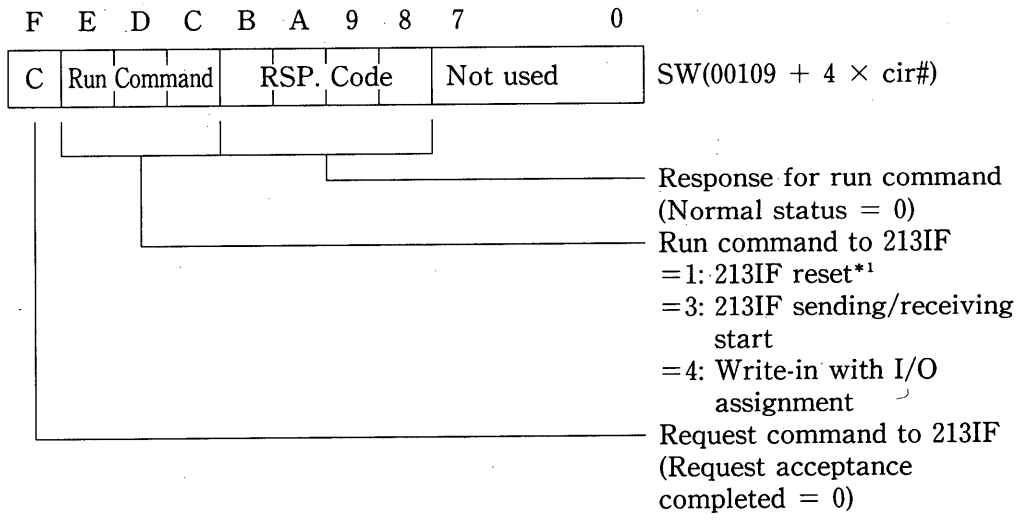
(d) CP-213IF control word and status

CP-213IF status



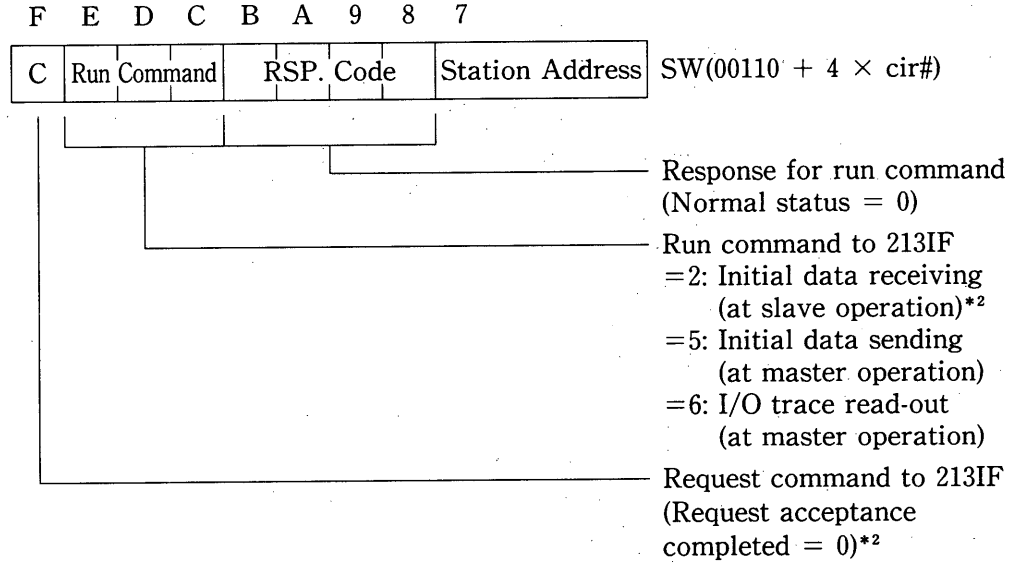
CP-213IF control word-1

A copy when run command and write-in command with I/O assignment are given from the CPU to 213IF



CP-213IF control word-2

A copy of initial data write-in to the 213IF and I/O trace read-out command

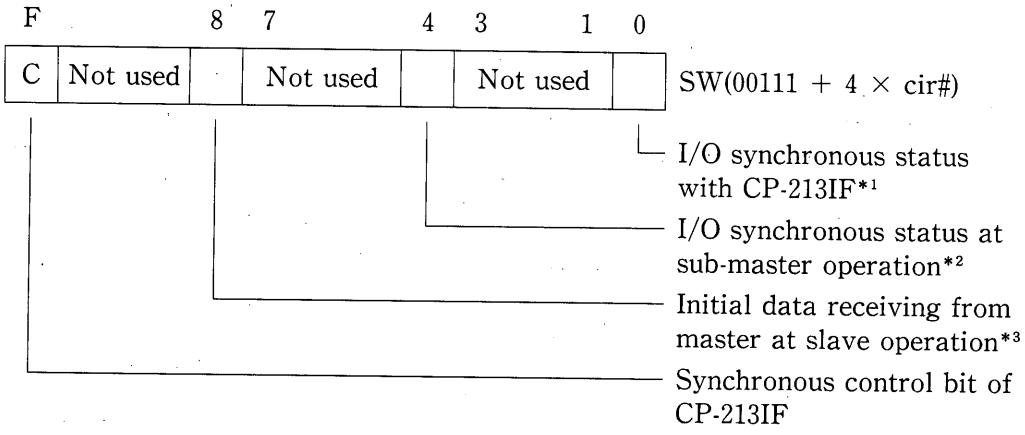


*1 When the CPU is activated by memory initialization, if the 213IF is mounted, the reset command is output from the CPU.

*2 When the CP-3300 is a slave on the line of the 213IF, cotrol word-2 is always in the waiting status for receiving the initial data (request command to the 213IF = 1). When the initial data are received from the master, the received initial data are stored in the M-register specified by CP-213 I/O assignment and it is entered again in the waiting status for receiving the initial data.

CP-213IF control word-3

A control word indicates I/O processing status of CP-213IF.



*1 Indicates whether the CP-213IF has completed I/O processing within the synchronization scan set by the CP-213IF I/O assignment.
=0: Completed.
=1: Not completed. At this time, the input register data in the CPU is not updated but the previous value is held.

*2 Indicates whether I/O processing with the slave station has been completed within the CPU scan when the CP-3300 is operating as a sub-master on the CP-213IF line.
=0: Completed.
=1: Not completed. At this time, the input register data in the CPU is not updated but the previous value is held.

*3 Turned ON only for one scan when the CP-3300 is operating as a slave on the CP-213IF line and the initial data are received from the master.

Table 4.12 Correspondence between Input Word Status and Input Address

Status : Input Addr.	Status : Input Addr.	Status : Input Addr.	Status : Input Addr.
SW00130 : IW0000~	SW00146 : IW0100~	SW00162 : IW0200~	SW00178 : IW0300~
SW00131 : IW0010~	SW00147 : IW0110~	SW00163 : IW0210~	SW00179 : IW0310~
SW00132 : IW0020~	SW00148 : IW0120~	SW00164 : IW0220~	SW00180 : IW0320~
SW00133 : IW0030~	SW00149 : IW0130~	SW00165 : IW0230~	SW00181 : IW0330~
SW00134 : IW0040~	SW00150 : IW0140~	SW00166 : IW0240~	SW00182 : IW0340~
SW00135 : IW0050~	SW00151 : IW0150~	SW00167 : IW0250~	SW00183 : IW0350~
SW00136 : IW0060~	SW00152 : IW0160~	SW00168 : IW0260~	SW00184 : IW0360~
SW00137 : IW0070~	SW00153 : IW0170~	SW00169 : IW0270~	SW00185 : IW0370~
SW00138 : IW0080~	SW00154 : IW0180~	SW00170 : IW0280~	SW00186 : IW0380~
SW00139 : IW0090~	SW00155 : IW0190~	SW00171 : IW0290~	SW00187 : IW0390~
SW00140 : IW00A0~	SW00156 : IW01A0~	SW00172 : IW02A0~	SW00188 : IW03A0~
SW00141 : IW00B0~	SW00157 : IW01B0~	SW00173 : IW02B0~	SW00189 : IW03B0~
SW00142 : IW00C0~	SW00158 : IW01C0~	SW00174 : IW02C0~	SW00190 : IW03C0~
SW00143 : IW00D0~	SW00159 : IW01D0~	SW00175 : IW02D0~	SW00191 : IW03D0~
SW00144 : IW00E0~	SW00160 : IW01E0~	SW00176 : IW02E0~	SW00192 : IW03E0~
SW00145 : IW00F0~	SW00161 : IW01F0~	SW00177 : IW02F0~	SW00193 : IW03F0~
SW00194 : IW0400~	SW00210 : IW0500~	SW00226 : IW0600~	SW00242 : IW0700~
SW00195 : IW0410~	SW00211 : IW0510~	SW00227 : IW0610~	SW00243 : IW0710~
SW00196 : IW0420~	SW00212 : IW0520~	SW00228 : IW0620~	SW00244 : IW0720~
SW00197 : IW0430~	SW00213 : IW0530~	SW00229 : IW0630~	SW00245 : IW0730~
SW00198 : IW0440~	SW00214 : IW0540~	SW00230 : IW0640~	SW00246 : IW0740~
SW00199 : IW0450~	SW00215 : IW0550~	SW00231 : IW0650~	SW00247 : IW0750~
SW00200 : IW0460~	SW00216 : IW0560~	SW00232 : IW0660~	SW00248 : IW0760~
SW00201 : IW0470~	SW00217 : IW0570~	SW00233 : IW0670~	SW00249 : IW0770~
SW00202 : IW0480~	SW00218 : IW0580~	SW00234 : IW0680~	SW00250 : IW0780~
SW00203 : IW0490~	SW00219 : IW0590~	SW00235 : IW0690~	SW00251 : IW0790~
SW00204 : IW04A0~	SW00220 : IW05A0~	SW00236 : IW06A0~	SW00252 : IW07A0~
SW00205 : IW04B0~	SW00221 : IW05B0~	SW00237 : IW06B0~	SW00253 : IW07B0~
SW00206 : IW04C0~	SW00222 : IW05C0~	SW00238 : IW06C0~	SW00254 : IW07C0~
SW00207 : IW04D0~	SW00223 : IW05D0~	SW00239 : IW06D0~	SW00255 : IW07D0~
SW00208 : IW04E0~	SW00224 : IW05E0~	SW00240 : IW06E0~	SW00256 : IW07E0~
SW00209 : IW04F0~	SW00225 : IW05F0~	SW00241 : IW06F0~	SW00257 : IW07F0~
SW00258 : IW0800~	SW00274 : IW0900~	SW00290 : IW0A00~	SW00306 : IW0B00~
SW00259 : IW0810~	SW00275 : IW0910~	SW00291 : IW0A10~	SW00307 : IW0B10~
SW00260 : IW0820~	SW00276 : IW0920~	SW00292 : IW0A20~	SW00308 : IW0B20~
SW00261 : IW0830~	SW00277 : IW0930~	SW00293 : IW0A30~	SW00309 : IW0B30~
SW00262 : IW0840~	SW00278 : IW0940~	SW00294 : IW0A40~	SW00310 : IW0B40~
SW00263 : IW0850~	SW00279 : IW0950~	SW00295 : IW0A50~	SW00311 : IW0B50~
SW00264 : IW0860~	SW00280 : IW0960~	SW00296 : IW0A60~	SW00132 : IW0B60~
SW00265 : IW0870~	SW00281 : IW0970~	SW00297 : IW0A70~	SW00313 : IW0B70~
SW00266 : IW0880~	SW00282 : IW0980~	SW00298 : IW0A80~	SW00314 : IW0B80~
SW00267 : IW0890~	SW00283 : IW0990~	SW00299 : IW0A90~	SW00315 : IW0B90~
SW00268 : IW08A0~	SW00284 : IW09A0~	SW00300 : IW0AA0~	SW00316 : IW0BA0~
SW00269 : IW08B0~	SW00285 : IW09B0~	SW00301 : IW0AB0~	SW00317 : IW0BB0~
SW00270 : IW08C0~	SW00286 : IW09C0~	SW00302 : IW0AC0~	SW00318 : IW0BC0~
SW00271 : IW08D0~	SW00287 : IW09D0~	SW00303 : IW0AD0~	SW00319 : IW0BD0~
SW00272 : IW08E0~	SW00288 : IW09E0~	SW00304 : IW0AE0~	SW00320 : IW0BE0~
SW00273 : IW08F0~	SW00289 : IW09F0~	SW00305 : IW0AF0~	SW00321 : IW0BF0~

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Status : Input Addr.	Status : Input Addr.	Status : Input Addr.	Status : Input Addr.
SW00322 : IW0C00~	SW00338 : IW0D00~	SW00354 : IW0E00~	SW00370 : IW0F00~
SW00323 : IW0C10~	SW00339 : IW0D10~	SW00355 : IW0E10~	SW00371 : IW0F10~
SW00324 : IW0C20~	SW00340 : IW0D20~	SW00356 : IW0E20~	SW00372 : IW0F20~
SW00325 : IW0C30~	SW00341 : IW0D30~	SW00357 : IW0E30~	SW00373 : IW0F30~
SW00326 : IW0C40~	SW00342 : IW0D40~	SW00358 : IW0E40~	SW00374 : IW0F40~
SW00327 : IW0C50~	SW00343 : IW0D50~	SW00359 : IW0E50~	SW00375 : IW0F50~
SW00328 : IW0C60~	SW00344 : IW0D60~	SW00360 : IW0E60~	SW00376 : IW0F60~
SW00329 : IW0C70~	SW00345 : IW0D70~	SW00361 : IW0E70~	SW00377 : IW0F70~
SW00330 : IW0C80~	SW00346 : IW0D80~	SW00362 : IW0E80~	SW00378 : IW0F80~
SW00331 : IW0C90~	SW00347 : IW0D90~	SW00363 : IW0E90~	SW00379 : IW0F90~
SW00332 : IW0CA0~	SW00348 : IW0DA0~	SW00364 : IW0EA0~	SW00380 : IW0FA0~
SW00333 : IW0CB0~	SW00349 : IW0DB0~	SW00365 : IW0EB0~	SW00381 : IW0FB0~
SW00334 : IW0CC0~	SW00350 : IW0DC0~	SW00366 : IW0EC0~	SW00382 : IW0FC0~
SW00335 : IW0CD0~	SW00351 : IW0DD0~	SW00367 : IW0ED0~	SW00383 : IW0FD0~
SW00336 : IW0CE0~	SW00352 : IW0DE0~	SW00368 : IW0EE0~	SW00384 : IW0FE0~
SW00337 : IW0CF0~	SW00353 : IW0DF0~	SW00369 : IW0EF0~	SW00385 : IW0FF0~

Table 4.13 Correspondence between Output Word Status and Output Address

Status : Output Addr.	Status : Output Addr.	Status : Output Addr.	Status : Output Addr.
SW00400 : OW0000~	SW00416 : OW0100~	SW00432 : OW0200~	SW00448 : OW0300~
SW00401 : OW0010~	SW00417 : OW0110~	SW00433 : OW0210~	SW00449 : OW0310~
SW00402 : OW0020~	SW00418 : OW0120~	SW00434 : OW0220~	SW00450 : OW0320~
SW00403 : OW0030~	SW00419 : OW0130~	SW00435 : OW0230~	SW00451 : OW0330~
SW00404 : OW0040~	SW00420 : OW0140~	SW00436 : OW0240~	SW00452 : OW0340~
SW00405 : OW0050~	SW00421 : OW0150~	SW00437 : OW0250~	SW00453 : OW0350~
SW00406 : OW0060~	SW00422 : OW0160~	SW00438 : OW0260~	SW00454 : OW0360~
SW00407 : OW0070~	SW00423 : OW0170~	SW00439 : OW0270~	SW00455 : OW0370~
SW00408 : OW0080~	SW00424 : OW0180~	SW00440 : OW0280~	SW00456 : OW0380~
SW00409 : OW0090~	SW00425 : OW0190~	SW00441 : OW0290~	SW00457 : OW0390~
SW00410 : OW00A0~	SW00426 : OW01A0~	SW00442 : OW02A0~	SW00458 : OW03A0~
SW00411 : OW00B0~	SW00427 : OW01B0~	SW00443 : OW02B0~	SW00459 : OW03B0~
SW00412 : OW00C0~	SW00428 : OW01C0~	SW00444 : OW02C0~	SW00460 : OW03C0~
SW00413 : OW00D0~	SW00429 : OW01D0~	SW00445 : OW02D0~	SW00461 : OW03D0~
SW00414 : OW00E0~	SW00430 : OW01E0~	SW00446 : OW02E0~	SW00462 : OW03E0~
SW00415 : OW00F0~	SW00431 : OW01F0~	SW00447 : OW02F0~	SW00463 : OW03F0~
SW00464 : OW0400~	SW00480 : OW0500~	SW00496 : OW0600~	SW00512 : OW0700~
SW00465 : OW0410~	SW00481 : OW0510~	SW00497 : OW0610~	SW00513 : OW0710~
SW00466 : OW0420~	SW00482 : OW0520~	SW00498 : OW0620~	SW00514 : OW0720~
SW00467 : OW0430~	SW00483 : OW0530~	SW00499 : OW0630~	SW00515 : OW0730~
SW00468 : OW0440~	SW00484 : OW0540~	SW00500 : OW0640~	SW00516 : OW0740~
SW00469 : OW0450~	SW00485 : OW0550~	SW00501 : OW0650~	SW00517 : OW0750~
SW00470 : OW0460~	SW00486 : OW0560~	SW00502 : OW0660~	SW00518 : OW0760~
SW00471 : OW0470~	SW00487 : OW0570~	SW00503 : OW0670~	SW00519 : OW0770~
SW00472 : OW0480~	SW00488 : OW0580~	SW00504 : OW0680~	SW00520 : OW0780~
SW00473 : OW0490~	SW00489 : OW0590~	SW00505 : OW0690~	SW00521 : OW0790~
SW00474 : OW04A0~	SW00490 : OW05A0~	SW00506 : OW06A0~	SW00522 : OW07A0~
SW00475 : OW04B0~	SW00491 : OW05B0~	SW00507 : OW06B0~	SW00523 : OW07B0~
SW00476 : OW04C0~	SW00492 : OW05C0~	SW00508 : OW06C0~	SW00524 : OW07C0~
SW00477 : OW04D0~	SW00493 : OW05D0~	SW00509 : OW06D0~	SW00525 : OW07D0~
SW00478 : OW04E0~	SW00494 : OW05E0~	SW00510 : OW06E0~	SW00526 : OW07E0~
SW00479 : OW04F0~	SW00495 : OW05F0~	SW00511 : OW06F0~	SW00527 : OW07F0~
SW00528 : OW0800~	SW00544 : OW0900~	SW00560 : OW0A00~	SW00576 : OW0B00~
SW00529 : OW0810~	SW00545 : OW0910~	SW00561 : OW0A10~	SW00577 : OW0B10~
SW00530 : OW0820~	SW00546 : OW0920~	SW00562 : OW0A20~	SW00578 : OW0B20~
SW00531 : OW0830~	SW00547 : OW0930~	SW00563 : OW0A30~	SW00579 : OW0B30~
SW00532 : OW0840~	SW00548 : OW0940~	SW00564 : OW0A40~	SW00580 : OW0B40~
SW00533 : OW0850~	SW00549 : OW0950~	SW00565 : OW0A50~	SW00581 : OW0B50~
SW00534 : OW0860~	SW00550 : OW0960~	SW00566 : OW0A60~	SW00582 : OW0B60~
SW00535 : OW0870~	SW00551 : OW0970~	SW00567 : OW0A70~	SW00583 : OW0B70~
SW00536 : OW0880~	SW00552 : OW0980~	SW00568 : OW0A80~	SW00584 : OW0B80~
SW00537 : OW0890~	SW00553 : OW0990~	SW00569 : OW0A90~	SW00585 : OW0B90~
SW00538 : OW08A0~	SW00554 : OW09A0~	SW00570 : OW0AA0~	SW00586 : OW0BA0~
SW00539 : OW08B0~	SW00555 : OW09B0~	SW00571 : OW0AB0~	SW00587 : OW0BB0~
SW00540 : OW08C0~	SW00556 : OW09C0~	SW00572 : OW0AC0~	SW00588 : OW0BC0~
SW00541 : OW08D0~	SW00557 : OW09D0~	SW00573 : OW0AD0~	SW00589 : OW0BD0~
SW00542 : OW08E0~	SW00558 : OW09E0~	SW00574 : OW0AE0~	SW00590 : OW0BE0~
SW00543 : OW08F0~	SW00559 : OW09F0~	SW00575 : OW0AF0~	SW00591 : OW0BF0~

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Status : Output Addr.	Status : Output Addr.	Status : Output Addr.	Status : Output Addr.
SW00592 : OW0C00~	SW00608 : OW0D00~	SW00624 : OW0E00~	SW00640 : OW0F00~
SW00593 : OW0C10~	SW00609 : OW0D10~	SW00625 : OW0E10~	SW00641 : OW0F10~
SW00594 : OW0C20~	SW00610 : OW0D20~	SW00626 : OW0E20~	SW00642 : OW0F20~
SW00595 : OW0C30~	SW00611 : OW0D30~	SW00627 : OW0E30~	SW00643 : OW0F30~
SW00596 : OW0C40~	SW00612 : OW0D40~	SW00628 : OW0E40~	SW00644 : OW0F40~
SW00597 : OW0C50~	SW00613 : OW0D50~	SW00629 : OW0E50~	SW00645 : OW0F50~
SW00598 : OW0C60~	SW00614 : OW0D60~	SW00630 : OW0E60~	SW00646 : OW0F60~
SW00599 : OW0C70~	SW00615 : OW0D70~	SW00631 : OW0E70~	SW00647 : OW0F70~
SW00600 : OW0C80~	SW00616 : OW0D80~	SW00632 : OW0E80~	SW00648 : OW0F80~
SW00601 : OW0C90~	SW00617 : OW0D90~	SW00633 : OW0E90~	SW00649 : OW0F90~
SW00602 : OW0CA0~	SW00618 : OW0DA0~	SW00634 : OW0EA0~	SW00650 : OW0FA0~
SW00603 : OW0CB0~	SW00619 : OW0DB0~	SW00635 : OW0EB0~	SW00651 : OW0FB0~
SW00604 : OW0CC0~	SW00620 : OW0DC0~	SW00636 : OW0EC0~	SW00652 : OW0FC0~
SW00605 : OW0CD0~	SW00621 : OW0DD0~	SW00637 : OW0ED0~	SW00653 : OW0FD0~
SW00606 : OW0CE0~	SW00622 : OW0DE0~	SW00638 : OW0EE0~	SW00654 : OW0FE0~
SW00607 : OW0CF0~	SW00623 : OW0DF0~	SW00639 : OW0EF0~	SW00655 : OW0FF0~

5 DUAL SYNCHRONOUS OPERATION AND PRECAUTIONS

5.1 DUAL SYNCHRONOUS PROCESSING

Synchronous processing between both CPUs is divided mainly into the following three categories as CP-3300 dual synchronous operation:

- Dual follow-up start
- I/O processing at a high/low speed scan
- Synchronous processing in user drawing

(1) Dual Follow-up Start

Dual follow-up start means that synchronous operation starts copying the data memory contents or required system data from the CPU which was started up later and has already been in the [RUN] status through the DSW module.

> **NOTE**
> *I/O Processing of the CPU in [RUN] status will stop for approx. 0.5 to 1 second when performing dual follow-up start. (The stopping time differs depending on the applied system). Therefore, perform dual follow-up start in a status where it does not cause any trouble for the system.*

Error for dual follow-up start

- Data receiving error:
  If data copy fails, the later started CPU will have a data receiving error and this is considered to be an excess or shortage of user drawings in both CPUs. Example, it occurs when a DWG is programmed in the former started CPU but not in the latter CPU.
- Dual synchronous error (See Par. 5.2.):
  When a DWG is programmed in the latter CPU but not in the former CPU, and the DWG is enabled to be executed, a dual synchronous error occurs when operation is shifted to synchronous operation.

(2) I/O Processing at a High/Low Speed Scan

I/O processing is performed as follows:

① When both CPUs start dual synchronous operation, both CPUs are synchronized at the head of high-speed or low-speed scan.

② Both CPUs output identification codes (ID code) of each I/O module (IF6X series module) according to I/O assignment.

③ The ID codes output from both CPUs are compared through the DSW module.

④ After the ID codes are matched, I/O data processing starts. At this time, the data to be output to I/O modules actually are the data from CPU#0.

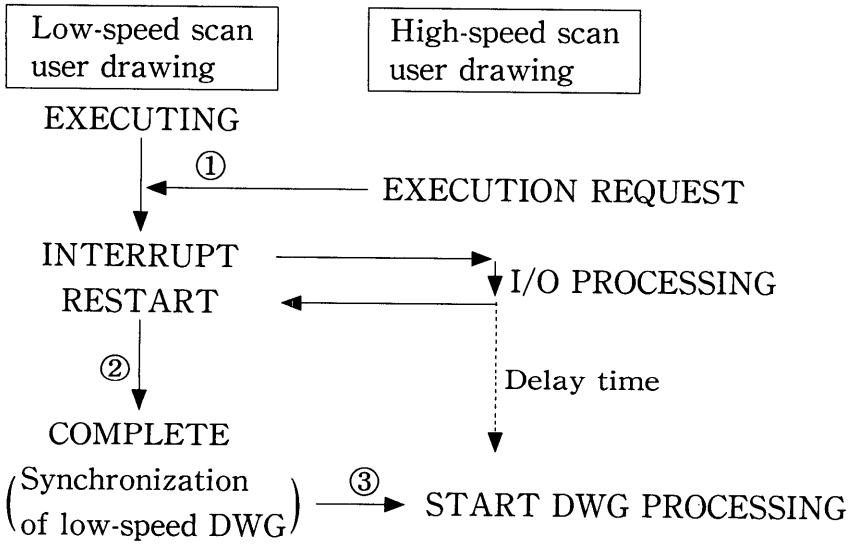
Error for I/O processing

If I/O assignment or application programs are not matched in both CPUs, the [DATA UNM] or [ADDR UNM] LED lamp on DSW module front side blinks. Check and take appropriate corrective action.

(3) Synchronous Processing in User Drawings

At dual synchronous operation, both CPUs are synchronized in the units of user drawings (excluding user definition function). Synchronization of the user drawings is performed when user drawing execution starts and the DEND command is executed.

Example of synchronous processing in user drawings



① If an execution request of high-speed scan is given during execution of a low-speed scan user drawing, the user drawing under execution is interrupted and shifted to I/O processing of high-speed scan [described in (2)].

② The low-speed scan user drawing which has been interrupted is executed completely, and both CPUs are synchronized by DEND command.

③ Then, the high-speed scan user drawing is executed. Therefore, the start of the high-speed scan will be delayed for the execution time (② in the figure above) of low-speed scan user drawing.

5.2 CORRECTIVE ACTIONS AT DUAL SYNCHRONIZATION ERROR OCCURRENCE

When one of the CPUs breaks down because of a dual synchronization error in the CP-3300 dual system, the possible cause may be mismatched application programs or I/O assignment.
Determine the cause of dual synchronization error occurrence in the following way.

① Compare both CPUs as to whether their application programs, I/O assignment and data definition are matched.

② Record the contents of error registers of both CPUs.
Since the execution information at synchronization error detection has been stored in the proper CPU error registers, record the contents without fail. See Table 5.1.

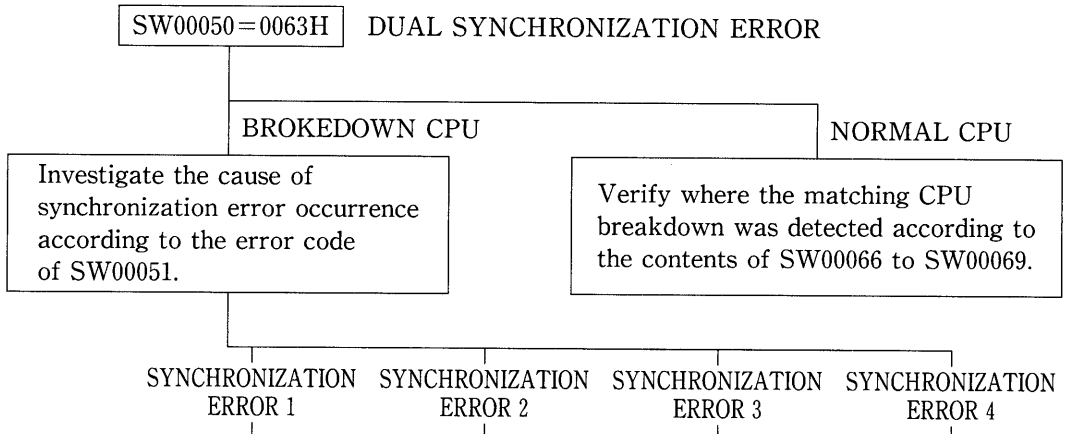
Table 5.1 Error Register to be Referred to at Dual Synchronization Error

Brokedown CPU				Error Register	Normal CPU				Remarks
Syn. Error -1	Syn. Error -2	Syn. Error -3	Syn. Error -4		Syn. Error -1	Syn. Error -2	Syn. Error -3	Syn. Error -4	
H 10XX	H 01XX	H 40XX H 8YXX	H D5XX H DEXX	SW00051*	○	○	○	○	—
○	○	○	○	SW00052	—	—	—	—	Indicates execution address at breakdown.
○	○	○	○	SW00053	—	—	—	—	
○	○	○	○	SW00054	—	—	—	—	Scan code
—	—	—	H 0001	SW00055	—	—	—	—	—
—	—	—	—	SW00056	—	—	—	—	—
—	—	—	○	SW00057	○	○	○	○	DWG No.
—	—	—	—	SW00058 ş SW00065	—	—	—	—	—
○	○	○	○	SW00066	○	○	○	○	Status code
—	—	—	—	SW00067	○	○	○	○	Address where other CPU breakdown is detected
—	—	—	—	SW00068	○	○	○	○	
—	—	—	—	SW00069	○	○	○	○	ID. and scan code

* See ③ on next page.

Note: *Mark ○—Error related to the error register*

③ Investigate the cause according to the contents of SW00051 of the CPU which broke down.



	SW00051=H 10XX	SW00051=H 01XX	SW00051=H 40XX	SW00051=H D5XX (H DEXX)
Contents of Synchronization Error	System synchronization error Mismatched synchronization level or excessive time occurred when both CPUs were synchronized at starting and completion of high-/low-speed scan and programming panel service scan processing.	Module ID error Mismatching or excessive time occurred in the identification code of the slave module (IF6X series) which is output from both CPUs at I/O processing.	I/O synchronization error Mismatched synchronization level or excessive time occurred at synchronization during system I/O processing.	DWG synchronization error Mismatched synchronization level or excessive time occurred in both CPUs at starting of user DWG execution and at execution of the DEND command.
Cause of Synchronization Error	Mismatched application programs of both CPUs can be considered.	Mismatched I/O assignment of both CPUs or mismatched use of system functions can be considered.	Mismatched I/O assignment of both CPUs or mismatched parameter setting of system functions (especially master functions) can be considered.	Mismatched application programs of both CPUs can be considered.

5

Control Pack CP-3300

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