

Panasonic®

PROGRAMMABLE CONTROLLER

FP3/FP5

DATA PROCESS UNIT

Technical Manual

FP3/FP5 DATA PROCESS UNIT Technical Manual
ACG-M0017-2 '93.10

Matsushita Electric Works, Ltd.

Safety Precautions

Observe the following notices to ensure personal safety or to prevent accidents.

To ensure that you use this product correctly, read this User's Manual thoroughly before use.

Make sure that you fully understand the product and information on safe.

This manual uses two safety flags to indicate different levels of danger.

WARNING

If critical situations that could lead to user's death or serious injury is assumed by mishandling of the product.

- Always take precautions to ensure the overall safety of your system, so that the whole system remains safe in the event of failure of this product or other external factor.
- Do not use this product in areas with inflammable gas. It could lead to an explosion.
- Exposing this product to excessive heat or open flames could cause damage to the lithium battery or other electronic parts.

CAUTION

If critical situations that could lead to user's injury or only property damage is assumed by mishandling of the product.

- To prevent abnormal exothermic heat or smoke generation, use this product at the values less than the maximum of the characteristics and performance that are assured in these specifications.
- Do not dismantle or remodel the product. It could lead to abnormal exothermic heat or smoke generation.
- Do not touch the terminal while turning on electricity. It could lead to an electric shock..
- Use the external devices to function the emergency stop and interlock circuit.
- Connect the wires or connectors securely.
The loose connection might cause abnormal exothermic heat or smoke generation
- Do not allow foreign matters such as liquid, flammable materials, metals to go into the inside of the product. It might cause exothermic heat or smoke generation.
- Do not undertake construction (such as connection and disconnection) while the power supply is on.

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INTRODUCTION

The Data Processing Unit performs data processing with BASIC language programs and lightens the processing load on the Central Processing Unit.

The Data Processing Unit further enhances the FP3/FP3-B and FP5 systems, since it performs advanced data processing using BASIC language.

This manual provides an introduction to the Data Processing Unit and describes the operating procedures. For information on programming and DP-BASIC, refer to *DP-BASIC Reference Manual*.

CONTENTS

Before Beginning/ Limited Warranty / Introduction/ Contents/ Before Using the Data Processing Unit

Chapter 1 **Features and System Configuration**

Describes the features and system configuration of the Data Processing Unit.

Features2
System Configuration2

Chapter 2 **Specifications**

Describes the specifications and external dimensions of the Data Processing Unit.

General Specifications6
Performance6
Interface Specifications7
Dimensions9

Chapter 3 **Names and Functions**

Describes the functions of the Data Processing Unit.

Names 12
Functions 12
Operating Modes 14
System Functions 15
Writing/Reading with the CPU 16

Chapter 4 System Installation

Describes how to mount the Data Processing Unit on CPU and connect it to the external device.

Mounting the Unit	22
Connecting to a Terminal	22

Chapter 5 Test Run

Describes precautions before test run and provides a flowchart of the test run procedure.

Before Test Run	24
Test Run (Operational Check) Procedure	25

Chapter 6 Troubleshooting

Describes the recovery procedures with the flowchart in the event the Data Processing Unit fails to operate properly.

Troubleshooting	28
Self Diagnosis	28
Flowchart with Power On	29

Chapter 7 Maintenance

Describes the daily system inspection and how to replace the battery.

Inspection	36
Replacement Parts and Procedures	36

Before Using the Data Processing Unit

PACKING LIST

The package of the Data Processing Unit contains the following items.
Check them before use.

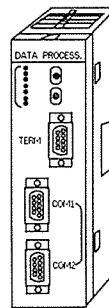
Data Processing Unit

9-pin D-subminiature connectors

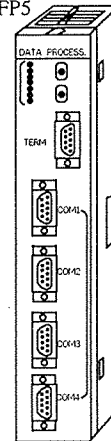
For FP3/FP3-B: 3 pcs.

For FP5: 5 pcs.

For FP3 and FP3-B

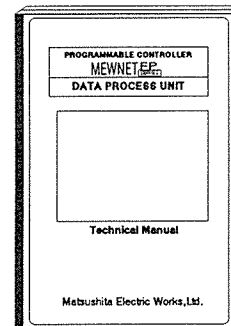


For FP5



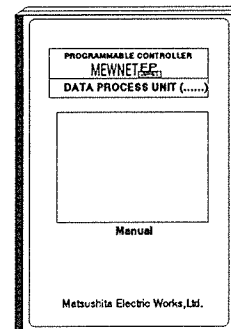
Technical Manual (The manual you are now reading.)

This manual describes the basic system information and operations.
Read this manual first.



Manual

This manual describes in detail the programming and the statements of DP-BASIC.
Read the appropriate sections for your purpose.



SYMBOLS USED IN THE MANUAL

- Note* Signifies a precaution or restriction.
[] Signifies characters or values to be entered or an important section.
() Signifies a supplementary description.

Chapter 1

Features and System Configuration

This chapter describes the features and system configuration of the Data Processing Unit (DPU).

Features

The Data Processing Unit (DPU) is similar to the system unit of a personal computer because it's capable of executing programs by itself. The terminal device (your personal computer) functions as the display and keyboard.

Data processing with BASIC language programs.

The Data Processing Unit performs data processing with the DP-BASIC programming language. You can create advanced and efficient programs using the familiar BASIC language.

Multiple-task programs (Multitasking).

A maximum of four tasks can be processed simultaneously.

Internal processing of data lightens the processing load on the Central Processing Unit (CPU).

The Data Processing Unit shows its power when a terminal device that processes large amounts of data such as numeric information is connected.

Processor (16 bit) built into DPU for high-speed processing.

Uses the terminal compatible with VT-100 for programming.

You can use any personal computer having the RS-232-C interface by executing VT-100 emulator software on it.

Motion unit functions.

Connect multiple display units (console), personal computers or printers to the Data Processing Unit, and you can display or print out production information and the operating status of machines.

Image processing system using an Image Checker.

The Data Processing Unit processes data from an Image Checker.

System Configuration

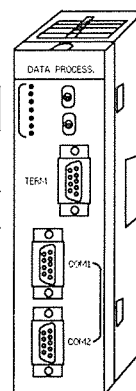
You can use the Data Processing Unit by mounting it on a motherboard, expansion motherboard or remote I/O slave station. The number of DPU's that you can mount on one CPU depends on the capacity of the power supply unit. The hardware configuration of the Data Processing Unit and system configuration example with peripheral devices are described in the following.

Hardware Configuration of the Data Processing Unit

The Data Processing Unit provides an RS-232-C interface for connecting to a programming device and other interfaces for connection to peripheral devices.

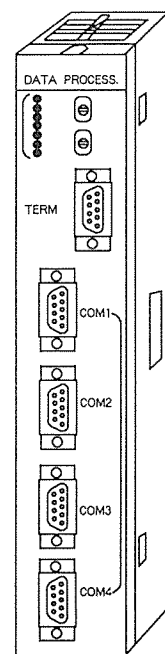
For FP5

For a programming device:
1 channel
For interface:
4 channels for RS-232-C



For FP3/FP3-B

For a programming device: 1 channel
For interface:
2 channels for RS-232-C

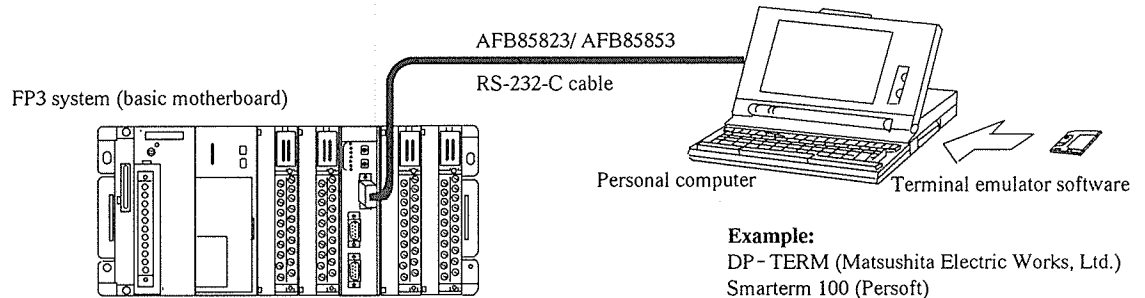


System Configuration Example

Terminal connection: When programming/debugging with the Data Processing Unit, connect a terminal. Any terminal compatible with the DEC VT-100 can be used.

If you use IBM PC AT personal computer, use [DP-TERM] and the terminal emulator software so that the personal computer functions as a VT-100 compatible terminal.

Programs are saved onto the memory in the Data Processing Unit through the RS-232-C cable.



Suitable cables

(Serial data unit to I/O device connection): RS-232-C cable: 9 pin to 9 pin, cross type, 3 m/10 ft. AFB85823 or AFB85853.

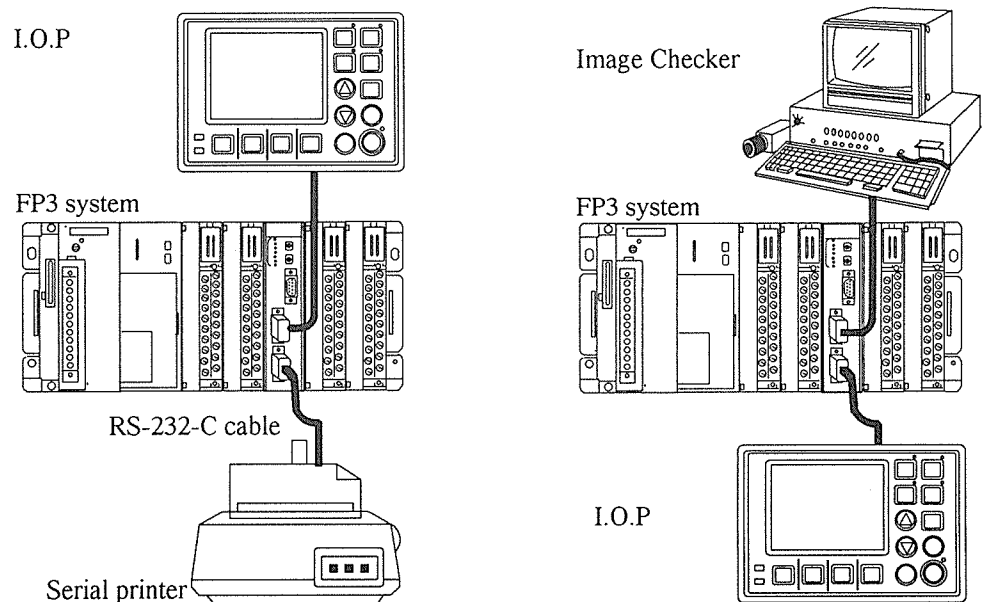
Emulator software: DP-TERM(Terminal software for the Data Processing Unit) FP866518

What is the VT-100?: The VT-100 is a typical terminal which connects to DEC minicomputers. To use a personal computer instead of the VT-100, use a terminal emulator software on the personal computer.

Applications

Monitoring system using an I.O.P.: Connect an I.O.P. (display unit) to COM1: and a serial printer to COM2:. A record of any error can be simultaneously printed out while monitoring a process.

Image processing system: Connect an image checker and an I.O.P. (display unit) to configure an inspection system.



Chapter 2

Specifications

This chapter describes the features and system configuration of the Data Processing Unit (DPU).

General Specifications

Operating temperature	0 to 55 °C /32 to 131 °F
Operating humidity	30 to 85%RH (non-condensing)
Storage temperature	- 20 to 70 °C /- 7.6 to 158 °F
Storage humidity	30 to 85%RH (non-condensing)
Vibration resistance	10 to 55 Hz, 1 cycle/minute, double amplitude 0.03 in./0.75mm, 10 minutes for each of the X, Y and Z directions
Shock resistance	10 G or more, 4 times in each of the X, Y and Z directions
Noise resistance	1000 Vp-p, <i>Pulse width</i> , 50 nanosec. to 1 microsec. (using noise simulator)
Operating condition	Free of corrosive gases and excessive dust.
Current consumption	300 milliA or less (5 V DC)
Weight	Approx. 330 g/11.655 oz.(for FP3/FP3-B), Approx. 610 g/ 21.545 oz.(for FP5)

Performance

Processor	V50 (NEC)
User memory (For program and data area)	96 K bytes (for FP3/FP3-B) 160 K bytes (for FP5)
Programming language	DP-BASIC(interpreter) 17 key commands, 39 statements, 41 functions
Multitasking	4 tasks maximum
Calendar	Year, month, day, hours, minutes, seconds, and day of week (accuracy: ± 21 second per day at 25°C /77°F)
Number of occupied I/O points	<i>I/Opoints</i> : 16
Interface	<i>For programming device:</i> 1 channel for RS-232-C <i>For peripheral device:</i> 2 channels (FP3/FP3-B) for RS -232-C 4 channels (FP5) for RS-232-C
Self diagnosis	Memory check, watchdog timer, battery error detection at power on
Writing/Reading with CPU	Shared (2 K byte) memory. Read and write operations by high level instructions F150 and F151 for CPU (READ and WRITE for FP-BASIC).
Backup time (guaranteed value/typical value)	25,000 hours/50,000 hours

Interface Specification

For Programming Device (TERM)

Interface RS-232-C

Bit rate 9600 bps

Transmission method Full duplex

Synchronous method A synchronous

Transmission data format *Data length:* 8 bits
Parity: none
Stop bit: 1 bit

Maximum buffer 255 characters

Connectable terminal

VT-100 (DEC) compatible

VT-100 compatibility can be achieved with a personal computer and emulation software.(DP-TERM)

RS-232-C interface specifications

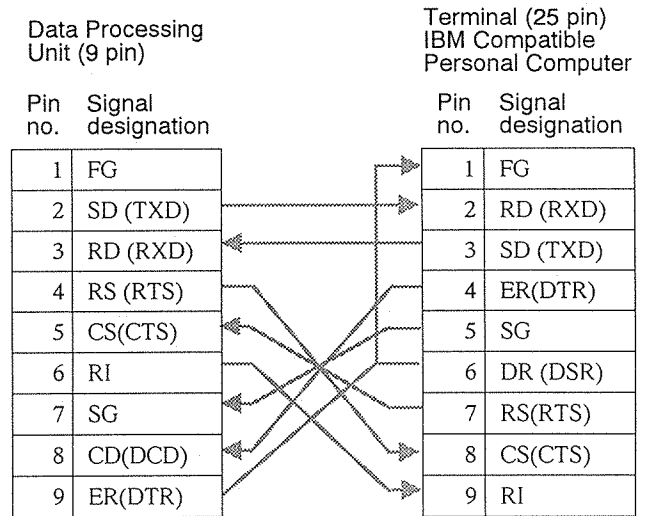
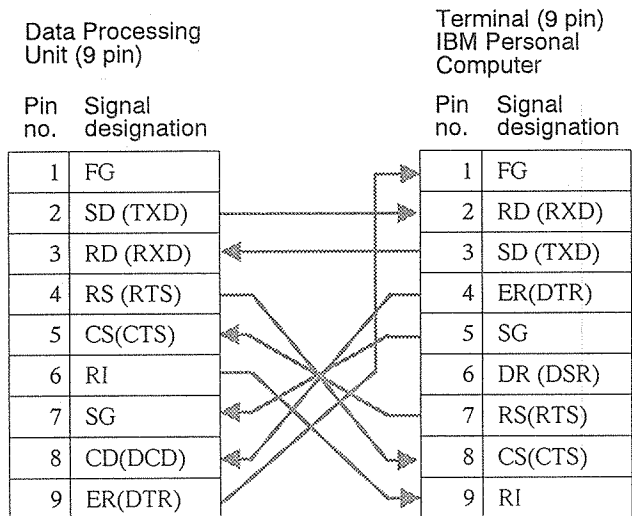
Pins 8 and 9 will be shorted within the Data Processing Unit.

Pin no.	Specification	Designation	Direction	
			DTE	DCE
1	Frame ground	FG	-----	-----
2	Send data	SD	----->	-----
3	Receive data	RD	-----<	-----
4	Request to send	RS	----->	-----
5				
6				
7	Signal ground	SG	-----	-----
8				
9				

Example

AFB85823 is used for the connecting cable.

AFB85853 is used for the connecting cable.



For Peripheral Device (COM 1 to COM 4)

Interface RS-232-C

Bit rate 300/600/1200/2400/4800/9600 /19200 bps

Transmission method Half duplex

Synchronous method Asynchronous

Transmission data format: *Data length:* 7 or 8 bits
Parity: none/even/odd
Stop bit: 1 or 2 bits

Maximum buffer 255 characters/COM

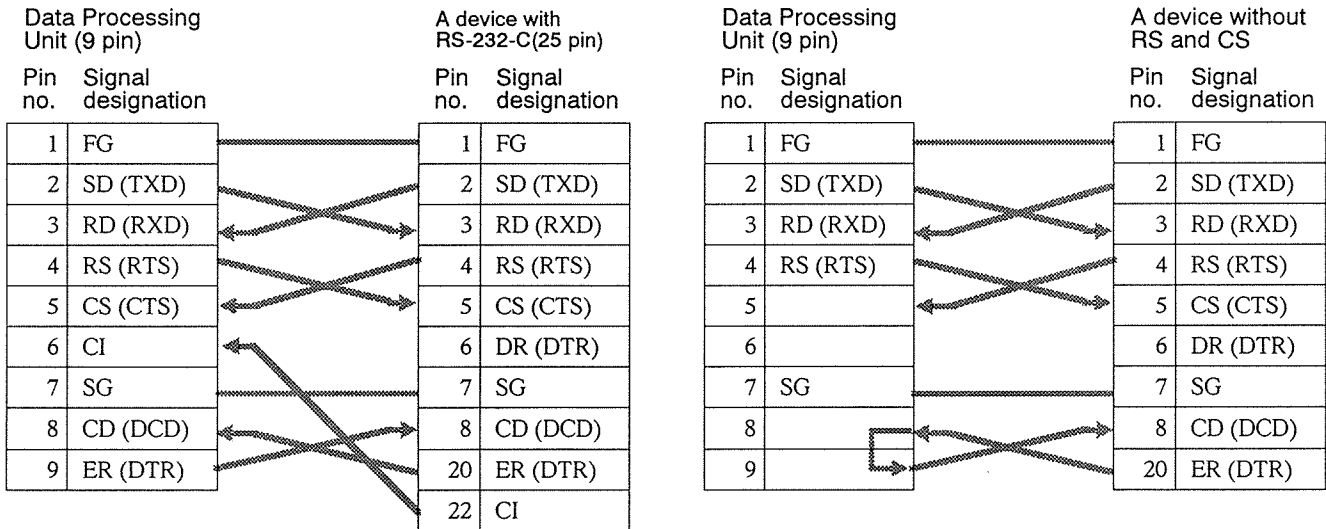
RS-232-C interface specifications

The RS and ER signals are normally active outputs. CD can be controlled by the OPEN statement and CI can be controlled by the CI command. CS cannot output the transmit data unless you input an active signal.

Pin no.	Specification	Designation	Direction	
			DTE	DCE
1	Frame ground	FG	-----	-----
2	Send data	SD	----->	-----
3	Receive data	RD	-----	-----<
4	Request to send	RS	----->	-----
5	Clear to send	CS	-----	-----<
6	Call indicator	CI	-----	-----<
7	Signal ground	SG	-----	-----
8	Receive carrier de-	CD	-----	-----<
9	Data terminal	ER	----->	-----

Example 1: Connection to a personal computer

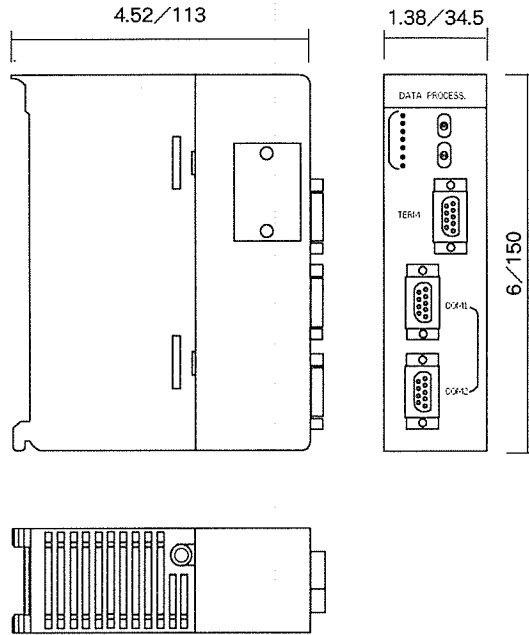
Example 2: Connection to a device that does not provide RS and CS (I.O.P.)



Dimensions

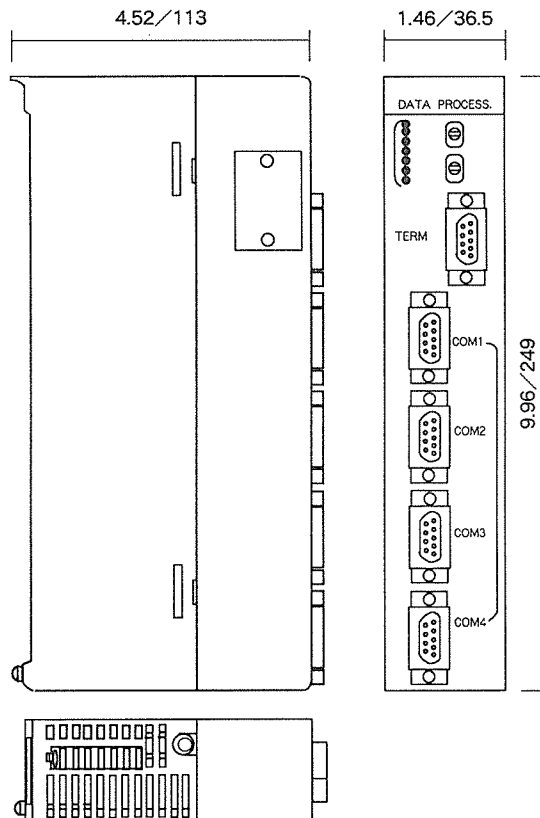
Unit for FP3/FP3-B

Unit: inch/mm



Unit for FP5

Unit: inch/mm



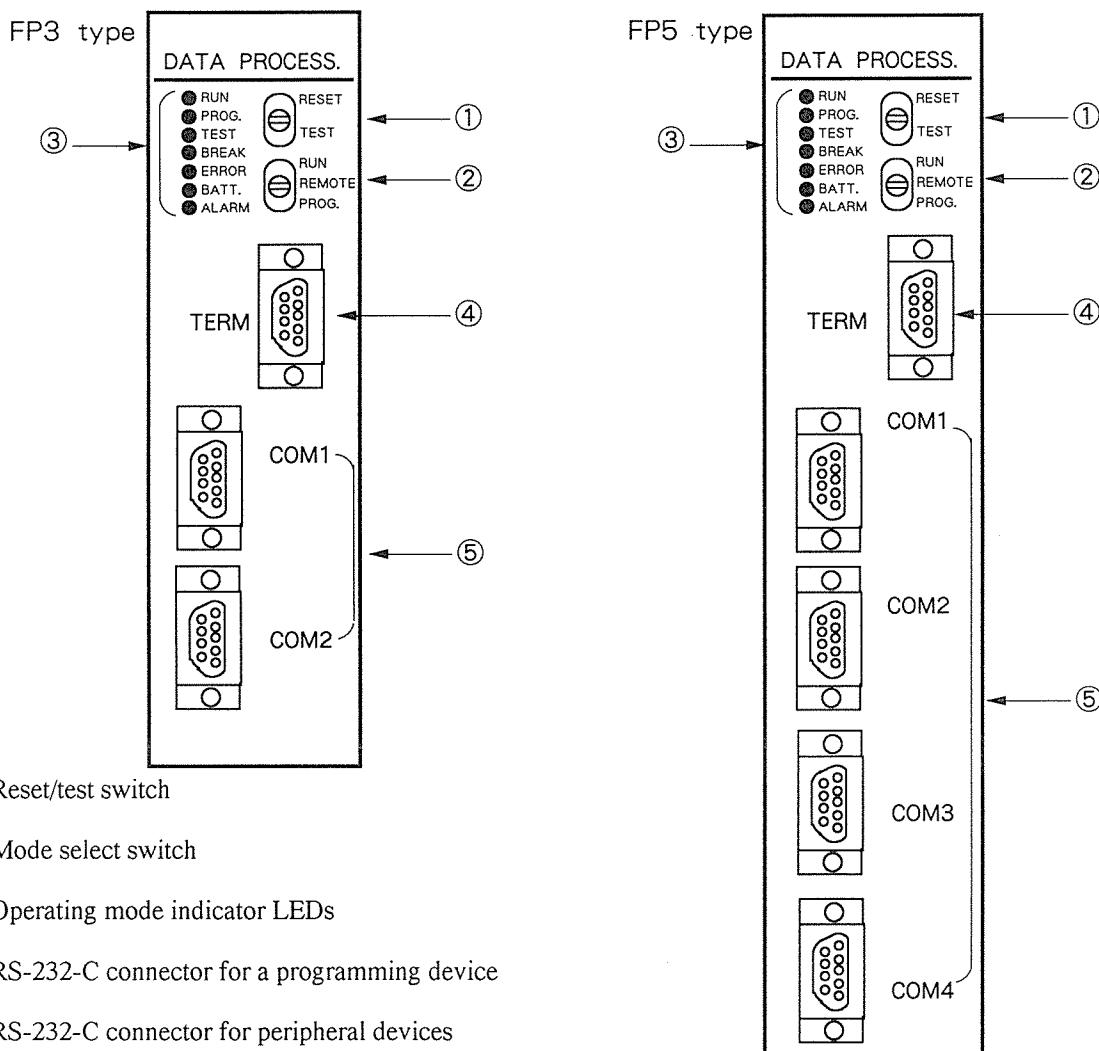
Chapter 3

Names and Functions

This chapter describes the function of each part of the Data Processing Unit (DPU).

Names

Each part on the front panel for the Data Processing Unit are shown below.



- ① Reset/test switch
- ② Mode select switch
- ③ Operating mode indicator LEDs
- ④ RS-232-C connector for a programming device
- ⑤ RS-232-C connector for peripheral devices

Function

Reset/test switch

Select the test switch while the program is in halting state.

RESET: This returns the internal state of the Data Processing Unit to initial state. Variables are cleared but not the program. When you reset, the green LEDs all light to indicate that reset has been executed. *The switch is momentarily in the reset direction.*

Normal: This is the state in which operations are executed normally. (A debug command, if found in a user BASIC program during execution, is executed as a NOP.)

Enabling and disabling the debug commands and STOP command

Command	RUN mode (multitasking execution)		REMOTE mode (execution of current task only)	
	Normal	TEST	Normal	TEST
STOP	NOP	NOP	Enabled	Enabled
DPRINT	NOP	Enabled	NOP	Enabled
DLPRINT	NOP	Enabled	NOP	Enabled

TEST : When the RUN mode is set to the TEST mode, a test run is executed. (A debug command is executed if found in a user BASIC program during execution.)
The Data Processing Unit will not be in the run mode if the test switch is set during the RUN mode.
Debug commands: DPRINT, DLPRINT

Mode select switch

This switch selects the operating mode of the Data Processing Unit.

RUN : This mode executes the program through multitasking and the test run.

REMOTE : Data Processing Unit can be set to RUN or PROG. mode from terminal. A program that you can execute at RUN mode is only the current task. Multitasking programs can not be executed.

PROG. : Programs are not executed and the Data Processing Unit is in halting state. You can create a program, map the memory and format the Data Processing Unit from a terminal.

Operating mode indicator LEDs

Turning on and off LED indicates the state of the Data Processing Unit.

- RUN:** ☀ Turns on when a program is executed.
 ● Turns off when an error occurs even in RUN mode.
- PROG. :** ☀ Turns on when a program stops.
 ● Turns off when a program is executed.
- TEST :** ☀ Turns on during test run mode.
- BREAK :** ☀ Turns on when you stop a program by STOP command or CTRL+C.
 ● Turns off when you execute the next command.
- ERROR :** ☀ Turns on when an error occurs during command execution or when an error occurs from direct command.
 ● Turns off when you execute the next normal command.
- BATT. :** ☀ Turns on when the voltage of the backup battery drops below specified level.
- ALARM:** ☀ Turns on when system watchdog timer activates. Reset either by turning power off or pressing reset switch.

RS-232-C connector for a programming device

This connects the Data Processing Unit to a terminal for programming.

RS-232-C connector for peripheral device

This connects the Data Processing Unit to devices with the RS-232-C interface. The Data Processing Unit provides two channels for the FP3 and four channels for the FP5.

Operating Modes

The Data Processing Unit operates in the following modes.

Remote mode (REMOTE) :

This mode enables the Data Processing Unit to be set to the PROG or RUN mode from a terminal.

Operating states and LED indications

	RUN		PROG.	
	Normal	TEST	Normal	TEST
RUN	☀	☀	●	●
PROG	●	●	☀	☀
TEST	●	☀	●	☀
BREAK	●	●	—	—
ERROR	—	—	—	—
BATT	—	—	—	—
ARRM	—	—	—	—

Program mode (PROG.):

The Data Processing Unit does not execute programs and is in the halted state.

You can create a program, map the memory and format the Data Processing Unit remotely from a terminal in this mode.

Operating states and LED indications

User BASIC program is halted or non-executable (other tasks are also halted)

	Normal	TEST	RESET
RUN	●	●	☀
PROG	☀	☀	☀
TEST	●	☀	☀
BREAK	—	—	☀
ER-	—	—	☀
BATT	—	—	●
ARRM	—	—	●

Run mode (RUN):

The Data Processing Unit operates according to the program in this mode.

The test run is also executed in this mode.

Operating states and LED indications

User BASIC program is executed (multitasking)

	Normal	TEST
RUN	☀	☀
PROG	●	●
TEST	●	☀
BREAK	●	●
ERROR	—	—
BATT	—	—
ARRM	—	—

System Functions

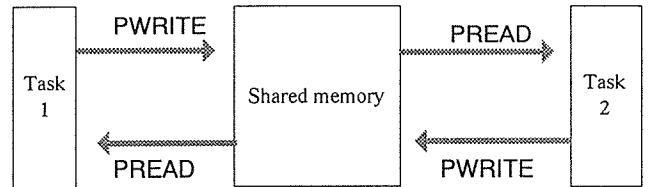
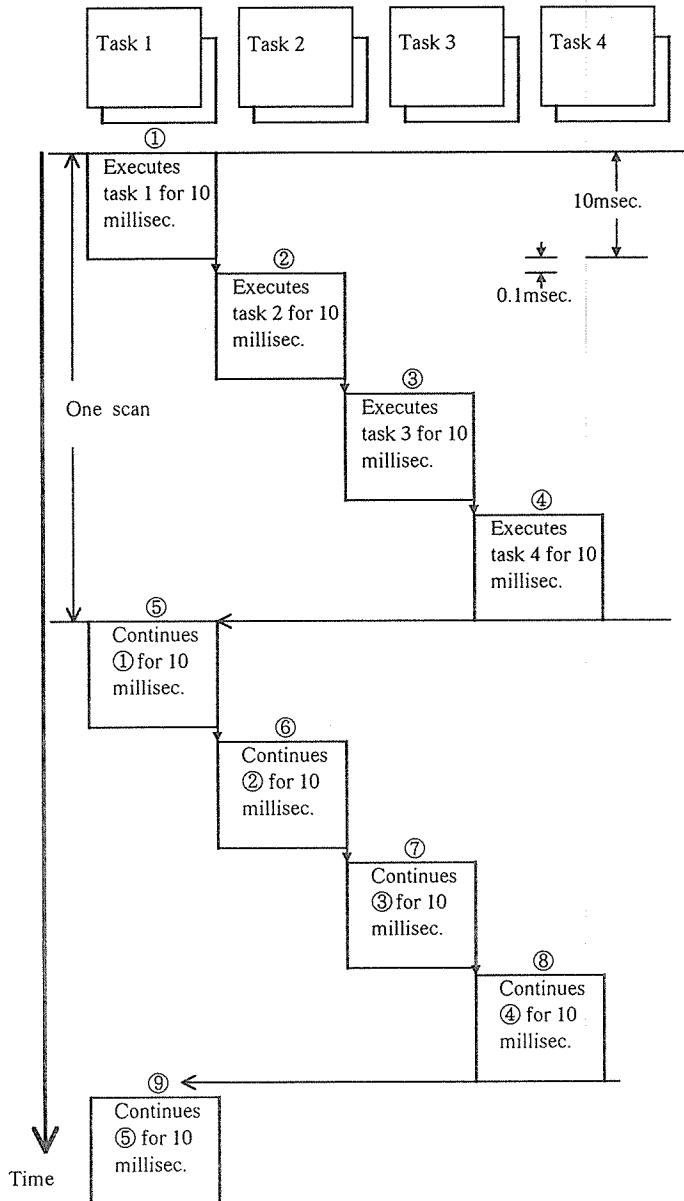
Multitasking

Multitasking is executed in high speed and its time sharing is 10 millisecond.

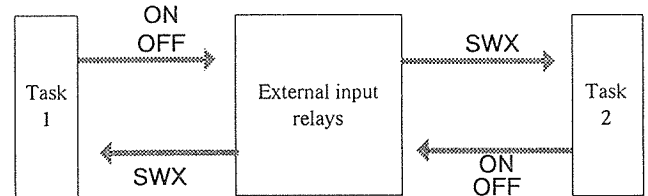
Programs are executed in the order of their task numbers.

A task without a program, a task which executes END, and a task which generates an error are skipped at that point.

Functional flow



If you operate the Data Processing Unit in multitasking, global variables that are accessible to all tasks cannot be set. Therefore use the PREAD and PWRITE statements to read and write through the shared memory.



A task can control another task through the ON/OFF status of the relays for the Data Processing Unit. In this case, use the SWX function and the ON/OFF command. A task can also activate another task using the [EWAIT SWX ()] instruction.

Self Diagnosis

The ALARM indicator LED on the Data Processing Unit lights if an error is detected in the memory during the memory check at power on, or if an error is detected in the CPU by monitoring of the watchdog timer.

The ERROR LED indicator on the Data Processing Unit lights when a syntax error occurs during program execution. At the same time, an error message appears on the connected terminal screen.

See *Chapter 6. Troubleshooting* for details.

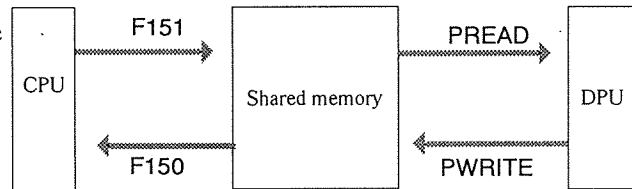
Calendar

A 24-hour clock is built into the unit. The date and time(year, month, day, hours, minutes, seconds, day of week) can be used in DP-BASIC programs.

Writing/Reading with the CPU

Writing/Reading through the shared Memory

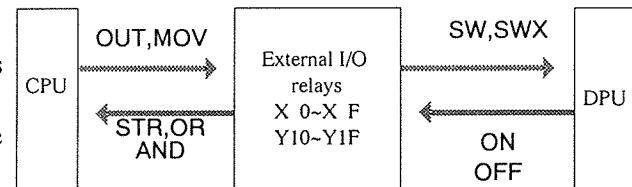
Data between the CPU and Data Processing Unit are written/read through the shared memory.



To transfer ON/OFF status on the relays between the CPU and Data Processing Unit, use the SW and SWX functions and the ON/OFF instruction.

To activate a task for the Data Processing Unit from the CPU, use EWAIT SW ().

To interrupt from the relays, use ON SW () GOSUB.

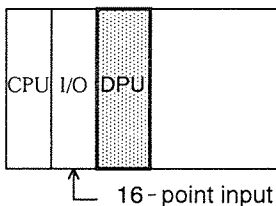


Note

You can specify the address of the shared memory by DP-BASIC for the Data Processing Unit. It is in the range 0 to 1999 and specified in 1-byte units. X0-XF and Y0-YF of the external I/O relays are specified as relays of the DPU itself.

However, the shared memory is addressed in word (2 byte) units from the CPU the external I/O relays of the DPU are specified depending on the relay numbers in the slot that mounts the DPU.

The following numbers are given to the Y and X relays.

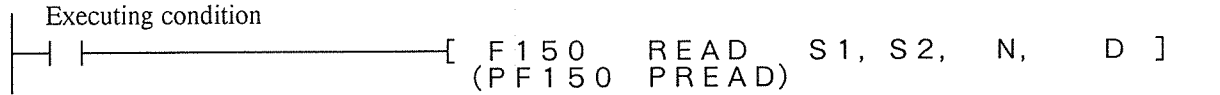


Example

In the figure on the left, the relays set for the DPU are: X10-X1F Y20-Y2F

Reading From Shared Memory

To read the data on shared memory to the FP5/FP3 CPU, use the high level instruction F150. To read to the FP3-B (BASIC program type), use the READ statement.



- SI*: Specifies advanced unit's slot and memory bank
- S2*: Specifies advanced unit's memory address (word address)
- N*: Specifies number of words to be read
- D*: The starting data area (register) storing data to be read

Program

When R0 turns on, the data(two words) are read from address 251 in the Data Processing Unit mounted on slot no. 1 and sent to data register DT15 of the CPU.

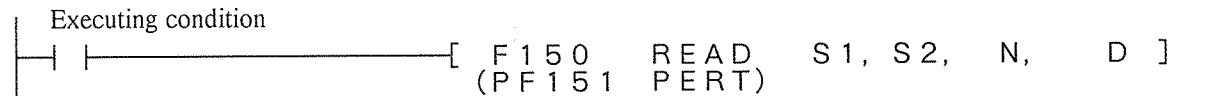


Note

The high level instruction F150 for a ladder and FP-BASIC's READ statement process data in word (2 byte or 16 bit) units. Thus, 4 bytes of data are processed as two words and address 251 in the CPU is processed as address 502 in DPU.

Writing to Shared Memory

To write the data on shared memory from the FP5/FP3 CPU, use the high level instruction F151. From the FP3-B (BASIC program type), use the WRITE statement.



- SI*: Specifies advanced unit's slot and memory bank
- S2*: Specifies the starting data area(register of data to be written)
- N*: Specifies number of words to be written
- D*: The starting data area (register) where data is to be written

Program

When R1 turns on, the data(3 words) are written on address 1 from data register DT0 of the CPU Processing Unit mounted on slot number 0.

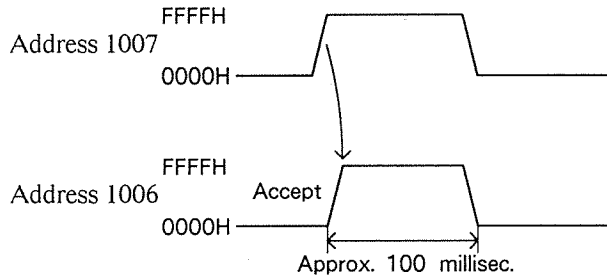


Software Reset

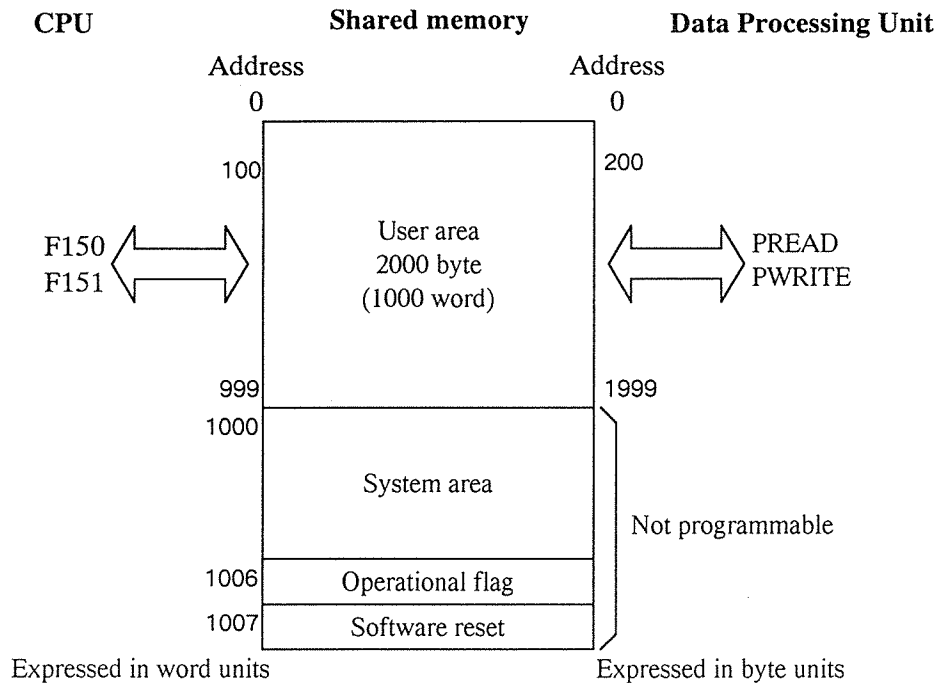
The CPU can reset the Data Processing Unit. We call this a software reset of the DPU. You can do this by writing a numeric value other than 0 on address 1007 of shared memory from the DPU.

The reset is accepted when the edge is detected. Address 1006 holds FFFFH for 100 millisecc. as an acknowledge. Both addresses 1006 and 1007 return to 0000H after the 100 millisecc. Address 1006 contains 0000H when the Data Processing Unit is in an operational state.

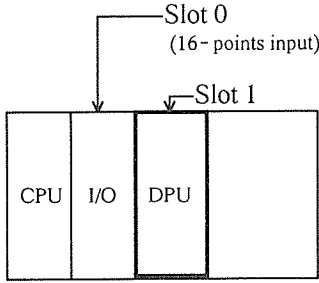
Timing: Access the Data Processing Unit after address 1006 is reset to 0000H.



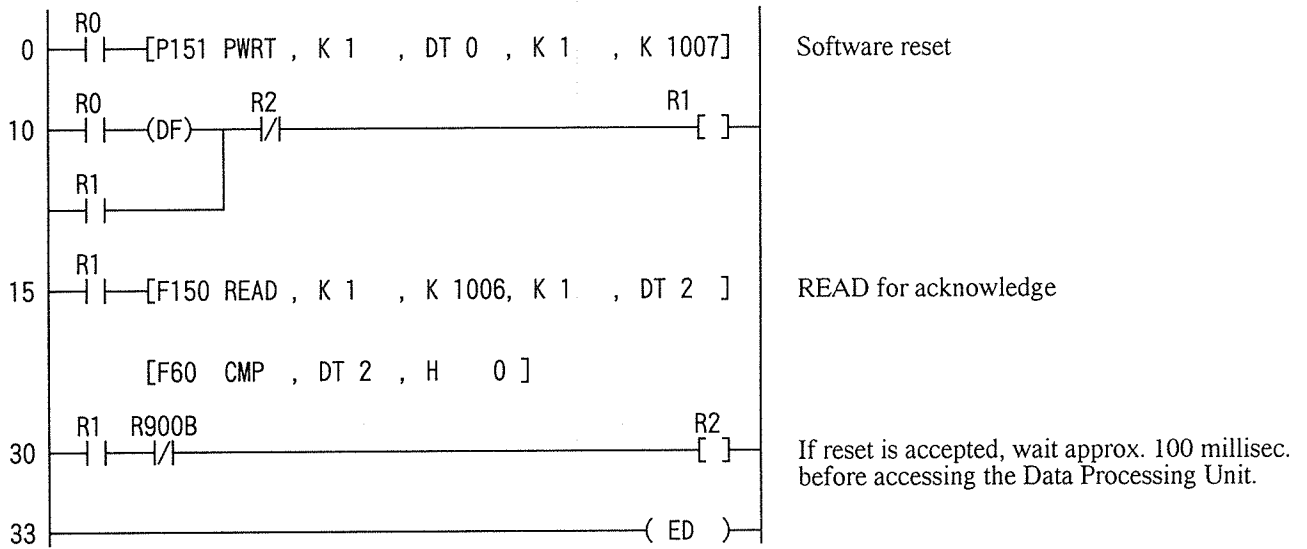
Shared memory as seen from the CPU



Software Reset Program



The program below executes a software reset and an acknowledge. Use addresses 0 to 9 only for the software reset.
 This program assumes the Data Processing Unit is mounted on slot number 1 and DT0=FFFFH and DT1=0000H.



Address	Command
0	STR0
1	P 151 (PWRT)
	K1
	DT0
	K 1007
10	STR0
11	DF
12	ORR1
13	AN/R2
14	OTR1
15	STR1
16	F 150 (READ)
	K1
	K 1006
	K1
	DT2
25	F 60 (CMP)
	DT2
	H0
30	STR1
31	AN/R 900B
32	OTR2

R0 represents the executing condition for the software reset. It can be turned ON or OFF by forcing on output during test run.

Example in DP-BASIC

When the software reset is executed, a program starts from the INPUT statement in line 10.

```

Task 1 10 INPUT A
        20 IF A=1 THEN 30 ELSE 10
        30 PRINT "TEST"
        40 DELAY 0.1
        50 GOTO 30
    
```


Chapter 4

System Installation

This chapter describes how to mount the unit and connect it to peripheral devices.

Mounting the Unit

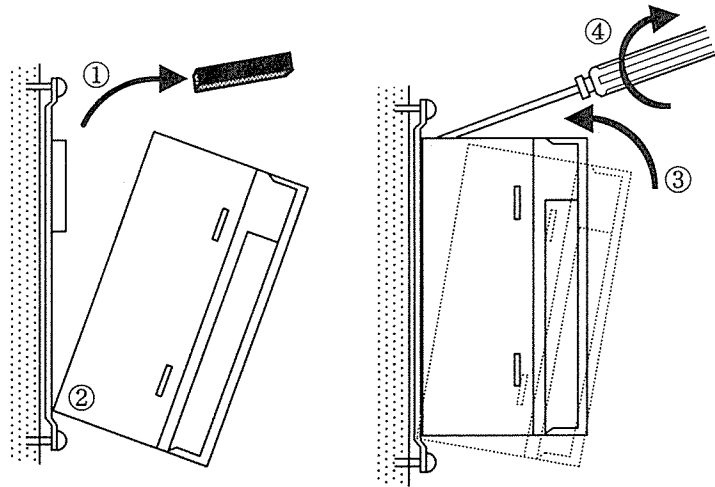
Mounting Position

The Data Processing Unit can be mounted on a basic motherboard, expansion motherboard or remote I/O slave station.

Mounting Method

Mount the unit following the steps below.

- ① Remove the connector cover from the motherboard.
- ② Set the tab on the back of the unit in the hole on the motherboard.
- ③ Fit the unit onto the motherboard.
- ④ Fasten the unit firmly onto the connector and secure the top of the unit with the mounting screw.

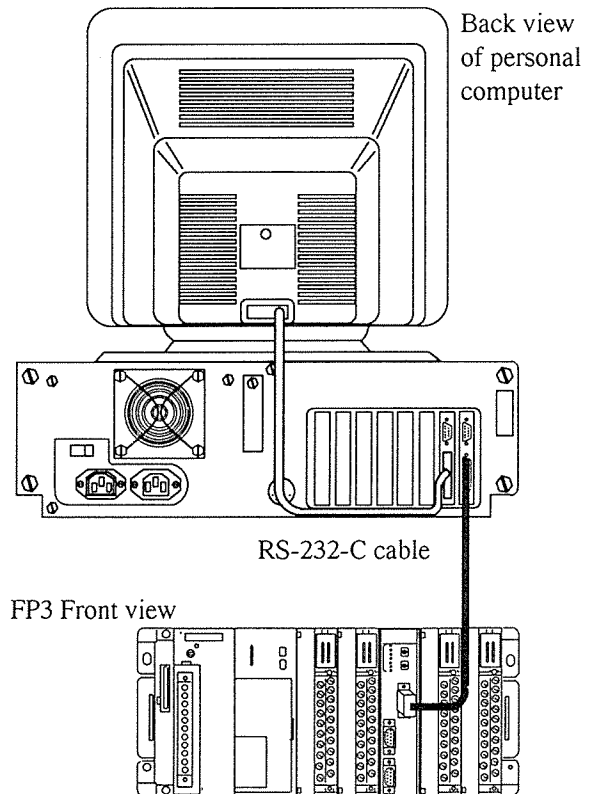


Connecting to a Terminal

Use a RS-232-C cable to connect the Data Processing Unit to a terminal for programming with DP-BASIC. Connect as shown in the figure below. *The terminal, Data Processing Unit and cable are not shown to scale.*

Note

Turn off the personal computer and Data Processing Unit when connecting.



Chapter 5

Test Run

This chapter describes precautions before test run and provides a flowchart of the test run procedure.

Before Test Run

Check the items below before turning on the power to the Data Processing Unit.

Check Items

PC unit

Unit : Do the units match the device list of the design?

Did you tighten the unit mounting screw at the top of the unit firmly ?

Did you remove the anti-dust cover for the unit?

Board number setting : Is the expansion motherboard number not duplicated?

(When an expansion motherboard is connected, the board number for the expansion motherboard must be set. Set the expansion motherboard number to 1 or 2.)

Wiring : Does the 100/200 V AC selection for the power supply unit match the power line voltage? (for AC type power supply unit)

Did you tighten the terminal screws firmly?

Did you wire each terminal based on the signals?

Is line wide enough for the current?

DPU

Connecting cable : Did you connect the expansion cable correctly?

Did you fasten the connectors correctly?

Switches on CPU : Did you set the mode switch to the PROG. mode?

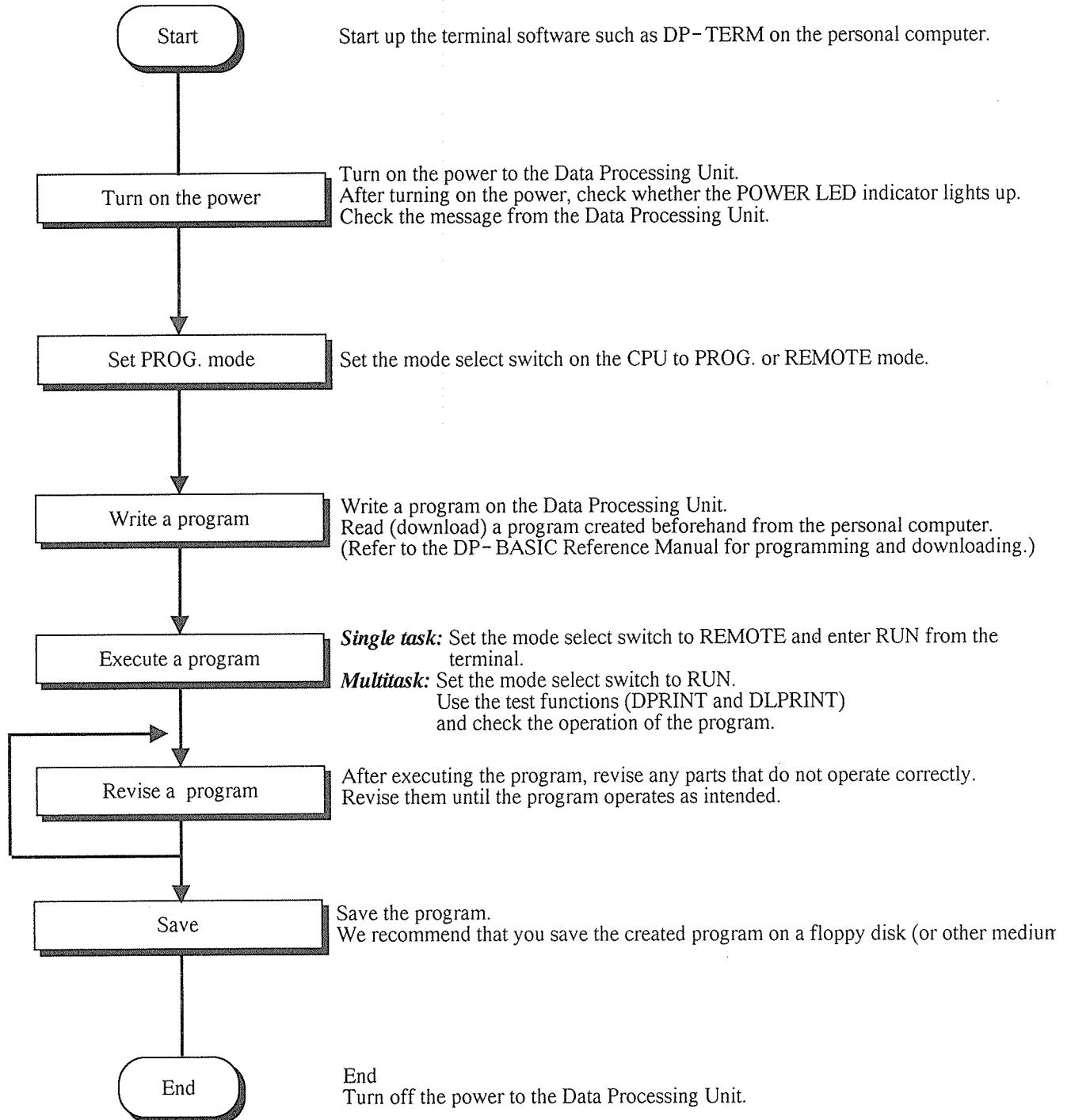
Did you set the reset/test switch to the normal mode?

Battery : Did you install the battery?

Test Run Procedure

Test Run (Operational Check) Procedure

After checking the items in the previous section (*Before Test Run*), start the test run of the system. Start the operation according to the flowchart below. Refer to the Reference Manual for programming.



10/1/20



Chapter 6

Troubleshooting

This chapter describes the recovery procedures with the flowchart in case the Data Processing Unit fails to operate properly.

Troubleshooting

If there is any error in the system, examine the situation and determine the problem. If you cannot determine the problem from the description given in this chapter, please contact **us**.

Check Points

Before concluding that a error exists in the system, check the following items.

1. Examine what's happening and check if you can correct it or not.
2. Is there any problem in setting the unit?
3. Have you checked the power and wiring?
4. Are there any problems in the program?

Check these together with the items in **chapter 5 Before Test Run**.

Self Diagnosis

Hardware Diagnosis

- The Data Processing Unit checks memory when the power is turned on. If there is an error in memory, the ALARM LED and LED's from RUN to ERR turn on and the Data Processing Unit will not operate. You can determine the memory error from the table below.
- The Data Processing Unit monitors the CPU through the watchdog timer while it is operating. If an error occurs at the CPU, the ALARM LED turns on. It is necessary to turn on the power supply again or press the reset switch to turn off the ALARM LED.
- Battery error : The BATT LED turns on when the battery voltage drops. A drop in battery voltage can be detected with the BATT command in DP-BASIC.

Error diagnosis from LED states ☀:ON ●:OFF

LED after power on					Description
RUN	PRG	TEST	BRK	ERR	
●	●	●	●	●	DPU system error
☀	☀	☀	☀	☀	DPU system ROM error (DPU system ROM check sum error)
●	☀	☀	☀	☀	System RAM 1 error (read/write error) (10000 to 1FFFFF)
●	●	☀	☀	☀	System RAM 2 error (read/write error) (20000 to 2FFFFF)
●	●	●	☀	☀	System RAM 3 error (read/write error) (30000 to FFFFF) For FP5 only
●	●	●	●	☀	Other system error

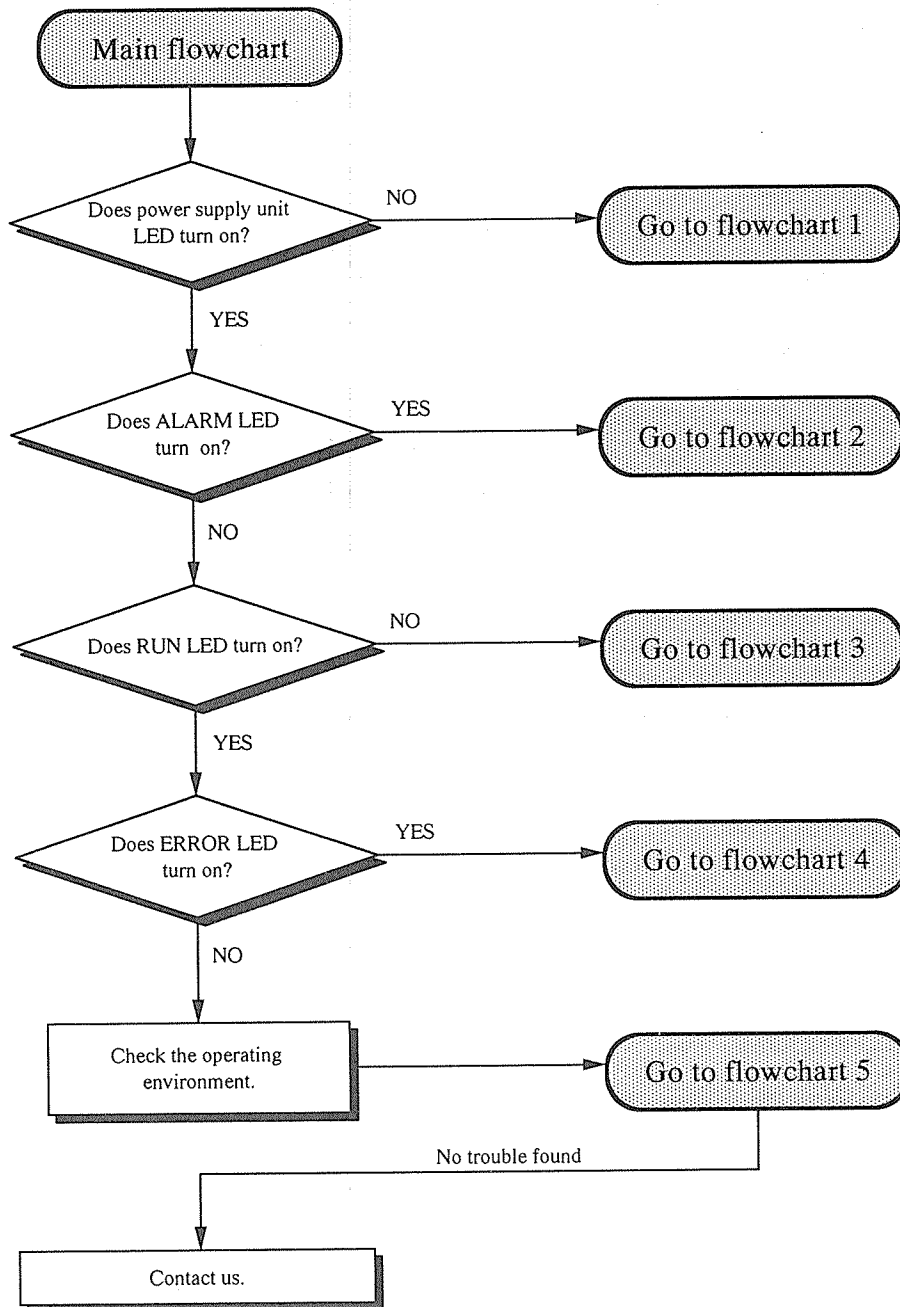
Software Diagnosis

Since DP-BASIC for the Data Processing Unit is an interpreter language, syntax errors can be detected by running the program in REMOTE mode. When you execute the command at the line number associated with the error in the program, the error message appears.

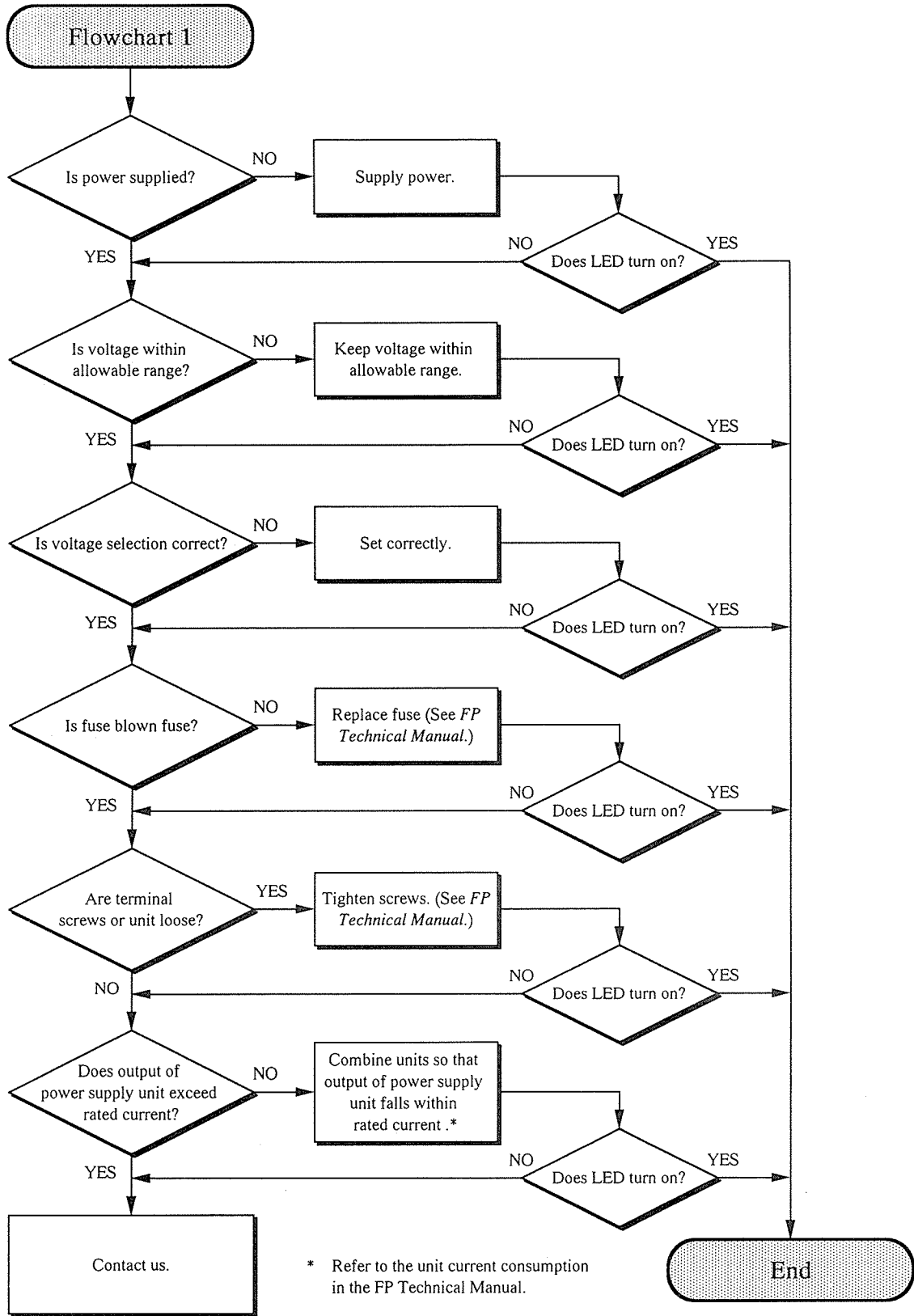
Flowchart with Power On

If an error occurs, first follow the procedure in the main flowchart shown below. Then branch off to the appropriate flowchart (1-5).

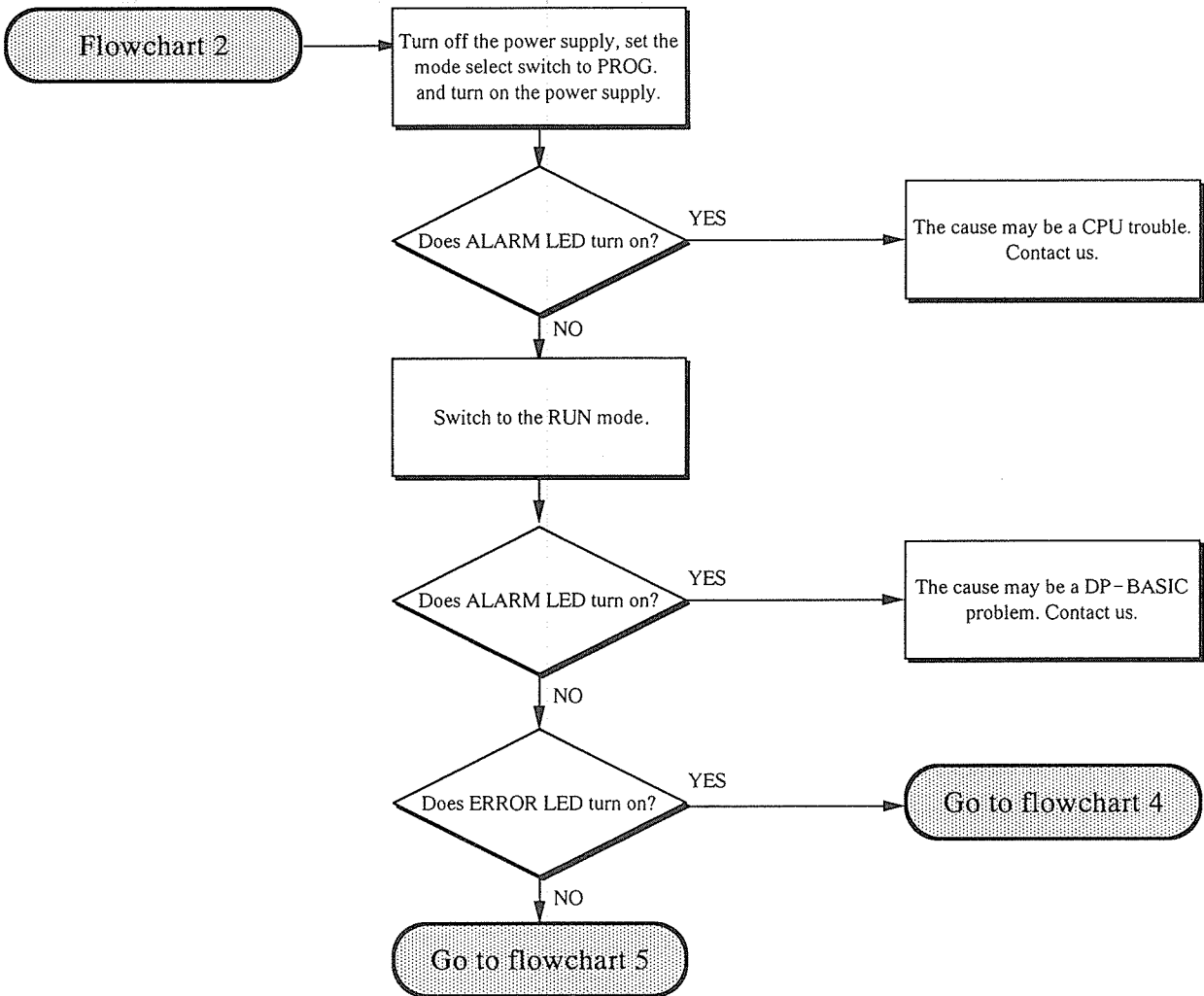
Does not operate normally in RUN mode (main flowchart)



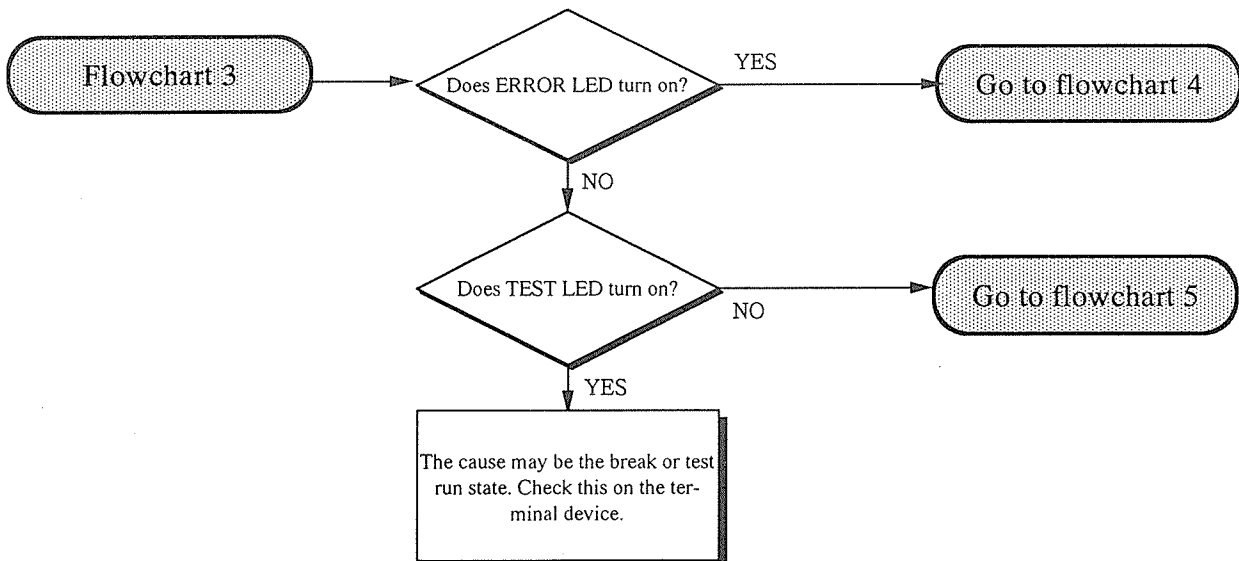
Power supply unit LED is off (flowchart 1)



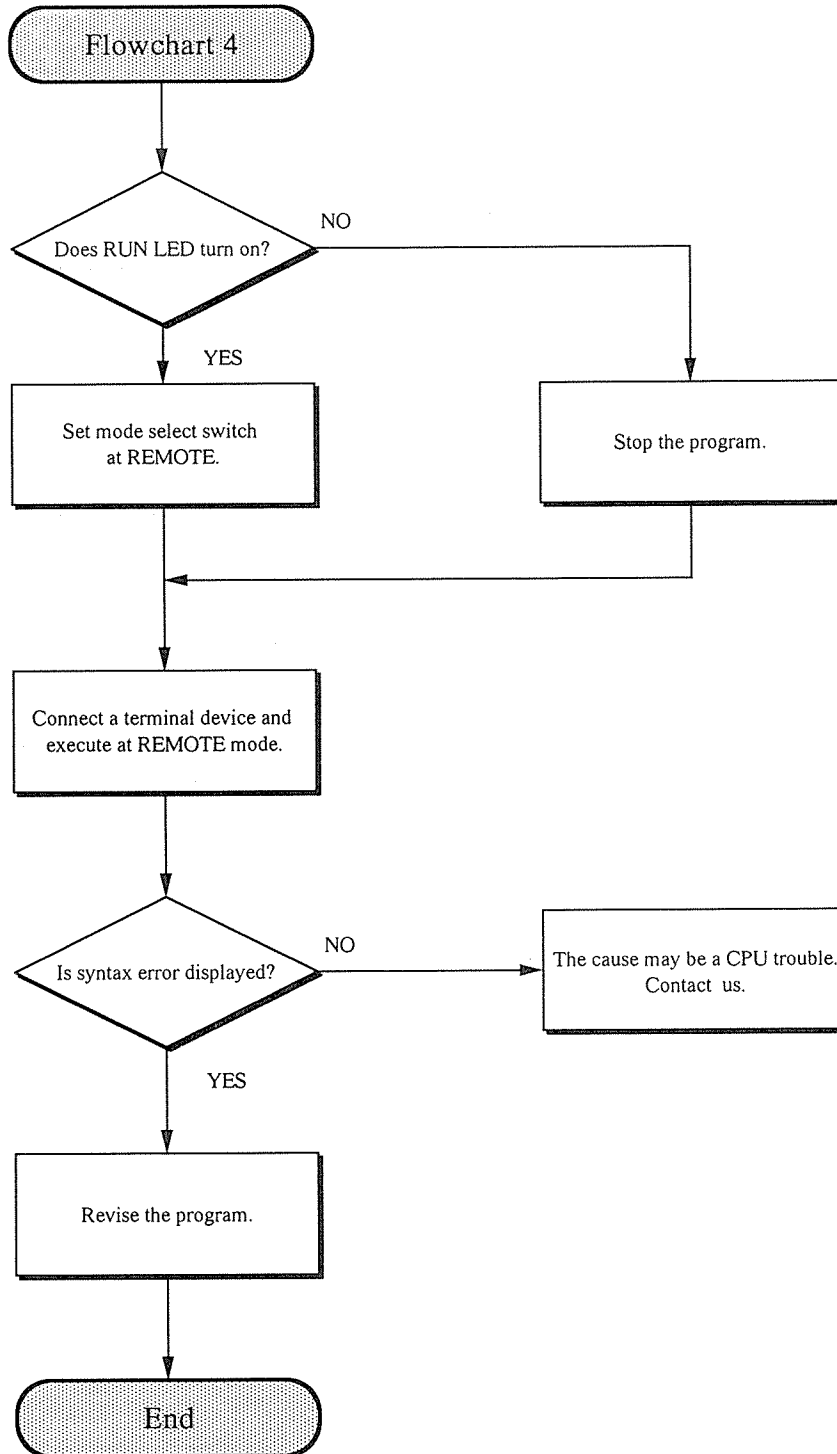
ALARM LED is on (flowchart 2)



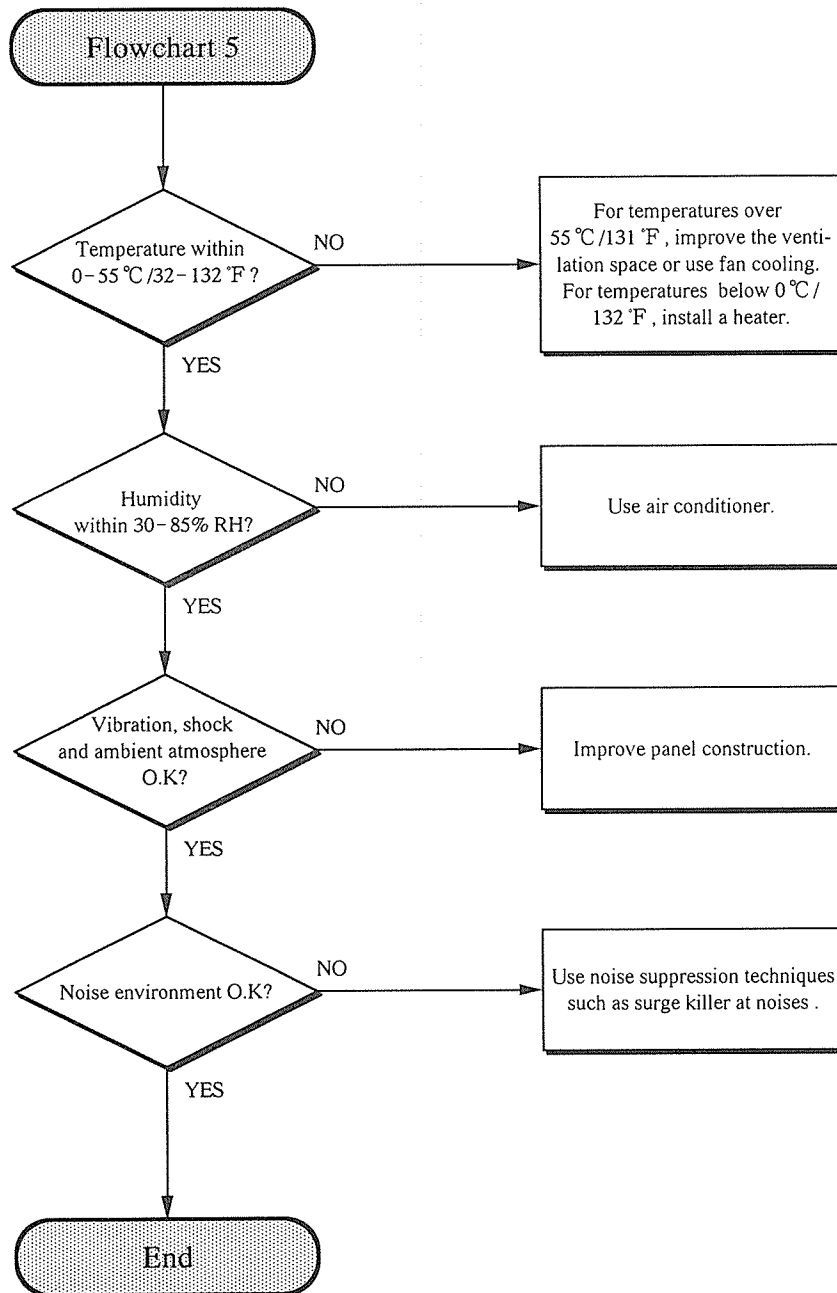
RUN LED is off (flowchart 3)



ERROR LED is on (flowchart 4)



Installation environment (flowchart 5)



Chapter 7

Maintenance

This chapter describes the daily inspection and how to replace the battery.

Inspection

Inspect periodically to maintain the optimum operation of the Data Processing Unit at all times.

Inspection Items

Environment : Check whether the ambient temperature (internal temperature) is within 0 to 55 °C /32 to 131 °F and humidity (internal humidity) is within 35 to 85% RH. Any dust or wire scraps?

Installation : Tighten each unit, motherboard and connectors.

Tighten terminal block screws.

Check wiring, and crimp terminals.

Battery : Replace it periodically.

See if BATT LED on CPU turns on or not.

Replacement Parts and Procedures

Battery Replacement for Data Processing Unit

Any program stored in RAM (Random Access Memory) is retained by the backup battery. Since the program is lost by the drop of the battery voltage, replace the battery beforehand.

A drop in battery voltage can be checked in the following manner.

1. Determined from BATT* function through the self- diagnostic function of the Data Processing Unit.
2. BATT LED turns on.

Although the backup function remains effective even if the indications exist, replace the battery with a new one (AFP8805) within one week.

Notes

1. Replace the battery within 10 minutes after turning off the power.

If the power is not on, turn on the power for at least 1 minute and then turn it off.

2. To prevent accidents such as bursting, fire or heat generation, do not short, disassemble, or dispose of battery in fire.

Replacement Procedure

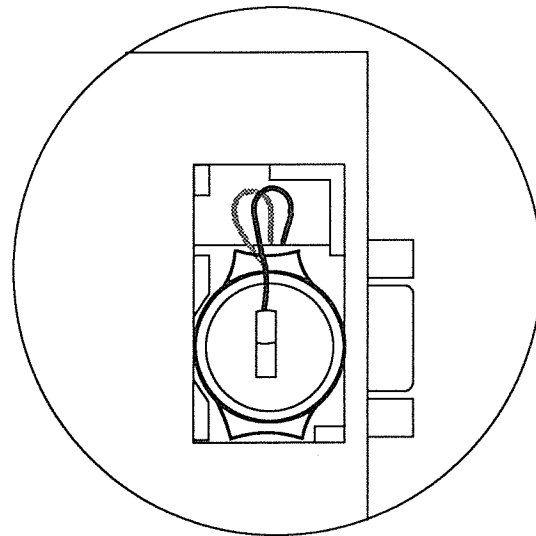
1. Turn off the power for the FP series equipment.
2. Remove the Data Processing Unit.
3. Use tweezers to remove the battery cover.
4. Replace with new battery.
5. Close battery cover.
6. Turn on power.
7. Check the BATT* function.

Battery Backup Time

Typical value : 50,000 Hr. **Guaranteed value :** 25,000 Hr.

* BATT is the function of DP-BASIC, and checks the battery error.

Refer to the BATT function in the *DP-BASIC Reference Manual* for details.



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