User's Manual

YEWSERIES 80

Model SPRG (Style E) Programmer

IM 1B4W1-02E

YOKOGAWA ◆
Yokogawa Electric Corporation

IM 1B4W1-02E
4th Edition

Notices

■ Regarding This User's Manual

(1) This manual should be passed on the end user. Keep at least one extra copy of the manual in a safe place.

(2) Read this manual carefully and fully understand how to operate this product before you start operation.

(3) This manual is intended to describe the functions of this product. Yokogawa Electric Corporation (hereinafter simply referred to as Yokogawa) does not guarantee that the functions will suit a particular purpose of the user.

(4) Under absolutely no circumstances may the contents of this manual in part or in whole be transcribed or copied without permission.

(5) The contents of this manual are subject to change without prior notice.

(6) Every effort has been made to ensure accuracy in the preparation of this manual. Should any error or omissions come to your attention however, please contact your nearest Yokogawa representative or our sales office.

■ Regarding Protection, Safety, and Prohibition against Unauthorized Modification

(1) In order to protect the product and the system controlled by it against damage and ensure its safe use, make certain that all of the instructions and precautions relating to safety contained in this manual are strictly adhered to. Yokogawa does not guarantee safety if products are not handled according to these instructions.

(2) Be sure to use the spare parts approved by Yokogawa when replacing parts or consumables.

(3) Modification of the product is strictly prohibited.

(4) Reverse engineering such as the disassembly or decompilation of software is strictly prohibited.

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■ Force Majeure

(1) Yokogawa does not make any warranties regarding the product except those mentioned in the WARRANTY that is provided separately.

(2) Yokogawa assumes no liability to any party for any loss or damage, direct or indirect, caused by the user or any unpredictable defect of the product.

CONTENTS

1. INTRODUCTION.

This instrument was thoroughly tested in the factory before shipment. However, you should inspect it for visible damage to confirm that it was not damaged in transit. You should also confirm that you have received all standard accessories.

Read this chapter before commencing to use this instrument. For other information, check the index and other chapters of this manual.

1-1. Model and Suffix Codes.

The model and suffix codes are marked on a name plate (see Figure 1-2-1 for location).
Confirm that you received what you ordered.

If you have any questions about this instrument, please contact either your nearest Yokogawa Sales & Service Office or Yokogawa Electric Corporation, Tokyo, Japan.

1-2. Scope of This Manual and Associated Manuals.

This Instruction Manual covers handling, operating and simple maintenance procedures for the SPRG Programmer.

Using this Programmer with the SLPC Programmable Indicating Controller involves the following three steps:This instruction manual covers only Step 2 below. For Steps 1 and 3, see the related instruction manual.

Step-1: Applications programming.

[Reference Manuals]

① "Programmable Instruments Functions and Applications" TI 1B4C2-02E.

② "IPL Computing Station, IPL Computing Unit and Programmer" TI 1B3E4-E.

Step-2: Storing Application Programs in ROM (Read Only Memory).

This is covered by this instruction manual.

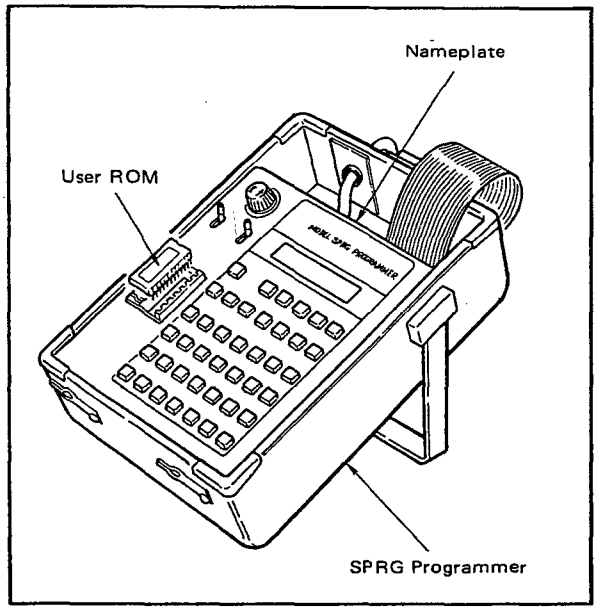


Figure 1-2-1. User ROM and SPRG Programmer.

Step-3: Initiating Operation.

[Reference Manuals]

① "SLPC Programmable Indicating Controller" IM 1B4C2-03E.

② "SPLR Programmable Computing Unit" IM 1B4L3-01E.

③ "IPL Computing Station" IM 1B3E4-01E.

④ "IPL Computing Unit" IM 1B3L4-01E.

⑤ "SLMC Programmable Indicating Controller with Pulse Width Output" IM 1B4C3-02E.

⑥ "SCMS Programmable Computing Station" IM 1B4D6-01E.

2. GENERAL.

The SPRG Programmer is designed to store control and computational programs – e.g. for the SLPC Programmable Indicating Controller, the SLMC Programmable Indicating Controller with Pulse Width Output, the SCMS Programmable Computing Station, or the SPLR Programmable Computing Unit – in ROM (Read Only Memory).

The Programmer can also store programs for the IPL Computing Station and IPL Computing Unit (Model $5\frac{2}{3}47$, $5\frac{2}{3}55$).

When the Programmer is used with the SPCM Pulse Computing Unit, it can set and display SPCM's parameters.

The Programmer has the following functions:

- **Programming functions.**

This programmer is used to prepare SLPC, SLMC, SCMS or SPLR computational/control programs – together with parameters, constants and display tables – and it stores them in its RAM memory.

- **Test run functions.**

Computational expressions for the SLPC, SLMC or SCMS allow you to create a simulated process and a closed control loop without using process simulator to perform "test run" for checking operation of process control.

(SPLR computational expressions may also be "test run" off line: signals may be applied to the input terminals, and the corresponding outputs measured).

- **Function of storing programs in ROM.**

Control and computational expressions which have been successfully "test run" can be stored into ROM by the programmer.

- **Function to read and print programs in ROM.**

This programmer can read application programs – control and computational expressions – from ROM into the programmer's RAM memory, where they may be edited or printed out together with parameters, constants and display tables. Programs, parameters, constants, display tables and register contents may also be printed out on a printer.

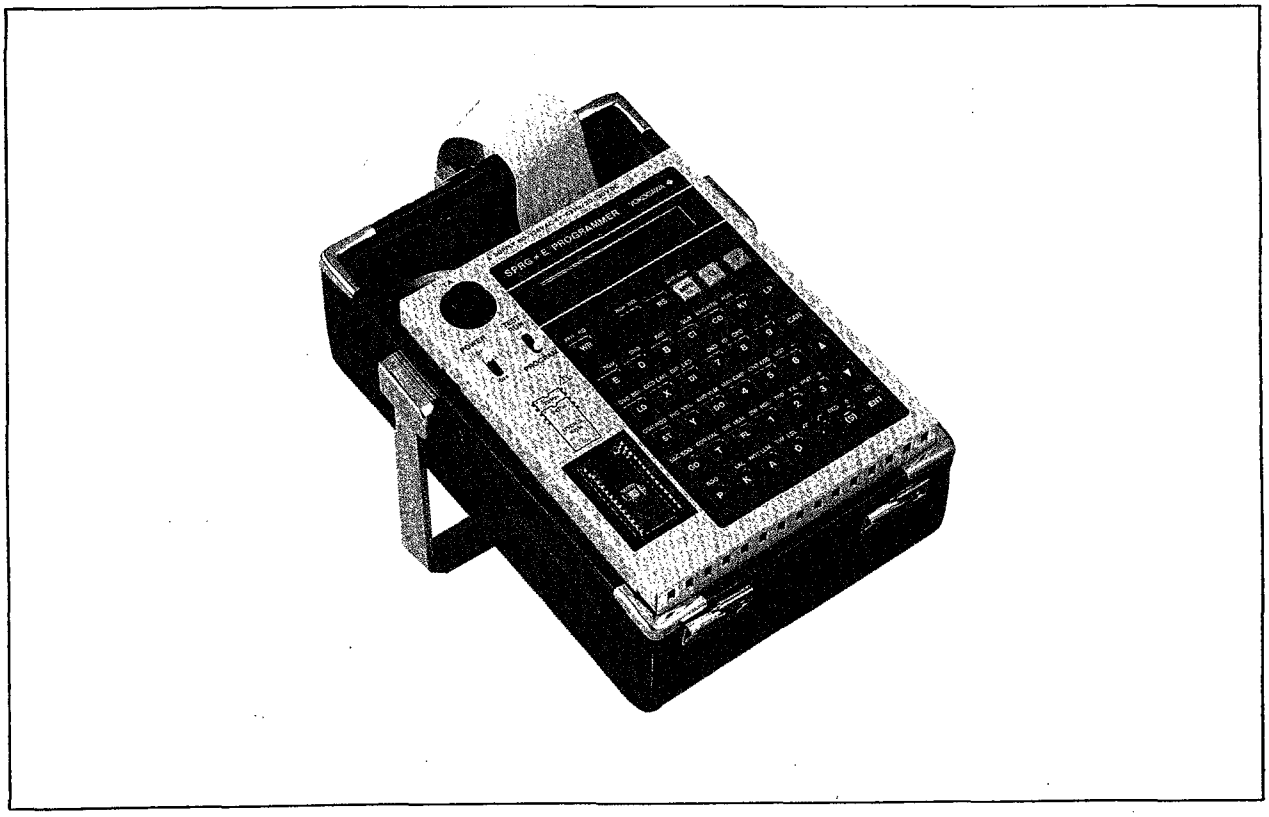


Figure 2-1-1. External View of SPRG Programmer.

2-1. Standard Specifications.

Operating keyboard:
Comprises 33 keys: numeric keys, function keys, and command keys – e.g. for reading (from ROM), storing (to ROM), initializing (RAM) and test-running programs.

Indicator: Sixteen-digit alphanumeric displays for program codes, constants, display tables, input/output data etc.

ROM socket: ROM is plugged into this socket for reading or storing programs and data in ROM.

Connection to instrument: Special cable, 0.6-m long, with connector.

Connection to printer: Special cable for printer.
Cable length: 2 m (6.6 ft).

Programmer used with: SLPC Programmable Indicating Controller (Styles A and E), SLMC Programmable Indicating Controller with pulse width output (Styles A and E), SCMS Programmable Computing Station, SPLR Programmable Computing Unit, Model $5^{2}_{3}47$ IPL Computing Station, Model $5^{2}_{3}55$ IPL Computing Unit.

Power and Ground Wiring: JIS C 8303 two-pole plug with earthing contact (IEC A5-15, UL498).
Cable length: 2 m (6.6 ft).

Power supply: Two versions, for "100 V" (standard) or "220 V" (option /A2ER). Both versions may use AC or DC, without change to the instrument:

Version	100 V	220 V
DC (polarity reversible)	20 to 130 V	120 to 340 V
AC (47 to 63 Hz)	80 to 138 V	138 to 264 V

Maximum power consumption:
330 mA (with 24 V DC supply).
11.2 VA (with 100 V AC supply).
15.3 VA (with 220 V AC supply).

Insulation resistance:
Between ROM socket pin and ground terminal: 100 MΩ (with a 500 V DC insulation tester).

Dielectric strength:
Between ROM socket pin and ground terminal: 500 V AC for 1 min.
Between power terminal and ground terminal: 1000 V AC for 1 min. (100 V version).
1500 V AC for 1 min. (220 V version).

Outside dimensions: 255 X 155 X 95 mm (10.0 X 6.1 X 3.7 in.).

Weight: 1.8 kg (4.0 lb).

2-2. Model and Suffix Codes.

Model	Suffix codes	Style	Description
SPRG	.....	.....	Programmer
	- 000	.....	Always 000
Style Code		*E	Style E
Option		/A2ER	220 V power supply

2-3. Options.

/A2ER: For "220 V version" power supply.

2-4. Accessories.

Tool for pulling ROM from socket . . . . . 1 piece.
Conversion plug for two-pole socket . . . . . 1 piece.
Extension card for SPLR . . . . . 1 piece.
Fuse (1 A) . . . . . 1 piece.
Note: The fuse (S9510VK) is the dedicated fuse, Do not use it for other products.

3. INSTALLATION.

3-1. Installation.

The SPRG programmer is designed to be placed on a work bench. It is recommended to provide a work-bench large enough to hold the programmer, other instruments to be used with it, and a printer.

Normal Operating Conditions

Ambient temperature: 0 to 40°C (32 to 104°F).

Ambient humidity: 5 to 90% Relative Humidity (non-condensing).

CAUTION

Before connecting or disconnecting the cable, remove the power from both the programmer and the associated instrument (e.g. SLPC/ SPLR). Do not remove the SPRG power cable with the power turned ON.

3-2. Cable Connection.

3-2-1. Cable Connection Procedures.

(1) Turn OFF the power for the SPRG and associated instruments (programmable indicating controller, computing station or unit).
(2) Set the SPRG to PROGRAM mode.
(3) Connect the SPRG cable connector to the programmable indicating controller or computing unit (see Subsections 3-2-3 through 3-2-6).
(4) Turn ON the SPRG power.
(5) Turn ON the power for associated instruments.

3-2-2. Cable Disconnection Procedures.

(1) Set the SPRG to PROGRAM mode.
(2) Turn OFF the power for the associated instruments.
(3) Turn OFF the SPRG power.
(4) Disconnect the SPRG cable connector from the associated instruments.

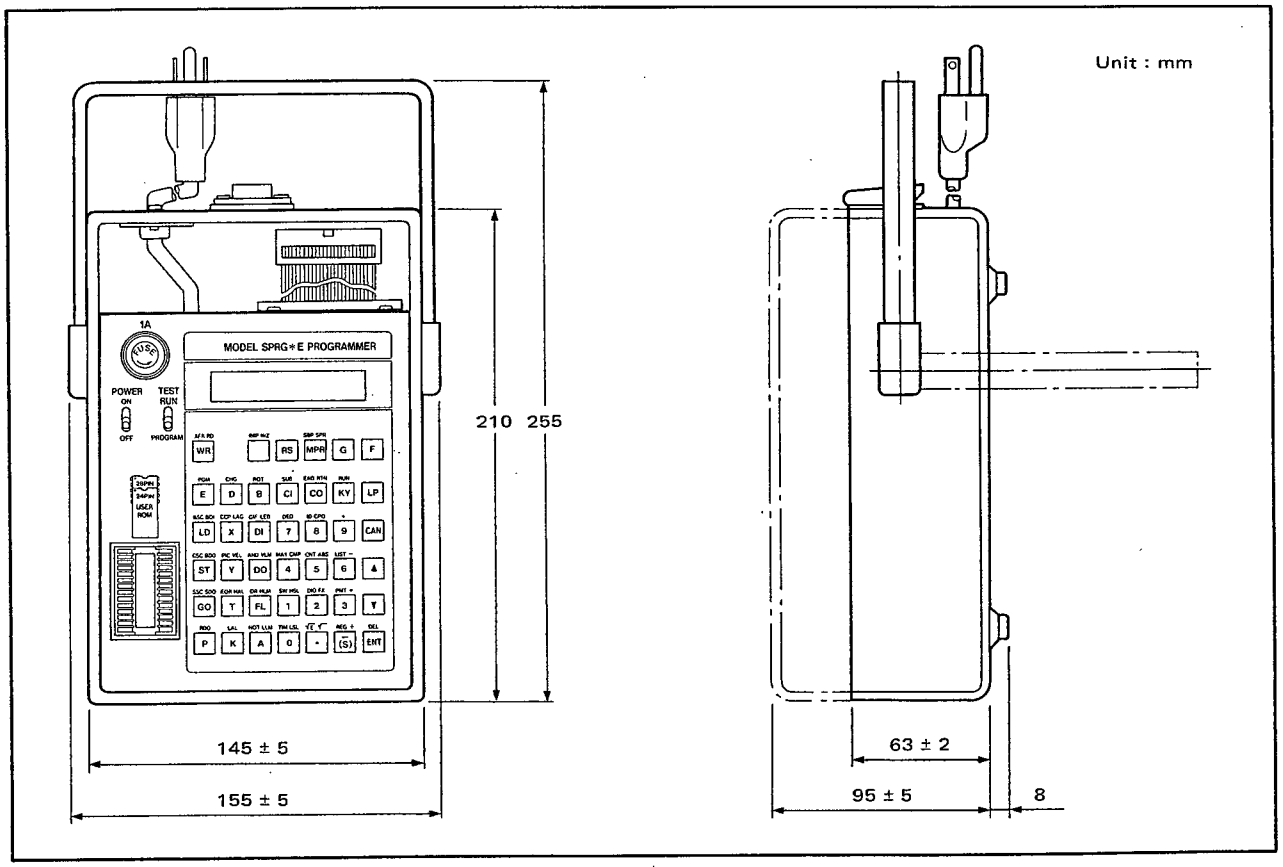


Figure 3-1-1. Outside Dimensions of SPRG.

3-2-3. Connecting SPRG to SLPC, SLMC or SCMS.

Refer to Figure 3-2-1.

(1) Withdraw the SLPC, SLMC, or SCMS from its housing until it stops at the "service" position. Remove the side cover to access the "programmer" socket (see Figure 3-2-1).

(2) Insert the SPRG programmer cable connector in the SLPC, SLMC, or SCMS socket so the two marks (▲) coincide.

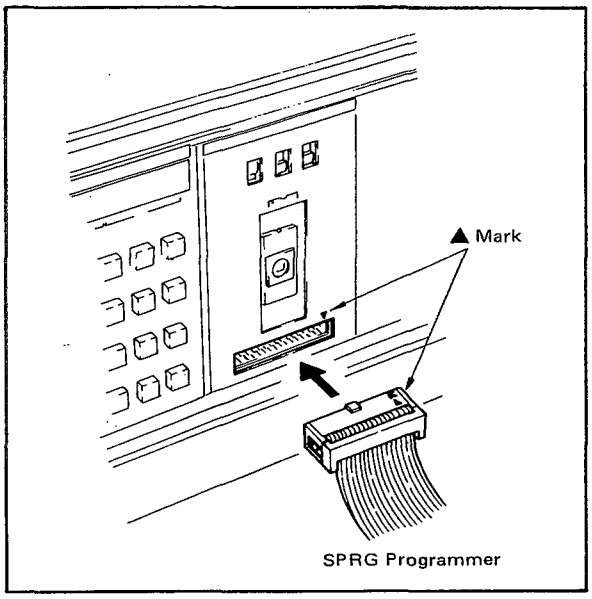


Figure 3-2-1. Connection to SLPC, SLMC or SCMS.

3-2-4. Connecting SPRG to SPLR Programmable Computing Unit.

(1) When the SPLR module is removed from its housing, a connector socket appears (see Figure 3-2-2).

(2) Insert the SPRG programmer connector so that the triangle mark (▲) coincides with that on the corresponding SPLR socket.

(3) Use an extension card to connect the SPLR module to the connector in the housing.

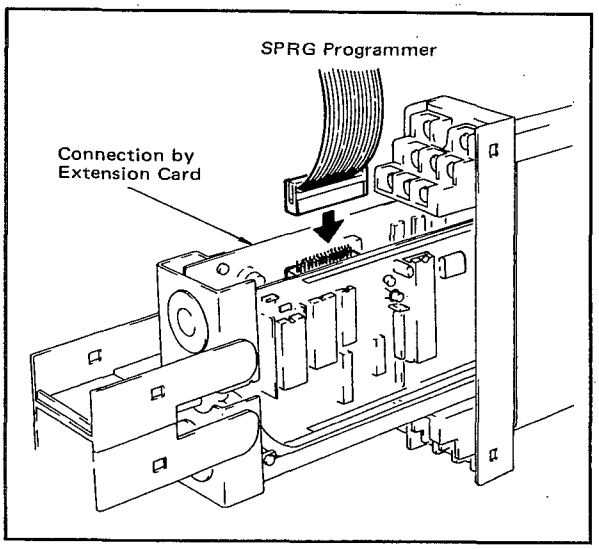


Figure 3-2-2. Connection to SPLR.

3-2-5. Connecting SPRG to IPL Computing Station.

Refer to Figure 3-2-3.

(1) When the IPL module is removed from its housing, connector socket CN2 appears on its left side.

(2) Open the lock lever of socket CN2, and insert the SPRG connector so that its triangle mark (▲) coincides with that on the socket. Complete the lock lever.

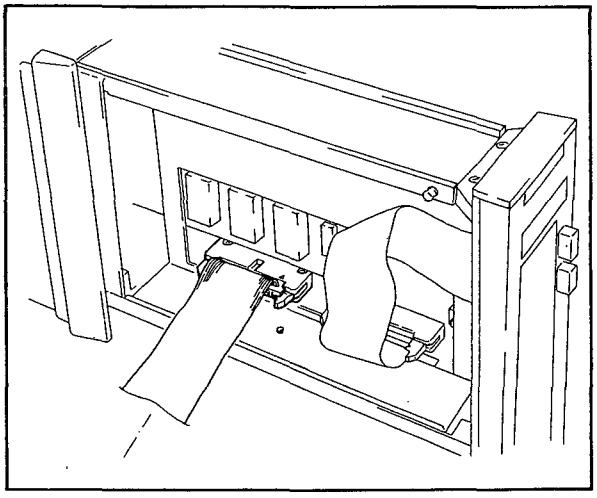


Figure 3-2-3. Connection to IPL Computing Station.

3-2-6. Connecting SPRG to IPL Computing Unit.

Refer to Figure 3-2-4.

(1) When the IPL module is drawn from its rack housing, connector socket CN2 appears on its left side.

(2) Open the lock lever of socket CN2, and insert the SPRG connector so that its triangle mark (▲) coincides with that on the socket. Complete the lock lever.

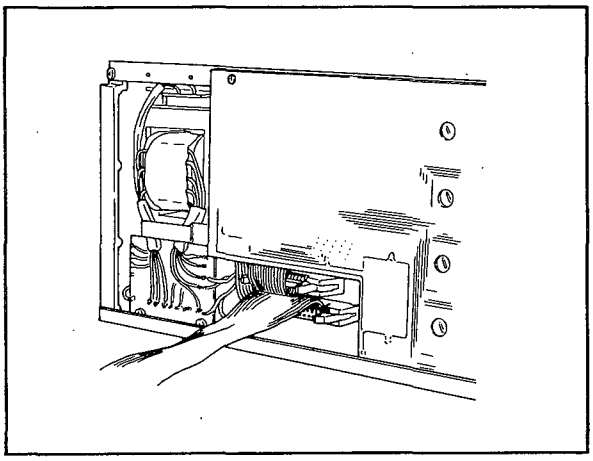


Figure 3-2-4. Connection to IPL Computing Unit.

3-2-7. Connecting SPRG to Printer.

Refer to Figure 3-2-5.

(1) The printer connection socket is on the left side of SPRG.

(2) Insert the printer connector (the plug can be only inserted one way).

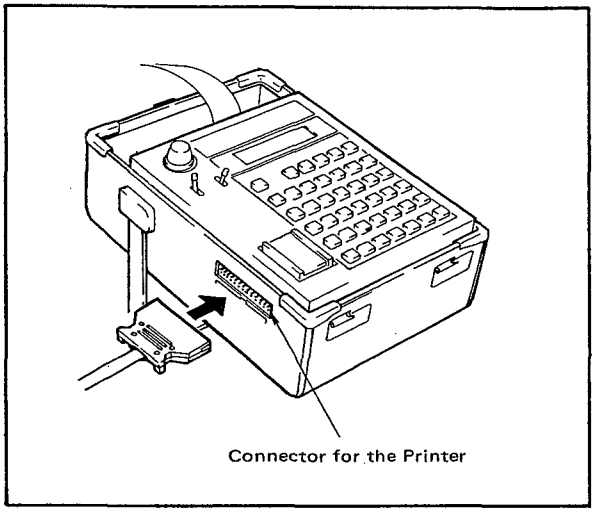


Figure 3-2-5. Connection of Printer.

3-2-8. Turning ON the Power.

After connecting the above-mentioned cables, connect the power plug.

4. PRINCIPLES OF OPERATION.

4-1. Principles of Operation.

When a programmable instrument such as SLPC and the SPRG Programmer are connected together, the operating principles of the system are as shown in Figure 4-1-1. The programmer – consisting of ROM, RAM and interface – is controlled by the CPU of the instrument connected to the programmer. A switch on the programmer selects program mode or test run mode. In program mode, the program is stored in RAM-2. The procedure is as follows:

1. Press the programmer keys to enter a program, or
2. Transfer the program from User ROM mounted in the instrument to RAM-2 of the programmer, or
3. Insert User ROM into the socket on the programmer to transfer its program to RAM-2.

After storing the program in RAM-2 by the above procedure, switch the system to "test run" mode so that the program – including I/O signals to/from the process – will be executed.

For the SLPC, SLMC or SCMS, it is possible not only to store a process model (a program which simulates the process) into RAM-2 but also to test the closed loop operation of the controller off line using the process model. Data in each register can be displayed on the programmer display, This is convenient for program debugging. Parameters can be changed, by pressing the programmer keys, even when the system is in test run mode.

If programs are satisfied, install ROM which is not written in the programmer ROM socket and write a program stored in RAM-2. Parameters set by the programmer tuning panel are stored in ROM of the SLPC, SLMC or SCMS as initial values. The contents of ROM appear on the SPRG Programmer display. So you can check them.

After a program is stored in ROM, the ROM is plugged into an SLPC instrument, the programmer is disconnected, and the instrument can then execute the program by itself.

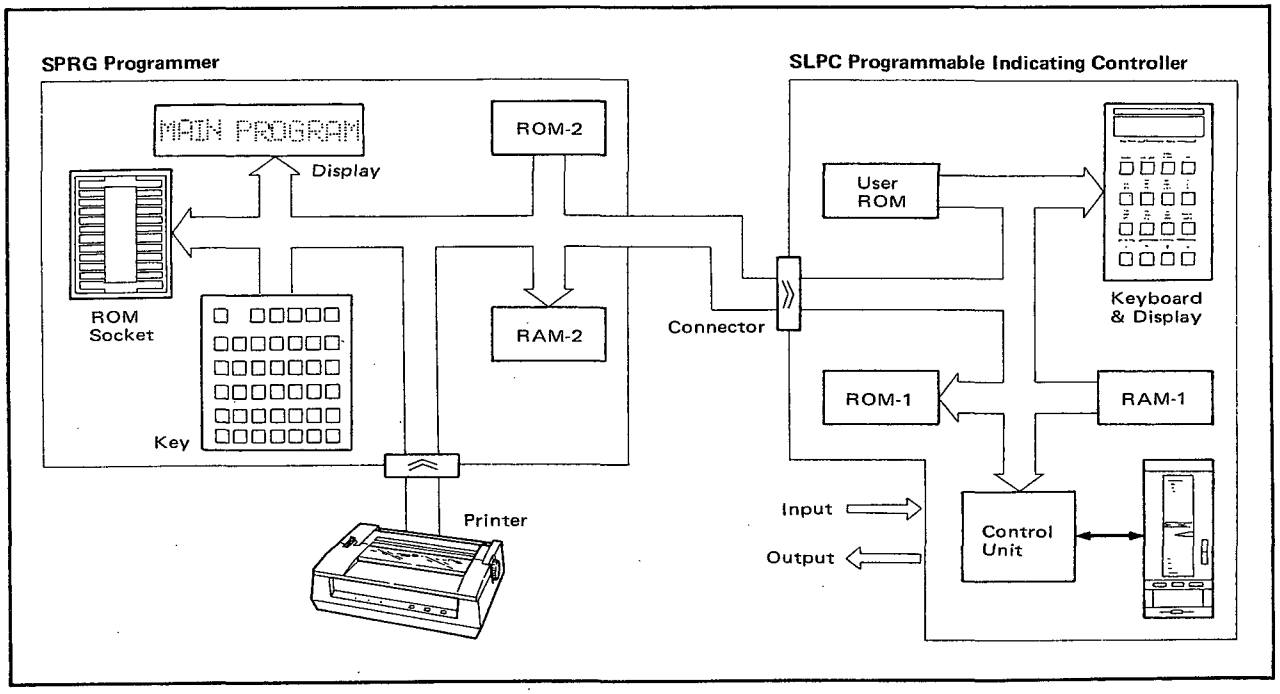


Figure 4-1-1. Principles of Operation.

4-2. Simple Program, Example-1.

For easy handling of this instrument, some simple programs are generated. Detailed key operations are described in Section 5.

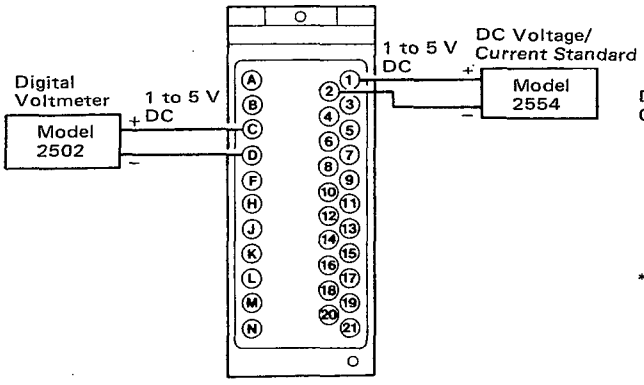


Figure 4-2-1. Wiring Diagram for SLPC, SLMC, or SCMS Test Run.

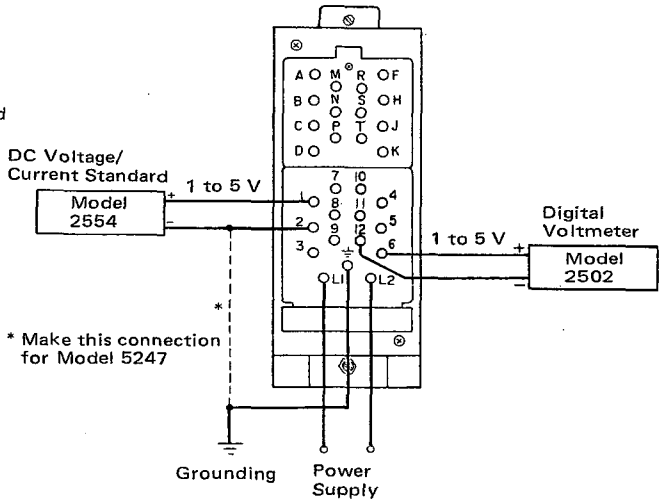


Figure 4-2-3. Wiring Diagram for IPL Station (Model $5\frac{2}{3}47$) Test Run.

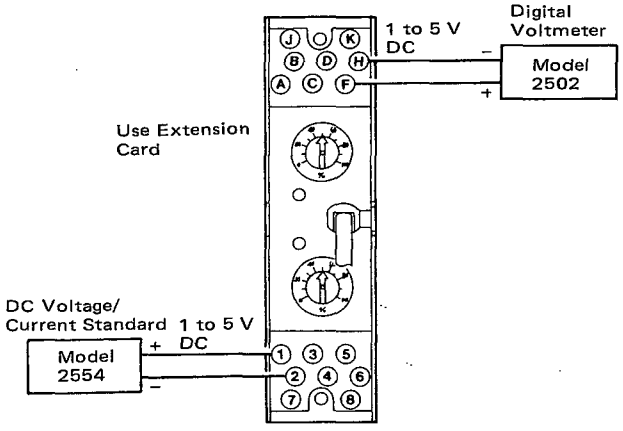


Figure 4-2-2. Wiring Diagram for SPLR Test Run.

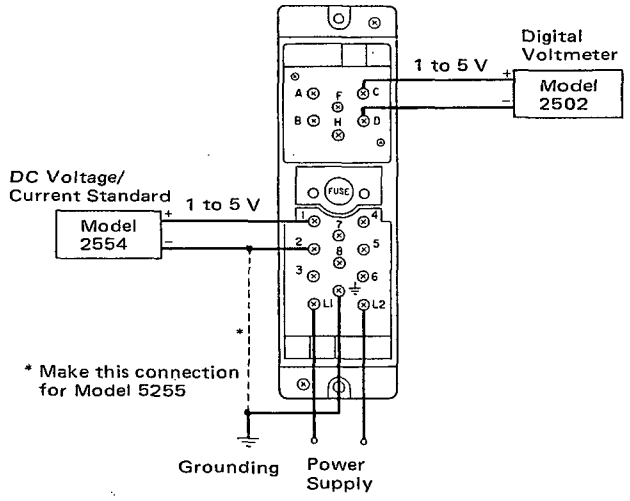


Figure 4-2-4. Wiring Diagram for IPL Unit (Model $5\frac{2}{3}55$) Test Run.

4-2-1. Preparation.

1. Connect the SPRG Programmer and test instruments as shown in Figures 4-2-1 through 4-2-4 to check that operation of the Programmer in test run mode is normal. Leave the power supplies disconnected.
2. Set the TEST RUN/PROGRAM switch to PROGRAM mode.
3. Connect the instrument and the programmer as illustrated in Section 3-2.
4. Connect the programmer to the power supply, but leave its power switch turned off.
5. Turn ON the programmer power switch. Connect power to the programmable instrument and test instruments and allow time for warming up. For the IPL unit, the fail indicator lamp (red) lights, and the fail contact opens. This operation is normal.
6. Key operation — Programmer display

	MAIN PROGRAM
(1) [F]	m 1 F
(2) [ ]	INIT PROGRAM
After a moment	MAIN PROGRAM
(3) [G]	m 1 G
(4) [ ]	INIT PARAMETER
After a moment	MAIN PROGRAM

These key operations prepare the programmer to accept a new program (pressing [F] and [ ] keys in sequence has the function [INZ] – initialize). Refer to Subsections 5-3-1 and 5-3-2.

4-2-2. Programming.

1. As an example, enter the simple program shown below.

```
01   LD    X1
02   ST    Y2
03   END
```

This program reads input signal 1 and provides output signal 2 (1 to 5 V DC).

2. Key operation — Programmer display

	MAIN PROGRAM
(1) [LD]	m 1 LD
(2) [X]	m 1 LD X >
(3) [1]	m 1 LD X 1
Completion of the first step	
(4) [ST]	m 2 ST
(5) [Y]	m 2 ST Y >
(6) [2]	m 2 ST Y 2
Completion of the second step	
(7) [END] (=[G] [CO])	m 3 END
Completion of the third step	

Press the keys in order of program steps.

The symbol >, which appears while keying in program steps, prompts the user to enter more information to complete a program step.

If key entry is invalid, press the [CAN] (cancel) or [DEL] (delete) key (see Subsections 5-3-12 and 5-3-16).

3. Press the [▲] and [▼] keys to confirm that the program entry is correct.

Key operation	Programmer display
	m 3 END
(1) [MPR]	MAIN PROGRAM
(2) [▲]	m 1 LD X 1
(3) [▲]	m 2 ST Y 2
(4) [▲]	m 3 END

4-2-3. Test Run.

Confirm that the program runs normally (producing an output corresponding to the applied input) by a test run:

1. Set the TEST RUN/PROGRAM switch to TEST RUN.
2. Key operation — Programmer display

	m 3 END
(1) [RUN] (=[G] [KY])	TEST RUN

3. Vary the input voltage – applied to the instrument from the voltage source – within the range of 1 to 5 V DC. The reading on the digital voltmeter connected to the output terminal of the instrument should coincide with the output voltage from the voltage source.

4. For the SLPC (or SLMC) Programmable Indicating Controller, when X1 is selected using the tuning panel keyboard on the side of the controller, the SLPC (or SLMC) displays the values between 0.0 and 100.0 corresponding to input signals within the range 1 to 5 V DC. Y2 can be selected and displayed in the same way as for X1.
5. For the SCMS Programmable Computing Station, select X1 with the data selection key. The SCMS displays 0.0 to 100.0 when the input signal of 1 to 5 V DC is applied. Y2 can be selected and displayed in the same way.
6. For the Model $5\frac{2}{3}47$ IPL Computing Station, when the upper display select lamp is lighted, the display varies between 0.0 and 100.0 in response to variation of the input signal within the range 1 to 5 V DC. Y2 can be selected by the selector switch and displayed in a similar manner.
7. The contents of the input and output registers can be displayed on the programmer display.

Key operation	Programmer display
(1) [X] [1]	X 1 □□□□□
(2) [Y] [2]	Y 2 □□□□□

4-2-4. Specifying Display Table.

In the previous section, the values displayed by the SLPC, SLMC, SCMS or IPL Station are within the range 0.0 to 100.0. The following steps show how to display the I/O values in actual engineering units (for example, a range of 1.000 to 5.000) corresponding to an input signal variation within the range 1 to 5 V DC.

1. Set the TEST RUN/PROGRAM switch again to PROGRAM. For the IPL, wait until the fail lamp lights before operating the keys.
2. Key operation — Programmer display

MAIN PROGRAM

(1) [X]	X>	
(2) [1]	X1H	100.0
(3) [ENT]	X1L	000.0
(4) [ENT]	X1H	100.0

Each time the [ENT] key is pressed, the display toggles between the high and low range limits of X1 (in engineering units).

3. Specify X1.

Key operation		Programmer display	
		X1H	100.0
(1) [5]		X1H	5
(2) [▪]		X1H	5.
(3) [0]		X1H	5.0
(4) [0]		X1H	5.00
(5) [0]		X1H	5.000
(6) [ENT]	After the numeric value 5.000 has disappeared momentarily,	X1H	5.000

Always press the [ENT] key after keying in a numeric value.

(7) [ENT]		X1L	0.000
(8) [1]		X1L	1
(9) [▪]		X1L	1.
(10) [0]		X1L	1.0
(11) [0]		X1L	1.00
(12) [0]		X1L	1.000
(13) [ENT]	After the numeric value 1.000 has disappeared momentarily,	X1L	1.000

4. The output signals can be displayed in engineering units in a manner similar to that shown above.
5. Set the TEST RUN/PROGRAM switch to the TEST RUN position, and press the [RUN] key. Confirm that the value on the display corresponds exactly to the signal from the voltage source. (Since the display table is set to display the range 1.000 to 5.000, the displayed value should coincide with the input voltage from the voltage source).

4-3. Simple Program, Example-2.

4-3-1. Preparation.

Use the same procedure as described in subsection 4-2-1 to set up the instruments. The wiring diagrams are shown in Figures 4-3-1 through 4-3-4.

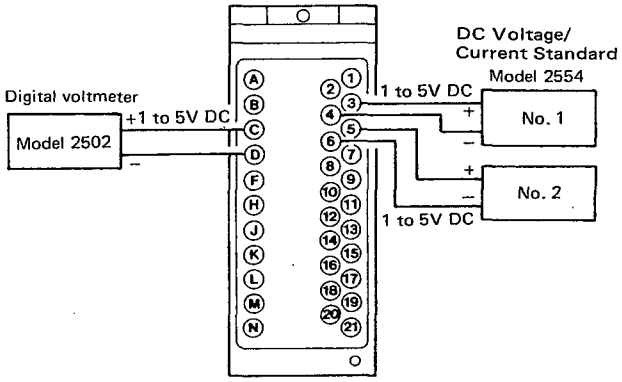


Figure 4-3-1. Wiring Diagram for SLPC, SLMC or SCMS Test Run.

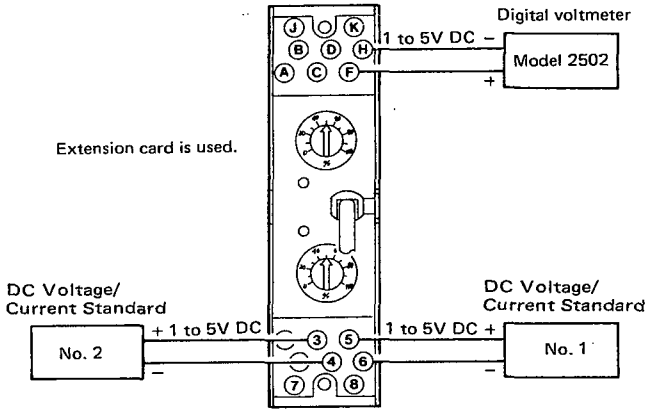


Figure 4-3-2. Wiring Diagram for SPLR Test Run.

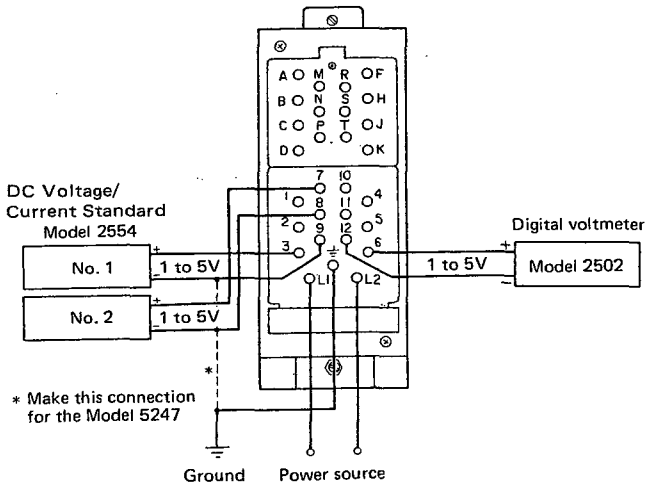


Figure 4-3-3. Wiring Diagram for an IPL Station (Model $5\frac{2}{3}47$) Test Run.

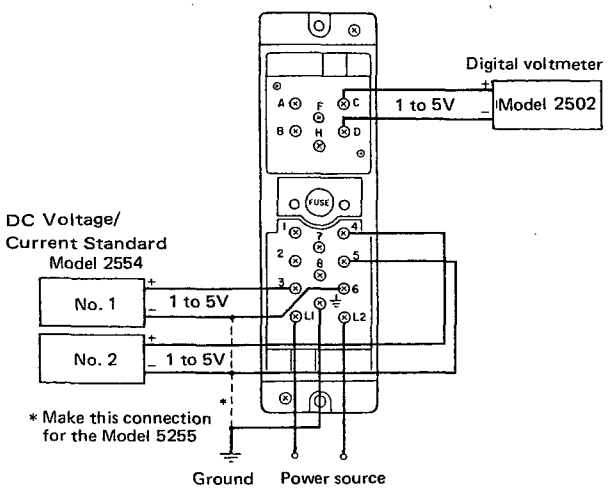


Figure 4-3-4. Wiring Diagram for IPL Unit (Model $5\frac{2}{3}55$) Test Run.

4-3-2. Programming.

The following program outputs the sum of two input signals. Suppose that the application is an actual manufacturing process where flows of two different materials have to be blended.

Flow rate 1: 0 to 600 ℓ/h

Signal of 1 to 5 V DC with linear characteristic

Flow rate 2: 0 to 200 ℓ/h

Signal of 1 to 5 V DC with linear characteristic

In this case, when the two flows are combined, the flow rate will be

Flow rate: 0 to 800 ℓ/h

Signal of 1 to 5 V DC with linear characteristic

Assign input and output signals as follows: assign flow rate 1 to No. 2 input, flow rate 2 to No. 3 input, and output to No. 2 output. The wiring diagrams are as shown in Figures 4-3-1 through 4-3-4.

1. Program

```
01   LD   X2
02   LD   K01    K01 = 0.750
03   x
04   LD   X3
05   LD   K02    K02 = 0.250
06   x
07   +
08   ST   Y2
09   END
```

X2 (100% input represents 600 ℓ/h) and X3 (100% input represents 200 ℓ/h) are multiplied by K01 = 0.75 (75%) and K02 = 0.25 (25%) respectively. Thus, the ratio K01:K02 = 600:200, and the sum K01 + K02 = 1.00 (100%).

2. Key operation	Programmer display
	MAIN PROGRAM
(1) [LD] [X] [2]	m 1 LD X 2
(2) [LD] [K] [0] [1]	m 2 LD K 1
(3) [*] (=[F] [3])	m 3 *
(4) [LD] [X] [3]	m 4 LD X 3
(5) [LD] [K] [0] [2]	m 5 LD K 2
(6) [*]	m 6 *
(7) [+] (=[F] [9])	m 7 +
(8) [ST] [Y] [2]	m 8 ST Y 2
(9) [END]	m 9 END
(10) [K] [0] [1] [0] [.] [7] [5] [0]	K 0 1 0.750
(11) [ENT]	K 0 1 0.750
(12) [K] [0] [2] [0] [.] [2] [5] [0]	K 0 2 0.250
(13) [ENT]	K 0 2 0.250

4-3-3. Test Run.

Confirm that the instrument performs the keyed-in program correctly.

1. Set the TEST RUN/PROGRAM switch to the TEST RUN position.
2. Key operation / Programmer display
   (1) [RUN] — TEST RUN
   (2) [X] [2] — X 2 □□□□□
3. When the output of the voltage source connected to the No. 2 input terminal of the instrument is varied within the range 1 to 5 V DC, the programmer displays for inputs of 1 V and 5 V should be 0.000 and 1.000 respectively.
4. When keys [X] and [3] are pressed in sequence, the reading on the programmer display corresponds to input signal 3.
5. When the keys [Y] and [2] are pressed in turn, the programmer displays 0.000 when the digital voltmerer No.2 reads a 1 V DC output, and 1.000 when it reads a 5 V DC output.
6. Vary the two inputs, and confirm that the relationship between inputs and output is correct.

4-3-4. Changing Constants during Test Run.

While checking a program in test run mode, sometimes constants must be changed so that results correspond with actual process quantities. In such cases, the constants Kn can be changed during test run mode.

1. Suppose that – when using the program described in Section 4-3-3 – it becomes necessary to change the flow rates as a result of a test run.
   Flow rate 1: 0 to 600 ℓ/h
   (Remains unchanged)
   Flow rate 2: 0 to 400 ℓ/h
   (Changed from 0 to 200 ℓ/h)
   Thus, when these two flow rates are combined, we obtain
   Flow rate: 0 to 1000 ℓ/h
   As a result, the constants have to be changed to K01 = 0.6 (60%) and K02 = 0.4 (40%) respectively.
2. The following key operations have to be performed during test run mode to make the changes.

Key operation	Programmer display
(1) [K] [0] [1] [0] [.] [6] [0] [0]	K 0 1 0.600
(2) [ENT]	K 0 1 0.600
(3) [K] [0] [2] [0] [.] [4] [0] [0]	K 0 2 0.400
(4) [ENT]	K 0 2 0.400

3. Vary the two inputs, and confirm that the relationship between the input and output "flow rates" is appropriate.

4-3-5. Specifying Display Table.

For the SLPC, SLMC, SCMS or IPL Station, variables Xn and Yn, and parameters Pn can be displayed in engineering units. Prepare the display table according to the procedure described in subsection 4-2-4.

5. OPERATION.

5-1. Front Panel Features.

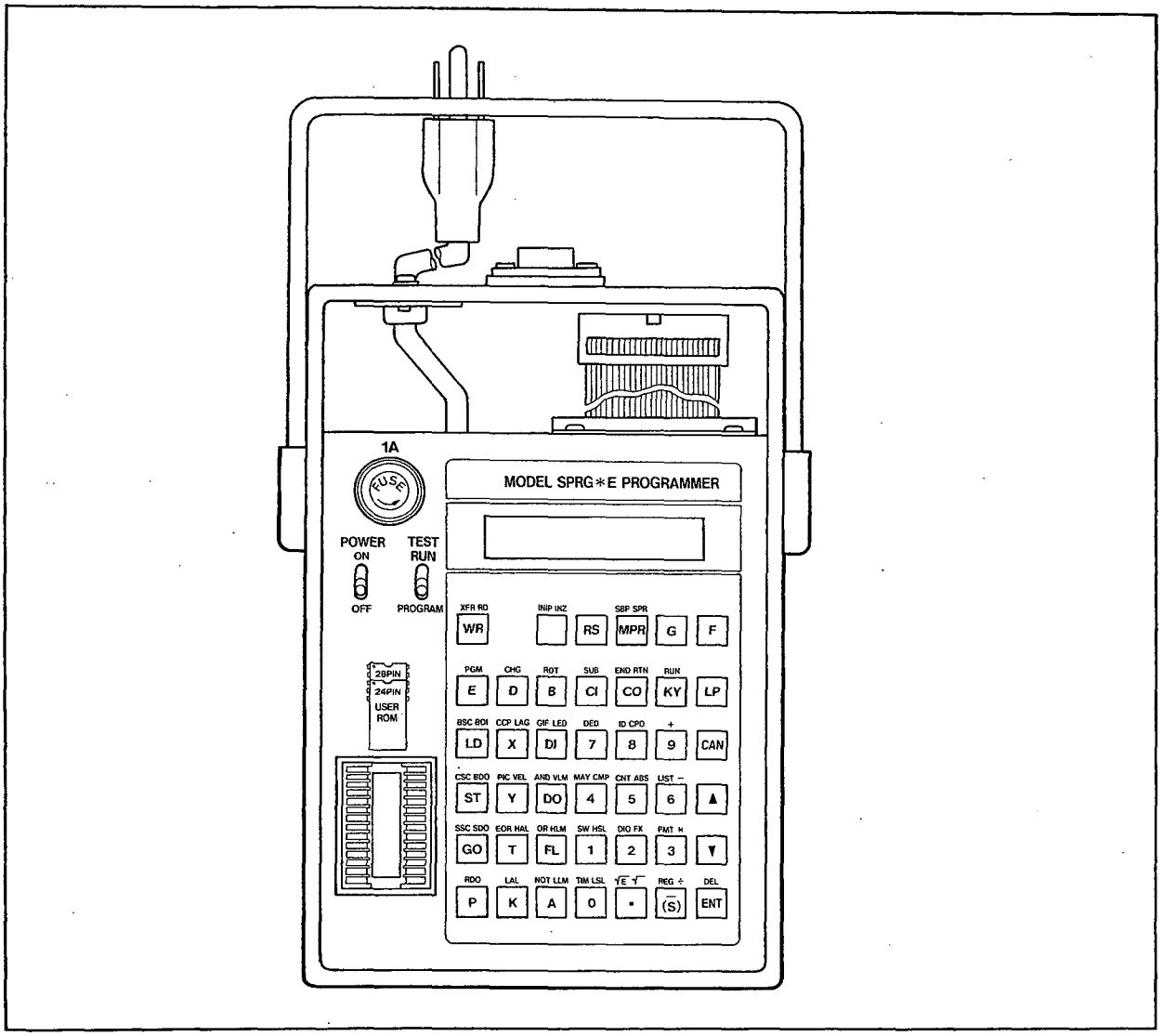


Figure 5-1-1. Front Panel Features.

5-2. Toggle Switches.

5-2-1. Mode (TEST RUN/PROGRAM) Switches.

1. PROGRAM

   When the switch is at the PROGRAM position, a program may be input from the programmer keyboard to its memory. Constants, display table (for SLPC, SLMC, SCMS and IPL station) and control mode CNT (SLPC, SLMC and SCMS) may also be input.

   Programs stored in User ROM can be transferred to RAM in the Programmer, and test run or modified.

2. TEST RUN

   When the switch is at the TEST RUN position, pressing the RUN key initiates a program in an (SLPC etc.) instrument. In Test Run Mode, register (variable) contents may be checked. (The displayed input register contents are the values read each computational cycle before the user program is executed, the output register contents are the values output at the end of the user program).

5-2-2. Power Switch (POWER ON/OFF).

ON: Power applied.

OFF: Power disconnected.

5-3. Programmer Control Keys.

5-3-1. [F] (Shift key).

Pressing [F] shifts the next key pressed: it takes the function indicated in blue above the key. For example, when [F] and [X] keys are pressed in sequence, the program instruction "LAG" is entered (see [X] key in Figure 5-1-1). In this manual, these two key operations may simply be expressed as [LAG].

5-3-2. [G] (Shift key).

Pressing [G] shifts the next key pressed: it takes the function indicated in yellow above the key. For example, when [G] and [DO] keys are pressed in sequence, the program instruction "AND" is entered (see [DO] key in Figure 5-1-1). In this manual, these two key operations may simply be expressed as AND.

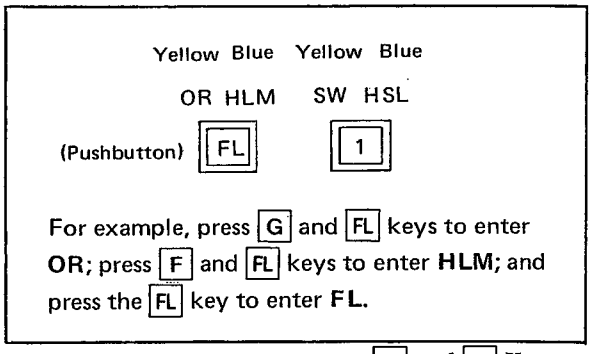


Figure 5-3-1. How to Operate [F] and [G] Keys.

5-3-3. [MPR] (Main program key).

Programs consist of the main program, subprograms and simulation programs. Press the [MPR] key to call the head of the main program. Programs which can be used for each instrument are as follows:

	SLPC*E	SLPC*A	SLMC*E	SLMC*A	SCMS	SPLR	$5^{2}_{3}47$	$5^{2}_{3}55$
Main Program	O	O	O	O	O	O	O	O
Subprogram	O	—	O	—	O	—	—	—
Simulation Program	O	O	O	O	O	—	—	—

*E: Style E
O: Can be used
—: Cannot be used

5-3-4. [SBP] (Subprogram key).

[= [G] [MPR]]

Press the [SBP] (subprogram) key to call the head of the subprograms (up to 99 program steps can be described).

5-3-5. [SPR] (Simulation program key)

[= [F] [MPR]].

Pressing this key specifies the head of a process simulation program (process model) used for an off line closed loop test run of an SLPC, SLMC or SCMS program. The program can be up to 20 steps long.

5-3-6. [INZ] (Program-erasing key) [= [F] [ ]].

Press this key before entering a new program to erase previous programs, constants and display tables.

5-3-7. [RS] (Reset key).

This key is used to return the program to its starting point. In test run mode, pressing this key resets register variables Xn Yn and digital I/O and restarts the user's program from the beginning. In program mode, pressing this key changes the program location to its starting point, and the programmer waits for further commands.

5-3-8. [WR] (Program-write key).

Pressing this key stores a program (including constants and display tables) from programmer RAM into a blank ROM inserted into the ROM socket.

5-3-9. [RD] (Program-read key) [= [F] [WR]].

Pressing this key reads the contents of the ROM in the programmer ROM socket into programmer RAM memory.

5-3-10. [XFR] (Program transfer key) [= [G] [WR]].

Pressing this key transfers a program from User ROM in an instrument (SLPC etc.) connected to the programmer to RAM in the programmer.

5-3-11. [RUN] (Test run execution key) [= [G] [KY]].

When the TEST RUN/PROGRAM switch is set to the TEST RUN position, pressing this key makes the instrument connected to the programmer execute the program in programmer RAM memory in test run mode.

5-3-12. [CAN] (Clear – partial erasure – key).

Aborts entry of a single program step.

1. This key aborts entry of a partially-complete program step. Operating this key moves the display back one program step. If the last program step entered is complete, this key does not delete it – use the [DEL] key instead.
2. This key can also be used to abort entry of constants Kn, temporary variables Tn and display table items (for SLPC, SLMC, SCMS and IPL Station).

5-3-13. [▲] (Forward-step key).

Pressing this key moves the program display one step forward. Thus, it can be used to display the program step by step, or to move to a program step that must be changed. After step 99 is reached, pressing the key again reverts the display to step 01.

5-3-14. [▼] (Back-step key).

This key is used to display the previous program step. After step 01 is reached, pressing the key again jumps the program display to step 99.

5-3-15. [ENT] (Entry key).

In program mode, this key is used (after typing in numeric data) to enter settings for constants Kn, display table, and the numeric value of CNTn (SLPC, SLMC or SCMS) into the programmer. In test run mode, this key is used (after typing in numeric data) to enter new settings for constants, parameters and the numeric values of various registers. In register print mode, this key is used to initiate printout.

5-3-16. [DEL] (Delete program step key) [= [F] [ENT]].

This key is used to modify a program. Each time this key is pressed, the currently-displayed program step is erased and the previous program step is displayed.

5-3-17. [INIP] (Parameter erasing key) [= [G] [ ]].

This key is used to initialize the tuning parameters of the instrument connected to the SPRG (cannot be used for SPLR and IPL).

5-4. Numeric Keys.

[0] [1] to [9] [▪] [(S)]

These keys are used to input numeric values, e.g. data, register numbers, and step numbers which are the target of jump instructions.

The [▪] key is for entering the decimal point. Entries may have up to three digits below the decimal point. (.□□□□ = four digits below the decimal point is illegal).

The [(S)] key enters a minus sign in front of a number.

For example, to enter −0.500, press the keys [(S)] [0] [▪] [5] [0] [0] in order (pressing the keys [0] [▪] [5] [0] [0] [(S)] in order is invalid).

5-5. Register Keys.

These keys are used with commands LD and ST for creating programs. When only the register keys are pressed, data is displayed. Instruments for which register keys can be used are shown below.

		Register	SLPC*E	SLPC*A	SLMC*E	SLMC*A	SCMS	SPLR	$5\frac{2}{3}47$	$5\frac{2}{3}55$
Numeric Data Register	X	Input Register	○	○	○	○	○	○	○	○
	Y	Output Register	○	○	○	○	○	○	○	○
	T	Temporary Storage	○	○	○	○	○	○	○	○
	K	Constant	○	○	○	○	○	○	○	○
	P	Parameter	○	○	○	○	○	○	○	—
	A	Control Parameter	○	○	○	○	—	—	—	—
	B	Control Parameter	○	—	○	—	—	—	—	—
	D	Send Data	○	—	○	—	○	—	—	—
	E	Receive Data	○	—	○	—	○	—	—	—
Status Register	DI	Status Input	○	○	○	○	○	○	○	—
	DO	Status Output	○	○	○	○	○	○	○	—
	FL	Flag	○	○	○	○	○	○	—	○
	CI	Send Data	○	—	○	—	○	—	—	—
	CO	Receive Data	○	—	○	—	○	—	—	—
	KY	Key Input	○	—	○	—	○	—	—	—
	LP	Lamp Output	○	—	○	—	○	—	—	—

○ Can be used.
— Cannot be used.

5-6. DIO Designation Key [DIO] [= [G] [2]].

This key is used to designate DIO (digital I/O) terminals for the SLPC*E, SLMC*E and SCMS.

5-7. CNT Designation Key [CNT] [= [G] [5]].

CNT1: Designates control elements in control loop No.1.

CNT2: Designates control elements in control loop No.2.

CNT3: Designates auto selector for selector control.

CNT4: Designates computation cycles.

CNT5: Designates computation expressions.

Instruments for which CNTs can be used are shown below.

	SLPC*E	SLPC*A	SLMC*E	SLMC*A	SCMS	SPLR	$5\frac{2}{3}47$	$5\frac{2}{3}55$
CNT1	O	O	O	O	—	—	—	—
CNT2	O	O	—	—	—	—	—	—
CNT3	O	O	—	—	—	—	—	—
CNT4	O	—	—	—	O	—	—	—
CNT5	O	—	O	—	—	—	—	—

5-8. Computational and Control Program Keys.

Program keys correspond to computational and control functions of SLPC, SLMC, SCMS, SPLR and IPL. A program is generated by keying in a sequence of program steps. Some computational/control functions do not apply to all instruments – see Table 5-8-1 for details of which functions apply to which instruments.

Table 5-8-1. Computational and Control Functions in Different Programmable Instruments (Continued).

Category	Instruction Code	Instruction	Programmer Display	Instruments							
				SLPC*E	SLPC*A	SLMC*E	SLMC*A	SCMS	SPLR	$5\frac{2}{3}47$	$5\frac{2}{3}55$
Load	LDXn	Read Xn	LD Xn	○	○	○	○	○	○	○	○
	LDYn	Read Yn	LD Yn	○	○	○	○	○	○	○	○
	LDPmn	Read Pmn	LD Pmn	○	○	○	○	○	○	○	—
	LDKmn	Read Kmn	LD Kmn	○	○	○	○	○	○	○	○
	LDTmn	Read Tmn	LD Tmn	○	○	○	○	○	○	○	○
	LDAmn	Read Amn	LD Amn	○	○	○	○	—	—	—	—
	LDBmn	Read Bmn	LD Bmn	○	—	○	—	—	—	—	—
	LDFLmn	Read FLmn	LD FLmn	○	○	○	○	○	—	—	—
	LDDImn	Read DImn	LD DImn	○	○	○	○	○	○	—	—
	LDDOmn	Read DOmn	LD DOmn	○	○	○	○	○	○	—	—
	LDEmn	Read Emn	LD Emn	○	—	○	—	○	—	—	—
	LDDmn	Read Dmn	LD Dmn	○	—	○	—	○	—	—	—
	LDCImn	Read CImn	LD CImn	○	—	○	—	○	—	—	—
	LDCOmn	Read COmn	LD COmn	○	—	○	—	○	—	—	—
	LDKYn	Read KYn	LD KYn	○	—	○	—	○	—	—	—
	LDLPn	Read LPn	LD LPn	○	—	○	—	○	—	—	—
Store	STXn	Store into Xn	ST Xn	○	○	○	○	○	○	○	○
	STYn	Store into Yn	ST Yn	○	○	○	○	○	○	○	○
	STPmn	Store into Pmn	ST Pmn	○	○	○	○	○	—	—	—
	STTmn	Store into Tmn	ST Tmn	○	○	○	○	○	○	○	○
	STAmn	Store into Amn	ST Amn	○	○	○	○	—	—	—	—
	STBmn	Store into Bmn	ST Bmn	○	—	○	—	—	—	—	—
	STFLmn	Store into FLmn	ST FLmn	○	○	○	○	○	—	—	—
	STDOmn	Store into DOmn	ST DOmn	○	○	○	○	○	○	—	—
	STDmn	Store into Dmn	ST Dmn	○	—	○	—	○	—	—	—
	STCOmn	Store into COmn	ST COmn	○	—	○	—	○	—	—	—
	STLPn	Store into LPn	ST LPn	○	—	○	—	○	—	—	—
End	END	End of Program	END	○	○	○	○	○	○	○	○
Function — Basic Functions	+	Addition	+	○	○	○	○	○	○	○	○
	—	Subtraction	—	○	○	○	○	○	○	○	○
	×	Multiplication	*	○	○	○	○	○	○	○	○
	÷	Division	/	○	○	○	○	○	○	○	○
	$\sqrt{\ }$	Square Root Extraction	SQT	○	○	○	○	○	○	○	○
	$\sqrt{E}$	Square Root Extraction with Locked Low Level Signal Adjustable	SQT-E	○	—	○	—	○	—	—	—
	ABS	Absolute Value	ABS	○	○	○	○	○	○	○	○
	HSL	High Selector	HSL	○	○	○	○	○	○	○	○
	LSL	Low Selector	LSL	○	○	○	○	○	○	○	○
	HLM	High Limit	HLM	○	○	○	○	○	○	○	○
	LLM	Low Limit	LLM	○	○	○	○	○	○	○	○

Table 5-8-1. Computational and Control Functions in Different Programmable Instruments.

Category		Instruction Code	Instruction	Programmer Display	Instruments							
					SLPC*E	SLPC*A	SLMC*E	SLMC*A	SCMS	SPLR	$5\frac{2}{3}$47	$5\frac{2}{3}$55
					2 Functions, Each 10 Segments	2 Functions, Each 10 Segments	2 Functions, Each 10 Segments	2 Functions, Each 10 Segments	2 Functions, Each 10 Segments	2 Functions, Each 10 Segments	3 Segments	20 Segments
Functions	Function with Device Addresses	FX	Segment	FX n								
		FX	Line Segment	FX n	○	—	○	—	○	—	—	—
		LAG	First Order Lag	LAG n	○	○	○	○	○	○	○	○
		LED	First Order Lead	LED n	○	○	○	○	○	○	○	○
		DED	Dead Time	DED n	○	○	○	○	○	○	○	○
		VEL	Velocity Computation	VEL n	○	○	○	○	○	○	○	○
		MAV	Moving Average Computation	MAV n	○	—	○	—	○	○	—	—
		VLM	Velocity Limiter	VLM n	○	○	○	○	○	○	○	○
		CCD	Condition Change Detection	CCD n	○	—	○	—	○	—	—	—
		TIM	Timer	TIM n	○	○	○	○	○	○	—	—
		PGM	Program Set	PGM n	○	—	○	—	○	—	—	—
		PIC	Pulse Input Count	PIC n	○	—	○	—	○	—	—	—
	Conditional Instructions	HAL	High-Limit Alarm	HAL n	○	○	○	○	○	○	○	○
		LAL	Low-Limit Alarm	LAL n	○	○	○	○	○	○	○	○
		BDI	Branch DIn	BDI n	—	—	—	—	—	—	○	—
		BDO	Branch DOn	BDO n	—	—	—	—	—	—	○	—
		AND	Logical Product	AND	○	○	○	○	○	○	—	—
		OR	Logical Sum	OR	○	○	○	○	○	○	—	—
		NOT	Negation	NOT	○	○	○	○	○	○	—	—
		EOR	Exclusive OR	EOR	○	—	○	—	○	—	—	—
		GOmn	Jump to Step mn	GO mn	○	○	○	○	○	○	○	○
		GIFmn	Conditional Jump	GIFmn	○	○	○	○	○	○	—	—
		GO SUB mn	Jump to Sub-program mn	GO SUB mn	○	—	○	—	○	—	—	—
		GIF SUB mn	Jump to Sub-program mn	GIF SUB mn	○	—	○	—	○	—	—	—
		SUBmn	Subprogram Label	SUBmn	○	—	○	—	○	—	—	—
		RTN	Return	RTN	○	—	○	—	○	—	—	—
		CMP	Comparision	CMP	○	○	○	○	○	○	○	○
		SW	Signal Switching	SW	○	○	○	○	○	○	—	—
	Contact Output	SDO	Set DOn	SDO n	—	—	—	—	—	—	○	—
		RDO	Reset DOn	RDO n	—	—	—	—	—	—	○	—
		CPO	Totalizer Pulse Output	CPOn	○	○	—	—	○	○	○	—
	Register	CHG	Change S Register	CHG	○	—	○	—	○	—	—	—
		ROT	Rotate S Register	ROT	○	—	○	—	○	—	—	—
	Control Functions	BSC	Basic Control	BSC	○	○	○	○	—	—	—	—
		CSC	Cascade Control	CSC	○	○	—	—	—	—	—	—
		SSC	Selector Control	SSC	○	○	—	—	—	—	—	—

○ Can be used
— Cannot be used

5-9. ID Number Setting Key [ID] [=[G][8]].

ID numbers are attached to the user ROMs. These ID numbers are read by the SPRG to identify the user ROMs.

For ID numbers, use four-digit constants.

5-10. Printer Control Keys.

These keys are used to print programs or data when the UPRT printer is connected to the SPRG programmer. The printer control keys are valid only when the system is in PROGRAM mode (the [REG] key valid even in test run mode).

5-10-1. [LIST] (Program list key) [=[G][6]].

This key allows program steps in a program to be printed ("listed") on the printer. Use [MPR] and [LIST] keys for printing the main program. [SBP] and [LIST] keys for printing subprograms, [SPR] and [LIST] keys for printing the process model (simulation) program.

5-10-2. [PMT] (Display table, constant and parameter keys) [=[G][3]].

This key is used to print the engineering unit display tables (range min./max. values) for input signals Xn, parameters Pn constants Kn, and output signals Yn. PID parameters (for SLPC or SLMC) can also be printed by pressing this key.

5-10-3. [REG] (Register key) [=[G][(S)]].

This key is used to print the input signals Xn, output signals Yn, temporary storage registers Tn, parameters Pn (except for IPL units) and the extended function registers An (for SLPC and SLMC only).

5-11. Preparation for Operation.

5-11-1. Connecting Power Source Plug.

A 3-pole power plug is used, but a 3-pole-to-2-pole adapter is supplied to enable connection to a 2-pole socket. The grounding wire should always be properly grounded.

5-11-2. Connecting Programmable Instrument.

With the power supplies OFF, connect the programmer flat cable to the programmable instrument. For more information, see Section 3-2.

5-11-3. Connecting Printer.

To use the printer, disconnect the power supplies and connect the printer to the socket on the left side of the programmer (see Figure 3-2-5).

5-12. Keying in Program.

5-12-1. Preparation.

Before applying power to the programmer, set the TEST RUN/PROGRAM toggle switch to PROGRAM mode. Apply power, and let the programmer warm up for a while. The initial programmer display is as shown below.

(Programmer display)

MAIN PROGRAM

Program generation procedures are dependent upon the types of programmable instruments. Necessary items for each instrument are described below.

Program Generation Procedures \ Instruments		SLPC*E	SLPC*A	SLMC*E	SLMC*A	SCMS	SPLR	$5\frac{2}{3}47$	$5\frac{2}{3}55$
Initialize Programmer	INZ	○	○	○	○	○	○	○	○
Initialize Parameters	INIP	○	○	○	○	○	—	—	—
Generate Main Program	MPR	○	○	○	○	○	○	○	○
Generate Subprogram	SBP	○	—	○	—	○	—	—	—
Generate Simulation Program	SPR	○	○	○	○	○	—	—	—
Set DIO Terminals	DIO	○	—	○	—	○	—	—	—
Set Constants (Kn)		○	○	○	○	○	○	○	○
Set Control Elements (CNTn)		○	○	○	○	○	—	—	—
Generate Display Table (Xn,Pn,Yn)		○	○	○	○	○	—	○	—
Set ID Number		○	○	○	○	○	○	○	○

5-12-2. Initializing Programmer.

The programmer should be initialized before generating programs.

Key operation	Programmer display
(1) [F] } = [INZ]	MAIN PROGRAM
(2) [ ] }	m 1
	INIT PROGRAM
(3) [G] } = [INIP]	MAIN PROGRAM
(4) [ ] }	m 1
	INIT PARAMETER
	MAIN PROGRAM

The [INZ] key is used to initialize the program area, constants and display table, and the [INIP] key initializes the SLPC tuning parameters.

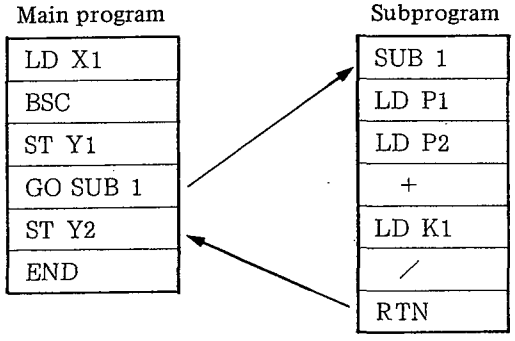
5-12-3. Keying in Main Program.

After initializing the programmer, key in the main program step-by-step. The correspondence between instruction codes and programmer displays is shown in Table 5-8-1.

5-12-4. Keying in Subprograms.

SLPC*E and SCMS can use subroutines which can be executed at several times. Thirty types of subroutines can be created in 99-step subprogram areas.

For functions with device addresses (except FX), the same device address number should not be executed in a routine.



Key operation	Programmer display
	MAIN PROGRAM
01 [LD] [X] [1]	m␣␣1␣LD␣␣X␣1
02 [BSC]	m␣␣2␣BSC
03 [ST] [Y] [1]	m␣␣3␣ST␣␣Y␣1
04 [GO] [SUB] [0] [1]	m␣␣4␣GO␣␣SUB␣1␣e
05 [ST] [Y] [2]	m␣␣5␣ST␣␣Y␣2
06 [END]	m␣␣6␣END
[SBP]	SUB␣PROGRAM
01 [SUB] [1]	s b ␣1␣SUB␣␣␣1␣␣␣e
02 [LD] [P] [0] [1]	s b ␣2␣LD␣␣P␣1
03 [LD] [P] [0] [2]	s b ␣3␣LD␣␣P␣2
04 [+]	s b ␣4␣␣+
05 [LD] [K] [0] [1]	s b ␣5␣LD␣␣K␣1
06 [÷]	s b ␣6␣␣/
07 [RTN]	s b ␣7␣RTN␣␣␣␣␣␣␣e

where

m: Main program
sb: Subprogram
si: Simulation program (see Section 5-12-5)
e: Style E program

5-12-5. Keying in Simulation Program.

For the SLPC, SLMC and SCMS, a simple process simulation can be programmed in SPRG program area. The simulation program shares 20 steps and allows a closed loop off-line test run. In this program area, the user can program a process simulation in the same procedures as for the main program. The total number of general functions with device addresses (LEDn, LAGn, DEDn, etc.) used in the simulation and main programs should be within the limits specified.

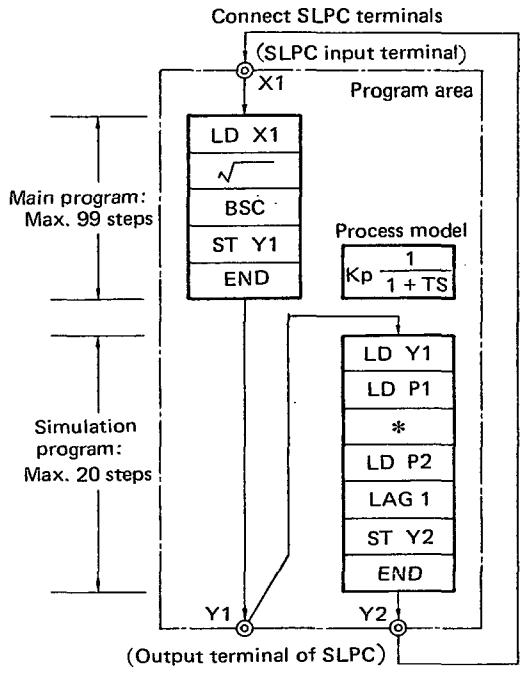


Figure 5-12-1. Simulation Program.

The main program and simulation program shown in Figure 5-12-1 are keyed in as follows:

	Key operation		MAIN PROGRAM
01	[LD] [X] [1]	Main program	m 1 LD X 1
02	[√]		m 2 SQT
03	[BSC]		m 3 BSC
04	[ST] [Y] [1]		m 4 ST Y 1
05	[END]		m 5 END
	[SPR]		SIMUL PR
01	[LD] [Y] [1]	Simulation (process model) program	Si 1 LD Y 1
02	[LD] [P] [0] [1]		Si 2 LD P 1
03	[*]		Si 3 *
04	[LD] [P] [0] [2]		Si 4 LD P 2
05	[LAG] [1]		Si 5 LAG 1
06	[ST] [Y] [2]		Si 6 ST Y 2
07	[END]		Si 7 END

5-12-6. Keying in DIOs (digital I/O) (for SLPC*E, SLMC*E and SCMS).

(1)	[DIO]		DIO >>
(2)	[0]		DIO O>
(3)	[1]		DIO 1
(4)	m	(m=[0],[1])	DIO 1 m
(5)	[ENT]		DIO 1 m

SLPC*E can set DIOs 1 through 6, SLMC*E DIOs 1 through 4 and SCMS DIOs 1 through 10. When the [INZ] (initialize) key is pressed, DIOs 1 through 3 (for the SLPC*E) and DIOs 1 through 5 (for the SCMS) are set for status input; DIOs 4 through 6 (for the SLPC*E) and DIOs 6 through 10 (for the SCMS) are set for status output.

5-12-7. Keying in Constants.

1. Displaying constants.

(1)	[K]		K
(2)	[0] or [1]	01 to 16	Km
(3)	[0] to [9]		Kmn 0.0 0 0

When the function FX is used, specify constants K20 to K85 for SCMS and K20 to K41 for SPLR, 5255 and 5355.

2. Keying in numeric values.

Numeric values −7.999 to 7.999 can be input using the numeric keys. For a negative value, press the [(S)] key prior to keying in the numeric value. The example shows how to key in "−4.507".

(1)	[(S)]	Kmn −
(2)	[4]	Kmn −4
(3)	[•]	Kmn −4.
(4)	[5]	Kmn −4.5
(5)	[0]	Kmn −4.5 0
(6)	[7]	Kmn −4.5 0 7
3.	[ENT]	Kmn −4.5 0 7

After keying in the numeric value, press the [ENT] key to store it.

5-12-8. Designating Control Functions.

For the SLPC, SLMC and SCMS, control function module designations need to be entered.

(1)	[CNT]		CNT>
(2)	[1]		CNT1
(3)	m	(m=[1] ~ [3])	CNT1 m
(4)	[ENT]		CNT1 m
(5)	[CNT]		CNT>
(6)	[2]		CNT2
(7)	n	(n=[1] ~ [3])	CNT2 n
(8)	[ENT]		CNT2 n

The example shown in steps (5) through (8) applies to cascade or selector control. CNT3 may also specified for selector control.

Keying in CNT4 and 5.

(1)	[CNT]	CNT>
(2)	[4]	CNT 4
(3)	m	CNT 4 m
(4)	[ENT]	CNT 4 m
(5)	[CNT]	CNT>
(6)	[5]	CNT 5
(7)	n	CNT 5 n
(8)	[ENT]	CNT 5 n

When the [ENT] key is pressed, the display is turned off and on, and the designation is completed.

5-12-9. Designating Display Table (SLPC, SLMC, SCMS and PIL).

1. Displaying inputs (registers Xn).
   (1) [X] X>
   (2) [n] Xn H 100. 0
   (3) A 4-digit number is keyed in. For example, if it is 120.0:
   [1] [2] [0] [.] [0] Xn H 120. 0
   (4) [ENT] Xn H 120. 0
   After keying in numeric values, press the [ENT] key to store the numeric value in the programmer.
   (5) [ENT] Xn L 000. 0
   Each time the [ENT] key is pressed without keying in a numeric value, the display alternates between XnH and XnL (high and low limits of range).
   (6) Follow the procedure shown in (3) and (4) for keying in numeric values. For example, when 0% = −40.0 is keyed in, the decimal point position (see below) must be the same as it would be when entering the value corresponding to 100%.
   [(S)] [0] [4] [0] [.] [0] Xn L−040. 0
   [ENT] Xn L−040. 0
2. Displaying outputs (registers Yn).
   The procedure is the same as that of 1. above, except that the [Y] key is operated instead of the [X] key.
3. Displaying parameters.
   The procedure is the same as for 1. above, except that the [P] key is operated instead of the [X] key.

5-12-10. Setting ROM ID Number.

To set ROM ID number to 4662:

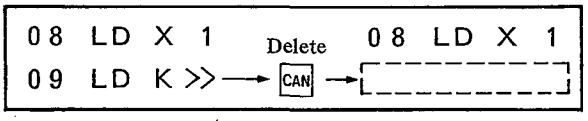
(1)	[ID]	SLPC 0000
(2)	[4] [6] [6] [2]	SLPC 4662
(3)	[ENT]	SLPC 4662

The instrument model, for example, SLPC (including SLPC*E and SLPC*A) is displayed automatically.

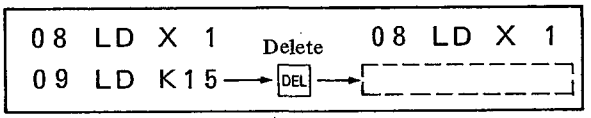
5-13. Modifying Program.

5-13-1. Deleting Incorrect Key Entry.

1. Delecting incomplete program step.
   To delete incomplete program step (on the way of one line), press the [CAN] (cancel) key. When the [CAN] key is pressed, the display returns to the previous program step. When the [CAN] key is pressed, the display indicates the previous step. To delete an instruction which has been completely entered, use the [DEL] key.
   Deleting a program step using the [CAN] key.



   Deleting a program step using the [DEL] key.



2. Deleting entries for constants Kn and temporary storage registers Tn.
   (1) Numeric values entered in Kn and Tn can be cleared by pressing the [CAN] key before pressing the [ENT] key.
   (2) To change a numeric value already stored in Kn or Tn, display the old value, enter a new numeric value and press the [ENT] key. This replaces the old value with a new one.

[K] [0] [6]	K 6 0. 000	(Initial value)
[3] [.] [5] [6] [0]	K 6 3. 560	
[CAN]	K 6	
[3] [.] [0] [0] [0]	K 6 3. 000	
[ENT]	K 6 3. 000	

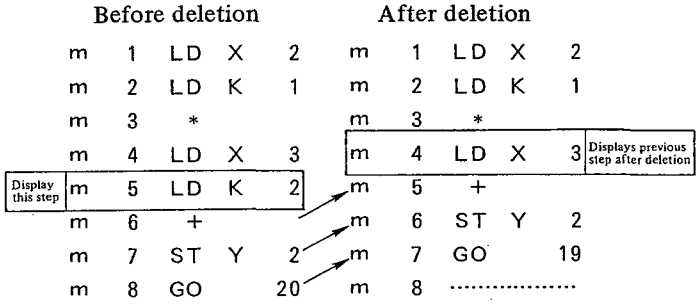
[K] [0] [6]	K 6 0.000	(Initial value)
[3] [.] [5] [6] [0]	K 6 3.560	
[ENT]	K 6 3.560	
[3] [.] [0] [0] [0]	K 6 3.000	
[ENT]	K 6 3.000	

3. If you make an error when entering the display table of SLPC, SLMC, SCMS or IPL Station, follow the same procedure as shown in 2 above to make the necessary changes.
4. To change the SLPC, SLMC or SCMS control function designation, follow the same procedure as shown in 2 above.

5-13-2. Deleting Program Step.

In the following program, to delete step 05: LD K02, proceed as follows:

1. Display the step to be deleted using the numeric keys (Press keys [0] and [5]). The step may also be displayed by stepping through the program using [▲] and [▼] keys.
2. Press the [DEL] key to delete the step. The display will then show the previous step.



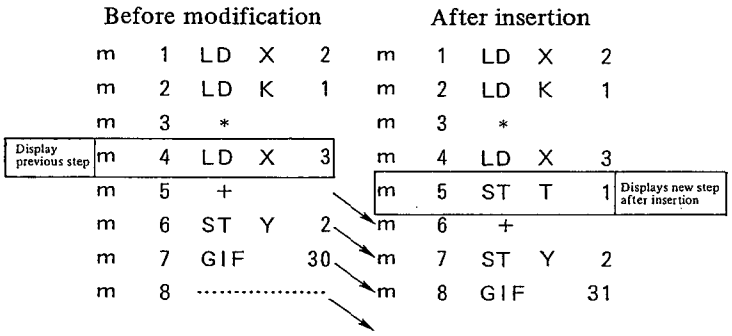
All steps following the deleted step move one step in memory.

3. Finally, operate the [▲] and [▼] keys to confirm that the incorrect step has been deleted.

5-13-3. Inserting Program Step.

In the following program, the following procedure inserts the step ST T1 between steps 04 and 05:

1. Display the step preceding the one to be inserted (step 04 in this case).
2. To insert the new step, follow the same key operation procedure as for keying in an ordinary program. In this case, the keys [ST], [T] and [1] are pressed.

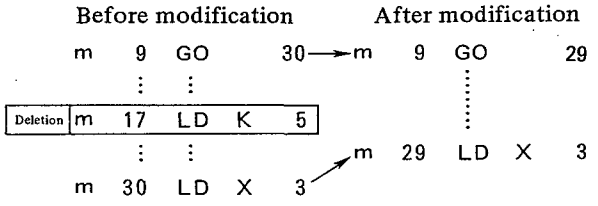


Program steps following the inserted step will be shifted by one step.

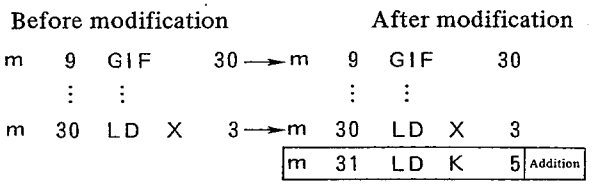
3. Finally, operate [▲] and [▼] keys to confirm that the desired program step insertion has been performed.

5-13-4. Jump Instruction Target Address Changes Automatically.

After deletion or insertion of a program step, the target address of jump instructions ([GO] [GIF]) changes automatically.

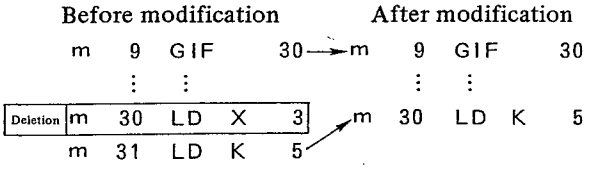


If the deletion or addition does not affect the jump instruction, there is no change of target address.



If the instruction which is the target of a jump instruction is deleted, the target address in the jump instruction is not be changed.

Modify the target step number in the jump instruction as necessary.



5-14. Test Run.

5-14-1. Test Run.

1. After completely keying in the program, step through it to confirm that all program steps are correct.
   (1) Press the [MPR] key to select program mode.
   (2) Press the [▲] key to display the next program step, and check that it is correct.

   ```
   MAIN  PROGRAM
   m 1   LD  X 1
   m 2   LD  K 1
   :
   m n   END
   ```

   For the SLPC, SLMC and SCMS press the [SPR] key to select the simulation program and step through it to confirm that it is correct.
   (3) Check the constants. For example, for K01, press keys [K] [0] [1] to display the value of K01.

   ```
   K 1   □□□□□
   ```

   (4) For SLPC, SLMC, SCMS and IPL Station, the display table must be checked.

   The procedure is similar to that for constants. Pressing [X] [1] displays the 100% value for the range of X1 in engineering units, pressing [ENT] displays the 0% value.

   ```
   X 1 H   □□□□□
   X 1 L   □□□□□
   ```

2. Set the TEST RUN/PROGRAM switch to the TEST RUN position.

   TEST RUN

3. A test run is initiated by pressing the [RUN] key. Apply voltages of 1 to 5 V DC to each input terminal with the programmer connected, and check that the input-output relationship is as intended.
5. If any problems are detected during the test run, set the TEST RUN/PROGRAM switch to the PROGRAM mode position, and correct the program according to the procedure described in Section 5-13. After correcting the program, set the switch back to the TEST RUN position, and press the [CAN] key to repeat the test run.

5-14-2. Load Rate of Program.

The program load rate is displayed only when the Programmer is connected to SLPC*E, SLMC*E or SCMS*E.

1. If the [CAN] key is pressed whole the test run is being executed, the current load rate flashes at the right of the programmer display.

$$\text{Load rate} = \frac{\text{Program execution time}}{\text{Computing time}} \times 100\%$$

```
TEST␣RUN␣␣␣[ 50 % ]
              (flashing)
```

2. The rate of program load, when the test run is executed, must be less than 100% in any program path. If it exceeds 100%, "OVER" flashes. Leave the rate of program load less than 100%.

   Note: Under operating status, the program execution time 20 ms is added for key operation and communication processing.

5-14-3. Displaying and Modifying Register Data.

In test run mode, each register can be displayed, and it is possible to not only display its value on the programmer but also to change its value.

1. Registers Xn.

   [X][n] X n □. □□□

   The input data display ranges from 0.0 to 1.0 corresponding to the input data 1 to 5 V DC. However, when the program uses an ST Xn instruction, the input data display may range from −7.999 to +7.999.

2. Registers Yn.

   [Y][n] Y n □. □□□

   The output signal of 1 to 5 V DC (or 4 to 20 mA DC) is displayed for the input data ranging from 0.0 to 1.0. Data ranging from −7.999 to +7.999 can be stored and displayed by Yn registers.

   For the SLPC and SLMC, data Y4, Y5 and Y6 to be transmitted to a supervisory system can be checked.

3. Registers Pmn (not in Model $5\frac{2}{3}55$).

   [P][m][n] Pmn □. □□□

   The set values of parameters are displayed as data in range 0.0 to 1.0 (for SLPC, SLMC and SCMS, values are −7.999 to +7.999, and the setting can be changed from the instrument side-panel keyboard as well as from the programmer).

4. Registers Tmn.

   [T][m][n] Tmn □. □□□

   The values of temporary storage registers are displayed as data of range −7.999 to +7.999. Setting change is possible.

5. Registers Kmn.

   [K][m][n] Kmn □. □□□

   The keyed-in values are displayed. Setting change is possible. For SPLR, SCMS and Model $5\frac{2}{3}55$, it is possible not only to display but also to set K20 to K85 (for SCMS), K20 to K41 (for SPLR) and K20 to K40 (for $5\frac{2}{3}55$), the constants which define line segment functions.

6. Registers An (for SLPC and SLMC).

   [A][m][n] Amn □. □□□

   The extended function register values are displayed as data in the range 0.0 to 1.0 (or data of range −7.999 to +7.999, depending on the signal).

7. Registers DImn (not is Model $5\frac{2}{3}55$).

   [DI][m][n] D I mn □

   0 indicates the OPEN contact condition, 1 indicates the CLOSED contact condition.

8. Registers DOmn (not in Model $5\frac{2}{3}55$).

   [DO][m][n] DOmm □

   The contact output signal status is displayed, the same as for contact input signals.

9. Registers FLmn (SLPC, SLMC, SCMS, SPLR, Model $5\frac{2}{3}55$).

   [FL][m][n] F Lmn □

   For the registers with extension functions, the values are displayed as integer data of range between 0 and 1. For SPLR and Model $5\frac{2}{3}55$, the result of self-diagnosis will be displayed.

10. Registers Emn (SLPC*E, SLMC*E and SCMS).

    [E][m][n] Emn □. □□□

    For SLPC*E and SLMC*E, data to be sent to the SCMS is displayed. For SCMS, data ranging from −7.999 to +7.999, which is sent from the SLPC*E and SLMC*E is displayed.

11. Registers Dmn (SLPC*E, SLMC*E and SCMS).

    [D][m][n] Dmn □. □□□

    For SLPC*E and SLMC*E, data to be sent to the SCMS is displayed. For SCMS, data ranging from −7.999 to +7.999, which is sent to the SLPC*E and SLMC*E is displayed.

12. Registers CImn (SLPC*E, SLMC*E and SCMS).

    [CI][m][n] C I mn □

    Same as register E. Data 0 and 1 are displayed.

13. Registers COmn (SLPC*E, SLMC*E and SCMS).

    [CO][m][n] COmn □

    Same as register D. Data 0 and 1 are displayed.

14. Registers KYn (SLPC*E and SCMS).

    [KY][n] KYn □

    The front panel switch statuses are stored. Switch ON-status is displayed by "1"; switch OFF-status by "0".

15. Registers LPn (SLPC*E, SLMC*E and SCMS).

    [LP][n] LPn □

    The front panel lamp statuses are stored. Lamp ON-status is displayed by "1" and lamp OFF-status by "0".

16. Registers Bmn cannot be displayed contents of register. Check registers Bmn on the side panel of the programmable controller.

5-14-4. Change of Parameters (SLPC, SLMC and SCMS).

In test run mode, the parameters can be changed using the tuning panels on the front and side of SLPC, SLMC or SCMS. When the program is stored in ROM, the final parameter settings are stored as initial values.

5-15. Storing a Program in ROM.

5-15-1. Storing Program.

After verifying the program by a test run, store it into ROM.

(1) Install a blank ROM in the ROM socket of the programmer (observe correct orientation of ROM in socket – note notch orientation).

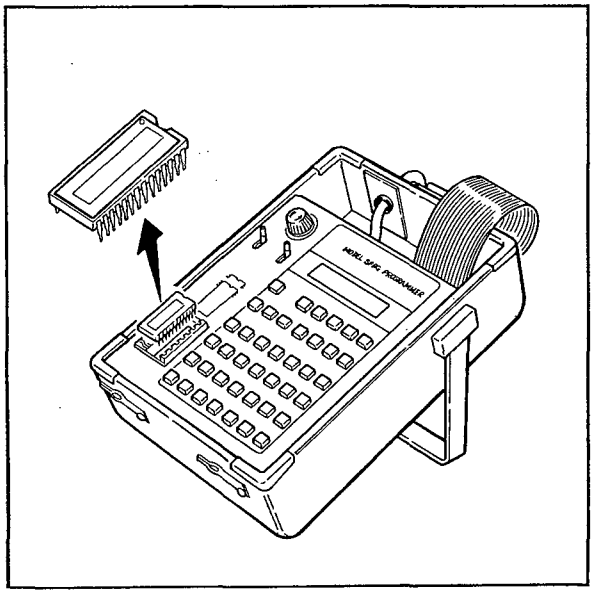


Figure 5-15-1. Orientation of ROM.

(2) When the WR key is pressed, "ROM WRITE" display flickers. The display changes to "COMPLETE" within about 100 seconds, after data storage has been completed.

ROM WRITE
COMPLETE

(3) When data storage is not possible, the SPRG displays one of the following messages:

NOT BLANK

NOT BLANK – which means that the ROM is not blank. Remove the ROM from the socket and erase it in the procedures described in Section 5-16-2. Or the ROM may not be connected to the socket correctly.

R/W ERROR

This indication means that data has been stored into the ROM, but the data stored in the programmer and the data stored in (and read back from) the ROM differ.

(4) After completing storing data into the ROM, stick the opaque seal over the window of the ROM.

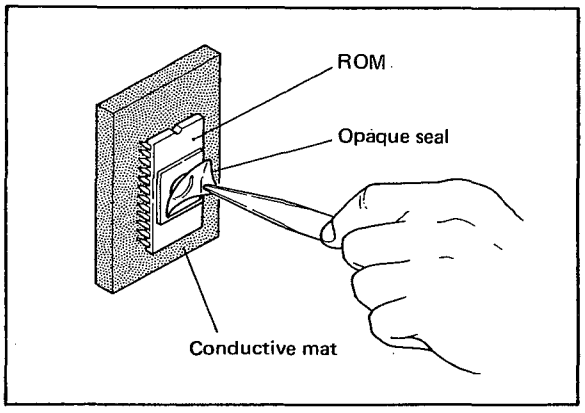


Figure 5-15-2. Attaching Opaque Seal.

(5) When the ROM loaded with data is plugged into the ROM socket of the programmable instrument, the instrument operates according to the program.

[CAUTION]

If the program – created by the SPRG that is combined with the SLPC*E and SLMC*E – is stored into ROM with function "Style E" (see below), it cannot be used for SLPC*A and SLMC*A (if it is used, the ROM fails).

Function "Style E" includes:

(1) "e" is displayed at the right of the display when a program is created.

(2) CNT4 or CNT5 set to other than 0.

(3) DIO changed from initial status (for example, set other than DIO1 through DIO3 = 0, DIO4 through DIO6 = 1, in case SLPC*E).

(4) A new program created in a subprogram area.

5-16. Reading or Erasing ROM Program.

5-16-1. Reading ROM Contents.

The ROM contents can be transferred to — and displayed on — the programmer. When the transfer instruction is executed, the program previously stored in the programmer is deleted.

1. Reading the ROM plugged into the socket of the programmer:

   [RD] ROM READ COMPLETE

   The [ID] key is used to check the ID number, and the [▲] key for checking each step of the program. If the [RD] key is pressed with no ROM installed, the following indication will appear.

   ROM ERROR

   If a different ROM is installed and called by pressing the [RD] key, the following display appears.

   ERROR □□□□ ROM
   ↑ Instrument Model for the ROM

   If the ROM is blank, "BLANK ROM" is displayed.

2. The [XFR] key is used to check the contents of the ROM installed in the instrument.

   TRANSFER COMPLETE

   The [ID] key is used to check the ID number, and the [▲] key is used to check each step of the program.

   If the [XFR] key is pressed without installing ROM, "TRANSFER ERROR" is displayed.

   TRANSFER ERROR

5-16-2. Erasing ROM Contents.

To erase the ROM contents, use a commercially-available ultraviolet erasing device. When using such a device, remove the opaque seal from the window of the ROM.

5-17. Printout.

Programs or data can be printed out by connecting a printer to the SPRG and manipulating the appropriate printer control key.

A special cable (see Figure 5-17-1) supplied by Yokogawa Electric Corporation is necessary for connecting the printer.

Figure 5-17-1 shows the interconnection diagram.

Refer to Section 5-10 for the key definitions.

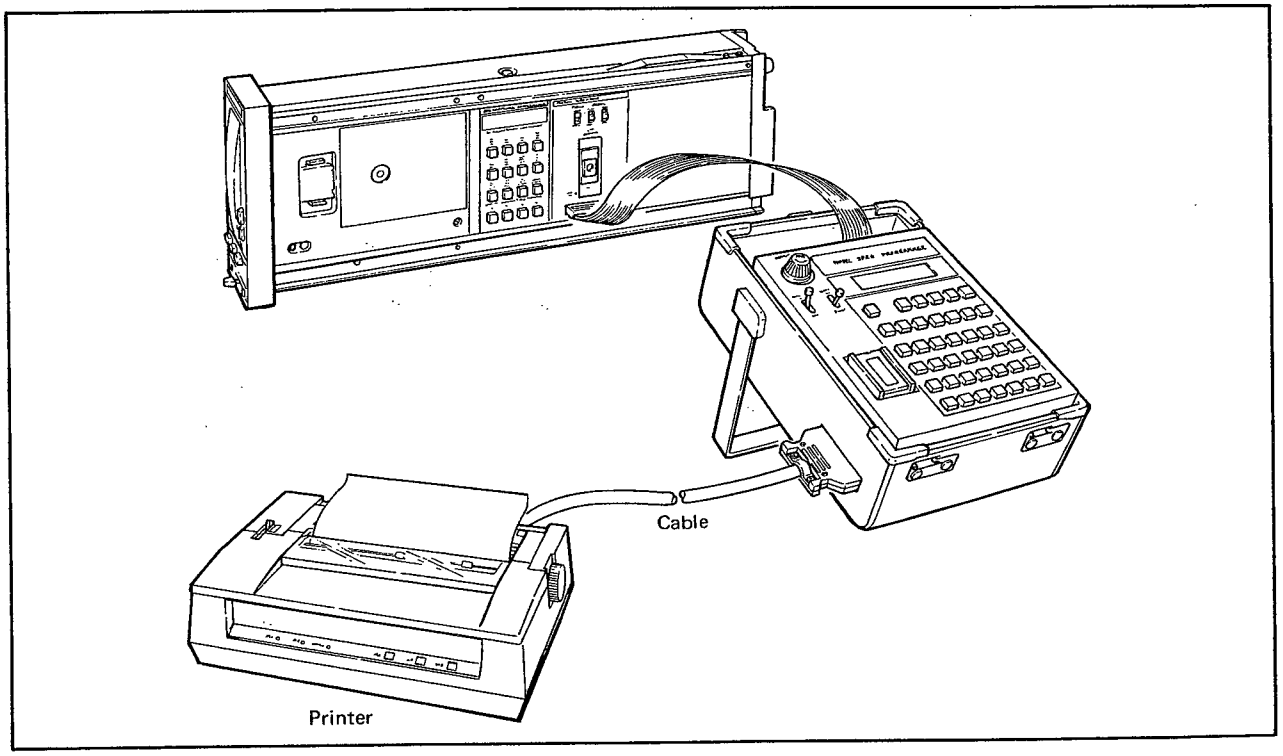


Figure 5-17-1. Connecting Printer.

5-17-1. Printing a Program List.

A program list can be printed out on the printer by using the [LIST] key in program mode.

To print out a main program list, press [MPR] and [LIST]. To print out a subprogram list, press [SBP] and [LIST].

To print out a simulation program list, press [SPR] and [LIST].

A printout example is shown in Figure 5-17-2.

5-17-2. Printing Parameters.

In program mode, the [PMT] (parameter) key is used to printout input signal Xn, output signal Yn, parameter Pn, and constant Kn. When the SLPC or SLMC is connected, the control function data including PID parameters is also printed out.

To print out parameters, press [PMT].

The printout is produced in three pages like the sample printout which is shown in Figure 5-17-3.

5-17-3. Printing Data.

In test run mode, it is possible to print out momentarily-changing data, such as input signal Xn, output signal Yn, temporary register Tn, computational parameter Pn (excluding IPL unit), and function extension register An (SLPC and SLMC).

(Register content printout operation).

(1) [REG]

(2) [X] [1] [ENT] to print data X1.

(3) [Y] [2] [ENT] to print data Y2.

(4) [ENT] to print data Y2 which is written at the time [ENT] is pressed.

(5) [CAN] to cancel [REG] key instruction.

In the above key-in sequence, [REG] is set in program mode and step (2) through (5) is executed in test run mode.

A sample printout is shown in Figure 5-17-4.

Note: The printout examples presented in Figures 5-17-2 to 5-17-4 are A4 sized each.

SLPC USER PROGRAM ROM ID: 4662 DATE / /

STEP	PROGRAM	COMMENT	STEP	PROGRAM	COMMENT
1	LD FL10		51		
2	GIF 8		52		
3	LD K 3		53		
4	ST A 1		54		
5	LD K 2		55		
6	TIM 1		56		
7	GO 26		57		
8	LD K 1		58		
9	TIM 1		59		
10	LD K 8		60		
11	*		61		
12	ST Y 4		62		
13	ST P 1		63		
14	LD K 1		64		
15	CMP		65		
16	GIF 21		66		
17	LD Y 4		67		
18	FX 1		68		
19	ST A 1		69		
20	GO 26		70		
21	LD K 2		71		
22	ST FL10		72		
23	LD K 2		73		
24	ST Y 4		74		
25	ST P 1		75		
26	LD X 1		76		
27	BSC		77		
28	ST Y 1		78		
29	END		79		
30			80		
31			81		
32			82		
33			83		
34			84		
35			85		
36			86		
37			87		
38			88		
39			89		
40			90		
41			91		
42			92		
43			93		
44			94		
45			95		
46			96		
47			97		
48			98		
49			99		
50					

TAG NO.:

INSTRUMENT NO.:

Figure 5-17-2. Printout Example of a Program List.

```
SLPC  TUNING  PARAMETER          ROM ID: 0000   DATE   /  /
================================================================

MODE 1   0    : COLD START
MODE 2   0    : CASCADE OFF
MODE 3   0    : CSV2 CLOSE
MODE 4   0    : BACKUP MAN
MODE 5   0    : WRITE ENABLE

PB 1  999.9 %                    PB 2  999.9 %
TI 1  1000 SEC                   TI 2  1000 SEC
TD 1     0 SEC                   TD 2     0 SEC

BD 1     0.0 %                   BD 2     0.0 %
BB 1     0.0 %                   BB 2     0.0 %
BL 1     0.0 %                   BL 2     0.0 %
ST 1       0 SEC                 ST 2       0 SEC
SW 1       0 SEC                 SW 2       0 SEC
GW 1     0.0 %                   GW 2     0.0 %
GG 1   100.0 %                   GG 2   100.0 %
DL 1   100.0 %                   DL 2   100.0 %
VL 1   100.0 %                   VL 2   100.0 %
VT 1       1 SEC                 VT 2       1 SEC
PH 1   106.3 %                   PH 2   106.3 %
PL 1    -6.3 %                   PL 2    -6.3 %
MH 1   106.3 %                   MH 2   106.3 %
ML 1    -6.3 %                   ML 2    -6.3 %
HI 1   100.0                     HI 2   100.0
LO 1     0.0                     LO 2     0.0

P 1   0.000                      P 9   0.000
P 2   0.000                      P10   0.000
P 3   0.000                      P11   0.000
P 4   0.000                      P12   0.000
P 5   0.000                      P13   0.000
P 6   0.000                      P14   0.000
P 7   0.000                      P15   0.000
P 8   0.000                      P16   0.000

PX1  -0.000                      PX2  -0.000
PY1  -0.000                      PY2  -0.000
PZ1  -0.000                      PZ2  -0.000

----------------------------------------------------------------

TAG NO.:

INSTRUMENT NO.:

SLPC  TUNING  PARAMETER          ROM ID: 0000   DATE   /  /
================================================================

P20      0 SEC                   P30      0.0 %
P21      0 SEC                   P31      0.0 %
P22      0 SEC                   P32      0.0 %
P23      0 SEC                   P33      0.0 %
P24      0 SEC                   P34      0.0 %
P25      0 SEC                   P35      0.0 %
P26      0 SEC                   P36      0.0 %
P27      0 SEC                   P37      0.0 %
P28      0 SEC                   P38      0.0 %
P29      0 SEC                   P39      0.0 %

FX 1     0.0 %                   GX 1     0.0 %
FX 2    10.0 %                   GX 2    10.0 %
FX 3    20.0 %                   GX 3    20.0 %
FX 4    30.0 %                   GX 4    30.0 %
FX 5    40.0 %                   GX 5    40.0 %
FX 6    50.0 %                   GX 6    50.0 %
FX 7    60.0 %                   GX 7    60.0 %
FX 8    70.0 %                   GX 8    70.0 %
FX 9    80.0 %                   GX 9    80.0 %
FX10    90.0 %                   GX10    90.0 %
FX11   100.0 %                   GX11   100.0 %

H 1     0.0 %                    I 1     0.0 %
H 2    10.0 %                    I 2    10.0 %
H 3    20.0 %                    I 3    20.0 %
H 4    30.0 %                    I 4    30.0 %
H 5    40.0 %                    I 5    40.0 %
H 6    50.0 %                    I 6    50.0 %
H 7    60.0 %                    I 7    60.0 %
H 8    70.0 %                    I 8    70.0 %
H 9    80.0 %                    I 9    80.0 %
H10    90.0 %                    I10    90.0 %
H11   100.0 %                    I11   100.0 %

L 1     0.0 %                    M 1     0.0 %
L 2    10.0 %                    M 2    10.0 %
L 3    20.0 %                    M 3    20.0 %
L 4    30.0 %                    M 4    30.0 %
L 5    40.0 %                    M 5    40.0 %
L 6    50.0 %                    M 6    50.0 %
L 7    60.0 %                    M 7    60.0 %
L 8    70.0 %                    M 8    70.0 %
L 9    80.0 %                    M 9    80.0 %
L10    90.0 %                    M10    90.0 %
L11   100.0 %                    M11   100.0 %

----------------------------------------------------------------

TAG NO.:

INSTRUMENT NO.:
```

```
SLPC  SCALE DATA & CONSTANT      ROM ID: 0000   DATE   /  /
================================================================

X1H   100.0                      X1L   000.0
X2H   100.0                      X2L   000.0
X3H   100.0                      X3L   000.0
X4H   100.0                      X4L   000.0
X5H   100.0                      X5L   000.0

Y1H  -0001                       Y1L  -0001
Y2H  -0001                       Y2L  -0001
Y3H  -0001                       Y3L  -0001
Y4H  -0001                       Y4L  -0001
Y5H  -0001                       Y5L  -0001
Y6H  -0001                       Y6L  -0001

P1H   100.0                      P1L   000.0
P2H   100.0                      P2L   000.0
P3H   100.0                      P3L   000.0
P4H   100.0                      P4L   000.0
P5H   100.0                      P5L   000.0
P6H   100.0                      P6L   000.0
P7H   100.0                      P7L   000.0
P8H   100.0                      P8L   000.0

K 1   0.000                      K 9   0.000
K 2   0.000                      K10   0.000
K 3   0.000                      K11   0.000
K 4   0.000                      K12   0.000
K 5   0.000                      K13   0.000
K 6   0.000                      K14   0.000
K 7   0.000                      K15   0.000
K 8   0.000                      K16   0.000

CNT 1   1     : BASIC CONTROL
CNT 2   1     : BASIC CONTROL
CNT 3   0     : LOW SELECTOR
CNT 4   0     : 200 ms CYCLE
CNT 5   0     : AUT Mn CONTROL

DIO 1   0     : IN
DIO 2   0     : IN
DIO 3   0     : IN
DIO 4   1     : OUT
DIO 5   1     : OUT
DIO 6   1     : OUT

----------------------------------------------------------------

TAG NO.:

INSTRUMENT NO.:
```

Figure 5-17-3. Printout Example of Parameters.

```
REGISTER DATA
A01   0.500
A02   0.000
A03   1.000
A04   0.000
A09  -8.000
A12   0.503

FL01     0
FL02     0
FL03     0
FL04     0
FL09     0
FL10     0
FL11     1

X 1   0.503

P01   0.200

Y 1   0.503
Y 4   0.200
```

Figure 5-17-4. Data Printout Example.

6. MAINTENANCE.

6-1. Changing Fuse.

To remove the fuse, unscrew the fuse holder cap in the direction of the arrow mark. To install a new fuse, insert it into the cap, then screw it into the fuse holder.

Fuse part No.: S9510VK.

Rating: 1 A.

Note: Use the dedicated fuse (S9510VK). Do not use a fuse for other products.

6-2. Precautions in Handling User ROM.

User ROM is a EPROM – a MOS (metal oxide semiconductor) IC. This type of IC must be handled carefully, as it may be damaged by static electricity. Note also that the program written into it will be lost if ultraviolet rays are applied through the window of this IC.

Observe the following cautions when handling the ROM:

- **Cautions against static electricity:**
  Be sure to use a conductive mat when carrying and storing this element. Do not bring the EPROM into contact with clothes and other substances that can be charged easily. Do not handle the EPROM using chemical fiber gloves.
- **Cautions against ultraviolet rays:**
  Do not remove the seal of EPROM except when erasing the contents.
  When attaching a new EPROM to the controller, be sure to affix the specified seal to the EPROM.
- **Caution not to deform pins:**
  If the pins are deformed, straighten them, taking care not to apply force to the root of each pin.

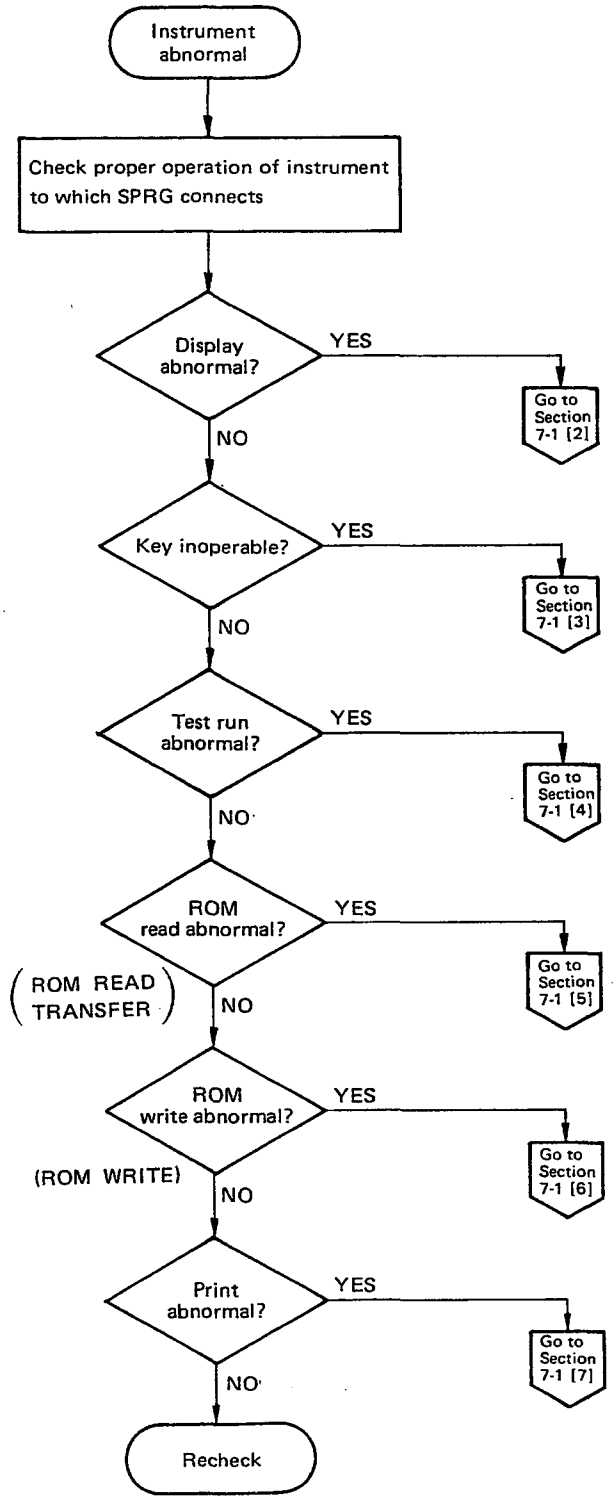
7. TROUBLESHOOTING.

If a problem occurs in the Model SPRG Programmer, identify the problem and resolve it according to the troubleshooting flowcharts shown in Section 7-1.

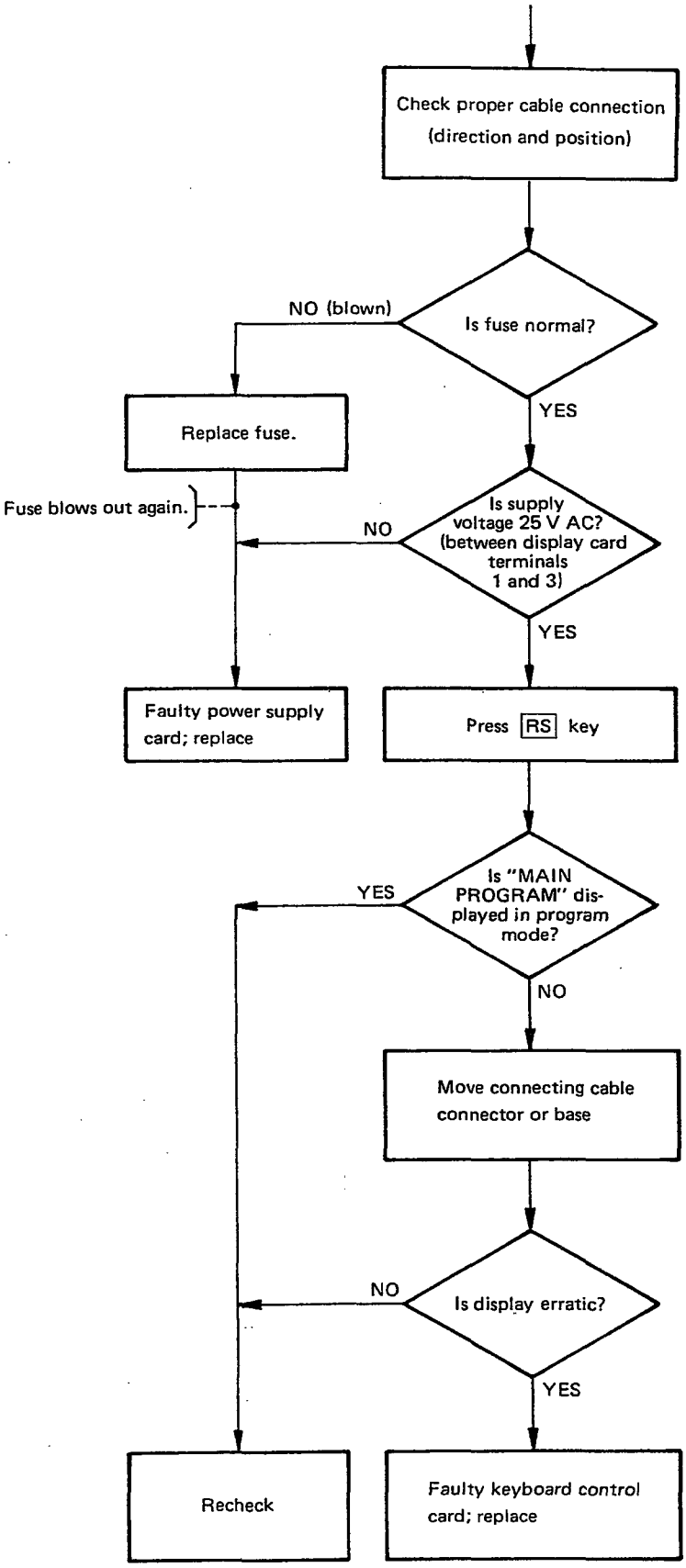
If the problem is difficult to find, consult your nearest YOKOGAWA service station or sales representative.

7-1. Troubleshooting Flowcharts.

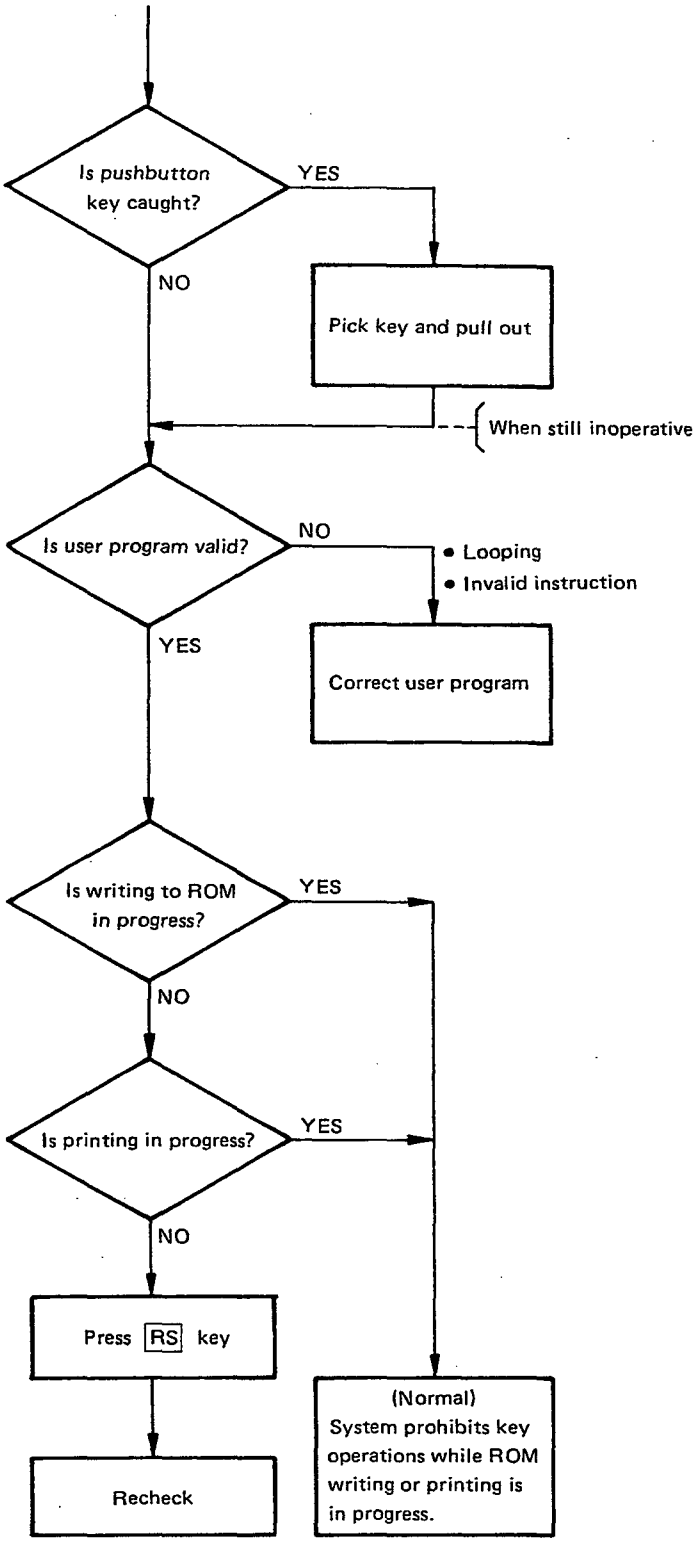
[1] Problem identification



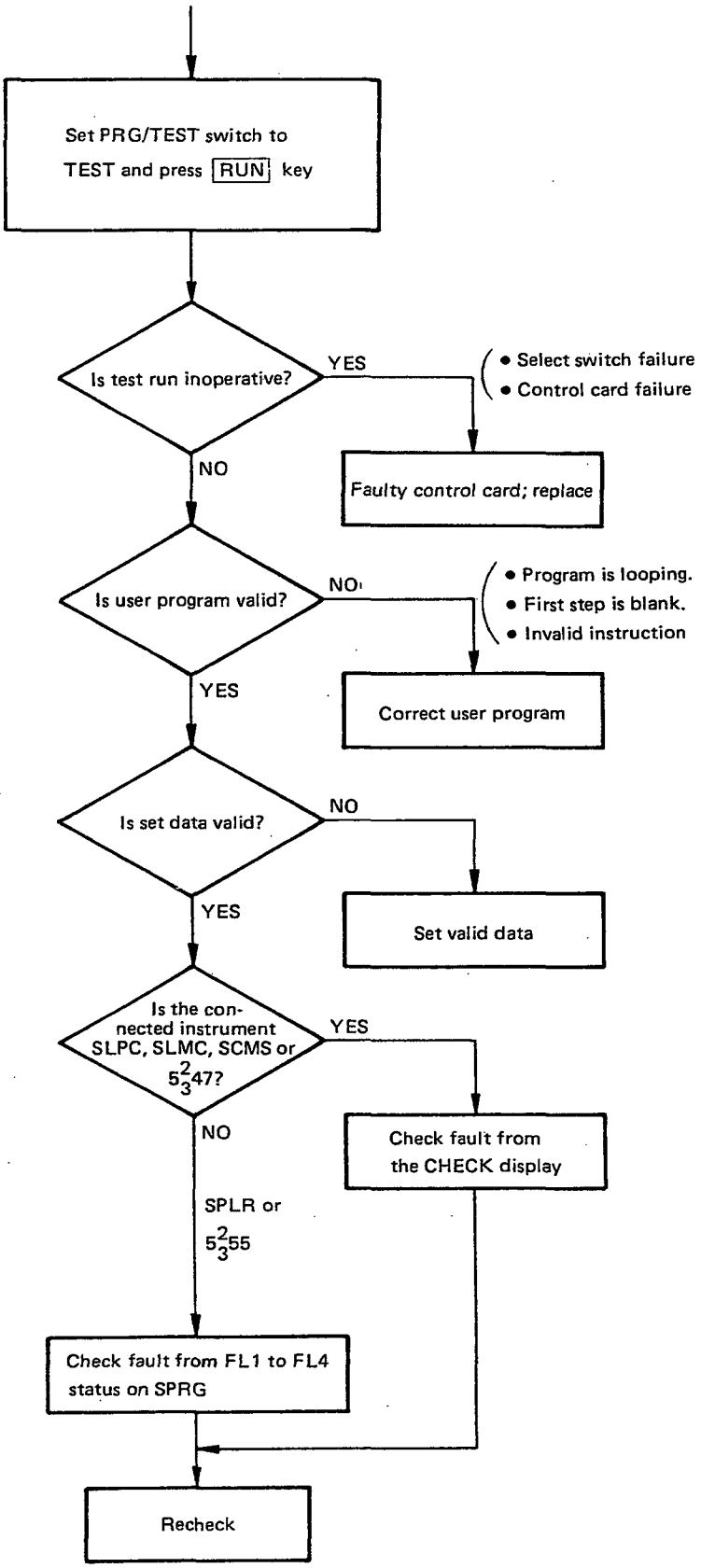
[2] Display abnormal



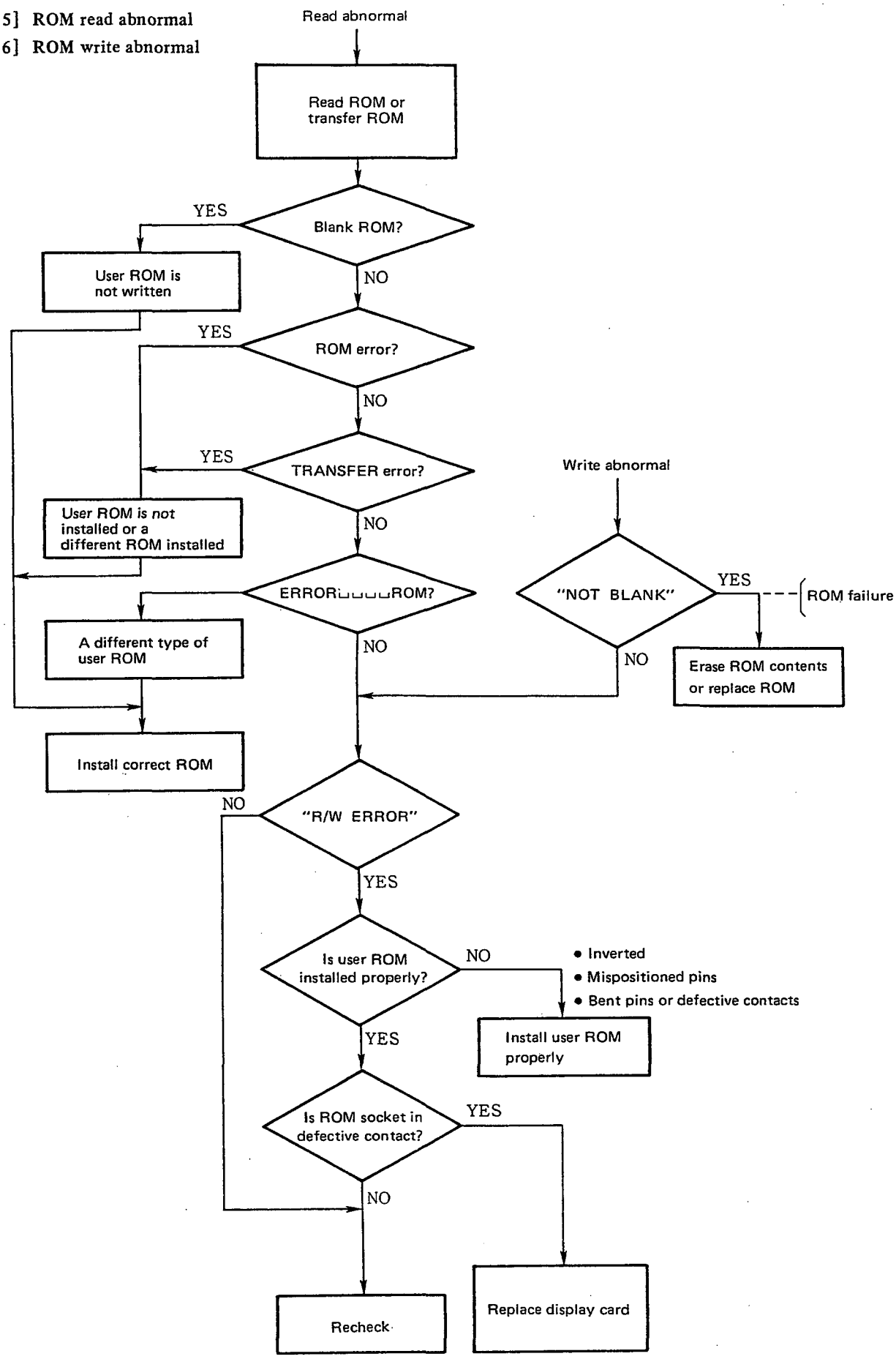
[3] Key inoperable



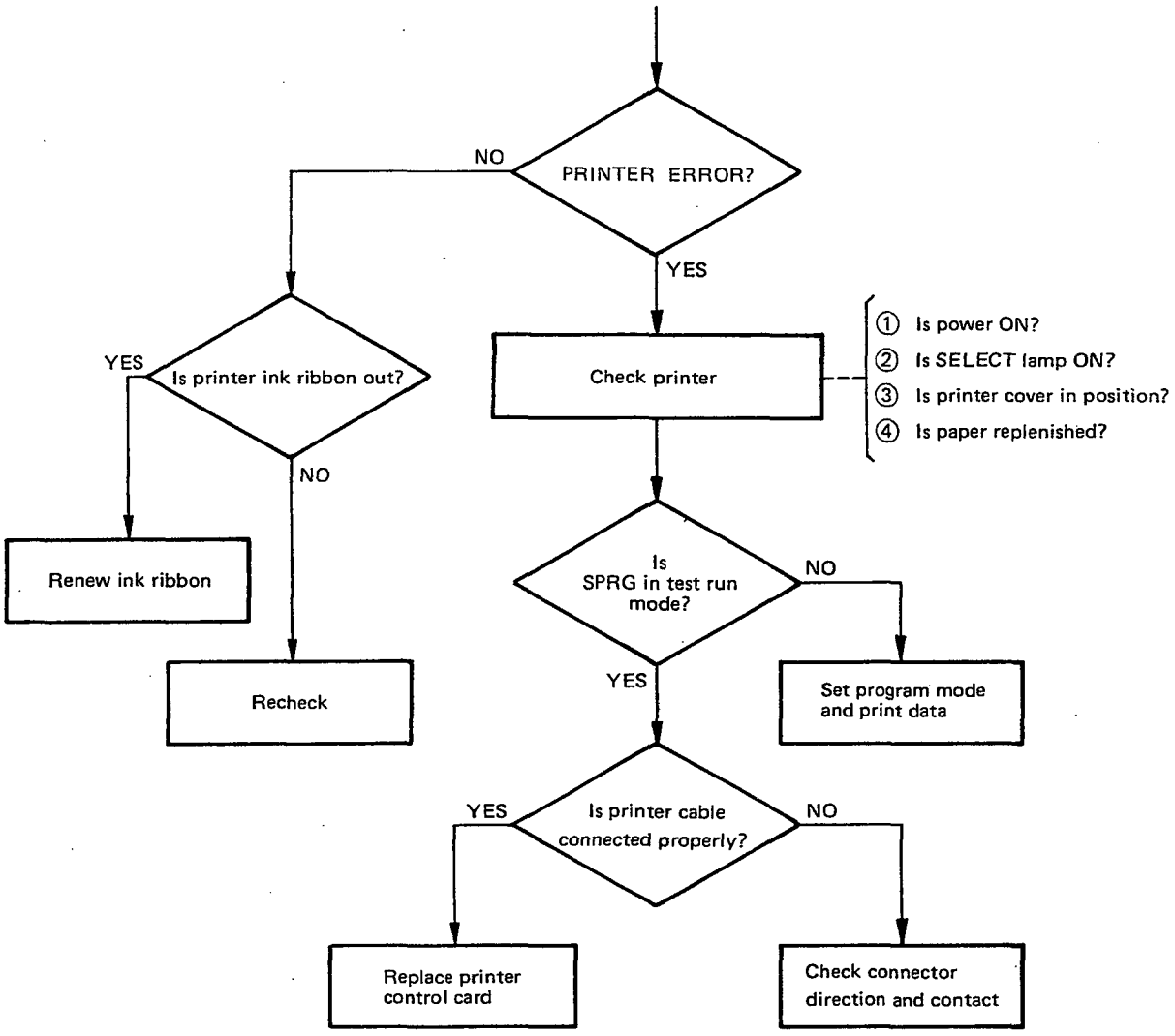
[4] Test run abnormal



[5] ROM read abnormal
[6] ROM write abnormal



[7] Print abnormal



7-2. Component Replacement.

Follow Sections 7-2-1 and 7-2-2 for removal and replacement of a faulty unit.

7-2-1. Disassembly.

Figure 7-2-1 and 7-2-2 illustrate the procedures for disassemblying the Programmer.

(1) Remove the two screws ① and associated two washers on the bottom of the housing. Remove the two screws ② and associated two washers for the power supply cable connection. Remove the programmer internal assembly from the housing.

(2) Remove the two screws ③ on each side of the front panel, and the two screws ④ fastening the connector cable guide.

(3) Lift the keyboard to disconnect two connectors for the control card and power supply card. Thus the keyboard and power supply card are separated.

(4) Remove the two screws ⑤ that fasten the power supply card to the bracket. The power supply card is now free.

(5) To separate the control card from the display card, proceed as follows:
Remove the four screws ⑥ that connect the control card to the display card with the four studs ⑦.
Disconnect connector CN1 from the display card.

(6) To remove the cover from the display card, remove the four studs ⑦. Do not perform any further disassembly.

7-2-2. Reassembly.

Reassemble in the reverse order to the above disassembly procedures. Check that the connectors are connected correctly.

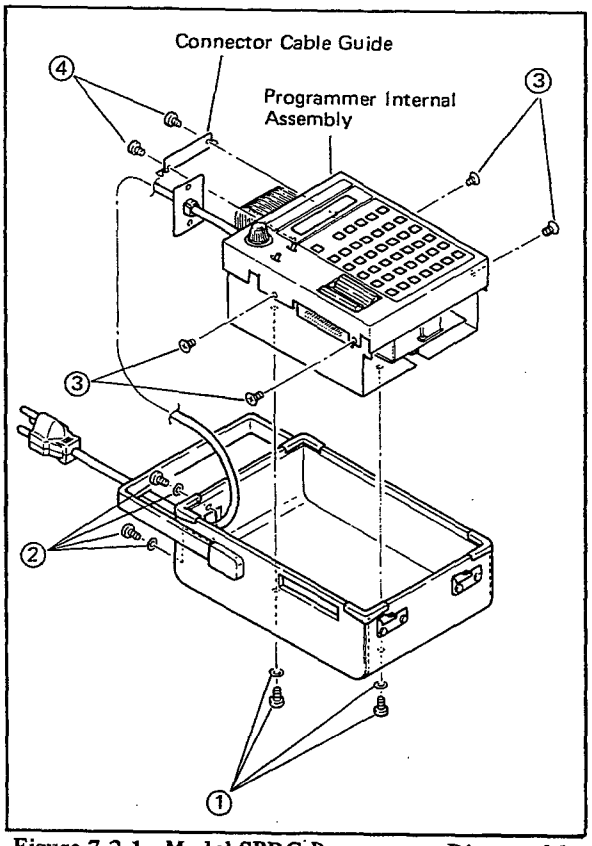


Figure 7-2-1. Model SPRG Programmer Disassembly Drawing — 1.

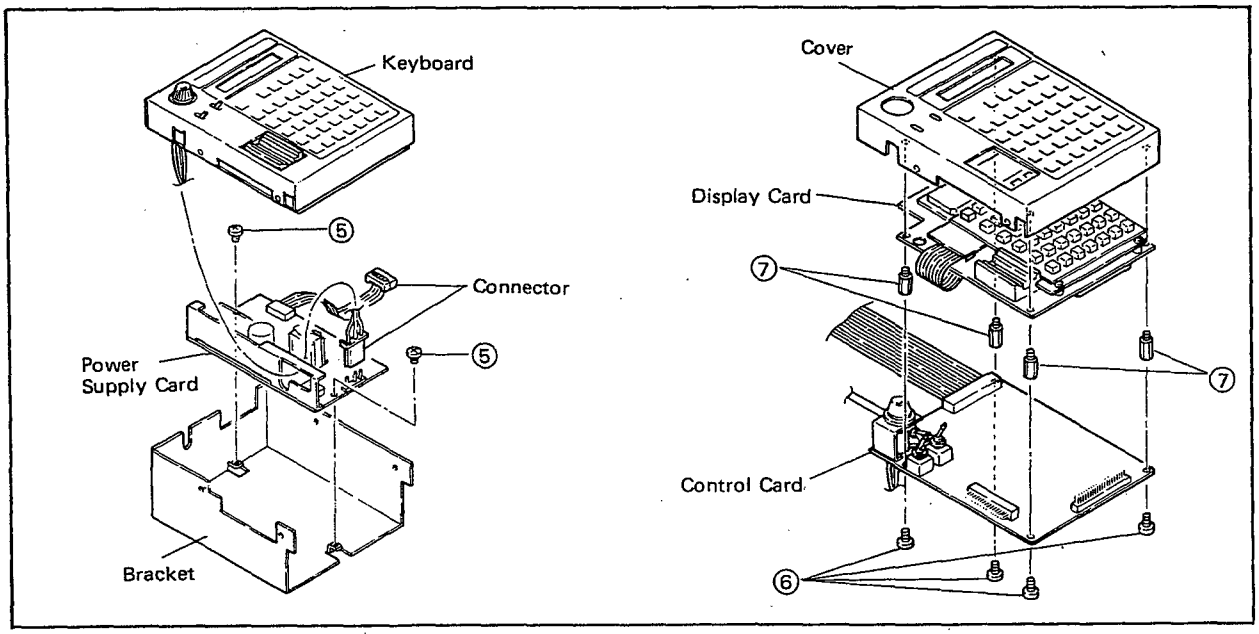
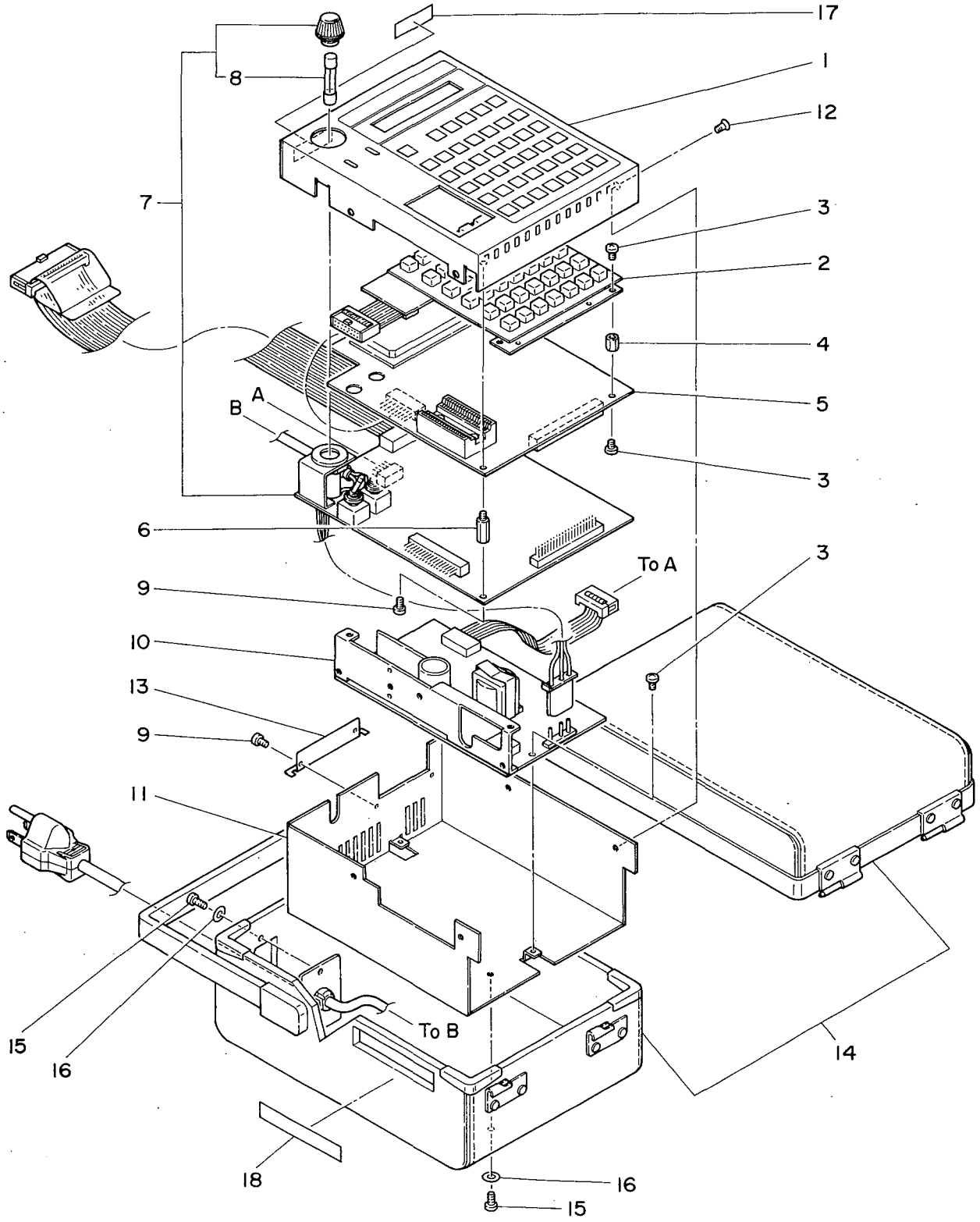


Figure 7-2-2. Model SPRG Programmer Disassembly Drawing. — 2.

Customer Maintenance Parts List

Model SPRG (Style E)
Programmer

YEWSERIES 80



CMPL 1B4W1-03E

Item	Part No.	Qty	Description
1	—	1	Cover Assembly
2	E9714JT	1	Rubber Switch
3	Y9304JB	8	Pan H. Screw, M3 x 4
4	—	4	Stud
5	E9714NA	1	Display Board Assembly
6	—	4	Stud
7	E9714JQ	1	Control Board Assembly
8	S9510VK	1	Fuse (1 A)
9	—	8	Pan H. Screw, M3 x 6
10	E9716YD	1	Power Unit Assembly
11	—	1	Bracket
12	Y9304EB	4	F.H. Screw, M3 x 4
13	E9712AC	1	Bracket
14	E9714JJ	1	Case
15	Y9308LE	4	B.H. Screw, M3 x 8
16	Y9301WE	4	Washer
17	Y9023NP	1	Tag No. Label
18	E9712AZ	1	Label

YOKOGAWA ◆

Yokogawa Electric Corporation

YOKOGAWA ELECTRIC CORPORATION
Network Solutions Business Div.
2-9-32, Nakacho, Musashino-shi, Tokyo, 180-8750 JAPAN
Phone: +81-422-52-7179 Facsimile: +81-422-52-6793
Sales Branch Offices
Tokyo, Nagoya, Osaka, Hiroshima, Fukuoka

YOKOGAWA CORPORATION OF AMERICA
Headquaters
2 Dart Road, Newnan, GA. 30265-1094 U.S.A.
Phone: +1-770-253-7000 Facsimile: +1-770-251-0928
Sales Branch Offices / Texas, Chicago, Detroit, San Jose

YOKOGAWA EUROPE B. V.
Headquaters
Databankweg 20, 3821 AL Amersfoort THE NETHERLANDS
Phone: +31-334-64-1611 Facsimile: +31-334-64-1610
Sales Branch Offices / Houten (The Netherlands), Wien (Austria), Zaventem (Belgium), Ratingen (Germany), Madrid (Spain), Bratislava (Slovakia), Runcorn (United Kingdom), Milano (Italy), Velizy villacoublay(France), Johannesburg(Republic of South Africa)

YOKOGAWA AMERICA DO SUL S.A.
Headquarters & Plant
Praca Acapulco, 31-Santo Amaro, Sao Paulo/SP, BRAZIL CEP-04675-190
Phone: +55-11-5681-2400 Facsimile: +55-11-5681-4434

YOKOGAWA ENGINEERING ASIA PTE. LTD.
Head office
5 Bedok South Road, Singapore 469270 SINGAPORE
Phone: +65-6241-9933 Facsimile: +65-6241-2606

YOKOGAWA ELECTRIC KOREA CO., LTD.
Seoul Sales office
395-70, Shindaebang-dong, Dongjak-gu, Seoul,156-010, KOREA
Phone: +82-2-3284-3000 Facsimile: +82-2-3284-3019

YOKOGAWA TAIWAN CORPORATION
Head office
17F, No.39, Sec. 1, Chung Hwa Road Taipei, 100 TAIWAN
Phone: +886-2-2314-9166 Facsimile: +886-2-2314-9918

YOKOGAWA AUSTRALIA PTY. LTD.
Head office
Centrecourt D1, 25-27 Paul Street North, North Ryde, N. S. W. 2113, AUSTRALIA
Phone: +61-2-9805-0699 Facsimile: +61-2-9888-1844

YOKOGAWA INDIA LTD.
Head office
40/4 Lavelle Road, Bangalore, 560 001, INDIA
Phone: +91-80-227-1513 Facsimile: +91-80-227-4270

LTD. YOKOGAWA ELECTRIC
Grokholskiy per. 13, Build. 2, 4th Floor, 129010, Moscow, RUSSIA FEDERATION
Phone: +7-095-737-7868 Facsimile: +7-095-737-7869