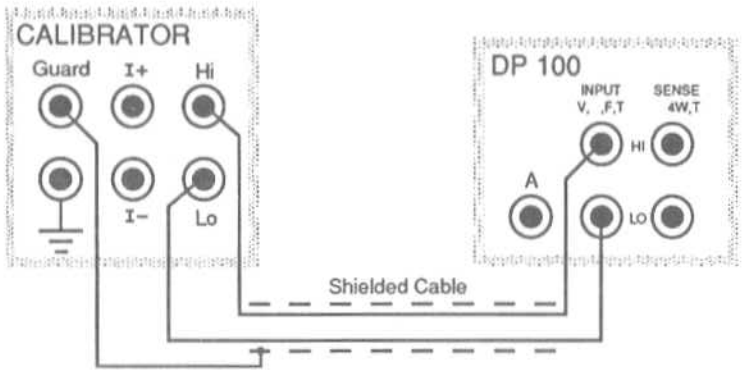


Figure 6-8. Connections for AC/DC Volts, Resistance (2T) and Frequency

c. Adjust the calibrator output to the value displayed on the DP 100.

d. Wait a few seconds for the input signal to stabilize.

e. Press ENTER to update the calibration constant and invoke the next input signal prompt, or press FUNCTION ▼ to leave the old calibration constant unchanged and invoke the next input signal prompt.

f. Repeat steps *c, d* and *e* for the subsequent DC voltage input signals (Table 6-4, steps 2 through 6).

g. To continue the calibration procedure, go to step *(2)d*. To conclude the calibration at this point, press FUNCTION ▼ repeatedly until the CAL due date is displayed (Table 6-4, step 23) and go to step *(10)c*.

(2) Calibrate ac volts.

a. Activate CAL routine #0. See Section 6.8.2.

b. Press FUNCTION ▼ repeatedly until the first ac voltage prompt is displayed (Table 6-4, step 7).

c. Connect the calibrator to the DP 100 as shown in Figure 6-8.

d. Set the frequency of the calibrator output to 100 Hz.

e. Adjust the calibrator output to the value displayed on the DP 100.

f. Wait a few seconds for the the input signal to stabilize.

g. Press ENTER to update the calibration constant and invoke the next input signal prompt, or press FUNCTION ▼ to leave the old calibration constant unchanged and invoke the next input signal prompt.

NOTE

If the 2V range is calibrated, the 180mV input is not requested in step 11.
If you skip the 2V calibration step, the next prompt is 180mV at step 11.

h. Repeat steps e, f, and g for the subsequent ac voltage input signals (Table 6-4, steps 8 through 11).

i. To continue the calibration procedure, go to step *(3)c*. To conclude the calibration at this point, press FUNCTION ▼ repeatedly until the CAL due date is displayed (Table 6-4, step 23) and go to step *(10)c*.

(3) Calibrate frequency.

a. Activate CAL routine #0. See Section 6.8.2.

b. Press FUNCTION ▼ repeatedly until the frequency prompt is displayed (Table 6-4, step 12).

c. Connect the calibrator to the DP 100 as shown in Figure 6-8.

d. Adjust the calibrator output to 1.000 MHz, 1V ac rms.

e. Wait a few seconds for the the input signal to stabilize.

f. Press ENTER to update the calibration constant and invoke the next input signal prompt, or press FUNCTION ▼ to leave the old calibration constant unchanged and invoke the next input signal prompt.

g. To continue the calibration procedure, go to step *(4)d*. To conclude the calibration at this point, press FUNCTION ▼ repeatedly until the CAL due date is displayed (Table 6-4, step 23) and go to step *(10)c*.

(4) Calibrate resistance.

a. Activate CAL routine #0. See Section 6.8.2.

b. Press FUNCTION ▼ repeatedly until the first resistance prompt is displayed (Table 6-4, step 13).

c. Connect the calibrator to the DP 100 as shown in Figure 6-8.

d. Adjust the calibrator output to the value displayed on the DP 100.

e. Wait a few seconds for the the input signal to stabilize.

f. Press ENTER to update the calibration constant and invoke the next input signal prompt, or press FUNCTION ▼ to leave the old calibration constant unchanged and invoke the next input signal prompt.

g. Repeat steps *d,e* and *f* for the subsequent resistance input signal (Table 6-4, step 14).

h. To continue the calibration procedure, go to step *(5)c*. To conclude the calibration at this point, press FUNCTION ▼ repeatedly until the CAL due date is displayed (Table 6-4, step 23) and go to step *(10)c*.

(5) Calibrate 4-terminal resistance

a. Activate CAL routine #0. See Section 6.8.2.

b. Press FUNCTION ▼ repeatedly until the first four-terminal resistance prompt is displayed (Table 6-4, step 15).

c. Connect the calibrator to the DP 100 as shown in Figure 6-9.

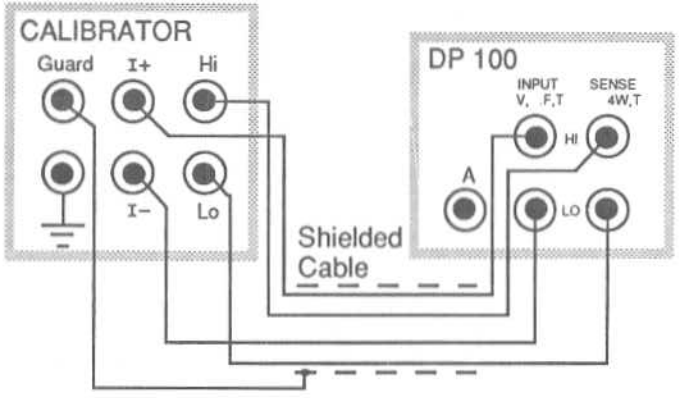


Figure 6-9. Connections for 4-Terminal Resistance

d. Adjust the calibrator output to the value displayed on the DP 100.

e. Wait a few seconds for the the input signal to stabilize.

f. Press ENTER to update the calibration constant and invoke the next input signal prompt, or press FUNCTION ▼ to leave the old calibration constant unchanged and invoke the next input signal prompt.

g. Repeat steps *d*,*e* and *f* for the subsequent four-terminal resistance input signals (Table 6-4, steps 16 through 18).

h. To continue the calibration procedure, go to step *(6)c*. To conclude the calibration at this point, press FUNCTION ▼ repeatedly until the CAL due date is displayed (Table 6-4, step 23) and go to step *(10)c*.

(6) Calibrate 200-mA dc current range.

a. Activate CAL routine #0. See Section 6.8.2.

b. Press FUNCTION t repeatedly until the 180-mA dc current prompt is displayed (Table 6-4, step 19).

c. Connect the calibrator to the DP 100 as shown in Figure 6-10.

d. Adjust the calibrator output to 180mA dc current.

e. Wait a few seconds for the the input signal to stabilize.

f. Press ENTER to update the calibration constant and invoke the next input signal prompt, or press FUNCTION ▼ to leave the old calibration constant unchanged and invoke the next input signal prompt.

Pages 6-16

Replace Table 6-4 with the following table:

Table 6-4. Normal Calibration Sequence

Step	Input(s)	Function	Section	Figure
1	450V	DC Volts	6.8.3 (1)	6-8
2	180V			
3*	18V & – 18V			
4	1.8V			
5*	180mV & – 180mV			
6*	18mV & – 18mV			
7	400V @ 100 Hz	AC Volts	6.8.3 (2)	
8	180V @ 100 Hz			
9	18V @ 100 Hz			
10*	1.8V, 0.8V & 0.18V @ 100 Hz			
11**	180mV & 18mV @ 100 Hz			
12	1 MHz @ 1V rms	Frequency	6.8.3 (3)	
13	10MΩ	Resistance	6.8.3 (4)	
14	1MΩ			
15	100kΩ	4-Terminal Resistance	6.8.3 (5)	6-9
16	10kΩ			
17	1kΩ			
18	100Ω			
19	180mA	DC Current	6.8.3 (6)	6-10
20	180mA @ 100 Hz	AC Current	6.8.3 (7)	
21	1.8A	DC Current	6.8.3 (8)	
22	1.8A @ 100 Hz	AC Current	6.8.3 (9)	
23	Store CAL Due Date & CAL constants.		6.8.3 (10)	

* Multiple inputs are listed at this step. After calibrating the first input, you are prompted for the subsequent inputs.

** The 180-mV input is requested only once. If step 10 is skipped, the 180-mV input is requested in step 11.

Page 6-17 through 6-24

Replace calibration steps (1) through (9) with the following new calibration procedure:

(1) Calibrate dc volts.

a. Activate CAL routine #0. See Section 6.8.2.

b. Connect the calibrator to the DP 100 as shown in Figure 6-8.

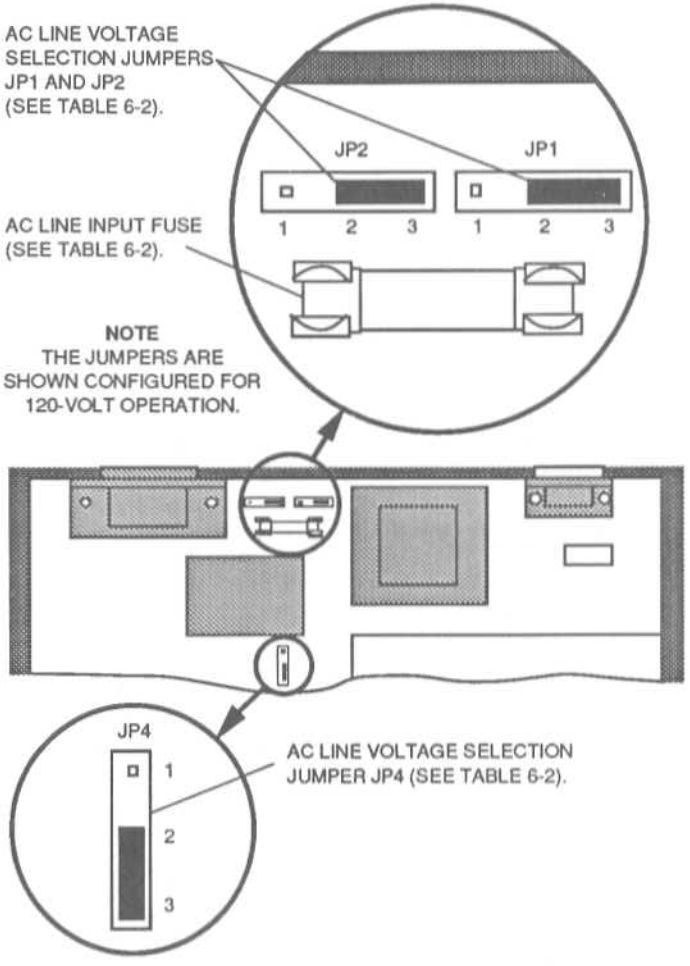


Figure 6-3. AC Line Voltage Selection Jumpers and Fuse

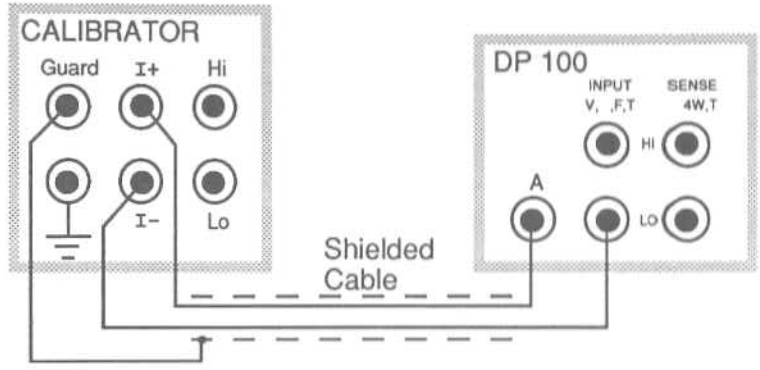


Figure 6-10. Connections for AC/DC Current

g. To continue the calibration procedure, go to step *(7)d*. To conclude the calibration at this point, press FUNCTION ▼ repeatedly until the CAL due date is displayed (Table 6-4, step 23) and go to step *(10)c*.

(7) Calibrate 200-mA ac current range.

a. Activate CAL routine #0. See Section 6.8.2.

b. Press FUNCTION t repeatedly until the 180-mA ac current prompt is displayed (Table 6-4, step 20).

c. Connect the calibrator to the DP 100 as shown in Figure 6-10.

d. Set the frequency of the calibrator output to 100 Hz.

e. Adjust the calibrator output to 180mA ac current.

f. Wait a few seconds for the the input signal to stabilize.

g. Press ENTER to update the calibration constant and invoke the next input signal prompt, or press FUNCTION ▼ to leave the old calibration constant unchanged and invoke the next input signal prompt.

h. To continue the calibration procedure, go to step *(8)d*. To conclude the calibration at this point, press FUNCTION ▼ repeatedly until the CAL due date is displayed (Table 6-4, step 23) and go to step *(10)c*.

(8) Calibrate 2-A dc current range.

a. Activate CAL routine #0. See Section 6.8.2.

b. Press FUNCTION ▼ repeatedly until the 1.8-A dc current prompt is displayed (Table 6-4, step 21).

c. Connect the calibrator to the DP 100 as shown in Figure 6-10.

d. Adjust the calibrator output to 1.8A dc current.

e. Wait a few seconds for the the input signal to stabilize.

f. Press ENTER to update the calibration constant and invoke the next input signal prompt, or press FUNCTION ▼ to leave the old calibration constant unchanged and invoke the next input signal prompt.

g. To continue the calibration procedure, go to step *(9)d*. To conclude the calibration at this point, press FUNCTION ▼ repeatedly until the CAL due date is displayed (Table 6-4, step 23) and go to step *(10)c*.

(9) Calibrate 2-A ac current range.

a. Activate CAL routine #0. See Section 6.8.2.

b. Press FUNCTION t repeatedly until the 1.8-A ac current prompt is displayed (Table 6-4, step 22).

c. Connect the calibrator to the DP 100 as shown in Figure 6-10.

d. Adjust the calibrator output to 1.8A ac at a frequency of 100 Hz.

e. Wait a few seconds for the the input signal to stabilize.

f. Press ENTER to update the calibration constant and invoke the next input signal prompt, or press FUNCTION ▼ to leave the old calibration constant unchanged and invoke the next input signal prompt.

h. To continue the calibration procedure, go to step *(10)c*.

(10) Entering a CAL Due Date.

a. Activate CAL routine #0. See Section 6.8.2.

b. Press FUNCTION ▼ repeatedly until the CAL due date is displayed (Table 6-4, step 23). See Figure 6-11.

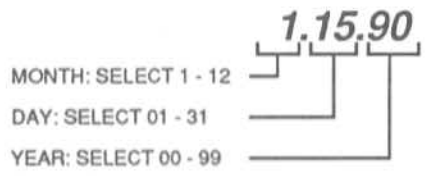


Figure 6-11. Calibration Due Date Format

NOTE

Storage of the calibration due date is provided only for convenience and has no effect on measurements made by the DP 100.

c. You now have the opportunity to change the CAL due date. If you do not wish to change the date, go directly to step d. If you wish to change the date, press FUNCTION t to select the month, day, or year. Press RANGE ▲ or RANGE ▼ to increment or decrement the number for the month, day, or year.

The prompt usually serves to set the pace for communications. Therefore, when the prompt is OFF, be sure to allow adequate time for a response between commands. Recommended delay times to allow after a command are as follows:

Command	Delay After Command
VAL?	0.33 seconds
OHMS4	4 seconds
All others	2.5 seconds

Page 5-10

In Table 5-5, change the output description of the FUNC? / FUNC1? command to read as follows:

The mnemonic of the active measurement function: VDC, VAC, ADC, AAC, OHMS, OHMS4, RTD_F, RTD_C, or FREQ.

Page 6-4

In Section 6.5, change the first sentence in the first paragraph to read as follows:

Configuring the DP 100 for 100, 120 or 220–240 Vac input voltage requires removing the top cover to access the voltage selection jumpers and ac input fuse on the internal circuit board.

Page 6-6

Change Table 6-2 to read as follows:

Input Voltage	JP1	JP2	JP4	AC Fuse
100 Vac	2–3	2–3	1–2	100mA 250V
120 Vac	2–3	2–3	2–3	100mA 250V
220–240 Vac	1–2	1–2	2–3	F 50mA 250V

Page 6-7

Replace Figure 6-3 with the following new figure:

Page 4-15

In Section 4.8, change the last sentence in the first bulleted paragraph to read as follows:

1X probes are preferred for low-frequency measurements to minimize noise pickup. They can also be used for voltage measurements.

Page 4-16

Add the following statement at the top of the page:

- If possible, connect the "low" side of the circuit being measured to ground.

Page 5-6

In Section 5.3, change step (3) to read as follows:

(3) Terminate each command string with a <CR> or <CR><LF>.

Page 5-7

In Table 5-1, delete the space between "S" and "4" in mnemonic OHMS4. Change the description of the FIXED command to read as follows:

Selects the MANUAL range mode.

Page 5-9

In Section 5.3.2, last paragraph, next to last sentence, change "less" to "more."

Page 5-9

Add the following new section:

5.3.3 Prompt Control

When communicating with the DP 100 over the serial port, you can eliminate the prompt (=>) from a DP 100 response string by using the PROMPT command.

The command functions are defined as follows:

Command	Function	Response and Termination
PROMPT_0	Prompt OFF	data<CR><LF>
PROMPT_1	Prompt ON*	data<CR><LF>=><CR><LF>
PROMPT?	Interrogate	Prompt OFF: 0<CR><LF>
		Prompt ON: 1 CR><LF>=><CR><LF>

* Power-on state.

With the prompt OFF, the response to a command such as VAL? is only numeric data terminated by a <CR><LF>. In this mode, it is possible to write a simple program to receive data without parsing out the prompt string.

d. Press ENTER to store the new calibration constants if you just performed a calibration and the calibration due date in permanent memory.

e. This completes the calibration process. The DP 100 returns to the dc voltage measurement mode of operation in AUTO range.

(11) Verify the DP 100 Calibration. After calibrating your DP 100 it is good practice to check its performance. Using the calibrator again, generate each signal from Table 6-4 and measure it with the DP 100. Check the accuracy of each measurement. This will confirm that the calibration procedure was performed correctly.

Page 6-28 through 6-32

Replace calibration steps (1) through (8) with the following new remote calibration procedure:

(1) Send $CAL <nnn> to activate the remote calibration routine, where nnn is a three-digit password from 001 to 999.

The DP 100 responds with a message indicating the signal to apply to the input terminals followed by three periods and the standard prompt. The first message is:

APPLY +0450.00 VDC ...=>

NOTE

Sending $CANCEL at any time aborts the calibration process leaving all calibration constants unchanged. The DP 100 returns to the dc voltage measurement function in AUTO range.

(2) Calibrate dc volts:

a. Connect the calibrator to the DP 100 as shown in Figure 6-8.

b. Adjust the calibrator output to the value indicated in the message.

c. Wait a few seconds for the the input signal to stabilize.

d. Send $GO to update the calibration constant and invoke the next message, or send $SKIP to leave the old calibration constant unchanged and invoke the next message.

e. Repeat steps *b, c* and *d* for the subsequent dc voltage input signals (Table 6-4, steps 2 through 6). When the DP 100 returns the message,

APPLY +0450.00 VAC ...=>, Go to step (3).

(3) Calibrate ac volts:

a. Connect the calibrator to the DP 100 as shown in Figure 6-8.

b. Set the frequency of the calibrator output to 100 Hz.

c. Adjust the calibrator output to the value indicated in the message.

d. Wait a few seconds for the the input signal to stabilize.

e. Send $GO to update the calibration constant and invoke the next message, or send $SKIP to leave the old calibration constant unchanged and invoke the next message.

NOTE

If the 2V range is calibrated, the 180mV input is not requested in step 11.
If you skip the 2V calibration step, the next prompt is 180mV at step 11.

f. Repeat steps *c*, *d* and *e* for the subsequent ac voltage input signals (Table 6-4, steps 8 through 11). When the DP 100 returns the message,

APPLY +18 M VAC ...=>, Go to step (4).

(4) Calibrate frequency:

a. Connect the calibrator to the DP 100 as shown in Figure 6-8.

b. Adjust the calibrator output to 1 MHz, 1 V ac rms.

c. Wait a few seconds for the the input signal to stabilize.

d. Send $GO to update the calibration constant and invoke the next message, or send $SKIP to leave the old calibration constant unchanged and invoke the next message.

e. When the DP 100 returns the message,

APPLY +10.0000 M OHM ...=>, Go to step (5).

(5) Calibrate resistance:

a. Connect the calibrator to the DP 100 as shown in Figure 6-8.

b. Adjust the calibrator output to the value indicated in the message.

c. Wait a few seconds for the the input signal to stabilize.

d. Send $GO to update the calibration constant and invoke the next message, or send $SKIP to leave the old calibration constant unchanged and invoke the next message.

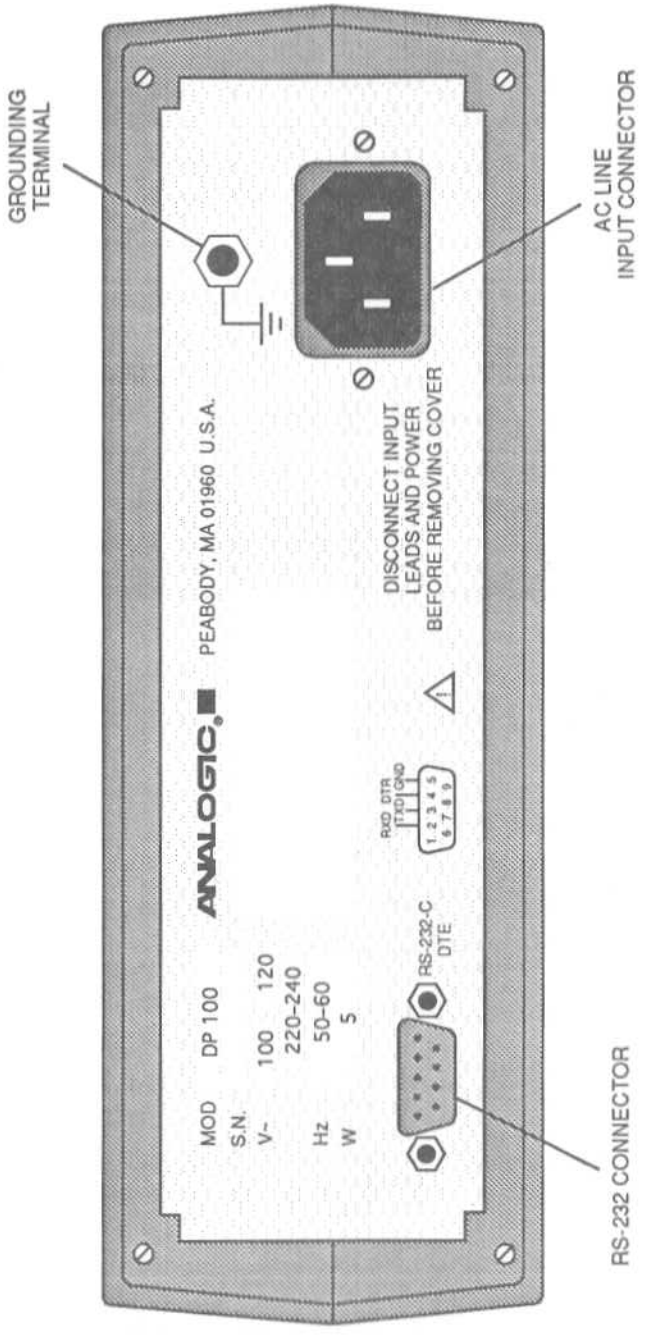
e. Repeat steps *b*, *c* and *d* for the 1 Megohm input signal (Table 6-4, step 14). When the DP 100 returns the message,

APPLY +100.000 K OHM 4 ...=>, Go to step (6).

(6) Calibrate 4-terminal resistance:

a. Connect the calibrator to the DP 100 as shown in Figure 6-9.

b. Adjust the calibrator output to the value indicated in the message.



New Figure 2-5. DP 100 Rear Panel Layout

Page 1-4

Change the fourth paragraph, second sentence to read as follows:

Using voltage selection jumpers, the transformer can be configured for 100 Vac, 120 Vac, or 220–240 Vac.

Page 2-4

Change the caution to read as follows:

CAUTION

The DP 100 can be configured for 100-volt, 120-volt or 220–240-volt operation. Make sure you know the ac line configuration of your unit before connecting it to an ac voltage source. If a 100-volt or 120-volt unit is connected to a 240-volt source, the internal power fuse will blow. Battery life will be reduced if a 100-volt unit is connected to a 120-volt source. The battery will not be charged if you use an ac line voltage that is lower than the voltage for which the unit is configured.

Page 2-4

Change the first sentence following the caution to read as follows:

Units delivered in the U.S.A. and Canada are wired for 120 volts. Units delivered in Japan are wired for 100 volts. A North American power cord is provided with units delivered in the U.S.A., Canada, and Japan.

Page 2-12

Replace Figure 2-5 with the new figure on the opposite page.

Page 3-10

Add the following new section:

3.5.7 Using the REL Function

The REL function provides a means of removing an offset from a measurement. It is available in all non-ac measurement modes provided a PRINT function has not been selected from the submenu. To use the REL function, press the PRINT/ENTER key when the offset you wish to remove is displayed.

You can use REL to remove lead resistance from a two-wire ohms measurement or to perform delta measurements (*i.e.* delta Temperature or delta Frequency).

Note that the display indicates overload when either the measured analog signal exceeds the range limit or the numerical delta value exceeds the display capacity.

c. Wait a few seconds for the the input signal to stabilize.

d. Send $GO to update the calibration constant and invoke the next message, or send $SKIP to leave the old calibration constant unchanged and invoke the next message.

e. Repeat steps b, *c* and *d* for the subsequent four-terminal resistance input signals (Table 6-4, steps 16 through 18). When the DP 100 returns the message,

APPLY +180.000 MADC ...=>, Go to step (7).

(7) Calibrate 200mA dc current:

a. Connect the calibrator to the DP 100 as shown in Figure 6-10.

b. Adjust the calibrator output to the value indicated in the message.

c. Wait a few seconds for the the input signal to stabilize.

d. Send $GO to update the calibration constant and invoke the next message, or send $SKIP to leave the old calibration constant unchanged and invoke the next message.

e. When the DP 100 returns the message,

APPLY +180.000 M AAC ...=>, Go to step (8).

(8) Calibrate 200mA ac current:

a. Connect the calibrator to the DP 100 as shown in Figure 6-10.

b. Set the frequency of the calibrator output to 100 Hz.

c. Adjust the calibrator output to the value indicated in the message.

d. Wait a few seconds for the the input signal to stabilize.

e. Send $GO to update the calibration constant and invoke the next message, or send $SKIP to leave the old calibration constant unchanged and invoke the next message.

f. When the DP 100 returns the message,

APPLY +1.80000 ADC ...=>, Go to step (9).

(9) Calibrate 2A dc current:

a. Connect the calibrator to the DP 100 as shown in Figure 6-10.

b. Adjust the calibrator output to the value indicated in the message.

c. Wait a few seconds for the the input signal to stabilize.

d. Send $GO to update the calibration constant and invoke the next message, or send $SKIP to leave the old calibration constant unchanged and invoke the next message.

e. When the DP 100 returns the message,

APPLY +1.80000 AAC ...=>, Go to step (10).

(10) Calibrate 2A ac current:

a. Connect the calibrator to the DP 100 as shown in Figure 6-10.

b. Set the frequency of the calibrator output to 100 Hz.

c. Adjust the calibrator output to the value indicated in the message.

d. Wait a few seconds for the the input signal to stabilize.

e. Send $GO to update the calibration constant and invoke the next message, or send $SKIP to leave the old calibration constant unchanged and invoke the next message.

f. The DP 100 exits the calibration routine and returns to the normal mode of operation. Go to Section 6.9.2.

Page 6-32

In Section 6.9.2, delete step (1) and renumber the remaining steps.

Page 6-33

In Section 6.10.1, change "Electronics Products Group (EPG)" to Measurement and Control Division (MCD)." Also, delete all telephone numbers and add the following information:

Telephone: (508) 977-3000
Telex: 681-7021
Fax: (508) 532-6097, (508) 531-1266

Page A-6

Change Section A.8.3, AC Power to read as follows:

88 to 112V, 108 to 132V, or 216 to 264 Vac (configured internally), 47 to 63 Hz, 5 watts max.

TECHNICAL MANUAL REVISION NOTICE

This notice applies to the following technical manual:

Title of Manual:	DP 100 User's Manual
Document No:	82-5045-1

This notice provides information to ensure the accuracy of the applicable technical manual.

This information contained in this notice applies to all DP 100 Multimeters shipped with revision 1.2 and higher firmware. The firmware revision level can be read on the front panel display at power-on.

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