

PULSE INSTRUMENTS COMPANY
USER'S REFERENCE MANUAL
MODEL PI-720
+25V PROGRAMMABLE DUAL BIPOLAR
DC SOURCE WITH 4½ DIGIT DISPLAY

PRELIMINARY

SIZE	CODE IDENT NO.	DRAWING NO. 91000150
SCALE		SHEET 1 of 8

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I. GENERAL DESCRIPTION

The PI-720 Programmable Dual Bipolar DC Source is a plug-in unit designed to operate in the Tektronix TM-500 series power modules. Each channel employs a precision $4\frac{1}{2}$ digit monolithic A/D converter for measuring the output voltage or load current. A $4\frac{1}{2}$ digit LED display unit is also provided for each channel. Minimum display resolution is 0.1mV or $0.1\mu\text{A}$, and Auto Ranging is provided in the Digital Programming Mode (Option 002). The PI-720 is a Talker/Listener type instrument.** In the Listen mode, its output voltage, voltage or current display, and display range can be programmed. Programming resolution is 1.2mV for dual channel operation and 1mV or 0.5mV when both channels are combined. In the Talk mode, it reports back to the controller the measured results.

With the additional DVM inputs, the PI-720 can be used as system DVM's for measuring and recording other DC voltages. The PI-720 DC Source employs operational amplifier type output stages. Consequently, the output voltage of each channel can be varied continuously from positive values, through zero, to negative values. Furthermore, each output can source or sink a maximum of 150mA regardless of the output voltage polarity or value. Output voltage of each channel is manual-adjustable or digitally programmable within the $\pm 25\text{V}$ range and is short circuit protected. The PI-720 can, therefore, be used as a dual channel DC measurement system.

**For use with IEEE-488 (GPIB) Bus, the TM/RTM 506-MOD DP power module and the PI-952 Bidirectional Instrument Coupler are required.

II. SPECIFICATIONS

1. FORCE FUNCTION

Output Voltage Range

$\pm 25\text{V}$ DC, manual control or external programming selectable by front panel switch; $I_0 = \pm 150\text{mA}$ maximum for $-25 \leq V_0 \leq +25\text{V}$.

Manual - Continuously variable from -25V to $+25\text{V}$ by front panel control.

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Digital Programming (Option 002 only)

Range: -25.000V to +24.9878V.

Resolution: 11 bits (12mV typical) plus sign bit. Option HR provides 1mV or 0.5mV resolution when channels A and B are combined. The high resolution output available from channel A is equal to $V_A + V_B/12.207$.

Accuracy (open circuit): ± 25 mV of programmed value.

Code: Complementary offset binary.

Output Resistance

75m Ω Maximum.

Line Regulation

5mV maximum for a $\pm 10\%$ line voltage change.

Ripple and Noise

1.2mV P-P maximum @ 25mA load

2mV P-P maximum @ 150mA load

Output Rise and Fall Times (10% - 90%)

5ms for a ± 25 V output swing, for digital programming.

Digital Programming Inputs

LP TTL compatible

\overline{MS} - Mainframe select

\overline{PS} - Plug-in select

CS - Channel select (Channel A/ $\overline{\text{Channel B}}$)

DS - Data strobe

D₁ - Talk/ $\overline{\text{Listen}}$

D₂ - $\overline{\text{Ack}}$ (Listen)

D₃ - $\overline{\text{Inhibit}}$ (Talk)

D₄ - $\overline{\text{Ext Data Ready}}$ (Talk)

D₅ - D₁₂ - Data

For more information regarding programming format, refer to pages 11, 12 and 13 in DIGITAL PROGRAMMING FOR PI-SERIES PLUG-IN INSTRUMENTS.

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2. SENSE FUNCTION

<u>Range</u>	<u>Max. Reading</u>	<u>Accuracy (18° - 28° c)</u>	
		<u>Volts</u>	<u>MA</u>
2	1.9999	0.1% rdg \pm 0.3mV	0.2% rdg \pm 0.8 μ A
20	19.999	0.1% rdg \pm 3mV	0.2% rdg \pm 8 μ A
200	199.99	0.1% rdg \pm 30mV	0.25% rdg \pm 80 μ A

DVM INPUT

1 M Ω , \pm 100V Maximum

Measurement Cycle Time

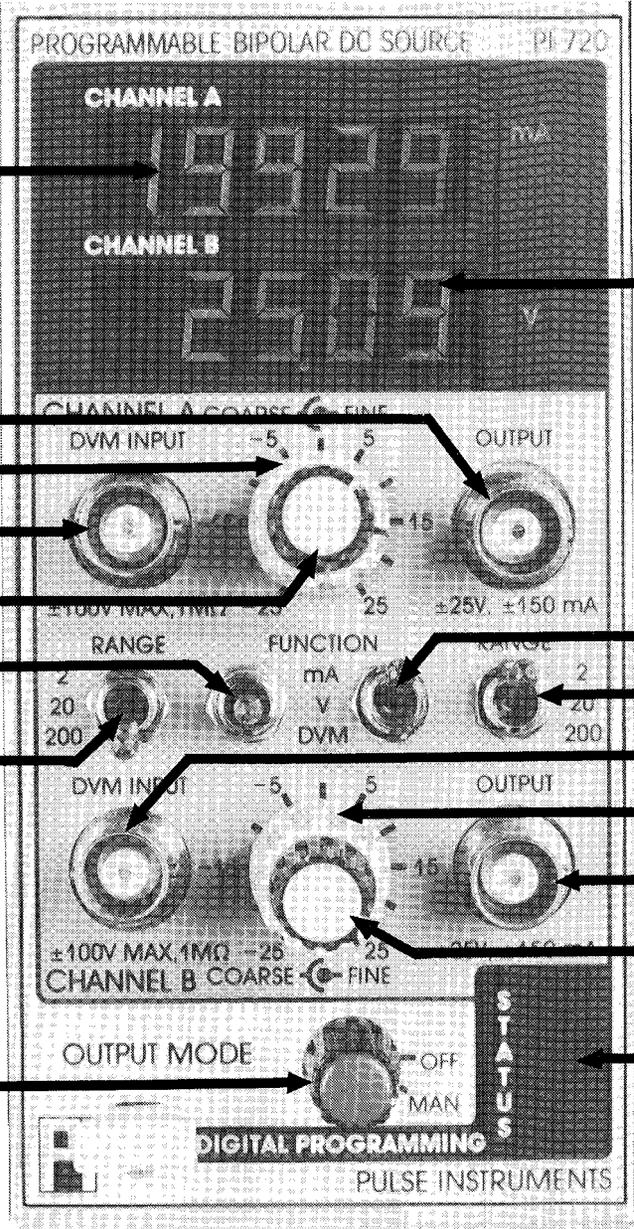
336ms typical

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III FRONT PANEL CONTROLS.

1. Channel A display, volts or milliamps.
2. Channel A DVM Input - to be used for measuring external voltages, $\pm 100V$, max.
3. Channel A Output - $\pm 25V$, $\pm 150mA$, maximum.
4. Channel A Output manual control, coarse.
5. Channel A Output manual control, fine.
6. Channel A manual function selector switch.
7. Channel A manual display range selector switch.
8. Channel B display, volts or milliamps.
9. Channel B DVM Input - to be used for measuring external voltages, $\pm 100V$, max.
10. Channel B Output - $\pm 25V$, $\pm 150mA$, maximum.
11. Channel B Output manual control, coarse.
12. Channel B Output manual control, fine.
13. Channel B manual function selector switch.
14. Channel B manual display range selector switch.
15. Mode selector switch-
OFF: Power supply in standby mode. Outputs are within $\pm 25mV$.
MANUAL: Output controlled by front panel coarse/fine potentiometer control.
DIGITAL PROGRAMMING: All front panel controls and selector switches are disabled. Output voltages, display ranges and function selections are controlled by host computer. See 'Digital Programming for PI-Series Plug-In Instruments.'
16. Digital Programming Status indicator:
REM: Remote mode, indicating PI-720 is in digital programming mode.
LSN: Listen mode, indicating that the PI-720 is receiving information.
TLK: Talk mode, indicating that the PI-720 is outputting information.
HR: High Resolution, indicating Channel A and Channel B are combined to produce a high resolution output at Channel A providing either a $1mV$ or $.5mV$ programming resolution.

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IV. PROGRAMMING COMMANDS

80 Resets both channels to:
 0.00V
 Auto ranging on
 High resolution off/12mv increments
 DVM's off

90 Execute command used to terminate input

81 Sets channel A auto ranging on

91 Sets channel B auto ranging on

82 Sets channel A auto ranging off

92 Sets channel B auto ranging off

83 Sets channel A to read internal power supply voltage

93 Sets channel B to read internal power supply voltage

84 Sets channel A to read power supply current

94 Sets channel B to read power supply current

85 Sets 2 range on Channel A

95 Sets 2 range on channel B

86 Sets 20 range on channel A

96 Sets 20 range on channel B

87 Sets 200 range on channel A

97 Sets 200 range on channel B

88 Sets channel A DVM to read external voltage

98 Sets channel B DVM to read external voltage

89 Sets channel A external DVM off

99 Sets channel B external DVM off

8A Sets high resolution on (channel A + channel B)

9A Sets high resolution off

8B Sets resolution to 1 mv.

9B Sets resolution to .5mv

8C Takes a reading from channel A

9C Takes a reading from channel B

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Except for 80, 90, 8A, 9A, 8B and 9B, commands beginning with the digit '8', such as 81 and 8C, control channel A functions, and those with the digit '9', control channel B functions. For example, an '8C' stores the channel A displayed information in memory which can be read by the controller at a later time; only one reading may be stored in memory at a given time. However, if the command '8C' is not used, and if channel A is selected for TALK, the instantaneous displayed information will be sent to the controller.

All commands must have a '90' at the end of the command string; otherwise, the instrument will not respond to the command string. Example: 84 82 86 07 1? 2? 90.

The command string sets channel A to: current, auto range off, 20 ma range, then loads a voltage of 12.5 volts.

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