



*P60 Series, P80 Series  
DC Power Supplies*

**Isolated Analog Option  
Programming Manual**

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## Safety Notice

Before applying power to the system, verify that the unit is configured properly for the user's particular application.

CE and UL recognition status of this series of power supplies is based on rack mounted application only. Use of the power supplies outside of a rack mount enclosure will expose the user to high voltage and/or high current sources. Extreme caution must be used under these circumstances.

The analog control inputs (connectors J1 and J2) on the rear panel are referenced to the negative output of the power supply. Grounding the positive output of the power supply or biasing the output of the supply above chassis potential will cause these inputs (along with the output of the supply) to have a potentially hazardous offset voltage. Exercise caution under these conditions. Under no circumstances should the output of the supply be biased more than 500 volts from chassis potential.

**Installation and service must be performed only by properly trained and qualified personnel who are aware of dealing with attendant hazards. This includes simple tasks such as fuse verification.**

**Ensure that the AC power line ground is connected properly to the unit input connector or chassis. Similarly, other power ground lines including those to application maintenance equipment must be grounded properly for both personnel and equipment safety.**

Always ensure that facility AC input power is de-energized prior to connecting or disconnecting the input/output power cables.

Warning: Lethal voltages may be present inside the power supply even when the AC input voltage is disconnected. Only properly trained and qualified personnel should remove covers and access the inside of the power supply.

During normal operation, the operator does not have access to hazardous voltages within the chassis. However, depending on the user's application configuration, HIGH VOLTAGES HAZARDOUS TO HUMAN SAFETY may be generated normally on the output terminals. Ensure that the output power lines are labeled properly as to the safety hazards and that any inadvertent contact with hazardous voltages is eliminated.

Due to filtering, the unit has high leakage current to the chassis. Therefore, it is essential to operate this unit with a safety ground.

This unit is designed to be permanently connected to the power source and as such must have a readily accessible disconnect device incorporated in the fixed wiring.

After the unit has been operating for some time, the metal near the rear of the unit may be hot enough to cause injury. Let the unit cool before handling.

These operating instructions form an integral part of the equipment and must be available to the operating personnel at all times. All the safety instructions and advice notes are to be followed.

Neither Power Ten nor any of the subsidiary sales organizations can accept responsibility for personal, material or consequential injury, loss or damage that results from improper use of the equipment and accessories.

## SERVICE SAFETY NOTICES

**WARNING!**

HAZARDOUS VOLTAGES IN EXCESS OF 480 V RMS, 700 V PEAK MAY BE PRESENT WHEN COVERS ARE REMOVED. QUALIFIED PERSONNEL MUST USE EXTREME CAUTION WHEN SERVICING THIS EQUIPMENT. CIRCUIT BOARDS, TEST POINTS, AND OUTPUT VOLTAGES MAY BE FLOATING ABOVE CHASSIS GROUND.

**WARNING!**

TO GUARD AGAINST RISK OF ELECTRICAL SHOCK DURING OPEN COVER CHECKS, DO NOT TOUCH ANY PORTION OF THE ELECTRICAL CIRCUITS. EVEN WHEN THE POWER IS OFF, CAPACITORS CAN RETAIN AN ELECTRICAL CHARGE. USE SAFETY GLASSES DURING OPEN COVER CHECKS TO AVOID PERSONAL INJURY BY ANY SUDDEN FAILURE OF A COMPONENT.

**WARNING!**

SOME CIRCUITS ARE LIVE EVEN WITH THE FRONT PANEL SWITCH TURNED OFF. SERVICE, FUSE VERIFICATION, AND CONNECTION OF WIRING TO THE CHASSIS MUST BE ACCOMPLISHED AT LEAST FIVE MINUTES AFTER POWER HAS BEEN REMOVED VIA EXTERNAL MEANS; ALL CIRCUITS AND/OR TERMINALS TO BE TOUCHED MUST BE SAFETY GROUNDED TO THE CHASSIS.

**WARNING!**

QUALIFIED SERVICE PERSONNEL NEED TO BE AWARE THAT SOME HEAT SINKS ARE NOT AT GROUND, BUT AT HIGH POTENTIAL.

## **FCC NOTICE**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## DECLARATION OF CONFORMITY

We:

Power Ten  
9250 Brown Deer Road  
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declare under our sole responsibility that the product:

*all 'P' series models except 600V output*

are in conformity with the following standards or other normative documents:

CE Mark (Commercial/Light Industrial)

Radiated Emissions	EN55011A	
Conducted Emissions	EN55011A	
Electrostatic Discharge	EN61000-4-2	4kV contact
	EN50082-2 (1995)	8kV air
Radiated Susceptibility	ENV50140	
	EN50082-2 (1995)	10V/m
Conducted Susceptibility	ENV50141	10V rms
	EN50082-2 (1995)	
Electrical Fast Transient Burst	EN61000-4-4	2kV (A/C)
	EN50082-2 (1995)	1kV (I/O)
Low Voltage Directive	EN60950: 1992+A1+A2+A3	(TUV cert)

following the provisions of IEC 89/336/EEC directive.

June 25, 1999

John Baker  
Manager, Quality Assurance



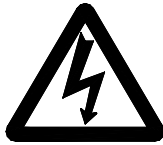
### About This Manual

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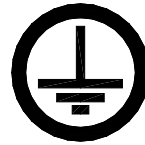
This manual has been written expressly for the Power Ten “P” Series of power supplies which have been designed and certified to meet the 1997 Low Voltage and Electromagnetic Compatibility Directive Requirements of the European Community. All units in this series comply with these directives.

Since the Low Voltage Directive is to ensure the safety of the equipment operator, universal graphic symbols (see below) have been used both on the unit itself and in this manual to warn the operator of potentially hazardous situations.

## SAFETY SYMBOLS



CAUTION  
Risk of Electrical Shock



Protective Conductor Terminal



CAUTION  
Refer to Accompanying Documents



Alternating Current (AC)

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# Chapter 1

## DESCRIPTION OF EQUIPMENT

### 1.1 PURPOSE AND CAPABILITIES

The Isolated Analog Option for all Power Ten power supply models fully isolates remote control signals. This isolation allows users to control power supplies not connected to a common ground. In addition, in systems with high ambient noise or with large ground loop currents the control ground can be isolated from power ground eliminating problems.

### 1.2 TECHNICAL CHARACTERISTICS

The characteristics for the Isolated Analog Option are listed in Tables 1-1.

#### **NOTICE**

This option is not intended to allow operation of the power supply at excessive voltages. Refer to the power supply manual for maximum terminal voltages.

Table 1-1  
Isolated Analog Option Technical Characteristics

PARAMETERS	SPECIFICATIONS
<b>ELECTRICAL CHARACTERISTICS:</b>	
Input to Output Isolation	300 V
Linearity Control to Power Output	$\pm 1\%$ of full scale from 20-100% of output
Isolation Mode Rejection	10 kV / $\mu$ s
Isolation Mode Rejection Ratio	>100dB

# Chapter 2

## OPERATING INSTRUCTIONS

### 2.1 REMOTE CURRENT PROGRAMMING

A DC voltage source for remote current programming is connected between J1-10 (IP 5V) or J1-16 (IP 10V) and the return terminal J1-23 (IP RTN). The voltage coefficient for 5V remote current programming is 50 millivolts = 1% of rated output current, i.e., for a 300 amp model, each 50 millivolts of programming voltage equals 3 amps of output current. The voltage coefficient for 10V remote current programming is 100 millivolts = 1% of rated output current, i.e., for a 300 amp model, each 100 millivolts of programming voltage equals 3 amps of output current

### 2.2 REMOTE VOLTAGE PROGRAMMING

A DC voltage source for remote voltage programming is connected between J1-9 (VP 5V) or J1-15 (VP 10V) and the return terminal J1-20 (VP RTN). The voltage coefficient for 5V remote voltage programming is 5 volts = 100% of rated output voltage. The voltage coefficient for 10V remote voltage programming is 10 volts = 100% of rated output voltage. To program voltage slightly above the rated output will not damage the unit, but degraded performance may result.

Table 2-1  
Connector J1 Designations and Functions

J1 DESIGNATOR	SCHEMATIC SYMBOL	FUNCTIONAL DESCRIPTION
1	ISO ON/OFF	Isolated remote on/off. Externally supplied AC/DC voltage source for on/off control. A positive(+) voltage will turn on the supply. This input control is optically isolated from the power supply circuit up to 500 VDC.
2	ISO RTN	Isolated circuit return used with isolated on/off control J1-1 and J1-14.
3	-	Factory use only
4	VP RTN	Voltage programming return. Used with J1-9, J1-15 or J1-21 and must be referenced to or within $\pm 3V$ of the circuit common.
5	ON/OFF	Remote on/off. Switch/relay contacts or a direct short between this terminal and circuit common turns on the unit.
6	COM	Common Circuit
7	I MON	Output current monitor. 0-10 VDC equals 0-100% rated current.
8	-	Factory use only
9	VP 5V	Remote voltage programming using a 0-5 VDC source.
10	IP 5V	Remote current programming using a 0-5 VDC source.
11	-	Factory use only
12	-	Factory use only
13	-	Factory use only
14	ISO TTL/CMOS	Isolated TTL/CMOS on/off control. A high state TTL/CMOS voltage turns on the power supply, and a low state or open connection turns the supply off.

Table 2-2  
D-Shell Connector J1 Designations and functions – Continued

J1 DESIGNATOR	SCHEMATIC SYMBOL	FUNCTIONAL DESCRIPTION
15	VP 10V	Remote voltage programming using a 0-10 VDC source.
16	IP 10V	Remote current programming using a 0-10 VDC source.
17	-	Factory use only
18	-	Factory use only
19	V MON	Output voltage monitor. 0-10 VDC equals to 0-100% rated voltage.
20	VP RTN	Voltage programming return. Used with J1-9, J1-15 or J1-21 and must be referenced to or within $\pm 3V$ of the circuit common.
21	-	Factory use only
22	-	Factory use only
23	IP RTN	Current programming return. Used with J1-10, J1-16 or J1-22 and must be referenced to or within $\pm 3V$ of the circuit common.
24	COM	Circuit common.
25	IP RTN	Current programming return. Used with J1-10, J1-16 or J1-22 for remote current programming and must be referenced to or within $\pm 3V$ of the circuit common.

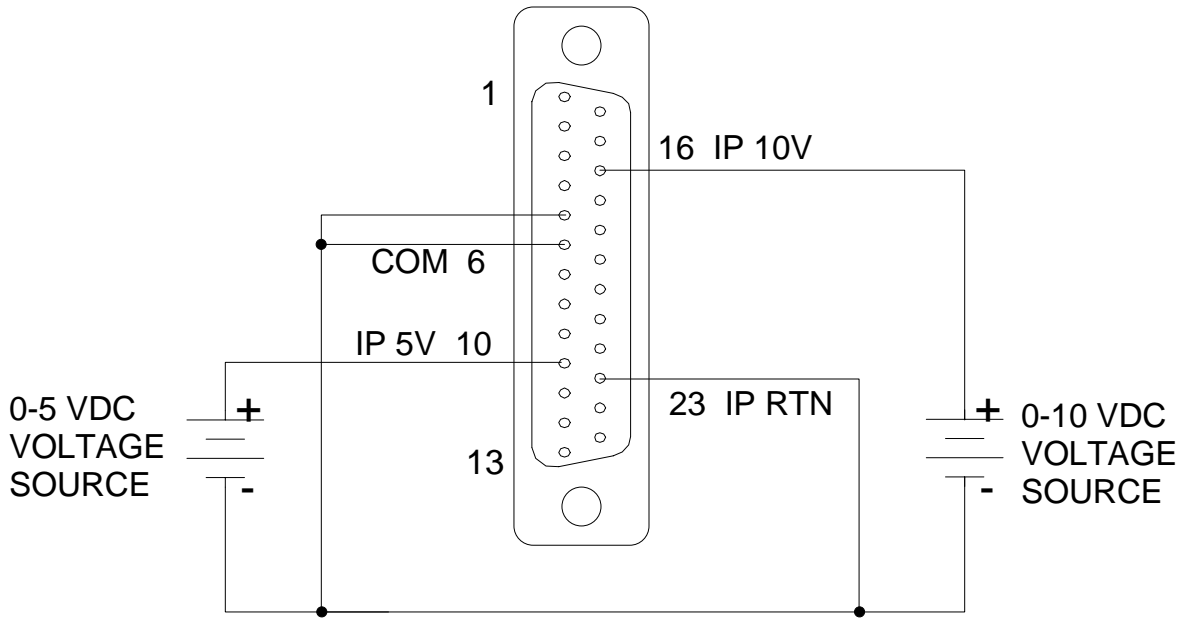


Figure 2-1  
Remote Current Programming Using 0-5 VDC or 0-10 VDC Voltage Source

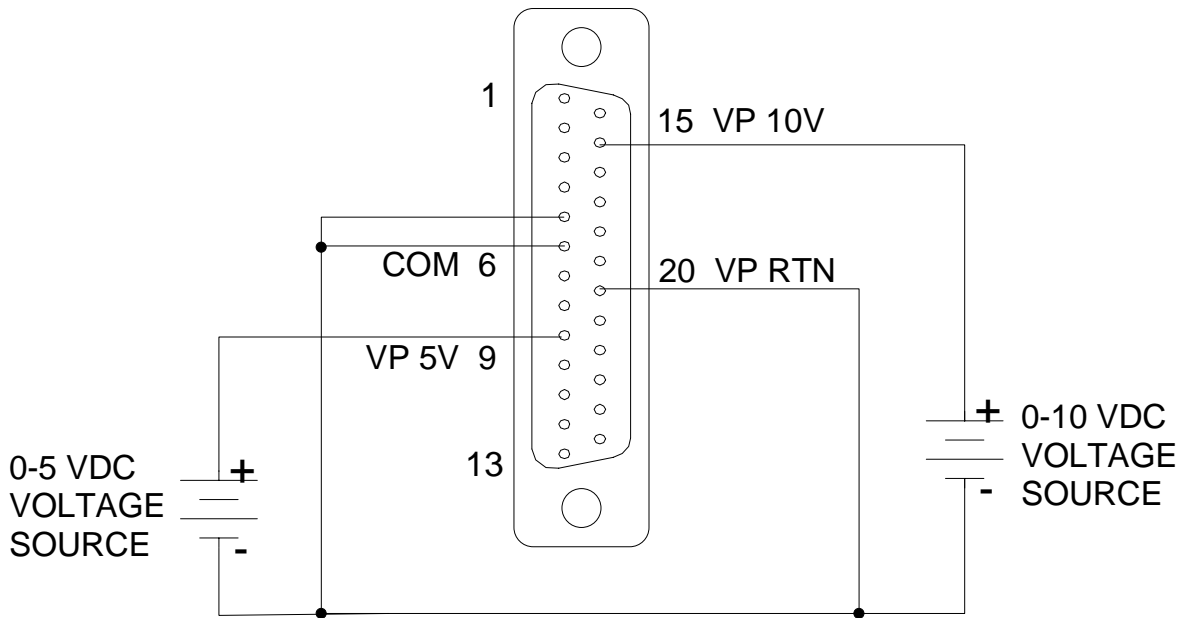


Figure 2-2  
Remote Voltage Programming Using 0-5 VDC or 0-10 VDC Voltage Source