

MANUAL

AC/DC Power Supply Test Set

Model PS-12/480

AC/DC Power Supply PS-12/480 Manual



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1. GENERAL INFORMATION

1.1 DESCRIPTION

The **PS-12/480 AC/DC Power Supply** provides an adjustable voltage/current source to meet a wide variety of field and lab testing applications. The unit has been designed and built to maximize power output while maintaining ease of portability.

The **PS-12/480** is built using rugged components with generous ratings for high reliability. The foam padded outer case provides good protection for shipping and transportation even under rough circumstances.

1.2 FEATURES

- Adjustable AC-power with 12A up to 140VAC
- Adjustable AC-power with 1A up to 480V
- Adjustable DC-power with 10A up to 190V
- Adjustable DC-power with 2A up to 335V
- Auto-range AC and DC Digital Voltmeters, no conversion scales
- Digital AC and DC Ammeters
- Circuit breaker line protection
- Fuse protection for primary and secondary transformer
- Compact size - easily portable, moderate weight
- Aluminum shock absorbent foam padded carrying and storage case
- Complete one year warranty

1.3 APPLICATIONS

The Magna PS-12/480 will accommodate the following partial list of testing applications:

- Power supply AC or DC within voltage and current ratings
- Meter verification, AC and DC volts
- Circuit breaker test power (trip/close/charge)
- Temporary battery charger
- Reverse excitation tests of current and potential transformers
- Relay operating characteristic (pick/dropout)
- CT saturation testing

1.4 SPECIFICATIONS

Input Requirements:	120 VAC, 12A nominal, 60 Hz (Standard Outlet)
Environmental:	-10 ...45°C < 80% RH
Output Ranges:	
120 V selection:	2.1kVA Autotransformer (Primary) 0-140 VAC @ 12 A 0-190 VDC @ 10 A (Full Wave Rectified and Filtered)
240 V selection:	500 VA 120-240/480 control transformer 0-240 VAC @ 2 A 280VAC @ 25% duty cycle 0-335 VDC @ 2 A (Full Wave Rectified and Filtered) 390 VDC @ 25% duty cycle
480 V selection:	500 VA 120-240/480 control transformer 0-480 VAC @ 1 A 550VAC @ 25% duty cycle no DC available
Meter Ranges:	
Voltmeters:	0.0 to ~190.0 and 115 to 999VAC autorange 0.0 to ~190.0 and 90 to 999VDC autorange
Ammeters:	0.00 to 19.99 AAC 0.00 to 19.99 ADC
Accuracy:	±0.2% reading, ±2 digits
Cabinet:	Aluminum shock absorbent foam padded carrying and storage case
Dimensions:	16.25" width, 16.75" height, 12.25" depth
Weight:	70 lbs.

1.5 ACCESSORIES

Each instrument is supplied complete with:

- Three wire line input cord
- One operating and instruction manual
- One transport case

Optional accessories:

- Magna Timer Unit MT-1

1.5 CERTIFICATION

Magna IV Engineering Ltd. certifies that this instrument was thoroughly tested and inspected and found to meet published specifications when shipped from the factory. Magna IV Engineering Ltd. further certifies that the calibration of this instrument is in accordance with the calibration procedure of the instrument instruction manual using equipment checked against instruments traceable to N.I.S.T. (N.B.S.) or N.R.C. within the limits of their calibration services.

1.6 WARRANTY

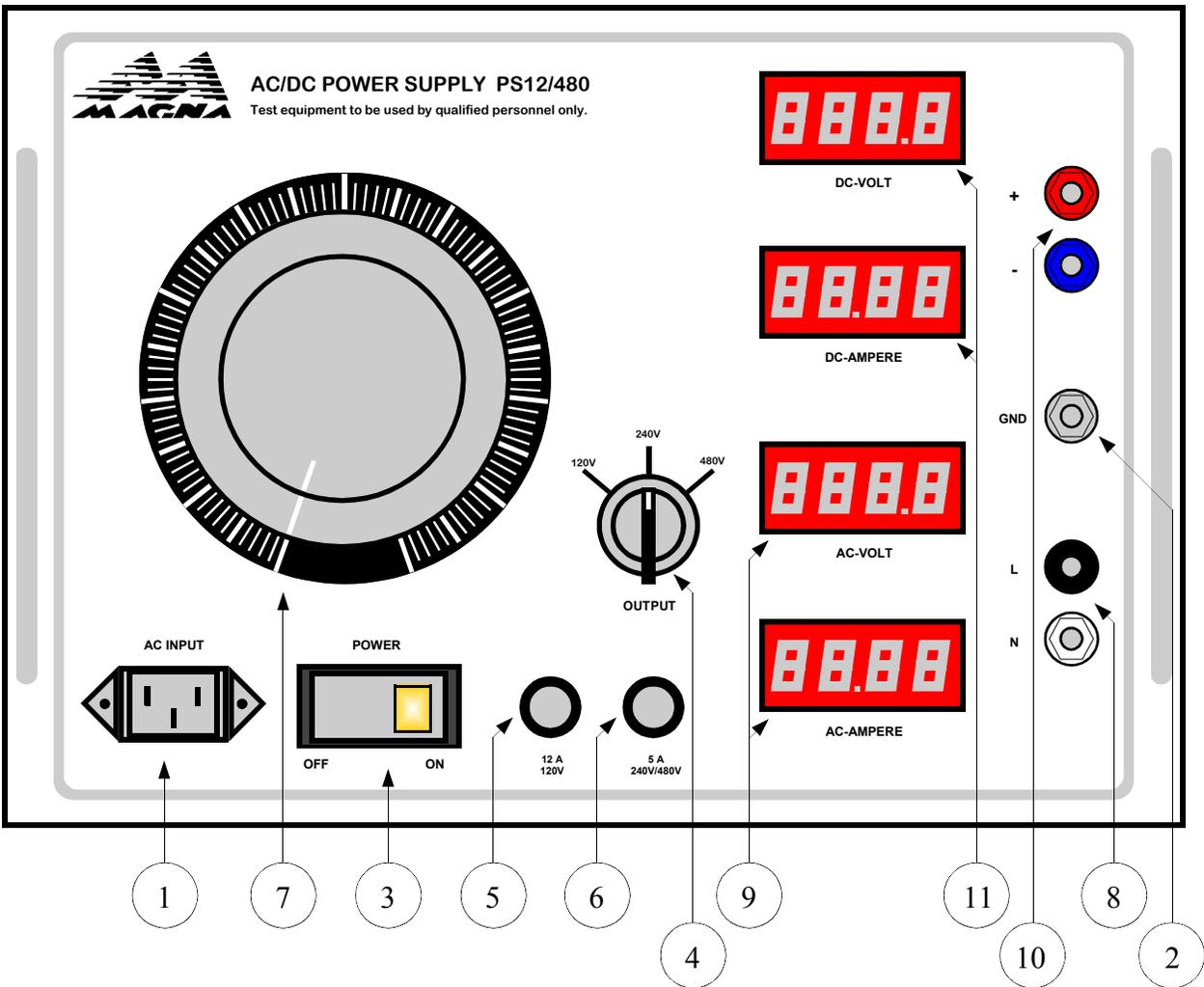
Magna IV Engineering Ltd. warrants this instrument sold by us or our authorized agents to be free from defects in material and workmanship for a period of 12 months from date of shipment. During the warranty period, Magna IV Engineering Ltd. will, at our option, repair or replace the instrument or any part thereof which proves to be defective providing:

- The instrument is returned properly packed and transportation prepaid with prior authorization from us or our appointed agent,
- The instrument has not been altered, modified or repaired by unauthorized personnel and,
- That our examination discloses to our satisfaction that any improper operation or failure was the result of defective material or workmanship and was not the result of improper use, negligence or accident, exceeding environment limits, or connecting the instrument to incompatible equipment.

This warranty is exclusive and is given and accepted in lieu of all other warranties, expressed or implied, and constitutes fulfillment of all our liabilities to the purchaser. Magna IV Engineering Ltd. specifically disclaims the implied warranties of merchantability and fitness for a specific purpose. We assume no liability, in any event, for consequential damages, for anticipated or lost profits, for personal injury due to use or accident, for incidental damage or loss of time or other losses incurred by the purchaser or any third party in connection with instruments covered by this warranty or otherwise.

2. OPERATING INSTRUCTIONS

2.1 PANEL CONTROLS AND OPERATING FUNCTIONS



1 Line Input Socket

International line socket. Use only supplied 3 conductor power cord with earth or equivalent replacement

2 Ground Terminal

It is recommended to ground the instrument to a safe electrical ground. The terminal is connected to the ground contact of input socket.

3 Main Power Switch

Thermal breaker switch rated for 15A interrupting both neutral and line voltage.

2.1 PANEL CONTROLS AND OPERATING FUNCTIONS CON'T

4 Output Selector Switch

120V selection:

Only primary power transformer will be used. Maximum AC Voltage is limited to line voltage; maximum rating is 140VAC at 12A. DC Voltage is rectified and filtered; nominal output 1.41x AC at 10A.

240V selection:

Secondary power transformer will be used. Maximum AC Voltage is limited to 2x primary voltage; rating is 240VAC at 2A., however primary voltage can be set to reach 140VAC but output voltage higher than 240VAC should not be sustained longer than 10 minutes followed by 30 minutes off time.

DC Voltage is rectified and filtered; nominal output 1.41x AC at 2 A

480V selection:

Secondary power transformer will be used. Maximum AC-Voltage is limited to 4x line voltage; maximum rating is 480VAC at 1A., however primary voltage can be set to reach 140VAC but output voltage higher than 480VAC should not be sustained longer than 10 minutes followed by 30 minutes off time.

DC Voltage is not available.

Caution: Never switch ranges while power is supplied to a device under test or any load. Although switches are rated for high current flow, they could get damaged by extreme inrush currents.

5 Primary Transformer Fuse

Protective fuse for primary transformer. Use only 250V/12A slow blow rated fuse.

6 Secondary Transformer Fuse

Protective fuse for secondary transformer. Use only 250V/5A slow blow rated fuse.

7 Voltage Regulator (Primary Transformer)

Control for both AC and DC output voltage.

8 AC Output Terminals

The white terminal (N) is always at neutral input potential; the black terminal (L) is at line potential when control is fully open

Caution: Output is not isolated, AC terminals have a potential to ground!

9 AC Output Meters

Digital AC Voltmeter reads output voltage in two different ranges with autorange function. Up to 195VAC with a resolution of 100mV. Up to 600VAC with a resolution of 1V. Autorange return to the lower resolution is delayed to support a steady display at all times.

Digital AC Ammeter reads output current up to 12.00AAC with a resolution of 10mA. Accuracy of both meters is $\pm 0.2\% \pm 2$ digit.

2.1 PANEL CONTROLS AND OPERATING FUNCTIONS CON'T

10 DC Output Terminals

The blue terminal (-) is at negative potential; the red terminal (+) is at positive potential. DC output is filtered.

Caution: Output is not isolated; DC terminals have a potential to ground!

Caution: DC Output is filtered through a capacitor and will retain potential well after control is returned to 0 or unit supply power is switched off !

11 DC Output Meters

Digital DC Voltmeter reads output voltage in two different ranges with autorange function, up to 195VDC with a resolution of 100mV, up to 500VDC with a resolution of 1V. Autorange return to the lower resolution is delayed to support a steady display at all times. When returning to 120V output range, the overflow indication (-1 .) may be displayed due to a slow decrease of the DC voltage; this will cause no harm to the meter.

Digital DC Ammeter reads output current up to 12.00ADC with a resolution of 10mA. Accuracy of both meters is $\pm 0.2\% \pm 2$ digit.

2.2 GENERAL OPERATING INSTRUCTIONS

1. Ensure Power switch is in "Off" position.
2. Ensure voltage control is fully counter clockwise at zero.
3. Plug unit into 120VAC receptacle via power cord.
4. Ensure that the unit is properly grounded.
5. Connect test leads to appropriate binding posts and device under test and turn power switch to "On" position. Confirm power light comes on.

Caution: Never use the power switch to energize device under test. The in-rush may trip the main line breaker, instrument breaker, or protection fuses and might even damage the PS-12/480. Where necessary, use external switch or use the Magna Timer Unit MT-1.

6. Set the output selection to the appropriate rate. As control is turned clockwise, both AC and DC output voltages/currents are available simultaneously at levels indicated by the meters.
7. When current output is required, make sure not to exceed the rated values of 2kVA at 120V and 500VA at 240V and 480V. The unit is protected for short circuit and severe overload conditions, but current maximum ratings must not be exceeded except for momentary tests.
8. Dual output is possible when suitable external components are used. For example, the DC voltage could be set to 120V and with a high wattage load resistor/divider, AC amps can be regulated to the required level. This application would be special as normal operation uses either the AC or DC output.

3. SAFETY CONSIDERATIONS

The following general safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Magna IV Engineering Ltd. assumes no liability for customers failure to comply with these requirements.

3.1 GROUND THE INSTRUMENT

To minimize the hazard of electric shock, the instrument **must** be connected to an electrical ground. This should be accomplished through the earth ground pin of the units power connector and power cord. Do not use a non-grounding plug or adapter. An auxiliary chassis ground terminal should be connected to a suitable external ground for greater operator safety.

3.2 DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Unless specifically designated as “Intrinsically Safe”, operation of any electrical instrument in the presence of flammable gases, fumes, or particles constitutes a definite safety hazard.

3.3 DO NOT REMOVE COVERS

Operating personnel must not attempt component replacement or internal adjustment. Dangerous voltages may exist internally even when power is switched off. Because of the dangers of introducing additional hazards, do not install substitute parts or perform any unauthorized modifications to the instrument. Refer unit to qualified maintenance personnel or to manufacturer.

3.4 DANGER! HIGH VOLTAGE

Use extreme caution when connecting to the output plugs of the instrument. Due to the construction of the PS-12/480, the instrument has line connected AC outputs; therefore, all due caution should be exercised when working with live circuits. The PS-12/480 is not an isolated power supply! DC positive and negative terminals will develop potential with respect to earth ground. Caution must be exercised when connecting to a system that has either a positive or negative ground reference. The filtering capacitor for the DC output is equipped with a bleeding resistor; however, dangerously high voltage remains present at the output well after the unit is turned off or disconnected from input power.

3.5 READ AND UNDERSTAND THE MANUAL

Prior to operating this instrument, the user must be familiar with the operating procedures, controls, and precautions regarding the PS-12/480.

4. SERVICE AND MAINTENANCE

The unit is built to withstand regular shipping and transportation in field use. Maintenance requirements are minimal and are essentially reduced to cleaning and visual checks for loose or broken components. Calibration should be checked once a year on normal use and shipping. Intervals may be shorter with extensive travel or as per user requirements.

4.1 ROUTINE INSPECTION

Regular inspection of the unit should be done to ensure safety, reliability, and accuracy. Loose or broken parts could cause harmful damage to user and components of the unit. Check power cord for wear, possible cuts, or broken insulation. Check output plugs for burn marks and sure seating.

4.2 CLEANING

The foam padded case is aluminum lined for protection and easy cleaning can be done with all common household cleaning detergents. Care must be taken not to soak the padding foam since moisture and excessive penetration with chemicals could damage the unit. The faceplate, made of anodized aluminum embedding the graphic on the plate, will withstand most common chemicals. The LEXAN™ covers of the meters are equipped with a special protective coating; however, the glue bonding to the face will not withstand prolonged soaking with aggressive cleaning chemicals. For cleaning, a soft cloth should be used to avoid scratches; avoid soaking with cleaning chemicals.

4.3 CALIBRATION

The PS-12/480 has been factory calibrated traceable to N.I.S.T standards. Calibration should be checked at regular intervals as per requirements, but at least once a year. Any valid meter with an accuracy better than 0.1% can be used. Since the output is not electronically stabilized make sure that the supply voltage is not fluctuating to obtain best results.

- Check DC voltage at about 130.0VDC using the output control to set the voltage
Note: Reading should be better than ± 5 Digit.
- Check AC voltage at about 110.0VAC using the output control to set the voltage
- Check DC current at about 8.00ADC using a suitable load and output control
- Check AC current at about 10.00AAC using a suitable load and output control
Note: Readings should be better than ± 4 Digit.
- Check DC voltage at about 250VDC using the output control to set the voltage
- Check AC voltage at about 300VAC using the output control to set the voltage
Note: Reading should be better than ± 7 Digit.

4.3 CALIBRATION CONT'D

Where adjustments are required these can be made accessing the trimming potentiometers located behind the faceplate. Unit must not be opened in the process as all potentiometers are accessible through sealed holes on the side of the PS-12/480 as shown below.

Caution: Adjustments must only be made by a certified instrumentation technician. Damages due to adjustment attempts will definitely void warranty!

- Remove instrument from outer case
- Remove calibration seals on the right side underneath the face plate
- Access the respective potentiometer with a screwdriver

Caution: Use only screwdriver entirely made from highly isolating material.

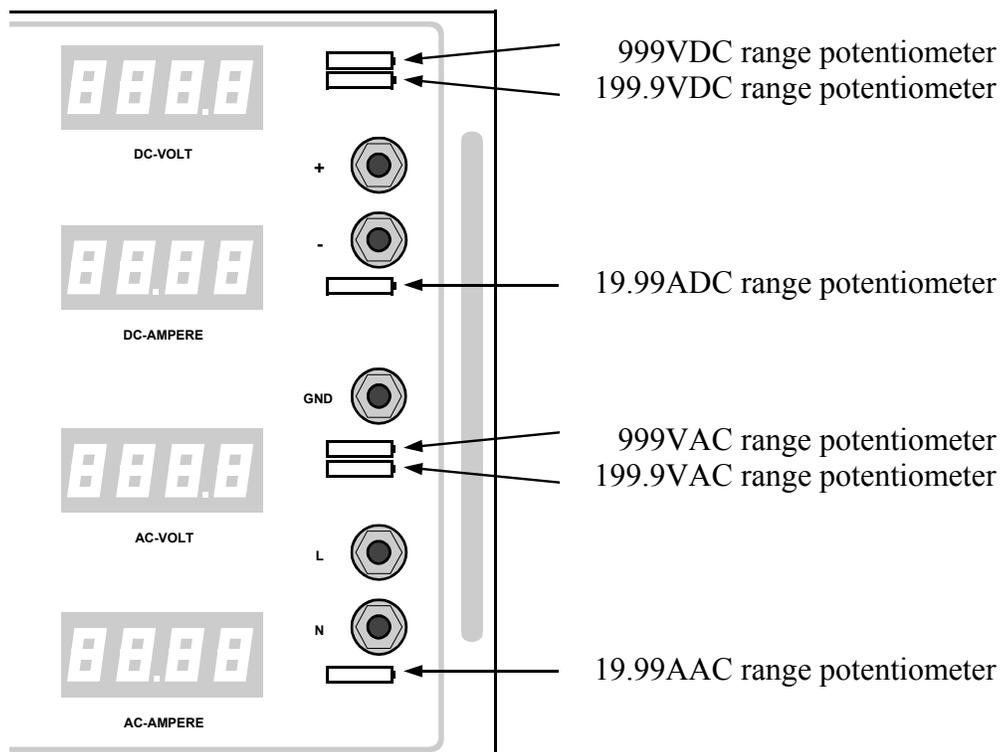
- Set potentiometer to match instrument display with calibration meter reading

Note: Both Voltmeter potentiometers are accessible through one hole.

Note: Adjusting the lower range may also effect the higher range of the meter. The calibration of both ranges should be rechecked after adjustment.

- Reseal calibration access holes when finished

Note: If the desired values can not be set appropriately the instrument will have to be sent back for factory adjustment. Do not attempt to alter the basic meter settings.



5. COMPONENT LIST

Part-ID	Part Description	#
BP-49	Red panel mount hex binding post	1
BP-50	Blue panel mount hex binding post	1
BP-51	White panel mount hex binding post	1
BP-52	Black panel mount hex binding post	1
BP-53	Panel mount hex binding ground post	1
BR-4	115VAC 15A 4PDT thermal breaker switch	1
C-7	450VDC 3300 μ F electrolytic capacitor	1
D-194	Full-wave bridge rectifier 400PIV 35A 3640	1
EL-5	6'7" 3/16 shielded PVC jacketed detachable angled power cord	1
EL-7	15A 250V panel mount male receptacle	1
EN-22	PS-12/20 aluminum case	1
EN-143	PS-12/480 front plate	1
EN-147	Rock Solid aluminum inner box for PS12 & CRS100	1
FU-40	Panel mount fuse holder e/w screw knob for 1/4 x 1 1/4 fuses	2
FU-9	1/4 x 1 1/4 MDL 5A 250V glass time	1
FU-197	1/4 x 1 1/4 MDA 12A 250V glass time	1
HA-24	Brass U shape instrument handle	2
PC-22	Control Power Board PS-12.1, with components	1
PC-26	Meter Board Volt/Amp. DC PS-12.2A-480V, with components	1
PC-27	Meter Board Volt/Amp. AC PS-12.2B-480V, with components	1
R-1	Fixed aluminum housing chassis mount resistor 25W 4K0 1%	1
SW-18	Black 3-pos maintained selector switch	1
SW-23	60 mm contact block 1-N/O 1-N/C	2
SW-27	60 mm contact block 2-N/C	1
TR-12	Single-phase rheostat 0-140VAC 2.1 kVA	1
TR-115	Enclosed control transformer 480/240 to 240/120 500VA	1

6. DRAWINGS

