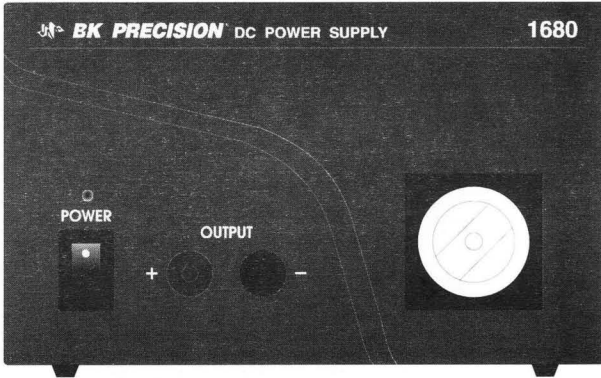


# BK PRECISION®

Model: 1680

## DC Power Supply

USER MANUAL



### SPECIFICATIONS

OUTPUT VOLTAGE	13.8 VDC $\pm$ 0.5V
OUTPUT CURRENT	0 to 4 Amps DC continuous 0 to 6 Amps DC peak
OUTPUT POLARITY	Positive or Negative
OUTPUT CONNECTORS	Binding Posts and Cigar Lighter Socket
LOAD REGULATION (0 TO RATED CURRENT)	$\leq$ 320 mV
LINE REGULATION (110 TO 132 VAC)	$\leq$ 130 mV
RIPPLE AND NOISE	$\leq$ 6 mV rms
PROTECTION	Current foldback overload protection, short circuit protection, reverse polarity protection
COOLING	Convection
AC INPUT	110 - 132 VAC 60 Hz
POWER CONSUMPTION	185 W
OPERATING TEMPERATURE	0 TO 40 °C, $\leq$ 75% RH
STORAGE TEMPERATURE	-15° TO 70°C, $\leq$ 85% RH
DIMENSIONS (H x W x D)	3-5/8" x 6-5/16" x 6-3/4" (92 x 160 x 170mm)
WEIGHT	6-1/2 lbs (2.65 kg)
ACCESSORIES SUPPLIED	Instruction Manual Spare Fuse
OPTIONAL ACCESSORIES	Power Supply Hook-up Cables, Model TL-5

## CONTROLS AND INDICATORS

1. **OPERATE Indicator.** Lights when power is turned on.
2. **POWER Switch.** Turns power supply on and off. Power on indicated by illuminated OPERATE indicator above switch.
3. **OUTPUT + Terminal (red).** Positive polarity output terminal.
4. **OUTPUT - Terminal (black).** Negative polarity output terminal.
5. **Cigar Lighter Socket** Provides output voltage through an automotive cigar lighter plug.
6. **Line Cord.**
7. **Fuse.**

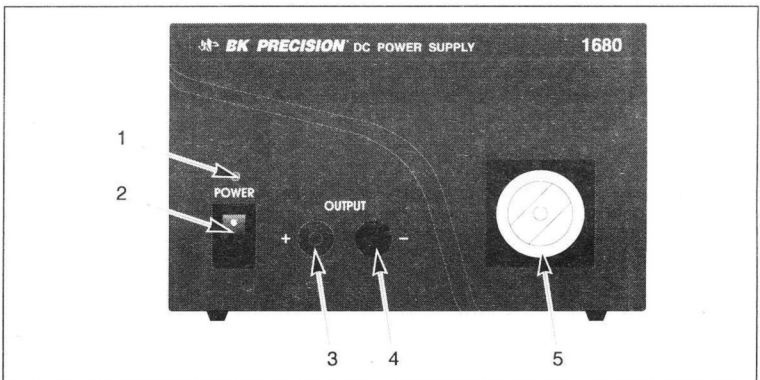


Figure 1  
Front Panel Controls and Indicators, Model 1680

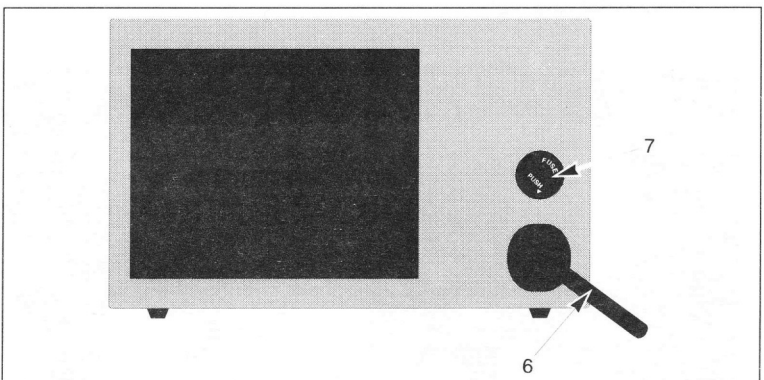


Figure 2  
Rear Panel, Model 1680

# OPERATING INSTRUCTIONS

## NOTE

- (1) The cigar lighter output socket may be used to power equipment. Be sure to observe polarity when connecting equipment. The center contact is negative (-).
- (2) If both the binding posts and the cigar lighter output socket are used at the same time, the total current demand must not exceed 4 Amps continuous, or 6 amps peak.
4. Place the POWER switch in the On position, the OPERATE indicator should illuminate.
5. Turn on the equipment being powered.

## PROTECTING AGAINST OVERLOAD

### CAUTION

*Overloading the power supply may burn it out. This is considered misuse and damage caused by overloading is not covered under warranty. Heed the following precautions to prevent overload.*

### A. Severe Overloads

The power supply is self protected against severe overload such as accidental short circuits of the output terminals, connection to defective (shorted) equipment, or loads that require more than 7 amps. In such cases the equipment to be powered will probably not operate. The output voltage will drop significantly below 13.8 volts and the POWER LED indicator will go off. This condition can be further verified by measuring the output voltage as shown in Fig. 3.

### B. Moderate Overload

The Model 1680 provides 4 amps continuous and 6 to 7 amps peak. Overloads of greater than 4 amps but less than 7 amps are the greatest risk to burnout. The equipment being powered will operate normally, but the power supply will overheat. Loads greater than 4 amps should be limited to 5 minutes duration, then allow at least 10 minutes for cooling before using the power supply again. Connecting an ammeter in series with the load as shown in Fig. 4 permits measurement of unknown loads.

Another rule of thumb method to prevent overloading is to periodically check the temperature of the power supply heatsink. If the power supply "smells" hot or the heat sink is too hot to touch (exceeds 100°C or 200°F), it should be cooled by removing the load.

An overload of about 6 or 7 amps may cause loss of regulation and extremely high ripple in the output. High ripple will produce a loud buzz in most audio equipment or electronic products with a speaker. If you hear a loud buzz, you need to reduce the load or use a power supply with a higher current rating.

## MEASURING OUTPUT VOLTAGE

The output voltage with the load connected, can be measured by connecting a multimeter across the power supply OUTPUT terminals as shown in Fig. 3. Be sure multimeter is set to a voltage range to measure 13.8 VDC. If the cigar lighter socket is used to power the equipment, the voltmeter may still be connected to the output terminals.

## MEASURING OUTPUT CURRENT

The output current can be measured by connecting a multimeter in series with the load as shown in Fig. 4. Be sure multimeter is set to a range sufficient to measure the maximum current.

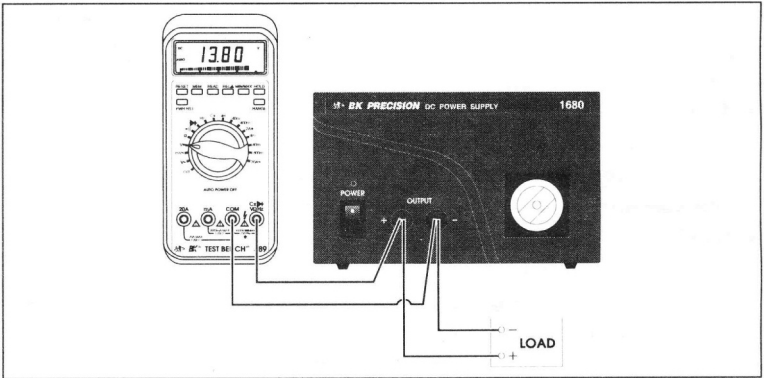


Figure 3  
Measuring Output Voltage

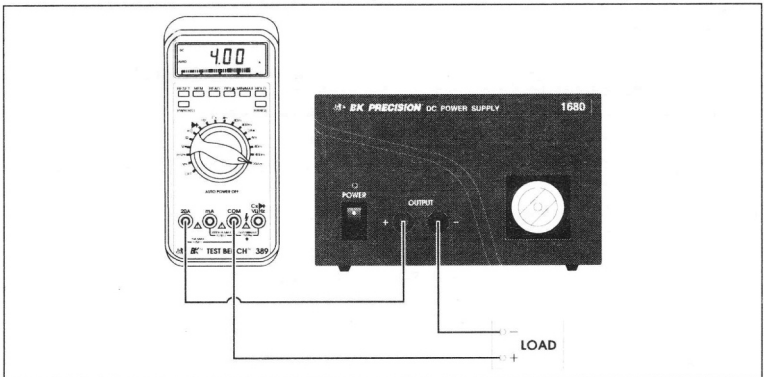


Figure 4  
Measuring Output Current

# TEST INSTRUMENT SAFETY

## WARNING

*An electrical shock causing 10 milliamps of current to pass through the heart will stop most human heartbeats. Voltage as low as 35 volts dc or ac rms should be considered dangerous and hazardous since it can produce a lethal current under certain conditions.*

1. There is little danger of electrical shock from the dc output of this power supply. However, if the equipment under test uses high voltage in any of its circuits, a shock hazard may be present. Remember that high voltage may appear at unexpected points in defective equipment.
2. Use only a polarized 3-wire ac outlet. This assures that the power supply chassis, case, and ground terminal are connected to a good earth ground and reduces danger from electrical shock

## INTRODUCTION

The **B+K Precision** Model 1680 DC Power Supply has a regulated output of 13.8 volts DC, which is the same voltage as an automotive electrical system when the engine is running and the battery is charging. Thus, it is ideal for powering automotive accessories when removed from the vehicle. Applications include displaying, demonstrating, and servicing of electronic automotive equipment such as stereo sound systems, cellular telephones, CB radios, mobile two-way radios, and vehicular alarm systems. The 4-amp continuous and 6-amp peak output current should be sufficient for all such devices except high power sound systems and medium or high power two-way radios. This manual provides the information to assure the maximum performance and longest life for your power supply.

## SAFETY PRECAUTIONS

### WARNING

*The following precautions must be observed to help prevent electric shock*

1. Use only a polarized 3-wire outlet. This assures that the power supply chassis and case are connected to a good earth ground and reduces danger of electrical shock.
2. There is little danger of electric shock from the power supply output, which produces a maximum of 13.8 volts dc. However, there may be great danger of electrical shock if the power supply output is connected to an external high voltage. Some equipment being powered may contain high voltage and present a shock hazard. Observe caution. If the power supply output is floated (referenced to a voltage rather than earth ground) turn off the power supply and the equipment under test when making connections. Never float the power supply to a voltage greater than 100 volts peak with respect to ground.

## EQUIPMENT PROTECTION PRECAUTIONS

### CAUTION

*The following precautions will help avoid damage to the power supply.*

1. Avoid using the power supply in ambient temperatures above +40°C (104°F). Always allow sufficient air space at the rear of the power supply and the top and side vent openings for effective air flow to prevent internal heat build-up. Typically a two inch space at the sides, as well as a six inch space at the top and rear of the power supply is adequate. **DO NOT** block the heat sink on the rear of the power supply or the vent on top of the power supply. **DO NOT** place objects on top of the power supply.
2. Avoid overloading the power supply. The unit will provide 4 amps continuous and up to 6 amps peak. Do not operate at greater than 4 amps for more than 5 minutes, then allow 10 minutes for cooling. Overloading will burn out the power supply.
3. Make certain that hook-up is as intended before turning power supply on. Incorrect polarity may damage the equipment being powered.

## POWER SUPPLY HOOK-UP AND OPERATION

1. Turn off the power supply and equipment being powered.

### NOTE

Use copper hook-up wire at least 18 gauge AWG. Using smaller wire increases the source resistance "seen" by the load, thereby derating regulation capabilities of the power supply. Tighten connections snugly to assure low resistance.

2. Connect the red (+) OUTPUT terminal of the power supply to the positive polarity input of the equipment being powered.
3. Connect the black (-) OUTPUT terminal of the power supply to the negative polarity input of the equipment being powered.

## LIMITED ONE-YEAR WARRANTY

B&K Precision Corp. warrants to the original purchaser that its products and the component parts thereof, will be free from defects in workmanship and materials for a period of **one year** from date of purchase.

B&K Precision Corp. will, without charge, repair or replace, at its option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form of a sales receipt.

To obtain warranty coverage in the U.S.A., this product must be registered by completing a warranty registration form on our website [www.bkprecision.com](http://www.bkprecision.com) within fifteen (15) days of purchase.

**Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. The warranty is void if the serial number is altered, defaced or removed.**

B&K Precision Corp. shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitations of incidental or consequential damages. So the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

B&K Precision Corp.  
22820 Savi Ranch Parkway  
Yorba Linda, CA 92887  
[www.bkprecision.com](http://www.bkprecision.com)  
714-921-9095

## SERVICE INFORMATION

**Warranty Service:** Please go the support and service section on our website [www.bkprecision.com](http://www.bkprecision.com) to obtain a RMA #. Return the product in the original packaging with proof of purchase to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device.

**Non-Warranty Service:** Please go the support and service section on our website [www.bkprecision.com](http://www.bkprecision.com) to obtain a RMA #. Return the product in the original packaging to the address below. Clearly state on the RMA the performance problem and return any leads, probes, connectors and accessories that you are using with the device. Customers not on an open account must include payment in the form of a money order or credit card. For the most current repair charges please refer to the service and support section on our website.

Return all merchandise to B&K Precision Corp. with pre-paid shipping. The flat-rate repair charge for Non-Warranty Service does not include return shipping. Return shipping to locations in North America is included for Warranty Service. For overnight shipments and non-North American shipping fees please contact B&K Precision Corp.

B&K Precision Corp.  
22820 Savi Ranch Parkway  
Yorba Linda, CA 92887  
[www.bkprecision.com](http://www.bkprecision.com)  
714-921-9095

Include with the returned instrument your complete return shipping address, contact name, phone number and description of problem.

# MAINTENANCE

## WARNING

*The following instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.*

### FUSE REPLACEMENT

If the fuse blows, the OPERATE LED indicator will not light and the power supply will not operate. The fuse should not normally open unless a problem has developed in the unit. Try to determine and correct the cause of the blown fuse, then replace only with a fuse of the correct rating of 5 Amps. The fuse is located on the rear panel (Fig. 2).

### INSTRUMENT REPAIR SERVICE

Because of the specialized skills and test equipment required for instrument repair and calibration, many customers prefer to rely upon **B+K Precision** for this service. We maintain a network of **B+K Precision** authorized service agencies for this purpose. To use this service, even if the instrument is no longer under warranty, follow the instructions given in the WARRANTY SERVICE INSTRUCTIONS section of this manual. There is a nominal charge for instruments out of warranty.

# **B<sup>+</sup>K PRECISION<sup>®</sup>**

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