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BK PRECISION[®]

Instruction Manual

Model 1672 Triple Output Power Supply

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Section 1 - Test Instrument Safety

WARNING - Normal use of test equipment exposes you to a certain amount of danger from electrical shock because testing must sometimes be performed where exposed voltage is present. An electrical shock causing 10 milliamps of current to pass through the heart will stop most human heartbeats. A 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. Higher voltages pose an even greater threat because such voltage can more easily produce a lethal current. Your normal work habits should include all accepted practices to prevent contact with exposed high voltage and to steer current away from your heart in case of accidental contact with high voltage. You will significantly reduce the risk factor if you know and observe the following safety precaution.

1. Don't expose high voltage needlessly. Remove housings and covers only when necessary. Turn off equipment while making test connections in high voltage circuits. Discharge high voltage capacitors after removing power.
2. If possible, familiarize yourself with the equipment being tested and the location of its high voltage points. However, remember that high voltage may appear at unexpected points in defective equipment.
3. Use an insulated floor material or a large, insulated floor to stand on and an insulated work surface on which to place equipment and make certain such surfaces are not damp or wet.
4. Use the time proven "one hand in the pocket" technique while handling an instrument probe. Be particularly careful to avoid contacting a nearby metal object that could provide a good ground return path.
5. When testing ac powered equipment, remember that ac line voltage is usually present on some power input circuits such as the on-off switch, fuses, power transformer etc. any time the equipment is connected to an ac outlet, even if the equipment is turned off.
6. Some equipment with a two-wire ac power cord, including some with polarized power plugs, is the "hot chassis" type. This includes most recent television receivers and audio equipment. A plastic wooden cabinet insulates the chassis to protect the customer. When the cabinet is removed for servicing, a serious shock hazard exists if the chassis is touched. Not only does this present a dangerous shock hazard, but damage to test equipment. Always connect an isolation transformer between the ac outlet and the equipment under test. The B&K Precision Model TR-110 or 1604A Isolation Transformer or Model 1653A or 1655A AC Power Supply is suitable for most applications. To be on the safe side, treat all two-wire ac equipment as "hot chassis" unless you are sure it is isolated chassis or an earth ground chassis.
7. On test instruments or any equipment with a 3-wire ac power plug, use only a 3-wire outlet. This is a safety feature to keep the housing or other exposed elements at earth ground.
8. B&K Precision products are not authorized for use in any application involving direct contact between our product and the human body or for use as a critical component in a life support device or system. Here "direct contact" refers to any connection from or to our equipment via any cabling or switching means. A "critical component" is any component of a life support device or system whose failure to perform can be reasonably expected to cause failure of that device or system or to affect its safety or effectiveness.

Never work all alone. Someone should be nearby to render aid if necessary. Training in CPR (cardio-pulmonary resuscitation) first aid is highly recommended.

Section 2

Introduction

2.1 INTRODUCTION

2.2 FEATURES

2.1 INTRODUCTION

The Model 1672 is a Triple Output Regulated DC Power Supply that provides one fixed output (5V/ 3A) and two variable outputs (0 – 32V/ 0 – 3A) ratings. The variable outputs can work independently, or in series tracking, or parallel mode.

2.2 FEATURES

- Independent control of Voltage and Current controls for variable output.
- CV/CC operation.
- Separate 3 digit displays for voltage (Green) and current (Red) for both variable outputs.
- LED indication for CV (Green)/ CC (Red) mode.
- Overload indication LED for Fixed output.
- Series tracking and parallel mode operation.
- Power On/Off switch on front panel.
- Input voltage selection on rear side (115 Vac/ 230Vac).

Section 3

Installation

3.1 INTRODUCTION

3.2 UNPACKING

3.3 INPUT POWER REQUIREMENTS

3.4 SYSTEM CONFIGURATION

3.5 INSTALLATION

3.6 OPERATING INSTRUCTIONS

3.1 INTRODUCTION

This unit is tested prior to shipment. It is therefore ready for immediate use upon receipt. The initial physical inspections should be made to ensure that no damage has been sustained during shipment.

3.2 UNPACKING

Inspect the packing box on receipt for any external damage. If any external damage is evident, remove the instrument and visually inspect it's case and parts for any damage. If damage to the instrument is evident, a description of the damage should be noted on the carrier's receipt and signed by the driver or carrier agent. Save all shipping packaging for inspection. Forward a report of any damage to the agent through which the unit is procured.

Retain the original packing in case subsequent repackaging for return is required. Use of the original packing is essential.

3.3 INPUT POWER REQUIREMENTS

The instrument can operate on 115V or 230V 50 or 60Hz Line selector plug on the rear panel allows you to select the line voltage. Before connecting the power plug to an AC line outlet, be sure to check that voltage Selector plug is set in the correct position corresponding to the line voltage in your location and the fuse rating is as shown in the table.

3.4 SYSTEM CONFIGURATION

The Model 1672 works in independent mode, series tracking mode or parallel mode. User can select the desired mode by following the user instructions.

3.5 INSTALLATION

3.5.1 AC Input Power Connection

Before connecting line ensure the following:

- a) That correct line voltage tap is selected as described above.
- b) That the input fuse rating is as specified.

SELECTOR	LINE VOLTAGE	FUSE
115V	100 ~ 125V 50/60 Hz	3.0A 6A
230V	220 ~ 240V 50/60 Hz	1.5A 3A

3.5.2 Load Connections

Connect the appropriate load between **+ve (Red)** and **-ve (black)** terminal.

For model **1672** the load connection is same as above while using independent output.

In serial tracking mode of operation, connect the appropriate load between **+ve (Red)** terminal of **master** and **-ve (black)** terminal of **slave**.

In parallel mode of operation, connect the appropriate load between **+ve (Red)** terminal and **-ve (black)** terminal of **slave** OR between **+ve (Red)** terminal of **master** and **-ve (black)** terminal of **slave**.

3.6 OPERATING INSTRUCTIONS

Before applying power to unit, make sure that input voltage setting is correct and the ventilation holes are not blocked. Ensure that Ventilation Fan (26) is working well (it should turn on at power on condition). Do not load the output if FAN is not working otherwise it may cause the overheating.

Section 4

SETTING THE OUTPUT VOLTAGE AND OUTPUT CURRENT

1. As per load requirement calculate the voltage and maximum current limit to be set on Output. Note: $V=IxR$
2. Disconnect the load from output terminals.
3. For current limit adjustment, turn the current adjustment knob (11) counter-clockwise to get minimum current output.
4. Short the circuit between the \oplus (7) and \ominus (5) output terminals by the accessory leads.
5. Vary the current adjustment knob clockwise until the 1672 current (Red) displays the required current limit. The C.C. LED will be lighted while adjusting the current limit. Remove the accessory lead after current limit adjustment.
6. The voltage will be displayed again and C.V. LED (Green) will be lighted.
7. Vary the voltage adjustment knob (10) to get the desired output voltage on the (Green) display.

Depending on Load condition power supply will work either in C.V. or in C.C. mode. The automatic changeover is indicated by the C.V. / C.C. LED's.

Model 1672 has two variable outputs, which can work independently or in series tracking or parallel mode with pull and push switch arrangements provided with master voltage and current control knobs.

Independent Mode

Ensure the master voltage and current control knobs are in **PUSH** condition to operate the variable outputs independently.

Section 5

Serial Tracking Mode

In this mode negative output terminal of the **Master** gets connected internally to positive output terminal of the **Slave**.

The output is available across Positive output terminal of the **Master** and Negative output terminal of the **Slave**.

1. **PULL** the Voltage adjustment knob of **Master** (10). The green LED (14) will light up to indicate serial tracking mode.
2. Turn the Current adjustment knob of **Slave** (19) clockwise to maximum.

Set output voltage with the Voltage adjustment knob of **Master**. The display of Master shows half voltage of the actual output available across Positive output terminal of the **Master** and Negative output terminal of the **Slave**.

Parallel tracking Mode

In this mode Positive output terminal of Master gets connected internally to Positive output terminal of Slave and Negative output terminal of Master gets connected to Negative output terminal of Slave. The output voltage will be same as the Master set value and current and the **output current is twice** the set master output current.

1. **PULL** the Current adjustment knob of **Master** (11). The red LED (15) and the red (23) CC LED of the slave output will light up to indicate parallel tracking mode.
2. Turn both of the voltage adjustment knob (18) and current adjustment knob (19) of the slave output clockwise to maximum.
3. Set output voltage with the Voltage adjustment knob of **Master**. The output current shall be twice of the set master output current.

Multiple units in serial mode

For achieving the higher voltage, two or more units can be connected in series (Max 240V). The output voltage will be the SUM of twice of set voltage of the Master.

1. Set all the 1672, which would be connected in serial operation under serial tracking mode as described in serial tracking mode and adjusts to the same output.
2. Connect the Negative of **Slave** output terminal of the **unit 1** to the Positive of **Master** output terminal of the **unit 2**.
3. The output shall be available across Positive of **Master** terminal of **unit 1** and Negative of Slave terminal of **unit 2**.

Section 6

Multiple units in parallel mode

The power supply 1672 can be connected two or more units in parallel to obtain a higher current output (Max. 24A only).

1. Set all the 1672 which will be connected in parallel operation under parallel tracking mode as described in parallel tracking mode and adjust all units to the same output voltage.
2. Make the parallel connection of Positive and Negative terminals of Master and Slave outputs of all units.

The output voltage of the system will be the same for all the units. The output current of the system will be the sum of each unit.

FIXED 5V/3A OUTPUT

This is the standard 5V/ 3A power output provided for supplying the power to TTL logic circuits. When the load exceeds 3A. The red OVER LOAD LED (4) will light up. The output voltage will lower and the power supply will be under C.C. Mode.

Section 7

Technical Specifications

Output Parameters

Number of Outputs Three (One fixed and Two variable)
Range 0 to 32 Vdc/ 0 to 3A (variable) and 5V/ 3A (fixed)
Max. output power 195VA

Constant Voltage Mode
Line regulation <0.01% + 5mV
Load regulation <0.2% + 10mV
Ripple & Noise <1mVms
Temp. coefficient <300PPM/ °C

Constant Current Mode
Line regulation <0.2% + 5mA
Load regulation <0.2% + 8mA
Ripple & Noise <1mAms

Tracking Operation

Slave tracking error < 0.5%+3 digital of the master Series Single Supply Reg.

5V Fixed Output

Line Regulation not specified
Load Regulation not specified
Ripple & Noise <1mVms
Voltage Accuracy 5V ± 0.85V

Display

Voltage 3 digits 0.56" Green LED
Current 3 digits 0.56" Red LED
Accuracy <0.1% + 3 digits

Input Parameters

Input voltage range 115/230 ± 10%
Input frequency 50/ 60Hz

Operating Environment

Temperature 50° F to 104 ° F (10° C to 40 ° C)
Humidity 90 % R.H.

All specifications apply to the unit after a temperature stabilization time of 15 minutes

Mechanical Specifications

Dimensions 9x6.7x12.2lbs. (230X170X310mm) (WXHXD)
Weight 12.6lbs. (5.7kg)

Section 8

CONTROLS AND INDICATORS

8.1 INTRODUCTION

8.2 FRONT PANEL DESCRIPTION

8.3 REAR PANEL DESCRIPTION

8.4 PANEL LAYOUT

8.1 INTRODUCTION

This chapter explains the operating procedure of the unit. The operation is made very simple by providing front panel Potentiometer control.

The Front and rear panel description of the instrument is provided first. Then the operating procedure is explained in detail.

8.2 FRONT PANEL DESCRIPTION

Refer to the Front panel drawings and the numbers assigned to various objects on the front panel. (see page 12)

1. POWER SWITCH: Pushing the switch "ON" will light the LED display to indicate power "ON".
2. Negative output terminal of the **Fixed** 5V/3A output (black).
3. Positive output terminal of the **Fixed** 5V/3A output (red).
4. Over load indicator LED (Red) for **Fixed** 5V/3A output.
5. Negative output terminal of the **Master** 0-32V/0-3A Output (black).
6. Ground terminal of the **Master** output (green).
7. Positive output terminal of the **Master** 0-32V/0-3A Output (Red).
8. C.C. Mode LED (Red) for the **Master** to indicate constant current.
9. C.V. Mode LED (Green) for the **Master** to indicate constant voltage.
10. Master **voltage** adjustment knob with pull and push switch mechanism for **series** tracking mode operation and parallel mode operation along with pull switch of current adjustment knob.
11. Master **current** adjustment knob with pull and push switch mechanism for **parallel** mode operation.
12. Master Voltage Indicator Display in full 3-digits Green 0.56" LED.
13. Master Current Indicator Display in full 3-digits Red 0.56" LED.
14. Series Mode Indicator LED (Green).
15. Parallel Mode Indicator LED (Red).

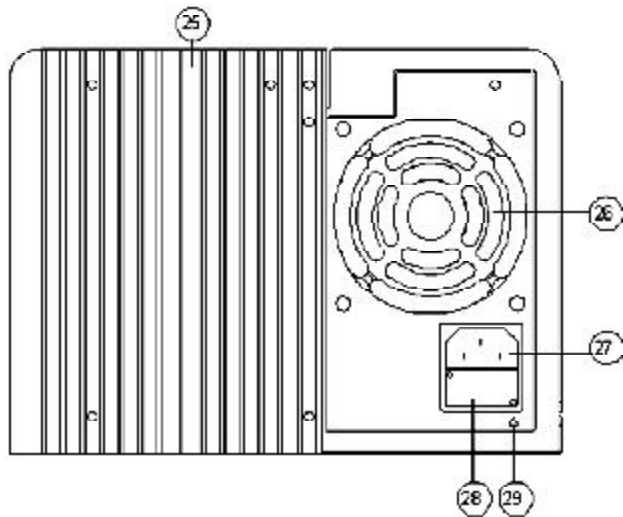
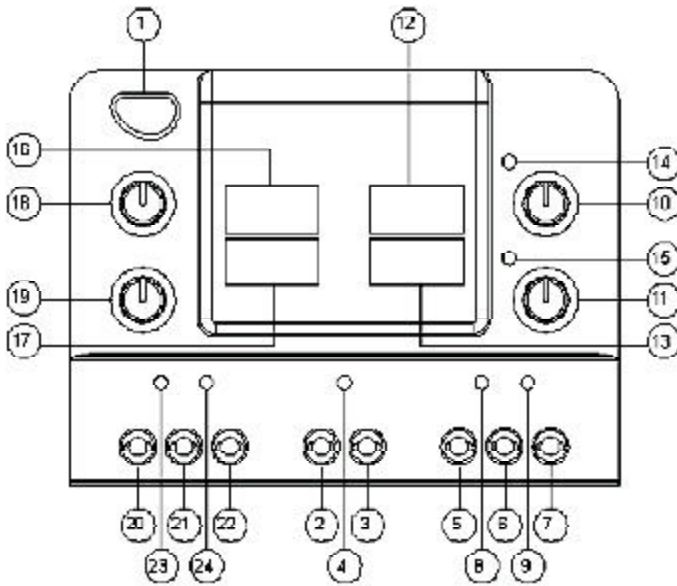
16. **Slave** Voltage Indicator Display in full 3-digits Green 0.56" LED.
17. **Slave** Current Indicator Display in full 3-digits Red 0.56" LED.
18. Voltage Adjustment knob for adjusting **Slave** output voltage when master power is at C.V. Mode.
19. Current Adjustment knob for adjusting **Slave** output current when master power is at C.C. Mode.
20. Negative output terminal of the **Slave** 0-32V/0-3A Output (black).
21. Ground terminal of the **Slave** output (green).
22. Positive output terminal of the **Slave** 0-32V/0-3A Output (Red).
23. C.C. Mode LED (Red) for the **Slave** to indicate constant current.
24. C.V. Mode LED (Green) for the **Master** to indicate constant voltage.

8.3 REAR PANEL DESCRIPTION

Refer to the Rear panel drawings and the numbers assigned to various objects on the front panel. (see page 12)

25. Heat sink for dissipating the heat of power devices.
26. Fan Ventilation (80mm 12V DC Fan).
27. Power input socket
28. Fuse holder and input line selector.
29. The input Line voltage indicator. (Refer to ▽ mark)

FRONT PANEL OF 1672



REAR PANEL OF 1672

Section 9

Maintenance

9.1 INTRODUCTION

9.2 PREVENTIVE MAINTENANCE

9.3 SERVICE INFORMATION

9.4 TEST EQUIPMENT REQUIREMENTS

9.1 INTRODUCTION

This chapter gives information about preventive maintenance and service information of the unit.

9.2 PREVENTIVE MAINTENANCE

Please follow the following preventive steps to ensure the proper operation of your instrument.

- Never place heavy objects on the instrument.
- Never place a hot soldering iron on or near the instrument.
- Never insert wires, pins or other metal object into ventilation fan.
- Never move or pull the instrument with power cord or output lead. Especially never move instrument when power cord or output lead is connected.
- Do not obstruct the ventilation holes in the rear panel. As this will increase the internal temperature.
- Do not operate the instrument with the cover removed unless you are a qualified service technician.
- Clean and recalibrate the instrument on a regular basis to keep the instrument looking nice and working well.

Remove any dirt, dust and grime whenever they become noticeable on the Outside cover with a soft cloth moistened with a mild cleaning solution.

9.3 SERVICE INFORMATION

WHEN THE UNIT IS NOT TURNING ON.

Check if the power ON/OFF switch is turned ON. If not, then check the power cord. Please make sure that the power cord is properly connected to the unit. Please also check the main switch. And ensure that the AC supply at your site is the same as the one mentioned at the rear chassis of the unit.

FUSE REPLACEMENT

If the fuse blows, the LED will not light and the instrument will not operate. Replace only with the correct value fuse. The fuse is located on the rear panel adjacent to the power cord receptacle.

Remove the fuse holder assembly as follows:

1. Unplug the power cord from rear of the instrument.
2. Insert a small screwdriver in fuse holder slot (located between fuse holder and receptacle).

When reinstalling fuse holder, be sure that the fuse is installed so that the correct line voltage is selected.

9.4

TEST EQUIPMENT REQUIREMENTS

(only required when doing a performance verification test)

The following instruments will be required to test the complete installation of the unit.

- 1). A 4½ Digit Multimeter for verifying the output voltage and current.
- 2). A 20 MHz dual channel oscilloscope for verifying the Ripple in the DC Output/s.
- 3). A Resistive load to suit the maximum output current from the unit depending on the model and capacity.
- 4). A Standard calibrated current shunt to measure the output current.



Limited One-Year Warranty

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

To obtain warranty coverage in the U.S.A., this product must be registered by completing and mailing the enclosed warranty card to B&K Precision Corp., 22820 Savi Ranch Parkway, Yorba Linda, CA 92887 within fifteen (15) days from proof of purchase.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alternations or repairs. It is void if the serial number is alternated, 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 limitation 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.

Model Number: _____

Date Purchased: _____

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