INSTRUCTION MANUAL

MANUAL DE INSTRUCCIONES

BK PRECISION®

Models 1620A/ 1621A/ 1622A/ 1623A/ 1626A/ 1627A

DC REGULATED POWER SUPPLY

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1. INTRODUCTION

The BK Precision Analog and Digital series are high quality serial control type DC Regulated Power Supplies. These models can be operated at constant voltage or constant current mode whose output can be varied from 0 up to the rated values for respective model.

It is a compact unit provided with separate voltage and current meters (Analog for 1620A, 1622A, 1626A and 3-digit LEDS for 1621A, 1623A, and 1627A series) for monitoring the output voltage and current simultaneously. In terms of operability, these units enable high precision, continuous variability via coarse and fine adjust knobs. The BK Precision Analog and Digital series can be connected in parallel with multiple units of the same model set up a "master/slave" configuration to increase the output current capability. Serial connection of multiple units can be used to increase the output voltage level.

This family of power supplies provides clean and stable DC output which is most suitable for many areas including laboratory, industrial, field service, hobby, and telecommucation applications.

2. FEATURES

- The BK Precision Analog and Digital series are constant voltage / constant current power supplies which feature excellent line and load regulations, low ripple and noise characteristics.
- The units feature separate voltage and current meters so that output voltage and current can be monitored simultaneously.
- Output voltage and current can be adjusted continuously in full range to any desired values. Adjustment can be done easily and precisely by using separate coarse and fine adjust knobs.
- The constant current circuit operates to protect against overload and output short circuit. The limiting current values can be preset in the full range of the rated values for respective model.
- Multiple units of power supplies of same family can be connected in series to provide higher output voltage.
- Multiple units of power supplies of **SAME** model can be connected in parallel (master / slave configuration) to achieve higher output current.

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3. SPECIFICATIONS

	1620A	1626A	1622A	1621A	1627A	1623A
OUTPUT VOLTAGE	0 - 18V	0 - 30V	0 - 60V	0 - 18V	0 - 30V	0 - 60V
OUTPUT CURRENT	5A	3A	1.5A	5A	3A	1.5A
CONSTANT VOLTAGE CHARACTERISTICS						
Load regulation (0-100%)	0.02% +3mV					
Line regulation (120VAC + 10 %, -6 %)	0.02% +3mV	0.02% +3mV	0.02% +3mV	0.02% +3mV	0.02% +3mV	0.02% +3mV
Ripple and noise r.m.s	1mV max.					
CONSTANT CURRENT CHARACTERISTICS						
Load regulation (0-100%)	0.02% +3mA					
Line regulation (120VAC + 10 %, -6 %)	0.02% +3mA	0.02% +3mA	0.02% +3mA	0.02% +3mA	0.02% +3mA	0.02% +3mA
OUTPUT						
Output terminals (color)	(+) Red , (–) Black , (GND) Green					
Ground proof voltage	± 180V					
INSTRUMENTATION						
Voltmeter	Analog			3 digits LEDS		
Ammeter	Analog			3 digits LEDS		
Voltmeter accuracy	± 7% fs			± 2% + 2 digits		
Ammeter accuracy	± 7% fs			± 2% + 2 digits		

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FUNCTIONS		
Serial connection (independent control mode)	Can be connected in series (within limits of ground proof voltage)	
Parallel operation (master – slave mode)	Can be operated in “one-control” parallel configuration (only same model)	
COOLING SYSTEM	Natural Convection	
POWER CONSUMPTION		
VA / W (for rated load of AC 220V)	Approximate 210	Approximate 220
AC INPUT		
Voltage , Frequency	120V AC ± 10%, 60 Hz (120/220/230/240V AC ± 10%, 50/60Hz version available)	
Operating ambient temperature	5 to 40°C 10 – 80% R.H.	
DIMENSIONS AND WEIGHT		
Dimensions (W x H x D)	205 x 115 x 270 (mm)	
Weight	Approximate 6 Kgs	Approximate 7.4 Kgs
FUSE RECOMMENDED		
Input fuse F2		
AC 100V, 110V, 120V	3AF	
AC 220V, 230V, 240V	2AF	
Internal fuse F1	500mAF	

NOTE: Specifications and information are subject to change without notice.

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4. PRECAUTIONS FOR USE

4.1 . CONFIRMING THE SUPPLY RANGE

The unit must be used within its specified range. The rated input voltage can be found on the rating table under the unit. Before plugging into the AC supply outlet, check if the input rating conforms to your local supply. For certain models, a voltage selector is available, switch the voltage selector to the correct position before use. Also, please check that you have the correct fuse inserted in the fuse box below the AC input receptacle.

4.2. PRECAUTIONS FOR CONNECTION OF OUTPUT TERMINALS

These units are a floating type power supply. For ordinary use, be sure that the **MASTER/SLAVE** switch on the rear panel is set to **MASTER** position and either the (**+**) output terminal or the (−) terminal is connected to the **GND** terminal (chassis **GND**) via the shorting bar.

⚠Warning: For model 1622A and 1623A, the maximum output voltage is up to 60Vdc. Touching the live metal part of output terminals may be hazardous. User must avoid touching the live metal part of output terminals.

4.3. OPERATING ENVIROMENT

- Be sure to use this unit within the specified ambient temperature range listed in the specification table.
- Because the unit is cooled by natural convection, do not place objects on top to block the convection. Also user must avoid placing the unit on or near any heat emitting devices or use multiple units in stacked configuration. For best results, use the unit in an environment that has good cross-ventilation.
- Altitude up to 2000M
- Installation category: CAT II
- Pollution degree: 2
- Indoor use only

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5. EXPLANATION OF PANELS

5.1 FRONT PANEL

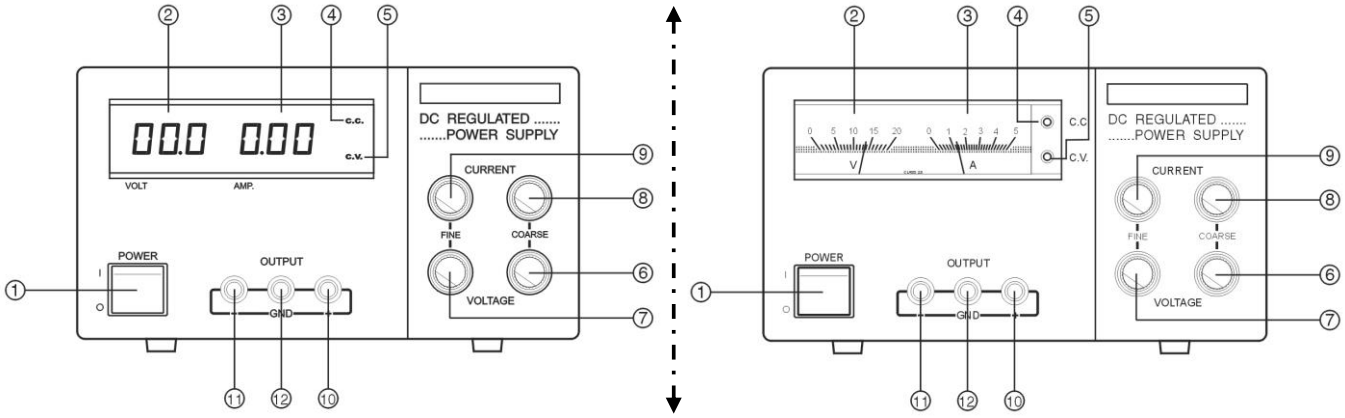

Fig. 5.1

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1. **Power switch**
   Turns the power supply **ON-OFF.** The switch will be lighted up when the unit is **ON.**

2. **DC Voltmeter**
   Indicates the present output voltage. (Analog for 162A, 1622A, 1626A and 3-digit LEDS for 1621A, 1623A, and 1627A series)

3. **DC Ammeter**
   Indicates the present output current. (Analog for 162A, 1622A, 1626A and 3-digit LEDS for 1621A, 1623A, and 1627A series)

4. **Constant current mode (C.C.) indicator**
   Indicates the power supply is operating in constant current mode.

5. **Constant voltage mode (C.V.) indicator**
   Indicates the power supply is operating in constant voltage mode.

6. **Voltage coarse adjust**
   Coarse adjust knob for the output voltage in voltage mode.

7. **Voltage fine adjust**
   Fine adjust knob for the output voltage in voltage mode.

8. **Current coarse adjust**
   Coarse adjust knob for current limiting point and current value in constant current mode.

9. **Current fine adjust**
   Fine adjust knob for current limiting point and current value in constant current mode.

10. **Output terminal positive (+)**
    Terminal for tapping of positive (+) output.

11. **Output terminal negative (–)**
    Terminal for tapping of negative (–) output.

12. **Ground terminal (GND)**
    Chassis ground terminal. Normally, this is connected to either (+) or (–) terminal depend on application.

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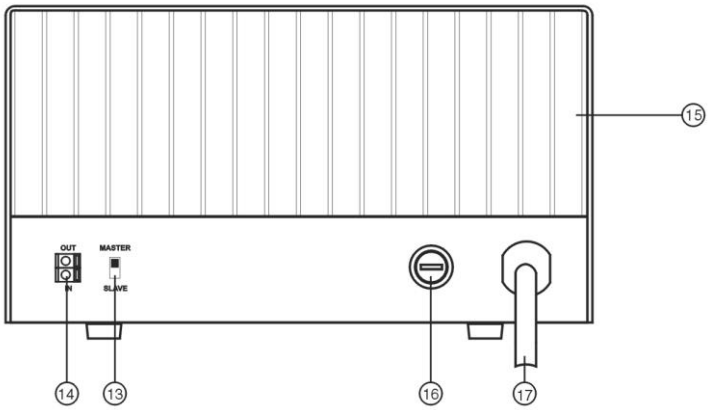
5.2 REAR



13. Master / Slave switch
Used during "master / slave control" parallel operation in **MASTER / SLAVE** configuration. For normal operation, switch should be set to **MASTER.**

14. In / out terminals for Master / Slave operation
Control terminals for use in the "**MASTER / SLAVE** control" parallel operation mode.

15. Heat sink
Heat sink for the power supply. Be careful as this area can become quite hot during operation.

16. Main Fuse

17. Power cable

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6. OPERATION PROCEDURES

6.1 . STAND-ALONE OPERATION

When using the power supply in stand-alone mode, simply operate by manipulation of the panel switches and adjustment knobs as needed.
However, be sure that **MASTER / SLAVE** switch is set to **MASTER** position.

6.2. SERIAL CONNECTION

Two or more units of the power supply can be hooked up in series to achieve higher output voltage. The resulted output will be sum of the outputs of the individual units. In this situation, however, care must be taken that the voltage of neither of the terminals with respect to the chassis GND exceed the ground proof voltage of + 180V

- **SINGLE VOLTAGE CONNECTION**

  For connection as shown in FIG.6.1, the output voltage will be the sum of individual supplies and output current will be limited to within the value specified for a single unit whichever is lower. For positive ground terminal to output positive point and for negative ground system, hook-up the ground terminal to the negative output point.

- **PLUS / MINUS CONNECTION**
  For connection as shown in FIG.6.2 where the intermediate point is hooked up to ground, the configuration can be used as Plus / Minus power supply.

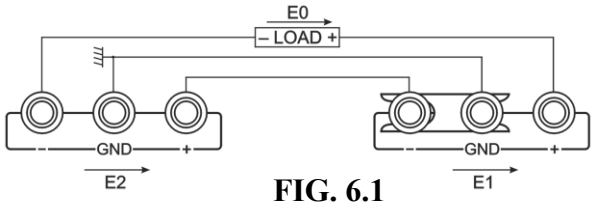

FIG. 6.1

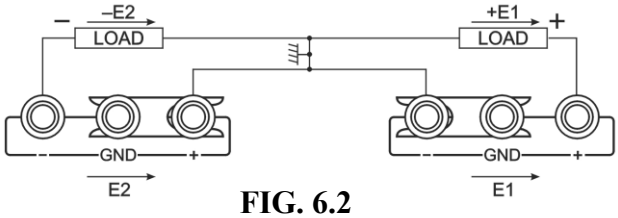

FIG. 6.2

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6.3. PARALLEL OPERATION (MASTER / SLAVE CONTROL)

Two or more units of the same model can be hooked up in parallel to give an increase in output current capacity. The total output current capacity will be the sum of the output currents of the individual units. In this mode of operation, one supply will act as the master and all settings are from the master unit

- **Note**: When connecting the supplies in parallel, be sure that all the power supplies are turned OFF.

- **HOOK-UP PROCEDURES**

  1. Switch **OFF** the power of all units.

  2. Switch the master/slave switch, **FIG.6.3**, on all the slave units from "**MASTER**" to "**SLAVE**" position.

  3. Hook-up the **IN/OUT** terminals for **MASTER/SLAVE** operation as shown in **FIG.6.3**.

  4. Connect the output terminals of each of the units to the load as shown in **FIG.6.4**. For proper performance, use all cables of same length and thickness.

  5. Set the voltage and current adjustment knobs of all the slave units to the maximum position.

  6. Switch "**ON**" the **MASTER** unit and **SLAVE** units. The output voltage and current then can be controlled to the desired value via the adjustment knobs on the **MASTER** unit.

  In the case of output goes to "0" ampere in the parallel operation mode, output voltage can no longer be controlled by the master machine.

  Be sure to keep a minimum current flowing that is at least several percent of the rated current at all time.

- **CONNECTION OF TERMINAL ON REAR PANEL**

  While pressing on the slit portion of the terminal with a small screw driver, insert the connecting cable into the round hole. When insertion is completed, release the screw driver. **(FIG.6.5)**

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FIG. 6.3

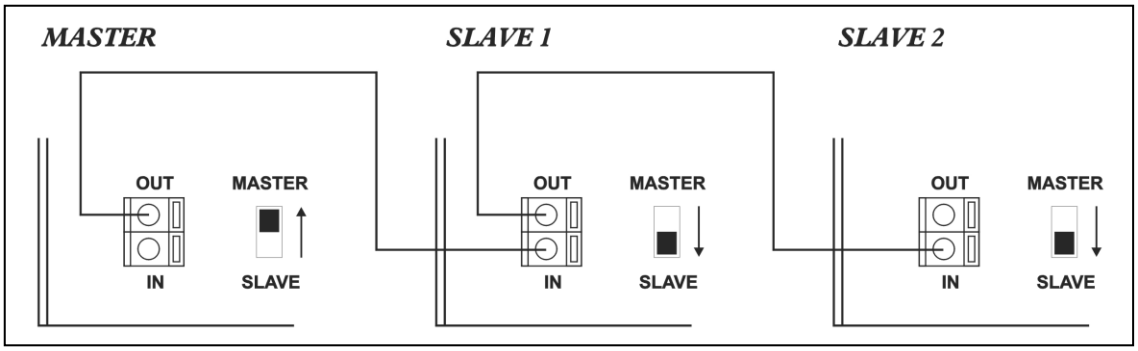


FIG. 6.4

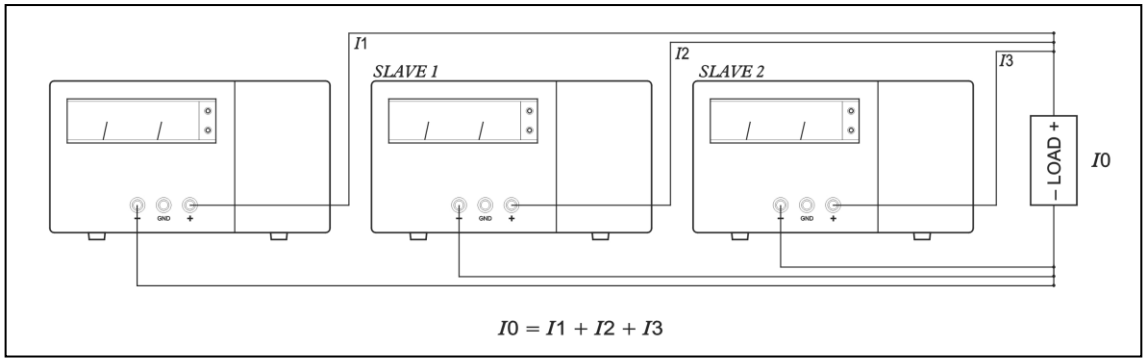
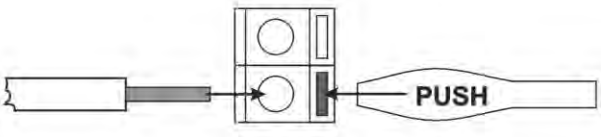


FIG. 6.5



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7. MAINTENANCE

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

7.1 MAIN FUSE REPLACEMENT

If the main fuse blows, the power on the **LED** indicator will not light and power supply will not operate. The fuse should not normally blow 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 correct rating. The fuse is located on the rear panel and fuse rating can be found next to the fuse holder. If the problem persists, return the unit to the agent for further investigation.

7.2 CALIBRATION

This unit has accurately calibrated at the factory before shipment. Re-calibration is recommended only if repairs have been made in a circuit affecting calibration accuracy, or if you have reason to believe the unit is out of calibration.

However, calibrations should be attempted only if a 3½ digit multimeter with an accuracy of +0.5% DCV or better and a 0 to 50ohm, 250 Watt adjustable resistive load is available.
If re-calibration is required, use the following procedures. Locations of the electrical calibration on the main PCB are shown in **FIG. 7.1.**

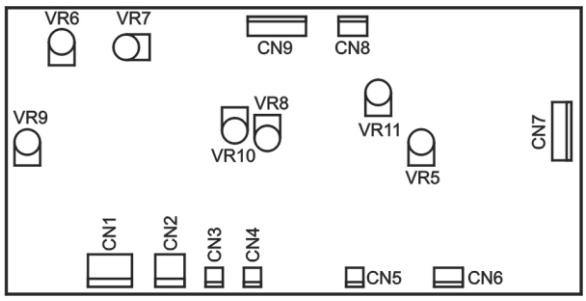

FIG. 7.1

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7.3. VOLTAGE CALIBRATION

1. Connect the multimeter to measure the DC voltage across the power supply (+) and (–) output terminals.

2. Turn on the power supply, and turn the panel **VOLTAGE** adjustment knob fully clockwise (maximum output).

3. Adjust trimmer **VR11** for a reading (Vmax. +0.5) ±0.1 volts on the multimeter. Vmax is the maximum normal output of the specific model under calibration.

7.4. VOLTAGE ALIGNMENT

1. Set the output voltage to about half the maximum allowable output for respective model.

2. Align the voltmeter reading with the multimeter reading.
   For BK Precision Analog series, adjust the trimmer **VR-6** on the main **PCB**.
   For BK Precision Digital series, adjust the trimmer **VR-1** on the back of meter **PCB**.

7.5. CURRENT CALIBRATION

1. Connect the 0 – 50ohm / 250W resistive load in series with the multimeter to measure the DC output current terminals.

2. Adjust trimmer VR-5 fully anti-clockwise (referring to the component side).

3. Adjust the output voltage to the maximum allowable output for respective model.

4. Adjust the variable resistive load to obtain (Imax +0.1) ±0.02 Ampere on the multimeter. Imax is the maximum nominal allowable output current of resistive model.

5. Adjust trimmer **VR-5** clockwise slowly until the limiting point is just reached and the C.C. LED lights up at the same time.

7.6. AMMETER ALIGNMENT

1. Adjust the output voltage to half of its maximum allowable output voltage for respective model.

2. Adjust the variable resistive load to obtain half of its maximum allowable current for respective model.

3. Align the ammeter reading with the multimeter reading.
   For BK Precision Analog series, adjust the trimmer **VR-7** on the main **PCB.**
   For BK Precision Digital series, adjust the trimmer **VR-2** on the back of meter **PCB**.

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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 three years 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 help us better serve you, please complete the warranty registration for your new instrument via our website

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.

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Service Information

Warranty Service: Please go to the support and service section on our website a 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 to the support and service section on our website at 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 prepaid 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.

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

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