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DC POWER SUPPLY

GPR-MIDDLE SERIES
(ANALOG / DIGITAL TYPE)

User Manual

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK®

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2. SPECIFICATIONS

2-1 General

Main supply: 100V/120V/220V/240V ± 10 % 50/60 Hz (Switch selectable)

Rating, dimension and weight: see Table 2-1.

Table 2-1

MODEL	Max. Rating		Input Rating		FUSE Type and Rating		Weight
	Volts (V)	Amps (A)	Watts	VA	100V/120V	220V/240V	(Kg)
GPR-1810H/1810HD	18	10	390	480	T 8A 250V	T 4A 250V	11.5
GPR-3060/3060D	30	6	360	450	T 6.3A 250V	T 3.15A 250V	11.5
GPR-6030/6030D	60	3	360	450	T 6.3A 250V	T 3.15A 250V	11.5

Dimensions: 255 (W) x 145 (H) x 335 (D) mm

Operation Mode: Single Operation, Series Operation

Operation Environment: Indoor use
Altitude up to 2000m
Installation Category II
Pollution degree 2

Operation Temperature & Humidity: 0°C to 40°C, < 80%

Storage Temperature & Humidity: -10°C to 70°C, < 70%

Accessories: Test Lead GTL-105 (current < 4A).....x1
GTL-104 (4A≤current≤10A)
Operation Manual.....x1

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2-5 Insulation

Between chassis and output terminal

20MΩ or above (DC 500V)

Between chassis and AC cord

30MΩ or above (DC 500V)

3. THEORY OF OPERATION

The power supply consists of an AC input circuit and transformer, a bias supply consisting of a rectifier and filter and reference voltage source, a main regulator circuit consisting of the main retifier and filter, a series regulator, a current comparator, a voltage comparator, a reference voltage amplifier, tag a instant over load protection circuit and a relay control circuit.

The circuit element are several of integrated circuit (U201, U202, U203, U204, U101).

The circuit arrangement is shown in block diagram from Fig. 1.

The circuit is discussed with reference to the block diagram Function Description.

Single phase input power is applied to transformer through the input circuit.

Auxiliary rectifier D102A~D provides a bias voltage filtered by capactor C103, C104 for the preregulator U101, Q101, Q102, that provides a regulator voltage for element of action.

The main retifier, a full wave bridge rectifier, provides the power which is filtered by capacitor C101, C102 and then regulated via a series regulator and deliver to the output.

U204 acted as a current limter. When current is over predominate rating, it acted and decreased the current. U201 provides a reference voltage for U202, U204. U202 is a invertor amplifier, U204 is a comparator amplifier. It's may be made comparator for reference voltage and detector feedback voltage, and then deliver to Q201, Q202, this time output voltage is calibrated.

Q204 is instant over load protection circuit, Q204 turn on when voice response load adds at instant. It controls Q201 current magnitude of I_B makes output current limited.

The relay control circuit provides limited power dissipation in series regulator.

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4. PANEL CONTROLS AND INDICATORS

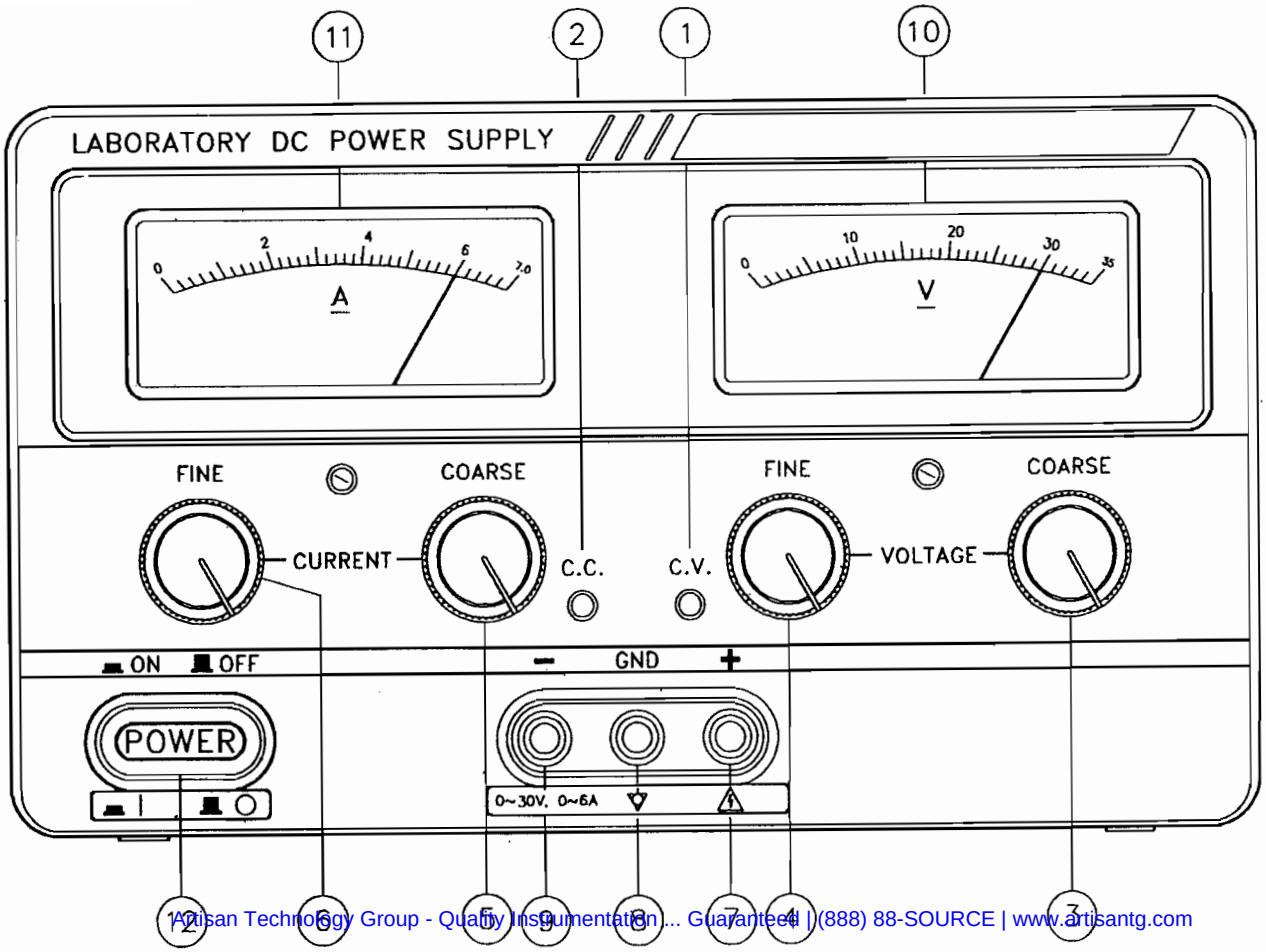
4-1 Front panel

①	CV indicator	lights when the power turn on and constant voltage operation.
②	CC indicator	lights when this unit in constant current operation.
③	Voltage coarse	for the coarse adjustment of the output voltage.
④	Voltage fine	for the fine adjustment of the output voltage.
⑤	Current coarse	for the coarse adjustment of the output current.
⑥	Current fine	for the fine adjustment of the output current.
⑦	"+" output terminal	positive polarity. (Red)
⑧	"GND" terminal	Earth and chassis ground (green).
⑨	"−" output terminal	negative polarity. (Black)
⑩	Voltmeter	indicates the output voltage (Digital panel meter or Analog meter)
⑪	Ammeter	indicates the output current (Digital panel meter or analog meter)
⑫	Power control	on/off switch.

4-2 Rear panel

⑬	Fuse holder	
⑭	Power cord	
⑮	HI-LO switch	HI position selects high voltage range (120V, 240V AC inputs), LO position selects low voltage range (100V, 220V AC inputs).
⑯	AC selects switch	With ⑮ HI-LO switch selects to permit operation from 100, 120, 220 or 240VAC, 50/60HZ line voltage.

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5. OPERATION INSTRUCTIONS

5-1 Precaution

(1) AC input

AC input should be within the range of line voltage ± 10% 50/60Hz.

⚠ WARNING. To avoid electrical shock, the power cord protective grounding conductor must be connected to ground.

(2) Installation

Avoid using the supply in a place where the ambient temperature exceeds 40℃. The heat sink located at the rear of the supply must have sufficient air space for radiation.

⚠ CAUTION. To avoid damaging the power supply, don't use it in a place where ambient temperature exceeds 40°C.

(3) Output voltage overshoot

Voltage between output terminals never exceeds the preset value when the power is turned on or off.

5-2 Setting Current Limit

(1) Determine the maximum safe current for the device to be powered.
(2) Temporarily short the (+) and (−) terminals of the power supply together with a test lead.
(3) Rotate the COARSE VOLTAGE control away from zero sufficiently for the CC indicator to light.
(4) Adjust the CURRENT control for the desired current limit. Read the current value on the Ammeter.
(5) The current limit (overload protection) has now been preset. Do not change the CURRENT control setting after this step.
(6) Remove the short between the (+) and (−) terminals and hook up for constant voltage operation.

5-3 Constant Voltage/Constant Current Characteristic

The working characteristic of this series Power Supplies is called a constant voltage/constant current automatic cross-over type. This permits continuous transition from constant current to constant voltage modes in response to the load change. The intersection of constant volatge and constant current modes is called the crossover point. Fig. 5-1 shows the relationship between this crossover point and the load.

For example, if the load is such that the power supply is operating in the constant voltage mode, a regulated output voltage is provided. The output voltage remains constant as the load increases up until the point where the preset current limit is reached. At that point, the output current becomes constant and the output voltage drops in proportion to further

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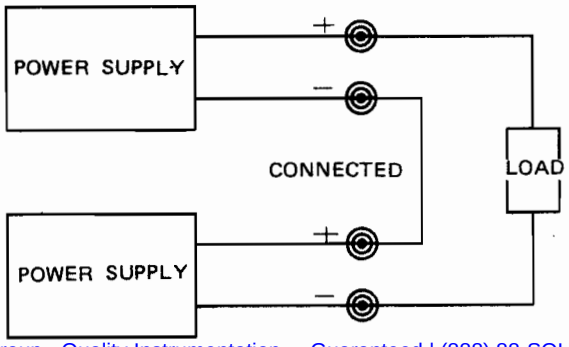
A. Set Power switch to "OFF" position.
B. Make sure that line voltage is correct for the input power voltage.
C. Plug power cord into the power outlet.
D. Set Power switch to "ON" position.
E. Adjust "Voltage" and "Current" control to the desired output voltage and current.
F. Connect the external load to the output binding posts. Make sure both "+" and "−" terminals are connected correctly.

(2) Series Operation

Two power supplies may be connected in series to provide higher voltage and rating current output. See Fig. 5-2 for the connection scheme.

When connected in series, the VOLTAGE controls of each power supply exercise control over a 0 to rating range. Add the two voltmeter readings together to determine the total output voltage, or an external voltmeter may be connected across the load.

Load current may be monitored from either supply; the readings will be identical since they are connected in series. Also, since the supplies are connected in series, it is only necessary to set the current limit on one of the supplies; the other may be set for maximum.



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Fig. 5-2 Connecting Two Power Supplies in Series.

If readjustment is required, use the following procedure. Locations of the adjustments are shown in Fig. 6-1 and FIG. 6-2.

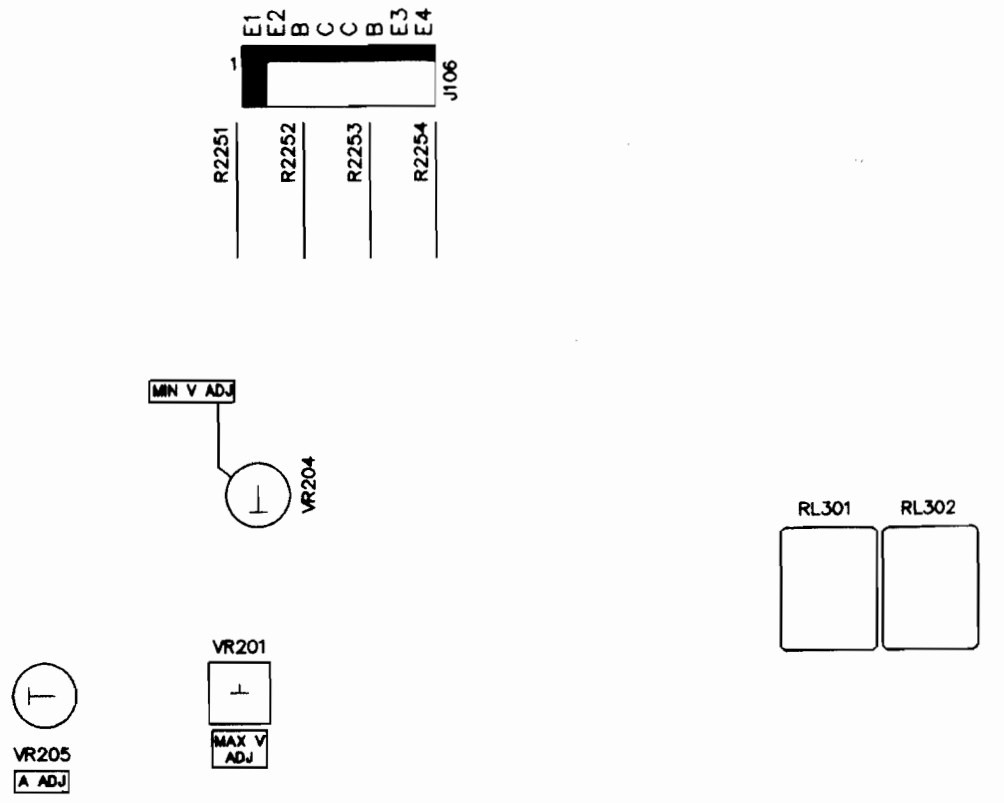
(1) Adjustment of the Rating Voltage
   A. Connect an accurate (±0.1%) external multimeter to measure the de voltage at output terminals of the power supply.
   B. Set the COARSE and FINE VOLTAGE controls to minimum (fully counterclockwise).
   C. Adjust trimmer pot VR204 for a reading of 0 volts on the multimeter.
   D. Turn the COARSE and FINE VOLTAGE controls to maximum (fully clockwise).
   E. Adjust trimmer pot VR201 for a reading of rate volts x1.05 on the multimeter.
   F. Set the COARSE and FINE VOLTAGE controls for a reading of rate volts on the multimeter.
   G. Adjust trimmer pot VR207 (VR201 digital type) for a reading of rate volts on the volt meter (Digital Panel meter, digital type) of the power supply.

(2) Adjustment of the Rating Current
   A. Set the CURRENT control to minimum (fully counterclockwise).
   B. Connect the external multimeter to measure de current at the output terminals of the power supply.
   C. Set the COARSE and FINE CURRENT controls to minimum (fully counterclockwise).
   D. Adjust trimmer pot VR301 for reading of 0 amps on the multimeter.
   E. Set the COARSE and FINE VOLTAGE controls to a centered position.
   F. Setting and turn the COARSE and FINE CURRENT controls to maximum (fully clockwise).
   G. Adjust trimmer pot VR205 for a reading of rate amps x 1.05 on the multimeter.
   H. Readjust the CURRENT control for a reading of rate amps on the multimeter.
   I. Adjust trimmer pot VR208 (VR202 digital type) to calibrate the Ammeter (Digital panel meter, digital type) of the power supply for the same reading as the multimeter.

6.4 Cleaning

To clean the power supply,use a soft cloth dampened in a solution of mild detergent and water. Do not spray cleaner directly onto the instrument, since it may leak into the cabinet and cause damage. Do not use chemicals containing benzine, benzene, toluene, xylene, acetone, or similar solvents. Do not use abrasive cleaners on any portion of the instrument.

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FIG. 6-2

EC Declaration of Conformity

We

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(2) Plot 522, Lorong Perusahaan Baru 3, Prai Industrial Estate, 13600 Prai, Penang, Malaysia

declare under sole responsibility that

(a) GPR-1810H **(c) GPR-3060** **(e) GPR-6030D**

(b) GPR-1810HD **(d) GPR-3060D**

meets the intent of Directive 89/336/EEC ; 92/31/EEC ; 93/68/EEC for Electromagnetic Compatibility .

Compliance was demonstrated to the following specifications as listed in the industrial Technology Research institute :

EN50081-1: Electromagnetic compatibility - **(1992)** Generic emission standard Part 1: Residential, commercial and light industry			**EN50082-1:** Electromagnetic compatibility - **(1992)** Generic immunity standard Part 1: Residential, commercial and light industry		
Conducted Emission Radiated Emission	EN 55022	class B (1994)	Electrostatic Discharge	IEC 1000-4-2	(1995)
			Radiated Immunity	EN 61000-4-3	(1995)
Current Harmonics	EN 61000-3-2	(1995)	Electrical Fast Transients	IEC 1000-4-4	(1995)
Voltage Fluctuations	EN 61000-3-3	(1995)	Surge Immunity	IEC 1000-4-5	(1995)
Low Voltage Directive	EN 61010-1	(1993)	Voltage Dip/Interruption	EN 61000-4-11	(1994)

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