

## Regulated DC Power Supplies

# PS SERIES

6V/60A

**PS6-60**

10V/35A

**PS10-35**

20V/18A

**PS20-18**

20V/54A

**PS20-54**

36V/10A

**PS36-10**

36V/30A

**PS36-30**

60V/6A

**PS60-6**

60V/18A

**PS60-18**

6V/120A

**PS6-120**

10V/70A

**PS10-70**

20V/36A

**PS20-36**

36V/20A

**PS36-20**

60V/12A

**PS60-12**

### OUTLINE

The PS Series power supplies are DC constant-voltage (CV), constant-current (CC) power supplies based on the variable switching method, featuring compact size, light weight, excellent reliability and the variable outputs. They have been designed as highly universal stand-alone type models putting emphasis on the ease of operation and safety and equipped with a variety of protection functions. The capability to extend the capacity on a per-power unit basis makes these power supplies suitable for rack mounting and incorporation in other devices. Three capacity types are available including 360W, 720W, and 1080W and 13 kinds of variations are available by combining ranges of 0 to 6 V, 10 V, 20 V, 36 V and 60 V. Several versatile applications are also provided including remote control functions with GP-IB control capability (which is possible when the optional GP-600 is used.)

### FEATURES

Compact Size, Light Weight, High Efficiency

Thanks to the advanced switching method, the PS Series power supplies are both compact and light, with less than half the mass and volume of previous power supply models, resulting in an excellent space factor and high efficiency



## PS SERIES

### .Digital Display of Voltage and Current

Output voltage and current are indicated on 7-segment red LED displays to allow easy checking.

### GP-IB System Compatibility

In addition to the output voltage and current control capabilities and status signal outputs, the output on/off, power on/off control and remote/local switches are provided. The GP-IB control is also possible optionally (when the optional GP-600 is combined.)

### Wide Applications

Control operations include control by an external voltage or resistance of the output voltage and current.

### Low Noise

The temperature-sensitive fan motor reduces the rotation speed when the load is light or the ambient temperature is low to prevent noise.

### Front Air Intake

The forced air cooling system intakes air through the front panel and increases the packing density in case the power supply is mounted in a device or rack. The front grill incorporate an air filter to improve dust protection.

### Compatibility with Current Capacity Extension

The current capacity of the PS Series power supplies can be extended. When the current capacity of a power supply is insufficient, the current capacity can be extended using factory options, within the range of PS standard products.

## Safety

### (Fail-Safe Function)

For safety, the switching operation is stopped (output off status) and the AC power relay is interrupted while a protection function is operating.

#### Output over-voltage protection (OVP)

When the output voltage exceeds the OVP setting value, the switching operation (oscillation) is stopped and the output is turned off.

#### Output over-current protection (OCP)

Increase in the output current to 110% or more of the rated current is detected by a protection circuit, which stops the switching operation and interrupts the AC power relay.

#### Over-heat protection (OHP)

When the heat sink temperature reaches about 100 °C, the switching operation is stopped and the AC power relay is interrupted.

#### Input power abnormality protection

In case of input over-voltage, input voltage drop or an over-current due to internal abnormality, the switching operation is stopped and the output is turned off.

#### Alarm (power abnormality) signal

When the output over-current, input over-voltage or input over-current is detected, when the over-heat protection circuit is activated or when the power is switched off, an alarm signal is generated to turn the output off and interrupt the AC power relay.

#### Power relay off signal

When trouble occurs on the user side, etc., the power relay is interrupted by an external signal.

#### (Rush current protection circuit)

The rush current protection circuit is activated at the moment of the power is switched on to reduce the input surge current.



PS6-60  
PS10-35  
PS20-18  
PS36-10  
PS60-6



PS6-120  
PS10-70  
PS20-36  
PS36-20  
PS60-12



PS20-54  
PS36-30  
PS60-18

# REGULATED DC POWER SUPPLIES

Function		
Switch	Mode	Description
S1	POWER SELECT	Remote/local switching of AV power relay on/off.
	OUTPUT SELECT	Remote/local switching of output on/off.
	OUTPUT SELECT	Switching for fixing output to on.
	CV.CONTROL SELECT	Remote/local switching of output voltage, voltage/resistance mode selection for remote control. Control by an external voltage Control by an external resistance (Normal mode) Control by an external resistance (Fail-safe mode)
	CC.CONTROL SELECT	Remote/local switching of output current, voltage/resistance mode selection for remote control. Control by an external voltage Control by an external resistance (Normal mode) [ Control by an external resistance (Fail-safe mode)]
	REMOTE SENSING	Compensation for the resistance due to load lines, and the voltage drop or stability degradation due to contact resistance.

The PS Series control functions are implemented according to rear panel control switch S1 and terminals J1 and J2. The specification inside 【 】 is possible by special order.

## OVP Presetting

Pressing the OVP switch displays the OVP (Over Voltage Protector) trip voltage on the voltmeter. This lets you perform setting and verification without interrupting operation, even while the output is on.

## Digital Display

A bright, easy-to-read red LED shows the voltage and current simultaneously. The voltage can be measured in 3-1/2 digits (auto-ranging) with a maximum display resolution of 10 mV with all models. The current can be measured in 3-1/2 digits (auto-ranging) with a maximum display resolution of 10 mA with models with rated currents below 50 A, and in 3-1/2 digits with a maximum display resolution of 100 mA with models with rated currents of 50 A or more (3-digit, 1 A resolution with the PS10-210).

## Output Switch

The output switch uses an electronic switch system to eliminate chattering or noise. The switch is set automatically to off when power is switched on so that unexpected output is not produced. The output can be fixed to on or the output on/off switching can be remote controlled with an external signal according to the DIP switch selection.

## Limit Switch

Pressing the LIMIT switch displays the constant voltage setting value on the voltmeter and the constant current setting value (current limiting value) on the ammeter. This makes setting and verification possible without interruption, even while the output is on.

## Power Switch

To enhance the safety of the power supply, the protect function based on an AC power relay is provided separately from the power switch. The AC power relay can be turned on/off from a external signal while leaving the power switch in the on position.

## Applications

Reliability testing of electronic parts. Semiconductor aging systems. Durability testing of rotary and drive equipment. Operation testing of HIC, etc. Testing of board, packaging unit or electrical parts. Alternative to a battery. Secondary battery testing. Production or plating of electrolytic capacitors. LCD aging systems.

GP-IB Adaptor for expanding the PS Series to a GP-IB System, with 12 bits 4 built-in D/As.

GP-IB Adaptor for PS Series Power Supplies

## GP-600

### 【GP-600 Specifications】

#### GP-IB

##### Electrical specifications

: conforms to IEEE488.1-1978

##### Mechanical specifications

: conforms to IEEE488.1-1978

##### Interface function

: SH1, AH1, T6, L3, SR1, RL1, PP0, DC1, DT1, C0

Address : Addresses 0 to 30 can be set using an address switch.

##### Listen-only mode

: Can be set with L-ONLY switch

##### Transmission delimiter selection

: Can be set with the EOL/CRLF switch

##### Output on/off function:

: Output can be off by manually with the OUTPUT OFF key.

##### Service request function

: GP-IB command error, GP-IB parameter error, OVP function and alarm functions (OCP, OTP and POWER cut), CV function, CC function and OUTPUT OFF key

##### Analog Output

##### Output voltage range

: 0 to +10V (A, B Output/CH1)

: 0 to +10V (C, D Output/CH2)

##### Full scale voltage range

: +10V  $\pm$  15% (A, B Output/CH1)

: +10V  $\pm$  15% (C, D Output/CH2)

##### Maximum output current

: 3mA (A, B Output/CH1)

: 3mA (C, D Output/CH2)

##### D/A converter resolution

12bit, 0.025% (2.4mV) (A, B Output/CH1)

12bit, 0.025% (2.4mV) (C, D Output/CH2)

##### Setting accuracy

: 0.0275% (A, B Output/CH1)

: 0.0275% (C, D Output/CH2)

##### Output ripple (10Hz to 1MHz)

: 300 $\mu$ Vrms (A, B Output/CH1)

: 300 $\mu$ Vrms (C, D Output/CH2)

##### Supply voltage regulation ( $\pm$ 10% fluctuate)

: 1.5mV (A, B Output/CH1)

: 1.5mV (C, D Output/CH2)

##### Temperature coefficient

: 50ppm/°C (Typ) (A, B Output/CH1)

: 50ppm/°C (Typ) (C, D Output/CH2)



Rise time (10 to 90%, 10k $\Omega$  load)  
: 100 $\mu$ s or less (A, B Output/CH1)  
: 100 $\mu$ s or less (C, D Output/CH2)

##### Digital I/O

##### Control signal

##### Output ON/OFF

: TTL level Low (ON)/High (OFF)

Power • Relay ON/OFF

: TTL level Low (ON)/High (OFF)

##### Status signal

##### CV function (SRQ)

: TTL level Low (CV)/High (no change)

##### CC function (SRQ)

: TTL level Low (CC)/High (no change)

##### Alarm ON (SRQ)

: TTL level Low (ON)/High

Power ON/OFF : Low (ON)

OVP ON (SRQ) : Low (ON)

Temperature/humidity for characteristics

in spec. : 0°C to 40°C, 80% or less

##### Power source

: 100V  $\pm$  10%, 120V/220V/240V

(250V/max) AC,

(internally switchable)

##### Power consumption

: 10W

##### Case dimensions

: 70 (W)  $\times$  124 (H)  $\times$  351 (D)

Weight : 2.5kg

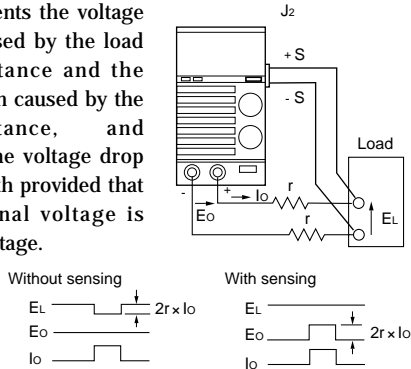
Accessories : Instruction manual  $\times$  1

20pin flat cable  $\times$  2

## Applications - Remote Control Operations

## Remote Sensing

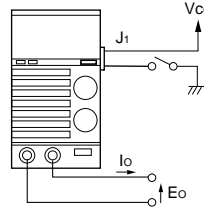
This function prevents the voltage drop which is caused by the load connection resistance and the stability degradation caused by the contact resistance, and compensates for the voltage drop of up to 1 V per path provided that the output terminal voltage is within the rated voltage.



## Output ON/OFF Control

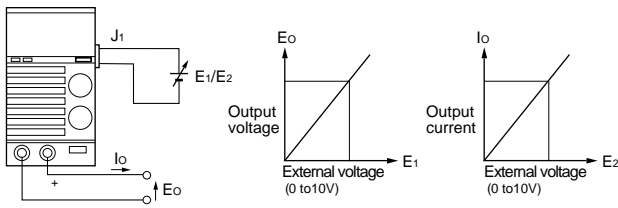
Control item	Control signal	Input Common
Output	ON	Photo diode ON
	OFF	Photo diode OFF
		Floating (Community common)

The output can be turned on/off with an external signal. The output can also be fixed to on while power is on.



## Control by an External Voltage of Output Voltage and Current

Control item	Control Voltage	Input impedance	Input Common
Output voltage	0 to Approx. 10V	Approx. 10k	+S terminal
Output current	0 to Approx. 10V	Approx. 10k	+S terminal



## Functions for system power supply

	Items	Control contents	Input control signal	In/Out Common	Connector
Input signal	Output voltage	Output voltage	0 to 10V/0 to 10k , to 0	+ S terminal	J <sub>1</sub>
	Output current	Output current	0 to 10V/0 to 10k , to 0	+ S terminal	J <sub>1</sub>
	Output ON/OFF	Output ON	Photo diode ON	Floating(Community common)	J <sub>1</sub>
	Power ON/OFF	AC power relay ON	Photo diode ON	Floating(Community common)	J <sub>1</sub>
Output signal	CV. mode signal	At CV operation	Photo transistor ON	Floating(Community common)	J <sub>1</sub>
	CC.mode signal	At CC operation	Photo transistor ON	Floating(Community common)	J <sub>1</sub>
	Power on signal	At power on	Photo transistor ON	Floating(Community common)	J <sub>1</sub>
	OVP signal	At OVP operation	Photo transistor ON	Floating(Community common)	J <sub>1</sub>
	Alarm signal	At OCP, OHP operation, power off	Photo transistor ON	Floating(Community common)	J <sub>1</sub> /J <sub>2</sub>
	Output voltage monitor	For output 0V to rated voltage	0V to 1/10 × rated voltage	+ S terminal	J <sub>2</sub>
	Output current monitor	For output 0A to rated current	0V to 10V	+ S terminal	J <sub>2</sub>

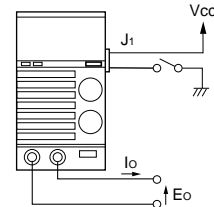
\* Each of the Floating (Common) input/output signals passes through a photo coupler and uses a diode input and open collector output. Their common terminal is common.

\* The alarm signal is also output during the operation of the input current protection circuit or input over-voltage protection circuit.

## AC Power ON/OFF Control

Control item	Control signal	Input Common
AC power relay	ON	Photo diode ON
	OFF	Photo diode OFF
		Floating (Community common)

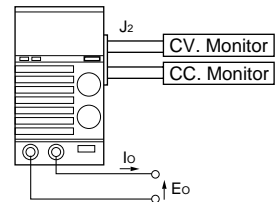
The power protection device (AC power relay) can be controlled on/off from an external signal (provided that the power switch is on).



## CV/CC Monitoring

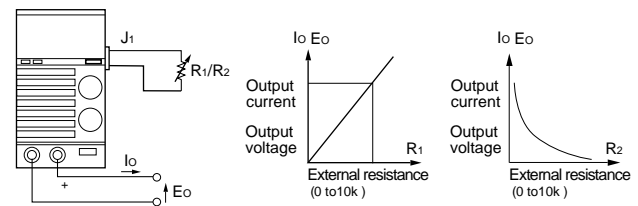
A monitoring output from about 0 V to 1/10 the rated voltage can be output with respect to the output voltage from 0 V to the rated voltage.

A monitoring output from about 0 V to 10 V can be output with respect to the output current from 0 A to the rated current.



## Control by an External resistance of Output Voltage and Current

Cont. item	Control Resistance		Current flowing a resistance	Input Common
	Normal	Fail safe		
Output voltage	0 to approx.10kΩ	to 0	Approx. 1mA or less	+S terminal
Output current	0 to approx.10kΩ	to 0	Approx. 1mA or less	+S terminal



# REGULATED DC POWER SUPPLIES

## SPECIFICATIONS

Model	Output		Ripple*	CV (constant-voltage) characteristic			
	CV	CC		Line regulation	Load regulation	Transient response**	Rise time/ Fall time
	V	A		mV rms	0.05% + mV	0.1% + mV	m sec
PS6-60	0 to 6	0 to 60	10	5	5	1	80/150
PS6-120		0 to 120				2	
PS10-35	0 to 10	0 to 35	10	5	5	1	80/150
PS10-70		0 to 70				2	
PS20-18	0 to 20	0 to 18	10	5	5	1	80/150
PS20-36		0 to 36				2	
PS20-54		0 to 54	15				
PS36-10	0 to 36	0 to 10	10	5	5	1	80/150
PS36-20		0 to 20				2	
PS36-30		0 to 30	15				
PS60-6	0 to 60	0 to 6	10	5	5	1	80/150
PS60-12		0 to 12	15			2	
PS60-18		0 to 18	20				

## Common Specifications

Power source ..... 85 to 132V /170 to 250V  
AC 50 to 60Hz

### Display instruments

#### Voltmeter

Display ..... 3-1/2 digits red LED  
Accuracy ..... 0.1%rdg ± 2digits (23 ± 5 )  
Temperature coefficient ... ± 100ppm/ (0 to 50 )

#### Ammeter

Display ..... 3-1/2 digits red LED  
Accuracy ..... 0.5%rdg ± 3digits (23 ± 5 )  
Temperature coefficient ... ± 200ppm/ (0 to 50 )

### Protection

Overvoltage protection ... The power relay is tripped when the output voltage is exceeded by approx. 110% of the rated voltage.

Overcurrent protection ... The power relay is tripped when the output current is approx. 110% to 130% of the rated current.

Overheating Protection ... The power relay is tripped when the temperature of the heat sink is approx. 100 ± 5 °C or more.

Thermal fuse ..... Built-in thermal fuse

Input fuse ..... Cut off the power relay

### Environmental condition

#### Temperature/humidity

for operation ..... 0 to 50 /30 to 80%RH

#### Temperature/humidity

for storage ..... - 20 to 70 /20 to 80%RH

Cooling system ..... Forced air (fan), front air intake type.

Functions ..... Automatic output switch resetting, voltage/current limit switch, preset OVP

### Case dimensions

Type I ..... 70 (W) × 124 (H) × 350.5 (D) mm

Type II ..... 140 (W) × 124 (H) × 350.5 (D) mm

Type III ..... 210 (W) × 124 (H) × 350.5 (D) mm

Accessories ..... 2.5m AC cable × 1

## PS SERIES

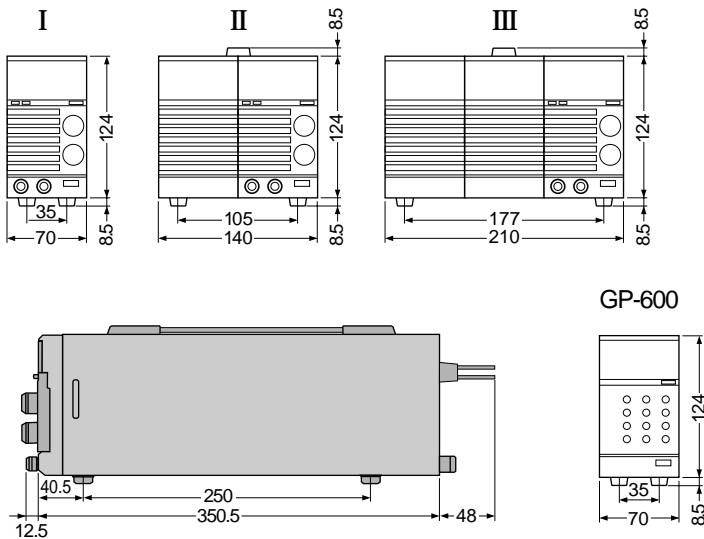
CC (constant-current) characteristic				Others		
Ripple***	Line regulation	Load regulation	Input Current	Case dimensions	Weight	
mA rms	0.2% + mA	0.2% + mA	AC (100/200V)A	Type	kg (approx.)	
120	5	5	8/5	I	3.0	
260	10	10	16/10	II	5.5	
70	5	5	8/5	I	3.0	
160	10	10	15/9	II	5.5	
40	5	5	8/5	I	3.0	
92	10	10	15/9	II	5.5	
120	15	15	22/13	III	7.0	
20	5	5	8/5	I	3.0	
60	10	10	15/9	II	5.5	
80	15	15	22/13	III	7.0	
12	5	5	8/5	I	3.0	
44	10	10	15/9	II	5.5	
55	15	15	22/13	III	7.0	

\*1: Between 20 Hz and 1 MHz.

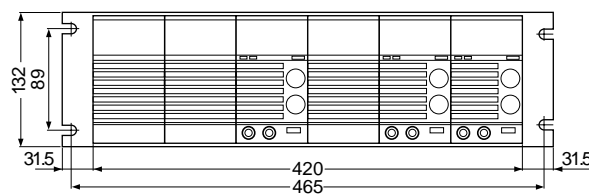
\*2: The time taken by the output voltage to return to within 0.1% +10 mV of the set value when the output current is varied from 20% to 100% at 50% to 100% of the rated output voltage.

\*3: Measured when the output voltage is between 1% and 100% of the rated voltage.

Figure of Case dimensions



■ RACK for PS series  
RK-600E (EIA)



■ Blank panel

RB-600A (1/2 rack width)

RB-600B (1/3 rack width)

RB-600C (1/6 rack width)