Multiple-output Regulated DC Power Supplies
PW-A SERIES

4-Output power supply
PW18-1.8AQ
(+18V/1.8A, −18V/1.8A, +8V/2A, −6V/1A)

3-Output power supply
PW18-1.3AT
(+18V/1.3A, −18V/1.3A, 6V/5A)

3-Output power supply
PW18-2ATP
(+36V/1A, +18V/2A, 8V/2A)

2-Output power supply
PW18-3AD
(+18V/3A, −18V/3A)

2-Output power supply
PW36-1.5AD
(+36V/1.5A, −36V/1.5A)

2-Output power supply
PW18-3ADP
(+18V/3A, +18V/3A)

OUTLINE

The PW-A Series are multi-output tracking CV/CC power supplies featuring a built-in microcomputer and excellent reliability. PW-A Series provides a multi output and a great function, and can be used from the development to the manufacturing by mounting the interface (factory option) for computer-controlled. There are two kinds of interfaces for computer-controlled, and corresponds to a full remote with listener and talker function. IF-40GU can be controlled with GP-IB or USB, and IF-40RS can be controlled with RS-232C.

USB OPTION **RS-232C OPTION** **GP-IB OPTION**

PW-A SERIES

FATURES

One-Dial Control
All setting conditions are selected at the single rotary-encoder. Speedy setting is available to select the figures by the digit-key. Output voltage and current can be set to resolutions of 10mV at 18V/ 36V output, 1mV at 6V/8V output and 1mA.

Tracking
Output voltage and current value of positive and negative can be adjusted from zero at the same time by the absolute value tracking. And adjusting plus % and minus % value based on a certain voltage and current value is possible. The trucking function can be disabled for individual adjusting of positive and negative value.

4 Points Pair Presetting of Voltage and Current Value
Four sets of frequency used voltage and current can be preset. (V-A pairs) It is possible to quick set-up. A variable adjustment is also available.

ON/OFF Delay Time
Delay-time can be set in each output. For multiple-output power supply, When multiple-output is turned on or off at the same time, the equipment is occasionally damaged. For this, the time of on and off of a specific output can be delayed.

Output Selection
On and off of each output can be selected and set besides the main output key.

Key Lock
A key lock function provides to hold all setting values excepting power switch. It prevents the miss-operation.

Limit & Status
The output voltage and current values can be confirmed by the limit-key. The trucking of each output and the condition of delay setting can be confirmed by the status-key.

Various External Controls
ON/OFF of main output, selection of PRESET1-4 and makes to the alarm and a main output is turned off.

Overheating Protection
When the exhaust temperature enters the state of overheating, the alarm signal is output and a main output is turned off. When the alarm signal is output in case of one of several systems, all main outputs are automatically turned off. Maximum 5 sets can be connected.

Heat Radiation Method
Rotation speed of the fun is proportion to the temperature of exhaust air. It was considered to the noise.

REMOTE CONTROL

**Control by USB and GP-IB Interface card IF-40GU**
USB Remote Control
GP-IB/USB Interface Card (IF-40GU) is built in the PW-A series and connects with the PC by the USB cable via hub. The number that can be directly connected with the PC is up to 32 sets. (The hub is excluded.)
A power supply connected with the PC becomes a local bus master set, and the local bus master set can be connected with up to 31 slave sets. The power supply that can be controlled with this USB remote control is only PW-A series.
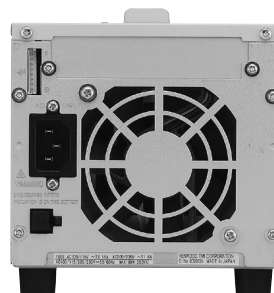
System-1
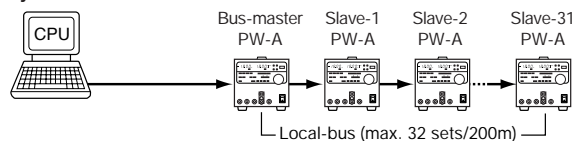
System-2
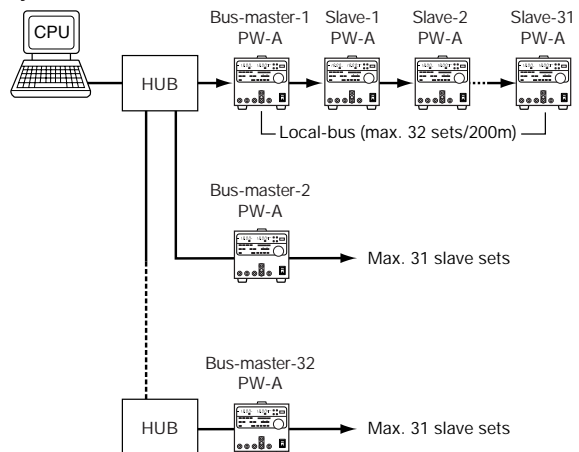
Note: Twist cable as follow must be used to connect at USB control.
● Single cable: ϕ 0.4 to ϕ 1.2
● Twist cable: 0.3mm^2 to 1.2mm^2/AWG 16 to 22 (Diameter of single cable: ϕ 0.18)
● Impedance: 50 Ω or less

Characteristic

IF-40GU satisfies the Universal Serial Bus specification revision 1.0, and operates asynchronously.

Transfer rate is corresponded to 12Mbps of full speed. It is not necessary to build in the USB interface board to PC because the USB interface is standard function. It is corresponded to a plug and play hot plug. It is possible to connect maximum 127 sets including the hub. The PW-A power supply can be connected maximum 32 sets. (The number might not be able to be guaranteed with the hub.)

Composition
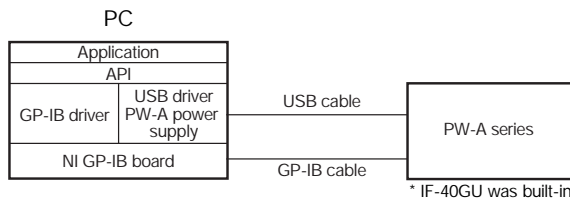
Operation environment

Supported OS: Microsoft Windows 98/2000/ME

API is the DLL form and offered by Kenwood TMI Corp. The language can be used VB, VBA (EXCEL), and VC++(C,C++) when the application is made with API. (DLL is supported. But the method of the programming and the debugging cannot be supported.)

The USB cable is a not accessory.

GP-IB Remote Control

GP-IB/USB Interface Card (IF-40GU) is built in the PW-A series and connects with the PC directly by the GP-IB cable. The number that can be directly connected with the PC is up to 14 sets.

A power supply connected with the PC becomes a local bus master set, and the local bus master set can be connected with up to 31 slave sets. The PW-A series correspond to the wide usage as a programmable power supply by the listener/talker function to read the function setting, output voltage and output current.
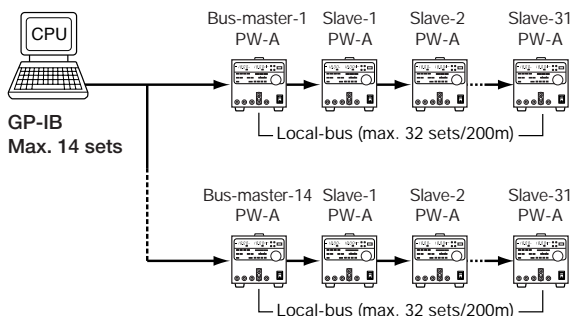
Operation environment

The GP-IB card and the driver that operates NI488.2 software and made of the national instruments are recommended.

Does not operate excluding made of the national instruments when API is used.

Control by RS-232C Interface card IF-40RS

RS-232C Remote Control

RS-232C Interface Card (IF-40RS) is built in the PW-A series and connects with the PC by the RS-232C cable. It is possible to operate as a programmable power supply with the listener and talker function.

The number that can be controlled with the PC is up to 4 sets.
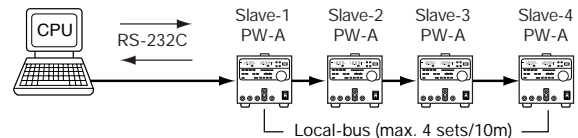
Note:
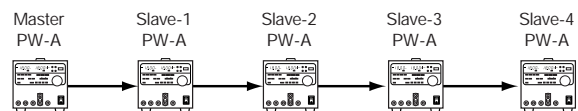Connection with PC and slave set: Modular cable made by Kenwood TMI is recommended. (Option)

Master Operation

One Control Operation

A power supply which builds in the RS-232C Interface Card (IF-40RS) becomes a master set, and the master set can be connected with up to 4 slave sets.

● Master and slave sets are limited to the same model.
● When the master operation is started, the slave sets enter a remote state and can not operate the front panel.

Note:
Connection with PC and slave set: Modular cable made by Kenwood TMI is recommended. (Option)

Interface

Two kind of interface boards which could be built in the PW-A series power supply to be controlled with the PC were prepared by the option. One is the IF-40GU witch can be controlled by GP-IB and USB, and other one is IF-40RS witch can be controlled by RS-232C.

It is possible to operate as an intelligent power supply system with the listener and talker function.

■ IF-40GU GP-IB and USB interface card
GP-IB part
● Specifications: Complied with the IEEE488-1978
● Connection with PC: GP-IB cable (CB-2420P made by Kenwood TMI is recommended)
● GP-IB board: Made of National-instrument AT-GPIB/TNT or PCMCIA-GPIB is recommended
  USB part
● Specifications: Complied with USB Revision 1.1
● Connector: USB series B
● Transfer rate: Full speed

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■ IF-40RS RS-232C interface card
● Communication condition: Format:7-bit, Even parity, Stop bit 1
● Communication speed: 9600 bps
● Connection with PC: RS-232C cable (general cross cable) or modular cable with TA-60
　D-sub modular conversion connector made by Kenwood TMI is recommended
Note: IF-40RS is recommended when control together with the PWR series power supply.

Control Contents

Control item	GP-IB control	USB control	RS-232C control	Master operation
Listener function				
Output voltage setting (PRESET/VARIABLE)	○	○	○	○
Output current setting (PRESET/VARIABLE)	○	○	○	○
Tracking function, ON/OFF setting	○	○	○	
Tracking output selection	○	○	○	
Tracking mode setting (Absolute value, %)	○	○	○	
Tracking voltage and current value setting	○	○	○	
ON/OFF of main output	○	○	○	○
ON/OFF of output selection	○	○	○	○
ON/OFF of output delay function	○	○	○	○
DELAY TIME setting	○	○	○	○
Indicate content selection of voltage and current LED	○	○	○	○
Pre-setting selection (1 to 4)	○	○	○	○
LOCAL setting	○	○	○	
LOCAL lock out setting	○	○	○	
Prohibit and permit setting of SRQ	○	○	○	
Saving of setting data (PRESET 1 to 4)	○	○	○	
Status				
Output request of voltage and current value	○	○	○	
Output request of CV/CC operation mode	○	○	○	
Output request of all pre-set contents	○	○	○	
Output request of all situation	○	○	○	
Output request of ID information	○	○	○	
Talker function				
Voltage and current value output	○	○	○	
CV/CC operation mode output	○	○	○	
All pre-set contents output	○	○	○	
All situation output	○	○	○	
ID information output	○	○	○	
Service request				
CV/CC operation mode monitoring	○	○	○	
Alarm condition monitoring	○	○	○	

Note: Master and slave sets are limited to the same model in the master operation.

PW-A SERIES

MULTIPLE-OUTPUT REGULATED DC POWER SUPPLIES

REGULATED DC POWER SUPPLIES

SPECIFICATIONS

Model	4-Outpu PW18-1.8AQ	3-Output PW18-1.3AT	2-Output PW18-3AD
Output voltage/current	+18V/1.8A −18V/1.8A +8V/2A −6V/−1A	+18V/1.3A −18V/1.3A 6V/5A	+18V/3A −18V/3A
Voltage			
Setting resolution	10mV (+18V, −18V output) 1mV (+8V, −6V output)	10m V (+18V, −18V output) 1mV (6V output)	
CV setting accuracy	± (0.5% of SET+20mV) : +36V, −36V, +18V, −18V output ± (0.5% of SET+5mV) : +8V, −6V, 8V, 6V output at 23℃±5℃ (After aging of 30 minutes)		
Tracking	Each output		
Current			
Setting resolution	1mA		
CC setting accuracy	± (1% of set+5mA) : 23℃±5℃ (After aging of 30 minutes)		
Tracking	Each output		
Voltage regulation characteristics			
Line regulation (with respect to 10% variation in AC)	1mV		
Load regulation (with respect to change from 0 to100%)	2mV	2mV (+18V, −18V output) 5mV (6V output)	
Repple noise (5Hz to 10MHz)	0.5mVrms		
Transient response	50us（Typ)		
Temperature coefficient	60ppm/℃		
Current regulation characteristics			
Line regulation (with respect to 10% variation in AC)	2mA		
Load regulation (with respect to change from 0 to 100%)	5mA		
Repple noise (5Hz to 10MHz)	1.5mArms	1.5mArms (+18V, −18V output) 4mArms (6V output)	
Temperature coefficient	150ppm/℃		
Voltmeter/Ammeter			
Voltmeter	4 digits, red LED		
Minimum display	10mV (+18V, −18V output) 1mV (+8V, −6V output)	10mV (+18V, −18V output) 1mV (6V output)	
Accuracy 23℃±5℃ (After aging of 30 minutes）	± (0.5%rdg +20mV) : +18V, −18V output, ± (0.5%rdg＋5mA) : +8V, −6Voutput	± (0.5%rdg +20mV) : +18V, −18V output, ± (0.5%rdg＋5mA) : 6V output	
Ammeter	4 digits, red LED		
Minimum display	1mA		
Accuracy 23℃±5℃ (After aging of 30 minutes）	± (1%rdg +5mA)		
Functions			
MAIN OUTPUT	Output on/off switch, but can not be switch on when the MEMORY is on.		
OUTPUT SELECT	Selects ON/OFF in each output, indicates CV/CC on output (CV: green LED lights,		

	2-Output PW36-1.5AD	2-Output PW18-3ADP	3-Output PW18-2ATP
	+36V/1.5A −36V/1.5A	+18V/3A +18V/3A	+36V/1A +18V/2A 8V/2A
	10 mV		10mV (+36V, +18V output) 1mV (8V output)
	2mV		
	1.5mArms		
	10mV		10mV (+36V, +18V output) 1mV (8V output)
	±(0.5%rdg+20mV)		±(0.5%rdg+20mV) : +36V, +18V output, ±(0.5%rdg+5mV) : 8V output
	(red LED lights at on) CC: red LED lights, no-select: out lights)		

REGULATED DC POWER SUPPLIES

Model	4-Outpu PW18-1.8AQ	3-Output PW18-1.3AT	2-Output PW18-3AD
PRESET (1, 2, 3, 4)	4 kinds of voltage and current can be preset (green LED lights at select)		
KEY LOCK	All setting functions except POWER and KEY LOCK are locked (green LED lights at on)		
DELAY TIME	Delay output can be set on each output (the time from OUTPUT ON to 0.1 to 10.0sec.)		
TRACKING ON/OFF	Tracking ON/OFF on set up each output (green LED lights at on)		
TRACKING abs( ), $\pm$%	Absolute value or % (0 to 200%) can be selected and set at tracking (green LED lights		
V,A	Limit value can be set in each voltage and current(green LED lights at on)		
LIMIT	Limit value can be confirmed in set each voltage and current. Each pre-set value can be		
DISPLAY/STATUS	Selects the indication of voltage and current in each output, sets the tracking operation.		
STATUS	TRACKING and DELAY TIME can be set in each output.		
DIGIT	Selects the setting digit from 4-digits when sets the voltage and current by encoder.		
Output			
COM	Each output common	Excepted 6V only	
Polarity	$+$, COM and $-$ can be ground		
Terminal color	$+$(Red), $-$(White), COM(Blue), GND(Black)		
Groundable voltage limit	$\pm$250VDC		
Serial output	0 to 36V		
External control			
OUTPUT ON/OFF	Terminal short: output ON (terminal open: OFF)		
PRESET 1 to 4	Terminal short: selects PRESET 1 to 4		
External ALARM input	Terminal short: output OFF		
Protect function			
Overheating protection	Output is off when OHA is active, and ALARM signal is output (LOW level)		
Temperature/humidity for operation	0 to 40℃, 30 to 85%RH(with no condensation)		
Temperature/humidity for storage	$-$20 to 60℃, 20 to 85%RH(with no condensation)		
Cooling system	Forced air (fun), Rotation speed of fun is proportion to the temperature of exhaust air		
Insulator voltage	Primary to body:1500VAC 1 minute, Primary to secondary:1500VAC 1 minute		
Insulator resistance	Primary to body, Primary to secondary:500VDC 10MΩ or more, Secondary to body:		
Power requirement	AC100/115/200/230V$\pm$10%, 50/60Hz		
Power consumption	Approx. 199W/250VA	Approx. 200W/255VA	Approx. 215W/274W
Case dimensions W$\times$H$\times$D（mm）	138 $\times$ 124 $\times$ 380		
Maximum case dimensions W$\times$H$\times$D(mm)	138 $\times$ 148 $\times$ 400		
Weight	Approx. 9.1kg		
Accessories	Instruction manual$\times$1, power cable$\times$1, Connector for external control$\times$1		

OPTION

- GP-IB Cable : CB-2420P
- D-sub Modular conversion Connector : TA-60
- Modular Cable (30cm) : CB-0603S
- Modular Cable (1.5m) : CB-0615S
- Modular Cable (3.0m) : CB-0630S
- Modular Cable (10m) : CB-06100S
- Rack Mount Adapter (EIA) : RK-606E
- Blank Panel (1/3 Rack Width) : RB-606B

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	2-Output PW36-1.5AD	2-Output PW18-3ADP	3-Output PW18-2ATP
	at the absolute value, out lights at %)		
	changed in output ON.(green LED lights at on)		
	Select indicate digits, red LED lights.		
	Each output common		Excepted 8V only
	0 to 72V	–	–
	250VDC 5M Ω or more		
	Approx. 191A/250VA	Approx. 215W/274VA	Approx. 191W/242VA