

INSTRUCTION MANUAL

AC STABILIZER

MODELS PCH100-5, PCH100-10, PCH100-20

KIKUSUI ELECTRONICS CORPORATION

78,4.3

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Power Requirements of this Product

Power requirements of this product have been changed and the relevant sections of the Operation Manual should be revised accordingly.

(Revision should be applied to items indicated by a check mark)

Input voltage

The input voltage of this product is _____ VAC,
and the voltage range is _____ to _____ VAC. Use the product within this range only.

Input fuse

The rating of this product's input fuse is _____ A, _____ VAC, and _____.

WARNING

- To avoid electrical shock, always disconnect the AC power cable or turn off the switch on the switchboard before attempting to check or replace the fuse.
- Use a fuse element having a shape, rating, and characteristics suitable for this product. The use of a fuse with a different rating or one that short circuits the fuse holder may result in fire, electric shock, or irreparable damage.

AC power cable

The product is provided with AC power cables described below. If the cable has no power plug, attach a power plug or crimp-style terminals to the cable in accordance with the wire colors specified in the drawing.

WARNING

- The attachment of a power plug or crimp-style terminals must be carried out by qualified personnel.



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1. GENERAL

Kikusui's PCH Series AC stabilizers are low-distortion, fast-reponse, and high-accurate and stable devices. They are linear amplifier circuit and are very compact as compared with traditional stabilizer.

The PCH provides a balanced-type output, which is isolated from the chassis. The output change caused by load variation can be reduced virtually to zero by means of an adjustment located on the rear panel.

The safety features of the PCH are explained in detail at a later part of this instruction manual. One of the most outstanding features of the PCH is: that, for supplying a power to such device as lamp or motor which has rush current characteristics, while conventional stabilizers employ an instantaneous cut-off system, the PCH employs such a system that the control output is instantaneously stopped and at this instant the input and output are coupled in a quasi-direct method, thereby avoiding the powerless period and eliminating the re-start procedure. Further safety features also are incorporated to the full.

For heat dissipation, the PCH employs a very effective cooling package system developed by Kikusui.

2. FEATURES

- (1) Low distortion: 0.5% or less (sine wave)
- (2) Fast response:

PCH100-5	...	100 μ sec
PCH100-10	...	120 μ sec
PCH100-20	...	200 μ sec

(3) High efficiency: 75% (typ.)

(4) High output stability:

Within $\pm 0.1\%$ for $\pm 10\%$ variation of AC line voltage.
 $-0.1\% \sim +1\%$ for load variation (using compensation circuit for leadwire drop voltage).

(5) Isolation: Chassis electrically isolated from AC power line.

(6) Safety provisions: Tripple protective circuits incorporated.

(7) Rush current protection: An input/output direct-coupling system is employed to guard against large rush current at load start.

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3. SPECIFICATIONS

Model	PCH100-5	PCH100-10	PCH100-20
Rated output	500 VA	1 kVA	2 kVA
Input voltage	100 V $\pm 10\%$		
Input frequency	50/60 Hz		
Input phase	Single phase		
Input voltage waveform distortion	5% maximum		
Rated output voltage	100 V		
Variable range of output voltage	$\pm 2\%$		
Voltage regulation	$\pm 0.1\%$ (Note 1)		
Load regulation	-0.1% ~ +1.0% (Note 2)		
Output voltage waveform distortion	0.5% or less		
Load power factor	1.0 ~ 0.7 (100% rated output current)		
Maximum peak current	7 A	14 A	21 A
Efficiency	approx. 75%		
Input frequency tolerance	50 Hz: 47 ~ 53 Hz, 60 Hz: 57 ~ 62 Hz		

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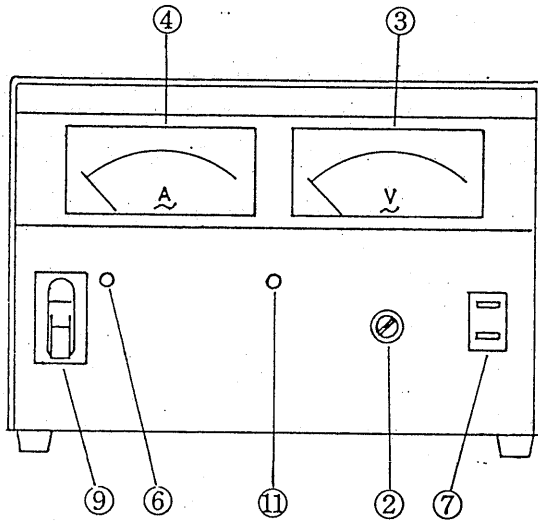
Model	PCH100-5	PCH100-10	PCH100-20
Voltmeter	150 V AC (JIS Class 2.5)		
Ammeter	6 A AC (Class 2.5)	15 A AC (Class 2.5)	30 A AC (Class 2.5)
Ambient temperature	0 ~ +40°C		
Humidity	90% RH		
External dimensions	210 W × 140 H × 410 D (mm)	430 W × 160 H × 400 D (mm)	430 W × 241 H × 450 D (mm)
Maximum dimensions	215 W × 165 H × 453 D (mm)	431 W × 175 H × 490 D (mm)	431 W × 292 H × 535 D (mm)
Weight (net)	Approx. 13 kg	Approx. 25 kg	Approx. 40 kg
Withstand voltage	1000 V AC, between AC power input terminal and chassis, for 1 minute		
Insulation resistance	20 MΩ or over, between AC power input terminal and chassis, with 500 V DC		
Accessories	Instruction manual 1 AC input power cord 1		

Note 1: For ±10% variation of input voltage

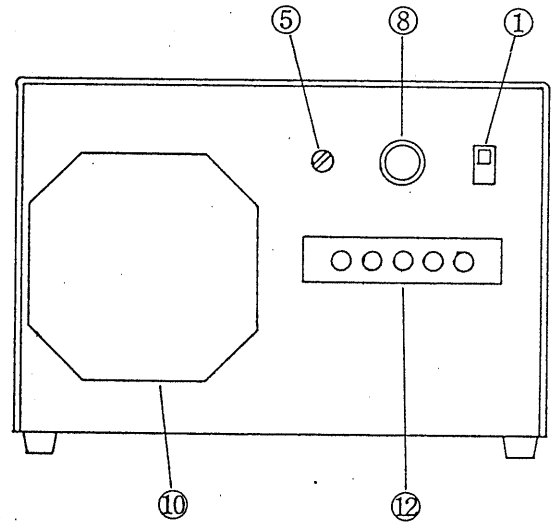
Note 2: For 0 ~ 100% variation of load current

4. EXPLANATION OF PANEL AND THEORY OF OPERATION

PCH100-5

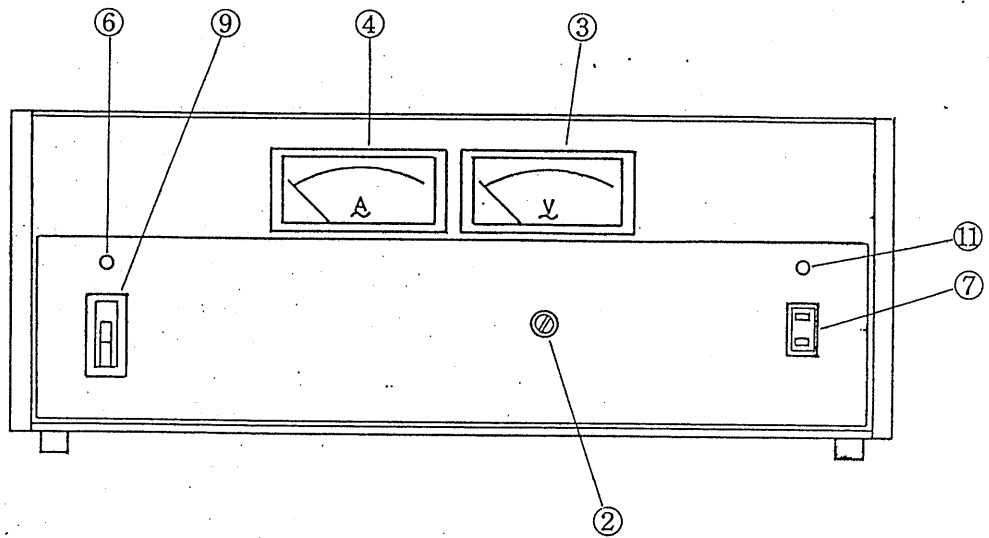


Front view



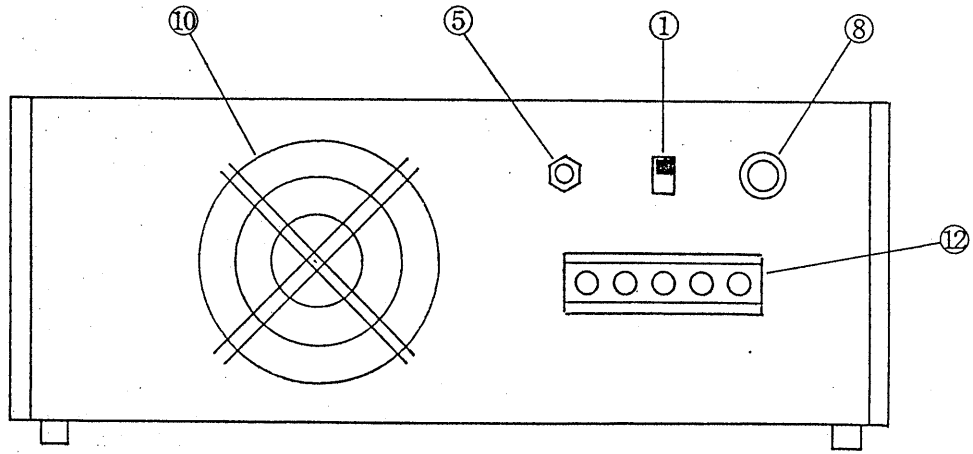
Rear view

PCH100-10



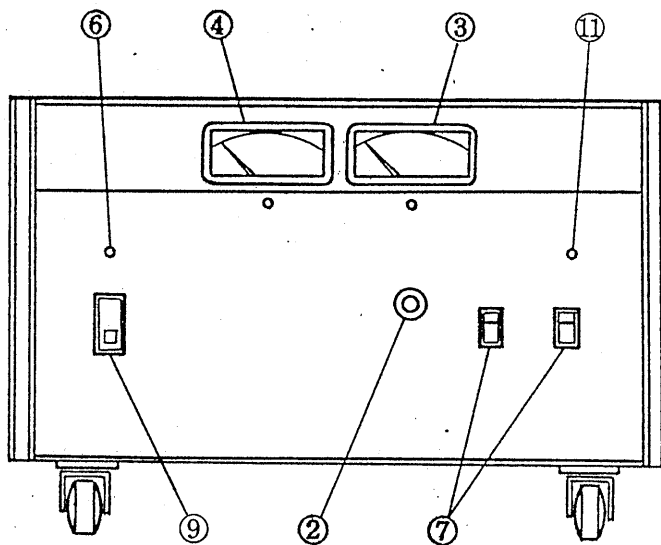
Front view

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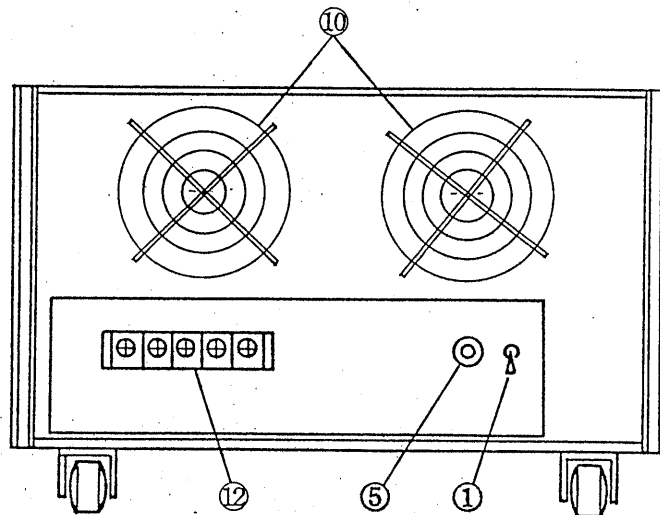


Rear view

PCH100-20



Front view



Rear view

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① AC line frequency selector switch:

Set at "50 Hz" or "60 Hz" position in conformity with the commercial AC line frequency. Panel marking:
"50 Hz 60 Hz"

② Output voltage adjustment:

The output voltage is adjustable for a range of 100 V \pm 2 V by turning this control using a screwdriver. Panel marking: "VOLTAGE"

③ Output voltmeter:

Indicates the output voltage. Full scale: 150 V

④ Output ammeter:

Indicates the output current. Full scale: 6 A (PCH100-5), 15 A (PCH100-10), 30 A (PCH100-20).

⑤ Regulation control:

Compensates for voltage drop caused by load. As this control is turned clockwise, the compensation voltage increases. For voltage drop caused by output cables at the rated load, compensation can be done up to 1 V. Panel marking: "REGULATION ADJ"

⑥ Power pilot lamp:

This lamp turns ON when the power switch is turned ON.

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⑦ Outlets:

Output connectors which are connected in common with output terminals on rear panel.

Panel marking: PCH100-5 ... "OUTPUT AC100V 500VA"
PCH100-10 ... "OUTPUT AC100V 1KVA"
PCH100-20 ... "OUTPUT AC100V 2KVA"

⑧ Fuse holder:

Holds the input power circuit fuse (regular tubular glass fuse). PCH100-5: 5A, PCH100-10: 7A, PCH100-20: no fuse.

Panel marking: PCH100-5 "FUSE 5A"
PCH100-10 "FUSE 7A"

⑨ Power switch:

The input power switch with circuit breaker for protection against overload and shorting. The upper position is for power ON.

Circuit breaker current rating: PCH100-5 7.5 A
PCH100-10 15 A
PCH100-20 30 A

Panel marking: "POWER"

⑩ Ventilation hole for fan motor:

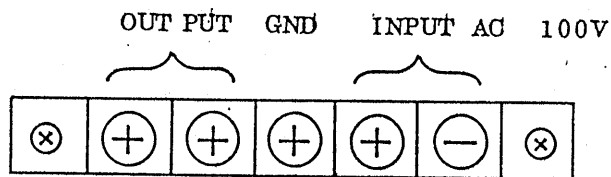
The hole for forced air cooling of internal components. Be sure, when installing this power supply, that a sufficient clearance is allowed in order not to impede the air flow through this hole.

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⑪ Control indicator lamp:

This lamp goes off when overload is caused or protecting circuit has tripped. At about 1 second after the overload state is eliminated, the normal operation is restored and this lamp turns ON. This lamp remains turned ON so far as the operation is normal.

⑫ Power input/output terminals:



Note 1: Be sure to disconnect the AC input power cord before connecting the cables to the output terminals. Note that one of the two lines of the input power remains connected even when the POWER switch is turned OFF.

Note 2: Be sure to connect the GND terminal to a good earth ground.

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5. OPERATING PROCEDURE

- (1) Ensure that the input voltage is within $\pm 10\%$ of the rated voltage.
- (2) Set the "50 Hz 60 Hz" selector switch (on the rear panel) in conformity with the commercial line frequency. The maximum tolerable input distortion is 5%. If the distortion is more than 5%, the operation may be unstable and the control indicator lamp (11) may go on and off frequently.
- (3) Connect the load.
- (4) Turn-ON the POWER switch (throw to the upper position). The control indicator lamp (11) will turn ON when the operation has become normal.
- (5) If it is required to supply instantaneously the power to the load, keep this power supply turned ON and provide an external switch in the load circuit and turn ON/OFF this switch for controlling the power to the load.
- (6) There are no problems so far as the power supply is operated within its rated output power. When the load impedance is lower than the rate value (20 Ω for PCH100-5, 10 Ω for PCH100-10, 5 Ω for PCH100-20) or when the load power factor has become low, however, the protecting circuit of the power supply will trip. To indicate this abnormal state, the control indicator lamp (11) will go off. When the abnormal load state is eliminated, the lamp will automatically turn ON again in about one second.

To turn-ON again the power after the power switch (circuit breaker) (9) has tripped, however, you must manually turn ON (throw to the upper position) the power switch.

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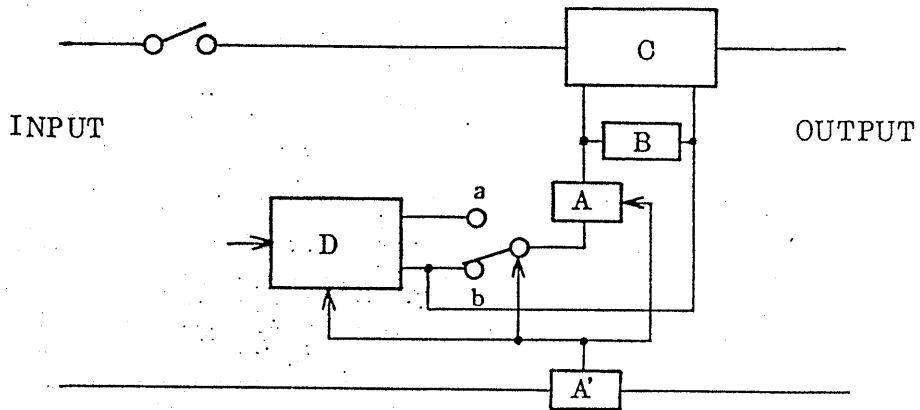
Note: For connection to the load, use cables which has a sufficient allowance of current rating. For your reference, current values and wire gauges are shown in the following. When the cables are very long, use larger cables (in order to prevent voltage drop in the cables).

5 A	0.75 mm ² or over
10 A	1.25 mm ² or over
20 A	3.5 mm ² or over

(7) Output impedance adjustment (regulation control): The output voltage change caused by load variation can be adjusted with the REGULATION ADJ ⑤.

- * The range covered with this control is -0.1 V ~ +1 V. For a range that the load power factor 0.7, the output impedance at the output terminal of the stabilizer can be made zero (excluding the cables for connection to the load).
- * When you turn-ON the power switch, the relay may chatter for several seconds until the stabilizer operation is stabilized. This chattering is not an abnormal indication. Chattering may also be caused when the load is rapidly varied. This chattering also is not an abnormal sign.

6. PROTECTIVE CIRCUITS



Some types of loads, such as lamps and motors and rectifying devices for examples, draw a large starting current (rush current).

To handle these loads, traditional stabilizers employed such a system that a protective circuit trips when the load current has exceeded a preset level even for a short period, thereby cutting off the output power. This system has a large disadvantage that a power interruption is caused for the load and the stabilizer must be manually turned ON each time. This type of inconveniences occur especially frequently if the stabilizer is turned ON with the load connected to the stabilizer.

With the PCH Series AC stabilizers when a rush current has occurred, the control output is instantaneously stopped and at the same time the input and output are quasi-directly connected in order that the load is free from complete power interruption.

(1) Protection against instantaneous overload:

The overcurrent is detected by the "A" and "A'" circuits, the input of the power amplifier (D) is cut off at a fast speed, and the control power is stopped. The "A" circuit detects the overcurrent of the amplifier output and the "A'" circuit does that of the power line.

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Further, relay is tripped from contact "a" to contact "b", thereby securely protecting the power amplifier. When the relay has tripped to its "b" contact, the input circuit and output circuit are quasi-directly connected by the internal mixing circuit. In about a second, the circuit restores its normal operating state.

(2) Protection against continuous overload:

When a continuous overload has occurred or when instantaneous overloads are frequently repeated, the "A" circuit detects such overloads and, since this circuit has a holding function of the protective state, the power amplifier is maintained in the protected state. When the overload is eliminated, the circuit automatically restores its normal operating state.

(3) Protection against output shorting:

When shorting is caused in the output circuit (load circuit), the "B" circuit is brought into effect in addition to the "A" and "A'" circuits in order to protect the power amplifier against overvoltage and overcurrent. Also, the circuit breaker trips in order to protect the load and circuits of set.

As mentioned in the above, the PCH Series AC stabilizers are fully incorporated with protective features.

* When the stabilizer has failed or an abnormal state is found, please contact the manufacturer's representative in your area.

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