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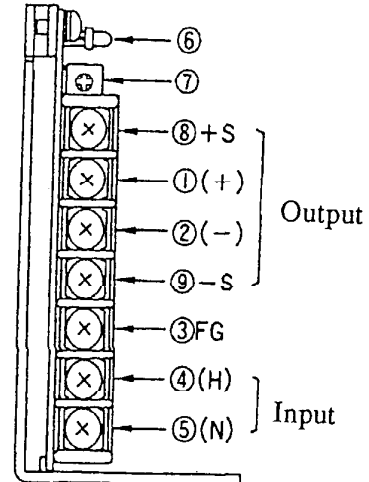
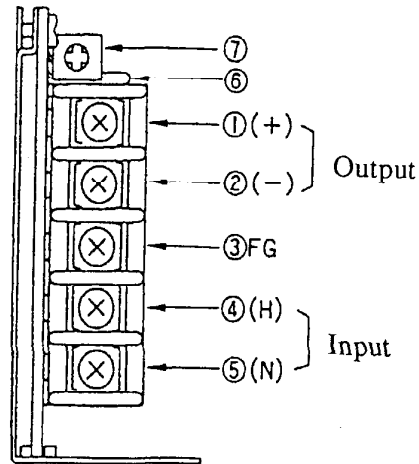
HK-A SERIES
INSTRUCTION MANUAL

DENSEI-LAMBDA

1. EXPLANATION ON FRONT PANEL

HK10A(Same as HK15A, HK25A, HK50A)

HK100A (Same as HK150A)

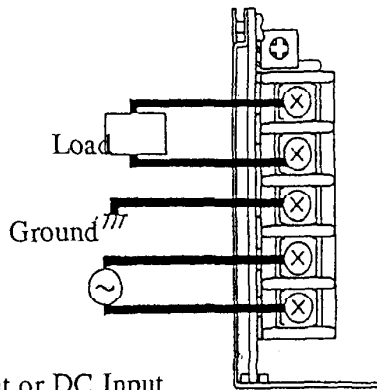


- ① +OUTPUT TERMINAL
- ② - OUTPUT TERMINAL
- ③ FRAME GROUND TERMINAL
- ④ INPUT TERMINAL(H)
“H”: Hot line with a fuse inside a power supply.
- ⑤ INPUT TERMINAL(N)
“N”: Neutral line without fuse.
- ⑥ OUTPUT VOLTAGE INDICATOR(POWER ON)
This indicator turns on when a power supply's output is normal operating condition.
- ⑦ OUTPUT ADJUST TRIMMER
The out voltage rises when a trimmer is turned clockwise.
- ⑧⑨ REMOTE SENSING TERMINALS(+S, -S)
These terminals are for remote sensing function which compensate the line drop (voltage drop by resistance of wire) between power supply terminals and load terminals.

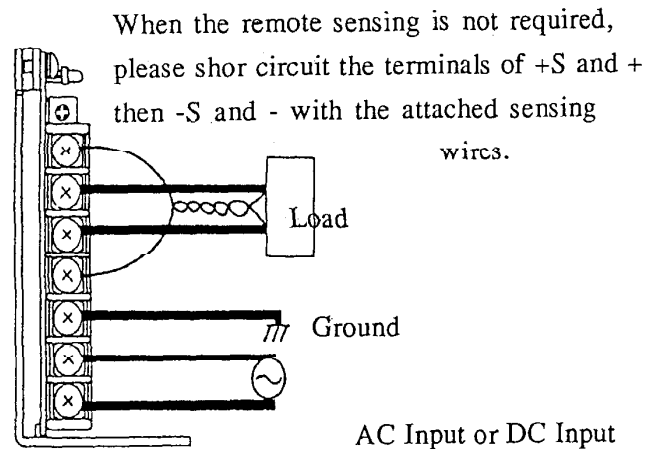
2. CONNECTION (WIRING)

HK10A(Same as HK15A, HK25A, HK50A)

HK100A (Same as HK150A)



AC Input or DC Input
(No polarity is designated in
the case of DC Input.)



AC Input or DC Input
(No polarity is designated in
the case of DC Input.)

- * Please do not connect 200 VAC with input terminals in order to avoid damage of the power supply.
- * Please do not turn V.ADJ trimmer except necessary. Especially the V.ADJ trimmer inside the power supply is preset at the time of shipment.
- * In the case of HK-11 and/or HK-12, please connect remote sensing terminals to avoid working of OVP.

3. DESCRIPTIONS OF VARIOUS FUNCTIONS AND CAUTIONS

3-1 SETTING OF OUTPUT VOLTAGE RANGE

The output voltage range can be set within the range of +/-10% of rated voltage by V.ADJ trimmer. The output voltage rises when this trimmer is turned clockwise. However, please note that the over voltage protection may shut down a power supply, if the output voltage becomes excessively high.

3-2 OVERLOAD PROTECTION (OCP)

The HK-A series are provided with built-in constant over current protective circuit with automatic recover. Hence, the power supply will automatically recover when the overload condition is cleared. It is not externally adjustable. The short circuit and / or over current conditions continue over 30 seconds, the power supply may be damaged.

DENSEI-LAMBDA

3-3 OVER VOLTAGE PROTECTION (OVP)

HK-A series is provided with a built in over voltage protection circuit. Once this over voltage protection circuit shut down, the output can only be recovered by turning off the input line and reinput the power after the interval time.

(HK10A, HK15A: Zener diode clamp method. When output voltage rises 115% of nominal output voltage, OVP will operate and shutdown the output. If this happens, zener diode must be changed.)

3-4 REMOTE SENSING

This function is built only HK100A and HK150A models in. In the case of the line drop (voltage drop) caused by the resistance of wires between output terminals of power supply and the terminals of a load.

If remote sensing is not required, please connect +S terminal with +terminal, and also connect -S terminal with -terminal.

Remote sensing can compensate the line drop within the range of 10% of rated output voltage. Please use a shielded cable or twisted-pair cable for remote sensing.

3-5 OUTPUT RIPPLE VOLTAGE

The output ripple voltage is measured at the power supply output terminals, irrespective of whether a load is connected or not. If the load cable is long, connect a capacitor (electrolytic, film, etc.) of sufficient capacity to the load

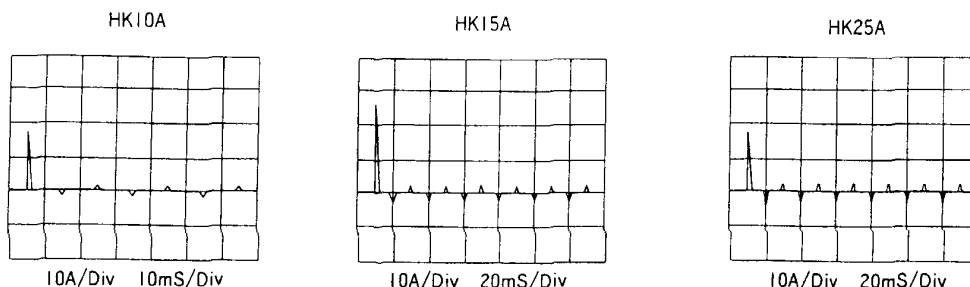
terminals to reduce the impedance. It should be noted that, if the ground lead of the oscilloscope's probe is too long during measurement, the ripple voltage cannot be measured accurately.

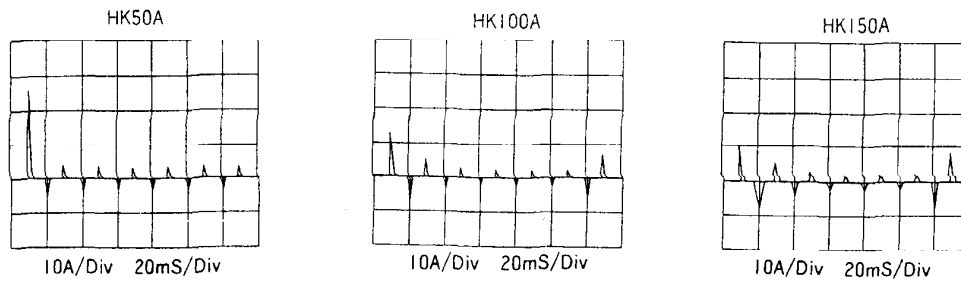
3-6 IN-RUSH CURRENT

HK-A series is provided built-in in-rush current limiting circuit. Please select an input switch, fuse etc. carefully, when you use multiple power supplies in your system jointly.

IN-RUSH CURRENT WAVE CURVES

(Input: 100VAC, Phase Angle: 90°, Full Load, Ambient Temperature: 25°C)





4. INSULATION RESISTANCE AND WITHSTAND VOLTAGE TEST

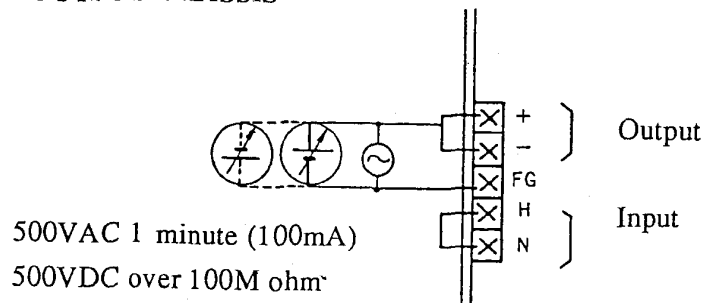
4-1 Insulation Resistance Test

Please use a DC megger(Max.500V) for measuring the insulation resistance between output terminals and chassis. The resistant figure of HK series is 100 M ohm at 500VDC.

A high voltage pulse may be generated when you change the charging DC value suddenly, therefore, please change the value gradually.

After the test, please discharge a power supply by short-circuiting all output terminals with chassis ground.

OUTPUT-CHASSIS



4-2 Withstand Voltage Test

This Series is designed to withstand 2.0KVAC, 1 minute between input and output terminals.

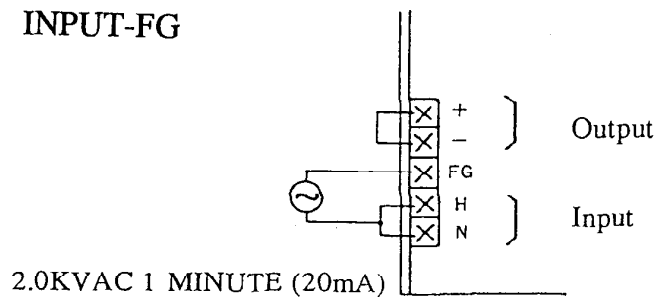
Please set the LIMIT value of a withstand voltage tester at 20mA. The withstand voltage between output terminals and chassis is 500VAC, 1 minute (LIMIT current: 100mA).

When you conduct the test, please elevate or lower the applying voltage gradually. If you suddenly apply the high voltage like 2.0KVA or shutdown the applying voltage, many components of a power supply will be damaged and also it is very dangerous for a test operator.

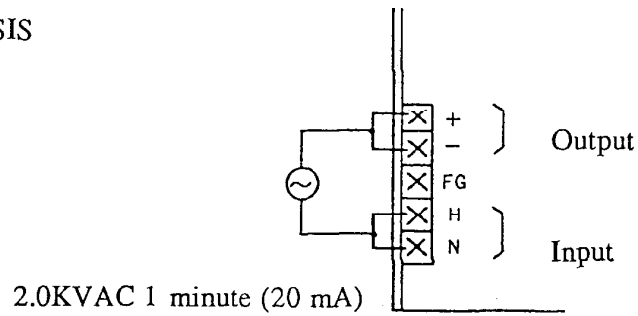
Moreover, please do not use a timer in the test, because the high voltage impulse may be generated and break a power supply unit when a timer shutdown the input power.

DENSEI-LAMBDA

INPUT-FG



INPUT-CHASSIS



Please connect OUTPUT as shown above.

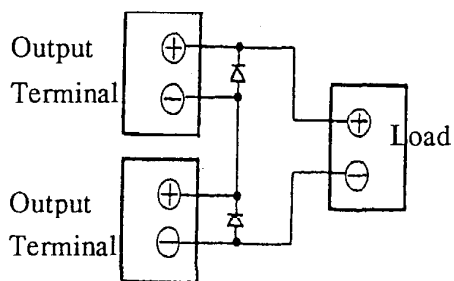
5. SERIES & PARALLEL OPERATIONS

Both (A) and (B) method is possible.

In case of (A), please connect diodes to prevent the reverse voltage (refer to the below chart).

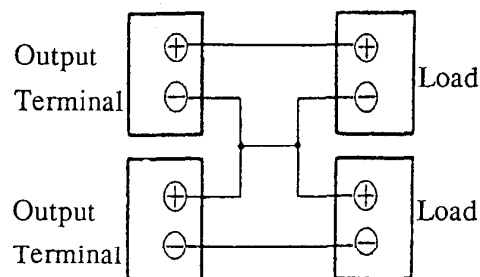
No parallel operation is possible.

POWER SUPPLIES



(A)

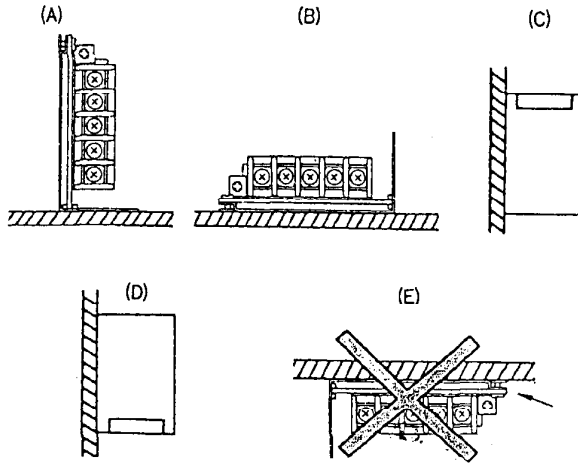
POWER SUPPLIES



(B)

6. INSTALLATION METHODS

We recommend the standard installation method of (A).
You can install a power supply like (B),(C) and (D).

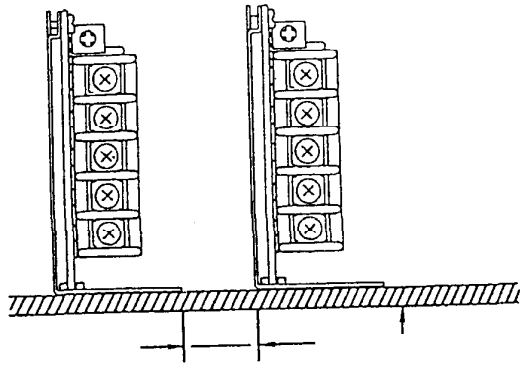


DERATING TABLE BY INSTALLATION METHODS(%)

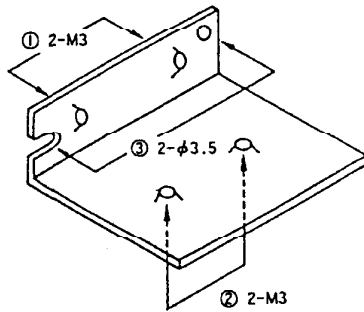
	HK10A				HK15A			
	A	B	C	D	A	B	C	D
30°C	100%	100%	100%	100%	100%	100%	100%	100%
40°C	100%	100%	100%	100%	100%	100%	100%	100%
50°C	100%	100%	50%	50%	100%	100%	50%	50%
60°C	50%	50%	—	—	50%	50%	—	—
70°C	—	—	—	—	—	—	—	—

	HK25A				HK50A			
	A	B	C	D	A	B	C	D
30°C	100%	100%	100%	100%	100%	100%	100%	100%
40°C	100%	100%	100%	100%	100%	100%	100%	100%
50°C	100%	70%	50%	50%	100%	70%	50%	50%
60°C	50%	40%	—	—	50%	40%	—	—
70°C	—	—	—	—	—	—	—	—

	HK100A				HK150A			
	A	B	C	D	A	B	C	D
30°C	100%	100%	100%	100%	100%	100%	100%	100%
40°C	100%	100%	100%	100%	100%	100%	100%	100%
50°C	100%	70%	50%	50%	100%	60%	40%	40%
60°C	50%	40%	—	—	50%	—	—	—
70°C	—	—	—	—	—	—	—	—

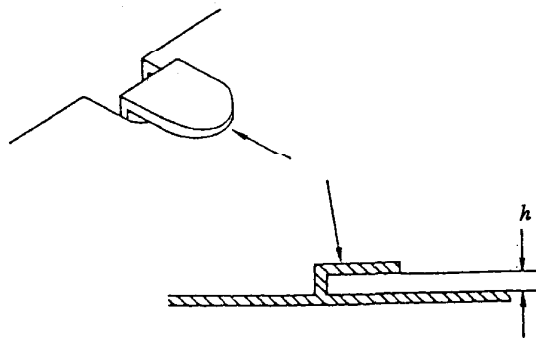


More than 15mm * Punch holes are necessary for ventilation.



Note 1.

- Notes: 1. Please keep less than 6m/m of screw into the power supply when mounting. Recommended torque is 5.0Kg.cm. (Please use M4 screw for HK100A & HK150A, and the recommended torque is 13.0Kg.cm.)
2. In the case of manner (3), please insert to U-cut the power supply and fix by screw.



$h \begin{cases} \text{HK10A,15A,25A,50A} & \text{--- } 1.2+0.2,-0\text{mm} \\ \text{HK100A,150A} & \text{----- } 2.2+0.2,-0\text{mm} \end{cases}$

DENSEI-LAMBDA