

Icom IC PS-125 Service Manual

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Brief operational description Of the Icom PS-125 power supply

A. Primary DC supply

1. AC input voltage is applied through the AC switch, to input fuse F-1 and filters IF1, IF2, and associated capacitors C1-5, C24 & C25, through R-2 to the primary rectifier array D-1. Triac Q-1 which is connected across R-2 conducts once the switching supply starts, thus limiting the voltage drop across R-2. A movable jumper from D-1 to the junction of C-9 & C-10 configures the primary supply for 110 volt operation only. **For 220 volt operation this jumper is not connected.** The +310 volt DC output voltage of D1 is connected through L2, & D2 to series connected electrolytic capacitors C-9 & C-10 which filter the DC output voltage of D-1.

B. Switching supply

1. The output of the primary 310V DC supply is now applied to series connected power FETs Q4 & Q5 and the primary of high frequency transformer T-1. The gates of Q4 & Q5 are driven by Switch mode controller IC, HC-1. Upon initial power application, Q4 or Q5 will conduct first, thus causing an ac output voltage on all secondary windings of T-1. The voltage of T-1 pins 7 & 8 is rectified by D-8, regulated by D-9 & Q-6 and applied to HC-1 pin 12(vcc) to operate HC-1. The voltage from T-1 pins 9 & 10 is rectified by D23, & filtered by C40 to supply voltage for all IC's and transistors except HC-1. HC-1 now begins operating and alternately drives Q4 & Q5 at a high AC frequency.

C. Secondary DC supply

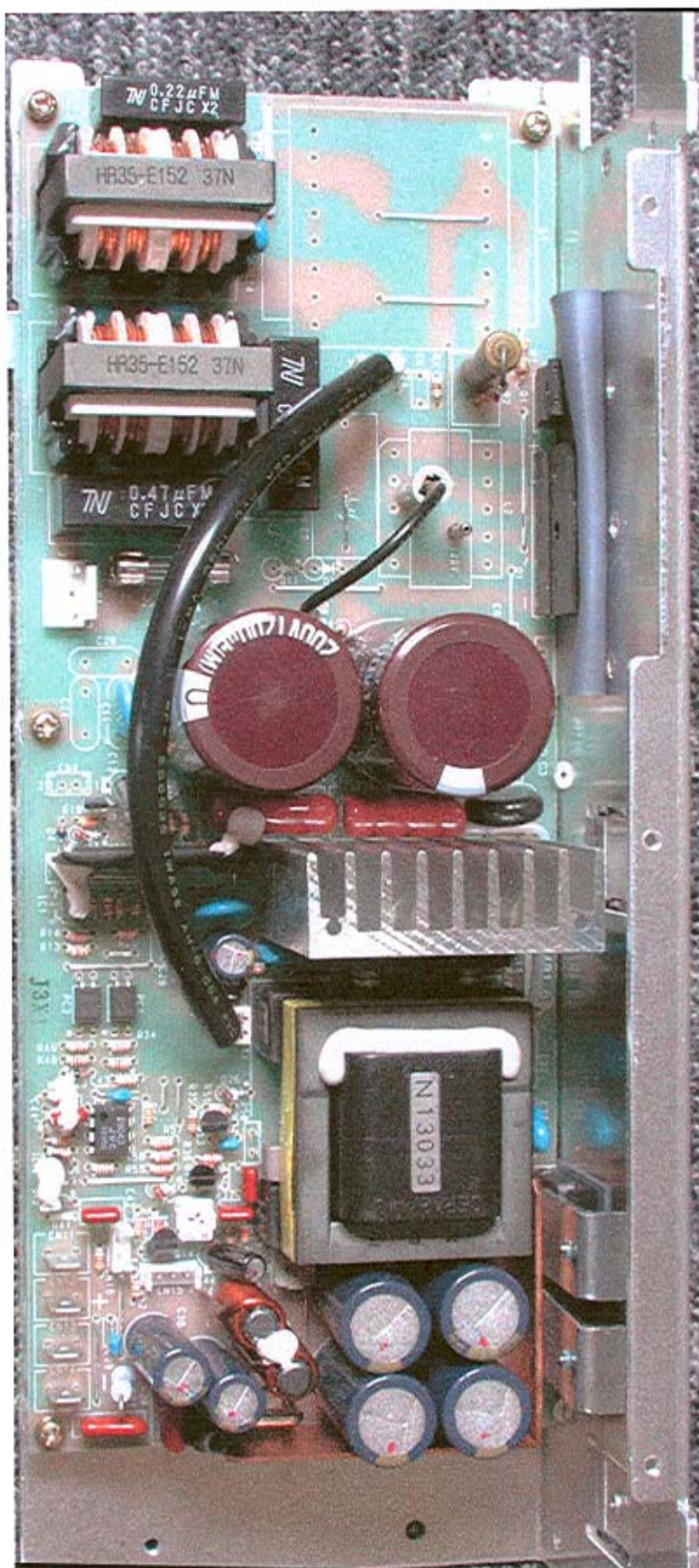
1. T-1 secondary windings pins 12 & 13, 16 & 17, 14 & 15, 10 & 11 and fast recovery diodes B 11, 12, & 13, 14, along with electrolytic capacitors C31, 32, 33, 34, & 35 form the 25 amp 13.8 volt DC output supply. The output is applied to the output terminals through L-12 & L-13.
2. The 13.8Volt DC output is sensed via R-58 to the base of Q-11, the collector of which drives opto-isolator PC-1. Adjustment of VR-11 adjusts the base voltage of Q-11 thus establishing via HC-1, the power supply DC output voltage.
3. IC-11 pins 1, 2, & 3 sense the voltage drop across R-31 & R-32 via VR-12 and R-44, to establish via the adjustment of VR-12, the maximum output current limit.
4. Zener diode D-26, Q13, R-48, R-49, PC-2 and associated components detect an over voltage condition of the 13.8 volt supply output.
5. IC-11, pins 5, 6, & 7, Q-14 & associated components sense temperature rise inside the supply and turn on the fan as appropriate.

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PS-125 parts list

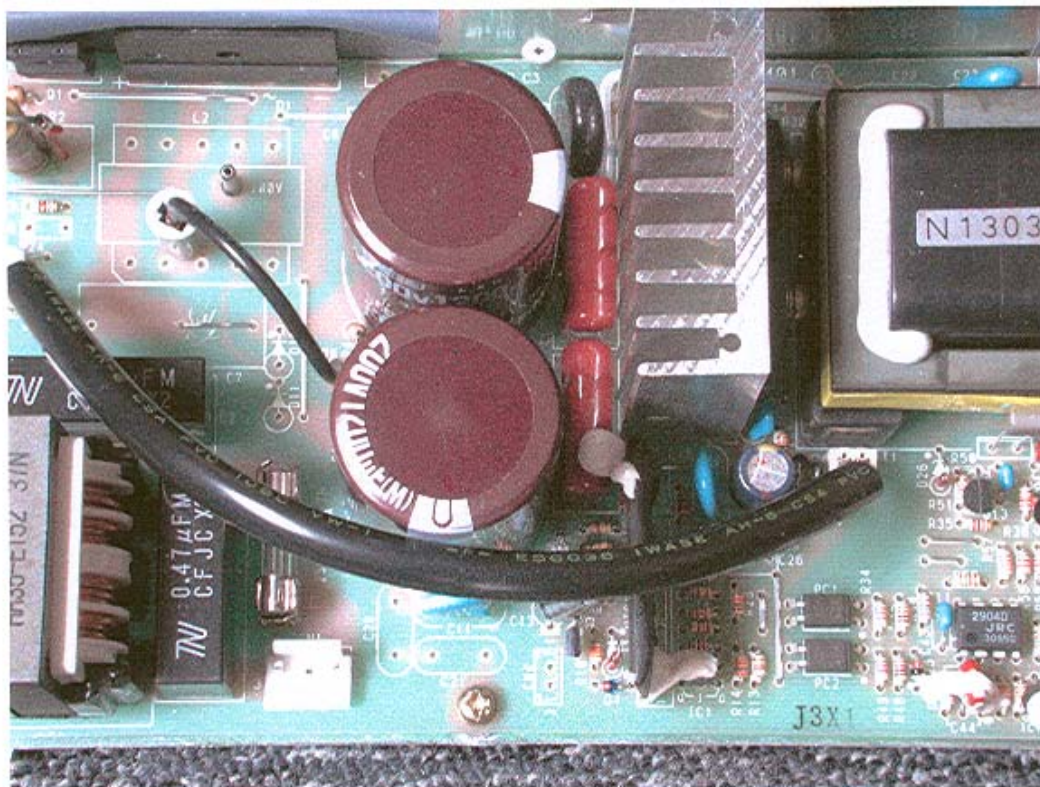
| Item | Description | Qty ea. |
|--------------|---|---------|
| Q1 | TM1641S-L Triac | 1 |
| Q2 | 2SC4002 NPN transistor | 1 |
| Q3, 12 | DTC 114E digital transistor | 2 |
| Q4, 5 | FS22SM-9 Power Mosfet transistor | 2 |
| Q6 | 2SC3246 | 1 |
| Q13 | 2SA733 pnp transistor | 1 |
| Q11,14 | 2SC945 npn transistor | 2 |
| HC-1 | WB 2013A switching controller IC | 1 |
| IC 1 | S80745 | 1 |
| IC 11 | LM2904 dip op amp | 1 |
| IC 12 | 431- | 1 |
| PC 1, PC 2 | PS2561 opto isolators | 2 |
| D1 | RBV1506 Bridge rectifier | 1 |
| D2,3,25,26 | 15 volt ½ w zener diode | 4 |
| D4,5,6 | Iss 270A diode | 3 |
| D10,11 | Diode | 2 |
| D23 | CRA91-D2 diode | 1 |
| D24 | 7 volt zener diode | 1 |
| B11,12,13,14 | D2ZKC060N04 fast recovery power diode | 2 |
| Fuse F1 | 10A (120V) 5A (230V) | 1 |
| R2 | 6.5 ohm power resistor with build in fuse | 1 |

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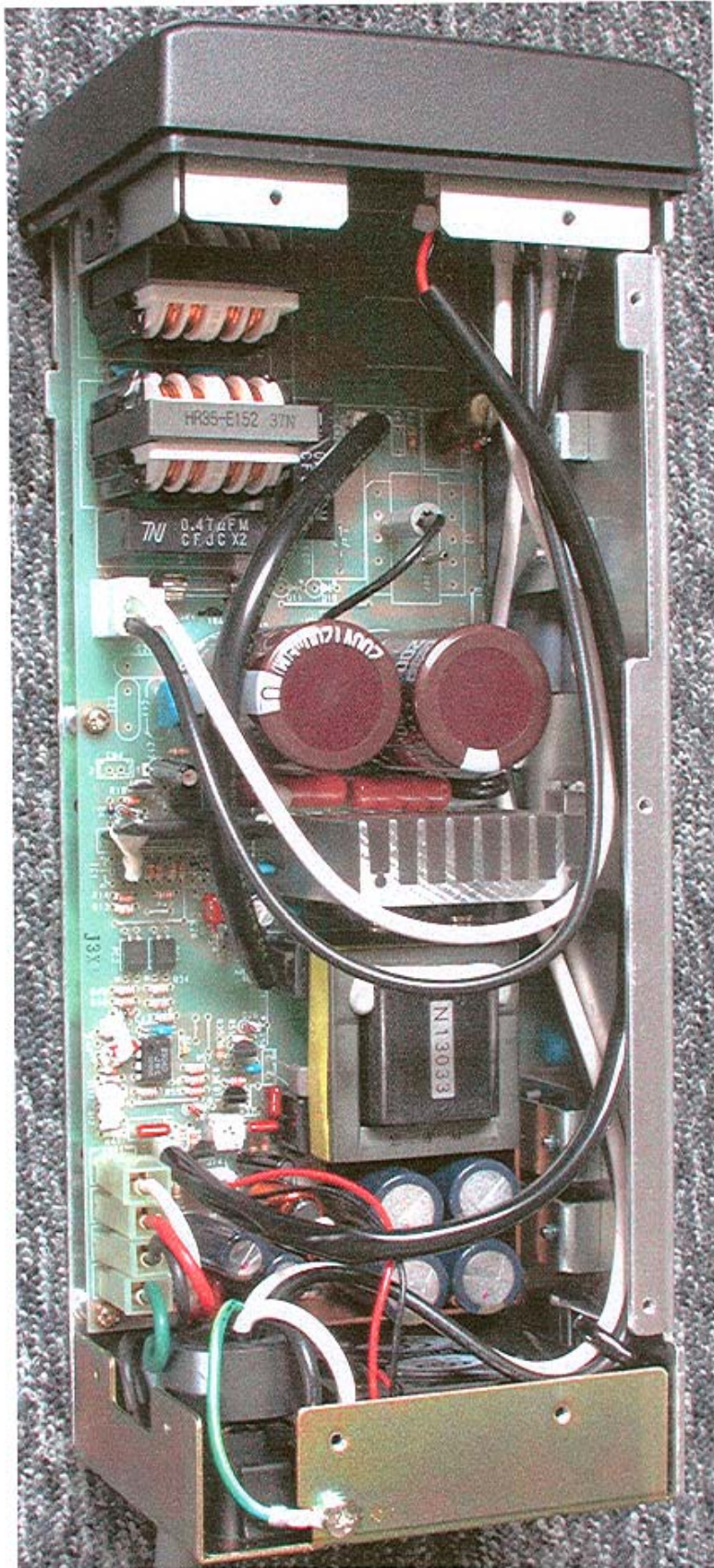
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110-220 V jumper detail

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