DURITC 1kW 230V Inverter/UPS

By G8MNY (Updated Jan 13)

(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

Not a UPS really but a high power, stepped square wave mains inverter from 12V. It was blow up when I got hold of it it. I now have it working with new output high voltage MOSFETs.

Having made this sort of thing before with heavy conventional transformer etc., I was amassed at this modern HF version, just how small & light weight it is.

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**DESCRIPTION**

It has 5 pot core HF pulse width inverters with 2 TIP MOSFETS each handling 200W. The 5 floating secondaries are connected in series to feed a fast high voltage bridge rectifier to a HF choke, into large 400V smoothing cap.

The pulse width feedback controls that voltage to 340V. This powers 2 high voltage MOSFET amps (blown-up) that switch the L & N to +340V for 2/3 for the time giving the 340V peak & 230V RMS 50Hz stepped waveform output.

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**OUTPUT WAVEFORM**

<table>
<thead>
<tr>
<th>+340V</th>
<th>-230V</th>
<th>0V</th>
<th>-230V</th>
<th>-340V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed pulse width</td>
<td></td>
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</tbody>
</table>

The control for this lot is not simple, there is monitoring of temperature, output current, supply Volts, etc. So working without the diagram is not easy. Still I have it going now, & done some worth while modifications....
PULSE CURRENT

If a capacitive load from say a good mains filter is put across the output, then the high voltage Power MOFETs can easily be blown up again, as very high pulse edge currents can flow.

20A ── 1kW Restive Load
6A ── 100W load + 0.1uF
0A
-6A
-20A

MODS

1/ Added HT fuse after 340V Cap smoothing!

2/ Added a mains IEC in socket small 25W mains transformer & 3 pole changeover relay for bypass (UPS).

3/ Added standby trickle charging, up to 1A Max @ 13.5V regulated.

4/ Speeded up the mains fail start up time, but it is too slow for some things.

5/ Added 1uF polly across each HF inverter 12V supply rails.

6/ Added 0.1uF @ 600v across the main HT caps.

7/ Bifilar balanced wound bigger swinging HF choke after bridge rectifier, reduced the QRM.
8/ Made balanced L output mains filter (from old HF choke & 2x 6n8 caps to ground).

--- Diagram ---

**WARNING**

Devices that use the reactance of mains caps to drop the mains voltage can be destroyed on this waveform. e.g. a true RMS digital meter! As the pulse edge puts 100x the voltage into the current limiting R or the circuit...

--- Diagram ---

100Ω will catch fire with 340V pulses into it despite the 1uF looking like 3kΩ @ 50Hz!

Why don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP