



HUGHEY & PHILLIPS

600 VA Power Adapter 6.6A Series Converter to 115VAC **Part No.130-0006-001**



1. General Description:

The 600 VA power adapter converts 6.6A 60 Hz series current to 115 VAC voltage. Power input cable is a FAA L-823 Class A, Type II, and Style 1 Male Plug. This input connector is designed to mate with the standard female receptacles found on all FAA certified Isolation transformers. The female output cable FAA L-823 Class A, Type II, and Style 7 female receptacle. The isolation transformers can be provided but are not part of the Power Adapter. The power adapter is encapsulated with a two part resin epoxy that has very high thermal conductivity and electrical insulation properties capable to be operating under the range of -40° to 130°C.

2. Circuit Description:

A Ferroresonant transformer designed for 6.6A, 60 Hz series current airfield circuits converts the energy of the series current into a stable voltage source of 60 Hz. The output is a quasi-sinewave regulated AC voltage that can be used to power most electronic devices. Voltage regulation is maintained at the transformer output from Open Circuit, to full load, when the input sees the input current range between 2.7A - 6.7A, 60 Hz. The secondary is design that a continuous short circuit of the output will cause no harm to the transformer, regulated voltage will return once the short circuit is eliminated. Output voltage will be regulated within a range of 100 – 125 VAC with a maximum of 100 VA loading.

FAA requires the use of isolation transformers to be used in all series circuits and the loads connected to the circuit. These isolation transformers were originally design for resistive loads of incandescent and halogen filament lamps. As such the voltage needed on the output is relatively low. Having a lower supply voltage with a constant current source cause the load to become highly inductive with respect to the isolation transformer. The high inductivity cause a poor power factor. The relationship of the current signal as compared to the voltage drop across the primary of the converter is reflected in the power factor of the unit. Efficiency of the transformer converter is the relationship of the IR losses of the input and the output coils along with the heat losses of the effective series resistant (ESR) of the capacitor used in the inductive/capacitor loop that regulates the output voltage so well.



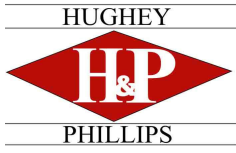
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The best efficiency and voltage regulation would be experienced when used with two series connected FAA certified L 830 14 6.6A / 6.6A isolation transformer or two series connected FAA certified L-830-15 20.0A / 6.6A three to one step down transformers. The transformers would be connected to a bridge cable to combine the secondaries of the isolation transformer and provide the adapter with the properly phased current. Their electrical design characteristics of this isolation transformer are rated at maximum load of 600 Watts at a resistive load of 29.6 ohms, and a maximum open circuit voltage of 145 V rms value at no load.

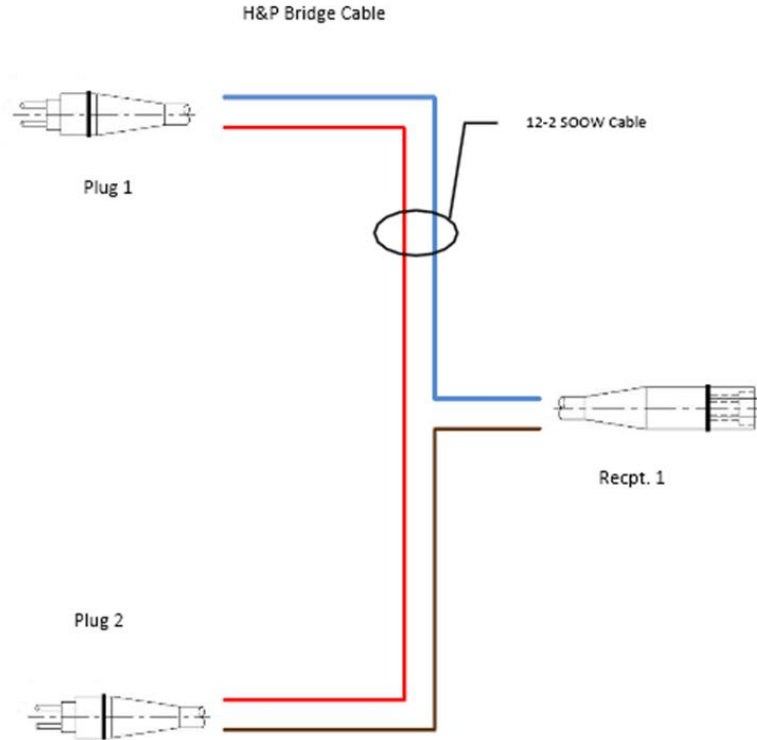
Data below was taken using two 500 Watt 6.6A / 6.6A isolation transformers transformer on a SCR circuit with incandescent lamps loads, rated at either 300 W or 620W at 130 VAC. Reading taken directly on the primary and secondary of the power adapter.

LOAD W & Step	Input Watts	Input PF	Input Voltage	Input Current	Output Wattage	Output Voltage	Output Current	EFF %
300W 6.7A	350	0.39	323	2.75A	301	139.6	2.16A	86.0%
300 W 2.6A	257	0.46	257	2.79A	286	136.2	0.98A	85.9%
600W 6.7A	655	0.65	312	3.2A	598	134.7	4.44A	91.3%
600W 2.6A	462	0.82	194	2.9A	422	113.3	3.73A	91.3%
640W 6.7A	699	0.69	308	3.29A	642	133.0	4.83A	91.8%
640W 2.6A	444	0.86	185	2.8A	408	106.4	3.84	91.9%
No load	44	-	327	2.49A	-	139.9	-	-
Short Circuit	31.9	-	255	3.0A	-	0	8.99A	-

The isolation transformers and the voltage converter can be used in circuits powered either by Ferroresonant or SCR controls Constant Current Regulators (CCR) that exhibit crest factors of 3.5 or less. Ferroresonant type CCR's will have a more conservative crest factor often in the 1.5 range this will allow a slightly higher power factor at lower current inputs closely approaching the range of 0.89 – 0.92.



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Notes:

Two each inputs: L-823 Plugs- Class A, Type II Style I, one for each 500 Watt Isolation transformer.
One each output: L-823 Receptacle- Class A, Type II, Style 7, for Power adapter Input connection.

2-Fer cable mold internal wiring, 12-2 SOOW, for secondary phase addition – Wire color coding
Large Pins/Sockets White jacketed wire
Small Pins/Sockets Black jacketed wire

Plug 1 - Large pin White connects to Output Receptacle White large socket
Plug 1 - Small pin Black connects to Input Plug 2 Large Pin
Plug 2 - Large Pin White connects to Input Plug 1 Small Pin
Plug 2 - Small pin Black connects to Output Receptacle Black small socket

Recp.1 - Output 100 – 130 VAC 60 HZ Isolated Voltage