



**PAT-4126 Application: 600 Ohm to 10 kOhm (line level)**

This is our smallest toroidal audio transformer intended for balancing audio signals on line level. The transformer has a primary of 10 kOhms and a secondary of 600 Ohms or can be used inverted from 600 Ohms to 10 kOhms. The bandwidth is extremely large, from 0.5 Hz to 625 kHz while the internal damping of the transformer is set to "critical damping" with a high frequency Q of 0.5. This transformer can handle +20dBm signals without any problems. Another application is using the turns ratio from 1:4 as a step-up transformer for moving coil elements in the front stage of a moving magnet pre-amplifier. Because this transformer delivers truly balanced output signals, its application is ideal for running long audio lines without influence of interfering RF signals. Its large common mode rejection ratio ensures distortion free operation.

**Toroidal Output Transformer for Tube Amplifiers**

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**PAT-4126-02 Ratings**

Type & Application	:	Plitron / VDV PAT-4126-02	
Primary Impedance	:	Raa = 10.02	[kΩ]
Secondary Impedance	:	Rls = 600	[Ω]
Turns Ratio Np/Ns	:	Ratio = 4.087	[ ]
Ultra Linear Tapping at	:	tap=0	[%]
-.1 dB Frequency Range [Hz to KHz] <sup>(3)</sup>	:	flf = 1.854	fhf = 151.411
-1 dB Frequency Range [Hz to KHz] <sup>(3)</sup>	:	fl1 = 0.791	fh1 = 340.024
-3 dB Frequency Range [Hz to KHz] <sup>(3)</sup>	:	fl3 = 0.402	fh3 = 641.933
Nominal Power <sup>(1)</sup>	:	Pn = 0.04	[W]
-3 dB Power Bandwidth starting at	:	fu = 10	[Hz]
Total Primary Inductance <sup>(2)</sup>	:	Lp = 82.7	[H]
Primary Leakage Inductance	:	lsp = 0.935	[mH]
Effective Primary Capacitance	:	Cip = 1.23	[nF]
Total Primary DC Resistance	:	Rip = 33.5	[Ω]
Total Secondary DC Resistance	:	Ris = 3.01	[Ω]
Tubes Plate Resistance per section	:	ri = 0.09	[kΩ]
Insertion Loss	:	lloss = 0.036	[dB]
Q-factor 2nd order HF roll-off <sup>(5)</sup>	:	Q = 0.46	[ ]
HF roll-off Specific Frequency <sup>(5)</sup>	:	Fo = 1.122•10 <sup>3</sup>	[kHz]
Quality Factor <sup>(5)</sup>	:	QF = 8.845•10 <sup>4</sup>	[ ]
Quality Decade Factor = log(QF) <sup>(5)</sup>	:	QDF = 4.947	[ ]
Tuning Factor <sup>(5)</sup>	:	TF = 18.038	[ ]
Tuning Decade Factor = log(TF) <sup>(5)</sup>	:	TDF = 1.256	[ ]
Frequency Decade Factor <sup>(4,5)</sup>	:	FDF = 6.203	[ ]

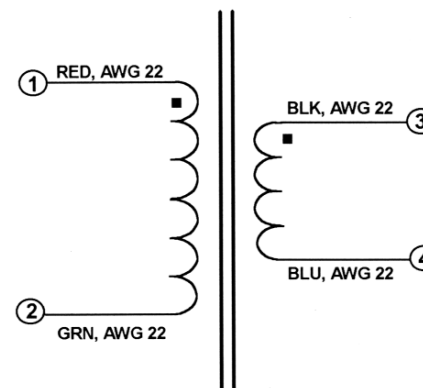
- (1): calculated under the conditions of balancing the DC-currents and the AC-anode voltages of the powertubes driving the transformer
- (2): maximum value, measured over secondary, transfered to primary
- (3): calculation at 1 mWatt in Rls; ri and Rls are pure Ohmic
- (4): defined as FDF = log(fh3/fl3) = number of frequency decades transfered
- (5): ir. Menno van der Veen; Theory and Practise of Wide Bandwidth Toroidal Output Transformers; preprint 3887, 97th AES Convention San Francisco
- (C): Copyright 1994 Vanderveen; Version 1.7; design date September 23, 1997

**Special Toroidal Output Transformer Designs**



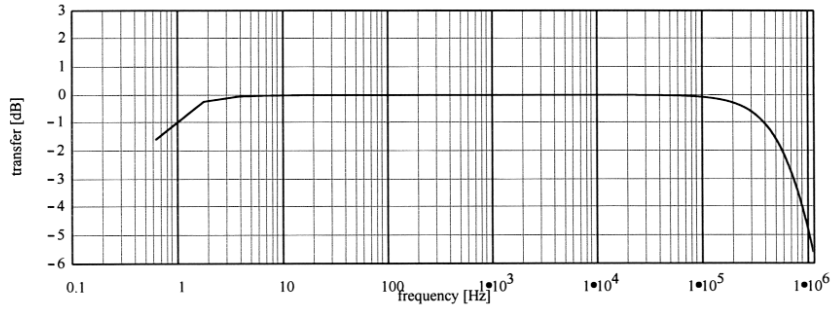
This special line-stage coupling transformer couples extreme wide bandwidth with very mixed distortions and high signal levels. Can be used as step-up or step-down transformer as well.

**Schematic**

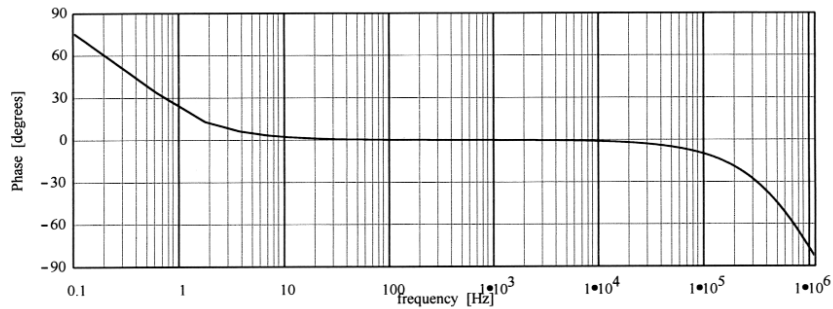


# PAT-4126-02 Response Curves

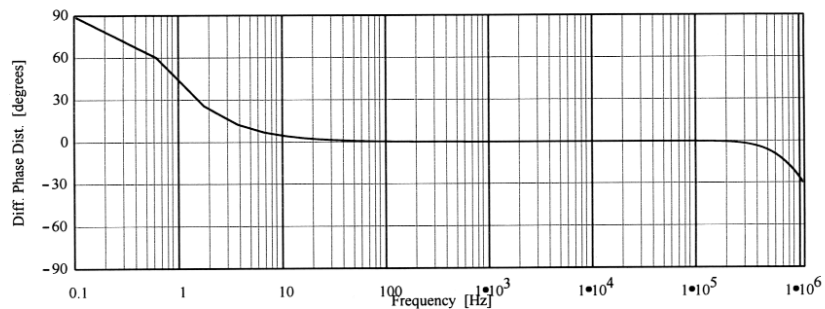
Frequency Response; Vertical 1 dB/div; Horizontal .1 Hz to 1 MHz (3)



Phase Response; Vertical 30 deg./div; Horizontal .1 Hz to 1 MHz

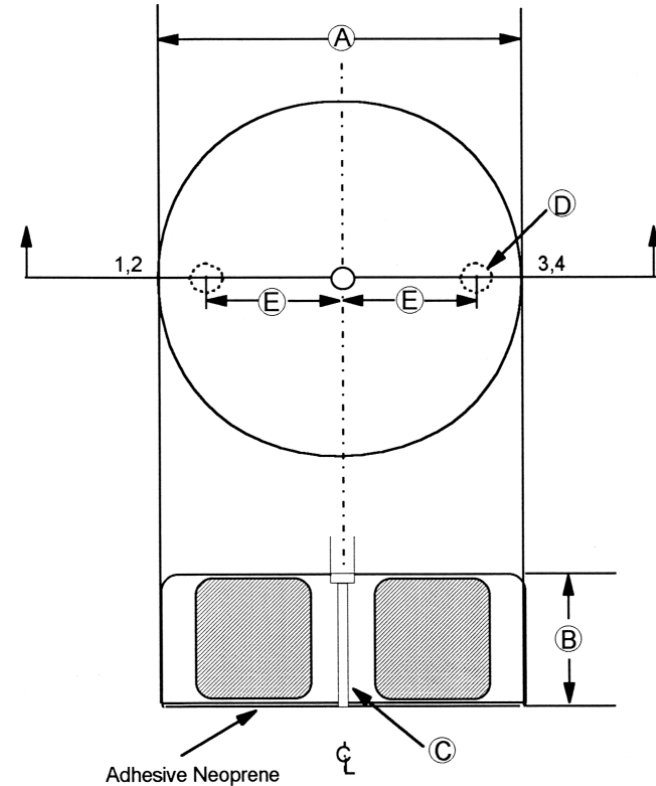


Differential Phase Distortion; vert. 30 deg./div; hor. .1 Hz to 1 MHz  
See: W.M.Leach, Differential Time Delay.; JAES sept.89 pp.709-715



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# Mechanical



REF	Dimension, in mm
A	96.9mm +/- 0.3mm
B	44mm +/- 0.2mm
C	6.1mm +/- 0.1mm
D	10mm +/- 3mm
E	40mm +/- 5mm

Weight: 1.0kg  
Lead Length: 200mm (+/- 10mm)

