

# ULTRA LOW DISTORTION LINE MATCHING TRANSFORMER

# P3176

## Features

- \* Low Cost
- \* Low Distortion
- \* 12.6mm (0.5") seated height
- \* Extended Frequency Response
- \* IEC 950, UL1950 and EN 60950 certified
- \* UL Recognized Component
- \* BAPT Certificate of Recognition
- \* Flat TX and RX Responses
- \* High Thermal Stability

## Applications

- \* V.90 and V.92 modems

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## DESCRIPTION

P3176 is intended for V.90 and V.92 (56kbps) modems and other high-speed applications where low distortion at high power levels and very low voiceband frequencies is required at a competitive price.

P3176 is mechanically compatible with industry standard P1200 and P2001 and electrically and mechanically compatible with P3146.

P3176 has extended flat frequency response from 30Hz to 4kHz with very low levels of signal distortion at signal frequencies as low as 150Hz.

P3176 also exhibits stable characteristics over its operating temperature range to maximize data throughput under varying environmental conditions without the need for modem retraining.

P3176 meets international safety standards, being vacuum encapsulated and 100% tested to withstand 6.5kV.

P3176 is certified to IEC 950, EN 60950, UL1950, and EN 41003. P3176 is a UL Recognized Component and is supported by a BAPT Certificate of Recognition and an IEC CB Test Certificate.



to Electronic Techniques  
(Anglia) Limited

## SPECIFICATIONS

### Electrical

At T = 25°C and as circuit Fig. 2 unless otherwise stated.

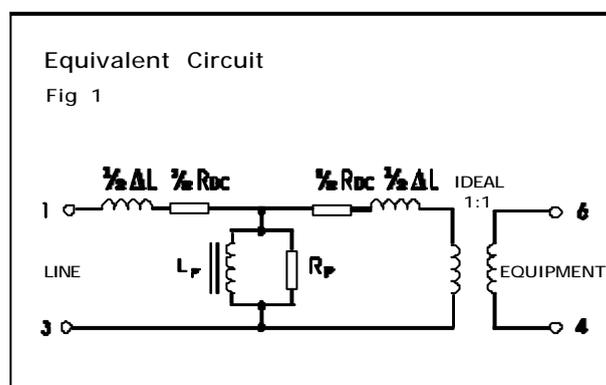
Parameter	Conditions	Min	Typ	Max	Units
Insertion Loss	f = 2kHz, R <sub>L</sub> = 510Ω	-	2.5	-	dB
Frequency Response	LF -3dB cutoff	-	10	-	Hz
	HF -3dB cutoff	-	6	-	kHz
	100Hz - 4kHz	-	±0.6	-	dB
Return Loss	200Hz - 4kHz	16	-	-	dB
Third Harmonic Distortion <sup>(1)</sup>	450Hz 0dBm in line	-	-85	-	dBm
	150Hz -3dBm in line	-	-78	-	dBm
Saturation	Excitation 50Hz	-	-	10	V <sub>rms</sub>
	250V <sub>rms</sub> . Output voltage across line	-	-	65	V <sub>peak</sub>
Voltage isolation <sup>(2)</sup>	50Hz	3.88	-	-	kV <sub>rms</sub>
	DC	5.5	-	-	kV
Operating range: Functional Storage	Ambient temperature	-10	-	+70	°C
		-40	-	+125	°C

Lumped equivalent circuit parameters as Fig. 1

DC resistance, R <sub>DC</sub> <sup>(3)</sup>	Sum of windings	180	-	220	Ω
Leakage inductance ΔL		22.3	-	27.7	mH
Shunt inductance L <sub>p</sub> <sup>(4)</sup>	-43dBm 200Hz	8.5	11	-	H
Shunt loss R <sub>p</sub> <sup>(4)</sup>	-43dBm 200Hz	17	25	-	kΩ

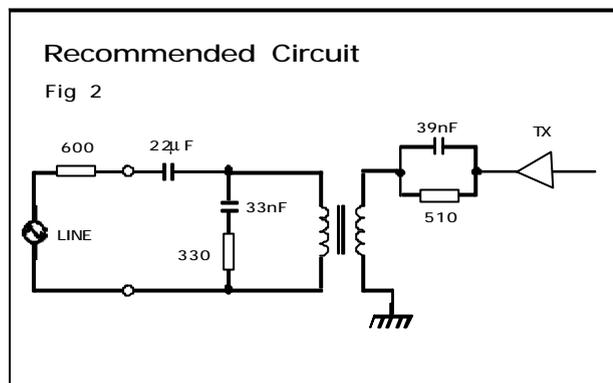
### Notes

1. Third harmonic typically exceeds other harmonics by 10dB.
2. Components are 100% tested at 6.5kV DC.
3. Caution: do not pass DC through windings. Telephone line current, etc. must be diverted using semiconductor line hold circuit.
4. At signal levels greater than -20dBm, L<sub>p</sub> will increase and R<sub>p</sub> will decrease slightly but the effect is usually favourable to the return loss characteristic.

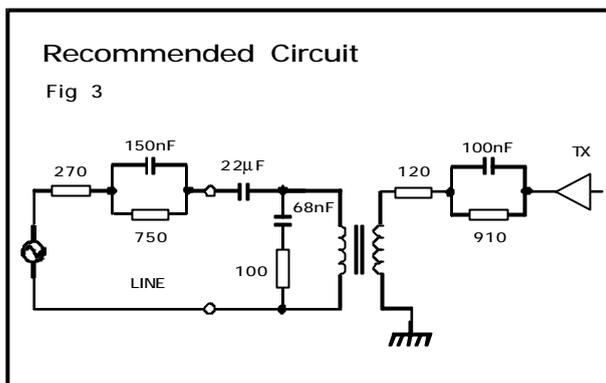


## MATCHING RECOMMENDATIONS

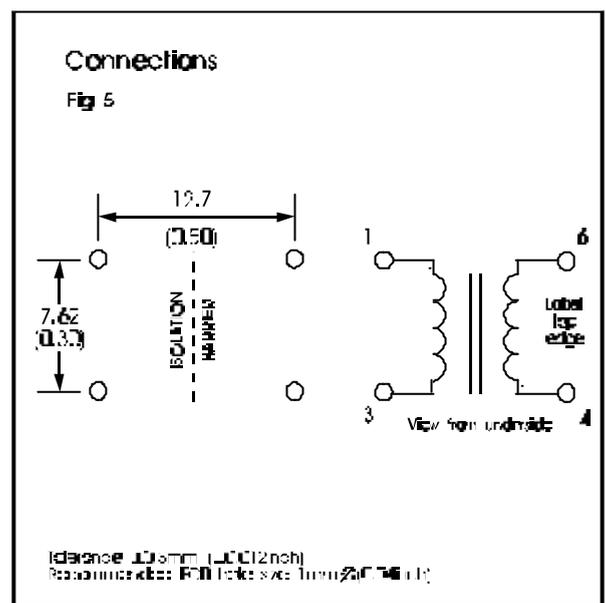
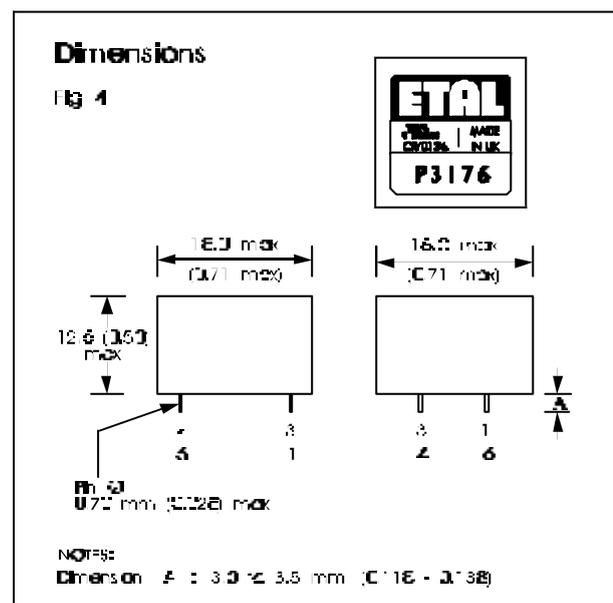
### 600Ω MATCH



### EUROPEAN CTR21 COMPLEX MATCH



## CONSTRUCTION



Dimensions shown are in millimetres (inches).  
Geometric centres of outline and pin grid coincide within a tolerance circle of 0.6mmØ.  
Windings may be used interchangeably as primary or secondary.

**SAFETY**

Constructed in accordance with IEC 950:1991, EN60950:1992 (BS7002:1992) to amendment 5, supplementary insulation, and UL 1950 3rd Edition, reinforced insulation, 250Vrms maximum working voltage, flammability class V-0.  
Distances through solid insulation 0.4mm minimum.

**CERTIFICATION**

Certified under the IEC CB scheme (Certificate GB445W) to IEC 950:1991, up to amendment 4, sub-clauses 1.5, 1.5.1, 1.5.3, 2.2, 2.2.2, 2.2.3, 2.2.4, 2.9.2, 2.9.3, 2.9.4, 2.9.6, 2.9.7, 4.4, 4.4.3.2 (class V-0) and 5.3 for a maximum working voltage of 250Vrms, nominal mains supply voltage not exceeding 300Vrms and a maximum operating temperature of 70°C in Pollution Degree 2 environments, supplementary insulation.

Recognized under the Component Recognition Program of Underwriters Laboratories Inc. to US and Canadian requirements CAN/CSA C22.2 No. 950-95/UL1950, Third Edition, including revisions through to revision date March 1, 1998, based on Fourth Amendment of IEC 950, Second Edition, maximum working voltage 250Vrms, Pollution Degree 2, reinforced insulation.

UL File number E203175.

Approved and certified by BABT to EN 60950 and EN 41003.

BABT Certificate of Recognition CR/0136.

Additionally, Profec Technologies certifies all transformers as providing voltage isolation of 3.88kVrms, 5.5kV DC minimum. All shipments are supported by a certificate of conformity to current applicable safety standards.

**ABSOLUTE MAXIMUM RATINGS**

(Ratings of components independent of circuit).

Short term isolation voltage (1s)	4.6kVrms, 6.5kVDC
DC current	100µA
Storage temperature	-40°C to +125°C
Lead temperature, 10s	260°C

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ISO 9001  
FM 25326

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