



TOE 7610

## 4-quadrant amplifiers DC to 100 kHz 150 W source and sink power

## **TOE 7610**

## **Special features**

- 150 W source and sink power
- Brief load current 3 x I<sub>rated</sub>
- Analog control input 0 to 5 V or 0 to 10 V
- ½ 19" width, 3 HU
   → parallel installation possible
- Slew (rise) rate approx. 6 V/μs to 25 V/μs (depends on model)
- Sensing
- Output at front, optional at rear
- Optimally suitable for electrical noise testing of components against vehicle electrics ripple

#### General

Power supplies for laboratory use are mostly only power sources. They are only able to deliver power with one single polarity, i.e. these instruments only work in one quadrant of the output voltage/current diagram. Common amplifiers deliver voltages with both priorities, but are generally unable to absorb power values in a range comparable to that which they are able to deliver. They therefore mainly work as two-quadrant devices. The TOE 7610 series of four-quadrant amplifiers is able to work as a power sink as well as a power source with equal values of delivered or absorbed power.

The TOE 7610 series is thus a voltage amplifier, bipolar voltage and current source, and current sink in one instrument. Having to combine different instruments, where problems frequently occur with the coordination of individual components and the tendency to oscillate, now belongs to the past.

#### Features of the standard delivery

## **Power Manager**

A selectable Power Manager enables the maximum output power Pmax. to also be processed as a continuous sink power. Numerous setting options of the 4-quadrant amplifier allow optimum connection of the amplifier with the seriesconnected driving equipment, whether this is a laboratory power supply, a calibrator, a function generator or a signal source from a PC in the form of a D/A converter card.

### Selectable input impedance

The input impedance can be switched between 50 Ohm and 100 kOhm and allows convenient selection of a function generator to be controlled and a signal source in the form of a D/A card in the PC without the need for external adaptation.

#### Selectable input voltage range

The adjustable input voltage range allows switching between an input voltage of ±5 V or ±10 V. Therefore no further external adaptation of the control voltage is necessary.

#### Variable DC offset

Using the adjustable DC offset it is possible to directly set a basic voltage (up to  $\pm$  V<sub>rated</sub>) on the 4-quadrant amplifier. This function is particularly suitable for superimposing an externally generated noise signal (e.g. from a function generator) on a constant voltage. This enables optimum simulation of the ripple on vehicle electrics.

## **Brief load current**

All 4-quadrant amplifiers of the TOE 7610 series can be equipped with the TOE 7610/103 option. They are then able to deliver three times the rated current for approx. 3 ms.

### **Output ON/OFF**

A convenient detail of the functionality is the output switch-off which allows immediate switching-off of the voltage and current when in the "Output OFF" position. The output signal path is then electrically interrupted!



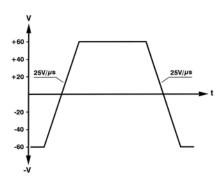
# 150 W source and sink power TOE 7610



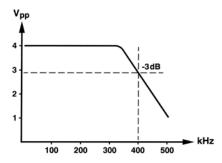
TOE 7610

## **Overview**

Model	Output voltage	Output current	Output power
TOE 7610-10	± 10 V	± 15 A	150 W
TOE 7610-20	± 20 V	± 7.5 A	150 W
TOE 7610-40	± 40 V	± 4 A	160 W
TOE 7610-60	± 60 V	± 2.5 A	150 W



Rise/fall rate with TOE 7610-60



Small signal bandwidth with TOE 7610





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## **Technical specifications**

•	TOE 7610-10	TOE 7610-20	TOE 7610-40	TOE 7610-60
Output voltage	± 10 V	± 20 V	± 40 V	± 60 V
Output current	± 15 A	± 7.5 A	± 4 A	± 2.5 A
Current limiting (Slow mode only)	0 - +15 A	0.754	0 .44	0.254
CURR LIMIT POS CURR LIMIT NEG	0-+15 A 015 A	0 - +7.5 A 0 - <b>-</b> 7.5 A	0 - +4 A 04 A	0 - +2.5 A 02.5 A
	0-134	0 - 7.3 A	0 44	0 - Z.J A
<b>Power</b> (continuously at I <sub>max</sub> ) Source mode	1	50 W	160 W	150 W
Sink mode with		150 W		130 11
Power Manager on	1:	150 W		150 W
Frequency range				
DC input coupling				
Speed slow			30 kHz	
Speed fast		0 Hz -	100 kHz	
AC input coupling		2 U-	30 kHz	
Speed slow			30 kHz	
Speed fast		2 112	TOO KIIZ	
Amplifier				
Input V range $\pm$ 5 V				
var gain Off	6 dB	12 dB	18 dB	21.6 dB
var gain On	6 dB ± 1 dB	12 dB ± 1 dB	18 dB ± 1 dB	21.6 dB ± 1 dB
Input V range ± 10 V var gain Off	O dB	6 dB	12 dB	15.6 dB
var gain On	0 dB ± 1 dB	6 dB ± 1 dB	12 dB ± 1 dB	15.6 dB ± 1 dB
-				
Input impedance DC input coupling				
Input impedance 50 $\Omega$		5(	Ω	
Input impedance $100 \mathrm{k}\Omega$		100	) kΩ	
AC input coupling				
Input impedance 50 $\Omega$	50 Ω			
Input impedance 100 k $\Omega$		100 kΩ		
Max. input voltage (continuous)	12 V <sub>rms</sub>			
Rise rate (Fast mode only)	Approx. 6 V/µs	Approx. 10 V/µs	Approx. 16 V/µs	Approx. 25 V/µs
Noise				
Up to 1 kHz	< 0.1 mV <sub>ms</sub>			
Up to 10 MHz		< 1 mV <sub>ms</sub>		
Harmonic distortion				
Speed Slow	.0.25.0/		. 0.10 %	
Up to 1 kHz Up to 7 kHz	< 0.25 % < 0.80 %		< 0.10 % < 0.30 %	
Up to 10 kHz	< 1.00 %		< 0.50 %	
Speed Fast	11.00 /0		. 5.55 /6	
Up to 20 kHz	< 0.20 %	< 0.20 %		
Up to 40 kHz	< 0.30 %	< 0.30 %		
Up to 60 kHz	< 0.50 %		< 0.50 %	



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### General data

Amplifier output	Floating, insulation $\pm$ 260 V against ground		
Line voltage	$115 \text{ V}/230 \text{ V} \pm 10 \text{ %}, \\ 47 \text{ to } 63 \text{ Hz} \\ 115 \text{ V: T4L; } 230 \text{ V: T2L;} \\ \text{in accordance with IEC} \\ 127-2/\text{III, DIN } 41662 \\ \text{Max. approx. } 400 \text{ VA} \\ \text{Protection class I in} \\ \text{accordance with DIN EN} \\ 61010-1$		
Line fuse			
Power consumption			
Protective measures			
Operating temperature	0 °C to 40 °C		
Storage temperature	-20 °C to 70 °C		
Reference temperature	23 °C ± 1 °C		
Cooling	With thermostatically controlled fan		
Dimensions			
(W x H x D)	216 x 132 x 429 mm		
With feet	216 x 147 x 429 mm		
19" system	Compatible with ½ 19", 3 HU		
Weight	Approx. 9 kg		
Housing	Aluminium		

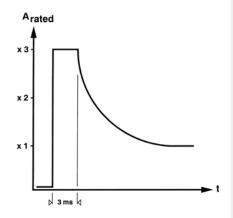
## Ordering data

## Four-quadrant amplifier

TOE 7610-10	DC - 100 kHz,	±10 V / ± 15 A
TOE 7610-20	DC - 100 kHz,	$\pm$ 20 V $/$ $\pm$ 7.5 A
TOE 7610-40	DC - 100 kHz,	± 40 V / ± 4 A
TOE 7610-60	DC - 100 kHz,	$\pm 60 \text{ V} / \pm 2.5 \text{ A}$

## **Options**

TOE 9008	Carrying handle
TOE 9502	19" adapter, 3 HU for single
	installation
TOE 9508	19" adapter, 3 HU, parallel
	installation set for 2 units
TOE 7610/103	Brief load current 3 x I <sub>rated</sub> for
	approx. 3 ms



Brief load current 3  $\times$  I $_{rated}$  for TOE 7610 (option TOE 7610/103)

## Supplied accessories

- 1 power cord
- 1 instruction manual