12MB1200A

12” Woofer for low and mid bass in automotive systems, offering high power capacity and excellent response frequency. This new product is capable of handling up to 1,200 Watts Continous Music Program.

Projected for boxes of small volume, the 12MB1200A is a versatile woofer and of high performance. It is a robust speaker, that it was developed and tested in the most severe conditions of use in Automotive Systems. The characteristics of their components can be checked to proceed:

General construction includes an aluminum sturdy cast frame, an impregnated cloth surround, impregnated long fiber paper cone and stable spider with double cloth.

The voice coil is composed of aluminum wire, resistant adhesives to high temperatures on a fiberglass former.

The 12MB1200A woofer incorporates, a large magnetic assembly central hole and 6 windows on the frame which increases heat dissipation and reduces operating temperature increasing the output power with reduced power compression. The polar piece still counts with a short ring of copper to minimize harmonic distortions.

SPECIFICATIONS

Nominal diameter	305 (12)	mm (in)
Nominal impedance	4	Ω
Minimum impedance @ 258 Hz	3.9	Ω
Power handling		
Peak	2,400	W
Continous Music[1]	1,200	W
NBR[2]	600	W
AES[3]	600	W
Sensitivity (2.83V@1m) averaged from 100 to 1,000 Hz	98	dB SPL
Power compression @ 0 dB (nom. power)	3.48	dB
Power compression @ -3 dB (nom. power)/2	2.17	dB
Power compression @ -10 dB (nom. power)/10	1.08	dB
Frequency response @ -10 dB	70 to 5,000	Hz

[1] Power handling specifications refer to normal speech and/or music program material, reproduced by an amplifier producing no more than 5% distortion. Power is calculated as true RMS voltage squared divided by the nominal impedance of the loudspeaker.
[2] NBR Standard (10,303 Brasilian Standard).
[3] AES Standard (60 - 600 Hz).

THIELE-SMALL PARAMETERS

Fs	66	Hz
Vas	35(1.25)	l (ft^3)
Qts	0.56	
Qes	0.60	
Qms	8.21	
ηo (half space)	1.67	%
Sd	0.0530 (82.15)	m^2 (in^2)
Vd (Sd x Xmax)	71.55 (4.36)	cm^3 (in^3)
Xmax (max. excursion (peak) with 10% distortion)	1.35 (0.053)	mm (in)
Xlim (max.excursion (peak) before physical damage)	25 (0.98)	mm (in)

Atmospheric conditions at TS parameter measurements:

Temperature	23 (73.4)	°C (°F)
Atmospheric pressure	1009	mb
Humidity	53	%

Thiele-Small parameters are measured after a 2-hour power test using half AES power . A variation of ± 15% is allowed.

ADDITIONAL PARAMETERS

βL	11.7	Tm
Flux density	0.89	T
Voice coil diameter	100 (4)	mm (in)
Voice coil winding length	17.3 (56.75)	m (ft)
Wire temperature coefficient of resistance (α25)	0.0041	1/°C
Maximum voice coil operation temperature	322 (611)	°C (°F)
θvc (max.voice coil operation temp./max.power)	0.536 (32.9)	°C/W(°F/W)
Hvc (voice coil winding depth)	12.2 (0.48)	mm (in)
Hag (air gap height)	9.5 (0.37)	mm (in)
Re	3.07	Ω
Mms	64.3 (0.14)	g (lb)
Cms	90	μm/N
Rms	3.27	kg/s

NON-LINEAR PARAMETERS

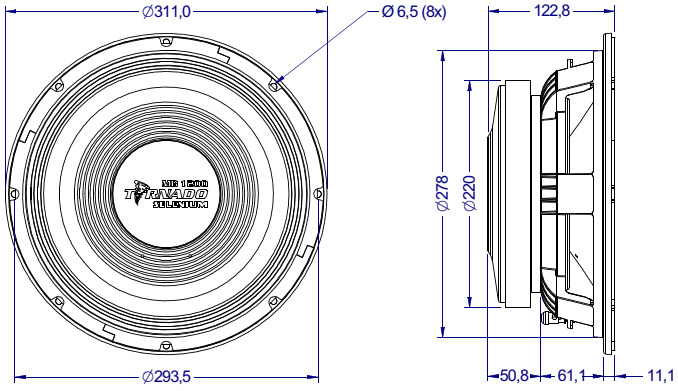
Le @ Fs (voice coil inductance @ Fs)	1.120	mH
Le @ 1 kHz (voice coil inductance @ 1 kHz)	0.349	mH
Le @ 20 kHz (voice coil inductance @ 20 kHz)	0.096	mH
Red @ Fs	0.300	Ω
Red @ 1 kHz	1.655	Ω
Red @ 20 kHz	10.929	Ω
Krm	6.70	mΩ
Kxm	15.00	mH
Erm	0.63	
Exm	0.57	

ADDITIONAL INFORMATION

Magnet material	Barium ferrite	
Magnet weight	3,440 (121)	g (oz)
Magnet diameter x depth	220 x 24 (8.66 x 0.95)	mm (in)
Magnetic assembly weight	8200 (18)	g (lb)
Frame material	Aluminum	
Frame finish	Black epoxy	
Voice coil material	Aluminum	
Voice coil former material	Fiberglass	
Cone material	Long fiber pulp	
Volume displaced by woofer	4.1 (0.14)	l (ft^3)
Net weight	9,040 (19.92)	g (lb)
Gross weight	9,840 (21.69)	g (lb)
Carton dimensions (W x D x H)	35 x 35 x 15 (13.7 x 13.7 x 5.9)	cm (in)

MOUNTING INFORMATION

Number of bolt-holes	8	
Bolt-hole diameter	7.0 (0.27)	mm (in)
Bolt-circle diameter	294 (11.58)	mm (in)
Baffle cutout diameter (front mount)	280 (11)	mm (in)
Baffle cutout diameter (rear mount)	275 (10.83)	mm (in)
Connectors	Silver-plated push terminals	
Polarity	Positive voltage applied to the positive terminal (red) gives forward cone motion	
Minimum clearance between the back of the magnetic assembly and the enclosure wall	75 (3)	mm (in)



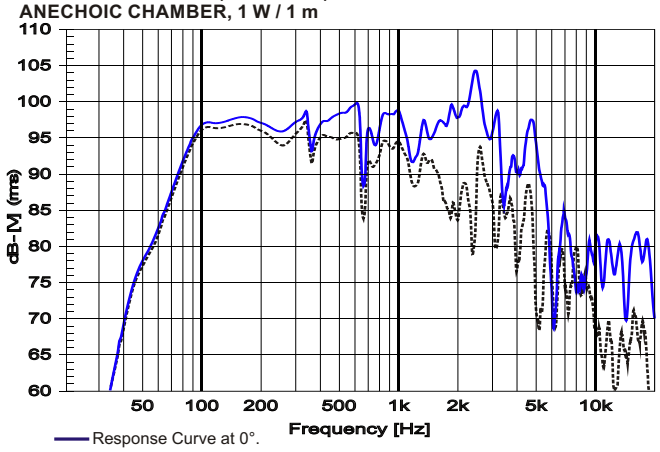
Dimensions in mm.

SELENIUM CAR DIVISION

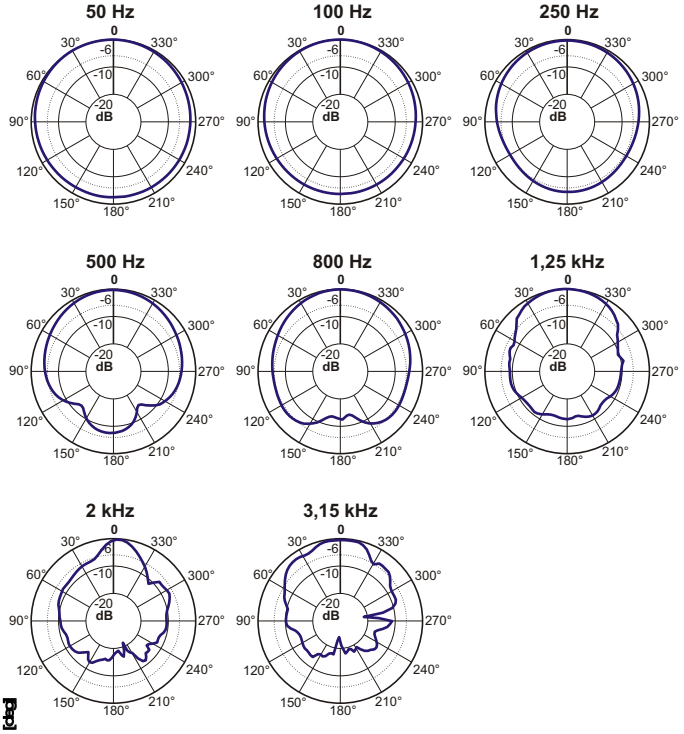
TORNADO SELENIUM

12MB1200A

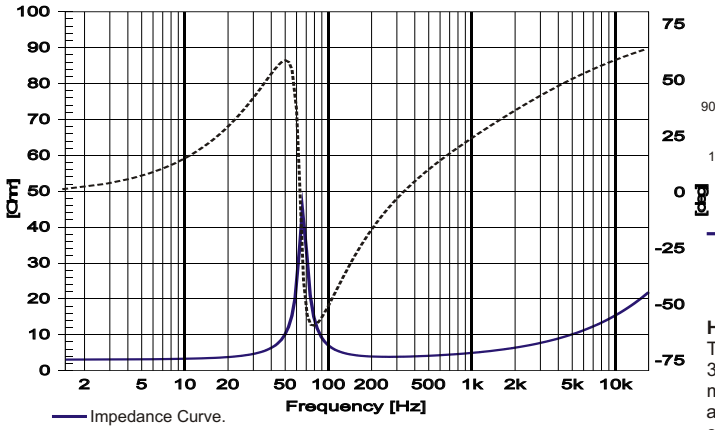
RESPONSE CURVES (0° AND 45°) IN A TEST ENCLOSURE INSIDE AN ANECHOIC CHAMBER, 1 W / 1 m



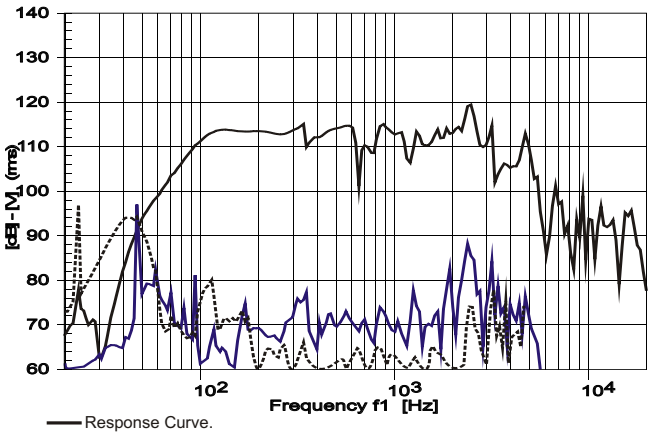
POLAR RESPONSE CURVES



IMPEDANCE AND PHASE CURVES MEASURED IN FREE-AIR



HARMONIC DISTORTION CURVES MEASURED AT 10% AES INPUT POWER, 1 m



HOW TO CHOOSE THE RIGHT AMPLIFIER

The power amplifier must be able to supply twice the RMS driver power. This 3 dB headroom is necessary to handle the peaks that are common to musical programs. When the amplifier clips those peaks, high distortion arises and this may damage the transducer due to excessive heat. The use of compressors is a good practice to reduce music dynamics to safe levels.

FINDING VOICE COIL TEMPERATURE

It is very important to avoid maximum voice coil temperature. Since moving coil resistance (R_E) varies with temperature according to a well known law, we can calculate the temperature inside the voice coil by measuring the voice coil DC resistance:

$$T_B = T_A + \left(\frac{R_B}{R_A} - 1\right)\left(T_A - 25 + \frac{1}{\alpha_{25}}\right)$$

T_A , T_B= voice coil temperatures in °C.
R_A , R_B= voice coil resistances at temperatures T_A and T_B, respectively.
α_{25}= voice coil wire temperature coefficient at 25 °C.

POWER COMPRESSION

Voice coil resistance rises with temperature, which leads to efficiency reduction. Therefore, if after doubling the applied electric power to the driver we get a 2 dB rise in SPL instead of the expected 3 dB, we can say that power compression equals 1 dB. An efficient cooling system to dissipate voice coil heat is very important to reduce power compression.

NON-LINEAR VOICE COIL PARAMETERS

Due to its close coupling with the magnetic assembly, the voice coil in electrodynamic loudspeakers is a very non-linear circuit. Using the non-linear modeling parameters Krm, Kxm, Erm and Exm from an empirical model, we can calculate voice coil impedance with good accuracy.

SUGGESTED PROJECTS

For additional project suggestions, please access our website.

TEST ENCLOSURE

33-Liter volume with a 2 ducts ø 4" by 6.3" length.

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