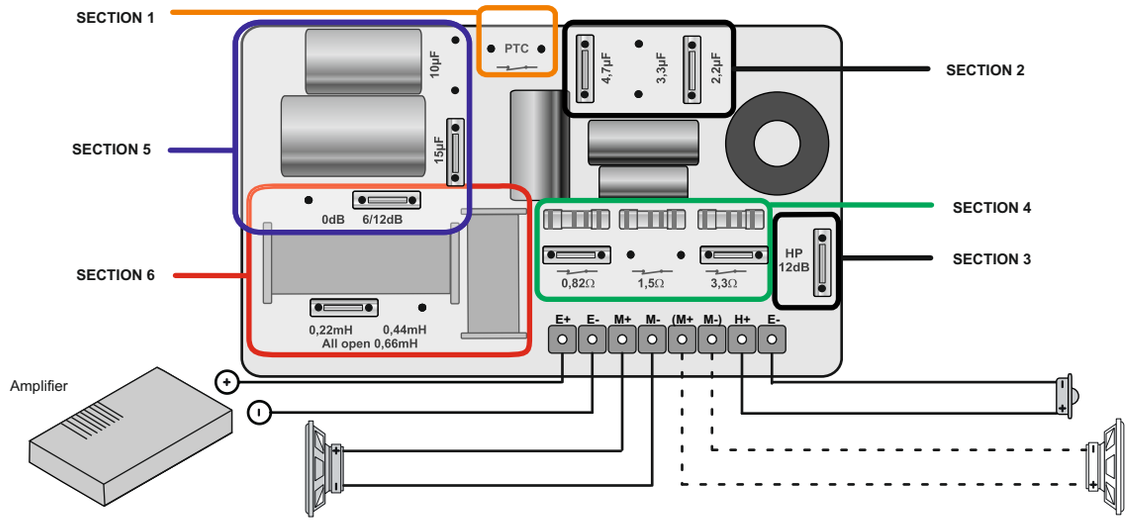
1) INTRODUCTION

The speaker system is adaptable to specific car acoustics. The frequency responce can be optimised according to position and geometric situation of the speaker by simple changes of the leading wire connections (JUMPER). There are simple and difficult adaptation possibilities, we recommend strictly to start with the simple ones while pass to the difficult only just after good experience is done. Unnecessary changes by the JUMPER(s) decrease the sound behaviour of the whole audio system.



DEFAULT SETTING

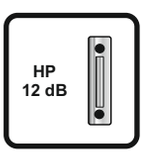
0,82ohm	1,5ohm	3,3ohm	4,7yF	3,3yF	2,2yF	HP 12dB	6dB/12dB	0dB	0,22mH	0,44mH	10yF	15yF	PTC
Jumper		Jumper	Jumper		Jumper	Jumper	Jumper		Jumper			Jumper	

IMPORTANT

The crossover is supplied with a default setting. If some speakers do not work or work too much softly as bad sounding, the crossover has to be adjusted again to the basic settings in order to clarify, if mistakes on crossover setting is the real defect reason or not. So you can avoid that you or the dealer have to check the speaker unnecessarily.

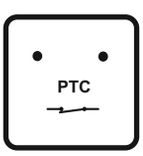
2) BASIC SETTING

Section 3



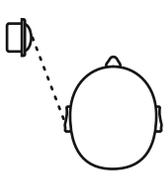
The crossover allows you to adjust the tweeter sounding by 6dB or 12dB cut-off slopes (Section 3). It is recommended to leave the 12dB setting (JUMPER in) so the system achives the full maximum stress and all further possible adjustments can be made easy. The 6dB setting is suitable for who knows the acoustic advantages only and knows which should be the rigth power to use on. By this setting, the tweeter is limited "downward" only with a 6 dB cut-off slope. Therefore the speaker must transfer very high power parts of the midrange (particularly with high capacitances as 10 µF, available on

Section 1



The crossover offers also the possibility to bridge the PTC (tweeter protection circuit) (Section 1). This operation brings minimal acoustic advantages, however the tweeter is not protected against overloads. Also this setting is reserved for specialists, who know the advantages and drive the system with the right power. Bridge the PTC in combo with a "6dB" setting is absolutely dangerous for the tweeter!

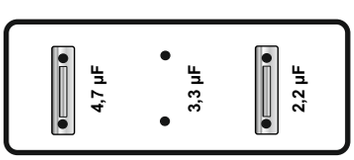
3) ADAPTATION OF THE SOUND BETWEEN 2.500 HZ AND 6.000 Hz



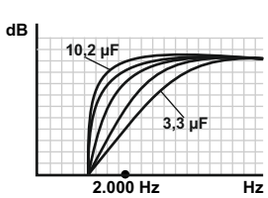
If tweeters are installed by "indirect radiation" (big angle default), there are generally too much of these frequencies. The crossover can adjust the amplitude on that band.

-Next procedure is available on 12dB setting only. If chose 6dB, the cut-off frequency only will be changed.

Section 2

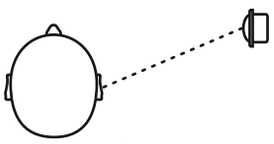


4,7µF	3,3µF	2,2µF	Result
-	Jumper	-	3,3µF decrease 5dB
Jumper	-	-	4,7µF decrease 3dB
-	Jumper	Jumper	5,5µF decrease 2dB
Jumper	-	Jumper	6,9µF basic setting 0dB
Jumper	Jumper	-	8,0µF increase 2db
Jumper	Jumper	Jumper	10,2µF increase 5dB

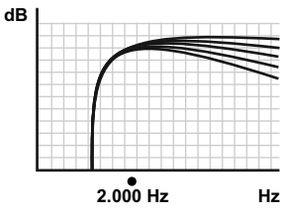


As for reduced C capacitance, the amplitude within the lower range is reduced. If the amplitude on the cut-off range is too quiet, the amplitude can also be increased by increasing C. Notice that on variation of capacitance, the characteristic of the filter will change. By large capacitance, the power which is supplied to the tweeter, strongly increases.

4)ADAPTATION OF THE SOUND ON SUPER-HIGH FREQUENCIES

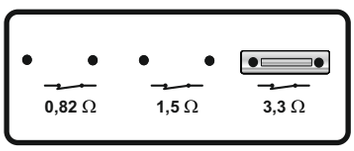


If tweeters are installed by “direct radiation” (low angle default), they will sound too loud on the super-high frequencies range.



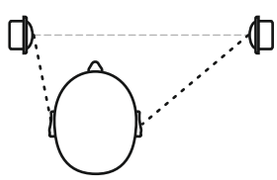
By increasing the resistance R, the amplitude will be reduced in the super-high frequency range.

Section 4



0,82 Ohm	1,5 Ohm	3,3 Ohm	Result
Jumper	Jumper	Jumper	0 Ohm increase 1,5dB
-	Jumper	Jumper	0,82 Ohm increase 0,8dB
Jumper	-	Jumper	1,5 Ohm basic setting
-	-	Jumper	2,32 Ohm decrease 2dB
Jumper	Jumper	-	3,3 Ohm decrease 3dB
	Jumper	-	4,12 Ohm decrease 4dB
Jumper	-	-	4,8 Ohm decrease 4,5dB
-	-	-	5,62 Ohm decrease 5dB

5)ADAPTATION OF THE WHOLE HIGH FREQUENCIEY FIELD

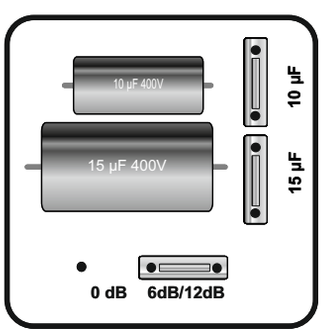


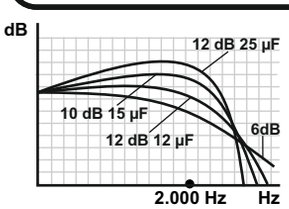
The level can be adapted across the whole high frequency area by increasing (decreasing) C and simultaneous decreasing (increasing) R. The common front-stage audio systems have sounding problems caused by different distances between driver and tweeters, combined with different angle defaults of the left and right tweeter.
The specialist knows how to adapt the left, respectively the right tweeter itself, according to the 3) and 4) points.

6)ADAPTATION OF THE MID FREQUENCIES

The crossover allows you to tune the mid-range by different cut-off slopes: 0 dB, 6dB or 12 dB, limiting it thereby upward differently. Depending on the position of the loudspeakers, each operation can be favourable. Usually, however, the 12 dB operation is the most fafourable for the characteristic of a 165mm speaker.

Section 5





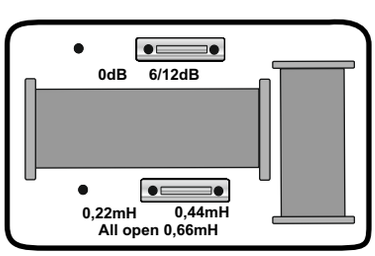
0 dB Activate by changing the JUMPER of the right 6/12 dB in the left 0 dB range. Thus the midrange is not limited upward. Advantage is that no units are running, which could cause a damping effect. Thus the best efficiency is attainable.

6 dB JUMPER has to be put in 6/12 dB position while the 15µF and 10µF bridges have to be out. This increases the “upward” limitation of the midrange additionally by 6 dB. Thus superelevated parts of the midranges can be decreased.

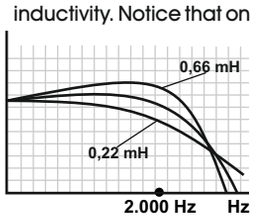
12 dB Insert JUMPER in the “6/12 dB” position and insert JUMPER(s) in positions “15µF”, “10µF” or in both for 25µF C value, changing filter’s characteristic. Higher C value means stronger presence of frequencies within the range of the cut-off point. This setting tune the sound by positions of loudspeakers
With typical 2-way compo systems we recommend the usage of 15 µF or 10 µF (bridge in it).
The „DUAL“ compo systems (two midbass per side) should be used with 15µF or 25 µF.

6/12 dB	10 µF	15 µF	Result
Jumper	Jumper	-	Capacity 10 µF
Jumper	-	Jumper	Capacity 15 µF
Jumper	Jumper	Jumper	Capacity 25 µF

Section 6



If the inductivity is decreased, the amplitude within the higher range is going higher. If the amplitude on the cut-off range is too high, the amplitude can be reduced by decreasing the inductivity. Notice that on variation of inductivity, the characteristic of the filter will change.

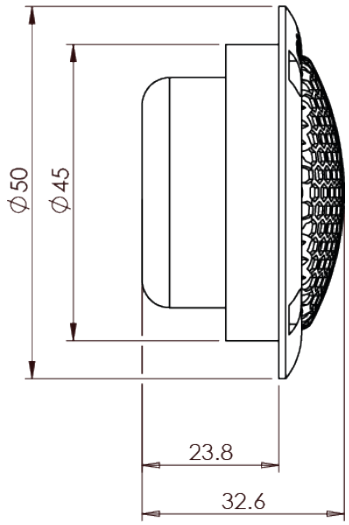


0db	6/12dB	0,22mH	0,44mH	Result
-	Jumper	-	Jumper	Coil 0,22mH
-	Jumper	Jumper	-	Coil 0,44mH
-	Jumper	-	-	Coil 0,66mH

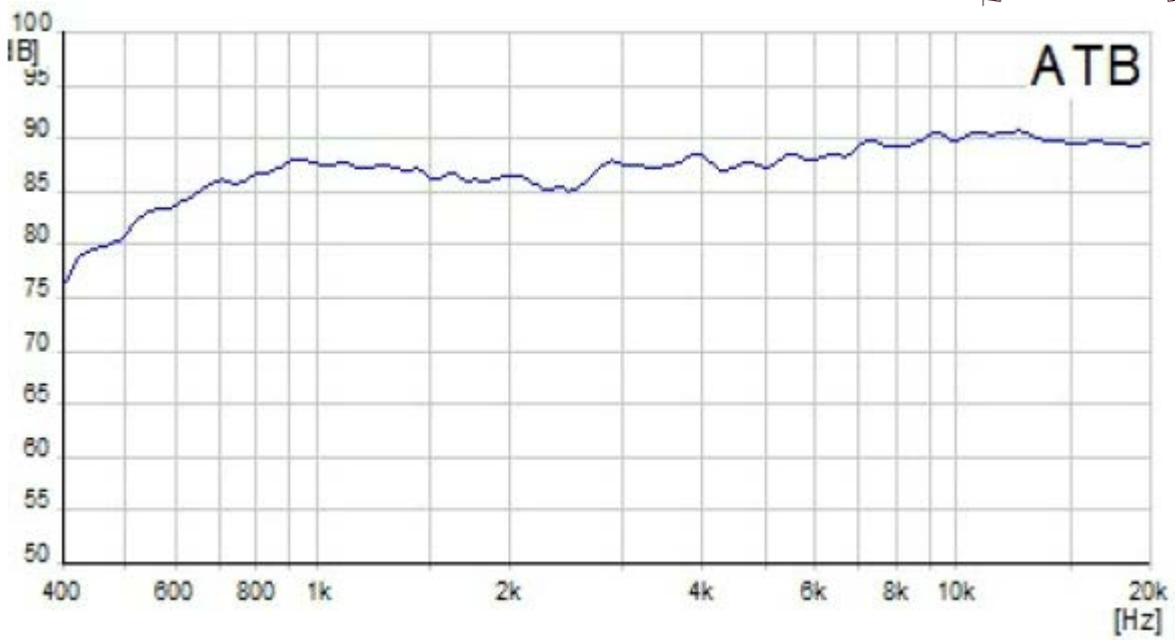
GLADEN®
GERMAN TECHNOLOGY

PRO 25

Specifications:



Name		***HG-25PRO***
DC resistance	*Rdc*	***3,4 Ω***
Nominal impedance	*ZN*	***4 Ω***
Resonance frequency	*fs*	***720 HZ***
Voice coil diameter		***25 mm***
Dome/Kalotte		***Fine cloth***
Cut-off Frequency / Trennfrequenz		***> 3000 Hz 12 dB/Oct***
		> 2300 Hz 18 dB/Oct
		>1600 Hz 24dB/Oct



GLADEN
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PRO 165

Specifications:

Cone:	***Paper (sand coated)***
Spider:	***Nomex***
Surround:	***SBR (rubber)***
Coil former:	***Fibreglass (GFK)***
Basket:	***Aluminum***
Dust cap:	***Fabric***

Name		***HG-165PRO DC-3***
DC resistance	*Rdc*	***2,7 Ω***
Nominal impedance	*ZN*	***3 Ω***
Resonance frequency	*fs*	***58,79 HZ***
Voice coil diameter		***37 mm***
Mechanical Q factor	*Qms*	***10,44***
Electrical Q factor	*Qes*	***0,7***
Total Q factor	*Qts*	***0,65***
Moving mass Mms		***14,88 g***
Effective piston area	*Sd*	***135 cm²***
Mechanical resistance	*Rms*	***0,53 Kg/s***
Compliance	*Cms*	***0,49 mm/N***
Force factor	*BL*	***4,61Tm***
Equivalent air volume	*Vas*	***12,61 dm3***
Efficiency	*η*	***0,35 %***
SPL 2,83V/1m		***92,2 dB***