REFERENCE SERIES SUBWOOFERS

MW10D
MW12D

WELCOME
Thank you for buying a DLS Reference subwoofer.
The subwoofer must be installed correctly in order to work well. This manual will show you how to install it like a pro. Please read the entire manual before beginning the installation.
Install the subwoofer yourself if you feel confident with our instructions and if you have the proper tools. However if you feel unsure, turn over the installation job to someone better suited to it.
The speakers are designed for enclosure mounting. In "open air" installations the power handling capacity is reduced by 30% from the nominal value. We don't recommend "open air" installations for Reference subwooers.

CONNECTION OF SUBWOOFER
How to connect depends on what type of amplifier you use. The best is to follow the instructions given in the manual for the amplifier. Most amplifiers today have built-in lowpass crossover and possibilities to connect your subwoofer in bridge mode.
Two 4 ohm subwoofers are often connected in stereo mode since most amplifiers can´t handle bridge mode loads below 4 ohms.

Make sure to connect in a way that don´t ruin the amplifier. If you have a DLS Ultimate amplifier it´s possible to connect the two subwoofers in parallel, these ampliers are 1 ohm stable.

We also recommend the use of a subsonic highpass filter. This gives a better bass reproduction with less "rumble". In most DLS amplifiers this feature is already built-in.
For wiring use high class speaker wires, min AWG13 (2.5 mm^2). For example **DLS SC 2x4.**

ENCLOSURE DAMPING
Most enclosures should be damped inside with syntetic (acoustic) wool or damping mat (line). Attach the damping material on the wall opposite from the speaker and port.
In a vented enclosure the speaker and port should be on the same side, otherwise a fade-out of some frequencies can occur. In most vehicles, except for SEDAN cars, the speaker and port should be directed backwards for best result.

RUNNING-IN PERIOD
Allow the speaker to play for at least 15-20 hours. After this time the performance is correct.

Technical Assistance
For technical assistance ask the shop where the product was sold or the distributor in your very country.You can always phone the DLS Helpdesk in Sweden + 46 31 840060 or send an e-mail to info@dls.e
Information can also be found on our WEB-site www.dls.se

We follow a policy of continuous advancement in development. For this reason all or part of specifications & designs may be changed without prior notice.

SUBWOOFER ENCLOSURES, GENERAL
Build your enclosure in a stable and airtight material. The best is MDF-board, 19 mm, or particle board, 22 mm. Larger enclosures must have bracing inside to avoid vibrations. The enclosure must be completely airtight. Use sealing compound in all joints, also around the cable terminals. The size of the enclosure is decided by the speaker data.

VENTED ENCLOSURES
A speaker in a vented enclosure has a higher efficiency (+3 dB) and higher power handling capacity than in a sealed enclosure. In a vented enclosure the sound from the speaker and the port work together creating a higher sound level. The sound from the port must come out in the same phase as from the speaker otherwise the result is bad.
The size of the vented enclosure is decided by the speaker data just as for the sealed one.
The size of the vehicle often decides the practical size of the enclosure. A smaller enclosure has a higher resonant frequency than the larger one. The size of the enclosure should not be so big that the speaker plays below it´s own free air resonance (Fs), then it loose in power handling capacity.
The port does not have to be fully inside the enclosure as long as the area and length are correct. Sometimes you need two or more ports in an enclosure. You can convert from one to two or more ports as long as the total port area is the same.
MW10D & MW12D works well in vented enclosures. We don't recommend sealed enclosures for these subwoofers.

IMPORTANT!
Think of the speaker weight when you do your install. Use heavy bolts when fastening the sub to the enclosure baffle.

WARRANTY SERVICE
This speaker is covered by warranty, depending on the conditions in the country where it is sold. If the speaker is returned for service, please include the original dated receipt with the product.

DLS Svenska AB
P.O. Box 13029
SE-40251 Göteborg, Sweden
Tel: +46 31 840060
Fax: +46 31 844021
E-mail: info@dls.se
www.dls.se

Technical specifications for DLS Reference MW10D

	MW10D
Size	25 cm (10")
Impedance	4 ohm
Nom. power (RMS)	400 W (max 600)
Freq. range	25 Hz - 2 kHz
Voice coil, diameter	75 mm (3")
Voice coil, length	20 mm (0,79")
X-max	+-9 mm (0,35")
Cms	137
SD	363 cm^2
Cone material	Magnesium one cone body
Magnet weight	50 oz (1,42 kg)
Magnet, diameter	156 mm (6,14")
Installation depth	125 mm (4,92")
Mounting hole	236 mm (9,29")
Outer diameter	266 mm (10,47")
Weigth	5,3 kg (11,68 lbs)

	Single voice coil
Re, DC-resistance	3,5 ohm
BL product	17,3
Sensitivity (SPL 1W/1m)	87,4 dB
Resonant freq. (Fs)	36,9 Hz
Vas (litre)	25,7
Vas (ft^3)	0,91
Qms	2,33
Qes	0,36
Qts	0,31

Technical specifications for DLS Reference MW12D

	MW12D
Size	30 cm (12")
Impedance	4 ohm
Nom. power (RMS)	400 W (max 600)
Freq. range	20 Hz - 2 kHz
Voice coil, diameter	75 mm (3")
Voice coil, length	20 mm (0,79")
X-max	+-9 mm (0,35")
Cms	162
SD	531 cm^2
Cone material	Magnesium one cone body
Magnet weight	140 oz (3,97 kg)
Magnet, diameter	180mm (7,09")
Installation depth	153 mm (6")
Mounting hole	282 mm (11,1")
Outer diameter	313 mm (12,32")
Weigth	9,7 kg (21,3 lbs)

	Single voice coil
Re, DC-resistance	3,5 ohm
BL product	17,5
Sensitivity (SPL 1W/1m)	93,5 dB
Resonant freq. (Fs)	39,8 Hz
Vas (litre)	64,9
Vas (ft^3)	2,29
Qms	3,16
Qes	0,28
Qts	0,26

ABOUT THE RECOMMENDED ENCLOSURES

The performance of these recommended enclosures will vary from vehicle to vehicle. It is more difficult to get a tight and well defined bass in a SEDAN vehicle because of the tightness between trunk and interior. In most cases the recommended enclusures below is the best choise. The vented box is to be preferred.

- The given enclosure volume is the inner volume.

- Volumes occupied by speaker and ports have already been added to the given enclosure volumes so don't add any more volume.

- Use DLS bass port kits for best result.
There are two flanges coming with this kit. The larger one is for the outside, and the smaller one should be attached to the tube inside the enclosure.
Make a round hole in the box where you want to mount the bass port.

The larger flange should beattached to the outside of the box. Fasten it to the box with screws or with some glue. There are prepared drill holes on the back of the flange.
The smaller flange is for the inner end of the tube. Use a PVC-glue to attach it to the tube.
Then glue the tube to the port mounted in the box.
Use sealing compound round the flange to make the box as airtight as possible.

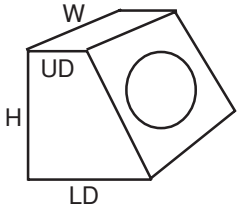
ENCLOSURE PLACING IN DIFFERENT TYPES OF VEHICLES

In **small vehicles** like VW Golf, Peugeot 306 and similar the bass box should be installed with both speaker and port directed backwards. Alternatively booth speaker and port can be directed upwards. This way of mounting is valid for all types of vehicles where the trunk is incorporated with the inner compartment.
In **sedan vehicles** with the passenger compartment separated from the trunk, the enclosure should be installed with booth speaker and port directed towards the rear seat. Some cars have an opening in the middle of the rear seat for loading skis etc. You can install the enclosure behind this opening and direct speaker or port through this opening. There must be some free space in front of the port, (between the rear seat and the port opening).
In **large vehicles** like station wagons the best sound is achieved with the enclosure installed behind the rear seat with booth speaker and port directed backwards. Alternatively you can install the enclosure on one side of the luggage compartment.

CALCULATE YOUR OWN ENCLOSURE

Box volumes:
When calculating the inner volume of an enclosure you just multiply the width (W) x height (H) x depth (D).
Use measures in dm and you will get the answer in liters.
A trapezoid box is calulated as this:

$$\text{Vol} = \text{width (W)} \times \text{height (H)} \times \frac{\text{upper depth (UD)} + \text{lower depth (LD)}}{2}$$



Be sure to measure the inside dimensions.

RECOMMENDED ENCLOSURE MW10D

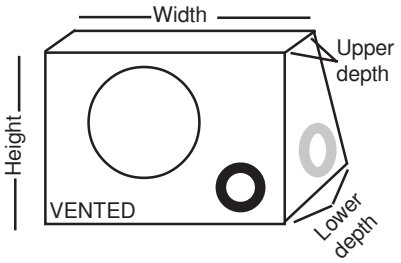
Vented enclosure:

Wiring : Singe voice coil
Volume : 23 / 0,81 (litre / ft³)
Port* : 3”(6,8 cm) x 20 cm / 7,87”
Damping : Line inside
F3 : 40,1 Hz

* Use the BP 75 port kit coming with the subwoofer. The tube is already cut to it’s correct length.

Outside box dimensions:

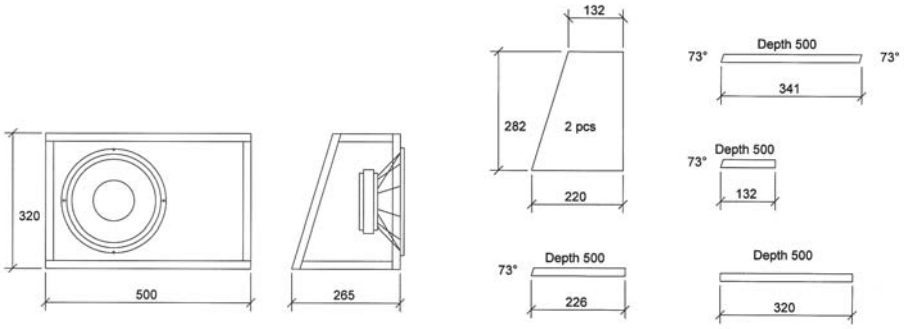
Width : 500 mm (19,69”)
Height : 320 mm (12,60”)
Lower depth : 265 mm (10,43”)
Upper depth : 165 mm (6,5”)
Material : MDF 19 mm (3/4”)



For best result, use the recommended enclosure.
If you want to modify the dimensions, use the calculation methods described on previous page. As an alternative the port can also be mounted on the side of the enclosure.

Technical drawing for a 23 litre enclosure.

The MW10D can work well in a 23 litre vented enclosure.
Here is the drawing for the box and the separate boards needed to build a suitable enclosure.



RECOMMENDED ENCLOSURE MW12D

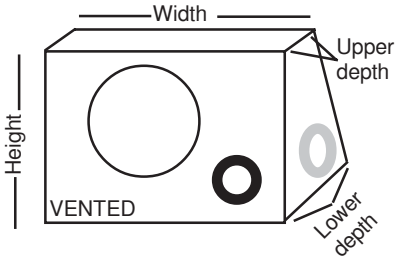
Vented enclosure:

Wiring : Single voice coil
Volume : 35 / 1,24 (liter / ft³)
Port* : 4”(10,2 cm) x 20 cm / 7,87”
Damping : Line inside
F3 : 54 Hz

* Use the BP 110 port kit coming with the subwoofer. The tube is already cut to it’s correct length.

Outside box dimensions:

Width : 550 mm (21,65”)
Height : 350 mm (13,78”)
Lower depth : 307 mm (12,09”)
Upper depth : 207 mm (8,15”)
Material : MDF 19 mm (0,75”)



For best result, use the recommended enclosure.
If you want to modify the dimensions, use the calculation methods described on previous page. As an alternative the port can also be mounted on the side of the enclosure.

Technical drawing for a 35 litre enclosure.

The MW12D can work well in a 35 litre vented enclosure.
Here is the drawing for the box and the separate boards needed to build a suitable enclosure.