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PERFORMANCE SERIES SUBWOOFERS

W308B,
W310D, W312D

OA8,
OA10D, OA12D

WELCOME

Thank you for buying a DLS PERFORMANCE series 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. When installed "open air" the power handling capacity is reduced with 30% from the nominal value. We don't recommend "open air" installations except for OA8, OA10D and OA12D that are designed for open air installations.

CONNECTION OF SUBWOOFER

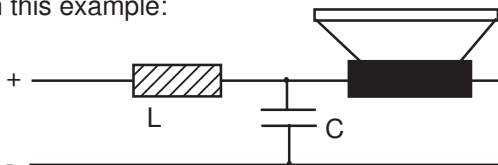
How to connect depends on what type of amplifier you use. The best is to follow the instructions given in the manual for the amplifier. Most amplifiers today have built-in lowpass crossover and possibilities to connect your subwoofer in bridge mode.

Two 4 ohm subwoofers are often connected in stereo mode since most amplifiers can't handle bridge mode loads below 4 ohms. If you have a DLS Ultimate amplifier it's possible to connect two 4 ohm subs in bridge mode, these amplifiers 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 mm²). For example **DLS SC 2x2,5**.

If you have an amplifier without built-in crossover you must use a passive crossover between amplifier and subwoofer like in this example:



Connected with a 12 dB passive low-pass x-over = 10 mH coil in series and a bipolar capacitor of 300 microFarad in parallel. Crossover frequency is 95 Hz.

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.

SEALED ENCLOSURES

Sealed enclosures are easy to build. The size is not critical, but it can't be too small. The speaker data such as Fs, Qts, Vas and X-max decides the size of the enclosure.

Large speakers need larger boxes. Two speakers need a box of the double size etc. The enclosure must be completely airtight.

A sealed enclosure should be filled with acoustic wool up to 75 - 100%.

A sealed enclosure has a lower efficiency than vented enclosures but they can handle high power and are easy to build.

A subwoofer in a sealed enclosure creates a tight bass suitable for the audiophiles listening to classical music, jazz and soft rock. All the Classic subwoofers except for OA12D, are recommended NOT to use in sealed enclosures.

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 its own free air resonance (Fs), then it loses 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.

BANDPASS ENCLOSURES

In all bandpass enclosures the speakers are hidden inside the enclosure, all sound is coming out through the ports. There are different types of bandpass enclosures and they have in common that they are a bit more difficult to build. Most of our subwoofers can be used in bandpass enclosures

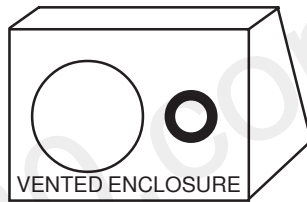
TECHNICAL SPECIFICATIONS FOR DLS PERFORMANCE SUBWOOFERS

	W308B	W310D	W312D
Size	20 cm (8")	25 cm (10")	30 cm (12")
Impedance	4 ohm	4 ohm	4 ohm
Nom. power (RMS)	100 W (max 150)	120 W (max 200)	150 W (max 250)
Freq. range	30 Hz - 2 kHz	25 Hz - 2 kHz	20 Hz - 2 kHz
Sensitivity	87,1 db	89 db	91 db
Voice coil diameter	50 mm (2")	50 mm (2")	50 mm (2")
Voice coil height	22 mm (0,87")	22 mm (0,87")	22 mm (0,87")
Re	3,1 ohm	3,4 ohm	3,3 ohm
Voice coil inductance, 1 kHz	1,5 mH	1,1 mH	1,1 mH
BL product	7,8	11,5	12,22
X-max	+5 mm (0,2")	+5 mm (0,2")	+5 mm (0,2")
Suspension compliance CMS	478	349	317
SD- Effective piston area	214 cm ²	314,6 cm ²	452,3 cm ²
Resonant freq. (Fs)	36,3 Hz	36 Hz	30 Hz
Vas (liters)	30,5	48,6	115
Vas (ft ³)	1,08	1,72	4,06
Qms	3,55	2,49	3,26
Qes	0,45	0,32	0,36
Qts	0,40	0,28	0,34
Cone material	Coated non-compress paper	Coated non-compress paper	Coated n-cp paper
Magnet weight	40 oz (1,13 kg)	40 oz (1,13 kg)	50 oz (1,42 kg)
Magnet diameter	4,7" (120 mm)	5,7" (145 mm)	6,14" (156 mm)
Installation depth	3,94" (100 mm)	5,28" (134 mm)	5,83" (148 mm)
Mounting hole	7,08" (180 mm)	9,45" (240 mm)	11,1" (282 mm)
Outer diameter	8,27" (210 mm)	10,43" (265 mm)	12,13" (308 mm)
Weighth	6,6 lb (3 kg)	8,82 lb (7 kg)	10,36 lb (4,7 kg)

RECOMMENDED ENCLOSURES FOR W308B, W310D & W312D

RUNNING-IN PERIOD

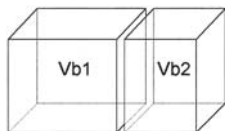
Allow the speaker to play for at least 15-20 hours. After this time the performance is correct.



F3 = approximative lower frequency for vented boxes in Hz. Often called F-3 dB point = the point where the power is 50% lower.
Fb = Box resonant frequency

Subwoofer	Volume (liters/ft3)	Port	Damping	F3	Fb
W308B	vol: 18 / 0,64	3" x 30 cm/ 11,8"	Line inside	45,9 Hz	45 Hz
W310D	vol: 28,5 / 1,0	3" x 14 cm/5,5"	Line inside	48,4 Hz	45,0 Hz
W312D	vol: 41,6 / 1,47	4" x 32 cm/12,6"	Line inside	47,1 Hz	40,2 Hz

SEALED BANDPASS



Vb1=rear, Vb2=front

The speaker is installed in Vb1 playing into chamber Vb2 where the port(s) are installed.

W310D

Vb1	Vb2	port Vb2
22,17	13,98	1x10,2x35,5 cm
0,78 ft ³	0,49 ft ³	1x4"x14" (US)

F3 Vb1: 40 Hz, Vb2: 118 Hz

W308B

Vb1	Vb2	port Vb2
8,02	4,93	1x6,8x33 cm
0,28 ft ³	0,17 ft ³	1x3"x13" (US)

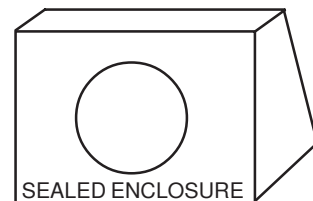
F3 Vb1: 50 Hz, Vb2: 141,9 Hz

W312D

Vb1	Vb2	port Vb2
32,84	37,23	2x10,2x19 cm
1,16 ft ³	1,32 ft ³	2 x 4" x 7,5" (US)

F3 Vb1: 45 Hz, Vb2: 99 Hz

Vb1	Vb2	port Vb2



W310D sealed enclosure:
18 liters / 0,64 ft³

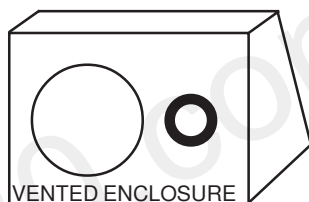
We don't recommend the use of sealed enclosures for W308B & W312D

TECHNICAL SPECIFICATIONS FOR DLS PERFORMANCE SUBWOOFERS

	OA8	OA10D	OA12D
Size	20 cm (8")	25 cm (10")	30 cm (12")
Impedance	8 ohms	4 ohm	4 ohm
Nom. power (RMS)	150 W (max 250)	180 W (max 360)	210 W (max 400)
Freq. range	30 Hz - 2 kHz	25 Hz- 2 kHz	20 Hz-2 kHz
Sensitivity	85,1 dB	86,5 dB	88,4 db
Voice coil diameter	50 mm (2")	50 mm (2")	50 mm (2")
Voice coil height	34 mm (1,34")	34 mm (1,34")	34 mm (1,34")
Re	7 ohm	3,59 ohm	3,55 ohm
Voice coil inductance, 1 kHz	5,7 mH	1,72 mH	1,79 mH
BL product	15,46	11,96	12,53
X-max	+ - 9 mm (0,35")	+ -9 mm (0,35")	+ -9 mm (0,35")
Suspension compliance CMS	375	183	167
SD- Effective piston area	214 cm ²	314,6 cm ²	452,3 cm ²
Resonant freq. (Fs)	32 Hz	39,9 Hz	37,8 Hz
Vas (liters)	23,96	25,5	48
Vas (ft ³)	0,85	0,6	1,69
Qms	2,59	3,19	3,47
Qes	0,39	0,55	0,57
Qts	0,34	0,47	0,49
Cone material	Coated non-compressed paper	Coated non-compressed paper	Coated non-compressed paper
Magnet weight	80 oz (2,27 kg)	80 oz (2,27 kg)	80 oz (2,27 kg)
Magnet diameter	4,72" (120 mm)	5,71" (145 mm)	5,71" (145 mm)
Installation depth	4,72" (120 mm)	6,02" (153 mm)	6,65" (169 mm)
Mounting hole	7,08" (180 mm)	9,45" (240 mm)	11,10" (282 mm)
Outer diameter	8,27" (210 mm)	10,43" (265 mm)	12,13" (308 mm)
Weighth	8,83 lb (3,8 kg)	12,13 lb (5,5 kg)	12,79 lb (5,8 kg)

RECOMMENDED ENCLOSURES FOR OA8, OA10D & OA12D

OA8, OA10D & OA12D subwoofers are designed for open air use but can also be used in these enclosures.

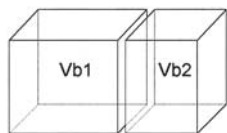


F3 = approximative lower frequency for vented boxes in Hz. Often called F-3 dB point = the point where the power is 50% lower.
Fb = Box resonant frequency

Subwoofer	Volume (liters/ft ³)	Port	Damping	F3	Fb
OA8	15 / 0,53	3" x 44 cm / 17" ***	Line inside	45,1 Hz	
OA10D	29 / 1,02	3" x 28 cm/11"	Line inside	34,7 Hz	35,0 Hz
OA12D	use sealed enclosure				

*** It is impossible to have a 44 cm port inside a 15 liter enclosure! If you want to use the vented box just cut the port tube 2,5 cm / 1" from the back wall for a good function. Doing so the subwoofer sees the port to be longer than it is because the short distance between port and back wall has an influence on the air flow through the port.

SEALED BANDPASS



Vb1=rear, Vb2=front

The speaker is installed in Vb1 playing into chamber Vb2 where the port(s) are installed.

OA10D

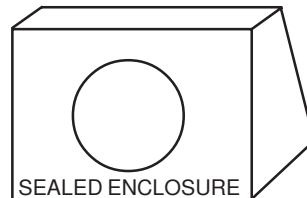
Vb1	Vb2	Port Vb2
11,96	13,35	1x10,2x46 cm
0,42 ft ³	0,47 ft ³	1x4"x18,1" (US)

F3 Vb1: 42,9 Hz, Vb2: 102,1 Hz

OA12D

Vb1	Vb2	Port Vb2
31,68	52,88	3x10,2cm x21 cm
1,12 ft ³	1,87 ft ³	3 x 4" x 8,26" (US)

F3 Vb1: 48,2 Hz, Vb2: 89,6 Hz



OA8 sealed enclosure:

13 liters / 0,46 ft³
 F3 46,7 Hz

OA10D: use vented enclosure

OA12D sealed enclosure:

39 liters / 1,38 ft³
 F3: 49,4 Hz
 or if you want a smaller box:
 27 liters / 0,95 ft³

HINTS & TIPS FOR "DO IT YOURSELF" ENCLOSURE BUILDERS

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 of the vehicle. In this case a bandpass box could be a better choice.

- All volumes are inside measures.
- Volumes occupied by speaker and ports have already been added to the given enclosure volumes.
- Use conical bass ports for best result. (DLS BP-75 or BP-110). If the ports are too long for the box you can use a bend. Either cut the tube and glue it together in angle, or use factory made tube bends. It's easier to use the factory made ones. The total length must be the same as for a straight tube. Make the measure in the center of the tube. The port opening inside the enclosure must not be closer to an interior wall than 3" (75 mm), otherwise it will have negative effects on the airflow.
- The enclosure must be very steady and completely airtight. Use 22 mm particle board or 19 mm MDF-board. The particle board has a self resonant frequency of 14 Hz while the MDF has a resonant frequency of approx. 400 Hz. It's important to do some type of bracing inside the enclosure to avoid vibrations. Volume taken up by bracing should be added to the enclosure volumes.

ENCLOSURE DAMPING

Most enclosures should be damped inside with synthetic (acoustic) wool or damping mat (line). Attach the damping material on the wall opposite from the speaker and port. A sealed enclosure should be filled up to 70-100% with acoustic wool.

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.

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 ENCLOSURE

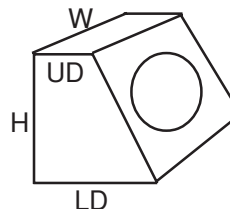
Box volumes:

When calculating the volume of an enclosure you simply multiply the width (W) x height (H) x depth (D).

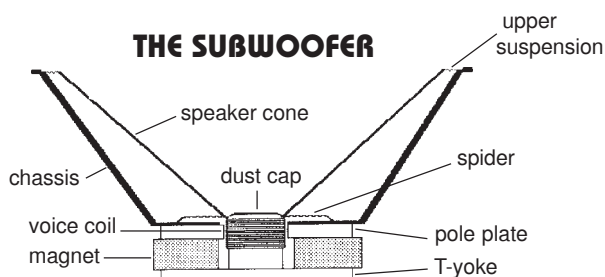
Use measures in dm and you will get the answer in liters.

A trapezoid box is calculated as below:

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



Be sure to measure the inside dimensions.



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.



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.se. 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.



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