



ULTIMATE Nobelium SERIES SUBWOOFERS

Nobelium 10
Nobelium 12
Nobelium 15

*Nobelium is a radioactive metal with atomic number 102. It is named after the Swedish scientist Alfred Nobel

WELCOME

Thank you for buying a DLS ULTIMATE Nobelium 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 Ultimate Nobelium subwoofers.

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.

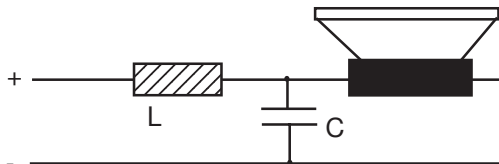
The Iridium subwoofers have dual, four ohm, voice coils. Each voice coil has an impedance of 4 ohms. If they are connected in series the resulting impedance is 8 ohms. If they are connected in parallel the resulting impedance is 2 ohms. Make sure to connect in a way that don't ruin the amplifier. If you have a DLS Ultimate amplifier it's possible to connect the voice coils in parallel, 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.

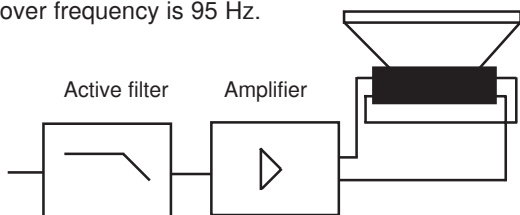
For wiring use high class speaker wires, min AWG13 (2.5 mm²). For example **DLS SC 2x4**.

If you have an amplifier without built-in crossover you must use a passive crossover between amplifier and subwoofer like in this example, one crossover for each voice coil.

Component values are for 4 ohms.



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.



Connection in mono bridge mode with an active x-over. Voice coils connected in series. If you have a 1 ohm stable amplifier the voice coils should be connected in parallel for best performance (for example on a DLS monoblock).

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. The Nobelium subwoofers can be used 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 it's own free air resonance (Fs), if so the power handling capacity drops.

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.

All Nobelium subwoofers can be used in vented boxes.

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. DLS Iridium subwoofers can be used in bandpass enclosures.

IMPORTANT!

Think of the speaker weight when you install it. If you don't mount it properly it can come loose.

Technical specifications for DLS ULTIMATE Nobelium 10

Size	25 cm (10")
Impedance	2 x4 ohm
Nom. power (RMS)	500 W (max 800)
Frequency range	25 Hz - 2,5 kHz
Voice coil, diameter	75 mm (3")
Voice coil, length	40 mm (1,57")
X-max	+14 mm (0,55")
SD	346 cm ²
Cone material	Aluminium
Upper surround	Rubber
Magnet weight	180 oz (5,1 kg)
Magnet, diameter	180mm (7,08")
Installation depth	133 mm (5,24")
Mounting hole	236 mm (9,29")
Outer diameter	266 mm (10,47")
Weight	9,5 kg (20,9 lb)

Data that can vary depending on how the voice coils are connected:

	Single voice coil 4 ohm	Voice coils in parallel 2 ohm
Re, DC-resistance	3,2 ohm	1,7 ohm
Z, impedance	4 ohm	2 ohm
Cms	143	143
Zo (Z max at Fs)	15,92 ohm	14,03 ohm
BL product	9,35	9,21
Sensitivity	85,6 dB	88,2 dB
Resonant freq. (Fs)	43,5 Hz	43,5 Hz
Vas (litre)	26,77	26,75
Vas (ft ³)	0,95	0,95
Qms	3,72	3,72
Qes	0,93	0,51
Qts	0,75	0,45

Technical specifications for DLS ULTIMATE Nobelium 12

Size	30 cm (12")
Impedance	2 x4 ohm
Nom. power (RMS)	600 W (max 1000)
Freq. range	20 Hz - 2,5 kHz
Voice coil, diameter	75 mm (3")
Voice coil, length	40 mm (1,57")
X-max	+14 mm (0,55")
SD	491 cm ²
Cone material	Aluminium
Upper surround	Rubber
Dual spiders	Yes
Magnet weight	180 oz (5,1 kg)
Magnet, diameter	220mm (8,7")
Installation depth	140 mm (5,51")
Mounting hole	282 mm (11,1")
Outer diameter	312 mm (12,28")
Weight	12,2 kg (28 lb)

Data that can vary depending on how the voice coils are connected:

	Single coil, 4 ohm	Voice coils in series, 8 ohm	Voice coils in parallel, 2 ohm
Re, DC-resistance	3,5 ohm	7 ohm	1,9 ohm
Z, impedance	4 ohm	8 ohm	2 ohm
Cms	120,5	193,4	182,2
Zo, (Z max at Fs)	20,3 ohm	71,8 ohm	13,3 ohm
BL product	15,72	21,02	9,12
Känslighet (SPL at 1W)	85,6 dB	90,5 dB	88 dB
Resonant freq. (Fs)	32,2 Hz	34,6 Hz	33,8 Hz
Vas (litre)	41,25	66,1	62,3
Vas (ft ³)	1,456	2,33	2,2
Qms	2,78	3,48	3,53
Qes	0,58	0,37	0,59
Qts	0,48	0,34	0,50

Technical specifications for DLS ULTIMATE Nobelium 15

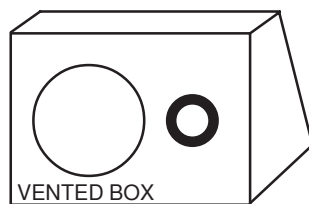
Size	37,5 cm (15")
Impedance	2 x4 ohms
Nom. power (RMS)	600 W (max 1000)
Frequency range	15 Hz - 2,5 kHz
Voice coil, diameter	75 mm (3")
Voice coil, length	40 mm (1,57")
X-max	+14 mm (0,55")
SD	779 cm ²
Cone material	Aluminium
Upper suspension	Rubber
Magnet weight	200 oz (5,67 kg)
Magnet, diameter	220mm (8,7")
Installation depth	176 mm (6,93")
Mounting hole	360 mm (14,17")
Outer diameter	390 mm (15,35")
Weight	13,8 kg (30,4 lb)

Data that can vary depending on how the voice coils are connected:

	Single coil 4 ohm	Voice coils in parallel 2 ohm
Re, DC-resistance	3,6 ohm	1,7 ohm
Z, impedance	4 ohm	2 ohm
Cms	142,5	142,5
Zo, Z max at Fs)	19,4 ohm	17,18 ohm
BL product	11,8	11,4
Sensitivity	90 dB	92,3 dB
Resonant freq. (Fs)	34,7 Hz	34,7 Hz
Vas (liter)	130,7	130,7
Vas (ft ³)	4,6	5,6
Qms	3,62	3,77
Qes	0,82	0,49
Qts	0,67	0,43

RECOMMENDED ENCLOSURES FOR Nobelium10, 12 and 15

VENTED ENCLOSURES



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

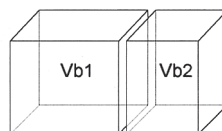
Sub	Connection	Volume (litre/ft3)	Port	Damping	F3	Fb
10"	VC in parallel	31,65 / 1,1	3" x 18 cm/7,1"	Line inside	39,3 Hz	39,0 Hz
12"	Single VC	34,4 / 1,21	3" x 25,7 cm / 10"	Line inside	33,7 Hz	33,0 Hz
12"	VC in series	35,87 / 1,26	4" x 29 cm/ 11,4"	Line inside	46,4 Hz	45,0 Hz
12"	VC in parallel	46,10 / 1,1	4" x 32 cm / 12,6"	Line inside	37,3 Hz	36,9 Hz
15"	VC in parallel	56,5 / 1,99	2x4" x 40 cm / 15,7"	Line inside	50,2 Hz	45,0 Hz

SEALED BANDPASS

Nobelium10 (VC:s in parallel to 2 ohm)

Vb1	Vb2	Port Vb2
20,1	17	2 x 6,8 x 27,6 cm
0,71 ft ³	0,60 ft ³	2 x 3" x 10,8" (US)

F3 Vb1: 44,8 Hz, Vb2: 86,6 Hz



Vb1=rear chamber,
Vb2=front chamber

Nobelium12 (VC:s in parallel to 2 ohm)

Vb1	Vb2	Port Vb2
24,46	32,12	2 x 10,2 x 27 cm
0,86 ft ³	1,13 ft ³	2 x 4" x 10,6" (US)

F3 Vb1: 45 Hz, Vb2: 94 Hz

Nobelium12 (Single VC, 4 ohm)

Vb1	Vb2	Port Vb2
23,95	22,37	1 x 10,2 x 29 cm
0,84 ft ³	0,79 ft ³	1 x 4" x 11,4" (US)

F3 Vb1: 38,5 Hz, Vb2: 79 Hz

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

SEALED ENCLOSURES

Nobelium10, single VC:

28 litres / 0,99 ft³
F3: 52,7 Hz

Nobelium10, dual VC in parallel:

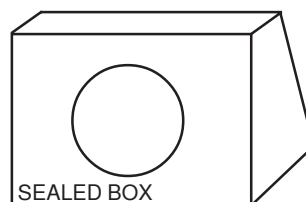
17,4 litres / 0,61 ft³
F3: 73,4 Hz

Nobelium 12, single VC:

23,2 litres / 0,82 ft³
F3: 51,9 Hz

Nobelium 12, dual VC in parallel:

43,72 litres / 1,54 ft³
F3: 52,4 Hz



Nobelium 15, single VC:

45 litres / 1,59 ft³
F3: 51,5 Hz

Nobelium 15, dual VC in parallel:

40 litres / 1,41 ft³
F3: 64,5 Hz

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 band-pass 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 air-tight. 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

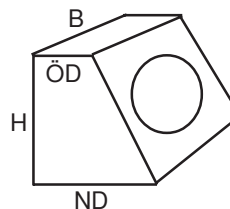
Box volumes:

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

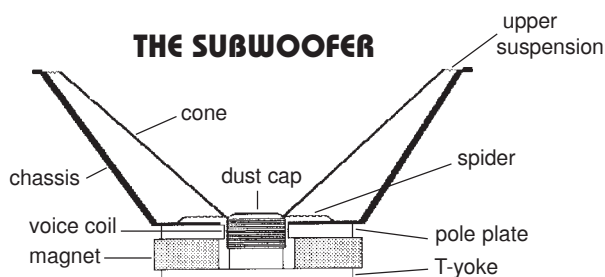
Use measures in dm and you will get the answer in liters.

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.



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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

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