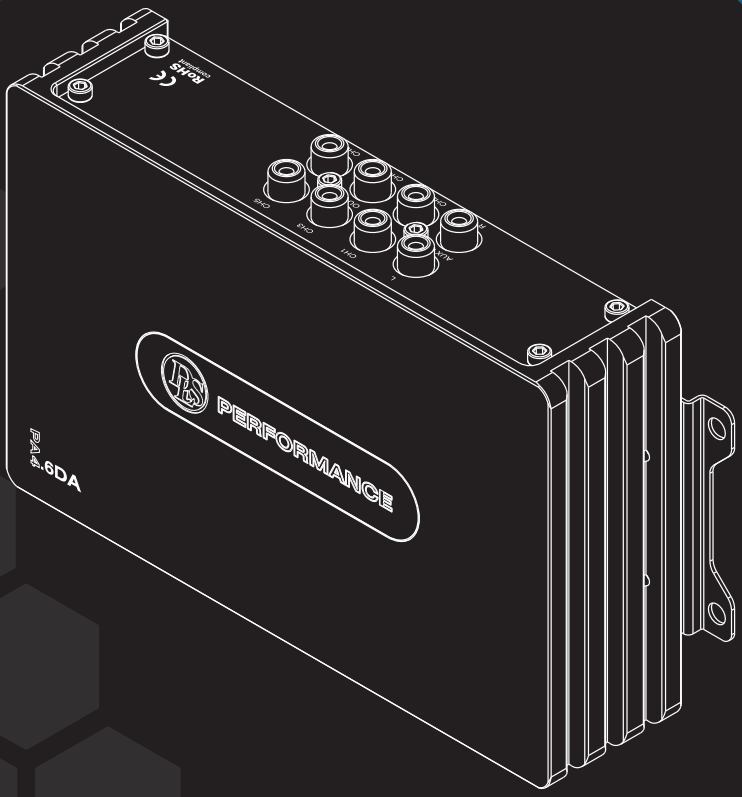
SWEDISH • AUDIO • PASSION

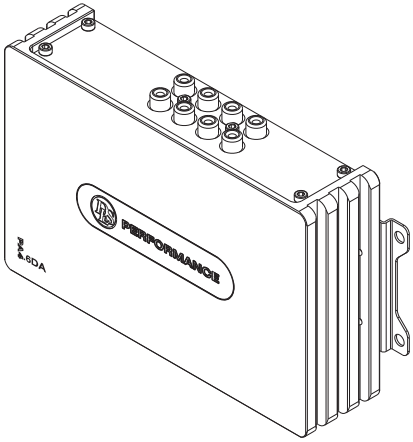


PA4.6DA

User Manual

DSP Class AB amplifier

PERFORMANCE



DLS PERFORMANCE

PA4.6DA

Content

Welcome to DLS!
Thank you for buying a DLS Performance DSP amplifier. For us, it's all about the sound experience. We care deeply about sound and construction quality. In order for your experience to be as optimal as possible, it is important that you fully read this manual, preferably before you start your installation. Keep the manual in a safe and accessible place for future reference.

Your DSP amplifier must be installed correctly in order to work as intended. Make sure you have all necessary tools nearby before starting and that you are completely confident in how to proceed. If you feel the slightest uncertainty; feel free to take the help of an experienced installer or a car audio dealer.

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

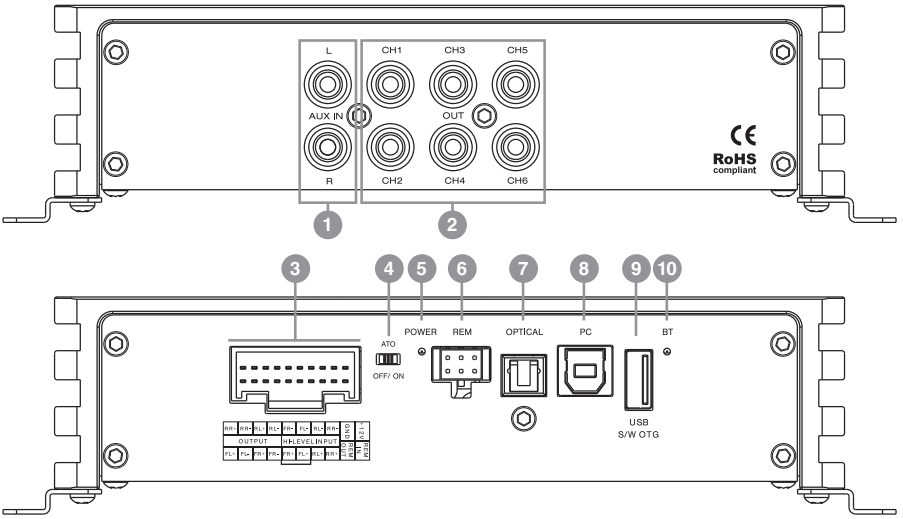
DECLARATION OF CONFORMITY
DLS DSP amplifiers for vehicles are manufactured in accordance with the EU directive EEC 95/54 (72/245/ EEC) and are marked with the approval number. They are also marked in accordance with the WEEE-directive 2012/19/EC. The products are also produced in accordance with the EU RoHS directive 2015/863/EU.

DLS products are engineered by DLS Sweden, a part of:

Winn Scandinavia AB
Idrottsvägen 37 - SE-702 32 Örebro - Sweden
Tel: +46 19 20 67 65 - E-mail: info@dls.se
www.dls.se

Designed & Sound tuned in Sweden.

Product overview



1	**AUX IN** RCA input for AUX audio sources, providing the ability to connect and play additional audio sources through the DSP amplifier for versatile sound options.
2	**OUT** 6-Channel DSP RCA Output. This output allows you to connect the DSP to external amplifiers or audio components, enabling multi-channel audio distribution for enhanced sound performance.
3	**CONNECTIONS** *A) POWER*: Connector for power input. *B) 4-CHANNEL HIGH-LEVEL INPUT*: This terminal connects to the enclosed cable harness. Ensure that only the included original cable is used to connect the amplifier to your head unit or car stereo. *C) 4-CHANNEL SPEAKER OUTPUT*: Connect your speakers to this output based on your sound system configuration for proper audio distribution. This layout allows for efficient setup and operation of the DLS PA4.6DA DSP amplifier, providing multiple input options and easy integration with your vehicle's audio system.
4	**ATO/ACC** Selects between Auto input and ACC input modes, offering flexibility in how the amplifier is triggered.
5	**POWER** Power indicator light. Displays the operational status of the DSP amplifier.
6	**REMOTE** Terminal for connecting an external remote controller (sold separately) to manage the DSP amplifier's functions remotely.
7	**OPTICAL INPUT** Supports optical input for digital audio sources, providing high-quality sound transmission.
8	**PC** USB input designed for connecting a PC or laptop. This allows you to manage and configure the DSP settings of the amplifier using the DSP software.
9	**USB-OTG** USB port for connecting a USB flash drive or OTG audio source. The audio input can be switched via the software. Can also be used for software update. OTG cable is required.
10	**BT** Bluetooth indicator light. Indicates the status of the Bluetooth connection.

Features

The DSP amplifier include the following features:

- Performance Advantage DSP Class AB Amplifier
- Cirrus Logic DSP Chip 24Bit/192kHz Sample Rate
- Output: 6 RCA / 4x25W RMS (4Ω) / 4x50W RMS (2Ω)
- Input: 4 High-level / AUX / Optical / USB-OTG / BT 5.1
- Crossover: 6CH / 6dB – 48dB Adjustable Slopes
- EQ: GEQ / PEQ / 6CH 31-band -18dB - +12dB / 0.1dB Steps
- Time Alignment: 6CH 0-15ms / 0.021ms Steps
- Autosave Feature / 10 Memory Presets / Windows GUI

Pre-installation

DSP amplifier location

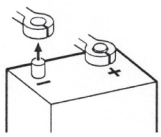
Important!
Allow air circulation around the DSP amplifier.

The DLS Performance series of DSP amplifiers have a compact design that allows great flexibility in mounting. You can mount it under a seat or in the trunk.

When selecting a location, keep in mind that the amplifier generates heat. Choose a location where air can circulate freely around the DSP amplifier. Do not cover the DSP amplifier with carpets or hide behind trim panels. Do not mount the DSP amplifier in an inverted or upside-down position.

Check all locations and placements carefully before making any cuts, drilling any holes or making any connections.

Disconnect battery



Before you start the process of installing an amplifier, disconnect and secure the negative terminal from your battery/power source. This will prevent the risk of damaging yourself or the products.
Place the disconnected terminal in a secure and isolated location away from any possible connection belonging to the battery/power source system.

Installation

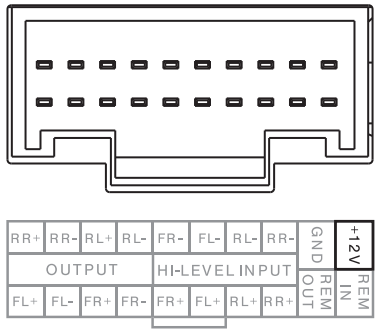
Tools and materials

TOOLS

- Insex, Flat and Phillips screwdrivers or bits.
- Wire cutter.
- Wire stripper.
- Electric drill with drill bits.
- Crimping tool.
- Digital multimeter or test lamp.
- Wire brush, scraper or a piece of an abrasive sheet to remove paint for a good ground connection.
- Grease to protect the ground connection from oxidation.

Power wiring

POWER TERMINAL (+12V)
Connect the *YELLOW* cable to +12Volt using a power cable between 15 AWG/1.5mm² and 11 AWG/4mm². Use a ring crimp terminal to securely connect the cable to the battery. For a 1.5mm² cable, a 15 Amp fuse is recommended. Position the fuse holder as close to the vehicle's battery positive terminal (+) as possible. This fuse is essential for protecting against cable fires!

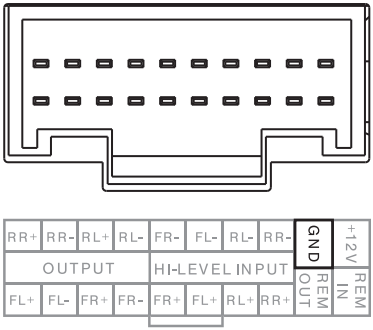


Recommended fuse rating for PA4.6DA: 15A

NOTE! Max fuse value is always related to cable size & quality.

Be sure to use a rubber grommet or a plastic insulating tube wherever the cable passes through the firewall or other areas where it could become pinched. Secure the cables using wire ties to existing wiring in the engine compartment to prevent movement.

GROUND TERMINAL (GND)
Connect the *BLACK* ground cable to a solid, unpainted metal chassis ground for a reliable electrical connection. Use same size as +12Volt cable. A ground cable between 15 AWG/1.5mm² and 11 AWG/4mm² is recommended.



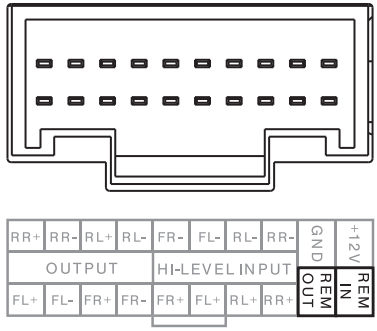
Clean the metal surface with a wire brush, scraper, or abrasive sheet to ensure a proper connection. Use one or two lock washers to secure the ground wire. After securing the connection, protect it with silicone grease or paint to prevent corrosion.

POWER LIGHT / PROTECT LIGHT
The power indicator (blue) is lit when the DSP amplifier is powered on

The protect indicator (red) is lit when the DSP amplifier shuts down due to overheating or a short circuit (e.g., speaker failure). If the red protect LED light turns on, power off your audio system to reset the amplifier. If the red light remains on, contact your local dealer for further assistance.

Power (Blue)
Protect (Red)

REMOTE TERMINAL (REM)
When using an RCA cable for the signal input:



Connect the radio power antenna lead = remote turn on/off from the car stereo to the DSP amplifier remote REM IN connection (*RED* cable). This turns on the DSP amplifier whenever the car stereo is turned on. You can either use the built-in remote cable in the RCA cable itself or use a separate cable.

If there is no remote voltage available from the stereo, you must connect to the ignition key or any accessories fuse.

To avoid potential interference, we recommend using a separate remote wire and routing the RCA cable away from the remote wire, power cables, and speaker cables. This minimizes the chance of any disturbances entering the amplifier through the remote voltage.

When using high-level input, the amplifier will automatically turn on when the car stereo is switched on.

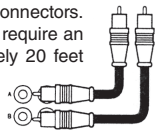
REM OUT connector (*BLUE* cable) will turn other devices/amplifiers on when the DSP amplifier have started.

Audio wiring

LOW-LEVEL INPUT WIRING
Inputs can either be low-level (from the RCA output of the car stereo) or high-level (from the car stereo speaker output). For optimal sound quality, low-level (RCA) input is preferred.

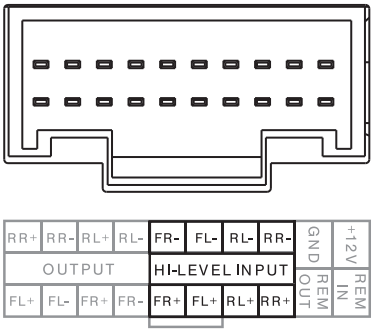
Important!
Use either the low-level or high-level input, do not use both at the same time.

For best results, use a pair of shielded stereo audio cables with RCA connectors. Most trunk-mounted amplifiers require an RCA cable that is approximately 20 feet (5-6 meters) in length.



HIGH-LEVEL INPUT WIRING
Most head units are pre-installed from the car factory and have no RCA output, in this case you can take the signal from the speaker output instead. Use either a separate remote cable or let the high-level signal automatically start the amplifier.

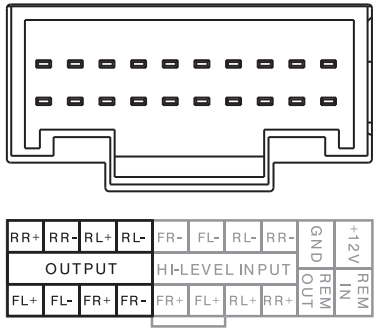
Connect left and right speaker wires coming from the car stereo to the high-level input as shown. You must connect both plus and minus as the inputs are balanced, connecting plus only gives lower level and bad sound quality. By changing the polarity of plus and minus, you can change the phase.



The high-level input connector wires follow the standard DIN-color coding. However, the car's wiring loom may use different color codes. When using high-level inputs, the amplifier's turn-on signal is derived from the high-level input itself, eliminating the need for a separate remote wire.

HARNESS CONNECTOR INPUT PINOUT			
FL+	Front Left +	White	Connect left front speaker (+)
FL-	Front Left -	White / Black	Connect left front speaker (-)
FR+	Front Right +	Grey	Connect right front speaker (+)
FR-	Front Right -	Grey / Black	Connect right front speaker (-)
RL+	Rear Left +	Green	Connect left rear speaker (+)
RL-	Rear Left -	Green / Black	Connect left rear speaker (-)
RR+	Rear Right +	Purple	Connect right rear speaker (+)
RR-	Rear Right -	Purple / Black	Connect right rear speaker (-)

HIGH-LEVEL OUTPUT WIRING
The PA4.6DA features four internal amplification channels, which can be configured via the DSP software. These channels can be set as front and rear outputs for full-range speakers or configured for a two-way system with separate midrange and tweeter channels.



The high-level output connector wires follow the standard DIN color coding. However, the car's wiring loom may use different color codes.

HARNESS CONNECTOR OUTPUT PINOUT			
FL+	Front Left +	White	Connect left front speaker (+)
FL-	Front Left -	White / Black	Connect left front speaker (-)
FR+	Front Right +	Grey	Connect right front speaker (+)
FR-	Front Right -	Grey / Black	Connect right front speaker (-)
RL+	Rear Left +	Green	Connect left rear speaker (+)
RL-	Rear Left -	Green / Black	Connect left rear speaker (-)
RR+	Rear Right +	Purple	Connect right rear speaker (+)
RR-	Rear Right -	Purple / Black	Connect right rear speaker (-)

Tuning software

General information

Download the PC tuning software from the official DLS website www.dls.se.

Connect the amplifier to your computer using the supplied USB cable.

Once the software is launched, the main interface will open automatically, presenting all key functions for immediate access.

Clear and Functional Interface
The software is designed for ease of use, featuring a clean and user-friendly graphical interface. All key functions are organized in a single menu, allowing intuitive navigation and control.

Advanced x-over management

The crossover section enables precise control of crossover frequencies and filter slopes for each individual channel. Filter type and slope can be set independently, ensuring seamless frequency division between different speaker types. Additionally, the AUX output signal can be freely adjusted, enabling tailored signal routing and tuning flexibility.

- Both high-pass (HPF) & low-pass (LPF) settings can be adjusted independently. They can also be used together for a band-pass function.
- Users can select between filter types such as Bessel, Butterworth, and Linkwitz-Riley.
- Depending on the selected type, slope options range from 6 dB/oct to 48 dB/oct, allowing for fine-grained control over frequency separation between drivers (e.g., tweeters, midrange, subwoofers). This section is essential for achieving seamless integration and accurate phase response in multi-way audio systems.

31-band graphic equalizer

The EQ section offers full-spectrum tuning with adjustable gain, Q-factor, and frequency per band. Real-time visual feedback assists in achieving precise tonal balance. Users can switch between PEQ (Parametric EQ) and GEQ (Graphic EQ) modes depending on their tuning needs.

Switching EQ Modes
Click PEQ Mode to switch to GEQ Mode.

- In Parametric EQ (PEQ) mode, frequency and Q values can be adjusted for each band, providing advanced tuning flexibility.
- In Graphic EQ (GEQ) mode, only the gain values can be adjusted, and the frequency and Q values are fixed for each band.

These tools are useful for both professional installers and advanced users who want to quickly compare or reset their EQ settings.

Reset EQ
This function restores the 31-band equalizer to pass-through mode, where all filters are bypassed. The EQ's frequency points, Q values, and gain levels are all reset to their default values, which ensures a clean start for fresh tuning.

Restore EQ
This option toggles between the active EQ settings and the pass-through state. In pass-through mode, gain values are set to 0 dB, while the frequencies and Q values remain visible and unchanged, offering an easy A/B comparison during system tuning.

System controls

Master Volume and System Control
Control the main volume, mute function, delay units, and manage individual channels with full flexibility. A bypass function is also available for comparison and testing purposes.

Speaker Assignment
Easily assign and configure channels according to your vehicle's speaker setup. This ensures accurate signal routing and optimized acoustic performance.

Channel configuration

Each channel supports precise individual tuning of output level, phase polarity, and time alignment for accurate imaging. Channels can also be linked for synchronized control of volume, delay, and phase settings.

In the Channel Adjustment section, you can configure key parameters for each individual channel:

- Volume Control: Adjust the output level per channel.
- Phase Selection: Adjust phase orientation (0° or 180°) to ensure proper alignment and imaging across the system.
- Time Delay: Set the correct delay per channel (milliseconds, centimeters or inches) to align sound arrival times at the listening position.
- Link Settings: Link channels for mirrored adjustments, useful in stereo or symmetrical system layouts.

These adjustments are essential for achieving accurate imaging, coherent staging, and spatial balance in the vehicle environment.

Quick access tools

The PC software provides quick-access tools for:

- Resetting the EQ to factory defaults.
- Restoring pass-through mode.
- Bypassing or locking output channels.
- Linking EQ settings across multiple channels.

Additional features

PC Connection and Input Selection
The main menu allows you to manage the following system-level functions:

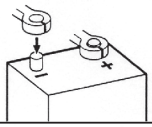
- System connection to PC.
- Select input sources.
- Handle presets including saving and loading of files.
- Firmware updates and factory resets are also located here.

Mixing Set Adjustments
The Mixing Set menu enables individual adjustments per selected input source (e.g., High-Level or Optical). These adjustments ensure optimal signal balance before DSP processing.

With the combination of intuitive software and advanced tuning capabilities, the DLS PA4.6DA provides unmatched flexibility and precision for demanding in-car audio environments.

Testing

RECONNECT BATTERY
When wiring is complete, re-connect the battery negative terminal.



TEST POWER WIRING

1. Turn on the head unit but do not turn up the volume. The amplifier power light should come on. If not, check the remote, high-level input cables and +12 Volt wires. Check the ground connection.

2. Turn up the head unit volume slightly. All speakers should operate. if not, check wiring connections at amplifier and speakers.

TEST SPEAKER CONNECTIONS
Make sure the speakers are connected right. Use the balance control on the head unit to make sure right channel is on right speaker etc. If speakers don´t play at all, one or both speaker wires may be disconnected.

Troubleshooting

If any issues occur during installation or later, this guide may help you diagnose and resolve it.

THE DSP AMPLIFIER IS DEAD

1. Check power lead, ground and remote connections at the amplifier using a multi meter.
2. Check the battery terminal connections.
3. Check the power lead fuse or circuit breaker. If fuse damage continues, inspect the power lead for short circuits.
4. Check the amplifier protection fuses. Are these broken change to new ones with the same value. If short circuiting continues, contact your local DLS dealer. A fault may be in the amplifier.
5. To start the amplifier requires a remote voltage of 9-15 volt. Check the voltage with a multi meter.

DSP AMPLIFIER PROTECTION FUSE BLOWS AT LOW VOLUME

1. One or more speaker cables are shorted. Make an insulation test with a multi meter. The cables must not have a connection to earth.

DSP AMPLIFIER PROTECTION FUSE BLOWS AT LOW VOLUME
The amplifier is overheating due to inadequate ventilation. Check so the mounting position is clear:

1. Move the amplifier to a location with better ventilation.
2. Install one or two fans to cool down the heat-sink.
3. Overheating can also be caused by impedance load below the level permitted.

NO OUTPUT FROM ONE OR MORE SPEAKERS

1. No source is connected.
2. high-level input cables are not connected properly.
3. Start the DSP software to see if:
4. Mute function is activated.
5. Check so the input channels are selected correctly.
6. Check all speaker cable connections.
7. Check signal lead plugs and cables.

Proffessional tips

Noise problems

WHINING NOISE VARYING WITH ENGINE REVOLUTIONS
Do this:
1. Rewire the power supply (12 V) to source unit direct from battery.
2. Rewire ground wire from source unit to clean position on chassis.
3. Check all power connections to ensure that they are clean and tight.
4. Check quality of system ground connection.
5. Install a power capacitor with connections as close as possible to the alternator. This by-passes the noise at source and eliminates many issues with noise problems. In cars with a jump start connection, this provides a conventent connection point for the capacitor.

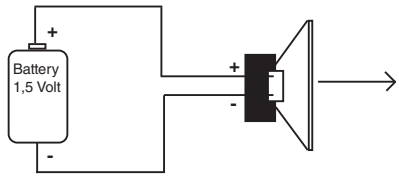
CONSTANT WHINING NOISE
Do this:
1. Ensure that all equipment has a common ground point.
2. Check quality of earth strap connection from battery negative terminal to chassis.
3. Disconnect signal cables from the DSP amplifier to see if noise disappears. If so the leads are picking up noise. Test this by laying a new cable over the seats and reconnecting to the DSP amplifier. If the noise does not return, reroute original cable away from source of interference. If noise remains regardless of cable position, try to use so RCA signal cables of Coaxial type.

Speaker polarity check

All speakers in a car audio system should be connected in phase (the same polarity). This ensures that all speaker cones move in the same direction. Speakers that are out of phase can result in lack of bass, and a poor stereo soundstage.

Checking polarity:
Hold the - connection of the speaker wire to the - terminal of a 1,5 Volt flashlight battery. Tap the + wire on to the + terminal of the battery, and observe the movement of the cone. The cone should move outwards when the wire touches the battery, and inwards when the battery is removed. If it is the other way around, the speaker has been connected backwards and it must be removed and connected correctly.

If your system also has a subwoofer connected through a passive 6 or 12 dB crossover, try to connect this with various polarity and judge what sounds best. The phase shift in passive cross-overs sometimes makes it necessary to change polarity.



NOTE! Tweeters can not be tested this way, double check the connections instead.

Installation in trunk

When installing the DSP amplifier in the trunk, run the power wires along the same path as the other vehicle wiring. Many cars have insulated channels for wiring. You will have to remove the door sill trim and the carpet.

Securing wires

Use wire ties to bundle together when possible. (But never bundle speaker wires or signal cables together with power wires).

Crimp connections

Purchase crimp connectors and crimping tool. Connectors are color coded.
1. Strip 1/4 inch (6mm) of insulation from the wire
2. Insert into connector
3. Crimp tightly

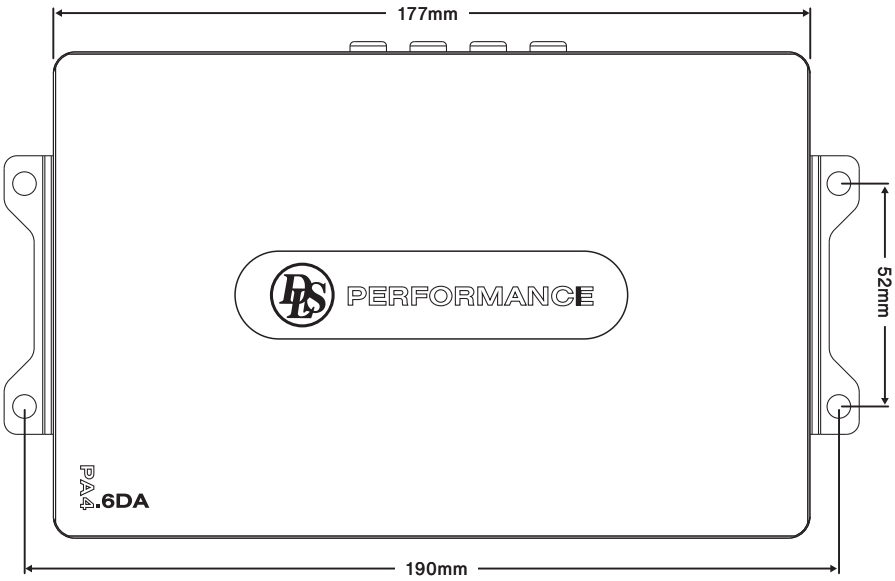
Speaker & power wires

Avoid running speaker and power wires alongside each other, as power cables can induce unwanted "siren" sounds in the speakers. For optimal performance, run speaker and power wires on opposite sides of the vehicle to minimize interference.

Specifications

	PA4.6DA
Amplifier class	AB
High-level speaker input channels	4
High-level speaker output channels	4
Power output RMS in 2 ohm	4x50 Watt
Power output RMS in 4 ohm	4x25 Watt
DSP RCA output channels	6
Signal to noise ratio, A-weighted	>100dB
Frequency response	20 Hz – 20 kHz
High input impedance	10 ohm
High input sensitivity	4 – 10V
Low input sensitivity	0.5 – 2.5V
DSP Processor	Cirrus Logic 24Bit/192kHz Sample Rate
Crossover type	Bessel / Butterworth / Linkwitz-Riley.
Crossover slope	6CH / 6dB – 48dB Adjustable Slopes
EQ	GEQ / PEQ / 6CH 31-band -18dB - +12dB / 0.1dB Steps
Time Alignment	6CH 0-15ms / 0.021ms Steps
Recommended Fuse Rating	15A
PC Connection	USB 2.0
Software / PC requirements	Microsoft Windows (32/64bit) XP, Vista, Windows 7, Windows 8, Windows 10, Windows 11
Dimensions HxWxD(mm)	199 x 116 x 48 mm (including installation feet)
Dimensions HxWxD(inch)	7,83 x 4,56 x 1,89 inches (including installation feet)
Weight	0,9 kg

Dimensions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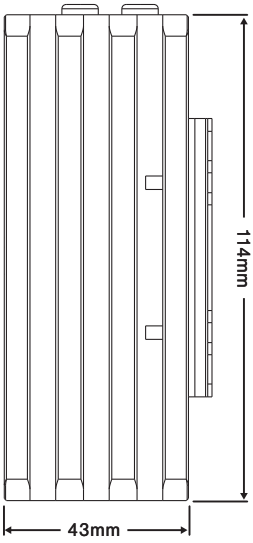
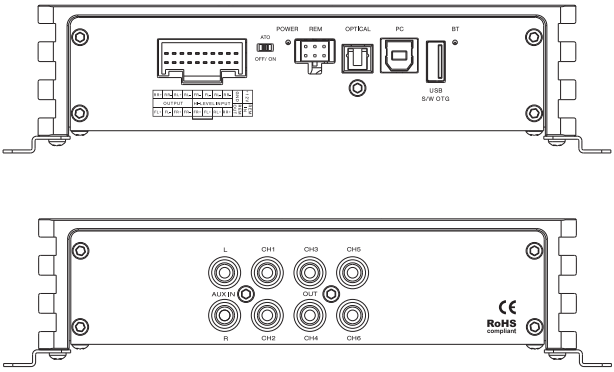
PERFORMANCE
52mm
PA4.6DA
190mm


114mm
43mm


POWER
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CH1
CH3
CH5
AUX IN
OUT
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CH2
CH4
CH6
RoHS
compliant

Product markings

The crossed-out wheelie bin symbol means that the product, literature and packaging included must be taken to separate collection at the end of their working life. Do not dispose of these products as unsorted municipal waste: take them for recycling. For info on your nearest recycling point, check with your local waste authority.

This product has been granted with the CE certification mark to show that the product follows the health, safety, and environmental protection standards for products sold within the European Economic Area (EEA).

DLS products complies with the relevant provisions of the RoHS Directive for the European Union. In common with all Electrical and Electronic Equipment (EEE) the product should not be disposed of as household waste. Alternative arrangements may apply in other jurisdictions.

DLS is a global partner of the European Mobile Media Association, an organisation that focus on promoting the custom made mobile media installations to consumers.

We follow a policy of continuous advancement in development. For this reason all or part of specifications & designs may be changed without prior notice. We reserve for possible typos, factual or numeric errors that may have been printed on any products, package designs, user manuals and/or other included accessories.


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