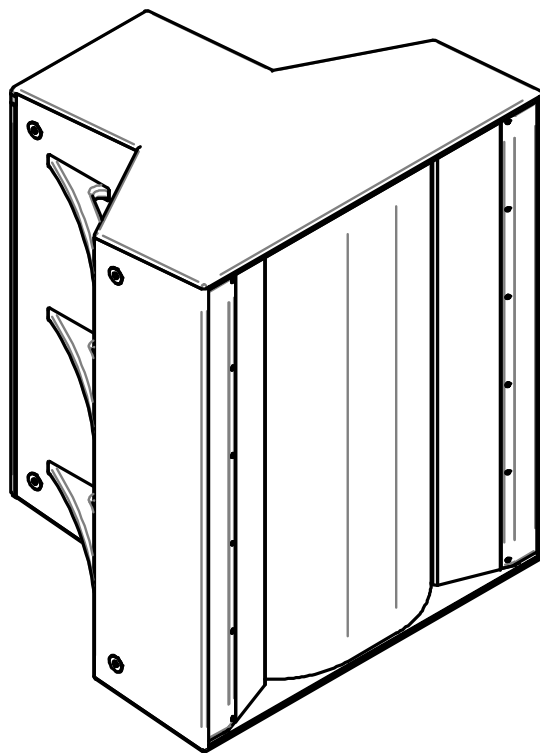


**ROUTINE**

# STADIA 100 LA

High Power Outdoor Loudspeakers



**USER MANUAL**

## SAFETY REGULATIONS

Please read this manual carefully and in its entirety. It contains important information regarding safety issues, including guidelines for general safe use of rigging systems as well as advisories on government regulations and liability laws. The suspension of large, heavy objects in public places is subject

to numerous laws and regulations at the national/federal, state/provincial, and local levels. The user must assume the responsibility for making sure that the use of any rigging system and its components in any particular circumstance or venue conform to all applicable laws and regulations in force at the time.


## GENERAL SAFETY RULES

- Carefully read this manual in all its parts
- Respect the working load limits and maximum configurations of the elements and of any third-party component (such as suspension points, motors, rigging accessories, etc...)
- Do not incorporate any accessory not provided by Outline; all damaged or defective components must be replaced only by equivalent parts approved by Outline
- Ensure personnel health and safety, ensure that no one is standing under the system during the installation, ensure that all personnel involved in the installation are equipped with personal safety devices
- Always double check that the elements are correctly connected before suspending the system.

The rigging elements are easy to use, however the installation shall be carried out only by qualified personnel that are familiar with the rigging techniques, safety recommendations and with the instructions described in this manual.

All mechanical components are subject to wear and tear over prolonged use as well as corrosive agents, impacts or inappropriate use. For this reasons users have the responsibility to adopt and adhere to a schedule of inspections and maintenance. Key components (screws, connecting pins, welded points, rigging bars) must be inspected before every use. Outline strongly recommends to carefully inspect the system components at least once a year, reporting in a written document the date, the name of the inspector, the points checked and any anomalies discovered.

## DISPOSAL OF WASTE MATERIALS

 Your product is designed and manufactured with high quality materials and components, which can be recycled and reused. When this crossed-out wheeled bin symbol is attached to a product, it means the product is covered by the European Directive 2012/19/EU and subsequent amendments. This means that the product must NOT be disposed of with other household-type waste. It is

the users' responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor. For more information about where you can send your equipment for recycling, please contact your local distributor. The correct disposal of your old product will help prevent potential negative consequences for the environment and human health.

## CONFORMITY AND WARRANTY

**CE** All the Outline electro-acoustic and electronic devices are in conformity with the provisions of EC/EU directives (as stated in our CE declaration of conformity).

The CE declaration of conformity is attached to the product warranty certificate and is shipped with the product.

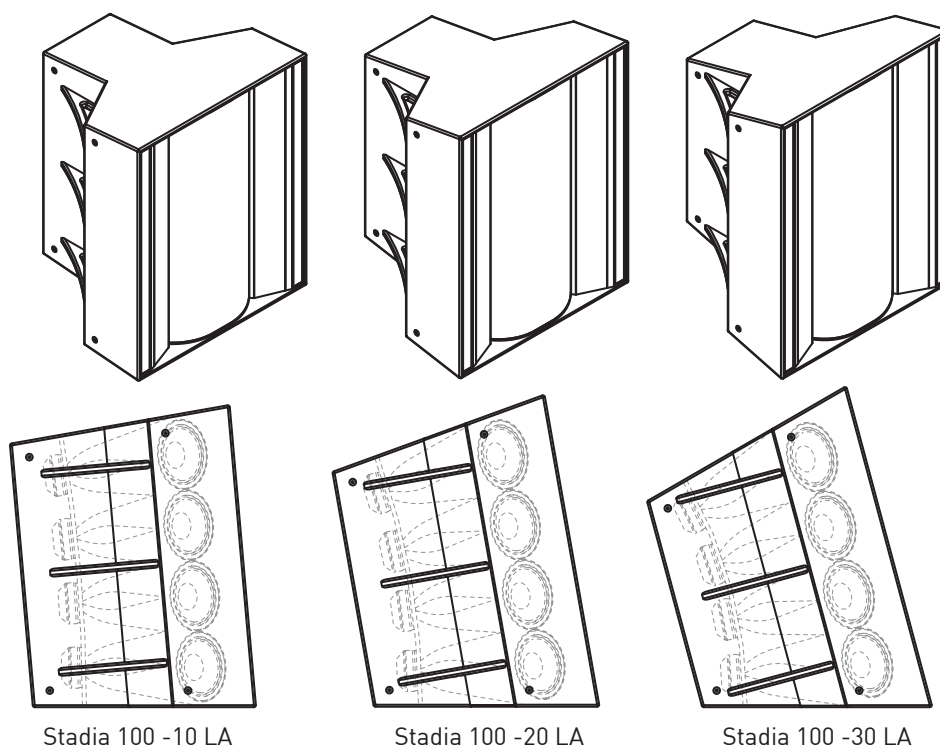
## STADIA 100 LA SERIES DESCRIPTION

Stadia 100 LA series comprises three loudspeaker modules of very similar dimensions and identical horizontal directivity ( $100^\circ$ ) which offer a choice of  $10^\circ$ ,  $20^\circ$  or  $30^\circ$  dispersion in the vertical plane allowing the modules to be combined to provide optimum coverage for the location.

Each loudspeaker is equipped with eight 8" woofers and four 3" compression drivers loaded by Outline's patented wave guide D.P.R.W.G. The four waveguides are arrayed on an arc and the total angle defines the vertical coverage. The main difference between the three models is the angle between each waveguide and the consequent box shape.

Each element can be coupled with any other element of the Stadia 100 LA series to build dedicated solutions for the specific space to cover.

The enclosures are constructed with birch ply finished with 'outSIDE', an extraordinarily tough and waterproof elastoplastic coating which interacts with the cabinet material to provide extreme levels of long-term protection. The outSIDE coating is just one of the fundamental parts of the outSIDE concept, which is a set of conceptual and implementative operations leading the product to be suitable for exposure to aggressive weather conditions.



## SAFETY PRECAUTIONS

Stadia 100 LA are intended to be used in installations and must be installed following the local and regional safety rules. Specific rules must be applied to the rigging structures that have to hold the assembly of one or more devices and to the cables for the connection to the amplifier. Periodic controls must be performed at regular time intervals according to local laws, to the presence of additional safety devices (such as tab washers against screw loosening) and to the working conditions of the components (exposure to heavy weather, heavy use, etc..).

An example of tests includes: a transducer test (i.e. to be performed before and after every use), a visual test for the rigging safety (i.e. to be performed every six months), a visual test for the paint and wooden external parts (i.e. to be performed once a year).

Additional tests must be performed after every unusual event such as incorrect use, very heavy storms, etc...

The results of the periodic tests must be reported on a document like the one at the end of this manual.

## RIGGING INSTRUCTIONS

Each Stadia 100 LA speaker requires an external rigging structure to support each single element and the total weight of the cluster if more than one loudspeaker is used. The rigging hardware must be designed according to the local laws and local safety

factors and considering the total load of the system, the dynamic factors inducted by vibrations, winds and mounting procedures. The rigging system shall allow also safe mounting and dismounting operations and easy visual control.

## RIGGING POINTS POSITION

Each Stadia 100 LA offers eight M10 threaded female points. Four rigging points are available on each side of the Stadia cabinet. Two of them are close to the front panel (as shown in the picture below) and

two are close to the rear panel. Please refer to the overall dimensions drawings for the exact position of each point.

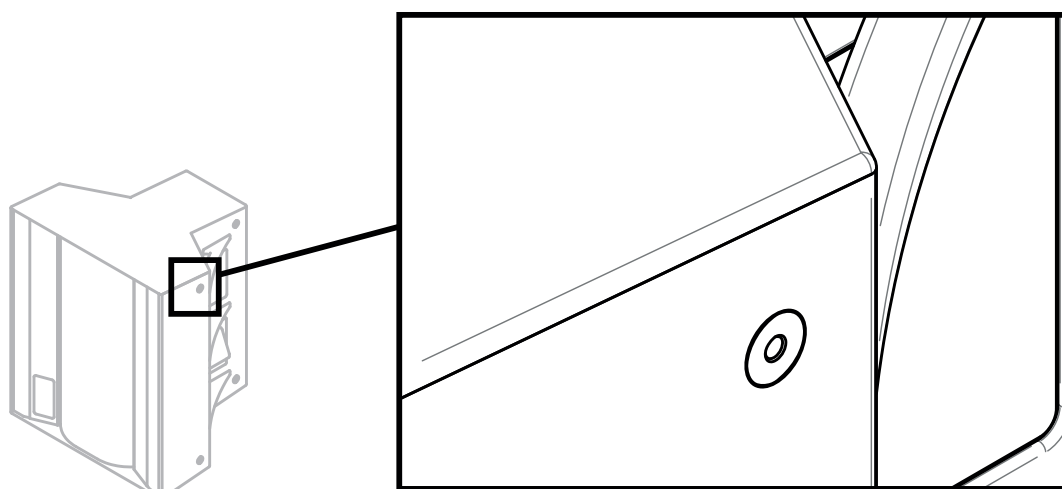


Figure 1: Detail of the position of a rigging point on a Stadia

## RIGGING STRUCTURE

The external rigging hardware must provide support for each loudspeaker. This means that the loudspeakers are **NOT** intended to support other loudspeakers or other weights.

When multiple loudspeakers are used to build a so-called "line array", the external rigging must embrace each loudspeaker and the entire array, as shown in the picture below.



## RIGGING POINTS DETAILS

The rigging points consist of unperforated inserts designed to hold a M10 bolt while protecting the speaker from water. The inserts are made of anodized corrosion-resistant aluminium alloy (Ergal) but it is in any case suggested to protect against water the points that are not used.

The length of the screw must allow the effective use of 22 mm of thread and must not exceed the maximum depth of the insert (27 mm), as shown in the picture below. It is strictly forbidden to use a shorter screw for safety reasons and to avoid damages to the loudspeaker.

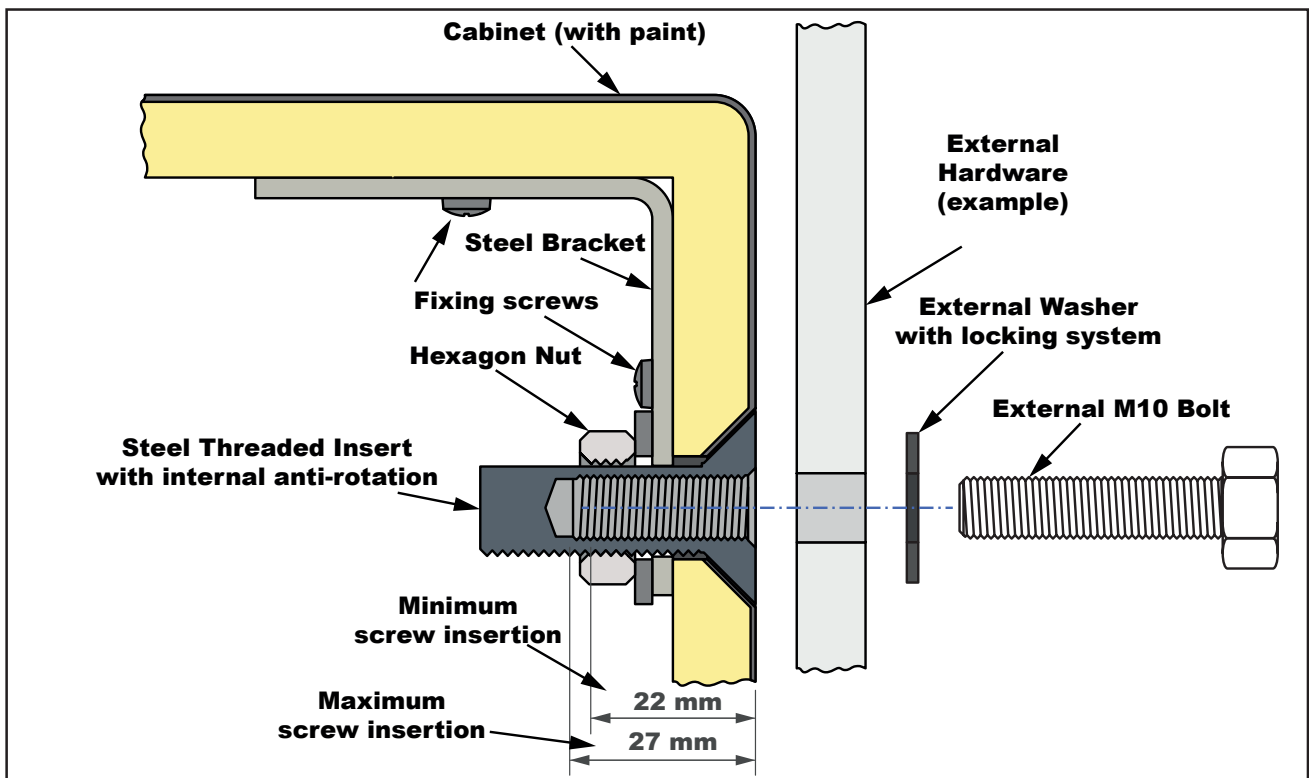


Figure 2: Rigging points details: each rigging point is made of a special insert that can receive a M10 bolt and ensure no water penetration inside the loudspeaker.

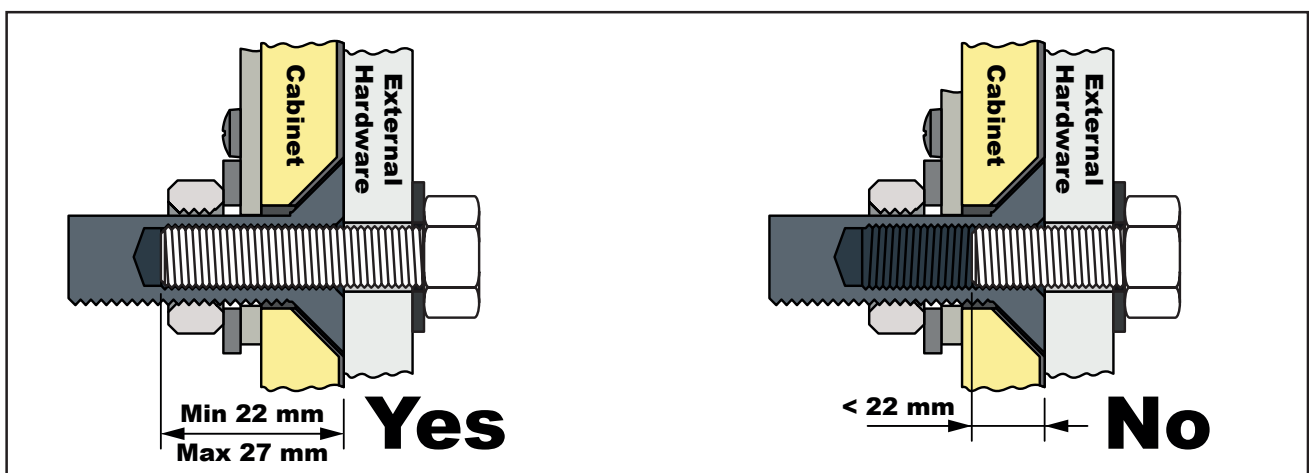


Figure 3: Correct use (on the left) and incorrect use (on the right) of the rigging points. The bolt must be long enough to fully engage the internal thread considering also the external hardware and accessories.

The external hardware must be designed to be placed as close as possible to the loudspeaker. It is strictly forbidden to use rigging hardware that is at any distance from the loudspeaker at the rigging

points. Tightening the screw with hardware that is not in contact with the enclosure may result in damage to the rigging points or to the cabinet if excessive torque is applied.

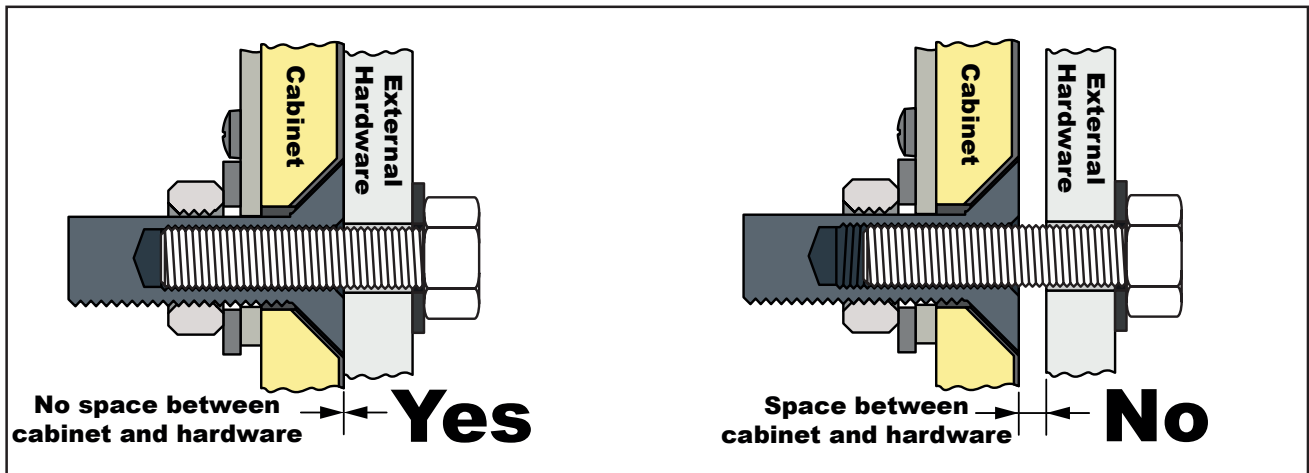


Figure 4: Correct use (on the left) and incorrect use (on the right) of external hardware.

## RIGGING POINTS MAXIMUM TORQUE

The connection of the external hardware to the rigging points must be made using proper bolts (the usual class is 8.8), following the above prescriptions and applying a controlled torque value with the help of a **torque wrench** (dynamometric key).

The tightening torque defines the axial force between the bolt and the insert and depends on the frictions with the washer and the thread of the insert. As a result of this, in order to apply the same axial

force, smaller torque is required if the parts are lubricated.

The torque to apply has been defined considering the resistance of the insert, of the wood and the interaction between the parts. **The maximum tightening torque is 15 Nm for lubricated parts.**

Tightening the bolts with higher or not controlled torque might result in damages and risk for the safety.

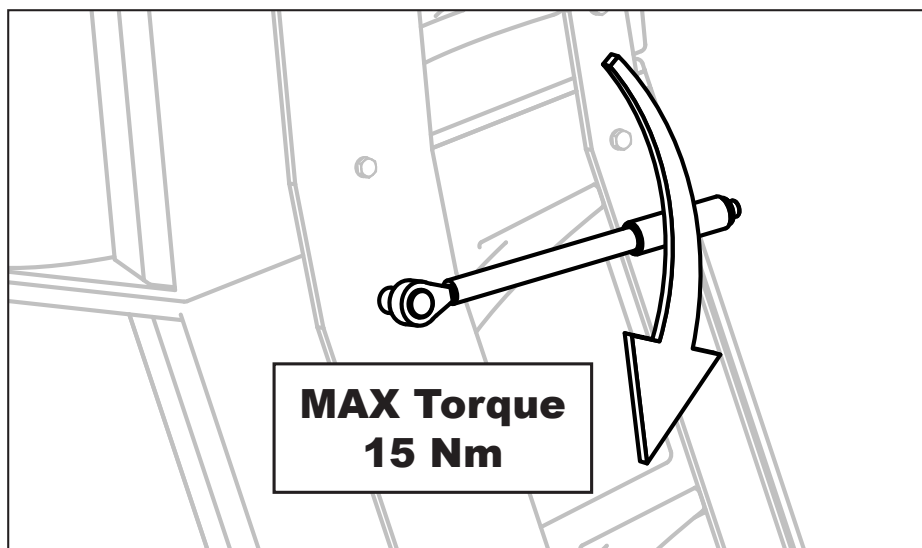


Figure 5: Tighten the bolts at MAX 15 Nm using a torque wrench (dynamometric key).

## USE OF THE HANDLES

The handles have been made for handling Stadia easily during the connection to the external hardware. Their design allows the water not to stop in any

possible configuration. **Warning! The handles must not be used neither for rigging, nor for the connection to safety locking systems.**

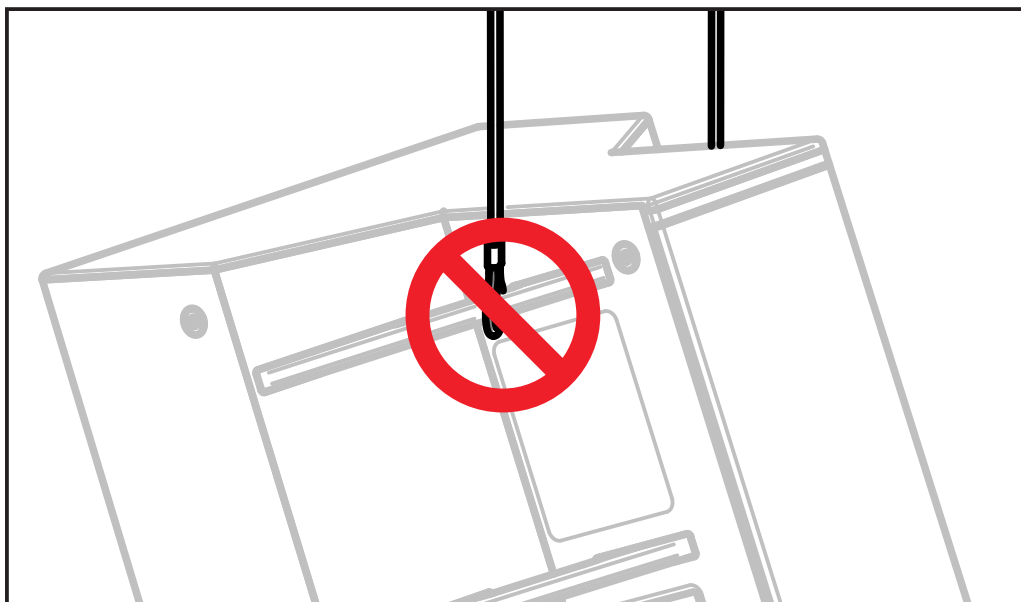


Figure 6: Handles must not be used for rigging or as a safety connection point.

## RESISTANCE TO WATER

The Stadia loudspeakers have been designed to resist to outdoor environment in all weather conditions. This is the result of a technology called “outSIDE” which is a set of conceptual and implementative operations leading the product to be suitable for exposure to aggressive weather conditions. The outSIDE concept includes not only the outSIDE coating technology, but also the particular shape of the cabinets so that the water can drain easily, weatherproof treatment for the speakers, ferrofluid in the drivers and position and shape of the internal elements. The outSIDE coating technology is a special procedure which implements two layers of polyurea paint plus one layer of UV-resistant finish with calibrated elasticity. This kind of finish avoids polymer-

ization and yellowing of the polyurea, whereas the calibrated elasticity helps keeping in time the perfect adherence between the layers in order to adapt to the dimensional variations of wood caused by “wet-dry” cycles of outdoor environment. It is to consider that the total thickness of the layers is of 2 mm (to add to the overall dimensions given in the technical drawings).

The Stadia loudspeakers have been certified with an IP55 rating, which means that the enclosure is protected from limited dust ingress and from low pressure water jets from any direction (limited ingress protection). The IP55 certification is related to the loudspeaker inclined by minimum 15° downward tilt (aiming of the acoustical axis).

## The external rigging hardware must be approved by a licensed professional engineer

## AMPLIFICATION

Stadia loudspeakers are two-way systems designed to be used with two amplifier channels.

The mid-low frequency sections are marked with 'LF' and the high frequency sections with 'HF'. Each loudspeaker can be logically divided in four sections from top to bottom, specified with letters 'A', 'B', 'C' and 'D'. Sections 'A' and 'D' are wired together, as well as sections 'B' and 'C'. These details are reported in the loudspeaker's side panel close to the con-

nectors and shown in the picture below.

The internal loudspeaker wiring allows multi-amplification (i.e. for electronic steering). In standard configurations four short wires connecting together the pins 1-5, 2-6, 3-7 and 4-8 on the barrier strip connector enable to use only 2 amplifier channels.

A proper size amplifier and DSP are required to operate the loudspeaker ensuring safe working condition and expansive dynamics.

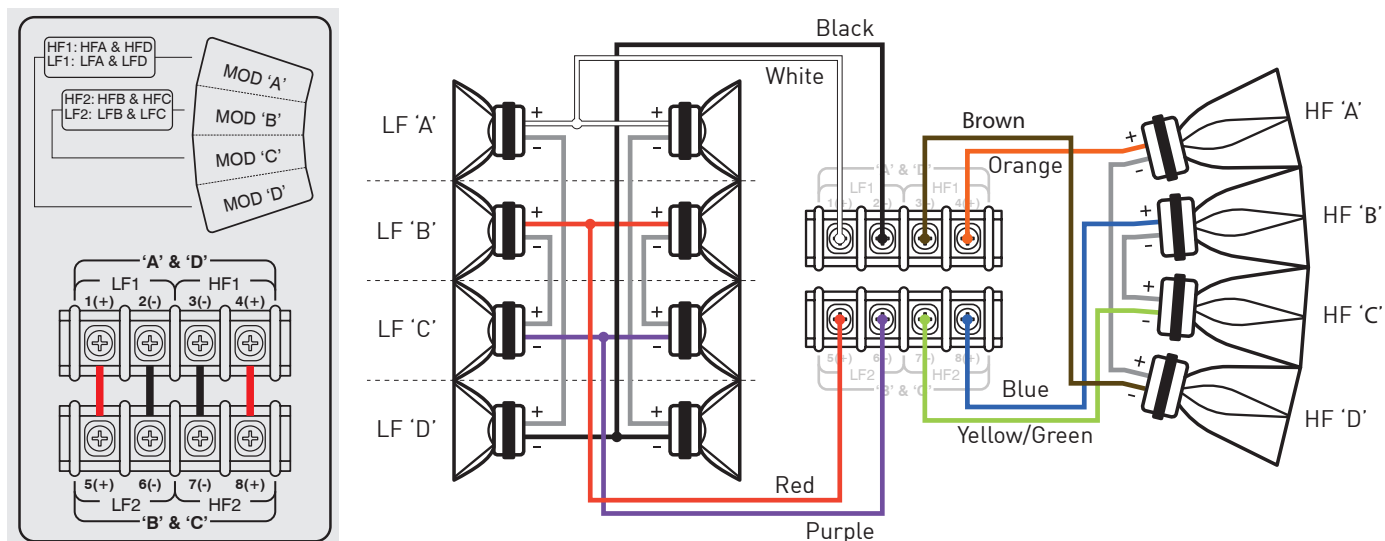


Figure 7: Stadia wiring as shown on the loudspeaker's label on the left (in thick black and red are represented the link cables for standard bi-amping mode) and, on the right, the internal wiring.

## CABLE SELECTION AND AMPLIFIER CONNECTION

The connection from the amplifier to the loudspeakers must ensure proper energy transmission and small losses. A general rule is that the cable's resistance should not be greater than the 10% of the minimum impedance of the components to be connected. Each Stadia 100 LA, when used in bi-wiring has a nominal impedance of 4 Ω (LF) and 8 Ω (HF) and a minimum impedance of 3.2 Ω (LF) and 8.1 Ω (HF).

The resistance of the cable can be found in the catalogues of the cable manufacturers. These usually report the resistance of the length of one conductor,

so this value shall be multiplied by 2 to consider the total round trip distance.

The resistance of the cable (round trip) can also be estimated with the following formula:  $R = 2 \times 0.0172 \times l / A$ . Where 'R' is the resistance in ohm, 'l' is the length of the cable in meters and 'A' is the section area of the wire in square millimeters.

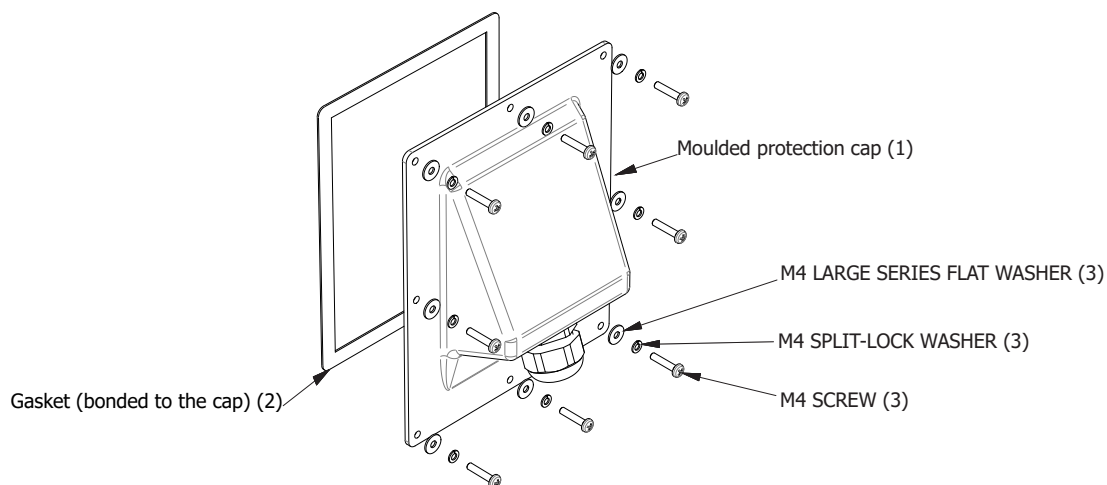
The following table reports the resistance in ohm per kilometer for different wire sections (calculated with the formula above) and the recommended maximum length of the cable.

Wire area [mm <sup>2</sup> ]	AWG	Round trip cable resistance [Ω/km]	max cable length [m] (R ≤ 0.32 Ω)
4	~11	8.60	37
6	~9	5.73	56
8	~8	4.30	74
10	~7	3.44	93
16	~5	2.15	149



## WEATHERPROOF CABLE PROTECTION

The weatherproof cable protection consists of a moulded protection cap (1), a neoprene gasket (2) and a set of screws (3) (see figure below), with the cable gland already mounted on the cap.



The neoprene gasket serves for the protection of the cable connections from water and dust ingress, so it is necessary to check the gasket conditions and integrity before mounting the protection cap. Please respect the sequence when mounting the

washers: first the large series flat washer (for the protection of the cap from scratching), and to follow the split-lock washer in order to prevent the unwanted unscrewing.

## APPENDIX - PERIODIC CONTROLS

All the loudspeakers, before the shipment, are fully tested at the end of the production line, but before the system is installed an overall check shall be performed to ensure that the system has not been dam-

aged during the shipment. Periodic controls shall be performed at regular time intervals. The following table represents an ideal check list and shall be completed with the external rigging elements.

Loudspeaker Serial Number:		Position:						
Date								
Transducers Impedance								
Amplifier								
Loudspeaker cabinet								
Loudspeaker grills								
Grills screws								
Hardware								
Hardware bolts								
Main rigging structure								
Safety devices								
Additional notes								
Signature								

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NOTES



Outline carries out on-going research for product improvement. New materials, manufacturing methods and design upgrades are introduced to existing products without prior notice as a routine result of this philosophy. For this reason, any current Outline product may differ in some aspect from its description, but will always equal or exceed the original design specifications unless otherwise stated.

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