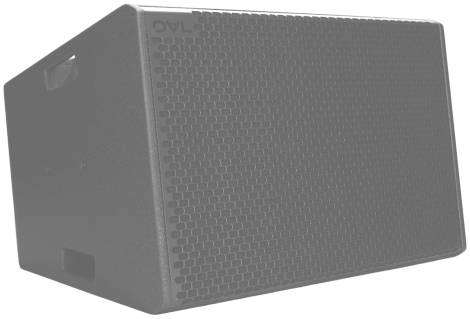

S15N

Professional Sound Reinforcement Loudspeaker System

Operation Instructions

DAL Acoustics loudspeaker systems are designed and manufactured in Germany by German Audio Engineering GmbH. German Audio Engineering works exclusively with upstream suppliers who can guarantee consistent and verifiable quality of their components and parts.
If you have a problem with one of our products, or if you need a spare part, please contact your local distributor or contact us directly.
Thank you for choosing a DAL Acoustics product.

## System Description:

The S15N system is are larger 2-way vertical converted point sourc providing a front loading for the cone transducer to extend the constant coverage into the mid frequency band. This in order to expand an optimized transmission for medium to longer throw applications in vertical stacked or rigged operations. The front loading does not effect the low frequency band covered by the S15N but will equalized to flat down to its low end with close coupling of 3 systems in a vertical converted system. Operation is simplified with an optimized passive frequency dividing network incl. Hi Driver RMS protection. The ported cabinet is made of waterproof glued plywood with a durable PU coating. The S15N provides a horizontal and vertical coverage angel of 90°x 20° (h x v). The S15N system is primarily intended for touring use, but can be ordered with fine textured varnish paint for fixed installation use. In stand-alone or spaced array operation, it can be used as a support or (side-) fill speaker. Due to its neutral reproduction characteristics and the very high maximum SPL Level, it is equally suitable for speech and music transmission. For low end support, the DAL Sub-Low systems, BR118 and BR218, BB218 and BB118 are suitable.
Featuring an efficient 15" NDym cone transducer with 4" voice coil and two 1,4" NDym Hi drivers with 3" voice coil on our proprietary wave formers, the S15N system provides an audio bandwidth of 45Hz - 15KHz with a Peak power handling of 2000W.
The S15N systems can be operated without the DAL Control & Drive Systems but with a disadvantage of using an external controller device. The passive frequency dividing network has an integrated (RMS) protection limiter for the high frequency drivers on board. When operated with the DAL Control & Drive System, the system is optimal parameterised for sonic quality and protected for maximum continuous and peak sound pressure levels. The DAL Control & Drive Systems provide different settings for the operation of S15N combinations.

The S15N offers a narrow horizontal dispersion in upright position for stand-alone operation. This allows a tight coupling in dual clusters for long throw high power applications.

## S15N Acessories

S15N Stack Cradle (vertical stack - 3 units)

S15N Flying Frame (vertical rig - 3units)

S15N Flying Cradle (2 x S15N upright)

U-Installation Yoke vertical

Pole Mount Adapter

Truss C-Clamp large

## Notes On The Operating Instructions:

Observe the explanations and notes in these operating instructions. If you lend or pass on this product to third parties, please refer to this operating manual, pass on this operating manual.

This symbol in connection with the signal word "Beware" indicates a possibly dangerous situation. Failure to observe this safety instruction may result in serious injury or even death.

This symbol in connection with the signal word "Warning" indicates a possibly dangerous situation for persons with pacemakers. Non-observance can lead to serious injuries or even death.

This symbol in connection with the signal word "Caution" indicates a possibly dangerous situation with a high ambient noise level. It is recommended to wear hearing protection in case of high noise level.

This symbol in conjunction with the signal word "Caution" indicates a warning of a magnetic field present in the immediate vicinity of the object.

This symbol in connection with the signal word "Warning" indicates commands to observe product-relevant operating conditions.

## Intended use and application

General information: Operating Instructions DAL S15N.
The information in this operating manual is given to the best of our knowledge and is valid at the time of printing. We reserve the right to change specifications of the product at any time. German Audio Engineering does not guarantee the quality or suitability for use. German Audio Engineering GmbH (for DAL) assumes no liability for direct or indirect damage or consequential damage resulting from the use and operation of this product.
German Audio Engineering reserves the right to continuously develop the product and to make changes to the product as a result. German Audio Engineering is always pleased to receive suggestions for improvement and comments on the product.

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## Safety and operational reliability

Observe the following safety instructions when operating loudspeakers to avoid risks. The S15N loudspeaker has been designed exclusively for professional use in sound reinforcement systems. The loudspeaker may only be used by instructed and qualified personnel. Observe the operating modes described in these operating instructions. Other uses are not permitted.
The S15N can be operated without the DAL Control & Drive electronics, but then performance data will differ.

In operation avoid Feedback, distorted signals (clipping), peaks resulting from plugging or unplugging devices in the signal chain, long term pure sine wave tones with high power and too weak power amplifiers not specified by their power ratings. Such signals and devices can cause loudspeaker overload or damages and are not covered by our warranty

## Safety instructions:

*Warning*

Warning

Loudspeakers have a permanent magnetic field. Persons with pacemakers must not be in the immediate vicinity of loudspeakers, as magnetic fields can lead to interference with pacemakers. When repairing loudspeakers, it must be ruled out that the magnetic components come into contact with persons wearing pacemakers.

*Caution*

Warning

Loudspeakers have a permanent magnetic field. This can interfere with the operation of other components in the immediate vicinity that are magnetically sensitive.

*Beware*

Beware

The S15N is suitable for flown operation and offers mounting points for this purpose. For flown operation, the original Manufacturer hardware must be used and a proven static of the hanging point is mandatory. When installing and commissioning in standing or stacked operation, pay careful attention to secure footing and solid professional mounting. In stacked operation, the loudspeakers must be secured as a group against slipping or falling over, e. g. with suitable tension straps on stages. A falling loudspeaker can cause great damage to property and personal injury. Use only material specified by DAL for the installation and mounting of DAL loudspeakers. This work must be carried out by qualified personnel. Observe the applicable safety regulations when doing so.

*Caution*

Caution

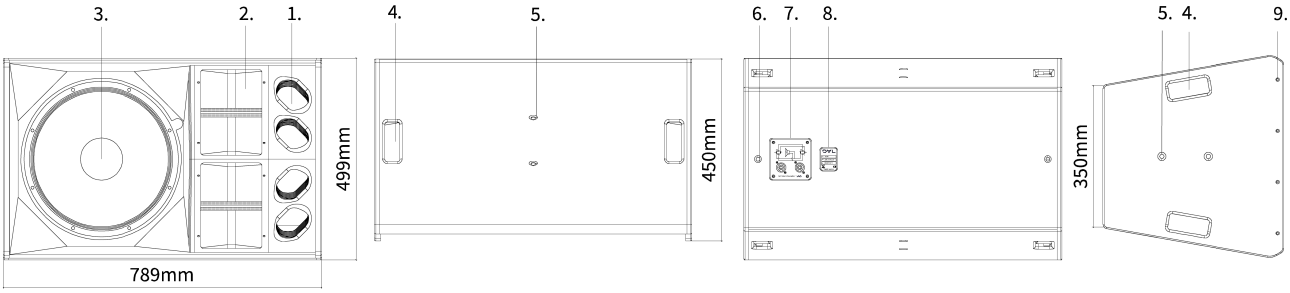
Do not stand in the immediate vicinity of loudspeaker systems that are operated at high sound pressure levels. Wear hearing protection when testing and setting up speaker systems. These speaker systems - operated at high sound pressure levels - can endanger health. Even seemingly low sound pressure levels of 90dB/SPL can cause long-term impairment or damage to hearing.

*Attention*

Attention

When setting up, storing and transporting loudspeakers, ensure that excessive environmental influences such as direct sunlight, moisture, vibrations and dust have no effect. When operating the loudspeakers, avoid feedback, distorted signal transmission and playback as well as signal peaks that can be caused by switching devices in the signal chain on and off or disconnecting them from the signal chain during operation. Make sure that the loudspeaker is not exposed to permanent thermal overloads, which may cause fire and result in damage to property and personal injury. DAL will not be liable for any damage caused in this way and will not accept any warranty or liability for consequential damage.

## Technical Overview




(1.) LV-Tuned Ports (4)

(2.) 1,4“ NDym-Hi Driver on proprietary Wave Formers: Replacement Voice Coil: DAL GAE GAE VC 1,4HFN05-072C, Order Code: 1000413

(3.) 12“ Cone Transducer: Replacement DAL GAE 15TN01-16-100B Order Code: 1000489

(4.) Integrated Transport Handles (4) in edges

(5.) Mounting Points M10 (2) Top and Bottom,

(6.) Lashing Point M8 (2) back wall

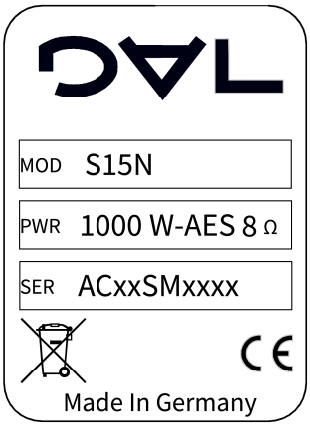
(7.) Connector Panel

(8.) Manufacturer Plate with serial number

(9.) Fixing Points M4 Protective Front Grill (2x4) left/right

Protective Front Grill with Foam Cover: Order Code: 1000713, Type DAL ASS-FGS15N)

Tools required for maintenance: Srewdriver and Bits: TX20, TX40, Philips PH2




*S15N – Manufacturer Plate With Serial Number*

## Purchase Of Spare Parts

Please state the serial number of your product when ordering spare parts.
The serial number identification of your product can be found on the serial number plate recessed in the rear wall of the loudspeaker system.
The illustration of the serial number plate is shown on the left. The S/N designation is followed by the serial number of the speaker system.

## Technical Specifications

Acoustical Bandwidth (S15N FR-Mode) with DAL DS-4S / DS-4M: 45Hz – 15HHz

Acoustical Bandwidth (S15N Cut-Mode) with DAL DS-4S / DS-4M: 60Hz – 15HHz

Dispersion (h x v): typically 90° x 20°

Electrical Phase Response: +/- 45°: 150Hz – 20KHz

Nominal Impedance (Re): 8Ohm

System Power: 1000W (AES), 2000W Peak

Continous SPL: >124dB/100W/1m, Pink Noise Crest Faktor 12dB

Peak SPL: > 144dB SPL/2000W/1m, Music Signal[1]

Dimensions (H x W x D mm): 500 x 790 x 450

Net Weight: 38,9kg

Connectivity: 2 x Speakon™ NL4 1+/1- alternative 2+/2-

Standard Coating: PU Coating, black, optional RAL colours or black PU-coating

Recommended Control & Drive System: DAL DS-4L

For operation recall one of the following controller setups for DAL DS-4L DAL DS-4M or DAL DS-4S:

S15NFR: Full Range stand - alone operation, spaced arrays

S15NCut: Low Cut operation with sub-/low support - stand alone

S15NFRC: Full Range stand – 3 Units, Concert System
S15NCutC: Low Cut operation with sub-/low support – 3 Units, Concert System

Parallel connection of multiple S15N systems and DAL Control & Drive Systems:
DS-4L: 3 systems per channel
DS-4M: 2 systems per channel
DS-4S: 2 systems per channel

## Technical Notes

Safety steels may be used only with the M10 threaded inserts. M6 or M8 threaded inserts in the rear are to be used exclusively with DAL original accessories or are designed as lashing points. After use, make sure that the countersunk screws belonging to the cabinet are screwed back into the threaded sleeves in order to maintain an air-tight system.

DAL protective grilles with foam lamination are the mechanical protection component for the built-in transducers and offer a high acoustic transmission as well as their affixing minimizes sonic influences of the grilles. The backing or covering of the grilles with foam serves also as UV-light protection, dust protection and improves the optical unobtrusive of the systems. Only undamaged grilles and foams can fulfil these tasks. Replace warped grilles or worn foams to maintain their function.

DAL loudspeaker systems with Poly Urea-coated or painted enclosures are basically suitable for temporary outdoor operation, even in the rain.

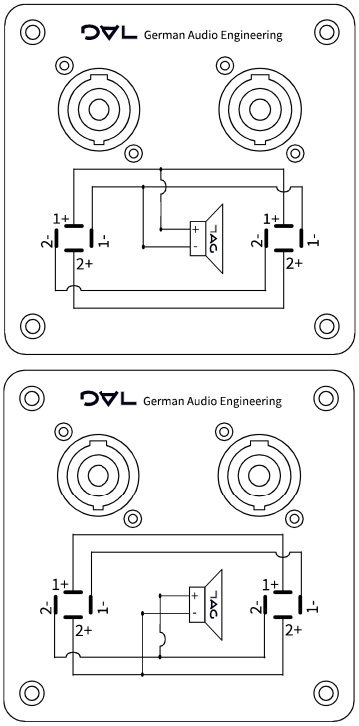
For indefinite operation outdoors as in fixed installations, the loudspeaker systems must be protected with a hood against direct sunlight and rain. If

1 With GAE DS-4L

necessary, the loudspeaker should be equipped with the optional front grille with weather protection.

Most DAL loudspeaker systems can be supplied for extra charge from the factory in a weatherproof (WR) or sea-weatherproof (SWR) variant.

For indefinite operation outdoors in subtropical and tropical areas, the loudspeaker should be ordered as the WR variant. For indefinite operation at sea and other areas with a humid and salty atmosphere, the loudspeaker should be ordered in the SWR equipment variant. Both variants are manufactured at the factory only.



*Variants of the NL4 connector panel*

## Connectivity And Electrical Operation

The S15N is connected via 2 Speakon™ NL4 sockets connected in parallel on the connector panel. The connectivity is 1+/1- as standard. Alternatively, the connector panels can be supplied or retrofit as a version with the Neutrik NL4 connectivity for 2+/2-. For certain fixed installations, connector panels can be supplied with screwed glands instead of NL4 sockets.

Connectors Pin Assignment 1+(2+)/1-(2-): The S15N is wired in such a way that a positive voltage at 1+ (2+) moves the membrane of the woofer outwards.

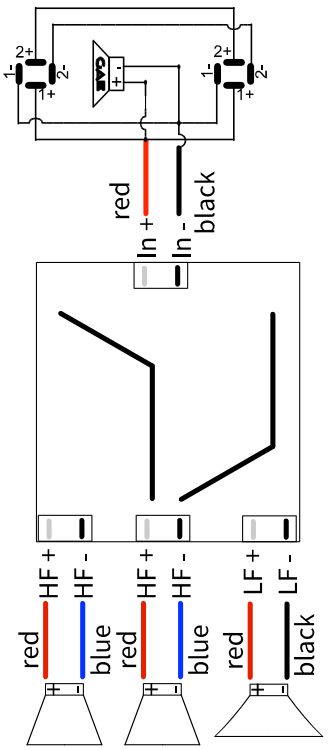
The S15N can be operated without a dedicated system controller. The high frequency driver is protected by an RMS limiter function in the passive frequency dividing system. Use the DAL Control & Drive Systems to ensure factory specification, maximum performance and sonic characteristics.

Keep in mind that you may need to increase the required cable cross-section for parallel operation of multiple S15N on one amplifier channel. The same applies to long and longer cables between power amplifier and S15N. We recommend a minimum cross section of 2.5 qmm up to 20m cable length @8Ohm. Here the loss through the cable is approx. 5% of the amplifier power.

## Installation And Rigging

The S15N is primary intended to be used in a Concert System as a stack of 3 units together with 2 BB218 or 3 BB118 Sub-/Low Systems. For the stacking purpose there is a separate stacking cradle available. The stacking operation and handling is described in the S15N Stacking and Rigging Manual.

A secondary intended use may be flown operation in higher venues or for sound reinforcement of sports venues upper levels. For this purpose there is a Rigging Frame available. The rigging operation and handling is described in the S15N Stacking and Rigging Manual.




*S15N - internal wiring schematic*

## Test and Maintenance

The wiring of the loudspeaker components inside the cabinet is according to the diagram to the left. With an impulse phase checker, delivering a signal of non-inverted phase a signal of positive polarity is obtained directly measured in front of the cone transducer. If the same test is performed in front of the high frequency driver/horn, also a signal with positive polarity is obtained.

If the diaphragm of the high-frequency driver is replaced, make sure that the original spacer ring (if originally fit) made of a thin plastic material remains in the driver so that the new voice coil is correctly positioned in the magnetic field. Cone transducer and horn need to fit back airtight in the cabinet after service.

It is good practice to check loudspeaker systems frequently in concern of mechanical integrity and distortion free sound reproduction.

Here is a simple way to quickly check sound reproduction. Use a sine wave generator with sweep function or a tunable sine wave generator and a power amplifier. Adjust the test system to deliver an appropriate sound power level and tune the sine wave generator from low to high frequencies. Listen to the acoustic output the loudspeaker delivers. The signals should be free of audible distortions. Mechanical noise from the system or unwanted reproduction of side tones should be followed up by inspection and a search for the root cause.

Fixing and mounting points should be inspected frequently.

## Operation of DAL S15N

The S15N systems are very high power systems. The main Application is a Concert System of 3 Units vertically stacked. A minimum active control for the S15N plus a dedicated power amplifier delivering RMS 3000W@2,6Ohm, Peak 5000W@2,6Ohm.

Down below are the basic parameters to be adjusted for an external system controller. Please note that the parameter “Delay” should be measured on site with an FFT analyzer in relation to any Sub-/Low System. Depending on the acoustic distance between Sub-/Low Systems and top stacks their relative acoustic distance must be compensated for best summation. Doing that correctly will give an optimum summation at the acoustic cross over frequency between e.g. BR218 or BB218 and top stacks e.g. S15N

| S15NFRC | Concert System (3U) | Control Parameters | |
|---|---|---|---|
| Limiter | +40dBu | | |
| Polarity | + | | |
| Delay | to be adjusted locally | | |
| High Pass | 30Hz | Butterworth 4$^{th}$ Order | |
| EQ1 | 100Hz | BW 0,5Oct/Q=2,8 | Gain +2dB |
| EQ2 | 240Hz | BW 0,64Oct/Q=2,2 | Gain -1dB |
| EQ3 | 350Hz | BW 0,35Oct/Q=4,0 | Gain -1,6dB |
| EQ4 | 540Hz | BW0,23Oct/Q=6,3 | Gain +3dB |
| EQ5 | 740Hz | BW0,26Oct/Q=5,4 | Gain -1,4dB |
| EQ6 | 2000Hz | BW1,0Oct/Q=1,4 | Gain -1,4dB |
| EQ7 | 11000Hz | BW 0,3Oct/Q=4,7 | Gain +3dB |
| Hi Shelf | 12000Hz | 12dB/Oct | Gain +3dB |

## Note on disposal

Observe the applicable national regulations and rules for disposal.
All products manufactured by German Audio Engineering GmbH are B2B products and are supplied to commercial customers. The adjacent symbol of the crossed-out trash bin can indicate that this product will be disposed of exclusively by German Audio Engineering GmbH. For DAL products that do yet bear this marking, the owner is responsible for proper disposal.
Our registration according to Elektro G is: WEEE-Register-Nr. DE 72073104



## Manufacturer's declaration

The declaration applies to: DAL S15N 1000562 and all model variants that correspond to the factory design and have not been modified by others.
Applied national standards and technical specifications:
DIN 18800, DIN 1055, DGUV regulation 17, BGI 810-13
Hamburg, 01.06.2018