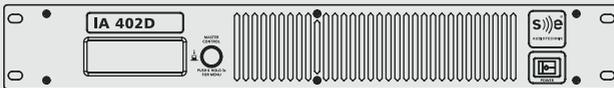
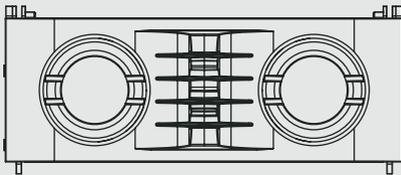




AUDIOTECHNIK

L 35 & IA 402D



APPLICATION GUIDE

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INTRODUCTION

SE AUDIOTECHNIK® is constantly looking the best ways to provide the products, tools and resources to provide competent and satisfactory solutions for a wide range of PA applications. Among these efforts, special attention is given to the proper pairing of products from different lines, offering better and more complete systems to our customers.

With this in mind and from firmware version **20200826**, the IA 402D amplifiers include additional presets to use with L 35 or L 35 R line array systems, as well as their respective flyable subwoofers.

Furthermore, both B 15A and S 112i PRO subwoofers have also one preset to use specifically with L 35 loudspeakers. Therefore, both of them can be used as ground-based low-frequency extensions to broaden the working range of L 35 line arrays.

This application guide gives then further insights about the use and configuration of systems comprising the mentioned loudspeakers and subwoofers.

Please, refer to the dedicated user manual for further information of each product:

- **S 112i PRO subwoofer and IA 402D amplifier:** I-Line User Manual
- **L 35/R and L 35 FS/R:** L-Line User Manual – Loudspeakers
- **B 15A subwoofer:** B-Line User Manual

These can be can be openly downloaded from our website www.se-audiotechnik.de.

CONVENTIONS IN THIS GUIDE



Symbol to alert the user about important operating or maintenance instructions.



Symbol for practical tips and ideas useful to ensure the correct use of the product and improve its operation.

In addition, the term L 35/R refers to both versions of L 35: L 35 indoor or L 35 R outdoor version. Correspondingly, L 35 FS/R indicates the indoor and outdoor versions of the flysubs.

WIRING

The IA 402D amplifiers use 4-pin Phoenix terminals and speakON® NL4 and connectors to output audio signals, being the later the most recommended option. Equally, L-Line loudspeakers use speakON® NL4 connectors to input and pass amplified audio signals. These wires should be connected as shown below:

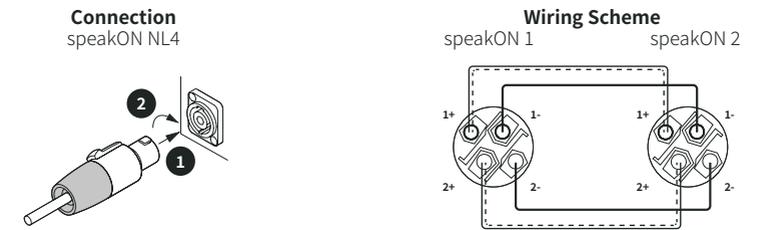


Figure 1. SpeakON® NL4 plug-in and link cable connection.

As detailed in the L-Line User Manual – Loudspeakers, L 35/R units include on the rear a switch to select the source of the input signal from the NL4 connector, namely pins 1+/1- or 2+/2-. The signal chosen is the one delivered to the transducers.



With a single NL4 cable, it is possible to send independent signals to L 35 FS and/or L 35 units in the same array. Then, the input switch on each unit allows to select the pins carrying the signal it must reproduce.

Finally, IA 402D amplifiers can input and link audio signals through XLR-3 connectors. They follow the next plug-in and configuration scheme:

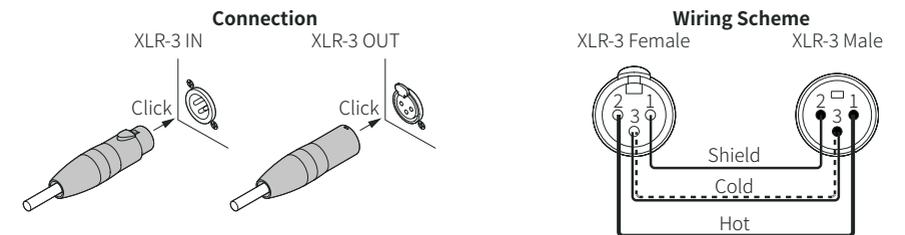


Figure 2. XLR-3 plug-in and cable connection.

It is recommended to use cables with at least 18 AWG conductor size. For long cable lengths, the maximum conductor size is 14 AWG. Those wires must be assembled by a qualified technician.

LIST OF PRESETS

From firmware version 20200826, IA 402D amplifiers include the following presets to work with different SE AUDIOTECHNIK® products:

Product	Preset Name	Description	Units per channel
IC 32	IC 32	For powering up to four IC 32 columns.	1 - 4
IC 34	IC 34	For powering up to two IC 34 columns.	1 - 2
IC 38	IC 38X	For powering IC 38X columns.	1
L 35	2L35Sat	For array of up to two L 35 units, used indoor as "satellite" and with additional subwoofer.	1 - 2
	4L35Sat	For array of up to four L 35 units, used indoor as "satellite" and with additional subwoofer.	3 - 4
	8L35Sat	For array of up to eight L 35 units, used indoor as "satellite" and with additional subwoofer.	3 - 4 (2 channels needed)
	2L35FR	For indoor array of up to two L 35 units full-range, without subwoofer.	1 - 2
	4L35FR	For indoor array of up to four L 35 units full-range, without subwoofer.	3 - 4
	8L35FR	For indoor array of up to eight L 35 units full-range, without subwoofer.	3 - 4 (2 channels needed)
L 35 R	2L35R	For outdoor array of up to two L 35 R units. Additional subwoofer usage is recommended.	1 - 2
	4L35R	For outdoor array of up to four L 35 R units. Additional subwoofer usage is recommended.	3 - 4
	8L35R	For outdoor array of up to eight L 35 R units. Additional subwoofer usage is recommended.	3 - 4 (2 channels needed)
L 35 FS	L35FS+Sat	For up to two L 35 FS used in L 35 line arrays indoor.	1 - 2
L 35 FS R	L35FS+R	For up to two L 35 FS R used in L 35 R line arrays outdoor.	1 - 2
Subwoofer	Sub	General configuration to use with other passive subwoofers.	-
General	Flat	General configuration to use with other products or as a base for custom user presets.	-



Use each of these presets only with the corresponding product stated. And do not connect more units to each IA 402D channel than those specified in the table.



Factory presets provide natural sound and even frequency response between products in the close distance.

USE WITH L 35 FS/R

L 35 FS/R allow to extend the low frequency range of L 35 or L 35 R line arrays and for that, IA 402D can power up to two flysubs per channel. As shown before, there are two presets for L 35 FS/R: one to use indoor with L 35 and, other to use outdoor with L 35 R.

These presets set the optimal crossover frequency between both systems but, in order to define the balance of the total response, the gain of each way must be set as desired. Values below are a right basis for further adjustments:

Pieces of L 35 FS	Pieces of L 35/R	L 35/R Gain	L 35/R Preset
1	2	-6 dB	2L35Sat/R
2	2	0 dB	2L35Sat/R
2	4	-6 dB	4L35Sat/R

In all those cases, L 35 FS gain is 0 dB, IA 402D Input Sensitivity is +4 dBu and the preset for each channel powering L 35 FS flysub/s is L 35FS+Sat/R.

Some applications may comprise additional ground-based subwoofers to reproduce frequencies below the range of L 35 FS/R flysubs. A good starting point for that adjustment would be:

Pieces of L 35 FS	Pieces of L 35/R	L 35 FS/R Gain	L 35/R Gain
1	2	0 dB	-3 dB
2	2	-3 dB	0 dB
2	4	0 dB	-3 dB

Additionally in the IA 402D amplifier, an Input Sensitivity of +4 dBu must be set and, a delay of 2.1 ms should be applied to the L 35/R and L 35 FS/R channels, in order to align in time the array and the additional subwoofer/s. This time alignment should be confirmed through accurate measurements in-situ.

USE WITH B 15A

Below, the table on the left details recommended gain and quantity values for systems including L 35/R arrays and B 15A subwoofers. The one on the right, specifies the parameters for B 15A configuration. In all combinations, IA 402D amplifiers have an Input Sensitivity of +4 dBu and its output level is 0 dB.

B 15A Pieces	L 35/R Pieces	B 15A Gain	L 35/R Preset
1	2	-11 dB	2L35Sat/R
1	4	-5 dB	4L35Sat/R
1	8	0 dB	8L35Sat/R
2	4	-11 dB	4L35Sat/R
2	8	-5 dB	8L35Sat/R

B 15A Parameters		
Low-pass filter	LR24 @ 145 Hz	
User delay	0.7 ms	
Phase inversion	YES	
Input Sensitivity	+4 dBu	
Preset	L 35	

When L 35 FS/R flysubs are included in the L 35/R line array, it is recommended to respect the following combinations and parameters for B15A:

L 35/R Pieces	L 35 FS/R Pieces	B 15A Gain	
		1 piece	2 pieces
2	1	-12 dB	
4	2	-6 dB	-12 dB
8	4	0 dB	-6 dB

B 15A Parameters		
Low-pass filter	BW24 @ 80 Hz	
Phase inversion	YES	
Input Sensitivity	+4 dBu	
Preset	L 35	

In those three cases, the Input Sensitivity of IA 402D amplifiers is +4 dBu, and the gains for L 35/R and L 35 FS/R are respectively -3 dB and 0 dB. In addition, a delay of around 2.1 ms must be applied to all L 35/R and L 35 FS/R channels to align in time the array and the B 15A subwoofer/s. This time alignment should be confirmed through accurate measurements in-situ.

USE WITH S 112i PRO

For some installation applications, the S 112i PRO subwoofer may be more suitable and preferred to work with L 35 arrays. In those cases, the following quantities, levels and configurations can be taken as a reference:

Number of S 112i PRO	Number of L 35/R	S 112i PRO Gain	L 35/R Preset
1	2	-12 dB	2L35Sat/R
1	4	-6 dB	4L35Sat/R
1	8	0 dB	8L35Sat/R
2	4	-12 dB	4L35Sat/R
2	8	-6 dB	8L35Sat/R

S 112i PRO Parameters		
Low-pass filter	LR24 @ 145 Hz	
Phase inversion	NO	
Input Sensitivity	0 dBV	
Preset	L 35	

IA 402D Parameters		
Delay	0.73 ms	
Channel gain	0 dB	
Input Sensitivity	+4 dBu	

HF ADJUSTMENT FOR SPY ANGLES

In a line array, the splay angles between units can greatly influence the response of the system, especially in the high frequencies. This is mainly due to the decoupling of the different sources: the greater the splay angles, the more the HF level starts decreasing and from a lower frequency.

In some cases and depending on the application, this may or must be compensated. The graphs below show the compensation EQs for two, three and four boxes splayed at the different angles available.



These recommended EQs should be applied additionally to the presets and configurations given before for the different combinations of L 35/R and the subwoofers.

Additional frequency adjustment (EQ) for 2x L 35 at splay angles 0°, 2.5°, 5°, 7.5°, 10°

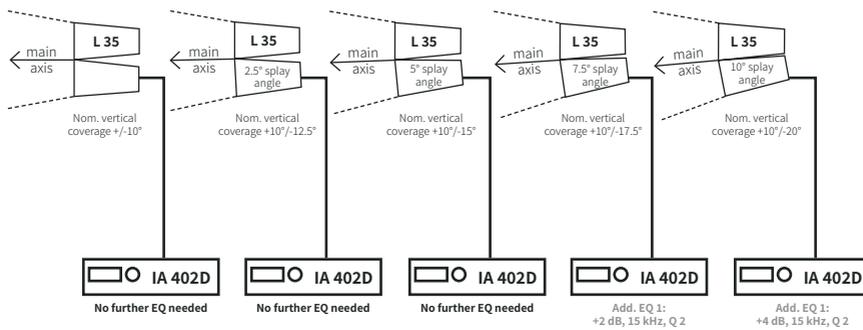


Figure 3. Additional frequency adjustment for splay angles: 2 x L 35 with 0°, 2.5°, 5°, 7.5° and 10°.

Additional frequency adjustment (EQ) for 3x L 35 at splay angles 0°, 2.5°, 5°, 7.5°, 10°

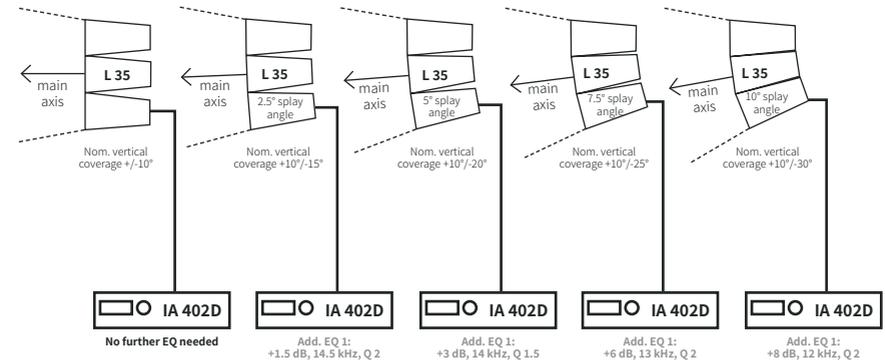


Figure 4. Additional frequency adjustment for splay angles: 3 x L 35 with 0°, 2.5°, 5°, 7.5° and 10°.

Additional frequency adjustment (EQ) for 4x L 35 at splay angles 0°, 2.5°, 5°, 7.5°, 10°

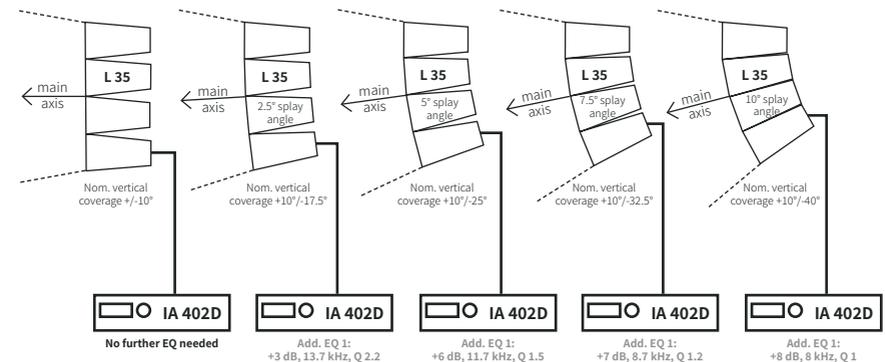


Figure 5. Additional frequency adjustment for splay angles: 4 x L 35 with 0°, 2.5°, 5°, 7.5° and 10°.

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