

Self Powered

K&F Subwoofers 'SP'



User's Manual

Version 7.0
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**Important Information,
Please Read Before Use!**

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Thank you for your decision to buy a Kling & Freitag product. To guarantee a trouble-free operating of the equipment and to allow the KLING & FREITAG – 'SP' speaker system to achieve its full potential please read the operating instructions carefully before use.

With the purchase of a K&F subwoofer system with integrated power amplifier technology, you have acquired a speaker system with the highest possible quality and performance capabilities.

As the owner of this system, you now have a versatile and highly professional tool which, when operated properly, is a true pleasure to use.

Symbols in User's Manual



Warning

This symbol indicates the possibility of life-threatening danger and a health risk for persons. Not following these instructions may result in serious health problems including potentially fatal injuries.



Caution

This symbol indicates a possibly dangerous situation. Not following these instructions may cause minor injuries or cause property damage.



Important

This symbol gives instructions for the proper use of the described products. Not following these instructions may cause malfunctions or property damage.

Information about this User's Manual

User's Manual K&F Self Powered Subwoofer Systems, Version 7.0 09.09.2014

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All specifications in this manual are based on information available at the time of publishing for the features and safety guidelines of the described products.

Technical specifications, measurements, weights and properties are not guaranteed.

The manufacturer reserves the right to make product alterations within legal provisions as well as changes to improve product quality.

All persons who use the speaker system must have this guide and all further information for safe operations available to them during assembly, disassembly, and use.

We appreciate any input with suggestions and improvements for this manual. Please send this to us at the following address:

info@kling-freitag.de or to:

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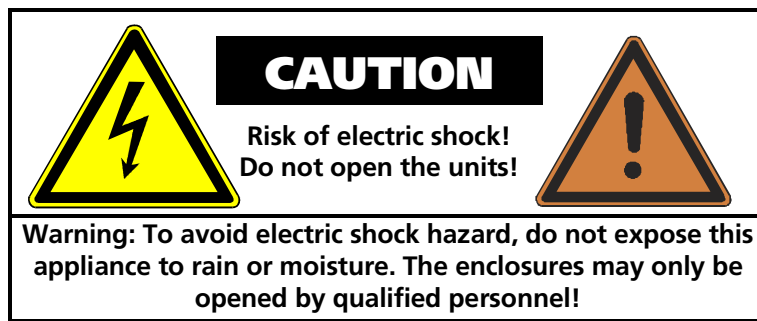
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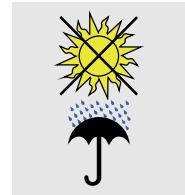
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1. General Safety Instructions



Do not install devices in any of the following places:

- where the devices are permanently exposed to direct sunlight.
- near any heat sources and open fire. do not put candles etc. on top of the speaker.
- where the airflow for cooling is blocked. a minimum distance of 10 cm to the heat sink on the rear of the speaker must be kept.
- where the devices are exposed to high moisture. Objects filled with liquids, such as a vase, must not be placed on the speaker.
- where the devices are exposed to strong vibrations and dust.



Power Supply

Before connecting the AC power cable of the SP speaker, please check if the available voltage is compatible with the operating voltage as indicated on the unit. If this is not the case, then the unit needs to be adapted by the manufacturer or an authorized service centre. If the unit is not compatible with the available voltage, it should never be connected! This could irreparably ruin the SP speaker.

Make sure that the power outlet supplies a ground connector, which must be connected to the unit via the PE conductor of the power cord!

All equipment, which is connected together using signal cables and has a connection to protect ground, must be connected to a common protective earth. If not, there is a risk of an electric shock or the destruction of the connected equipment.

The power plug must always be used to disconnect from the power supply. Furthermore, the power plug must be easily accessible for use at all times.



Protection of Electrical Cables

Power cords should be laid in such a way that they are protected against footstep damages, tensile strain and against being trapped.

Transportation

When transporting the equipment, make sure that it is protected from vibrations.

Cleaning

The equipment should only be cleaned with a damp cloth when it is not plugged in.

Pauses in Use

The power cord should be disconnected from the power source during longer pauses in use.

Intrusion of Objects or Liquids

No objects or liquids should intrude or leak into the equipment.

**Warning****Maintenance and Technical Service**

The user should not perform any maintenance work on the equipment other than that which is described in this manual. Repairs should be executed by a qualified service technician only.

In the following cases, the unit should be serviced by an authorized technician only if:

- the power cord or the mains connectors have been damaged.
- objects or liquids have gotten into it.
- it was exposed to rain.
- it doesn't appear to be functioning properly.
- it has fallen down or the enclosure is damaged.

Mounting the speakers

If the weight of the speaker exceeds 25 kg then it is necessary for two people to carry it. To prevent injury, this equipment must be securely placed on the floor or secured to the wall according to the assembly instructions. Speakers, which are stacked, must be secured with securing straps. Please note that speakers can move as a result of vibrations. To prevent them from falling from their mounted position, they must be secured properly.

Speakers may only be suspended by qualified personnel.

Never use signal cables or power cords for suspending, aligning or securing the systems. When laying the connecting cables, make sure that nobody can trip.

The speakers must be hung by using at least two of the designated flying points. The same applies when lifting and aligning the speakers.

Never hang more than two speakers under one another without using the designated Kling & Freitag mounting devices.

Ensure that all installation connections comply with the applicable safety guidelines and that the size and strength are sufficient. Further instructions are in our user's manual for assembly equipment and in the general safety instructions for speakers and assembly equipment.

For mobile and fixed installations, use only assembly equipment from KLING & FREITAG. Make sure to observe the included Safety and Mounting Instructions for Loudspeakers and Accessories.

**Important****Unwanted interference**

RF interference on the power cord or on the line signal cables may lead to unwanted sound interference.

Damage caused by the speakers' magnetic fields

Speakers are permanently surrounded by a magnetic field, even when they are not operating. Therefore, during transport and placement of the speakers, it is important to ensure that there is always approx. 1 m between the speakers and magnetic data media and computer/video monitors.

The following signals may damage the speakers

- permanent high-pitched signals with high frequency and continuous noise from feedback
- permanently distorted signals with high power.
- noises, which occur when the SP speaker is connected while equipment is being connected, disconnected or switched on.

Preventing hearing damage

To prevent the risk of hearing damage, avoid being too close to operating speakers even if the volume level seems to be low enough. In general, volume levels over 90 dB can cause hearing damage.

**Caution**

2. Introduction SP Loudspeakers

'SP' denotes the Self Powered product line in the K&F range of loudspeakers. Based on selected K&F speaker systems, the 'SP' models are equipped with state-of-the-art integrated driver circuits and Class D power amplifier technology. The extremely lightweight system electronics replace ponderous racks, power amplifiers, controllers, and speaker cables.

Aside from the integrated power amplifier and input modules with controller functions, the full-range systems possess a passive crossover so that the advantageous features provided by the K&F passive technology (all-pass filter, protection circuits) remain usable. The frequency separation for the subwoofers is controlled by an active 110 Hz low pass filter.

Integrated phase optimisation allows for all systems in the 'SP Series' to be combinable with one another. With this, the 'SP' speakers, when the filter section is switched off, have a completely comparable sound to the corresponding versions without integrated power amplifier technology. Operations using a K&F System Controller CD 44, CD 44 (discontinued) und C2 (discontinued) are also possible, which is appropriate for many applications.

Operating the 'SP Series' is incredibly easy: The full range systems transmit the complete frequency spectrum. If necessary, the 'SP' subwoofers in parallel operations can provide an additional bass boost.

The Input Module

- Line signal input
- Limiter section (feed-forward RMS-limiter and peak limiter in feed-back design).
- High pass filter, 45 Hz tops, and 32 Hz subwoofers
- Low pass filter 110 Hz (subwoofer systems only)
- System specific, switchable frequency equalisation ('FILTERS ON/ OFF') controllable by a covered switch on the connecting terminal
- Phase correction
- Level adjustment (countersunk level control on the connecting terminal)

The Amplifier Module

- 1 x, or 2 x 1 kW Class D state-of-the-art power amplifier
- Minimal dimensions (speaker dimensions of the models without the 'SP' module are retained)
- Low weight (weight increase of 2.5 / 4 kg as compared to systems without the 'SP' module; and with the Line 212 - SP, the weight even stays identical)
- High efficiency enables convection cooling, because of which bothersome fans are unnecessary
- High fidelity (even in high frequency range) and a large power band width resulting from impedance optimisation

Modes of Operation

- Operations without external controller:
with activated filters (FILTERS 'ON'), all K&F models in the 'SP Series' are combinable with one another by simply linking the signal from one speaker to the next.
- With optional K&F System Controller*:
via a K&F System Controller CD 44, CD 24 (discontinued) or C2 (discontinued, with system plug-in card) or an Audio DSP*:
- if used with BSS Soundweb, FDS 366, 336, 334, and XTA DP 226, 224, K&F system parameters are available upon request

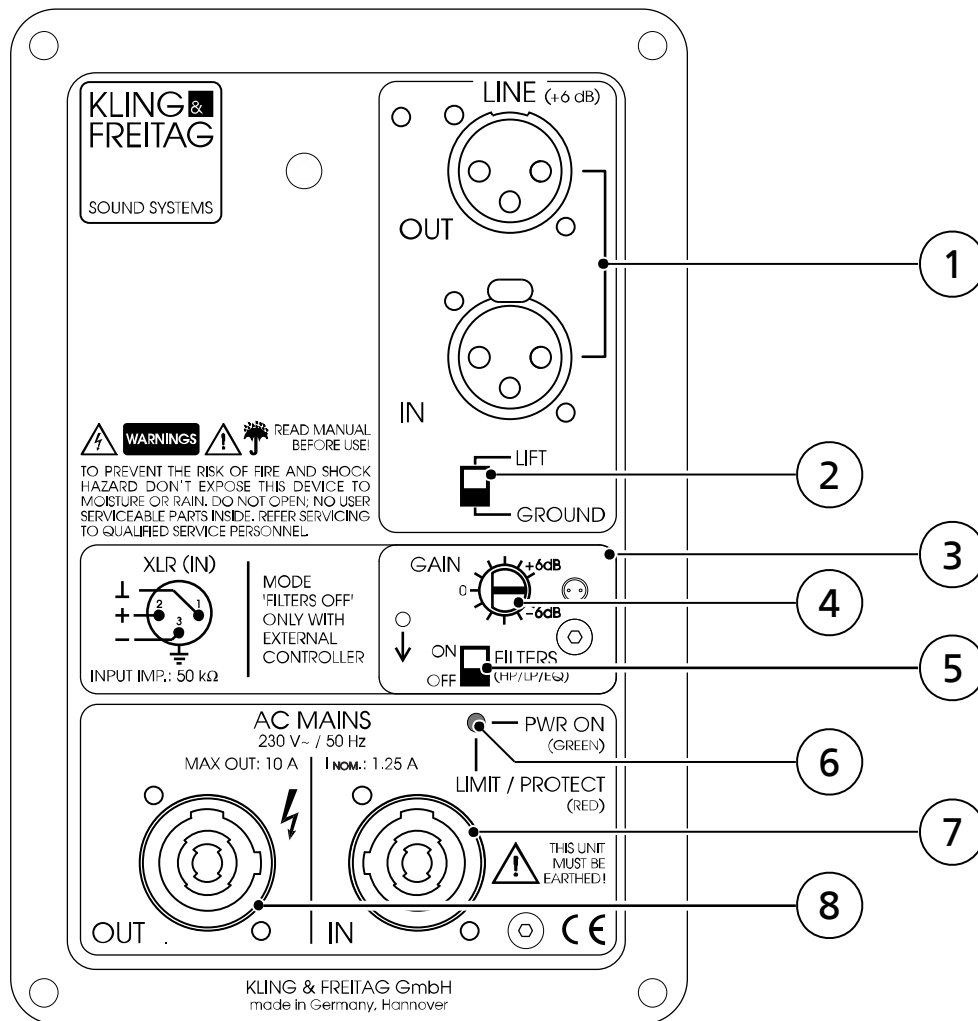
* The operation of the K&F 'SP' models with a K&F System Controller or Audio DSP is recommended for uses in which special filter pre-sets are advisable, i.e. in combination with passive systems of the 'CA Series', in cluster operations (top low cut), when bass and high boost are necessary, adjustment to the room acoustics (EQ), etc.

The following K&F 'SP' speakers are available:

Full-range systems: CA 1001 - SP,
CA 1201 - SP,
CA1215-6 - SP, CA 1215-9 - SP
CA 1515-6 - SP, CA 1515-9 - SP
LINE 212-6 - SP, LINE 212-9 - SP

Subwoofers: SW 112 - SP, SWi 112 - SP,
SW 115E - SP, SWi 115E - SP,
SW 118E - SP, SWi 118E - SP,
SW 215E - SP, SW 215E - SP 'Suspension'

3. Connectors, Controls und Displays



1) LINE IN and LINE OUT (+6 dB)

Electronically balanced input and output connectors. Use the XLR female connector (marked 'IN') as input. The parallel-wired XLR male connector (OUT) is for connections to further 'SP' loudspeakers.

2) GROUND LIFT

When the 'Ground Lift' switch is set to LIFT, pin 1 of the LINE IN connector (ground) is not connected to the chassis ground of the integrated amplifier module. The ground connection between LINE IN (XLR male) and LINE OUT (XLR female) is maintained. The use of the 'Ground Lift' switch is sometimes necessary in dealing with hum problems (see chapter 7.1)

Never tape over the protective earth on the plug – danger to life!

3) PROTECTIVE COVER

The protective cover prevents unwanted adjustment of the gain control and filter ON / OFF switch. The cover has a snap-in lock. In order to reach the controls beneath, turn the cover sharply down in the direction of the arrow.



4) GAIN CONTROL (± 6 dB)

- a) The gain control can be used to adjust the input level of the amplifier module by ± 6 dB. It serves to balance the volume levels of the various systems. In order to avoid overloading the input circuit or the mixer's output circuit, it should normally be set in the case of K&F full-range systems at 0 dB (centre notch setting).
- b) When operating with a K&F System Controller, set the input level of the amplifier module on the controller. The gain control on the SP speaker should be set at 0 dB (centre notch setting). One exception to this rule is a cluster arrangement, in which the inner speakers should be set at a lower level than the outer ones. In this case the level of the gain control on the inner SP speakers can be adjusted downwards accordingly.

When operating with additional bass systems it is very important that the respective volume levels between the top speakers and the bass systems are correctly balanced. To this end the sound engineer should check the volume levels during the set-up and adjust them accordingly. When setting up a system without a K&F System Controller this adjustment should be carried out using the gain control of the SP subwoofer (use gain control of the top speaker if not sufficient); in the case of a system with K&F System Controller set this gain on the controller.

Please note that the position of a bass speaker is crucial for its actual sound level. A bass speaker, which is on the floor, can be a few decibels louder than a flown bass system because of the floor reflections. Because of this, a sound engineer must always fine-tune the system using the corresponding level controls.

5) FILTERS ON / OFF (High Pass / Low Pass / Equalizer)

This switch turns the filter in the SP module on ('ON'), or off ('OFF').

- a) The switch should always be in the 'ON' position when the speakers are being driven without K&F System Controller.
- b) The switch should always be in the 'OFF' position when the speakers are being driven with K&F System Controller.

The filters consist of:

- high-pass: protects the speakers against mechanical stress due to frequencies outside the speaker's frequency range (protection against subsonic frequencies)
- low-pass (subwoofers with SP-module only): Only frequencies below 110 Hz can pass the low pass filter. In this way, the bass speaker only reproduces the intended frequencies.
- EQ: filter for basic equalization, optimizing the frequency response of the speaker systems.

Furthermore the SP filter module has a phase alignment, which prevents loss of certain frequencies due to phase shift between mid-high and bass systems. Thus the combination of all available K&F mid-high SP systems with all K&F bass SP systems is possible, and 100% phase compatibility with all K&F speakers operating in conjunction with a K&F System Controller in the '2-way active' mode is guaranteed.

6) LED POWER ON (GREEN) and LIMIT / PROTECT (RED)

The LED is dual-purpose:

- a) When the LED is green, the speaker is connected to the supply voltage and ready for operation
- b) The LED will turn red if...

...the input signal is so high that the internal limiters reduce its level.

The limiters consist of a peak limiter, which limits the peaks of the signal, and an RMS / thermal limiter, which continuously regulates excessive levels. During normal operation the red light may occasionally illuminate briefly. It does indicate that the level peaks are limited by the limiter circuit. The peak performance of the speaker has then been reached.

Should the red light come on more frequently or remain illuminated, the output level of the mixer should be reduced. When speakers with and without SP module are in operation simultaneously, the gain control on the SP speaker can be turned down, provided the level is sufficient for the other power amplifiers. The limiter protects the speaker from damage due to excessive levels.

- c) The LED stays permanently red, if...

...the protection circuitry of the integrated power amplifier cuts in and as a result no further signal reaches the speaker (Protect Mode).

The protection circuitry switches off the integrated power amplifier,...

- ...if the temperature of the amplifier module is too high. As soon as the temperature falls below the critical value, the amplifier module is switched on again automatically. Excessive temperatures can be caused for example by inadequate ventilation of the heat sink. Make sure that the air vents are not covered or positioned directly against a wall.
- ...if the output impedance is too low or in the case of a short circuit, caused for example by a defective chassis or a faulty component on the crossover.
- ...if the amplifier has an internal fault. The SP amplifier module checks that all is functioning correctly during operation. As soon as a fault becomes apparent the module switches into protect mode. If only one module of the SW 215E has a fault, the input signal is attenuated by 70 dB, to prevent damage to the other module.

Measures to be taken when LED is red:

Fault	Measure	Function
LED remains red or flickers continually during operation	Reduce output level on mixer until LED goes out or flickers only occasionally.	Limiter
No or too low output signal, LED shows red in spite of reduced mixer level.	Allow to cool. The amplifier module switches itself on after a few minutes. Provide sufficient ventilation.	Temperature protection
No or too low output signal, LED stays red after cooling down.	Have loudspeaker checked by authorized repair technician.	Other protection
SW 215E: Output signal is too low	Have loudspeaker checked by authorized repair technician.	Other protection



7) AC MAINS 'IN'

Connect this PowerCon socket using the mains cable supplied to a max. 16 A fused mains socket, paying particular attention to the stated mains voltage! Connection to an incorrect mains voltage can result in irreparable damage!

8) AC MAINS 'OUT'

Socket for connection to further equipment such as further speakers with SP module. **Use only connection cables, which conform to your national safety regulations.**

Maximum power consumption: 230 V: 10 A / 2300 W

110 V: 10 A / 1150 W

4. Power Cord

In Germany, a pre-constructed ready for use power cord is included in the delivery. For deliveries to foreign countries, a pre-constructed power cord incl. PowerCon plug is included. Because of the different standards abroad, the power plug is not included. This must be subsequently assembled only by qualified electrical specialists.



brown = BN = L

green / yellow = GNYE = \perp

blue = BU = N

5. Safety Instructions for Suspending the Speakers

The speakers may only be mounted by trained specialised personnel with proof of their qualifications as an approved 'rigger'.

Please follow the accompanying instructions for speakers and assembly equipment.

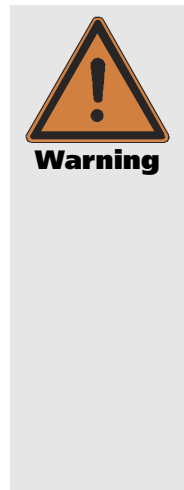
Speaker systems, whether single or connected to one another, must always be secured to a second separate point, even if two rigging points are used for suspending the speaker system!

A maximum load of 73 kg may be hung below one SW 215E – SP subwoofer.

This means a maximum additional load of 36.5 kg on each flying point.

A maximum load of 50 kg may be suspended from the two flying points of all other subwoofers. **This means a maximum additional load of 25 kg on each flying point.**

Ensure that all connections are secured to prevent their detaching on their own and that only admissible statically tested and sufficiently sized connecting devices, ropes and chains are used.

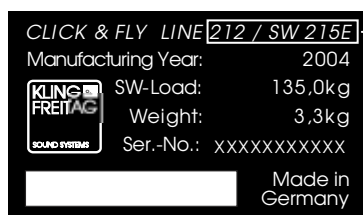


5.1 SW 215E - SP and Click & Fly Accessories

The Click & Fly rigging system is a certified and type tested rigging system for safe and comfortable rigging of SW 215E or Line 212 systems.

Click & Fly Systems with the classification of 'CLICK & FLY RIGGING SYSTEM' may not be used with the SW 215E Systems without the supplementary measures described below.

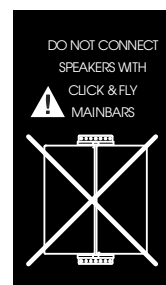
This is necessary due to safety measures for the subwoofer system, which have become additionally necessary. Only when these new supplementary measures are observed can it be guaranteed that you will have a safe and accordingly certified product for your further use.



At this position, '**LINE 212 / SW 215E**' must be visible. If 'RIGGING SYSTEM' is present at this position, then the Click & Fly rigging systems is only approved for use with the Line 212 systems.

Supplementary measures which allow for an 'old' Click & Fly System to be used for mounting SW 215E systems:

- Affix a new name plate, available from Kling & Freitag, recognisable by the classification 'CLICK & FLY LINE 212 / SW 215E'
- Affix the following additional sticker, received from Kling & Freitag, to the top side of the main bar:



- Receipt of a written version of this manual for each Click & Fly rigging system.
- User's manual made available for the users.
- Disposal of the old user's manual.

Kling & Freitag GmbH has made all resources necessary for supplementation including a detailed manual available free of charge to all buyers of the 'old' 'CLICK & FLY RIGGING SYSTEM'. If you did not receive these resources, please contact your retailer!

5.2 SP-Subwoofers with 'Suspension Thread' M12 (SWi-Versions)



Warning

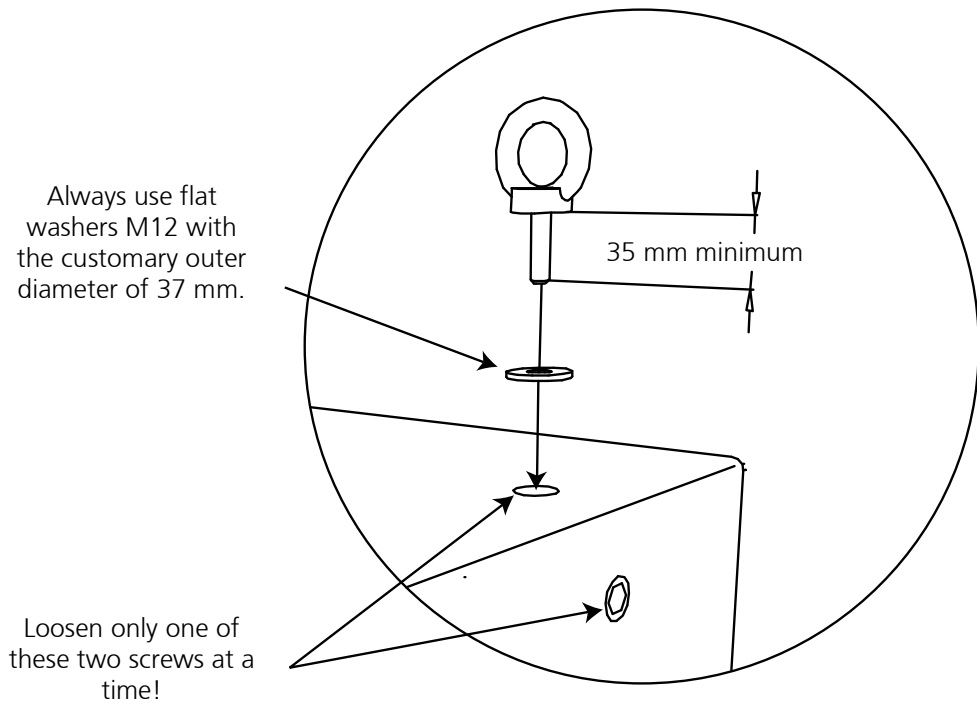
If you want to use the SP subwoofers equipped with 'suspension threads' M12, please read the following instructions.

Appropriate fastening mechanisms with an external screw thread of M12 and a minimum length of 35 mm! may be screwed on to the M 12 thread inserts. The internal screw threads in the speaker enclosure are fastened during production with counter-sunk head screws M12.

The two internal screw threads of the inner enclosure edge are on an L-bracket. This L-bracket has the function of connecting the adjoining plates of the enclosure. It provides sufficient tensile strength for flown operations. To guarantee that the enclosure plates are correctly connected by the L-brackets, only one screw of the enclosure edge may be loosened at a time. If both screws of an enclosure edge become loose, then, for safety reasons, the L-bracket will collapse into the enclosure.

If the L-bracket has fallen into the enclosure the loudspeaker must on no account be used again until it has been repaired by an authorized repair service.

When mounting the speakers, use only fastening mechanisms with threads that extend at least 35 mm into the speaker enclosure. Take into account the permissible load capacity of the fastening mechanisms while considering the safety factors. Mount the speakers using at least two independently operating points. Secure all screws to prevent loosening.



5.3 Subwoofer SP with 'allsafe JUNGFALK' Flying Points



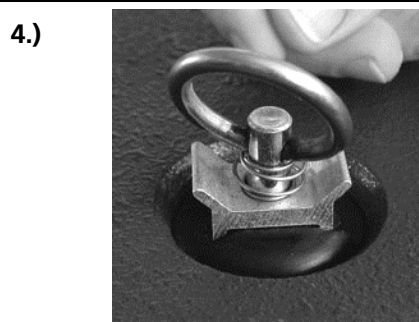
Take the single stud fitting in one hand...



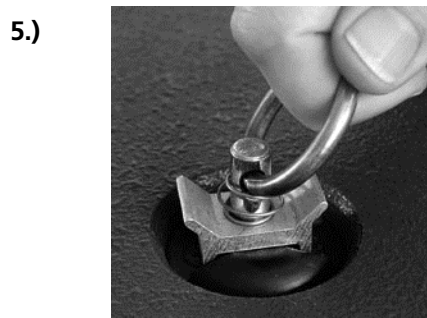
... and push the locking device up against the spring tension.



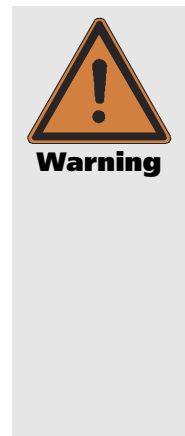
Put the flat head of the holding bolt into the guiding of the flying point.



Release the locking device when the single stud fitting is located in the middle of the flying point. Make sure that the locking device clicks into place.



Check that the single stud fitting is securely fastened and cannot be pulled out.



5.4 SW 215E 'Suspension': The 'allsafe JUNGFALK' Flying Track

The subwoofer SW 215E with rigging option may only be suspended by using the double stud fittings available from Kling & Freitag. The 'allsafe JUNGFALK' flying tracks are used to suspend the SW 215E system.

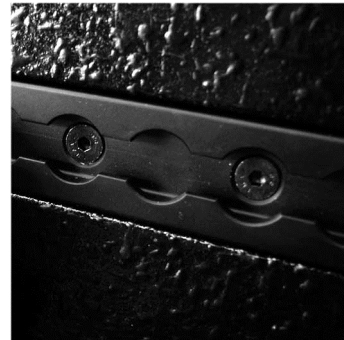
We recommend using the certified Click & Fly Line 212 / SW 215E rigging system for suspending the SW 212E.

***The 'allsafe JUNGFALK' Flying Track can only support weights up to 73 kg!
Please follow the accompanying safety and assembly instructions carefully!***



Double Stud Fitting

Used as fastener to the 'allsafe JUNGFALK' flying point and the 'allsafe JUNGFALK' flying track.



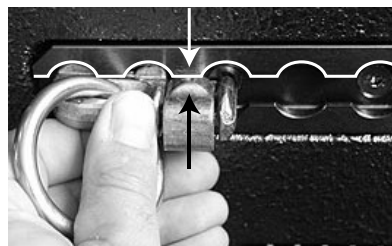
'allsafe JUNGFALK' Flying Track

Receptacle for the double stud fitting.



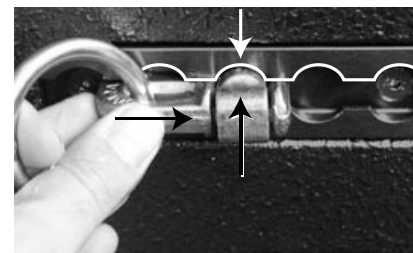
Warning

1.)



Align the double stud fitting as shown above and push it into the track,...

2.)



... slide the pushed double stud fitting to the middle of the speaker until it clicks into place. Make sure that it is secured tightly.

6. Mounting Instructions for Speakers

Mount the speakers securely. To avoid injury or damage, always be sure to mount the speakers securely so that they do not fall. Speakers, which are stacked, must be secured with securing straps. When laying the connecting cables, make sure that nobody can trip.

The stability of stacked systems (also valid for the use of stands and distance rods!) is contingent upon the following stability requirement. These conditions must, therefore, be guaranteed by the user:

Stacked systems may not fall over even if they are inclined by 10° in each direction. If this requirement is not fulfilled, then it is necessary to take steps to achieve compliance. Possible measures include strapping it to an appropriate base structure or fastening it using safety straps.

6.1 Using the Mounting Accessory 'Distance Rod'

The SP subwoofer is equipped with a threaded flange (M20) on the top of the enclosure for mounting the optionally available distance rod (not on the SWi versions).

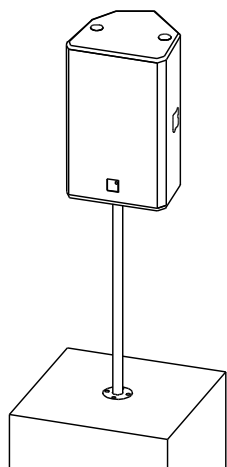
All K&F top speakers with a mounting flange or stand adapter may be mounted on the distance rod. Only use authentic Kling & Freitag distance rods and stand adapters. We can only guarantee safe operations when these parts are used.

When a top speaker is mounted on the subwoofer using a distance rod, the stability of the speakers is reduced. Please follow the stability requirements in chapter 6!

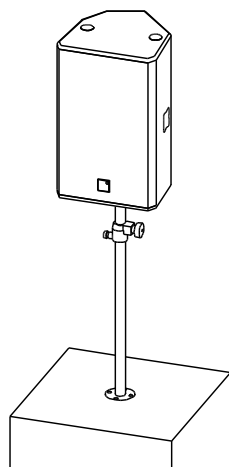
When re-positioning after set-up, remove the upper speaker mounted on the distance rod first.

Special note for the model SW 112

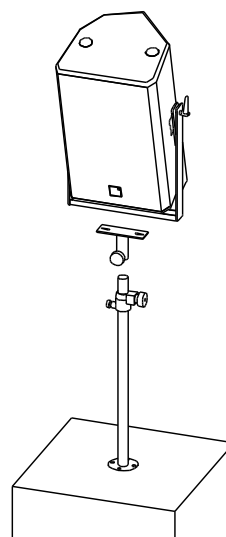
A top speaker with a maximum weight of 28 kg (i.e. CA 1201) may be mounted on this speaker using a distance rod. Speakers, which are heavier than 28 kg, may not be mounted on the distance rod flange and must be mounted on an additional speaker stand.



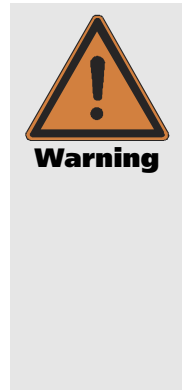
Distance Rod 334



Distance Rod 337
(adjustable)

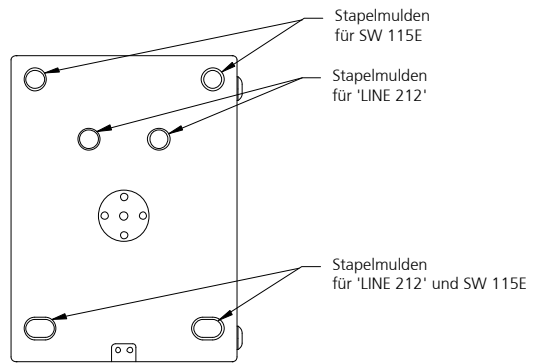


Distance Rod 337
with stand adapter and
adjustable speaker mount



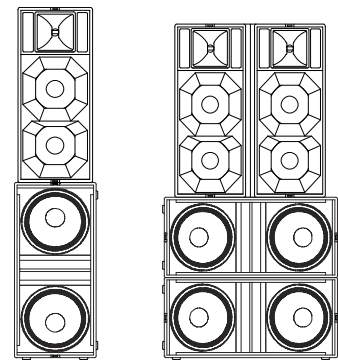
6.2 LINE 212 Systems on Top of SW 115E-SP


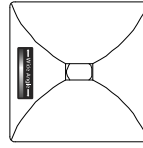
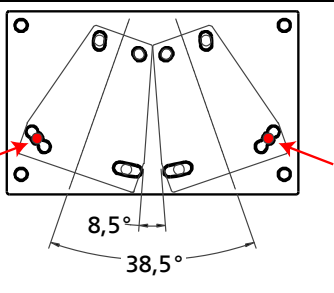
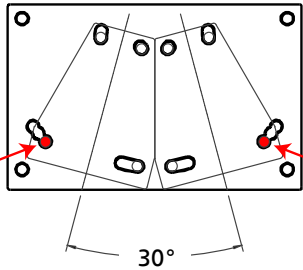
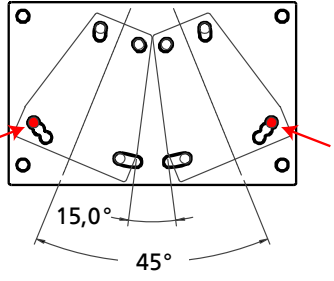
In addition to the stacking foot grooves for stacking the same enclosures, the subwoofer SW 115E -SP also has stacking foot grooves for the Line 212 system. One Line 212 System can be quickly and safely placed on the subwoofer.



6.3 LINE 212 Systems on Top of SW 215E

In addition to the stacking foot grooves for stacking the same enclosures, the subwoofer SW 215E also has stacking foot grooves for the Line 212 system. One Line 212 system can be quickly and safely positioned on top of a vertically placed SW 215E. Two Line 212 systems can be precisely arrayed on top of a horizontally placed SW 215E - SP.



	 Horn <u>not</u> rotated on standing Line 212 system	 Horn rotated on standing Line 212 system
Line 212-6 - SP with Line 212-6 - SP		
Line 212-6 - SP with Line 212-9 - SP		

Other combinations of Line 212 Systems are not recommended as they can cause unwanted interferences.

7. Wiring

Before connecting your SP system, be sure to switch off all connected appliances and turn down all level controls.

- We recommend the use of high-quality cables provided by KLING & FREITAG.
- For connections to the line level inputs, please use 2-pin shielded microphone cable with high-quality connectors.
- Avoid ground loops (see chapter 7.1)
- Make sure that the pin assignment of the line level connectors is correct (2 + / 3 - / 1 ⊥).

7.1 Avoiding Ground Loops

7.1.1 What is a Ground Loop?

Every component of a P.A. or Hi-Fi System has its own internal 0V reference (ground). This point is often connected to the protective earth connector (PE / Ground). If two or more units are connected to one another with a line level audio cable, there may be a ground connection through the ground of the power supply cable (yellow-green) as well as through the shielding of the audio cable. The voltage difference between these two ground points causes audible interference to come from the speaker.

7.1.2 Avoiding Ground Loops

If there is a loud humming or buzzing after the 'SP' System has been connected, then set the "Ground Lift" switches on the rear of the 'SP' speakers to the 'Lift' position (chapter: 3 / section 2).

If the noise is still audible, check if

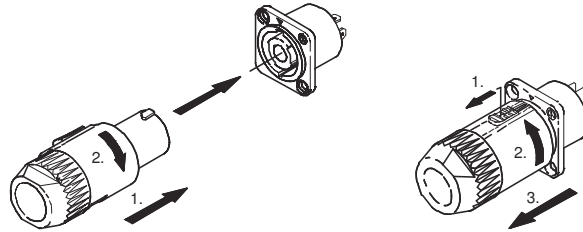
1. the noise is caused by a ground loop before the speakers (e.g. mixing console, effects or equalizers).
2. the system or parts of the system are connected to an "unclean" power supply - meaning one which is also running large motors or lighting systems. An "unclean" supply voltage, electrostatic and electromagnetic fields can cause interference.

Please observe the following basic rules:

- **Never !!! try to avoid a ground loop by disconnecting or taping the ground contact at the connector! Extremely dangerous!**
- If possible, only use high-quality audio appliances with balanced signal outputs and with power cables with PE connectors.
- Use high-quality cables with good shielding.
- The point of ground for all connected components should merge at one central point. The power connections should lead out in a radial manner from one point and not be linked from one unit to the next.
- When installing appliances that create strong electrostatic or electromagnetic fields (large transformers, switch-mode power supplies), maintain some distance from other audio appliances. In extreme cases, the only solution is to create a completely independent 'audio ground'; in other cases, it is sufficient to connect a filter in front of the audio equipment.



7.2 Connecting the Power Connectors to the Connecting Terminal



Only use the supplied power cable and connect it to a mains outlet with a 16 A fuse. See instructions in chapter 4 'Power Cord' on page 13.

8. Configurations and Connecting Diagrams

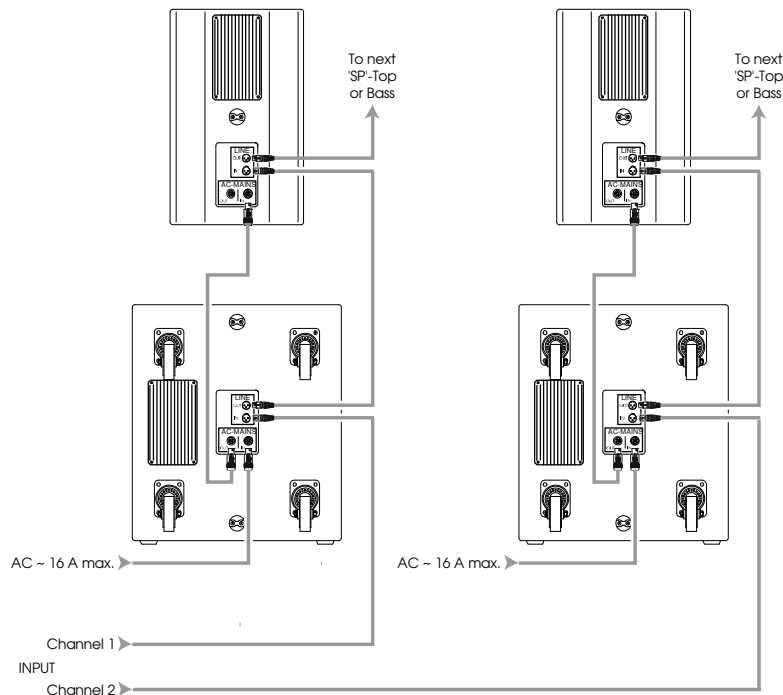
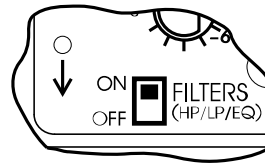
8.1 Operating the Systems without K&F System Controller

The subwoofer has an integrated filter for use in this mode, which limits the bandwidth. The full-range system is protected against low frequency (subsonic) signals by a high pass filter and when used with bass speakers it is phase aligned with the subwoofers by means of alignment filters.

8.1.1 Subwoofer with Tops in Full-Range Mode

You can link the input signal (for example from the mixer) from one loudspeaker to another. It makes no difference whether the input signal reaches the bass speaker first and is then transmitted to the mid-high speaker or the other way around.

The switch 'FILTERS' on the SP speaker must be at 'ON' in this mode.



8.2 Operations with K&F System Controller

For optimal performance with an extended functional range we recommend using a K&F system controller. Instructions for use, connecting diagrams and detailed descriptions of the latest controller models 'CD 24' and 'CD 44' you can find in the corresponding user's manuals.

8.3 Maximum Configuration

It is possible to use a large number of SP speakers in parallel simultaneously, however this number is limited according to the permitted minimum load impedance of the signal source (e.g. mixer, equalizer, etc.).

The total input impedance of all SP speakers must be larger than the permitted minimum load impedance of the signal source. If no manufacturer's recommendations can be found, take the output impedance of the signal source. In this case we recommend a total input impedance at least 10 times higher than the stated output impedance of the signal source.

(The output impedance of your signal source can normally be found under Technical Specifications in the manufacturer's instruction manual).



Definition:

R_{OUT} = output impedance of signal source

R_{IN} = input impedance SP - speaker = $50k\Omega = 50.000\Omega$

n_{MAX} = maximum recommended number of SP speakers

The maximum number of SP speakers can be calculated with this formula:

$$n_{MAX.} < \frac{R_{IN}}{R_{OUT} \times 10} = \frac{50k\Omega}{R_{OUT} \times 10}$$

Example:

$$R_{OUT} = 75\Omega$$

$$n_{MAX.} < \frac{R_{IN}}{R_{OUT} \times 10} = \frac{50.000\Omega}{75\Omega \times 10}$$

$$\Rightarrow n_{MAX.} < \underline{\underline{66}}$$

9. Operating the Speakers



- Switch off all equipment and make sure that the SP speakers are not connected to a power source.
- Connect your SP systems in accordance with preceding connection diagrams. **Use only mains cables, which comply with your national safety regulations.**
- Upon completing the wiring, ensure that the connected speakers are working in phase. To do so, use i.e. a phase checker. A phase error can also be recognized when the connected channels are used simultaneously. During simultaneous use the bass frequencies become notably quieter or the mid-frequencies such as voices cannot be located.
- Switch on first the peripheral units (mixer, effects, etc.), then, if used, the K&F System Controller and connect lastly the SP loudspeakers to the supply voltage. Always use the before mentioned switching order. Otherwise switching noises may damage the system.
- If there is interference, turn off all appliances in the reverse order and check all cable connections. Next, turn up all other peripheral units, and check these for interference.
- Your system should now be ready for operation.
- You can now turn up the level on the mixer.
- If you are using additional bass systems you can now balance the respective volume levels of the top speakers and bass systems. A fine adjustment of the system without K&F System Controller can be obtained using the gain control on the SP loudspeakers (not on the mixing console!).
- When switching off the system first disconnect the 'SP' loudspeakers from the supply voltage. Then you can switch off the remaining units.



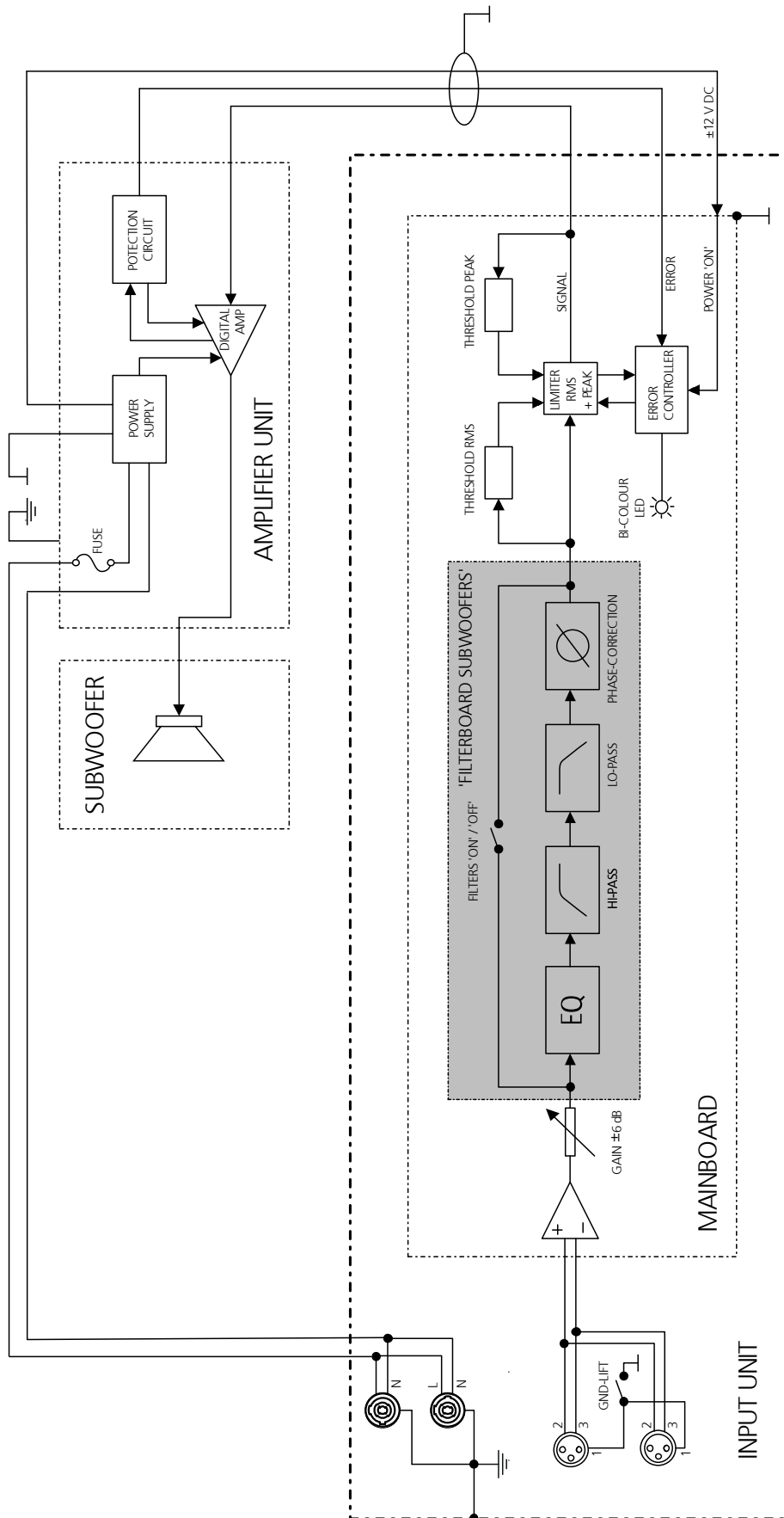
10. Touching Up Damage to Paint / Changing the Front Foam

Although the PU structured paint used by KLING & FREITAG is extremely resistant, we recommend using protective coverings or cases to help avoid damaging the paint during i.e. continuous mobile use. If paint damage occurs despite these precautions, it can be touched up by using commercial acrylic paint in the appropriate RAL colour of the speaker. To replace the filter foam, send the front grille incl. foam to KLING & FREITAG GmbH. Upon payment for expenses, the grille with the new covering will be returned.

11. Block Diagram of the SP Subwoofer...

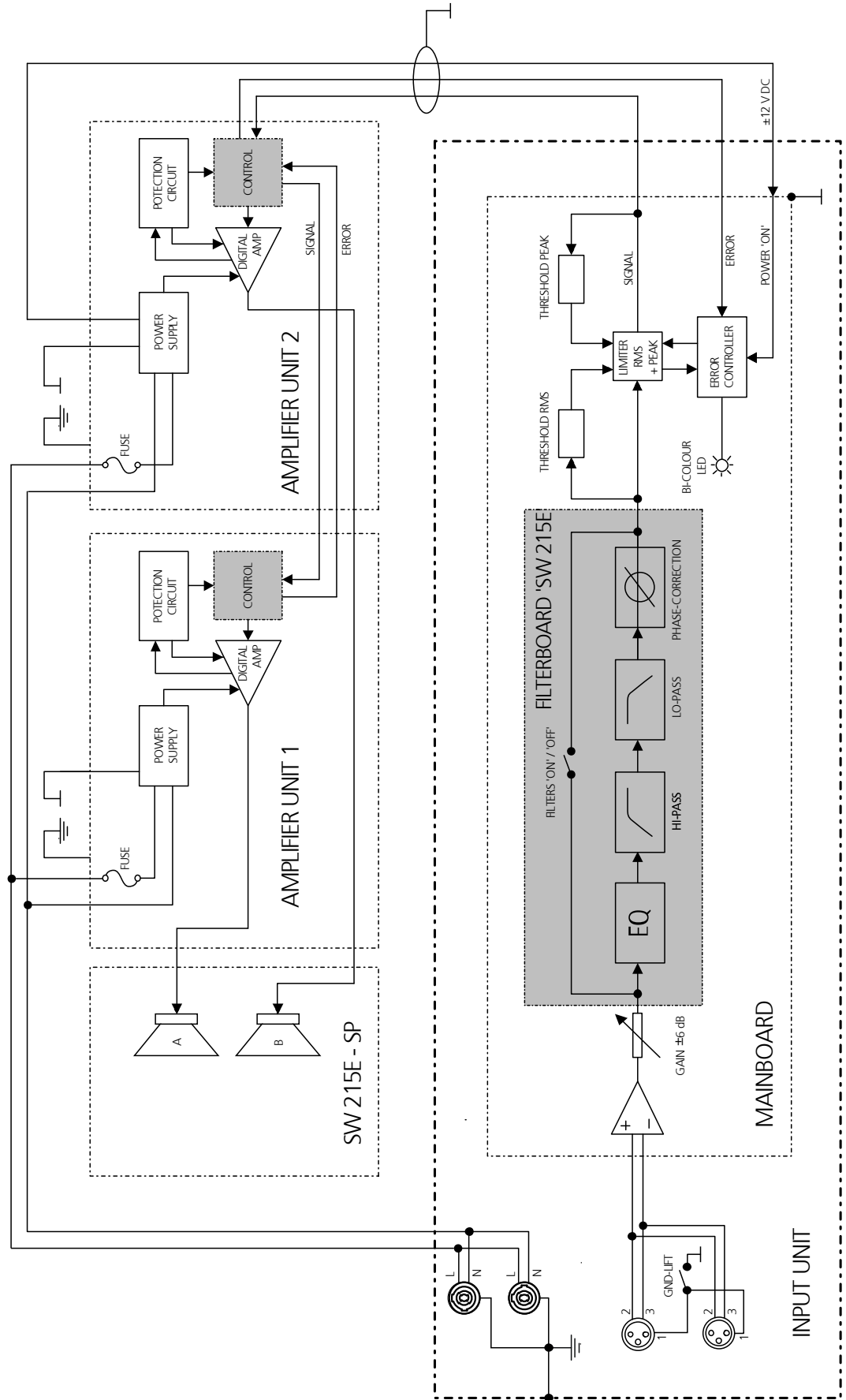
11.1 ... with one Amplifier Module

SCHEMATIC SUBWOOFERS 'SP'



11.2 ... with two Amplifier-Modules (SW 215E - SP)

SCHEMATIC SW 215E - SP



12. Technical Specifications

12.1 SW 112 - SP

Loudspeaker	
Design	Bass reflex system with exponential tunnel geometry, integrated driver and power amplifier technology
Lower cut-off frequency -10 dB	35 Hz ('FILTERS ON')
Frequency range ± 3 dB	41 Hz - 350 kHz ('FILTERS OFF')
	40 Hz - 120 Hz ('FILTERS ON')
Max. SPL	122 dB (peak / 1 m / free field, equivalent 128 dB half room)
Components	12" long excursion chassis, 100 mm voice coil, internal and external ventilation
Supply voltage	230 V version: AC 195-250 V, 50 / 60 Hz
alternative	115 V version: AC 95-125 V, 50 / 60 Hz
Rated power consumption	@ 230 V: 1.25 A @ 115 V: 2.5 A
Max. power consump. (I _{rms} / <500 ms)	@ 230 V: 7 A @ 115 V: 14 A
Idle current	@ 230 V: 200 mA @ 115 V: 400 mA
Power connectors	Neutrik PowerCon, lockable, one input and 1 output
Input module	
Input connectors	Pin 1 = ground / pin 2 = + signal / pin 3 = - signal LINE IN: XLR 3 pin female LINE OUT: XLR 3 pin male, parallel with LINE IN
Input sensitivity	+6 dB / 1.55 V _{rms} for rated output
Input impedance	50 k Ω (balanced / unbalanced)
Common mode rejection	Min.: 74 dB, typical: 90 dB
Controls	Level control ± 6 dB, by-pass switch for the active filters (for operations with K&F System Controller), ground lift switch
Display	Bi-coloured LED: green = Power On, red = Limit / Protect
Driver circuit	High-pass 32 Hz (-3 dB), 24 dB / octave ('FILTERS ON'), Low-pass 110 Hz (-6 dB), 24 dB / octave ('FILTERS ON'), Phase correction, frequency equalization (EQ), peak limiter, RMS limiter
Amplifier module	
Type	Class D
Power	1000 W @ 8 Ω (EIAJ / 1 kHz, 1% THD)
Power bandwidth	10 Hz to 30 kHz
Damping factor	1 > 500 (100 Hz), > 100 (10 kHz)
S / N ratio	> 105 dB (A)
Cooling	Air convection (without fan)
Protection circuits	Short circuit, over-temperature, clipping, overload
Enclosure	
	15 mm frame-reinforced birch plywood with highly resistant black structured paint (PU), ball proof front grille with exchangeable, black acoustic foam, 1 ergonomic carrying handle, K&M mounting plate M 20 for distance rod, 4 countersunk, non-abrasive plastic feet, stacking foot grooves for stacks of identical enclosures
Dimensions	470 x 370 x 520 mm (W x H x D)
Weight	29.5 kg
Options	6 flying points 'allsafe JUNGFALK', special finish in RAL colours

12.2 SWi 112 - SP

Loudspeaker	
Design	Bass reflex system with exponential tunnel geometry, integrated driver and power amplifier technology
Lower cut-off frequency -10 dB	35 Hz ('FILTERS ON')
Frequency range ± 3 dB	41 Hz - 350 kHz ('FILTERS OFF')
	40 Hz - 120 Hz ('FILTERS ON')
Max. SPL	122 dB (peak / 1 m / free field, equivalent 128 dB half room)
Components	12" long excursion chassis, 100 mm voice coil, internal and external ventilation
Supply voltage	230 V version: AC 195-250 V, 50 / 60 Hz
alternative	115 V version: AC 95-125 V, 50 / 60 Hz
Rated power consumption	@ 230 V: 1.25 A @ 115 V: 2.5 A
Max. power consump. (Irms / <500 ms)	@ 230 V: 7 A @ 115 V: 14 A
Idle current	@ 230 V: 200 mA @ 115 V: 400 mA
Input module	
Input connectors	Pin 1 = ground / pin 2 = + signal / pin 3 = - signal LINE IN: XLR 3 pin female LINE OUT: XLR 3 pin male, parallel with LINE IN
Input sensitivity	+6 dB / 1.55 Vrms for rated output
Input impedance	50 k Ω (balanced / unbalanced)
Common mode rejection	Min.: 74 dB, typical: 90 dB
Controls	Level control ± 6 dB, by-pass switch for the active filters (for operations with K&F System Controller), ground lift switch
Display	Bi-coloured LED: green = Power On, red = Limit / Protect
Driver circuit	High-pass 32 Hz (-3 dB), 24 dB / octave ('FILTERS ON'), Low-pass 110 Hz (-6 dB), 24 dB / octave ('FILTERS ON'), Phase correction, frequency equalization (EQ), peak limiter, RMS limiter
Amplifier module	
Type	Class D
Power	1000 W @ 8 Ω (EIAJ / 1 kHz, 1% THD)
Power bandwidth	10 Hz to 30 kHz
Damping factor	> 500 (100 Hz), > 100 (10 kHz)
S / N ratio	> 105 dB (A)
Cooling	Air convection (without fan)
Protection circuits	Short circuit, over-temperature, clipping, overload
Enclosure	
	15 mm frame-reinforced Multiplex plywood with highly resistant black structured paint (PU), ball proof steel grille with exchangeable, black acoustic foam
Rigging	12 concealed M12 mounting points
Dimensions	470 x 370 x 520 mm (W x H x D)
Weight	29.5 kg
Options	special finish in RAL colours

12.3 SW 115E - SP

Loudspeaker	
Design	Bass reflex system with integrated driver and power amplifier technology
Lower cut-off frequency -10 dB	37 Hz ('FILTERS ON')
Frequency range ± 3 dB	43 Hz - 150 kHz ('FILTERS OFF') 42 Hz - 115 Hz (FILTERS 'ON')
Max. SPL	125 dB (SPL peak / 1 m / free field, equivalent 131 dB half room)
Components	15" long excursion chassis, 100 mm voice coil, double centering, internal and external ventilation, Aluminium demodulation ring for minimal distortion
Supply voltage	230 V version: AC 195-250 V, 50 / 60 Hz
alternative	115 V version: AC 95-125 V, 50 / 60 Hz
Rated power consumption	@ 230 V: 1.25 A @ 115 V: 2.5 A
Max. power consump. (Irms / <500 ms)	@ 230 V: 7 A @ 115 V: 14 A
Idle current	@ 230 V: 200 mA @ 115 V: 400 mA
Power connectors	Neutrik PowerCon, lockable, 1 input and 1 output
Input module	
Input connectors	Pin 1 = ground / pin 2 = + signal / pin 3 = - signal LINE IN: XLR 3 pin female LINE OUT: XLR 3 pin male, parallel with LINE IN
Input sensitivity	+6 dB / 1.55 Vrms for rated output
Input impedance	50 k Ω (balanced / unbalanced)
Common mode rejection	Min.: 74 dB, typical: 90 dB
Controls	Level control ± 6 dB, by-pass switch for the active filters (for operations with K&F System Controller), ground lift switch
Display	Bi-coloured LED: green = Power On, red = Limit / Protect
Driver circuit	High-pass 32 Hz (-3 dB), 24 dB / octave ('FILTERS ON'), Low-pass 110 Hz (-6 dB), 24 dB / octave ('FILTERS ON'), Phase correction, frequency equalization (EQ) peak limiter, RMS limiter
Amplifier module	
Type	Class D
Power	1000 W @ 8 Ω (EIAJ)
Power bandwidth	10 Hz to 30 kHz
Damping factor	> 500 (100 Hz), > 100 (10 kHz)
S / N ratio	> 105 dB (A)
Cooling	Air convection (without fan)
Protection circuits	Short circuit, over-temperature, clipping, overload
Enclosure	
	15 mm frame-reinforced Multiplex plywood with highly resistant black structured paint (PU), 2 ergonomic butterfly handles, K&M mounting plate M M20 for distance rod, 4 non-abrasive plastic feet, stacking foot grooves for stacking of identical enclosures or SW 215E as well as Line 212, 2 locking profiles for optional transport cover with castors, ball proof steel grille with exchangeable, black acoustic foam
Dimensions (W x H x D)	470 x 515 x 640 mm
Weight	37.3 kg
Options	special finish in RAL colours
Accessories	see catalogue or visit www.kling-freitag.de

12.4 SWi 115E - SP

Loudspeaker	
Design	Bass reflex system with integrated driver and power amplifier technology
Lower cut-off frequency -10 dB	37 Hz ('FILTERS ON')
Frequency range ± 3 dB	43 Hz - 150 kHz ('FILTERS OFF') 42 Hz - 115 Hz ('FILTERS 'ON')
Max. SPL	125 dB (SPL peak / 1 m / free field) equivalent 131 dB half room)
Components	15" long excursion chassis, 100 mm voice coil, double centering, internal and external ventilation, Aluminium demodulation ring for minimal distortion
Supply voltage	230 V version: AC 195-250 V, 50 / 60 Hz alternative 115 V version: AC 95-125 V, 50 / 60 Hz
Rated power consumption	@ 230 V: 1.25 A @ 115 V: 2.5 A
Max. power consump. (I _{rms} / <500 ms)	@ 230 V: 7 A @ 115 V: 14 A
Idle current	@ 230 V: 200 mA @ 115 V: 400 mA
Power connectors	Neutrik PowerCon, lockable, 1 input and 1 output
Input module	
Input connectors	Pin 1 = ground / pin 2 = + signal / pin 3 = - signal LINE IN: XLR 3 pin female LINE OUT: XLR 3 pin male, parallel with LINE IN
Input sensitivity	+6 dB / 1.55 V _{rms} for rated output
Input impedance	50 k Ω (balanced / unbalanced)
Common mode rejection	Min.: 74 dB, typical: 90 dB
Controls	Level control ± 6 dB, by-pass switch for the active filters (for operations with K&F System Controller), ground lift switch
Display	Bi-coloured LED: green = Power On, red = Limit / Protect
Driver circuit	High-pass 32 Hz (-3 dB), 24 dB / octave ('FILTERS ON'), Low-pass 110 Hz (-6 dB), 24 dB / octave ('FILTERS ON'), Phase correction, frequency equalization (EQ), peak limiter, RMS limiter
Amplifier module	
Type	Class D
Power	1000 W @ 8 Ω (EIAJ)
Power bandwidth	10 Hz to 30 kHz
Damping factor	> 500 (100 Hz), > 100 (10 kHz)
S / N ratio	> 105 dB (A)
Cooling	Air convection (without fan)
Protection circuits	Short circuit, over-temperature, clipping, overload
Enclosure	
	15 mm frame-reinforced Multiplex plywood with highly resistant black structured paint (PU), ball proof steel grille with exchangeable, black acoustic foam
Rigging	12 x M12 thread inserts
Dimensions (W x H x D)	470 x 504 x 640 mm
Weight	37.6 kg
Options	'Special finish in RAL colours'
Accessories	see catalogue or visit www.kling-freitag.de

12.5 SW 118E - SP

Loudspeaker	
Design	Bass reflex system with exponential tunnel geometry, integrated driver and power amplifier technology
Lower cut-off frequency -10 dB	30 Hz ('FILTERS ON')
Frequency range ± 3 dB	38 Hz - 300 kHz ('FILTERS OFF') 37 Hz - 115 Hz ('FILTERS ON')
Max. SPL	127 dB (peak / 1 m / free field, equivalent 133 dB half room)
Components	18" long excursion chassis, 100 mm voice coil, double centering, internal and external ventilation, 2 Aluminium demodulation rings for minimal distortion
Supply voltage	230 V version: AC 195-250 V, 50 / 60 Hz alternative 115 V version: AC 95-125 V, 50 / 60 Hz
Rated power consumption	@ 230 V: 1.25 A @ 115 V: 2.5 A
Max. power consump. (Irms / <500 ms)	@ 230 V: 7 A @ 115 V: 14 A
Idle current	@ 230 V: 200 mA @ 115 V: 400 mA
Power connectors	Neutrik PowerCon, lockable, 1 input and 1 output
Input module	
Input connectors	Pin 1 = ground / pin 2 = + signal / pin 3 = - signal LINE IN: XLR 3 pin female LINE OUT: XLR 3 pin male, parallel with LINE IN
Input sensitivity	+6 dB / 1.55 Vrms for rated output
Input impedance	50 k Ω (balanced / unbalanced)
Common mode rejection	Min.: 74 dB, typical: 90 dB
Controls	Level control ± 6 dB, by-pass switch for the active filters (for operations with K&F System Controller), ground lift switch
Display	Bi-coloured LED: green = Power On, red = Limit / Protect
Driver circuit	High-pass 32 Hz (-3 dB), 24 dB / octave ('FILTERS ON'), Low-pass 110 Hz (-6 dB), 24 dB / octave ('FILTERS ON'), Phase correction, frequency equalization (EQ) peak limiter, RMS limiter
Amplifier module	
Type	Class D
Power	1000 W @ 8 Ω (EIAJ / 1 kHz, 1% THD)
Power bandwidth	10 Hz to 30 kHz
Damping factor	> 500 (100 Hz), > 100 (10 kHz)
S / N ratio	> 105 dB (A)
Cooling	Air convection (without fan)
Protection circuits	Short circuit, over-temperature, clipping, overload
Enclosure	
	15 mm frame-reinforced Multiplex plywood with highly resistant black structured paint (PU), 2 ergonomic butterfly handles, K&M mounting plate M20 for distance rod, 4 plastic feet, stacking foot grooves, 4 rear mounted transport castors, 100 mm, 2 locking profiles for optional transport cover, ball proof steel grille with exchangeable, black acoustic foam
Rigging	4 flying points 'allsafe JUNGFALK'
Dimensions	600 x 680 x 766 mm (W x H x D)
Weight	52.3 kg
Options	Transport cover with butterfly catches, special finish in RAL colours

12.6 SWi 118E - SP

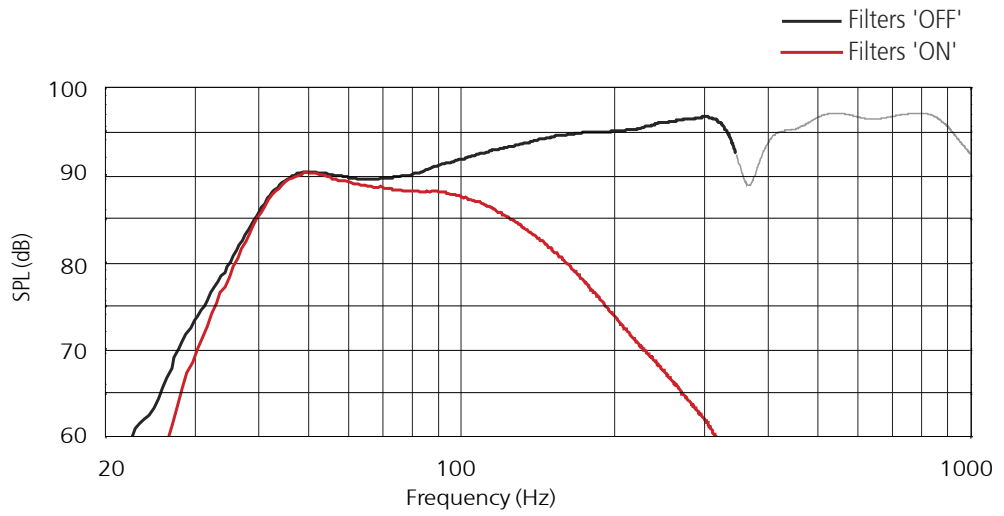
Loudspeaker	
Design	Bass reflex system with exponential tunnel geometry, integrated driver and power amplifier technology
Lower cut-off frequency -10 dB	30 Hz ('FILTERS ON')
Frequency range ± 3 dB	38 Hz - 300 kHz ('FILTERS OFF')
	37 Hz - 115 Hz ('FILTERS ON')
Max. SPL	127 dB (peak / 1 m / free field, equivalent 133 dB half room)
Components	18" long excursion chassis, 100 mm voice coil, double centering, internal and external ventilation, 2 demodulation rings for minimal distortion (double DDR)
Supply voltage	230 V version: AC 195-250 V, 50 / 60 Hz
alternative	115 V version: AC 95-125 V, 50 / 60 Hz
Rated power consumption	@ 230 V: 1.25 A @ 115 V: 2.5 A
Max. power consump. (I _{rms} / <500 ms)	@ 230 V: 7 A @ 115 V: 14 A
Idle current	@ 230 V: 200 mA @ 115 V: 400 mA
Power connectors	Neutrik PowerCon, lockable, 1 input and 1 output
Input module	
Input connectors	Pin 1 = ground / pin 2 = + signal / pin 3 = - signal LINE IN: XLR 3 pin female LINE OUT: XLR 3 pin male, parallel with LINE IN
Input sensitivity	+6 dB / 1.55 V _{rms} for rated output
Input impedance	50 k Ω (balanced / unbalanced)
Common mode rejection	Min.: 74 dB, typical: 90 dB
Controls	Level control ± 6 dB, by-pass switch for the active filters (for operations with K&F System Controller), ground lift switch
Display	Bi-coloured LED: green = Power On, red = Limit / Protect
Driver circuit	High-pass 32 Hz (-3 dB), 24 dB / octave ('FILTERS ON'), Low-pass 110 Hz (-6 dB), 24 dB / octave ('FILTERS ON'), Phase correction, frequency equalization (EQ), peak limiter, RMS limiter
Amplifier module	
Type	Class D
Power	1000 W @ 8 Ω (EIAJ / 1 kHz, 1% THD)
Power bandwidth	10 Hz to 30 kHz
Damping factor	> 500 (100 Hz), > 100 (10 kHz)
S / N ratio	> 105 dB (A)
Cooling	Air convection (without fan)
Protection circuits	Short circuit, over-temperature, clipping, overload
Enclosure	
	15 mm frame-reinforced Multiplex plywood with highly resistant black structured paint (PU), ball proof steel grille with exchangeable, black acoustic foam
Rigging	12 concealed M12 mounting points
Dimensions	600 x 672 x 640 mm (W x H x D)
Weight	48.7 kg
Options	special finish in RAL colours

12.7 SW 215E - SP

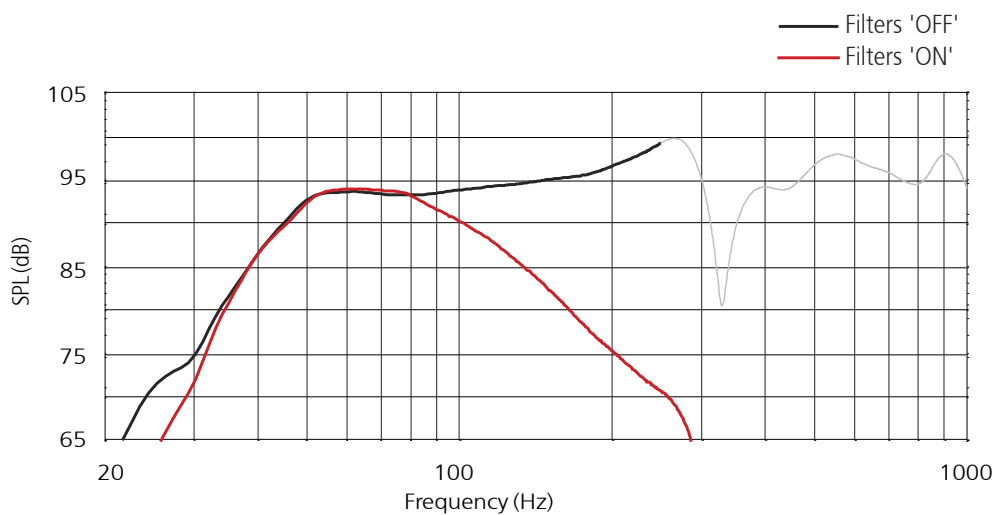
Loudspeaker	
Design	Bass reflex system with exponential tunnel geometry, integrated driver and power amplifier technology
Lower cut-off frequency -10 dB	36Hz ('FILTERS ON'), 36Hz ('FILTERS OFF')
Frequency range ± 3 dB	42 Hz - 140 Hz ('FILTERS OFF')
	41 Hz - 120 Hz ('FILTERS ON')
Max. SPL	131 dB (peak / 1 m / free field, equivalent 137 dB half room)
Components	2 x 15" long excursion chassis, 100 mm voice coil, double centering, internal and external ventilation, 2 Aluminium demodulation rings for minimal distortion
Supply voltage	230 V version: AC 195-250 V, 50 / 60 Hz
alternative	115 V version: AC 95-125 V, 50 / 60 Hz
Rated power consumption	@ 230 V: 2.2 A @ 115 V: 4 A
Max. power consump. (Irms / <500 ms)	@ 230 V: 9 A @ 115 V: 18 A
Idle current	@ 230 V: 360 mA @ 115 V: 720 mA
Power connectors	Neutrik PowerCon, lockable, 1 input and 1 output
Input module	
Input connectors	Pin 1 = ground / pin 2 = + signal / pin 3 = - signal LINE IN: XLR 3 pin female LINE OUT: XLR 3 pin male, parallel with LINE IN
Input sensitivity	+6 dB / 1.55 Vrms for rated output
Input impedance	50 k Ω (balanced / unbalanced)
Common mode rejection	Min.: 74 dB, typical: 90 dB
Controls	Level control ± 6 dB, by-pass switch for the active filters (for operations with K&F System Controller), ground lift switch
Display	Bi-coloured LED: green = Power On, red = Limit / Protect
Driver circuit	High-pass 32 Hz (-3 dB), 24 dB / octave ('FILTERS ON'), Low-pass 110 Hz (-6 dB), 24 dB / octave ('FILTERS ON'), Phase correction, frequency equalization (EQ), peak limiter, RMS limiter
Amplifier module (2x)	
Type	Class D
Power	1000 W (EIAJ/1 kHz, 1% THD)
Power bandwidth	10 Hz to 30 kHz
Damping factor	> 500 (100 Hz), > 100 (10 kHz)
S / N ratio	> 105 dB (A)
Cooling	Air convection (without fan)
Protection circuits	Short circuit, over-temperature, clipping, overload
Enclosure	
	15 mm frame-reinforced Multiplex plywood with highly resistant black structured paint (PU), 4 ergonomic butterfly handles, 4 integrated handles K&M mounting plate M20 for distance rod, 8 plastic feet, stacking foot grooves for save stacks of identical enclosures or for single or clustered Line 212 enclosures, 4 x 100 mm rear mounted transport castors, 2 locking profiles for optional transport cover, ball-proof steel grille with exchangeable black acoustic foam
Dimensions incl. castors	480 x 1015 x 765 mm (W x H x D)
Weight	72.4 kg
Options	'Suspension' with 6 flying tracks 'allsafe JUNGFALK' special finish in RAL colours

13. Frequency Diagrams

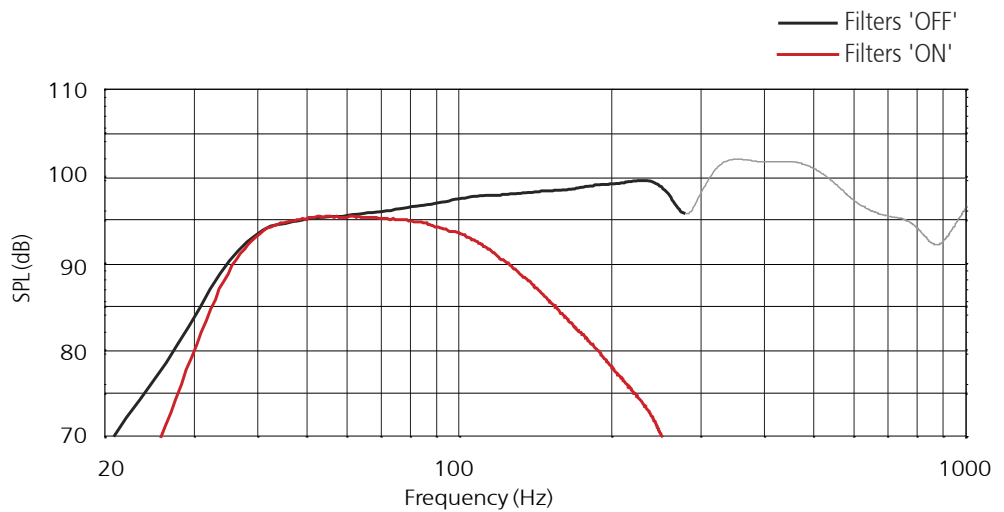
13.1 SW 112-SP / SWi 112-SP



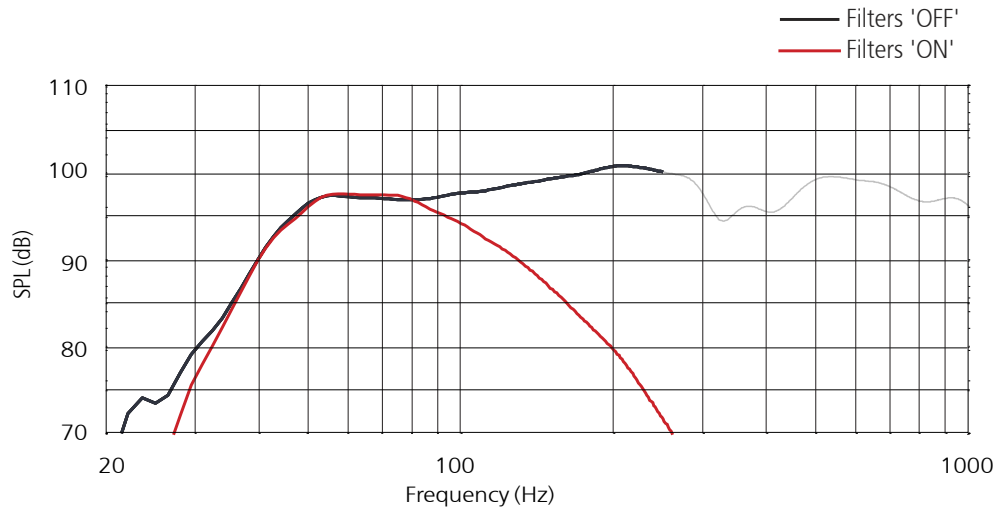
13.2 SW 115E-SP / SWi 115E-SP



13.3 SW 118E-SP / SWi 118E-SP

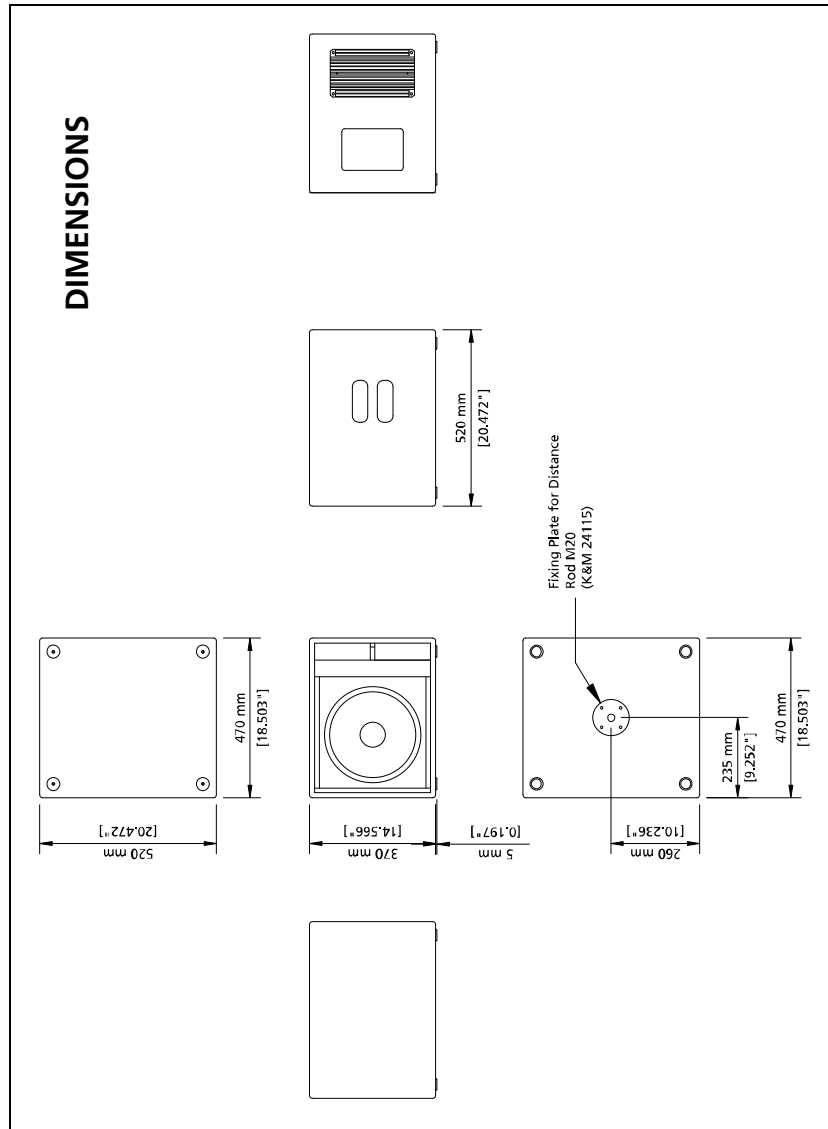


13.4 SW 215E - SP

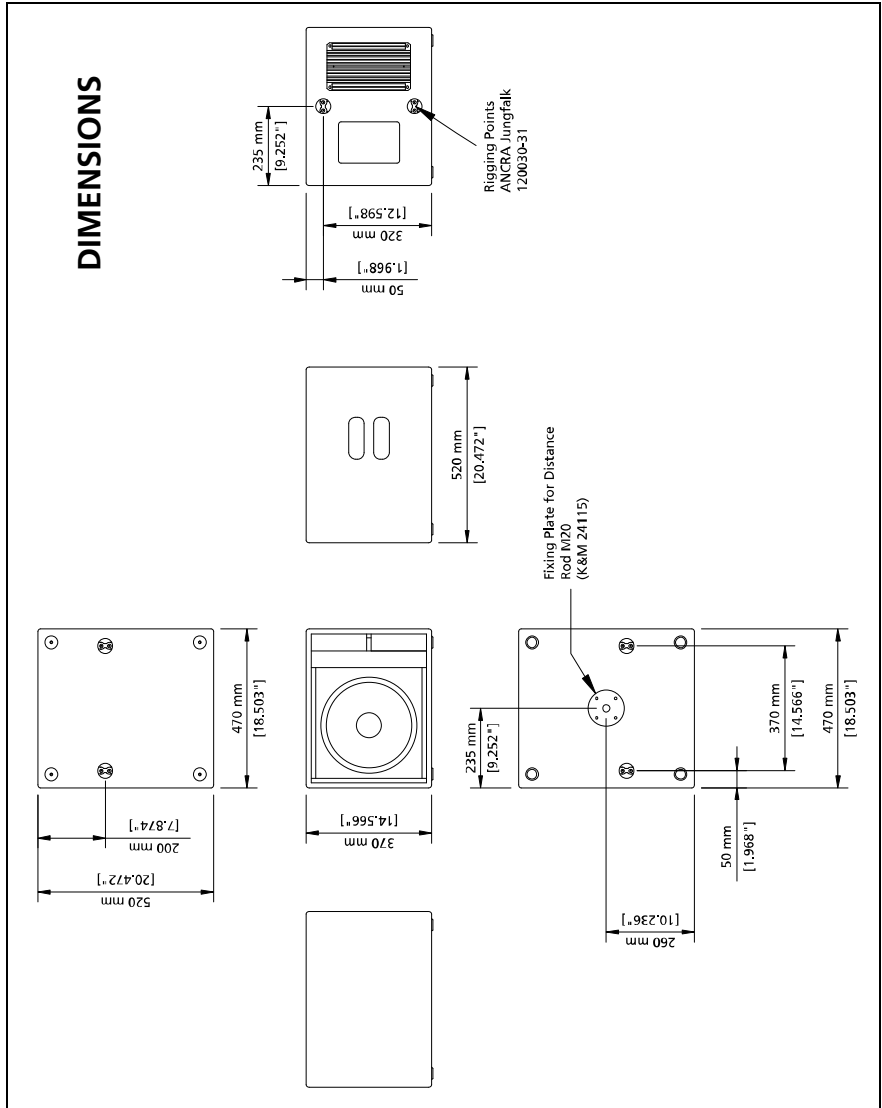


14. Dimensions

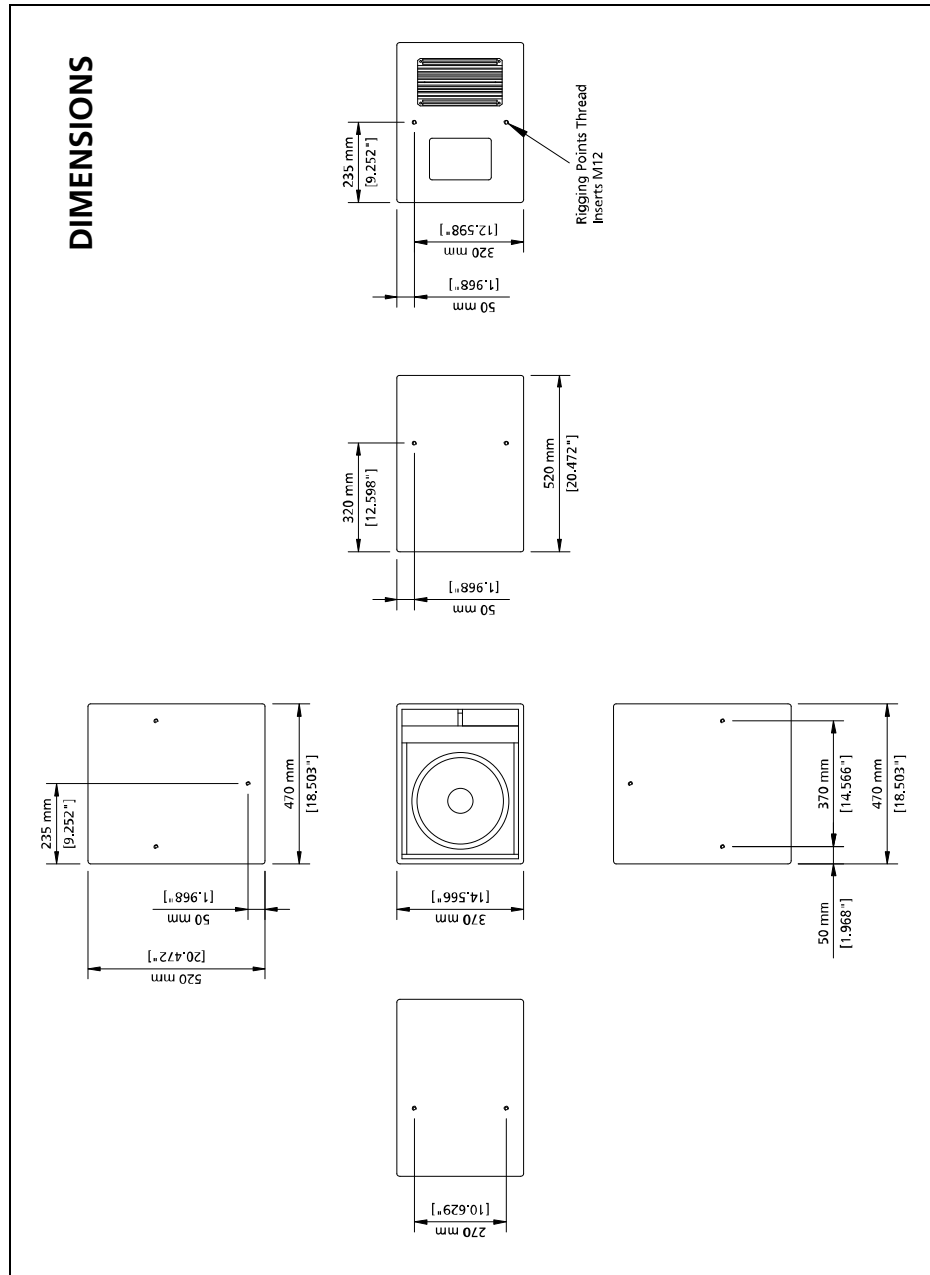
14.1 SW 112-SP



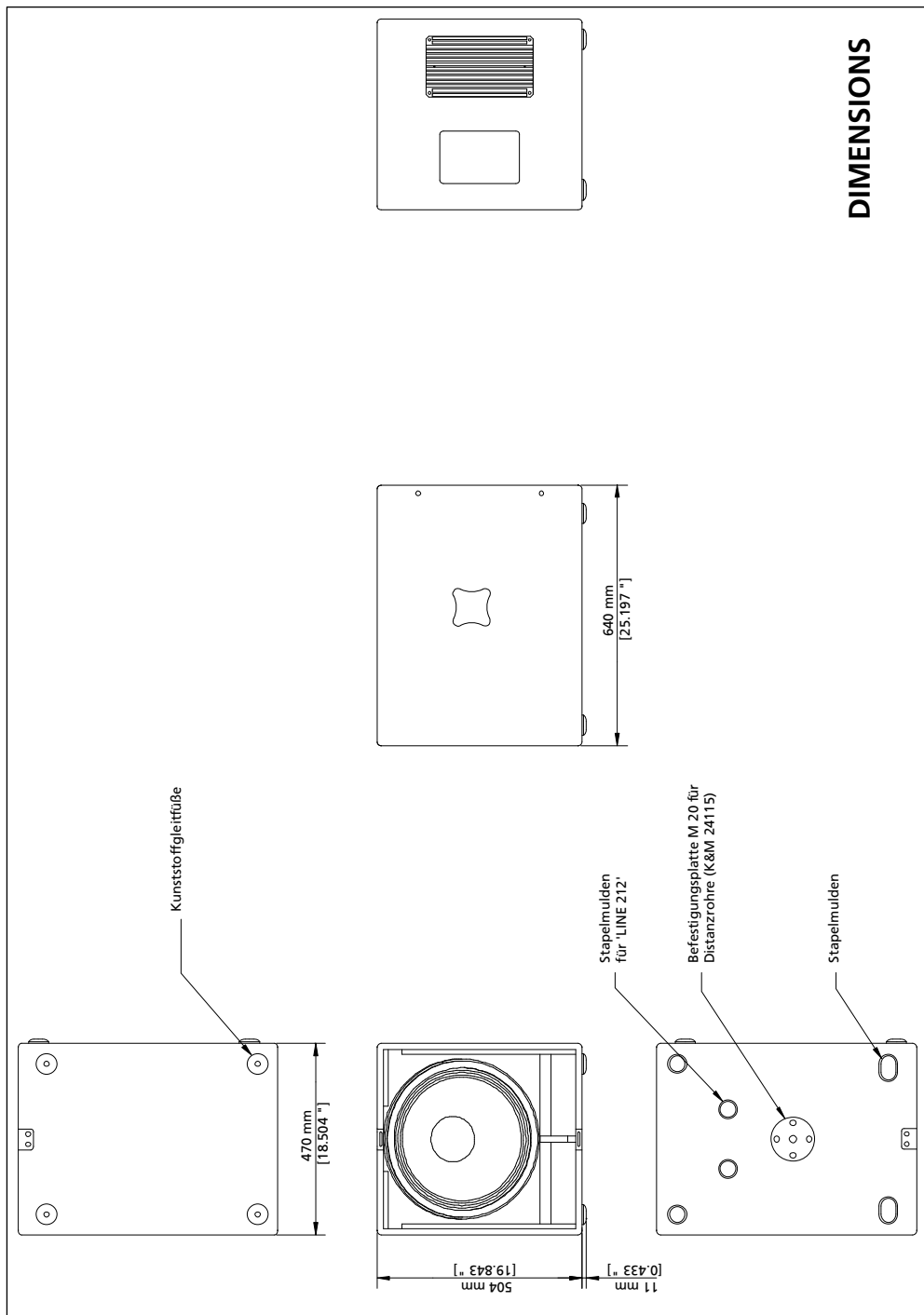
14.2 SW 112-SP 'Suspension'



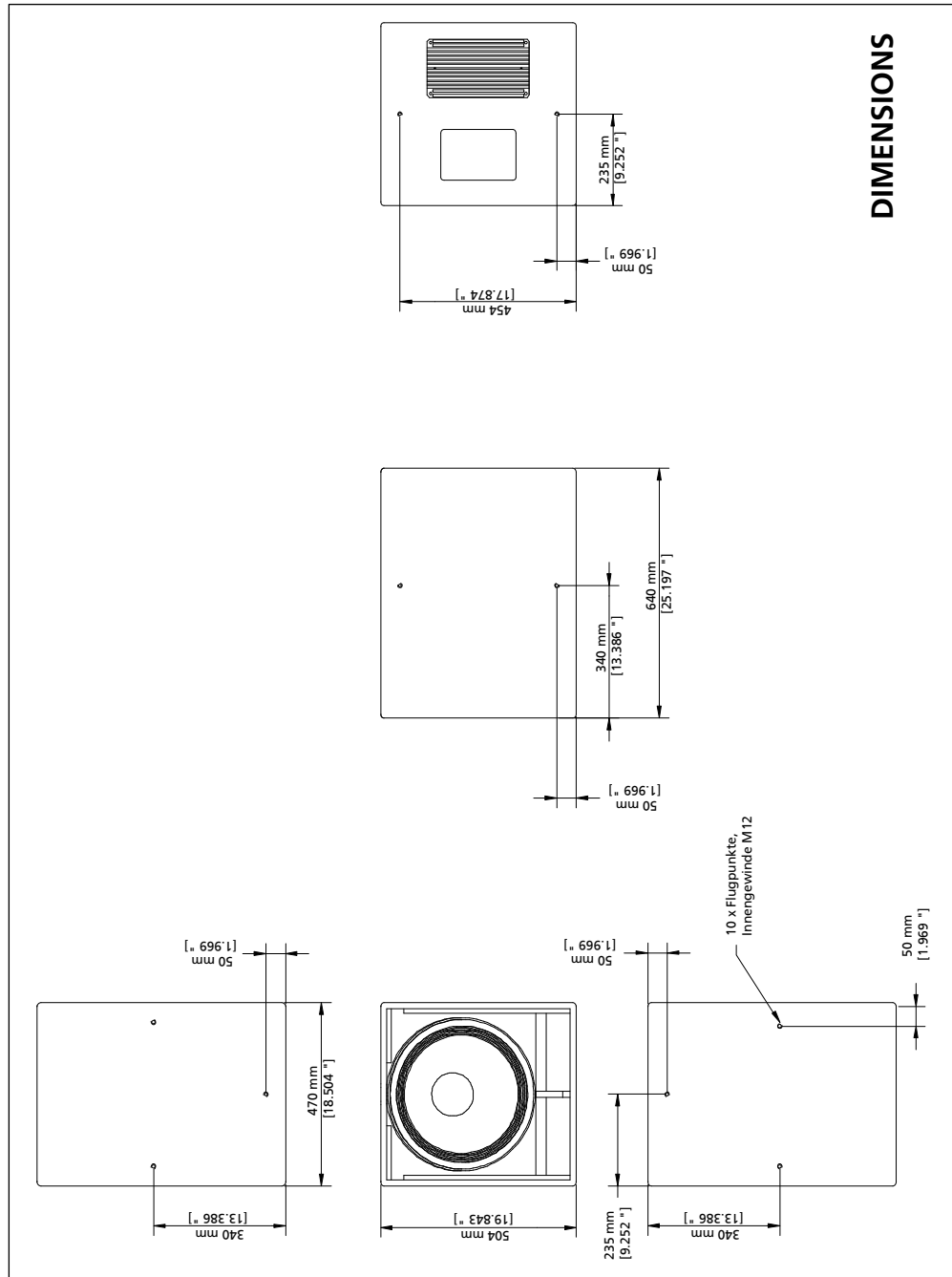
14.3 SWi 112-SP



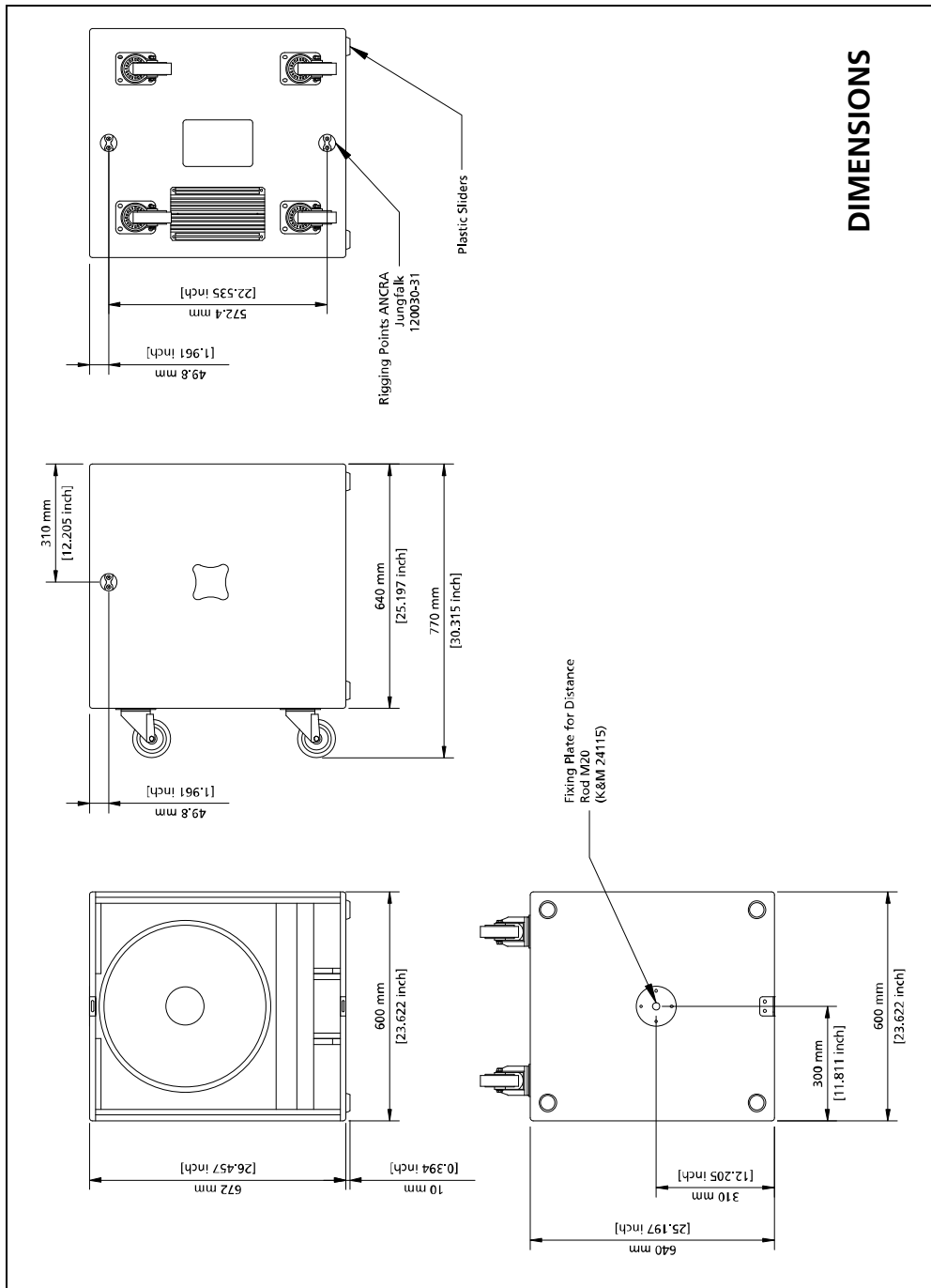
14.4 SW 115E-SP



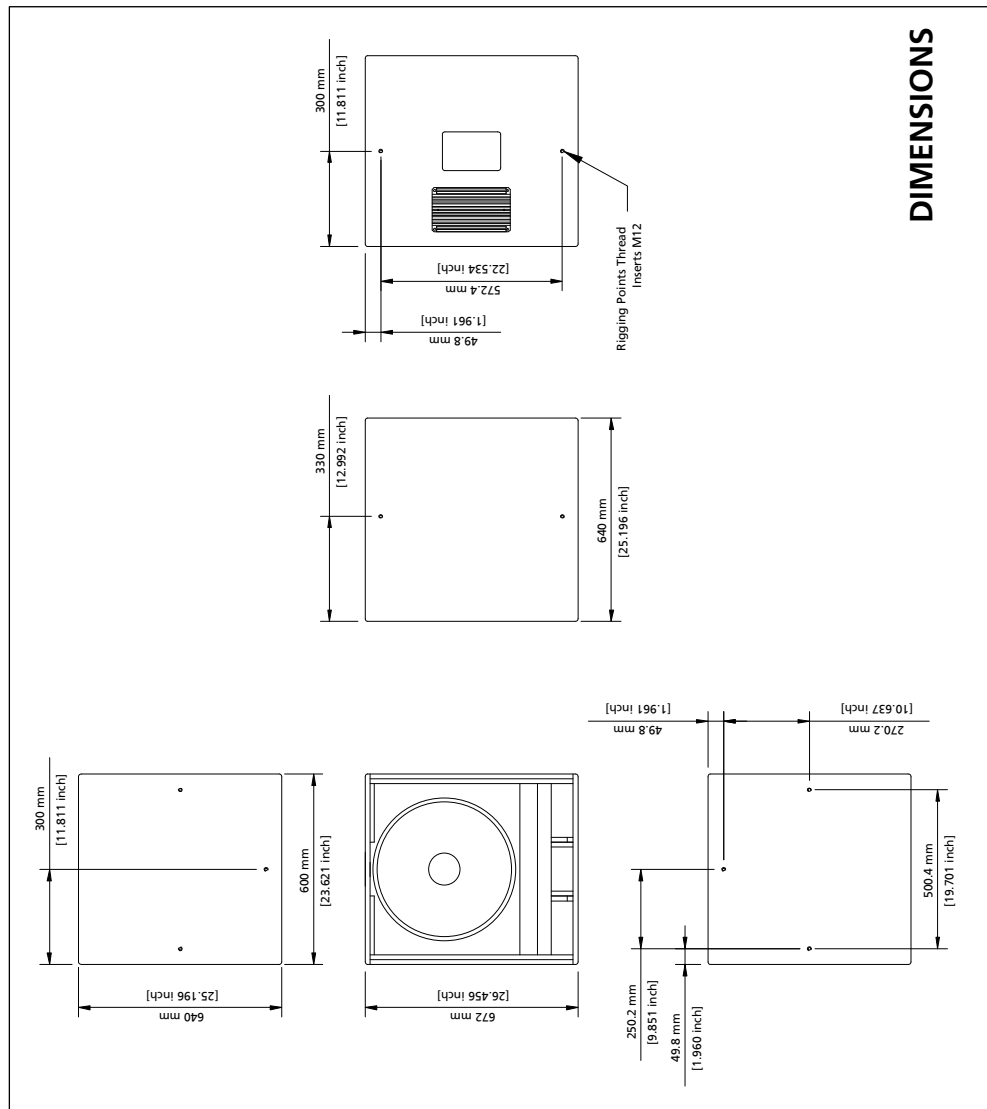
14.5 SWi 115E-SP



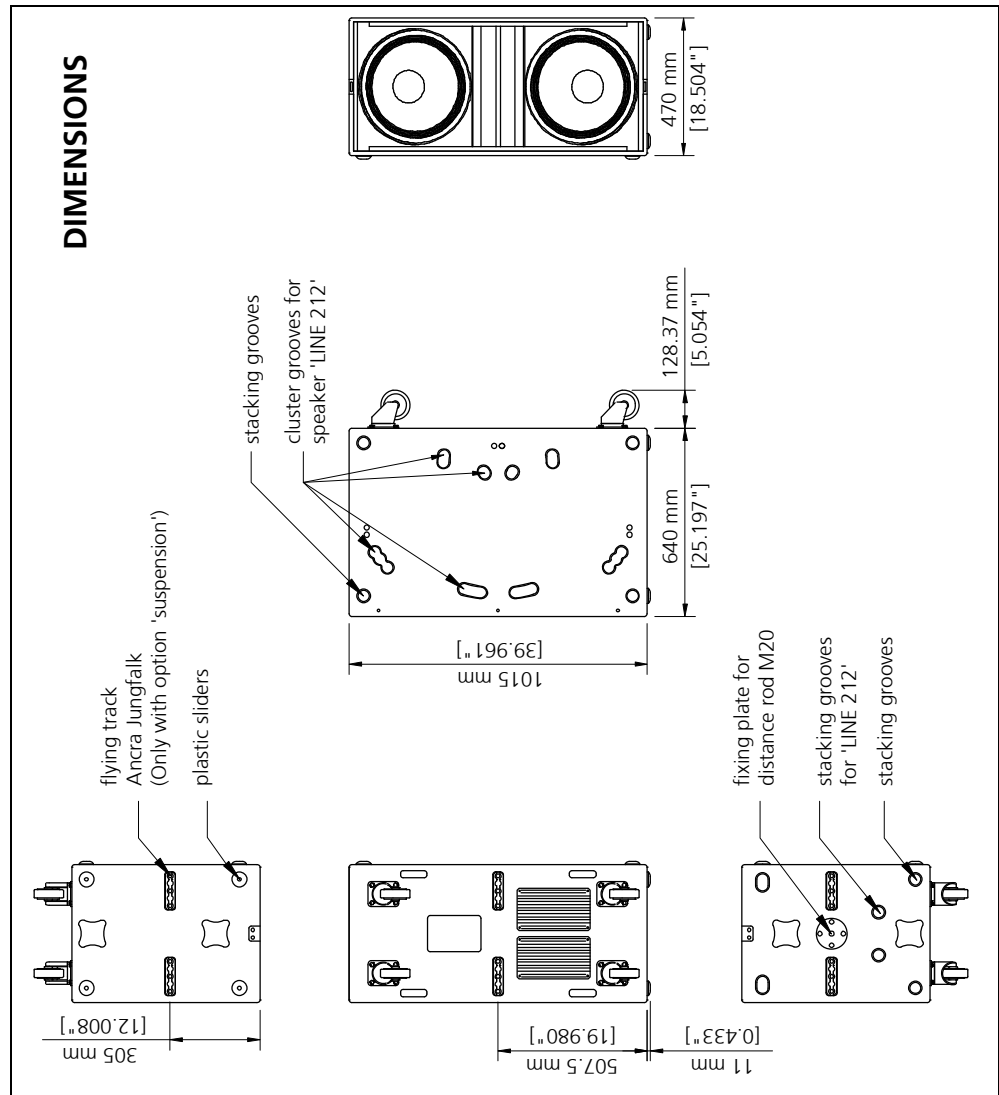
14.6 SW 118E-SP



14.7 SWi 118E-SP



14.8 SW 215E - SP



15. Regulations for Disposal

15.1 Germany

It is not allowed to dispose of used electrical equipment as domestic waste.

But please do not dispose of them at official collecting points for recycling either!

All Kling & Freitag products are plain business-to-business (B2B) products. Disposal of Kling & Freitag products labelled with a waste bin sign have thus to be disposed of by Kling & Freitag alone. Please call Kling & Freitag at the number stated below if you have a Kling & Freitag product to be disposed. We will offer you a straightforward and professional disposal not affecting costs.

If there is no dustbin sign on one of your Kling & Freitag products, because they have been sold before March 2006 then by law the owner is in charge of the disposal. For these we will be happy to assist and offer you proper ways of disposal.

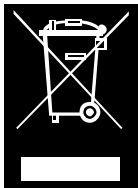
Telephone number to call about the disposal of used Kling & Freitag products: +49 (511)-96 99 7-0

Explanation: With the ElektroG (law relating to electrical and electronic equipment and appliances) we have complied with the EU-directive on waste electrical and electronic equipment (WEEE, 2002/96/EC)

The Kling & Freitag GmbH has thus labelled all products mentioned in the WEEE from 03/24/2006 onwards with a sign with a crossed out waste bin and a white bar below. This sign indicates that the disposal into the domestic waste is prohibited and that the product has been put into circulation at the 03/24/2006 earliest.

The Kling & Freitag GmbH has been legally registered as a manufacturer with the registration office EAR. Our WEEE Registration-Nr. is: DE64110372

For the German Registration office EAR we have accredited that our products are sole B2B products.



15.2 EU, Norway, Iceland, and Liechtenstein

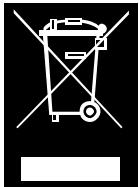
It is not allowed to dispose of used electrical equipment as domestic waste.

The Kling & Freitag GmbH has thus labelled all products coming from EU-Member countries as well as Norway, Island and Liechtenstein (except Germany) mentioned in the WEEE from 08/13/2005 onwards with a sign with a crossed out waste bin and a white bar below. This sign indicates that the disposal into the domestic waste is prohibited and that the product has been put into circulation at the 08/13/2005 earliest.

Unfortunately the European directive WEEE has been complied with implementing different national provisions of law throughout all member countries, which makes it impossible for us to offer consistent solutions for the disposal throughout Europe.

Responsible for complying with these provisions of law is the local distributor (importer) of each country.

For proper disposition of used products in accordance with these local provisions in the mentioned countries of the European Union (except Germany) please ask your local dealer or the local authorities.



15.3 Other Countries

For proper disposition of used products in accordance with local provisions in other countries please ask your local dealer or the local authorities.

16. Declaration of Conformity and International Certificates

16.1 Declaration of Conformity



EG-Konformitätserklärung

EMV Richtlinie 89 / 336 / EWG

Niederspannungsrichtlinie: 73 / 23 / EWG

Wir: KLING & FREITAG GMBH
Junkersstraße 14
30179 Hannover
Deutschland

erklären eigenverantwortlich, dass folgende Produkte:

Art: Lautsprecher mit integrierten Endverstärkern

Modelle: CA 1001 - SP,
CA 1201 - SP,
CA 1215-6 - SP, CA 1215-9 - SP,
CA 1515-6 - SP, CA 1515-9 - SP,
LINE 212-6 - SP, LINE 212-9 - SP,
SW 112 - SP, SWi 112 - SP,
SW 115D - SP, SWi 115D - SP,
SW 115E - SP, SWi 115E - SP,
SW 118E - SP, SWi 118E - SP,
SW 215E - SP

den Anforderungen folgender Normen und Dokumente entsprechen:

EN 60065:1998;
E9 05 05 50454 004

Jürgen Freitag
Geschäftsführer

Hannover, 23.03.2006
Ort, Datum

Akkreditiertes Prüflaboratorium: MIKES BABT PRODUCT SERVICE GmbH, Ohmstraße 2-4
D-94342 Strasskirchen

KLING & FREITAG GmbH
Innovative Sound Systems

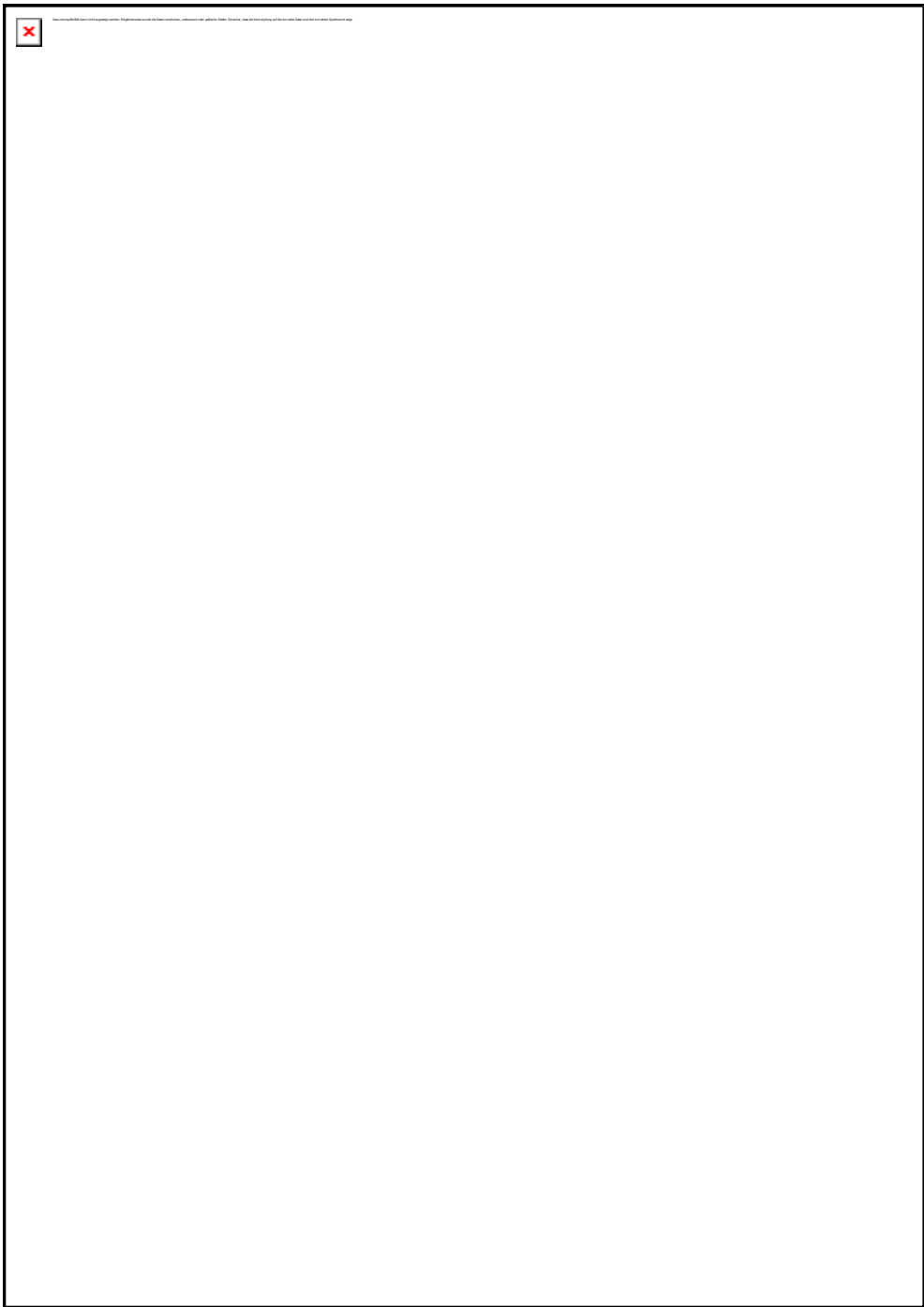
Mitglied folgender Verbände

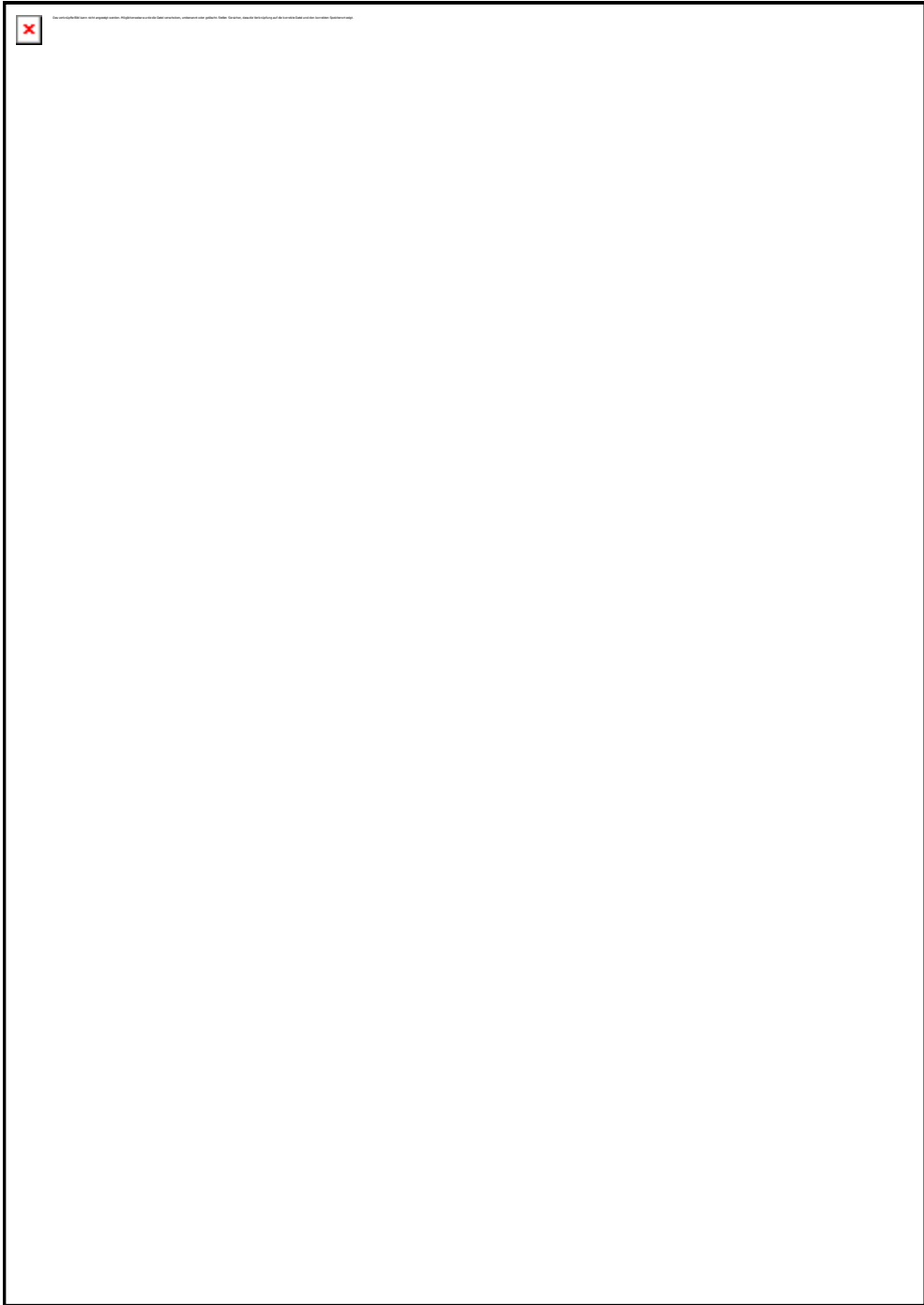


Ust.-IdNr.: DE 115648828 · Amtsgericht Hannover: HRB 52497
Geschäftsführer: Martin Kling, Jürgen Freitag
Stadtsparkasse Hannover: BLZ 250 501 80 · Konto 794 996
Deutsche Bank 24 Hannover: BLZ 250 700 24 · Konto 4410601

Junkersstraße 14 · D-30179 Hannover
Phone: 0(049) 511 96 99 7-0
Fax: 0(049) 511 67 37 94
info@kling-freitag.de · www.kling-freitag.de

16.2 EMV Certificate Directive 89 / 336 / EWG





16.3 TÜV Certificate for the USA and Canada (UL 6500)

