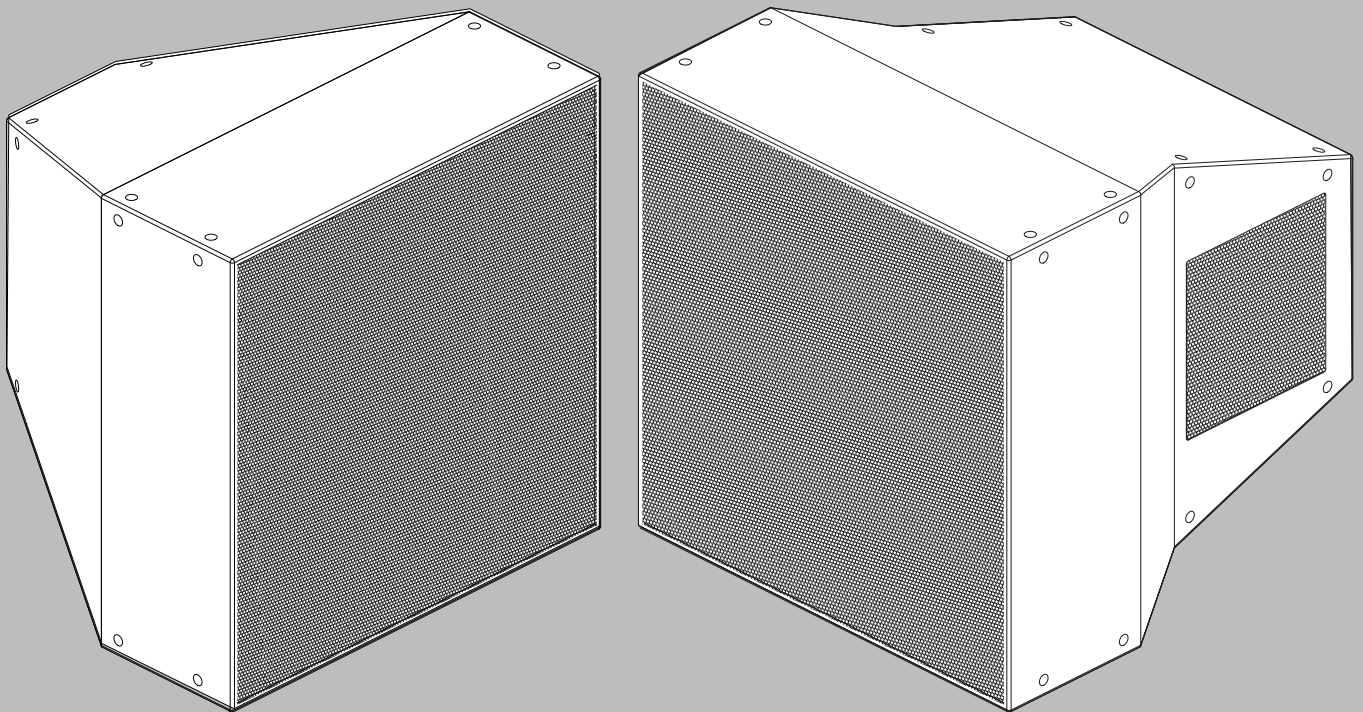


# MTS High Output Point Source

MTS-4153-64 | MTS-6154-64 | MTS-4153-43 | MTS-6154-43





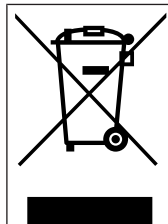
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# 1 Important safety instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
6. Clean only with a damp cloth. No harsh chemicals or solvents.

## Old electrical and electronic equipment



This product and/or battery must be disposed of separately from household waste. Dispose such equipment according to local laws and regulations, to allow their reuse and/or recycling. This will help in conserving resources, and in protecting human health and the environment.

## 1.1 Suspension

### Warning!

Read and fully understand the manual and all safety instructions before attempting to suspend this loudspeaker.

Qualified professionals must carry out suspension and installation.

Follow all applicable local laws and regulations. Incorrect or improper suspension could expose persons to serious injury or death.

Carefully inspect loudspeakers and associated hardware for defects or signs of damage before proceeding to suspend the speakers. Inspect all components at least once per year or as local laws and regulations require. Inspection shall include visual survey of all corners and load bearing surfaces for signs of cracking, water damage, de-lamination, or any other condition that may decrease the strength of the loudspeaker enclosure. If any parts are damaged or suspect, or if there is any doubt as to the proper functioning and safety of the items, stop using them immediately.

It is the responsibility of the person installing the assembly to make sure the wall, ceiling, structure, and any attachments are capable of supporting all objects suspended overhead. Never modify Electro-Voice loudspeakers or rigging components or use a partial assembly of rigging components.

Only use rigging components with the loudspeaker models they are designed for. Any hardware not provided by Electro-Voice is the responsibility of others.

Electro-Voice assumes no liability for any damage or personal injury resulting from improper use, installation, or operation of the product.



### Warning!

Always attach a secondary support mechanism with correctly load rated equipment when speakers are suspended overhead.

In case of failure of the main attachment, the speaker must be prevented from falling without dropping or swinging by a significant amount.



**Warning!**

Arrays designed for outdoor use must take into account environment effects such as wind loads, snow or any other condition that can add external forces to the array. Always use a qualified professional to certify outdoor arrays for safety to local environmental conditions.

**1.2****Chlorine****Warning!**

Do not install MTS loudspeaker systems in high chlorine environments, such as swimming pools.

**1.3****Precautions**

	These Electro-Voice loudspeakers were designed for use in an environment with ambient temperatures between -20°C (-4°F) and +50°C (122°F).
	PW (partially weatherized) MTS loudspeakers are not designed for direct exposure to rain and/or outdoor environments. Use only FW (fully weatherized) loudspeaker versions for direct outdoor and rain exposure.
	Electro-Voice loudspeakers are easily capable of generating sound pressure levels sufficient to cause permanent hearing damage. Caution should be taken to avoid prolonged exposure to sound pressure levels exceeding 90 dB.

**1.4****Copyright and disclaimer**

All rights reserved. No part of this document may be reproduced or transmitted in any form by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. For information on getting permission for reprints and excerpts, contact Electro-Voice.

All content including specifications, data, and illustrations in this manual are subject to change without prior notice.

**1.5****Personal Protective Equipment (PPE)****Warning!**

Use safety glasses, a safety helmet, safety boots, and safety gloves at all times during installation.

Failure to do so can result in injury or death.



## 1.6 Safety standards

Bosch Security Systems Inc. LLC

130 Perinton Pkwy, Fairport, NY 14450 USA

Confirms that this product has been designed and validated to meet or exceed the relevant sections of:

- EN 62368-1:2018, IEC 60065:2014 (Low Voltage Directive)
- IEC 60529:1989/AMD2:2013/COR1:2019 (IP Rating)
- ISO 12100:2010 (Machine Directive)

## 2 System overview

MTS loudspeakers are very high output, long-throw, horn-loaded, point-source systems designed for high performance permanent install applications, such as sports arenas, houses of worship, and performing arts centers. The series represents the culmination of EV's extensive experience in designing rugged, large format horn-loaded systems that can survive in harsh, direct exposure environments.

All models feature stainless steel hardware and grilles, weatherized transducers, and durable birch plywood enclosures with internal bracing and a highly durable polyurea coating. The dual 8-conductor terminal blocks, with a current capacity that exceeds 40 amps (continuous), are mounted in a cast aluminum input cup. Gland nut plates are included with each speaker to seal the input panel and to present a clean, consistent look for the rear of the loudspeaker.

The fully weatherized models are specifically designed for harsh environments, including direct exposure to the elements. In addition to the features already described, all interior and exterior surfaces of the fully weatherized enclosures are finished with a weather resistant coating that seals the marine-grade plywood. The grilles are backed with a special hydrophobic cloth that minimizes water intrusion without impeding the acoustic output of the speaker.

MTS loudspeakers integrate seamlessly with Dynacord IPX series amplifiers and SONICUE sound system control software. For ease of set up and installation, the SONICUE software has presets for all MTS products.

### MTS-4153 Standard Models

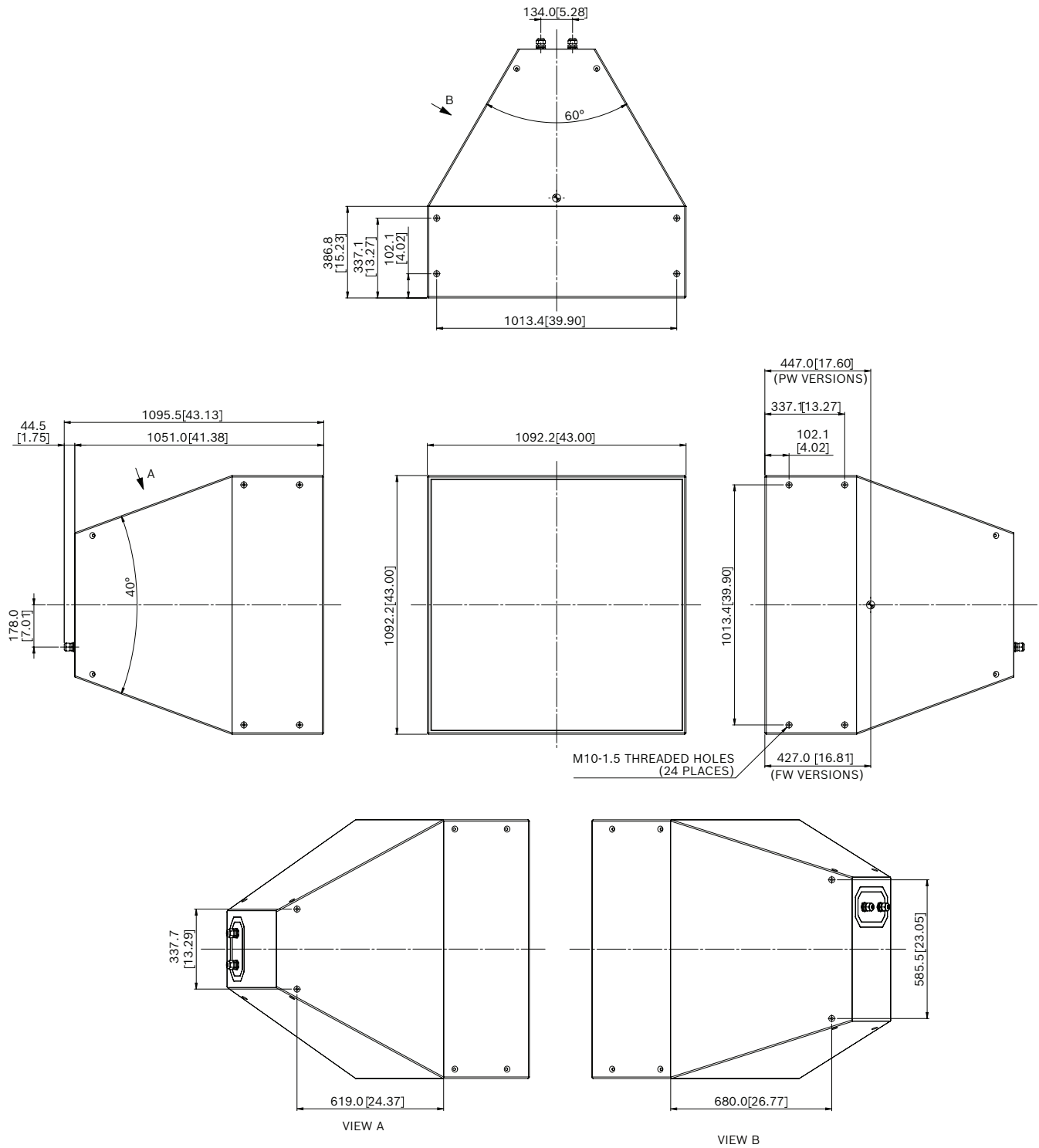
Each MTS-4153 standard horn-loaded loudspeaker consists of four 15-inch (381 mm) LF drivers and two 1.4-inch (36 mm) exit coaxial mid/high compression drivers. The transducers couple to a large, constant directivity, co-entrant arc source horn. Two coverage patterns are available: 40° x 30°, and 60° x 40°. The compression drivers mount at the throat of the horn to maximize efficiency and eliminate acoustic obstructions within the horn that can interfere with consistent coverage. The large horns provide accurate pattern control down to 400 Hz. The coaxial mid/high compression drivers feature a high power passive crossover with 24 dB per octave slopes to minimize the required number of amplifier channels. The enclosure is trapezoidal in both the horizontal and vertical planes, in such a way that tight packing the loudspeakers in a cluster results in the smoothest coverage transition. MTS loudspeakers are available in either white or black. Each loudspeaker has 24 M10 hard points for suspension in either horizontal or vertical configurations. Suspend the speakers from individual cable systems or use third-party structural frames.

### MTS-6154 Cardioid Models

MTS-6154 models deliver complementary performance to that of the standard three-way models and are almost identical to them except for the addition of two 15-inch woofers positioned in a separate chamber at the rear of the cabinet. This extra pair of woofers is arranged in a cardioid configuration that substantially reduces acoustic energy behind the loudspeaker and extends pattern control to the low frequency cut-off of the system. The cardioid section requires its own processed amplifier channel. Cardioid models have 32 M10 suspension points.

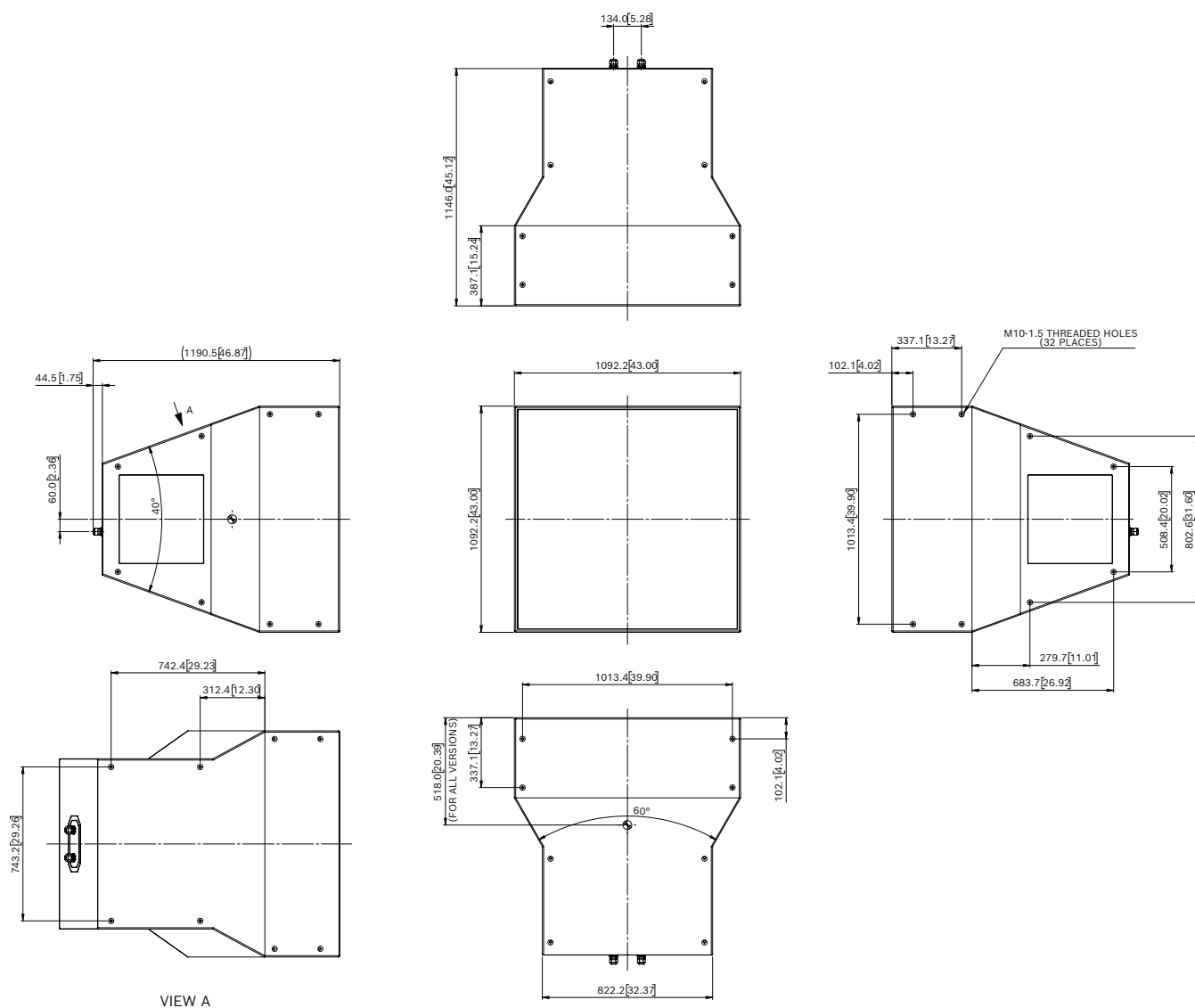
### 3 Dimensions

#### 3.1 MTS-4153-64 standard dimensions

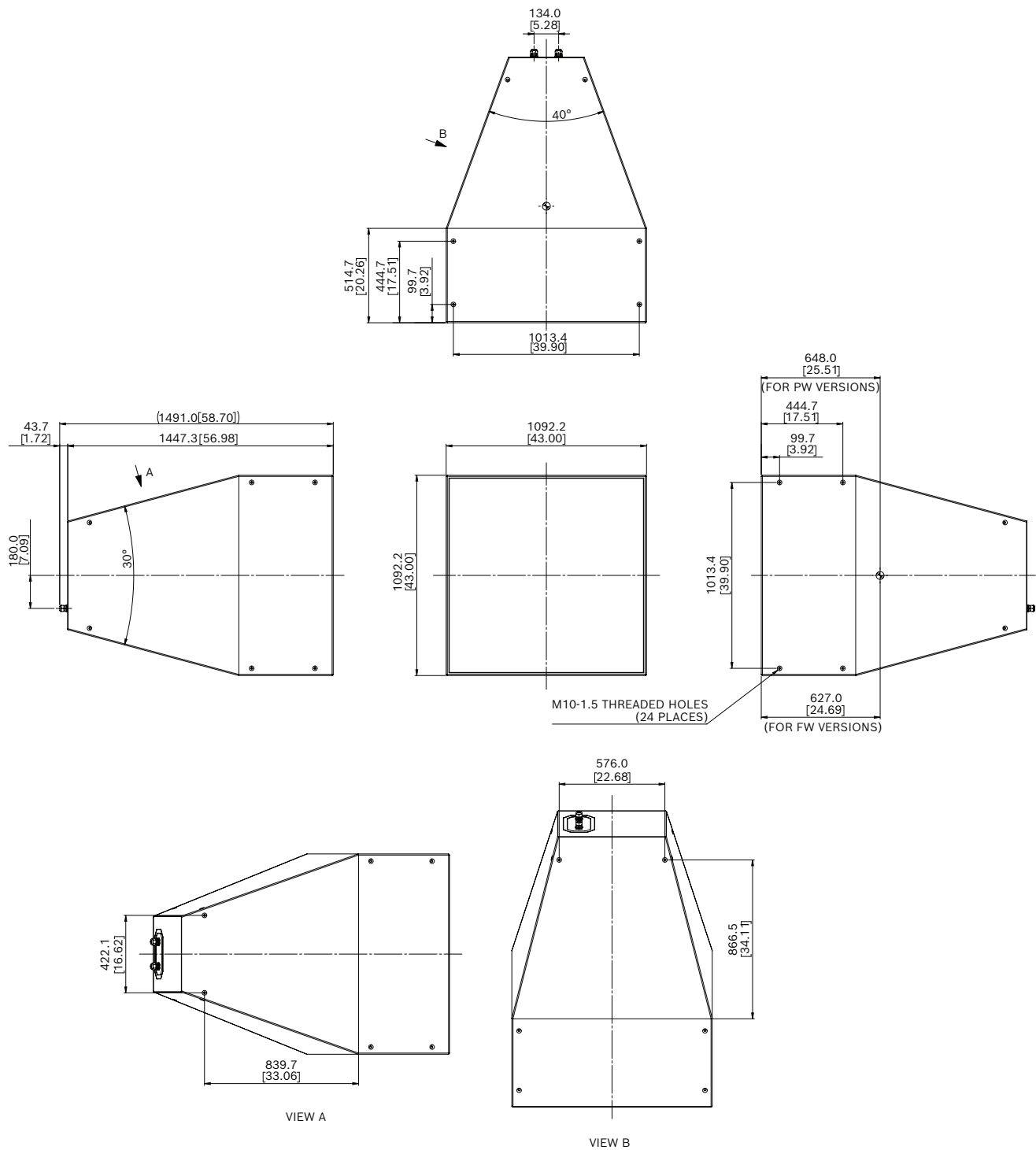




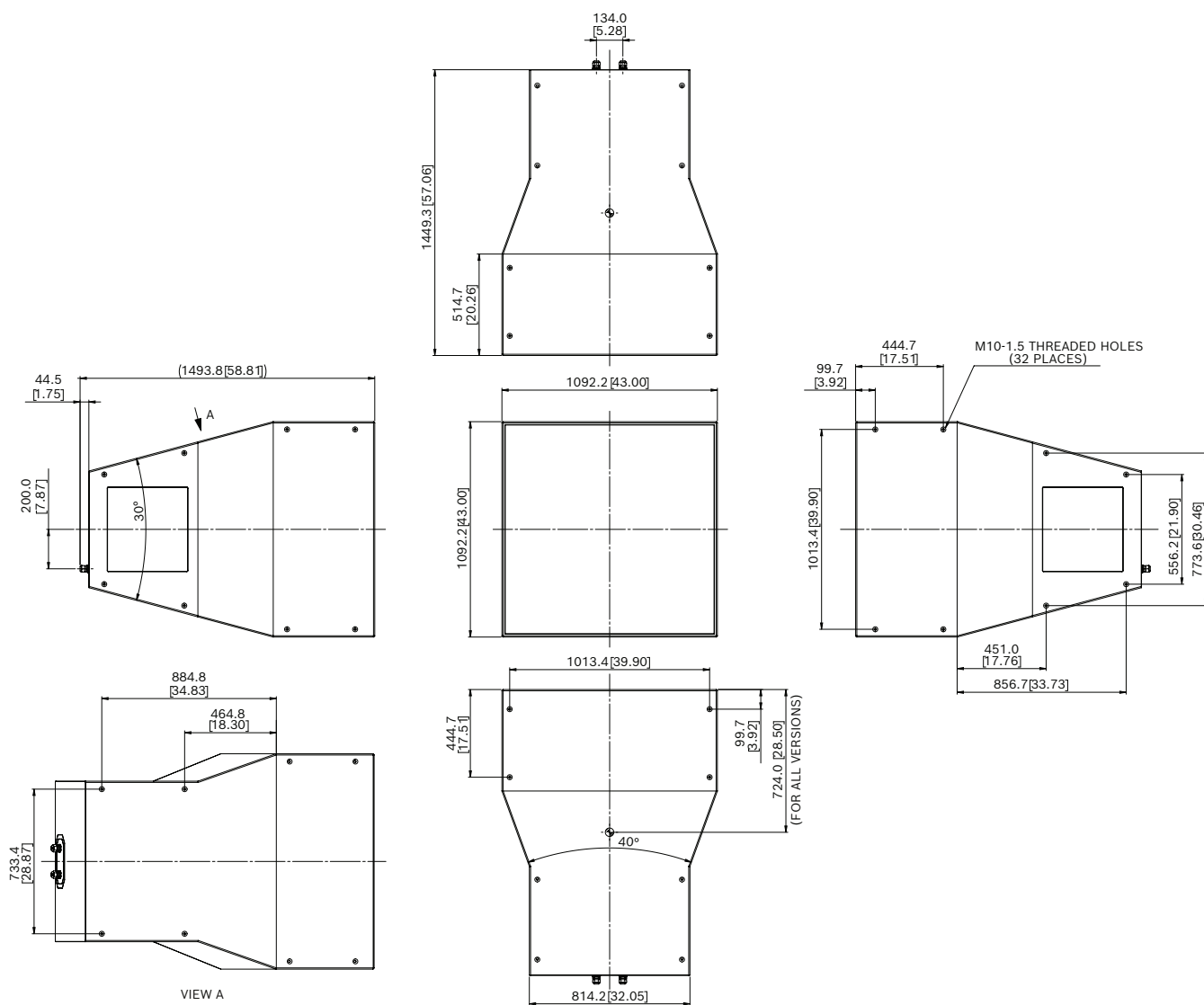
### 3.2 MTS-6154-64 cardioid dimensions



### 3.3 MTS-4153-43 standard dimensions



### 3.4 MTS-6154-43 cardioid dimensions



## 4 Wiring and connections

MTS loudspeakers utilize heavy-duty input panels, with dual 8-conductor Phoenix terminal blocks (Phoenix Contact P/N 1709212). The connectors can accommodate up to 6 mm<sup>2</sup> (10 AWG) stranded wire. A cover plate with gland nuts is included with MTS. It provides protection for the speaker and wiring against water ingress. The cover plate must be installed for outdoor and full exposure applications. The cover plate can also be installed for indoor applications to prevent tampering and enhance cosmetics.

### 4.1 Amplifier configurations

#### Standard models with single amplifier

Amplifier	IPX 20:4		IPX 10:4
Total no. of speakers	2	4	2
Channel			
1	LF1    LF2 (1 box)	LF1    LF2 (2 boxes)	LF1    LF2 (1 box)
2	MHF (1 box)	MHF (2 boxes)	MHF (1 box)
3	LF1    LF2 (1 box)	LF1    LF2 (2 boxes)	LF1    LF2 (1 box)
4	MHF (1 box)	MHF (2 boxes)	MHF (1 box)
Monitoring and processing	Per Box	Per Pair	Per Box
Worst case Max SPL reduction (dB)	0*	-0.8	0
* 3 dB Headroom			

Tab. 4.1: Amplifier configurations for standard models with single amplifier

**Cardiod models with single amplifier**

<b>Amplifier</b>	<b>IPX 20:4</b>	<b>IPX 10:4</b>	<b>IPX 5:4</b>	<b>IPX 10:8</b>
Total no. of speakers	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>
Channel				
1	LF1 (2 boxes)	LF1 (2 boxes)	LF1 (1 box)	LF1 (1 box)
2	LF2 (2 boxes)	LF2 (2 boxes)	LF2 (1 box)	LF2 (1 box)
3	MHF (2 boxes)	MHF (2 boxes)	MHF (1 box)	MHF (1 box)
4	LF CARDIOD (2 boxes)	LF CARDIOD (2 boxes)	LF CARDIOD (1 box)	LF CARDIOD (1 box)
5				LF1 (1 box)
6				MHF (1 box)
7				LF2 (1 box)
8				LF CARDIOD (1 box)
Monitoring and processing	Per Pair	Per Pair	Per Box	Per Box
Worst case Max SPL reduction (dB)	0*	0	0	0
* 3dB Headroom				

**Tab. 4.2: Amplifier configurations for cardiod models with single amplifier**

# 4.2 Input connections, wiring diagram and schematic for standard models

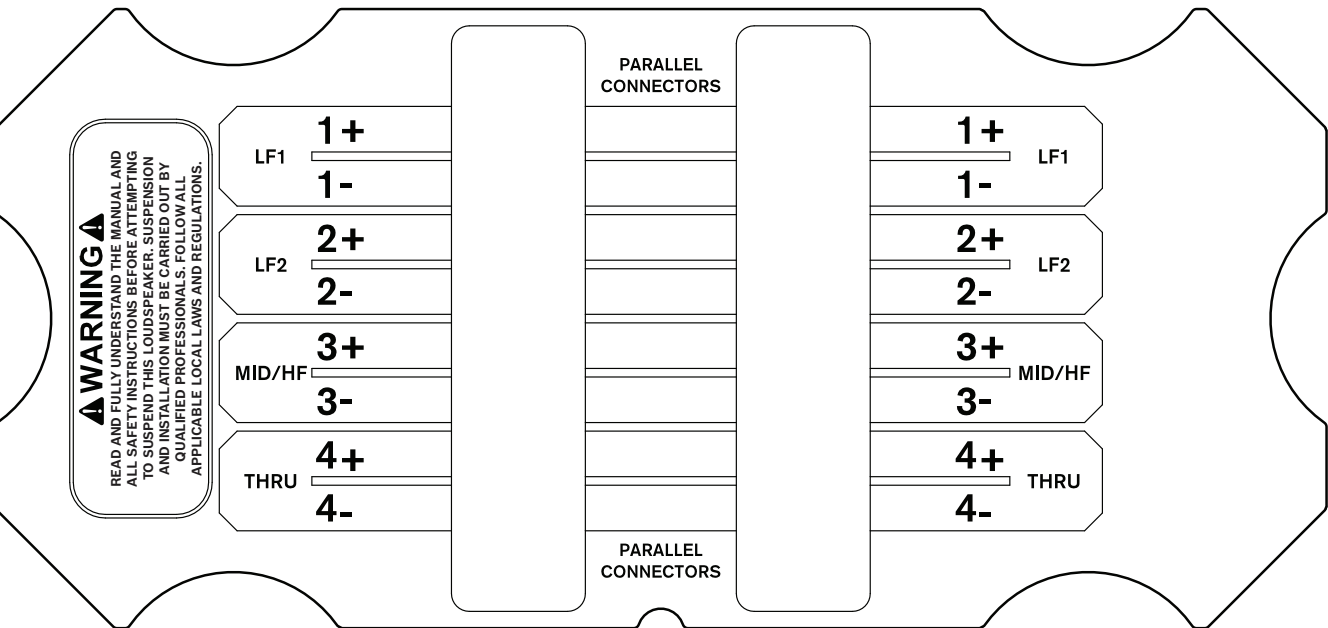


Figure 4.1: Input connections label for standard models

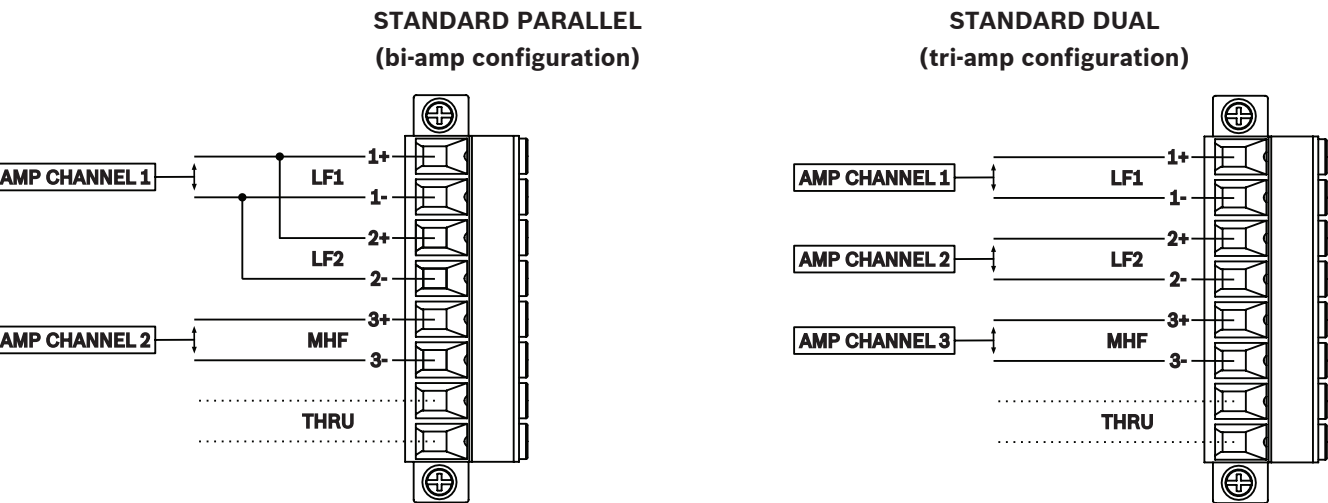
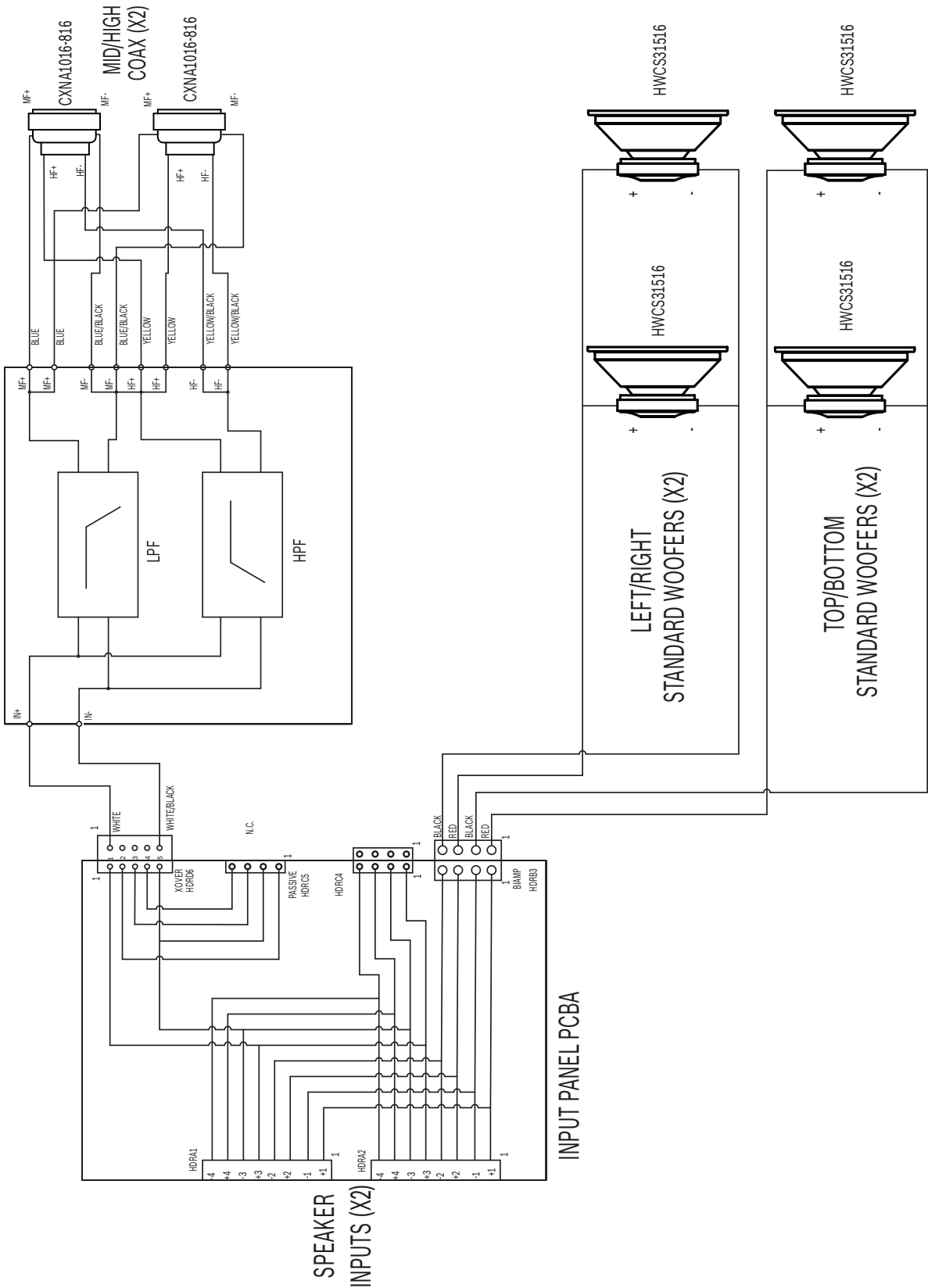


Figure 4.2: Wiring diagrams for standard models

STANDARD MODELS

CROSSOVER PCBA



### 4.3 Input connections, wiring diagram and schematic for cardioid models

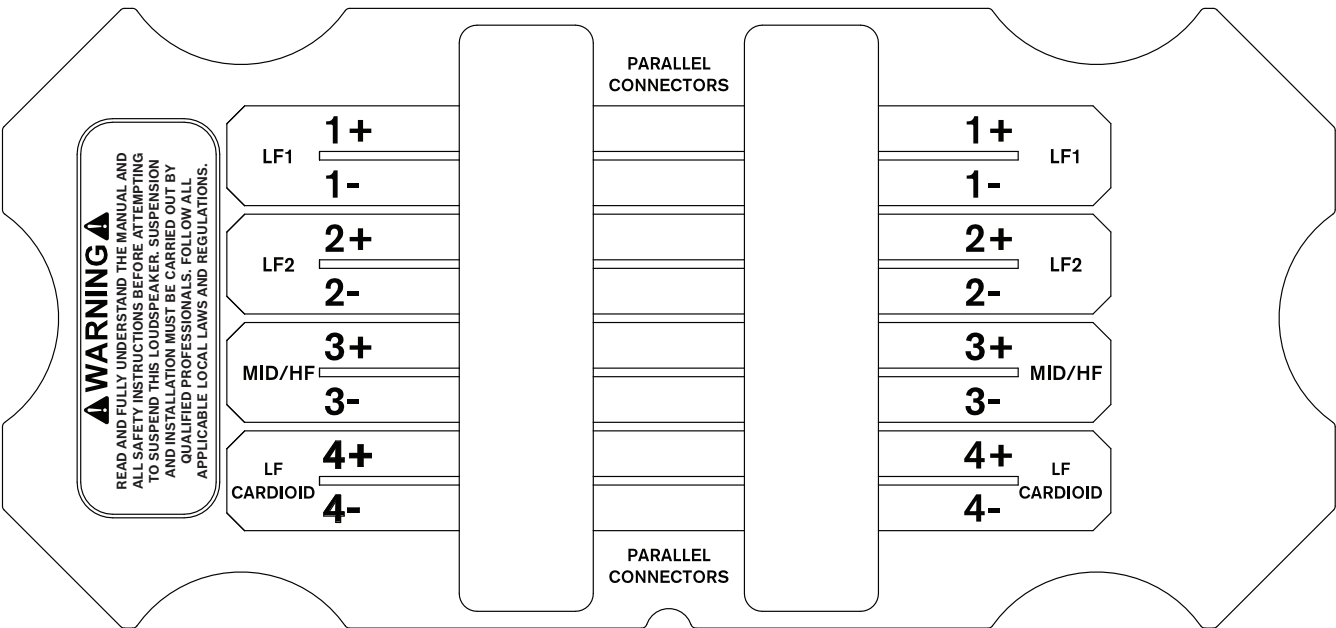


Figure 4.3: Input connections label for cardioid models

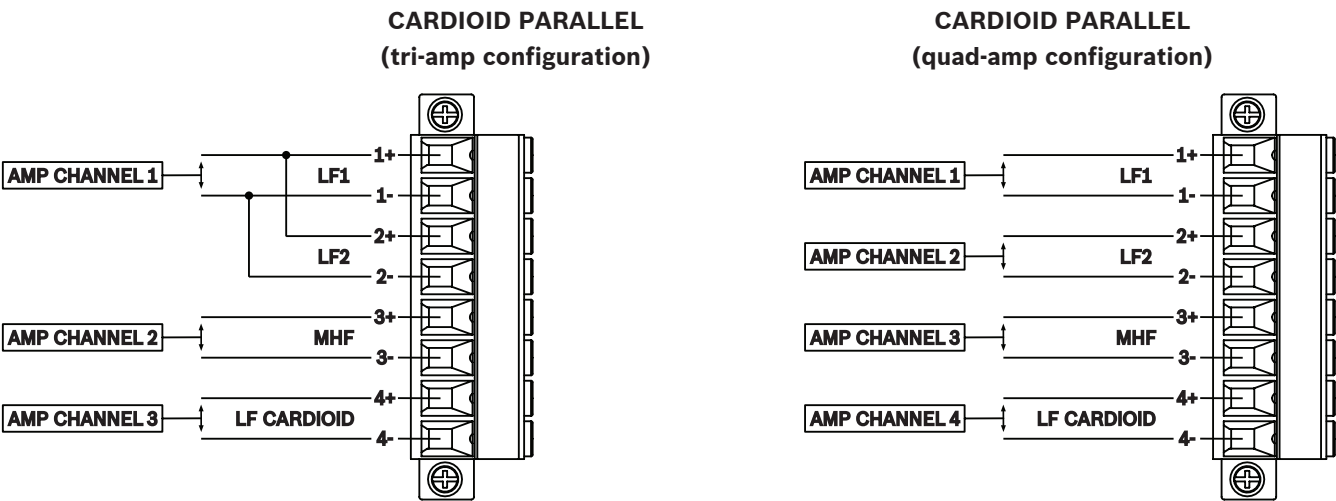
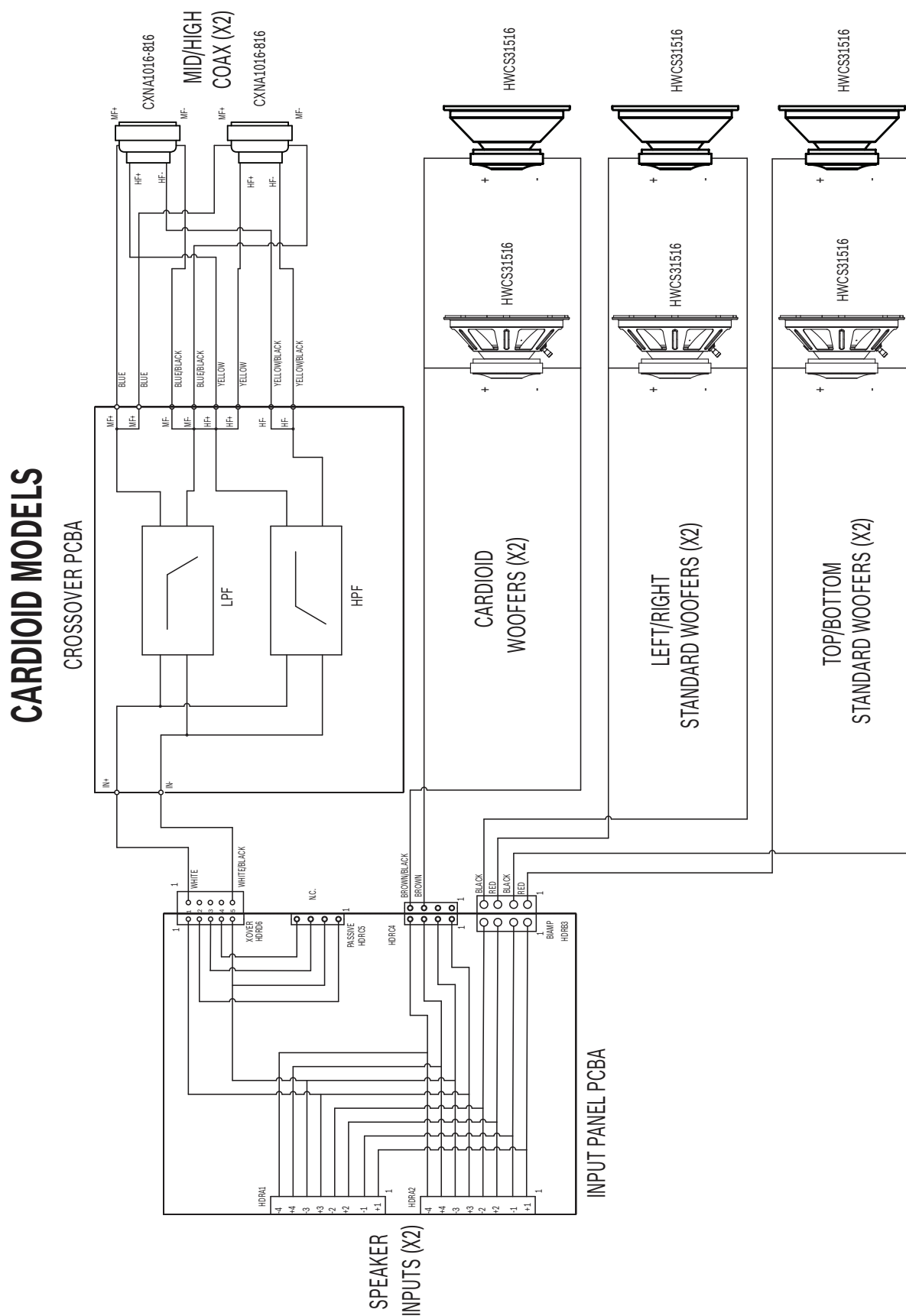
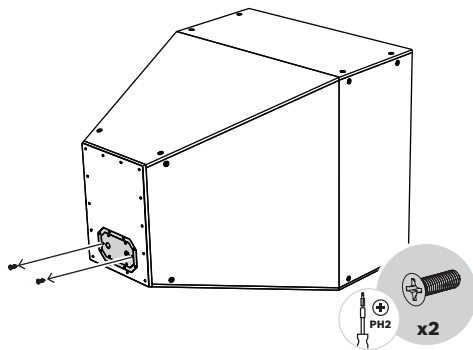
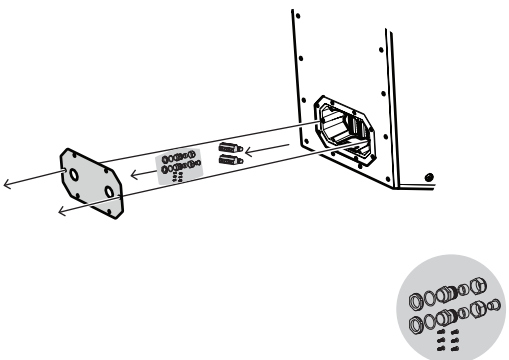
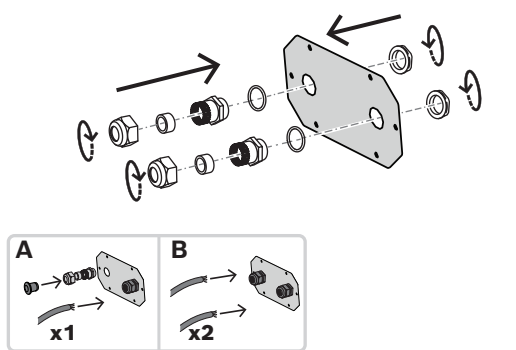
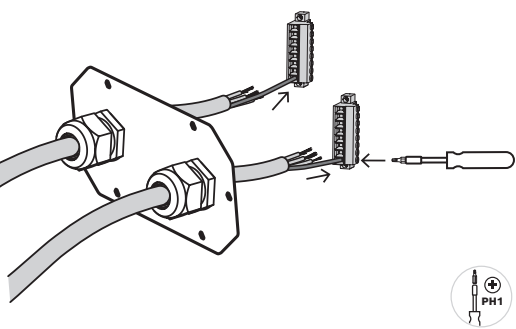


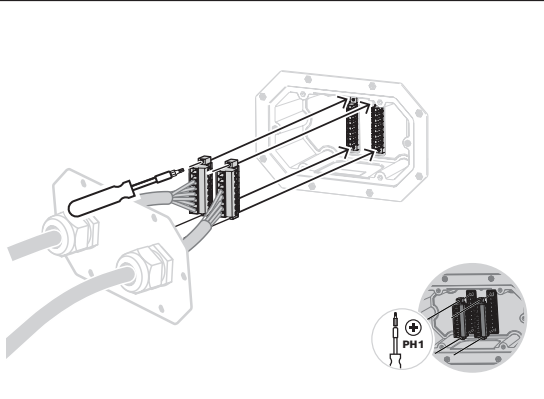
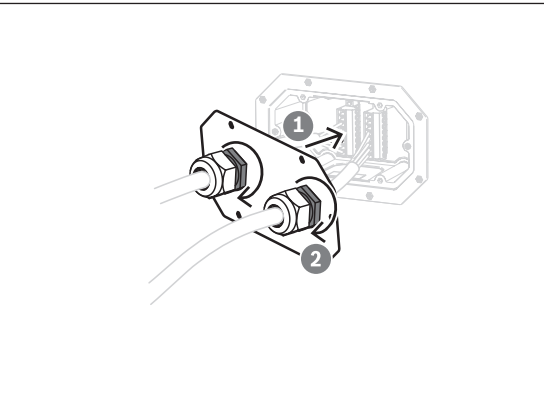
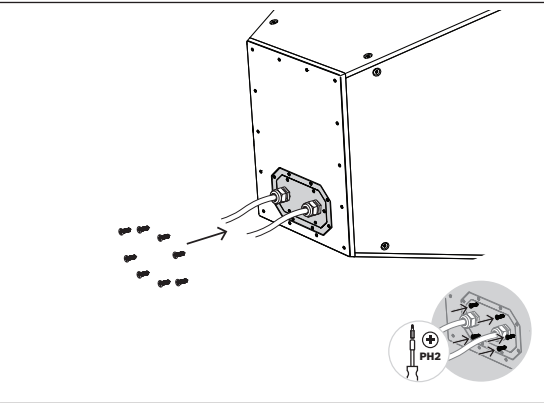
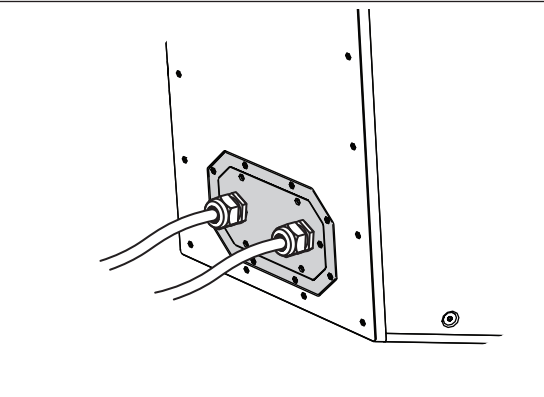
Figure 4.4: Wiring diagrams for cardioid models





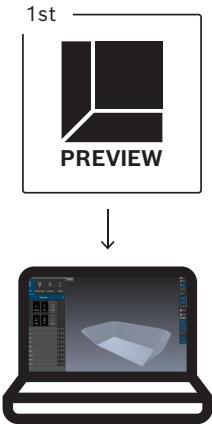
## 4.4 Installing weather plate and gland nuts

	<ol style="list-style-type: none"> <li>1. Remove (2) screws and the weatherproof plate from the input cup. Note the orientation of the plate since the screw holes are not symmetrical.</li> </ol>
	<ol style="list-style-type: none"> <li>2. Remove the gland nut kit and (2) terminal block connectors from inside the input cup.</li> </ol>
	<ol style="list-style-type: none"> <li>3. Install the gland nuts onto the plates. If the loudspeaker only requires 1 cable, use the gland nut plug on one of the gland nuts.</li> <li>4. Feed the cable(s) through the gland nuts.</li> </ol>
	<ol style="list-style-type: none"> <li>5. Connect each wire to the appropriate point on the terminal block.</li> </ol>

	<p>6. Connect the terminal blocks to the input connectors, and secure with the (4) captive screws.</p>
	<p>7. Pull the cable(s) through the gland nut(s) while you push the plate toward the input cup until it seats properly and is flush with the outer flange.</p> <p>8. Tighten the gland nuts.</p>
	<p>9. Secure the gland nut cover to the input cup using the (6) screws.</p>
	<p>The image shows the properly installed gland nut cover.</p>

## 5 Designing an MTS array

### 5.1 Electro-acoustic design

	<p>Use <b>PREVIEW Loudspeaker Software</b> to design the array.</p> <p>Note, <b>PREVIEW</b> helps optimize the acoustical coverage, but does not validate the mechanical mounting design.</p> <p>You can also use EASE or EASE Focus to model acoustics.</p>
---	--

### 5.2 Mechanical design

MTS-4153 models are equipped with 24 M10 external suspension points for connection of eyebolts or 3<sup>rd</sup> party suspension hardware.

MTS-6154 models are equipped with 32 M10 external suspension points for connection of eyebolts or 3<sup>rd</sup> party suspension hardware.

Use forged, load-rated shoulder eye bolts from a trusted supplier. The carbon steel eye bolts in the Electro-Voice EBK-M10L-4HS High-Strength 45mm Eyebolt 4 Pack are ideal. Please read and fully understand the EBK-M10L-4HS datasheet before use.

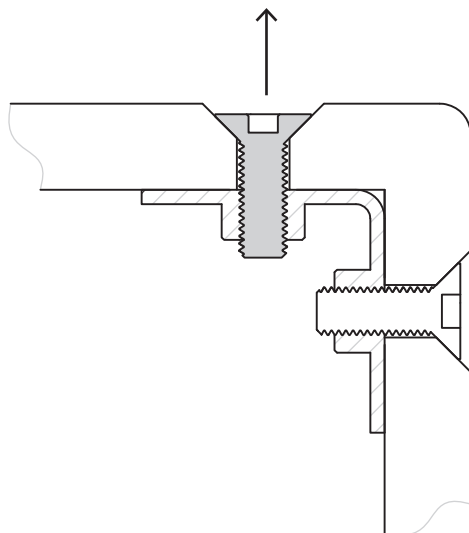
Never exceed manufacturer load ratings.

Never use unrated hardware.

The following suspension point load ratings are provided to guide qualified professionals while designing support structures and suspension systems within a required safety factor.

#### 5.2.1 M10 Suspension points: General

Remove the M10 fasteners from the loudspeaker carefully. Remove only one bolt at a time from each bracket to prevent any chance that you dislodge the entire bracket when re-inserting the bolts.



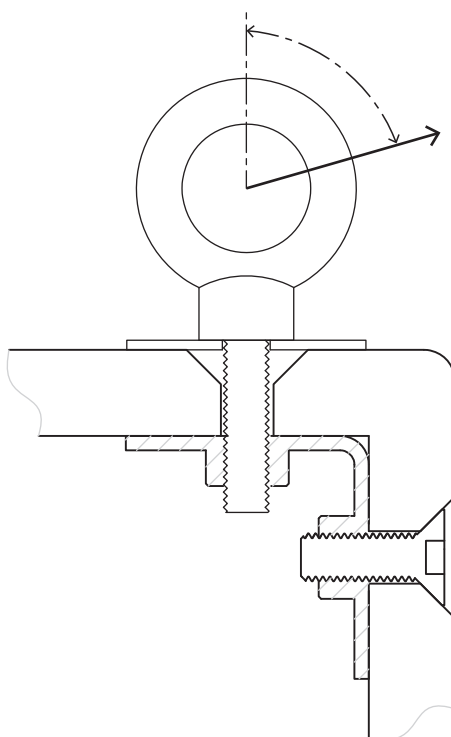
For fully weatherized (FW) models, always coat fasteners with RTV (silicon sealant) prior to insertion. Make sure a completely watertight seal is achieved and the threads are completely coated.

### 5.2.2

#### M10 Suspension points: Attachment at any angle

Suspension systems can use the hard points at any angle up to 90° to a maximum WLL of:

Safety factor	WLL (lbs)	WLL (kg)
8:1	300	136
10:1	240	109



#### Warning!

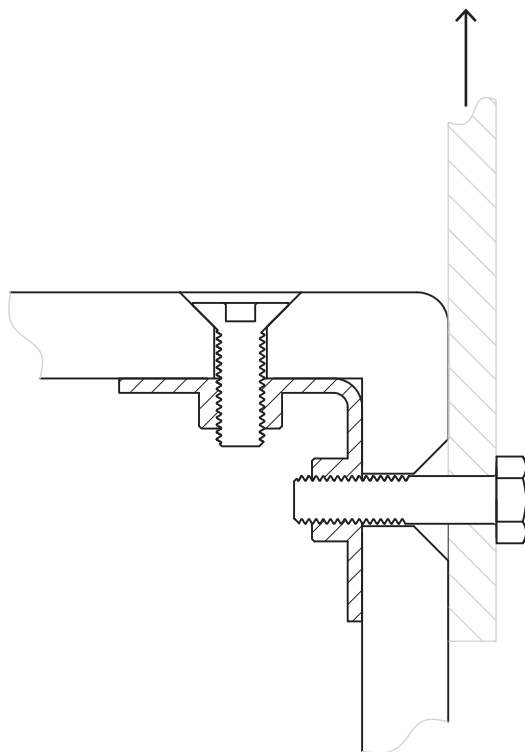
This is the WLL for the hardpoints, not for the attached hardware (for example, eyebolts). Always use attachment hardware with adequate WLL calculated for the resultant force angle.

### 5.2.3

#### M10 Suspension points:

Suspension frames constructed so that only shear forces act on the hard points can use the hard points at any angle in the shear plane to a maximum shear force of:

Safety factor	Shear force (lbs)	Shear force (kg)
8:1	450	204.1
10:1	360	163.3


**Warning!**

This is the maximum shear force for the hardpoints, not for the attached hardware (for example, steel frames). Always use attachment hardware with adequate strength and safety factor.

The shear force may greatly exceed the working load of the speaker if the center of mass is not within the physical envelope of the mounting points.


### 5.3 Recommended rigging methods

- There are two methods of deploying MTS loudspeakers:
- With eyebolts or similar M10 hardware - single speaker suspension only
  - With a custom frame



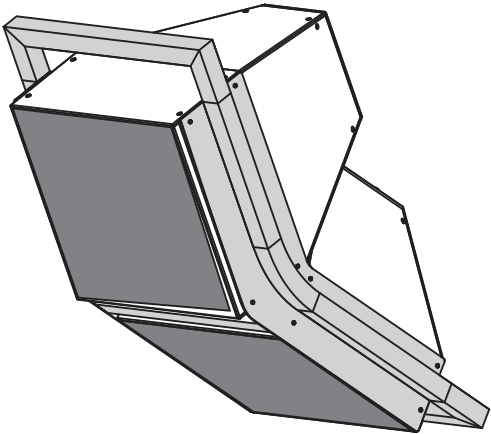
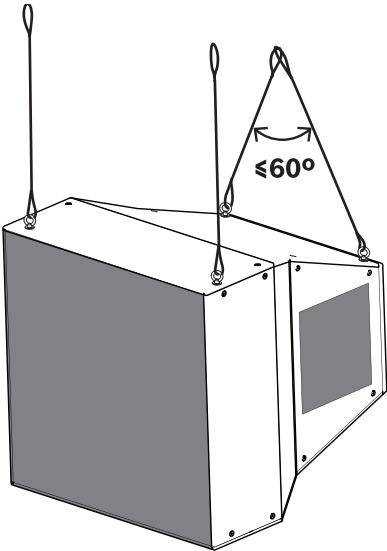
**Warning!**

Qualified professionals must carry out the design, construction, and installation of custom frames, in accordance with applicable laws and regulations. Any hardware used to suspend a loudspeaker not provided by Electro-Voice is the responsibility of others.



**Notice!**

Electro-Voice has experienced and knowledgeable application engineers willing to assist with any design related questions. Contact information for technical support is located at [www.electrovoice.com](http://www.electrovoice.com)

Custom rigging frame	Eyebolt Kit
	

**Refer to**

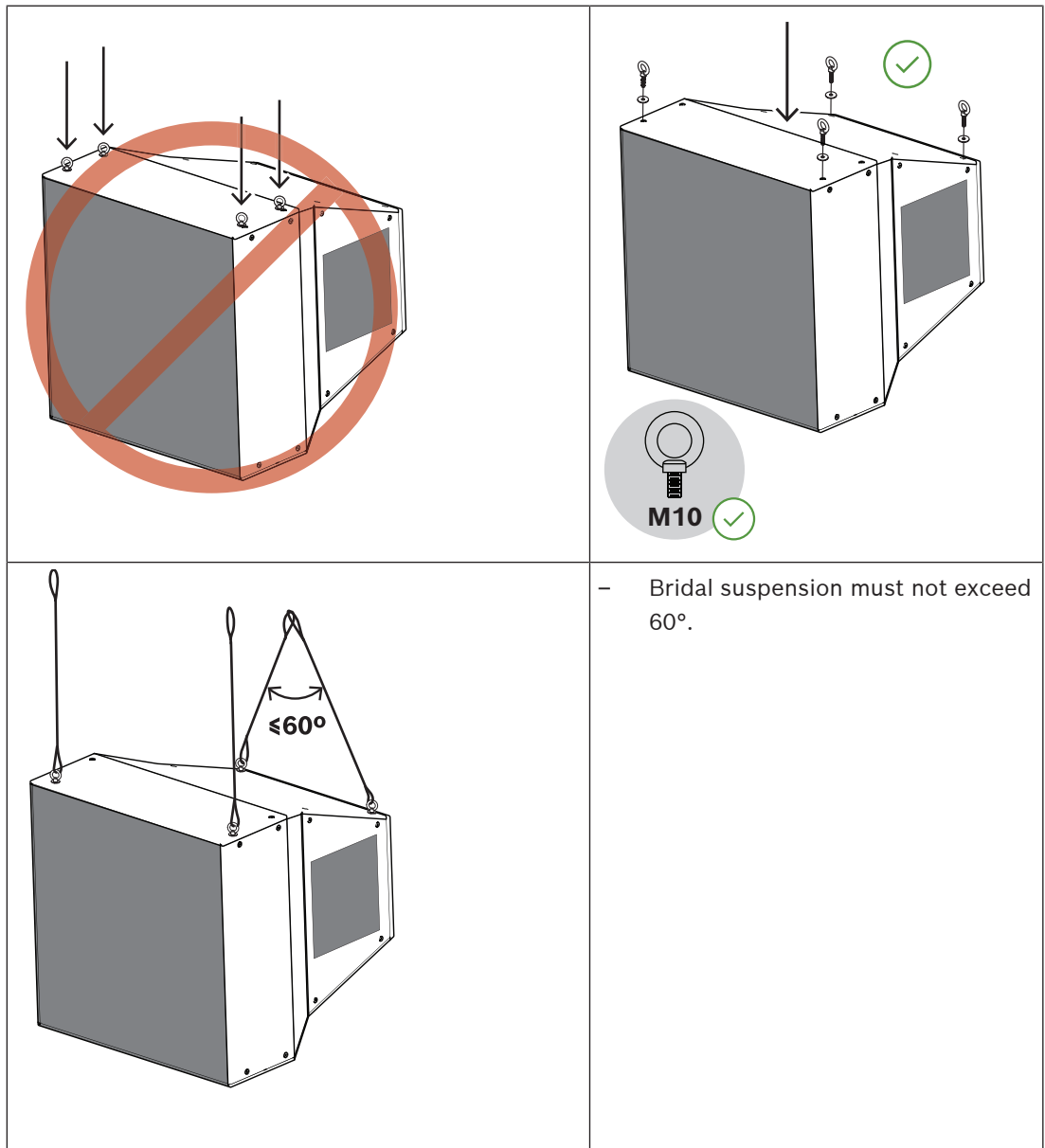
- *Suspension, page 4*

**5.3.1****Single loudspeaker suspension using M10 eyebolts**

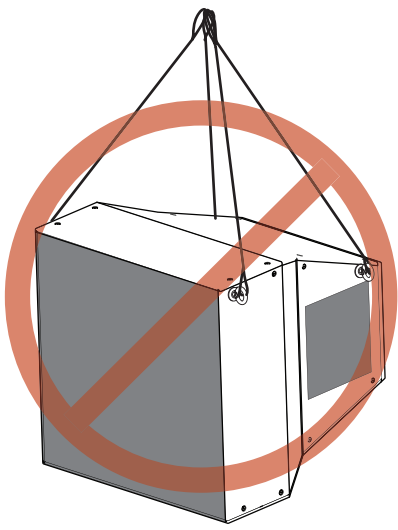
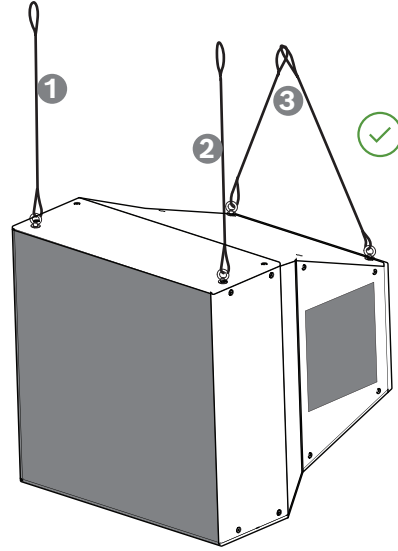
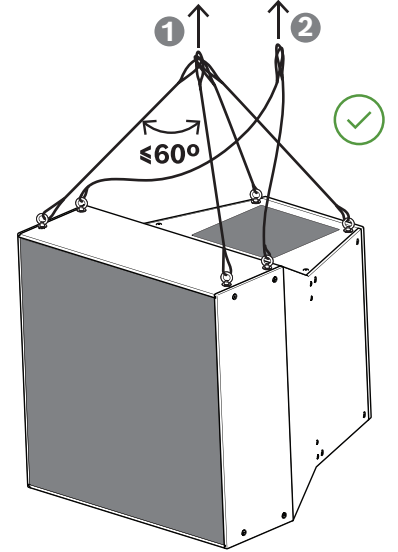
Suspend MTS loudspeaker models individually using the M10 suspension points.

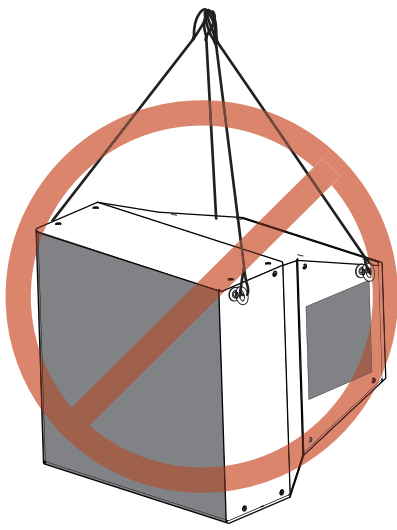
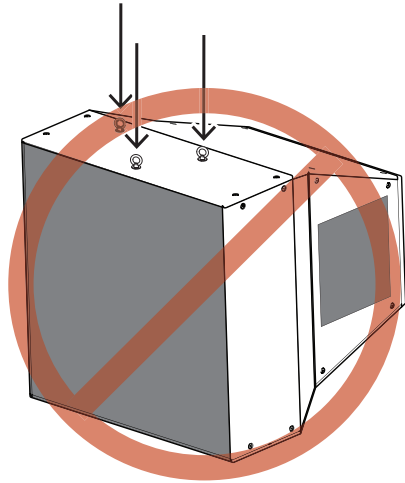
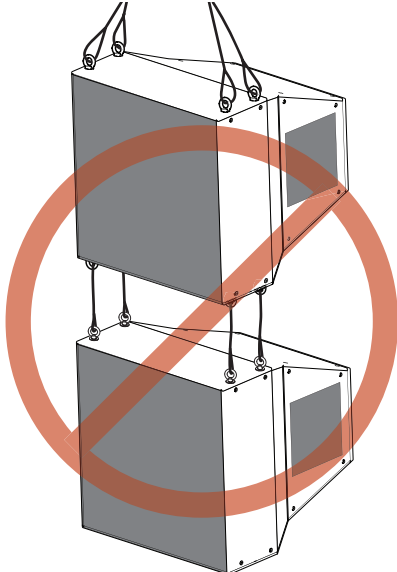
MTS is a very heavy loudspeaker. A minimum of 4 points must be used to suspend the speaker, 2 points minimum per planar surface.

- Use correctly rated shoulder eyebolts for proper suspension. Bolts in the Electro-Voice EBK-M10L-4HS High-Strength 45mm Eyebolt 4 Pack are ideal.
- Follow the instructions for safe suspension provided by the Eyebolt manufacturer in conjunction with this manual.





	<p><b>DO NOT</b> use a single pick point suspension system. Use multiple structural pick points or a single pick point with a secondary safety. See the examples that follow.</p>
	<p>Use a minimum of two pick points. This example uses three pick points.</p>
	<p>Single pick point suspension must be installed in conjunction with an additional secondary safety suspension capable of supporting the entire load, with the required safety factor. Refer to <i>Suspension, page 4</i>.</p>

	<p>Always suspend MTS from the top of the enclosure, relative to its orientation.</p> <p>Speakers must not be suspended from cables attached to eye bolts on the sides of the cabinet.</p>
	<p><b>DO NOT</b> modify the loudspeaker to add a custom suspension point. Use only the M10 hard points provided.</p>
	<p>Never suspend an MTS or any other speaker from the bottom of an MTS loudspeaker.</p>

5.3.2 Custom frame design considerations



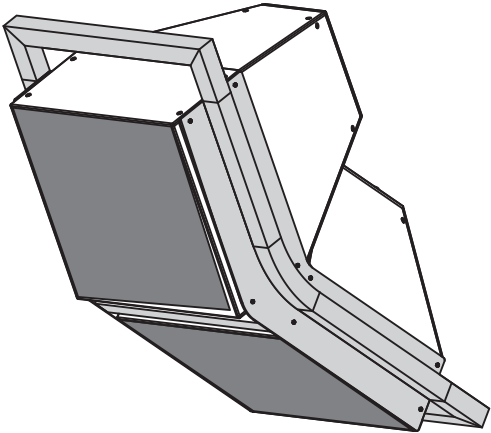
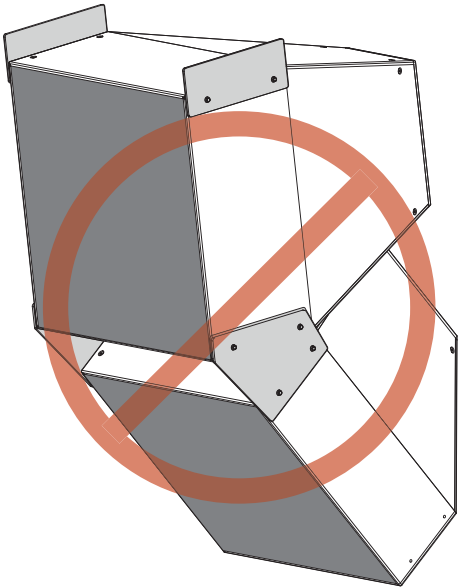
**Warning!**  
Suspending any object overhead is potentially dangerous and should only be attempted by individuals who have a thorough knowledge of the techniques and regulations of suspending objects overhead.  
Only certified structural engineers should be used to design any custom suspension frame. Failure to do so could result in serious injury or death.

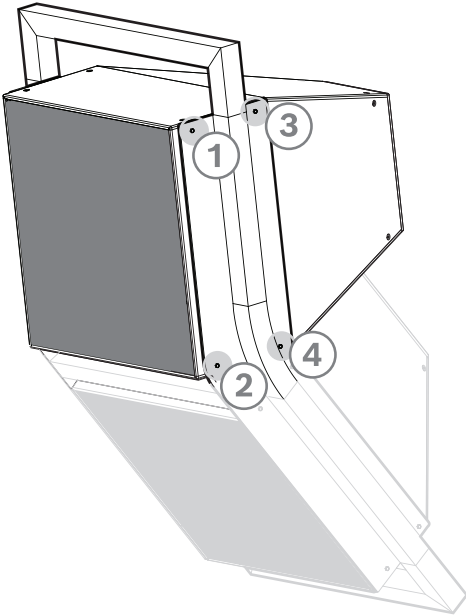
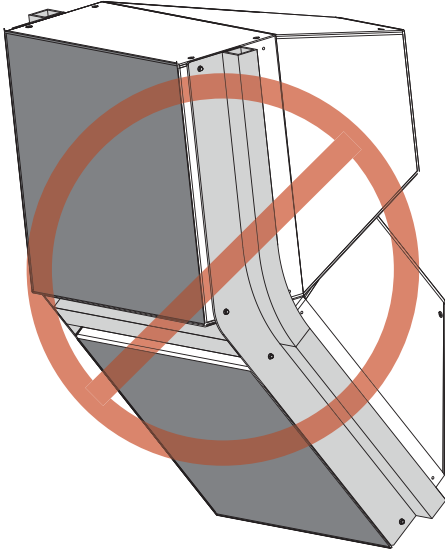


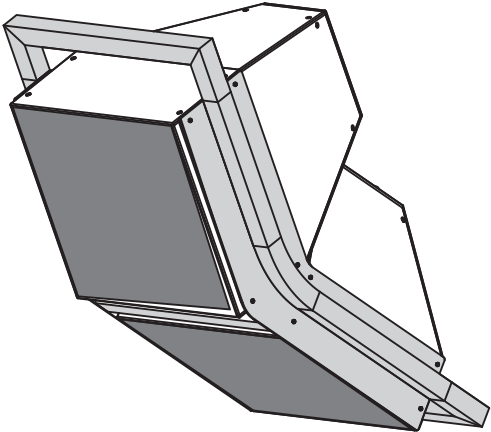
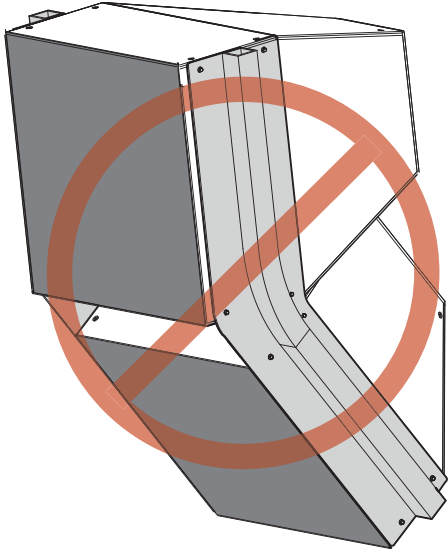
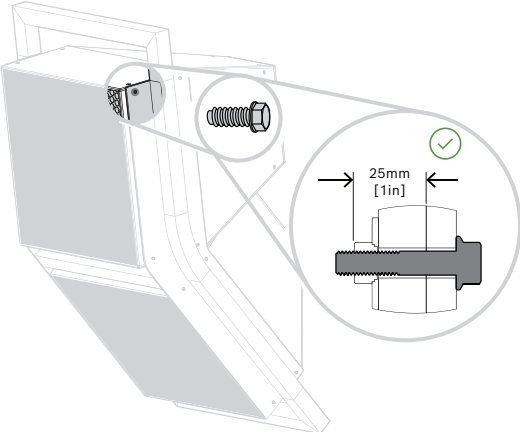
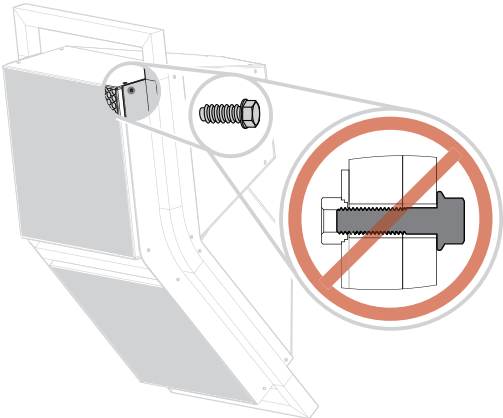
**Warning!**  
Any hardware used to suspend a loudspeaker array not associated with Electro-Voice is the responsibility of others.

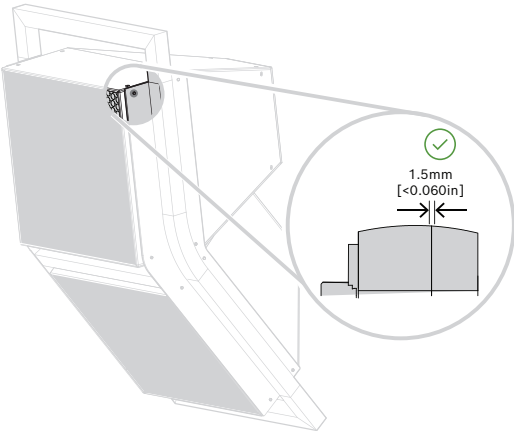
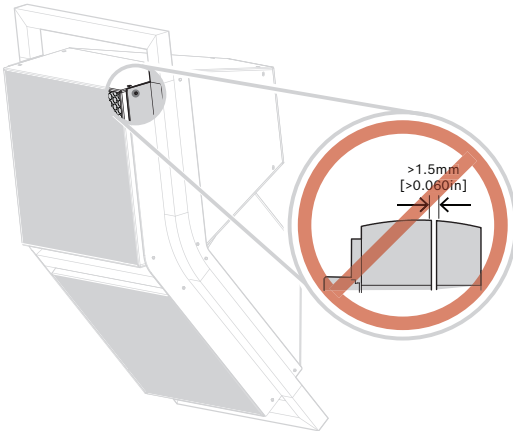


**Warning!**  
The simplified designs shown are for illustrative purposes only and do not represent or imply a complete design from Electro-Voice.  
Any custom frame must be designed by an experienced structural engineering professional in accordance with local laws and regulations.  
Electro-Voice does not take responsibility for any custom suspension system.

Correct	Incorrect
<p>Suspend each element of the array from the frame independently.</p> 	<p><b>DO NOT</b> suspend one element from the bottom of another element.</p> 

Correct	Incorrect
<p>Use at least eight M10 structural hard points on each loudspeaker element, four on each side of the element.</p> 	<p><b>DO NOT</b> use fewer than four M10 hard points on each side of the loudspeaker.</p> 

<p><b>Correct</b></p> <p>Install lateral support bars after the loudspeakers are mounted to the frame sides to ensure they are tight to the loudspeakers, and that the frame is rigid between the side mounting points.</p> 	<p><b>Incorrect</b></p> <p><b>DO NOT</b> use plates on each side of the array without lateral support.</p> 
<p>Use M10 fasteners that penetrate the loudspeaker element 30 - 45 mm (1.2 - 1.8 in). Use thread locker and appropriate torque for the type of fastener used. Fastener torque must not exceed 13.5 N*m (120 in*lbs). Only use fasteners that are capable of supporting the weight of the loudspeaker with a safety factor appropriate for local laws and regulations.</p> 	<p><b>DO NOT</b> use fasteners that are too long or too short.</p> 

Correct	Incorrect
<p>The gap between the custom frame and the enclosure must be less than 1.5 mm (0.06 in).</p>  <p>The diagram shows a perspective view of a custom frame being inserted into an enclosure. A circular callout provides a cross-sectional view of the joint. A green checkmark is positioned above the callout. A dimension line indicates a gap of 1.5mm, with the text '&lt;0.060in' below it.</p>	<p><b>DO NOT</b> allow any gap between the enclosure and the custom frame that exceeds 1.5 mm (0.06 in).</p>  <p>The diagram shows a perspective view of a custom frame being inserted into an enclosure. A circular callout provides a cross-sectional view of the joint. A red 'X' is positioned over the callout. A dimension line indicates a gap greater than 1.5mm, with the text '&gt;0.060in' below it.</p>

## 6 Consideration for weatherized design

### 6.1 IP (Ingress Protection)

MTS models are finished with EVCoat. Grilles are equipped with a water-repellent backing and the gland nut cover, when properly installed, will seal the input cup against water and dust ingress.

ALL MTS Models are rated at IP55, assuming a 5° down-tilt.

Partially Weatherized (PW) models must be installed under a roof or canopy with no continuous direct exposure to wind, rain, and sunshine.

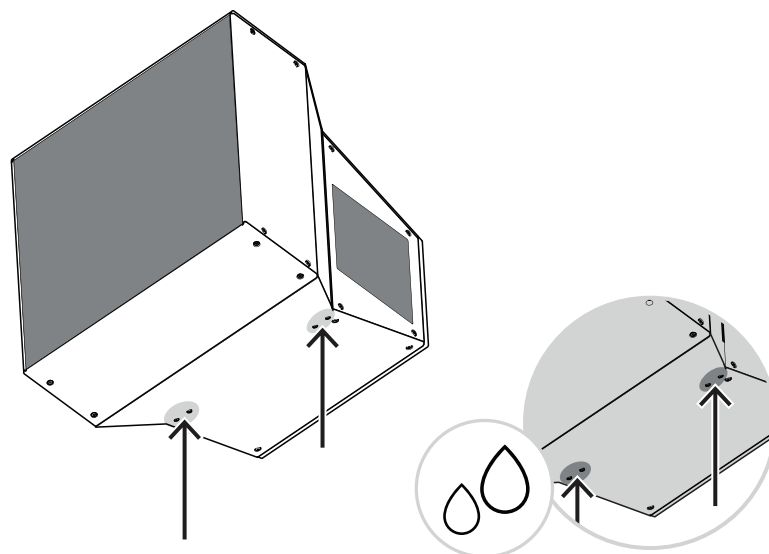
Fully Weatherized (FW) models may be installed in locations with full exposure to the elements.

### 6.2 Drain holes

The MTS fully weatherized models have optional drain holes on the bottom of the enclosure.

The drain hole design discharges any water that accumulates over time.

Electro-Voice recommends that the installer opens the drain holes for applications in which MTS loudspeakers will be directly exposed to precipitation.

**Notice!**

Opening the drain holes may cause minor air noises close to the loudspeaker that are inaudible at normal listening distances.

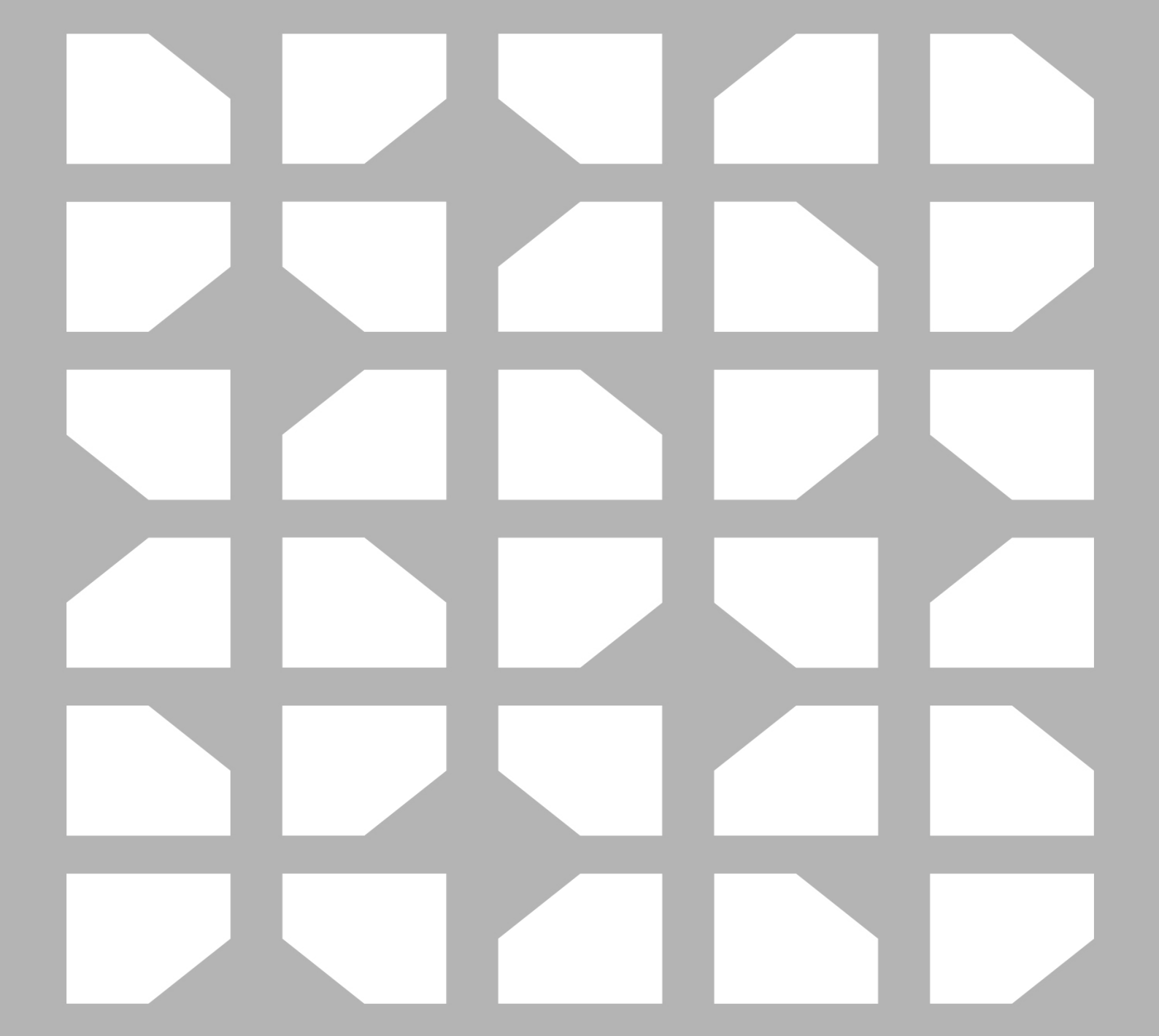
**Warning!**

Never use the M8 drain holes to suspend the loudspeaker.









**Bosch Sicherheitssysteme GmbH**

Robert-Bosch-Ring 5  
85630 Grasbrunn  
Germany

**[www.boschsecurity.com](http://www.boschsecurity.com)**

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**Bosch Security Systems, LLC**

12000 Portland Avenue South  
Burnsville MN 55337  
USA

**[www.electrovoice.com](http://www.electrovoice.com)**

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