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CHAPTER 1: INTRODUCTION

HOW TO USE THIS MANUAL

Make sure to read these instructions in their entirety before configuring a Meyer Sound loudspeaker system. In particular, pay close attention to material related to safety issues.

As you read these instructions, you will encounter the following icons for notes, tips, and cautions:

NOTE: A note identifies an important or useful piece of information relating to the topic under discussion.

TIP: A tip offers a helpful tip relevant to the topic at hand.

CAUTION: A caution gives notice that an action may have serious consequences and could cause harm to equipment or personnel, or could cause delays or other problems.

Information and specifications are subject to change. Updates and supplementary information are available at www.meyersound.com.

Meyer Sound Technical Support is available at:

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- Web: www.meyersound.com/support
- Email: techsupport@meyersound.com

LEO-M LINEAR LINE ARRAY LOUDSPEAKER

The LEO-M™ linear array loudspeaker is defined by its sonic linearity at any output level. With exceptional headroom, extremely low distortion, and optimized rigging options, LEO-M forms the nucleus of Meyer Sound’s next-generation LEO® array systems, conceived for long-throw applications. LEO arrays are ideally paired with Meyer Sound’s 1100-LFC low-frequency control element for bass reproduction, and the LYON™ linear line array loudspeaker for downfill. The MICA® compact high-power curvilinear array loudspeaker is also well suited for downfill. Entire systems are driven by Meyer Sound’s Galileo Callisto™ 616 array processor, which provides matrix routing, alignment, and processing for array components.

To guarantee optimum performance, LEO array systems should be designed with Meyer Sound’s MAPP™ prediction software. The intuitive, cross-platform application accurately predicts coverage patterns, frequency and impulse responses, and maximum peak SPL for LEO array systems, ensuring that systems deliver the required SPL and ideal coverage for the intended audience areas.

LEO-M’s high-frequency section is comprised of two proprietary compression drivers coupled to a constant-directivity horn through a patented REM® manifold. The manifold’s smooth radiating characteristics afford tight vertical coverage. The low-frequency section includes two long-excursion cone drivers, also proprietary, capable of withstanding high, continuous output levels. Precise phase and magnitude alignment between low- and high-frequency drivers yields consistent and well-behaved system responses.

The unit’s onboard power amplifier operates at nominal voltages from 165–264 V AC at 50–60 Hz. TruPower® limiting ensures maximum driver protection, minimizing power compression while yielding high constant output under high continuous and peak power conditions. The amplifier, control electronics, and power supply are contained in a single field-replaceable module located on the rear of the cabinet.

Meyer Sound's RMS™ remote monitoring system comes standard with all LEO-M loudspeakers and provides comprehensive monitoring of system parameters on a Mac® or Windows®-based computer. Convenient XLR 5-pin connectors allow the use of composite cables carrying both RMS and balanced audio signals.
LEO-M offers intuitive rigging with captive GuideALinks™ that can be set to the desired splay angles while cabinets rest in caster frames. The MTG-LEO-M top grid flies arrays of up to 18 LEO-Ms at a 7:1 safety factor (with some restrictions). Optional transition frames are available for flying LYONs or MICAs below LEO-M arrays for downfill. Stacks of up to four LEO-Ms can be securely transported with the optional MCF-LEO-M caster frame; durable nylon covers, accommodating stacks of two, three, or four units, are available to protect the cabinets during transport.

The vented LEO-M cabinet is constructed of multi-ply hardwood and coated with a black-textured finish. A hex-stamped, steel grille with acoustical black mesh protects the unit’s drivers. The cabinet is weather protected and includes a collapsible rain hood that shields user panel connectors from water intrusion.
CHAPTER 2: POWER REQUIREMENTS

LEO-M combines advanced loudspeaker technology with equally advanced power capabilities. Understanding power distribution, voltage and current requirements, and electrical safety guidelines is critical to the safe operation of LEO-M.

AC POWER DISTRIBUTION

All components in an audio system (self-powered loudspeakers, mixing consoles, and processors) must be properly connected to an AC power distribution system, ensuring that AC line polarity is preserved and that all grounding points are connected to a single node or common point using the same cable gauge (or larger) as the neutral and line cables.

⚠️ CAUTION: Make sure the voltage received by LEO-M remains within its 165–264 V AC operating range. In addition, the ground line must always be used for safety reasons and the line-to-ground voltage should never exceed 250 V AC (typically 120 V AC from line to ground).

⚠️ CAUTION: Before applying AC power to any Meyer Sound self-powered loudspeaker, make sure that the voltage potential difference between the neutral and earth-ground lines is less than 5 V AC when using single-phase AC wiring.

>Note: Improper grounding of connections between loudspeakers and the rest of the audio system may produce noise or hum, or cause serious damage to the input and output stages of the system’s electronic components.

120 V AC, 3-Phase Wye System (Two Lines)

Line-Line-Earth/Ground

Figure 1 illustrates a 120 V AC, 3-phase Wye distribution system with each loudspeaker connected to two lines and a common earth/ground line. This configuration is possible because LEO-M tolerates elevated voltages from the ground line and does not require a neutral line. This system delivers 208 V AC to each loudspeaker.

![Figure 1: 120 V AC, 3-Phase Wye System (Two Lines to Loudspeakers)](image)

💡 TIP: The 120 V AC, 3-phase Wye system with two lines is recommended because it allows loudspeakers to draw less current than with single-line systems, thereby reducing voltage drop due to cable resistance.

220 V AC, 3-Phase Wye System (Single Line)

Line-Neutral-Earth/Ground

Figure 2 illustrates a basic 220 V AC, 3-phase Wye distribution system with the loudspeaker load distributed across all three phases, with each loudspeaker connected to a single line and common neutral and earth/ground lines. This system delivers 220 V AC to each loudspeaker.

![Figure 2: 220 V AC, 3-Phase Wye System (Single Line to Loudspeakers)](image)

⚠️ CAUTION: For 220 V AC, 3-phase Wye systems, never connect two lines to the AC input of LEO-M, as the resulting voltage would be higher than the allowable upper voltage range (275 V AC) and would damage the loudspeaker.
CHAPTER 2: POWER REQUIREMENTS

AC INPUT
The LEO-M user panel includes an AC Input connector that supplies power to the loudspeaker. The 3-conductor powerCON 32 is rated at 32 A and uses a locking connector that prevents accidental disconnections.

powerCON 32 AC Input Connector

LEO-M ships with a black powerCON 32 cable mount connector, rated at 32 A, for assembling AC power cables. Make sure to use an AC power cable that is wired correctly (see “Wiring AC Power Cables” on page 8) and equipped with the appropriate power plug (on the other end) for the area in which you will operate the unit.

LEO-M requires a grounded outlet. To operate safely and effectively, it is extremely important that the entire system be properly grounded.

WIRING AC POWER CABLES
LEO-M ships with a black powerCON 32 cable mount connector, rated at 32 A, for assembling AC power cables. The pins on the powerCON 32 cable mount connector are labeled as follows:

■ L (Line)
■ N (Neutral)
■ PE (Protective Earth or Ground)

How AC power cables are wired is determined by the type of AC power distribution system used (see “AC Power Distribution” on page 7). When wiring AC power cables for single-line systems, use one of the following wiring schemes:

AC Wiring Scheme

<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Attach to the Following Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. / Canada 60 Hz</td>
<td>European 50 Hz</td>
</tr>
<tr>
<td>Black</td>
<td>Brown</td>
</tr>
<tr>
<td>White</td>
<td>Blue</td>
</tr>
<tr>
<td>Green</td>
<td>Green and Yellow</td>
</tr>
</tbody>
</table>

CAUTION: When wiring AC power cables and distribution systems, it is important to preserve AC line polarity and connect the earth ground on both ends of the cable. LEO-M requires a grounded connection. Always use a grounded outlet and plug. It is extremely important that the system be properly grounded to operate safely and properly. Do not ground-lift the AC cable.
Supported Cable Gauges for the powerCON 32

While the powerCON 32 connector supports cable gauges of 14–10 AWG (2.5–6.0 mm²), due to LEO-M’s current draw, 10 AWG (6.0 mm²) should be used whenever possible.

LEO-M VOLTAGE REQUIREMENTS

CAUTION: Due to its expanded power capabilities, LEO-M was engineered to operate only at 220 V AC (208–235 V AC) to reduce current draw. Make sure to use AC power cables with sufficient gauge to operate with stable voltages during peaks and that the AC power source is capable of providing enough power.

LEO-M operates as intended when receiving AC voltage within the following range:

- 165–264 V AC, 50–60 Hz

If the voltage drops below 165 V, the loudspeaker uses stored power to continue operating temporarily; the loudspeaker powers off if the voltage does not return to its operating range.

If the voltage rises above 275 V, the power supply could become damaged.

CAUTION: To ensure that LEO-M performs as specified, without interruption, and without damage to its power supply:

1. Its power source must operate within the required voltage window (208–235 V AC).
2. Its AC cable length and gauge must be such that peak voltage drops do not exceed 5 percent of its voltage.

NOTE: When voltage fluctuates within the loudspeaker’s operating ranges, automatic tap selection stabilizes the voltage. Tap selection is instantaneous with no audible artifacts, allowing continuous operation.

LEO-M CURRENT REQUIREMENTS

Current draw for loudspeakers is dynamic and fluctuates as operating levels change. Since different cables and circuit breakers heat up at varying rates, it is important to understand the following types of current ratings and how they affect circuit breaker and cable specifications.

- **Idle Current** — The maximum rms current during idle periods.
- **Maximum Long-Term Continuous Current** — The maximum rms current during a period of at least 10 seconds. The maximum long-term continuous current is used to calculate temperature increases for cables, to ensure that cable sizes and gauges conform to electrical code standards. The current rating is also used as a rating for slow-reacting thermal breakers, which are recommended for loudspeaker power distribution.
- **Burst Current** — The maximum rms current during a period of around 1 second. The burst current is used as a rating for magnetic breakers. It is also used for calculating the peak voltage drop in long AC cable runs according to the following formula:
  
  \[ V_{pk}\text{(drop)} = I_{pk} \times R \text{ (cable total)} \]

- **Maximum Instantaneous Peak Current** — A rating for fast-reacting magnetic breakers.
- **Inrush Current** — The spike of initial current encountered when powering on.

You can use the following table as a guide for selecting cable gauges and circuit breaker ratings for the system’s operating voltage.

<table>
<thead>
<tr>
<th>LEO-M Current Draw</th>
<th>230 V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idle</td>
<td>0.6 A rms</td>
</tr>
<tr>
<td>Maximum Long-Term Continuous</td>
<td>6.0 A rms</td>
</tr>
<tr>
<td>Burst</td>
<td>8.0 A rms</td>
</tr>
<tr>
<td>Maximum Instantaneous Peak</td>
<td>24 A peak</td>
</tr>
<tr>
<td>Inrush</td>
<td>&lt;15 A peak</td>
</tr>
</tbody>
</table>

The minimum electrical service amperage required by a loudspeaker system is the sum of the maximum long-term continuous current for all loudspeakers. An additional 30 percent above the minimum amperage is recommended to prevent peak voltage drops at the service entry.
NOTE: For best performance, the AC cable voltage drop should not exceed 10 V (5 percent at 230 V). Make sure that even with AC voltage drops that the voltage always remains within the loudspeaker’s operating range.

DO NOT RESET CIRCUIT BREAKERS!

CAUTION: In the unlikely event that one of LEO-M’s circuit breakers trips (the center button disengages), disconnect the AC power cable and contact Meyer Sound for repair information. DO NOT attempt to reset the breaker or reconnect the AC power cable.

INTELLIGENT AC POWER SUPPLY

LEO-M’s Intelligent AC™ power supply eliminates high inrush currents with soft-start power up; suppresses high-voltage transients up to several kilovolts; filters common mode and differential mode radio frequencies (EMI); and sustains operation temporarily during low-voltage periods.

Powering on LEO-M

When powering on LEO-M, the following startup events take place over several seconds.

1. Audio output is muted.
2. The primary fan turns on.
3. The power supply ramps up.
4. On the user panel, the Active LED turns solid green, indicating the loudspeaker is ready to output audio.

CAUTION: If the Active LED does not turn solid green, or LEO-M does not output audio after 10 seconds, remove AC power immediately and verify that the voltage is within the required range. If the problem persists, contact Meyer Sound Technical Support.

ELECTRICAL SAFETY GUIDELINES

Make sure to observe the following important electrical and safety guidelines.

- The powerCON 32 connector should not be engaged or disengaged when under load or live.
- LEO-M requires a grounded outlet. Always use a grounded outlet and plug.
- Do not use a ground-lifting adapter or cut the AC cable ground pin.
- Make sure the AC power cable for the loudspeaker has the appropriate power plug (on the other end) for the area in which you will operate the loudspeaker.
- Do not operate the unit if the power cable is frayed or broken.
- Keep all liquids away from LEO-M loudspeakers to avoid hazards from electrical shock.
- Use the cable rings (see “Cable Rings” on page 12) on the rear of the LEO-M cabinet to reduce strain on the AC power cable (and audio cables). Do not use the cable rings for any other purpose.
CHAPTER 3: AMPLIFICATION AND AUDIO

LEO-M’s drivers are powered by a proprietary 3-channel amplifier with bridged MOSFET output stages. The audio signal is processed with an electronic crossover, correction filters for flat phase and frequency responses, and driver protection circuitry. Each channel has peak and rms limiters that prevent driver over-excursion and regulate voice coil temperatures.

AUDIO CONNECTORS

LEO-M includes XLR 5-pin connectors for audio Input and audio Loop output. XLR 5-pin connectors accommodate both balanced audio and RMS signals.

Audio Input (XLR 5-Pin Female)

The XLR 5-pin female Input connector accepts balanced audio signals with an input impedance of 10 kOhm. The connector uses the following wiring scheme:

- **Pin 1** — 1 kOhm to chassis and earth ground (ESD clamped)
- **Pin 2** — Signal (+)
- **Pin 3** — Signal (–)
- **Pin 4** — RMS (polarity insensitive)
- **Pin 5** — RMS (polarity insensitive)
- **Case** — Earth (AC) ground and chassis

Pins 2 and 3 carry the input as a differential signal. Pin 1 is connected to earth through a 1 kOhm, 1000 pF, 15 V clamped network. This circuitry provides virtual ground lift for audio frequencies while allowing unwanted signals to bleed to ground. Make sure to use balanced XLR audio cables with pins 1–3 connected on both ends. Telescopic grounding is not recommended and shorting an input connector pin to the case may cause a ground loop, resulting in hum.

**TIP:** If unwanted noise or hiss is produced by the loudspeaker, disconnect its input cable. If the noise stops, there is most likely nothing wrong with the loudspeaker. To locate the source of the noise, check the audio cable, source audio, and AC power.
Audio Loop Output (XLR 5-Pin Male)
The XLR 5-pin male Loop output connector allows multiple loudspeakers to be looped from a single audio source. The Loop output connector uses the same wiring scheme as the Input connector (see “Audio Input (XLR 5-Pin Female)” on page 11). For applications that require multiple LEO-Ms, connect the Loop output of the first loudspeaker to the Input of the second loudspeaker, and so forth.

NOTE: The Loop output connector is wired in parallel to the Input connector and transmits the unbuffered source signal even when the loudspeaker is powered off.

Calculating Load Impedance for Looped Audio Signals
To avoid distortion when looping multiple loudspeakers, make sure the source device can drive the total load impedance of the looped loudspeakers. In addition, the source device must be capable of delivering approximately 20 dBV (10 V rms into 600 ohms) to yield the maximum SPL over the operating bandwidth of the loudspeakers.

To calculate the load impedance for the looped loudspeakers, divide 10 kOhms (the input impedance for a single loudspeaker) by the number of looped loudspeakers. For example, the load impedance for 10 LEO-Ms is 1000 ohms (10 kOhms / 10). To drive this number of looped loudspeakers, the source device should have an output impedance of 100 ohms or less. This same rule applies when looping LEO-Ms with other Meyer Sound self-powered loudspeakers.

NOTE: Most source devices are capable of driving loads no smaller than 10 times their output impedance.

TIP: Audio outputs from Meyer Sound’s Galileo 616 and Galileo Callisto 616 are rated at 50 ohms, which means that their outputs can singly drive up to 20 Meyer Sound (10 kOhm) loudspeakers without distortion.

CAUTION: Make sure that all cabling for looped loudspeakers is wired correctly (Pin 1 to Pin 1, Pin 2 to Pin 2, and so forth) to prevent the polarity from being reversed. If one or more loudspeakers in a system have reversed polarity, frequency response and coverage will be significantly degraded.

CABLE RINGS
Two cable rings are provided on the rear of the LEO-M cabinet. Power and audio cables should be tied off to the rings to reduce strain on the cables and prevent damage to them during installation. The cable rings should not be used for any other purpose.

CAUTION: LEO-M cable rings should only be used to reduce strain on cables. The cable rings should not be used for any other purpose.

TRUPOWER LIMITING
LEO-M employs Meyer Sound’s advanced TruPower® limiting. Conventional limiters assume a constant loudspeaker impedance and set the limiting threshold by measuring voltage alone. This method is inaccurate because loudspeaker impedances change as frequency content in the source material changes, and as thermal values for the loudspeaker’s voice coil and magnet vary. Consequently, conventional limiters often begin limiting prematurely, which reduces system headroom and dynamic range.

In contrast, TruPower limiting anticipates varying loudspeaker impedances by measuring both current and voltage to compute the actual power dissipation in the voice coil. This improves performance, both before and during limiting, by allowing the driver to produce the maximum SPL across its entire frequency range, while also retaining signal peaks. TruPower limiting also eliminates power compression at high levels over lengthy periods, which helps regulate voice coil temperatures, thereby extending the life of the driver.
HF and LF Limit LEDs

The low- and high-frequency drivers for LEO-M are powered by separate amplifier channels, each with their own limiter. Limiting activity is indicated with two Limit LEDs on the user panel. The HF Limit LED indicates limiting for the high-frequency channel and the LF Limit LED indicates limiting for the low-frequency channel.

When engaged, the limiters not only protect the drivers but also prevent signal peaks from causing excessive distortion in the amplifier channels, thereby preserving headroom and maintaining smooth frequency response at high levels. When levels return to normal, below the limiter thresholds, limiting ceases.

LEO-M performs within its acoustical specifications at normal temperatures when the Limit LEDs are unlit, or when the LEDs are lit for 2 seconds or less and then turn off for at least 1 second. If the LEDs remain lit for longer than 3 seconds, the loudspeaker enters hard limiting where:

- Increases to the input level have no effect
- Distortion increases due to clipping
- Drivers are subjected to excessive heat and excursion, thereby compromising their lifespan

**CAUTION:** The Limit LEDs indicate when a safe, optimum level is exceeded. If a LEO-M loudspeaker system begins to limit before reaching the desired SPL, consider adding more units to the system.

**NOTE:** LEO-M uses optical limiters that add no noise and have no effect on the signal when limiting is not engaged.

### AMPLIFIER COOLING SYSTEM

LEO-M employs forced-air cooling with four ultrahigh-speed fans (two primary, and two reserve) to prevent the amplifier from overheating. The fans draw air in through ducts on the rear of the cabinet, over the heat sinks, and out the rear of the cabinet. Because dust does not accumulate in the amplifier and power circuitry, their lifespans are increased significantly.

**CAUTION:** To keep LEO-M from overheating, allow at least 6 inches behind the loudspeaker for proper ventilation.

<table>
<thead>
<tr>
<th>LEO-M Fans</th>
<th>Primary Fans</th>
<th>Reserve Fans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Ultrahigh-speed</td>
<td>Ultrahigh-speed</td>
</tr>
<tr>
<td>Number</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Location</td>
<td>1 for each heat sink (2)</td>
<td>1 for each heat sink (2)</td>
</tr>
<tr>
<td>Fan speeds and heat sink temp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;34° C</td>
<td>Half speed</td>
<td>&lt;52° C</td>
</tr>
<tr>
<td>34° – 50° C</td>
<td>Ramps up</td>
<td>&gt;52° C</td>
</tr>
<tr>
<td>50° – 84° C</td>
<td>Full speed</td>
<td>&lt;44° C</td>
</tr>
<tr>
<td>&gt;95° C</td>
<td>Audio muted, fans continue at full speed</td>
<td>&gt;95° C</td>
</tr>
<tr>
<td>&lt;86° C</td>
<td>Audio unmuted, fans continue at full speed</td>
<td>&lt;86° C</td>
</tr>
</tbody>
</table>

**CAUTION:** If a LEO-M loudspeaker system consistently overheats before reaching the desired SPL, consider adding more units to the system.

**TIP:** When LEO-M is connected to an RMS network, the Compass RMS software provides additional feedback on the loudspeaker's hardware status and operating temperature. For more information, see Chapter 5, “RMS Remote Monitoring System.”
CHAPTER 4: QUICKFLY RIGGING

IMPORTANT SAFETY CONSIDERATIONS!

When installing Meyer Sound loudspeakers and subwoofers, the following precautions should always be observed:

- All Meyer Sound products must be used in accordance with local, state, federal, and industry regulations. It is the owner’s and user’s responsibility to evaluate the reliability of any rigging method for their application. Rigging should only be carried out by experienced professionals.
- Use mounting and rigging hardware that has been rated to meet or exceed the weight being hung.
- Make sure to attach mounting hardware to the building’s structural components (roof truss), and not just to the wall surface.
- Make sure bolts and eyebolts are tightened securely. Meyer Sound recommends using Loctite® on all threaded fasteners.
- Inspect mounting and rigging hardware regularly. Immediately replace any worn or damaged components.

LEO-M RIGGING OPTIONS

Table 1 summarizes the available rigging options for LEO-M. For complete information on rigging hardware, including dimensions, weight, configuration, and load ratings, refer to the MTG-LEO-M Assembly Guide (PN 05.215.049.01) available at www.meyersound.com.

Table 1: LEO-M Rigging Options

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight</th>
<th>Features</th>
<th>Required Quick-Release Pins</th>
<th>Required Shackles</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTG-LEO-M top grid</td>
<td>205 lbs (93.0 kg)</td>
<td>With some restrictions, flies up to 22 LEO-Ms at a 5:1 safety factor, or up to 18 LEO-Ms at a 7:1 safety factor; accommodates a variety of pickup configurations with six pickup points; includes attachment points to accommodate brackets and adapters for lasers and inclinometers</td>
<td>1/2 x 1.50-inch (red button), PN 134.045, qty 4 included</td>
<td>7/8-inch</td>
</tr>
<tr>
<td>MVP motor Vee plate</td>
<td>20 lbs (9.1 kg)</td>
<td>Fine tunes the horizontal aim of arrays; compatible with MTG-LEO-M, MTG-LYON, MTG-1100, and MG-LEOPARD/900 grids</td>
<td>---</td>
<td>3/4-inch or 7/8-inch</td>
</tr>
<tr>
<td>MTF-LEO-M/LYON transition frame</td>
<td>85 lbs (38.6 kg)</td>
<td>With some restrictions, flies up to seven LYONs at a 7:1 safety factor below LEO-M arrays for downfill; includes rear attachment points for pull-back</td>
<td>7/16 x 1.50-inch (red button), PN 134.051, qty 4 included</td>
<td>5/8-inch</td>
</tr>
<tr>
<td>MTF-LEO-M/MICA transition frame</td>
<td>9 lbs (4.1 kg)</td>
<td>With some restrictions, flies up to eight MICAs at a 7:1 safety factor below LEO-M arrays for downfill</td>
<td>7/16 x 1.50-inch (red button), PN 134.051, qty 0 included</td>
<td>---</td>
</tr>
<tr>
<td>PBF-LEO-M pull-back frame</td>
<td>16 lbs (7.3 kg)</td>
<td>Attaches to bottom of LEO-M arrays (to the MTF-LEO-M/MICA transition frame) and provides pull-back for extreme array downtilt; can also be used for pull-up to expand the array’s splay angles during installation so the blue locking pins can be more easily inserted</td>
<td>1/2 x 1.50-inch (red button), PN 134.045, qty 2 included</td>
<td>5/8-inch</td>
</tr>
<tr>
<td>RPP-LEO-M rear pull-up plate</td>
<td>6 lbs (2.7 kg)</td>
<td>Helps assemble large arrays with wide splay angles by providing pull-up (with a motor) to expand the array’s splay angles during installation so the blue locking pins can be more easily inserted</td>
<td>1/2 x 2.50-inch (blue button), PN 134.007, qty 2 included</td>
<td>5/8-inch</td>
</tr>
</tbody>
</table>

NOTE: The MCF-LEO-M caster frame and MTF-LEO-M/MICA transition frame do not include quick-release pins because they are secured with the quick-release pins included with the loudspeakers.
Rigging Example, LEO-M Array with MICA Downfill and Pull-Up

MTG-LEO-M Top Grid
Oriented for maximum array downtilt with three pick-up points and four motors

RPP-LEO-M
Rear Pull-Up Plate
Helps assemble large arrays with wide splay angles by providing pull-up (with a motor) to expand the array’s splay angles during installation so the blue locking pins can be more easily inserted

MVP Motor Vee Plate
Attached to rear center of grid with two motors to adjust the horizontal aim of the array

(12) LEO-Ms
Primary array coverage

(3) MICAs
Downfill coverage

MTF-LEO/MICA
Transition Frame
Transitions from last LEO-M to first MICA (for downfill); is also required when using the PBF-LEO-M pull-back frame (with or without MICAs)

The MTF-LEO/LYON transition frame is also available for flying LYONs below LEO-Ms
LEO-M GUIDEALINKS

LEO-M is equipped with four captive GuideALinks and four mating link slots that link to adjacent units in flown arrays. Located at the top corners of the cabinet, GuideALinks extend up and into the link slots of the cabinet above it, or into the link slots of the MTG-LEO-M grid, making it easy to link cabinets once they are stacked. GuideALinks extend and retract with knobs and are secured with two quick-release pins: one each in the top and bottom cabinets. Each LEO-M loudspeaker ships with 10 1/2 x 1.25-inch quick-release pins (blue button) (PN 134.044).

![LEO-M GuideALinks with Quick-Release Pins, Exploded View](image1)

**CAUTION:** GuideALinks must be secured with the included quick-release pins. At no time should the weight of the loudspeaker rest on the GuideALink knobs when the links are fully extended (without the pins inserted). GuideALink knobs are for extending and retracting the links only.

LEO-M Splay Angles

Rear GuideALinks attach at a fixed splay angle of 0 degrees and act as a pivot point between linked LEO-Ms, with the splay angle between the units determined by the front GuideALink positions. Rear GuideALinks can be pinned in either of two positions: extended or stowed.

![LEO-M GuideALinks (Exposed) Attached at 0 Degrees](image2)

Front GuideALinks determine the loudspeaker splay angles and are configured with the yellow ANGLE positions when the cabinets are resting in the caster frame. After the stack is lifted with the motors, the loudspeakers rotate on the axis of the rear GuideALinks and the front GuideALinks slide into position as the weight of the loudspeakers causes the cabinets to shift, at which point, quick-release pins are inserted in the corresponding blue LOCKING positions to lock the splay angles.

Available splay angles for linked LEO-Ms include 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, and 5.0 degrees and are indicated by the blue and yellow GuideALink labels.

**CAUTION:** Splay angles of 0 degrees should only be used for the top cabinet attached to the grid. Splay angles of at least 0.5 degrees are recommended for cabinets near the top of the array. If multiple cabinets are set to 0 degrees and the array is
flown with downtilt, the resulting splay angles could be negative because of the gaps in the links and pins that facilitate easy pinning.

**NOTE:** The splay angles listed on the GuideALink labels are for relative angles between the center axes of the linked units. For example, setting the GuideALinks to 5 degrees yields a 5-degree downtilt of the lower unit to the upper unit. How the loudspeakers relate to the floor, stage, and seating angles in the venue depends on the orientation of the grid, the angles of the loudspeakers in the array above them, and other factors. MAPP prediction software should be used to calculate optimum splay angles for loudspeakers and to predict coverage patterns for arrays.

**NOTE:** For more information on GuideALink configurations, refer to the MTG-LEO-M Assembly Guide (PN 05.215.049.01) available at www.meyersound.com.

**WHEN TO MOVE THE LOCKING PINS TO THE “STOW PIN” POSITION**

The quick-release pins in the blue LOCKING positions must be moved to the STOW PIN position before either lifting or lowering an array. The removal of the quick-release pins from the LOCKING positions allows the splay angles to expand and contract when assembling and disassembling the array. Moving the pins to the STOW PIN position also keeps them handy so they won’t be dropped or misplaced.

**TIP:** Resist the urge to put the blue locking pins in your pocket. Instead place them in the STOW PIN position before lifting or lowering the array.

---

**Figure 3: LEO-M Front GuideALinks Label**
LEO-M includes an RMS remote monitoring system module, allowing the loudspeaker to be connected to an RMS network. RMS reports, in real time, the status and power usage of multiple Meyer Sound loudspeakers from a Mac or Windows-based computer. The RMS host computer communicates with Meyer Sound loudspeakers (equipped with RMS modules) via RMServer™, a compact, Ethernet-based hardware unit with two FT-10 ports. RMServer stores system configurations internally, eliminating most manual data entry. Systems can be monitored from a computer at front-of-house or backstage, or from a laptop anywhere within the venue over WiFi.

**NOTE:** For the latest RMS system requirements, visit the Meyer Sound website [http://www.meyersound.com](http://www.meyersound.com).

**NOTE:** LEO-M includes an internal Mute Jumper that enables RMS mute and solo capability. The loudspeaker currently ships with the Mute Jumper installed. Compass RMS also allows you to disable Mute and Solo functions to eliminate any possibility of accidentally muting loudspeakers.

**NOTE:** RMS does not control AC power.

**COMPASS RMS SOFTWARE**

Compass RMS™ software provides extensive system status and performance data for each loudspeaker, including amplifier voltage, limiting activity, power output, fan and driver status, as well as mute and solo capability. Loudspeakers are added to the RMS network and assigned a node name during a one-time discovery procedure. Once loudspeakers are identified on the RMS network, they appear in Compass RMS as icons that can be customized to suit your needs.

Individual loudspeakers can be physically identified with the Wink option in RMS, which lights the Wink LED on the RMS module for that particular loudspeaker. Conversely, a loudspeaker can be identified in Compass RMS by pressing the Identify button on the loudspeaker’s RMS module.

Loudspeaker icons can be arranged in Compass RMS and saved as pages to represent how the loudspeakers have been deployed in the system. Multiple pages can be saved and recalled for specific performances and venues.
RMS MODULE

The LEO-M RMS user panel includes an Identify button, Wink/Activity LED, and two Network connectors.

NOTE: The Identify button and Wink/Activity LED on the RMS user panel are used exclusively by RMS and have no effect on the acoustical or electrical activity of the loudspeaker.

Identify Button

The Identify button serves the following functions:

- If the loudspeaker has not yet been discovered on the RMS network (Wink/Activity LED not lit), press the Identify button to discover it.
- To remove the loudspeaker from the RMS network, press and hold the Identify button during startup (see “Resetting the RMS Module” on page 20).
- To wink a discovered loudspeaker, press the Identify button. The Wink LED on the loudspeaker icon in Compass RMS lights up and the Wink/Activity LED on the loudspeaker’s RMS user panel turns solid green. Press the Identify button again to unwink the loudspeaker.

TIP: The Wink function is useful for identifying the physical loudspeaker corresponding to a loudspeaker icon in Compass RMS.

Wink/Activity LED (Green)

The green Wink/Activity LED indicates the status of the loudspeaker:

- During startup, the LED flashes green 10 times.
- If the loudspeaker has not yet been discovered on the RMS network, the LED is not lit after startup.

TIP: The loudspeaker can also be winked by clicking the Wink button on the loudspeaker icon in Compass RMS.

- If the loudspeaker has been successfully discovered on the RMS network, the LED flashes green continuously and flashes more rapidly with increased data activity.
- When the loudspeaker is winked, either by clicking the Wink button in Compass RMS or by pressing the Identify button on the RMS user panel, the LED is solid green. The LED remains solid green until the loudspeaker is unwinked.

TIP: The Wink function is useful for identifying the physical loudspeaker corresponding to a loudspeaker icon in Compass RMS.

RMS Network Connectors

The Weidmuller 2-conductor, locking connectors transfer data to and from the RMS network. Two connectors are provided to allow for easy connection of multiple (daisy-chained) loudspeakers on the network. Included with each RMS-equipped loudspeaker are RMS cable connectors and mounting blocks for constructing RMS cables. The RMS blocks allow cables to be securely attached to the RMS module with screws.

NEURON ID FOR RMS MODULE

Each RMS module has a unique 12-character Neuron ID (NID) that identifies the loudspeaker on the network. The NID is automatically detected by RMServer but can also be entered manually, if necessary, when configuring RMS systems in Compass RMS without loudspeakers present. The NID label is located on the RMS user panel near the orange Network connectors.

RESETTING THE RMS MODULE

You can use the Identify button to reset the LEO-M RMS module when powering on the loudspeaker. This will cause the module to be removed from the RMS network.

To reset the RMS module:

1. Power down the loudspeaker.
2. Press and hold the Identify button.
3. While continuing to hold down the Identify button, power on the loudspeaker.
4. After the Wink/Status LED flashes on and off, release the Identify button. The RMS module is reset and the loudspeaker is removed from the RMS network.
CHAPTER 6: SYSTEM DESIGN AND INTEGRATION TOOLS

This chapter introduces MAPP, Meyer Sound’s patented system design tool, and SIM 3, a comprehensive system for measurement and analysis.

MAPP SYSTEM DESIGN TOOL

MAPP is a powerful, cross-platform application for accurately predicting the coverage pattern, frequency response, phase response, impulse response, and SPL capability of single or arrayed Meyer Sound loudspeakers.

Whether planning for fixed installations or for tours with multiple venues, you can use MAPP to accurately predict the appropriate loudspeaker deployment for each job, complete with coverage data, system delay and equalization settings, rigging information, and detailed design illustrations. MAPP’s accurate, high-resolution predictions ensure that systems will perform as expected, thereby eliminating unexpected coverage problems and minimizing onsite adjustments.

The key to the accuracy of MAPP’s predictions is Meyer Sound’s exhaustive database of loudspeaker measurements. Performance predictions for each loudspeaker are based on 720 1/48th-octave-band measurements taken with a SIM audio analyzer in the Meyer Sound anechoic chamber. The extraordinary consistency between Meyer Sound loudspeakers guarantees that predictions from MAPP will closely match their actual performance.

MAPP client software lets you configure Meyer Sound loudspeaker systems and define the environment in which they operate, including air temperature, pressure, humidity, and even the location and composition of surfaces. You can also import CAD (.DXF) files containing detailed venue information to act as a visual aid.

MAPP prediction requests are sent by the client software to Meyer Sound servers, where complex, high-resolution (magnitude and phase) polar data is processed with sophisticated acoustical prediction algorithms. The resulting predictions are then displayed in the MAPP client software.

TIP: Meyer Sound offers seminars and webinars on using MAPP. For more information, visit www.meyersound.com.

MAPP Capabilities

With MAPP, you can:

- Simulate different loudspeaker configurations to refine system design and determine the best coverage for intended audience areas
- Monitor loudspeaker interactions to locate constructive and destructive interferences so that loudspeakers can be re-aimed and repositioned as necessary
- Place microphones anywhere in the sound field and predict loudspeaker frequency response, phase response, and sound pressure levels as measured at each microphone position
- Determine delay settings for fill loudspeakers using the Inverse Fast Fourier Transform feature
- Preview the results of Galileo or Galileo Callisto processing to determine optimum settings for the best system response
- Automatically calculate load information for arrays to determine rigging capacity, front-to-back weight distribution, and center of gravity location
- Generate and export system images and full-system PDF reports for client presentations
**SIM 3 MEASUREMENT SYSTEM**

The SIM 3 audio analyzer is a high-resolution audio measurement system comprised of software, hardware, microphones, and accessory cables. SIM 3 is optimized for measuring audio frequencies with resolutions down to 1/48th of an octave, allowing you to apply precise corrections to balance system response using frequency and phase domain information.

**Source Independent Measurement Technique**

The SIM 3 audio analyzer implements Meyer Sound’s source independent measurement technique, a dual-channel method that accommodates statistically unpredictable excitation signals. Any excitation signal within a desired frequency range can be used to obtain highly accurate measurements for acoustical or electronic systems.

For example, during a performance, both the input signal and the measured output of the loudspeaker system can be captured and used as a SIM 3 test signal, so you can:

- View measurement data as amplitude versus time (impulse response) or amplitude and phase versus frequency (frequency response)
- Utilize a single-channel spectrum mode
- View frequency domain data with a logarithmic frequency axis
- Determine and internally compensate for propagation delays using the SIM 3 Delay Finder

**SIM 3 Applications**

SIM 3’s main applications are testing and aligning loudspeaker systems, which entails:

- Measuring propagation delays between subsystems to determine appropriate polarities and delay times
- Measuring variations in frequency response caused by the acoustical environment and the placement and interaction of loudspeakers to determine corrective equalization
- Optimizing subwoofer integrations
- Optimizing loudspeaker arrays

SIM 3 can also be used in the following applications:

- Microphone calibration and equalization
- Transducer evaluation and correction
- Echo detection and analysis
- Vibration analysis
- Architectural acoustics
APPENDIX A: RAIN HOODS

LEO-M comes standard with weather protection that includes a collapsible rain hood that protects the loudspeaker's connectors from water intrusion.

EXPANDING THE LEO-M COLLAPSIBLE RAIN HOOD

To expand the LEO-M collapsible rain hood:

1. Remove the rain hood's Velcro straps.
2. Expand the rain hood's fabric fully upward and outward.
3. Reach inside the rain hood and free the two struts from the top corner pockets nearest the loudspeaker.

4. Fold the two struts downward and outward and insert them into the two side pockets.

NOTE: For LEO-M dimensions with the rain hood expanded, see “LEO-M Dimensions with Rain Hood” on page 28.
### APPENDIX B: SPECIFICATIONS

**NOTE:** Loudspeaker system predictions for coverage and SPL are available in Meyer Sound’s MAPP prediction software.

#### LEO-M Specifications

<table>
<thead>
<tr>
<th><strong>ACOUSTICAL</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Frequency Range</td>
<td>55 Hz – 16.5 kHz</td>
</tr>
<tr>
<td><strong>Note:</strong> Recommended maximum operating frequency range. Response depends on loading conditions and room acoustics.</td>
<td></td>
</tr>
<tr>
<td>Phase Response</td>
<td>375 Hz to 14 kHz ±30 degrees</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>TRANSDUCERS</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Frequency</td>
<td>Two 15-inch long-exursion cone drivers</td>
</tr>
<tr>
<td>High Frequency</td>
<td>Two 4-inch compression drivers coupled to a constant-directivity horn through a patented REM® manifold</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>AUDIO INPUT</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Differential, electronically balanced</td>
</tr>
<tr>
<td>Maximum Common Mode Range</td>
<td>±15 V DC, clamped to earth for voltage transient protection</td>
</tr>
<tr>
<td>Connectors</td>
<td>XLR 5-pin female input</td>
</tr>
<tr>
<td></td>
<td>XLR 5-pin male loop output</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>10 kOhm differential between pins 2 and 3</td>
</tr>
<tr>
<td>Wiring</td>
<td>Pin 1: Chassis/earth through 1 kOhm, 1000 pF, 15 V clamped network to provide virtual ground lift at audio frequencies</td>
</tr>
<tr>
<td></td>
<td>Pin 2: Signal (+)</td>
</tr>
<tr>
<td></td>
<td>Pin 3: Signal (–)</td>
</tr>
<tr>
<td></td>
<td>Pin 4: RMS (polarity insensitive)</td>
</tr>
<tr>
<td></td>
<td>Pin 5: RMS (polarity insensitive)</td>
</tr>
<tr>
<td></td>
<td>Case: Earth ground and chassis</td>
</tr>
<tr>
<td>DC Blocking</td>
<td>Differential DC blocking up to the maximum common mode voltage</td>
</tr>
<tr>
<td>CMRR</td>
<td>&gt;50 dB, typically 80 dB (50 Hz – 500 Hz)</td>
</tr>
<tr>
<td>RF Filter</td>
<td>Common mode: 425 kHz</td>
</tr>
<tr>
<td></td>
<td>Differential mode: 142 kHz</td>
</tr>
<tr>
<td>TIM Filter</td>
<td>Integral to signal processing (&lt;80 kHz)</td>
</tr>
<tr>
<td>Nominal Input Sensitivity</td>
<td>0.0 dBV (1.0 V rms) continuous is typically the onset of limiting for noise and music</td>
</tr>
<tr>
<td>Input Level</td>
<td>Audio source must be capable of producing +20 dBV (10 V rms, 14 V peak) into 600 ohms to produce the maximum peak SPL over the operating bandwidth of the loudspeaker</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>AMPLIFIER</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>3-channel, complementary MOSFET output stages (class AB/H bridged)</td>
</tr>
<tr>
<td>Cooling</td>
<td>Two ultrahigh-speed primary fans, two ultrahigh-speed reserve fans</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>AC POWER</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>powerCON 32 input</td>
</tr>
<tr>
<td>Safety Rated Voltage Range</td>
<td>208–235 V AC, 50–60 Hz</td>
</tr>
<tr>
<td>Turn-on/off Points</td>
<td>Turn-on: 165 V AC; Turn-off: 264 V AC</td>
</tr>
</tbody>
</table>
### LEO-M Specifications

<table>
<thead>
<tr>
<th>Current Draw</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Idle</strong></td>
<td>0.6 A rms (230 V AC)</td>
</tr>
<tr>
<td><strong>Maximum Long-Term Continuous</strong></td>
<td>6.0 A rms (230 V AC)</td>
</tr>
<tr>
<td><strong>Burst</strong></td>
<td>8.0 A rms (230 V AC)</td>
</tr>
<tr>
<td><strong>Maximum Instantaneous Peak</strong></td>
<td>24 A peak (230 V AC)</td>
</tr>
<tr>
<td><strong>Inrush</strong></td>
<td>&lt;15 A peak (230 V AC)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHYSICAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enclosure</strong></td>
<td>Multi-ply hardwood</td>
</tr>
<tr>
<td><strong>Finish</strong></td>
<td>Black textured</td>
</tr>
<tr>
<td><strong>Protective Grille</strong></td>
<td>Hex-stamped steel with acoustical black mesh</td>
</tr>
<tr>
<td><strong>Rigging</strong></td>
<td>Endframes with captive GuideALinks (0.0 to 5.0-degree splay angles), quick-release pins, and detachable side handles</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>44.42 inches (1128 mm) W</td>
</tr>
<tr>
<td></td>
<td>17.85 inches (453 mm) H</td>
</tr>
<tr>
<td></td>
<td>23.00 inches (584 mm) D</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>265 lbs (120.2 kg)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ENVIRONMENTAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>0° C to +45° C</td>
</tr>
<tr>
<td><strong>Non Operating Temperature</strong></td>
<td>−40° C to +75° C</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>To 95% at 45° C (non-condensing)</td>
</tr>
<tr>
<td><strong>Operating Altitude</strong></td>
<td>To 5,000 m (16,404 ft)</td>
</tr>
<tr>
<td><strong>Non Operating Altitude</strong></td>
<td>To 12,000 m (39,000 ft)</td>
</tr>
<tr>
<td><strong>Shock</strong></td>
<td>30 g 11 msec half-sine on each of 6 sides</td>
</tr>
<tr>
<td><strong>Vibration</strong></td>
<td>10 Hz – 55 Hz (0.010 m peak-to-peak excursion)</td>
</tr>
</tbody>
</table>
NOTE: For the dimensions and weight for the MTG-LEO-M top grid and MCF-LEO-M caster frame, refer to the MTG-LEO-M Assembly Guide (PN 05.215.049.01) available at www.meyersound.com.
LEO-M Dimensions with Rain Hood
FEDERAL COMMUNICATIONS COMMISSION (FCC) STATEMENT
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

INDUSTRY CANADA COMPLIANCE STATEMENT
This Class A digital apparatus complies with Canadian ICES-003.

AVIS DE CONFORMITÉ À LA RÉGLEMENTATION D'INDUSTRIE CANADA
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

EN 55032 (CISPR 32) STATEMENT
Warning: This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.