# M-5 Control Electronics Unit

**Operating Instructions**

**The Meyer Sound M-5 is an active signal processor designed for use with the MSL-5 loudspeaker. It is a single channel device, and it occupies a single $1\frac{3}{4}$-inch rack space. The functions of the M-5 are:**

- **Active crossover for bi-amplification.**
- **Loudspeaker frequency response and phase response alignment.**
- **MultiSense™ driver protection.**

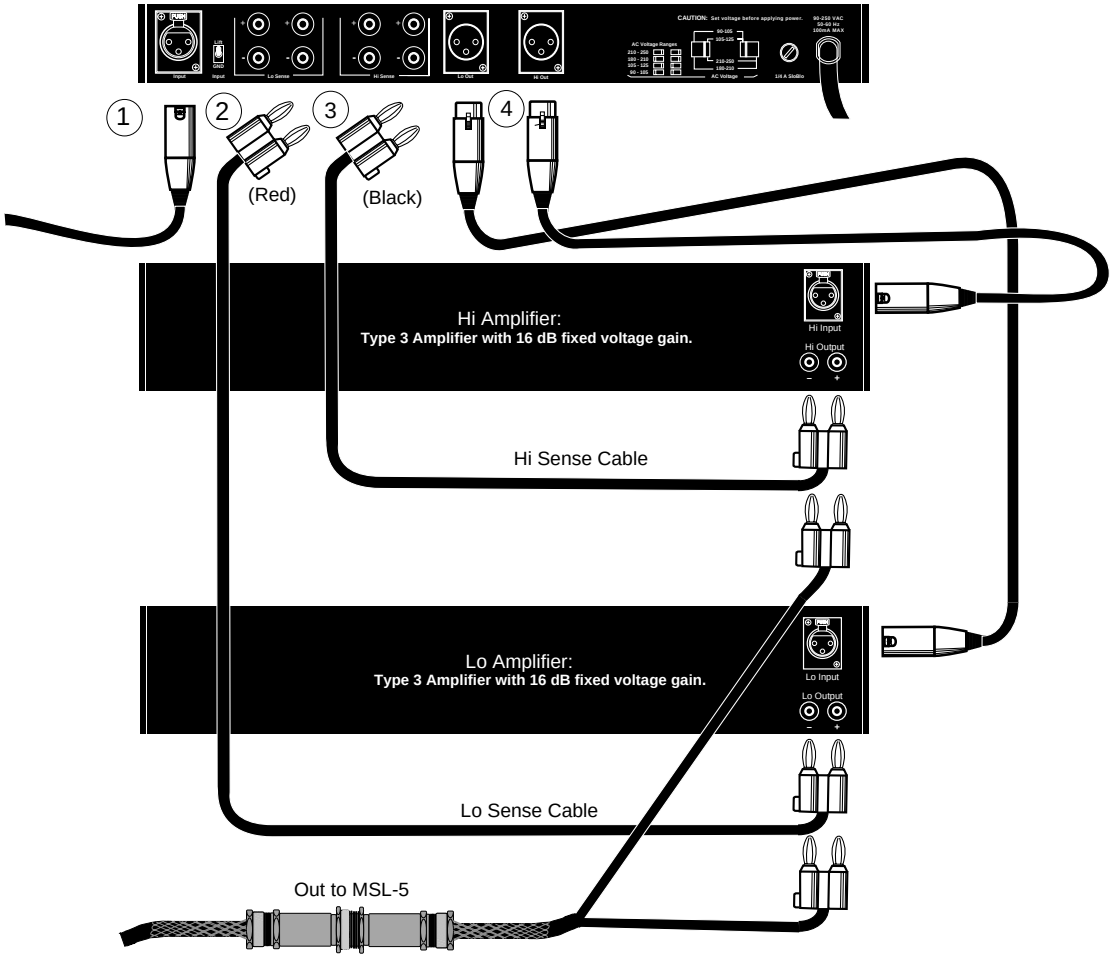


**Diagram A: Connections for use with MSL-5**

## Connections

The M-5 operates at line level and is designed to be the last component in the signal chain before the power amplifiers. Connections to the M-5 should be made according to Diagram A.

**1.** Signal **Inputs** to the M-5 should be balanced. For the best signal-to-noise ratio, the average input level should be at least 1 volt RMS. The M-5 will accept peak inputs of up to +26 dBV.

**Note:** The M-5 utilizes Meyer Sound's exclusive ISO™ Input. Pins 1, 2 and 3 are transformer-isolated, and the connector shell is connected to earth ground (pin 3 positive for positive pressure out from the MSL-5).

**2. MultiSense™** connections are made from the outputs of the power amplifiers to the M-5 **Sense** inputs. The output(s) of the **High** power amplifier(s) **must** be connected to the **Hi** Sense inputs, and the output(s) of the **Low** power amplifier(s) to the **Lo** Sense inputs in order for the **MultiSense** driver protection circuitry to operate properly.

**Note:** These inputs are polarity-sensitive: be certain that they are connected as indicated on the M-5 rear panel.

**3.** The signal **Outputs** from the M-5 are active balanced. The maximum output level before clipping is +26 dBV.

**4.** Connections between the power amplifier outputs and the MSL-5 loudspeaker should be made according to the **MSL-5 Operating Instructions**. These connections **must be verified for correct polarity**, and correct amplifier assignments (high to high, low to low). Color codes given in the diagrams are those used for Meyer Sound cables and adapters.


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## Operation

Once all the connections have been made and verified, the system is ready to operate.

**Note:** Check the voltage selector switch located on the rear panel of the M-5 and verify that it is set to the range that corresponds to the mains AC voltage.

- The M-5 **Attn** control should be set at minimum.
- Switch on AC to the M-5 first, then to the power amplifiers.
- Verify that the power amplifier voltage gains are fixed at +16 dB (6.3 volts out for 1 volt in, measured from balanced input to speaker output terminals).
- Advance the M-5 **Attn** control to set the system sensitivity. If the system is not operating properly, recheck all connections.

**Note:** The Attn control markings are merely a visual aid and should not be used to balance two systems. The output of the M-5 is calibrated only when the level control is fully clockwise.

## Front Panel Controls

The setup controls on the M-5 front panel are designed to be used to tailor the system response for particular applications.

**Safe/Autosafe Switch.** The M-5 incorporates three limiters in the MultiSense™ driver protection circuitry (see detailed description below). When the switch is in the **Safe** position, the RMS limiters come on at 6 dB lower power levels, affording added protection when heavy continuous power demands are placed on the system. For operator convenience, a green LED indicator is provided on the M-5 front panel which lights when the M-5 is in the **Safe** mode. When the switch is in the **Autosafe** position, the M-5 monitors system power over time and automatically switches into **Safe** mode if the power demands become too high. In the case that **Autosafe** switches the M-5 into **Safe** mode, the green LED will light to indicate the change.

**Note:** It is recommended that the switch be in the **Safe** position until the operator is familiar with the system's capablities.

## MultiSense™ Driver Protection

Through the **Sense** connections between the M-5 and the power amplifiers, the **MultiSense** circuitry of the M-5 continuously monitors the voltages across the high and low frequency drivers. If the amplifier output exceeds the safe operating limits of the drivers, independent limiters are automatically activated, holding down the level of the M-5 output.

**Note:** The M-5 employs an excursion limiting system which assumes ***a fixed amplifier voltage gain of +16 dB (6.3 volts out for 1 volt in)***. Please refer to the MSL-5 Operating Instructions or the Meyer Sound MSL-10A Power Amplifier Criteria note for a detailed description of MSL-5 / M-5 amplifier requirements.

The operation of the MultiSense circuitry is indicated by a set of five LEDs located on the front panel.

- **Sense** indicators. These function as signal presence indicators and verify that the **Sense** connections back to the M-5 are made. These indicators will be lit green whenever signal is present, or will flicker at low signal levels. These indicators will also light red if there is a sense fault (amplifier gain not set at +16 dB or sense lines improperly or not connected).
- **Limit** indicators. These indicators will come on whenever the corresponding limiter is activated, and a moderate amount of flashing of these indicators is acceptable. The Hi and Lo limiters have an attack time of 100 msec., so they will **not** affect peaks in the program material, nor will they prevent momentary amplifier clipping on peaks.

## Limiter Operation

To verify limiter operation in the field:

- Disconnect loudspeakers, leaving the amplifier and the M-5 in their standard connection configuration.
- If your amplifier requires a load, use resistive loads sufficient to dissipate the full power of the amplifier.
- Turn on both the M-5 and the amplifier.
- Set the **Safe** switch in.
- Supply an input to the M-5, preferably a sine wave oscillator. If you do not have an oscillator, use a microphone and a mixer to produce a line level signal.
- Set the input frequency according to this table:

| | **Oscillator** | **Microphone** |
|---|---|---|
| Lo limiter | 200 Hz | low growl |
| Hi limiter | 5,000 Hz | loud whistle |

- Bring up the input until you see the corresponding limit indicator come on. Since in each case the indicator will light **only** if the limiter actually operates, it provides a positive indication that the limiter is functioning.

Meyer Sound

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## Specifications

| | |
|---|---|
| Input Type | Balanced ISO™ Input, 10 kΩ |
| Output Type | Active push-pull, will drive 600 Ω |
| Maximum Input/Output Level (Balanced) | +26 dBV |
| Hum and Noise | -90 dBV (“A” weighted) |
| Dynamic range | >110 dB |
| Sense Inputs | 10 kΩ true differential |
| Electronic Crossover Frequency | 900 Hz |
| Driver Protection Circuitry | |
| Low Frequency | RMS limiter (100 msec. integration time), peak and excursion limiters |
| High Frequency | RMS limiter (100 msec. integration time), peak and excursion limiters |
| Indicators | |
| Sense: Hi and Lo | Bi-color LEDs |
| Limit: Hi, Lo and VHF | Red LEDs |
| Safe | Green LED |
| Power Supply, Positive and Negative | Green LEDs |
| Front Panel Controls | Level control, AC on/off, Safe/AutoSafe switch |
| Connectors | |
| Inputs/Outputs (Balanced) | XLR-type (A-3) |
| Sense Inputs | Banana jacks |
| Power | 90-100V / 105-120V / 180-200V / 210-240V AC rear switchable |
| Physical Dimensions | 19" W x 1 3/4" H x 7 3/4" D |
| Weight | 8 lbs. (3.6 kg) |



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