

polkaudio®

momo®

MM400 Tweeter

MM455 5.25" System

MM465 6.5" System

Attach your receipt here and file for future reference. It may be required for warranty service.

X

## A Word From Matthew Polk

Dear Music Lover,

You have just entered a new realm of car audio! I am extremely excited about these Polk Audio/MOMO high performance speakers; this is the first time that the exclusive MOMO Design house of Italy has co-branded a product. We've partnered with them to produce the best sounding, best looking car speakers ever. They are going to make your car look and sound great.



They may not look like any other Polk Audio speaker, but make no mistake: They contain the latest loudspeaker technology and many of our exclusive sound innovations, like Dynamic Balance® for clean sound and low distortion. You can be assured of outstanding performance and unmatched quality, as well as an exciting new look.

Please take a moment to read through this manual. It will help you get the greatest possible enjoyment from these fine instruments. If you have questions, or would like more information on building the car audio system of your dreams, don't hesitate to call our Customer Service Department at (800) 377-7655 from 9am to 6pm Eastern Standard Time, Monday through Friday.

Grazie!

Matthew Polk

## Polk Audio—A History of Excellence

Like the way these great new speakers sound in your car? You'll love the way Polk Audio speakers sound in your living room! Polk Audio has been making world-class loudspeakers since 1972. Polk's dedication to fundamental research has resulted in over 25 patents.

Polk loudspeakers have earned the praise of audio experts the world over, garnering dozens of awards for innovative, high-quality design. Whether you desire audiophile-quality sound for your home, car or even your multimedia computer, Polk loudspeakers deliver unmatched performance and value.

See the full line of Polk Audio loudspeakers at your Polk Audio dealer, or at [www.polkaudio.com](http://www.polkaudio.com)

## The Story of Dynamic Balance®

Your new Polk speakers employ Dynamic Balance, a technology that came out of a joint research project between Polk Audio and Johns Hopkins University. This laser imaging research enables us to view the entire vibrating surface of a driver or tweeter, allowing us to observe the resonances that develop on speaker cones as they move. These resonances are the root cause of frequency response distortions.

As an x-ray enables a physician to discover the root cause of a symptom and thereby prescribe the right treatment for a cure, this laser imaging technique allows Polk engineers to find the right combination of high-tech materials, geometry and construction techniques to tune out the offending resonances. The benefit of Dynamic Balance is the dramatic improvement in the sound quality of our speakers, which every listener can appreciate. You no longer have to choose between excellent bass and smooth, clear midrange and highs. Now you can have it all, thanks to Dynamic Balance technology.



***Laser Interferometry tests produced holographic "photos" of drivers in motion. The "bad" drivers are experiencing modal breakup that results in performance-robbing resonances. A "perfect" driver would look like a cake (flat on top), more, like the photo on the right.***

## All Polk Audio/MOMO Drivers Feature:

- Futuristic cast aluminum baskets that mimic MOMO wheel designs
- Elegant matching motor cup conceals a beefy magnet structure
- Rugged, highly conductive pro-grade nickel-plated binding posts
- Polymer/mica composite cones
- Aramid fiber spiders for greater dynamic range
- 6.5" mid/driver features 1.5" voice coil, 5.25" mid/driver features 1" voice coil
- Woven carbon-fiber dustcaps

## Polk Audio/MOMO Tweeters Feature:

- Lightweight red fabric dome tweeters for flat response, great inner detail and low distortion
- Neodymium magnets that are small and powerful
- Low viscosity ferro-magnetic cooling fluid for superior power handling
- Surface and flush-mount swivel cups allow fine tuning of the tweeter angle for better soundstaging

## Component System Crossovers Feature:

- Gold plated terminals
- Air-core inductor for low distortion
- Mylar capacitors for cleaner, more transparent highs
- Tweeter level control to fine-tune the tonal balance of your system
- Midrange Extension switch bypasses the low-pass filter for better driver-to-tweeter blending when the two components are separated by a great distance

## Getting Started

Please inspect each loudspeaker carefully. Notify your Polk dealer if you notice any damaged or missing items. Keep the carton and packing material. They will do the best job of protecting your speakers if they need to be transported. Check that you have the following parts:

## MM455 and MM465

- 2 mid/ woofers
- 2 tweeters
- 2 crossover networks
- 2 tweeter flush mount cups
- 2 flush mount cup clamps
- 2 tweeter surface mount cups
- 2 grilles
- 8 - #8 screws with 9/16" Allen head
- 8- screw clips
- 2- #4 Phillips head screws
- Tweeter hook- up wire
- Mid/ woofer hook- up wire
- Registration card

## MM400:

- 2 tweeters
- 2 in- line crossover networks
- 2 tweeter flush mount cups
- 2 flush mount cup clamps
- 2 tweeter surface mount cups
- Registration card

Read this manual thoroughly first. If you have any doubts about your ability to execute any of the installation steps, save yourself a lot of grief and contact a professional installer (your Polk dealer is a good place to find one).

If you intend to do the installation yourself we assume that you possess some skill in the proper use of hand and power tools. No matter how much installation experience you have, it's always a good idea to:

- Read this manual thoroughly before you begin.
- Plan your installation carefully.
- Allow enough time to complete the installation without rushing.
- Protect your car from unwanted scratches.

## Necessary Tools

- Phillips head screwdriver
- 9/16" allen wrench
- Flat blade screwdriver or putty knife
- Electric drill
- 1/4" and 1/8" drill bits
- Reciprocating saw or razor knife
- Magic marker for marking the cutout (new location only)
- Metal cutting tool (hole saw, if you intend to cut metal)
- Metal file
- Soldering iron or a supply of solderless connectors
- Safety glasses
- Wire strippers and cutters
- Crimping tool

## Installing the Components

### The Polk/MOMO System Crossovers

You will need to make wiring connections from your amp or radio to the crossovers and from the crossovers to your mid/woofers and tweeters (Figure 1). Choose crossover box locations that are convenient for making these connections. As there are adjustments on and in the crossover networks which you will need to access during the “fine tuning” stage of the installation, place them in a spot that’s easy to get to. Once you’re done fine-tuning the system, the crossovers can be hidden away and secured.

Your Polk/MOMO Series crossovers have clearly marked terminals. Before making connections between your crossovers, mid/woofers and tweeters, refer to Figure 1. The wires provided with your Polk/MOMO System have one conductor with a white stripe. Use this wire as the positive (+) lead and connect it to the positive (+) terminals on your crossovers as well as to the positive (+) terminals of each speaker.

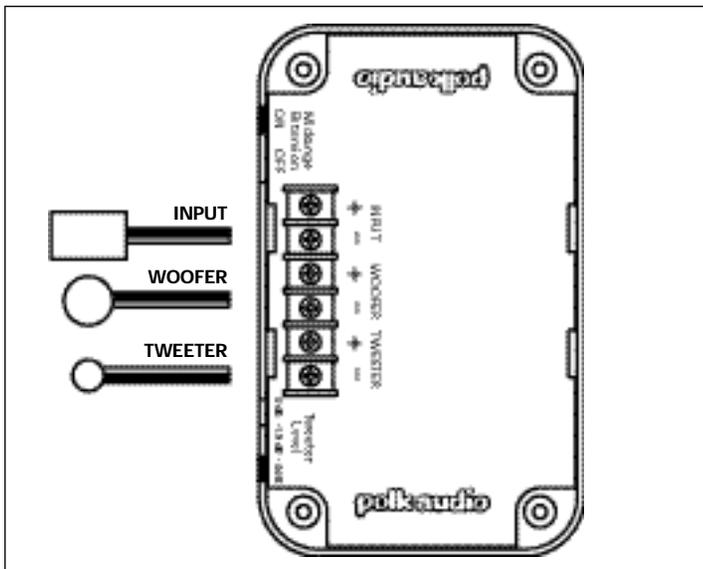


Figure 1

(Note: Crossover is not weather proof)

### Installing the Polk/MOMO System Mid/Woofers in Factory Locations

Most cars have speaker grilles that blend with the rest of the car’s interior. Sometimes it is difficult to determine how to remove these grilles to gain access to the speaker that you intend to replace. If you have one of these grilles, you may want to consider using a professional installer. On some cars, the grilles are held by screws or spring clips. The screws will be obvious, the spring clips won’t.

If there are screws, remove them, put them in a safe spot, and remove the grilles. To remove a clip-on grille, use your flat-blade screwdriver or a putty knife to gently pry up the grille. If it resists, back off and think again about the professional install. The cost of one of these can sometimes be less than the cost of new door panels. Some grilles are integral parts of the door panel and are not removable. In these cases you will need to remove the entire door panel to gain access to the speaker location.

This will usually require removal of door handles, window mechanisms, and other parts such as door pulls and lock buttons.

1. Once you get the grille off, remove the factory speakers. Save the hardware. You may be able to reuse it to mount your new speaker.
2. Cut the supplied driver wire (the heavier gauge of the two sets of wire) in half.
3. Remove the yellow crossover cover by squeezing the cover at the tabs. Attach speaker wires to the crossover “woofer” terminals. Attach the wire with the white stripe to the positive (+) terminal screw, and the un-striped wire to the negative (-) terminal screw.
4. Route the driver wire from the crossover location to the mid/woofer location.
5. Strip 1/8” – 1/4” (4-6 mm) of plastic insulation from the cut ends of the driver wire.
6. Unscrew the binding post thumbnuts on the mid/woofers to fully expose the hole in the terminal shaft and slip the other end of the wire into the holes in the input terminals. Tighten the thumbnuts finger-tight (do not over-tighten the nuts as you may strip the threads). Be sure to attach the wire with the white stripe to the positive (red) terminal, and the un-striped wire to the negative (black) terminal.
7. If the factory speaker had three screw holes, you’ll need to drill additional screw holes to accommodate the four screw pattern of the Polk/MOMO mid/woofer.
8. Using the hardware retained from the factory speaker or the screw clips supplied with the Polk/MOMO speaker, secure your new speaker to the car panel.

## Installing the Mid/Woofers in Non-Factory Locations

If you have decided to install your Polk/MOMO Series mid/woofers in locations other than those provided by the automobile manufacturer, make certain that the location you choose is clear of all obstructions, both in front of and behind the panel, before you proceed. Pay particular attention to window mechanisms and any body panels critical to the structural integrity of the vehicle. The mounting depths and cutout diameters of your Polk/MOMO Series mid/woofers are listed with all the other important specifications at the end of this manual.

1. Cut a hole in the panel (5 inch or 127 mm hole for the MM455 and 5-15/16 inch or 150.9 mm hole for the MM465).
2. Using the speaker grille as a template for marking the locations of the four screw holes.
3. Drill the holes with a 1/8" bit.
4. Attach the screw clips to the car panel at the hole locations.
5. Cut the supplied driver wire (the heavier gauge of the two sets of wire) in half.
6. Remove the yellow crossover cover by squeezing the cover at the tabs. Attach speaker wires to the crossover "woofer" terminals. Attach the wire with the white stripe to the positive (+) terminal screw, and the un-striped wire to the negative (-) terminal screw.
7. Route the driver wire from the crossover location to the mid/woofer location.
8. Strip 1/8" – 1/4" (4-6 mm) of plastic insulation from the cut ends of the driver wire.
9. Unscrew the binding post thumbnuts on the mid/woofers to fully expose the hole in the terminal shaft and slip the other end of the wire into the holes in the input terminals. Tighten the thumb nuts finger-tight (do not over-tighten the nuts as you may strip the threads). Be sure to attach the wire with the white stripe to the positive (red) terminal, and the un-striped wire to the negative (black) terminal.
10. Place the grille over the driver and line up the screw holes with the screw clips on the car panel.
11. Secure the speaker/grille assembly to the car panel with the supplied Allen head screws.

## Polk/MOMO System Tweeters

One important advantage of component systems is their ability, when properly installed, to improve the soundstage created by the music in your car. The soundstage is the musical "picture" made up of the instruments and vocalists. The difference in the soundstage will be dramatic depending on where you mount your tweeters. We recommend a simple experiment that will help you decide the best spot for your tweeters in your car. Here are the steps:

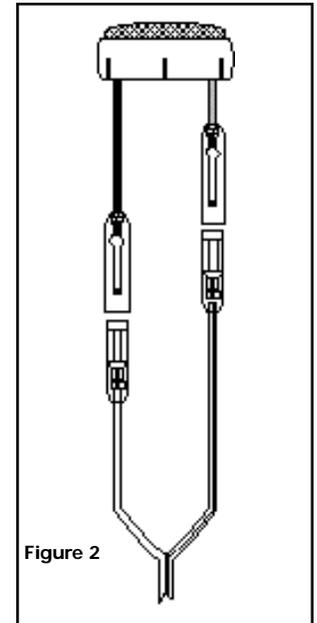
1. Complete the installation of your entire system except for the MM400 tweeters.
2. Connect the wires provided with your tweeters to the tweeter terminals on your Polk/MOMO crossovers. (See detailed instructions below)

3. Without running the wires through doors or under upholstered panels, connect your Polk/MOMO tweeters to these wires. (See detailed instructions below)
4. Have a friend sit in the passenger's seat while you sit in the driver's seat, each holding a tweeter in hand.
5. With music playing, position the tweeters in different locations around the passenger compartment, listening for the differences caused from these placements. We recommend using vocals for this test. You will be able to determine in a short time the best location for your tweeters. The soundstage or image should "float" above the dash and not be localized to the physical location of the drivers or tweeters. Both passenger and driver should be able to hear both channels and a stereo image.

## The Polk MM400 tweeter offers two mounting options for installation flexibility.

### Mounting Option #1—Surface mounting the MM400 Tweeter

1. Using the base of the surface mount cup as a template, mark the screw hole and drill it using a 1/8 inch drill bit. Mark the wire holes (for the tweeter wires), drill using the 1/4-inch drill bit.
2. Attach the surface mount cup to the panel using supplied #4 screw.
3. Cut the supplied tweeter wire (the lighter gauge wire) in half.
4. Strip 1/8" – 1/4" (4-6 mm) of plastic insulation from the cut ends of the tweeter wire. Connect this end of the wire to the tweeter terminals of the crossover. Connect the white-striped wire strand to the positive (+) terminal of the crossover tweeter output and the un-striped wire to the negative (-) tweeter terminal.
5. Route the tweeter wire from the crossover to the tweeter location. Push the red and black tweeter wires through the holes in the bottom of the tweeter cup and through the panel.
6. Slip the male fast-on connector on the red tweeter wire onto the female connector on the white-striped wire from the crossover and the black tweeter wire to the un-striped wire (Figure 2). Make sure the clear plastic insulators fully cover the fast-on connectors otherwise you may short the tweeter leads and possibly damage your amplifier.
7. Mount the tweeters by gently pushing them into the surface mount cup. Be careful not to pinch the wires.
8. Once the tweeter is mounted and connected, swivel the tweeter to fine-tune the soundstage image of the system.



## Mounting Option #2 - Flush mounting the MM400 Tweeter

1. Remove the panel on which you are going to mount the tweeter and check for proper clearance behind it. The flush mount kit is 13/16 inch deep. Measure to make sure there is sufficient depth behind the spot you choose the final location.
2. Use the hole that is punched into the cardboard packing insert as a template to mark the location and size of the mounting hole.
3. Mark the center of the spot and cut a hole with the 2-inch hole-saw attachment for your power drill. Go slow. Or you can use a razor knife instead of a drill.
4. Cut the supplied tweeter wire (the lighter gauge wire) in half.
5. Strip 1/8" - 1/4" (4-6 mm) of plastic insulation from the cut ends of the tweeter wire. Connect this end of the wire to the tweeter terminals of the crossover. Connect the white-striped wire strand to the positive (+) terminal of the crossover tweeter output and the un-striped wire to the negative (-) tweeter terminal.
6. Route the tweeter wire from the crossover location to the tweeter location.
7. Assemble cup, clamp, and machine screw loosely.
8. Route the red and black tweeter wires through the holes in the bottom of the cup.
9. Slip the male fast-on connector on the red tweeter wire onto the female connector on the white-striped wire from the crossover and the black tweeter wire to the un-striped wire (Figure 2). Make sure the clear plastic insulators fully cover the fast-on connectors otherwise you may short the tweeter leads and possibly damage your amplifier.
10. Press the assembly into the 2" hole until the clamp edge is below the mounting surface, then tighten the screw. The cup will clamp down to the surface as the screw is tightened (Figure 3). In the case of a thick mounting surface, the legs of the clamp can be bent outward by inserting a screwdriver through the four rectangular holes in the cup while still mounted (Figure 4)
11. Snap the tweeter into the mounting cup, being careful not to pinch the wires.
12. Once the tweeter is mounted and connected, swivel the tweeter by applying firm pressure to the edge of the tweeter module. **DO NOT** apply pressure to the grille.

*NOTE: to remove the tweeter assembly, place a small screwdriver into the side slot and pry carefully upwards (Figure 5)*

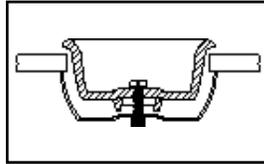


Figure 3

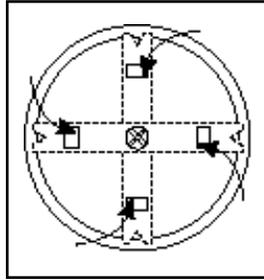


Figure 4

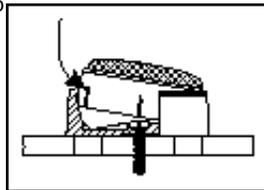


Figure 5

## MM400 Component Tweeter Hook-up

When purchased as a separate unit, the MM400 tweeter includes a crossover network integrated into the hook-up wires. This high-pass filter allows the MM400 to be used with other components. It is important to maintain correct polarity. The red wire connects to the positive (+) amplifier terminal and the black to the negative (-) amplifier terminal.

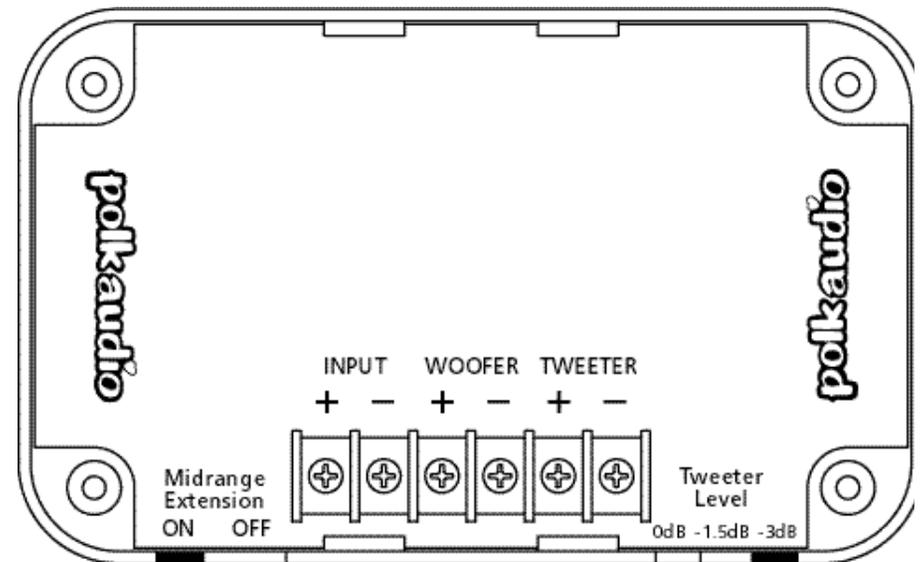
If your system contains an active crossover, you may bypass the in-line crossover and wire the tweeter directly to the output terminals of an amplifier that has a high-pass filter (crossover) on its input. The minimum crossover point should be 2 kHz at 12dB per octave.

**DO NOT USE THE TWEETER WITHOUT A CROSSOVER NETWORK.**

Damage to the tweeter from thermal overload will result without the protection provided by a crossover and will void your warranty.

## Extending Frequency Response using Mid-Range Extension

The Polk Audio/MOMO Crossover features a Mid-Range Extension option. When placed in the "ON" position, this removes the low pass crossover filter from the mid/bass driver, allowing it to run full-range. This may be helpful in getting a better "blend" between mid/driver and tweeter when the two are placed some distance from each other.



It works like this: Normally the crossover rolls off the high frequency response of the driver in a steep slope. But when a great distance separates a tweeter from the driver (for example, the driver is on the bottom of the door panel, and the tweeter is on the top of the door panel or dash) getting a good driver-to-tweeter blend may be difficult. The Mid-Range Extension feature bypasses the driver's crossover, extending the response of the driver to better meet that of the tweeter. Experiment to find the setting that best suits your installation.

#### **Tweeter Level**

The slide switch on top of the crossover box adjusts the level (volume) of the tweeter relative to the mid/woofer. Start with the switch in the bottom position and listen. If you want a "brighter" sound, move the switch to the middle position and listen again. The top position provides the greatest amount of tweeter output.

If you have the MM400 separate tweeter, there is a blue wire loop on the in-line crossover. When the wire is intact the tweeter plays at full output. If the system sounds too "bright," cut the wire loop to decrease the tweeter output by 3 dB.

#### **Polarity / Blending**

If it seems that the tweeters and mid/woofers are not "blending" or working together in harmony, try changing the polarity of both the tweeters by reversing the positive (+) and negative (-) tweeter wires at the crossover. Reversing the absolute phase of the tweeters may help the blending or integration of the system components, particularly if the tweeters and mid/woofers are on different planes.

#### **Tweeter Angle**

The MM400 tweeters may be pivoted to get the best high frequency response and sound-stage. Generally, pointing the tweeters toward the listening position will yield the best results. But don't be afraid to try other angles. Use the position that sounds best to you.

Pivot the tweeter module by applying firm pressure on the edge of the tweeter module.

**DO NOT APPLY PRESSURE TO THE DOME ITSELF.**

## **Amplifier Power Requirements**

Your speakers will work well with a variety of electronic components. As little as 25 watts (RMS) per channel will deliver adequate listening levels in most cars. If you have a noisy car or intend to play your system at loud listening levels, more power is necessary to achieve the best performance. Consult your Polk Audio dealer for specific recommendations.

## **Safe Limits Of Operation**

Your Polk loudspeakers are made with the highest quality materials for years of trouble-free performance. However, damage to loudspeakers can occur when an amplifier, regardless of its wattage, is made to play at higher listening levels than its power can cleanly produce (usually beyond the "2 to 3 o'clock" position on the volume control).

This results in very high levels of audible distortion, originating in the amplifier, which adds a harsh, gritty sound to the music. Contrary to popular belief, a speaker is more likely to be damaged by trying to get too much volume from a low-powered amp or receiver than from a high-powered one.

## **Technical Assistance Or Service**

If, after following the hook-up directions, you experience difficulty, please double check all wire connections. Make sure that your electronic equipment is operating correctly by hooking up another speaker to the speaker output. For example, if you are not getting sound from the left channel speaker, connect the right channel speaker to the left output. If you still get no sound from that side, the problem is in your amp or source electronics. Should you isolate the problem to the speaker, contact the authorized Polk Audio dealer where you made your purchase. Authorized Polk Audio dealers are the best source for advice and assistance.

Call Polk Audio's Customer Service Department at 1-800-377-7655 from 9am to 6pm, Eastern Time, Monday through Friday. Please do not hesitate to call us if you have questions about your speaker system.

Visit <http://www.polkaudio.com>

## Specifications

	MM455	MM465	MM400
Recommended Amplification	25-100 watts	25-150 watts	25-100 watts
Impedance(DCR)	4.0 ohms	4.0 ohms	5.5 ohms
Frequency Response (+/-3dB)	68 Hz - 20 kHz	50 Hz - 20 kHz	4.4 kHz - 20 kHz
Sensitivity (1w/1m)	86 dB	87 dB	90 dB*
Magnet Weight	13.5 oz	14.4 oz	5 oz
Height	N/A N/A	N/A N/A	Flush Mount Cup: 0.9"(22.8 mm) Surface Mount Height: 1.015"(25.7 mm)
Cutout Dimensions	5.0" 127.0 mm	5.94" 150.9 mm	2.06" 52.4 mm
Mounting Depth top mount with grille	2.72" 69.1 mm	2.81" 71.4 mm	N/A N/A
Mounting Depth bottom mount	3" 76.2 mm	3 1/16" 77.8 mm	N/A N/A
Grille Height	3/4" 19.1 mm	3/4" 19.1 mm	N/A N/A
Grille Diameter	6 13/32" 162.7 mm	7 1/4" 184.1 mm	N/A N/A
Crossover Frequency	4200 Hz	4200 Hz	4800 Hz
Crossover Order	Tweeter & Driver**: 2nd Order Butterworth	Tweeter & Driver**: 2nd Order Butterworth	1st Order Butterworth

\*When MM400 bought separately sensitivity = 90 dB with loop intact  
When MM400 bought separately sensitivity = 87 dB with loop cut

\*\*Midrange extension switch on crossover will bypass driver crossover

## POLK/MOMO MID/WOOFER TECHNICAL SHEET THIELE / SMALL PARAMETERS

	5.25" Mid Driver	6.5" Mid Driver
Freq. Response	68 Hz - 5.5 kHz	50 Hz - 5.5 kHz
Resonant Freq. (Fo, Fs)	68 Hz	50 Hz
Qms	9.06	9.58
Qes	0.61	0.67
Qts	0.58	0.62
Vas	5.27 L .186 ft <sup>3</sup>	14.61 L .515 ft <sup>3</sup>
Cms	431 µm/N	493 µm/N
BL	5.5 TM	5.8 TM
Sd	.0093 m <sup>2</sup> .100 ft <sup>2</sup>	.0145 m <sup>2</sup> .156 ft <sup>2</sup>
Mms	12.6 g	19.8 g
Winding Width	12.7 mm .500in.	12.4 mm .488 in.
Xmax (Linear)	3.4 mm .132 in.	3.2 mm .126 in.
Xmax (Mechanical)	14.3 mm .562 in.	15.2 mm .600 in.
Le	.265 mH	.313 mH

## Polk/MOMO Series 3 Year Warranty

Polk Audio, Inc. warrants the original purchaser only that this Polk Audio Polk/MOMO Product (the Product) will be free from defects in materials and workmanship for a period of (3) three years from the date of original retail purchase from a Polk Audio Authorized Dealer. However, this warranty will automatically terminate prior to the expiration of the (3) three year period if the original retail purchaser sells or otherwise transfers the Product to any other party. The original retail purchaser shall herein after be referred to as "you." To allow Polk Audio to offer the best possible warranty service, please fill out the Product Registration Card(s) and send them to the Factory at the address provided in the Registration Card within (10) ten days of the date of purchase.

Defective Products must be shipped, together with a proof of purchase, prepaid insured to the Authorized Polk Audio Dealer from whom you purchased the Product, or to Polk Audio, 2550 Britannia Blvd., Suite D, San Diego, CA 92154. Products must be shipped in the original shipping container or its equivalent; in any case the risk of loss or damage in transit is to be borne by you. If, upon examination at the Factory or Polk Audio Authorized Dealer it is determined that the unit was defective in materials or workmanship at any time during the Warranty period, Polk Audio or the Polk Audio Dealer will, at its option, repair or replace this Product at no additional charge, except as set forth below. All replaced parts and Products become property of Polk Audio. Products replaced or repaired under this Warranty will be returned to you, within a reasonable time, freight prepaid.

This Warranty does not include service or parts to repair damage caused by accident, disaster, misuse, abuse, negligence, inadequate packing or shipping procedures, commercial use, voltage inputs in excess of the rated maximum of the unit, cosmetic appearance of the cabinetry not directly attributable to defects in materials or workmanship, or service, repair, or modifications of the Product which has not been authorized or approved by Polk Audio.

This Warranty is in lieu of all other expressed Warranties. If this Product is defective in materials and workmanship as warranted above, your sole remedy shall be repair or replacement as provided above. In no event will Polk Audio, Inc. be liable to you for any incidental or consequential damages arising out of the use or inability to use the Product, even if Polk Audio, Inc. or a Polk Audio Dealer has been advised of the possibility of such damages, or any other claim by any other party. Some states do not allow the exclusion or limitation of consequential damages, so the above limitation and exclusion may not apply to you. This Warranty gives you specific legal rights which may vary from state to state.

This warranty applies only to Products purchased in the United States of America, its possessions, and U.S. and NATO armed forces exchanges and audio clubs. The Warranty terms and conditions applicable to Products purchased in other countries are available from the Polk Audio Authorized Distributors in such countries.

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5601 Metro Drive  
Baltimore, Maryland 21215  
(800) 377-7655

<http://www.polkaudio.com>

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