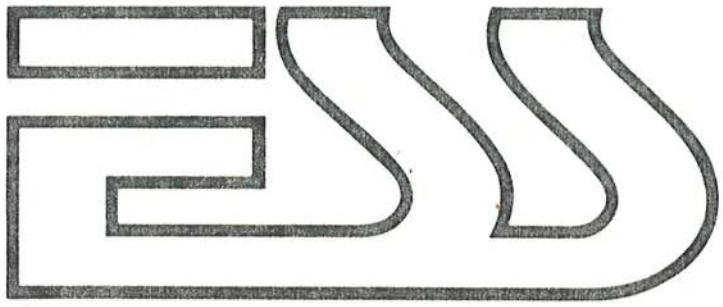

SERVICE MANUAL

THE ESS "CLEAN POWER" RATING

Speakers manufactured by ESS are power rated for the maximum amount of clean, unclipped power they will handle indefinitely from a musical source.

Driving the loudspeakers with sine wave signals at high dB levels is not advisable, since sine wave energy can potentially damage the speakers at much lower dB output levels than a music-derived signal.

Driver failure from excessive input levels, faulty electronic equipment, or owner neglect is not covered under the conditions of the warranty.

Owners that abuse equipment are often reluctant to admit their own culpability. Unstable electronics at moderate output levels, or more typically, low to moderate powered receivers or even high powered receivers can begin to reach a point of instability and "clip" as the volume is turned up. We find typically with normal program material that with no equalization a receiver can begin to "clip" with the volume control at just over half way. Equalization induced either from preamplifier controls or a multi-band equalizer can dramatically influence amplifier stability and drive a unit into "clipping" much sooner.

Most conventionally recorded music has peaks that are about 10 dB higher than the average level of the music. This means that a receiver averaging 30 watts output would have to provide clean peaks of about 300 watts per channel. Meters are not an accurate indication of power output. For example, recently in our R & D Department, we played the Rolling Stones "Some Girls" lp at very loud levels with no equalization on the ESS 500-A basic amplifier. With the meters reading in their most sensitive range, output appeared averaged between 45 - 55 watts RMS. However, connecting the amplifier to an oscilloscope revealed consistent musical peak output in excess of 1000 watts.

Other commentators have noted that, with direct-to-disc recordings, the difference between average meter readings and peaks can be as high as 50-33:1 on some amplifiers!

Both examples illustrate how typical recordings contain transient information that can demand 10 - 40 times the average apparent output indicated by meters. Because the ESS amp is both very powerful (325 w/RMS) and extremely overbuilt to accommodate instantaneous peaks much in excess of its rated output, the 500-A could handle the demand. (Even the 500-A clipped occasionally on some loud percussion passages that demanded peaks in excess of 1000 watts.) Receivers and many basic amplifiers at such high dB output levels are simply incapable of such power reserves, and when driven hard become unstable.

Direct-to-disc and digital recordings contain peaks in excess of 25 dB higher than the average level of the music. Dynamic range of such potential taxes the best audio systems and record manufacturers like Telarc advise the user to first play the recording at low levels and then carefully increase the volume.

Thus it should be borne in mind that ESS speakers rated for 375 watts of clean power, will handle just that. The continuous RMS rating of such power would be about 10 dB lower or 38 watts. And an amplifier rated at 80 watts RMS will only realistically deliver peaks of slightly more than 80 watts and will probably not be able to continuously deliver more than 8 - 10 watts of continuous power.

ESS inc. 9613 OATES DRIVE · SACRAMENTO, CALIFORNIA 95827

Warranty Provisions Chart

Model	Duration
AMT-Monitor (1980)	5 Yrs. Parts & Labor
AMT-1C (1980)	5 Yrs. Parts & Labor
AMT-Bookshelf (1980)	5 Yrs. Parts & Labor
Tempest "Classic"	3 Yrs. Parts & Labor
Tempest Bookshelf 1, BKSF. 2	3 Yrs. Parts & Labor
Performance Series PS-4A, 5-A, 8-A, 9-A	3 Yrs. Parts & Labor
ESS Model 10	3 Yrs. Parts & Labor
AMT-1B last made 8 yrs ago	3 Yrs. Parts & Labor
AMT-1B Bookshelf	3 Yrs. Parts & Labor
AMT-Monitor	3 Yrs. Parts & Labor
AMT-10B	3 Yrs. Parts & Labor
Tempest LS-4, 5, 8, 8E, 9	3 Yrs. Parts & Labor
Targa 210, 310, 312, 412T	3 Yrs. Parts & Labor
Eclipse B-102, B-122, M-102, M-122	3 Yrs. Parts & Labor
Accent DS1002, DS1003, DS1203	3 Yrs. Parts & Labor
Daytona MM1002, MM1003, MM1203	3 Yrs. Parts & Labor
LE-20	3 Yrs. Parts & Labor
AMT-1A	3 Yrs. Parts & Labor
AMT-1A Monitor	3 Yrs. Parts & Labor
AMT-1A Bookshelf	3 Yrs. Parts & Labor
Disco	3 Yrs. Parts & Labor
Evaluator	3 Yrs. Parts & Labor
Tempest Lab I, II, III, IIIE	3 Yrs. Parts & Labor
Fortura Sovereign	3 Yrs. Parts & Labor
Array	3 Yrs. Parts & Labor
Stack	3 Yrs. Parts & Labor
Elite	3 Yrs. Parts & Labor
Transcend 1050E, 1250E, 1950E	5 Yrs. Parts & Labor
Fortura 8PD, 10PD, 12PD	1 Yr. Parts & Labor
Fortura 8BS, 10BS, 12BS	1 Yr. Parts & Labor
Satellite	5 Yrs. Parts & Labor
AMT-5	5 Yrs. Parts & Labor
AMT-6	Lifetime Heil, 5 Yrs. Remainder
AMT-1	Lifetime Heil, 5 Yrs. Remainder
AMT-1 Tower	Lifetime Heil, 5 Yrs. Remainder
AMT-3	Lifetime Heil, 5 Yrs. Remainder
AMT-4	Lifetime Heil, 5 Yrs. Remainder
ESS 7, 9	5 Yrs. Parts & Labor
Translinear	5 Yrs. Parts & Labor
Transtatic	5 Yrs. Parts & Labor

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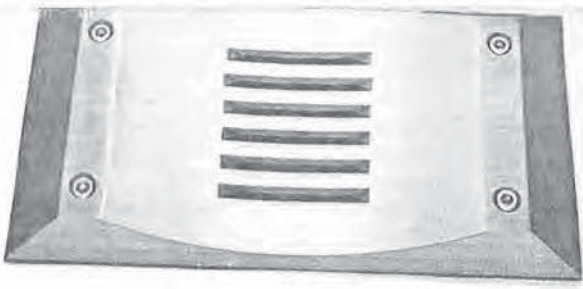
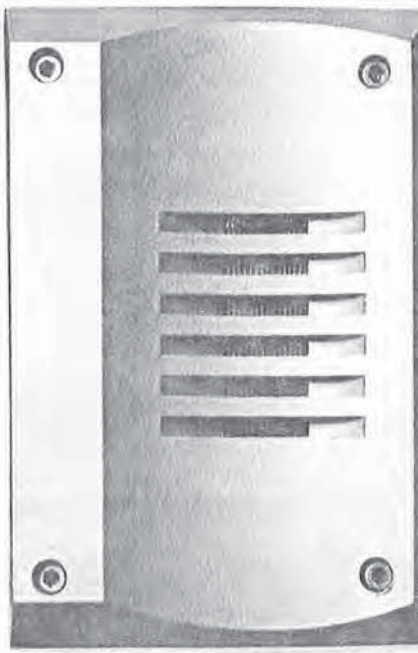


Diaphragm Replacement Procedure

Heil AMT: Performance "A" Series
Tempest Bookshelf models



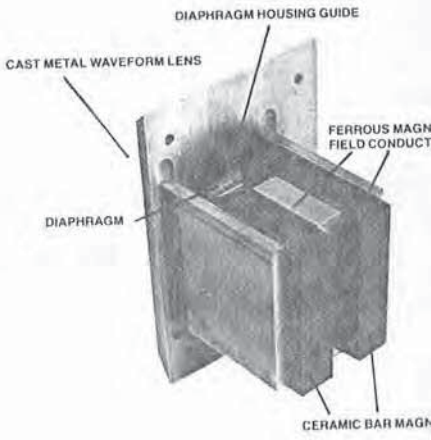
An "open" or intermittent Heil air-motion transformer in either the ESS Performance "A" series or Tempest Bookshelf models is easily repaired in the following manner:

1. Remove the 4 Allen-head screws holding the AMT to the speaker front baffle. The Heil driver is not glued in place, and should easily remove to expose the input terminals at the top, rear of the AMT.

2. Disconnect the blue and purple wires from the cross-over (at the input terminal) by pulling the mechanical connection apart. The Heil driver can now be removed completely from the cabinet to a convenient work space.

3. Unsolder the blue and purple (or orange) wire from the input terminal at the top, rear of the AMT.

4. Carefully remove the "fish paper" from the top and bottom of the driver. (A razor knife or X-acto knife should easily accomplish the task). Remove cotton damping material from the center, top and bottom of the AMT in the vacinity of the diaphragm housing guide (see illustration).to expose the diaphragm.



The diaphragm is fixed in place with silicone adhesive at the top and bottom edge.

5. Carefully cut the silicone away from the diaphragm--gently wiggle the diaphragm loose in the housing guide. DO NOT BEND the diaphragm.

6. Once loose, the diaphragm is easily removed and a replacement inserted. Check the parts list as the proper diaphragm can somewhat differ in these models.

7. Reverse the procedure using silicone adhesive, if available. The fish paper can be held in place with contact cement or adhesive tape. Take care not to spill excess adhesive on the pleats of the diaphragm.

8. Be careful to properly center the diaphragm in the housing. Check for possible shorting of the diaphragm against the housing and move the diaphragm slightly if necessary.

The blue wire should connect to the corresponding blue from the crossover. the purple (or orange) wire should connect to the purple wire from the crossover.

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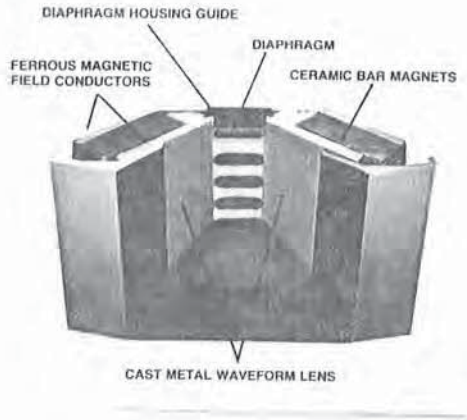

Diaphragm Replacement Procedure

Metal Plate Heil AMT

Metal Plate Heil air-motion transformers are used in a number of speakers manufactured by ESS. The Heil configuration is the same: Slotted metal front and back plates are glued to two, large ceramic magnets. The Heil diaphragm inserts into the center core. Some of the assemblies are shaped like a "V", as in the illustration to the right, other assemblies are flat. Removal of the diaphragm from the housing is simple once the tweeter and decorative cowling are removed from the speaker.

Note carefully how the tweeter attaches to the cabinet. On some bookshelf models the metal plate Heil driver is removed by unscrewing bolts Inside the front baffle. (In such instances, remove the passive radiator at the rear of the speaker to gain access to the bolts).

Carefully remove the decorative cowling to expose the slot at the center of the AMT the diaphragm rests in. Most of the diaphragms insert from the bottom of the magnet assemblies. You may want to entirely remove the Heil driver to an appropriate work space to check and replace the diaphragm. Disconnect the purple and blue wires leading from the crossover to the terminal block to completely free the housing from the cabinet.

If the diaphragm is "open", disconnect the blue and purple leads coming from the diaphragm at the terminal block, remove any caulking (but save the caulking) and slide the diaphragm carefully out of the housing.

Reverse the process to insert the replacement diaphragm--take care not to damage the new diaphragm during insertion.

Possible shorting of the newly inserted diaphragm against the metal housing can be easily checked by touching one VOM lead to the housing and one lead, in sequence, to each of the diaphragm wires. If the diaphragm is shorted against the metal housing, repositioning the diaphragm slightly should resolve the problem. Normal diaphragm resistance should read between 4-6 ohms, depending on the diaphragm.

Once the diaphragm is inserted and check for possible shorting, reverse the above process making sure that the purple and blue wires attach at the terminal block to the corresponding purple and blue wires.

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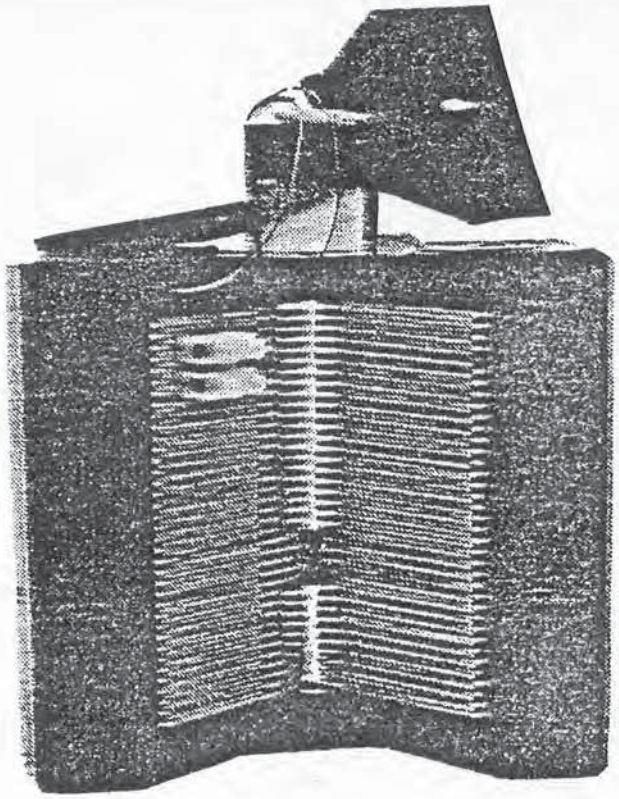

Diaphragm Replacement Procedure

Plastic Housed Large AMT Units

An "open" or intermittent Heil air-motion transformer usually indicates that the diaphragm at the center of the AMT requires replacing. (Failure of the diaphragm might also indicate crossover damage as a consequence of extreme over-driving.)

Before removing the diaphragm, check to see if it is "open" with an ohmmeter by connecting the meter leads to the blue and purple wires leading out of the diaphragm. An "open" reading indicates that the diaphragm is defective and should be replaced. Good diaphragms typically read from 2.5 to 4 ohmmeters. (On rare occasions a diaphragm will be intermittent--such diaphragms usually read "open", but sometimes require listening to the speaker until the intermittence shows up.)

Replacement of a defective diaphragm is easily accomplished:

1. Remove the hardware attaching the AMT to the cabinet. Removal will require either a 7/16 hex head driver or a Phillips head screwdriver (for the four bolts that screw the Heil AMT in the ESS Bookshelf model.)
2. Disconnect the blue and purple leads from the crossover that connect to the terminal block at the rear of the air-motion transformer. Carefully lift the AMT away from the bookshelf model to expose the terminal block. Disconnect the blue and purple leads from the diaphragm at the terminal block.
3. Carefully break any seal that may exist between the AMT and the cabinet. The AMT is not glued in place. Remove the AMT to a suitable work space.
4. Note where the blue and purple leads come out of the Heil housing. The diaphragm will be removed from the housing at this point. On most AMT's the diaphragm removes from the underside. Carefully peal off any pad or warning label that may prevent easy removal of the diaphragm. Remove (but save) any caulking.
5. Carefully remove the defective diaphragm.
6. Reverse this procedure to insert the new diaphragm, include any caulking that was removed. Note: Our newly developed, articulated, single-sided diaphragm has one black and one silver side. INSERT THE SINGLE-SIDED DIAPHRAGM INTO THE HOUSING WITH THE SILVER SIDE FACING FORWARD, TOWARDS THE FRONT OF THE SPEAKER. Connect the purple wire from the diaphragm to the purple wire from the crossover. Connect the blue wire to the blue wire. Use new warning labels.

Do not over tighten the hex-head or Phillips-head bolts.

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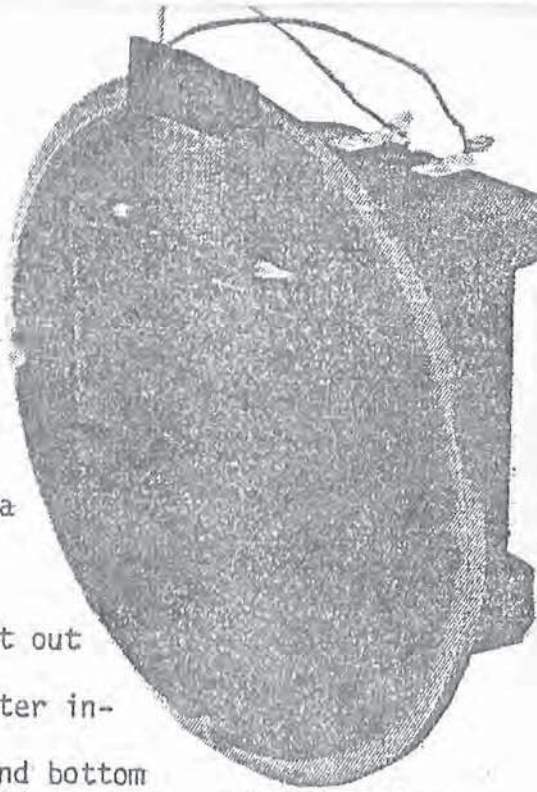
DIAPHRAGM REPLACEMENT PROCEDURE: POWER RINGS



A non-functioning power ring usually suggests that the diaphragm has partially or completely opened or remotely suggests that the crossover is damaged. Easy in-field replacement of the diaphragms in many power rings simplifies the repair task.

Initially, an ohm meter should be used to determine the resistance of the diaphragm. An "open" reading indicates a defective diaphragm.

Getting to the diaphragm requires the following steps:
1. Remove the four (4) screws from the power ring and lift out the power ring.
2. Clip or unsolder the blue and purple leads at the tweeter input terminal and completely remove the tweeter.
3. With an X-acto knife or similar tool, remove the top and bottom black gauze dust cover to expose the diaphragm which is held in place with RTV rubber cement or CP Moyen 4001 DB cement.
4. Remove the defective diaphragm by cutting the cement holding the diaphragm frame to the frame of the metal housing. Pull the lead wires on the diaphragm through the housing and pull out the diaphragm.
5. Remove all excess hardened cement and foreign particles.
6. Very carefully insert the new diaphragm into the cleaned slot. The conductive strips on one side of the diaphragm must face to the rear of the housing.
7. Slide the diaphragm down past the housing and apply RTV rubber cement or similar adhesive to the horizontal edge of the diaphragm frame. Pull the diaphragm back and apply cement to this end of the frame also. Center the diaphragm and cement it to the metal housing.
8. Allow time for the cement to dry firmly affixed to the metal housing.
9. String the blue and purple leads through the hole in the housing and solder the leads to the input terminals. Glue the black gauze dust covers back in place.

Any possible shorting of the diaphragm against the magnet or housing can be checked with VOM. One VOM lead should be connected to the housing, one to the lead wire of the diaphragm. A meter reading indicates a short. Such a problem can be rectified by repositioning the diaphragm, taking care to insulate any conducting surface. Connecting both leads of the diaphragm to the VOM should indicate a resistance of between 4-6 ohms depending upon the diaphragm.

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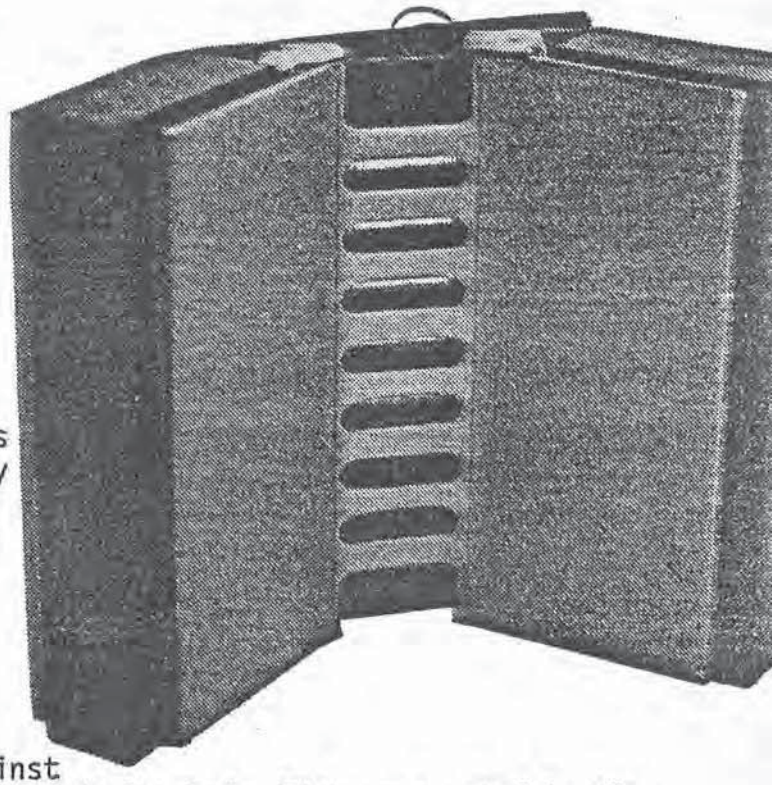

Diaphragm Replacement Procedure:
AMT TRANSFORMER

II. "Metal-Plate" Units

Diaphragm replacement in metal plates units used in many models is very simple: Merely disconnect the purple and blue leads from the terminal block, remove the caulking at the corners and gently lift the diaphrams from the core. Reverse the process to insert the new diaphragm, taking extreme care not to damage the diaphragm during insertion.

Any possible shorting of the diaphragm against the metal frame can be checked with VOM. One VOM lead should be connected to the frame and the other to one of the leads from the diaphragm. A meter reading will indicate a short. Such a problem can probably be rectified by repositioning the diaphragm, taking care to insulate any conducting surface that might have shorted against the metal frame. Connecting both leads to the VOM should indicate a resistance of between 4-6 ohms depending on the diaphragm.

Once the diaphragm is inserted, simply connect the input wires from the crossover to the AMT terminal block. Match the ground and hot wires.