

GRAY MODEL #108-B VISCOUS DAMPED ARM

GENERAL

The Gray #108-B Transcription Arm incorporates a radical advance in suspension principle in its design. A ball and socket arrangement provides means for introducing damping action. An adjustable cone point pivot allows the degree of damping to be readily controlled and at the same time provides for practically frictionless movement in any plane. Damping in horizontal plane virtually eliminates troublesome low frequency arm resonance which frequently causes groove hopping and distortion on loud passages. With low vertical stylus forces, accidentally jarring or bumping the turntable no longer causes groove jumping. Vertical damping prevents damage to record and stylus due to accidentally dropping arm and improves tracking of warped records.

All groove widths, all record diameters up to 16" and all normally used stylus forces are accommodated by one arm which is non-critical for turntable leveling. Utilizing quick change slides, cartridge interchange is no problem. Each slide and cartridge assembly preset to desired stylus force, reducing to minimum danger of unauthorized tampering. Slide and contact arrangement accommodates most commonly used cartridges including G. E., Pickering, Clarkstan, etc.

GRAY MODEL #108B VISCOUS DAMPED ARM

GENERAL SPECIFICATIONS

CARTRIDGE MOUNTING - Removable slides of two types. One slide has two $3/16$ " diameter studs slightly over $1/4$ " long in line across arm on $1/2$ " centers. Studs drilled and tapped for #3-48 screw for cartridges such as G. E. and Clarkstan. Other slide has permanently attached Pickering Keystone Clip.

CARTRIDGE DIMENSIONS - In addition to wide latitude of dimension of mounting holes to contact, cartridge width may be as great as $13/16$ ".

ELECTRICAL CONNECTIONS - Pair of formed spring contacts mounted in insulated holder and connected to flexible twisted pair. Plane of contacts is horizontal.

HEIGHT ADJUSTING MEANS - Three knurled thumb nuts $5/8$ " diameter $1/8$ " high threaded into bottom of base.

HEIGHT ADJUSTMENT RANGE - Measured from the bottom of arm to top of mounting surface this range is $1\ 1/2$ " to $1\ 15/16$ ". With a G. E. RPX-046 installed, this corresponds to a range of height of turntable platter above arm mounting surface of $1\ 1/16$ " to $1\ 1/2$ " neglecting record thickness.

ARM LENGTH - $11\ 1/8$ " from stylus to pivot point and approximately $14\ 1/2$ " overall.

CARTRIDGE OFFSET ANGLE - For minimum tracking error over the range of outermost groove of a 16" transcription to inner-most groove of a phonograph record, this angle has been fixed at 20° .

PIVOT MEANS - Stud from base terminating in cone point provides pivot point. Hollow point thumb screw threaded into arm provides mating part. Pivot action takes place at center of ball and socket.

VERTICAL FORCE ADJUSTMENT - To derive maximum benefit from quick change cartridge slides, no separate adjustment is provided on the arm. Each slide and cartridge assembly is provided with a small calibrated weight which may be preset for any reasonable stylus force.

DAMPING ADJUSTMENT - Pivot thumb screw provides adjustment to vary clearance between ball and socket. This varies the depth of layer of damping fluid between ball and socket.

RESONANCE - With high compliance reproducer, about 18 cps. but very low amplitude due to damping arrangement.

FLUID CHARACTERISTICS - With minor change of damping adjustment, negligible effect of temperature from about 45° F to about 100° F. Oxidation is practically zero, practically inert physiologically and is non-toxic. It is chemically inert and may be removed with mild soap and water.

GRAY MODEL 108-B VISCOUS DAMPED ARM

MOUNTING INSTRUCTIONS

MOUNTING RADIUS - Distance from center of turntable spindle to center of base pivot.

OVERHANG - Amount distance from pivot to stylus tip exceeds mounting radius.

MOUNTING BASE PLACEMENT - Approximate mounting radius for general use of 108-B Arm is $10 \frac{5}{8}$ ". This is on basis of $11 \frac{1}{8}$ " from stylus to pivot and $\frac{1}{2}$ " overhang. Exact mounting radius depends on overhang used, as given below, as well as position of stylus in cartridge selected. For minimum tracking error, three overhang measurements are given here to a tolerance of plus or minus $\frac{1}{16}$ ". The last will probably be the overhang most frequently used.

If Arm is to be used to play only phonograph records of maximum diameter of 12", overhang measurement is $\frac{3}{8}$ ".

If used for 16" transcriptions only, overhang measurement is 1".

If used for both 16" transcriptions and phonograph records interchangeably, the overhang measurement is $\frac{1}{2}$ ".

MOUNTING BASE ORIENTATION - Due to symmetrical construction of pivot and base, there is no preferred orientation.

BASE MOUNTING HOLES - Three mounting holes 120° apart on $1 \frac{5}{16}$ " radius around pivot point. Three #8-32 screws are furnished. It is best that motorboard mounting holes be tapped since the screws must be loosened when adjusting the height of base. An additional hole for wiring is usually required.

MOUNTING HEIGHT - Before permanently mounting arm, the three leveling feet should be adjusted approximately an equal amount so bottom of arm is about $\frac{7}{16}$ " higher than top surface of turntable platter (see Sketch 1). This will vary somewhat depending on cartridge used. The essential point is to have the arm horizontal with cartridge in place on a record.

INSERTING DAMPING FLUID - Damping fluid is contained in a separate tube packed with arm. Remove pivot screw from top of arm. Place arm on flat surface so base hangs clear. Place a book or other object on arm to prevent it being accidentally knocked over.

Remove cap from fluid tube and, holding tube with cap end up, pierce a hole in blind opening with knife or other pointed tool. Insert tube end in pivot screw hole. Slowly squeeze tube starting at folded end. Since fluid is rather heavy and must run down around pivot stud, this process should take several minutes. An excess of about 25% over the required amount of fluid has been provided to allow for some remaining in the solid end of the tube.

INSERTING DAMPING FLUID - Continued

It is, therefore, unnecessary to remove the last bit of fluid from the tube. The amount of fluid required is not critical, although an excess may result in some seeping over the top of the socket if the arm is violently moved back and forth. Placing the tube in a pan of hot (not boiling) water immediately prior to removing the cap will speed up this process slightly. After the fluid has been removed from the tube, discard tube and allow arm to remain in this position about ten minutes for fluid to disperse.

LEVELING - Due to method of pivoting arm, leveling is not critical. An ordinary steel scale to secure equal height on all 3 logs is adequate. See "Mounting Height". Make certain that wiring is so placed that it does not affect free movement of arm.

CARTRIDGE MOUNTING - Each cartridge should be mounted on a separate slide, two types of which are available. G. E. and Clarkstan cartridges are to be mounted on plain slides using #3-48 screws to attach cartridge to studs. Pickering cartridges attach to slides having Keystone clip as a part of slide. Cartridge slides on to clip, stylus end first. Pickering slide has removable stop at rear to prevent cartridge sliding off Keystone clip when removing slide and cartridge from arm.

ELECTRICAL CONNECTIONS - Spring contacts automatically provide electrical connection when slide assembly is inserted in arm channels.

STYLUS FORCE - For 6 to 8 grams stylus force, slide and cartridge assembly should weigh about 27 grams. For 25 grams force, slide and cartridge assembly should weigh about 45 grams. The appropriate slide weights are included with each slide.

DAMPING ADJUSTMENT - With arm mounted in place but stylus not in contact with record, press firmly down on arm keeping it level lengthwise and laterally. Slowly turn damping screw clockwise until it binds due to damping screw meeting cone point of pivot. Turn about 25° beyond this point clockwise. This give maximum damping. The useful range extends about 1 1/2 turns beyond this point. A measure of the degree of damping is the time taken for arm and cartridge to come to rest on turntable when dropped one inch. A drop time of 2 to 4 seconds is ordinarily the optimum operating range.

GROUNDING - Three highly flexible wires are provided attached to arm. Red and black wires are cartridge leads isolated from ground for balanced input when such connection is desired. The third lead is grounded to the arm since damping fluid effectively insulates arm from base. This lead should be grounded to system ground. In cases where a non-metallic mounting surface is used, it is also advisable to insert a grounding lug or wire under one leveling foot and connect it to system ground. If wire must be replaced for any reason, use most flexible wire obtainable.

MOUNTING DIAGRAM MODEL 108-B VISCOUS DAMPED ARM

