THE GRAY MANUFACTURING COMPANY

SPECIAL PRODUCTS DIVISION

16 Arbor Street
Hartford 1, Connecticut
U.S.A.

212-TN, 212-TG, 216-TN

STEREO DUAL VISCOUS DAMPED TRANSCRIPTION ARMS

The Gray 212 and 216 series Tone Arms are designed for use with high quality turntables and cartridges to obtain the ultimate in high fidelity sound reproduction from stereo and monaural discs. The plug-in slide feature with the 4 wire connector permits simple interchange of stereo and monaural cartridges and slide assemblies. Extra slides (Item 20) and connectors (Item 27) may be purchased separately from your dealer or the factory.

212 series arms are designed for use on discs with a maximum diameter of 12 inches and, when mounted at the specified mounting radius of 8-5/16 inches, assures a maximum tracking error of less than 2 degrees. The 216-TN may be used with records up to 16 inches and when mounted at the specified mounting radius of 10-37/64 inches, assures a maximum tracking error of less than 1.5 degrees.

Permanent, sealed viscous damping is provided at both, horizontal and vertical, pivot points. The arm can be mounted on turntables with mounting bases up to 3/4 inch in thickness. The distance between the top of the turntable base and the disc surface may be from 1 inch to 2-3/4 inches.

The rear over-hang clearance from the center of the arm mounting base is 3-5/8 inches for the 212 series and 4-3/8 inches for the 216-TN. The distance from the front of the arm to the center of the arm mounting base is 9-1/2 inches for the 212 series and 11-5/8 inches for the 216 series.

Tools Required:

a. Small screwdriver (to adjust base height).
b. Drill of type suitable for cutting through turntable mounting base.
c. A one inch drill to provide a hole to mount base of arm.
d. A drill which will provide a hole approximately 5/16 inches in diameter to mount Arm Rest.
e. 12 inch ruler.
f. Wrench (preferred) or pliers for 9/16 inch wide and 1-1/4 inch wide nuts.
g. Soldering iron and solder.

Installation Procedure:

1. Cartridge Mounting:

a. Remove cartridge slide (Item 20, Fig. 1) from arm by removing screws from cartridge mounting studs and pulling slide straight forward.

b. Lugs are supplied pre-soldered to the wires in the slide but if cartridge requires only three terminals, solder both, black and white, leads to one solder lug. Warning - Do not solder leads directly to cartridge terminals, unless so indicated by cartridge manufacturer, since heat on cartridge itself may damage unit.

c. Temporarily mount cartridge on slide with make connector (Item 27) between cartridge and slide base per exploded drawing Fig. 2. Note that spacer (Item 28) is required with cartridges not having recesses to accept slide studs in order to hold down connector plate securely. Check to make sure mounting screws do not protrude from top side of slide, preventing insertion of slide into arm. If so, replace with shorter screws selected from assortment supplied with cartridge.

d. Consulting cartridge manufacturer's instructions relative to cartridge terminal connections, slide solder lugs on to proper cartridge terminals, using black for right channel ground return, white for left channel ground return, red for right channel, and green for left channel. Make certain that each terminal is securely in place, then dress any remaining slack wire between cartridge and slide connector block neatly into place so that wire does not protrude below cartridge.

e. Slide cartridge and slide assembly carefully into arm, checking to make sure that male pins engage socket squarely. Do not force. Minor misalignment can be corrected by slight bending of tab supporting male connector, if necessary.

f. With slide assembly and cartridge inserted in arm, hold arm by base so that arm is on side and check arm balance. After a few seconds, arm will come to rest. Determine if weight adjustment is required. If arm is approximately level, weight adjustment is satisfactory. If rear of arm is higher or lower than front of arm, loosen rear knurled screw (1, Fig. 1) and slide weight forward or to rear as required and re-check balance.

Note 1: With exceptionally heavy cartridges, exact balance may not be achieved. In such cases, adjust for optimum balance. Exact balance is desired, but not mandatory for normal operating conditions, as long as turntable is level.

Note 2: Cartridge must be in arm to check balance. Remove cartridge and slide assembly and place in safe location until arm is mounted on turntable base.

2. Locating Arm on Turntable:

a. Place arm on turntable to get approximate position. Note where cartridge (front end of arm) will be and check turntable instruction sheet for optimum cartridge locations. (Some turntable manufacturers advise best cartridge-arm locations to avoid having the sensitive area of the cartridge near the turntable magnetic motor field.) See Fig. 3.

b. Obtain a piece of string approximately 12 inches long. Tie a loop at one end and place over spindle in center of turntable. Measure 8 5/16 inches for 212 series (or 10 37/64 for 216 series) from center of spindle to location on string and loop a pencil around string at this point. Mark point on turntable base at location for arm base mounting.

IMPORTANT: Make sure arm in this location has clearance at rear to avoid hitting sides of cabinet, etc. Also make sure there is nothing mounted on underside of turntable - then drill 1 inch hole for arm base.

c. Pass wire through base flange (10) and place wire in groove in base shell (8). Assemble arm to turntable using base nut (11). Tighten nut securely.

3. Arm Height Adjustment:

a. Install cartridge and slide on arm. With disc on turntable, place stylus in contact with disc surface. The head (cartridge) position of the arm should be in alignment with the body of arm as indicated in Figure 4.

b. Adjustment is made by loosening the base set screw (9, Fig. 1) and moving arm up or down as required. Hold the arm in correct position and tighten set screw.

4. Install Arm Rest:

a. Mark position for arm rest at location you desire. Drill 5/16 inch hole and mount rest using headless screw and nut provided.

b. Insert plastic rod in top of arm rest, breaking off excessive length if necessary. Secure rod with set screw (Fig. 1).

5. Stylus Pressure Adjustment:

The gram pressure of the stylus in the record groove is normally specified by the cartridge manufacturer (usually 3 to 8 grams for stereo discs.) The correct setting may be obtained by use of a stylus pressure gauge. Turn the knurled adjusting screw (6, Fig. 1) as required to increase or decrease stylus pressure.

6. Wiring:

Connect the ends of the 4 conductor shielded wire from tone arm to a suitable insulated terminal lug mounted to underside of turntable base and connect a 2 wire shielded cable from these terminals to pre-amplifier, as shown in Fig. 5. The GRAY ST-33 turntable is equipped with proper terminal strip and the necessary pre-amplifier connecting cables.

The shield should be connected to the turntable mounting plate if the plate is metal.

INDEX TO FIGURE 1

REF. NO.	DESCRIPTION	212-TN	212-TG	216-TN
1	Ret. Screw - Weight	75325	75784	75325
2	#10-32 Hex Nut	P-22429	P-22429	P-22429
3	Vertical Pivot Assembly	S-75754	S-75754	S-75754
4	Cap Nut - Pivot	75317	75783	75317
5	Hex Nut	75321	75321	75321
6	Adjusting Screw	75278	75278	75278
7	Cable & Connecting Block	S-75303	S-75303	S-75303
* 8	Base Shell - Machined	75308	75308	75308
	Base Shell - Die Cast	75723	75724	75723
9	Base Set Screw	75311	75311	75311
*10	Spacer Base	75293	75293	75293
*11	Hex Nut (Special)	75310	75310	75310
12	Screw #2-56 x 3/16"	P-014194	P-014194	P-014194
13	Screw #2-56 x 1/16"	P-31872	P-31872	P-31872
14	Adjusting Sleeve	75277	75277	75277
15	Spring - Pressure	P-75279	P-75279	P-75279
16	Wire Clip	75322	75322	75322
17	Damper - Spring	P-75686	P-75686	P-75686
18	Pin - Stop	75706	75706	75706
*19	Button Head	-------	75304	-------
20	Cartridge Slide	75682	75718	75682
21	Sleeve Arm Rest	75329	75732	75329
22	Arm Rest	75330	75330	75330
23	Set Screw	75311	75311	75311
24	5/16-18 NC-2 x 1 3/8"	P-75327	P-75327	P-75327
25	5/16-18 NC-2 Nut	P-75328	P-75328	P-75328
26	Cartridge Connector (Fem.)	P-75383	P-75383	P-75383
27	Cartridge Connector (Male)	P-75384	P-75384	P-75384
28	Cartridge Spacer	75608	75608	75608
29	Arm Body	75761	75762	75362
30	Head (Die Cast)	75716	75717	75716
*	Head (One Piece)	-------	75289	-------
31	Pin Spring	75297	75297	75297
32	Finger Lift	75727	75728	75727
33	Stiffener	------	-------	75722

* Not used in die cast tone arms.

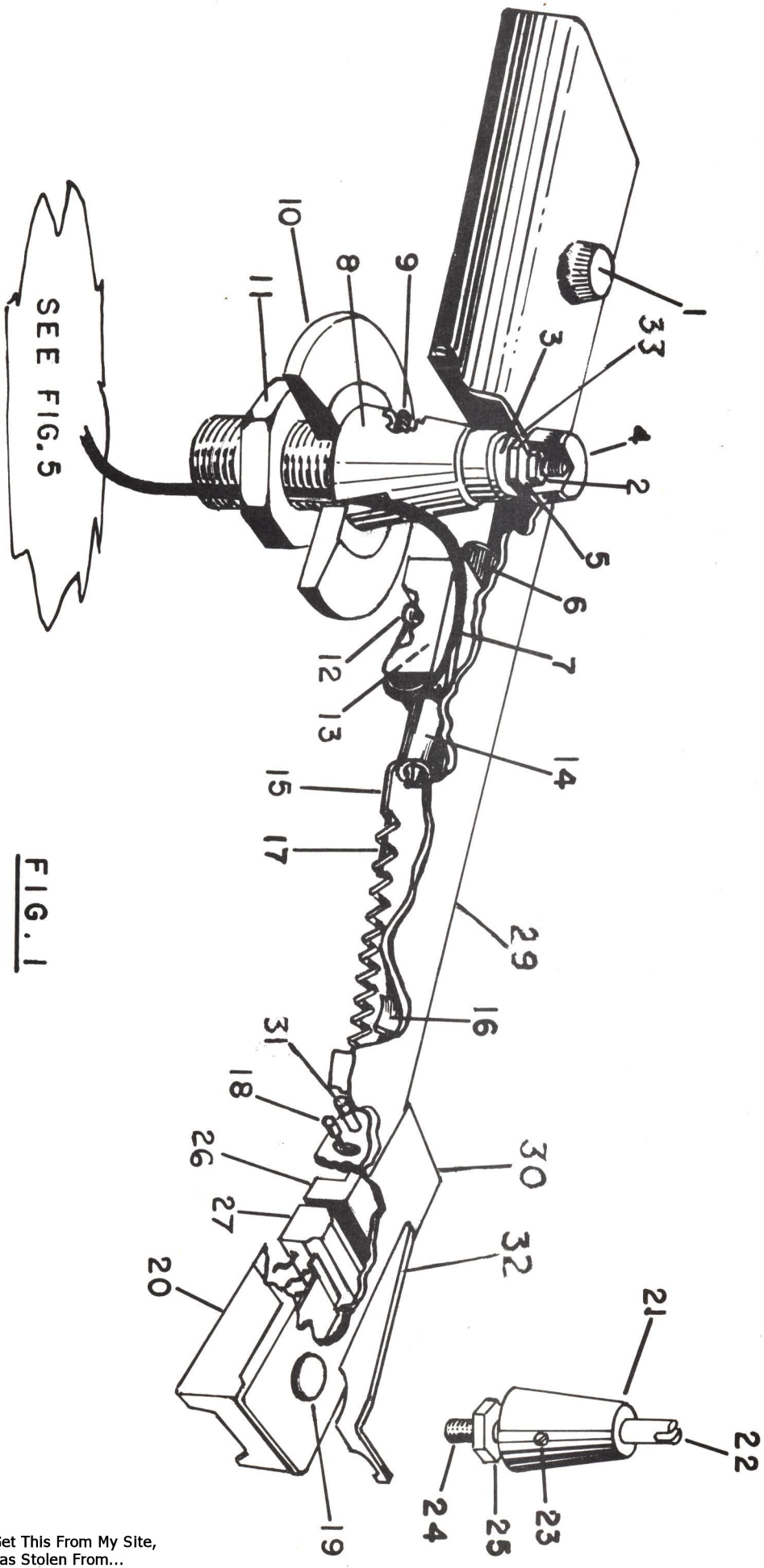

FIG. 1

FOR 212 X = 8 5/16

FOR 216 X = 10 37/64

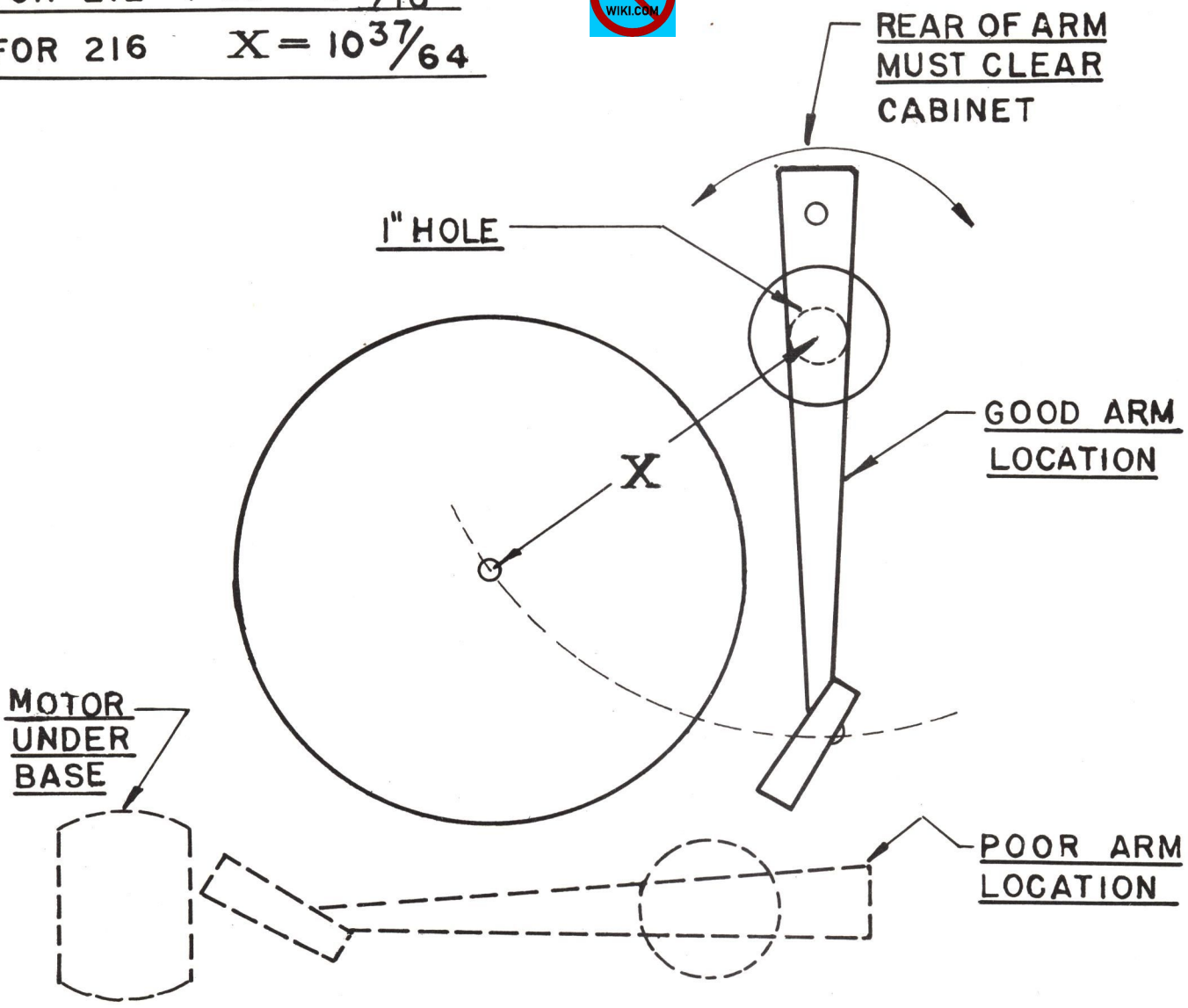

FIG. 3

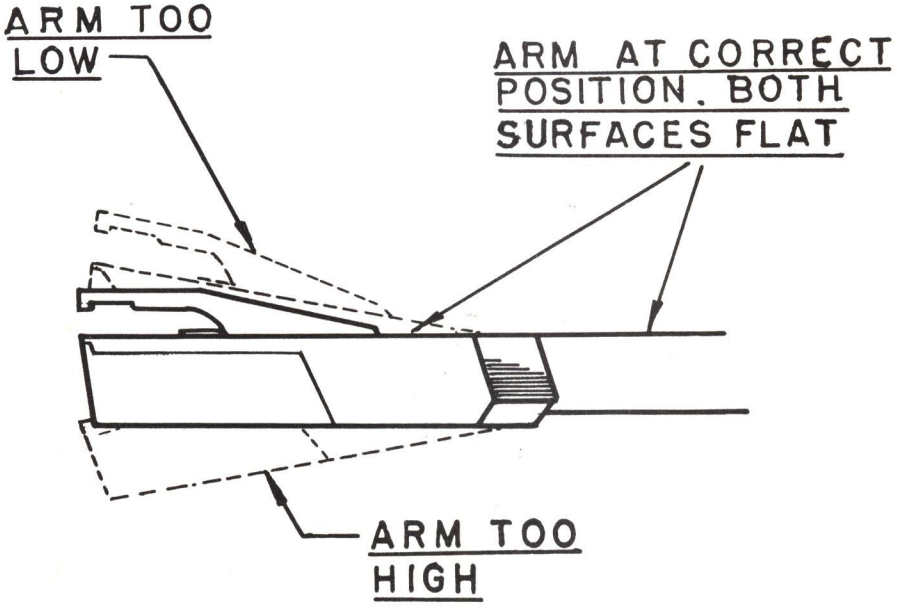

FIG 4

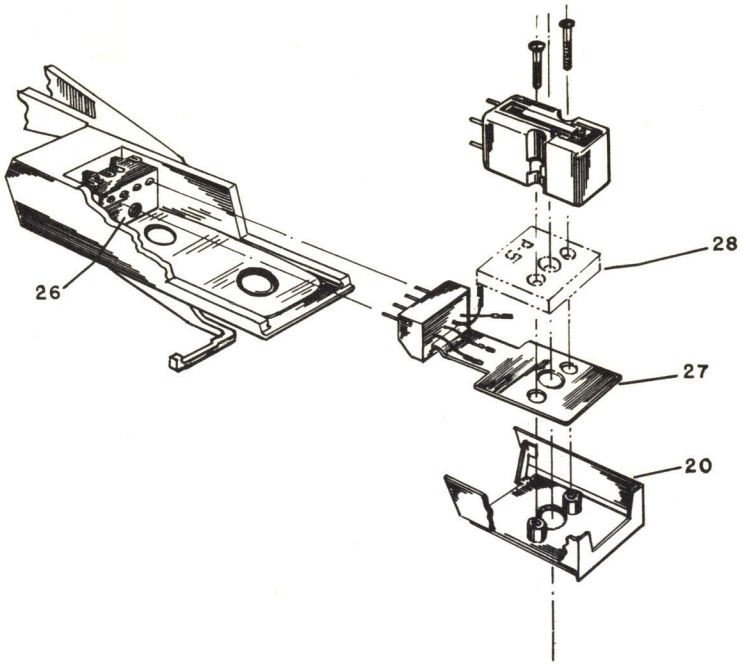

FIG. 2.

RECOMMENDED STEREO CONNECTIONS
FOR
-212 & 216 TONE ARMS-GRAY-

FIG. 5