

Operating Instructions

MARSHALL STABILITY TESTER

Models: 45-6829/01 (AP-170E-8)
45-6829/02 (AP-170E)
45-6829/06 (AP-170E-2)

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MARSHALL STABILITY TESTER MODEL 45-6829/ (AP-170E) SERIES

I. GENERAL INFORMATION

The 45-6829/ (AP-170E) Series **Marshall Stability Tester** quickly and accurately measures the resistance to plastic flow of bituminous mixtures. With automation of the Marshall test, greater uniformity of the test procedure is achieved, and operator errors are almost eliminated.

The **Marshall Stability Tester's** compact size takes up very little counter space in the lab, and simple push-buttons control the movement of the load screw. Indicator lights show both when the unit is operating and when the platen has reached its limit or maximum travel point.

With an overall load capacity of 10,000 lbs. (4590 kg), the **45-6829/ (AP-170E)** is driven by a 3/4 horsepower electric motor. It is equipped with a 4" (102 mm)-diameter lower platen and an upper load transfer attachment. The load is measured by the 6,000 lb. (10,000 lb. optional) capacity proving ring (sold separately); maximum piston travel is 2-1/2" (63.5 mm), at a speed of 2" (50.8 mm) per minute.

With the simple addition of the optional data logging equipment, the **45-6829/ (AP-170E)** can be upgraded for automatic data recording at anytime. For maximum flexibility, the upper crosshead has approximately 10" (254 mm) of adjustment room, to allow for various specimen sizes.

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II. RELATED USER DOCUMENTATION

These operating instructions do not contain all the necessary information on the specific test procedures. Please refer to ASTM D-1559 or AASHTO T-245 for additional testing information.

III. INSTALLATION

The **45-6829/ (AP-170E)** is assembled before it is shipped. The operator need only attach the load measuring device (for use with the 4" or 6", Marshall or Lottman Breaking Head). See Figure 1. Connect the machine to the appropriate laboratory power supply.

IV. OPERATION

A. Control Buttons

Control buttons labeled "UP," "DOWN" and "STOP" are located on the front of the cabinet. (See Figure 1). They operate the machine as follows:

1. When the operator pushes the "UP" button, the motor starts, causing the lower platen to move upward.
2. When the operator pushes the "DOWN" button, the lower platen moves downward.
3. When the lower platen reaches the top and bottom limits of travel, limit switches located inside the cabinet automatically shut the machine off. Lights above the switches indicate whether the movement is up, down or at limit.
4. The "STOP" button functions as an emergency button, allowing the operator to stop the tester at any time during operation.

CAUTION: Do not jiggle the START-STOP buttons under load; jiggling of these buttons may cause fuse failure.

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B. Test Procedure

1. Prepare and compact the asphalt specimens, as directed in ASTM D-1559 and AASHTO T-245 specifications.
2. After preparing and compacting the specimen, place it into the lower section of the breaking head. Place the upper part of the breaking head on the specimen, and load the complete assembly into position on the testing machine. Set the flow meter on top of the breaking head.
3. Use the push button controls to apply the load to the specimen, until the dial on the proving ring indicates that the maximum load is reached, and shows a decreasing load. When maximum load is reached, remove the flow meter. The flow amount will be retained on the dial.
4. Record the maximum load noted on the testing machine; then record the flow amount at the maximum load.
5. Press the reset button after completion of each test, to bring the dial indicators for both the proving ring and the flow meter back to zero.

V. TROUBLESHOOTING

A. If Machine will not Start

1. Check electrical socket for power.
2. Check the "Slo-Blo" 15 amp fuse, located in the rear of the machine (Figure 2, #32).

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B. If Machine will not Reverse

1. Loosen the crosshead holding nuts to unload the machine.
2. Check the "Slo-Blo" 15-amp fuse, located in the back of the machine.
3. If this problem occurs frequently, it may be necessary to grease the transmission.

C. If Machine will not Take Load

Contact ELE/Soiltest Service Dept., as mechanical damage is indicated.

D. If Machine Makes Excessive Noise

Contact ELE/Soiltest Service Dept., as mechanical damage is indicated.

A wiring schematic is shown in Figure 3.

VI. ADJUSTMENT

Although the speed of the machine is set correctly in the factory, field adjustment may be needed. An adjustment pulley is provided for this purpose. The adjustment pulley can be reached by removing the top cover of the unit as follows:

- A. Disconnect the unit from the electrical supply, making sure to remove the cord from the wall socket.
- B. Remove the side screws (Figure 1, #8) from the top cover.
- C. Detach the front panel by removing the four screws (Figure 1, #12). Lay the panel down flat.

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- D. Remove the two 1"- 8 hex steel jam nuts (Figure 1, #7) under the gear box. This will allow you to pull the crosshead and tie rods from the gear box.
- E. Remove the top. The adjustable variable pulley (Figure 2, #26) is now accessible. Reposition the motor so there is 1/2" (12.7 mm) slack in the pulley belt.
- F. To adjust the pulley, loosen the set screw on the inner hub (Figure 2, #26). Rotate the section of pulley toward the outer hub to increase crosshead speed; rotate it away from the outer hub to decrease crosshead speed. Each 1/2 rotation of the pulley will produce a change in load screw speed of about 1/16" (1.5 mm) per minute.
- G. Tighten the pulley set screw. Loosen the motor mounting bolts (Figure 2, #39), and reposition the motor to allow the belt approximately 1/2" (12.7 mm) of slack when depressed by hand. Retighten the bolts. Reassemble the tie rods and crosshead, and replace the front panel.

VII. DRIVE TRAIN MAINTENANCE

- A. Keep the belts clean. If slippage should occur, clean the belts and readjust the belt tension. Do not use belt dressing.
- B. When mounting the belts, do not force them over the pulley; first release the belt tension before installing over the large pulley.

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VIII. ACCESSORIES

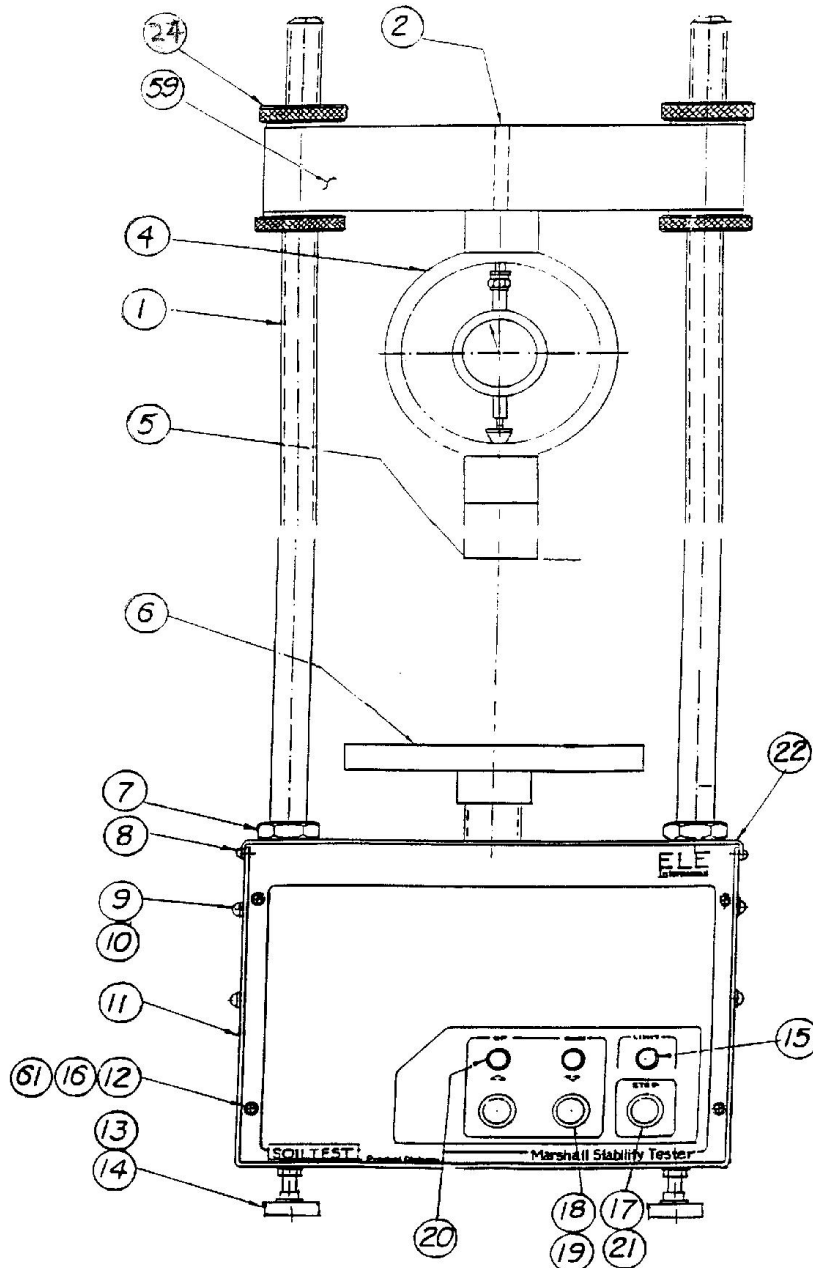
45-6855 (AP-724)	4" (101mm) Marshall Breaking Head.
45-6860 (AP-734)	4" (101 mm) Lottman Breaking Head.
45-6892 (AP-171B)	Asphalt Flow Indicator with Brake. English.
45-6894 (AP-171BM)	Asphalt Flow Indicator with Brake. Metric.
45-7016/02 (AP-707E)	Load Cell Recorder Set. 110vAC, 50/60 Hz, 1ø.
45-7016/01 (AP-707E-4)	Load Cell Recorder Set. 220vAC, 50/60 Hz, 1ø.
78-0760	Proving Ring, 28 kN (6,294 lb.) capacity.
78-0764	Digital Proving Ring, 28 kN (6,294 lb.) capacity.
PR-60	Proving Ring, 6,000 lb. (27 kN) capacity.
PRD-60	Digital Proving Ring, 6,000 lb. (27 kN) capacity.
78-0860	Proving Ring, 50 kN (11,240 lb.) capacity.
78-0864	Digital Proving Ring, 50 kN (11,240 lb.) capacity.
PR-100	Proving Ring, 10,000 lb. (45 kN) capacity.
PRD-100	Digital Proving Ring, 10,000 lb. (45 kN) capacity.
27-1587	S-Type Load Cell 10,000 lb. Capacity.
45-6820	Flow Transducer
27-1300/02	DSU 110vAC, 60 Hz, 1ø.
27-1300/01	DSU 220vAC, 50/60 Hz, 1ø.

IX. MODELS AVAILABLE

45-6829/02 (AP-170E)	110vAC, 60 Hz ø
45-6829/06 (AP-170E-2)	220vAC, 60 Hz ø
45-6829/01 (AP-170E-8)	220vAC, 50 Hz ø

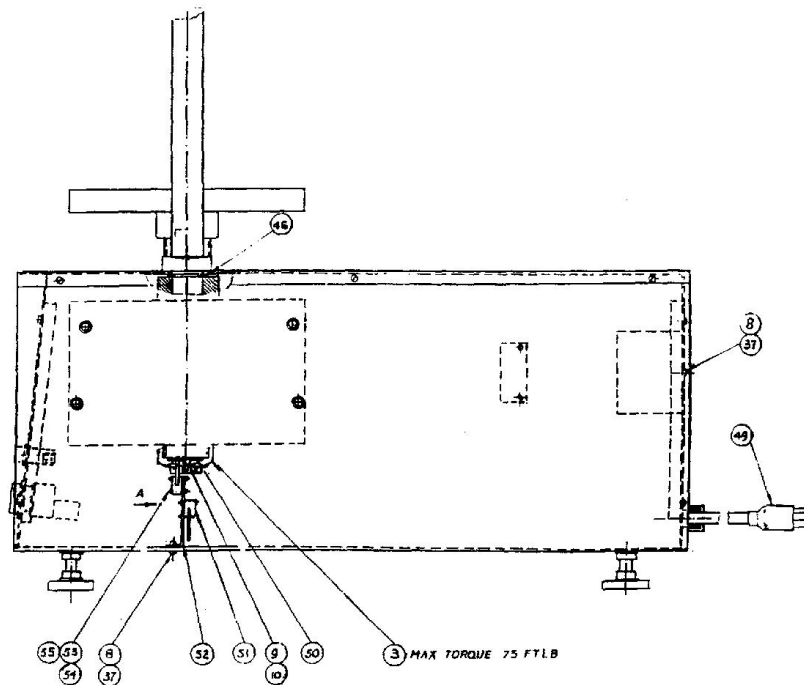
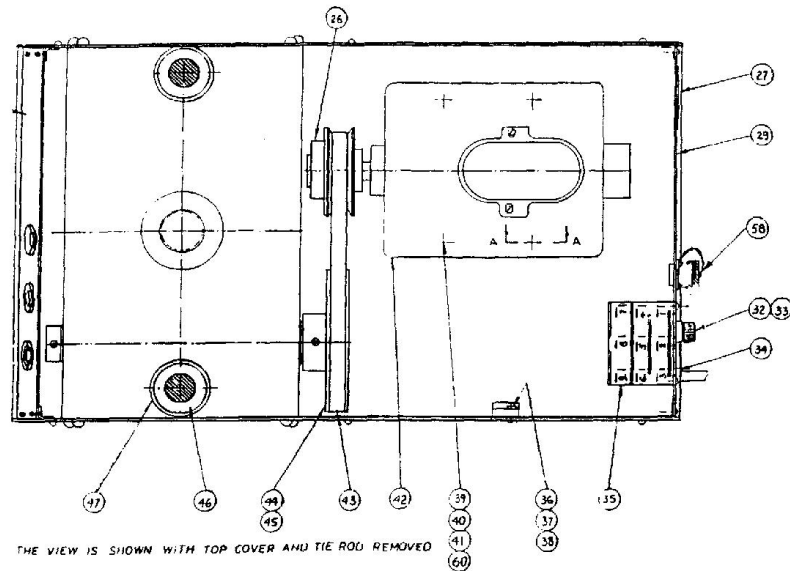
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Figure 1



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Figure 2



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Parts List

Item	Part No.	Description	Req./Unit
1	3205-0023	Upright Rod	2
2	9508-0022	1/4-20 x 2-1/2 Soc Hd Cap Scr	2
3	9601-0043	1" - 8 Hex Nut	2
4	*See Accessories	Proving Ring (sold separately)	1
5	*3205-0050	Penetration Piston (sold separately)	1
6	4944-0003	Lower Platen	1
7	9601-0042	1"-8 Hex Steel Jam Nut	2
8	9505-0049	#8-32 x 3/8 Rd Hd Mach Screw	6
9	9508-0010	1/4-20 x 3/4 Button Hd Soc Cap Screw	9
10	9704-0036	1/4-20 Lock Washer	9
11	3243-0001	Lower Frame	1
12	9504-0061	#6-32 x 1/2 Soc But Hd Cap Scr	8
13	9601-0022	3/8-16 Hex Nut	4
14	9401-0021	Leveling Foot	4
15	See Chart	Pilot Light, Red, 120V	1
16	9605-0001	#6-32 Speed Nut	8
17	0903-0035	Push Button Switch, Red	1
18	0903-0032	Push Button Switch, Green	2
19	0903-0033	Contact Block, F50	2
20	See Chart	Pilot Light, Green, 110V	2
21	0903-0034	Contact Block, F40	1
22	3243-0002	Cover	1
23	2205-0001	Wire Nut	5
24	5044-0006	Knurled Nut 1" - 8	4
25	3243-0003	Front Cover	1
26	8913-0012	Variable Pulley 5/8 Bore	1
27	9302-0034	Nameplate	1
29	3243-0056	Rear Cover	1
32	2008-0005	Fuse Holder, 20 Amp	1
33	See Chart	Fuse	1
34	9403-0003	Strain Relief (Bushing)	1
35	See Chart	Reversing Contactor	1
36	9505-0050	#8-32 x 5/8 Binder Hd Scr	2

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Item	Part No.	Description	Req./Unit
37	9601-0011	#8-32 Hex Nut (Keps)	6
38	1905-0009	Terminal Block	1
39	9512-0017	5/16-18 x 1 Carriage Bolt	4
40	9601-0057	5/16-18 Hex Nut	4
41	9701-0007	5/16 Flat Washer	4
42	See Chart	Motor	1
43	8923-0008	Drive Belt	1
44	8913-0017	Sheave 3/4 Bore	1
45	8928-0001	Key 3/16 x 3/16 x 1	1
46	9702-0047	Washer 1"	2
47	3243-0020	Gear Box Assembly	1
49	See Chart	Power Cord	1
50	3243-0007	Limit Switch Activator	1
51	4536-0020	Limit Switch	2
52	3243-0008	Limit Switch Bracket	1
53	9503-0009	#4-40 x 5/8 Round Hd Screw	4
54	9601-0001	#4-40 Hex Nut (Keps)	4
55	9702-0001	#4 Internal Tooth Lockwasher	4
56	5044-0003	Wiring Harness	1
58	3243-0055	X/T Contactor Cable	1
59	3205-0026	Crosshead	1
60	9702-0012	5/16 Lock Washer	4
61	9704-0032	#6 x 1/4" Fiber Washer	8

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Item	45-6829/01 (AP-170E8)	45-6829/02 (AP-170E)	45-6829/06 (AP-170E2)
15	0502-0019	0502-0018	0502-0019
20	0502-0023	0502-0020	0502-0023
33	1102-0020	1102-0021	1102-0020
35	1005-0008	1005-0007	1005-0008
42	8805-0033	8805-0037	8805-0037
49	3243-0011	3243-0010	3243-0011

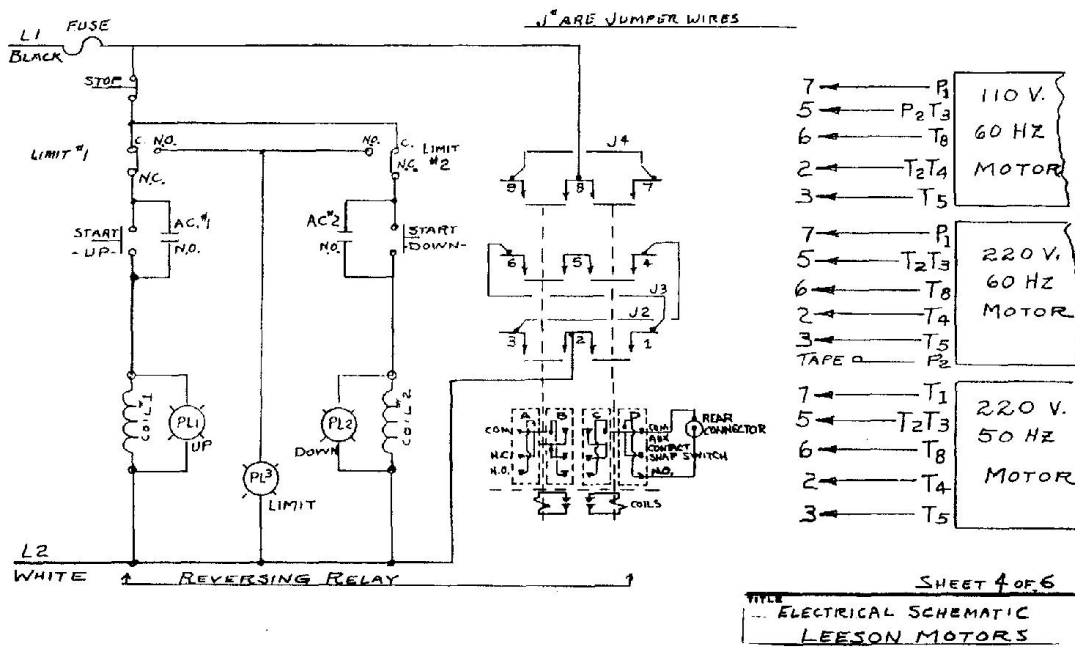
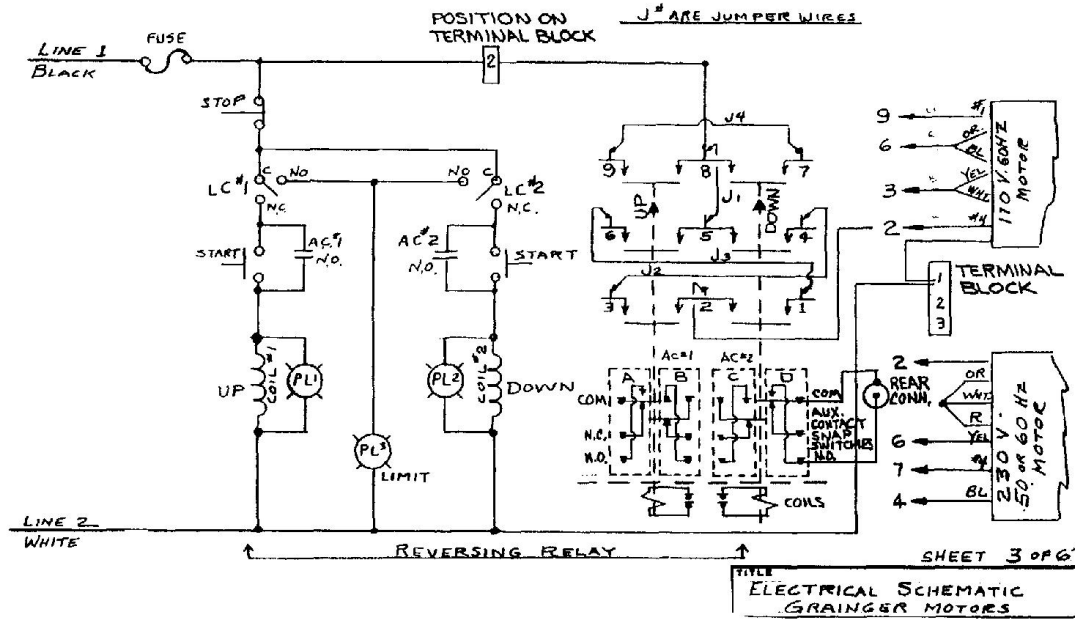
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Specifications

Frame Capacity	10,000 lbs. (44.5kN) maximum
Proving Ring	up to 11,240 (50 kN) capacity
Controls	Push-button; up/down/stop, with running and limit indicator lights
Motor	3/4 h.p.; reversible
Speed	2" (50.8mm) per minute
Travel	2.5" (64mm) maximum
Clearances	10" (64mm) between uprights; 7.5" (191mm) between platen and load piston
Overall Dimensions	14" w. x 23" d. x 40" h. (356 x 584 x 1016mm)
Housing	14" w. x 23" d. x 11" h. (356 x 584 x 279mm)
Weight	Net 185 lbs. (84kg.); Shpg. 200 lbs. (91kg)

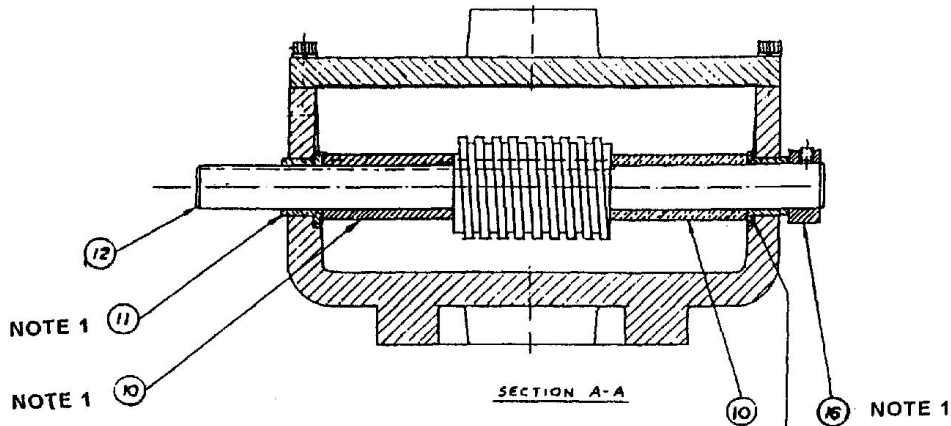
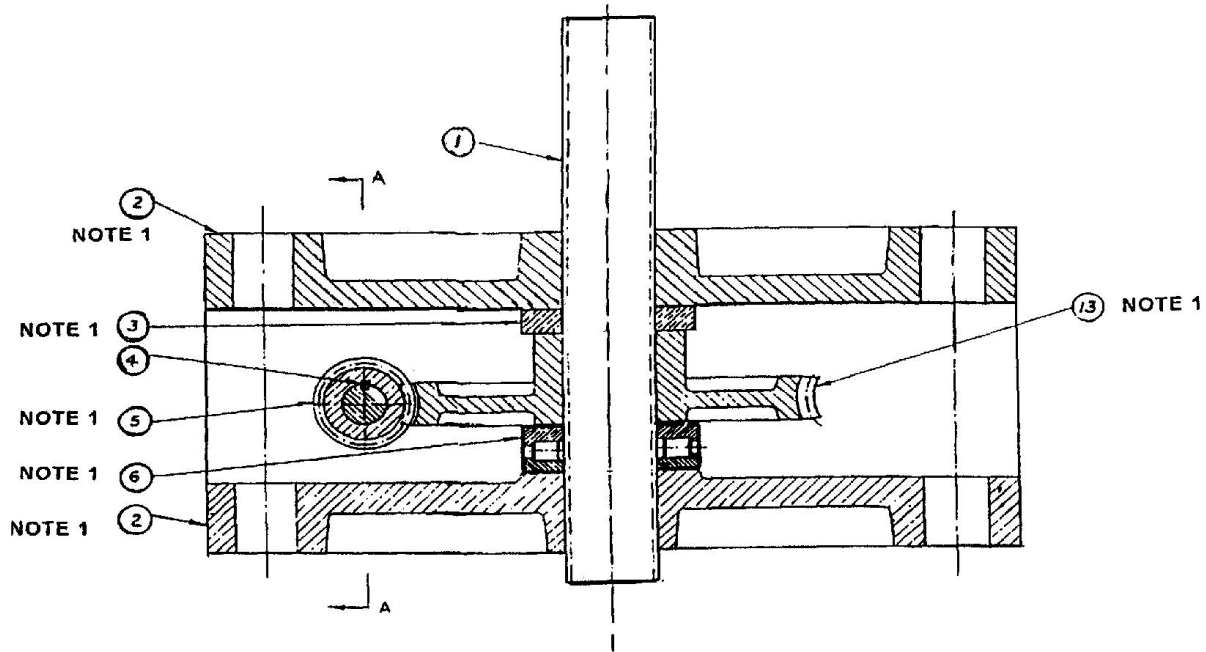
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Figure 3 -- Electrical Schematic



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Figure 4 -- Gear Box Assembly



WORM CLEARANCE ADJUSTMENT PROCEDURE.
 1. ASSEMBLE DRIVE SHAFT (1) SPACERS (10) AND WORM (5).
 2. USING FEELER GAGE MEASURE CLEARANCE IN WORM-SPACER ASS'Y.
 3. CLEARANCE MUST BE .005-.007, IF MORE SHIM IT AS SHOWN.

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NOTE 1: Brush with moly lubricant 9806-0021 all surfaces transferring load.
Parts List -- Figure 4

Item	Part No.	Description	Req'd.
1	3243-0013	Load Screw	1
2	3243-0023	Gear Box Housing Subass'y.	1
3	3205-0020	Spacer Bushing	1
4	8928-0009	Worm Key	1
5	8901-0011	Worm	1
6	8902-0014	Thrust Searing	1
7	9806-0021	Moly Lubricant (Not Shown)	as req'd.
8	9511-0037	#10-32 x 5/8 Soc. Hd. Cap Screw	1
9	3243-0019	Load Screw Key	1
10	3205-0039	Worm Spacer Bushing	2
11	8902-0013	Bronze Bearing	1
12	3243-0021	Drive Shaft	1
13	3243-0024	Worm Gear	1
14	3243-0022	Bearing	1
16	8906-0005	Set Screw Collar ½ ID	1

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