

CONTACT-MAKING AMPERE-HOUR METERS PIECE-PART DATA AND REPLACEMENT PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of the contact making ampere hour meters per KS-5098. It also covers approved procedures for replacing these parts.

1.02 Part 2 of this section covers the various parts which may be replaced in the field in the maintenance of this equipment. Part 2 also contains explanatory figures showing

the different replacement parts. This information is called "Replacement Parts". No attempt should be made to replace parts not designated.

1.03 Part 3 of this section covers the approved procedures for the replacement of the parts listed under part 2. This information is called "Replacement Procedures".

2. REPLACEMENT PARTS

2.01 The figures included in this part show the various replacement parts in their proper relation to other parts of the apparatus with their corresponding names.

2.02 When ordering replacement parts

give the complete nameplate data of the meter including the serial and "KS" number, using the name given in the figure, e.g. 1 - Upper pivot screw for type PBX ampere hour meter per KS-5098, Serial No. 4275699, 10 amperes, 48 volt thermocouple.

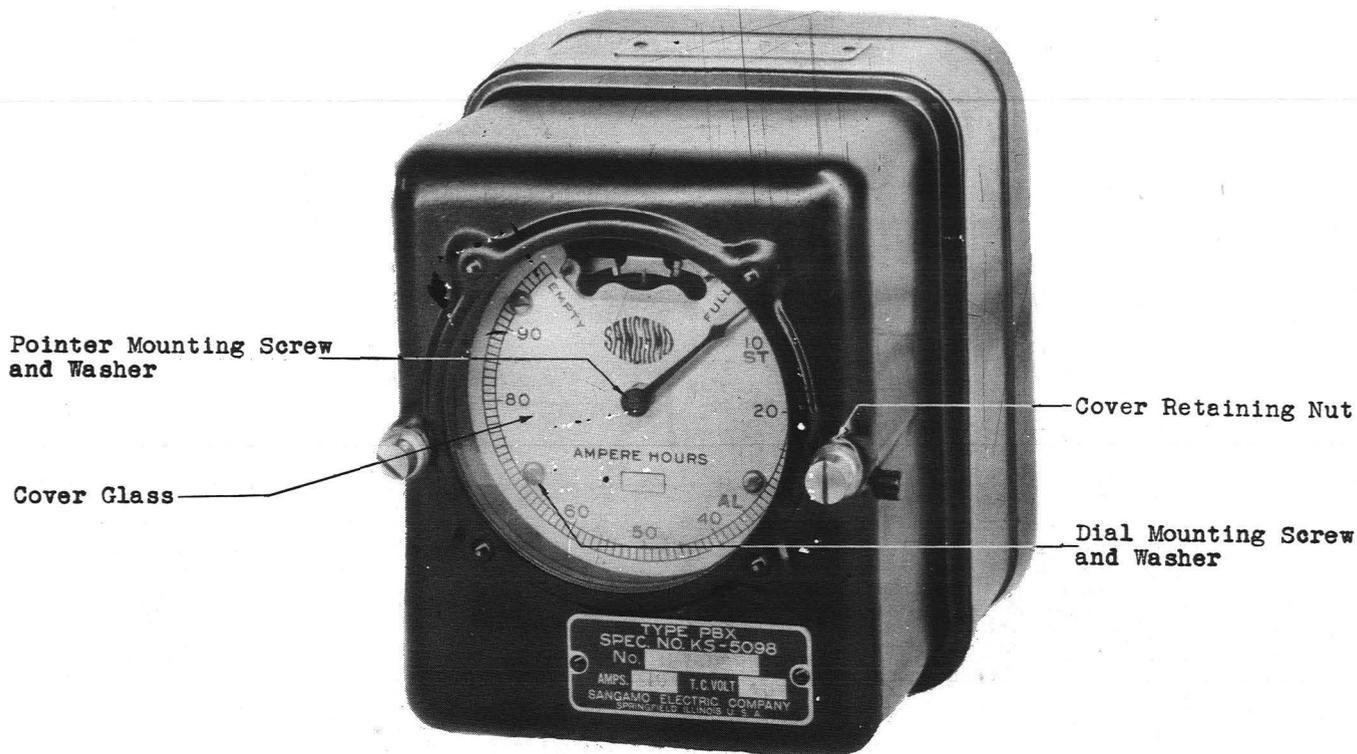


FIG. 1 CONTACT MAKING AMPERE HOUR METER

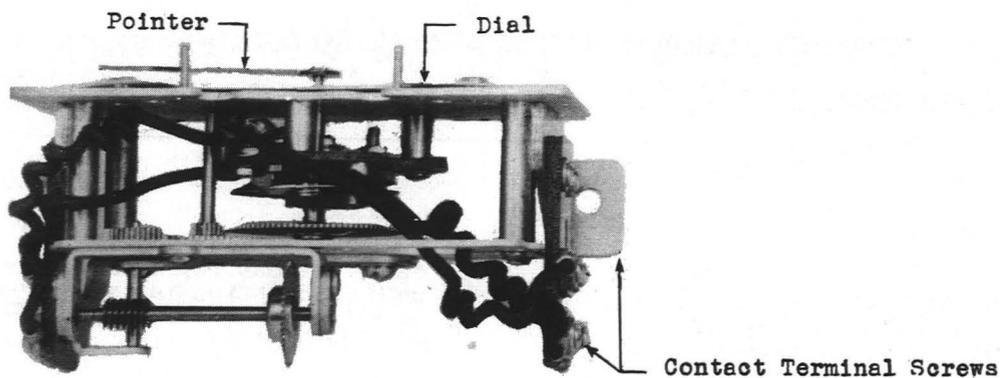


FIG. 2-A GEAR TRAIN WITH ONE MOVABLE CONTACT

NOTE: When Contact Mechanism Shown in Figure 2-A Requires Replacement, Replace Gear Train and Contact Mechanism With the Type Shown in Figure 2-B

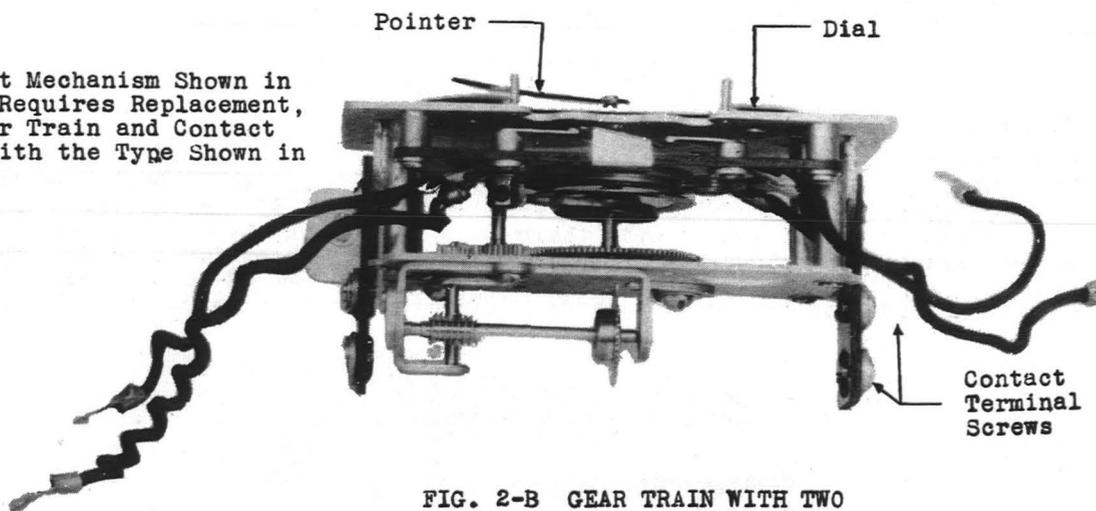


FIG. 2-B GEAR TRAIN WITH TWO MOVABLE CONTACTS



FIG. 3 THERMOCOUPLE

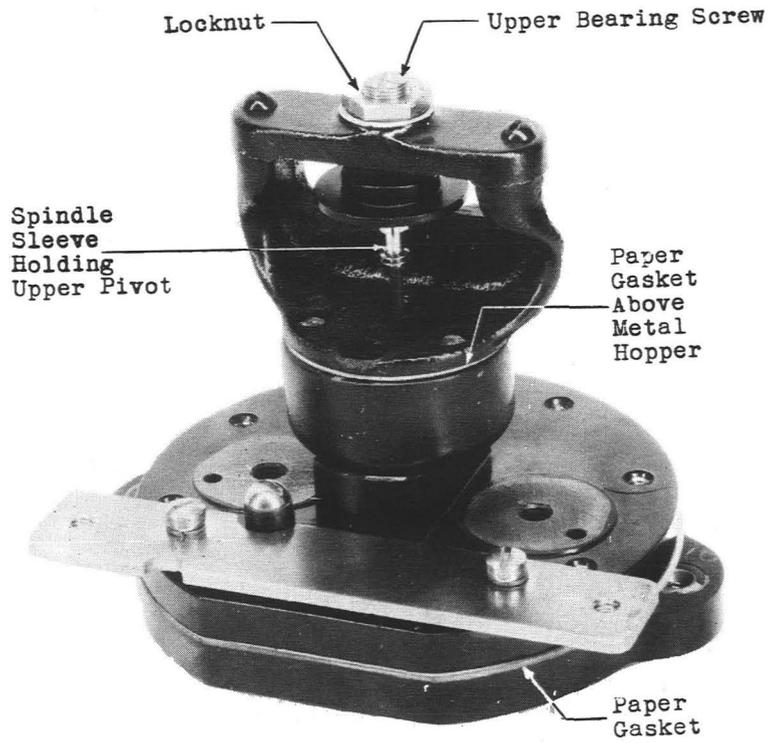


FIG. 4 ARMATURE ASSEMBLY

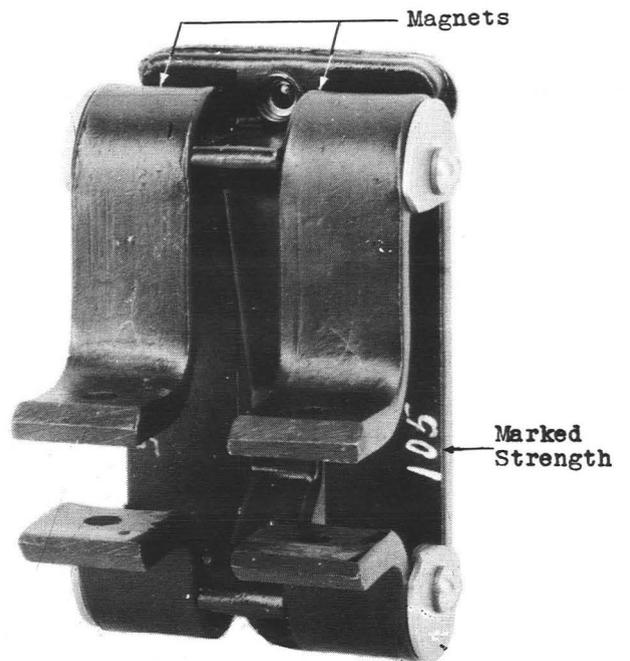


FIG. 5 MAGNETS ON MOUNTING FRAME

- 2.03 Miscellaneous parts such as screws, nuts, etc., which may have to be replaced are not illustrated but are listed below.

Main Positive Terminal Screws
Main Negative Terminal Screws
Mercury

Resistor Terminal Screws
Screws holding Cover Plate to Resistor
Resistor Locknut
Screws holding Yoke to Metal Hopper
Screws holding Upper and Lower Armature
Box

3. REPLACEMENT PROCEDURES

TOOLS

Pliers, Long Nose, P-6 1/2" A.T.&T. Co.
Std. Dwg. 46-X-56
Screw-driver, 4", A.T.&T.Co. Std. Dwg.
46-X-34
Screw-driver, Jeweler's
Wrench, Open End, Flat 1/2" Opening
Wrench, Open End, Flat 5/16" Opening

MATERIALS

Cloth, Twill Jean per KS-2423
Cup, Porcelain or Glass
Mercury, Triple Distilled
Oil, Nye's Watch
"Keeper" (Soft iron, Approx. 1" x 1/2"
x 1/32")

- 3.001 Before making any replacements it will be necessary to remove the cover by unscrewing the two filister head screws on the front of the meter.

- 3.002 After making any replacements of parts, the apparatus should be checked and where necessary, adjusted to meet the requirements specified in the associated Requirements and Adjusting Procedures.

- 3.002 The meter cover shall be replaced when replacements and adjustments are completed.

3.01 GLASS

M-1 Unscrew the nuts holding the retaining ring and remove the retaining ring and glass. Shellac that part of the glass which will be under the retaining ring and cover, replace the glass and fasten it in place with the retaining ring.

3.02 POINTER AND DIAL

M-1 Remove the screw and washer on the end of the pointer shaft and take off the pointer. The dial may now be replaced by taking out the four small

screws on the front of the dial. Replace the pointer or put on a new one if necessary, and put back the screw and washer on the end of the pointer shaft.

3.03 GEAR TRAIN

M-1 Take off the gear train and dial by disconnecting the colored contact leads (Noting their positions) from the plates at the side of the gear train and removing the screws which hold the train to the meter proper. Replace the train with one of the type shown in figure 2-B having the same ratio. If the dial and pointer are in good condition they shall be removed from the old train and placed on the new one following the method described in paragraph 3.02. Do not attempt to use the contact mechanism from the old gear train.

3.04 CONTACT MECHANISM

M-1 When the contact mechanism needs replacement the entire gear train shall be replaced by one of the type shown in figure 2-B.

3.05 THERMOCOUPLE

M-1 Remove the thermocouple connection to the gear train and the screws in the current terminals of the mercury motor element. Remove the thermocouple and light load adjustment and replace with a new one. Reassemble in the reverse order.

3.06 MAGNETS

M-1 Remove the gear train as covered in M-1 of paragraph 3.03. Remove the screws holding the leads to the main terminals in the base, take out the two large screws holding the main bracket and remove the meter unit.

3.06 (Continued)

Remove the thermocouple as covered in M-1 of paragraph 3.05 and remove the screws holding the resistor in position. Lift the resistor out and remove the large iron screws holding the magnet tips to the pole pieces in the main armature chamber. Lift out the armature chamber. Note the positions of the shims between the pole pieces and the magnet tips so that they may be replaced in the same order.

M-2 Remove the screws holding the permanent magnets to the main bracket and replace the magnets with new ones having the same marked strength as the originals. Reassemble the meter in the reverse order from which it was taken down.

3.07 PIVOTS AND BEARINGS

M-1 To replace an upper bearing, loosen the lock nut and unscrew the upper bearing. The upper pivot shall be replaced whenever the upper bearing is replaced. Remove the yoke bridge.

M-2 If the meter is of the type in which the counter-weight is fastened by a screw, loosen the screw and remove the counter-weight. Raise the spindle sleeve which carries the worm and upper pivot from the shaft and replace. Put back the counter-weight and tighten the set screw. Place a trace of watch oil on the upper pivot and replace the yoke bridge.

M-3 If the meter is of the type in which the counter-weight is threaded, hold the spindle sleeve with long nose pliers and unscrew the counter-weight by turning it counter-clockwise when viewed from above. Raise the spindle sleeve which carries the worm and upper pivot and replace. Hold the spindle sleeve with long nose pliers and screw on the counter-weight. Replace the yoke bridge.

M-4 Put in a new bearing screw and tighten until the rotating element bottoms lightly in the chamber. Then turn the screw back 1/2 to 3/4 of a full turn and tighten the locknut.

3.08 MERCURY

M-1 To replace the mercury, remove the screws holding the leads to the main terminals in the base, take out the two large screws holding the

main bracket and remove the meter unit. Disconnect the leads from the current terminals on the lower side of the armature assembly and remove the screws holding the resistor in position. Lift the resistor out and remove the large iron screws holding the magnet tips to the pole-pieces in the main armature chamber. The armature chamber shall then be lifted out of the magnets and a "keeper" shall be placed across the magnet tips until the armature is replaced. Do not remove the magnets from the main bracket. Remove the shims found beneath the lower magnet tips and the lower pole-pieces noting their positions so that they may be replaced in the same locations.

M-2 Remove the yoke bridge by taking out the two screws holding it to the yoke. If the meter is of the old design, loosen the set screw holding the counterweight, spindle sleeve and worm on the steel shaft and slip the counterweight from the shaft, taking care not to injure the upper pivot. If the meter is of the newer type, the counterweight may be unscrewed from spindle sleeve by holding the spindle sleeve with pliers and turning the counterweight in a counter-clockwise direction. Lift the spindle sleeve from the steel shaft. Dismantle the hopper yoke by unscrewing the screws holding it to the top of the metal hopper. Remove the screw in the filling well and pour the mercury into a clean glass or porcelain cup. Then remove the screws holding the halves of the armature box together. Separate the armature chamber, taking care not to injure the paper gasket, and remove the armature. Wipe out the armature chamber and clean the rotating element with cloth per KS-2423 making certain that the contact ears are bright. The flat end ring jewels and the lower jewel guide shall be cleaned with a brush or piece of pith. Care shall be taken to leave no foreign matter in these bearings or to damage the upper or lower pivots, steel shaft or armature. The lower pivot and pivot screw may be removed for inspection and shall be replaced if bent or damaged.

M-3 After all parts have been thoroughly cleaned and any defective parts replaced, screw the lower pivot firmly into the lower half of the armature box. Place the armature in position over the spindle and put on the upper half of the armature box, making sure that the paper gasket is not damaged. Tighten the holding screws with a lock washer under each and pour the mercury in through the hole in the filling well

3.08 (Continued)

until it comes to the top of the hole. Approximately four ounces will be required. Replace the screw in the filling well, the hopper yoke, spindle sleeve and counterweight. If the upper bearing screw is still in the yoke bridge, it shall be removed and the yoke bridge shall be put on the yoke. Place a trace of watch oil on the upper pivot for lubrication purposes and put in the upper bearing screw. Hold the worm on the spindle sleeve between the thumb and first finger and rotate the armature slowly. Turn the upper bearing screw until the armature bottoms lightly in the chamber. Then turn the upper bearing screw back one-half to three-quarters of a full turn and tighten the lock nut. The armature should now turn freely and it should be possible to force the armature down about $1/64$ " be-

fore the element strikes the bottom of the chamber. Reassemble the gear train on the meter, connect the thermocouple and remount the meter on the base.

M-4 To replace the mercury in the resistor, remove the bearing screw in the top of the resistor box and pour out the mercury into a clean glass or porcelain cup. Remove the screws holding the halves of the resistor box and lift off the top. Remove the resistor armature and wipe off with a brush or cloth per KS-2423. Wipe out the armature chamber and clean the pivot bearing. Reassemble the resistor in the reverse order, using new mercury. Approximately two ounces will be required. Care shall be taken that the paper gasket is properly placed and not injured.