

STANDARD ELECTRIC TIME COMPANY'S
S-1, S-1A, AND S-10 TIMERS
AND KS-8160 ELECTRIC STOP CLOCK
REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the Standard Electric Time Company's S-1, S-1A, and S-10 timers and the KS-8160 electric stop clock.

1.02 This section is reissued to include the S-1A and S-10 timers, and to revise the requirements and adjusting procedures covering the S-1 timer and the KS-8160 electric stop clock. Detailed reasons for reissue are shown at the end of the section. Since this reissue covers a general revision, the arrows ordinarily used to indicate changes have been omitted.

1.03 Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.

1.04 Asterisk: Requirements are marked with an asterisk () when to check for them would necessitate the dismantling or dismounting of the apparatus, or would affect the adjustment involved or other adjustments. No check need be made for these requirements unless the part is made accessible for other reasons or its performance indicates that such a check is advisable.

1.05 One dip of oil for the purpose of this section is the amount of oil retained on a KS-14164 brush after being dipped into the oil to a depth of $\frac{3}{8}$ inch and then scraped on the edge of the container to remove the surplus oil. There should not be sufficient oil adhering to the brush to form one drop on the end of the bristles.

1.06 Unless specifically noted, reference to timers in this section includes the KS-8160 electric stop clock.

1.07 The timers covered in this section are arranged for the timing of intervals of circuit opens and closures either directly from the circuit or under control of an external switch. Each of the timers is started and stopped by a clutch which permits the hands to move when the clutch magnet is operated. When the clutch magnet is released, a stop pawl on the clutch armature engages a knurled disc on a shaft associated with the hands and stops their movement. Since the clutch magnets are designed to operate only on specified dc voltages, care should be taken that the proper voltage is used when checking a timer. All timers have a manual reset lever or knob for resetting the hands. Some timers also have a reset magnet which may be operated by the reset button of an external switch of the type shown in Fig. 1.

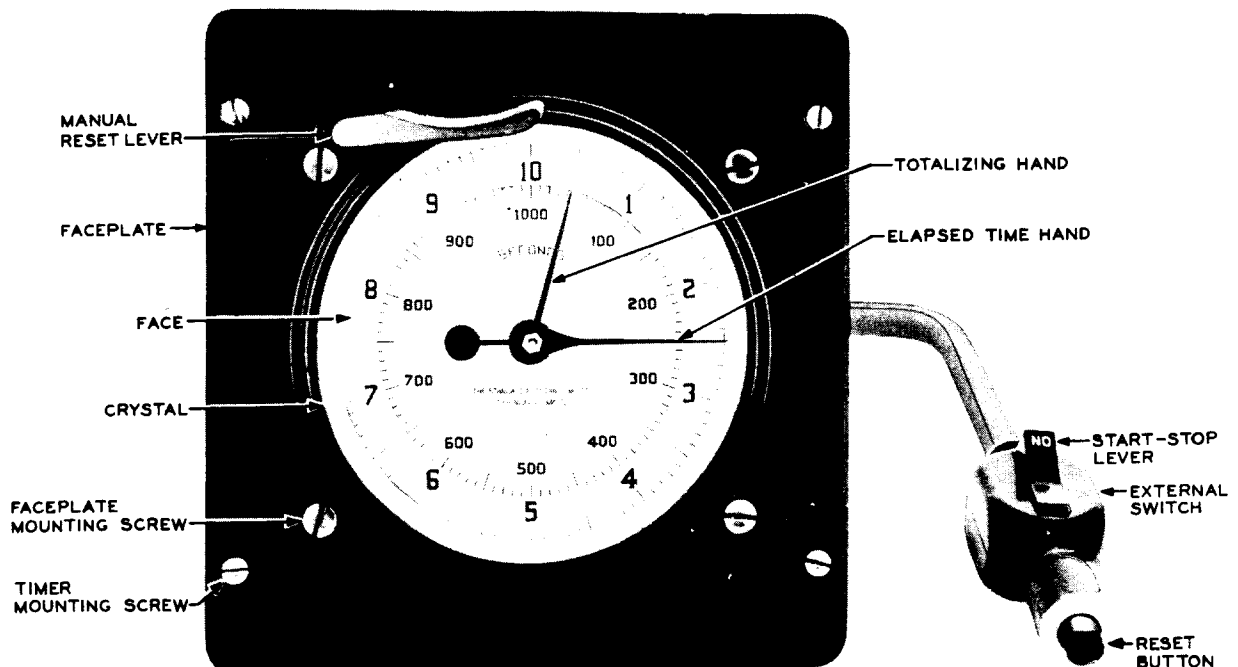


Fig. 1 - S-10 Timer and KS-8160 Electric Stop Clock

2. REQUIREMENTS

2.01 Cleaning: The timers shall be cleaned when necessary in accordance with approved procedures.

2.02 Lubrication

(a) Fig. 2(A) - The hairpin clutches shall be adequately lubricated with petrolatum. When lubrication is necessary, a light film of petrolatum shall be applied to each clutch.

(b) Fig. 2(B) - The teeth on the gear mating with the motor pinion shall be adequately lubricated with KS-6232 oil. When lubrication is necessary, one dip of oil shall be distributed over four gear teeth.

(c) The points listed below shall be adequately lubricated with KS-6232 oil. When lubrication is necessary one dip of oil shall be distributed over two or three of the bearings listed below:

Reset Shaft Bearings - Fig. 2(C)

Bearings of Reset Lever Rollers - Fig. 3(A)

(d) Recommended Lubrication Intervals:

After turnover, it is recommended that the parts listed in requirements (a), (b), and (c) be lubricated at intervals of one year. This interval may be extended if periodic inspections have indicated that local requirements will be met during the extended interval.

2.03 Freedom of Movement

(a) Fig. 1 - The elapsed-time and totalizing hands shall not interfere with each other, the face, or the crystal.

Gauge by eye.

*(b) All moving parts shall be free from bind.

Gauge by eye and feel.

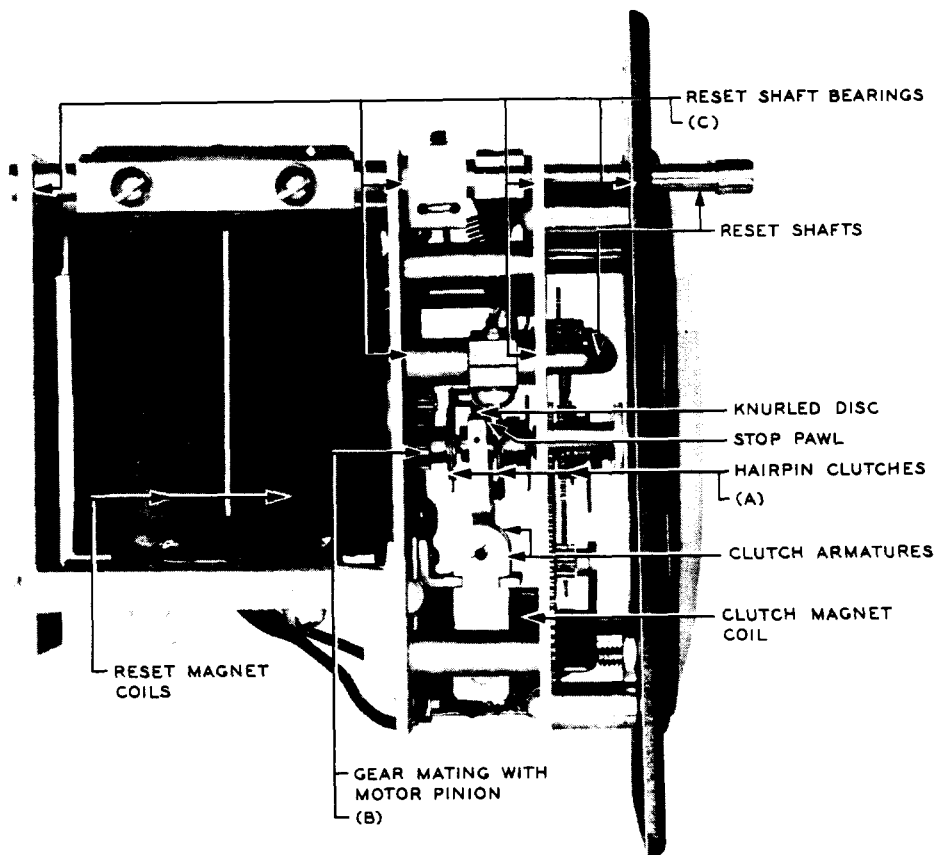


Fig. 2 - Timer Mechanism Having Clutch With Two Armatures - Side View

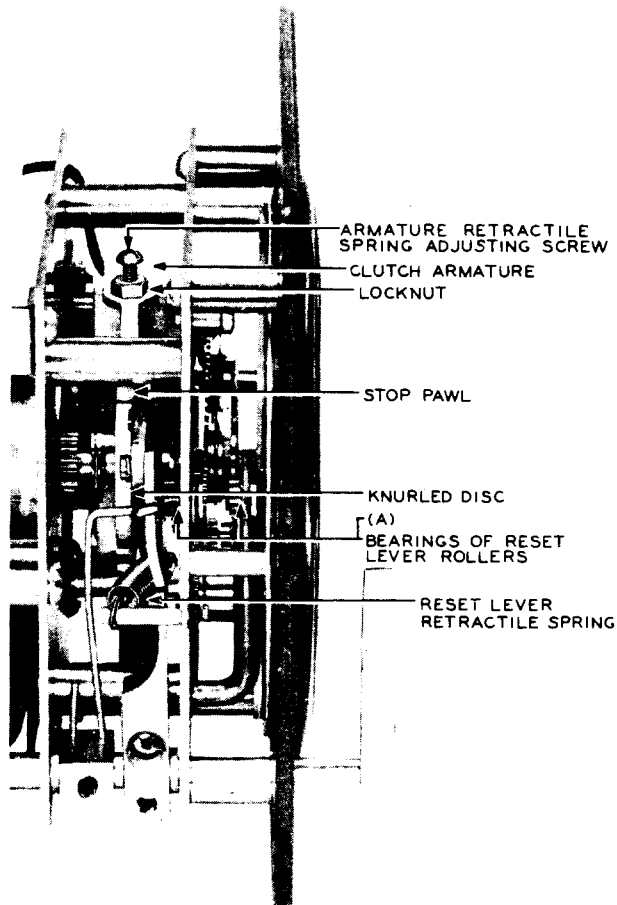


Fig. 3 - Timer Mechanism Having Clutch With Two Armatures - Top View

2.04 Accuracy of Timer: During continuous operation, the timer shall not gain or lose any time during an interval of 100 seconds.

To check this requirement use an electric clock of known accuracy operating at the same frequency as the timer.

2.05 Movement of Elapsed-time and Totalizing Hands

(a) With the clutch magnet electrically operated, the elapsed-time and totalizing hands shall rotate.

Gauge by eye.

(b) When the clutch magnet is released, the elapsed-time and totalizing hands shall stop.

Gauge by eye.

2.06 Operation of Reset Mechanism

(a) When the manual reset lever is fully depressed, the two hands shall restore to their normal position where:

(1) On S-1 and S-1A timers the elapsed-time hand is in line with the 100 mark on the 1/100-second division scale and the totalizing hand is in line with the 60 mark on the one-second division scale.

(2) On S-10 timers and KS-8160 electric stop clocks the elapsed-time hand is in line with the 10 mark on the 1/10-second division scale and the totalizing hand is in line with the 1000 mark on the 10-second division scale.

Gauge by eye.

Note: If either the elapsed-time or the totalizing hand is 180 degrees from its normal position, the hands may not restore to normal when resetting is attempted. If they do not restore under this condition, either allow the hands to rotate further before attempting to reset them again or operate the reset mechanism several times.

(b) On timers equipped with a reset magnet, the hands shall restore to their normal position as covered in (a) when the reset magnet is electrically operated.

Gauge by eye.

See note covered in (a).

2.07 Position of Manual Reset Lever: After the manual reset lever is fully depressed and released, it shall restore to its unoperated position. This requirement is considered met if rotation of the hands causes no movement of the lever after it has been released from its fully depressed position.

Gauge by eye.

3. ADJUSTING PROCEDURES

3.001 List of Tools and Materials

Code or Spec No.	Description
48	Combination 7/32-inch and 1/4-inch Hex. Double-end Socket Wrench and Screwdriver
485A	Smooth-jaw Pliers
KS-14164 (Two Required)	Brush
-	3-inch Cabinet Screwdriver

Materials

KS-2423	Cloth
KS-6232	Oil
KS-7860	Petroleum Spirits
-	Petrolatum

3.002 Removing Timer From Mounting: When necessary to remove the timer from its mounting, proceed as follows:

(a) Timers With Mounting Screws on Faceplate: Fig. 1 - Remove the timer mounting screws using the 3-inch cabinet screwdriver. Remove the timer from its mounting pulling it out as far as the leads will permit.

(b) Timers With Mounting Screws at the Rear: Remove the manual reset lever from its shaft by turning it counterclockwise. Remove the rear cover mounting screws using the 3-inch cabinet screwdriver or the screwdriver portion of the No. 48 combination wrench and screwdriver. Remove the rear cover from the case. If the timer is equipped with a terminal strip fastened to the inside of the case, remove the terminal strip mounting screws using the 3-inch cabinet screwdriver and remove the terminal strip. Loosen or remove, as required, the screws which mount the timer to the case and remove the timer.

3.01 Cleaning (Rq 2.01)

(1) Clean the external parts of the timer with a clean KS-2423 cloth.

(2) Cleaning Face of Timer and Inner Surface of Crystal: Remove the timer from its mounting. On timers having a faceplate, remove the manual reset lever by turning it counterclockwise on its shaft and remove the faceplate mounting screws with the 3-inch cabinet screwdriver and remove the faceplate. Wipe the face and the inner surface of the crystal with a clean KS-2423 cloth, taking care not to bend the hands when cleaning the face.

(3) Clean the internal parts of the timer with a clean KS-14164 brush.

3.02 Lubrication (Rq 2.02)

(1) Lubricate the various parts with the specified lubricant applied with the KS-14164 brush.

3.03 Freedom of Movement (Rq 2.03)

(1) If the hands interfere with each other, the crystal, or the face, remove the timer from its mounting. On timers having a faceplate, remove the manual reset lever by turning it counterclockwise on its shaft and remove the faceplate mounting screws with the 3-inch cabinet screwdriver and remove the faceplate. Adjust the hands as required using the No. 485A smooth-jaw pliers.

(2) If other parts of the timer bind, make sure that the parts for which lubrication is specified in requirement 2.02

are properly lubricated. If the lubrication is satisfactory and the parts still bind, replace the timer.

3.04 Accuracy of Timer (Rq 2.04)

(1) If the timer fails to keep accurate time, replace the timer.

3.05 Movement of Elapsed-time and Totalizing Hands (Rq 2.05)

(1) Failure to meet the requirements may be due to faulty electrical connections, a defective external switch (if a switch is provided), or failure of the clutch to operate or release satisfactorily.

(2) If electrical connections are faulty, correct them as required.

(3) If the external switch is defective, replace the switch.

(4) Clutch Operation: Failure of the armature to operate when the clutch magnet circuit is closed may be due to a defective coil or excessive armature retractile spring tension. If the coil is defective, replace the timer. If failure is due to excessive spring tension, decrease the tension as covered in (6) or (7).

(5) Clutch Release: Failure of the armature to release when the clutch magnet circuit is opened may be due to insufficient armature retractile spring tension. If failure is due to insufficient spring tension, increase the tension as covered in (6) or (7).

(6) Clutch With Two Armatures: To decrease or increase the armature retractile spring tension, proceed as follows. Using the No. 48 combination wrench and screwdriver, loosen the locknut on the adjusting screw and turn the screw in or out to decrease or increase the spring tension as required. Securely tighten the locknut. After decreasing the tension, check that the clutch releases. After increasing the tension, check that the clutch operates.

(7) Clutch With One Armature: To decrease or increase the armature retractile spring tension, proceed as follows. Raise the adjusting screw with the screwdriver portion of the No. 48 combination wrench and screwdriver, as shown in Fig. 4, until the adjusting nut clears the two embossings on the armature. Then, turn the nut up or down with the finger to decrease or increase the spring tension as required. Release the screw and make sure that the nut rests between the embossings. After decreasing the tension, check that the clutch releases. After increasing the tension, check that the clutch operates.

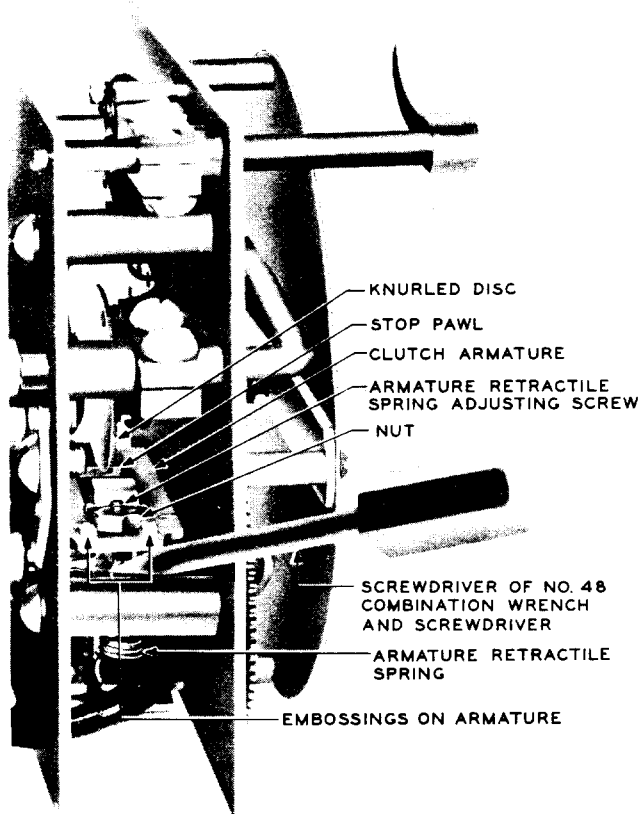


Fig. 4 - Timer Mechanism Having Clutch With One Armature - Adjustment of Armature Retractable Spring Tension

3.06 Operation of Reset Mechanism (Rq 2.06)

All Timers

(1) Fig. 2 - Failure of either hand to restore to normal when the manual reset lever is depressed, may be due to bind of the reset shafts in their bearings. If this is due to dirt in the bearings, flush the bearings with KS-7860 petroleum spirits applied with a KS-14164 brush. Remove the dirt with a clean KS-2423 cloth and lubricate the bearings as covered in 3.02. If the operation of the reset mechanism is still unsatisfactory, replace the timer.

Timers Equipped With A Reset Magnet

(2) Failure of either hand to restore to normal when the reset magnet is electrically operated may be due to bind in the bearings, faulty electrical connections, a defective reset magnet coil, or a defective external switch.

(3) If there is bind in the bearings, proceed as covered in (1).

- (4) If the electrical connections are faulty, correct them as required.
- (5) If a coil is defective, replace the timer.
- (6) If the external switch is defective, replaced the switch.

3.07 Position of Manual Reset Lever (Rq 2.07)

- (1) Failure to meet the requirement may be due to bind in the reset shaft bearings or to a defective reset lever retractile spring.
- (2) If there is bind in the shaft bearings, proceed as covered in 3.06(1).
- (3) If the retractile spring is defective, replace the timer.

REASONS FOR REISSUE

1. To add a paragraph defining "timer" as used in this section (1.06).
2. To add a paragraph giving general information on the timers covered (1.07).
3. To revise Figs. 1, 2, and 3.
4. To delete Fig. 4 of previous issue and Figs. 1 and 2 of the addendum.
5. To revise (a) and (b) of the requirement covering movement of hands (2.05).
6. To revise the requirement covering operation of reset mechanism (2.06).
7. To revise the requirement covering position of manual reset lever (2.07).
8. To delete the requirement covering operation of braking mechanism (2.08 of previous issue).
9. To revise the list of tools (3.001).
10. To add a procedure covering removal from mounting of timers with mounting screws at the rear [3.002(b)].
11. To revise cleaning procedures (3.01).
12. To revise the procedure covering movement of hands and to add a procedure for adjusting retractile spring tension of clutches with one armature (3.05).
13. To add a figure illustrating adjustment of retractile spring tension on clutches with one armature (Fig. 4).
14. To revise the procedures covering operation of reset mechanism (3.06).