BELLS, CHIMES, AND SIGNALS

SOLENOID TYPE

REQUIREMENTS AND ADJUSTING PROCEDURES

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1. GENERAL

1.01 ◗This section covers KS-5595, KS-6918, KS-6919, KS-6920, KS-7228, KS-7752, and KS-20375 solenoid-type bells, KS-5594 and KS-8229 solenoid-type signals, and KS-22001 solenoid-type chimes.◖

1.02 This section is reissued for the following reasons:

- To add coverage on the KS-8229 signals
- To add coverage on the KS-20375 bells
- To add coverage on the KS-22001 chimes.

Revision arrows have been used to emphasize the more significant changes. The Equipment Test List is not affected.

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 apparatus or would affect the adjustment involved or other adjustments. No check need be made for these requirements unless the apparatus or part is made accessible for other reasons or its performance indicates that such a check is advisable.

1.05 ◗For further information on the KS-8299, L13, L14, L15, and L23 signals (Mfr Disc.), the KS-20375, L1, bells, and the KS-22001, L1 through L7 chimes, see Section 463-110-100.◖

2. REQUIREMENTS

2.01 *Cleaning*

(a) The contacts of the bell shall be cleaned when necessary in accordance with other sections covering cleaning of relay contacts and parts.

(b) Other parts of the bell or signal shall be cleaned in accordance with approved procedures.

*2.02 ***Contact Alignment:*** Figure 1(A)—The point of contact shall fall wholly within the boundary of the opposing contact.

Gauge by eye.

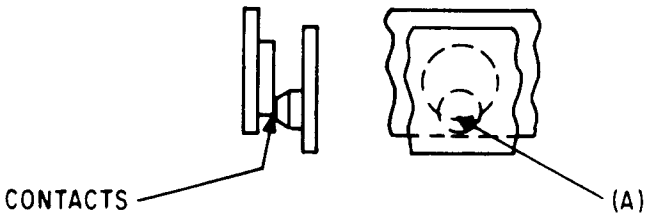

Fig. 1—Contact Alignment Requirements

2.03 *Back Contact Stud Clearance: The back contact stud shall not rub on the spring through which it passes.

Gauge by eye and feel.

2.04 *Straightness of Springs: Figure 2(A)—All springs shall be free of sharp bends or kinks due to adjustment. A gradual bow in a spring is permissible.

Gauge by eye.

2.05 *Separation Between Springs: Figure 2(B)—There shall be a clearance between the operating spring and the stop spring whether in the operated or unoperated position of

Min 0.010 inch

Gauge by eye.

2.06 *Contact Pressure: Figure 2(C)—There shall be a pressure between closed contacts of

Min 20 grams

Use the No. 70-D gram gauge.

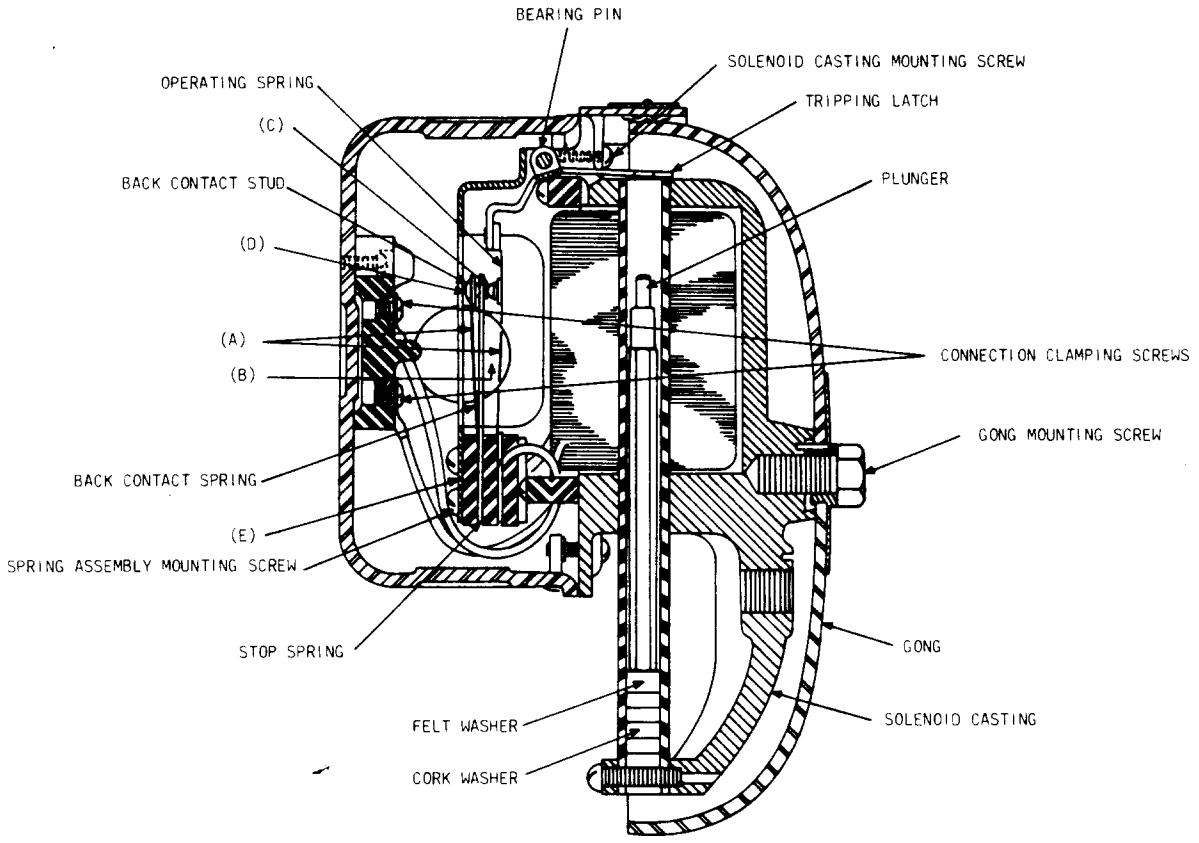

Fig. 2—Self-Interrupting Solenoid-Type Bells

*2.07 ***Contact Follow:*** Figure 2(D)—There shall be a follow on the back contact of

Test - Min 0.008 inch

Readjust - Min 0.010 inch

Gauge by eye.

2.08 ***Tightness of Spring Assembly:*** Figure 2(E)—All springs in a given assembly shall be held in their relative positions to one another by being securely fastened to the mounting bracket at their bases.

*2.09 ***Freedom of Movement:***

(a) ***Bells and Signals:*** The plunger shall move freely in the plunger tube.

(b) ***Bells:*** The tripping latch shall move freely on its bearings.

Gauge by feel.

*2.10 ***Position of Xylophone Bar (Signals):*** Applicable only to signals with cords supporting the bar and with cords held by being knotted against the mounting posts and not by an extension spring. Figure 3(A)—The distance between the bottom surface of the bar and the top surface of the solenoid casting at each end shall be

Min 1/2 inch
Max 9/16 inch

Use the R-8550 scale.

Gauge by feel.

2.11 ***Electrical Requirements:*** The bell or signal shall give a clear tone when the circuit through the solenoid is closed.

3. APPARATUS

3.01 *List of Tools, Gauges, and Materials:*

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
236	9/16-inch Hex Open Single-end Offset Wrench
417A	1/4-inch and 3/8-inch Hex Open Double-end Flat Wrench
418A	5/16-inch and 7/32-inch Hex Open Double-end Flat Wrench
KS-8097	5/8-inch and 7/16-inch 12-point Box Wrench
KS-6015	Duck-bill Pliers, 6 inches
-	Long-nose Pliers, 6-1/2 inches
AT-7825	3-inch C Screwdriver
AT-7825	4-inch E Screwdriver
GAUGES	
70D	50-0-50 Gram Gauge
R-8550	Scale, Steel, 5 inches
MATERIALS	
KS-7860	Petroleum Spirits
KS-14666 (or replaced D-98063) or KS-2423	Cloth
KS-6232	Oil
-	Toothpicks, Hardwood, Flat at One End and Pointed at Other
-	Wood, Thin, Round, 6 inches Long

4. ADJUSTING PROCEDURES

4.01 In order to check or adjust a bell, signal, or chime, remove the solenoid casting or chime housing from the container. (For bells, first remove the gong mounting screw with the No. 417A, No. 236, or KS-8097 wrench and remove the gong.) Remove the solenoid casting mounting screws with the 3 inch C screwdriver and remove the casting. Then while holding the casting, loosen the connection clamping screws with the 3 inch screwdriver and remove the wires from under the screws. After adjustments have been made, remount the parts in reverse order of disassembly.

4.02 ***Cleaning:*** (Requirement 2.01)

(1) Clean the contacts in accordance with other sections covering cleaning of relay contacts and parts.

(2) Clean the exterior of the bells, signals, and chimes with a clean dry KS-14666 cloth.

(3) Clean the tripping latch bearings by flushing them with petroleum spirits applied with a clean toothpick.

4.03 ***Contact Alignment:*** (Requirement 2.02)

4.04 ***Back Contact Stud Clearance:*** (Requirement 2.03)

If the contacts do not line up properly or if the back contact stud rubs on the stop spring, loosen the spring assembly mounting screws with the 3 inch C screwdriver sufficiently to shift the springs so as to correct the fault. Tighten the spring assembly clamping screws securely.

4.05 ***Straightness of Springs:*** (Requirement 2.04)

4.06 ***Separation Between Springs:*** (Requirement 2.05)

(1) Do not straighten kinked springs unless the kink interferes with the proper adjustment of the spring assembly. Removing kinks tends to weaken the spring and shorten the life of the spring assembly.

(2) If the springs are not straight or if there is insufficient clearance between the springs, correct by adjusting the spring as follows: In the case of a bowed spring, apply the KS-6015 duck-bill pliers at the far end of the bow and adjust the spring slightly in the opposite direction to the bow and then, while applying only enough pressure to hold the spring away from any support, draw the pliers along the length of the bow pausing momentarily at each 1/16 inch of the spring to apply a slightly greater pressure than the drawing pressure in a direction opposite the bow. Repeat this operation until a satisfactory adjustment has been obtained. If the spring is bent, follow the same procedure as outlined for a bowed spring, except that it will only be necessary to adjust the spring from approximately 1/4 inch beyond the bend to approximately 1/4 inch in front of the bend.

4.07 ***Contact Pressure:*** (Requirement 2.06)

4.08 ***Contact Follow:*** (Requirement 2.07)

(1) If the contact pressure or follow is unsatisfactory, place the KS-6015 duck-bill pliers on the front end of the spring but back of the contact and slide it back to a point about 1/4 inch from where the spring leaves the spring assembly. Adjust the spring at this point with a slight twist to the left or right as required, exercising care not to disturb adjacent springs. When a satisfactory adjustment cannot be obtained in this manner, distribute the tension by adjusting the spring as outlined in paragraph 4.06, giving the spring its final adjustment at a point approximately 1/4 inch from the point where the spring leaves the spring assembly.

(2) Normally, straight springs that have been adjusted should have no sharp kinks due to adjustment. A gradual bow, however, is permissible.

4.09 ***Tightness of Spring Assembly:*** (Requirement 2.08). If necessary, tighten the assembly screws with the 3 inch C screwdriver.

4.10 ***Freedom of Movement:*** (Requirement 2.09)

(1) If the plunger does not move freely in its plunger tube, proceed as follows:

(2) ***On bells,*** remove the bearing pin locks from the tripping latch and remove the tripping latch bearing pin with the long-nose pliers. Remove the tripping latch and the plunger.

(3) Clean the plunger and plunger tube with a KS-14666 cloth slightly moistened with petroleum spirits. Cleaning the plunger tube may be facilitated if the KS-14666 cloth is wrapped around a thin round piece of wood.

(4) After cleaning the plunger and plunger tube, insert the plunger in the plunger tube. Remount the tripping latch so that the stud on the end of the latch bears against the contact side of the operating spring. Remount the bearing pin and bearing pin locks with the long-nose pliers.

(5) ***On signals*** with the internal tone control screw [Fig. 4(A)], loosen the solenoid casting mounting screws with the 4 inch E screwdriver and remove the casting and resonator box. Remove the locating nuts (Fig. 3) with the No. 417A wrench and remove the solenoid casting. Remove the plunger by turning the solenoid up-side-down. Clean the plunger and tube as outlined in (3). Remount the parts in reverse order of disassembly.

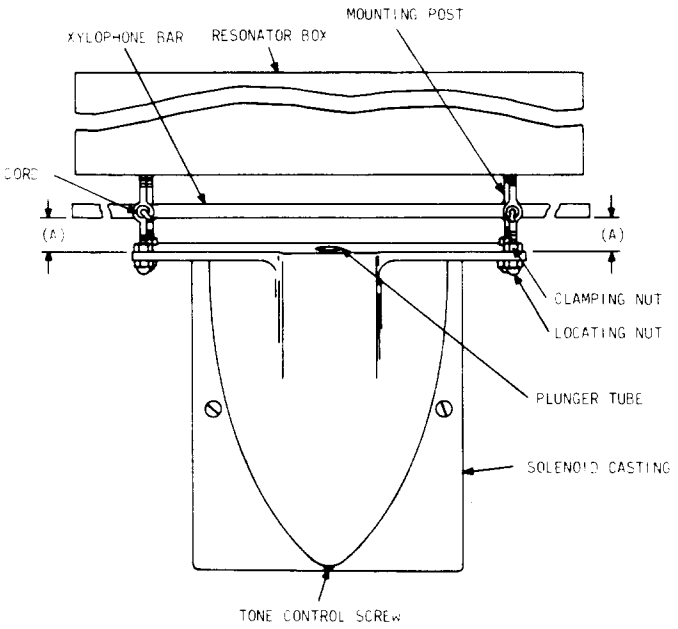

Fig. 3—Xylophone Bar-Type Signal

(6) ***On signals*** with the external tone control screw [Fig. 4(B)], remove the screw holding the plate assembly with the 3 inch C screwdriver. Removal of the plate assembly will allow the plunger to drop out from the bottom of the plunger tube. Clean the plunger and tube as outlined in (3). Reassemble the parts in reverse order of disassembly.

(7) ***On chimes,*** remove the chime cover using the 3 inch C screwdriver. Remove the four screws holding the plunger solenoid with the 3 inch C screwdriver, and swing the solenoid clear of the resonator bar. Turn the chime upside-down and remove the plunger. Clean the plunger and plunger tube as outlined in (3). Remount the parts in reverse order of disassembly.

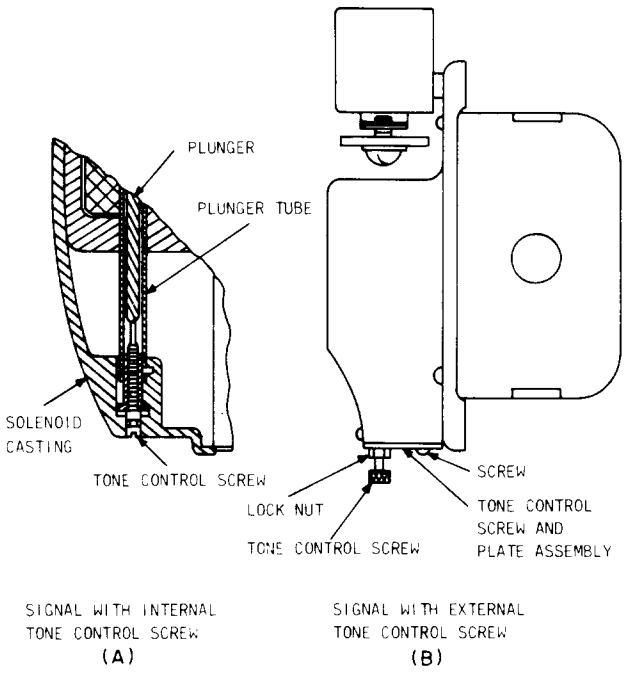

Fig. 4—Illustrating Tone Control Adjustment on Signals

4.11 ***Position of Xylophone Bar (Signals):*** (Requirement 2.10). Applicable only to signals as covered under Requirement 2.10. If the clearance between the solenoid casting and the xylophone bar is not satisfactory, adjust as follows. If the cords which support the bar are loose, tighten them. Tie the cords with double knots. Take care not to tie the cords too tight or the bar will bind on the cords. If the requirement is still not met,

loosen the clamping nuts and position the locating nuts as required with the No. 417A wrench. Tighten the clamping nuts securely.

4.12 ***Electrical Requirements:*** (Requirement 2.11)

(1) ***General:*** The bells and signals are designed to operate satisfactorily on the voltages specified in the following table. If failure of a bell or signal occurs, it may be due to the voltages being outside these limits and consideration should be given to checking and, if necessary, correcting the voltages before readjusting the apparatus.

BELLS, SIGNALS, AND CHIMES (NOMINAL VOLTAGE)	VOLTS	
	MIN	MAX
24 d-c	20 d-c	28 d-c
48 d-c	40 d-c	56 d-c
18 (60 Hz)	16 (60 Hz)	20 (60 Hz)
24 (60 Hz)	22 (60 Hz)	26 (60 Hz)
112 (60 Hz)	108 (60 Hz)	122 (60 Hz)

(2) The tone volume on the signals may be adjusted by the tone control screw. Turn the screw clockwise to decrease the volume and counterclockwise to increase the volume. On signals in accordance with Fig. 4(A), use the 3 inch C screwdriver to turn the screw. On signals in accordance with Fig. 4(B), loosen the locknut with the 418A wrench, hand turn the screw, and then retighten the locknut.

(3) Failure of the signal to give a good clear tone may be due to lack of clearance between the plunger tip and the xylophone bar after the impact. This condition would result from improper positioning of the bar with respect to the solenoid casting. Correct for this condition as outlined in paragraph 4.11 only on signals covered under paragraph 4.11.

(4) Failure of a bell or signal to give a satisfactory tone may be due to the plunger sticking in the plunger tube due to a dirty gummy substance collecting on the plunger surface. To clean the plunger and the plunger tube, proceed as outlined in paragraph 4.10.

(5) Failure of a bell to give a good continuous signal may be due to excessive tension of the operating spring resulting in the failure of the contact to open. Correct this condition by adjusting the operating spring as outlined in paragraph 4.07.

(6) Bind in the bearing of the tripping latch of the bell may result in failure to give a good continuous signal. If necessary, remove the bearing pin as outlined in paragraph 4.10 and wipe it with a cloth which has been dampened with KS-6232 oil. Remount the parts.