



**KS-14593, LIST 1**  
**MESSAGE REGISTER CAMERA**  
**REQUIREMENTS AND ADJUSTING PROCEDURES**

**1. GENERAL**

**1.001** This addendum supplements Section 030-301-701, Issue 2-D. The attached pages must be inserted in the section in accordance with the filing instructions above.

**1.002** This addendum is issued to change cross references to Section 030-335-301 to refer to Section 030-301-301 instead.

**2. REQUIREMENTS**

The following change applies to Part 2 of the section:

- (a) 2.17 and 2.18 — revised

**4. GENERAL INFORMATION**

The following change applies to Part 4 of the section:

- (a) 4.01 — revised

**Attached:**

Page 7 dated October 1963, reissued.  
Page 8 dated October 1963, revised.  
Page 15 dated October 1963, revised.  
Page 16 dated October 1963, revised.

(b) With the cam release lever held against its front stop, the motor-solenoid switch actuator shall have some additional forward movement.

Gauge by feel.

To check this requirement, hold the cam release lever against the stop and press on the switch actuator with a KS-6320 orange stick to determine whether the actuator has further forward movement.

#### **Readjust**

\* (a) The motor-solenoid switch shall operate when the cam release lever is manually operated against a 0.010-inch gauge held across the face of the lever front stop.

Use the KS-6909 gauge.

To check the requirement, remove the image chamber from the camera as covered in 3.006. Hold the 0.010-inch feeler of the KS-6909 gauge across the face of the stop, operate the cam release lever, and listen for the click indicating operation of the motor-solenoid switch.

\* (b) Fig. 6(D) — With the cam release lever held against the lever front stop, the motor-solenoid switch actuator shall have additional travel of

Min 0.005 inch

Gauge by eye.

To check the requirement, remove the image chamber from the camera as covered in 3.006. Hold the cam lever against its stop and move the switch actuator to its fully operated position. Observe the clearance between the lever and the actuator at the closest point.

#### **2.11 Release of Metering Roller Cam**

(a) With the camera prepared for operation as covered in 1.10, the indicator of the meter in the power unit set in the middle of the green range on the meter scale, and after the camera has been operated once by pulling the trigger, the following requirement shall be met. A pull of 525 grams applied to the cam release lever approximately 1/4 inch from the top of the lever in the direction to operate the lever shall not release the metering roller cam and a pull of 825 grams shall release the cam.

Use the No. 79B gauge.

\* (b) With the image chamber removed from the camera and the specified pull applied to the cam release lever approximately 1/4 inch from the top of the lever in the direction to operate the lever, the cam release lever shall not leave the delay magnet with a pull of 450 grams and shall leave the magnet with a pull of 700 grams.

Use the No. 79B gauge.

To check the requirement, remove the image chamber from the camera as covered in 3.006.

\* (c) With the image chamber removed from the camera, the cam release lever shall pull away from the delay magnet when the switch actuating rod is moved from its normal position in the direction to operate the lever.

Max 0.185 inch

Use the G-34354-A gauge.

To check the requirement, remove the image chamber from the camera as covered in 3.006. Insert the tapered end of the G-34354-A gauge between the snap ring on the actuating rod and its stop, with the flat side of the gauge against the stop so that the gauge straddles the rod. Slide the gauge between the snap ring and the stop until the snap ring rests on the 0.185-inch step of the gauge. Check whether the cam release lever has pulled away from the delay magnet.

**2.12 Position of Lamp Switch:** As the solenoid is operated manually, the lamp switch shall operate while some portion of the shutter blade is still visible through the image chamber opening, but with no more than 1/8 inch of the blade extending into the opening.

Gauge by eye and ear.

To check the requirement, operate the solenoid manually and observe the position of the shutter blade when the lamp switch operates as indicated by the click.

**2.13 Sequence of Operation of Lamp and Motor-solenoid Switches:** When the solenoid is operated manually, the lamp switch shall operate before the motor-solenoid switch.

Gauge by ear.

To check the requirement, first identify the characteristic click of each switch by operating the switch with the KS-6320 orange stick applied to

the switch actuator. Then operate the solenoid manually and check whether the click indicating operation of the lamp switch occurs before the click indicating operation of the motor-solenoid switch.

*Note:* Because of the different conditions obtaining during manual and electrical operation, it may be possible to operate the solenoid manually without causing the motor-solenoid switch to operate. If this is the case, rotate the cam release lever to its front stop, checking for the click indicating operation of the motor-solenoid switch.

**2.14 Operation Requirement:** Fig. 4 — With the camera prepared for operation as covered in 1.10, and the indicator of the meter in the power unit set at 105 volts, the following requirement shall be met. When the solenoid is electrically energized against a 0.018-gauge (No. 74D gauge) held against the solenoid stop, the lamps shall flash while the shutter is open, and the motor shall drive the metering roller through one complete revolution and then stop.

Gauge by eye and ear.

Fasten the holder of the No. 74D gauge to a KS-6320 orange stick with a rubber band in order to provide an insulating handle for the gauge.

**2.15 Pilot Lamp Timing:** With the camera prepared for operation as covered in 1.10, and the indicator of the meter in the power unit set in the middle of the green range on the meter scale, pulling the trigger shall cause the pilot lamp to be extinguished and then to relight within 3 to 4 seconds.

Gauge by eye using the KS-3008 stop watch or a watch with a second hand.

**2.16 Control of Solenoid Operation:** With the camera prepared for operation as covered in 1.10, and the indicator of the meter in the power unit set in the middle of the green range on the meter scale, the following requirements shall be met.

- (a) After an initial operation of the trigger and flash of the lamps, additional operations of the trigger shall not cause the lamps to flash a second time until the metering roller has completed one revolution.

Gauge by eye.

- (b) The flash lamps shall flash only once and the metering roller shall advance through one revolution when the trigger is held operated.

Gauge by eye.

**2.17 Quality of Photographs:** The camera shall make 80 successive exposures of message registers with the indicator of the meter of the power unit set at either the minimum or maximum of the green range on the meter scale and, when processed, the finished photographs shall meet the following requirements.

- (a) Successive photographs shall not overlap.
- (b) Successive photographs of the same group of 25 registers shall be uniform.
- (c) All numerals, including those of the designation strip, shall be legible.
- (d) There shall be no objectionable light reflections or burns (dark spots) which obscure the register numerals.

To check the requirements, take and process the test photographs in accordance with the procedures covered in Section 030-301-301. If the office in which the camera is used has both 5- and 14-type message registers, photographs of both types should be included. Visually inspect the finished photographs to determine whether the requirements are met.

**2.18 Speed of Camera Operation:** The camera shall make successive exposures at intervals of 4 seconds or less with the indicator of the meter of the power unit set at 110V.

Gauge by eye using the KS-3008 stop watch or a watch with a second hand.

To check the requirement, load and operate the camera in accordance with procedures covered in Section 030-301-301, except set the indicator of the power unit at 110V. Pull the trigger and observe whether the exposure counter makes one revolution less one scale division on the counter within the specified interval.

### 3. PROCEDURES

#### 3.001 List of Tools, Gauges, and Materials

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
418A	5/16- and 7/32-inch Hex. Open Double-end Flat Wrench

leads applied to the relay terminal with the red lead, and to the relay terminal which has the white lead and which is adjacent to the solenoid. If the flashlight does not light, replace the trigger switch.

(b) **Failure of Motor-solenoid Switch Contacts in Relay Circuit to Close When Switch Is Operated:** Check closure of these contacts as follows. Make sure that the cam release lever engages the low portion of the metering roller cam as shown in Fig. 7. Apply the flashlight test leads to the relay terminals with red and brown leads and manually operate the cam release lever. If the lamp does not light, replace the motor-solenoid switch.

(c) **Relay Contacts Fail to Close:** Remove the relay bracket mounting screw using the 3-inch cabinet screwdriver. Hold the relay in a position where the contact springs are accessible taking care not to damage the leads. If the contacts on the springs connected to the red and brown leads appear to close when the relay is manually operated, clean the contacts as covered in the section on cleaning relay contacts and parts. If the contacts do not appear to close when the relay is manually operated, adjust the movable contact spring, as required, using the No. 485A pliers.

(d) If the trouble cannot be cleared by following procedures (a) through (c), replace the relay.

### 3.17 *Quality of Photographs* (Reqt 2.17)

(1) Since the quality of the photographs depends on satisfactory processing as well as the mechanical adjustment of the camera, a list of defects which may appear in the photographs and their probable causes with recommended procedures for correction are covered in Part 4.

### 3.18 *Speed of Camera Operation* (Reqt 2.18)

(1) Failure to meet the requirement is probably due to one of the following conditions.

- (a) Binding of paper as it leaves cassette. Replace cassette.
- (b) Metering roller drive spring stretched. Replace spring.

(c) Loose drive pulley. Remove the drive spring. If the flat on the motor shaft is not facing upward, move the shaft to this position as follows. With power in the camera, operate the cam release lever and momentarily operate the end-of-paper switch finger until the flat on the motor shaft faces upward. Remove power from the camera. Securely tighten the pulley set-screw against the flat on the motor shaft using the R-2959 wrench. Remount the drive spring.

(d) Binding of solenoid plunger or associated linkage. Check requirement 2.05.

## 4. GENERAL INFORMATION

### 4.01 *Analysis and Correction of Defects in Photographs*

DEFECT	PROBABLE CAUSE AND RECOMMENDED PROCEDURE FOR CORRECTION
1. Overlapping of Photographs	<p>Paper slipping due to:</p> <ul style="list-style-type: none"> <li>(a) Binding of paper as it leaves cassette. Indication of defective cassette. Replace cassette.</li> <li>(b) Glazing of metering roller surface. Replace roller.</li> </ul>
2. Nonuniformity of Successive Photographs	<ul style="list-style-type: none"> <li>(a) Camera held improperly while taking photographs. See Section 030-301-301. ←</li> <li>(b) Insufficient time interval allowed between exposures. See Section 030-301-301. ←</li> <li>(c) Change in line voltage. Reset voltage regulating knob on power unit. See Section 030-301-301. ←</li> <li>(d) Old or exhausted developer used or processor improperly prepared. See Section 030-301-301. ←</li> <li>(e) Defective paper.</li> </ul>

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DEFECT	PROBABLE CAUSE AND RECOMMENDED PROCEDURE FOR CORRECTION	DEFECT	PROBABLE CAUSE AND RECOMMENDED PROCEDURE FOR CORRECTION
3. Some Numerals Illegible	(a) Camera held improperly while taking photographs. See Section 030-301-301.	7. Photographs Too Dark	(a) Filter not used. See Section 030-301-301.
	(b) Unsatisfactory condition of message registers photographed. See Section 030-301-301.		(b) Voltage incorrectly adjusted. See Section 030-301-301.
	(c) Defective flash lamp or power unit. See 3.14(3).		(c) Temperature of processing solutions too high. See Section 030-320-701.
4. Blurring of Right Edge of Numerals	(a) Metering roller cam releases at too low a pull. Check requirement 2.11(a).	8. Brown or Yellowish Stains	(a) Old, exhausted, or improperly prepared processing solutions. See Section 030-301-301.
5. Objectionable Light Reflections or Burns	(a) Flash lamp shield improperly positioned. See note.	9. A Few Very Dark Photographs at End of Roll	(a) Too many exposures made on roll. See Section 030-301-301.
	(b) Unsatisfactory condition of message registers photographed. See Section 030-301-301.		(b) Failure to advance paper before removing cover after last photograph. See Section 030-301-301.
	(c) Loose flash lamp mountings. Reposition or replace flash lamp mounting grommets.	10. Part of Each Photograph Missing	(a) Lamp switch improperly positioned. (Shutter not fully open when lamps flash.) See 2.12.
6. Photographs Too Light	(a) Filter improperly used. See Section 030-301-301.	11. One Side of Each Photograph Too Light	(a) One flash lamp not functioning. Defective lamp or power unit. See 3.14(3).
	(b) Voltage incorrectly adjusted. See Section 030-301-301.	12. Dark Streak on Each Picture	(a) Defective cassette (light leaks). Replace cassette.
	(c) Improper adjustment of pilot lamp potentiometer. Insufficient time interval between exposures. See Section 030-301-301.	13. No Picture	(a) Lens cap left on. Remove cap.
	(d) Old, exhausted, or improperly prepared processing solutions. See Section 030-301-301.		(b) Both lamps fail to flash. See 3.14(3).
	(e) Temperature of processing solutions too low. See Section 030-320-701.		(c) Broken shutter. Replace shutter.
	(f) Defective paper.	14. Double Exposure	(a) Check requirement 2.16(a).

*Note:* Refer the matter to the supervisor for consideration of returning the camera to Graflex, Inc, Rochester 8, N. Y., for repairs.