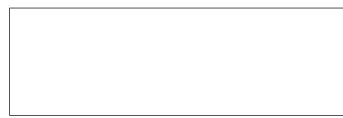


**HG-3**  
**BATTERY CHARGER**



STAT

THIS FORWARD SECTION MUST BE REMOVED PRIOR TO OPERATIONAL ISSUE OF THIS DOCUMENT.

1. The blank in paragraph C-4 (CHARGING THE BS/A-13 BATTERY) must be filled in prior to issuing the HG-3 Instructions. The HG-3 delivers 1 ampere when the generator is cranked at a rate above 60 turns-per-minute. To fully charge a ni-cad battery, 140 percent of the capacity used must be returned to the battery. The following may be used as a guide to estimate the cranking time.

To determine the cranking time required to return the charge used from the battery when operating a transmitter during a medium speed contact: multiply the average current drain of the transmitter by 1.4 to determine the number of minutes cranking time.

Example: The AT-3 transmitter draws 5 amperes average current during a contact. Five times 1.4 equals 7 minutes. Therefore, for every minute that the transmitter has been used, the HG-3 should be cranked 7 minutes.

2. For the BS/A-13 and other sealed-cell nicad batteries, cranking of the HG-3 must stop after the 70 percent battery capacity point has been reached. Otherwise, the battery may be damaged by charging at too high a rate after gassing has begun. The HG-3 FULLY CHARGED indicator is adjusted to light when the BS/A-13 type battery is charged to about 70 percent capacity at 70 degrees F. This indication will normally occur when the battery reaches a voltage of about 14.5 volts under charge at this temperature.

3. Seventy percent charge of vented-cell batteries, such as the BS/A-3 and BS/B-3, is not accomplished until the battery voltage under charge (1A) reaches approximately 17.2 volts. The FULLY CHARGED indicator, therefore, cannot satisfactorily be used with the BS( )-3 to indicate battery state-of-charge without modifying the HG-3. An engineering work order outlining the procedure to increase the FULLY CHARGED indicator voltage is being prepared and will be forwarded to the field. The generator should not be modified, however, until a decision has been made regarding the type of battery that is to be issued with the HG-3.

4. The attached instructions are put together in such a way that they may be issued for use with either BS/B-3 or BS/A-13 batteries, simply by removing the non-applicable pages.

## LEGENDS FOR ILLUSTRATIONS

### Illustration A:

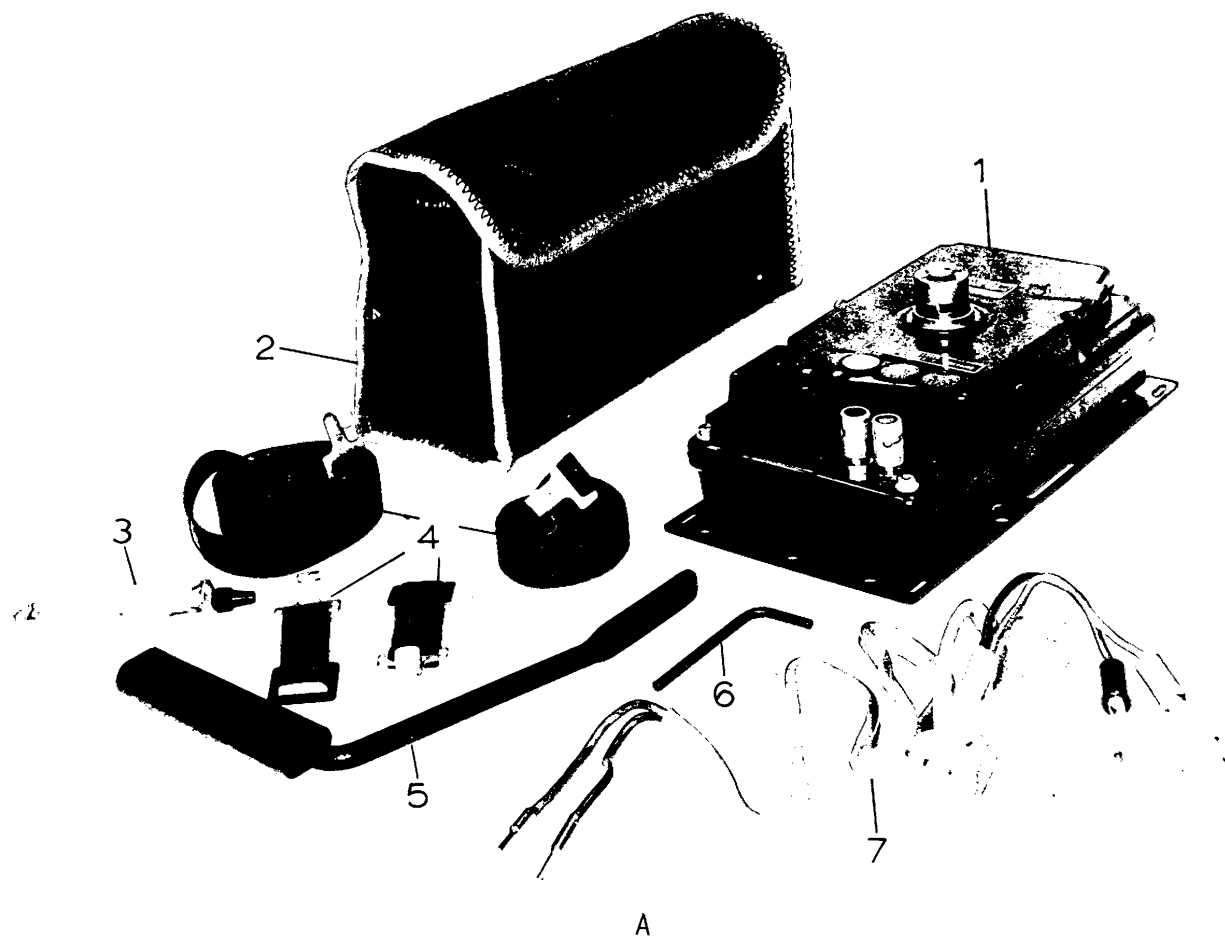
1. HG-3 Generator.
2. Canvas Carrying Bag.
3. Tube of Grease.
4. Canvas Mounting Straps.
5. Crank.
6. Allen Wrench.
7. Charger to Battery Connector Cable.

### Illustration B:

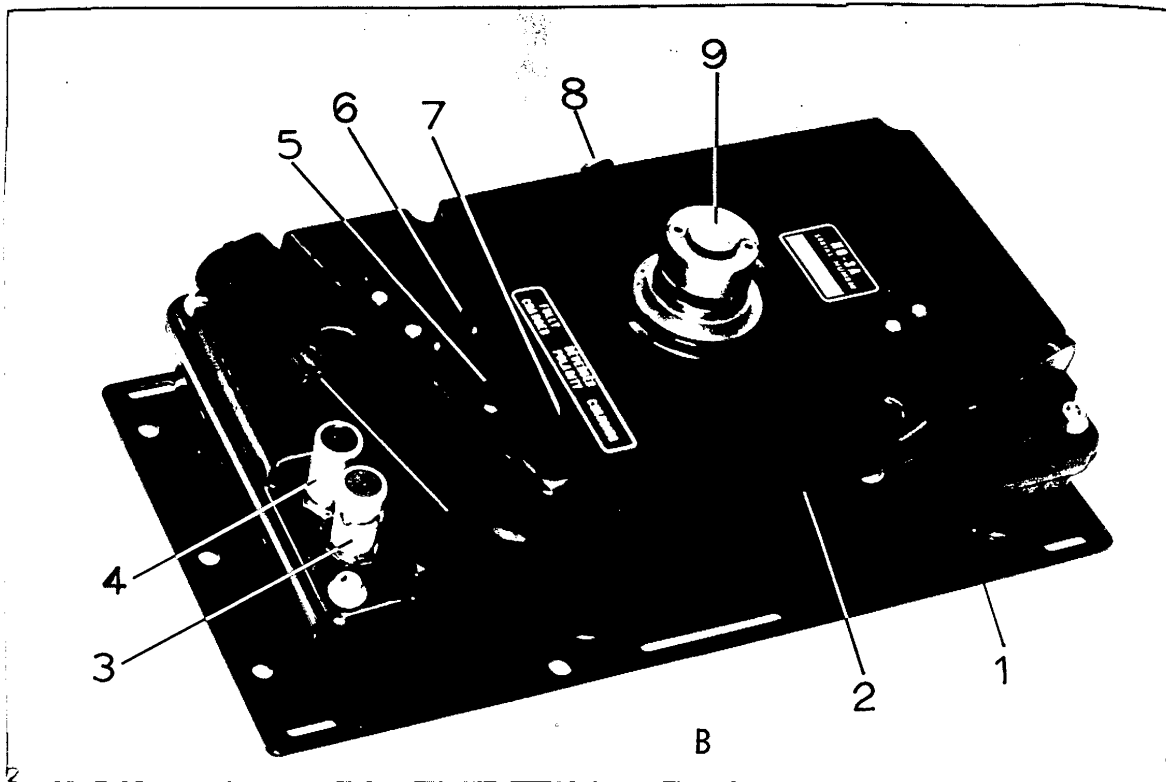
1. Metal Mounting Plate.
2. Crank Mounted for Storage.
3. Red Charger Terminal Post (Positive or +).
4. Black Charger Terminal Post (Minus or -).
5. REVERSED POLARITY Indicator (Red Light).
6. FULLY CHARGED Indicator (White Light).
7. CHARGING Indicator (Green Light).
8. Lubricating Point.
9. Hub or Crank Shaft.

### Illustration C:

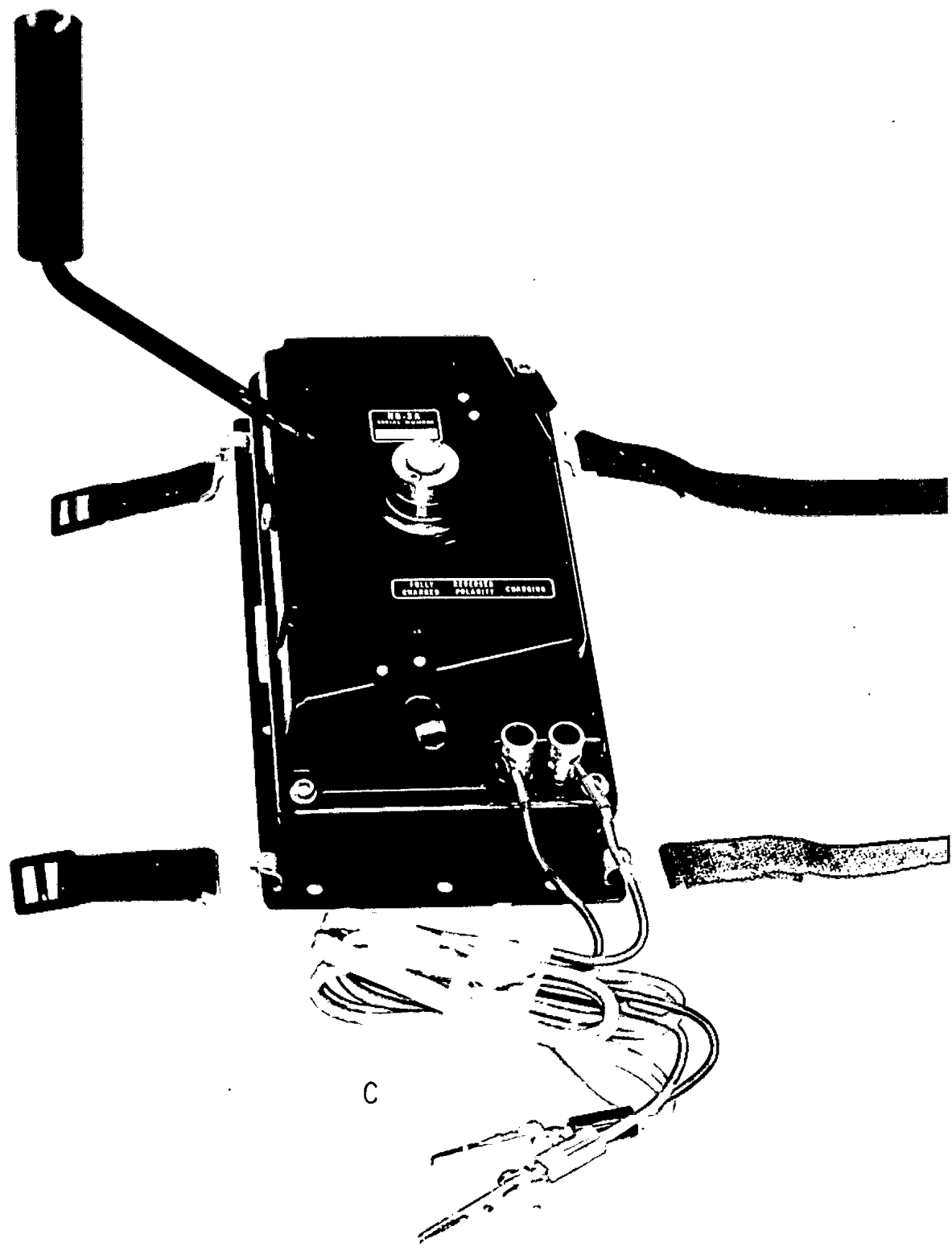
HG-3 with the crank mounted, canvas straps attached to the mounting plate, and with the charger-to-battery cable connected to the charger.



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HG-3 Hand-Cranked Battery Charger  
With The  
BS/B-3 Battery

A. DESCRIPTION

The HG-3 will charge any rechargeable 1.5 to 14-volt battery. The HG-3 is intended primarily for BS/B-3 battery charging.

B. PREPARING TO CHARGE THE BATTERY

1. With the straps or "C" clamps provided, securely mount the generator to a sturdy support.
2. Attach the crank to the hub or crank shaft as shown in illustration 3. First, turn the large center screw counter-clockwise, then lift the pin and insert the flat edge of the crank into the slot in the hub. Allow the screw to fall back in place, then turn it clockwise to the end of its travel.
3. Turn the crank several times to determine that the charger is operating satisfactorily. The FULLY CHARGED indicator will flash momentarily. Disregard the REVERSED POLARITY indicator if it glows dimly.
4. Always connect the cable to the charger terminals before connecting it to the battery. To do this, depress the red charger terminal post and insert the tip of the red wire into the hole in the side of the post. Connect the tip of the brown wire into the hole in the black terminal post in the same manner. Next, connect the clip of the red wire to the red (+) battery post and the clip of the brown wire to the black (-) battery post. Reverse the battery connections if the REVERSED POLARITY indicator lights.

C. CHARGING THE BS/B-3 BATTERY

1. Turn the crank at a rate slightly above 60 turns per minute. The CHARGING indicator will light to indicate that charging is taking place.
2. Crank the generator 10 hours to fully charge a discharged BS/B-3 battery.
3. When the FULLY CHARGER indicator lights, the battery is about three-fourths charged. After the indicator lights, crank the generator an additional three hours to fully charge the battery.

4. .Because of temperature variations, the FULLY CHARGED indicator may not always accurately indicate that your battery is three-fourths charged. In these instances, it will be necessary to estimate the cranking time. Also, if you are in doubt, overcharging up to ten hours will not harm the battery.

5. To disconnect the charger, first remove the leads from the battery terminals and then remove the pins from the charger terminals.



HG-3 Hand-Cranked Battery Charger  
With The  
BS/A-13 Battery

A. DESCRIPTION

The HG-3 is a hand-cranked battery charger that will charge any rechargeable 1.5 to 14-volt battery. The HG-3 is intended primarily for BS/A-13 battery charging.

B. PREPARING TO CHARGE THE BATTERY

1. With the straps or "C" clamps provided, securely mount the generator to a sturdy support.
2. Attach the crank to the hub or crank shaft as shown in illustration 3. To do this, first turn the large center screw counter-clockwise, then lift the pin and insert the flat edge of the crank into the slot in the hub. Allow the screw to fall back in place, then turn it clockwise to the end of its travel.
3. Turn the crank several times to determine that the charger is operating satisfactorily. The FULLY CHARGED indicator will flash momentarily. Disregard the REVERSED POLARITY indicator if it glows dimly.
4. Always connect the cable to the charger terminals before connecting the battery. Depress the red charger terminal post and insert the tip of the red wire into the hole in the side of the post. Connect the tip of the brown wire into the hole in the black terminal post in the same manner. Connect the clip of the red wire to the red (+) battery post and the clip of the brown wire to the black (-) battery post. Reverse the battery connections if the REVERSED POLARITY indicator lights.

C. CHARGING THE BS/A-13 BATTERY

1. Turn the crank at a rate above 60 turns per minute. The CHARGING indicator will light to indicate that charging is taking place.
2. When the FULLY CHARGED indicator lights, the battery is about three-fourths charged. DO NOT CRANK THE CHARGER FURTHER AFTER THE INDICATOR LIGHTS OR THE BATTERY MAY BE DAMAGED.
3. If the FULLY CHARGED indicator is not operating properly, crank the generator 5 hours to charge a fully discharged BS/A-13 battery.

4. Because of temperature variations, the FULLY CHARGED indicator may not always accurately indicate that your battery is three-fourths charged. In these instances, it will be necessary to estimate the cranking time to replace the charge used when operating your equipment.

For each minute that you use your transmitter and equipment charge the battery \_\_\_\_\_ minutes.

5. To disconnect the charger, first remove the leads from the battery terminals and then remove the pins from the charger terminals.

#### D. CHARGING OTHER BATTERIES

1. When charging batteries of less than 12 volts or when charging lead-acid 6 or 12 volt automobile batteries, the FULLY CHARGED indicator may not light even when the battery is fully charged. The cranking time therefore must be estimated as given below.

a. To charge a fully discharged battery, crank the charger a number of hours equal to the battery ampere-hour capacity times 1.4. For example, crank the charger 14 hours to charge a 10 ampere hour battery.

b. The above method is also suitable for replacing the charge used from a battery. For instance, crank the generator about 2 hours and 45 minutes to replace 2 ampere-hours of charge.

#### E. HG-3 OPERATING NOTES

1. Extra effort or a hard push on the crank is required to start the crank in motion. Once set in motion, the crank turns freely. The drag in turning the crank becomes less as the cranking rate is increased. The optimum cranking speed is 60 turns-per-minute; faster cranking will not materially increase the charging rate.

2. The generator may be cranked in a clockwise or counter-clockwise direction without any change in the charging rate. However, because the noise level is greater when the unit is cranked counter-clockwise, it is recommended that the operator rotate the crank in a clockwise direction.

3. The FULLY CHARGED indicator light has been adjusted for your nickel-cadmium battery and to a temperature which is normal for your area. Large variations from the normal temperature, however, will affect the accuracy of the indicator. When the temperature is much higher than normal, the indicator may light before the battery reaches three-fourths charge. When the temperature is much lower than normal, the indicator may not light even when the battery is fully charged. Under either of these conditions of temperature, it will be necessary to estimate the cranking time.

4. The HG-3 may be used to rejuvenate (partially charge) dry cells of any voltage between 1.5 and 14 volts. For instance, many carbon zinc type flashlight batteries can be charged to about one third of their original capacity.

a. Wire leads may be taped to a flashlight battery and used to connect to the HG-3 connector cable. Connect the charger to the battery as previously instructed. Normally, the nipped end of a flashlight battery is the positive (+) connection.

b. For most flashlight batteries, charge about 2 hours to rejuvenate the battery. Occasionally feel the battery during charge and if it feels hot, discontinue charging. The battery will normally feel warm after charging for 15 minutes or more.

#### F. LUBRICATING THE CHARGER

After every 200 hours of operation, the charger should be lubricated with the grease provided in the small tube. Lubricate as follows:

a. First, attach the crank.

b. Remove the screw that covers the lube hole. See Illustration B, line 8.

c. Insert the nozzle of the grease tube into the lube hole as far as it will go. Gently squeeze the tube to insert a small amount of grease. Under a bright light, or with a flashlight, look inside the lube hole to determine that the grease has been placed on the gear.

d. Rotate the handle about one-quarter turn and lubricate that part of the gear. Repeat the process twice more. When you have completed, the gear will have been lightly lubricated in four places.

e. Replace the screw that covers the lube hole and then rotate the crank for about 1 minute to evenly distribute the grease on the gear.