

FOR OFFICIAL USE ONLY

RADIO TELEGRAPH TRANSMITTING SETS

Type SCR-74

Type SCR-74-A

(Confidential)

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Radio Telegraph Transmitting Sets
Type SCR-74
Type SCR-74-A

THE TYPE SCR-74 and SCR-74-A radio telegraph sets are used for the transmission of radio messages between regiment and brigade headquarters. Only in exceptional cases are these sets used at battalion headquarters. They are similar to the French set "*Poste Portatif No. 3.*"

These sets produce damped wave signals. The only way in which the wave length can be changed is to alter the dimensions of the antenna. On account of the broad, non-musical wave emitted, a special inverted "L" antenna, type A-3 or type A-3-A, is used because of its marked directional effect. This antenna also lends itself well to the necessity of having one which can be easily repaired under shell fire. Its characteristics permit the simultaneous use of a comparatively large number of sets within a limited area. It is described in a later paragraph.

The signals emitted by both these sets may be received with any damped wave receiving set of suitable wave length range, but the type SCR-54 or SCR-54-A set is generally used for this purpose.

Description of the Sets

The two sets are identical in their electrical characteristics and operation. They differ only in the arrangement of the various parts within the set box, and in that the cover of the set box of the type SCR-74-A set is equipped with rubber gaskets, to make the box waterproof.

The principle of the sets is illustrated in the circuit diagram of Fig. 3. Both sets comprise an open magnetic circuit induction coil, the primary of which is energized by a 10-volt storage battery when the telegraph sending key is closed. The primary circuit also comprises an ammeter which serves to indicate by its deflection whether or not the set is operating properly. The secondary winding of the induction coil is connected to an adjustable spark gap of the open-gap type. The two electrodes of the gap are connected to the aerial and ground respectively. The vibrator contacts are shunted by a 6-mfd. mica condenser, which greatly reduces the sparking at the vibrator and produces a more abrupt interruption of the primary current.

The set box contains the induction coil with its vibrator, vibrator condenser, telegraph key, ammeter, antenna spark gap, aerial and ground binding posts, and battery binding posts, to which is connected an extension cord with a plug for connection to the 10-volt battery. A screwdriver and file for making adjustments and keeping the vibrator contacts in shape, are also furnished with the box.

All these parts are arranged in the set box as shown on the photographs. A glass covered hole in the cover over the ammeter and over the spark gap, and a rubber covered hole over the key, permit operating the set with the cover closed to exclude the rain or snow, etc.



Fig. 1—Type BC-18 Set Box and Operating Panel of the Type SCR-74 Set

Installation and Operation

The method of installation is the same for both types of sets, and is given below. The following steps should be followed exactly and in the order given.

1. Choose a location suitable for the installation of the station. This should be done with due regard for the screening effect of trees and houses, and also for protection from enemy shell fire or

observation. The set box itself may be installed under a protected shelter, but precautions must then be taken to thoroughly insulate the lead-in wires at the points where they enter the shelter.

2. Install the antenna, with due regard to its directional effect. The method of setting up the type A-3 antenna, which is the standard antenna for this set, is illustrated in Fig. 5. The length of this antenna is 150 feet, its height about 3 feet. The aerial wire and the two counterpoise wires are unreeled, so that their general direction



Fig. 2—Vibrator Mounted in the End of the Type BC-18 Set Box

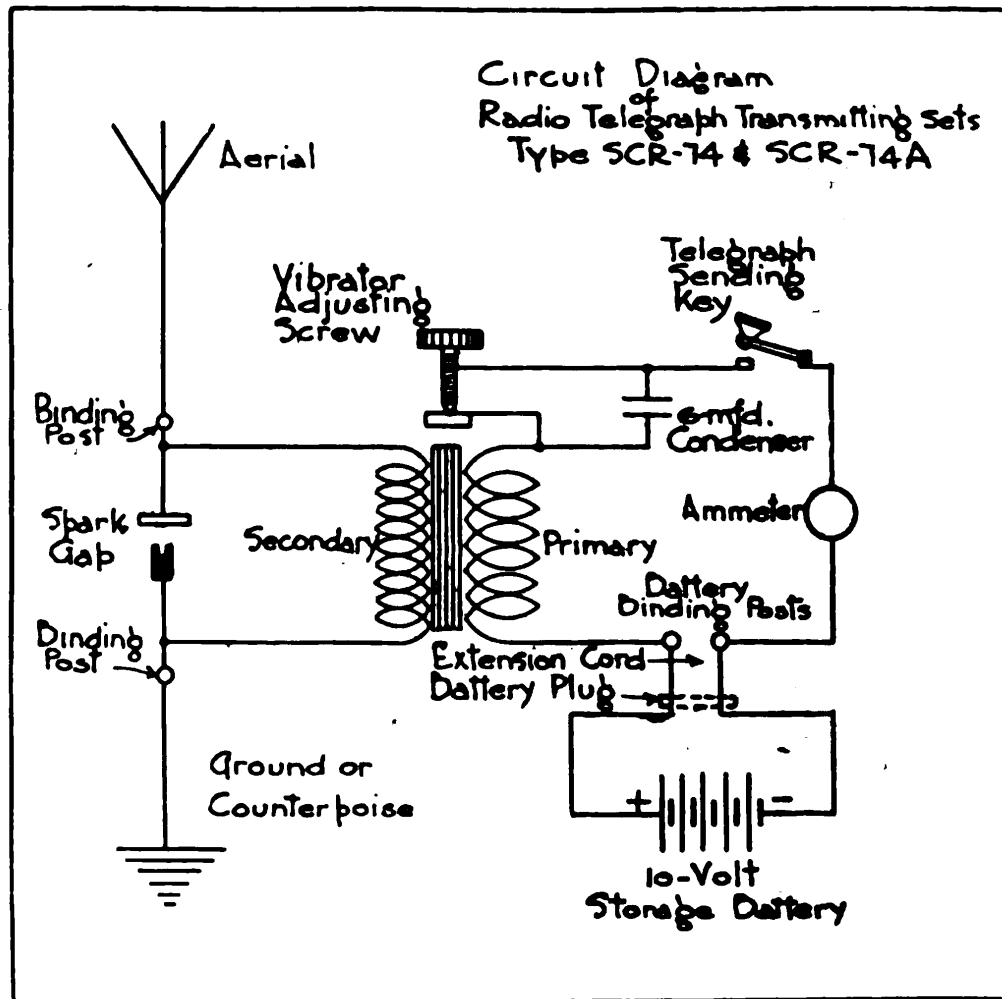


Fig. 3—Schematic Wiring Diagram for the Type SCR-74 and Type SCR-74-A Sets

will point toward the station with which it is desired to communicate, and with the lead-in end of the aerial wire and plug end of the counterpoise wire at the end nearest to that station. Open the two wooden antenna supports, fasten the aerial wire to the insulators, and guy the supports in position by tying the guy ropes to one or two stakes driven in the ground. The counterpoise lead-in wire is then knotted around the strut cord of the wooden support so that the connecting block will be held off the ground. Plug the two counterpoise wires into the connecting block, and bring the free ends of the two lead-in wires to the set box, taking care to keep them separated and off the ground.

The antenna used with the type SCR-74-A set is the type A-3-A, which differs but little from the type A-3 described above in conjunction with the type SCR-74 set. The main difference is that a ground mat is used in place of the two-wire counterpoise. This alters the electrical constants to only a slight degree, and

does not appreciably affect the directional characteristics. When working on a damp ground, it is best to bury the mat about one foot deep, or deeper if possible, and to pack the earth well around and above it. If on dry ground, the mat is simply laid on the surface of the ground. In all cases, the location for the mat is directly underneath the aerial wire.

An advantage of the type A-3-A antenna is the use of snap hooks to fasten the aerial wire to the insulators. This makes the installation more secure. In its general aspect, this antenna appears similar to that shown in the sketch, Fig. 5, the counterpoise being replaced by the mat.

3. Connect the antenna and counterpoise lead-in wires respectively to the "antenna" and "ground" binding posts of the set box.



Fig. 4—Type BC-18-A Set Box of the Type SCR-74-A Set

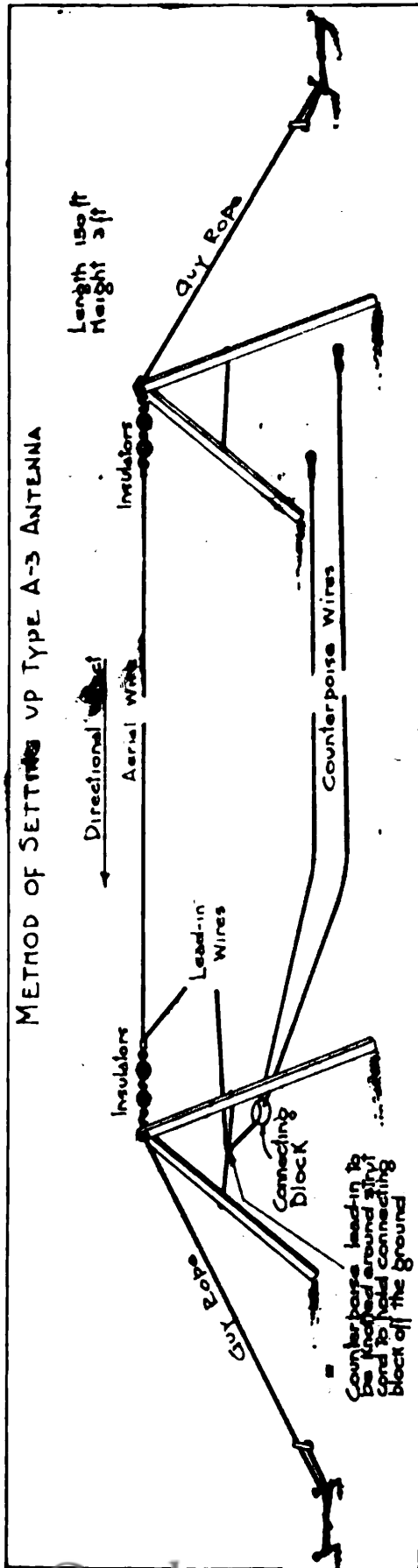


Fig. 5—Method of Setting Up the Type A-3 Antenna

4. Connect the 10-volt storage battery by means of the battery plug and connector. If no connector has been furnished with the set, use short and heavy wires, and give due regard to the polarity, as marked on the "Battery" binding posts of the set box, and on the terminals of the battery.

5. Open the antenna spark gap all the way out.

6. Close the telegraph sending key, and adjust the vibrator by means of the vibrator screw until a good, clear, steady note is obtained.

7. Release the key, and gradually decrease the distance between the spark gap electrodes; turning the disc electrode about one turn at a time, and closing the key for each position, until a good spark is obtained across the gap. The adjustment is completed when, upon closing of the key, a rapid succession of fine, white-blue sparks takes place across the gap. The distance between the electrodes should be the smallest distance possible which will give such white blue sparks in abundance, without establishing a "power arc," easily recognizable by its flaming, yellowish aspect.

Care should be taken during the operation, to never touch the spark gap elec-

trodes or lead-in wires, while the telegraph key is held down, as a serious shock will result.

8. The current indicated by the ammeter, with the gap and vibrator properly adjusted, and the battery fully charged, should be from 7 to 11 amp.

Special Precautions in Operating and Maintaining the Sets

The following rules should be strictly observed when operating the SCR-74 and SCR-74-A sets:

1. Never touch any part of the antenna circuit (lead-in wires, spark gap, etc.) while the telegraph sending key is closed.
2. Never connect the battery to the set before both the counterpoise and aerial are connected to their respective terminals on the set box.
3. Under no circumstances should the set be tried out with the counterpoise or aerial disconnected. If the telegraph key is closed after the set is connected up but without the antenna, an emf. will be induced in the secondary winding of the coil of such high voltage that there will be great likelihood of breaking down the insulation, thus rendering the set inoperative.
4. Care must be taken to have all parts of the aerial, counterpoise and lead-in wires well insulated from the ground at all points.

As was mentioned before, the type A-3 or A-3-A antenna equipment, furnished as part of these sets, is particularly well suited for the kind of service intended. The sets may however be used with antennae of different dimensions. A higher antenna, of about the same length will give good results when a longer distance of transmission is required.

These types of antennae have the advantage of being easily hidden from enemy observation. When desired or necessary, the antenna supports can be camouflaged with paint or otherwise, to meet local conditions. In general, painting the supports will be found sufficient, but in no case should any method be used whereby any material other than the insulators provided, comes in contact with the aerial wire or lead-in wire. The insulators should not be painted as this may reduce their insulating qualities.

By tying the feet of the antenna supports with cords, to pins driven in the ground adjacent to each foot, thus hinging them at the ground, it is possible to lower or raise the entire antenna by releasing or tightening one of the end guys. This may prove convenient, as the antenna can be lowered and effectively protected during periods when the set is not in use.

As a general precaution, it is well to always keep the set in as clean and dry a condition as possible.

If it is desired to use the set for longer distances, the range may be increased by using a higher antenna. This makes the antenna more vulnerable to destruction by shell fire and hence should ordinarily be used only in rear positions or in well protected forward locations. The change in dimensions might also alter the wave length, which must be taken into consideration.

Parts Lists

In ordering this set or parts of this set, specification must be made by names and type numbers as listed below, exactly. The designation printed in bold face type *only*, will be used in requisitioning, making property returns, purchasing, etc.

In ordering *complete* sets, it is not necessary to itemize the parts; simply specify, "2 Sets, Radio Telegraph Transmitting, Type SCR-74." If *all* the parts listed under a group heading are desired, it is not necessary to itemize the parts; simply specify, for example: "1 Equipment Type RT-3."

The Type SCR-74 Set or SCR-74-A Set is not complete unless it includes all of the items listed below, under the respective headings.

SET, RADIO TELEGRAPH TRANSMITTING, TYPE SCR-74

EQUIPMENT, TYPE PE-13; Power.

- 2 Batteries, Type BB-3; Edison storage; 10 volts, 30 amp-hr.: includes powdered electrolyte in separate container.

EQUIPMENT, TYPE RT-3; Transmitting.

- 1 Set Box, Type BC-18; radio telegraph transmitting.
- 1 Cord, Type CD-20; extension; set box to battery.
- 1 Bag, Type BG-4; carrying; canvas.
- 2 Cords, Type CD-21; extension; set box to antenna and ground.
- 1 Screwdriver, Type TL-2.
- 1 File, Type TL-5; contact.

EQUIPMENT, TYPE A-3; Antenna.

- 2 Supports, Type MS-4; antenna; complete with guys.
- 1 Antenna, Type AN-2; antenna cord, 150 ft. complete with 20-ft. lead-in wire and 4 Electrosec No. 4500 insulators, of which 2 in series linked to each end of antenna wire; free end of insulator provided with open wire hook.
- 1 Counterpoise, Type CP-1; two 150-ft. lengths counterpoise wire, spec. 416-I, with terminal plug on one end.

- 1 **Block, Type BL-3;** connecting; at one end of 20-ft. lead-in.
- 4 **Stakes, Type GP-2;** ground, standard.
- 3 **Reels, Type RL-3;** hand; for antenna and counterpoise wires.
- 1 **Bag, Type BG-8;** carrying; for ground stakes, antenna and accessories.
- 2 **Hammers, Type HM-1;** 2 lb.

SET, RADIO TELEGRAPH TRANSMITTING, TYPE SCR-74-A

EQUIPMENT, TYPE PE-11; Power.

- 3 **Batteries, Type BB-23;** lead storage; 10 volts, 20 amp-hr.; electrolyte is not included; concentrated acid for electrolyte supplied separately in carboys; 1 in use, 2 spare.

EQUIPMENT, TYPE RT-3-A; Transmitting.

- 1 **Set Box, Type BC-18-A;** radio telegraph transmitting.
- 1 **Contact, Type CN-10;** moving; with vibrator spring and screws; spare.
- 1 **Contact, Type CN-11;** stationary.
- 1 **File, Type TL-30;** contact.

EQUIPMENT, TYPE A-3-A; Antenna.

- 2 **Supports, Type MS-4-A;** antenna; complete with guy rope type RP-5, insulator type IN-5, ground stake type GP-5 and guy rope fastener type FT-9.
- 1 **Antenna, Type AN-5;** with snap hooks on both ends.
- 1 **Stake, Type GP-6;** ground.
- 1 **Reel, Type RL-3;** hand; for antenna wire.
- 1 **Bag, Type BG-15;** carrying; for ground stakes, antenna and accessories.
- 1 **Hammer, Type HM-1;** 2-lb.
- 1 **Mat, Type MT-3;** ground.
- 1 **Pliers, Type TL-19;** combination.
- $\frac{1}{2}$ lb. **Tape, Friction;** $\frac{3}{4}$ -in.

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