DEPARTMENT OF TRANSPORT

RADIO DIVISION

REFERENCE DIAGRAMS

AND

OPERATING INSTRUCTIONS

FOR

MARCONI EMERGENCY TRANSMITTERS
TYPE 10" INDUCTION COIL.
TYPE 75786 50 WATT Q.G.

INSTALLING AND OPERATING INSTRUCTIONS

MARCONI EMERGENCY TRANSMITTER TYPE 75786 WITH DYNAMCTOR UNIT TYPE 83900.

GENERAL

The equipment is designed for emergency service only and consists essentially of a 50-watt quenched gap transmitter and associated dynamotor. The circuits permit tuning to the average ship's antenna (capacity 500 to 1000 uuf). The wavelength range is 600 to 730 metres.

The dynamotor supplying the transmitter works from a 24-volt emergency storage battery and delivers 110 volts 600 cycles to the transmitter. The dynamotor carries a starting device to limit inrush current on starting.

The transmitter is housed in a cabinet 16¼" wide x 15-3/8" deep x 21" high. The front panel is removable to allow access to the equipment for inspection and adjustment. The top of the cabinet carries a lead-in bushing, and an antenna ammeter is included behind a glass bezel in the front of the cabinet. The mounting brackets on the cabinet may be relocated to allow mounting the unit on either a bench or directly on the wall.

The low frequency circuit of the transmitter comprises transformer 82275 (refer diagram No. 83928) and choke 83998. The former raises the line voltage to a suitable value to charge the closed circuit condenser. The latter serves to limit the current drawn from the line and to afford the regulation necessary in the system. It also serves to vary the power output so as to allow greatest battery economy.

The high frequency closed circuit consists of the primary of the closed circuit inductance 82530, the closed circuit condenser C1 and the quenched gap 82767. Energy is transferred to the antenna through the adjustable coupling coil, and the antenna is tuned by means of loading coil 82393. Taps on all coils allow adjustment of closed and antenna circuits to 600 or 730 metres. The antenna ammeter is connected in the earth lead.

The dynamotor carries, as part of its assembly, a sheet steel cabinet which houses the line fuses and the starting device. This consists of resistor 22743 and a contactor. This contactor is normally opened, so that when the circuit to the 24-volt battery is closed, the starting current to the dynamotor is limited to a reasonable value since the resistor is in series. As the dynamotor comes up to speed, the current falls and the drop through the resistor decreases. The voltage across the coil of the contactor rises and when it reaches the pull-in value the contacts close, short-circuiting the resistor and allowing full voltage to appear on the dynamotor. The fuses employed are of the standard 30-amp renewable link type, with an extra 6-amp link to increase the current carrying capacity.

INSTALLATION.

Diagram No. 83928 shows the complete equipment and connections. The operator's position should carry a heavy duty switch, such as A.H. & H. 6808, and a hand key, such as "Signal" R-48 N.P. The wiring should be carried out using conductors as recommended on the diagram. The arrangement should be such that the length of leads between battery and dynamotor is kept to a minimum to avoid excessive voltage drop. In some instances it may be better to run the leads from the dynamotor switch directly to the battery, rather than through the switchboard, since this often permits the shortest leads to be used.

The dynamotor should be located out of the way, yet arranged to allow the cover of its starter to be easily removed. It should be bolted down and the frame grounded.

The transmitter may be located where most convenient. Connections should be made to the antenna, or antenna transfer switch if used, using stiff bus wire supported on stand-off insulators. Lead sheaths on the wiring should be bonded and grounded and clamped by means of saddles. Extra ports are provided on the transmitter to permit the neatest arrangement of wiring for bench or wall mounting. The transmitter should be securely fastened down.

Care should be taken in wiring up the 24-volt circuits to ensure good joints. The ends of the wires should be finished off on soldering lugs and all lead sheaths stripped back at least 1/2" to avoid danger of contact with the conductor. Joints should be taped up.

A ground connection is also required between the ground bolt on the transmitter and the hull. This should be run as short and direct as possible.

ADJUSTMENT

Set the primary taps on the power transformer 82775 on P1 and P4. These are the preferred locations and should not be changed. Set the movable tap on choke 83998 on position No.4. The lead to position No. 0 should not be disturbed.

Close the main switch. The dynamotor should start, and an instant later the relay should close and the dynamotor build up to speed. Should at any time the dynamotor not start immediately, do not leave the main switch closed too long before investigating the cause as the resistors will overheat.

Shut down and set the taps on the closed circuit inductance so as to include about 16 turns. It should be noted that the coil is tapped every turn for four turns then every fourth turn. This allows variation of a turn at a time for fine tuning. The coupling coil should be out to the limit of its travel (loosest coupling) and the antenna circuit opened. Start up and press the key. Uniform sparking should take place in all the gaps.

With the aid of a wavemeter, adjust the closed circuit inductance to give a wavelength slightly greater than that required.

To tune the antenna, connect in all of the coupling coil and set it to minimum coupling. It will be observed that the antenna loading coil is tapped every turn for the first six turns, then every sixth turn. This allows turn by turn variation. Adjust the taps until the antenna current is highest.

The power delivered to the aerial may be increased by tightening coupling and by manipulating the taps on the 83998 choke. If the tap is moved towards position 6, the power will decrease, likewise the battery drain, and if moved towards position 0, the power and the battery drain will both increase.

The adjustment which gives clearest note of 1200 cycles is rather critical, involving manipulation of the coupling, antenna tune, and suitable choice of tap on the choke. The power output under these conditions is lower than the maximum obtainable. Changes in battery voltage, antenna constants, and condition of the gap also affect the note, so that for emergency operation it is better to adjust to a moderately good note with plenty of output, rather than attempt to secure a perfectly clear note. With low resistance aerials, it may not be possible to obtain this perfectly clear note.

The adjustments mentioned above occur with the choke tap on position 2 or 3. If on position 5 or 6, the drain on the battery is least and the note drops in pitch to 600 cycles. This is the adjustment which would result in longest service period. It is not recommended that the tap be set to position 1, since this overloads the machine and results in a shorter service period due to high battery drain. The movable lead should never be placed with the fixed lead on tap 0 as this cuts the choke completely out of circuit and the machine will be badly overloaded.

The inrush current to the dynamotor on starting is limited to approximately 55 amperes. When adjusted above, with choke tap 2 or 3, the "key down" battery drain is of the order of 20 amperes and the 110 volt, 600 cycle line current approximately 3 amperes. With "key up" the battery drain is 9 to 10 amperes. This is the normal no-load dynamotor current.

When adjustments are complete, all screws should be locked up and the leads to the taps disposed to avoid shorting or grounding. The coupling coil adjustment should also be locked up.

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The wavelength should be checked and minor adjustments made to bring it as close as possible to that desired. A wavemeter with crystal detector and phones is recommended as a means of observing the note.

MAINTENANCE

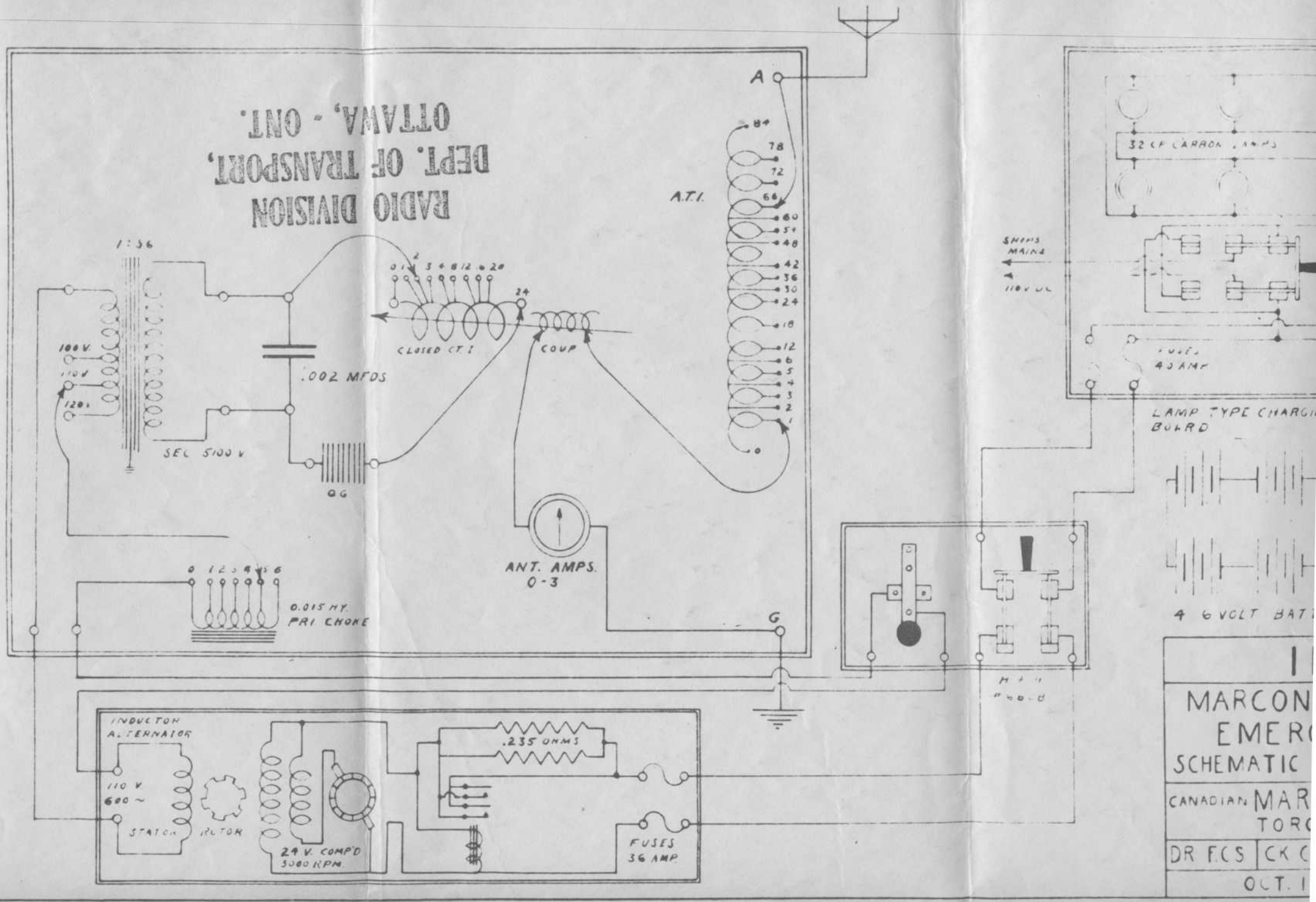
The equipment requires nothing other than a periodical inspection and removal of accumulated dust. The bearings of the dynamotor should be cleaned out and repacked with fresh grease every few months. The commutator should be kept clean. Sandpapering is not recommended unless badly pitted. The quenched gap should be cleaned occasionally. Care must be taken in disassembling the gap. To clean the sparking surfaces, it is advisable to polish them by vigorously rubbing with a piece of cloth, with the disc on a clean, flat surface. No abrasives such as sandpaper should be used, as it is apt to spoil the sparking surface and cause the gaps to spark irregularly over their surfaces, with possible pitting and arcing. When reassembling, the plates and mica spacers should be put back in the same order as when disassembling. Care should be taken to see that the glass tube on which the discs are stacked is not cracked.

It is suggested that the transmitter be run up for a few minutes every day for test.

A great deal of heat is generated at the spark gap, and if the transmitter is used for prolonged transmission, arcing may occur which will affect the carrying quality of the signal, besides resulting in reduced output. Allowing the gap to cool off will correct this.

It is recommended that the battery used consist of a group of four 6-volt cells, rated at not less than 148 ampere-hours at an eight-hour rate, such as Exide XH-21. With these batteries full charged and in good condition, the equipment has been tested for six hours continuously keyed. The battery voltage under these circumstances falls to approximately 23 volts. The cells should not be discharged to a voltage below 1.75 per cell. If the specific gravity falls below 1150, the battery is nearing the discharged condition and should be recharged.

Battery maintenance should consist of keeping the electrolyte at a level of 3/8" above the plates by the addition of distilled water, and the terminals and top of the battery kept clean. The battery should be kept fully charged at all times. The maximum charging rate is 11 amperes.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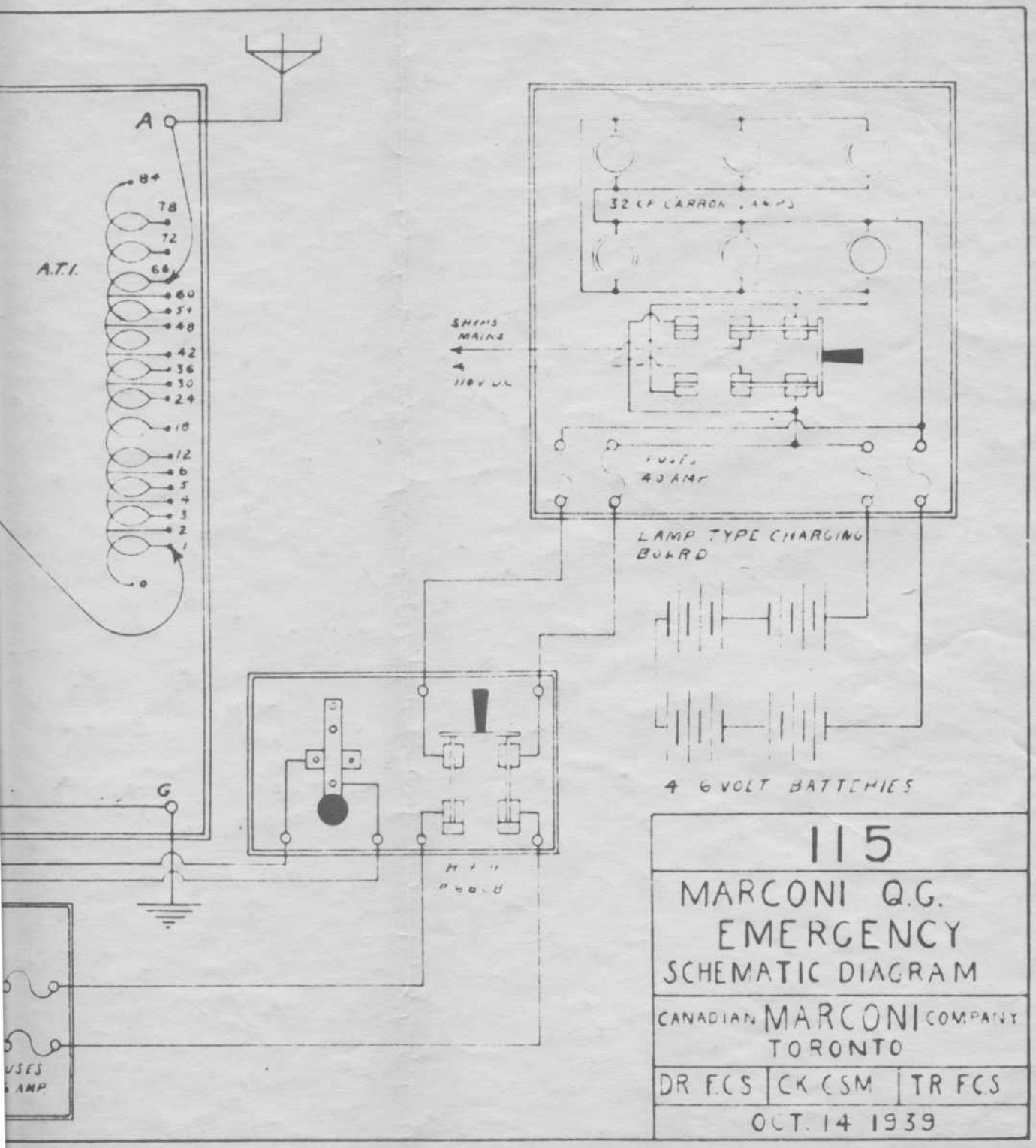

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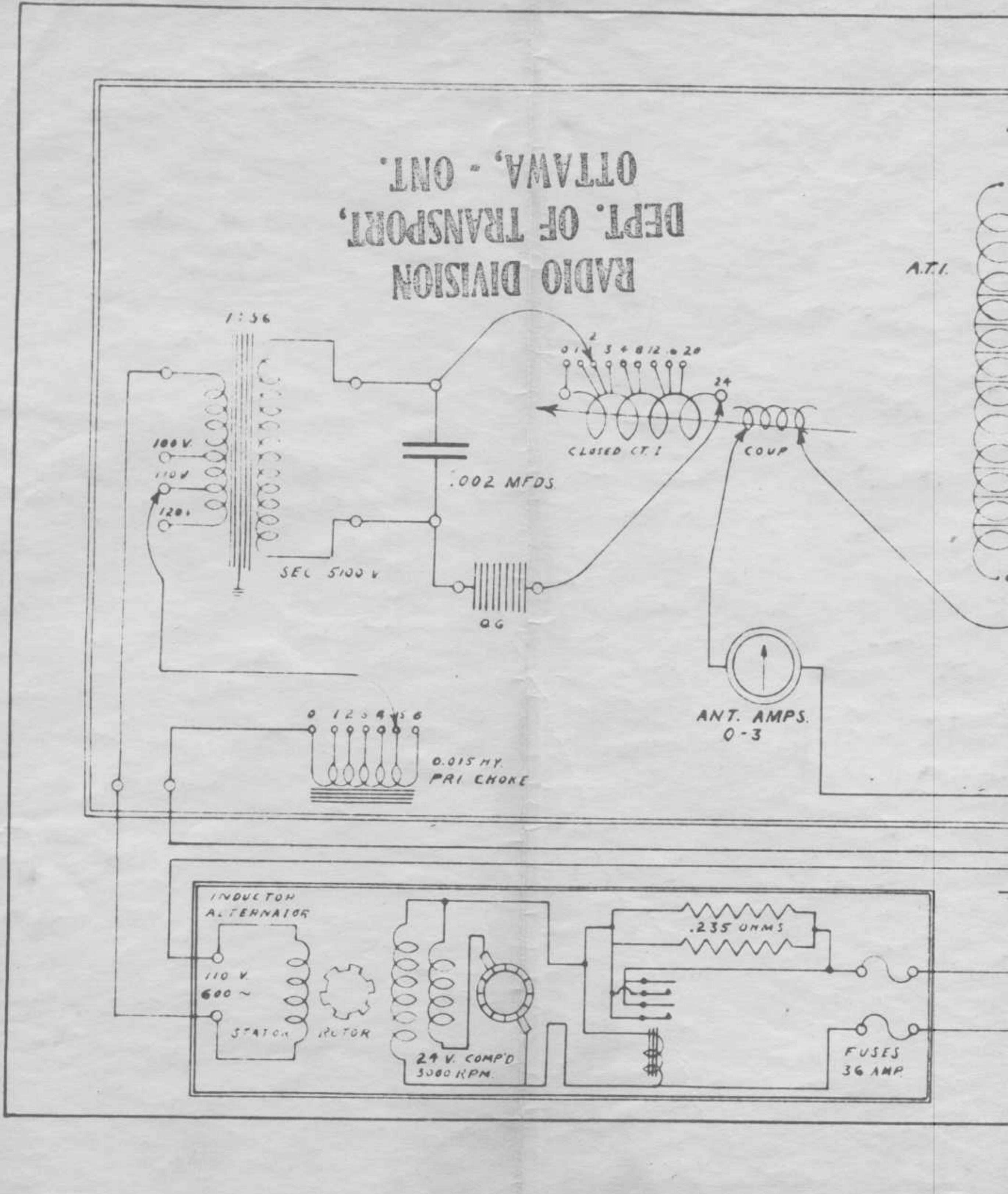
MARCONI Q.G. EMERGENCY SCHEMATIC DIAGRAM

CANADIAN MARCONI COMPANY TORONTO

DR F.C.S	CK C.S.M	TR F.C.S

OCT. 14 1939



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