

NAVSHIPS 900,719

OPERATION

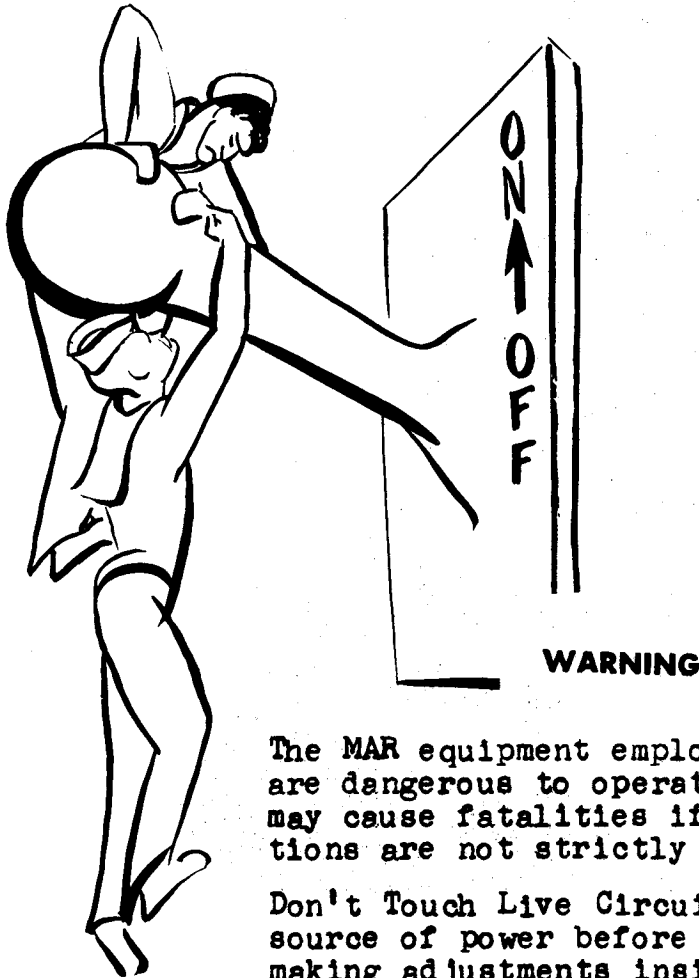
SECTION 4



M-A-R

RADIO TRANSMITTING AND
RECEIVING EQUIPMENT

RESTRICTED



The MAR equipment employs voltages which are dangerous to operating personnel and may cause fatalities if safety regulations are not strictly obeyed.

Don't Touch Live Circuits - Remove all source of power before changing tubes or making adjustments inside the equipment. Capacitors may retain dangerous charges after power is off so discharge and ground circuits prior to touching them.

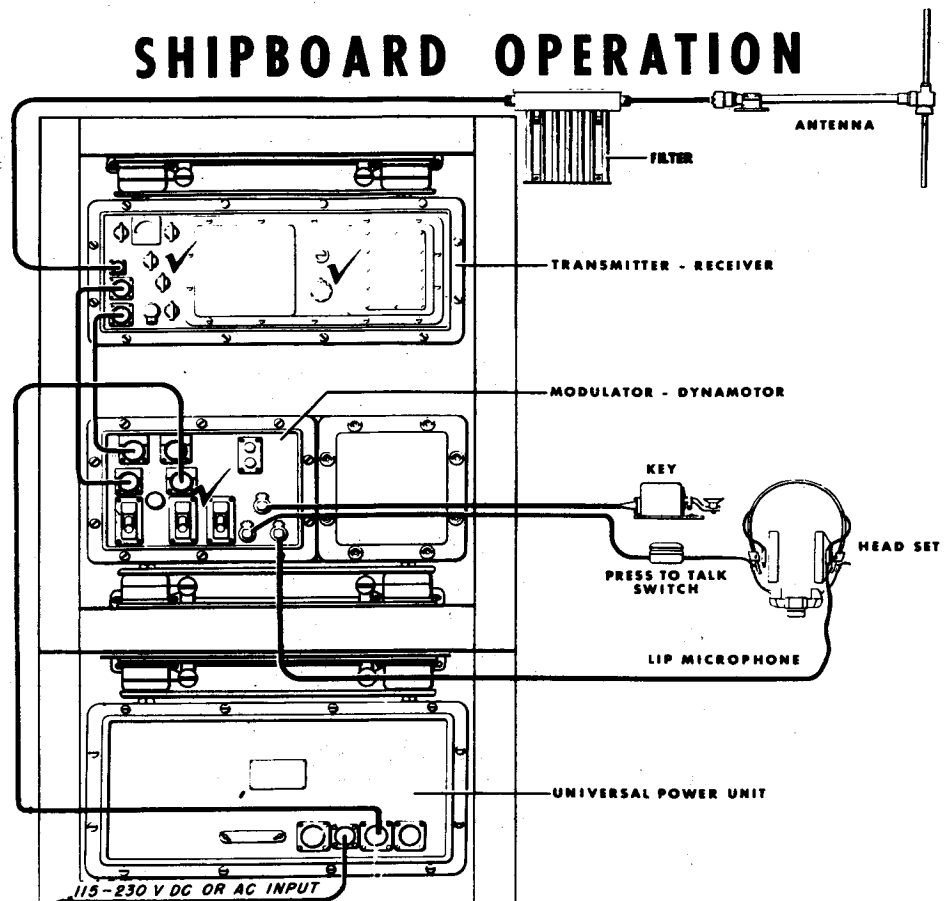
Don't Service or Adjust Alone - Check resistance and continuity rather than voltage whenever possible.

The attention of officers and operating personnel is directed to Chapter 67 of Bureau of Ships Manual or superseding instructions on the subject of Radio-Safety precautions to be observed.

NOTICE

An approved poster illustrating the rules for resuscitation by the prone pressure method shall be prominently displayed in each Radio, Radar or Sonar Enclosure. Posters may be obtained upon request to the Bureau of Medicine and Surgery.

SHIPBOARD OPERATION

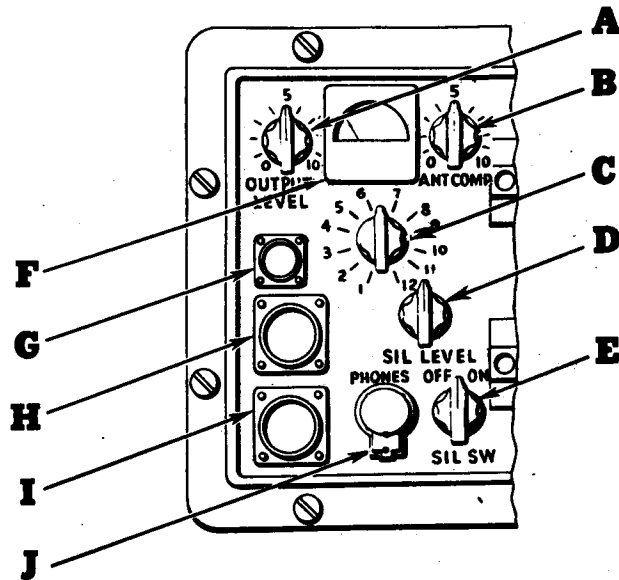
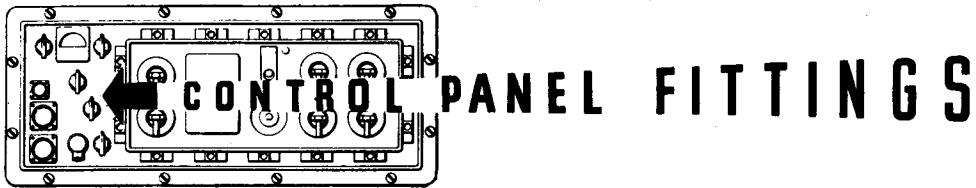


Operation of the MAR equipment can be grouped into three general procedures, namely, operation of the basic radio equipment, operation at the remote control box, and operation of the gas engine generator. While the first procedure applies to all installations, the last two procedures are confined only to field applications.

The controls involved in the operation of the basic equipment are indicated by check marks on the panels of the Transmitter-Receiver and Modulator-Dynamotor in the above illustration. These controls are typical of shipboard or mobile installations where the power supply is obtained from local sources, such as power lines or low voltage circuits.

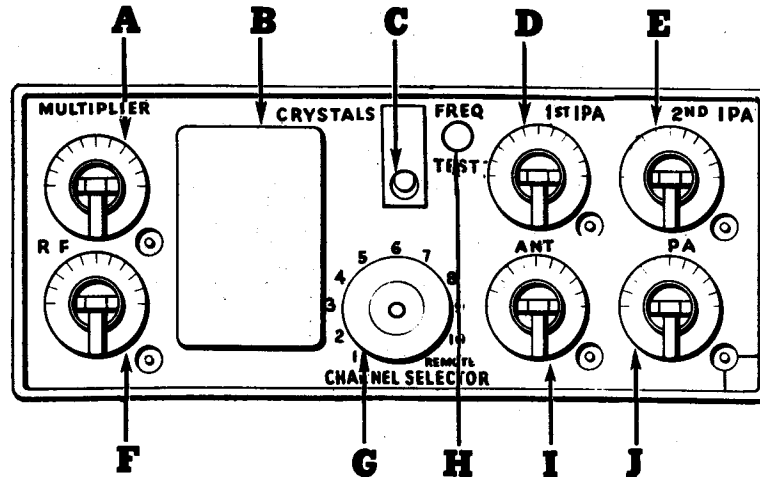
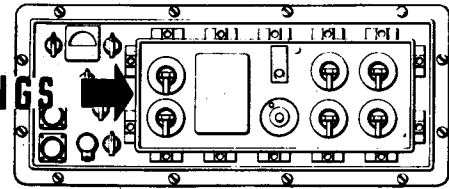
To start the radio equipment it is only necessary to move the power switch lever to the proper position. When the power supply unit is used, the power switch is moved to the PU position. With the 13V d-c supply, the power switch is moved to the DYN position which switches on the dynamotor to furnish plate current.

The panel fittings and their individual functions are described on the following pages. Note that the selector dials are normally covered during operation and need be disturbed only in case of damage to the equipment, replacement of the crystal oven or retuning the equipment.

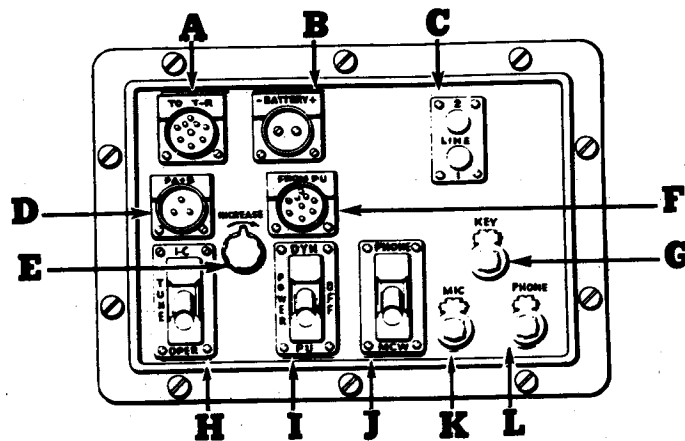
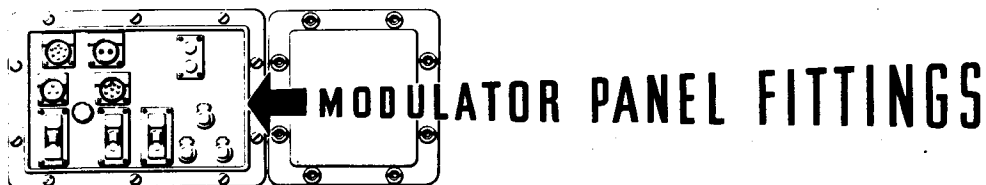


- A Output Level control for receiver.
- B Antenna trimming capacitor control.
- C Meter switch, rotary 12 point, to connect meter into circuits of the equipment to check operation.
- D Silencer Level control to adjust level at which silencer circuit functions.
- E Silencer switch to cut off silencer circuit.
- F Meter to indicate circuit conditions as determined by setting of meter switch.
- G Plug receptacle for antenna transmission line.
- H Plug receptacle for three conductor cable connecting to modulator-dynamotor.
- I Plug receptacle for nine conductor cable connecting to modulator-dynamotor.
- J Jack for plugging headset into output of receiver.

A SELECTOR PANEL FITTINGS



- A** Multiplier dial for adjusting ganged variable capacitors which tune the circuits of the frequency multiplier tubes.
- B** Crystal Oven which maintains practically constant crystal temperature for the ten channel frequency crystals.
- C** Pilot light to indicate power on the equipment and illuminate channel selector switch.
- D** 1st IPA dial to tune circuits of first intermediate power amplifier.
- E** 2nd IPA dial to tune circuits of second intermediate power amplifier.
- F** R.F. dial to adjust circuits in radio frequency tuning section of receiver.
- G** Channel Selector switch to select operating channel frequency.
- H** Frequency Test switch to check 1st IPA tuning adjustment.
- I** Antenna coupling dial to adjust coupling to antenna transmission line.
- J** PA dial for tuning circuits of power amplifier.



- A** Plug receptacle for nine conductor cable to transmitter-receiver.
- B** Plug receptacle for power input when operating from 13V d-c supply source.
- C** Line terminals for line to remote control unit.
- D** Plug receptacle for three conductor cable to transmitter-receiver.
- E** Rheostat for regulating tube heater voltage.
- F** Plug receptacle for nine conductor cable to Universal Power Supply.
- G** Jack for plugging in key for MCW communication.
- H** IC-TUNE-OPERATE switch. OPERATE position for normal operation. TUNE position when adjusting transmitter. IC position to permit communication between operators at equipment and remote control.
- I** Power switch, OFF, in center position, placed in DYN position for operation on 13V d-c and PU position for operation with power supply unit.
- J** MCW-PHONE switch to change from voice operation when in Phone position to code communication when in MCW position.
- K** Jack for plugging in extension cord with pre-talk switch and lip microphone.
- L** Jack for extension cord and headset.

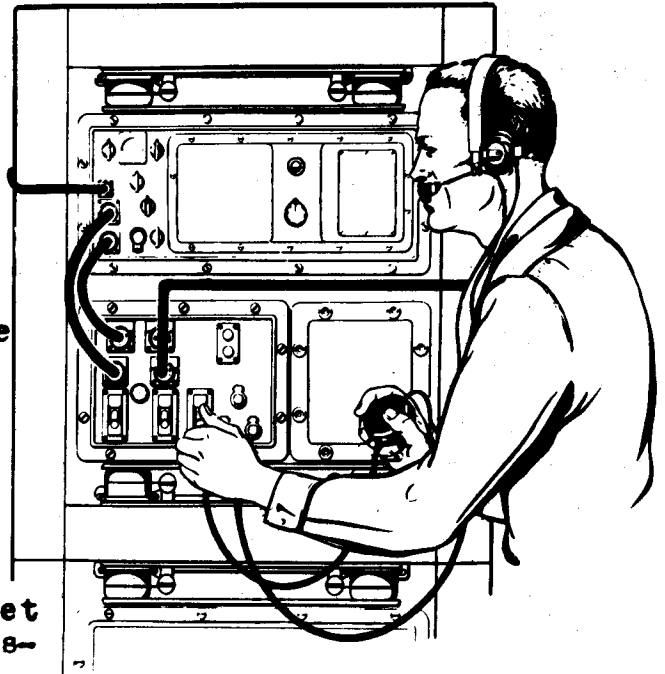
OPERATING PROCEDURE

PRELIMINARY ADJUSTMENTS

Phone-NCW switch on Phone
 IC-Operate switch on Operate
 Silencer switch on OFF
 Silencer Level at 0
 Output Level at 0

PLUG INTO PROPER JACKS On Modulator-Dynamotor Panel

Extension cord and headset
 Extension cord with press-
 to-talk switch and lip
 microphone, key.



Place headset on head and adjust microphone over lip by slipping cords on microphone through clips on headset.

Move power switch to proper position to switch power on the equipment and allow tubes to heat for 3 minutes. With the universal power unit there is a 30 second delay after the switch is closed before power is on the equipment. Panel light glows when power is on.

Check filament voltage with meter by placing meter selector switch on positions 5 and 6 respectively when 13V d-c supply is used. Positions 6 and 7 of the switch are used when the equipment is operated from the universal power supply. Adjust filament control to bring meter readings to 7.5 in both cases.

Rotate meter switch to position 12 to check output of transmitter and close press-to-talk switch. A meter reading of 4.5 indicates transmitter is functioning properly. Release switch.

Rotate Output level knob to the right to increase the output and bring in weak signals. When signals are heard, adjust Ant. Compensator knob for maximum output and readjust Output Level as found necessary. Move Silencer switch to the ON position and rotate Silencer level knob to the right to cut out background noise during no signal periods. The Silencer level should never be increased to a point where it will interfere with the reception of weak signals.

To change operating frequency, rotate Channel Selector switch to frequency channel desired. A chart showing switch positions and channel frequencies is clipped to the selector panel cover to the left of the Channel Selector switch.

-THEN PROCEED TO OPERATE.

TO TRANSMIT, by voice, close press-to-talk switch on microphone cord and speak into microphone.

Release button for receiving.

FOR MCW COMMUNICATION. Move Phone-MCW switch to MCW position and proceed to signal by means of key. Return switch to Phone position to put receiver in operation.

TO TALK TO REMOTE BOX OPERATOR move IC-Operate switch to the IC position, which prevents speech being radiated by transmitter during intercommunication.

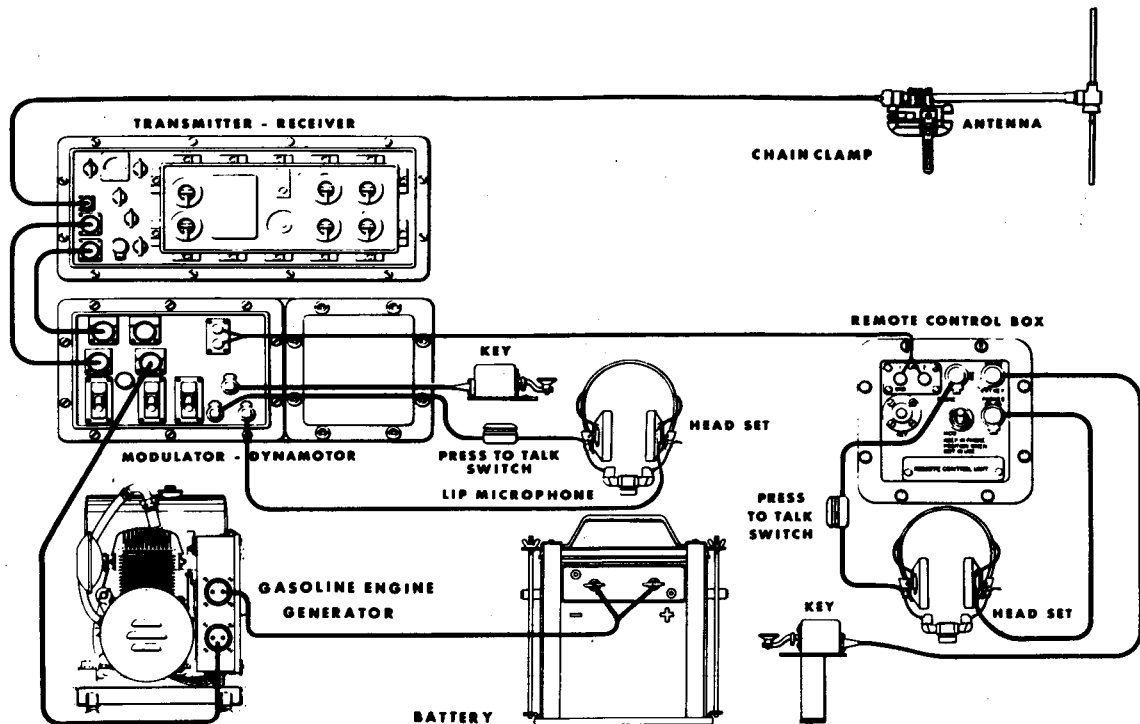
TO SHUT DOWN EQUIPMENT move power switch to the center or OFF position. Return Silence Level to 0 setting or turn Silence Switch to OFF to assure reception of weak signals when operation is resumed.

NOTE Channel Selecting mechanism will not operate with equipment in transmitting condition.

FIELD OPERATION

In field installations where remote control is provided and a gas engine generator or batteries are utilized as a power source, operation also involves attention to these units. Batteries should be used as a sole source of power only for short periods, their capacity being insufficient for sustained operation. They may be "floated" across the gas engine generator output, however, for prolonged operating periods. The generator control box switch must be in the Radio position whenever the MAR is operated or when floating the batteries across the generator output, and in the Battery position when batteries are being charged.

TO START ENGINE: First check oil level with plug gage on side of engine base, adding oil, if necessary, to bring to full mark. Check fuel level. Open the fuel shutoff valve on the bottom of tank: unscrew the air vent screw on fuel filler cap about two turns: unscrew the chained oil seal plug from the crankcase breather. Snap the engine toggle switch to "ON." Close the carburetor choke by moving the choke handle upwards.



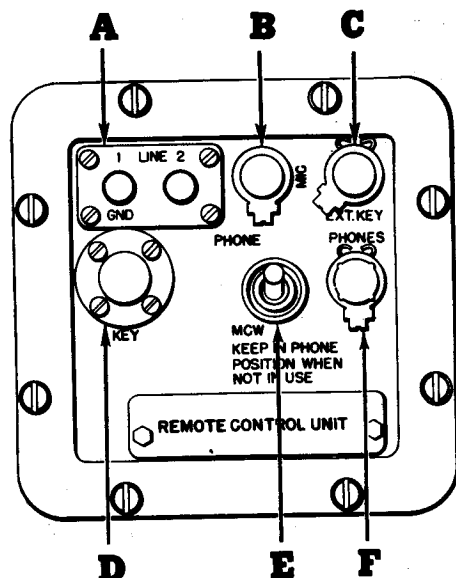
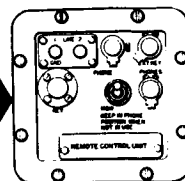
Engage starter rope knot in pulley notch and wrap rope around pulley. Steady the engine and exert a quick pull on the rope. When engine starts, open choke valve.

If engine does not start, reopen choke valve for several trials and repeat spinning of engine with rope until it starts. Should engine fail to start after several attempts, close choke for one pull of the starter rope and open it for several additional pulls of the rope.

Never run the engine with a partly-closed choke. Should the engine fail to start, the condition may be caused by over-choking, a fouled or faulty spark plug, a short in the stop switch, failure or lack of fuel supply, water in the fuel, lack of compression, or an ignition breakdown. Consult the Engine Trouble Chart in Section 7.

In cases where an engine has been out of operation for some time it sometimes happens that the heavy fractions in the gasoline may settle in the form of a jelly which may have a tendency to clog the carburetor jets, inlet needle valve and seat. Should this happen, remove the old gasoline and clean out the entire fuel system. It is also advisable to remove the spark plug and squirt a little crankcase oil into the combustion chamber. Turn the motor over several times to permit the oil to accumulate on the valve seats and stems. This will also seal the piston and rings for better compression.

REMOTE CONTROL PANEL FITTINGS



- A** Line terminals for connection of leads to radio installation.
- B** Jack for plugging in extension cord fitted with press-to-talk switch and receptacle for lip microphone.
- C** Jack for external key with leg clamp.
- D** Key built into panel.
- E** Switch to select type of emission.
PHONE position enables voice communication.
MCW position enables keyed code communication.
- F** Jack for extension cord and headset.

OPERATION AT REMOTE BOX

Equipment must be switched on at modulator-dynamotor panel, placing IC-Operate switch in IC position for intercommunication between operators only or in Operate position for signal radiation.

Plug the headset and microphone with cord mounting press-to-talk switch into proper jacks on remote box. Plug the extension cord and key into key jack.

TO TRANSMIT by voice, place MCW-Phone switch in Phone position. Close press-to-talk switch and speak into microphone. Release switch for receiving. Press-to-talk switch may be operated by finger or placed under arm.

FOR MCW COMMUNICATION Move MCW-Phone switch to MCW position. Signaling can then be carried on with waterproof key on panel of remote box or by means of extension key clipped to leg. Switch must be in Phone position in order to receive signals.

WARNING--

Keep MCW-Phone switch in Phone position when equipment is not in use, in order to conserve the dry cells' energy. Weak voice or MCW signals indicate falling dry cells. Replace as soon as possible.





OPERATOR'S DON'TS

- DON'T** Leave Silencer switch at ON or Silencer level other than at 0 when equipment is switched off.
- DON'T** Operate the equipment with heater voltages above normal.
- DON'T** Leave caps off panel receptacles when cables are disconnected.
- DON'T** Forget to check engine oil level daily.
- DON'T** Leave the MCW-Phone switch on the remote box on MCW when the equipment is not in use.
- DON'T** Forget to check batteries for level and specific gravity of electrolyte.
- DON'T** Neglect the checking routine each time equipment is put into service.

