INSTALLATION AND MAINTENANCE FOR MASTER II MARINE HI-LO POWER KIT

(OPTIONS 1022, 9066 AND 9211 thru 9214)

CONTENTS

DESCRIPTION

The Marine HI-LO Power Option Kit modifies the standard 35 watt General Electric high band radio (150.8 to 174 MHz) and control unit to provide 1 or 25 watts of transmitted output power. This option can be installed in radios with a 35 watt PA board having a revision letter of "A" or higher.

Modification Kit 19A130302G1 is installed in the control unit and consists of a switch assembly, indicator LED, nameplate, label and associated hardware.

Modification Kit 19A130328G1 is installed on the 35 watt PA board in the radio and consists of component board A2101, discrete components, a lead to connect A2101 to a control lead in the control cable and a nameplate.

Non-compatible options include the Squelch Operated Relay, Priority Search Lock Monitor, Public Address, Wide Spaced Transmitter, and Internal External Speaker.

OPERATION

A HI-LO power option switch on the control unit selects the transmitted RF output power. When the option switch is in the HI position, the RF transmitted power is 25 watts and the power indicator LED is on. When the option switch is in the LO position, the RF transmitter output power is 1 watt and the power indicator is off.

CIRCUIT ANALYSIS

Amplifier Q201, driver Q202 and power amplifier Q203 on the power amplifier board amplify the RF input from the exciter to drive the antenna. The Marine HI-LO Power Option controls the regulated DC voltage to amplifier Q201 and thereby regulates the output power. HI-LO power switch S1701 selects the transmitted output power: 25 watts or 1 watt.

References to symbol numbers mentioned in the text are found on the block diagram, schematic diagram, outline diagram and parts list. Figures 1 and 2 are a block and simplified diagram respectively and show the interfacing of the power amplifier board and control unit with the HI-LO Marine power option kit.

HI POWER

With HI-LO power switch S1701 in the HI position, low power control transistor Q2101 is turned off by applying ground from the control unit to its base. Indicator CR1701 is turned on. With Q2101 turned off the regulated DC voltage applied to amplifier Q2101 and thus the output power is set solely by adjusting High Power Adjust Control R219 on the PA board. With the transmitter keyed R219 is set for 25 watts output power.

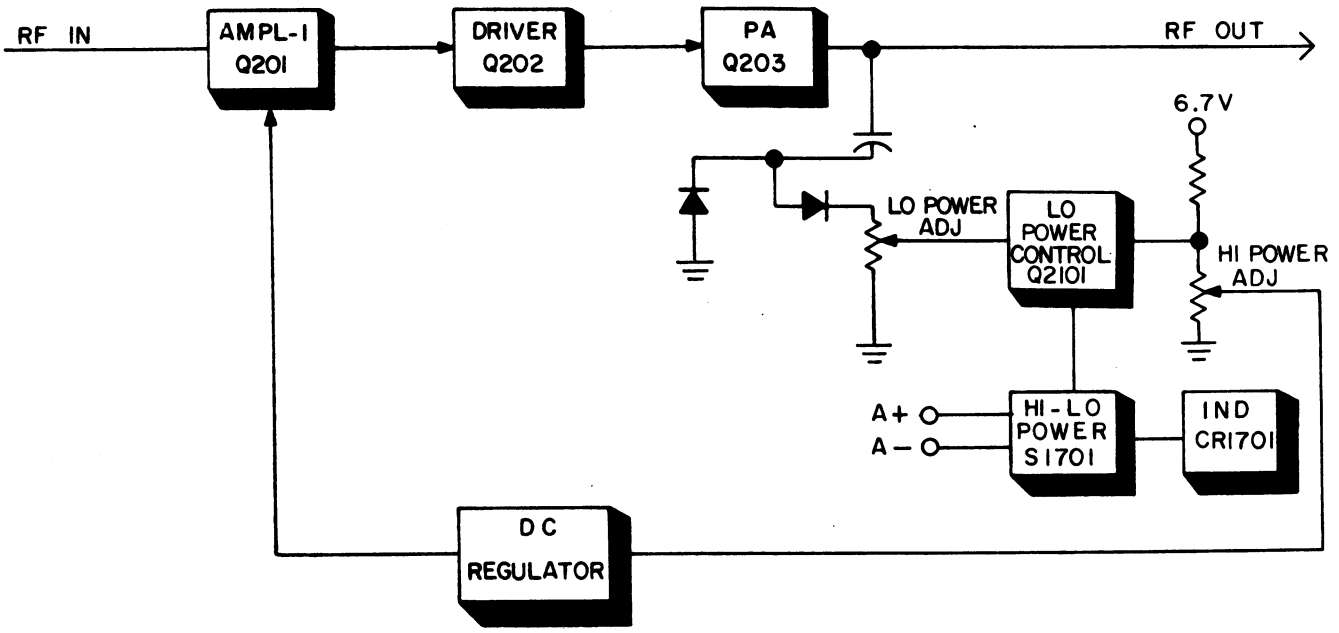


Figure 1 - HI-LO Marine Power Option Block Diagram

LO POWER

With HI-LO power switch S1701 in the LO position ground is removed from the base of Q2101. Conduction of low power control transistor Q2101 is controlled by Low Power Adjust Control R2101. RF energy is then coupled through C2104 and rectified by CR2103 and CR2105.

When the transmitter is keyed, Q2101 functions as a variable resistor in parallel with High Power Adjust Control R219 to lower the input voltage to the regulator. This lowers the voltage applied to Q201, thereby decreasing the transmitted power. With the transmitter keyed, R2101 is set for 1 watt output power. The indicator on the control unit is off.

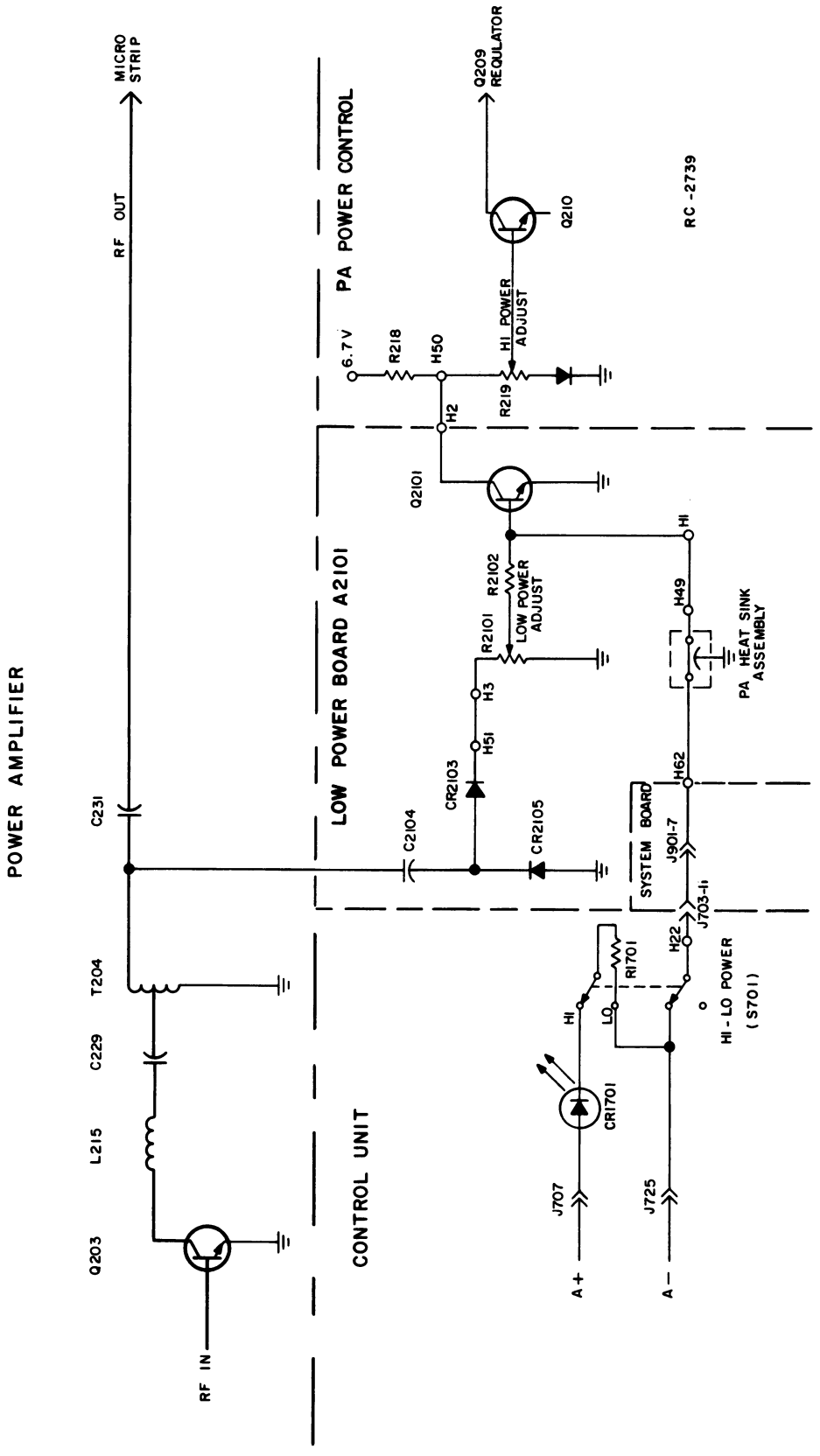


Figure 2 - Marine HI-LO Power, Simplified Diagram

FIELD INSTALLATION

CONTROL UNIT MODIFICATION

The following instructions can be used to install the switch assembly in the MASTR II control unit. The Marine HI-LO power option is not compatible with such options as the Internal/External Speaker, Squelch Operated Relay, Public Address, Wide Spaced Transmitter, or PSLM.

NOTE

A 30 or 38 conductor cable assembly is required when installing the Marine HI-LO Power Option in the control unit.

Disassemble the control unit and install switch assembly as follows:

1. Remove the two screws on the bottom of the front edge of the control unit and lift off the top cover.

2. Mount the HI-LO power switch (S1701) in the space provided in the control unit. Position the switch as shown on the Outline Diagram and secure it to the control mounting bracket with the 4-40 x 1/4 inch Phillips head POZIDRIV® tap screw provided. Secure the other end of the switch to the control unit housing with the 4-40 x 1/4 inch Phillips head tap screw provided.

3. Position the LED (CR1701) in the rear indicator slot of the control unit housing and secure in place with the spring clip provided.

4. Make LED and switch connections as indicated in the connection chart on the Outline Diagram.

5. Remove the existing nameplate from the control unit top cover and install new Nameplate (NP270753P11) as follows:

   a. Viewing the control unit from the front, note that there are only three of the plastic nameplate tabs which lock in place. These are the top left hand tab, the top right hand tab and the bottom center tab. The remaining tabs function only as guide tabs.

   b. Release the locking action of the tabs, starting with the top right hand tab, then the top left hand tab. Apply pressure with fingers or use a small flat blade screwdriver to release tabs. Push released tabs up through slots to prevent relocking of tabs.

   c. Release the locking action of the bottom center tab and pry the nameplate loose from the top cover. The old nameplate is not to be used.

   d. Install the new nameplate.

6. Attach label as shown in bottom view.

7. Replace the control unit top cover and secure in position with the two screws previously removed.

RADIO MODIFICATION

To install the Marine HI-LO Power Option Kit in the radio proceed as follows:

1. Remove top and bottom covers from the radio. Refer to Maintenance Manual for parts location.

   a. Pull the locking handle down and pull the radio out of the mounting frame.

   b. Pry up the top cover at the front notch and lift off,

   c. Loosen the two retaining screws from the bottom cover and remove cover.

2. Remove the PA top cover.

3. Refer to Service Outline, View A. On bottom of PA casting install C2106 using a #8 lockwasher.

4. Strip, tin & solder black lead supplied to C2106-2.

5. Remove left side rail of the radio (5 screws).

6. Place the black lead in the cable trough of the side rail along with the red and black power leads, replace the side rail, and dress leads as shown.

7. Refer to View B. Cut, strip, tin and solder the black lead to H62 on the system board. Dress wire as shown.

8. Mount A210 circuit board on top of the PA board as shown in top view and solder H60, H61, H62, and H63.

9. Connect leads of A2101 as follows:

   - White lead to H50 on PA Board
   - Black lead to C2106-1 at H49 on PA Board
   - Red lead to H51 on PA Board

10. Refer to Service Outline. Install three cable clamps as shown, flush with PA Board. Dress wires in cable clamps as shown.

FIELD INSTALLATION

11. Place and solder the following components on the PA Board. Keep leads as short as possible above and below board.

    - C2104(5 PF) capacitor from H58 to H59
    - C2105(150 PF) capacitor from H52 to H53
    - CR2102 - Cathode to H56, anode to H57
    - CR2103 - Cathode to H54, anode to H55

12. On the new combination nameplate supplied type the same combination number, serial number, and option numbers from the old nameplate. Type in new FCC type number indicated on chart below:

OLD FCC TYPE NO.	NEW FCC TYPE NO.	OPTION NO.
KT-32-A	KT-103-A	9066
KT-72-A	KT-108-A	9211
KT-82-A	KT-109-A	9212
KT-72-E	KT-108-E	9213
KT-82-E	KT-109-E	9214

Stick over existing nameplate.

13. Refer to View C. Install label 19A130309P1 near marking PA casting wall as shown.

14. Replace PA cover and bottom and top covers of the radio.

CHECKOUT AND ADJUSTMENT

1. Turn power on.

2. Switch the control unit HI-LO power switch to HI. The option indicator LED must light (upper right corner).

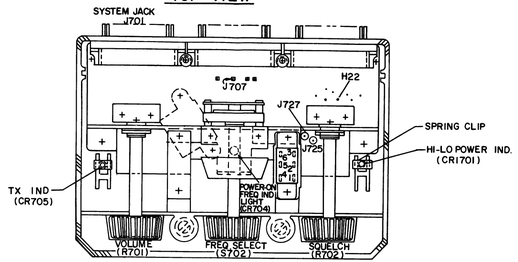
3. Key the transmitter and adjust high power control R219 on PA board for 25 watts output.

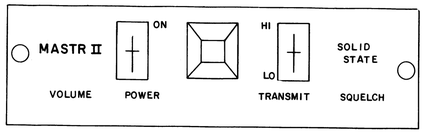
4. Switch the transmit control to LO. The option LED must extinguish.

5. Key the transmitter and adjust low power control R2101 on A2101 for 1 watt output.

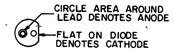
CONTROL UNIT
(OPTION 1022)

TOP VIEW

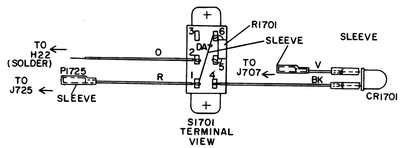


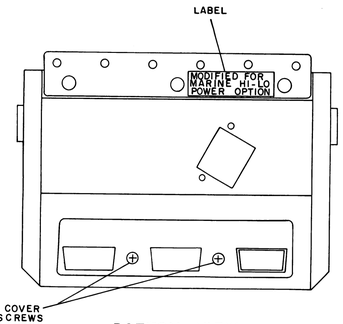


NAMEPLATE

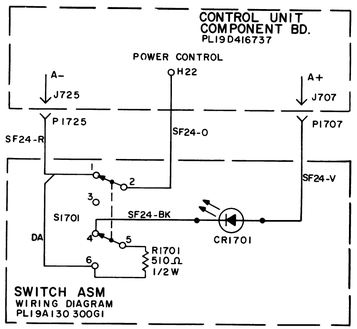


LEAD IDENTIFICATION FOR CR1701





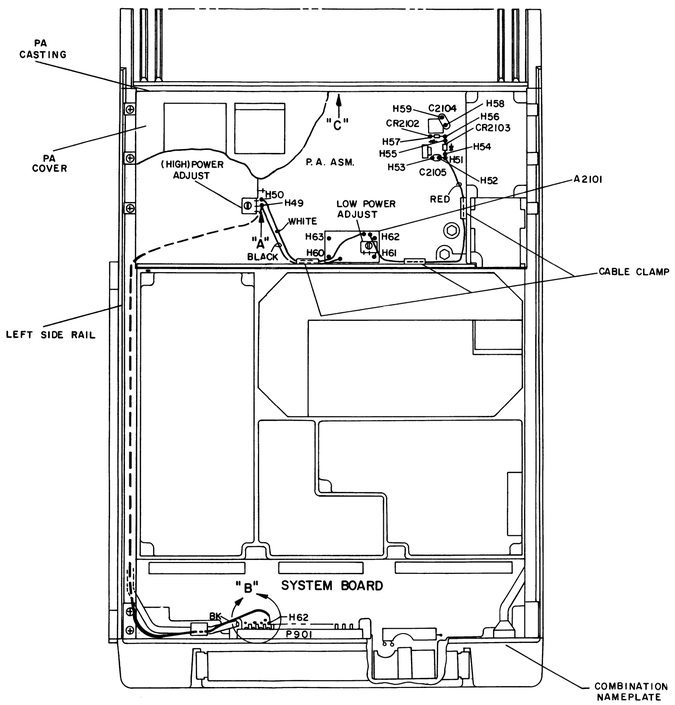
BOTTOM VIEW



OUTLINE DIAGRAM

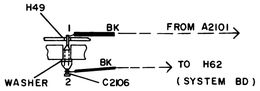
MARINE HI-LO POWER CONTROL

MOBILE RADIO
(OPTION 9066)

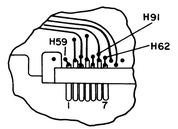


TOP VIEW

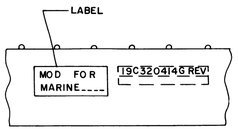
(19R622169, Rev. 0)



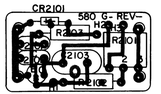
VIEW "A"



VIEW "B"

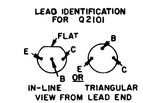


VIEW "C"

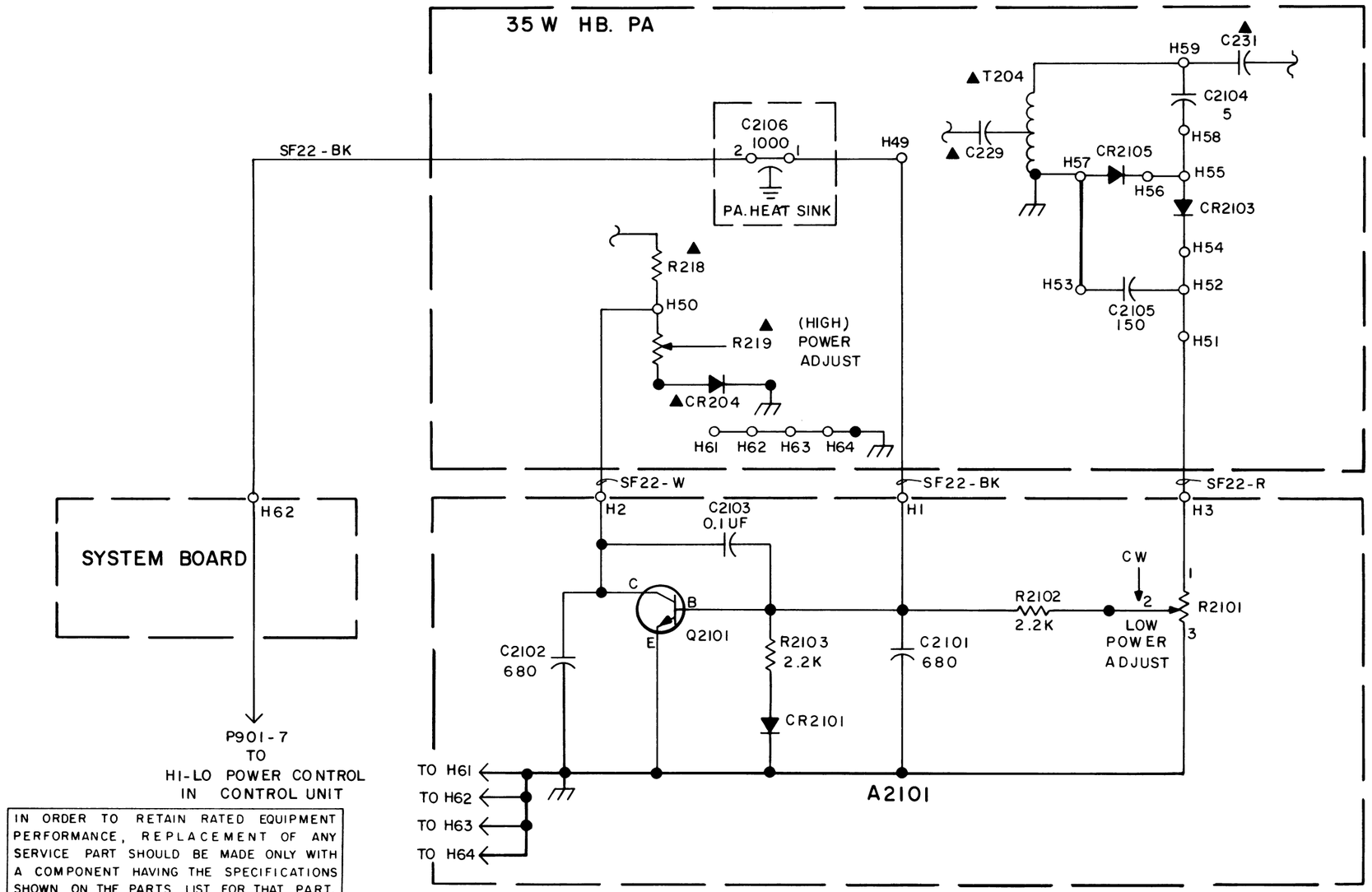


A2101 COMPONENT BOARD

(19B226579, Sh. 2, Rev. 0)
(19B226579, Sh. 3, Rev. 0)



NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.



▲ PART OF PL19D416936G1 (PA BOARD)

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG = 1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF = MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH = MILLIHENRYS OR H = HENRYS.

(19C321252, Rev. 1)

SCHEMATIC DIAGRAM

MARINE HI-LO POWER CONTROL

Issue 1

PARTS LIST

LBI-4882

MARINE HIGH-LOW POWER OPTION
CONTROL UNIT MODIFICATION KIT 19A130302G1
PA MODIFICATION KIT 19A130328G1

SYMBOL	GE PART NO.	DESCRIPTION
		CONTROL UNIT MODIFICATION KIT 19A130302G1 (Includes Switch Assembly 19A130300G1)
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1701	19A129291P3	Diode, red light emitting: red lens.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P1707	19A127042P2	Terminal, solderless: wire No. 20-24 AWG; sim to Malco 12093-10.
P1725	4029840P2	Contact, electrical: sim to Amp 42827-2.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1701	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1701	19A116622P4	Push: DPDT, 3 amp at VAC or 0.5 amp VDC at 125 v; sim to Switchcraft 11K1039.
		- - - - - - - - - - MISCELLANEOUS - - - - - - -
	NP270753P11	Nameplate.
	19S116807P1	Clip, spring tension.
	19B201074P204	Tap screw, Phillips POZIDRIV®: No. 4-40 x 1/4.
	N117P9004C13	Tap screw, phillips: No. 4-40 x 1/4.
		PA MODIFICATION KIT 19A130328G1
A2101		COMPONENT BOARD 19B226580G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2101 and C2102	19A116655P18	Ceramic disc: 680 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C2103	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR2101	19A115250P1	Silicon.
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q2101	19A116774P1	Silicon, NPN; sim to Type 2N5210.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R2101	19A116559P102	Variable, cermet: 5000 ohms ±20%, .5 w; sim to CTS Series 360.
R2102 and R2103	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2104	7489162P101	Silver mica: 5 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C2105	19A116655P8	Ceramic disc: 150 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C2106	19A209503P3	Feed-thru: 1000 pf +100% -10%, 100 VDCW; sim to Erie Style 2425-002.
CR2102 and CR2103	19A115775P1	- - - - - - - DIODES AND RECTIFIERS - - - - - - Silicon.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	NP279840	Nameplate.
	19A116552P1	Cable clip.
	N403P16C6	Lockwasher, external tooth: No. 8.
	4029548P1	Terminal, stud.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES