INSTRUCTION MANUAL

KEPCO An ISO 9001 Company.

BOP 1KW-MG RETROFIT KIT 219-0562

BOP 1KW-MG
FIRMWARE RETROFIT KIT

1. DESCRIPTION

Kepco KIT 219-0562 contains the PROMs used to upgrade the firmware for BOP 1KW-MG power supplies. The upgraded firmware supports faster serial communication and faster measurement rate

2. APPLICABILITY

This KIT applies only to model revisions listed under Applicable Revs in Table 1. Two components designated C49 are included in this Kit. Newer/Older revisions listed in Table 1 specify the correct part number and installation location, depending on the BOP revision.

TABLE 1. APPLICABILITY

BOP MODEL	APPLICABLE REVS	NEWER REVS	OLDER REVS
		These Revs require C49, P/N 117-1122 to be added to A4A3 per PAR. 3.6, step 3.	These Revs require capacitor assembly P/N 117-0999 to be added to A6A1 per PAR. 3.7, step 1.
BOP 6-125MG	Rev 0 to Rev 10	Rev 2 to Rev 10	Not applicable
BOP 10-75MG	Rev 3 to Rev 23	Rev 15 to Rev 23	Rev 3 to Rev 14
BOP 20-50MG	Rev 1 to Rev 31	Rev 22 to Rev 31	Rev 1 to Rev 21
BOP 25-40MG	Rev 0 to Rev 10	Rev 2 to Rev 10	Not applicable
BOP 36-28MG	Rev 7 to Rev 33	Rev 24 to Rev 33	Rev 7 to Rev 23
BOP 50-20MG	Rev 1 to Rev 30	Rev 21 to Rev 30	Rev 1 to Rev 20
BOP 72-14MG	Rev 0 to Rev 26	Rev 18 to Rev 26	Rev 0 to Rev 17
BOP 100-10MG	Rev 0 to Rev 29	Rev 21 to Rev 29	Rev 0 to Rev 20

NOTE: For revisions not listed above, please consult factory.

Kepco can provide firmware that has been pre-configured for a particular unit. The serial number of the unit is added to part number of the kit to indicate the unit to which the kit applies.

3. INSTALLATION INSTRUCTIONS

3.1 MATERIAL REQUIRED (See Table 2.)

TABLE 2. MATERIAL REQUIRED

MATERIAL	LOCATION	QUANTITY
PROM, Kepco P/N 250-0840; replaces U2 on Digital Board A1	Provided in this Kit	1
PROM, Kepco P/N 250-0841; replaces U24 on Digital Board A1	Provided in this Kit	1
PROM, Kepco P/N 250-0839; replaces U1 on Front End Control Board A4A3	Provided in this Kit	1
PROM, Kepco P/N 250-0842; replaces U9 on Keypad Interface Board A6A1	Provided in this Kit	1
Resistor, Kepco P/N 115-2511, metal film, 8.66K Ohms, 1%, 1/8W, replaces R9 on A4A3	Provided in this Kit	1

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TABLE 2. MATERIAL REQUIRED (CONTINUED)

MATERIAL	LOCATION	QUANTITY
Capacitor, Kepco P/N 117-1122, ceramic, 220pF, 10%, 100V, replaces C49 on A4A3 per Table 1	Provided in this Kit	1
Capacitor assembly, Kepco P/N 117-0999, ceramic, 1μF, 10%, 50V, with solder lug on A6A1 per Table 1	Provided in this Kit	1
Heatsink, Kepco P/N 136-0486, installed on A4A3U9 and A4A3U14.	Provided in this Kit	1
Screw, Kepco P/N 101-0092, PHPH, 4-40 x 0.375 used to install heatsink P/N 136-0486	Provided in this Kit	2
Lockwasher, #4, Kepco P/N 103-0097, used to install heatsink.P/N 136-0486	Provided in this Kit	2
Nut, Hex, Kepco P/N 102-0003, 4-40 x 1/3 in. used to install heatsink.P/N 136-0486	Provided in this Kit	2
• ESD (Electrostatic Discharge) wrist strap (Kepco P/N 114-0080)	Provided in this Kit	1
• IC Extractor (Kepco P/N 114-0079)	Provided in this Kit	1
Instruction Manual Kepco P/N 228-1789	Provided in this Kit	1
Phillips Screw Driver	Not Supplied	N/A
Chip Puller or small Flat Blade Screw Driver	Not Supplied	N/A

3.2 PRELIMINARY PROCEDURE

1. Prior to upgrade, turn on unit and note the serial number when it is displayed during power-up. Record Serial number for configuration after upgrade is complete.
2. If pre-configured chip is provided, verify the serial number of the unit matches the serial number of the kit (KIT 2190562-[serial number]

3.3 DISASSEMBLY PROCEDURE

1. Turn power off, disconnect the unit from source power and remove line cord.
2. Remove the two mounting ears from the chassis by removing three screws from each.
3. Remove the top cover of the unit by removing 14 screws as follows: two at top of the front panel, four at each side, (one towards the rear, three at the bottom) and four at the top of the rear panel.
4. Observe back of front panel-mounted circuit breaker. If a Printed Circuit Board is present, skip this step. If not, tag and remove the four quick disconnect cables from circuit breaker.
5. Disconnect ribbon cable attached to Distribution board A6A1 (see Figure 1) going to Front End Control board A4A3 connector J1.
6. Disconnect ribbon cable attached to Distribution board A6A1 going to Digital board A1J2.
7. Disconnect two 4-pin connectors (or, on some units one 4-pin and one 6-pin connector) (J12, J15, Figure 4), and one 5-pin connector (J14, Figure 4) wired with twisted pairs from Distribution board A6A1. Pull on the twisted pair where it enters the connector; if necessary, a screwdriver can be used to apply enough pressure to front panel to slightly increase separation between front panel and Distribution board A6A1, enough for the connectors to be removed.

   CAUTION: Failure to pull the fan connector straight back can damage the connector.

8. Remove fan connector (J10, Figure 4) from Distribution board A6A1 by pulling connector straight back.

   CAUTION: Removing the outer screws first can result in damage to the front panel.

9. At the bottom of the chassis, first remove the two inner screws, then the two outer screws securing front panel to chassis and separate front panel and Distribution board A6A1 from the chassis.
10. For units without lug wires, carefully pull the front panel straight back from the chassis to disengage the circuit breaker pins and separate the front panel from the chassis.

11. Pry black cover off front panel ADJUST knob. Then remove ADJUST knob by releasing the nut.

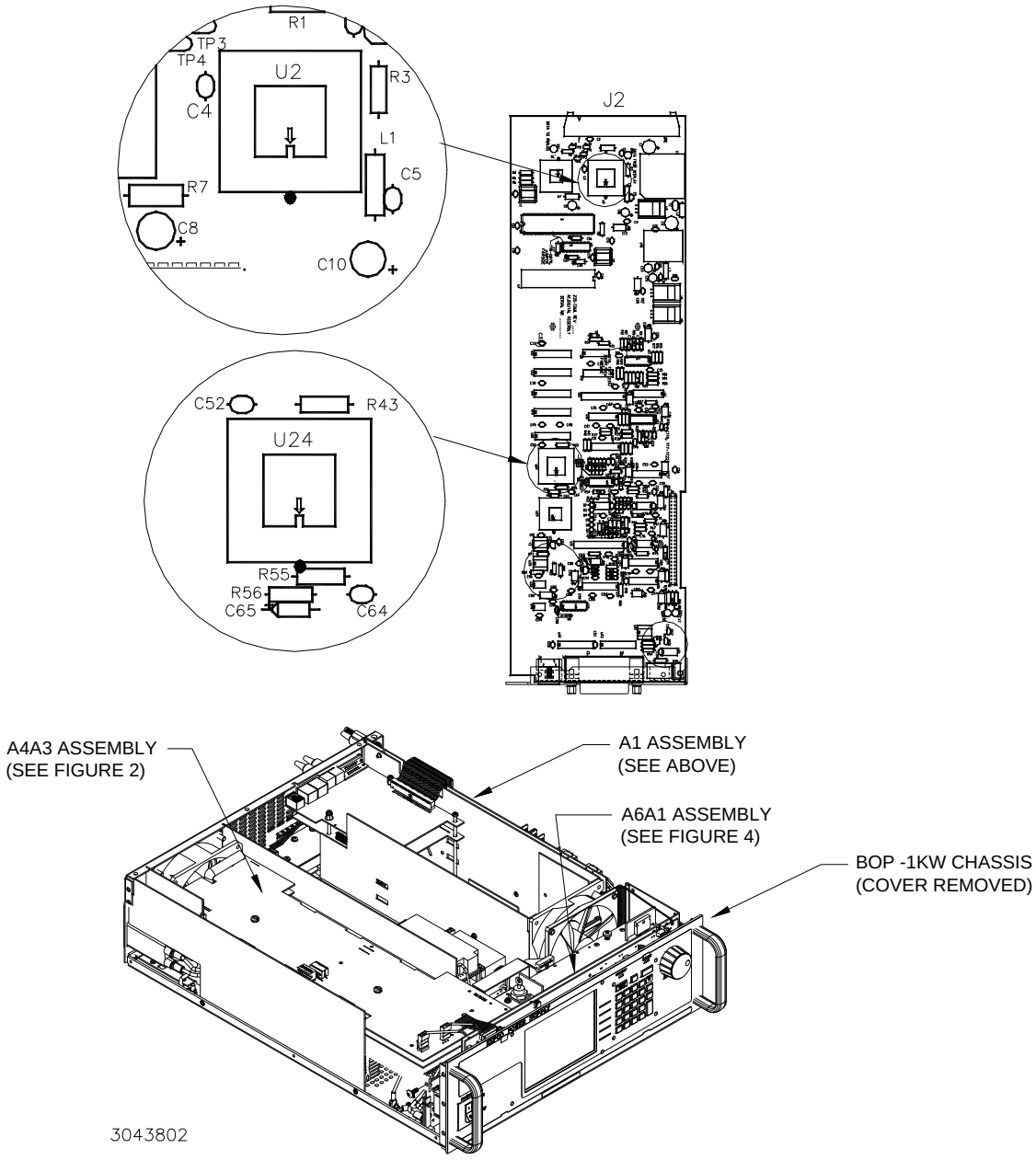

FIGURE 1. ASSEMBLIES A1, A4A3 AND A6A1 LOCATIONS AND DIGITAL BOARD A1 PROM LOCATIONS

3.4 DIGITAL BOARD A1 COMPONENT REPLACEMENT (SEE FIGURE 1)

NOTE: Steps 1 and 2 can be skipped if brief trigger pulses (less than one second) are used.

1. On Digital board A1, locate PROM, U2 (see Figure 1).

CAUTION: FAILURE TO USE THE ESD WRIST STRAP MAY DAMAGE THE PROM!

2. Take the ESD wrist strap from kit and use the peel and stick area to connect the wrist strap to the chassis of the BOP. Place the wrist strap on your arm as indicated by the instructions for the wrist strap.
3. Touch the IC tube to the chassis of the BOP. Open one end.
4. Pry out the PROM U2 using an IC extractor. Insert the hook, first into one slot and then the other, and gently pry out the PROM. Place the PROM in the tube and close the tube.
5. Open the other end of the IC tube and remove the replacement PROM U2 from the tube.
6. Insert the PROM into the socket, insuring the dot on the chip is oriented as shown in Figure 1.
7. Pry out the PROM U24 using an IC extractor. Insert the hook, first into one slot and then the other, and gently pry out the PROM. Place the PROM in the tube and close the tube.
8. Open the other end of the IC tube and remove the replacement PROM U24 from the tube.
9. Insert the PROM into the socket, insuring the dot on the chip is oriented as shown in Figure 1.
10. Reclose the IC tube. Remove wrist strap and disconnect it from the BOP chassis.

3.5 A4A3 FRONT END CONTROL BOARD, PROM U1 REPLACEMENT

1. On Front End Control board A4A3, locate PROM, U1 (see Figure 2).
2. Take ESD wrist strap and connect the wrist strap to the chassis of the BOP. Place the wrist strap on your arm as indicated by the instructions for the wrist strap.

CAUTION: FAILURE TO USE THE ESD WRIST STRAP MAY DAMAGE THE PROM!

3. Touch the IC tube to the chassis of the BOP. Open one end.
4. Pry out the PROM U1 using a chip puller (not supplied) or a small flat-blade screw driver to gently pry out the PROM. Place the PROM in the tube and close the tube.
5. Open the other end of the IC tube and remove the replacement PROM (P/N 250-0839 U1) from the tube.
6. Insert the PROM into the socket, insuring the indentation on the chip is oriented as shown in Figure 2.
7. Locate integrated circuits U9 and U14 (see Figure 2).
8. Attach heatsink (supplied in Kit) onto U9 and U14 as shown in Figure 3 using hardware supplied in Kit.

3.6 A4A3 FRONT END CONTROL BOARD, COMPONENTS R9, C49 REPLACEMENT

1. On Front End Control board A4A3, locate resistor R9 (see Figure 2).
2. Replace resistor R9 with the replacement R9 supplied in this kit.
3. Perform this step only for models listed under **Newer Revs** in Table 1.
   a. On Front End Control board A4A3, locate capacitor C49 (see Figure 2).
   b. Replace capacitor C49 with the replacement C49 P/N 117-1122 supplied in this kit.

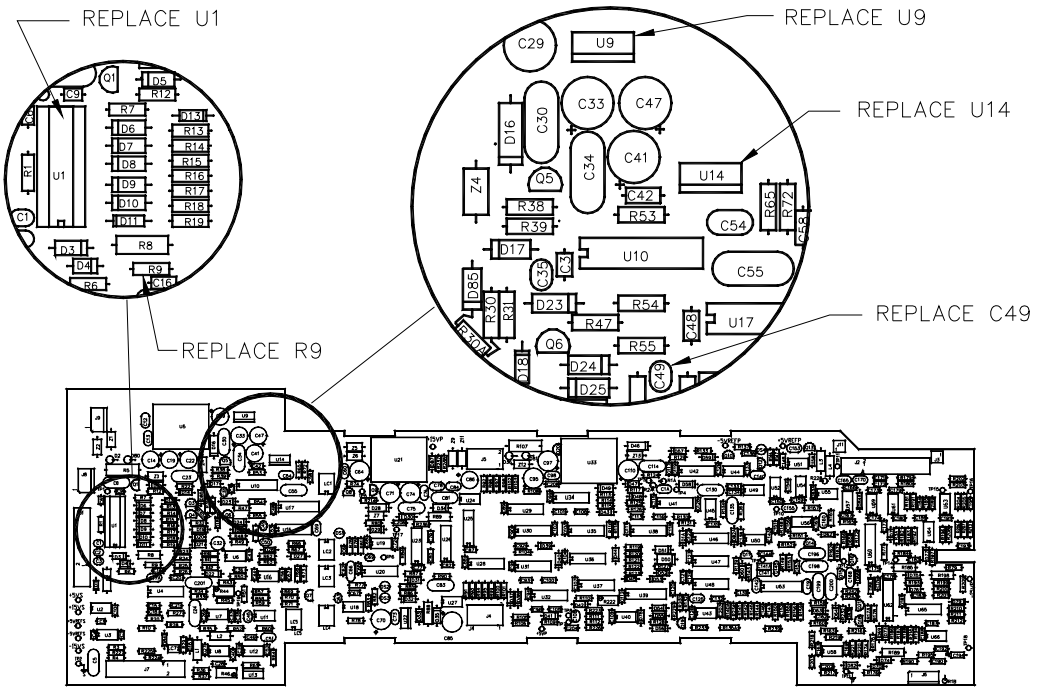

FIGURE 2. FRONT END CONTROL BOARD, A4A3, COMPONENT LOCATIONS

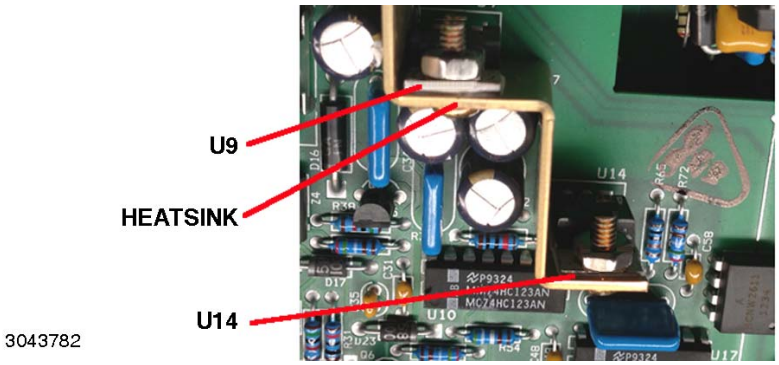

FIGURE 3. A4A3 HEATSINK INSTALLATION

3.7 DISTRIBUTION BOARD A6A1 PROM REPLACEMENT (SEE FIGURE 4)

CAUTION: Note which screws do not use flat washers and tag for reassembly.

1. Perform this step only for models listed under **Older Revs** in Table 1; for all other models, skip to step 2.

   a. Remove screw in upper left hand corner of front panel securing A6A1 to the front panel.

   b. Install the screw just removed through the lug of the capacitor assembly supplied, and reinstall the screw (hand tight); refer to Figure 4, Detail A.

   c. Solder the other end of the capacitor to pin 2 of J12 as shown in Figure 4, Detail A.

2. Remove seven screws, seven lockwashers and five flat washers securing the Distribution board A6A1 to the front panel. Carefully separate the Distribution board A6A1 from the front panel. The PROM on the Distribution board A6A1 is now accessible for replacement (it is not necessary to disconnect the ribbon cables between the front panel and Distribution board A6A1) to replace the PROM.

3. Place Distribution board A6A1 on an ESD mat (if an ESD mat is not available, place the Distribution board on the top cover) and locate PROM U9 (see Figure 4).

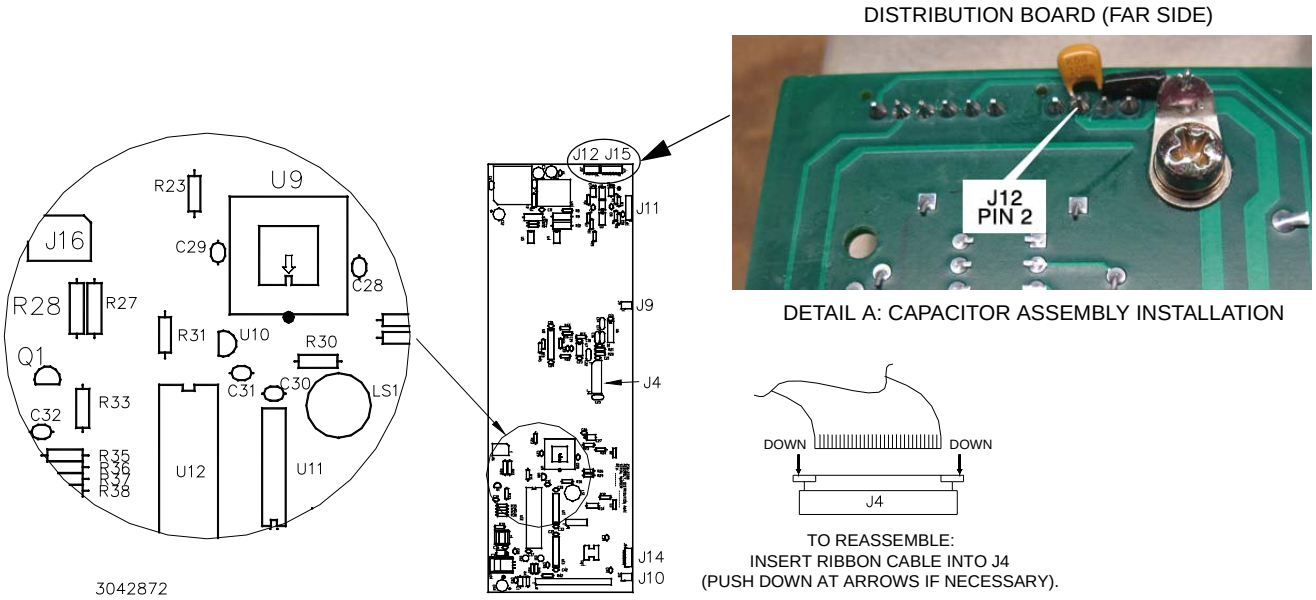

FIGURE 4. DISTRIBUTION BOARD A6A1 COMPONENT LOCATION

CAUTION: FAILURE TO USE THE ESD WRIST STRAP MAY DAMAGE THE PROM!

4. Use the peel and stick area of the wrist strap to connect the wrist strap to an ESD mat (or to the top cover if an ESD mat is not available). Place the wrist strap on your arm as indicated by the instructions for the wrist strap.

5. Touch the IC tube to the ESD mat or top cover. Open one end of the IC tube.

6. Pry out the PROM U9 using an IC extractor. Insert the hook, first into one slot and then the other, and gently pry out the PROM. Place the PROM in the tube and close the tube.

7. Open the other end of the IC tube and remove the replacement PROM U9 from the tube.

8. Insert the PROM into the U9 socket, insuring the dot on the chip is oriented as shown in Figure 4.

9. Reclose the IC tube. Remove wrist strap and disconnect it from the BOP.

3.8 REASSEMBLY

1. Carefully line up the 14-pin header on Distribution board A6A1 with the corresponding socket on the front panel, and the Distribution board LED's with the corresponding cutouts in the front panel and press the Distribution board into place.
2. Secure Distribution board A6A1 to the front panel using seven screws, seven lockwashers and five flat washers as noted during disassembly.
3. Slide the ADJUST knob over the shaft of the ADJUST control and secure using nut and washer. Press black cover onto front panel ADJUST knob.
4. Carefully line up circuit breaker pins with corresponding connectors on front panel and carefully mate front panel and chassis. If circuit breaker incorporates a Printed Circuit Board, it may be necessary to press the PCB onto the circuit breaker.

   CAUTION: Installing the inner screws first can result in damage to the front panel.

5. Attach front panel with Distribution board A6A1 to the chassis first using two outer screws at the bottom of the chassis, then two inner screws.
6. Connect two 4-pin connectors (or one 4-pin and one 6-pin connector), and one 5-pin connector attached to twisted pairs to connectors J12, J15 and J14, respectively on Distribution board A6A1 (see Figure 4). The 4-pin connectors can plug into either J12 or J15; holding the wires, line up the pins on an angle, then push until straight and press into place; if necessary a screwdriver can be used to apply enough pressure to front panel to slightly increase separation between front panel and Distribution board A6A1, enough for the connectors to be inserted.
7. Attach the fan connector (J10, Figure 4) by inserting the connector straight into the mating socket.
8. Connect ribbon cable from Distribution board A6A1 to Digital board connector A1J2.
9. Connect ribbon cable from A4A3 module to Distribution board A6A1 connector J11.
10. If Circuit breaker does not have a Printed Circuit Board, connect the four wires to the circuit breaker in accordance with the tags on the wires.
11. Attach the cover to the chassis using 14 screws.
12. Attach the two mounting ears to the chassis using three screws for each.
13. Install the power cord, connect the unit to source power, turn on power supply and proceed to Initialization, PAR. 4

4. INITIALIZATION

After the hardware upgrade has been completed it is necessary to configure the unit using the following procedure.

NOTE: For KIT part numbers that have a unit serial number, the unit type, max/min settings and calibration have been pre-configured; perform ONLY steps 2 and 3 of the following procedure.

1. At the front panel, press F5 then use ↑ to highlight **Unit Type**. Press F1 to select unit type. Highlight applicable model (should match nameplate on front panel) and press F4.
2. At the front panel, press F5 then use ↓ to highlight **Power Up Settings**. Press F1 to display the Max/Min Settings menu. Press F2 to set all the Power Up settings to the factory default. Then press F4 to save the settings for power-up.
3. At the front panel, press F5 then use ↓ to highlight **Protected Settings**. Press F1 to display the Protected Settings menu. Press F2 to set all the Protected settings to the factory default. Then press F4 to save the settings for power-up.
4. To establish the Serial Number use a remote interface to send the string DIAG:SER n where n is complete serial number recorded during the preliminary procedures (PAR. 3.2, step 1).
5. Cycle power to the unit, turning it OFF, then ON using the POWER ON/OFF circuit breaker.
6. Calibrate the unit in accordance with the applicable Technical Manual for BOP 1000W.

5. INSTRUCTION MANUAL CHANGES

None.