

# INSTRUCTION MANUAL



**KEPCO** An ISO 9001 Company.

**BOP 1KW-MG  
RETROFIT  
KIT 219-0597**

## BOP 1KW-MG FIRMWARE RETROFIT KIT

### 1. DESCRIPTION

Kepeco KIT 219-0597 contains the PROMs used to upgrade the firmware for BOP 100-10MG power supplies. The upgraded firmware supports a 60 millisecond (maximum) setpoint-to-measurement response.

### 2. APPLICABILITY

This KIT applies only to BOP 100-10MG models at Revision 30 or higher.

### 3. INSTALLATION INSTRUCTIONS

#### 3.1 MATERIAL REQUIRED (See Table 1.)

**TABLE 1. MATERIAL REQUIRED**

MATERIAL	LOCATION	QUANTITY
PROM, Kepeco P/N 250-0941; replaces U2 on Digital Board A1	Provided in this Kit	1
PROM, Kepeco P/N 250-0940; replaces U24 on Digital Board A1	Provided in this Kit	1
PROM, Kepeco P/N 250-0938; replaces U9 on Keypad Interface Board A6A1	Provided in this Kit	1
Label: BOP 100-10MG-27446	Provided in this Kit	1
• ESD (Electrostatic Discharge) wrist strap (Kepeco P/N 114-0080)	Provided in this Kit	1
• IC Extractor (Kepeco P/N 114-0079)	Provided in this Kit	1
Instruction Manual Kepeco P/N 228-1875	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 2190597-[serial number])

### 3.3 DISASSEMBLY PROCEDURE

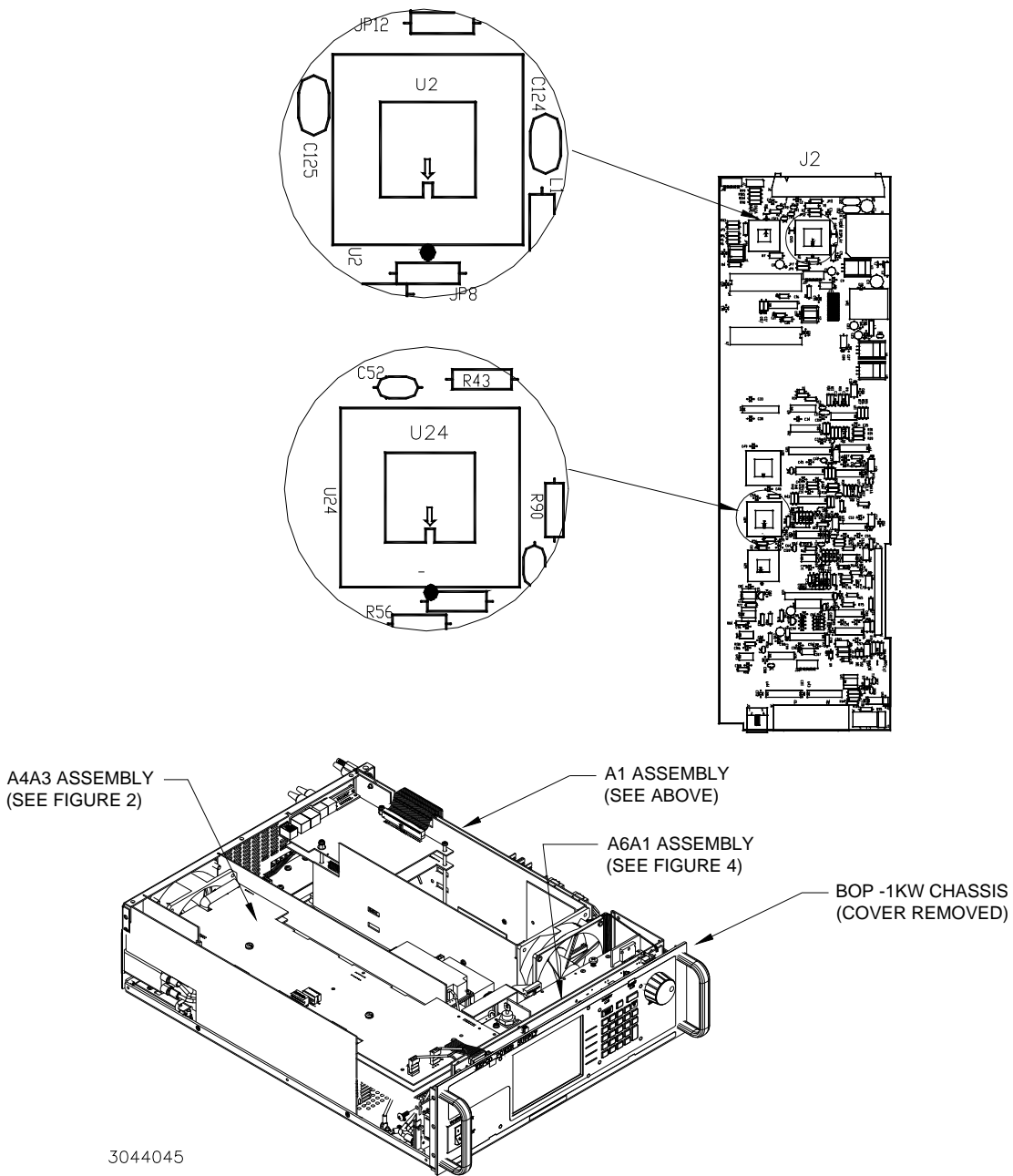
1. Turn power off, disconnect the unit from source power and remove line cord.
2. Remove the two mounting ears from the chassis by removing three screws from each.
3. Remove the top cover of the unit by removing 14 screws as follows: two at top of the front panel, four at each side, (one towards the 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 2), and one 5-pin connector (J14, Figure 2) 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 2) 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).

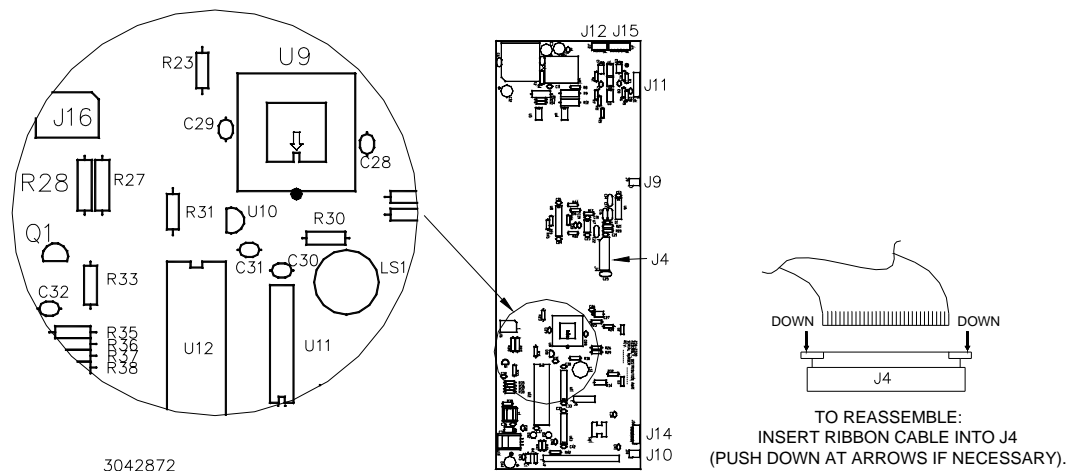
**CAUTION: FAILURE TO USE THE ESD WRIST STRAP MAY DAMAGE THE PROM!**

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 DISTRIBUTION BOARD A6A1 PROM REPLACEMENT (SEE FIGURE 2)

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

1. 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.
2. 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 2).



**FIGURE 2. DISTRIBUTION BOARD A6A1 COMPONENT LOCATION**

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

3. 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.
4. Touch the IC tube to the ESD mat or top cover. Open one end of the IC tube.
5. 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.
6. Open the other end of the IC tube and remove the replacement PROM U9 from the tube.
7. Insert the PROM into the U9 socket, insuring the dot on the chip is oriented as shown in Figure 2.
8. Reclose the IC tube. Remove wrist strap and disconnect it from the BOP.

### **3.6 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 2). 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 2) 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.
14. Affix label at rear of unit between MOD NO. and SER. NO lines.

## 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 1 and 2 of the following procedure.

1. From the computer interface send **DIAG:CUST EF** to identify the unit as BOP 100-10MG-27466.
2. From the computer interface send **MEM:UPD OUTP ; : \*OPC?** to save the customer id for power-up.
3. 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.
4. 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.
5. 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).
6. Cycle power to the unit, turning it OFF, then ON using the POWER ON/OFF circuit breaker.
7. Refer to PAR. 5 for operational details

## 5. INSTRUCTION MANUAL CHANGES

Refer to separate Modification Sheet, BOP 100-10MG-27446, for changes to BOP 1KW-MG Operator's Manual.