Introduction

For improved performance of the O₂ sensor, the O₂ sensor heater voltage must be set to 18 V DC. This change is performed using the R3 potentiometer located on the input / output (I/O) circuit board.

Note. This procedure must be carried out once only at O₂ sensor replacement if the change was NOT effected at a previous O₂ sensor replacement.

Tools / materials required

- O₂ heater voltage adjustment safety shock-shield kit from ABB (part no. 258418A2-ACC) comprising:
  - Shock-shield
  - 2 x 10-32 x ⅜ in shock-shield securing screws
  - 5 inch, 20 gauge voltage measurement extension wire
  - Insulated pot trimmer screwdriver (see Figure 1)
  - Sticker to be affixed to the inside of SMA O₂ analyzer’s upper door indicating that the O₂ heater voltage is set to 18 V DC
- Digital volt meter (DVM)

Figure 1  Insulated pot trimmer screwdriver
1 Health and safety

Safety precautions

Be sure to read, understand and follow the instructions contained within this document before and during use of the equipment. Failure to do so could result in bodily harm or damage to the equipment.

**WARNING – BODILY INJURY**

This procedure must be performed:
- by suitably trained personnel only
- in accordance with relevant national and local regulations

Potential safety hazards

**WARNING – BODILY INJURY**

- This procedure must be performed with the SMA analyzer powered with 120 / 240 V AC.
- Do not attempt this procedure unless the O₂ heater voltage adjustment safety shock-shield is fitted as detailed in this instruction.

2 Initial check

Open the SMA O₂ analyzer's upper and lower doors and check if there is a sticker indicating that the system has been set to 18 V DC. Continue with this procedure only if there is no sticker.

3 Adjusting the O₂ sensor heater voltage

1 Switch off power to the SMA O₂ analyzer.
2 Replace the O₂ sensor (part no. 258418A2) if necessary.

**Note.** The following steps must be performed with the O₂ sensor connected.
3 Open the SMA O₂ analyzer’s upper and lower doors.
4 Referring to Figure 2, disconnect connector block TU-P2 located in the bottom section of the enclosure.
5 Referring to Figure 3, unscrew the O2 HTR(+) and O2 HTR(-) terminals (see Figure 2) and, **taking care not to disturb the existing wires**, connect the voltage measurement extension wire from the kit (red to O2 HTR(+) and black to O2 HTR(-)) and tighten the terminal screws.

![Voltage measurement extension wire connections](image)

**Figure 3 Connecting extension wire**

6 Referring to Figure 2, reconnect connector block TU-P2.

7 Referring to Figure 4:
   a. Place shock-shield A on the analyzer enclosure as shown, aligning the top and right side edges as indicated on the shock-shield.
   b. Pass the extension wires through hole B in the shock-shield marked ‘Extension leads to voltmeter’.
   c. Insert 3 flaps C marked ‘insert this flap under instrument case frame’ under the lip on the left side of the enclosure as shown.
   d. Secure the shock-shield to the enclosure with 2 screws D from the kit as shown.

![Safety shock-shield installation](image)

**Figure 4 Safety shock-shield installation**

8 Connect the DVM to the extension wire.

9 Restore power to the SMA O2 analyzer.

10 After power has been applied for at least 10 minutes:
   a. Measure the O2 sensor heater DC voltage and record it as:
      \[ \text{V}_{\text{O2heater \_ present}} \]
      **Note.** If the O2 sensor heater DC voltage is >18 V DC, adjustment is not necessary. Go to step 11.
   b. Calculate the cable length (in feet) using the formula:
      \[ \text{Cable Length} = 485 \times \text{V}_{\text{O2heater \_ present}} - 8250 \]
   c. Calculate the new O2 sensor heater voltage setting using the formula:
      \[ \text{V}_{\text{O2heater \_ new}} = 0.0021 \times \text{Cable Length} + 18.02 \]
   d. Referring to Figure 5, locate the R3 potentiometer in the top section of the O2 analyzer’s enclosure.

![R3 potentiometer location](image)

**Figure 5 R3 potentiometer location**

e. Referring to Figure 4, use the recessed end of the insulated pot trimmer from the kit (see Figure 1) through hole E marked ‘R3-potentiometer’, to adjust the R3 potentiometer until the voltmeter measurement equals \( \text{V}_{\text{O2heater \_ new}} \).

11 Switch OFF power to the SMA O2 analyzer.

12 Disconnect the DVM and remove the shock-shield.

13 Attach the sticker from the kit to the inside of the SMA O2 analyzer’s upper door to indicate that the O2 sensor heater voltage has been changed to 18 V DC.

14 Referring to Figure 2, disconnect connector block TU-P2.

15 Referring to Figure 3, unscrew the O2 HTR(+) and O2 HTR(-) terminals and remove the extension wires that were connected to connector TU-P2 in step 5, **taking care not to disturb the existing wires**. Tighten the terminal screws.

16 Referring to Figure 2, reconnect connector block TU-P2.

17 Close the SMA O2 analyzer’s upper and lower doors.

18 Restore power to the SMA O2 analyzer.