

## **REPLACING THE KICKER IN AN “E & T” SERIES SO<sub>x</sub> ANALYZER**

### **I. PURPOSE:**

The purpose of this instruction is to outline the proper steps necessary for installation of a new Hydro Carbon Kicker in an “E” and “T” series SO<sub>x</sub> analyzer.

### **II. TOOLS:**

Phillips head screw driver.  
 $\frac{7}{16}$ ” wrench  
 $\frac{9}{16}$ ” wrench  
Diagonal cutters  
Ruler with  $\frac{1}{8}$ ” indications

### **III. PARTS:**

KIT000299, KIT, RETRO, HC KICKER, SOX UNITS

### **IV. PROCEDURE:**

1. Power down the analyzer and remove from service.
2. Remove the analyzer lid. Disconnect the black  $\frac{1}{8}$ ” inlet line and the  $\frac{1}{4}$ ” exhaust line from the top of the Reaction cell. (see Figure 3)
3. Disconnect the black  $\frac{1}{8}$ ” line from the Sample Filter outlet port. (see Figure 3)
4. Remove the following electrical connections from the Reaction Cell / PMT housing. (see Figure 3)
  - TEC +12Vdc cable
  - UV Detector cable
  - UV Lamp Driver power cable (P1 on driver board)
  - UV Lamp Shutter power cable
  - Reaction Cell Heater cables (twisted red pair)
  - Reaction Cell Thermistor cable (twisted yellow pair)
  - PMT Preamp power cable (J5) and signal cable (J6)
5. Remove the three mounting screws that secure the Reaction Cell and the PMT housing to the analyzer chassis. (see Figure 3)
6. Remove the entire Sensor Assembly from the analyzer. (see Figure 3)

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**NOTE**

**Do not adjust the black 1/8" line connections at the two Kicker TEE Union fittings. Any adjustment at this connection will destroy the kicker internal pneumatics. Remove the black 1/8" line from the Sample Filter outlet port and the Reaction Cell inlet port connections. (see Figure 1)**

7. Remove the 1/4" pump and exhaust manifold lines from the Kicker TEE Union fittings. (see Figure 1)
8. Remove the four mounting screws from the Kicker box then remove Kicker from the analyzer. You may need to cut wire zip ties to fully remove the Kicker; if so take special care not to cut any wiring or tubing.
9. Install the new Kicker. Using the four Kicker box screws, fasten the kicker assembly to the analyzer chassis.
10. Remove the new 1/4" Brass nut, Rear Ferrule, and Front Ferrule from the top port of both of the new Kicker TEE Union fittings, and reconnect the 1/4" lines removed in step 6. (see Figure 1)
11. Connect the black 1/8" line connections on the new Kicker to the Reaction Cell Inlet port and the Sample Filter outlet port. (see Figures 1&3)
12. Place the Sensor assembly back into the analyzer, and install the three mounting screws.

**NOTE**

**When installing the Sensor assembly, verify that the new Kicker tubing does not bind, get pinched or cut by the mounting brackets on the base of Reaction Cell and PMT Housing.**

13. Reconnect all of the electrical connections and ground straps to the Reaction Cell and PMT housing removed in step 4.
14. Apply power to the analyzer and turn it on.
15. Perform a leak check and verify that the flows are correct.
16. Allow the unit to run for 30-40 minutes and calibrate the unit as you normally would.

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**NOTE**

**The Kicker will come assembled and ready to install. Should the need arise to rebuild the black 1/8" lines on the kicker, follow the steps below.**

- A. The black 1/8" line to the Reaction Cell is a through fitting, and needs to be built so that the tubing is long enough to extend past the stainless steel fitting. It is essential that the tubing is not so long that it obstructs the UV light path to the UV Detector inside the Reaction Cell Light Trap. To build the black 1/8" line Reaction Cell connection, follow the steps below.

Refer to **Figure 1 & Figure 2. A**

- Slide the 1/8" Stainless Steel Nut onto the line that goes to the Reaction Cell.
- Slide the Rear Ferrule and then the Front Ferrule onto the line in front of the nut.
- Holding the nut and ferrules in place on the black 1/8" line, place the line inside of the Reaction Cell inlet port.
- Slide the nut and ferrules down the black 1/8" line onto the Reaction Cell inlet port. Turn the nut clockwise one full turn so the nut is connected but loose.
- **DO NOT TIGHTEN THE NUT.**
- Push the black 1/8" line through the nut into the Reaction Cell inlet port until it stops.
- Turn the nut clockwise and tighten the 1/8" nut down three quarter turns onto the Reaction Cell inlet port.
- Loosen and remove the 1/8" line and visually verify proper swage of the front and rear ferrules.
- Slide the 1/8" nut back off of the ferrules. Using a ruler, measure from the back of the rear ferrule to the end of the 1/8" line. Cut the 1/8" line at the 1 1/8" mark.
- Reinstall the black 1/8" line to the Reaction Cell inlet port and tighten another quarter turn.

- B. The black 1/8" line to the Sample Filter is a standard connection, not a through fitting. To build the black 1/8" line connection to the Sample Filter, follow the steps below.

Refer to **Figure 1 & Figure 2. B**

- Slide the 1/8" Teflon Nut onto the line that goes to the Sample Filter.
- Slide the Rear Split Ferrule and then the Front Ferrule onto the line in front of the nut.
- Holding the nut and ferrules in place on the black 1/8" line, place the line inside of the Sample Filter outlet port.
- Slide the nut and ferrules down the black 1/8" line onto the Sample Filter inlet port.
- Turn the nut clockwise and tighten the 1/8" nut down hand tight onto the Sample Filter outlet port.

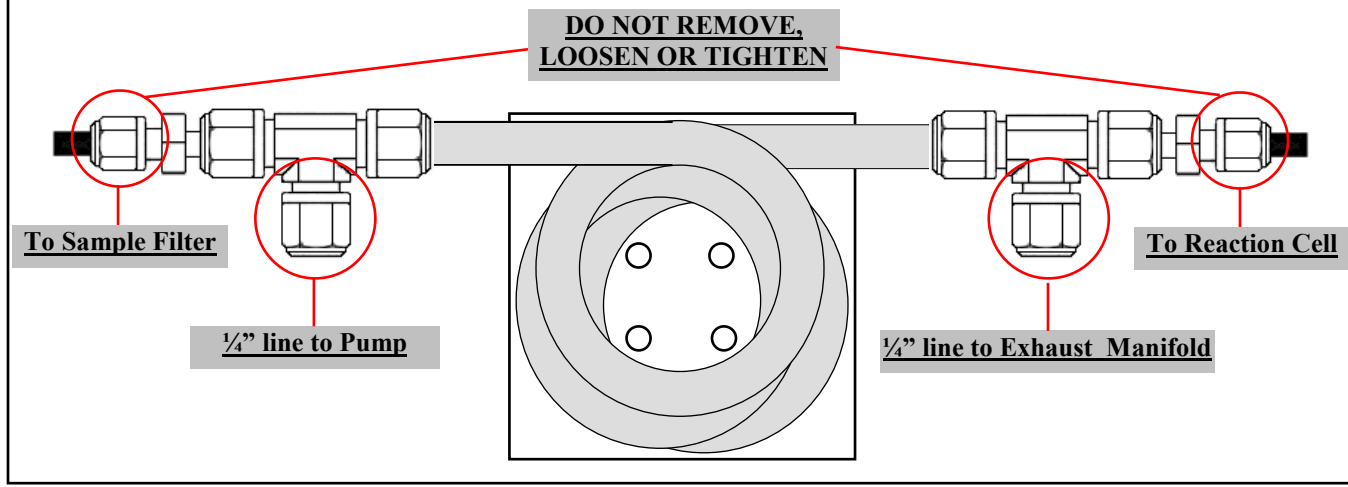
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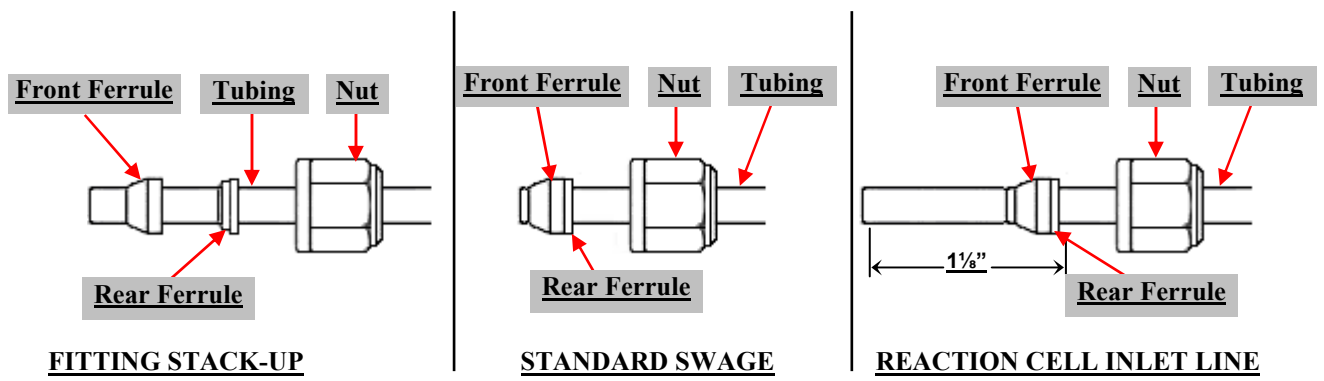
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**FIGURE 1. KICKER ASSEMBLY**

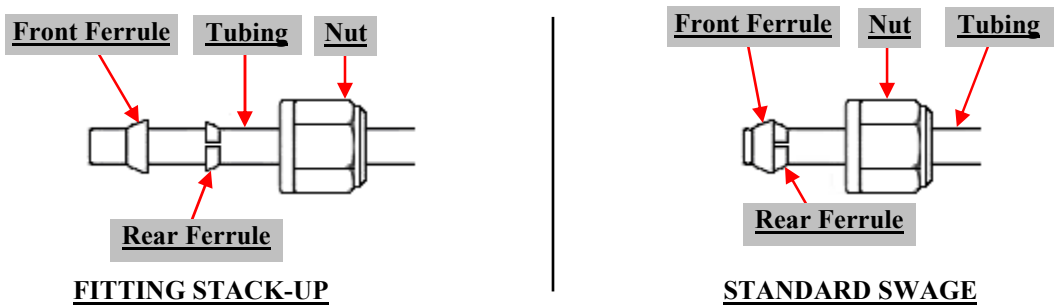


**FIGURE 2. FITTING DETAIL**

**FIGURE 2. A**  
**STAINLESS STEEL FITTING AT REACTION CELL INLET**



**FIGURE 2. B**  
**TEFLON FITTING AT SAMPLE FILTER**

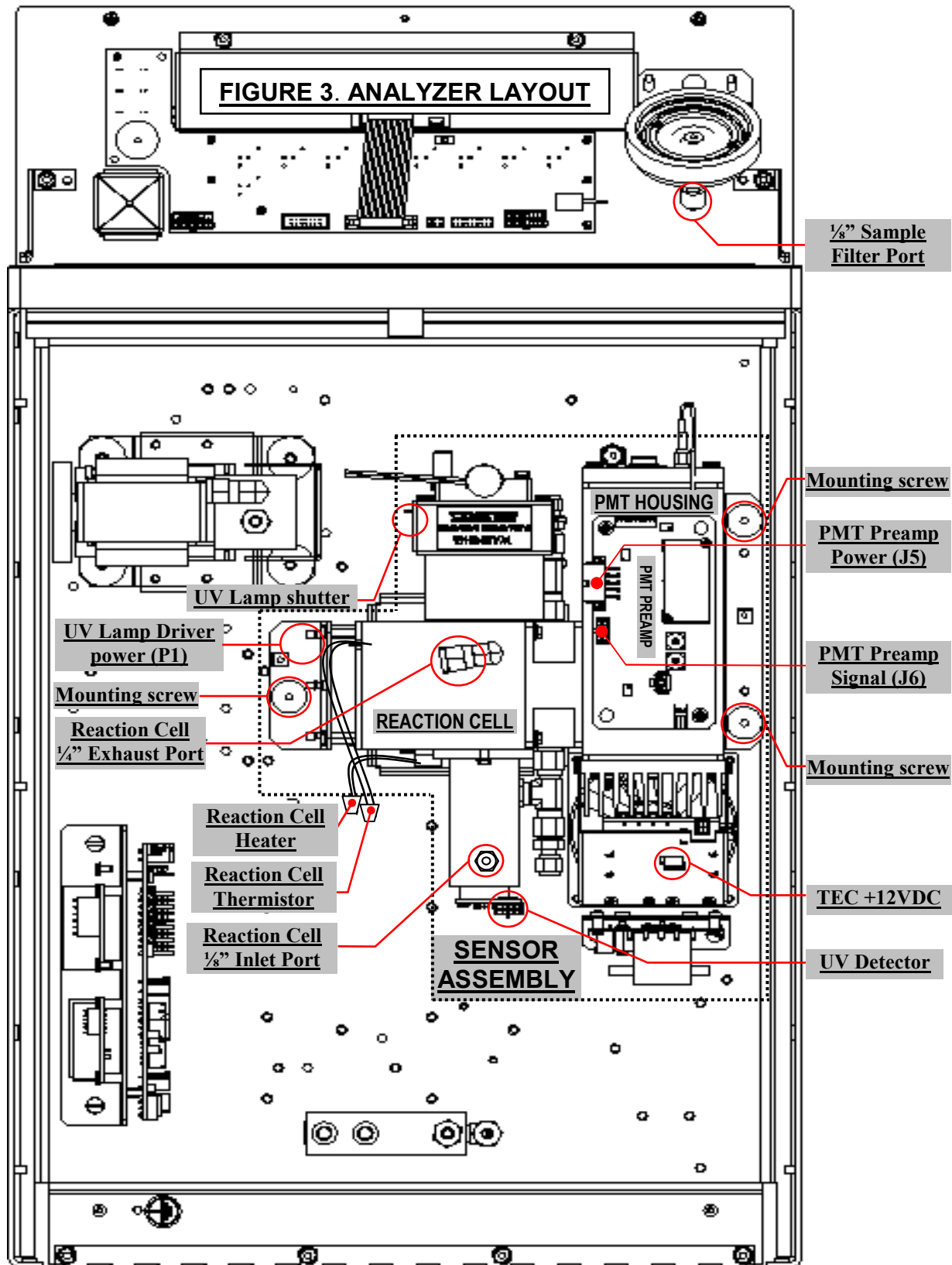


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