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Instruction Manual

Model 4500-9-SS1

Splice Kit for 4600 and 4660 Settlement Systems

(Doc. REV B 11/30/17)

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1. INTRODUCTION

Model 4500-9-SS1 splice kits (Figure 1) are for splicing settlement system twin-tubing and vented cable.

Each kit includes:

- One Uraseal Splice Kit (Manufacturer's part #CK200BSV) containing two foam stoppers, one mesh bag (not used), one split mold, one bag containing two-part epoxy, and one blue plastic cap.
- Nine Posi-Lock connectors.
- Two 1/16" to 1/16" inch Polycarbonate barbed tube connector.
- Two 1/4" to 1/4" Swagelok tube fittings.

Figure 1 - 4500-9-SS1 Splice Kit

2. REPLACING A TRANSDUCER

The most critical aspect of this operation is making sure that no air is allowed to get into the liquid lines.

The first step is to remove the faulty sensor by cutting both the liquid line and the cable from the faulty sensor using the procedures below.

2.1 Liquid Line

Extreme care must be exercised during this operation. The first step is to carefully strip a section of the outer (yellow) jacket off the tubing bundle to in preparation for splicing to the new sensor. This is a somewhat delicate operation as the jacket is tightly wrapped around the inner tubes. Practice the operation first on a waste piece of tubing bundle.

The new sensor should have the union already attached and ready to accept the tubing. Check to see that the sections of exposed tubing (including the part that must be prepared for the connection) will be short enough to fit into the splicing kit, and the outer jacket will be in the epoxy when finished

Be sure that the reservoir water level is maintained during the splicing operation and that the balance tube is disconnected from the top of the reservoir.

1) Cut one of the tubes about 2” beyond the yellow jacket and immediately block the end so that no fluid can flow.

2) Place the correct nut and ferrule pack over the end of this tube, and then block the flow.

3) Next, remove the cap from one of the lines on the replacement sensor and make sure the fluid is right at the top of the exposed tube. If the fluid is not there, top this up with the small syringe provided with the sensors.

4) Attach the previously cut tube with the nut and ferrule to the Swagelok union with fluid flowing from the reservoir to avoid any air being trapped in the joint. (See Appendix A for Swagelok instructions.)

5) The next operation is to repeat steps one through four with the other tube — with one exception — before making the connection with the tube and the union, keep the tube with the nut and ferrule blocked while removing the cap from the union and letting a small amount of liquid flow from the union. Next, block that flow and let a little flow from the tube to be attached. Attach the tube, allowing a little fluid to flow while making the connection. Tighten the Swagelok per the instructions in Appendix A.

2.2 Splicing the Cable

1) Cut the cable from the faulty sensor.

2) On the cable from the reservoir, strip the jacket back approximately two to three inches.

3) Strip about a half inch of the wire insulation from the four conductors.

4) Strip the new sensor wires back the same way.

5) Connect the four wires and the drain wire from the reservoir to the wires from the new sensor using the Posi-Lock connectors supplied. See Figure 2 for Posi-Lock instructions. **Always maintain polarity by connecting like colors together. It is very important that the shield drain wires be spliced together.**

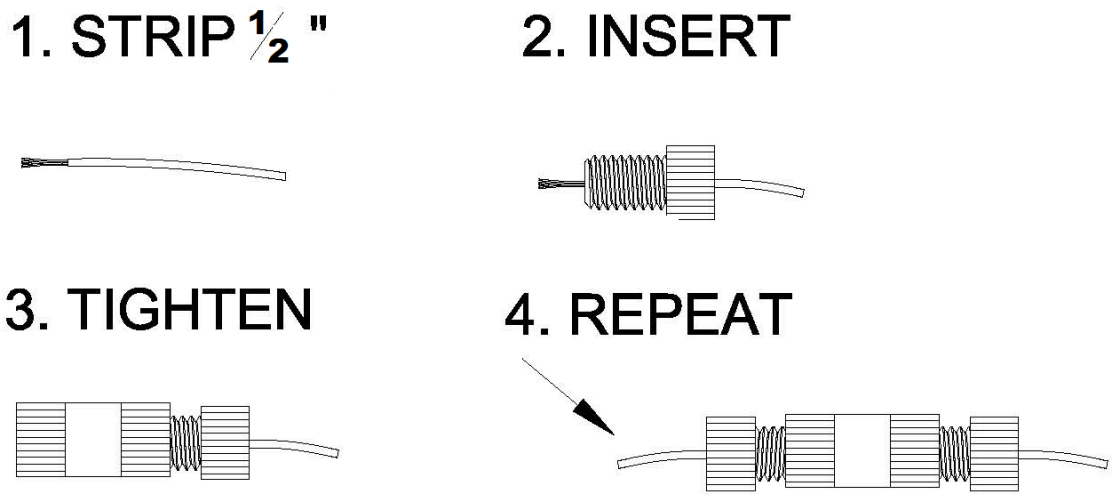

Figure 2 - Posi-Lock Connector Guide

6) Using the supplied polycarbonate barbed fitting, connect the two ends of the vent tube.

7) Take readings at the readout station to make sure the sensor and the thermistor are reading properly.

8) Put the two foam stoppers around the two ends of the cables and place the whole assembly inside the split mold (Figure 3).

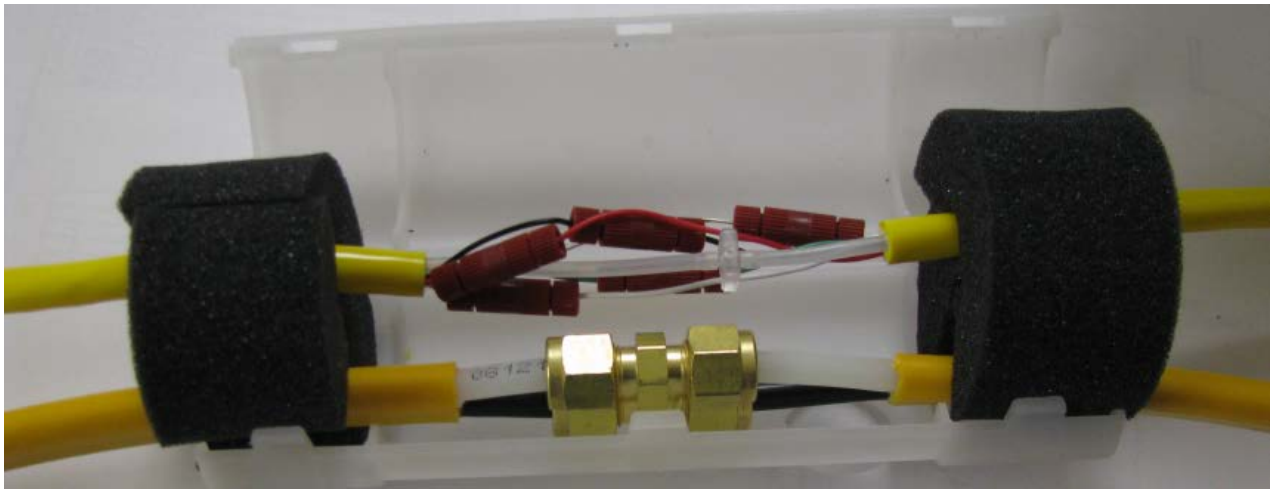

Figure 3 - Completed Assembly Prior to Encapsulating

9) Close the mold, and then mix the epoxy per the instructions in Section 2.3.

2.3 Encapsulant Mixing Instructions

ATTENTION! Wear disposable gloves while performing the following operations. (These instructions can also be found on the back of the splice kit bag under "Horizontal Installation".)

With the encapsulant tube still in the mixing bag, point the heat-sealed end of the mixing tube away from yourself and others.

Flip the white barrier wafer with your thumb and forefinger to allow the two-part encapsulant to mix. Refer to Table 1 for mix time and shake the tube with an up and down motion as noted on the chart.

Temperature:	Below 60 °F	Between 65 °F and 85 °F	Between 86 °F and 100 °F
Mix Time:	Use alternate mixing method shown below	**Shake for one minute**	**Shake for 30 seconds**
Alternative Mixing Method: At Temperatures below 65 °F **DO NOT SHAKE.** After flipping the white barrier, remove the tube from the mixing bag, cut the heat-sealed end, and remove the white barrier with the wooden paddle. Stir vigorously with the wooden mixing paddle for one minute to blend the two components together. Pour into enclosure.			

Table 1 Encapsulant Mixing Guide

Once the encapsulant is mixed, open the mixing bag, unscrew the cap, and squeeze the material out of the tube into the pouring spout on the side of the mold. Slightly tilt the enclosure to let the air pockets escape from the enclosure. When finished pouring epoxy place the blue cap over the pouring spout.

The splice is now complete. The splices should be allowed a couple of hours to cure before placing fill and compacting over them.

3. ADDING AN EXTENSION TO A SENSOR ASSEMBLY

The first step in this operation is to connect the supplied section of tubing to the reservoir. This should be done with the liquid flowing from the reservoir in the same way as described in Section 2.1.

After connecting the extension to the reservoir, the splice to the existing tubing bundle and cable should be made as described in Section 2.2. Be sure to remove the equalization line from the reservoir during this operation and keep liquid in the reservoir at all times.

Remember that for all tubing splices the prime concern is preventing air from getting into the liquid lines, or liquid into the vent line, and making sure that all electrical connections are good before finishing the splices.

APPENDIX A. SWAGELOK TUBE FITTING INSTRUCTIONS

These instructions apply to one inch (25 mm) and smaller fittings.

A.1 Installation

1) Fully insert the tube into the fitting until it bumps against the shoulder.

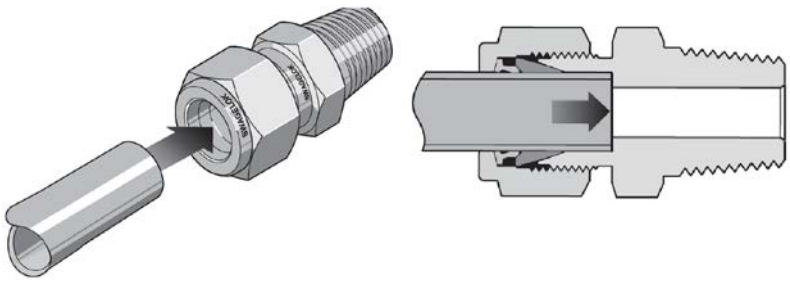

Figure 4 - Tube Insertion

2) Rotate the nut until it is finger-tight. (For high-pressure applications as well as high-safety-factor systems, further tighten the nut until the tube will not turn by hand or move axially in the fitting.)

3) Mark the nut at the six o'clock position.

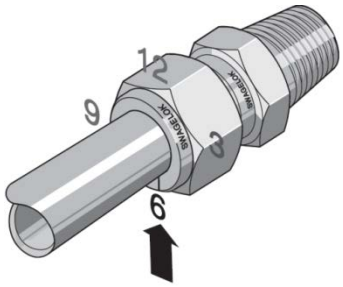

Figure 5 - Make a Mark at Six O'clock

4) While holding the fitting body steady, tighten the nut one and one quarter turns, until the mark is at the 9 o'clock position. (Note: For 1/16", 1/8", 3/16", and 2, 3, and 4 mm fittings, tighten the nut three-quarters of a turn until the mark is at the 3 o'clock position.)

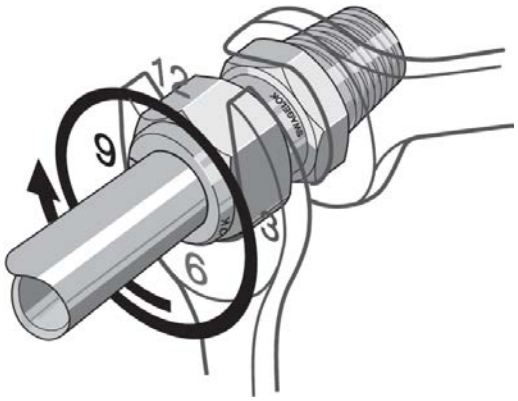

Figure 6 - Tighten One and One-Quarter Turns

A.2 Reassembly Instructions

Swagelok tube fittings may be disassembled and reassembled many times.
Warning: Always depressurize the system before disassembling a Swagelok tube fitting.

1) Prior to disassembly, mark the tube at the back of the nut, then make a line along the nut and fitting body flats. *These marks will be used during reassembly to ensure the nut is returned to its current position.*

Figure 7 - Marks for Reassembly

2) Disassemble the fitting.

3) Inspect the ferrules for damage and replace if necessary. **If the ferrules are replaced the connector should be treated as a new assembly. Refer to the section above for installation instructions.**

4) Reassemble the fitting by inserting the tube with preswaged ferrules into the fitting until the front ferrule seats against the fitting body.

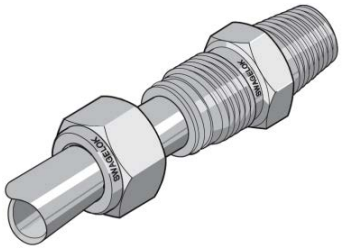

Figure 8 - Ferrules Seated Against Fitting Body

5) While holding the fitting body steady, rotate the nut with a wrench to the previous position as indicated by the marks on the tube and the connector. At this point, there will be a significant increase in resistance.

6) Tighten the nut slightly.

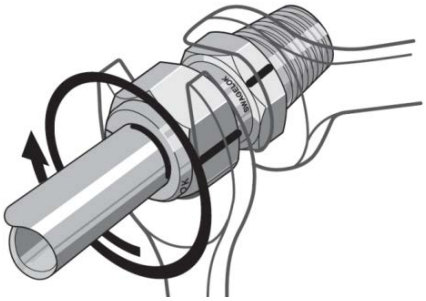

Figure 9 - Tighten Nut Slightly