

PRODUCT FIELD MODIFICATION ADVISORY

Date:	November 10, 2016
Report By:	Grant Van Hemert P.E.
Intended Audience:	All Customers and Distributor Partners
Advised Modification	Installation of Ground Wire to Amphenol Connector
Product(s) Impacted:	All Isokinetic Stack Testing Samplers Manufactured Before 2016 (ICS-902, INC-D205, KXC-572, KXC-60, KXC-62, MC-522, MC-572, MC-623, XC-50, XC-5000, XC-522, XC-563, XC-572, XC-60, XC-62, XC-63)

THIS DOCUMENT DETAILS MODIFICATIONS TO YOUR EXISTING EQUIPMENT.

Purpose of Notification:

Apex Instruments has been manufacturing source testing equipment since 1988. During this time, we have not become aware of any serious injuries from the use of our products or services. We are proud of this record and work very hard to assure this record stays intact.

Recently, we became aware that there are some additional steps that can be taken to enhance the functionality of our equipment. We have already made the changes to our production of new equipment. However, we believe that there is benefit to enhancing units that are currently being utilized in the field.

Accordingly, this notification will tell you how to make the advised changes to enhance our products functionality.

Reason for Notification:

Stack Testing is an activity that occurs in a highly electrically charged environment. The heat, velocities, and other criteria creates a high electrical charge within the gasses inside a stack. These charges can easily be transferred to the probe assembly during testing. This charge can be strong. If this charge is discharged through a person, then the potential exists to cause pain, injury or death. That is why, to assure proper safe operation, a stack tester must follow proper equipment grounding procedures at all times. This practice must be followed with any supplier's equipment including Apex Instruments equipment.

Part of a proper grounding procedure would be to ground the sampling unit, probe assembly (including and hot and cold box) and the umbilical cord between the sampler and the probe box to a common ground point. By following this procedure, all devices will be properly grounded.

However, if the procedures are not followed correctly, then it would be possible for a charge to build up in the test equipment. This accumulated charge would then discharge when a suitable ground means become apparent. To prevent this from happening improperly, we are advising field changes to the wiring of the connector that connects the umbilical cord to the sampler.

History of the Existing Wiring Method.

Our sampler uses a 4-pin connector to connect the umbilical cable to the sampler. This 4-pin connector was chosen, and wired based on information in a 1971 era United States Environmental Protection Agency (EPA) document titled “Construction Details of Isokinetic Source Sampling Equipment”. On page 13 of this document, there is a wiring diagram (Figure 1) that shows various components as being grounded. But, this diagram does not show a ground on the connector itself. Apex Instruments used the same equipment and wiring method shown in the diagram.

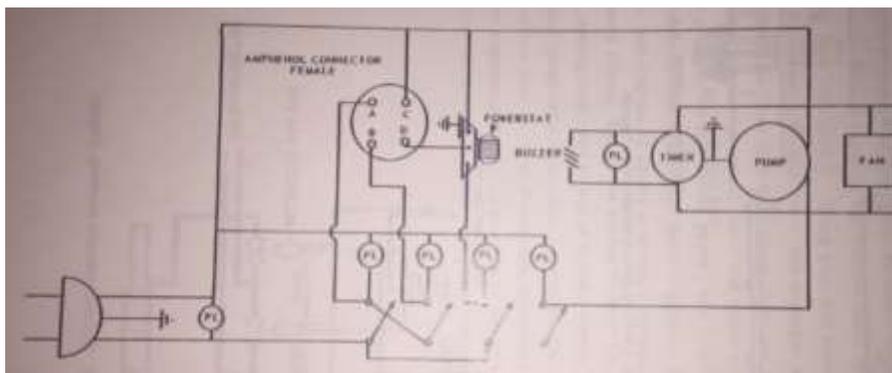


Figure 1: Page 13 Wiring Diagram from EPA Document “Construction Details of Isokinetic Source Sampling Equipment”

As originally shown in the diagram, this metal connector should be properly grounded, without a separate ground wire, by two different methods.

1. First, the metal connector should connect to the metal plate of the sampler.
2. Second, a proper grounding procedure by the stack tester would ground the umbilical cord, sampler, and probe box individually to a common point.

Therefore, with the wiring shown, the connector should be grounded through the frame of the sampler and independently through a properly applied grounding procedure.

Recently, we became aware that the protective paint we use on the faceplate is nonconductive. This paint could prevent the connector from electrically connecting to the grounded faceplate of the sampler (Figure 2). Even under this situation, a proper implemented grounding procedure by the stack tester would assure this connector was grounded. Regardless, Apex Instruments sees value in strengthening the ground connection by assuring a solid electrical contact between the connector and the faceplate.

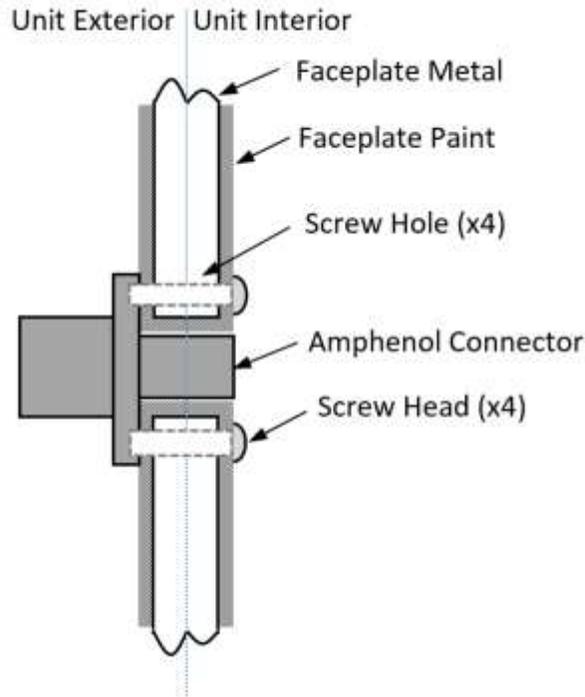


Figure 2: Existing Amphenol Connection Method.

Field Modification Procedure

The modification of the sampler should take about 15 minutes per sampler. This modification can be accomplished with the off the shelf components shown in Table 1. For convenience, you can order a parts kit that includes all the screws, nuts, wire, and washers. The kit part number is M-ASPK.

Required Material:

Item	Unit of Measure	Unit	Notes
Electrical Multimeter	Each	1	
#16 AWG stranded green copper wire	Per Sampler	7 inches (178mm)	
22-18 U/I #4-6 Ring Terminal	Per Sampler	2	Might have Red Insulation
#4 SAE Star Locknut Washer	Per Sampler	4	External or Internal Star Acceptable
#6 SAE Star Lockout Washer	Per Sampler	3	External or Internal Star Acceptable
#6-32 ½ Inch Machine Screw	Per Sampler	1	Only if adding a grounding screw
#6-32 nut	Per Sampler	1	Only if adding a grounding screw
Printed Safety Label	Per Sampler	1	See Step 15

Table 1:

Step 1: Shut off power:

Disconnect power and remove power cord from the sampler.

Step 2: Remove Umbilical Cord:

Remove Umbilical cord from unit. This includes thermocouple's, sample lines, and the plug on the 4-Pin Amphenol connector.

Step 3: Remove Unit from Case:

On the front of the unit there are four (4) latches. They are located at the top and bottom of the right edge and on the top and bottom of the left edge of the console. Turn each to the "Open" position and remove the unit from the case.

Step 4: Locate Amphenol Connector Penetration on Internal Side of Panel:

The four (4) pin Amphenol cable connector is the main connector for the Umbilical Cord. Locate this on the external and Internal side of the unit. Figure 3 shows how the unit should appear on the internal side of the unit.



Figure 3: Internal view of Amphenol connector with three (3) of four (4) mounting screws installed.

Step 5: Inspect Amphenol Connector for a Green Grounding Wire:

Some units in 2015 were shipped with a green grounding wire already attached to the Amphenol connector. Look to see if a wire exists. It should be attached to one of the four mounting screws used to connect the Amphenol to the faceplate. See Figure 3 as a reference. (But be aware that Figure 3 only shows three of the four mounting screws installed. The remaining location has not yet been assembled.) If a wire is found, then this unit does not require modification and please proceed to Step 14

Step 6: Remove one Screw

Pick one (1) of the four (4) screws and remove it. From the unit. Do not remove the other screws

Step 7: Remove some paint:

Use sand paper, a knife, or other tool to remove some of the paint around the hole that the screw was in. Make sure that bare metal of the faceplate is visible at least halfway around the hole.

Step 8: Make the grounding wire

Cut a 7 inch (178mm) long green #18 AWG stranded green wire. Material of the wire can be copper or aluminum. Get two (2) wire termination rings. Size will be 22-18 U/I #4-6. Strip each end of the wire so that it will fit all the way into the crimp end of the connector without any wire protruding from the ends. Insert one end of the wire into the ring connector and crimp it tight. Fit the other end of the wire into the ring terminal and crimp it tight.

Take a multimeter, turn it on and set it to Ohms (Ω). Connect leads to the unit. Place one lead on each end of the wire at the end of the wiring rings. Make sure either a tone is heard, or a display registers good conductivity (the display might read 0.00). If it does, then the wire was assembled correctly.

Step 9: Assemble the Washer and Wiring Ring Assembly

Take one of the ring connectors on the ground cable and place it on top of a #4 SAE star lock washer. The screw you removed from the Amphenol should have a washer on the screw. If not, then stack another #4 SEA washer on top of the ring connector.

Step 10: Put Washer and Wiring Ring Assembly on Screw

Put the completed washer and wiring ring assembly on the screw

Step 11: Reinsert Screw with Washer and Wiring Ring into Amphenol Connector

Reinsert the screw (with the washer and wiring ring assembly) back into the interior side of the Amphenol connector. See Figure 4

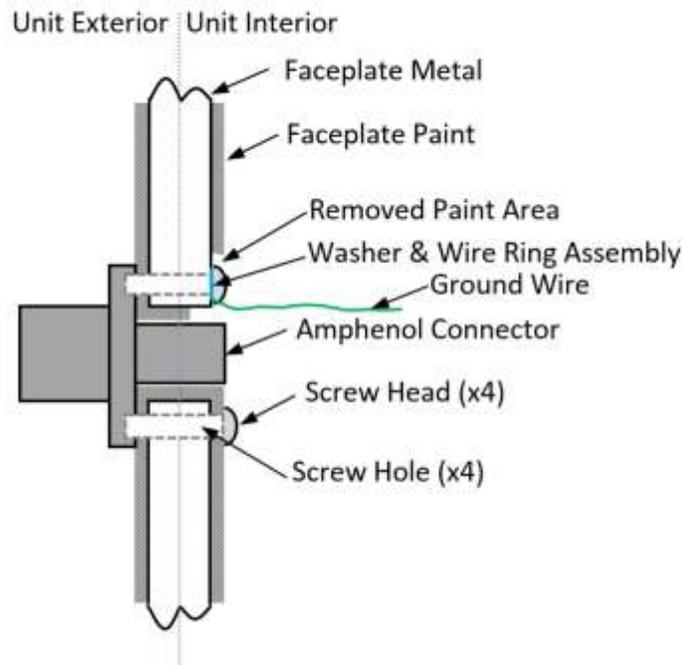


Figure 4 Ground Wire Added to Amphenol Connector.

Step 12: Ground Remaining end of Ground Wire

On the rear of the unit there is a metal flat plate that serves as a base. There should be a screw that is in the plate near the Amphenol connector that is already used for grounds. If so, then unscrew the screw and insert the new wiring ring assembly from the ground wire onto this screw. Be sure to add #4 SAE lock washers to assure contact. One on each side of the Ring Terminal. Replace screw and tighten.

If a screw does not exist, drill a hole and add a new screw. (See Figure 5 for an example) Make sure the screw is small enough to accept the wiring ring for the new ground wire made in step 8. If that is not possible, then there is a tall vertical metal divider. Locate a good place in that frame for a wire connection and drill a hole large enough to accommodate a #6 SEA screw. Take a #6 SAE screw and add a #6 Star Lock Washer to the screw. Next, place the other ring terminal from the ground wire on the screw. Then add another #6 SEA star lock washer. Insert the screw into the hole, and then add another #6 SAE Star Lock Washer to the screw, then add the #6 SAE nut to the screw. Tighten the nut until it is wrench tight.

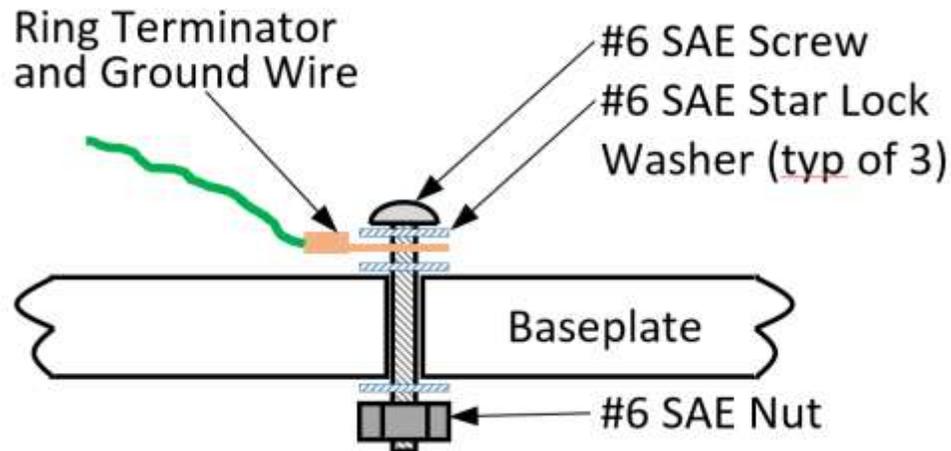


Figure 5: Self Drilled Screw Assembly (Shown before final tightening of nut and screw)

Step 13: Test the new ground:

Take a multimeter, turn it on and set it to Ohms (Ω). Connect leads to the unit. Place one lead on metal end of the exterior of the Amphenol connector and to the baseplate on the interior of the panel. Make sure either a tone is heard, or a display registers good conductivity (the display might read 0.00). If it does, then the modification was done successfully.

Step 14: Reinsert Unit to Box

Reinsert unit into box. Tighten all four latches so that panel is secured in case.

Step 15: Create and Adhere Safety Label:

Create a safety label and mount it on the front faceplate in an obvious location. A template for proper layout is shown in Figure 6. If your stack testers do not read English, then translate the text to your testers preferred language(s). The sticker should be made of a material that will last for the life of the equipment. If not, then replace as needed.



Figure 6: Safety Label Layout

FUTHER SUPPORT QUESTIONS:

For questions on this procedure, please do not hesitate to contact us in the United States at (919) 557-7300 (Our office in North Carolina is in the same time zone as New York City). You can also contact us by email at support@apexinst.com.