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E. Electrical Modules

X7SC—Electrical Module

1. Product Overview

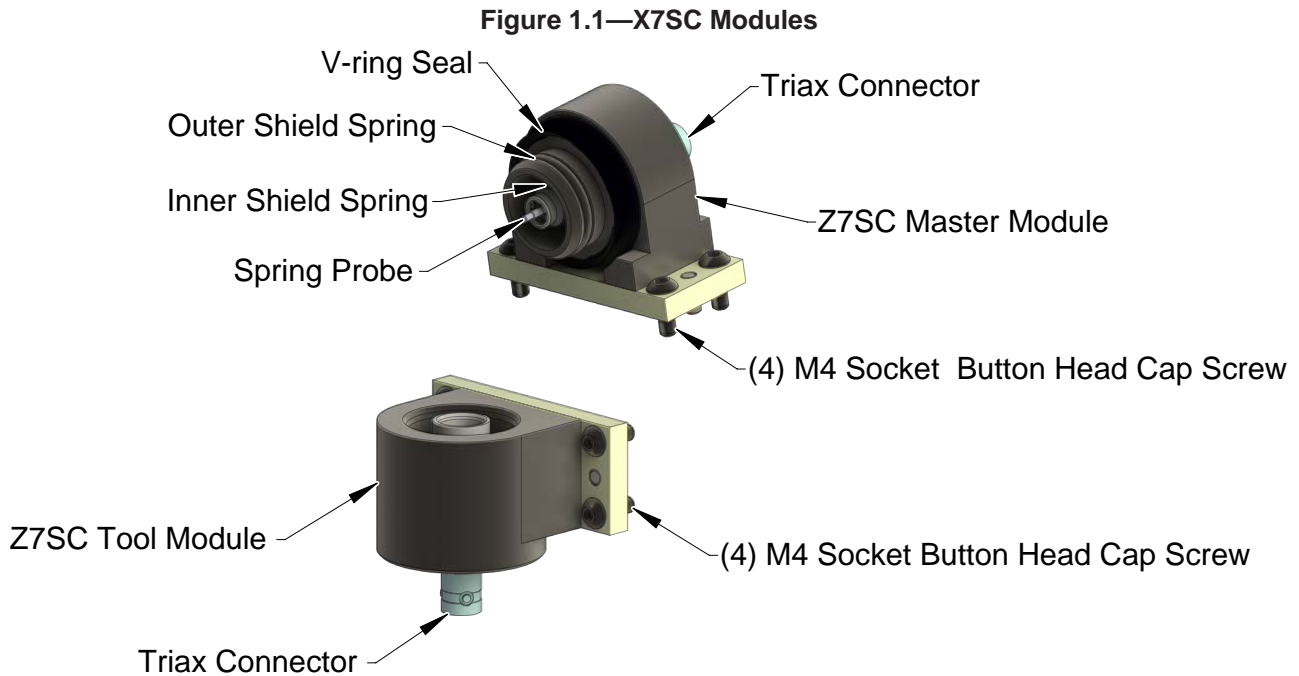
The X7SC modules provide a connection to customer tooling. When the modules are coupled, the V-ring seal forms a water resistant but not waterproof seal.

1.1 X7SC Master

The X7SC Master module includes: (1) Triax connector, V-ring seal, and serviceable connection components (refer to [Section 6—Drawings](#) for additional information and connector details).

1.2 X7SC Tool

The X7SC Tool module includes (1) Triax connector (refer to [Section 6—Drawings](#) for connector details and additional information).



2. Installation

Electrical modules are typically installed by ATI prior to shipment. Installation and removal are outlined in the following section: For wiring information, refer to [Section 6—Drawings](#).



WARNING: Do not perform maintenance or repair(s) on the Tool Changer or modules unless the Tool is safely supported or placed in the tool stand, all energized circuits (for example: electrical, air, water, etc.) are turned off, pressurized connections are purged and power is discharged from circuits in accordance with the customer specific safety practices and policies. Injury or equipment damage can occur with the Tool not placed and energized circuits on. Place the Tool in the tool stand, turn off and discharge all energized circuits, purge all pressurized connections, and verify all circuits are de-energized before performing maintenance or repair(s) on the Tool Changer or modules.



CAUTION: Thread locker applied to fasteners must not be used more than once. Fasteners might become loose and cause equipment damage. Always apply new thread locker when reusing fasteners.

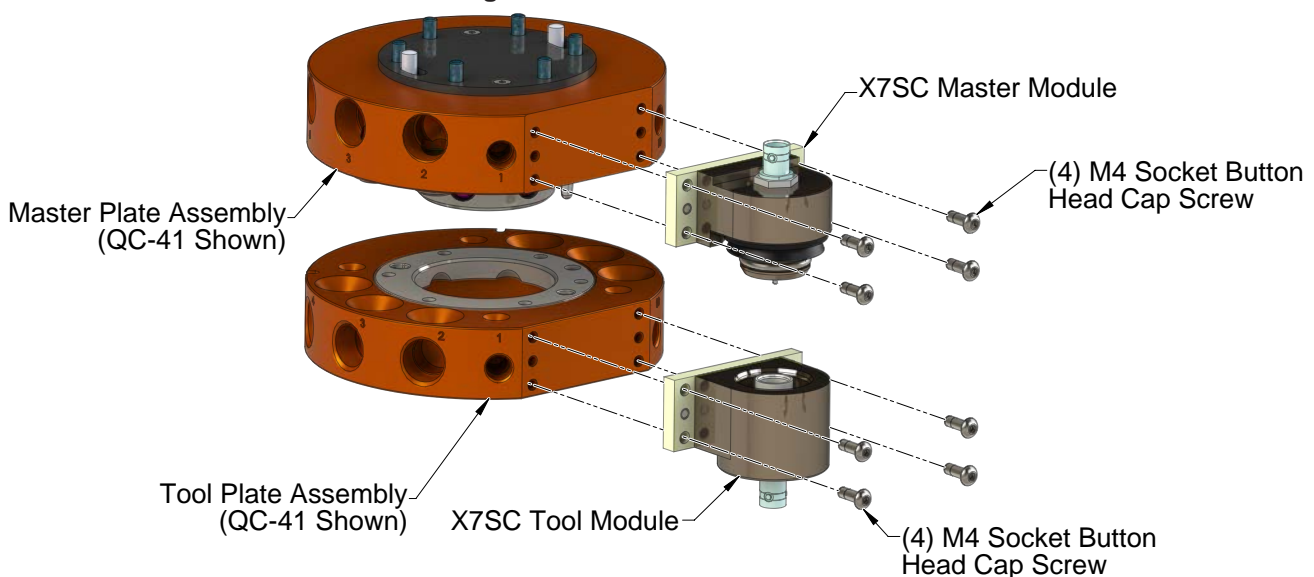
2.1 Module Installation

Tools required: 2.5 mm hex key, torque wrench

Supplies required: Clean rag, Loctite® 222, and Loctite® Primer 7649

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits; for example: electrical, air, water, etc.
4. Wipe down the mounting surfaces with a clean rag.
5. Align the optional module on the Master or Tool plate as shown in [Figure 2.1](#).
6. Apply Loctite primer 7649 to (4) M4 socket button head cap screws let dry.
7. Apply Loctite 222 to (4) M4 socket button head cap screws.
8. Secure module with (4) M4 mounting fasteners using a 2.5 mm hex key and tighten to 10 in-lbs (1.13 Nm).
9. Safely resume normal operation.

Figure 2.1—Module Installation



2.2 Module Removal

Refer to [Figure 2.1](#)

Tools required: 2.5 mm hex key

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits; for example: electrical, air, water, etc.
4. Disconnect any cables, air line, etc (if required).
5. Remove the (4) M4 socket head cap screws using a 2.5 mm hex key and lift the module from the Master or Tool plate.

3. Maintenance

Under normal conditions, no special maintenance is necessary; however, it is recommended that periodic inspections be performed to assure long-lasting performance and that unexpected damage has not occurred. The modules are not designed to be field serviced as all point-to-point wiring connections are soldered.



DANGER: This module has a voltage of 50V or greater; always remove power before contacting the module. Arcing and damage occur if power is not removed from the module during maintenance or service. Always remove power before attaching or disconnecting cables, separating or inserting the mating couplers, or making any contact with the Tool Changer or Utility Coupler.



WARNING: Do not perform maintenance or repair(s) on the Tool Changer or modules unless the Tool is safely supported or placed in the tool stand, all energized circuits (for example: electrical, air, water, etc.) are turned off, pressurized connections are purged and power is discharged from circuits in accordance with the customer specific safety practices and policies. Injury or equipment damage can occur with the Tool not placed and energized circuits on. Place the Tool in the tool stand, turn off and discharge all energized circuits, purge all pressurized connections, and verify all circuits are de-energized before performing maintenance or repair(s) on the Tool Changer or modules.

If the Tool Changer is used in dirty environments (for example: welding or deburring applications), limit the exposure of the Tool Changer. Idle Tool assemblies should be covered to prevent debris from settling on the mating surface. Also, the Master assembly should be exposed for only a short period of time during Tool change and down time. Perform the following visual inspections monthly:

- Inspect mounting fasteners to verify they are tight. If loose, then tighten to the proper torque (refer to [Section 2—Installation](#)).
- Cable connections should be inspected during maintenance periods to ensure they are secure. Loose connections should be cleaned and re-tightened, as appropriate. Inspect cable sheathing for damage, repair or replace damaged cabling. Loose connections or damaged cabling are not expected and may indicate improper routing and/or strain relieving.
- Inspect the Master and Tool pin blocks for pin damage, debris or darkened pins (refer to [Section 3.1—Cleaning Procedure](#)).
- Inspect V-ring seals for wear, abrasions, and cuts. If worn or damaged, replace (refer to [Section 4.2.1—Seal Replacement](#)).

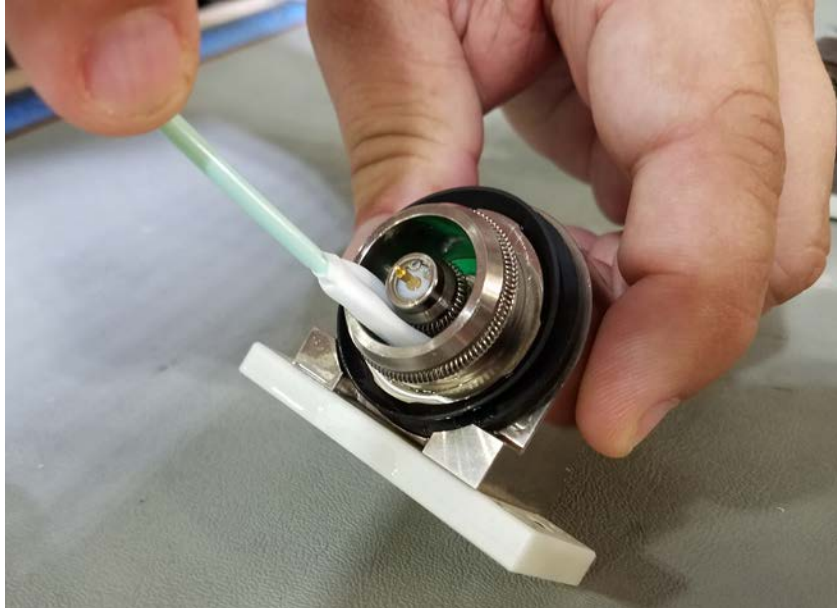
3.1 Cleaning Procedure

Tools required: polyester tipped swab (ATI part number 9545-0500001-0)

Supplies required: Isopropyl alcohol

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, air, water).
4. Apply Isopropyl alcohol to the polyester swab (ATI part number 9545-0500001-0) and clean the Master module inner / outer shield spring and internal and external contact surfaces.

Figure 3.1—Clean Internal Contact and Shield Spring



5. Clean center spring probe on the Master Module with a polyester tipped swab.

Figure 3.2—Clean Center Spring Probe



6. Clean V-Ring seal and inspect for damage or wear. Replace as necessary
7. Remove the Isopropyl alcohol from the module with a clean rag and dry using compressed air.

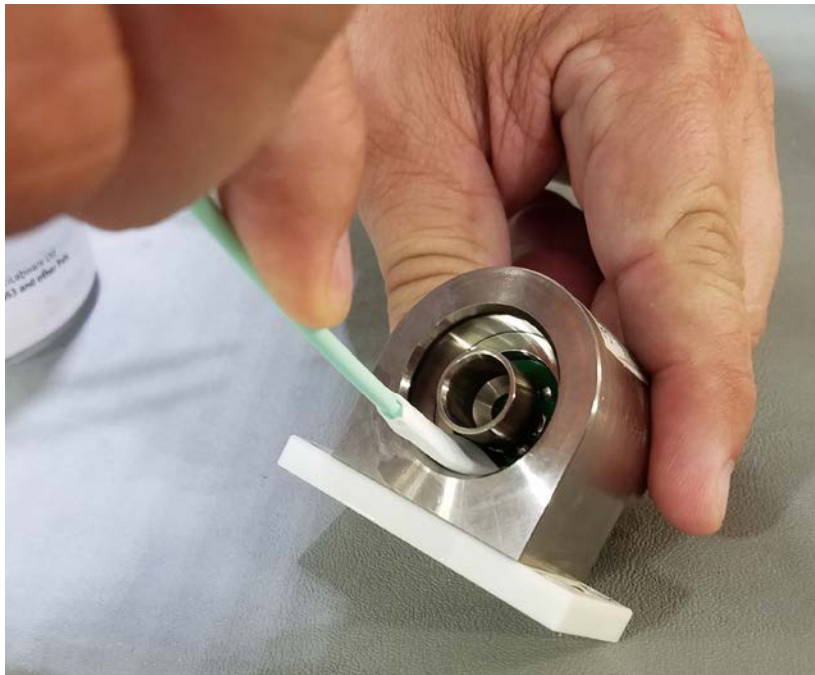
8. Apply Isopropyl alcohol to the polyester swab (ATI part number 9545-0500001-0) and clean the Tool module internal and external contact surfaces.

Figure 3.3—Clean Internal Contact Surface and Center Contact



9. Clean external contact surfaces on the Tool Module with a polyester tipped swab.

Figure 3.4—Clean Internal Contact Surface and Center Contact



10. Remove the Isopropyl alcohol from the module with a clean rag and dry using compressed air.
11. Safely resume normal operation.

4. Troubleshooting and Service Procedures

The following section provides troubleshooting and service information to help diagnose conditions and repair the X7SC modules.



WARNING: Do not perform maintenance or repair(s) on the Tool Changer or modules unless the Tool is safely supported or placed in the tool stand, all energized circuits (for example: electrical, air, water, etc.) are turned off, pressurized connections are purged and power is discharged from circuits in accordance with the customer specific safety practices and policies. Injury or equipment damage can occur with the Tool not placed and energized circuits on. Place the Tool in the tool stand, turn off and discharge all energized circuits, purge all pressurized connections, and verify all circuits are de-energized before performing maintenance or repair(s) on the Tool Changer or modules.

4.1 Troubleshooting

Troubleshooting information is provided in the following table:

Table 4.1—Troubleshooting		
Symptom	Possible Cause	Correction
Signal(s) malfunctioning	Object is trapped between modules.	Remove object and retry coupling.
	Module contact probe is contaminated.	Ensure that the spring probe on the Master side can move freely and is not obstructed by debris. Clean the spring pins to restore free operation. Clean Tool side module contacts, (refer to Section 3.1—Cleaning Procedure). Inspect V-ring seal, and replace if damaged (refer to Section 4.2.1—Seal Replacement). If spring probe is damaged replace (refer to Section 4.2.3—Spring Probe Carrier Assembly Replacement).
	Module outer or inner shield spring worn or damaged.	Inspect the outer and inner shield spring, replace if damaged or worn (refer to Section 4.2.2—Inner and Outer Shield Spring Replacement).
	Contact pins are separating when Tool Changer is coupled.	Ensure that the Tool Changer has proper pneumatic connections and supplied air is to the proper specification (refer to the Tool Changer section of this manual for air supply requirements).
	Tool Changer is coupling and uncoupling under a load.	Revise operating procedures to only couple/uncouple with power disconnected and discharged. Field replacement of module contacts is not possible.
	Cables are damaged, for example: pinched, torn, or fatigued.	Examine cables for damage; perform a continuity test on cables and replace damaged cables.

4.2 Service Procedures

Component replacement and adjustment procedures are provided in the following section:

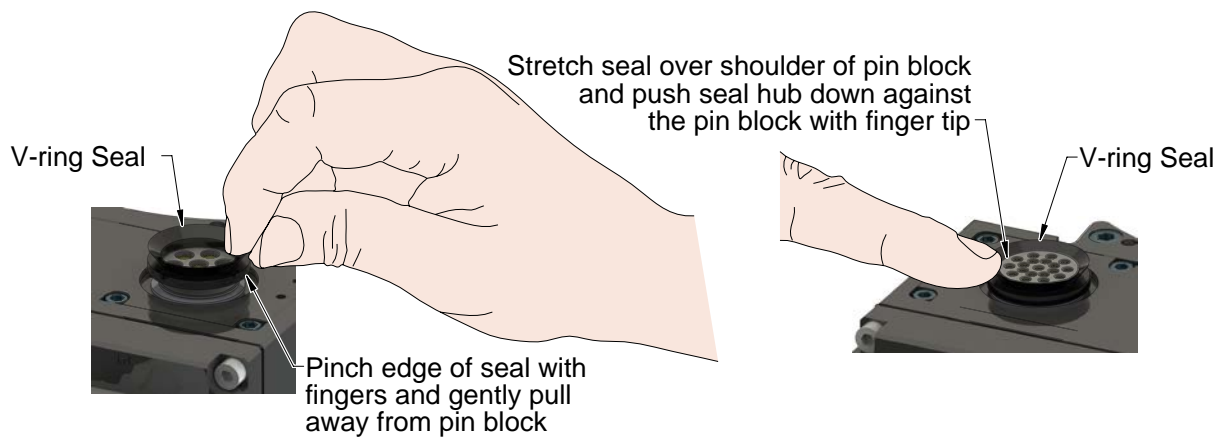
4.2.1 Seal Replacement

Parts required: Refer to [Section 6—Drawings](#).

The seal protects the electrical connection between the Master and Tool module. Replace the seal if it becomes worn or damaged.

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
4. To remove the existing seal, pinch the edge of the seal and pull the seal away from the pin block on the Master module.
5. To install a new seal, stretch the new seal over the shoulder of the pin block.
6. Push the seal hub down against the pin block.
7. Safely resume normal operation.

Figure 4.1—V-ring Seal Replacement



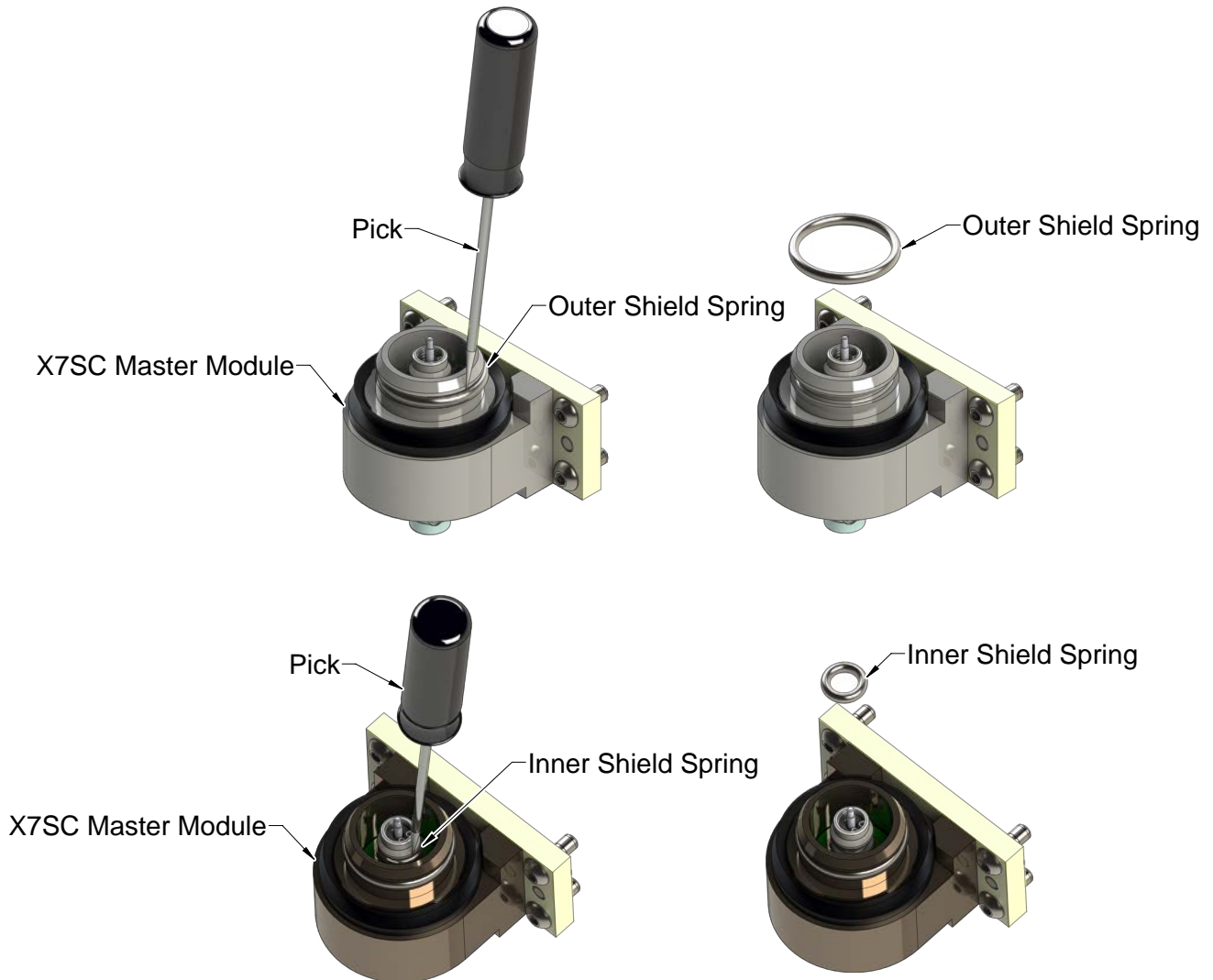
4.2.2 Inner and Outer Shield Spring Replacement

Tools required: Pick

Parts required: Refer to [Section 6—Drawings](#)

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
4. Using a pick pry shield spring out of the groove and remove.
5. Install the new outer or inner shield spring, make sure it is seated in the groove properly.
6. Safely resume normal operation.

Figure 4.2—Inner and Outer Shield Spring Replacement



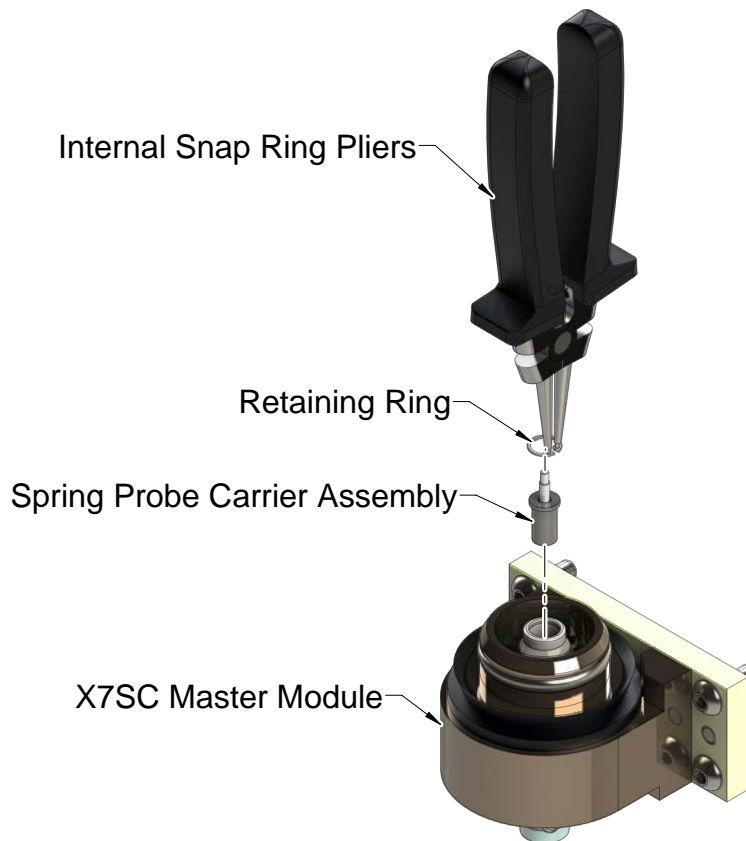
4.2.3 Spring Probe Carrier Assembly Replacement

Tools required: Internal snap ring pliers

Parts required: Refer to [Section 6—Drawings](#).

1. Place the Tool in a secure location.
2. Uncouple the Master and Tool plates.
3. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
4. Using internal snap ring pliers remove the retaining ring securing the spring probe carrier assembly.
5. Remove the spring probe carrier assembly.
6. Install the new spring probe carrier assembly, and secure with the retaining ring.
7. Safely resume normal operation.

Figure 4.3—Spring Probe Carrier Assembly Replacement



5. Serviceable Parts

For mounting fasteners and accessories, refer to the following tables. For additional serviceable parts (refer to [Section 6—Drawings](#)).

5.1 Master Module

Table 5.1—Master Module			
Item No.	Qty	Part Number	Description
*	4	3500-1162012-15A	M4 x 12, Socket Button Head Cap Screw, MB, ND Ind. Microspheres Epoxy, Yellow. 0-3 uncoated lead thds. 5-7 coated thds. IFI52

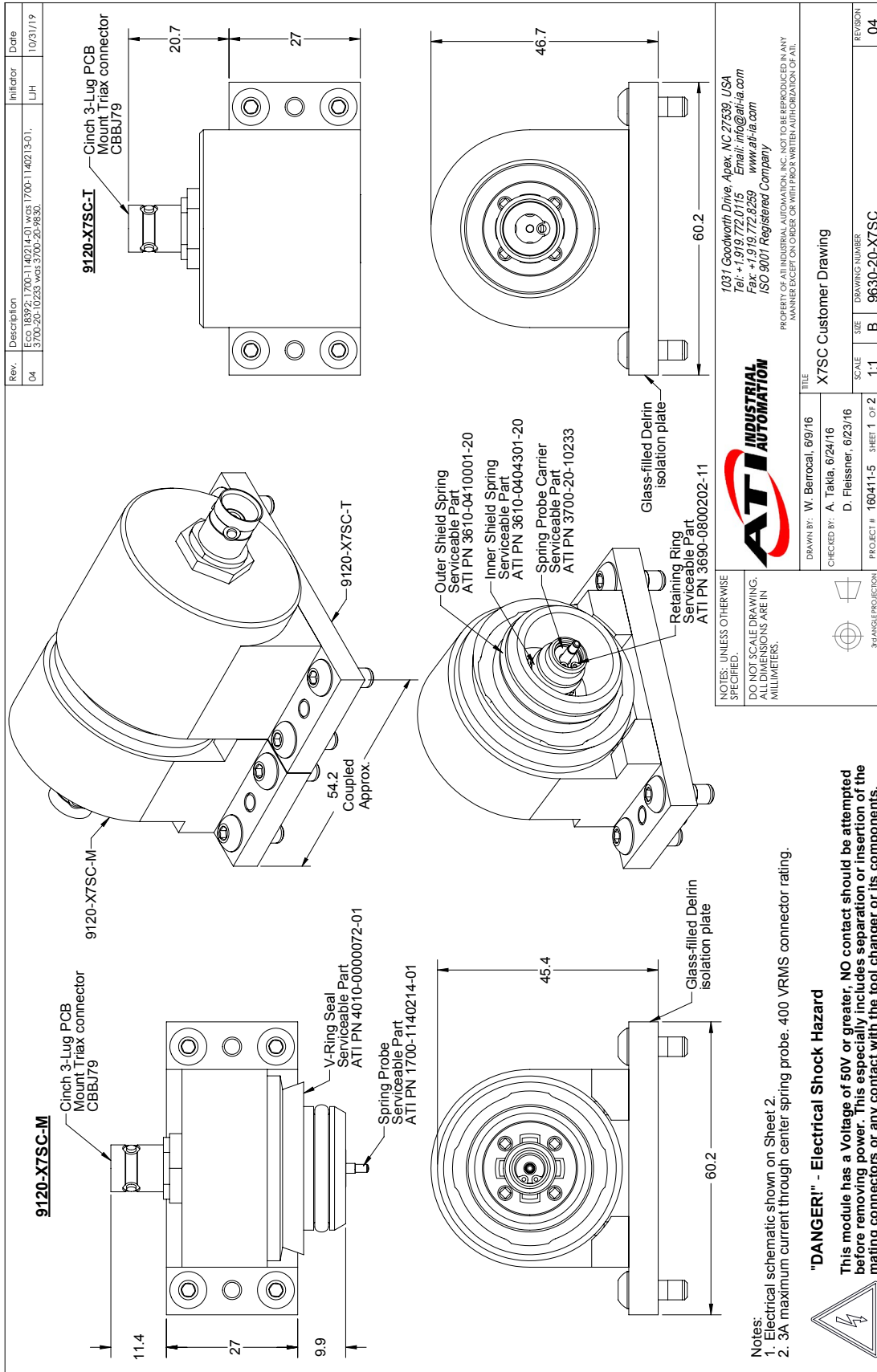
5.2 Tool Module

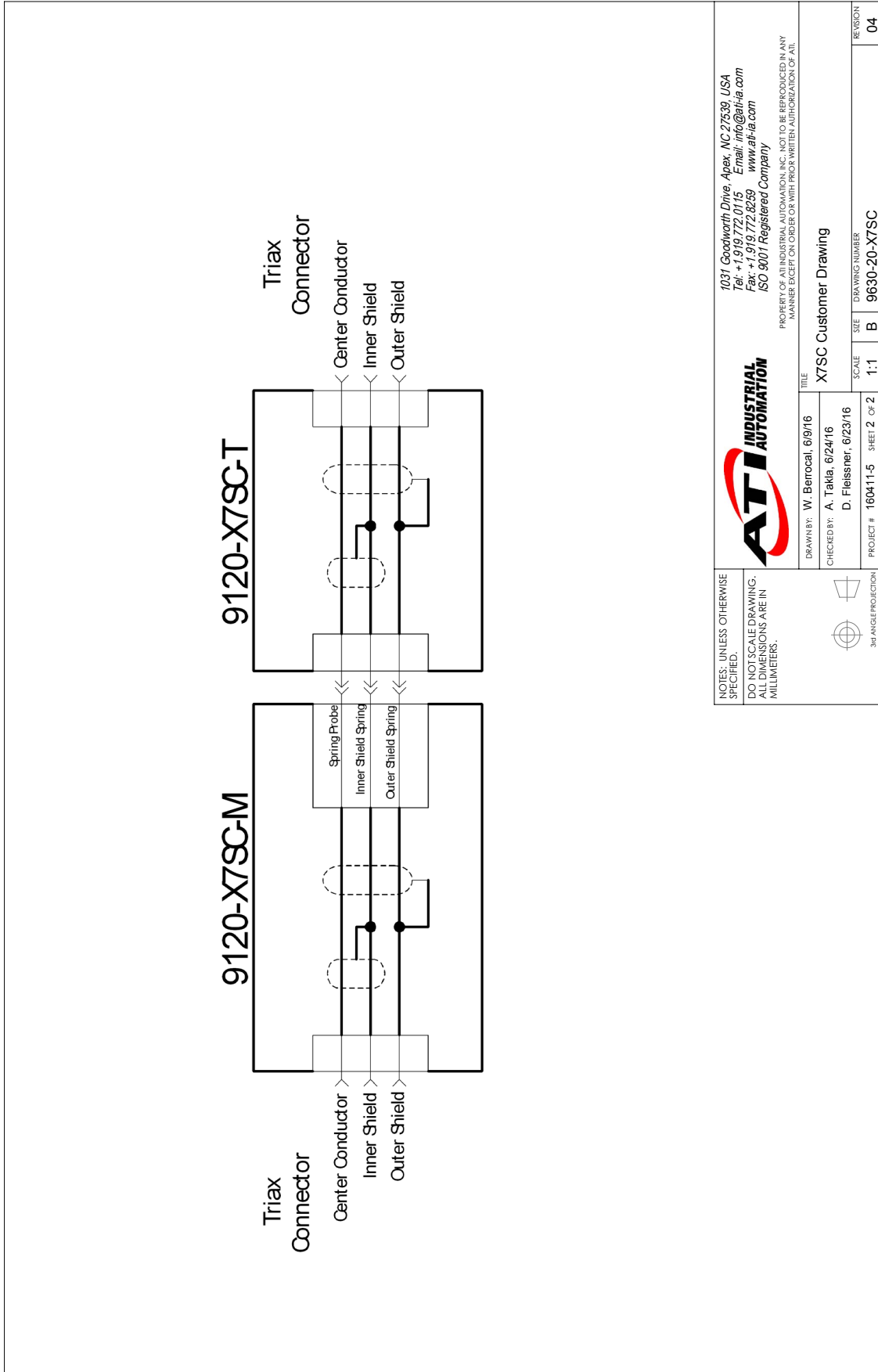
Table 5.2—Tool Module			
Item No.	Qty	Part Number	Description
*	4	3500-1162012-15A	M4 x 12, Socket Button Head Cap Screw, MB, ND Ind. Microspheres Epoxy, Yellow. 0-3 uncoated lead thds. 5-7 coated thds. IFI52

5.3 Accessories

Table 5.3—Accessories			
Item No.	Qty	Part Number	Description
*	*	9545-0500001-0	Polyester tipped swab

6. Drawings





NOTES: UNLESS OTHERWISE SPECIFIED:
 DO NOT SCALE DRAWING.
 ALL DIMENSIONS ARE IN MILLIMETERS.

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CHECKED BY: A. Takla, 6/24/16	SCALE: 1:1
D. Fleissner, 6/23/16	SHEET 2 OF 2
PROJECT # 160411-5	DRAWING NUMBER: 9630-20-X7SC
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