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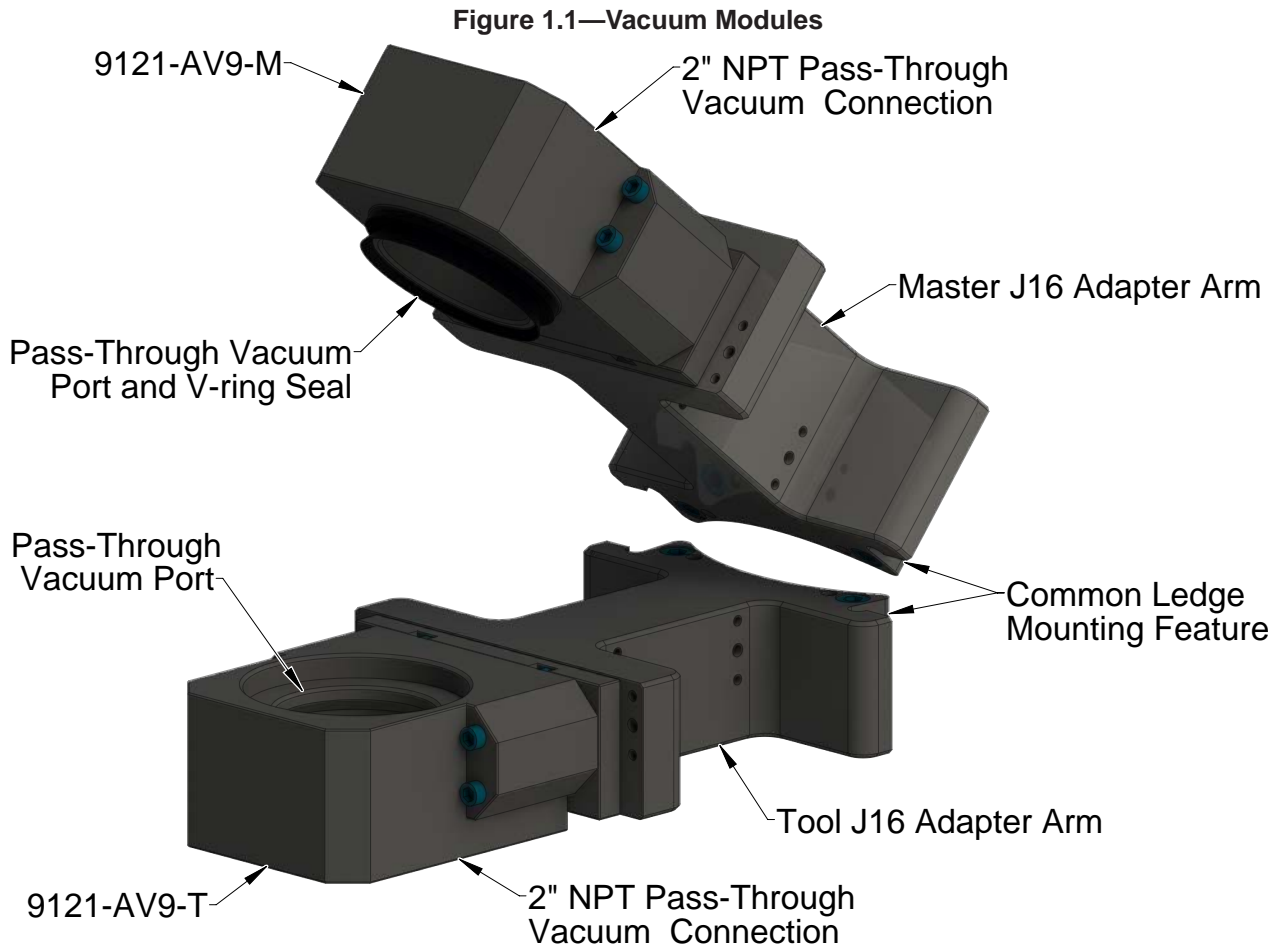
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D. Fluid Air Modules

AV9—Vacuum Module

1. Product Overview

The AV9 modules provide pass-through vacuum ports when attached to the Master and Tool Plates. A 2" NPT vacuum connection is provided for the customer interface. The Master module is equipped with V-ring seals on the pass-through ports. The modules provide a J16 adapter arm that is equipped with two additional J16 patterns for mounting additional modules.



2. Installation

The vacuum modules are typically installed on Tool Changers or Utility Couplers by ATI prior to shipment. The steps below outline field installation or removal as required. For detail information refer to [Section 8—Drawings](#).



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



CAUTION: It is recommended, not to use fasteners with pre-applied adhesive more than three times. Fasteners used more than three times may come loose and cause equipment damage. Discard fasteners used more than three times and install new fasteners with pre-applied adhesive.

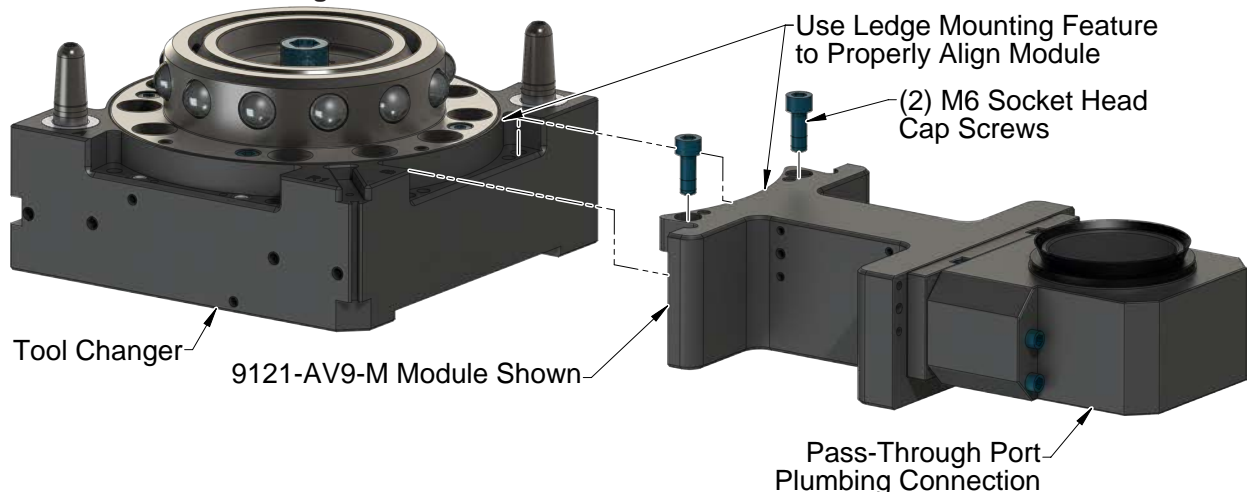
2.1 Module Installation

Tools required: 5 mm Allen wrench (hex key), torque wrench

Supplies required: Clean rag, Loctite® 242 (if fasteners do not have pre-applied adhesive)

1. For a Tool Changer, if the Tool Changer is installed place the Tool safely in the tool stand. Uncouple the Tool Changer or Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all circuits (e.g. electrical, air, water, etc.).
3. It may be necessary to clean the mounting surface on the Tool Changer or Utility Coupler prior to installing the module in order to remove any debris that may be present.
4. Using the ledge feature, place the module into the appropriate location on the Tool Changer or Utility Coupler body. Align the module with the Tool Changer using the dowels in the bottom of the ledge feature.
5. If fasteners do not have pre-applied adhesive, apply Loctite 242 to the supplied M6 socket head cap screws. Install the (2) M6 socket head cap screws securing the module to the Tool Changer or Utility Coupler and tighten to 89 in-lbs (10.0 Nm).
6. Connect air plumbing to the module. Ensure that the connectors are cleaned prior to being secured as appropriate.
7. After installation is complete, module may be put into normal operation.

Figure 2.1—Installation and Removal of the Modules



2.2 Module Removal

Tools required: 5 mm Allen wrench (hex key)

1. For a Tool Changer, if the Tool Changer is installed place the Tool safely in the tool stand. Uncouple the Tool Changer or Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. Prior to removing the module use a marker pen to scribe a line or indication between the Tool Changer or Utility Coupler and module as a reminder where the module is to be re-installed.
4. Disconnect air plumbing to the module.
5. Remove the socket head cap screws and lift off from the Tool Changer or Utility Coupler.

3. Operation

The vacuum modules are designed to pass vacuum utilities from the Master to the Tool for use by the customer's tooling.

4. Maintenance

Once installation is completed, the operation of the vacuum modules is generally trouble free. Periodically, the condition of the V-ring seal should be checked. Replace any damaged or degraded components as necessary. Mating surfaces should be kept clean. Use a vacuum to remove any debris and clean in and around the mating surfaces of the modules using a nylon brush (ATI Part Number 3690-0000064-60). During inspection, ensure that the fasteners attaching the modules to the Tool Changer or Utility Coupler are secure.



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4.1 Preventive Maintenance

A visual inspection and preventive maintenance schedule is provided in [Table 4.1](#).

Table 4.1—Preventive Maintenance Schedule	
Inspection Schedule	Action Required
Weekly	Clean and inspect
6 months or 500,000 cycles	Seal replacement
Checklist	
Weekly Maintenance:	
<input type="checkbox"/> Clean mating surfaces. <input type="checkbox"/> Inspect modules for leaks. Replace components as necessary.	
6 months or 500,000 cycle Maintenance:	
<input type="checkbox"/> Inspect V-ring seals for wear, abrasion, and cuts. Refer to Section 5.2.1—V-ring Seal Replacement <input type="checkbox"/> Inspect the mounting fasteners for tightness, tighten if loose refer to Section 2.1—Module Installation .	

5. Troubleshooting and Service Procedures

The following section provides troubleshooting information to help diagnose conditions with the Tool Changer or Utility coupler and service procedures to help resolve these conditions.



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5.1 Troubleshooting

Refer to the table below for trouble shooting information.

Symptom	Possible Cause	Correction
Poor Vacuum Flow	Vacuum lines or connections damaged or blocked	Inspect supply/return hoses and connections for damage or blockage, clean/repair/replace as necessary.
	Damaged V-ring Seal	Inspect V-ring seal and clean/repair as necessary. Refer to Section 5.2.1—V-ring Seal Replacement .
Modules Won't Couple	Debris between Master and Tool plates or modules.	Clean debris from between Master and Tool plates and modules.
	Loose Mounting Fasteners	Check module attachment to tool changer. Refer to Section 2.1—Module Installation for the proper torque.

5.2 Service Procedures

The following service procedures provide instructions for component replacement and adjustment.

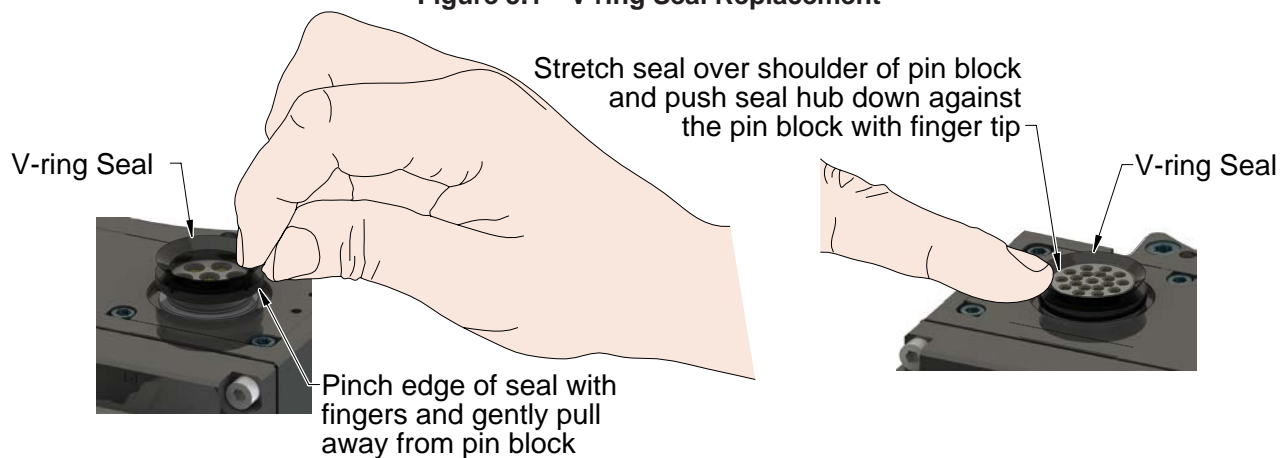
5.2.1 V-ring Seal Replacement

Parts required: Refer to [Section 8—Drawings](#).

The seal protects the electrical connection between the Master and Tool module. If the seal becomes worn or damaged it needs to be replaced.

1. For a Tool Changer, place the Tool safely in the tool stand. Uncouple the Tool Changer or Utility Coupler to allow clear access to the Master and Tool plates.
2. Turn off and de-energize all energized circuits (e.g. electrical, air, water, etc.).
3. To remove the existing seal, pinch edge of seal with fingers and gently pull the seal away from the pin block on the Master.
4. Pull the seal off the pin block.
5. To install a new seal, stretch the new seal over the shoulder of the pin block.
6. Push the seal's hub down against the pin block using finger tip.
7. If repairs are complete, return circuits to normal operation.

Figure 5.1—V-ring Seal Replacement



6. Serviceable Parts

6.1 Master Module

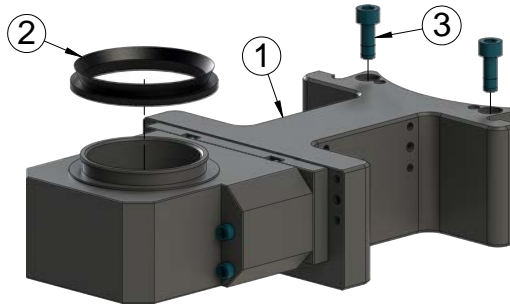


Table 6.1—AV2 Master Module

Item No.	Qty	Part Number	Description
1	1	9121-AV9-M	Master module with Pass-Trthrough Vacuum Port 2" NPT Vacuum Port Connection
2	1	4010-0000057-01	V-Ring Seal, V-55
3	2	3500-1066016-15A	M6 x 16 mm socket head cap screws Blue Dyed Magni, ND Microspheres

6.2 Tool Modules

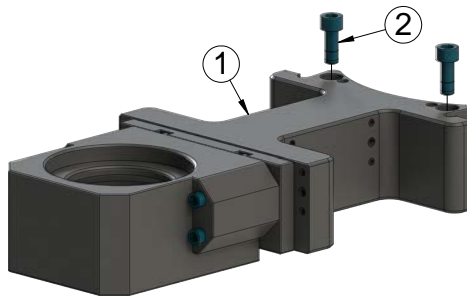


Table 6.2—Tool Modules

Item No.	Qty	Part Number	Description
1	1	9121-AV9-T	Tool module module with Pass-Trthrough Vacuum Port 2" NPT Vacuum Port Connection
2	2	3500-1066016-15A	M6 x 16 mm socket head cap screws Blue Dyed Magni, ND Microspheres

6.3 Accessories

Table 6.3—Accessories

Item No.	Qty	Part Number	Description
*	*	3690-0000064-60	Brush, Blue Nylon All Purpose

7. Specifications

Table 7.1—Master Module Specifications	
9121-AV9-M	Pneumatic Master module with Vacuum pass-through port, 1.5" O.D. flange mount port connections
Materials of Construction	Various - aluminum housing, Nitrile seal
Weight:	3.30 lbs. (1.50 kg)
Vacuum Ports:	
Quantity	1
Customer Port Connection	2" NPT

Table 7.2—Tool Module Specifications	
9121-AV9-T	Pneumatic Tool module with Vacuum pass-through ports, 1.5" O.D. flange mount port connections
Materials of Construction	Various - aluminum housing
Weight:	2.90 lbs. (1.2 kg)
Vacuum Ports:	
Quantity	1
Customer Port Connection	2" NPT

8. Drawings

8.1 AV9-M Vacuum Modules

