



ATI Axially-Compliant Compact Orbital Sander

(Model 9150-AOV-10)

Product Manual



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Engineered Products for Robotic Productivity

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Foreword



CAUTION: This manual describes the function, application, and safety considerations of this product. This manual must be read and understood before any attempt is made to install or operate the product, otherwise damage to the product or unsafe conditions may occur.

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Glossary

Term	Definition
Air Filter	Device for removing contamination from air supply lines. Typically refers to removal of particulates.
Air Lubricator	Device for adding controlled volumes of lubricating oil to the air supplying the air motor.
AOV	AOV (A xial O rbital V ane). An ATI series of orbital sanders that use a vane-type motor with an axially floating motor. The AOV is for material finishing operations.
Coalescing Filter	Device that removes liquid aerosols from the supply air lines.
Compliance	The ability of the motor to passively move in response to protrusions on or deviations of the work piece.
Interface Plate	Device for attaching the tool to robots or work surfaces.
Main Housing	The main cylindrical body of the unit which includes the mounting features.
Media	Term referring to tools and/or abrasives held by the tool during the completion of a manufacturing process.
Motor	The rotating portion of the tool assembly.
Pad	Device for backing and securing media via adhesive or hook and loop"
Qty	Quantity
Rear Housing	Rear cover to the main housing. This body includes a connection port for the compliance air supply and feed-through seals for optional electrical sensors.
Regulator	Device used to set and control the supplied air pressure to lower acceptable levels.
Solenoid Valve	Electrically controlled device for switching air supplies on and off.
Vane Motor	Air motor that drives the tool.

1. Safety

The safety section describes general safety guidelines to be followed with this product, explanations of the notifications found in this manual, and safety precautions that apply to the product. Product specific notifications are imbedded within the sections of this manual (where they apply).

1.1 Explanation of Notifications

These notifications are used in all of ATI manuals and are not specific to this product. The user should heed all notifications from the robot manufacturer and/or the manufacturers of other components used in the installation.



DANGER: Notification of information or instructions that if not followed will result in death or serious injury. The notification provides information about the nature of the hazardous situation, the consequences of not avoiding the hazard, and the method for avoiding the situation.



WARNING: Notification of information or instructions that if not followed could result in death or serious injury. The notification provides information about the nature of the hazardous situation, the consequences of not avoiding the hazard, and the method for avoiding the situation.



CAUTION: Notification of information or instructions that if not followed could result in moderate injury or will cause damage to equipment. The notification provides information about the nature of the hazardous situation, the consequences of not avoiding the hazard, and the method for avoiding the situation.

NOTICE: Notification of specific information or instructions about maintaining, operating, installing, or setting up the product that if not followed could result in damage to equipment. The notification can emphasize, but is not limited to: specific grease types, best operating practices, and maintenance tips.

1.2 General Safety Guidelines

The customer should first read and understand the operating procedures and information described in this manual. Never use the AOV for any purpose not explicitly described in this manual. Follow installation instructions and pneumatic connections as described in this manual.

All pneumatic fittings and tubing must be capable of withstanding the repetitive motions of the application without failing. The routing of pneumatic lines must minimize the possibility of stress/strain, kinking, rupture, etc. Failure of critical pneumatic lines to function properly may result in equipment damage.

1.3 Safety Precautions



CAUTION: Do not use serviceable parts other than original ATI serviceable parts. Use of serviceable parts not supplied by ATI can damage equipment and void the warranty. Always use original ATI serviceable parts.



CAUTION: Do not perform maintenance or repair on the AOV product unless the tool is safely supported or placed in the tool stand and air has been turned off. Injury or equipment damage can occur with tool not placed in a tool stand and air remaining on. Place the tool safely in the tool stand and turn off the air before performing maintenance or repair on the AOV product.

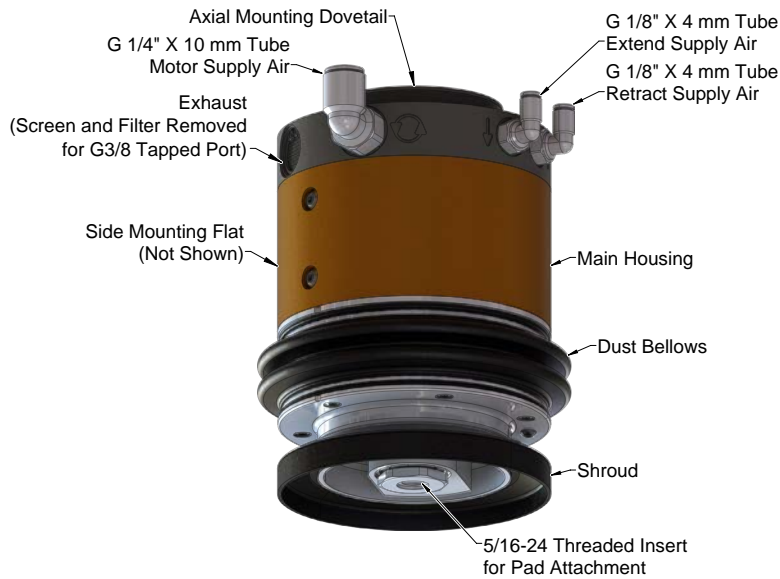
2. Product Overview

ATI's Axially-Compliant Compact Orbital Sander, also known as AOV, is a robust axially compliant orbital vane motor suitable for a multitude of robotic and non-robotic material finishing operations on aluminum, plastic, steel, etc.

Figure 2.1—Product Overview with Vacuum



Figure 2.2—Product Overview without Vacuum



2.1 Features and Benefits of the AOV Orbital Sander

- **Reliable vane motor**
A robust vane-type air motor that provides a long service with exceptional power.
- **High-torque performance**
Vane motors increase their torque in response to loads that are introduced in finishing operations.
- **Floating axial compliance (extend and retract air supply)**
Remotely-adjusted air pressure controls maintain the constant axial force on the orbiting motor. The axially-compliant motion of the motor allows the AOV to compensate for deviations in the part profile along the robot path and provide constant contact force with the workpiece.
- **Mounting options**
The AOV is provided with an axial mounting feature on the rear of its housing and on the side of the housing for benchmounting.
- **Media holder**
The AOV is compatible with 5" and 6" diameter pads with 5/16-24 threaded stud interface (Refer to [Section 7—Parts and Accessories](#))
- **Easy programming of the robot**
The axial motion of the AOV allows fast and simple programming of the robot. This movement also compensates for changes in part tolerances, part misalignment, and robot path variation.
- **Dust bellows**
The AOV is equipped with dust bellows between the moving motor mounting plate and the housing. This dust bellows is provided to minimize contamination of the guide and piston rods that allow free axial motion. This dust bellows is not provided as a safety device. Under no circumstances should the user operate the unit without the dust bellows. The user should never have their hands on or near the unit when in operation.

2.2 Technical Description

A technical overview of the product is provided in the following tables and graphs. For additional technical specifications, refer to [Section 8—Specifications](#).

2.2.1 Environmental Limitations

2.2.1.1 Operation

Table 2.1—Operation	
Installation position	Mounted to machining center by various means, customer-supplied tool holders/adapters.
Temperature range	5° C–35° C 41° F–95° F
Utilities	The tool requires the following: <ul style="list-style-type: none"> • Clean, dry, filtered, and lubricated air (refer to Section 4.2.2—Lubrication). • A coalescing filter and filter elements that are rated 5 micron or better. • The axial force/compliance air must be supplied at 1.03 - 4.1 bar (15-60 psi) from a regulated source.

2.2.1.2 Storage

Table 2.2—Storage	
Temperature range	0° C–45° C 32° F–113° F
Conditions	The tool should be stored in its crate and in a dry place. When not in use, keep the unit in its crate if possible. Consult Section 3.4—Storage and Preventive Maintenance During Storage of this manual.

2.3 Compliance Unit Performance

The force created by the compliance mechanism varies linearly with air pressure as shown in [Figure 2.3](#) and [Figure 2.4](#). The force characteristics shown are for horizontal, rigidly-mounted installations. This does not account for friction or the weight of the motor. Measurements may vary from one product to another and should only be treated as nominal. The effect of friction will vary based on the application, and a minimum compliance force is required to overcome the friction and allow the compliance mechanism to move properly. This minimum force is typically 2-4 lbf, but it may be higher or lower based on a variety of factors.

Figure 2.3—Compliance Force Curves (Retract)

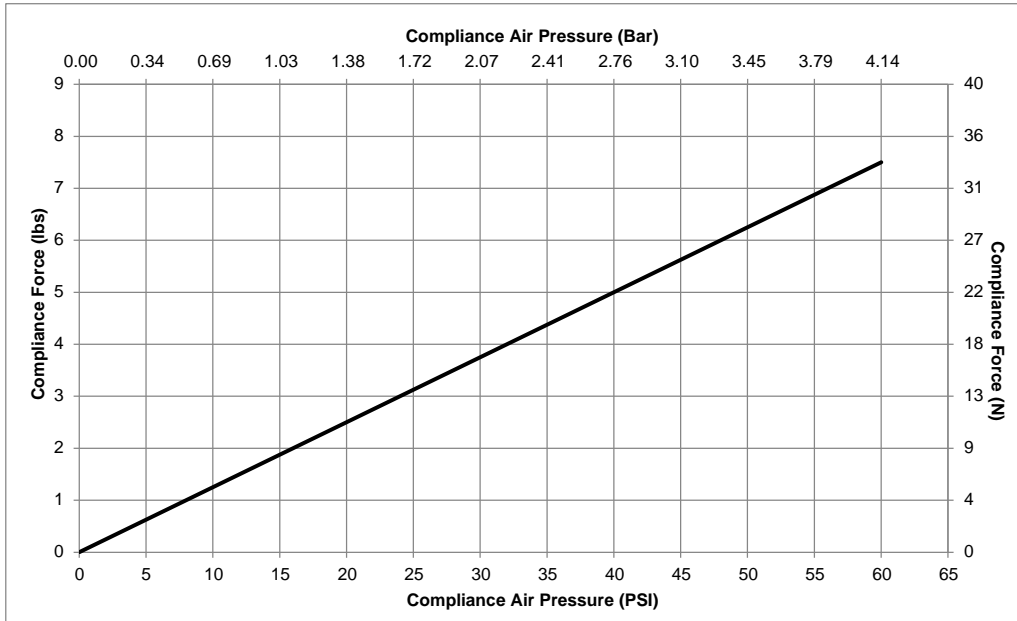
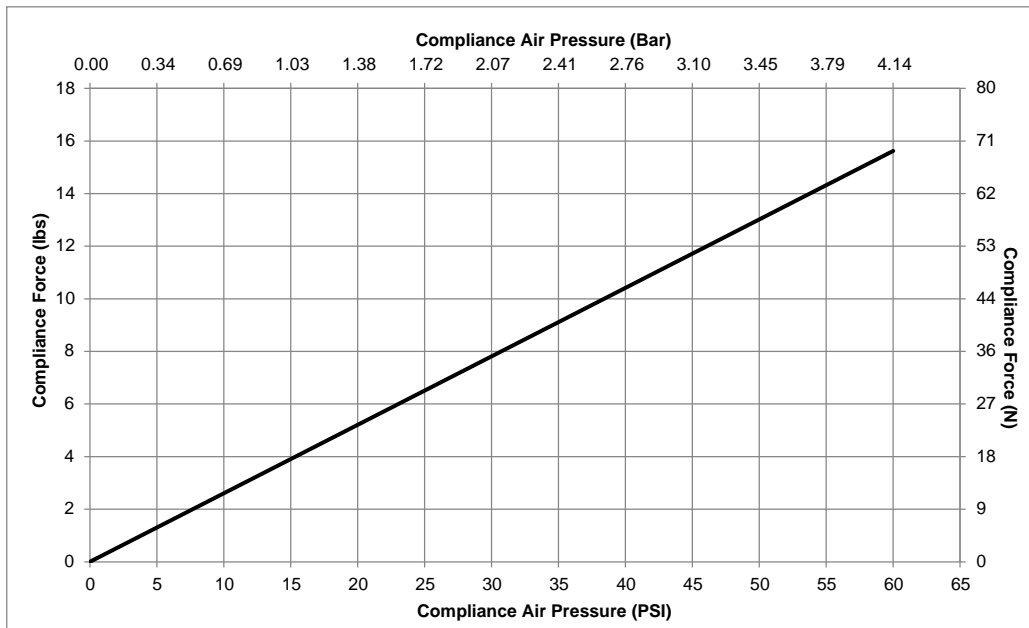


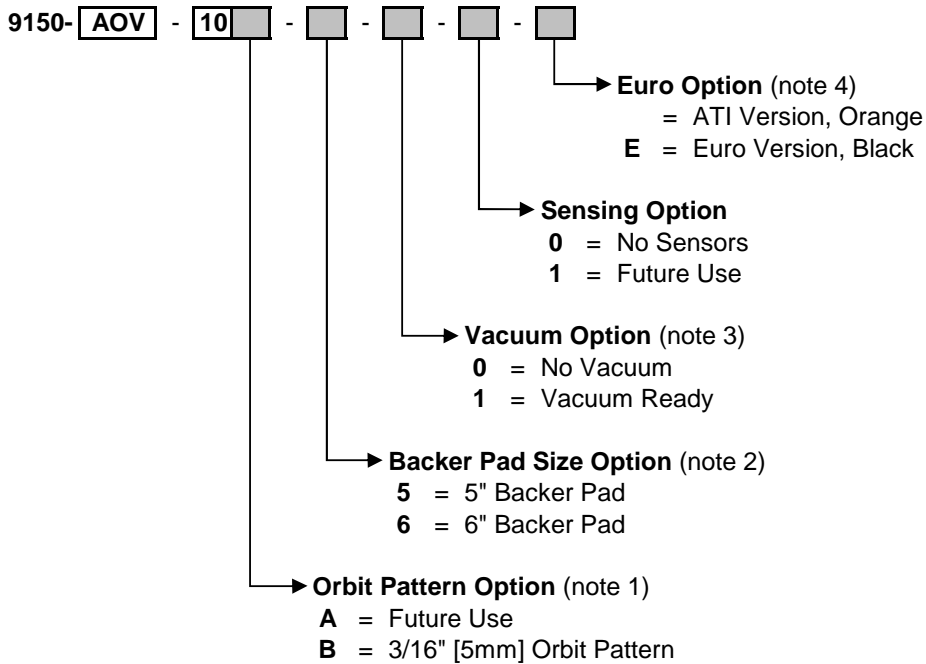
Figure 2.4—Compliance Force Curves (Extend)



Refer to [Figure 2.3](#) and [Figure 2.4](#). and factor in the weight of the attached tooling plus 3 lbs. for the weight of the motor. If the AOV is pointed upward, this weight will reduce the net compliance force, requiring a higher operating pressure to achieve the desired compliance force. If the AOV is pointed downward, it will increase the net compliance force, requiring a lower operating pressure (or a higher pressure applied to the retract compliance fitting) to achieve the desired compliance force.

2.4 Part Numbering Legend

Figure 2.5—Part Numbering Legend
AOV-10 Part Number Guide



Notes:

1. Currently only option "B" is available.
2. All units will come with "Hook and Loop" backer pads.
Backer pad interfaces unit via 5/16"-24 threaded female port on motor.
3. Units are not self-vacuuming. Units must be hooked up to auxiliary vacuum system.
Units are equipped with a 1" OD interface for central vacuum attachment.
Vacuum units are supplied with vacuum ready backer pads.
4. The only difference between Euro and Non-Euro is the unit color.

3. Installation

The compliance housing incorporates a rear mounting pattern (dovetail) which can be used to mount to an interface plate (refer to [Section 3.5—Axial Mount Installation](#)). An interface plate for side mounting is available (refer to [Section 3.6—Benchmount Installation](#)).

The tool must be rigidly mounted prior to use. Under no circumstances should the unit be used for manual/hand operations. Once securely mounted, the unit should be supplied with clean, lubricated, air filtered (5) micron or better. The use of a coalescing filter is recommended to remove trace moisture from the air supply. Air line fittings supplying the AOV should be installed with care using a minimum of tape or liquid sealant. To prevent contaminant damage to the air motor, all air lines should be blown down to remove debris prior to connection of the AOV.

3.1 Protection During Transportation

The AOV arrives in packaging that secures and protects the tool during transportation. Always use this packaging when transporting the AOV in order to minimize the risk of damage.

3.2 Inspection of Condition When Delivered

Upon receipt, the following should be checked:

- Delivery in accordance with freight documents
- Packaging is in good condition

If there is damage to any of the packaging, or if any of the goods have been exposed to abnormal handling, unpack those parts that may have been damaged for a closer inspection. Contact ATI for assistance.

3.3 Unpacking and Handling

The AOV should always be placed inside the accompanying packaging, while transporting, storing, and handling.

3.4 Storage and Preventive Maintenance During Storage

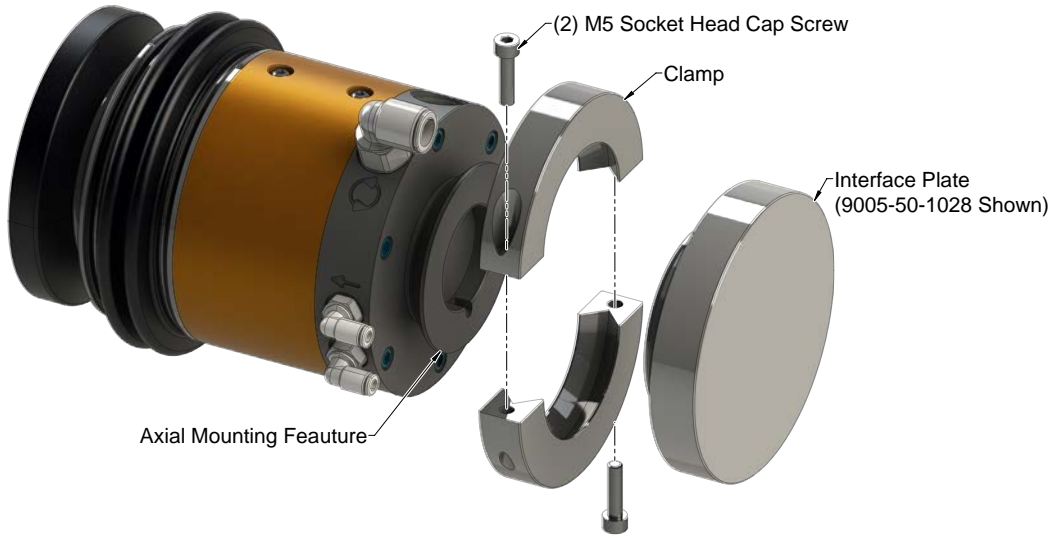
For short-term storage, keep the tool in its accompanying packaging and in a dry place.

For long-term storage, the AOV should be thoroughly cleaned of any dust or debris. To protect the air motor, the user may wish to inject several drops of oil directly into the motor input followed by a short burst of supply air to insure the vanes and internal components are completely lubricated. The units should not be disassembled. Place the tool inside a sealed, plastic bag and place the bagged tool inside the crate.

3.5 Axial Mount Installation

A blank interface plate is also available to allow axial mounting off the rear of the AOV housing. This plate may be modified by the system integrator or by the owner/user of the AOV. ATI can provide custom interface plates and adapters upon request.

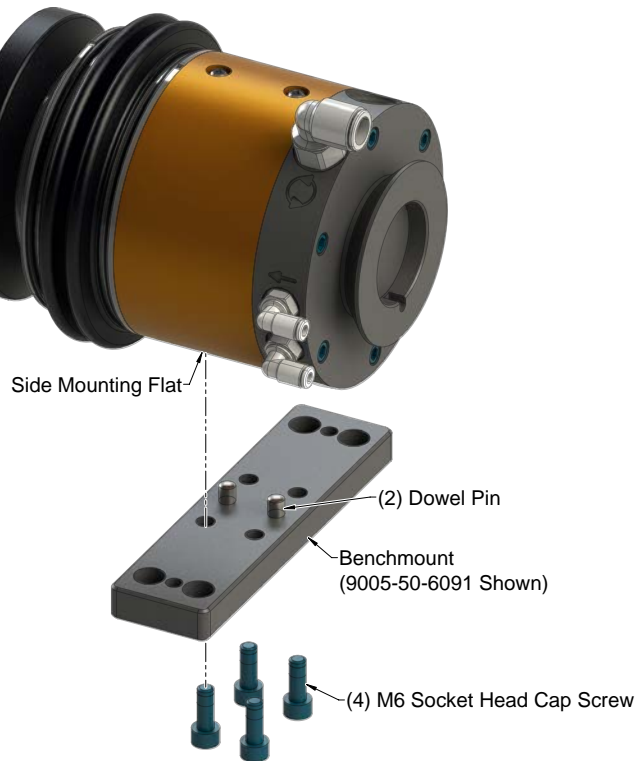
Figure 3.1—Axial Installation (Non-Vacuum Model Shown for Clarity)



3.6 Benchmount Installation

The benchmount pattern of the AOV consists of (2) dowel pin holes and (4) threaded holes as shown in [Figure 3.2](#). If the AOV is mounted to a fixed surface, the robot carries the part to be finished to the AOV.

Figure 3.2—Benchmount (Non-Vacuum Model Shown for Clarity)



3.7 Pneumatic Connections

Connect the AOV as shown in [Section 7—Parts and Accessories](#).



WARNING: All pneumatic fittings and tubing must be capable of withstanding the repetitive motions of the application without failing. The routing of pneumatic lines must minimize the possibility of over stressing, pullout, or kinking the lines. Failure to do so can cause some critical pneumatic lines not to function properly and may result in damage to the equipment.

NOTICE: It is recommended that the customer use a coalescing filter and filter elements rated 5 micron or better to remove trace moisture. Water damage of the air motor or damage associated with debris in the air lines is not covered under warranty.

Conventional, customer-supplied, pneumatic components are used to control the air supply to the tool. ATI recommends that the user install a high-flow pneumatic pressure regulator and a high-flow valve to properly supply a stable air supply of 90 psi (6.2 bar) to the motor (ATI Part # 9005-50-6167 or equivalent, see [Section 2.3—Compliance Unit Performance](#) for the maximum flow requirements.) While the motor can be operated below 90 psi (6.2 bar), it will not develop full power or speed. The end user may need two regulators (ATI Part # 9005-50-6164) for the extend (1) and retract (2) compliance. Very little airflow is required for the compliance mechanism.

The compliance force is applied axially and is adjusted until the desired finishing result is achieved.



CAUTION: Pneumatic components used for the motor drive circuit must be capable of meeting the air consumption requirements (See [Section 8—Specifications](#)). Poor performance will result if the correct components are not used. Lubricators must be located as close to the unit as possible with performance rapidly deteriorating when the distance exceeds 15 feet (5 meters).

Table 3.1—Pneumatic Connections		
Function	Connection Type	Pressure
Motor Inlet	G1/4 x 10 mm Tube	6.2 bar (90 psi)
Compliance (Axial) Force Inlet	(2) G1/8 x 4 mm Tube	1.03–4.1 bar (15–60 psi)

The tool must be plumbed using flexible tubing. The inside diameter of the motor supply tubing should be as large as practical to minimize pressure drop to the motor (8 mm minimum).

The air motor is quiet and vents air to the environment through the filtered exhaust port at the rear housing. The customer may choose to remove the filter and replace with tubing to carry exhaust away from the work area. Such tubing must have a minimum 10 mm inner diameter to minimize impact on motor speed from exhaust restriction. To reduce the sound level in neighboring working areas, a customer-supplied barrier surrounding the installation may be installed.

The compliance force air supply pressure regulator should be adjusted between 1.03–4.1 bar (15-60 psi). When testing for the proper contact force, start with a very low pressure and increase slowly until the desired process result is achieved.

4. Operation

These operating instructions are intended to help system integrators program, start up, and complete a robotic cell containing a finishing tool. The system integrator should be familiar with the task of finishing in general, and should have extensive knowledge relating to robots and automation incorporating robots.

4.1 Safety Precautions



DANGER: Never use the AOV for purposes other than automated processes. Never use the AOV as a hand-held machine.



DANGER: Never use the AOV in a manner to produce radial loads. If a failure occurs due to forces caused by improper use, hazardous situations for both personnel and equipment could be created.



WARNING: All personnel, who are involved in the operation of the AOV product, should have a thorough understanding of the operating procedures. Failure to follow these procedures or neglecting safety precautions can create hazardous situations that may injure personnel or damage the deburring installation and the AOV product.



WARNING: Never operate the ATI product without wearing hearing protection. High sound levels can occur during sanding. Failure to wear hearing protect can cause hearing impairment. Always use hearing protection while working in the proximity of the finishing tool.



WARNING: Never operate the ATI product without wearing eye protection. Flying debris can cause injury. Always use eye protection while working in the proximity of the finishing tool.



CAUTION: Do not use replacement parts other than original ATI replacement parts. Use of replacement parts not supplied by ATI can damage equipment and void the warranty. Always use original ATI replacement parts.

4.2 Normal Operation

The following sections describes the normal operating conditions for AOVs.

4.2.1 Air Quality

The air supply should be clean, dry, filtered, and lubricated. A coalescing filter that has elements rated for 5 micron or better is required. The air must be supplied at 6.2 bar (90 psi).

Air quality can affect tool performance substantially. Particulates can block airflow or impede motion.

4.2.2 Lubrication

Lubricate the air supply with 2-3 drops of an oil-fog lubrication mixture per hour.

Vane motors in the AOV must be run with lubrication in the air supply to maximize motor life.

It is imperative that the lubricator be located within 5 m (15 feet) of the AOV.

4.2.3 Media Selection

Do not use media that requires radial loading. Refer to [Section 8—Specifications](#).

The selection of such media is highly dependent upon the work piece material and geometry, and the amount of material to be removed. It is not practical to present all the possibilities in this document.

4.2.4 Sander Approach Path Should Be Slow and Perpendicular

Since the sander is not being turned on until the instant before contact or until after contact, approach should be slow and perpendicular to the surface.

If the tool quickly approaches perpendicularly to the workpiece, the result is scarring and premature wear of the tool bearings and results in premature failing of the unit. Additionally, collisions could result and create a hazardous situation for both personnel and equipment.

To avoid excess wear to the motor bearings, AOV should not be turned on until the instant before contact or until after contact.

4.2.5 No Radial Loads

Do not apply radial loads, which are perpendicular to the axis of rotation.

4.2.6 Program the Robot to Incorporate 50% Compliance Travel of the Tool

Program the robot to have the tool's compliance at 50% travel when on the nominal path.

As the part's surface deviates from the perfect path, the sanding pad can use compliance to follow along high and low spots without losing contact or hitting the positive stop and gouging.

Do not "bottom out" the compliance, hitting the positive stop.

Repeated impacts on the positive stop can damage the compliance mechanism or motor.

5. Maintenance

The air motor is supported by (4) guide pins attached to the motor mounting plate of the finishing tool. To prevent binding, compliance rods are free to float in the front plate. This allows the motor assembly to achieve free compliant motion while resisting the motor's torque. Do not attempt to change the floating nature of the rods by adding washers or additional thread locker. These actions will prevent the rods from floating, which will result in binding of the tool's compliance.

5.1 Routine Operational Maintenance

The tool utilizes a vane-type air motor. When subjected to normal use, this robust unit will provide many hours of operation before service or repair is necessary. When subjected to high shock loading or periods of continuous service without interruption, the unit will require service or repair earlier. While simple in design, there are few user-serviceable parts in the assembly. The user is encouraged to return the unit to ATI for service.

For all service, it is recommended that the air supply (before the solenoid valves) be disconnected. Drain any trapped air pressure in the lines. It is suggested that the air supply be "locked out" to prevent accidental operation of the motor. During maintenance operations, refer to https://www.ati-ia.com/Products/deburr/deburring_ModelDetails.aspx?id=AOV-10.

5.2 Media Replacement

Check media quality regularly to ensure it is not dull or worn. Using worn media causes a poor surface finish and increased wear on the bearings that results in premature tool failure.

The AOV is supplied with a simple thread-on hook and loop pad for holding media.

When performing maintenance, always remember to tighten all the fasteners. When replacing media always secure it correctly and insure that the hook and loop pad is tightened.

When in doubt, the customer should refer to the manufacturer of the media to determine how to properly secure that media to the pad.

5.3 Utilities

The air tubing and fittings to the unit should routinely be checked for general condition and replaced as required. The lines must be flexible to allow free motion when the unit is mounted to a moving surface or robot. The air to the tool must be filtered, dry, and lubricated. The life of the filter elements is dependent on the quality of compressed air at the customer's facility.

5.4 Lubrication

Ensure the air motor is being lubricated. Refer to [Section 4.2.2—Lubrication](#).

6. Troubleshooting and Service Procedures

The following section provides troubleshooting information to help diagnose conditions with the product and service procedures to help resolve these conditions.

6.1 Troubleshooting

The following table is presented to assist in solving finishing problems.

Table 6.1—Troubleshooting		
Symptom	Cause	Resolution
Unequal compliance	Defective regulator	Replace defective regulator
Compliance slide sticking	Compliance slide contaminated	Clean the compliance slide with compressed air and alcohol.
Poor finish	Travel rate is too fast	Reduce travel rate
	Media is worn	Replace media
Motor stalls	Not enough or no drive air	Check drive air regulator for 90 psi (6.2 bar) and for leaks
	Too much compliance force	Decrease compliance force and make multiple passes
	Compliance bottom out	Examine/correct path
Compliance slides sticking	Guide rods and pistons contaminated	Remove dust bellow, clean the compliance slides with compressed air and alcohol, and lubricate rods.

6.2 Service Procedures

The following service procedures provide instructions for component replacement, when the user chooses to service the unit in the field. For all service, the user should disconnect the air supply before the solenoid valves and vent trapped air pressure from the lines. This step prevents accidental operation of the motor.



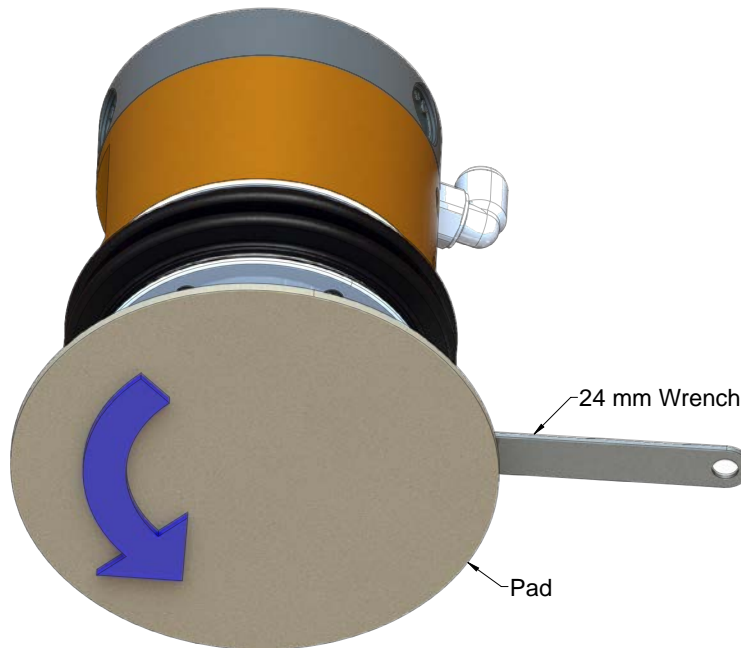
CAUTION: Thread locker applied to fasteners must not be used more than once. Fasteners might become loose and cause equipment damage. Always apply new thread locker when reusing fasteners.

6.2.1 Pad Removal

Tools required: 24 mm wrench

1. Discharge pressure in the air lines to the AOV's motor and compliance connections.
2. Insert supplied 24 mm wrench between shroud/vacuum and pad to hold nut on insert.
3. Rotate pad counter-clockwise, looking at media surface, until pad is removed.
4. Replace with new pad (refer to [Section 6.2.2—Pad Installation](#)).

Figure 6.1—Remove Pad (Non-Vacuum Model Shown for Clarity)



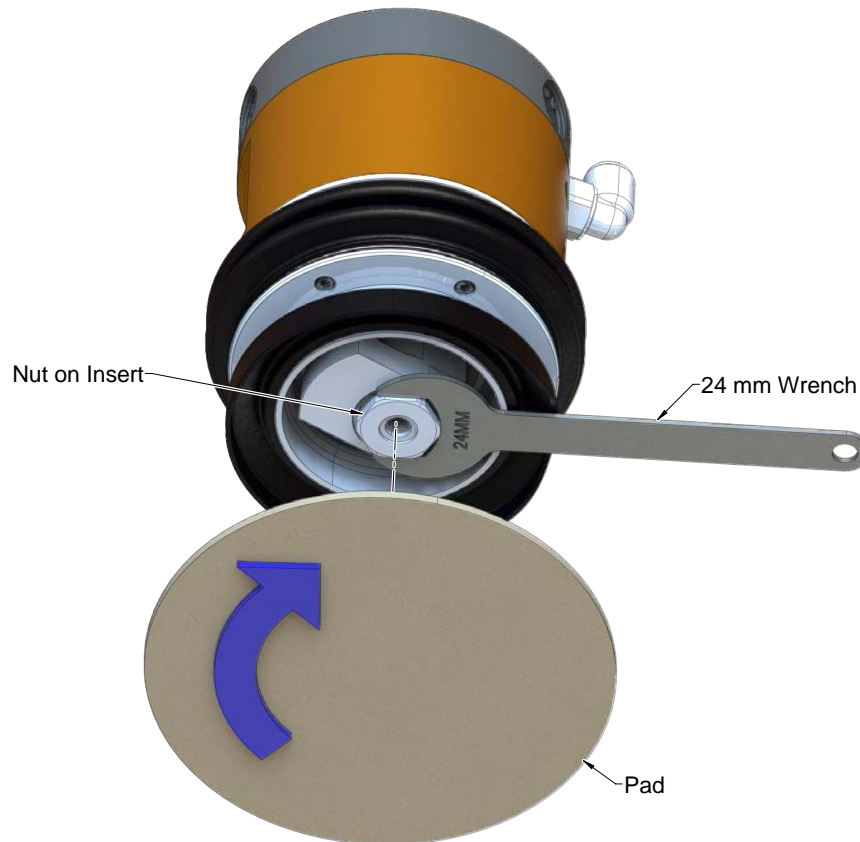
6.2.2 Pad Installation

Parts required: Refer to [Section 7—Parts and Accessories](#).

Tools required: 24 mm wrench, clean rag

1. Discharge pressure in the air lines to the AOV's motor and compliance connections.
2. Use clean rag to wipe dust and debris from shroud/vacuum and mounting surfaces.
3. Use supplied 24 mm wrench to hold nut on insert.
4. Thread stud on pad into threaded insert on AOV and rotate pad clockwise, looking at media surface, until contact.
5. Attach media to pad.
6. Safely resume normal operation.

Figure 6.2—Install Pad (Non-Vacuum Model Shown for Clarity)



6.2.3 Vacuum Removal

Tools required: 2.5 mm and 3 mm hex key, clean rag

1. Discharge pressure in the air lines to the AOV's motor and compliance connections.
2. Remove pad (refer to [Section 6.2.1—Pad Removal](#)).

Figure 6.3—Remove Hose



3. Use a 2.5 mm hex key, remove (2) M3 socket head cap screws that secure vacuum elbow to elbow mount.
4. Remove vacuum elbow from mount and vacuum shroud.
5. Use a 3 mm hex key, remove (2) M4 socket head cap screws that secure vacuum connector to AOV body.
6. Remove vacuum connector from AOV body.

7. Gently pull the vacuum shroud off the AOV.
8. Remove (2) M3 socket head cap screws that secure elbow mount to AOV body.
9. Remove elbow mount from AOV body.

Figure 6.4—Remove Vacuum Shroud



10. Replace with new shroud/vacuum (refer to [Section 6.2.6—Shroud Installation](#) or [Section 6.2.4—Vacuum Installation](#)).

6.2.4 Vacuum Installation

Parts required: Refer to [Section 7—Parts and Accessories](#)

Tools required: 2.5 mm and 3 mm hex key, clean rag

1. Discharge pressure in the air lines to the AOV's motor and compliance connections.
2. Remove pad and shroud/vacuum (refer to [Section 6.2.5—Shroud Removal](#) or [Section 6.2.3—Vacuum Removal](#)).
3. If (2) button head cap screws are installed in threaded holes for elbow mount, remove and discard these (2) button head cap screws.
4. Install elbow mount from AOV body.
5. Install (2) M3 socket head cap screws that secure elbow mount to AOV body.
6. Using fingers, push the vacuum shroud onto the AOV, ensuring vacuum shroud seats fully onto unit.

Figure 6.5—Install Vacuum Shroud



7. Install vacuum elbow to mount and into vacuum shroud.
8. Install (2) M3 socket head cap screws that secure vacuum elbow to elbow mount.
Tighten to contact.
9. If (2) button head cap screws are installed in threaded holes for vacuum connector, remove and discard these (2) button head cap screws.
10. Install vacuum connector from AOV body.
11. Install (2) M4 socket head cap screws that secure vacuum connector to AOV body.
Tighten to contact.

Figure 6.6—Install Hose



12. Install pad (refer to [Section 6.2.2—Pad Installation](#)).
13. Safely resume normal operation.

6.2.5 Shroud Removal

1. Discharge pressure in the air lines to the AOV's motor and compliance connections.
2. Remove pad (refer to [Section 6.2.1—Pad Removal](#)).
3. Gently pull the shroud off the AOV.
4. Replace with new shroud/vacuum (refer to [Section 6.2.6—Shroud Installation](#) or [Section 6.2.4—Vacuum Installation](#)).

Figure 6.7—Remove/Install Shroud



6.2.6 Shroud Installation

Parts required: Refer to [Section 7—Parts and Accessories](#)

1. Discharge pressure in the air lines to the AOV's motor and compliance connections.
2. Using fingers, push the shroud onto the AOV, ensuring shroud seats fully onto unit.
3. Install pad (refer to [Section 6.2.2—Pad Installation](#)).
4. Safely resume normal operation.

6.2.7 Dust Bellows Replacement

Parts required: Refer to [Section 7—Parts and Accessories](#)

Tools required: a pick or small ball-end hex key, clean rag

1. Discharge pressure in the air lines to the AOV's motor and compliance connections.
2. Remove the pad (refer to [Section 6.2.1—Pad Removal](#)).
3. Remove the shroud/vacuum (refer to [Section 6.2.1—Pad Removal](#)).
4. Remove the dust bellow.
 - a. Use a suitable pick or small ball-end hex key to lift and remove the O-ring securing the dust bellows to the front plate of the unit.
 - b. Similarly remove the O-ring securing the dust bellows to the main housing.
 - c. Use the pick to lift the dust bellows as necessary and slide it forward off the motor end of the tool.
5. Remove any debris or contamination that may have gotten through due to a damaged dust bellows using a clean rag.

Figure 6.8—Dust Bellows Replacement



6. Install the dust bellow.
 - a. Slip the first O-ring up and over the boss of the main housing, temporarily leaving the O-ring on the main housing.
 - b. Slip the dust bellows over the moving motor mount plate and onto the main housing.
 - c. Install both (2) O-rings to secure the dust bellow.
7. Install the shroud (refer to [Section 6.2.6—Shroud Installation](#) or [Section 6.2.4—Vacuum Installation](#)).
8. Install pad (refer to [Section 6.2.2—Pad Installation](#)).
9. Attach any air lines connected to the motor's exhaust port in place of the muffler.
10. Attach the flexible tubing supplying the air motor and compliance.
11. Safely resume normal operation.

6.2.8 Air Motor Replacement

AOV units with defective motors should be returned to ATI during the warranty period. For customer replacement of the motor after the warranty period, the following steps must be performed:

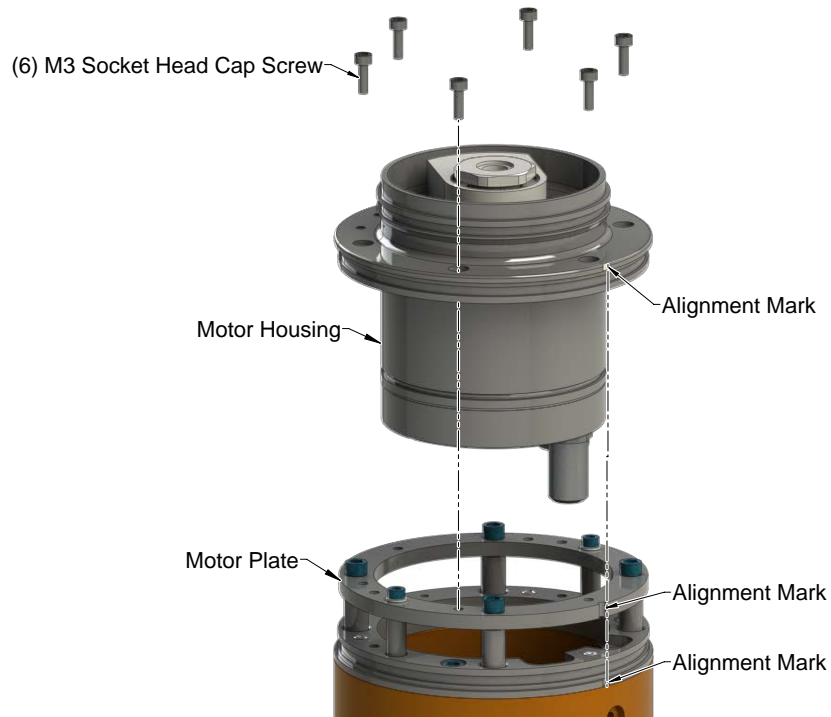
Parts required: Refer to [Section 7—Parts and Accessories](#)

Tools required: 2.5 mm hex key, clean rag, torque wrench

Supplies required: Magnalube

1. Discharge pressure in the air lines to the AOV's motor and compliance connections.
2. Remove the pad (refer to [Section 6.2.1—Pad Removal](#)).
3. Remove the shroud/vacuum (refer to [Section 6.2.1—Pad Removal](#)).
4. Remove the dust bellow (refer to [Section 6.2.7—Dust Bellows Replacement](#)).
5. Remove the air motor housing.
 - a. Use a 2.5 mm hex key, remove the (6) M3 socket head cap screws that secure the air motor housing to the motor plate.
 - b. Slide the air motor assembly out of the AOV body.
 - c. From inside the AOV body, disconnect the flexible tubing to the air motor housing.
6. Use a clean rag, wipe out any debris from the inside of the AOV body.

Figure 6.9—Motor Replacement



7. Install the new air motor housing.
 - a. Apply small amount of magnalube to exhaust tube on bottom of motor.
 - b. Attach the motor end of the internal air line to the motor connection.
 - c. Align the (3) alignment marks on the housing, plate, and body, ensure the internal air line has not been twisted or kinked (shown in [Figure 6.9](#)).
 - d. Slide the air motor assembly into the AOV body, ensuring proper alignment.
 - e. Use a 2.5 mm hex key, install the (6) M3 socket head cap screws that secure the air motor housing to the motor plate. Torque to 12 in-lbs (1.356 Nm).
8. Install the dust bellow (refer to [Section 6.2.7—Dust Bellows Replacement](#)).
9. Install the shroud (refer to [Section 6.2.6—Shroud Installation](#) or [Section 6.2.4—Vacuum Installation](#)).
10. Install pad (refer to [Section 6.2.2—Pad Installation](#)).
11. Attach the flexible tubing supplying the air motor and compliance.
12. Safely resume normal operation.

7. Parts and Accessories

Refer to https://www.ati-ia.com/Products/deburr/deburring_ModelDetails.aspx?id=AOV-10 for exploded drawings that show the user replaceable components of the AOV. Available accessories, tools, and replacement parts are listed in the following section. All other repairs must be performed by ATI.

7.1 Replacement Parts

Table 6.2—Replacement Parts			
Item No.	Qty	Part Number	Description
1	1	3700-50-9078	Dust Bellows, AOV-10
2	1	9005-50-6145	Orbital Sander Motor Kit, 10k RPM, 3/16" Orbit, AOV-10
3	1	9005-50-6118	Vacuum Kit, AOV-10
4	1	9005-50-6149	Non-Vacuum Kit, AOV-10

7.2 Accessories and Tools

Table 6.3—Accessories and Tools			
Item No.	Qty	Part Number	Description
1	1	3710-50-1481	Wrench, 24 mm
2	1	9005-50-1028	Clamping Collar Kit, With Rear Mounting Plate, Blank, RC-660
3	1	9005-50-6192	Interface Plate Kit, Dovetail Style B to BC 50, (4) M6, Boss 31.5, Dowel 6
4	1	9005-50-6091	Interface Plate Kit, Benchmount Style A to (4) M6, (2) Dowel 6, .75" x 4.5"
5	1	9005-50-6167	Coalescing Filter Regulator Lubricator Air Prep Kit with Standard Compliance (Low Lubrication Rate)
6	1	9005-50-6163	Upstream Single Point Lubricator, with Reservoir
7	1	9005-50-6168	Coalescing Filter Regulator Lubricator Air Prep Kit with Programmable Compliance (Low Lubrication Rate)

8. Specifications

Table 7.1—Specifications for the AOV-10	
Parameter	Rating
Motor	Air motor, vane type
Idle Speed	10,000 RPM
Weight total (w/o adapter)	5.9 lbs (2.68 kg)
Compensation (axial)	12.7 mm max. axial, +/-10 mm recommended (0.5 in. max. axial, 0.2 in. recommended)
Compliance force (extend)	13.3–66.7 N, @ supply pressure of 1.03–4.1 bar (3–15 lbs, @ supply pressure of 15–60 psi)
Compliance force (retract)	6.7–33.4 N, @ supply pressure of 1.03–4.1 bar (1.5–7.5 lbs, @ supply pressure of 15–60 psi)
Motor Air pressure	6.2 bar (90 psi)
Air consumption (max.)	20 cfm
Oil consumption	Approximately 2–3 drops of oil per hour (1 drop = 15 mm ³) by oil fog at max. air consumption
Orbit Pattern	3/16"
Pad Threaded Connection	5/16"-24
Pad Size	5" or 6" (Hook and Loop Pad Provided)
Abrasive media	Customer-supplied
Special tools (supplied)	Open end wrench, 24 mm (for media pad)
Sound Pressure Level¹	Less than 85 dBA , No-Load at a distance of 1.5 meters (5 feet) from the tool.
Notes:	
<ol style="list-style-type: none"> 1. Because the working environment is unknown, it is impossible to predict the noise that will occur during an operation. The tool may also excite resonant frequencies on equipment to which it is mounted creating higher sound pressure levels than the unit by itself. 2. Each AOV is tested for proper operation prior to shipment. 3. The following charts show measured forces relative to applied compliance air pressure. Measurements may vary from one product to another, and should only be treated as nominal. 	

9. Terms and Conditions of Sale

The following Terms and Conditions are a supplement to and include a portion of ATI's Standard Terms and Conditions, which are on file at ATI and available upon request.

ATI warrants the compliant tool product will be free from defects in design, materials and workmanship for a period of one (1) year from the date of shipment and only when used in compliance with manufacturer's specified normal operating conditions. This warranty does not extend to tool components subject to wear and tear under normal usage; including but not limited to those components requiring replacement at standard service intervals.

The warranty period for repairs made under a RMA shall be for the duration of the original warranty, or ninety (90) days from the date of repaired product shipment, whichever is longer. This warranty is void if the unit is not used in accordance with guidelines presented in this document. ATI will have no liability under this warranty unless: (a) ATI is given written notice of the claimed defect and a description thereof within thirty (30) days after Purchaser discovers the defect and in any event not later than the last day of the warranty period; and (b) the defective item is received by ATI not later ten (10) days after the last day of the warranty period. ATI's entire liability and Purchaser's sole remedy under this warranty is limited to repair or replacement, at ATI's election, of the defective part or item or, at ATI's election, refund of the price paid for the item. The foregoing warranty does not apply to any defect or failure resulting from improper installation, operation, maintenance or repair by anyone other than ATI.

ATI will in no event be liable for incidental, consequential or special damages of any kind, even if ATI has been advised of the possibility of such damages. ATI's aggregate liability will in no event exceed the amount paid by purchaser for the item which is the subject of claim or dispute. ATI will have no liability of any kind for failure of any equipment or other items not supplied by ATI.

No action against ATI, regardless of form, arising out of or in any way connected with products or services supplied hereunder may be brought more than one (1) year after the cause of action occurred.

No representation or agreement varying or extending the warranty and limitation of remedy provisions contained herein is authorized by ATI, and may not be relied upon as having been authorized by ATI, unless in writing and signed by an executive officer of ATI.

Unless otherwise agreed in writing by ATI, all designs, drawings, data, inventions, software and other technology made or developed by ATI in the course of providing products and services hereunder, and all rights therein under any patent, copyright or other law protecting intellectual property, shall be and remain ATI's property. The sale of products or services hereunder does not convey any express or implied license under any patent, copyright or other intellectual property right owned or controlled by ATI, whether relating to the products sold or any other matter, except for the license expressly granted below.

In the course of supplying products and services hereunder, ATI may provide or disclose to Purchaser confidential and proprietary information of ATI relating to the design, operation or other aspects of ATI's products. As between ATI and Purchaser, ownership of such information, including without limitation any computer software provided to Purchaser by ATI, shall remain in ATI and such information is licensed to Purchaser only for Purchaser's use in operating the products supplied by ATI hereunder in Purchaser's internal business operations.

Without ATI's prior written permission, Purchaser will not use such information for any other purpose or provide or otherwise make such information available to any third party. Purchaser agrees to take all reasonable precautions to prevent any unauthorized use or disclosure of such information.

Purchaser will not be liable hereunder with respect to disclosure or use of information which: (a) is in the public domain when received from ATI; (b) is thereafter published or otherwise enters the public domain through no fault of Purchaser; (c) is in Purchaser's possession prior to receipt from ATI; (d) is lawfully obtained by Purchaser from a third party entitled to disclose it; or (f) is required to be disclosed by judicial order or other governmental authority, provided that, with respect to such required disclosures, Purchaser gives ATI prior notice thereof and uses all legally available means to maintain the confidentiality of such information.

9.1 Motor Life and Service Interval Statement

The air motors that are used in ATI deburring/finishing tools are subject to wear and have a finite life. Motors that fail, during the warranty period, will be repaired or replaced by ATI as long as there is no evidence of abuse or neglect and that the normal operating practices outlined in this manual have been observed.

Components such as motor vanes, bearings, any gear reduction components, and collet nuts/chucks are considered consumable and are not covered by warranty. The customer should expect to service or replace these items at designated service intervals. For any part this is not detailed in this manual, contact ATI for part numbers and pricing.

Premature bearing failure can occur from exposing the AOV to coolants and water or impacts from collisions. Other failure modes that are outlined in the manual and relate to improper machining practices and deburring media selection.

9.1.1 Vane Motor Products

Vane type motors have a finite life and require regular service. At that time the customer should expect to replace the bearings and motor vanes. Any gear reduction components should also be inspected and replaced as necessary. Vane type motors perform best and longest when supplied with lubricated air. The service interval will be catastrophically shortened if the tool is ran without lubrication. The expected life of a properly lubricated vane motor in normal operation is entirely application dependent based on a multitude of factors. To maximize the life of a vane type motor products the customer should follow closely the normal operation guide in the product manual. The supplied air must be lubricated, and filtered to remove particulates and moisture. Premature bearing failure can occur from exposing the deburring tool to coolants and water or impacts from collisions. Other failure modes are outlined in the manual and relate to improper machining practices and deburring media selection.