ATI Compliant Deburring Blade (Models 9150-CDB-8-11-ATC, 9150-CDB-8-11-000)

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 this product. Failure to do so may result in personnel injury and/or damage to equipment.

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Glossary

Term	Definition
AC	Axially Compliant.
Air Filter	Device for removing contamination from air supply lines. Typically refers to removal of particulates.
ATC	Auto Tool Changer
Blade	Cutting tool used to remove burrs from the work piece.
Burr	Any unwanted, raised protrusion on the work piece.
CDB	Compliant Deburring Blade
Coalescing Filter	Device designed to remove liquid aerosols from the supply air lines.
Collet	Gripping device used to hold cutting tools in the spindle.
Compliance	The ability of the spindle to passively move in response to protrusions on or deviations of the work piece.
Deburr	To remove the burrs from (a piece of machined work).
Positive Stop	The tool has contacted a physical limitation and can no longer move.
RC	Radially Compliant.
Rear Housing	Rear cover to the main housing. This body includes a connection port for the compliance air supply.
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.
Tool Stand	Storage location for tools while not in use.

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

Prior to purchase, installation, and operation of the CDB, the customer should first read and understand the operating procedures and information described in this manual. Never use the CDB tool for any purposes, or in any ways, 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

WARNING: Never operate the CDB tool without wearing eye protection. Flying debris can cause injury. Always use eye protection while working in the neighborhood of the CDB tool.

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

CAUTION: Never be present near the CDB tool while it is in operation. Flying debris can cause injury. If it is necessary to approach the CDB tool while in motion, stand behind appropriate clear guards or similar windows. Provide a barrier to prohibit people from approaching the CDB tool.

CAUTION: Do not perform maintenance or repair on the CDB tool 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 CDB tool.

2. Product Overview

The Compliant Deburring Blade (CDB) is especially suited for removal of parting lines and flash from parts. The CDB's Auto Tool Changer (ATC) allows it to be used in a wide variety of applications without human interaction.

The CDB's pneumatically controlled, articulated compliance allows the blade to follow the part profile and compensate for surface irregularities while maintaining a constant force. As a result, high feed rates with uniform quality in any orientation is achievable. The tool requires no oil.

When the customer supplies air pressure to the compliance air fitting, the tool activates a compliance feature (or complies) for consistent deburring on irregular part patterns. The CDB utilizes standard industrial blades that allow for adaptation to changing assembly lines and part requirements.

Axially mount the CDB tool to the customer robot. The customer can mount the tapered flange of the CDB to an interface plate that adapts to a robot. The customer can purchase custom interface plates from ATI (refer to *Section 3.5—Axial Mounting Installation* and *https://www.ati-ia.com/Products/deburr/deburring_cdb_main.aspx* for more information)

The CDB can be manually locked to single axis compliance using the single axis lockout (refer to *Section 4.6—Locking and Unlocking Single Axis Compliance* for more information)

Figure 2.1—CDB Tool

2.1 ATC Collet System

The ATC's pneumatically controlled collet system allows the tool holder to be locked and unlocked to the CDB without human interaction, once a program is in place. The ATC's pneumatically controlled tool stand allows the tool holder to be locked and unlocked to the storage location As a result, faster tool changeovers are achievable. The ATC requires no oil.

2.2 Tool Stand

A tool stand is a pneumatic controlled locking and unlocking storage location for tool holders.

Figure 2.2—Tool Stand

2.3 Technical Description

The technical overview of the product is in the following tables and graphs. For additional technical specifications, refer to *Section 8—Specifications*.

2.3.1 Environmental Limitations

2.3.1.1 Operation

Table 2.1—Operation	
Installation position	Mounted to robot by means of the axial mounting flange. Refer to *Section 3.5—Axial Mounting Installation*. The flange is specific to each type of robot. This optional flange is normally supplied by ATI in a blank form suitable for customer modification.
	Mounted to a table or stand by means of the bench adapter (the robot is carrying the work piece).
Utilities	The tool requires the following: • Clean, dry, filtered, non-lubricated air. • A coalescing filter and filter elements rated 5 micron or better. • The compliance (centering) air must be supplied from a regulated source between 1-4.1 bar (15-60 psi). • The lock/unlock air must be supplied from a regulated source of 4.1 bar (60 psi). The lock/unlock air must be supplied from a regulated source of 4.1 bar (60 psi). Tubing should be semi-rigid polyethylene material (80R durometer). Soft rubber tubing will not secure in push to connect fitting.

2.3.1.2 Storage

Table 2.2—Storage	
Conditions	Store the tool in its case and in a dry place. When not in use, keep the unit in its case if possible. Consult *Section 3.4—Storage and Preventive Maintenance during Storage* of this manual.

2.3.2 Compliance Unit Performance

The graphs in *Figure 2.3* and *Figure 2.4* illustrates the variation of compliance force with applied air pressure in the vertical orientation with the collet pointed toward the ground. Measurements may vary from one product to another and should only be treated as nominal.

The actual force characteristics depend on mounting orientation and condition of the unit. Compliance pressure is also dependent upon the material of the work piece, type of blade tool, and the amount of material that is removed.

Figure 2.3—Radial Compliance Force (Measured at the Collet)

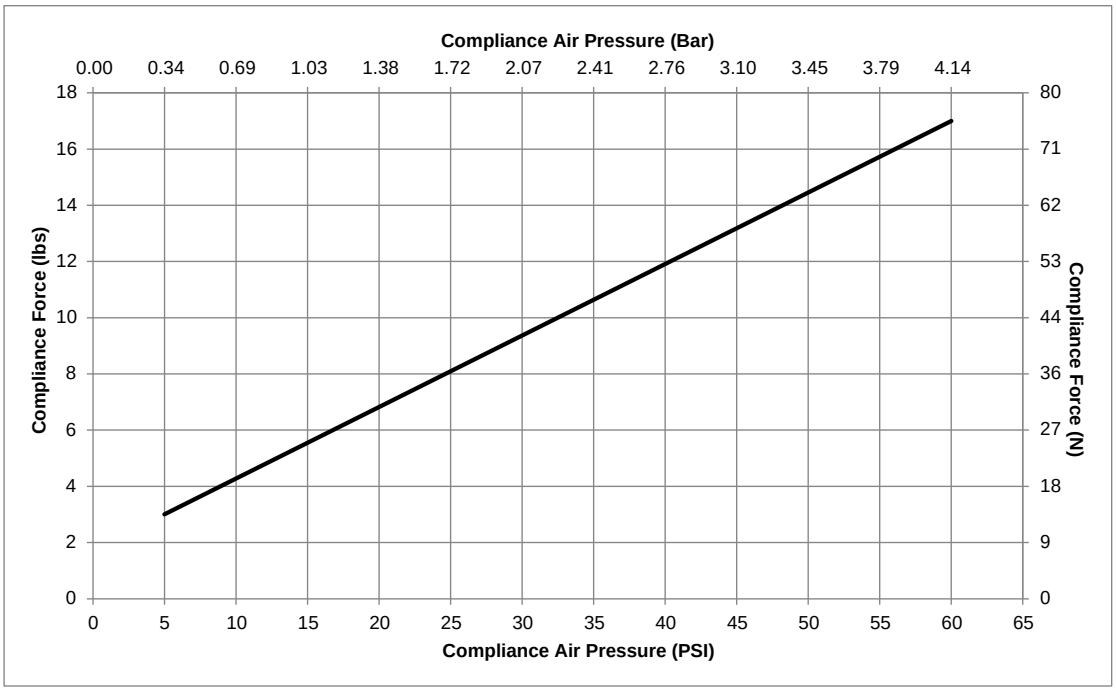


Figure 2.4—Axial Compliance Force (Measured at the Tool Tip)

3. Installation of the Compliance Device

The CDB tool is delivered fully assembled. Optional equipment such as mounting plates and additional customer supplied tool holders are separate.

3.1 Transportation and Protection during Transportation

The CDB tool is packaged in a case designed to secure and protect it during transportation. Always use the case when transporting the CDB tool 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 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. If necessary, notify ATI for assistance in evaluation of the product condition.

3.3 Unpacking and Handling

The CDB tool should always be placed inside the accompanying case during transportation, storing and handling.

Pneumatic lines are attached, bundled, and must be strain-relieved in a manner that allows for freedom of movement during operation.

3.4 Storage and Preventive Maintenance during Storage

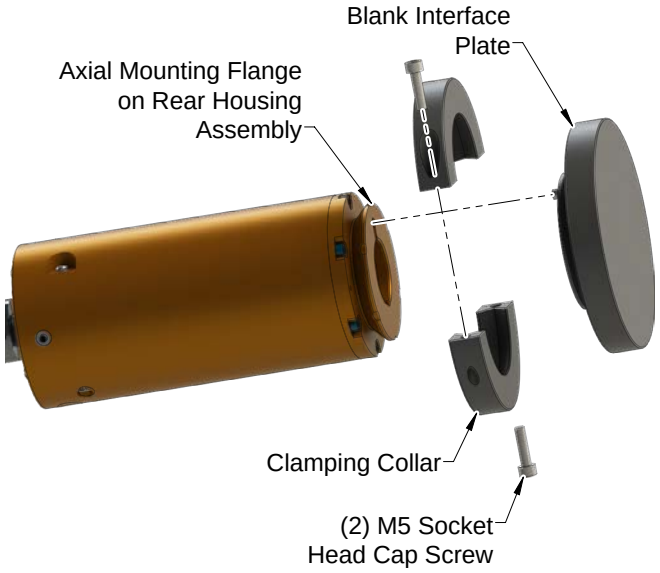
Store the CDB tool in its case when it is not in use. The CDB tool should also be stored in a dry place.

For long-term storage, the CDB tool should be thoroughly cleaned of any burrs or debris. It should not be disassembled. Place the CDB tool inside a sealed, plastic bag inside the case.

3.5 Axial Mounting Installation

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

Figure 3.1—Axial Installation



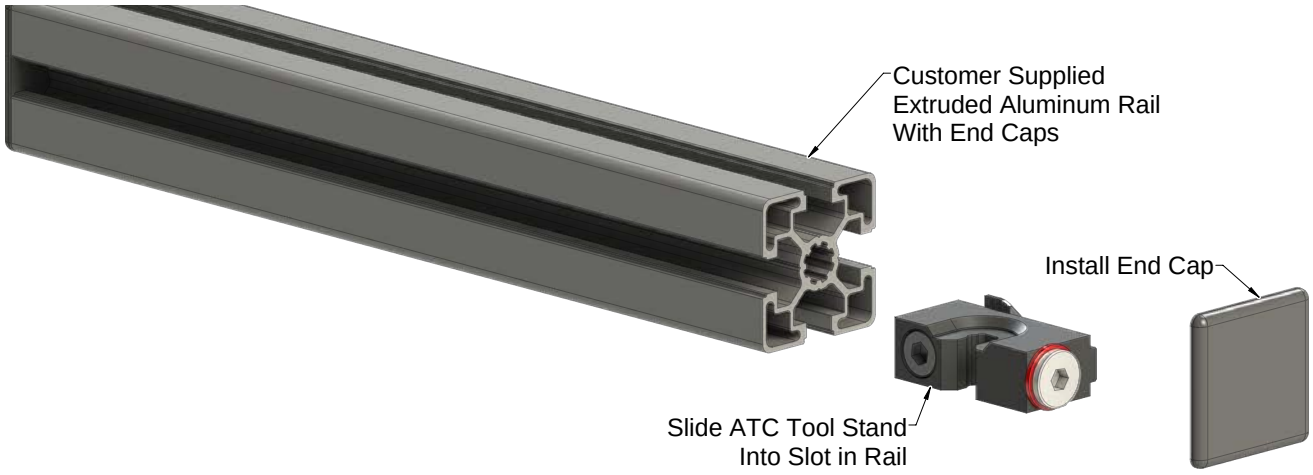
3.6 ATC Tool Stand Installation

A tool stand is designed to attach to a customer supplied extruded aluminum rail.

Tools required: *6 mm hex key*

1. Install the ATC tool stand system:
   a. Remove the end cap from the customer supplied extruded aluminum rail.
   b. Slide the ATC tool stand into the slot on the rail.
   c. Using a 6 mm hex key, tighten the M8 socket head cap screw in the ATC tool stand to 89 in-lbs (10 Nm).
   d. Install end cap onto the customer supplied extruded aluminum rail.
   e. Install the (2) 3 mm push-to-connect air lines to the ATC tool stand.

Figure 3.2—Axial Installation



3.7 Pneumatics

Connect the air lines as shown in *Section 9.1—9630-50-CDB-PNEUMATIC*.

> **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 equipment.

The air supply should be dry, filtered, and free of oil. A coalescing filter (ATI Part # 9005-50-6160 or equivalent) with elements rated for 5 micron or better is required.

A self-relieving regulator (ATI Part # 9005-50-6164, or equivalent) is used to supply the compliance (centering) mechanism. This pressure corresponds to the side force on the blade. Because very little air flow is required for the compliance mechanism, a smaller valve can be used (consult the valve and regulator supplier's literature when selecting these components).

Solenoid valves are actuated from the robot or program logic controller by means of a digital output signal. The lock/unlock for the tool stand must a regulated air supply pressure of 4.1 bar [60 psi].

Tubing for compliance should be semi-rigid polyethylene material (80R durometer). Soft rubber tubing will not secure easily in the push-to-connect fitting.

The compliance force, air supply pressure regulator should have a 1-4.1 bar [15–60 psi] range. When testing for the proper contact force, start with about 1 bar [15 psi] of pressure and increase the pressure slowly until the desired cut is achieved.

4. Operation

For assistance in programming, starting up, and complete a robotic deburring cell containing a CDB tool refer to the following section: The system integrator should be familiar with the task of deburring and have extensive knowledge about automation applications that incorporate robots.

DANGER: Never use the CDB tool for purposes other than robotic deburring. If used in any other way, serious injury or damage to equipment may occur.

WARNING: All personnel, who are involved in operation of the CDB tool, 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 CDB tool.

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

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

CAUTION: Never be present near the CDB tool while it is in operation. Flying debris can cause injury. If it is necessary to approach the CDB tool while in motion, stand behind appropriate protective windows. Provide a barrier to prohibit people from approaching the CDB tool.

CAUTION: Never use the CDB tool for any purposes, or in any ways, not explicitly described in this document. Using the CDB tool without fully understanding the installation and operating procedures may cause injury to personnel or damage to equipment.

4.1 Working Environment

The CDB tool should only be used in conjunction with a robot in a secured work cell/chamber.

The work cell must be secured by barriers to prohibit personnel from entering the cell. A lockable door should be included as a part of the barrier in order to facilitate access to the cell for authorized personnel only. The barrier could consist partly or fully of clear guards or similar to facilitate observation of the deburring operations.

During system or CDB tool maintenance, make sure the CDB tool and robot are stopped before entering the robot cell. When installing and testing, never be present in the cell when the CDB tool is in operation.

4.2 Normal Operation

The following sections describe the normal operating conditions for CDB.

4.2.1 Air Quality

The air supply should be dry, filtered, and free of oil. A coalescing filter with elements rated for 5 micron or better is required. The air must be supplied to the ATC collet at between 1-4.1 bar (15-60 psi) and to the ATC tool stand at 4.1 bar (60 psi).

Particulate can block airflow or impede compliance motion. If deburring tools do not receive proper air pressure, tool may not re-center properly. Any water in the system damages the housing and blades.

4.2.2 No Lubrication

The compliance device cannot have any oil in the air supply. Oil can clog compliance device and limit compliance range.

4.2.3 Blade Selection and Maintenance

CDB accepts industry standard, off the shelf hand deburring blades. As blades near end of their service life, surface finish may degrade, necessitating change of blade.

Radially loaded blades and scraper tools as well as axially loaded countersink tools are acceptable.

Always ensure the ball detent and locking divots on tool holder shaft are aligned radially and that the ball is securely seated in the divot. Unsecured blades can cause the shaft to slip, creating hazards for operators and quality.

4.2.4 Deburring Tool Approach Path Should be Slow and at an Angle

The deburring tool should approach the workpiece slowly and at an angle, with ample room for pivoting blade to reorient before beginning each pass.

When beginning a deburring pass, try to minimize the initial impact on the work piece by slowly approaching the tool at an angle while maintaining a parallel path with the surface.

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

When using pivoting blades, approach from a distance and angle for the blade to catch on the workpiece edge. Program the robot accurately when the contact holes are geometrically equal to or less than the tool’s pivot radius.

Note: some tools are directionally dependent. Before use, always verify the intended direction of blade operation.

4.2.5 Single Axis Loading

While using single axis lockout, do not apply radial loads that are perpendicular to the axis of pivot. Always keep the tool pivoting perpendicular to the deburring surface. Loading the tool along the pivot axis will damage the pivot pins and cause premature failure.

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 edge deviates from the perfect path, the bur 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 and hit the positive stop.

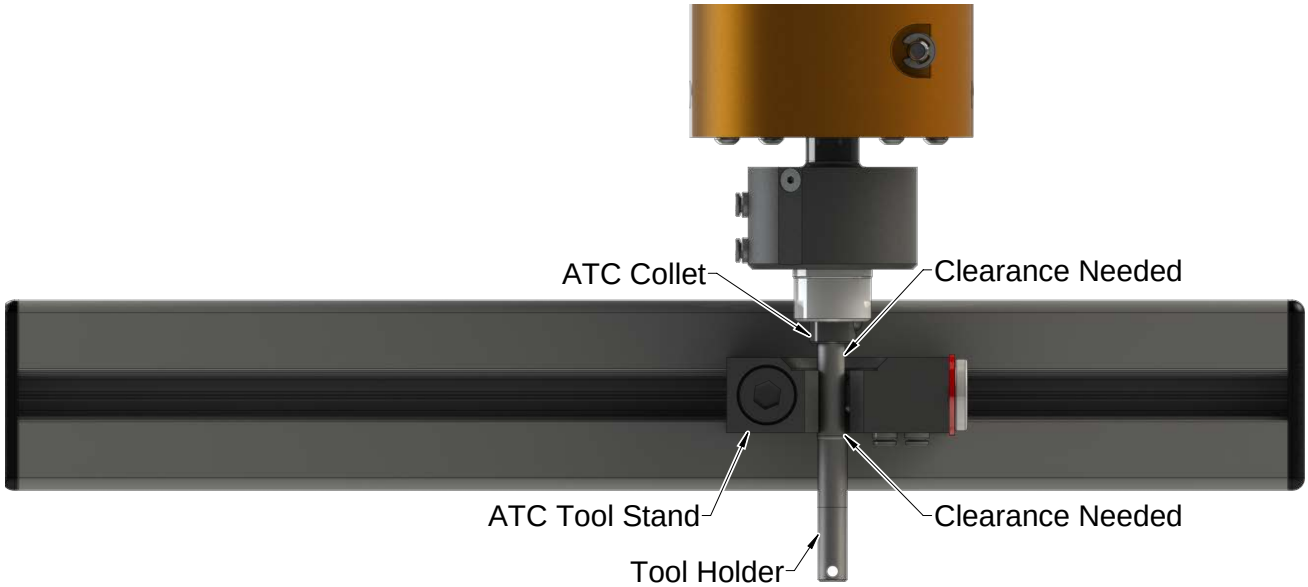
Repeated impacts on the positive stop create slop in the compliance and reduce recentering repeatability.

4.3 Programming for ATC Tool Stand

The tool stand component of the ATC system uses divots in the tool holder shaft for securing the tool to the tool stand. Due to this the tool holder has to extend further out of the ATC collet. The robot program must accommodate for this clearance between the tool stand and collet.

When adding additional ATC tool stands, a minimum of 25 mm (1”) is required between tool stands. Refer to *https://www.ati-ia.com/Products/deburr/deburring_cdb_main.aspx*

Figure 4.1—Programming



NOTICE: The customer must have familiarity with how to actuate each ATC station in order to manually place each blade. If plant regulations require all pressurized air is released prior to operator’s entrance into a robot cell, the ATC station can be used in conjunction with a swivel table to rotate ATC stations out of the cell. This ensures that the operators remain in a safe environment while the station is energized. If ATCs are maintained within the robot cell, operators must be able to control them through a 4-way valve or solenoid, so that the ATC can actuate open, the blade(s) can be replaced, and the ATC is actuated closed. Air lines will need to have check valves installed to ensure the ATC station remains locked, if customer supplied air pressure is lost.

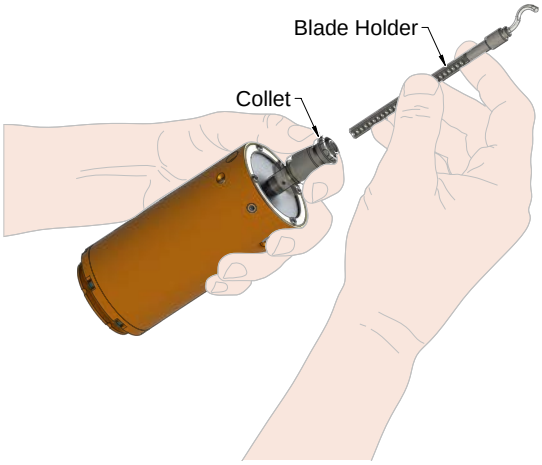
1. Always use personal protective equipment (PPE) when in robot cell.
2. Use teach mode on the robot pendant to safely manipulate the robot while inside the cell.
3. Manually actuate air to unlock the ATC station.
4. Manually place the blade holder inside the ATC collet and hold it at the desired depth such that there are at least 3 divots available for the ATC tool stand to grip. This blade holder height should allow the user to access and deburr all necessary features.
5. Lock the CDB ATC tool changer.
6. Manually unlock air at ATC station 1 tool stand.
7. Place additional cutting media holder in ATC tool stand.
8. Manually actuate air to lock the ATC station.
9. Repeat steps 5-8 for each additional ATC station in robot cell, maintaining one empty ATC tool stand station for the blade holder currently in use by the robot.
10. Exit the robot cell.
11. Follow standard power up procedure.

4.4 Installing the Customer Supplied Blade Holder in the Manual Collet

The customer supplied blade holder can be adjusted and locked at various heights in the compliance device.

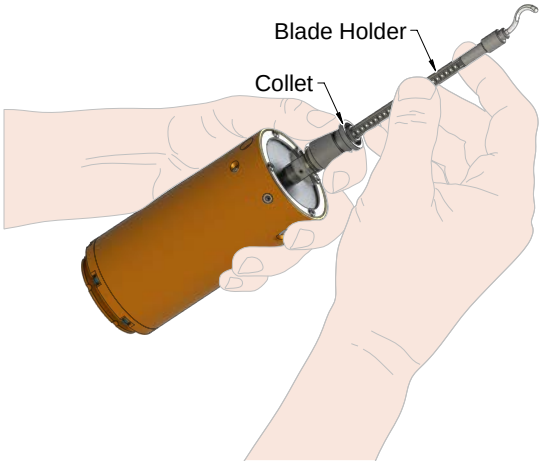
1. Securely grasp the blade holder.
2. Pull the collet toward the compliance device.
3. Insert the blade holder into the compliance device.

Figure 4.2—Installing the Customer Supplied Blade Holder



4. Adjust the blade holder to the desired height, confirm divots and ball lock are aligned.

Figure 4.3—Release the Collet



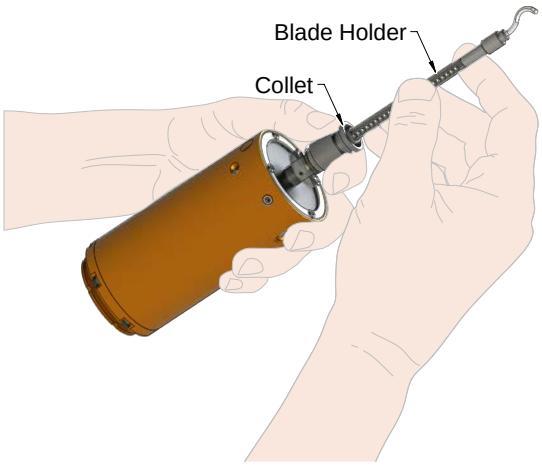
5. Release the collet.
6. Check that the blade holder is securely locked in place.

4.5 Removing the Customer Supplied Blade Holder in the Manual Collet

The customer supplied blade holder can be adjusted and locked at various heights in the compliance device.

1. Turn off and de-energize all energized circuits (for example: electrical, pneumatic, and hydraulic circuits).
2. Securely grasp the blade holder.
3. Pull the collet toward the compliance device.
4. Pull the blade holder out of the compliance device.

Figure 4.4—Installing the Customer Supplied Blade Holder



5. Release the collet.
6. Check that the blade holder is securely locked in place.
7. Safely resume normal operation.

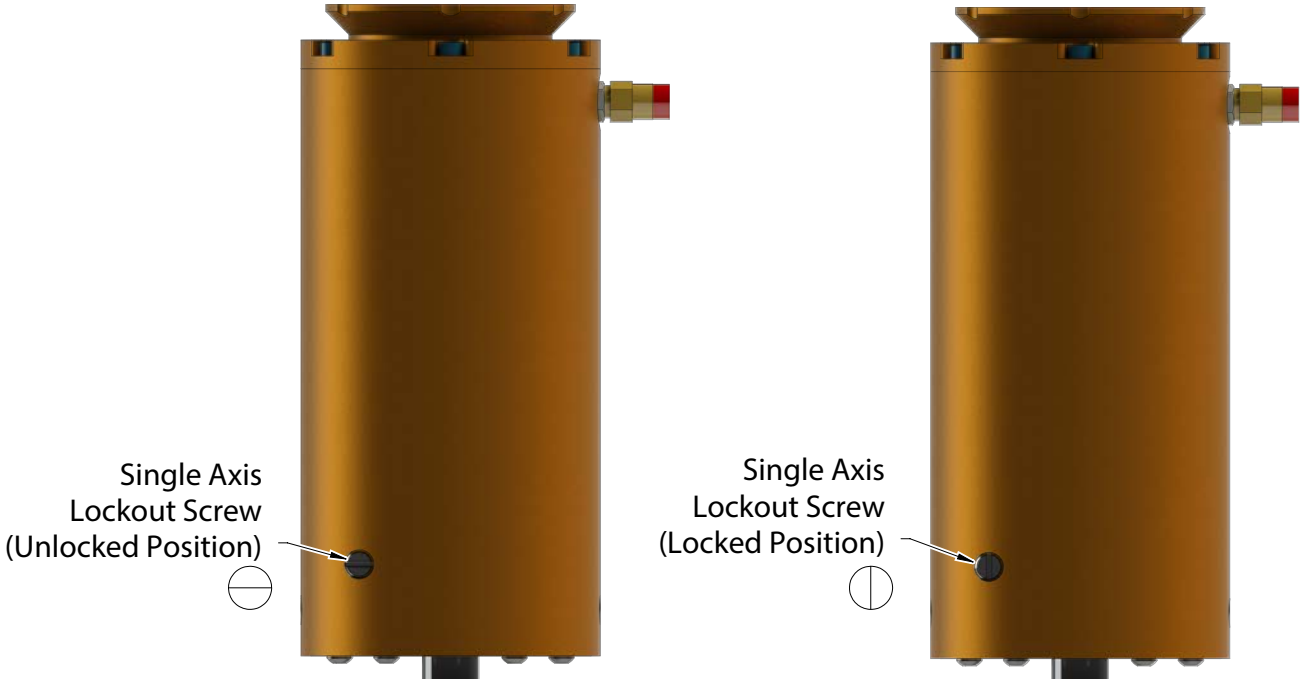
4.6 Locking and Unlocking Single Axis Compliance

The compliance device can be manually locked and unlocked to be compliant in a single axis.

Tools required: *Flat headed screwdriver*

1. Turn the single axis lockout screw as shown in *Figure 4.5* for desired compliance.
   - Locked = Single axis compliance
   - Unlocked = 360° of compliance

Figure 4.5—Single Axis Compliance



5. Preventive Maintenance

The CDB tool is designed to provide reliable service for long periods of operation. 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. *Section 6—Troubleshooting and Service Procedures* is provided to assist the user when they chose to service the unit in the field.

5.1 Pneumatics

The air lines to the CDB tool should routinely be checked for their general condition and replaced as required. The air must be filtered, dry, and non-lubricated. The air filters should be checked and replaced as required to maintain optimum performance. The life of the filter elements is dependent on the quality of compressed air at the customer's facility and therefore cannot be estimated.

5.2 Lubrication

Lubrication systems are not to be used. The CDB tool must be supplied with clean, dry, filtered air. See *Section 3.7—Pneumatics* for details on air supply and quality.

5.3 Blade Inspection

Blade wear depends on cut depth, feed rate, and material being deburred. Inspect the blade regularly for wear and refer to *Section 6—Troubleshooting and Service Procedures* for symptoms of a worn bur.

6. Troubleshooting and Service Procedures

6.1 Troubleshooting

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

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.

Deburring process development is an iterative, learning task. The following table is presented to assist in solving deburring problems.

Table 6.1—Troubleshooting

Symptom	Cause	Resolution
Blade wear	Hard work material	Use better grade blade material add coating
	Too heavy a cut	Decrease width of cut/make multiple passes.
	Feed rate is too slow	Increase feed rate.
Blade breakage	Too heavy a cut	Decrease width of cut/make multiple passes.
	Impacting the part	Decrease feed rate at contact/ enter part at an angle.
	Bottoming out compliance	Offset blade from surface of part to reduce necessary compliance travel
Inconsistent compliance	Pneumatic connections damaged	Contact ATI
	The regulator is defective	Replace the regulator.
Poor finish on work piece	Feed rate incorrect	Adjust feed rate to improve finish
	Blade is worn	Inspect blade; if worn, replace.
Blade is chattering during cut	The feed rate is too fast	Reduce the feed rate.
	Lack of rigidity	Increase radial compliance pressure.
	Too heavy a cut	Decrease width of cut/make multiple passes.
	Improper blade selection	Choose blade designed for work material.
	Blade is worn	Inspect blade; if worn, replace.
Secondary burrs are created on the work piece after a cut	Incorrect feed rate	Reduce the feed rate.
	Too heavy a cut	Decrease width of cut/make multiple passes.
	Improper blade selection	Choose a blade that is designed for the work material.
	Blade is worn	Inspect blade; if worn, replace.
Piston not actuating	Damaged O-rings	Replace seals
	Debris in air	Filter air
	Debris on piston	Clean piston
Blade not being retained	Debris in retention area	Clean retention areas
	Air leak	Replace seals

6.2 Service Procedures

6.2.1 Replacement of Bit Holders in ATC Tool Stand

NOTICE: The customer must have familiarity with how to actuate each ATC station in order to manually replace each blade. If plant regulations require all pressurized air is released prior to operator's entrance into a robot cell, the ATC station can be used in conjunction with a swivel table to rotate ATC stations out of the cell. This ensures that the operators remain in a safe environment while the station is energized. If ATCs are maintained within the robot cell, operators must be able to control them through a 4-way valve or solenoid, so that the ATC can actuate open, the blade(s) can be replaced, and the ATC is actuated closed. Air lines will need to have check valves installed to ensure the ATC station remains locked, if customer supplied air pressure is lost.

1. Turn off and de-energize all energized circuits (for example: electrical, air, water, etc.) to robot.

Note: Air must continue to be supplied to the ATC during this procedure.

2. Lock out robot and enter robot cell safely.

Note: If you are only changing the blade but not the holder, you don't need to manually actuate air to unlock.

3. Manually actuate air to unlock the ATC station.
4. Taking note of the bit holder's orientation and position in the ATC station, remove bit holder.
5. Replace holder in the orientation and position noted in step 4.
6. Manually actuate air to lock the ATC station.
7. Repeat steps 3-6 for each additional ATC station in robot cell.
8. Exit the robot cell.
9. Follow standard power up procedure.

7. Serviceable Parts

Refer to *https://www.ati-ia.com/Products/deburr/deburring_cdb_main.aspx* for exploded drawings showing the user replaceable components.

Table 7.1—Tool Changer Collet (Sheet 3 of *https://www.ati-ia.com/app_content/Documents/9630-50-CDB-8-11.auto.pdf*)

Item No.	Qty	Part Number	Description
39	1	3700-50-9024	CDB Collet Cam, with Auto Tool Change Interface
40	1	3410-0001502-01	X-Ring, AS568-013, Buna N, 70A Duro
41	1	3410-0001503-01	X-Ring, AS568-018, Buna N, 70A Duro
42	1	3410-0001504-01	X-Ring, AS568-020, Buna N, 70A Duro
45	1	3410-0001505-01	O Ring, 24 mm ID x 1 mm W,Buna N, 70A Duro

Table 7.2—Tool Stand (Sheet 4 of *https://www.ati-ia.com/app_content/Documents/9630-50-CDB-8-11-ATC.auto.pdf*)

Item No.	Qty	Part Number	Description
2	1	3410-0001507-01	O-Ring, 7.5 mm ID x 1 mm W, Buna N, 70A Duro
3	1	3410-0001508-01	O-Ring, 9.5 mm ID x 1 mm W, Buna N, 70A Duro
4	1	3490-0001041-01	1/4 BSPP Plug, Nickel Plated Brass (McM 4860K126)
6	1	3500-1068030-21	M8-1.25 x 30 mm Socket Head Cap Screw, SS
7	1	3505-9968001-21	T-Nut, 10 mm, M8, SS
9	1	3700-50-9026	CDB Tool Holder Piston

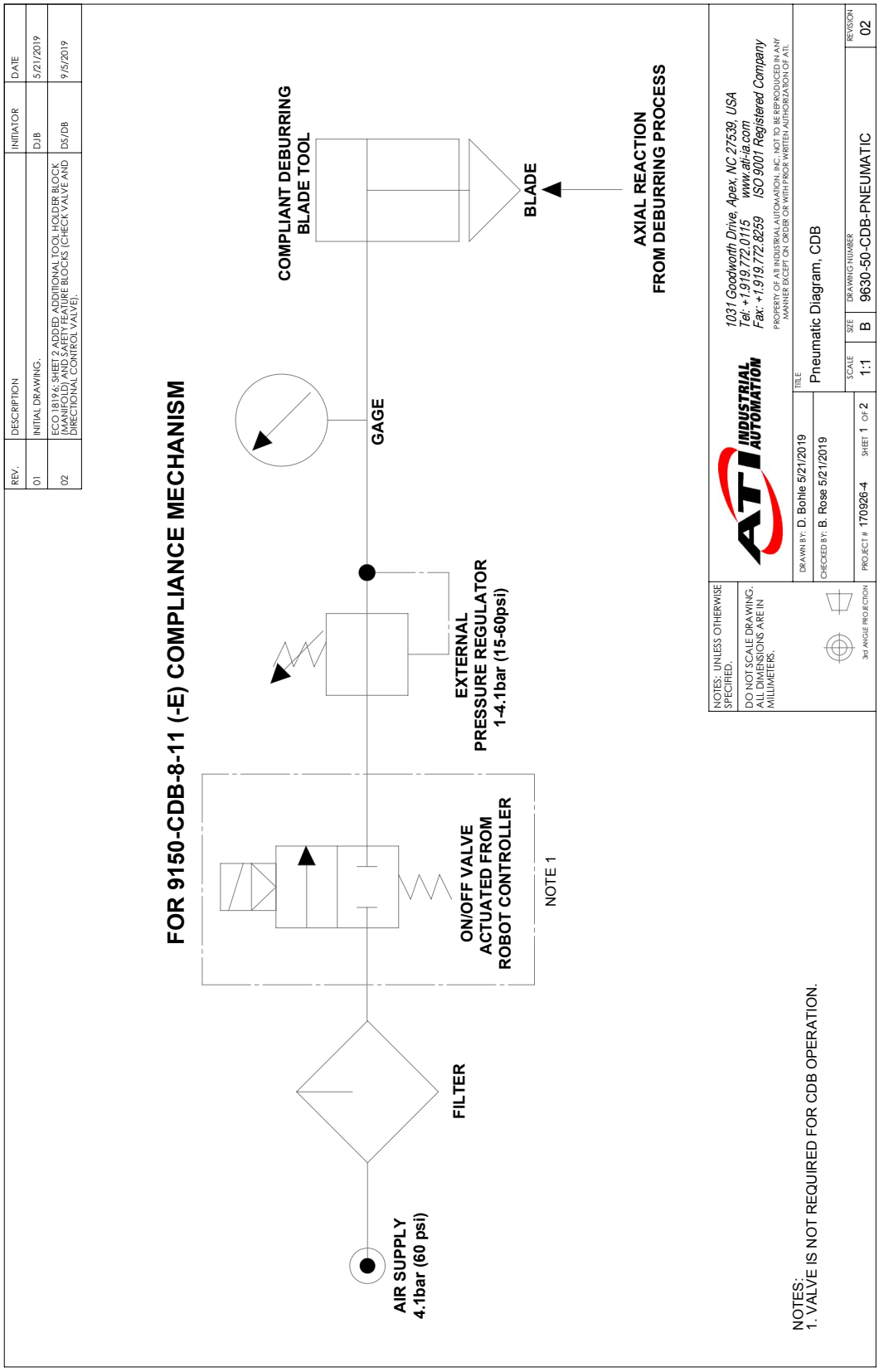
8. Specifications

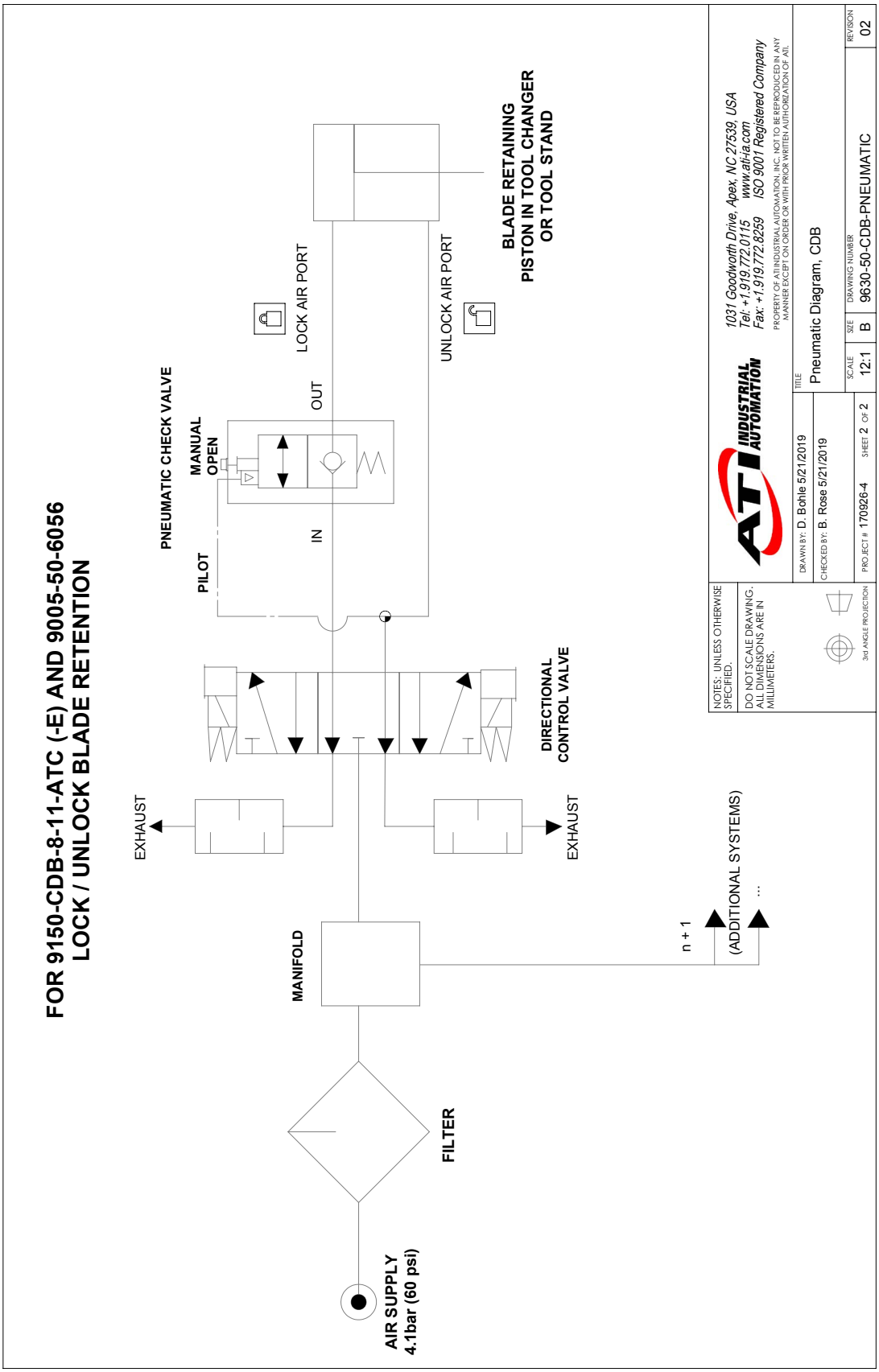
Table 8.1—CDB

Parameter	Rating
Weight (without Adapters): **CDB-8-11-ATC** **CDB-8-11**	 Approx. 2.4 lbs (1.09 kg) Approx. 2.3 lbs (1.04 kg)
Compensation (Radial)	+/- 5.5º
Compensation (Axial)	+/- 0.32 in (8 mm)
Radial Compliance Force (Measured at Collet)	5.7-17 lbf (25-77 N) @ 15-60 psi (1-4.1 Bar)
Axial Compliance Force (Measured at Collet)	3-15 lbf (13-67 N) @ 15-60 psi (1-4.1 Bar)
Blades	Standard Industrial

9. Drawings

9.1 9630-50-CDB-PNEUMATIC




FOR 9150-CDB-8-11-ATC (-E) AND 9005-50-6056
LOCK / UNLOCK BLADE RETENTION
BLADE RETAINING
PISTON IN TOOL CHANGER
OR TOOL STAND
LOCK AIR PORT
UNLOCK AIR PORT
PNEUMATIC CHECK VALVE
MANUAL
OPEN
PILOT
IN
OUT
DIRECTIONAL
CONTROL VALVE
EXHAUST
EXHAUST
MANIFOLD
FILTER
AIR SUPPLY
4.1bar (60 psi)
n + 1
(ADDITIONAL SYSTEMS)
...
NOTES: UNLESS OTHERWISE SPECIFIED.
DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS.
DRAWN BY: D. Bohle 5/21/2019
CHECKED BY: B. Rose 5/21/2019
PROJECT # 170926-4
SHEET 2 OF 2
3rd ANGLE PROJECTION
TITLE
Pneumatic Diagram, CDB
SCALE 12:1
SIZE B
DRAWING NUMBER 9630-50-CDB-PNEUMATIC
REVISION 02
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Fax: +1.919.772.8259 ISO 9001 Registered Company
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INDUSTRIAL AUTOMATION

10. Terms and Conditions

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.