



*The tools of a new generation™*

# USER NOTES FOR ALL UNITS

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**Read Thoroughly Before Use**

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**Read all instructions thoroughly before installation and use.**

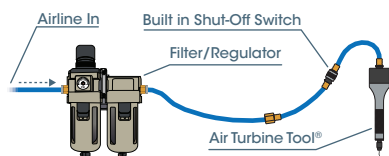
### Initial Installation

Install a new dedicated clean air line from a Filter/Regulator to your Air Turbine Tool® as shown in **Figures 1, 2 and 3**. Filter/Regulators are included with the **Air Turbine Spindles®**, **Air Turbine Live Tools®** and the **700 series of Air Turbine Motors®**. Filter/Regulators are available for an additional purchase.

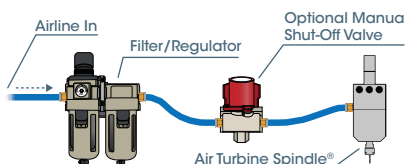
Ensure all air lines and fittings meet the minimum internal diameter specified for your model as specified in **Figure 4**. Additionally, place a plug in any air inlet that is not being used.

If working in a wet environment with the **700 Series of Air Turbine Motors®** or **Air Turbine Live Tools®** install exhaust hoses as shown in **Figure 3**. Internal diameters of exhaust hoses must be no smaller than minimum required ID for your model as shown in **Figure 4**.

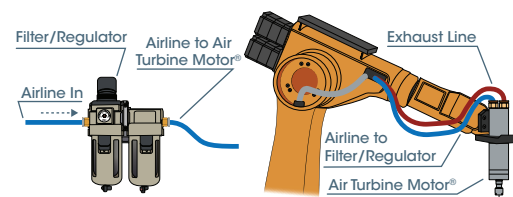
**Optional:** If you purchased or have a manual shut-off valve, install it after the Filter/Regulator as shown in **Figure 2**. Using a manual valve is recommended for Air Turbine Spindles®, Motors® and Live Tools®. Air Turbine Hand Tools already have a manual shut-off switch built into the tool as shown in **Figure 1**.



**Figure 1:** Clean Airline from a Filter/Regulator to an Air Turbine Hand Tool.



**Figure 2:** Clean Airline from a Filter/Regulator to a manual shut-off valve to an Air Turbine Spindle®.



**Figure 3:** Clean Airline from a Filter/Regulator to a mounted Air Turbine Motor® with exhaust hoses installed.

Model			Minimum Required ID	
			Metric	Imperial
› 600X › 601	› 602 › 800LT	› 822CX › 825CX	4mm	5/32"
› 200 › 201	› 0145	› 0190	4.763mm	3/16"
› 720MX › 722MX	› 732MX › 820MX	› 822MX › 730MX	5mm	0.1969"
› 202HD › 725MX › 740MX › 625	› 202 › 206X › 525	› 2590 › 2545 › 825MX	6mm	15/64"
› 625X › 650 › 660 › 450HD	› 460HD › 740XP › 210HD › 525X	› 303RX › 310R › 230DM	8mm	5/16"
› 650X	› 310RX	› 450X	12mm	15/32"

**Figure 4:** Air Turbine Tools® Hose / Fitting / Connector Internal Diameter Specifications.

### Air Hoses and Fittings Requirements

**Avoid fittings, couplings and hoses with a smaller internal diameter than the minimum required for your model.** Any connections smaller than the minimum will restrict air flow and reduce power to your Air Turbine Tool®. You can find the minimum required internal diameter for fittings and hoses for your tool on the table shown in **Figure 4**.

Air flow restrictions (such as air leaks and obstructions) cause under power performance and your cutting tool to drag through the material, damaging the bearings. **Some fittings with nominal internal dimensions may have an Internal Diameter passage that is smaller than stated and restrict air flow and power.** It only takes one fitting with too small an Internal Diameter to reduce air flow and reduce power of your Air Turbine Tool®.

#### General Air Fitting Dimensions

- › **1/4" Male > ID** - Usually 0.210" but some variations occur.
- › **1/4" Male (High Flow, Harbor) ID** - 0.277" with 1/4" NPT male thread.
- › **3/8" Male Hole** - 0.283" to 0.285" with thread of 3/8" - NPT (internal ID of female mating OD appears even smaller ID).
- › **1/2" Male Hole** - 0.375" (0.655" OD).

#### General Hoses

Actual Internal Diameter on brass fittings (i.e. swaged on ends) of standard Goodyear, etc. brands of 1/2" & 3/8" hose have various internal dimensions. As an example, Goodyear 1/2" Red hose with 3/8" / 9.5mm NPT fitting has Internal diameter hole of 0.282", which is sufficient for models that require a minimum ID of 6 mm, but not for models that require a minimum ID of 8mm. Goodyear black 3/8" / 9.5mm hose has Internal Diameter hole on swaged fittings of ~0.265" and is suitable for models requiring a 6 mm ID or smaller.

### Air Requirements

Do not oil or lubricate. Use dry, clean, oil free 90 psi (6.2 Bar) air supply only.

Ensure there is sufficient volume of compressed air flow at **90 PSI / 6.2 Bar** with the specified air flow volume CFM (L/S) for your model to maintain working air consumption. Depending on application, consider peak or stall capacity consumption. Air flow volume increases on demand to keep rotation at the high speed when your tool starts to cut. **Air Pressure and flow volume must therefore be available on demand and remain constant with no drop over time or when cutting.**

Refer to **Figures 8, 9, 10 and 11 on page 37** for the idle CFM / L/S rating V.S working air consumption ratings for all Air Turbine models.

Avoid Pressure below 90 PSI / 6.2 Bar, which causes the tool to be dragged through the material, causing rapid bearing wear and under powered performance. More than 100 PSI / 6.9 bar pressure will burst the turbine power producer.

Air Pressure and flow must remain constant with no drops under cutting load. Insufficient flow will cause the rotation of your tool to slow or stop suddenly, damaging the bearings. If a drop in PSI (Bar) occurs below 90 PSI (6.2 Bar), your compressor may not have enough CFM (L/S) to power the Air Turbine Tool® or there is a flow restriction in the air line.



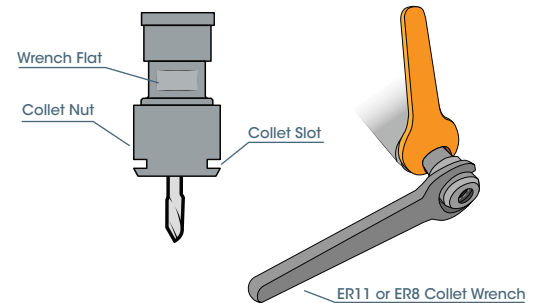
#### WARNING

**Never turn on the main spindle while the Air Turbine Spindle® is loaded.**

### Installation or Removal of Collet and Cutting Tool

Ensure your cutting tool is rated for the rotational speed you are using. **Your tool must be balanced and truly concentric to operate at the high speed of Air Turbine Tools®.** Incorrect tool selection results in unbalanced rotation or overloading, which will result in stress on the bearings and premature failure. The stick-out extension length of the cutting tool from your collet should optimally be no more than 3X the collet capacity.

1. Take the wrench included with your Air Turbine Tool and insert it to the wrench flat of your Air Turbine Tool's shaft.
2. Take the ER11 or ER8 collet wrench included with your Air Turbine Tool and apply it on the collet slot as shown in **Figure 5**. Turn the wrench counterclockwise to release the current cutting tool.
3. After the cutting tool is free, continue to turn the collet nut counterclockwise with the ER11 or ER8 collet wrench to fully remove the collet nut and release the existing collet. Remove the wrench from the shaft.
4. Remove the existing collet from the shaft and replace it with the new collet. Re-apply the collet nut by turning it clockwise on the shaft, use **Figure 6 to determine the tightening torque (ft-lbs) needed for your collet.**
5. Insert the new cutting tool by sliding it into the shaft of your Air Turbine Tool. Ensure that the new cutting tool goes completely through the collet as shown in **Figure 7**.
6. Re-insert the wrench onto the wrench flat of your Air Turbine Tool's shaft, and turn the collet nut by hand clockwise until its snug. **Do not over tighten the collet-nut**, refer to **Figure 6** for the tightening torque needed for your collet.
7. Insert the collet wrench into the collet nut and turn it clockwise as shown in **Figure 5** to ensure the new collet and cutting tool is snug.

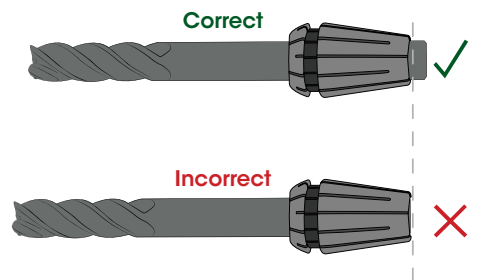


**Figure 5:** Correct insertion of both the wrench and the ER11 or ER8 collet wrench to remove or secure the collet nut.



#### WARNING

**Never tap the collet nut with the wrench.**



**Figure 7:** A comparison showing the correct and incorrect way to insert the cutting tool into the collet. **Ensure that the cutting tool goes completely through the collet.**

Collet Type	Collet Size	ft-lbs	Torco-Fix
ER8 MB	Ø 0.0078" (0.2mm) - 0.035" (0.9mm)	4	Micro
ER8	Ø 0.039" (1.0mm) - 0.196" (5.0mm)	4	Micro
ER11 MB	Ø 0.0078" (0.2mm) - 0.035" (0.9mm)	6	Micro, S
ER11	Ø 0.039" (1.0mm) - 0.098" (2.9mm)	7	Micro, S
	Ø 0.118" (3.0mm) - 0.256" (7.0mm)	7	Micro, S

**Figure 6:** Rego-Fix recommended tightening torque (ft-lbs) for collet nuts.

### Idle CFM / L/S Rating V.S Working Air Consumption Ratings

Air Turbine Tools® consume more air as the cutting load or the amount of material removed increases. This is normal operation of our patented governor which maintains high speed on your tool path and makes Air Turbine Tools® efficient in air consumption.

Air Turbine Live Tools® Idle CFM (L/S) and Working Air Consumption Ratings			
Model	Speed RPM	Air Consumption Idle CFM (L/S)	Air Consumption Working Flow (L/S)
800LT, 822CX, 825CX,	60,000	3.5	5
	80,000		
820MX, 822MX	50,000	4 (1.88)	6 (2.83) - 9 (4.24)
	65,000		
825MX	40,000	5 (2.36)	7 (3.30) - 10 (4.72)
	50,000	6 (2.83)	

**Figure 8:** Air Turbine Live Tools® idle CFM (L/S) and working air consumption ratings.

Air Turbine Tools® Idle CFM (L/S) and Working Air Consumption Ratings			
Model	Speed RPM	Air Consumption Idle CFM (L/S)	Air Consumption Working Flow (L/S)
0145SSV, 0190SSV	40,000	3.2 (1.51)	4.7 (2.22) - 7 (3.30)
	50,000	4 (1.89)	
	65,000	4 (1.59)	
200SV	50,000	4 (1.88)	6 (2.83) - 9 (4.24)
201	40,000	3 (1.51)	4.8 (2.22) - 7 (3.30)
	50,000	4 (1.88)	
	65,000		
	90,000	5 (2.36)	
202	30,000	10 (4.72)	11 (5.19) - 20 (9.44)
	40,000	13 (6.14)	
	50,000	14 (6.61)	
	65,000		
2545, 2590	30,000	10 (4.72)	11 (5.19) - 20 (9.44)
	40,000	13 (6.14)	
206X	40,000	6 (2.83)	7 (3.30) - 10 (4.27)
	50,000		
525	30,000	12 (5.66)	12 (5.66) - 20 (9.27)
	40,000	16 (7.55)	
525X, 303RX	30,000	19 (8.97)	22 (10.38) - 30 (14.16)
	40,000	20 (9.44)	
230DM	25,000	13 (6.14)	15 (7.08) - 35 (16.52)
	30,000	14 (6.61)	
	40,000		
310R	25,000	13 (6.14)	15 (7.08) - 35 (16.52)
	30,000	14 (6.61)	
	40,000		
310RX	25,000	16 (7.55)	19 (8.97) - 40 (18.89)
	30,000	20 (9.43)	
	40,000	30 (14.15)	

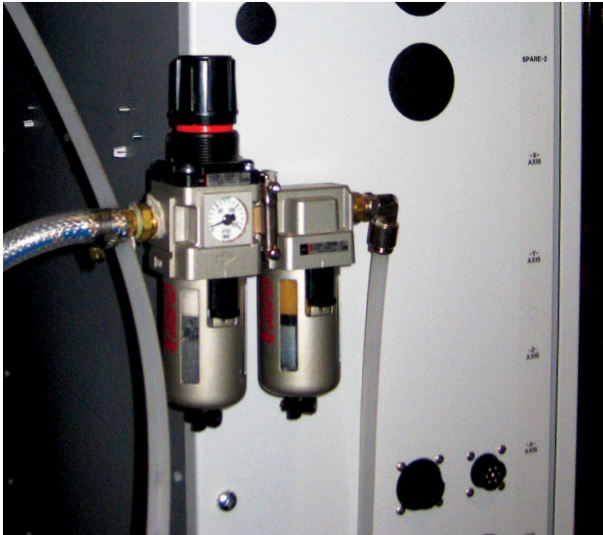
**Figure 10:** Idle CFM (L/S) and working air consumption ratings for Air Turbine Hand Tools.

Air Turbine Motors® Idle CFM (L/S) and Working Air Consumption Ratings			
Model	Speed RPM	Air Consumption Idle CFM (L/S)	Air Consumption Working Flow (L/S)
720MX, 722MX, 730MX, 732MX	50,000	4 (1.88)	6 (2.83) - 9 (4.24)
	65,000		
725MX	40,000	5 (2.36)	7 (3.30) - 10 (4.72)
	50,000	6 (2.83)	
740MX	40,000	5 (2.63)	7 (3.30) - 10 (4.72)
	50,000	6 (2.83)	
	65,000		
202HD	30,000	10 (4.7)	11 (5.19) - 20 (9.4)
	40,000	13 (6.1)	
	50,000	14 (6.6)	
	65,000		
210HD	30,000	14 (6.6)	14 (6.61) - 35 (16.52)
	40,000		
450HD	25,000	13 (6.1)	14 (6.61) - 35 (16.52)
	30,000	14 (6.6)	
	40,000		
740XP	30,000	16 (7.55)	17 (8.02) - 45 (21.2)
	40,000	20 (9.44)	
	50,000		
450XHD	25,000	14 (6.6)	19 (8.97) - 40 (18.89)
	30,000	20 (9.43)	
	40,000	23 (10.85)	
	40,000		
460HD	50,000	20 (9.43)	20 (9.43) - 35 (16.52)

**Figure 9:** Idle CFM (L/S) and working air consumption ratings for Air Turbine Motors®

Air Turbine Spindles® Idle CFM (L/S) and Working Air Consumption Ratings			
Model	Speed RPM	Air Consumption Idle CFM (L/S)	Air Consumption Working Flow (L/S)
600X	65,000	3.5 (1.65)	5 (2.35)
	80,000		
601, 602	40,000	4.5 (2.1)	5 (2.36) - 6 (3.30)
	50,000		
	65,000		
	90,000	5 (2.4)	
625	30,000	12 (5.66)	11 (5.2) - 20 (9.43)
	40,000	16 (7.55)	
	50,000		
	65,000	20 (9.43)	
625X	30,000	19 (8.97)	22 (10.38) - 30 (14.16)
	40,000	20 (9.43)	
	50,000		
625XVS	30,000 - 50,000	10.5 (4.9) - 20 (9.43)	11 (5.2) - 30 (14.16)
650	25,000	13 (6.1)	14 (6.60) - 35 (16.5)
	30,000	14 (6.6)	
	40,000		
650X	25,000	14 (6.6)	19 (8.97) - 40 (18.89)
	30,000	20 (9.43)	
	40,000	23 (10.85)	
650XVS	25,000 - 40,000	11 (5.2) - 23 (10.85)	14 (6.60) - 40 (18.89)
660	50,000	20 (9.43)	20 (9.43) - 35 (16.52)

**Figure 11:** Idle CFM (L/S) and working air consumption ratings for Air Turbine Spindles®



### Maintenance

**Your Air Turbine Tool® must be run at least 10 minutes every 30 days from manufacture date to maintain optimal performance. Run at least 10 minutes before initial use.**

The airline must be impeccably clean with no coupling or hose smaller than the minimum internal diameter required for your model as described in **Figure 4 on page 1** so that air flow volume is unrestricted. Purge the airline of contamination before each use.

A 0.3 micron filter extractor regulator combination is a necessary accessory for Air Turbine Tools® to eliminate impurities in your air supply. Contamination will damage your turbine components and require repair.

Filters are included with all **Air Turbine Spindles®**, all **Air Turbine Live Tools®** and the **700 Series of Air Turbine Motors®**. Replacement elements are available in the Accessories section on our website.

**Filter elements need to be changed and extractor drained in regular maintenance cycles.**

### Operation

**Purge the line of contamination and run at least 10 minutes before initial use to ensure the bearing lubrication does not solidify.**

Always monitor Air Pressure Gage during operation of your Air Turbine Tool®. The key to successful high-speed machining and optimized tool performance is to program light passes at very high feed rates. Start with a light pass observing surface finish quality and gradually step down or increase your rate of advance for optimal cutting conditions. Do not try to cut too aggressively. You will overload your turbine causing your cutting tool to stall or drag in the material. Dragging your tool or a sudden stop will cause stress to the bearings and causing premature failure.

The **700 series of Air Turbine Motors®** and all **Air Turbine Live Tools®** are sealed for wet environments. In a wet environment, turn on the air supply to your **Air Turbine Motor®** or **Air Turbine Live Tool®** **before** you turn on the coolant flow. **At the end of the cycle turn the coolant off first.** Only after the coolant flow is off, **then** you can turn off the air flow to your tool.

### Programming your Air Turbine Spindle®

Apart from a few instances, **Air Turbine Spindles®** will run your normal CAM programs. All you need to do is remove the Spindle RPM command (S3000) and the Rotation direction command (M3 or M4). At high speed a small concentric speed rated cutting tool should be used with a fast advance using shallow depths of cut. This layering programming technique produces clean cutting action and optimizes tool performance and life.

#### Spindle Commands

Gradually increase depth of cut to establish optimal cutting conditions. Use M05 on Fanuc type controls to ensure main spindle is turned off. **Always ensure main spindle is programmed not to rotate (S0/M05).**

#### Canned Cycles

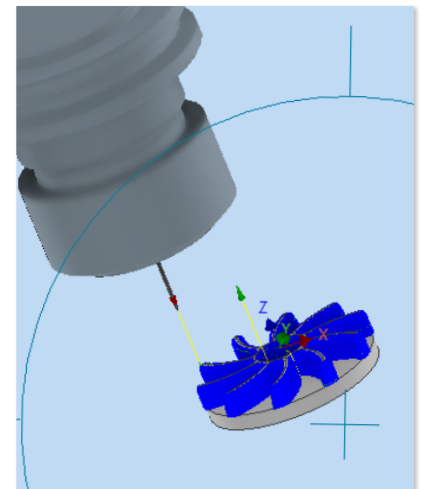
Beware that on CNC controls the G81, G82, G83 (peck drilling) commands will turn on the machine spindle, even with M05 (spindle stop). In most drilling applications you will not need to peck thanks to the high-speed of your **Air Turbine Spindle®**. There are several alternative solutions: Some CAM programs will allow you to program to drill without a canned cycle or you could program the path long hand or you can use macros.

#### Dry Run, Graphic Run

Always run the CNC machine program in Graphics and/or in a slow dry run to verify that the CNC spindle does not turn on and that you have no obstruction.

#### Disable CNC Main Spindle RPM

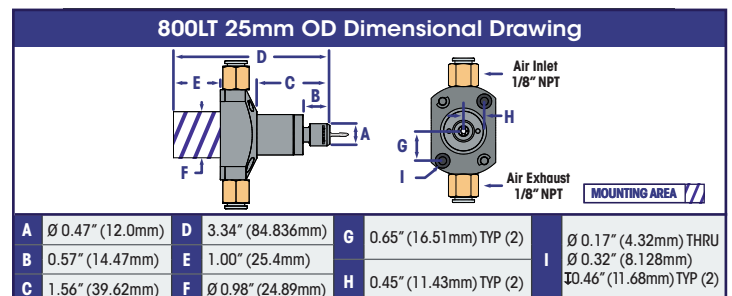
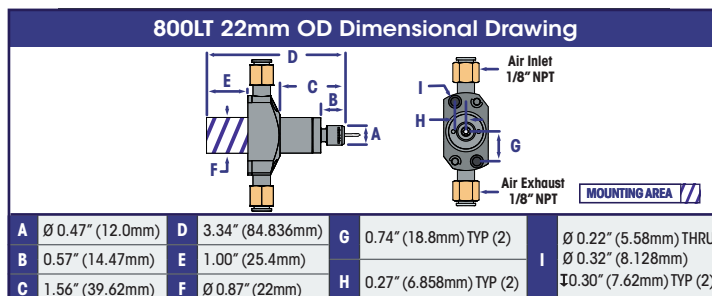
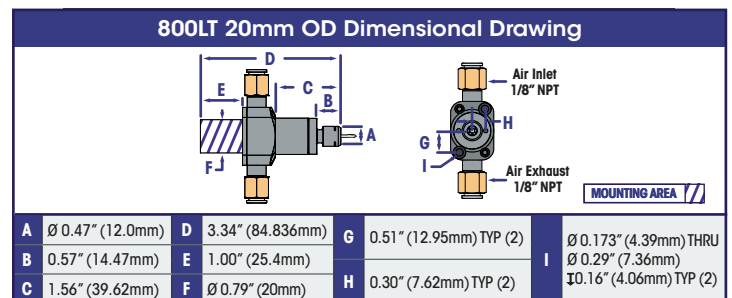
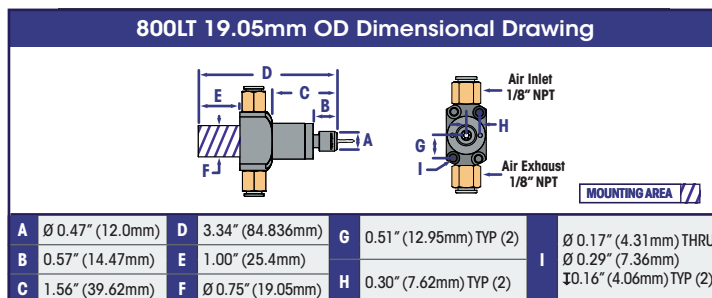
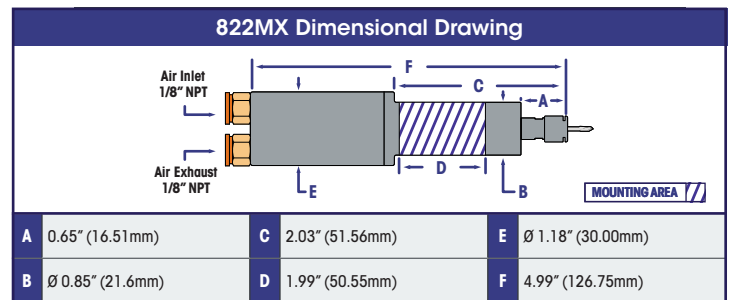
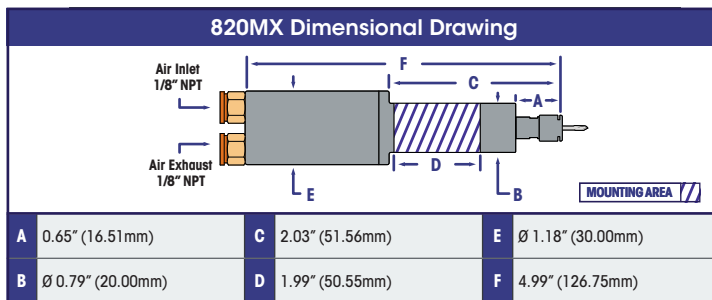
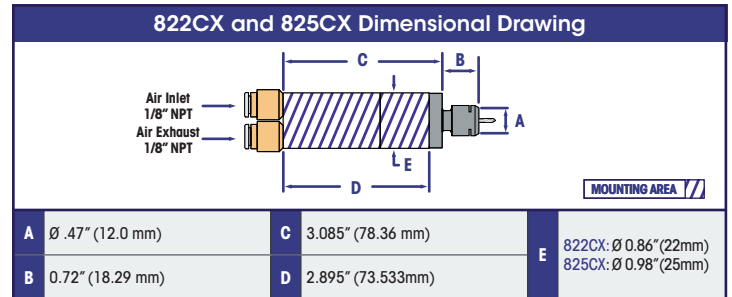
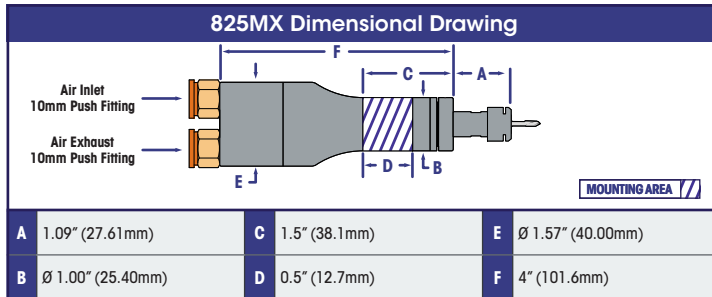
Program your CNC machine control to allow for normal operation without spindle rotation.





### Mounting Air Turbine Live Tools® into your Lathe

It is important that your fixture is not clamped over the bearings. Incorrect positioning or over tightening of the clamp on your **Air Turbine Live Tool's®** steel barrel **results in pressure on the bearings causing premature failure.** To avoid this error in installation refer to the tables in **Figure 12.**



**Figure 12:** Tables that show the proper mounting area and dimensions for mounting Air Turbine Live Tools®

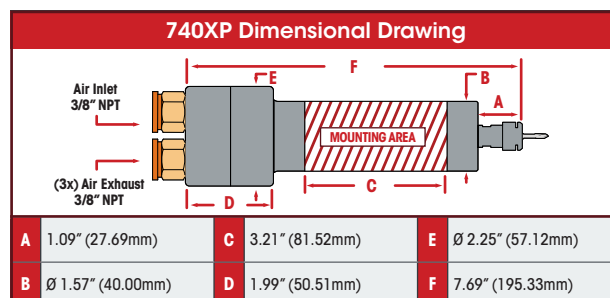
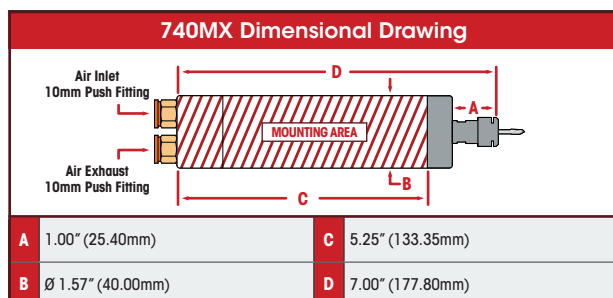
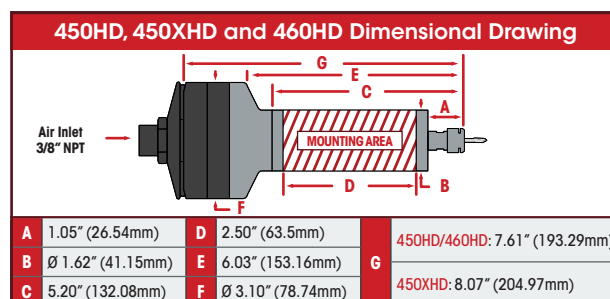
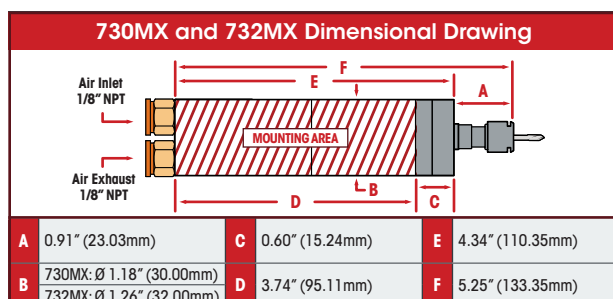
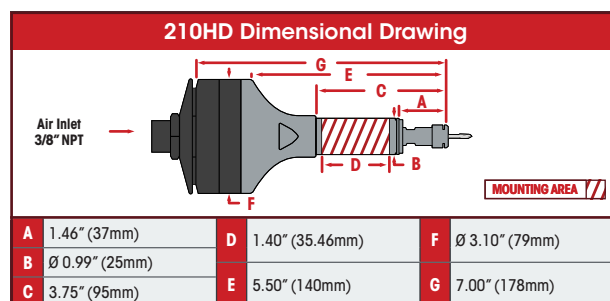
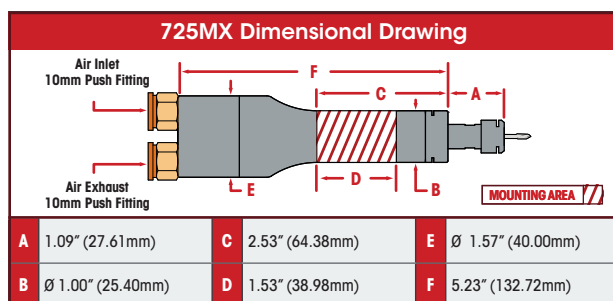
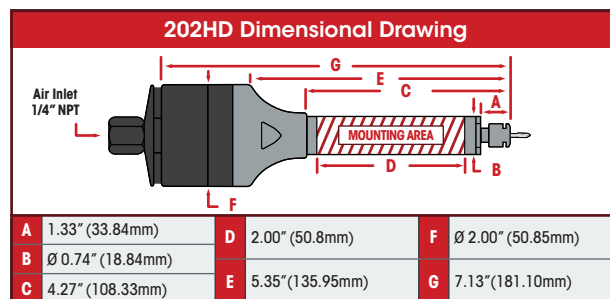
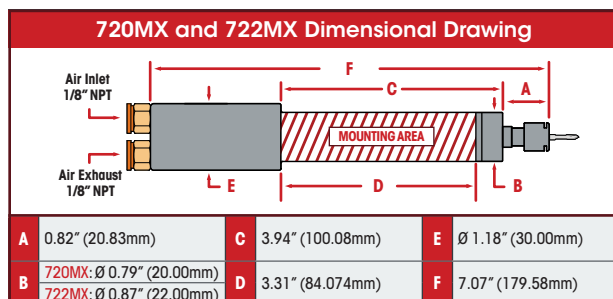


#### WARNING

Do not oil or lubricate.  
Use dry, clean, oil-free 90 psi (6.2 Bar) air supply only.

### Mounting Air Turbine Motors® into your Lathe or Robot

It is very important your fixture is not clamped over the bearings. Incorrect positioning or over tightening of the clamp on your **Air Turbine Motors®** steel barrel **results in pressure on the bearings causing premature failure**. To avoid this error in installation refer to the tables in **Figure 13**.



**Figure 13:** Tables that show the proper mounting area and dimensions for mounting Air Turbine Motors®.



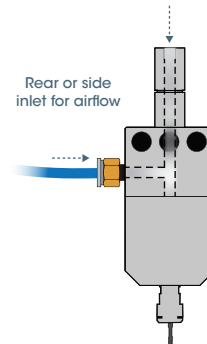
**WARNING**  
Mounting Air Turbine Hand Tools will  
damage the tool and void the warranty.

## Retrofitting Air Turbine Spindles® in your CNC

You have 3 options for mounting your **Air Turbine Spindle®** to your CNC machine. Side Air Inlet, Toolholder Air Supply and with the Toolchanger Mounting Assembly. If necessary, use magnets for temporary mounting during set up. Your spindle has 2 air inlets (rear + side) as shown in the images below. Ensure the inlet not in use is closed. If you hear a loud noise or have under rated power performance check if the plug is in the second inlet.

### 1. Side or Rear Air Inlet

Selectable rear or side inlet options. JS units combine with ER 32 or other toolholders for infinite compatibility.

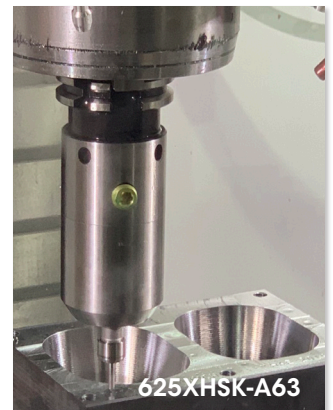
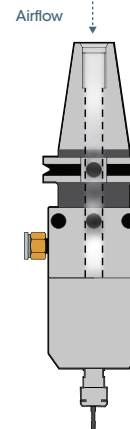


### 2. Toolholder Air Supply

To supply Thru-Spindle-Air (TSA) to power to **Air Turbine Spindles®**, verify the maximum CFM (L/S) flow possible through the air channel and determine the maximum drawbar/pull stud/internal hose Internal Diameter in the system, including any solenoid used to actuate the air.

Some retention knobs can be drilled to enlarge opening and permit the proper flow as specified in **Figure 11 on page 3**. The channel must be clean with no part smaller than the minimum internal diameter so that air volume is unrestricted.

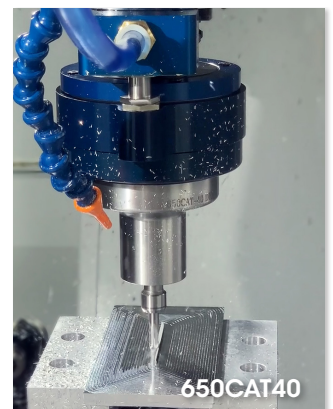
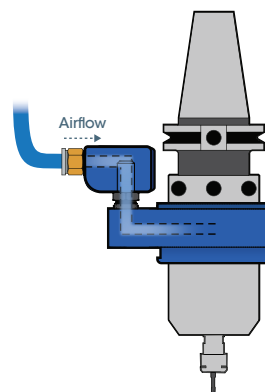
All HSK spindles may be used with the center air feed if the airline and all connectors meet the minimum internal dimension requirements stated for your model in **Figure 4 on page 1**.



### 3. Toolchanger Mounting Assembly (ATC)

Our patented wrap-around Toolchanger Mounting Assembly (TMA) option allows CNC tool-changers to automatically load/unload our family of high-speed precision spindles using a proprietary collar system and mounting block or a ring around the CNC spindle, the TMA collar orientates integrating to the right side of the CNC spindle in minutes.

Mounting blocks or rings compatible with Haas, Hurco, Doosan, Robodrill, Hardinge, DMG, Brother, Okuma, and all other CNC's are available. We are accustomed to developing custom solutions for any CNC. A Universal Block can be provided for drilling your CNC screw positions. Installation Kits are available. The TMA block remains on the CNC spindle for normal tool changes, even if not using the **Air Turbine Spindles®** as it will not interfere when using the main spindle.



#### TMA Assembly Includes

1. Mounting block or ring assembly.
2. Spindle manifold collar with adjustable height connector to block.



## Toolchanger Mounting Assembly

### Installation

Install the supplied Spindle Mount Block by connecting the dedicated clean air line from the included Filter/Regulator to your spindle as shown in the diagram below. We offer many pre-drilled Spindle Mount Blocks for different CNC machine models, and a universal block.

*\*Install action requires SHCS 10-32 x 0.75" on Haas CNC machines.*

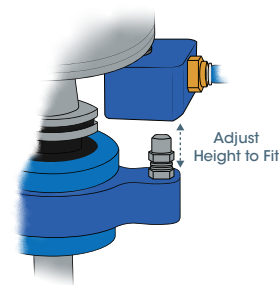


Prepare the CNC spindle by performing M19 or Spindle Orientation. **Ensure the TMA Nozzle will clear all portions for CNC Tool changer guard or machine columns** by consulting your CNC manufacturer drawings or verifying all clearances with a mock-up tool. For some Gantry machines, the Nozzle or O.D. of the TMA collar will not clear the column corner (i.e., All GR type machines require special tool rack on machine table or hand loading).

**Note:** Once the **Air Turbine Spindle®** is loaded into your CNC spindle, you adjust the height of the Nozzle screw more to engage the ball valve seal as shown in **Figure 14**. The air flow will turn on the spindles upon coupling.

Some trial and error may be needed in adjusting the height of your nozzle screws. Do not let main spindle drawbar (tool release button) start unless Connector Nozzle goes up into block Inlet hole (Approximately 1/4" (6mm) up into inlet hole).

If the Nozzle Arm is misaligned from inlet, remove the **Air Turbine Spindle®** from CNC spindle taper area and adjust clocking of the TMA Nozzle to properly align with the inlet hole and re-try loading procedure. Once successfully loaded into the CNC main spindle, turn on air hose shut-off valve. If the spindle turns on and sounds good, then the Connector Nozzle can be presumed to be set at the correct height. If you hear air escaping, then further adjustment is required.



**Figure 14:** Adjusting the height of the nozzle screw.

### G-Codes and Spindle Orientation

Ensure the installation was successful by performing a tool change with over-ride set to the lowest speed several times to observe the loading and unloading of the **Air Turbine Spindle®** to ensure it engages and operates correctly. Each CNC control has different codes to ensure the CNC main spindle does not turn on while the **Air Turbine Spindle®** is loaded. **It is critical for safety to ensure Set Up Personnel, Machine Operators, Programmers, etc. are all properly notified that the main spindle must remain stationary, except while the CNC machine is doing a Tool Change.** During a tool change, after loading the **Air Turbine Spindle®** a CNC spindle normally does a spindle orientation or rotation to ensure the drive dogs are aligned prior to loading into Tool changer drum or side mount magazine mechanism. The Toolchanger Mounting Assembly allows a spindle orientation due to its patented collar system.

### Troubleshooting your TMA Installation

#### Air Turbine Spindle® Does Not Turn On

Turn a wrench on the connector nozzle screw counterclockwise to raise the height. Use caution with hands and any clothing that may be near the spindle as your spindle will turn on and rotate at rated rpm when air is supplied. Once the **Air Turbine Spindle®** turns on, raise the Nozzle screw another small amount and then lock the hex locknut to secure the Nozzle in place.

#### Nozzle is Too High

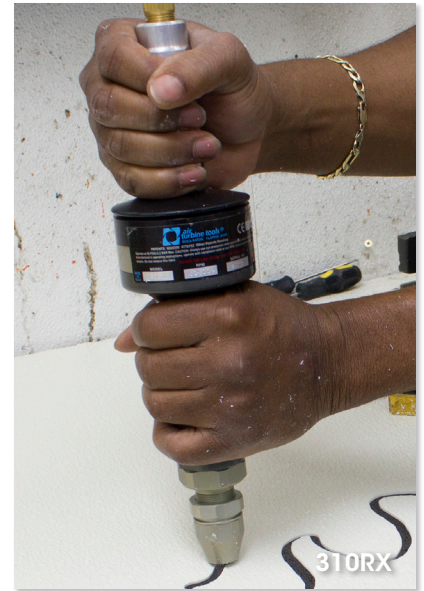
You will see the blue spindle collar tilt if the nozzle is too high. This may loosen the bottom lock in the spindle collar or allow excessive air to become released from the collar O-rings, which seal the TMA collar to the main flange portion of the TMA collar system. If too high, reverse procedure to lower the Nozzle re-tighten the locknut so the connector is an accurate fit.

#### TMA Collar Rotation

A factory set level of resistance (i.e. collar with plunger section to spindle body section) keeps the Plunger in place during a tool change, while still allowing the free rotation (i.e. spindle orient action). Over time this friction may change stiffness in the rotation due to coolant, dust, etc., ensure there is not too much friction or too little. Either will cause the spindle to misload. Tightness of collar may be adjusted using hex keys. If spindle collar does not rotate, loosen the collar by adjusting hex nuts in spindle collar so that the rotation is free at a light pressure while not being loose so your spindle remains free to rotate but is in securely place.

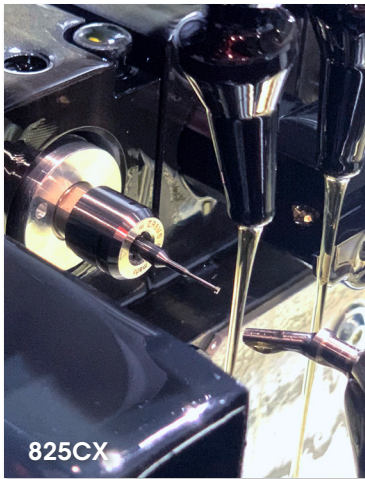
### Troubleshooting Steps

1. Eliminate flow restrictions in your airline. Check if the minimum internal diameter of your hose and fittings meet the requirements for your Air Turbine Tool® with **Figure 4 on page 1**.
2. Ensure a 0.3 micron Air Filter / Regulator is installed. Set the regulator between 90 psi (6.2 Bar) – 100psi (6.9 Bar). Air pressure exceeding 100 psi (7 bar) must not be used.
3. Check for and repair any airleaks and obstructions.
4. Use the air flow meter to check the CFM (L/S) air flow volume to your Air Turbine Tool® at the air inlet port to ensure the air flow volume and pressure meets the specifications as stated in **Figures 8, 9, 10 and 11 on page 37**.
5. If your Air Turbine Tool® has underpower performance, check the PSI (Bar) pressure using the Air Filter/Regulator gage to see if the pressure drops below 90 PSI (6.2 Bar). If the gage dial indicates that there is less than 90 PSI (6.2 Bar) pressure:
  - › Check for restrictions on air flow.
  - › Review compressor operation to turn up minimum PSI (Bar). Your default compressor settings may allow PSI / Bar to drop down to ~80 or 85 psi (5.5 or 5.9 Bar) before turning on to build up pressure. Add an extra holding tank if necessary.
6. For **Air Turbine Spindles®** ensure the rear air inlet of your spindle is plugged if using the side air inlet. Do not use retention knobs with holes unless using the rear air inlet for air supply.



#### WARNING

Your Air Turbine Tool® must be run at least 10 minutes every 30 days from manufacture date to maintain optimal performance.



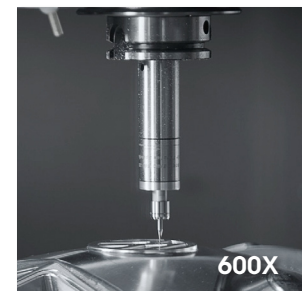
### Always Operate in Compliance With the Following

1. Safety code for portable air tools - ANSI 186.1, etc. Always use eye + face protection.
2. General Industry Safety & Health Regulations, Part 1910 and 2206 OSHA, etc.
3. Federal, State and local regulations and laws in your country.
4. Cutting tool manufacturers operating instructions. Ensure your cutting tool is rated for the rotational speed you are using. Your tool must be balanced and truly concentric. Incorrect tool selection results in unbalanced rotation or overloading, which will result in stress on the bearings and premature failure. The stick-out extension length of the cutting tool from your collet should optimally be no more than 3X the collet capacity.



#### WARNING

Failure to comply with all safety regulations could result in serious injury.



For further assistance call our factory technicians for support at +1-561-994-0500 or email us at [ask@airturbinetools.com](mailto:ask@airturbinetools.com).