air turbine tools®

The tools of a new generation™

USER NOTES FOR ALL UNITS

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Read Thoroughly Before Use

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WARNING
Connection to air supply starts motor rotation.
Do not connect air to your tool until installation is complete.

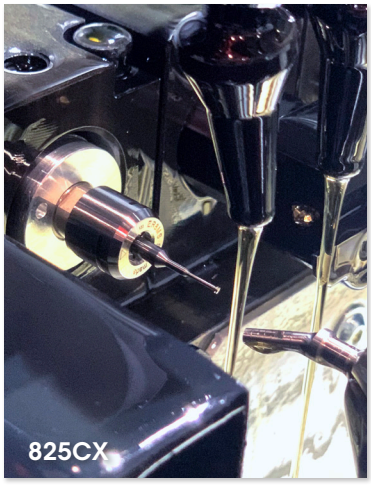
User Notes for All Units

Troubleshooting and Safety

Key Points for Successful Operation

1. Eliminate flow restrictions in your airline. Check if the minimum internal diameter of your hose and fittings meets the requirements for your Air Turbine Tool® as specified on **figure 4 on page 2.**
2. Ensure a 0.3 micron air filter/regulator is installed. Set the regulator between 90 psi (6.2 bar) to 100 psi (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 4.**
5. If your Air Turbine Tool® has underpower performance, check the psi (bar) pressure using the air filter/regulator gauge to see if the pressure drops below 90 psi (6.2 bar). If the gauge dial indicates that there is less than 90 psi (6.2 bar) pressure:
   - Check internal diameters of all couplings/connectors/hoses for restrictions on air flow.
   - Review compressor operation to turn up minimum psi (bar). If your default compressor settings allow psi/bar to drop down to ~80 or 85 psi (5.5 or 5.9 bar), then it is necessary to build up pressure before you turn the compressor on. An extra holding tank may be required.
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.

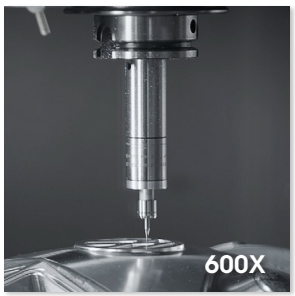
WARNING
Your Air Turbine Tool® must be run at least 10 minutes every 30 days from manufacture date to maintain optimal performance.



Always Operate in Compliance With the Following

1. **CAUTION:** Your Air Turbine Tool® will rotate **immediately** when air is connected.
2. Safety code for portable air tools - ANSI 186.1, etc. Always use eye + face protection.
3. General industry safety & health regulations, part 1910 and 2206 OSHA, etc.
4. Federal, state and local regulations and laws in your country.
5. 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 3 times the diameter of your cutting tool.

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.

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.

WARNING
Connection to air supply starts motor rotation. Do not connect air to your tool until installation is complete.

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 the specified minimum required ID for your model as shown in **figure 4.** For **Air Turbine Spindles®** refer to **page 8** to review the three different mounting options for your spindle. If you are using the Tool Changer Mounting Assembly (TMA) for ATC, refer to the installation guide for the TMA on **page 9**.

Optional: If you 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 have a manual shut-off switch built into the tool as shown in **figure 1**.

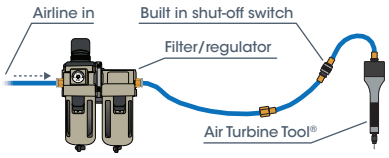


Figure 1: *A clean airline from a filter/regulator to an Air Turbine hand tool.*

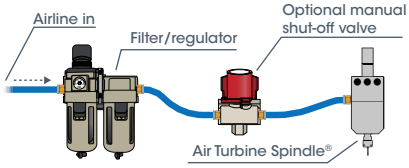


Figure 2: *A clean airline from a filter/regulator to a manual shut-off valve to an Air Turbine Spindle®.*

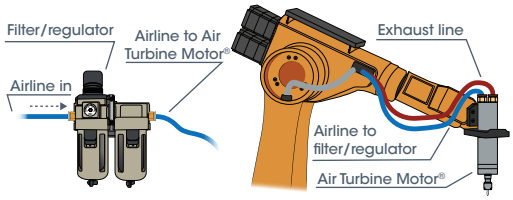


Figure 3: *A clean airline from a filter/regulator to a mounted Air Turbine Motor® with exhaust hoses installed.*

Model	Hose/Connector Minimum Required Internal Diameter	
	Metric	Imperial
› 600X › 602 › 822CX › 601 › 800LT › 825CX	4 mm	5/32"
› 200 › 0145 › 0190 › 201	4.763 mm	3/16"
› 720MX › 732MX › 822MX › 722MX › 820MX › 730MX	5 mm	0.1969"
› 202HD › 202 › 2590 › 725MX › 206X › 2545 › 740MX › 525 › 825MX › 625	6 mm	15/64"
› 625X › 460HD › 303RX › 650 › 740XP › 310R › 660 › 210HD › 230DM › 450HD › 525X	8 mm	5/16"
› 650X › 310RX › 450X	10 mm	25/64"

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 (ID) for fittings and hoses for your tool on the table shown in **figure 4**.

Air flow restrictions (such as air leaks and obstructions) will cause underpower performance and drag your tool through the material, damaging the bearings. **Some fittings with nominal internal dimensions may have an ID passage that is smaller than stated and restrict air flow and power.** It only takes one fitting with an internal diameter that is too small to reduce air flow and 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. swedged 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" / 9.5 mm NPT fitting has an 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 8 mm. Goodyear black 3/8" / 9.5 mm hose has internal diameter hole on swedged 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 clean compressed air flow at **90 psi/6.2 bar** with the specified air flow volume CFM (L/s) for your model as shown in the figures on **page 4** to maintain working air consumption. Depending on application, consider peak or stall capacity consumption. Our governor increases air flow volume 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 4** for the idle CFM/L/s rating vs. 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 underpowered performance. Do not use more than 100 psi (6.9 bar) pressure which 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
Always use proper eye protection while operating your Air Turbine Tool®.

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 3 times the diameter of your cutting tool.** Do not impact the collet when opening your collet.

1. Take the wrench included with your Air Turbine Tool® and insert it to the wrench flat of your Air Turbine Tools® shaft.
2. Take the ER8 or ER11 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 ER8 or ER11 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 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 Tools® shaft, and turn the collet nut clockwise until it's firmly held. **Do not over tighten the collet nut,** refer to **figure 6** for the 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 firmly held.

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

Figure 6: *Rego-Fix recommended torque (ft-lbs) for ER8 and ER11 collet nuts.*

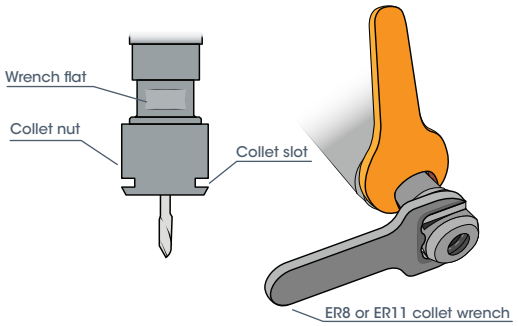


Figure 5: *Correct insertion of both the wrench and the ER8 or ER11 collet wrench to remove or secure the collet nut.*

WARNING
Never hit the collet nut with the wrench.

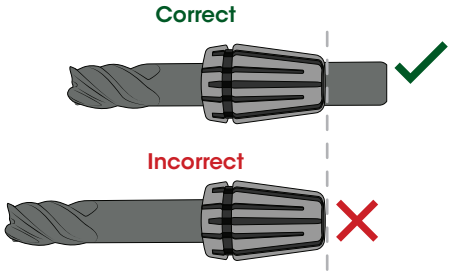


Figure 7: *A comparison showing the correct and incorrect way to insert the cutting tool into the collet.* ***Ensure that the cutting tool goes completely through the collet*** *and that the stick-out extension length of the cutting tool from your collet is no more than 3 times the diameter of your cutting tool.*

Idle CFM/L/s Rating vs. 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 and Working Air Consumption Ratings

Model	Speed	Air Consumption Idle	Air Consumption Working Flow
800LT, 822CX, 825CX	60,000 RPM 80,000 RPM	3.5 CFM (1.65 L/s)	5 CFM (2.36 L/s)
820MX, 822MX	50,000 RPM 65,000 RPM	4 CFM (1.89 L/s)	6 CFM - 9 CFM (2.83 L/s - 4.24 L/s)
825MX	40,000 RPM 50,000 RPM	5 CFM (2.36 L/s) 6 CFM (2.83 L/s)	7 CFM - 10 CFM (3.3 L/s - 4.72 L/s)

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

Air Turbine Tools® Idle and Working Air Consumption Ratings

Model	Speed	Air Consumption Idle	Air Consumption Working Flow
0145SSV, 0190SSV	40,000 RPM 50,000 RPM 65,000 RPM	3.2 CFM (1.51 L/s) 4 CFM (1.89 L/s)	4.7 CFM - 7 CFM (2.22 L/s - 3.3 L/s)
200SV	50,000 RPM	4 CFM (1.89 L/s)	6 CFM - 9 CFM (2.83 L/s - 4.24 L/s)
201	40,000 RPM 50,000 RPM 65,000 RPM 90,000 RPM	3 CFM (1.41 L/s) 4 CFM (1.89 L/s) 5 CFM (2.36 L/s)	4.8 CFM - 7 CFM (2.27 L/s - 3.3 L/s)
202	30,000 RPM 40,000 RPM 50,000 RPM 65,000 RPM	10 CFM (4.72 L/s) 13 CFM (6.14 L/s) 14 CFM (6.61 L/s)	11 CFM - 20 CFM (5.19 L/s - 9.44 L/s)
2545, 2590	30,000 RPM 40,000 RPM	10 CFM (4.72 L/s) 13 CFM (6.14 L/s)	11 CFM - 20 CFM (5.19 L/s - 9.44 L/s)
206X	40,000 RPM 50,000 RPM	6 CFM (2.83 L/s)	7 CFM - 10 CFM (3.3 L/s - 4.27 L/s)
525	30,000 RPM 40,000 RPM	12 CFM (5.66 L/s) 16 CFM (7.55 L/s)	12 CFM - 20 CFM (5.66 L/s - 9.44 L/s)
525X, 303RX	30,000 RPM 40,000 RPM	19 CFM (8.97 L/s) 20 CFM (9.44 L/s)	22 CFM - 30 CFM (10.38 L/s - 14.16 L/s)
230DM	25,000 RPM 30,000 RPM 40,000 RPM	13 CFM (6.14 L/s) 14 CFM (6.61 L/s)	15 CFM - 35 CFM (7.08 L/s - 16.52 L/s)
310R	25,000 RPM 30,000 RPM 40,000 RPM	13 CFM (6.14 L/s) 14 CFM (6.61 L/s)	15 CFM - 35 CFM (7.08 L/s - 16.52 L/s)
310RX	25,000 RPM 30,000 RPM 40,000 RPM	16 CFM (7.55 L/s) 20 CFM (9.44 L/s) 30 CFM (14.16 L/s)	19 CFM - 40 CFM (8.97 L/s -18.89 L/s)

Figure 10: *Idle CFM (L/s) and working air consumption ratings for Air Turbine hand tools.*

Air Turbine Motors® Idle and Working Air Consumption Ratings

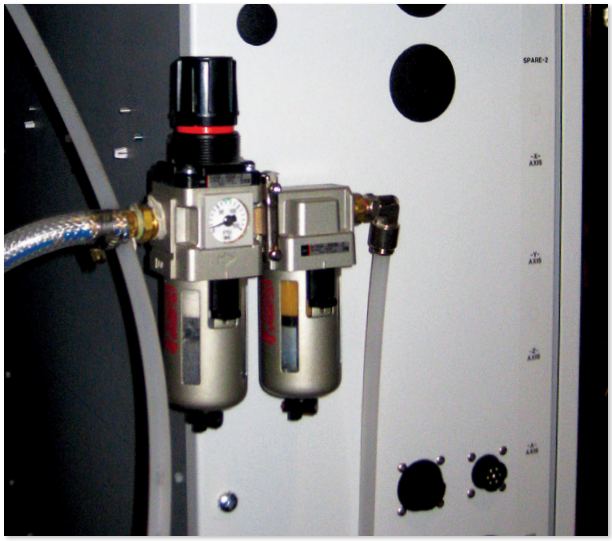
Model	Speed RPM	Air Consumption Idle	Air Consumption Working Flow
720MX, 722MX, 730MX, 732MX	50,000 RPM 65,000 RPM	4 CFM (1.89 L/s)	6 CFM - 9 CFM (2.83 L/s - 4.24 L/s)
725MX	40,000 RPM 50,000 RPM	5 CFM (2.36 L/s) 6 CFM (2.83 L/s)	7 CFM - 10 CFM (3.3 L/s - 4.72 L/s)
740MX	40,000 RPM 50,000 RPM 65,000 RPM	5 CFM (2.36 L/s) 6 CFM (2.83 L/s)	7 CFM - 10 CFM (3.3 L/s - 4.72 L/s)
202HD	30,000 RPM 40,000 RPM 50,000 RPM 65,000 RPM	10 CFM (4.72 L/s) 13 CFM (6.14 L/s) 14 CFM (6.61 L/s)	11 CFM - 20 CFM (5.19 L/s - 9.44 L/s)
210HD	30,000 RPM 40,000 RPM	14 CFM (6.61 L/s)	14 CFM - 35 CFM (6.61 L/s - 16.52 L/s)
450HD	25,000 RPM 30,000 RPM 40,000 RPM	13 CFM (6.14 L/s) 14 CFM (6.61 L/s)	14 CFM - 35 CFM (6.61 L/s - 16.52 L/s)
740XP	30,000 RPM 40,000 RPM 50,000 RPM	16 CFM (7.55 L/s) 20 CFM (9.44 L/s)	17 CFM - 45 CFM (8.02 L/s - 21.2 L/s)
450XHD	25,000 RPM 30,000 RPM 40,000 RPM	14 CFM (6.61 L/s) 20 CFM (9.44 L/s) 23 CFM (10.85 L/s)	19 CFM - 40 CFM (8.97 L/s - 18.89 L/s)
460HD	50,000 RPM	20 CFM (9.44 L/s)	20 CFM - 35 CFM (9.44 L/s - 16.52 L/s)

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

Air Turbine Spindles® Idle and Working Air Consumption Ratings

Model	Speed	Air Consumption Idle	Air Consumption Working Flow
600X	65,000 RPM 80,000 RPM	3.5 CFM (1.65 L/s)	5 CFM (2.36 L/s)
601, 602	40,000 RPM 50,000 RPM 65,000 RPM 90,000 RPM	4.5 CFM (2.1 L/s) 5 CFM (2.36 L/s)	5 CFM - 6 CFM (2.36 L/s - 2.83 L/s)
625	30,000 RPM 40,000 RPM 50,000 RPM 65,000 RPM	12 CFM (5.66 L/s) 14 CFM (6.61 L/s) 16 CFM (7.55 L/s)	11 CFM - 20 CFM (5.19 L/s - 9.44 L/s)
625X	30,000 RPM 40,000 RPM 50,000 RPM	16 CFM (7.55 L/s) 20 CFM (9.44 L/s)	22 CFM - 30 CFM (10.38 L/s - 14.16 L/s)
625XVS	30,000 RPM - 50,000 RPM	12 CFM - 20 CFM (5.66 L/s - 9.44 L/s)	11 CFM - 30 CFM (5.19 L/s - 14.16 L/s)
650	25,000 RPM 30,000 RPM 40,000 RPM	13 CFM (6.14 L/s) 18 CFM (8.49 L/s)	14 CFM - 35 CFM (6.61 L/s - 16.52 L/s)
650X	25,000 RPM 30,000 RPM 40,000 RPM	14 CFM (6.61 L/s) 20 CFM (9.44 L/s) 23 CFM (10.85 L/s)	19 CFM - 40 CFM (8.97 L/s - 18.89 L/s)
650XVS	25,000 RPM - 40,000 RPM	13 CFM - 23 CFM (6.14 L/s -10.85 L/s)	14 CFM - 40 CFM (6.61 L/s - 18.89 L/s)
660	50,000 RPM	20 CFM (9.44 L/s)	20 CFM - 35 CFM (9.44 L/s -16.52 L/s)

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 2** 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 and a repair service are available on our website.

Filter elements need to be changed periodically 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 the air pressure gauge 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. All tools are tested and rated to be within 10% of the designated speed. 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 on the work or a sudden stop will cause stress to the bearings and force the grease out, 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.

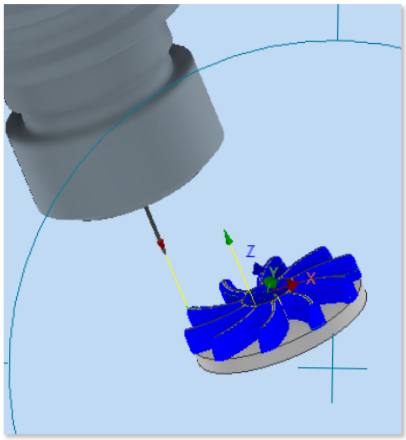
Spindle Commands

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)**.

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

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

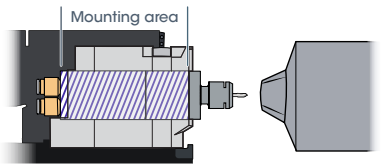
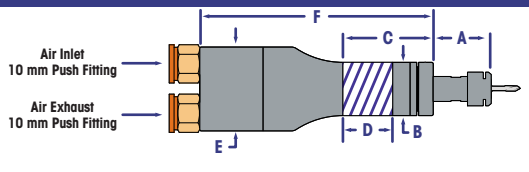


Figure 12: *A mounted 825CX showing that the fixture is only clamped within the labeled mounting area.*

It is important that your fixture is not clamped over the bearings when mounting your **Air Turbine Live Tool®**. 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 **figure 12.**

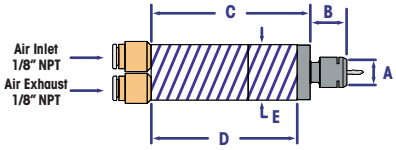
Use **figure 13** to refrence where the mounting area is for each **Air Turbine Live Tool®** model is located.

Sealed 825MX



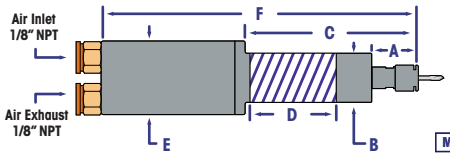
A	1.09" (27.61 mm)	C	1.5" (38.1 mm)	E	Ø 1.57" (40 mm)
B	Ø 1.0" (25.4 mm)	D	0.5" (12.7 mm)	F	4.0" (101.6 mm)

Sealed 822CX and 825CX



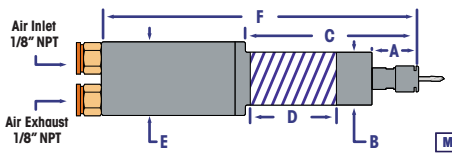
A	Ø 0.47" (12 mm)	C	3.09" (78.36 mm)	E	822CX: Ø 0.86" (22 mm) 825CX: Ø 0.98" (25 mm)
B	0.72" (18.29 mm)	D	2.9" (73.53 mm)		

Sealed 820MX



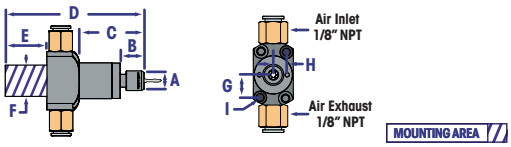
A	0.65" (16.51 mm)	C	2.03" (51.56 mm)	E	Ø 1.18" (30 mm)
B	Ø 0.79" (20 mm)	D	1.99" (50.55 mm)	F	4.99" (126.75 mm)

Sealed 822MX



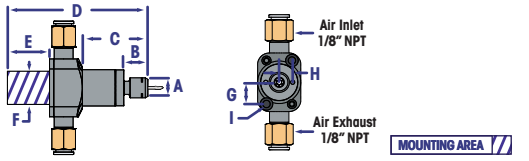
A	0.65" (16.51 mm)	C	2.03" (51.56 mm)	E	Ø 1.18" (30 mm)
B	Ø 0.85" (21.6 mm)	D	1.99" (50.55 mm)	F	4.99" (126.75 mm)

Sealed 800LT 19.05mm OD



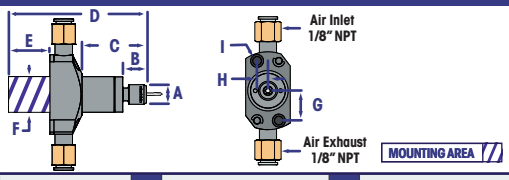
A	Ø 0.47" (12 mm)	D	3.34" (84.84 mm)	G	0.51" (12.95 mm) TYP (2)	I	Ø 0.17" (4.32 mm) THRU Ø 0.29" (7.36 mm) ↧0.16" (4.06 mm) TYP (2)
B	0.57" (14.47 mm)	E	1.0" (25.4 mm)	H	0.3" (7.62 mm) TYP (2)		
C	1.56" (39.62 mm)	F	Ø 0.75" (19.05 mm)				

Sealed 800LT 20mm OD



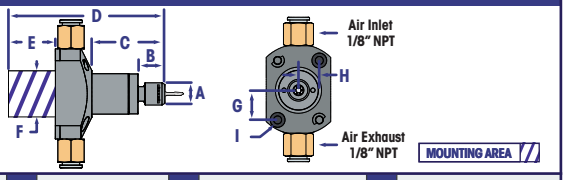
A	Ø 0.47" (12 mm)	D	3.34" (84.84 mm)	G	0.51" (12.95 mm) TYP (2)	I	Ø 0.17" (4.32 mm) THRU Ø 0.29" (7.36 mm) ↧0.16" (4.06 mm) TYP (2)
B	0.57" (14.47 mm)	E	1.0" (25.4 mm)	H	0.3" (7.62 mm) TYP (2)		
C	1.56" (39.62 mm)	F	Ø 0.79" (20 mm)				

Sealed 800LT 22mm OD



A	Ø 0.47" (12 mm)	D	3.34" (84.84 mm)	G	0.74" (18.8 mm) TYP (2)	I	Ø 0.22" (5.58 mm) THRU Ø 0.32" (8.13 mm) ↧0.3" (7.62 mm) TYP (2)
B	0.57" (14.47 mm)	E	1.0" (25.4 mm)	H	0.27" (6.86 mm) TYP (2)		
C	1.56" (39.62 mm)	F	Ø 0.87" (22 mm)				

Sealed 800LT 25mm OD



A	Ø 0.47" (12 mm)	D	3.34" (84.84 mm)	G	0.65" (16.51 mm) TYP (2)	I	Ø 0.17" (4.32 mm) THRU Ø 0.32" (8.13 mm) ↧0.46" (11.68 mm) TYP (2)
B	0.57" (14.47 mm)	E	1.0" (25.4 mm)	H	0.45" (11.43 mm) TYP (2)		
C	1.56" (39.62 mm)	F	Ø 0.98" (24.89 mm)				

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

WARNING
Connection to air supply starts motor rotation. 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

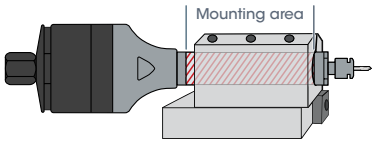
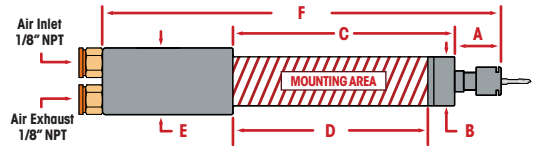


Figure 14: *A mounted 202HD showing that the fixture is only clamped within the labeled mounting area.*

When mounting your **Air Turbine Motor®**, make sure the fixture is only clamped on the labeled mounting area along the steel barrel for your model as shown in **figure 14**. Incorrect positioning or over tightening of the clamp on your Air Turbine Motor® will result in pressure on the bearings and distorting the race. This will cause your motor to fail prematurely and will require a repair.

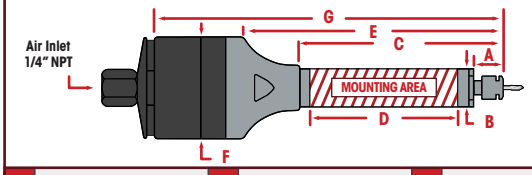
Use **figure 15** to refrence where the mounting area is for each **Air Turbine Motor®** model is located.

Sealed 720MX and 722MX



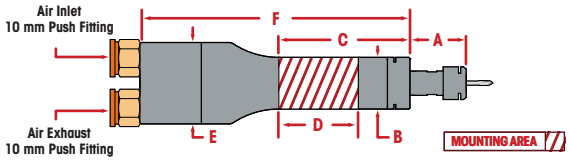
A	0.82" (20.83 mm)	C	3.94" (100.08 mm)	E	Ø 1.18" (30 mm)
B	720MX: Ø 0.79" (20 mm) 722MX: Ø 0.87" (22 mm)	D	3.31" (84.07 mm)	F	7.07" (179.58 mm)

202HD



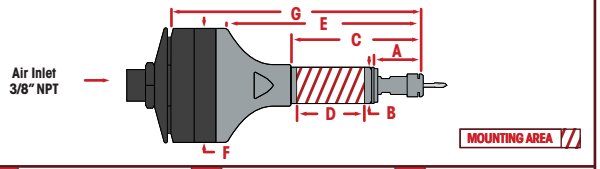
A	1.33" (33.84 mm)	D	2.0" (50.8 mm)	F	Ø 2.0" (50.8 mm)
B	Ø 0.74" (18.84 mm)	E	5.35"(135.95 mm)	G	7.13"(181.1 mm)
C	4.27" (108.33 mm)				

Sealed 725MX



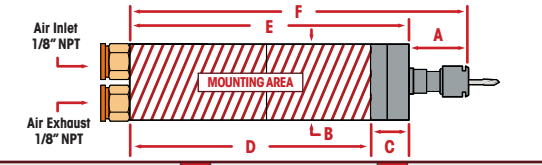
A	1.09" (27.61 mm)	C	2.53" (64.38 mm)	E	Ø 1.57" (40 mm)
B	Ø 1.0" (25.4 mm)	D	1.53" (38.98 mm)	F	5.23" (132.84 mm)

210HD



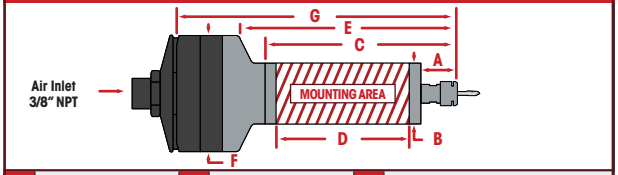
A	1.46" (37 mm)	D	1.4" (35.46 mm)	F	Ø 3.1" (78.74 mm)
B	Ø 0.99" (25 mm)	E	5.5" (140 mm)	G	7.0" (178 mm)
C	3.75" (95 mm)				

Sealed 730MX and 732MX



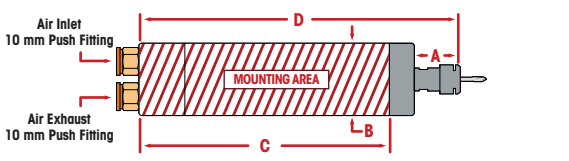
A	0.91" (23.03 mm)	C	0.6" (15.24 mm)	E	4.34" (110.35 mm)
B	730MX: Ø 1.18" (30 mm) 732MX: Ø 1.26" (32 mm)	D	3.74" (95.11 mm)	F	5.25" (133.35 mm)

450HD, 450XHD and 460HD



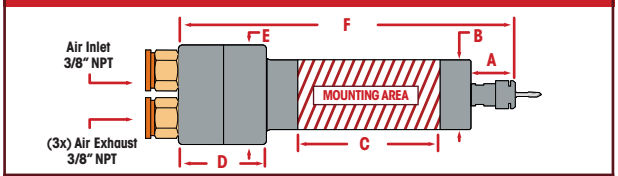
A	1.05" (26.54 mm)	D	2.5" (63.5 mm)	G	450HD/460HD: 7.61" (193.29 mm) 450XHD: 8.07" (204.97 mm)
B	Ø 1.62" (41.15 mm)	E	6.03" (153.16 mm)		
C	5.2" (132.08 mm)	F	Ø 3.1" (78.74 mm)		

Sealed 740MX



A	1.0" (25.4 mm)	C	5.25" (133.35 mm)
B	Ø 1.57" (40 mm)	D	7.0" (177.8 mm)

Sealed 740XP



A	1.09" (27.69 mm)	C	3.21" (81.52 mm)	E	Ø 2.25" (57.12 mm)
B	Ø 1.57" (40 mm)	D	1.99" (50.51 mm)	F	7.69" (195.33 mm)

Figure 15: *Tables that show the proper mounting area and dimensions for mounting Air Turbine Motors®.*

WARNING
Connection to air supply starts motor rotation. 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, thru-toolholder air supply and with the Tool Changer 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

The 600X, 601, 602, 625 and 625X series of **Air Turbine Spindles®** have selectable rear or side inlet options. JS units combine with ER32 or other toolholders for infinite compatibility. 650JS and 650XJS models only use the side inlet for air supply.

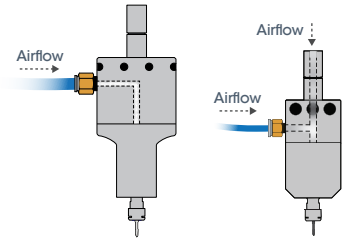


Figure 16: *A 625JS with side or rear air inlet Air Turbine Spindle® mounting and a 650JS with side air inlet mounting.*

2. Thru-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 4.** The channel must be clean with no part smaller than the minimum internal diameter as specifed for your model in the table in **figure 4 on page 2** so that air volume is unrestricted. Purge the line before use.

All HSK spindles may be used with the center air feed if the airline and all connectors meet the minimum internal diameter requirements stated for your model in **figure 4 on page 2**.

Certain CNC machines such as Hermle, have a valve which restricts airflow which needs to be removed for proper operation. Figure 17 shows an example of what this valve may look like. Please consult with your machines technician to **ensure that there are no restrictions of air flow and that your Air Turbine Spindle® is receiving 90 psi / 6.2 bar air to operate.**

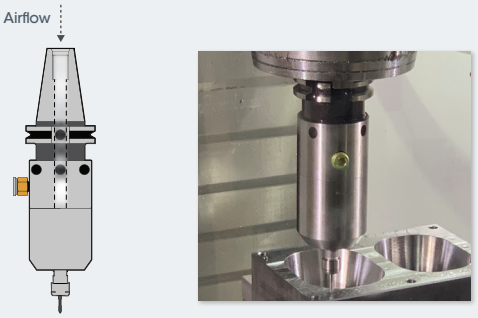


Figure 17: *A 625XHSK-A63 with Thru-Toolholder Air Supply (TSA) Air Turbine Spindle® mounting. All HSK spindles can be used with center air feed if the air supply line has sufficient ID.*

Figure 18: *A valve which restricts air flow to 30 psi / 3 bar air which is installed on certain CNC machines. This valve must be removed for proper operation of Air Turbine Spindles®.*

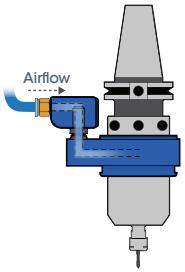
3. Tool Changer Mounting Assembly (ATC)

Our patented wrap-around Tool Changer 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.

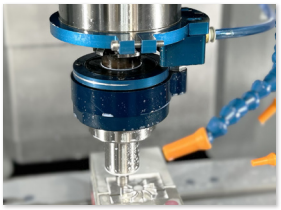
Mounting blocks or rings compatible with Haas, Hurco, Doosan, Robodrill, Hardinge, DMG, Brother, Okuma, and all other CNC's are available. Review **figure 19** for the different types of Tool Changer Mounting Assemblies. We are accustomed to developing custom solutions for any CNC. A universal block 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. **See page 9 for setup instructions for the Tool Changer Mounting Assembly.**

TMA Assembly Includes

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



Screw in Mounting Block



Two Piece Ring and Block

Drill Tap

Figure 19: *With different block or ring combinations available the TMA Air Turbine Spindle® mounting option allows for automatic tool change on any CNC.*

Tool Changer 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.*

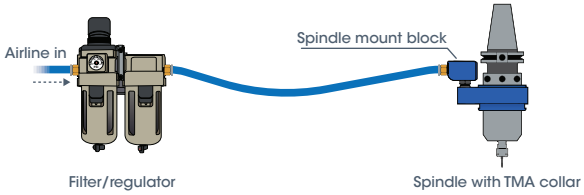


Figure 18: *A clean airline from a filter/regulator to an Air Turbine Spindle® with the Tool Changer Mounting Assembly.*

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 should adjust the height of the nozzle screw more to engage the ball valve seal as shown in **figure 20.** The air flow will turn on the spindle upon coupling.

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

If the nozzle arm is misaligned from the inlet, remove the **Air Turbine Spindle®** from CNC spindle taper area and adjust the clocking of the TMA nozzle to properly align it 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 no air is escaping, then the connector nozzle can be presumed to be set at the correct height. If you hear air escaping, then further adjustment is required.

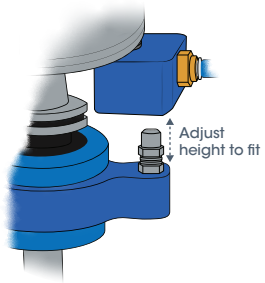


Figure 20: *Adjusting the height of the nozzle screw.*

G-Codes and Spindle Orientation

Ensure the installation was successful by performing a tool change with the 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 setup 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 the tool changer drum or side mount magazine mechanism. The Tool Changer Mounting Assembly allows a spindle orientation due to its patented collar system.

Troubleshooting your TMA Installation

Air Turbine Spindle® Does Not Turn On

Take a wrench on the connector nozzle screw and turn it 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 the 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 be released from the collar O-rings, which seal the TMA collar to the main flange portion of the TMA collar system. If the nozzle is too high, reverse the procedure to lower the nozzle and 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). Over time friction may change the stiffness in rotation due to coolant, dust, etc. Ensure there is not too much friction or too little, either will cause the spindle to misload. The tightness of the collar may be adjusted using hex keys. If the spindle collar does not rotate, loosen the collar by adjusting the hex nuts in the spindle collar to allow free rotation at a light pressure without being loose. Your spindle must remain free to rotate while being securely in place.

Pre-Installation

1. Ensure the air supply is turned off before installing the Tool Breakage Alarm™ monitor.
2. Mount monitor and filter on to your CNC.
3. Connect the airline to the filter supplied with the spindle to the airline from your compressor. From the filter connect the air line into the Tool Breakage Alarm™ monitor inlet port as shown in **figure 21**.
4. From the system monitor, connect the airline to your **Air Turbine Spindle®**.
5. **OPTIONAL:** Connect the alarm output port to your control and program for the Tool Breakage Alarm™ monitor to stop your program.

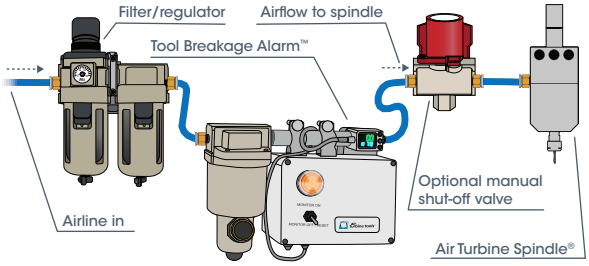


Figure 21: *System monitor airline diagram showing the connection from a filter/regulator to the Tool Breakage Alarm™ and then to the Air Turbine Spindle®.*

WARNING
Connection to air supply starts spindle rotation.

Initial Airline Setup

1. Ensure your air supply is adequate and set regulator at 90 psi/6.2 bar at the CFM, L/s specified flow rate for your **Air Turbine Spindle®** as shown in the table in **figure 11 on page 4**.
2. Ensure all hoses, couplings and connections have the minimum internal diameter specified for your spindle. Refer to **figure 4 on page 2** for the specific minimum size ID required for your model.
3. Set your machine spindle control for zero spindle rotation and close the machine door securely.
4. Connect the system monitor power cord to a 120 volt outlet, confirm that the air supply on/off switch is in the 'off' position.

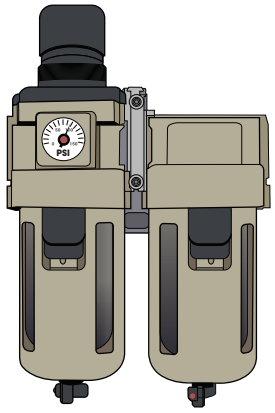
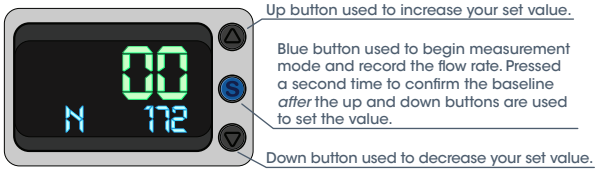


Figure 22: *Ensure the filter/regulator properly set to 90 psi/6.2 bar.*

Record Baseline Air Consumption and Start your Monitor

1. Turn on the air. Record the baseline cubic feet per minute/liters per second air consumption running while your spindle in idle for 5 minutes with no cutting load or until the CFM/L/s flow is stable.
2. On the flowswitch control, press the center blue button to begin measurement mode to record air flow rate while there is no load.
3. Press the up and down buttons on the flowswitch control to change the top value to match the baseline number displayed on the flowswitch control.
4. Press the blue button for the second time to confirm and fix your baseline.
5. Start your program on your CNC control and start cutting.
6. Flip the switch on the front of the system monitor to the 'on' position.

If your tool breaks or your compressor malfunctions the system will activate the light and klaxon. If connected to your CNC control and properly programmed, the system monitor will stop your machine.



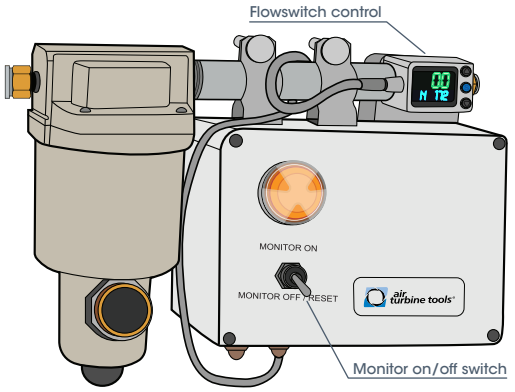


Figure 23: *Diagram of the flowswitch control and system monitor.*