TC72

Tube Cutting Tool

This manual contains important information for the safe and effective operation of the Swagelok® TC72 series tube cutting tool. Users should read and understand its contents before operating the tube cutting tool.

Swagelok®

Contents

Safety

Safety Summary

Read the entire safety information section and Tube Cutting Tool User's Manual before using this product. Failure to do so can result in serious injury or death.

Signal Words and Safety Alert Symbols Used in this Manual

WARNING Statements that indicate a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION Statements that indicate a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE Statements that indicate a hazardous situation which, if not avoided, could result in damage to the equipment or other property.

Safety alert symbol indicating a potential personal injury hazard.

Safety alert symbol indicating a potential for personal injury from electrical shock.

Safety Information

WARNING

Danger of death by electric shock

- If the power cord is damaged, electrically live parts may cause death if touched directly.
- Do not allow the tool to run unattended.
- The tool should be connected to a ground fault circuit interrupt (GFCI) protected outlet.
- Work on electrical equipment must be done by a qualified electrician.
- Switch off the tool and remove the plug from the power outlet before changing tooling, maintaining, or transporting the tool.

WARNING

Danger of eyes being injured by hot and sharp-edged metal chips.

Eye protection must be worn while operating or working near the equipment.

WARNING

Excessive noise possible while operating the equipment.

Ear protection must be worn while operating or working near the equipment.

WARNING

Keep dry. Equipment and components are not waterproof.

Do not use electric tools in a damp or wet environment.

WARNING

Fire or Explosion

Do not use in close proximity to flammable liquids or gases.

WARNING

Danger of being injured by sharp cutting edges

- Do not touch the saw blade while the tool is operating.
- Wear safety gloves.
- Do not remove chips or tubing from the work area when the tube cutting tool is still running and the tool is not yet at rest.

WARNING

Danger of being injured by rotating parts.

Keep hands, loose clothing, and long hair away from rotating and moving parts.

WARNING

Observe the following safety measures in order to protect against risk of injury.

- Inspect the tube cutting tool daily for visible signs of damage or defects. Have any damage or defects repaired immediately.
- Always ensure that the machine is in good working order and comply with these notes on safety.
- Only use the tube ODs, wall thicknesses, and materials specified in these instructions. Other materials should be used only after consulting your authorized Swagelok sales and service representative.
- Check that the tube is correctly clamped.
- Do not carry the tube cutting tool by the power cord and do not use the cord to pull out the plug. Protect the cord from heat, oil and sharp edges (chips).
- Before cutting tubing, ensure that the saw blade guard is attached.
- Do not have saw blades in both sawing positions at the same time.
- Ensure that the cut piece of tube will not fall.
- When work is complete, turn the tool off and let it run until the blade stops rotating.

Environmental Protection/Disposal

- Dispose of chips and used gear lubricant oil according to local regulations.

Electric tools and accessories contain a large share of valuable raw and synthetic materials, which can be recycled. Therefore:

- Electrical (electronic) devices that are marked with the symbol in Fig. 1, may not be disposed of with household waste in accordance with European Union (EU) regulations.
- By using local return and collection systems, you contribute to the reuse, recycling and utilization of electrical (electronic) devices.
- Electrical (electronic) used devices contain parts, which must be handled selectively according to EU regulations. Separate collection and selective treatment is the basis for environment-friendly disposal and the protection of human health.
- Batteries that are marked with the symbol in Fig. 2 may not be disposed of with household garbage according to EU directive 91/157/EEA.
- In batteries containing harmful substances, the chemical sign for the heavy metal contained is indicated below the garbage can:

  Cd = Cadmium Hg = Mercury Pb = Lead

Fig. 1 RL 2002/96/EC Symbol

Fig. 2 Battery Symbol

Product Information

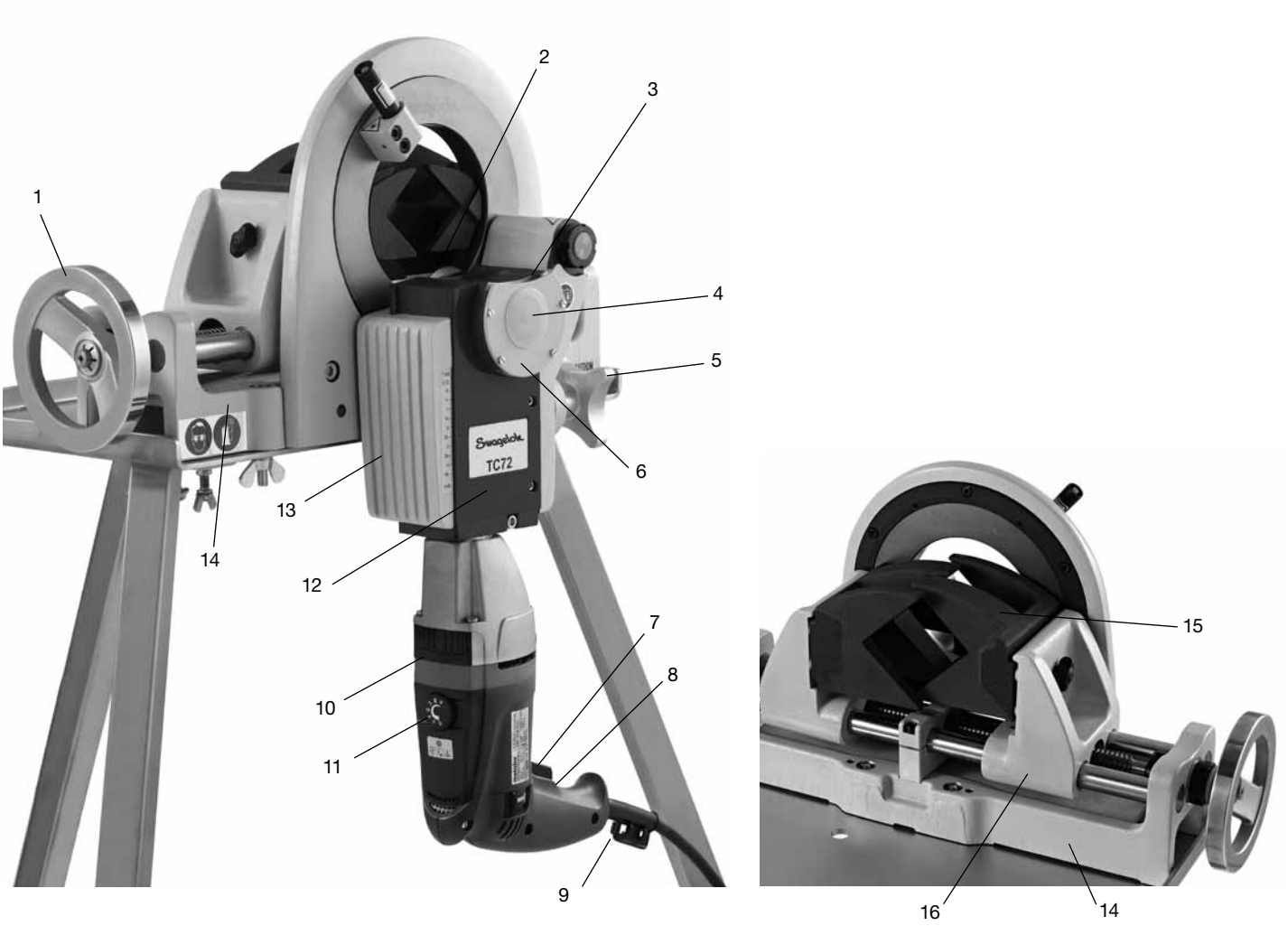

Fig 3 TC72 Series

1 Clamping jaw adjustment wheel
2 Saw blade position 1
3 Saw blade position 2
4 Clamping screw cover
5 Blade adjustment wheel
6 Saw blade guard
7 ON/OFF switch
8 ON/OFF lock
9 Hex key (not shown)
10 Motor
11 Speed adjustment dial
12 Slide
13 Saw blade housing
14 Vise
15 Clamping jaws
16 Mounting vise

Accessories

TC Series Saw Blade

A saw blade is supplied already installed. The tube wall thickness capability of the installed saw blade is 0.039 to 0.118 inch (1.0 to 3.0 mm).

Fig 4 TC Series Saw Blade

Clamping Jaws

A set of coated aluminum-cast clamping jaws is included.

Fig 5 Clamping Jaws

Mounting Plate with Screw Clamps

This optional mounting plate can be attached to the bottom of the tube cutting tool to aid in mounting the tool to a bench. Use the four included socket screws to attach the mounting plate to the tool.

Fig 6 Mounting Plate with Screw Clamps

Tripod

This optional stainless steel tripod can provide a space-saving, easily-moved mounting location for the tube cutting tool.

Fig 7 Tripod

See the *Swagelok Tube Cutting Tool—TC Series catalog,* MS-02-427*,* for additional information on the optional accessories.

Specifications

Application range

Material Shape	Saw Position	Tube OD, inch / mm	Wall Thickness, inch / mm
Tube	1	1/4 to 4 1/2 / 6 to 120	0.039 to 0.118 / 0.99 to 3
Elbow	2	1 3/16 to 4 1/2 / 30 to 120	

Tube materials

- Stainless steel
- Nickel chrome molybdenum alloys

Contact your authorized Swagelok representative for information on additional materials.

Technical data

Characteristic	TC72 Tube Cutting Tool
Dimensions, in. (mm)	20.4 W, 9.1 H, 23.6 L (518, 230 H, 600 L)
Weight Without Accessories, lb (kg)	52 (23.6)
Input Voltage	Single-phase alternating current, protection class II 110 V 50/60 Hz 230 V 50/60 Hz
Power, W	1100
Speed, r/min	30 to 160
Sound Level (EN23741), dB	approx. 75
Vibration Level (EN 28662, Part 1), m/s^2	< 2.5
Service Current Requirement, A	10 minimum
Insulation Class	Double insulated in accordance with Class II, DIN VDE 0740

Setup

Description

The tube cutting tool is designed in conformance with industry standards. It has the following features:

- Two saw blade positions to allow cutting of both straight tubing and elbows
- A variable-speed electric motor with restart protection
- Low-maintenance gearing
- A quick change system for saw blades
- Self-centering vise with all-purpose aluminum-coated clamping jaws
- Space-saving assembly
- Increased safety due to the stationary tube and rotating tool
- Right-angled and deformation-free cuts.

Unpacking the Tube Cutting Tool

Shipping Case Contents

- 1 Tube cutting tool
- 1 Saw blade (installed)
- 1 Set of clamping jaws
- 1 Open-end wrench (22 mm)
- 4 Socket screws
- 3 Hex keys (5 mm [on cutting tool], 6 mm, and 8 mm)
- 1 Lubricant brush
- 1 Tube of cutting lubricant with MSDS
- 1 Package of 1.5 V alkaline cell batteries (for laser)
- 1 Tool bag
- 1 User manual

Report any missing or damaged parts to your authorized Swagelok sales and service representative immediately.

Storage and Transport

Storage

To properly fit the tube cutting tool in the shipping case:

1. The vise should lie parallel to the long side of the shipping case.
2. The saw blade housing must be rotated approximately 70° clockwise. See Fig. 8.

Transport

For safe transportation of the tube cutting tool, hold the tool as shown in Fig 9.

Fig 8 Cutting Tool in Shipping Case

Fig 9 Transporting the Cutting Tool

Mounting the Tube Cutting Tool

Mounting to a Work Bench without Quick Mounting Plate

1. Set the tube facing tool on the work bench.
2. Mark holes on the work bench using the tube cutting tool as a template. See Fig. 10.
3. Drill four holes 23/64 in. or 9 mm in diameter.
4. Secure the tube cutting tool to the work bench using the four provided socket screws. See Fig. 11.

Fig 10 Marking Holes on the Work Bench

Mounting to a Work Bench with Quick Mounting Plate

1. Set the quick mounting plate on the work bench.
2. Tighten the two screw clamps of the mounting plate. See Fig. 12.
3. Secure the tube cutting tool to the mounting plate using the four provided socket screws.

Fig 11 Attaching the Tube Cutting Tool to the Workbench

Mounting to a Tripod

Secure the tube cutting tool to the tripod using the four provided socket screws.

Fig 12 Mounting a Quick Mounting Plate

Fig 13 Mounting to a Tripod

Mounting the Clamping Jaws to the Vise

The tube cutting tool is delivered with the clamping jaws mounted in the position needed to cut tubing with an OD greater than 1.772 inch (45 mm). Follow these steps to rotate the clamping jaws to enable cutting tubing with an OD smaller than 1.772 inch (45 mm).

1. Remove the wing thumb screw on either side of the vise (Fig. 14).
2. Remove the clamping jaws and position each jaw on the side opposite it was previously positioned.
3. Thread the wing thumb screw into place until finger-tight.

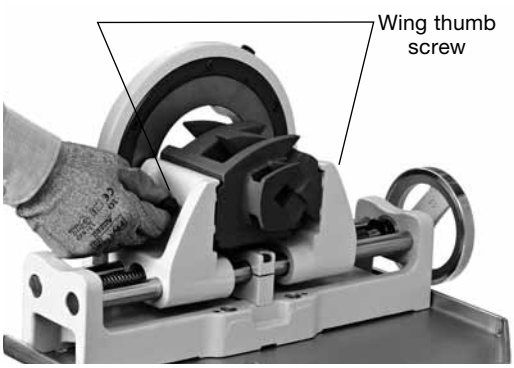

Fig 14 Clamping Jaw Wing Thumb Screws

Mounting the Saw Blade

WARNING

Do not touch the saw blade while the tool is in operation.

WARNING

Switch off the tool and remove the plug from the power outlet before changing tooling, performing maintenance, or transporting the tool.

WARNING

Never mount a saw blade in both blade positions at the same time.

WARNING

Keep hands away from the saw blade edge. Wear safety gloves.

NOTICE

The saw blade must be free of chips and dirt.

It is not possible to mount or replace a saw blade if a tube has been clamped into the clamping jaws.

Saw Blade Position 1

1. Open the clamping jaws by turning the clamping jaw adjustment wheel counterclockwise until it stops.
2. Move the saw blade housing up by turning the blade adjustment wheel clockwise until it stops.

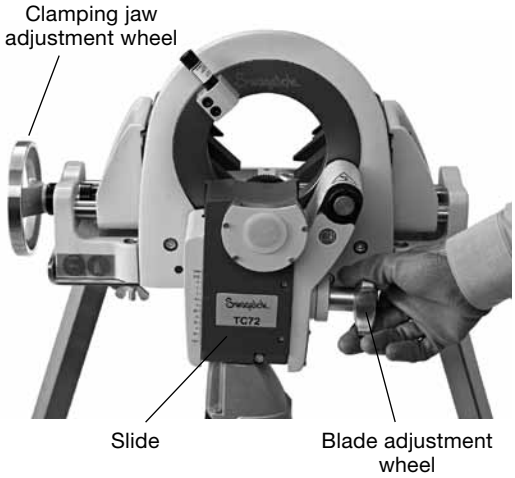

Fig 15 Tube Cutting Tool Adjustment Wheels

3. Remove the saw blade nut with the provided 22 mm wrench (Fig. 16).

   Note: The saw blade nut is a reverse-threaded nut.
4. Clean the saw blade shaft and the surrounding area with a brush.
5. Mount the saw blade on the shaft with the marking on the blade facing the clamping plate (Fig. 17).
6. Thread the saw blade nut onto the shaft and tighten wrench-tight with the provided wrench.

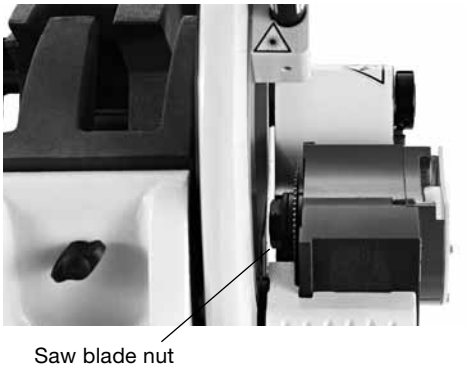

Fig 16 Saw Blade Position 1

Saw Blade Position 2

1. Remove the clamping screw cover (Fig. 18).
2. Loosen the clamping screw using the provided 8 mm hex key.
3. Clean the saw blade shaft and the surrounding area with a brush.
4. Mount the saw blade on the shaft with the marking on the blade facing the saw blade guard.
5. Tighten the clamping screw using the provided hex key (Fig. 19).
6. Replace the clamping screw cover.

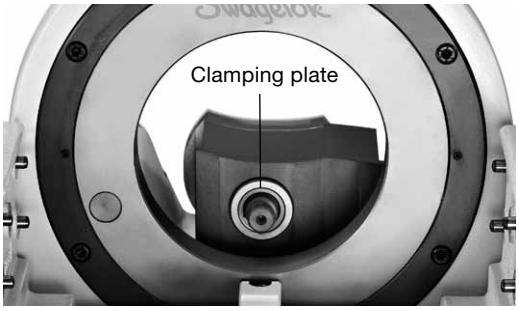

Fig 17 Clamping Plate

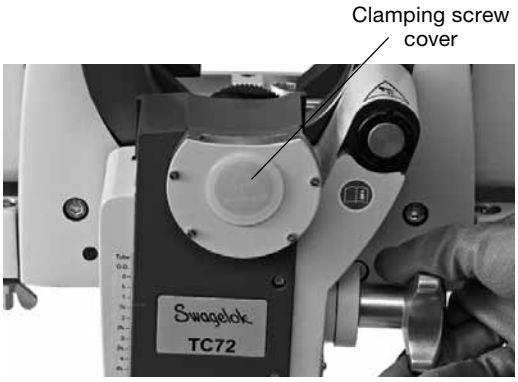

Fig 18 Clamping Screw Cover

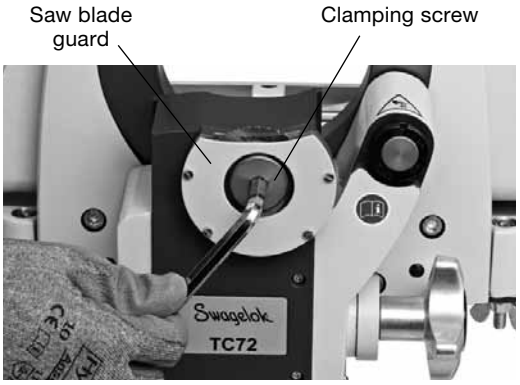

Fig 19 Saw Blade Position 2

Operation

The tool should only be operated using a ground fault circuit interrupt (GFCI) protected outlet.

Adjusting for Tube Size

CAUTION

The tube cutting tool must be switched off before adjusting the tool. The saw may revolve around the tube automatically when it is switched on.

The saw blade should not touch the tube before the cutting operation begins. Adjust the tube facing tool according to this section as necessary.

1. Turn the blade adjustment wheel until the saw blade housing is at the lowest position (Fig. 20).
2. Slide the tube towards the saw blade until it is right in front of the blade. Clamp the tube by turning the clamping jaw adjustment wheel (Fig. 21).
3. Rotate the motor to the cutting position, approximately 45° clockwise.
4. Adjust the saw blade position by turning the blade adjustment wheel until the teeth of the blade reach approximately 0.039 to 0.079 inch (1 to 2 mm) into the tube (Fig. 22).
5. Rotate the motor back to the original position.
6. Loosen the clamping jaw adjustment wheel and move the tube forward until the cutting location is above the saw blade. Fully clamp the tube by turning the clamping jaw adjustment wheel clockwise until it stops.

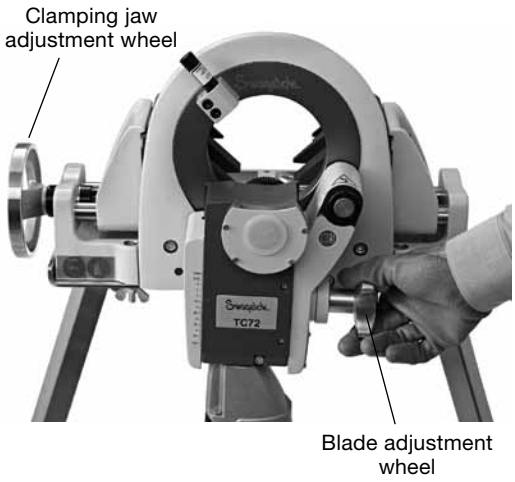

Fig 20 Moving the Saw Blade Housing

Fig 21 Saw Blade Teeth Position

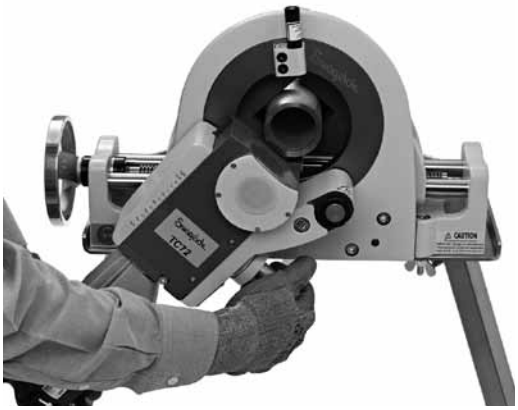

Fig 22 Adjusting the Blade Position

Tool Speed Range

Adjusting the Speed

Set the speed by turning the speed adjustment dial.

TC72 Series		
Level	**Tube material**	**Spindle Speed,** rpm
E and G	Stainless steel	114 to 160
B, C, D, E	Nickel chrome molybdenum alloys	42 to 114

Fig 23 Speed Adjustment Dial

Cutting the Tube

WARNING

Allow the machine to run until it stops rotating after cutting tube to avoid injury.

WARNING

Do not touch the saw blade while the tool is in operation.

WARNING

Eye protection must be worn while operating or working near the equipment.

WARNING

Do not operate the cutting tool without the saw blade guard in place.

CAUTION

Support long pieces of tubing with suitable fixtures to avoid injury from tilting tool and/or falling tubing.

NOTICE

The tool can be damaged by incorrect setup or a tube not cut at a right angle. Verify there is space between the tool and the tube to prevent damage.

1. Mount the saw blade in the desired position according to **Mounting the Saw Blade**.
2. Adjust for the tube size as necessary according to **Adjusting for Tube Size**.
3. Mark the cut location on the tube.
4. Insert the tube in the cutting tool vise and move until cut location is centered. Clamp the tube by turning the clamping jaw adjustment wheel until it stops.
5. Set the tool speed range according to **Adjusting the Speed**.
6. Apply cutting lubricant to the saw blade (Fig. 24).
7. Plug the cutting tool into a power outlet.
8. Press the ON/OFF switch to turn the tool on. The switch can be locked into place with the ON/OFF lock (Fig. 25).
9. Hold the cutting tool by the motor grip and slowly turn the cutting tool clockwise until the tube wall is pierced.

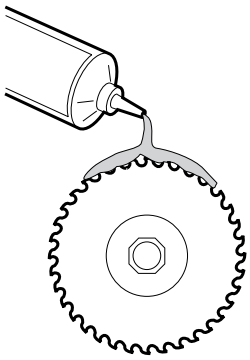

Fig 24 Lubricating the Saw Blade

Fig 25 ON/OFF Switch and Lock

10. Continue to rotate the cutting tool clockwise to complete the cut.
11. Rotate the cutting tool counter clockwise to the original position.
12. Unlock the ON/OFF lock and turn off the cutting tool.
13. Apply cutting lubricant to the saw blade after each cut (Fig. 24).

Operating in Space-Restricted Environments

1. Loosen the set screw with the provided 5 mm hex key (Fig. 26).
2. Rotate the motor 70°.
3. Tighten the set screw.

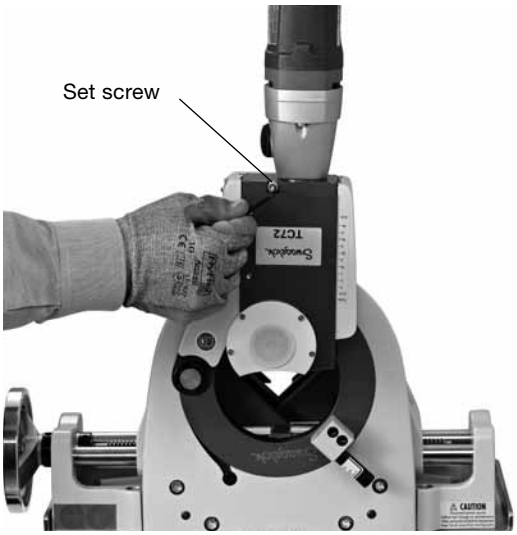

Fig 26 Rotating the Motor

Maintenance

WARNING

Allow the tool to run to a stop and unplug the tool before changing tooling, maintaining, or transporting the tool.

Remove any chips and dirt from the saw blade, between the saw blade and saw blade housing, and the blade shaft.

Troubleshooting

Problem	Cause	Remedy
The motor is not running but the signal indicator lights up.	Quick flashing light - The restart inhibitor has activated.	Switch the cutting tool off and back on. For safety reasons, the tool will not restart automatically after a power failure.
	Slow flashing light - The carbon brushes are worn out.	Have the carbon brushes replaced by your authorized Swagelok sales and service representative.
	Constant light - The motor has overheated.	Unplug the tool and allow it to cool.
The saw blade is not turning.	The tube dimension has not been set correctly.	Set the tube dimension according to **Adjusting for Tube Size**.
The saw blade is slipping through but is not cutting.	The hex nut on the saw blade shaft is loose.	Tighten the hex nut.
The saw blade is not cutting the tube.	The saw blade is not mounted correctly.	Mount the saw blade according to **Mounting the Saw Blade**.
	The saw blade is worn.	Replace the saw blade.
The tube is not cut properly.	The tube dimension has not been set correctly.	Set the tube dimension according to **Adjusting for Tube Size**.
The cut quality is poor.	The saw blade is worn.	Replace the saw blade.
	Insufficient lubrication.	Apply lubricant to the saw blade.
	Incorrect speed setting.	Set the speed according to **Adjusting the Speed**.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

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