

TF16, TF24, TF40

Tube Facing Tools



This manual contains important information for the safe and effective operation of the Swagelok® TF16 series, TF24 series, and TF40 series tube facing tools. Users should read and understand its contents before operating the tube facing tool.

Contents

Safety	5
Safety Summary	5
Environmental Protection/Disposal	7
Product Information	8
TF16 Series	8
TF24 Series	9
TF40 Series	10
Accessories	11
Specifications	12
Application range	12
Tube materials	12
Technical data	12
Setup	13
Description	13
Unpacking the Tube Facing Tool	14
Installation of the Bench Mount Bracket	14
Installation of the Cutting Insert and the Tool Holder	15
Installing the Collet Set	16
Removing the Collet Set	17
Installing the Collet Set Adapter for TF40 Series	18
Operation	19
Clamping the tube	19
Removing the Tube	19
Tool Speed Range	20
Facing the Tube	22
Operating in Space-Restricted Environments	24
Maintenance	25
Troubleshooting	26

Safety

Safety Summary



Read the entire safety information section and Tube Facing 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 current interrupt (GFCI) protected outlet.
- Read through the operating instructions and safety information completely before using the rechargeable battery and charger of the TF16 series, TF24 series, or TF40 series cordless models.
- Work on electrical equipment must be done by a qualified electrician.
- Switch off the tool, allow it to run until it stops rotating and remove the plug from the power outlet or take out the rechargeable battery 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****Keep dry. Equipment and components are not waterproof.**

Do not use electric tools and rechargeable batteries 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 cutting insert while the tool is operating.
- Wear safety gloves.
- Do not remove chips or tubing from the work area when the tube facing tool is still running and the tool is not yet at rest.
- Wear safety gloves to remove chips. Remove long and bent chips with needle-nose pliers.

**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 facing 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.
- Use only the tube ODs, wall thicknesses and materials specified in these instructions. Other materials should be used only after consulting your authorized Swagelok representative.
- Check that the work piece is correctly clamped.
- Do not carry the tube facing 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).
- Ensure that the viewing window is closed (TF24 and TF40 series) or the guard is in place (TF16 series) before and during the facing of tubing.
- Always work with sharp cutting tools to reduce vibrations.
- Turn the tool off and let it run until it stops rotating when work is complete.

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



Fig. 1 RL 2002/96/EC Symbol



Fig. 2 Cd Symbol

Product Information

TF16 Series



Fig 3 TF16 Series Corded Model

- | | |
|----------------------------------|----------------------------------|
| 1 Collet housing | 5 ON-OFF lock |
| 2 Viewing window | 6 ON-OFF switch |
| 3 Feed dial with scale divisions | 7 Bench mount bracket (optional) |
| 4 Motor | 8 Tube clamp |



Fig 4 TF16 Series Cordless Model

- | | |
|----------------------------------|-------------------------------|
| 1 Collet housing | 5 Rechargeable battery |
| 2 Viewing window | 6 ON-OFF switch/speed control |
| 3 Feed dial with scale divisions | 7 Tube clamp |
| 4 Motor | |

TF24 Series

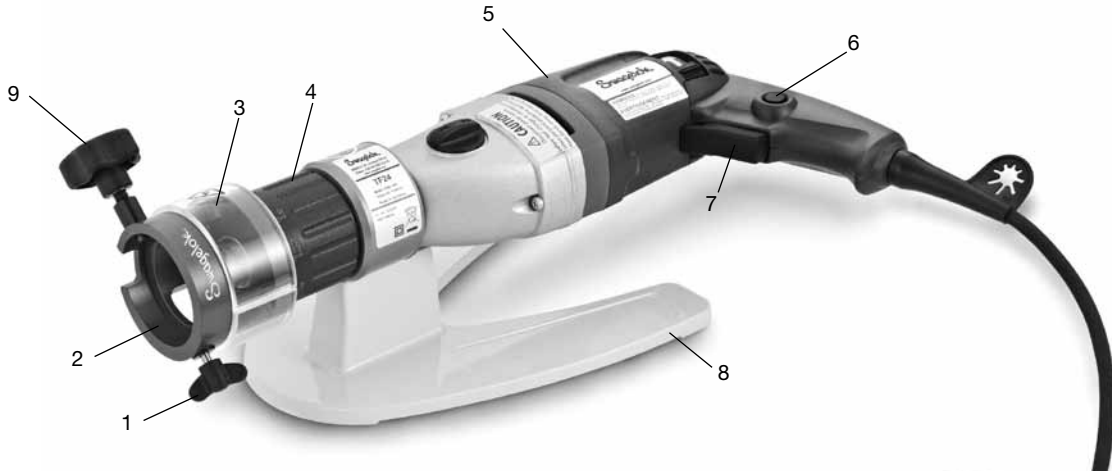


Fig 5 TF24 Series Corded Model

- | | |
|----------------------------------|----------------------------------|
| 1 Collet lock | 6 ON-OFF lock |
| 2 Collet housing | 7 ON-OFF switch |
| 3 Viewing window | 8 Bench mount bracket (optional) |
| 4 Feed dial with scale divisions | 9 Tube clamp |
| 5 Motor | |



Fig 6 TF24 Series Cordless Model

- | | |
|----------------------------------|-------------------------------|
| 1 Collet lock | 6 Rechargeable battery |
| 2 Collet housing | 7 ON-OFF switch/speed control |
| 3 Viewing window | 8 Tube clamp |
| 4 Feed dial with scale divisions | |
| 5 Motor | |

TF40 Series

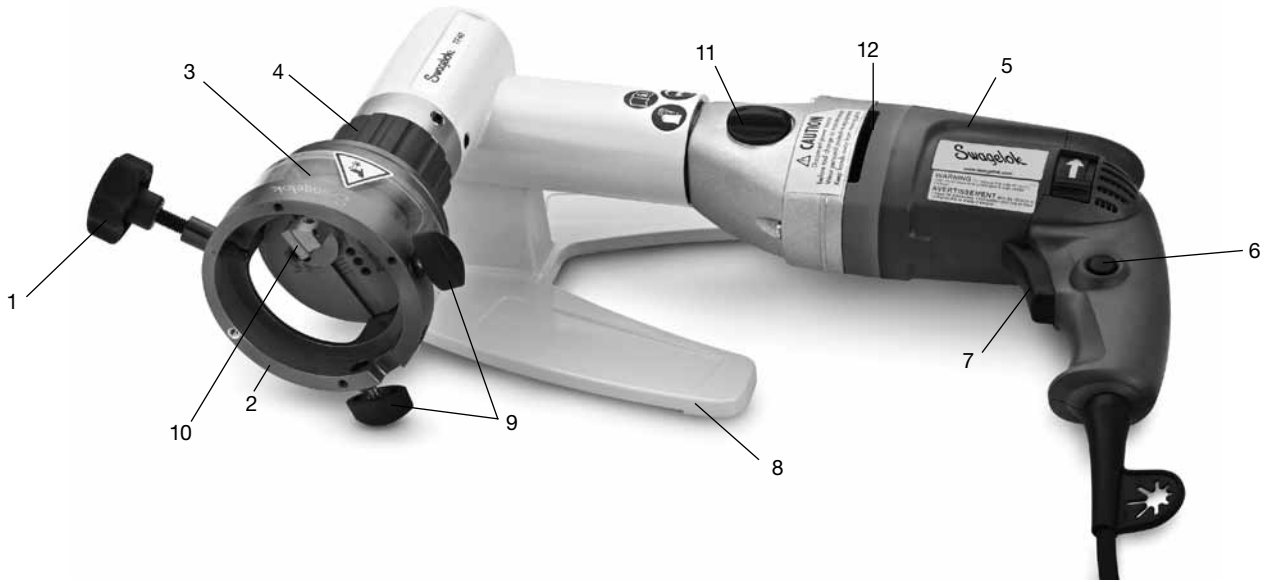


Fig 7 TF40 Series Corded Model

- | | |
|----------------------------------|-----------------------------------|
| 1 Tube clamp | 7 ON-OFF switch |
| 2 Collet housing | 8 Bench mount bracket (removable) |
| 3 Viewing window | 9 Collet locks |
| 4 Feed dial with scale divisions | 10 Tool holder and cutting insert |
| 5 Motor | 11 High/low motor setting dial |
| 6 ON-OFF lock | 12 Speed adjustment dial |

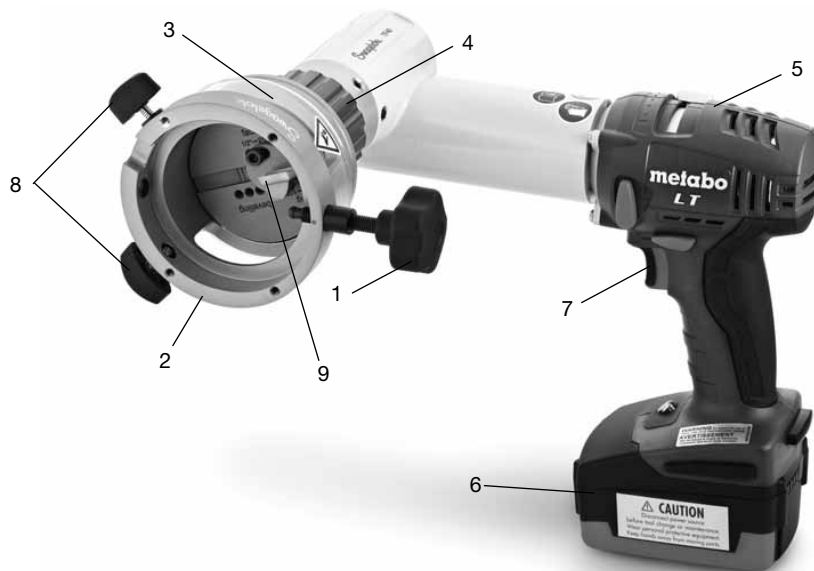


Fig 8 TF40 Series Cordless Model

- | | |
|----------------------------------|----------------------------------|
| 1 Tube clamp | 6 Rechargeable battery |
| 2 Collet housing | 7 ON-OFF switch/speed control |
| 3 Viewing window | 8 Collet locks |
| 4 Feed dial with scale divisions | 9 Tool holder and cutting insert |
| 5 Motor | |

Accessories

TF Series Cutting Insert

The cutting insert is supplied and can be used with all TF series tool holders.



Fig 9 Cutting Insert

Cutting Tool Holder for Beveling and Squaring

An adjustable tool holder is included with a Torx screw. Additional tool holders with different bevel angles are available.

Collet Set Adapter

This adapter is supplied as standard with the TF40 series. Using this adapter, the TF24 series collet sets can be used with the TF40 series, which extends the processing range to a minimum of 0.250 inch or 6 mm.

Included:

- 1 collet set adapter
- 1 clamping screw



Fig 10 Collet Set Adapter

Stainless Steel Collet Set

These are used for deformation-free clamping of tubing. They ensure precise mounting of tubing or Micro-Fit® fittings and a quick change of collet sets without tools. For use on all tubing materials with an OD from 0.125 to 2.500 in. or 3 mm to 63.5 mm.

See *Tube Facing Tools*, MS-02-426, for additional information on the optional accessories.



Fig 11 Stainless Steel Collet Set

Specifications

Application Range

Series	TF16	TF24	TF40
Tube OD min. to max. range	0.118 to 1.00 in. (3.0 to 25.4 mm)	0.118 to 1.50 in. (3.0 to 38.1 mm)	0.250 ^① to 2.50 in. (6.35 ^① to 63.5 mm)
Wall thickness max.	0.118 in. (3.0 mm)	0.118 (3.0 mm)	0.118 in. (3.0 mm)

① Requires optional collet set adapter.

Tube Materials

- Stainless steel
- Nickel alloys — Alloy 600, Alloy 625, Alloy 825
- Aluminum

Contact your authorized Swagelok representative for information on additional materials.

Technical data

Series	TF16	TF16 Cordless	TF24	TF24 Cordless	TF40	TF40 Cordless
Dimensions, in. (mm)	15.4 W, 7.87 H, 2.76 D (390 W, 200 H, 70 D)	10.3 W, 10.0 H, 3.15 D (261 W, 255 H, 80 D)	15.8 W, 13.8 H, 6.30 D (400 W, 350 H, 160 D)	10.8 W, 10.0 H, 3.54 D (275 W, 255 H, 90 D)	19.7 W, 11.8 H, 6.69 D (500 W, 300 H, 170 D)	10.2 W, 11.8 H, 12.6 D (260 W, 300 H, 320 D)
Weight Without Accessories, lb (kg)	9.13 (4.14)	6.35 (2.88)	10.4 (4.7)	7.58 (3.44)	14.6 (6.60)	11.5 (5.23)
Input voltage	Single-phase alternating current, protection class II 110 V 50/60 Hz 230 V 50/60 Hz					
Power, W	1100	–	1100	–	1100	–
Voltage Rechargeable Battery, V	–	18	–	18	–	18
Speed r/min	145 to 380	0 to 400	145 to 380	0 to 400	Speed 1: 9 to 52 Speed 2: 27 to 153	Speed 1: 0 to 24 Speed 2: 0 to 83
Sound Level (EN 23741), dB	approx. 78					
Vibration Level (EN 50144), m/s²	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Service Current Requirement A	10 minimum	–	10 minimum	–	10 minimum	–

Setup

Description

The tube facing tools are designed for facing and preparing tube ends or Micro-Fit fittings for welding in conformance with industry standards. They have the following features:

- A cutting tool with multiple cutting edges. Only one cutting tool is necessary for different tube wall thicknesses (up to 0.118 in./3 mm) and different tube materials (exclusively ferrous materials).
- A cordless model with:
 - A robust, removable battery that
 - is lithium-ion for extended operation time
 - has a charge level indicator
 - High performance and small size
 - No memory effect for the battery
 - Single-cell monitoring in the battery pack
 - Electronic overload protection with an integrated temperature monitor
 - Air-cooled technology for short charging times and a long service life
- A corded model with:
 - A speed-controlled electric motor with speed stabilization
 - Restart protection to prevent the machine from starting in an uncontrolled way after it has been reconnected to the electrical power or after a power failure
- A quick change system for collet sets
- A feed dial with scale divisions:
 - Total travel: 0.394 in. (10 mm)
 - Travel per rotation: 0.354 in. (9 mm)
 - Per graduation mark: 0.004 in. (0.1 mm)
- A viewing window that provides protection.

Unpacking the Tube Facing Tool

Shipping Case Contents

- 1 Tube facing tool
- 2 Rechargeable batteries, 1 battery charger (for cordless versions only)
- 1 Replacement breakaway nut
- 1 Tube clamp (TF24 series only)
- 1 Bench mount bracket (TF40 series only)
- 1 Collet set adapter (TF40 series only)
- 1 Tool holder with 1 cutting insert
- 1 Tool set (4 mm T-handle hex key, 3 mm hex key, T15 Torx driver)
- 1 Set of keys (2) for shipping case (TF16 and TF24 series only)
- 1 User manual

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

Installation of the Bench Mount Bracket

If needed, attach the bench mount bracket to the tube facing tool by tightening the screw with the provided 4.0 mm hex key.

Installation of the Cutting Insert and the Tool Holder

CAUTION

Do not touch the sharp cutting edges while mounting the multifunctional tool. Wear protective gloves.

Cutting Insert

Attach the cutting insert to the tool holder with the curved side of the insert away from the tool holder. Use the included T15 Torx driver to tighten the screw.



Fig 12 Installing the Cutting Insert

Tool Holder

Select a tool holder based on the tubing size.

Tool Holder Style	Possible Application		Bevel Angle [°]	TF16	TF24	TF40
	Squaring	Beveling		Tube OD, inch (mm)		
Standard	x	–	–	0.118 to 1.00 (3.0 to 25.4)	0.118 to 2.50 (3.0 to 63.5)	0.118 to 2.50 (3.0 to 63.5)
Optional	x	–	–	0.500 to 1.00 (12.7 to 25.4)	0.500 to 2.50 (12.7 to 63.5)	0.500 to 2.50 (12.7 to 63.5)
Optional	x	–	–	–	0.118 - 0.835 (3.0 to 21.2)	0.250 - 0.835 (6.35 to 21.2)
Optional	–	x	30°	1.00 (25.4) max.	1.378 (35.0) max.	2.374 (59.3) max.
Optional	–	x	35°	1.00 (25.4) max.	1.339 (34.0) max.	2.335 (60.3) max.

Contact your authorized Swagelok sales and service representative for information on optional tool holders.

WARNING

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

1. Install the tool holder into the tube facing tool lining up the hole on the tool holder with the screw hole in the center of the tube facing tool.



Fig 13 Installing the Tool Holder, TF16 and TF24 series

- TF40 series only: install the tool holder in one of the six screw locations according to the type of application.

The tool mounting plate of the TF40 offers different tool holder mounting options, according to type of application:

- Facing of 1/4 to 1/2 in. (6.35 to 12.7 mm)
 - Facing of 1/2 to 2 1/2 in. (12.7 to 63.5 mm)
 - Beveling, dimension range as per bevel tool
- Tighten the screw of the tool holder with the included 4.0 mm T-handle hex key.

Installing the Collet Set

- Select the correct collet set according to the tube OD. See **Installing the Collet Set Adapter** if necessary.
- Unscrew the collet lock:

TF16 series: Turn the collet lock counter clockwise until the end is flush with the inside of the collet housing.

TF24 and TF40 series: Turn the tube clamp counter clockwise until the end is flush with the inside of the collet housing. Then turn the collet lock(s) counter clockwise until the end(s) are flush with the inside of the collet housing.



Fig 15 TF16 Series, Step 2

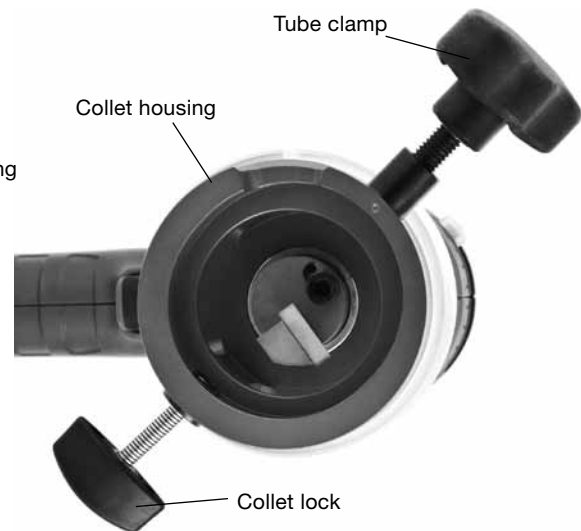


Fig 16 TF24 Series, Step 2



Fig 17 TF40 Series, Step 2



Fig 14 Installing the Tool Holder, TF40 series

3. Insert the collet set into the body by pressing the collet halves together and setting into the collet housing.

Note: TF24 and TF40 series, line up the unthreaded set point on the collet set with the red dot on the collet housing. (The collet lock will thread into the threaded hold on the other half of the collet set.)

Note: The collet set will lock into place when installed correctly. If the collet set is not locked, turn the collet set until it locks.



Fig 18 Step 3

4. TF16 series: Secure the collet set by turning the tube clamp clockwise until it stops.

TF24 and TF40 series: Secure the collet set by turning the collet lock(s) clockwise one turn. Turn the tube clamp clockwise until it stops.

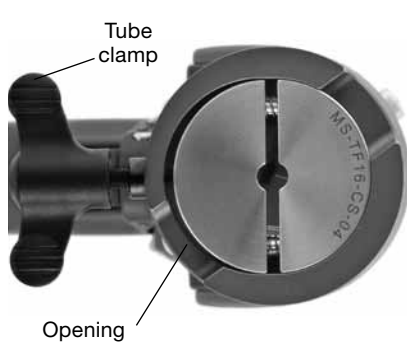


Fig 19 TF16 Series, Step 4

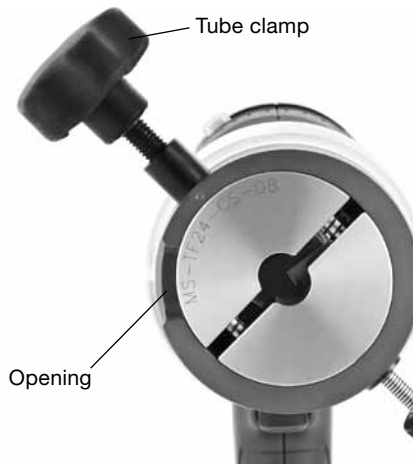


Fig 20 TF24 Series, Step 4



Fig 21 TF40 Series, Step 4

Removing the Collet Set

To remove a collet set, loosen the collet lock(s) and tube clamp until the collet set can be removed by pressing the collet set halves together through the opening in the collet housing.

Installing the Collet Set Adapter for TF40 Series

NOTICE

Using the collet set adapter could interfere with the tool holder and damage the tool. Check the tool holder prior to installing the adapter.

1. Install when cutting tube with an outer diameter of 0.250 to 1.5 in. or 6 to 35 mm.
2. Turn the tube clamp until the end is flush with the inside of the collet housing.
3. Turn the collet locks until the ends are flush with the inside of the collet housing.



Fig 22 TF40 series

4. Install the collet set adapter into the tube facing tool. The opening in the adapter should be flush with the opening in the tool.



Fig 23 Inserting the Collet Set Adapter

5. Secure the collet set adapter by turning the collet locks.
6. See **Installing the Collet Set** to install the collet set.

Operation

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

Clamping the Tube

CAUTION

Support long pieces of tubing with suitable fixtures. Injury from tilting tool and/or tilting tubing could result.

CAUTION

Verify that the tube facing tool is not rotating before clamping the tube.

NOTICE

The cutting tool can be damaged by incorrect set up. Before clamping the tube, verify there is space between the cutting insert and the tube.

1. Insert the tube in the collet set of the tube facing tool.
2. Secure the tube by turning the tube clamp clockwise until it stops.

Note: Clamp the tube squarely, ensuring that the tube and the face of the collet set are perpendicular to each other. The tube end will not have a right angle cut when not clamped properly.





Fig 24 Clamping the Tube

Removing the Tube

To remove the tube from the facing tool, rotate the tube clamp counterclockwise until the tube is loose enough to remove.



Tool Speed Range

Selecting the Speed Range

Series	Speed range, rpm	
	Level 1  Turtle	Level 2  Rabbit
TF16	145 to 380	(disabled)
TF16 Cordless	0 to 400	(disabled)
TF24	145 to 380	(disabled)
TF24 Cordless	0 to 400	(disabled)
TF40	9 to 52	27 to 153
TF40 Cordless	0 to 24	0 to 83

TF40 Series Only

There are 2 speed levels. It is recommended that you work exclusively at the Level 1. Increase or decrease the speed by turning the high/low motor setting dial.

Speed Level	Speed, rpm
Level 1  Turtle	9 to 52
Level 2  Rabbit	27 to 153

Adjusting the Speed: Corded Models

Set the speed by turning the speed dial.

TF16		TF24		TF40	
Level	Tube OD inch (mm)	Level	Tube OD inch (mm)	Level	Tube OD inch (mm)
C	0.125 (3.18)	C	0.125 (3.18)	G	0.250 (6.35)
B	0.250 (6.35)	B	0.250 (6.35)	D	1.500 (38.1)
A	0.500 (12.70)	A	0.500 (12.7)	C	2.000 (50.8)
A	1.000 (25.4)	A	1.500 (38.1)	B	2.500 (63.5)



Fig 25 High/low Motor Setting Dial



Fig 26 Speed Adjustment Dial

Adjusting the Speed: Cordless Models

The speed level is factory set in cordless models. See the table on the previous page for speed range information.

The speed range can be adjusted with the ON-OFF switch/speed control.

- Depress the ON-OFF switch/speed control to increase the speed.
- Gradually release the pressure on the ON-OFF switch/speed control to decrease the speed.



Fig 27 ON-OFF Switch/Speed Control

Facing the Tube



WARNING

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



WARNING

Do not touch the tool holder or cutting insert while the tool is in operation.



WARNING

Only operate the tool with a clamped tube (all series) and a closed viewing window (TF24 and TF40 series).



WARNING

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



WARNING

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



WARNING

Wear safety gloves to remove chips. Remove long and bent chips with needle-nose pliers or a similar tool.

NOTICE

Excessive feed of the cutting insert into the tube can damage the cutting tool or cause the tool to overheat.

NOTICE

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

NOTICE

If speed is reduced too quickly, the tool may “dig” into the tube, causing damage to the tube face and the tool, and may cause the tool to stop. Reduce the feed rate of the cutting insert and the tool speed gradually.

NOTICE

Verify the motor is in drill mode if the motor is equipped with a hammer mode. Operating the tool in hammer mode will cause damage to the tool and the tube.

Turning “On” Corded Models

1. TF24 and TF40 series: Check that the viewing window is closed, close if necessary.
2. Set the desired speed via the speed adjustment dial.
3. Activate the ON-OFF switch.

Note: If the tool vibrates after starting, the cutting speed is too high. Reduce the speed according to **Adjusting the Speed**.

Turning “On” Cordless Models

1. TF24 and TF40 series: Check that the viewing window is closed, close if necessary.
2. Attach the rechargeable battery.
3. Activate the ON-OFF switch/speed regulator.

Note: If the tool vibrates after starting, the cutting speed is too high. Reduce the speed according to **Adjusting the Speed**.

Facing the Tube

- Each division on the feed dial with scale adjustments equals an advancement of 0.004 in. (0.1 mm).
 - It is recommended not to exceed a clamp thickness of 0.002 in. (0.05 mm) with chip removal. Excessive feed levels will reduce the speed or stop the machine.
1. Slowly advance the cutting insert until it is in contact with the tube.
 2. Continue advancing the cutting insert until the desired result is achieved.

Note: To achieve the optimum squareness and finish, the tool should be allowed to rotate for 2 to 3 revolutions without further advancement of the cutting insert.

3. Release the ON-OFF switch.
4. Remove the tube by turning the tube clamp counter clockwise until it stops.



Fig 28 Speed Adjustment Dial



Fig 29 Attaching the Battery

Operating in Space-Restricted Environments

To make operation easier, the position of the machine with respect to the tube can be changed as follows:

Change Position of Motor

1. Remove the set screw on the back of the tool body.
2. Rotate motor to desired position.
3. Reinstall and tighten the set screw using the provided 3 mm hex key.

Change Position of Body (TF40 Series Cordless Only)

1. Remove the set screw on the underside of the tool.
2. Rotate body in 90° increments until in the desired position. Pay attention to the countersinks in the tool.
3. Reinstall and tighten the set screw using the provided 3 mm hex key.



Fig 30 Drive Position Set Screw



Fig 31 Body Position Set Screw

Maintenance

WARNING

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

When cleaning the tube facing tool, clear the collet set and tool body of debris and dirt.

When changing the cutting insert, clean the tool holder and inspect it for damage.

Breakaway Nut Replacement

Note: The ordering number for a replacement breakaway nut is MS-TF-NUT-SQ.

1. Verify the tool is unplugged or remove the battery.
2. Loosen the M5 × 16 set screw using the provided 4 mm hex key.
3. Remove the collet housing half of the tool.
4. Remove the breakaway nut using a 15 mm wrench.
5. Install the new breakaway nut. Securely tighten the breakaway nut to the motor shaft.
6. Replace the collet housing half and tighten the M5 × 16 set screw.
7. For cordless models, replace the battery.



Fig 32 Loosening the Set Screw



Fig 33 Removing the Collet Housing Half of Tool



Fig 34 Removing the Breakaway Nut



Fig 35 Breakaway Nut Removed from Tool

Troubleshooting

Problem	Cause	Remedy
Cutting insert is causing a "step" during facing.	The tube has been fed too far into the tool or the battery is almost completely discharged.	Take tube out of the tool and disassemble the tool holder.
		Remove chips using pliers. File down the step.
	Cutting insert or tool holder is loose.	Slowly advance the cutting insert towards the tube during new cutting.
Cutting insert does not rotate.	Battery completely discharged.	Tighten the cutting insert or the tool holder.
		Charge battery (refer to attached operating instructions of the charger).
	Battery not inserted properly	Use spare battery.
The motor is not running but the signal indicator lights up.	Breakaway nut has broken.	Completely remove the battery and then reinsert.
	Quick flashing light - The restart inhibitor has activated.	Replace the breakaway nut. See Maintenance .
	Slow flashing light - The carbon brushes are worn out.	Switch the tool off and back on. For safety reasons, the tool will not restart automatically after a power failure.
Tool has excessive vibration.	Constant light - The motor has overheated.	Have the carbon brushes replaced by your authorized Swagelok sales and service representative.
	Speed is too high.	Unplug the tool and allow it to cool.
The finished tube face is not smooth or has a large burr.	Axial or radial play in the components.	Reduce the speed.
	Cutting insert is loose.	Check that the collet set is properly secured.
	Cutting insert is worn.	Tighten the cutting insert.
		Replace the cutting insert.

Warranty Information

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