Operation Manual

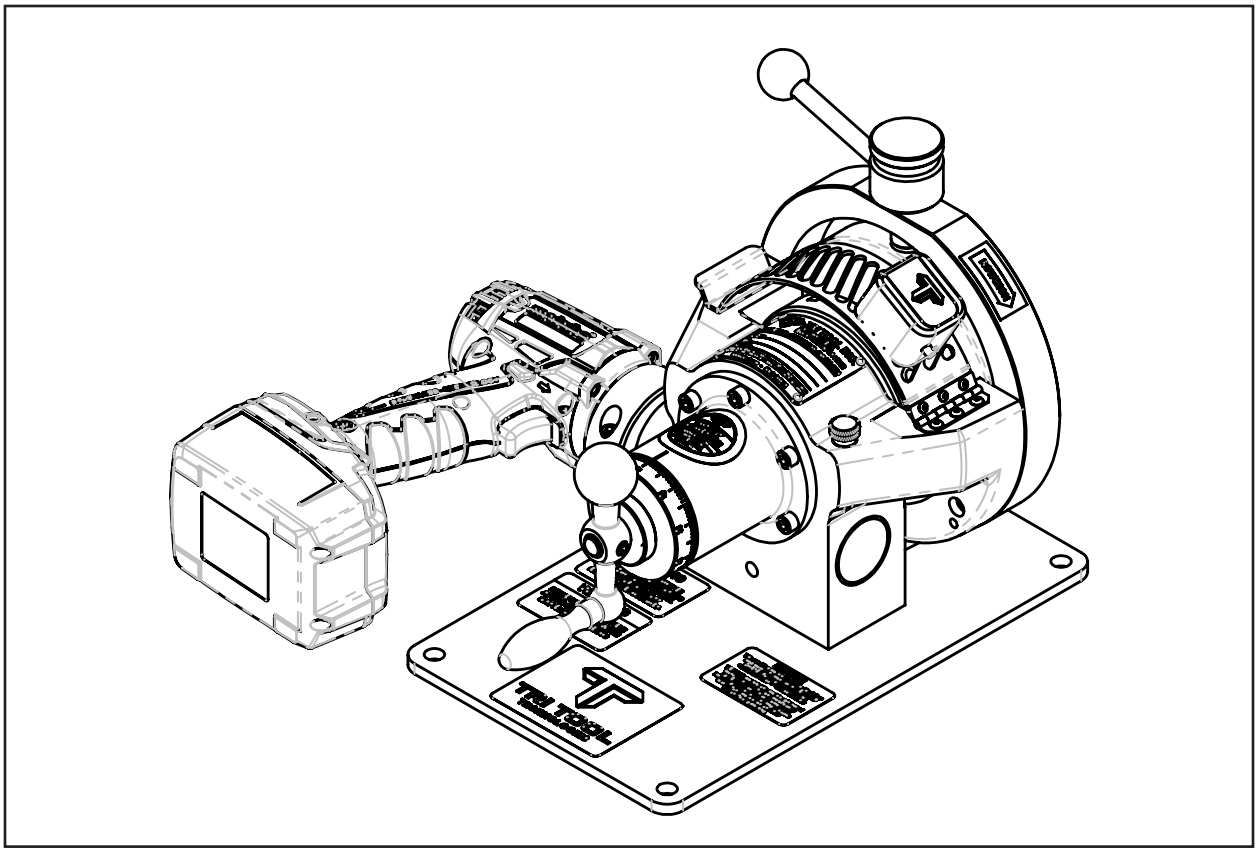
92-0749 Rev. 250414
Model STS-4 Tube Squaring Machine

TRI TOOL TECHNOLOGIES

ABOUT TRI TOOL TECHNOLOGIES

At Tri Tool Technologies, we are committed to your success through relentless innovation and powerful partnership. We insist on developing tools and equipment that exceed your expectations of performance, precision, safety, and durability. As a full-service engineering firm, we are here to support you every step of the way.

For more information on engineered solutions, products, and trainings, visit tritool.com or contact our engineers at +1 (916) 288-6100.



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Tri Tool Technologies Warranty

LIMITED WARRANTY: All products manufactured by Seller are warranted to be free from defects in materials and workmanship under normal use. The period of this warranty shall be three years from the date of shipment for all products, except for welding and Non-Standard Products which shall be one year from the date of shipment. The Buyer shall bear all shipping, packing and insurance costs and all other costs to and from a designated repair service center. All return goods must be authorized in advance and communicated upon issuance of a Return Material Authorization (RMA) by Seller. The product will be returned to the Seller accompanied by a RMA number and associated paperwork, freight prepaid and billed to the Buyer. This warranty is not transferable and will not apply to tool bits or other consumables, or to any Goods to have been (i) mishandled, misused, abused or damaged by Buyer or any third party; (ii) altered without the express permission in writing by Seller, (iii) repaired by a party other than Seller without Seller's prior written approval; or (iv) improperly stored, installed, operated, or maintained in a manner inconsistent with Seller's instructions. This warranty does not apply to defects attributed to (i) normal wear and tear or (ii) failure to comply with Seller's safety warnings.

No warranty for any parts or other supplies provided to seller by buyer, whether or not they are incorporated into goods. Goods supplied by seller which are designed or manufactured by a third party are subject strictly to the third party's warranty for those goods. Seller makes no warranty and disclaims all statutory or implied warranties for these goods, including the implied warranties of merchantability, freedom from patent infringement and fitness for a particular purpose.

Neither this warranty nor any other warranty, expressed or implied, including implied warranties of mechanical ability, fitness for a particular use, or merchantability, shall extend beyond the warranty period. No responsibility is assumed for any incidental or consequential damages. Some states do not allow limitations on how long an implied warranty lasts and some states do not allow the exclusion or limitations incidental or consequential damages, so the above limitation of exclusion does not apply to all Buyers. This warranty gives the Buyer specific legal rights. Other rights vary from state to state.

Warranty Claims and Remedies

Buyer must promptly notify Seller in writing during the applicable warranty period, of any defective Goods covered by Seller's warranties under the Limited Warranty section herein, and no later than fifteen (15) calendar days after discovery of the defect. Seller has no obligation to honor any warranty claim made after the expiration of the warranty period. However, despite the expiration of the warranty period, Seller, at its reasonable discretion, may accept warranty claims submitted up to fifteen (15) calendar days after the expiration of the warranty period provided that Buyer provides Seller with credible and persuasive documentary evidence that the defect was discovered during the warranty period. No warranty claims submitted after this fifteen (15) day calendar period will be considered by Seller.

Buyer's notice of a defective Goods must identify the specific Goods affected, and the nature of the defect. It is required when returning the defective Goods, that it is suitably packed, fully insured, and transportation and insurance prepaid in accordance with instructions issued by Seller. Seller, at its sole option, will either repair or replace any Goods authorized for return to Seller. Such repair, replacement, or credit shall be Buyer's sole remedy for defective Goods. Buyer must promptly provide Seller with all information requested regarding the identified defect.

If the defect claimed by Buyer cannot be reproduced or otherwise verified by Seller, the Goods will be returned to Buyer unmodified at Buyer's expense.

The warranty period for repaired or replaced Goods shall be (i) ninety (90) days or (ii) the unexpired portion of the original warranty period. Under no circumstances is Seller liable for recall, retrieval, removal, dismantling, re-installation, redeployment, or re-commissioning of any defective Goods or any costs associated therewith.

Tool Bit Resharpening Policy

Buyer is required to check all tool bits prior to returning and ensure they are packaged well for shipment. The price structure is available from the Seller's sales coordinator. Seller cannot resharpen badly gouged, chipped, or broken tool bits. Seller will return tool bits that are not suitable for resharpening with the tool bits that were resharpened upon Buyer's request. Buyer is responsible for all shipping charges to and from Seller.

1. ABOUT THE MANUAL

Copyright

Disclaimer

The instructions and descriptions in this manual were accurate when the manual was written. However, the information in the manual is subject to change without notice. Check for updated information before you start any job. The Tri Tool Technologies web site has the most current information.

Do not operate or work on this equipment unless you have read and understood the instructions in this Manual. Failure to follow the instructions or follow the safety instructions could result in serious injury or death. This manual describes conditions and hazards that are common and anticipated during equipment operation. No manual can address all conditions which may occur.

Safety Symbols

The manual may contain one or more safety symbols. These symbols and the associated text warn you of potentially hazardous conditions. Examples of the safety symbols and the associated text follow:

DANGER

DANGER: Indicates a hazardous situation that, if not avoided, will result in serious injury or death.

WARNING

WARNING: Indicates a hazardous situation that, if not avoided, could result in serious injury or death.

CAUTION

CAUTION: Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury, or cause property damage.

GLASSES

SAFETY GLASSES: Indicates a hazardous situation that requires the use of safety glasses.

HOT SURFACE

HOT SURFACE: Indicates a hazardous situation that hot surfaces may be present.

GLOVES

GLOVES: Indicates a hazardous situation that requires glasses.

SHOCK HAZARD

ARC FLASH & SHOCK HAZARD: High voltage. Entry by authorized personnel only. Appropriate PPE and tools required when working on this equipment.

READ MANUAL

READ MANUAL: Read manual before use, refer to manual for Tri Tool Technologies machine being used.

DISCONNECT FROM POWER

DISCONNECT FROM POWER: Disconnect main plug from electrical outlet before performing all maintenance.

2. SAFETY PRECAUTIONS

In General

Use standard safety equipment such as: hard hats, safety shoes, safety harnesses, protective clothes, and other safety devices when appropriate.

Operate this tool only in accordance with specific operating instructions.

WARNING: Do not override the deadman switch on the power unit. Locking down, obstructing, or in any way defeating the deadman switch on the power drive unit may result in serious injury.

Personal Protective Equipment

Use standard safety equipment such as: hard hats, safety shoes, safety harnesses, protective clothes, and other safety devices when appropriate.

Wear safety glasses.

Do not wear loose clothing or jewelry.

Wear nonskid footwear.

Put long hair in a cap or a net to make sure hair does not get tangled in equipment.

Personnel

Only personnel who are trained or are being trained may operate the equipment.

Keep the operation manual available where the equipment is used.

The operator must read the operation manual before using the equipment.

The equipment must be operated in accordance with the manual information.

The operator must follow the safety precautions in this manual and good engineering practices to reduce the risk of injury.

Before using the equipment, the operator must ensure that all safety messages on the equipment are legible.

Work Area

Keep the work area clean.

Keep the area well lit.

Keep items such as electrical cords, cables, rags, rigging straps, away from rotating equipment.

Do not use power-cutting tools in the presence of flammable liquids and gases.

Do not let visitors or untrained personnel near tools that are in use.

Ensure all observers wear eye protection.

Keep proper footing at all times.

Area Equipment

Secure the pipe with clamps, vises, chains or straps.

Ensure that both sides of the pipe at the cut site are fully supported so that the pipe will not move after the cut is completed. Long lengths of pipe may be under load and the separation of the pipe can release pressure. This pressure can cause both sides of the pipe to move.

Tool Care

Keep tools in good operating condition. Sharp tool bits perform better and are safer than dull tool bits.

Do not use damaged tools. Always check your tools for damage especially if a tool has malfunctioned, been dropped or hit, check it for damage.

Before you start operating the equipment, do no-load tests and feed function checks.

Tool Use

Use the right tool and tool bit for the job. Contact Tri Tool Technologies to help with your application.

Keep the tool bits fully engaged in the tool bit holders. Loose bits are sharp and can cause cuts or punctures.

Disconnect power supply during setup and maintenance. Use all ‘Stop’ or Shut off’ features available when changing or adjusting tool bits, maintaining the tool, or when the tool is not in use.

Remove adjusting keys and wrenches before applying power to the equipment. Check the tool before turning it on to make sure that all keys and wrenches have been removed.

Do not force tools. Tools and tool bits function better and safer when used at the recommended speeds.

Do not reach into rotating equipment.

Do not reach into the rotating head stock to remove chips, to make adjustments, or to check the surface finish.

Handle chips with care. Chips have very sharp edges and are hot. Do not try to pull chips apart with bare hands.

Store tools properly. Disconnect tools from the power source, remove the tool bits, and store in a safe place.

3. GENERAL DESCRIPTION

The Model STS-4 Tube Squaring machine is a lightweight, portable machine designed for facing and squaring .25” (6.35mm) to 4.50” (114.30mm) outside diameter tubing up to .250” (6.35mm) wall thickness.

Design and Operation Features

The Model STS-4 is available with a 115 VAC or 230 VAC integral, dual range, variable speed electric drive motor (corded or cordless).

The Model STS-4 features quick changing Saddle Sets (no tools required) and a .001” (.025mm) graduated feed dial.

The precision inside diameter saddles hold the tubing round to accurately square and face the tubing with minimum burr.

The Model STS-4 accepts its torque through the Saddle Clamping System.

The Cutting Head accepts up to three tool bits for a combination of squaring, beveling, counterboring, or facing operations simultaneously.

The Saddle Sets are made from stainless steel for durability and to avoid carbon contamination of high purity tubing.

All required wrenches for operation are supplied with the machine.

The Model STS-4 may be removed from the stand and used as a portable machine.

4. SPECIFICATIONS

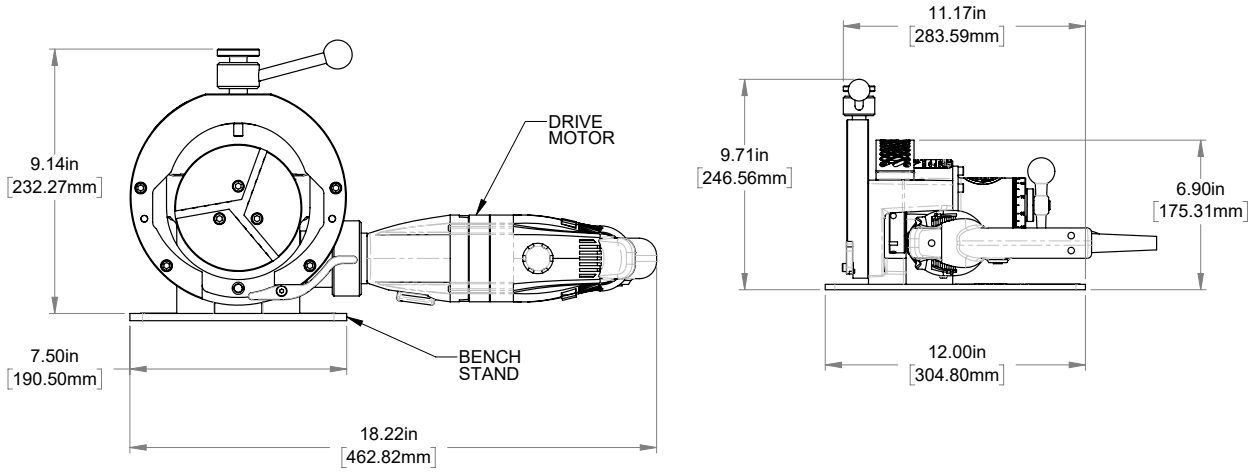


Figure 1: Model STS-4 w/ Corded Electric Motor

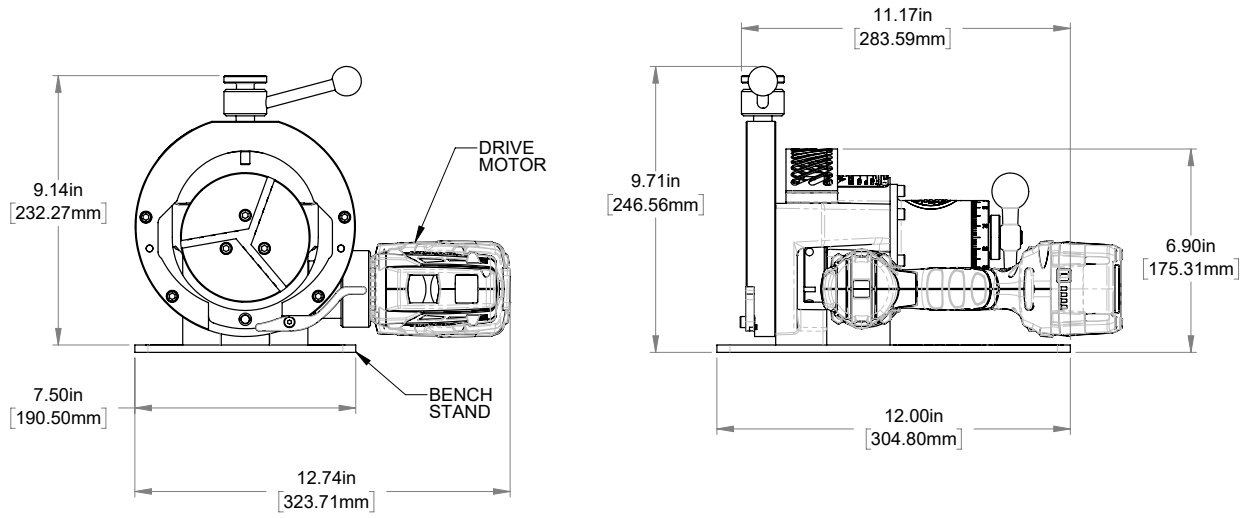


Figure 2: Model STS-4 w/ Cordless Electric Motor

Weight (approximate)

Base Machine	12.7 lbs. (5.7 Kg)
Corded Metabo Motor	5.6 lbs. (2.5 Kg)
Cordless Metabo Motor	4.2 lbs. (1.9 Kg)
Corded Makita Motor	4.0 lbs. (1.8 Kg)

Drive System

- Variable Speed Electric Drive Motor (corded or cordless)

Power Requirements

Electric Drive Motor

- 115VAC 50/60 Hz 9.6 Amp Metabo Corded Motor Assembly
- 230VAC 50/60 Hz 5.7 Amp Metabo Corded Motor Assembly
- 100VAC 50/60 Hz 7.2 Amp Makita Corded Motor Assembly (Japan)
- 18VDC Metabo Brushless Cordless Motor Assembly with 115VAC Charger
- 18VDC Metabo Brushless Cordless Motor Assembly with 230VAC Charger (Type C or G)
- 18VDC Metabo Brushless Cordless Motor Assembly with 100VAC Charger (Japan)

Feed

The manual feed handle is mounted at rear of tool. It provides .560” (14.2mm) of axial feed.

Mounting

Manual saddle clamping system

Speeds

Speed Control:

- Dual range, variable speed electric drive

Electric Drive Cutting Head Speeds:

- Corded

Free Speed (Gear 1)	15-70 RPM
Free Speed (Gear 2)	42-200 RPM

- Cordless

Free Speed (Gear 1)	0-31 RPM
Free Speed (Gear 2)	0-107 RPM

Cutting Capacities

Basic Pipe Sizes

- 1/8” through 3/8” pipe — All Schedules
- 1/2” through 1 1/4” pipe — Schedule 5 through Schedule 160
- 1-1/2” through 2” pipe — Schedule 5 through Schedule 80
- 1-1/2” through 4” pipe — Schedule 5 through Schedule 40

Basic Tube Sizes — .250” (6.35mm) to 4.50” (114.30mm) OD

Wall Thickness Capacity — Basic Tubing with a maximum wall thickness of .250” (6.35mm)

Material Cutting Capabilities

Mild steels, chrome steels (Rc 35 max.), stainless steel, copper-nickel and aluminum without limitations other than size and wall thickness as specified.

Inconel and some other high-temperature alloys may require special procedures as a function of wall thickness and type of end preparation. Contact the Tri Tool Technologies Engineering Department for details.

5. MAINTENANCE

General Maintenance Information

- Keep all equipment in good working condition and inspect it regularly.
- If the equipment is not in good working condition, promptly repair it or withdraw it from service.
- Use only Tri Tool Technologies replacement parts for repairs.

Daily/Starting Shift/Installation

- Clean all components.
- Coat all components with a light film of oil. Use a clean, non-detergent oil, preferably SAE 10 (90 SSU) or lighter.
- Report defects.

6. OPERATION

WARNING: Do not override the deadman switch on the power unit. Locking down, obstructing, or in any way defeating the deadman switch on the power drive unit may result in serious injury.

Placement Of Tool BIts

1. Loosen the cap screw in the Clamp Bracket and rotate the Motor Handle to the desired position.
2. Tighten the cap screw before turning the motor on.
3. Select the Tool Bit(s) required to machine the end configuration desired, refer to TOOL BITS section. When performing a tube squaring operation, install the Tool Bit in any of the three Cutting Head slots.
    - When performing any separate machining operation such as facing, beveling, or counterboring, install the Tool Bit in any one of the three Cutting Head slots.
    - When performing any multiple machining operation such as facing, beveling or counter-boring, install the tool bit with one in each slot.

The use of dull Tool Bits or Tool Bits not manufactured by Tri Tool Technologies may result in poor performance and may constitute abuse of this machine and therefore voids the Tri Tool Technologies factory warranty.

4. Insert the Tool Bit(s) into the slot(s) in the Cutting Head.
5. The cutting edge of the Tool Bit(s) must be located on the radial centerline. Do not install the Tool Bit(s) backwards.
6. Tighten the set screws to secure the Tool Bit(s) to the Cutting Head.
7. Adjust the Counterboring Tool Bit radially to control the counterbore diameter.

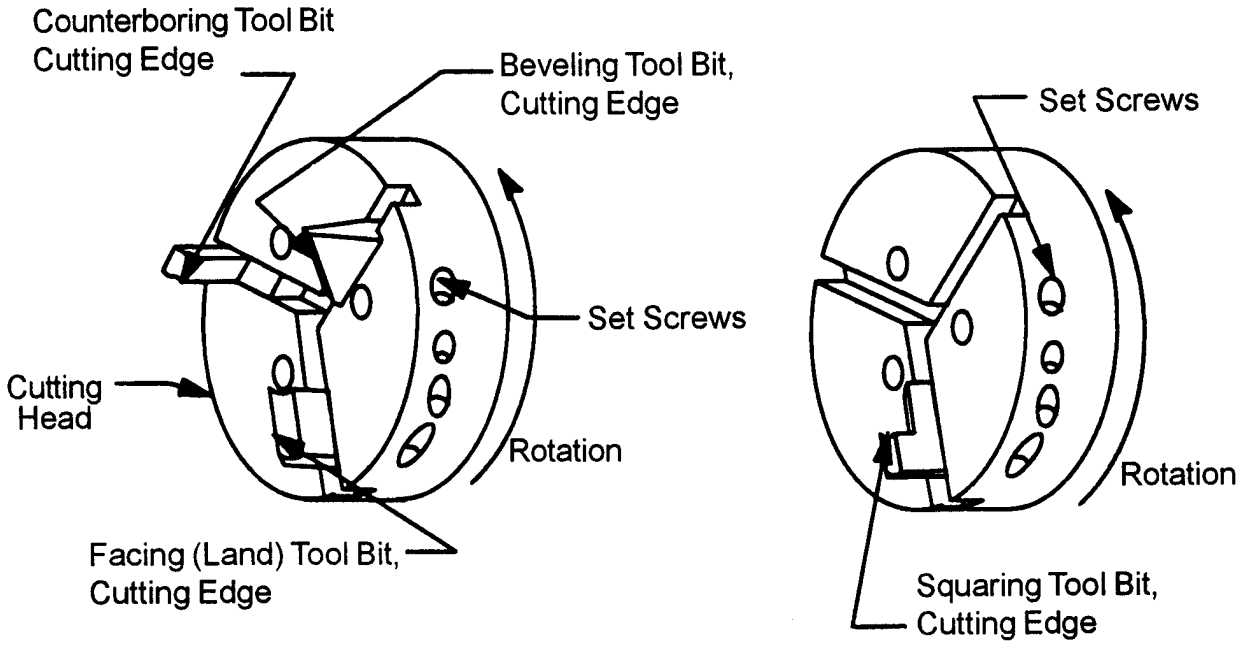


Figure 3: Tool Bit Placement in the Cutting Head

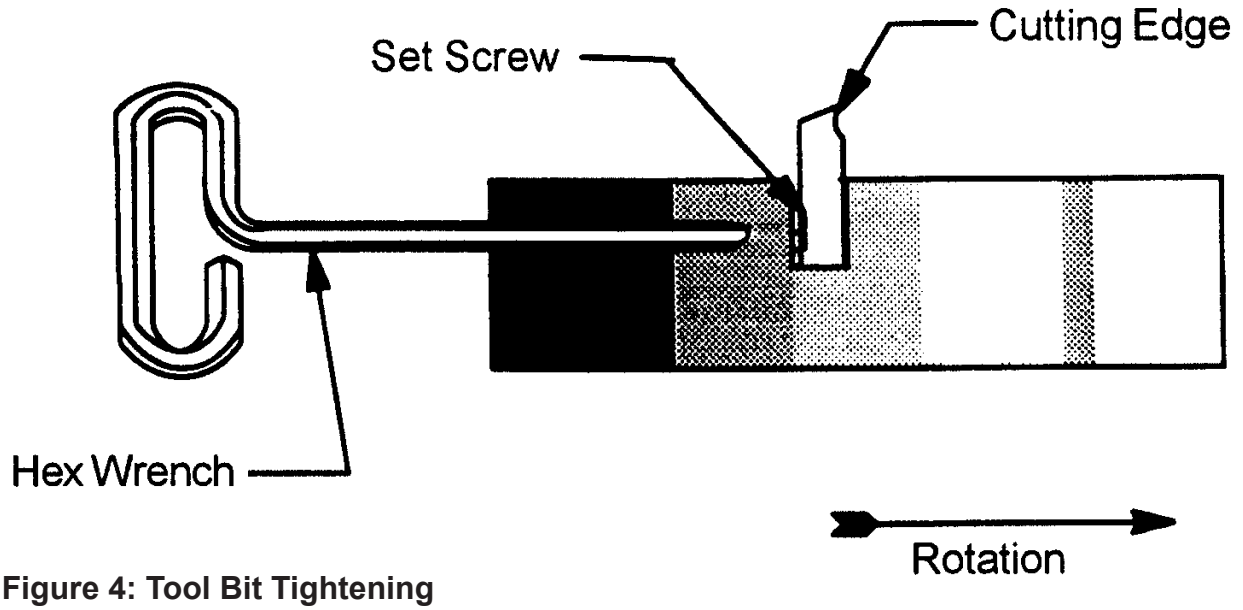


Figure 4: Tool Bit Tightening

Install The Saddles

1. Select the desired Saddle size for the pipe or tube, Refer to SADDLE SETS section.
2. Insert the upper Saddle half into the machine and thread the Saddle Locking Screw into the Saddle.
3. Raise the top Saddle using the Saddle Handle Assembly.
4. Insert the lower Saddle half and snap into place.
5. Place the pipe or tube into the Saddles.
6. Verify a clearance of 1/8” (3mm) between the Tool Bit(s) and the pipe or tube face as held by the saddles.
7. Tighten the upper Saddle using the Saddle Handle Assembly to secure the pipe or tube once the proper clearance has been verified.
8. Make sure there is a light film of grease on the Saddle Handle Assembly threads at all times to prevent them from galling or freezing during use.

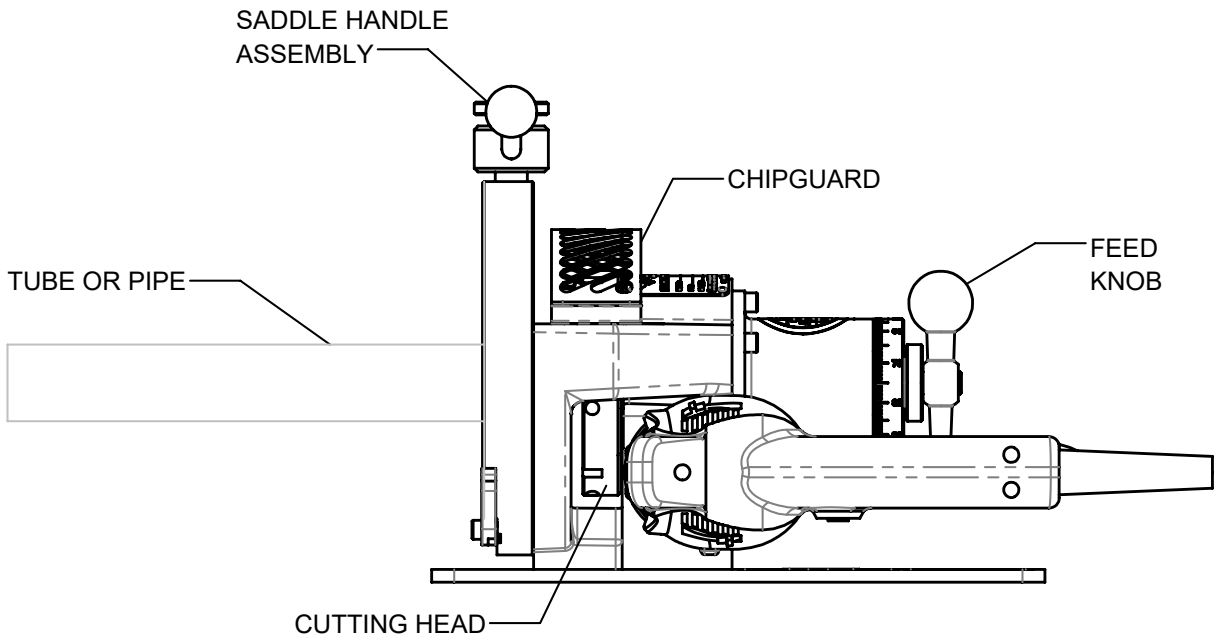


Figure 5: Secure the Pipe/Tube

Adjust The Motor Orientation (Cordless Motor)

1. Loosen the Collar Bolt with hex wrench (refer to Fig. 6).

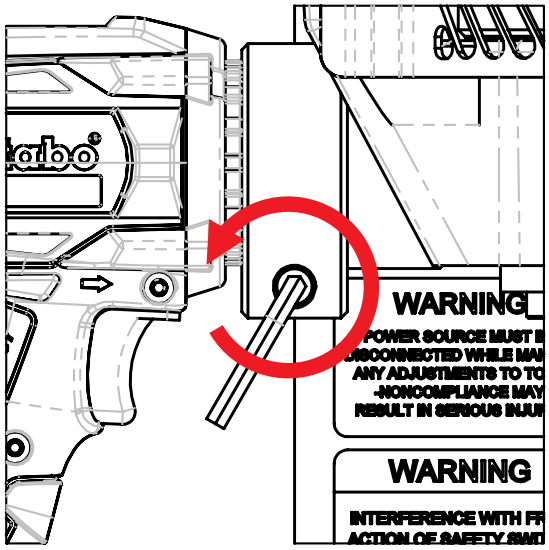


Figure 6: Collar Bolt Location

2. Rotate the Motor Assembly to desired angle (refer to Fig. 7).

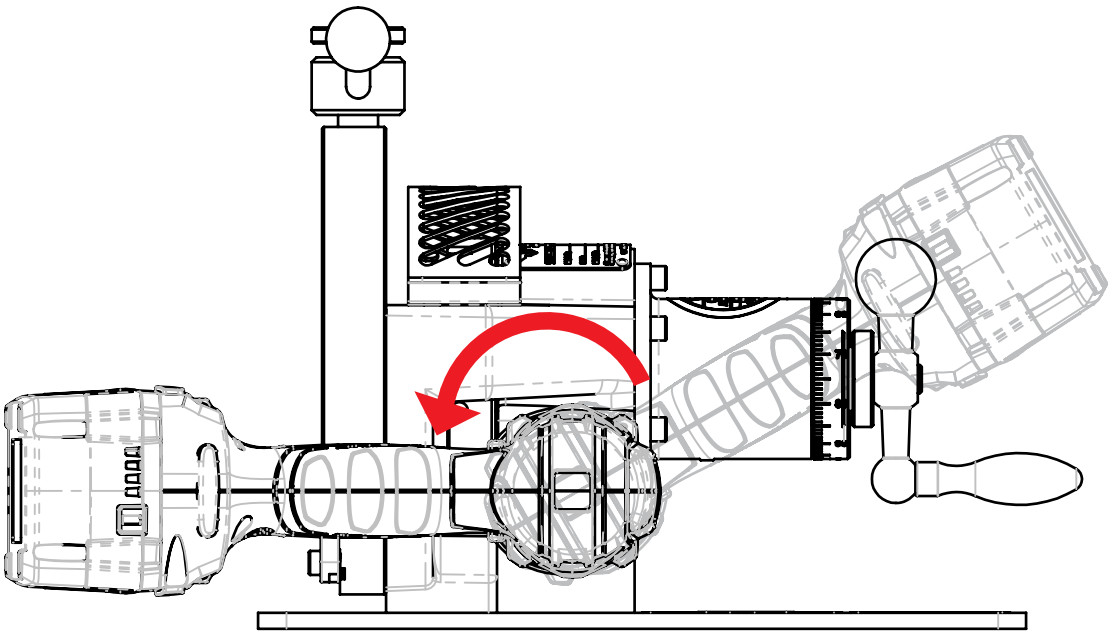


Figure 7: Motor Assembly Rotation

3. Tighten the Collar Bolt to secure the Motor Assembly.

Make The Cut

1. Connect the proper power supply.
2. Use the variable speed control knob on the top of the motor to adjust the cutting speed.
3. Rotate the Feed Handle clockwise to bring the Cutting Head and tube closer together. The machining operation begins when the Tool Bit contacts the tube or pipe.
4. If the tube end is not square to the tube axis, the Tool Bit will contact only a small segment of the tube during each revolution.
5. To avoid Tool Bit damage, use a slow feed rate until the Tool Bit is contacting the pipe continually during at least one revolution. Refer to CUTTING SPEEDS AND FEEDS section.
6. Continue rotating the Feed Handle clockwise until the end of the pipe is completely machined. Do not let the Tool Bit(s) cut into the Saddles or the Saddle Adapter.
7. Discontinue the feed and allow the Cutting Head to rotate one (1) to three (3) revolutions to improve the finish of the prep surface.
8. Rotate the Feed Handle counterclockwise to separate the Cutting Head from the tube.
9. Stop the tool rotation by releasing the Motor Trigger Switch.
10. Rotate the Feed Handle counterclockwise until the Cutting Head clears the tube or pipe by at least 1/8” (3mm) or more.
11. Loosen the upper Saddle by rotating the Saddle Handle Assembly. This will release the tube.

7. CUTTING SPEEDS AND FEEDS

Use the following table to select an RPM to obtain specified Tool Bit surface cutting speed on the surface of the pipe.

Tube Size		RPM for 200 in/min (5080 mm/min)	RPM for 250 in/min (6350 mm/min)	RPM for 300 in/min (7620 mm/min)
1.00"	25.4mm	64	79	95
2.00"	50.8mm	32	40	48
3.00"	76.2mm	21	27	32
4.00"	101.6mm	16	20	24
4.50"	114.3mm	14	18	21

Use 200 surface inches per minute (508 surface centimeters per minute) for:

- Stainless steels in general when no coolant is allowed, all heavy-wall tube and some of the chrome/molybdenum steels.

Use 250 surface inches per minute (635 surface centimeters per minute) for:

- Mild steels and some thin wall stainless steels when coolants are permitted and applied.

Use 300 surface inches per minute (762 surface centimeters per minute) for:

- Aluminum and thin-wall mild steel and tube with coolants.

Basic Feed Recommendations

Use very light feed for initial cutting or until a continuous cut is established. This is important for longer Tool Bit life when cutting through flame cut or out of square tube ends.

Use a feed rate .003” to .006” (.08mm to .15mm) per revolution afterwards, to establish a continuous chip cut.

- If the feed is too light, only light stringer chips will be removed.
- If the feed is too heavy, the drive will start to overload and the chip will start to have a rough or torn appearance.

Stainless, which work hardens, must be worked with a heavy enough feed to stay under the work hardened surface.

One revolution of the feed handle advances the Cutting Head .100” (2.5mm).

Never allow the Tool Bit to burnish the surface.

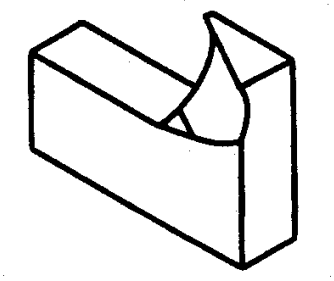
Reduce feeds and speeds will normally minimize any chatter problems.

A good rule of thumb for calculation purposes is a .0025” (.064mm) thick chip per revolution.

Actual measurements will show a pseudo-thickness of .006” (.15mm) unless a pin micrometer is used for measuring.

8. TOOL BITS

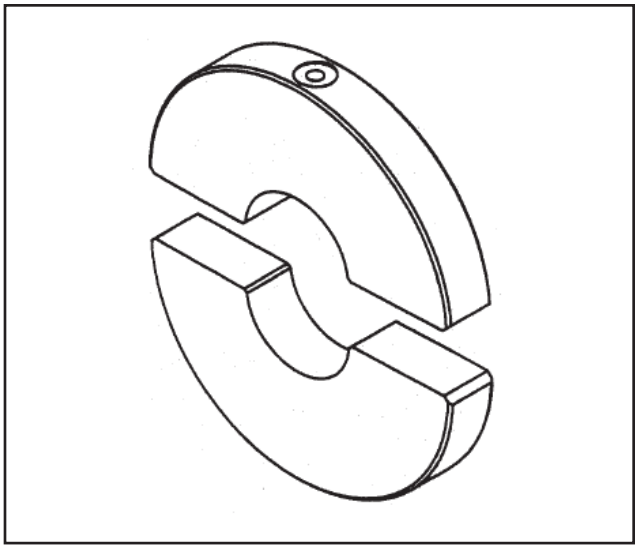
Tube Squaring Tool Bit



Range	Max Wall	Pipe or Tool Bit Material	Squaring Tool Bit P/N
.25" (6.35mm) OD Thru 2.60" (66.04mm) OD	0.250	C.S.	99-1479
	0.250	S.S.	99-2490
1.35" (34.29mm) OD Thru 4.50" (114.30mm) OD	0.250	C.S.	99-1480
	0.250	S.S.	DURABIT 1
Bevel, facing and special prep tool bits are available from Tri Tool Technologies. Contact the factory for information.			

9. SADDLE SETS

Standard Saddles (Material: Stainless Steel)



Decimal	Metric	Saddle P/N
.250"	6.35mm	67-3997
.276"	7.00mm	67-3998
.281"	7.14mm	67-3999
.313"	7.95mm	67-4000
.315"	8.00mm	67-4001
.344"	8.74mm	67-4002
.354"	9.00mm	67-4003
.359"	9.13mm	67-4004
.375"	9.53mm	67-4005
.394"	10.00mm	67-4006
.400"	10.16mm	67-4007
.406"	10.31mm	67-4008
.413"	10.50mm	67-4009
.422"	10.72mm	67-4010
.433"	11.00mm	67-4011
.438"	11.13mm	67-4012
.469"	11.91mm	67-4013
.472"	12.00mm	67-4014
.500"	12.70mm	67-4015
.512"	13.00mm	67-4016
.531"	13.50mm	67-4017
.540"	13.72mm	67-4018
.543"	13.80mm	67-4019

Decimal	Metric	Saddle P/N
.547"	13.89mm	67-4020
.551"	14.00mm	67-4021
.563"	14.30mm	67-4022
.591"	15.00mm	67-4023
.594"	15.08mm	67-4024
.602"	15.29mm	67-4025
.625"	15.88mm	67-4026
.630"	16.00mm	67-4027
.641"	16.27mm	67-4028
.656"	16.66mm	67-4029
.669"	17.00mm	67-4030
.675"	17.15mm	67-4031
.677"	17.20mm	67-4032
.681"	17.30mm	67-4033
.688"	17.48mm	67-4034
.709"	18.00mm	67-4035
.718"	18.24mm	67-4036
.750"	19.05mm	67-4037
.781"	19.84mm	67-4038
.787"	20.00mm	67-4039
.813"	20.65mm	67-4040
.840"	21.34mm	67-4041
.844"	21.44mm	67-4042
.854"	21.70mm	67-4043
.859"	21.83mm	67-4044
.866"	22.00mm	67-4045
.875"	22.23mm	67-4046
.906"	23.00mm	67-4047
.938"	23.83mm	67-4048
.945"	24.00mm	67-4049
.969"	24.61mm	67-4050
.984"	25.00mm	67-4051
1.000"	25.40mm	67-4052
1.024"	26.00mm	67-4053
1.050"	26.67mm	67-4054
1.063"	27.00mm	67-4055
1.071"	27.20mm	67-4056

Decimal	Metric	Saddle P/N
1.102"	28.00mm	67-4057
1.125"	28.58mm	67-4058
1.142"	29.00mm	67-4059
1.181"	30.00mm	67-4060
1.188"	30.18mm	67-4061
1.250"	31.75mm	67-4062
1.260"	32.00mm	67-4063
1.313"	33.35mm	67-4064
1.315"	33.40mm	67-4065
1.327"	33.70mm	67-4066
1.339"	34.00mm	67-4067
1.375"	34.93mm	67-4068
1.378"	35.00mm	67-4069
1.438"	36.53mm	67-4070
1.496"	38.00mm	67-4071
1.500"	38.10mm	67-4072
1.563"	39.70mm	67-4073
1.575"	40.00mm	67-4074
1.625"	41.28mm	67-4075
1.645"	41.78mm	67-4076
1.660"	42.16mm	67-4077
1.669"'	42.40mm	67-4078
1.681"	42.70mm	67-4079
1.688"	42.88mm	67-4080
1.750"	44.45mm	67-4081
1.752"	44.50mm	67-4082
1.813"	46.05mm	67-4083
1.875"	47.63mm	67-4084
1.900"	48.26mm	67-4085
1.902"	48.30mm	67-4086
1.904"	48.36mm	67-4087
1.913"	48.60mm	67-4088
1.938"	49.23mm	67-4089
1.969"	50.00mm	67-4090
2.000"	50.80mm	67-4091
2.008"	51.00mm	67-4092
2.063"	52.40mm	67-4093
2.125"	53.98mm	67-4094
2.188"	55.58mm	67-4095
2.240"	56.90mm	67-4096
2.244"	57.00mm	67-4097
2.250"	57.15mm	67-4098

Decimal	Metric	Saddle P/N
2.313"	58.75mm	67-4099
2.362"	60.00mm	67-4100
2.375"	60.33mm	67-4101
2.382"	60.50mm	67-4102
2.438"	61.93mm	67-4103
2.480"	63.00mm	67-4104
2.492"	63.30mm	67-4105
2.500"	63.50mm	67-4106
2.563"	65.10mm	67-4107
2.625"	66.68mm	67-4108
2.688"	68.28mm	67-4109
2.750"	69.85mm	67-4110
2.795"	71.00mm	67-4111
2.813"	71.45mm	67-4112
2.875"	73.03mm	67-4113
2.938"	74.63mm	67-4114
2.953"	75.00mm	67-4115
2.992"	76.00mm	67-4116
2.996"	76.10mm	67-4117
3.000"	76.20mm	67-4118
3.004"	76.30mm	67-4119
3.125"	79.38mm	67-4120
3.250"	82.55mm	67-4121
3.375"	85.73mm	67-4122
3.500"	88.90mm	67-4123
3.508"	89.10mm	67-4124
3.625"	92.08mm	67-4125
3.750"	95.25mm	67-4126
3.875"	98.43mm	67-4127
3.937"	100.00mm	67-4128
3.988"	101.30mm	67-4129
4.000"	101.60mm	67-4130
4.125"	104.78mm	67-4131
4.250"	107.95mm	67-4132
4.375"	111.13mm	67-4133
4.500"	114.30mm	67-4134

10. TROUBLESHOOTING

Problem: Tool Bit Chatters

The tool bit is loose or overextended.

The tool bit is damaged.

The tool holder is too loose in the slides.

The cutting speed is too fast.

The clamping pads are loose on the pipe or tube.

Cutting fluid is required.

The main bearing pre-load is loose.

Problem: Excessive Tool Bit Wear

The pipe or tube material is too hard or abrasive.

The cutting speed is too fast.

Cutting fluid is required.

A dull Tool Bit is causing surface hardening conditions (Stainless pipe or tubing).

There is scale or other foreign matter on the pipe or tube, which is dulling the tool bit at the start of the cut.

The tool bit is incorrect for the material being cut.

Problem: Rough Surface Finish

The tool bit is dull, chipped, etc.

Metal build-up on the cutting edge of the tool bit is creating a false cutting edge.

Cutting fluid is required.

The cutting speed is incorrect.

Problem: Tube Or Pipe Is Slipping In The Saddles

The saddles are not in full contact with the pipe or tube.

The clamping pressure is too light.

Scale and/or other foreign material is present on the pipe or tube.

Weld seams, swelling, or bumps under the saddles are preventing full contact.

Dull tool bits are causing extra force in the axial and/or radial direction.

Problem: Tool Holder Is Not Feeding

The feed pin is broken or out of position.

The feed sprocket shear pin is broken.

The feed screw is stripped.

The feed nut is stripped.

The slide rails are too tight.

Problem: Tool Bit Does Not Reach Work

Incorrect tool blocks are installed for the size of the pipe or tube being worked on.

Incorrect tool bit is installed.

Problem: Electric Motor Does Not Start

The electric power supply is shut off.

The electric motor is damaged and will not run free.

11. ACCESSORIES

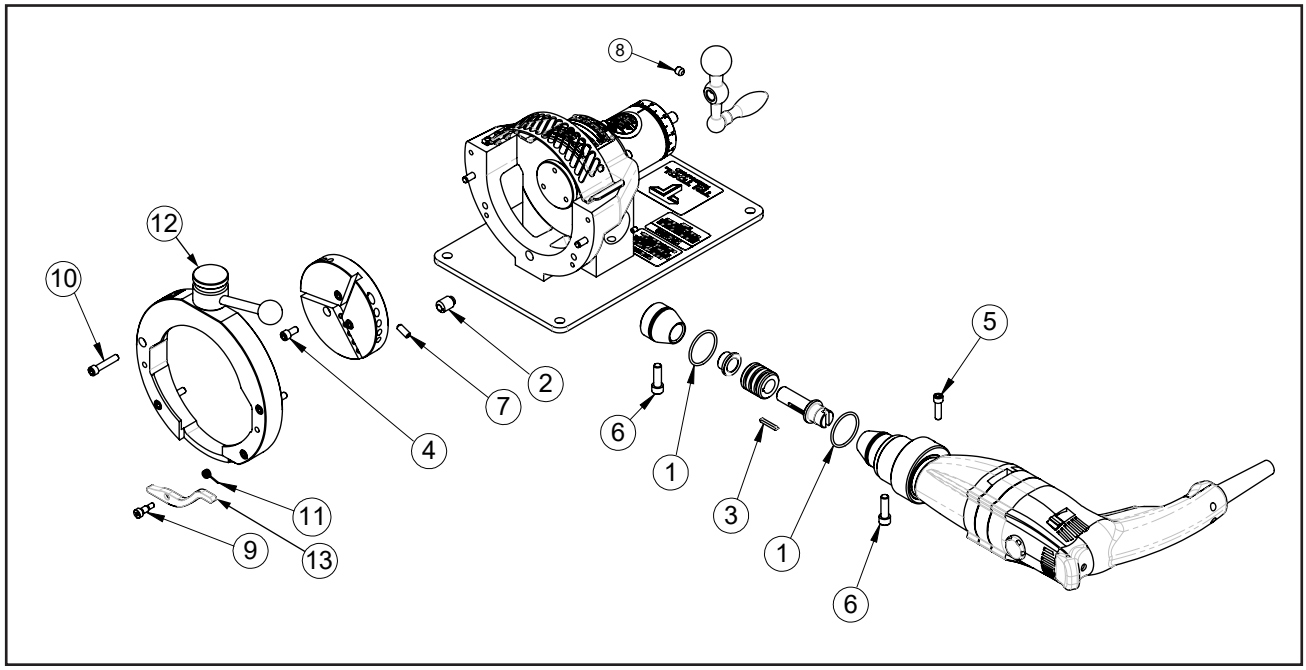
The following accessories are recommended for use with the Model STS-4 Tube Squaring Machine and are available from Tri Tool Technologies.

- Short Perch Saddle Sets
- Tool Bits
- Collet Adapter Kit (for use with 400 Series Collets)
- Battery Charger Assembly

  - 115V Standard (P/N 30-6143)
  - 230V Optional (P/N 30-6144)
- Battery 18V 5.2ah (P/N 30-6142)

12. RECOMMENDED SPARE PARTS

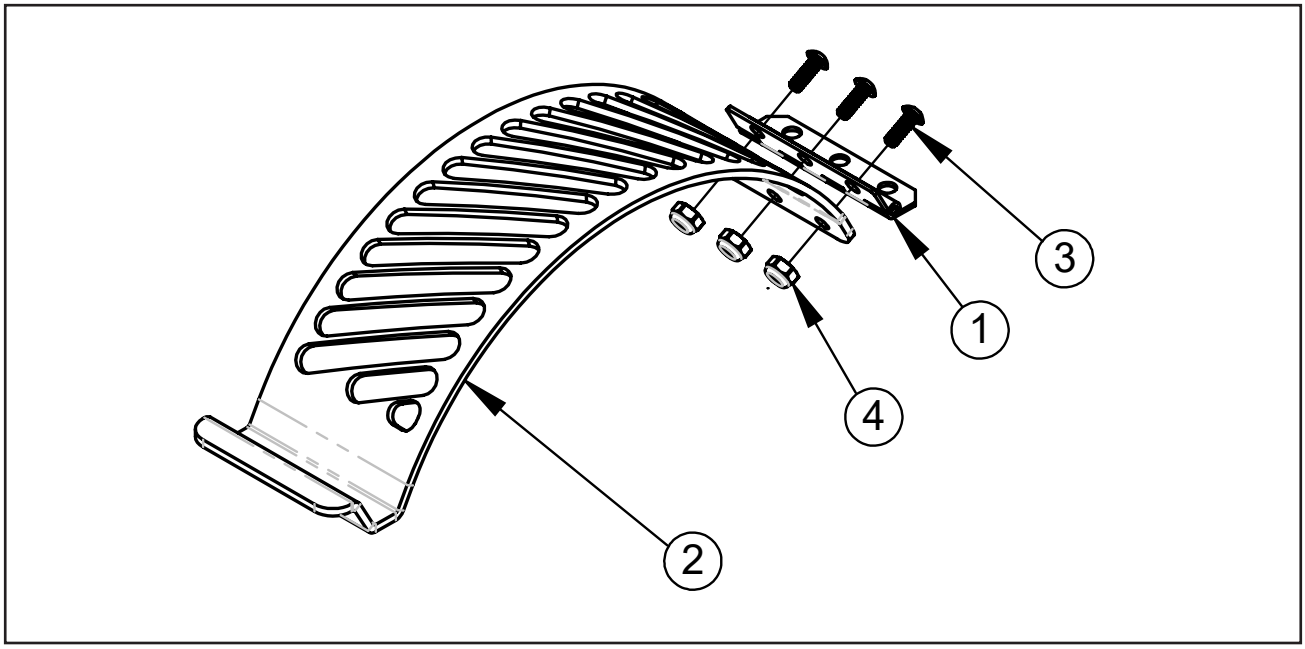
SPARE PARTS, MODEL STS-4



Parts List, Spare Parts, Model STS-4

Item No.	Part No.	Description	Qty
	05-1749	SPARE PARTS KIT, MODEL STS-4	
1	28-0233	O-RING, 1.364" ID X .070" W	2
2	30-7591	BALL PLUNGER, 1/2-13 UNC	1
3	31-0115	KEY, 1/8" SQ X 15/16”, BOTH ENDS ROUND	1
4	33-0038	SCREW, CAP, 1/4-20 X 1/2”	3
5	33-0041	SCREW, CAP, 1/4-20 X 7/8”	1
6	33-0056	SCREW, CAP, 5/16-18 X 1”	2
7	33-0504	SCREW, SET, 1/4-20 X 5/8” CUP PT	15
8	33-0513	SCREW, SET, 5/16-18 X 5/16”, CUP PT	1
9	33-1457	SCREW, SHLDR, 1/4 X 3/8”	1
10	33-2003	SCREW, CAP, SS, 1/4-20 X 1-1/4”	4
11	40-0261	SPRING, TORSION	1
12	33-2062	SCREW, SADDLE LOCKING	1
13	63-0148	ARM, SADDLE REMOVAL	1

COVER GUARD ASSEMBLY, MODEL STS-4 (P/N 43-1445)

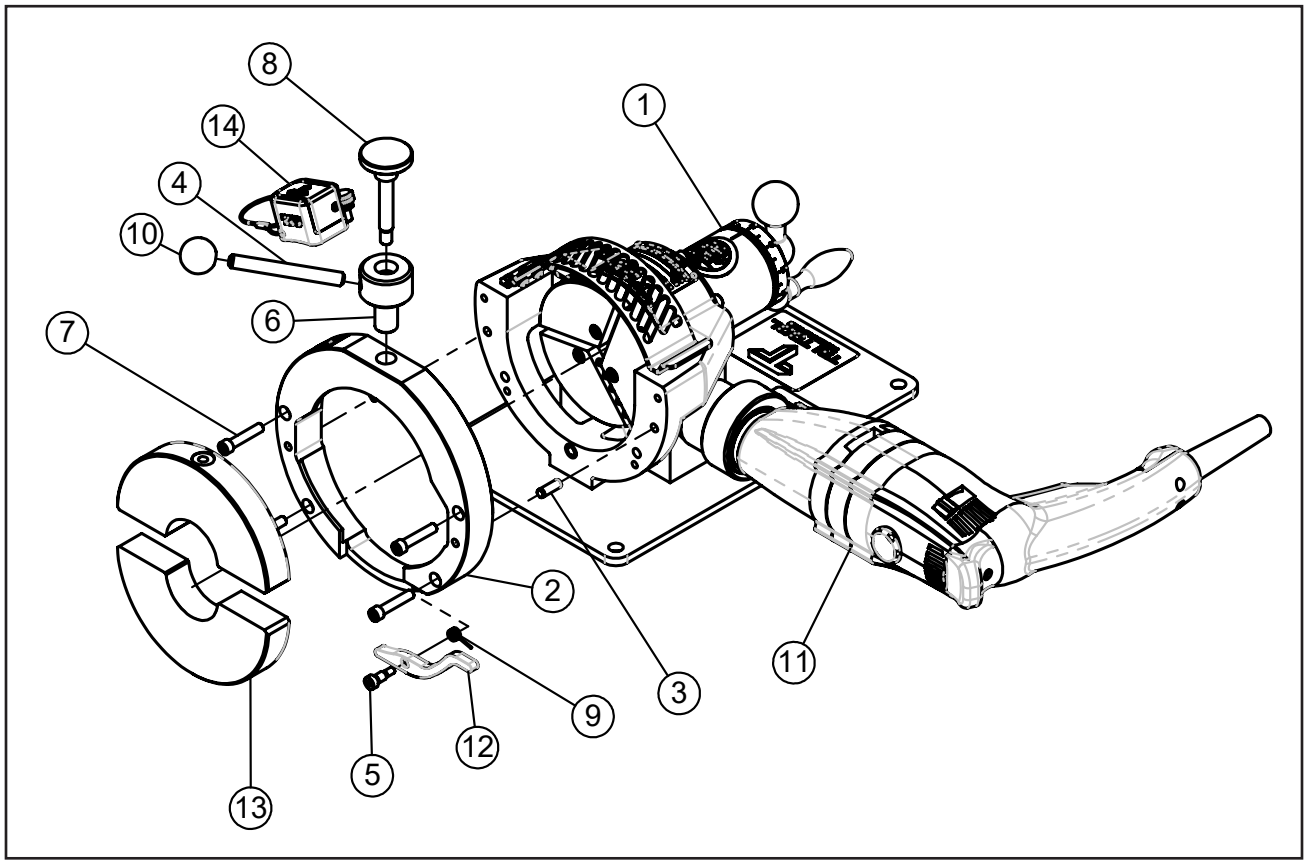


Parts List, Cover Guard Assembly, Model STS-4 (P/N 43-1445)

Item No.	Part No.	Description	Qty
1	30-6278	HINGE, COVER GUARD	1
2	24-5492	PLATE, CHIP GUARD, STS-4	1
3	33-5407	SCREW, BUTTON #4-40 X 5/16”	3
4	35-0253	NUT, LOCK, #4-40, NYLON INSERT	3

13. ILLUSTRATED PARTS BREAKDOWN

MODEL STS-4, CORDED

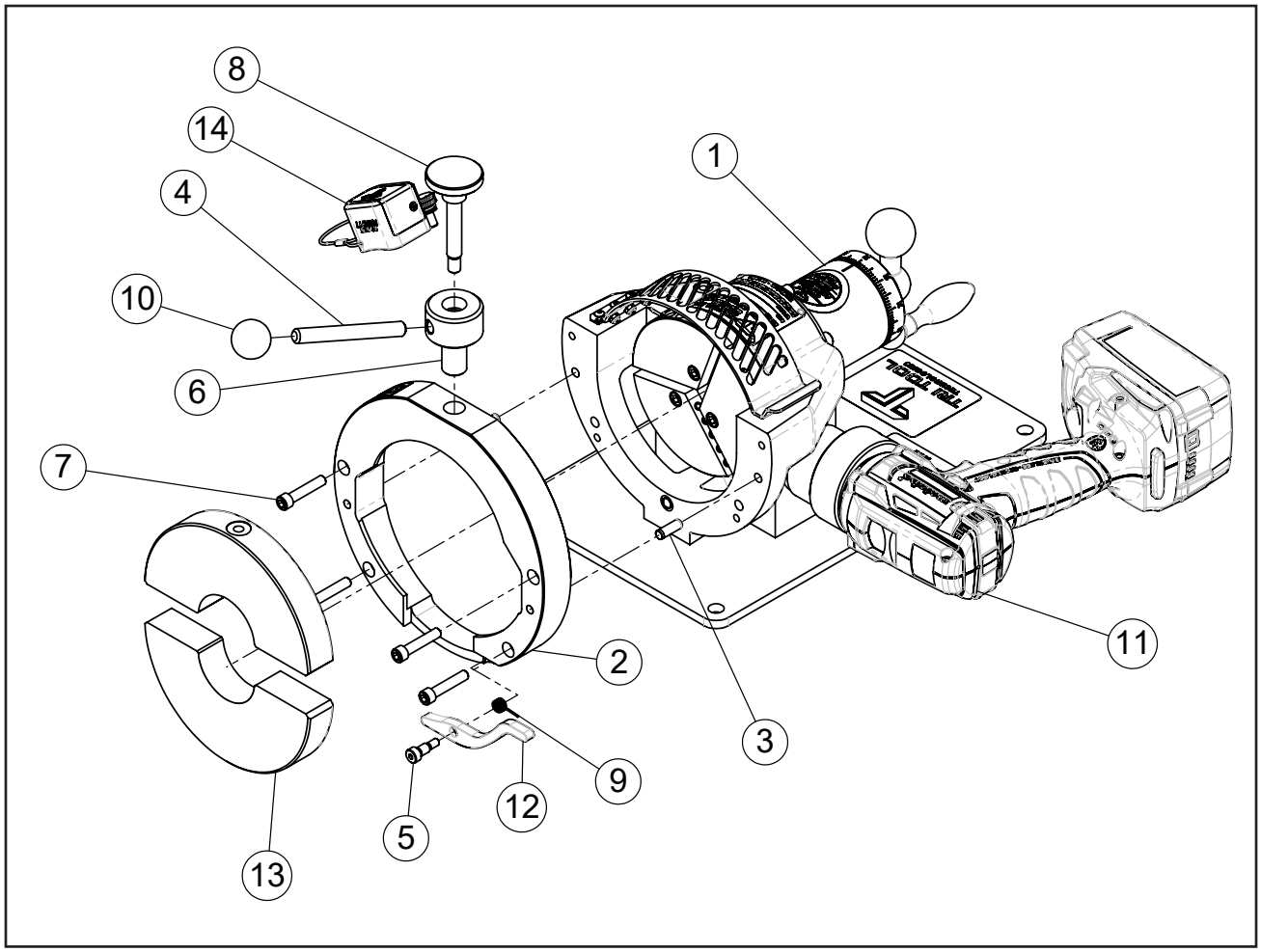


Parts List, Model STS-4, Corded

Model STS-4, Corded, 115V (P/N 01-1684)
Model STS-4, Corded, 230V Type C (P/N 01-1694C)
Model STS-4, Corded, 230V Type G (P/N 01-1694G)
Model STS-4, Corded, 100V Japan (P/N 01-2387)

Item No.	Part No.	Description	Qty
1	02-2290	MODEL STS-4 SUB-ASSEMBLY	1
2	27-0611	ADAPTER, SADDLE, STS-4	1
3	32-0140	PIN, DOWEL, 1/4” DIA X 3/4"	2
4	33-1424	STUD, HANDLE	1
5	33-1457	SCREW, SHOULDER, 1/4 DIA X 3/8"	1
6	33-1839	SCREW, ASSEMBLY, ADJUST	1
7	33-2003	SCREW, CAP, 1/4-20 X 1 1/4", SS	4
8	33-2062	SCREW, SADDLE, LOCKING	1
9	40-0261	SPRING, TORSION	1
10	42-0076	KNOB, BALL	1
11	58-0278	MOTOR, ASSEMBLY, METABO, 115V (01-1684)	1
	58-0127	MOTOR, ASSEMBLY, BOSCH, 230V (01-1694)	1
12	63-0148	ARM, SADDLE REMOVAL	1
13	67-XXXX	SADDLE SET	REF
14	79-0774	LUMEN LIGHT ASSEMBLY, STS, 4-8	1
	NOT SHOWN		
	05-1343	WRENCH KIT	1
	36-0005	WRENCH, L, 1/8" HEX	1
	36-0008	WRENCH, L, 3/16" HEX	1
	36-0018	WRENCH, T, 1/8" HEX	1
	86-0458	CASE, STS-4	1

MODEL STS-4, CORDLESS

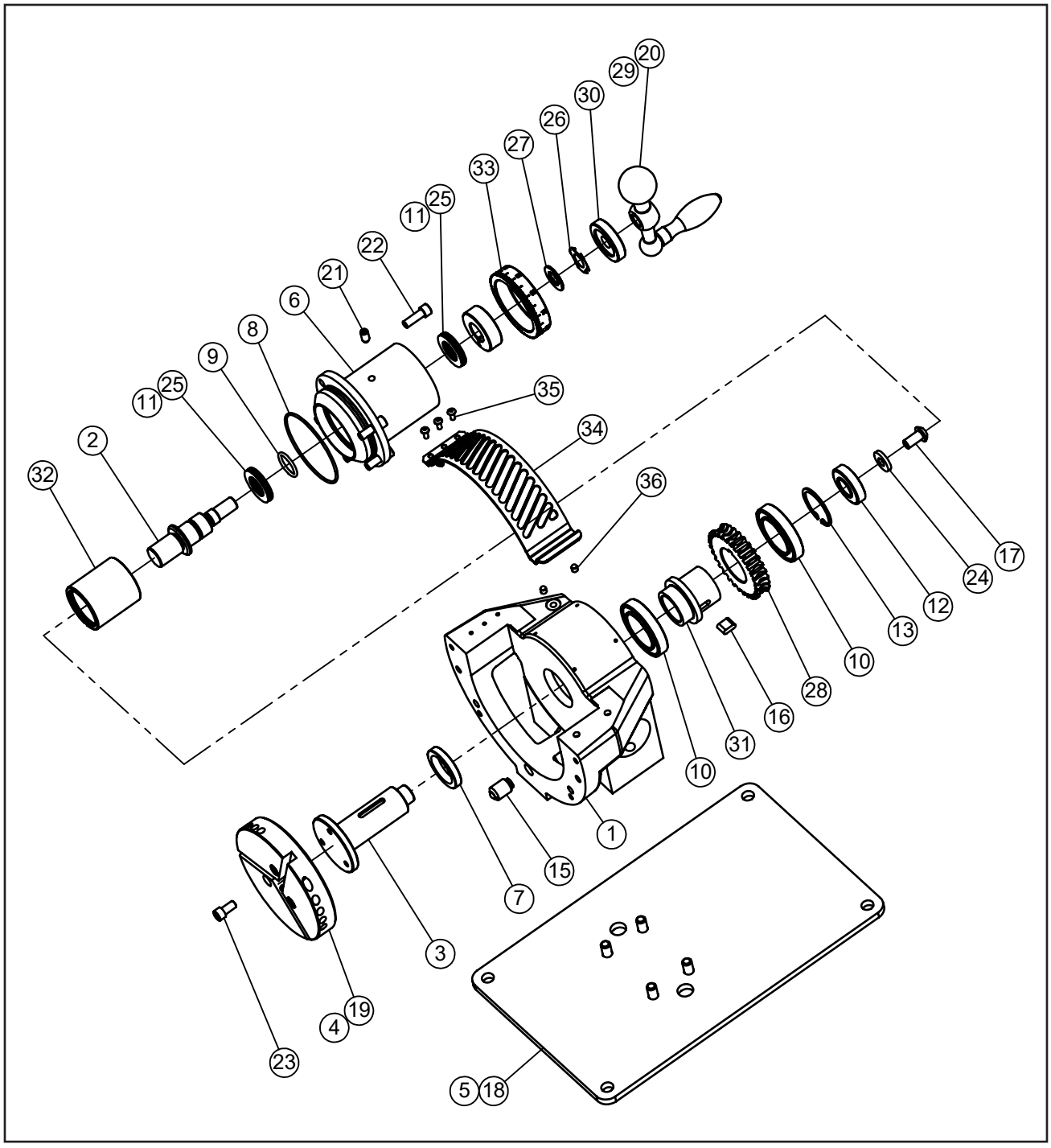


Parts List, Model STS-4, Cordless

Model STS-4, Cordless, 115V (P/N 01-2693)
Model STS-4, Cordless, 230V Type G (P/N 01-2693G)
Model STS-4, Cordless, 230V Type C (P/N 01-2693C)
Model STS-4, Cordless, 100V Japan (P/N 01-2693J)

Item No.	Part No.	Description	Qty
1	02-2290	MODEL STS-4 SUB-ASSEMBLY	1
2	27-0611	ADAPTER, SADDLE, 304	1
3	32-0140	PIN, DOWEL, 1/4” DIA X 3/4”	2
4	33-1424	STUD, HANDLE	1
5	33-1457	SCREW, SHOULDER, 1/4” X 3/8”	1
6	33-1839	SCREW ASSEMBLY, ADJUST	1
7	33-2003	SCREW, CAP, SS,1/4-20 X 1-1/4”	4
8	33-2062	SCREW, SADDLE, LOCKING	1
9	40-0261	SPRING,TORSION	1
10	42-0076	KNOB, BALL	1
11	58-0446	MOTOR ASSEMBLY, METABO, 18V CORDLESS	1
12	63-0148	ARM, SADDLE REMOVAL	1
13	67-XXXX	SADDLE SET	REF
14	79-0774	LUMEN LIGHT ASSEMBLY, STS, 4-8	1
	NOT SHOWN		
	30-6143	CHARGER, METABO, 18V, 115VAC (FOR 01-2693)	
	30-6144	CHARGER, METABO, 18V, 230VAC (FOR 01-2693C)	
	30-7533	CHARGER, METABO, 18V, JAPAN (PSE) (FOR 01-2693J)	
	30-7570	CHARGER, METABO, 18V, 115VAC (FOR 01-2693G)	
	86-0458	CASE STS-4	

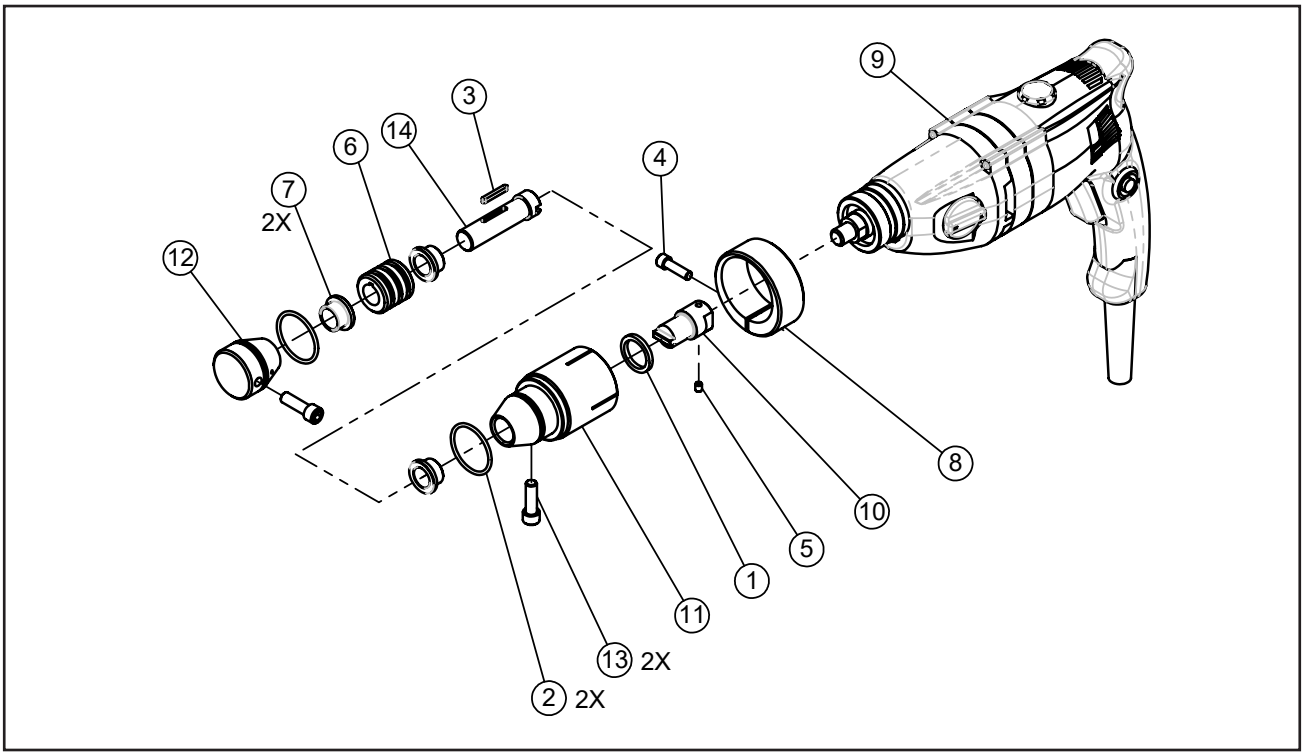
MODEL STS-4 SUB-ASSEMBLY (P/N 02-2290)



Parts List, Model STS-4 Sub-Assembly (P/N 02-2290)

Item No	Part No.	Description	Qty
1	19-0818	HOUSING, MAIN, STS-4	1
2	20-0654	SHAFT, FEED	1
3	20-0693	SHAFT, MAIN	1
4	21-0500	HEAD	1
5	24-1569	PLATE, BASE	1
6	27-0600	ADAPTER, FEED	1
7	28-0278	SEAL, 1" ID	1
8	28-0279	O-RING	1
9	28-0281	O-RING	1
10	29-0011	BEARING, BALL	2
11	29-0067	BEARING, THRUST	2
12	29-0141	BEARING, BALL	1
13	30-2358	RING, RETAIN, INTERNAL, 1-3/8"	1
14	30-2544	COLLAR, SHAFT	1
15	30-7591	PLUNGER, BALL	1
16	31-0174	KEY	1
17	33-0292	SCREW, BUTTON, 5/16-18 X 5/8"	1
18	33-0369	SCREW, FLAT, 5/16-18 X 3/4"	4
19	33-0504	SCREW, SET, 1/4-20 X 5/8", CUP PT	15
20	33-0513	SCREW, SET, 5/16-18 X 5/16", CUP PT	1
21	33-0927	SCREW, SET, 1/4-20 X 1/2", HDOG	1
22	33-0040	SCREW, CAP, 1/4-20 X 3/4"	5
23	33-0038	SCREW, CAP, 1/4-20 X 1/2"	3
24	34-0027	WASHER, FLAT, 5/16" ID	1
25	34-0106	WASHER, THRUST, 3/4" ID	4
26	34-0163	WASHER, THRUST, 1/2" ID	1
27	34-0325	WASHER, SPRING	1
28	39-0840	GEAR, WORM, 30T	1
29	41-0142	HANDLE, FEED	1
30	42-0172	KNOB, LOCK	1
31	46-0468	SLEEVE, SHAFT	1
32	46-0469	SLEEVE, FEED	1
33	50-0024	DIAL	1
34	43-1445	COVER GUARD ASSEMBLY, STS-4	1
35	33-0269	SCREW, BUTTON, #6-32 X 3/8”	3
36	30-6120	MAGNET, 5MM DIA X 5MM	2

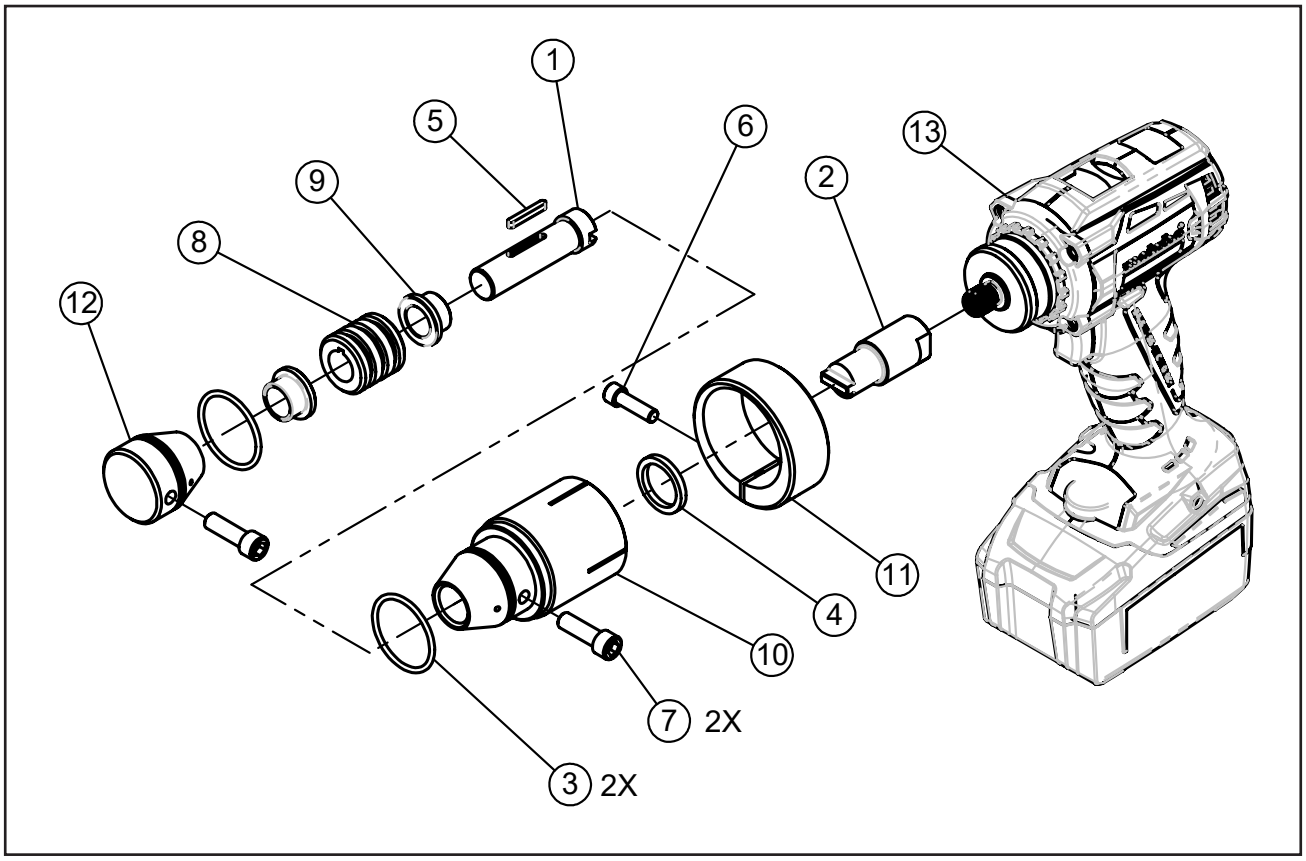
MOTOR ASSEMBLY, CORDED, 115V (P/N 58-0278), 230V (P/N 58-0127)



Parts List, Motor Assembly 115V (P/N 58-0278), 230V (P/N 58-0127)

Item No	Part No.	Description	Qty
1	28-0245	SEAL, GREASE, .875” ID	1
2	28-0233	O-RING, 1.364” ID X .070” W	2
3	31-0115	KEY, 1/8” SQ X 15/16”, BOTH ENDS ROUND	1
4	33-0041	SCREW, CAP, 1/4-20 X 7/8"	1
5	33-0619	SCREW, SET, #10-32 X 1/4", CUP PT	2
6	39-0841	WORM, RH, 12DP, 2T, 1.00” PD	1
7	45-0258	BUSHING, FLANGE, 5/8" ID	2
8	47-1111	BRACKET, CLAMP	1
9	58-0277	MOTOR, CW, ELECTRIC, METABO, 115V (58-0278)	1
	58-0323	MOTOR, MOD, ELECTRIC, BOSCH, 230V (58-0127)	
10	20-1468	SHAFT, DRIVE (58-0278)	1
	20-0619	SHAFT, DRIVE, 1/2-20 UNF (58-0127)	
11	46-0411	SLEEVE, MOTOR	1
12	54-0347	PLUG	1
13	33-0056	SCREW, CAP, 5/16-18 X 1"	2
14	20-0617	SHAFT, DRIVE	1

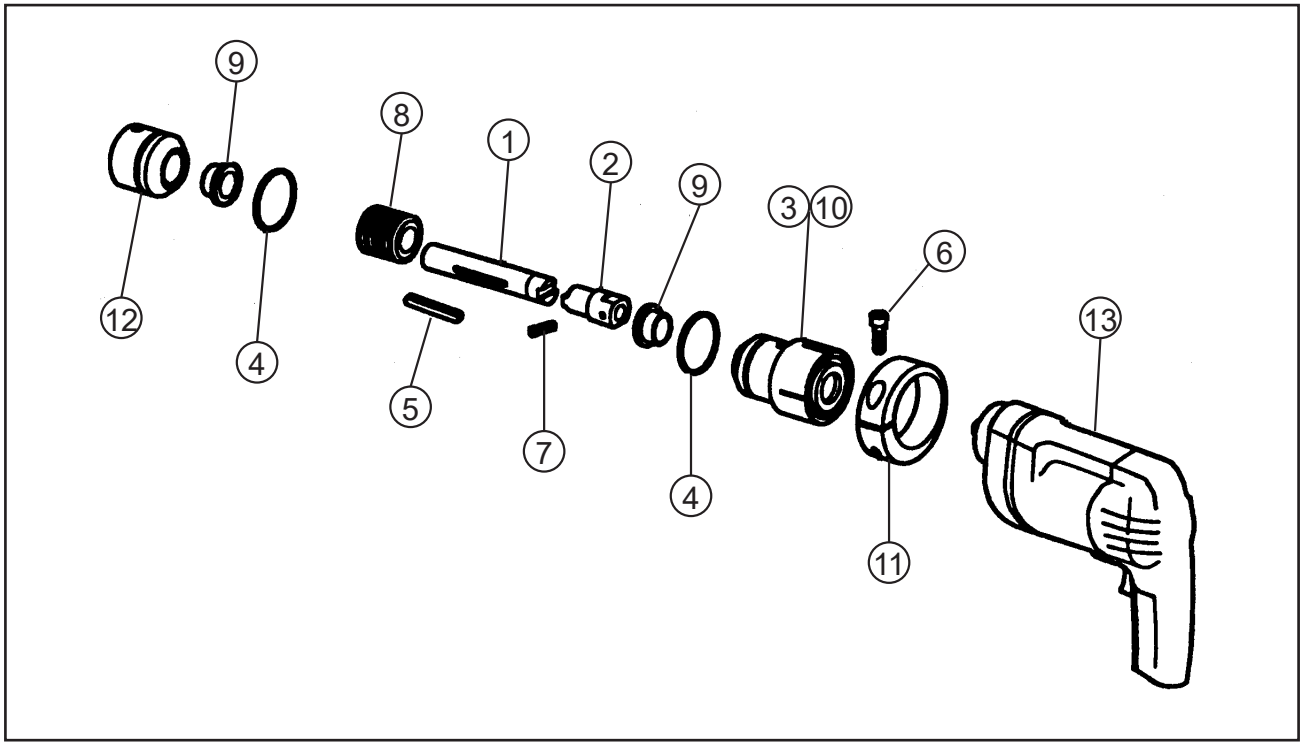
MOTOR ASSEMBLY, CORDLESS (P/N 58-0446)



Parts List, Motor Assembly, Cordless, 115V (P/N 58-0446), 230V (P/N 58-XXXX)

Item No	Part No.	Description	Qty
1	20-0617	SHAFT, DRIVE	1
2	20-1688	SHAFT, DRIVE 302E 18V, CORDLESS, METABO	1
3	28-0233	O-RING, 1.364" ID X .070" W	2
4	28-0245	SEAL, GREASE, .875" ID	1
5	31-0115	KEY, 1/8" SQ X 15/16”, BOTH ENDS ROUND	1
6	33-0041	SCREW, CAP, 1/4-20 X 7/8”	1
7	33-0056	SCREW, CAP, 5/16-18 X 1”	2
8	39-0841	WORM, RH, 12DP, 2T, 1.00" PD	1
9	45-0258	BUSHING, FLANGE, 5/8" ID	2
10	46-0411	SLEEVE, MOTOR	1
11	47-1111	BRACKET, CLAMP	1
12	54-0347	PLUG	1
13	58-0317	MOTOR, CORDLESS, 18V, METABO, MOD CW, 115V	1

ELECTRIC MOTOR ASSEMBLY, MAKITA 100V (P/N 58-0335) JAPAN ONLY



Parts List, Electric Motor Assembly, Makita, 100V (P/N 58-0335) Japan Only

Item No	Part No.	Description	Qty
1	20-0617	SHAFT, DRIVE	1
2	20-4071	SHAFT, DRIVE	1
3	28-0245	SEAL, GREASE	1
4	28-0233	O-RING	2
5	31-0115	KEY, ROUND ENDS	1
6	33-0041	SCREW, CAP, 1/4-20 X 7/8”	1
7	33-0619	SCREW, SET, CUP POINT, #10-32 X 1/4”	2
8	39-0841	WORM	1
9	45-0258	BUSHING, FLANGE, 5/8" I.D.	2
10	46-0411	SLEEVE, MOTOR	1
11	47-1111	BRACKET, CLAMP	1
12	54-0347	PLUG	1
13	58-0331	MOTOR, MOD. 100V MAKITA	1
	NOT SHOWN		
	33-0056	SCREW, CAP, 5/16-18 X 1"	2

REVISION HISTORY

ADDED 11/15/2024:

Description	Page
ADDED “RECOMMENDED SPARE PARTS” SECTION, INCLUDING:	
SPARE PARTS, MODEL STS-4	24
COVER GUARD ASSEMBLY, MODEL STS-4 (P/N 43-1445)	25

ADDED 1/23/2025:

Description	Page
MOTOR ROTATION INSTRUCTIONS FOR DC MOTOR	16
MODEL STS-4, CORDLESS, IPB	30/31
MOTOR ASSEMBLY, CORDLESS, IPB	35

WARNING

Read the manual and be familiar with all safety precautions before operating equipment. The following are general warnings for industrial equipment with moving parts. Refer to the manual for specific warnings applicable to your equipment.

EYE HAZARD - Always wear appropriate eye protection while operating the equipment.

PINCH HAZARD - Keep your hands and clothing away from moving parts.

CRUSH HAZARD - The machinery, pipe, or work piece can shift, separate, lurch, or fall.

CHIP HAZARD - Metal chips may be hot and sharp. Be careful when you clear the tooling path or clean up chips.

TIE DOWN HAZARD - Deliberate overriding of safety triggers can result in serious injury. Never lock or tie down any safety triggers.

SHOCK HAZARD - Ensure that the equipment is properly installed and grounded. Ensure that the equipment is not damaged and that the power cord is intact.

OTHER HAZARDS

• Tool bits are sharp and can cause serious injury.
• Do not defate or modify safety features.
• Disconnect power sources before servicing or moving the equipment.
• Remove all loose articles of clothing and jewelry before operating the equipment.

Be Safety Conscious!

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