



OTTO ARC

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OPERATING INSTRUCTIONS

MODEL TSM-6000 FACING/SQUARING MACHINE

REV 8/2011



USA

Otto Arc Systems, Inc. (Corporate/Sales/Mfg. Division)
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DATE OF PURCHASE:

SERIAL NUMBER:

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1. INTRODUCTION

Warning:

Otto Arc Systems, Inc. is committed to continued product improvement therefore; the machine you received may be slightly different than the one described herein. This manual and the information provided is a basic guide line for our customers. Otto Arc will do its best to insure that the information and procedures contained in this manual are correct and up-to-date. However, Otto Arc can not guarantee that it is correct for all applications or situations. Furthermore, the contents of this manual are subject to change without notice. It is, therefore, the obligation of the user to read all information in this manual, become familiar with the equipment to be used, and exercise the utmost care in equipment operation. Do not make any modifications to this equipment since this will void all warranty claims, as well as possibly increasing the risk of injury or harm. Also, do not operate this equipment if all parts are not functioning at 100% efficiency. Notify us immediately for any needed repairs.

Note: Otto Arc can supply all repair and replacement parts necessary for maintenance and operation of this machine. For repair, service or additional information, please contact us:

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When you receive it:

Inspect the machine for shipping damage. Be sure you received the parts listed on the invoice. Contact Otto Arc Systems, Inc. immediately if there are any errors or questions regarding this machine.

2. SAFETY PRECAUTIONS

The following is a list of general safety guidelines to be considered when operating this tool. Standard safe machining practices should always be followed when operating OTTO ARC Machines.

Before operating this machine, read the entire Operating Instructions. Inspect machine, cord and accessories for any damage.

Wear Safety glasses, ear plugs, and safety shoes while operating the machine. Keep your equipment clean and in good condition for maximum protection. Follow company and OSHA safety rules when operating equipment.

The motor should always be disconnected from the power source whenever servicing the machine or changing cutting inserts, collets, or other components.

SAFETY INFORMATION

WARNING!

MOVING PARTS. Keep hands, loose clothing, and hair away from rotating or moving parts. Unplug all equipment prior to adjusting or servicing.

WARNING!

ELECTRICAL SHOCK. Possible shock if not handled properly.

WARNING!

KEEP DRY. Keep all equipment and components away from any water source.

WARNING!

EYE PROTECTION. Eye protection must be worn while operating or working near facing equipment.

WARNING!

EAR PROTECTION. Ear protection should be worn while operating or working near loud equipment.

3. DESCRIPTION

This manual describes how to use your Model TSM-6000 Tube Squaring/Beveling Machine. This machine is designed for facing/beveling tubing and elbows from 1" to 6.63" outside diameter. For maximum safety and performance, read the entire instruction manual before operating this machine. The latch assembly is a self aligning, so it will work with out of round tubing or pipe. This feature will let you take an out-of-round tubing or pipe and face a square end. This machine is portable, or may be mounted on a bench for high volume operations.

The collets are made from hard Stainless Steel and are designed so the integrity of electro-polished tubing is not affected by their use. Our tool bits are designed to work on the following materials: stainless steel, inconel, hastelloy, carbon steels, aluminum, and a variety of other alloys.

This machine will let you face quickly and squarely every time. You will also find this machine has an unobstructed view of the tool bit and tubing. Our feed indicator will give you precise length every time.

The Standard TSM-6000-10 Package Includes:

- Operating tool (main body)
- Head Assembly
- Electric drive unit
- Custom carrying case
- Two facing tool bits
- Tool kit
- Operating manual

Optional Features:

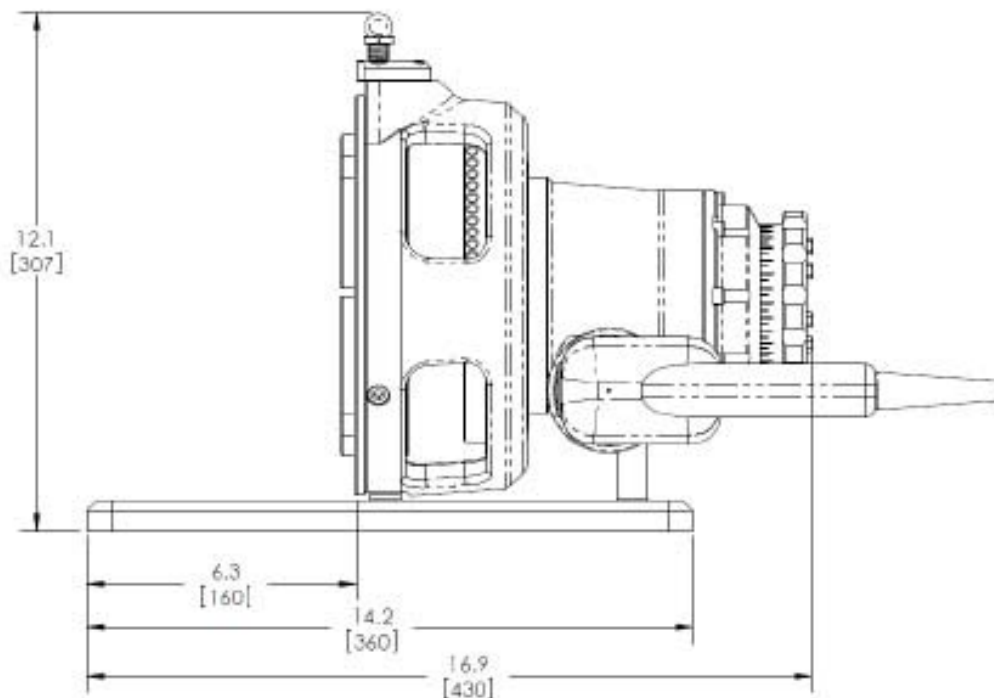
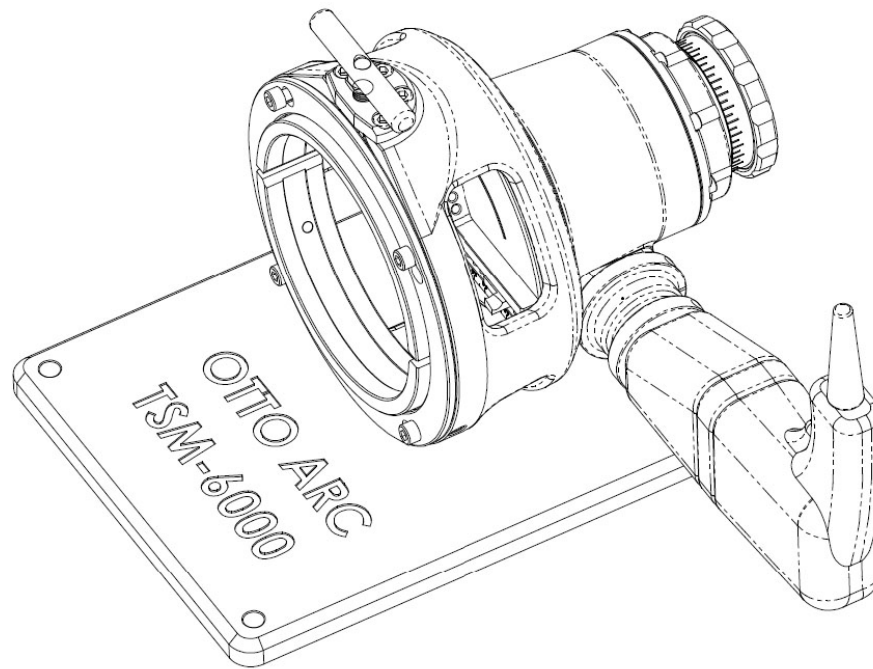
- Bench mounting hold down kit
- Battery power motor

Specifications:

- Approximate Weight (with electric motor): 44 lbs. (20 kg)
- Overall length: 17 inches (430 mm)
- Overall height: 12 inches (305 mm)
- Overall width: 11 inches (280 mm) (w/o motor attached)
- Tube size: 1.0" (25.4 mm) to 6.63" (168.3 mm)
- Pipe size: 3/4" schedule 80 to 6" schedule 40
- Feed range: 11/13" (.8125") (20.5 mm)
- Revolutions per minutes of Spindle (Cutter Shaft): 0-150 rpm
- Motor: Metabo SEB 1010 Plus (May be other brands or models w/o notice)

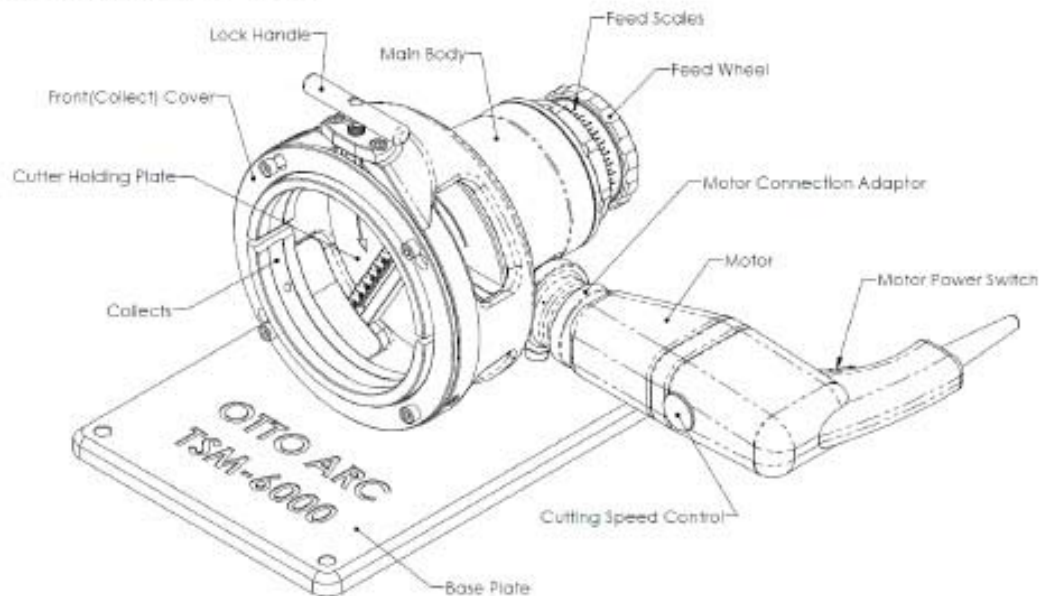
NOTE: ALSO HOLDS 3 TOOL BITS! FACES, BEVELS AND COUNTERBORES!

4. DETAILS AND DIMENSIONS

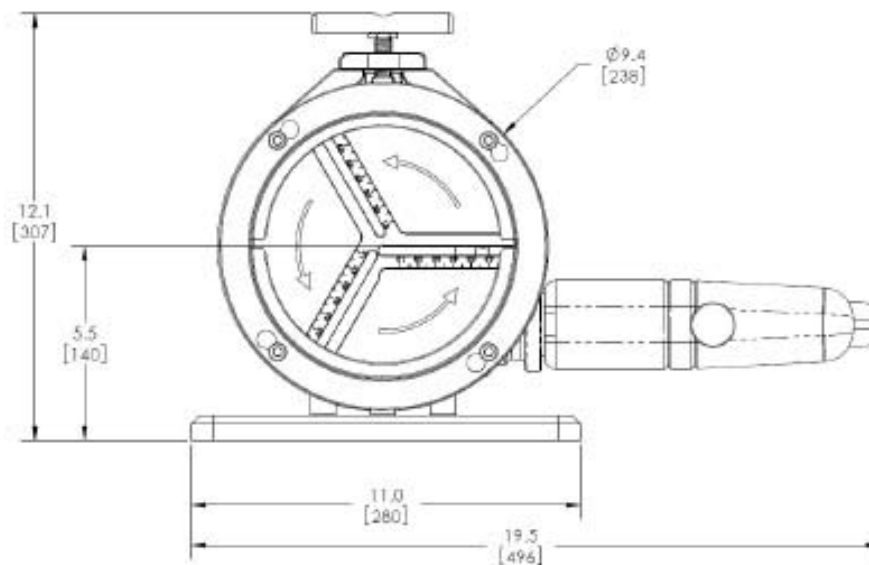


Front View

TSM-6000 3-D View



TSM-6000 Overall Dimensions

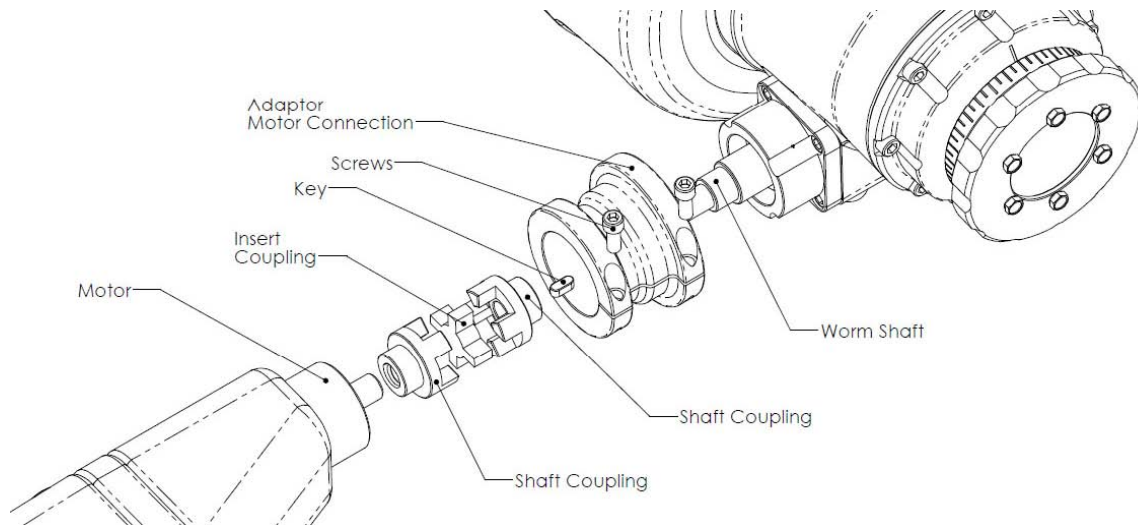


Left Side View

5. SET UP AND OPERATION

COLLET SET UP

1) Refer to the picture and installed motor on the machine. First, install key, couplings on the worm shaft and motor shaft. Then, insert motor connection adapter on the machine without tightening the screws. Align coupling insert and couplings, and insert the motor into adaptor making sure the coupling components are properly engaged. Slightly lock the screws, span the motor body to the comfortable operating orientation and then tighten the screws.



2) The collet consists of two parts, the upper collet and lower collet, they are designed to use in a pair. To get the best performance, clean the surfaces on the collets and collet seat areas before installation.

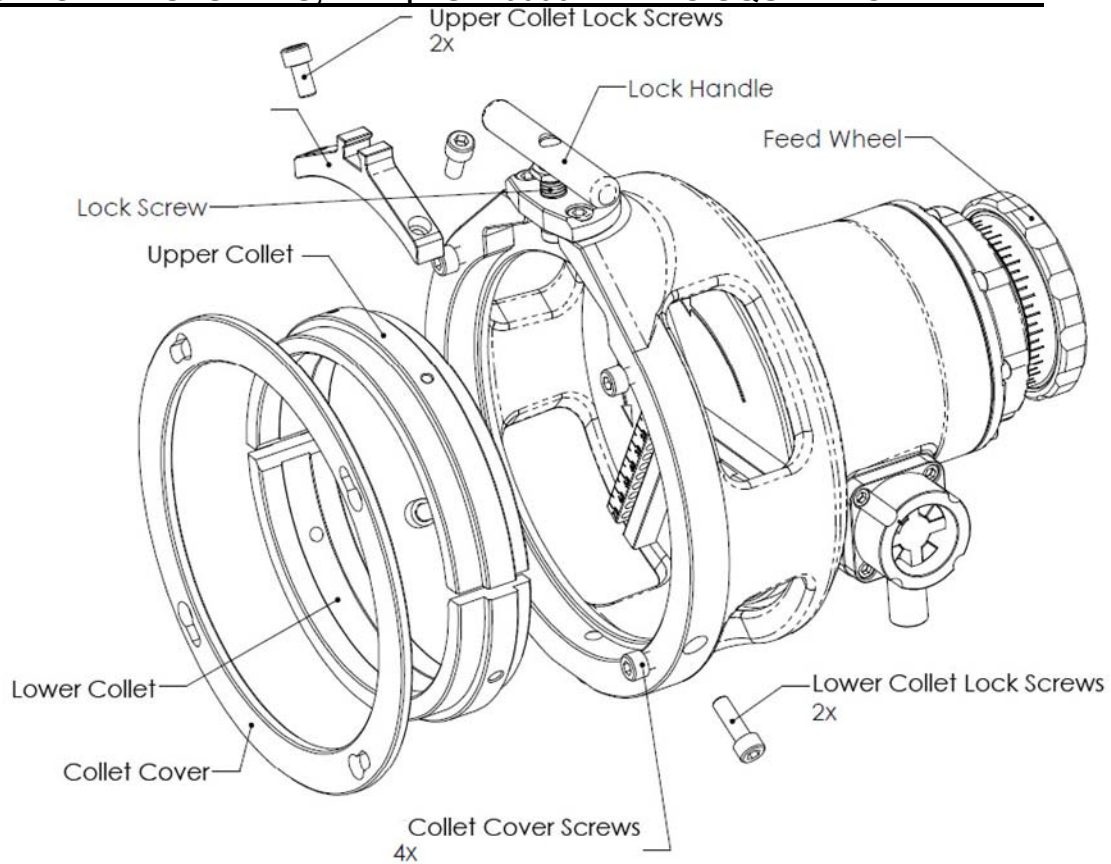
3) Loosen the four screws securing the front cover, twist the front cover, and remove it from the machine.

4) Unscrew the lower collet, lock screws and remove the lower collet. Unscrew the upper collet, lock screws and remove upper collet from the upper collet bracket. Select correct collets for your tubing; insert the lower collet into the collet seat from the front; and tighten. Insert lower collet, lock screws; tighten the upper collet on the upper collet bracket, and insert them into the collet seat from the front. You may need to adjust the lock handle to get the upper collet bracket slot so it fits into the lock screw nose.

5) Place the front cover back on the machine and secure the four screws.

6) Turn the lock handle slightly in both directions and see if the upper collet moves up and down smoothly.

OTTO ARC SYSTEMS, INC. | TSM-6000 FACING/SQUARING MACHINE



COLLET SIZES:

Standard

Part Number	Description (Inches)
TSM-6001	1" TUBE COLLET / 25.4mm
TSM-6002	1" PIPE COLLET
TSM-6003	1-1/2" TUBE COLLET / 38.1mm
TSM-6004	1-1/2" PIPE COLLET
TSM-6005	2" TUBE COLLET / 50.8 mm
TSM-6006	2" PIPE COLLET
TSM-6007	2-1/2" TUBE COLLET / 63.5mm
TSM-6008	2-1/2" PIPE COLLET
TSM-6009	3" TUBE COLLET / 76.2mm
TSM-6010	3-1/2" TUBE COLLET (3" PIPE) / 88.9mm
TSM-6011	4" TUBE COLLET (3.5" PIPE) / 101.6mm
TSM-6012	4.25" TUBE COLLET / 107.95mm
TSM-6013	4-1/2" TUBE COLLET (4" PIPE) / 114.3mm
TSM-6014	5" TUBE COLLET / 127mm
TSM-6015	6" TUBE COLLET / 152.4mm
TSM-6016	6" PIPE COLLET

Part Number	Description (Millimeters)
TSM-6017	28mm TUBE COLLET
TSM-6018	35mm TUBE COLLET
TSM-6019	52mm TUBE COLLET
TSM-6020	57.15mm TUBE COLLET
TSM-6021	60.5mm TUBE COLLET
TSM-6022	69.85mm TUBE COLLET
TSM-6023	76.2mm TUBE COLLET
TSM-6024	82.55mm TUBE COLLET
TSM-6025	95.25mm TUBE COLLET

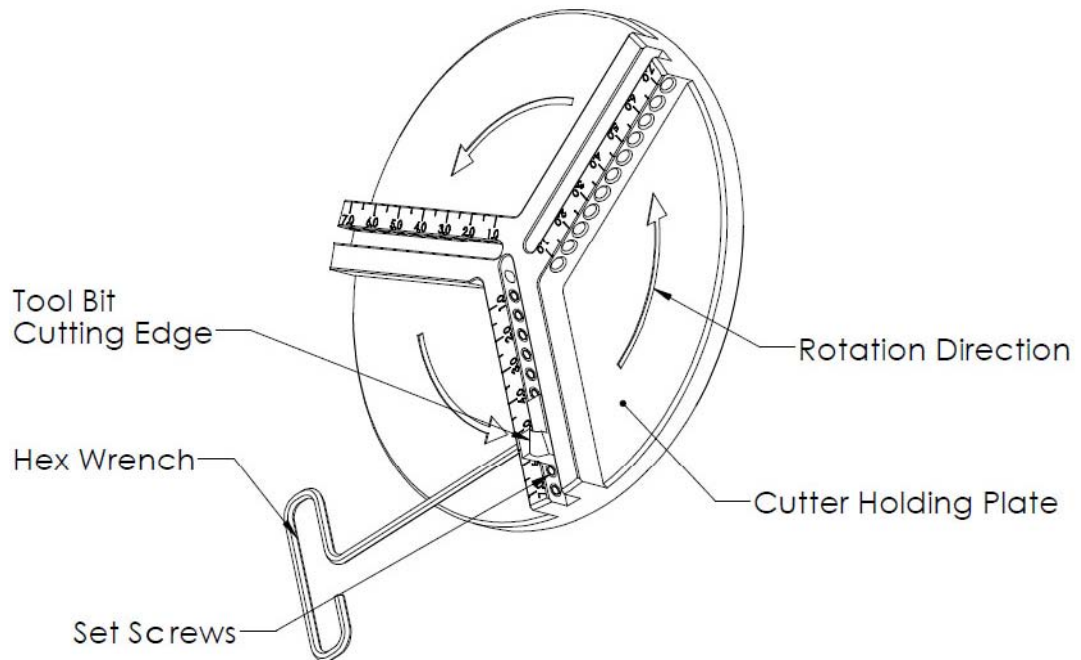
(Please note: some millimeter sizes are also equivalent to standard US standards)
Looking for a special size collet? Contact our sales department for pricing and delivery time.

6. TOOL BIT SELECTION

WARNING! Use of dull or improperly designed tool bits or tool bits not manufactured by Otto Arc Systems, Inc. may result in poor performance and may constitute abuse of this machine therefore; voiding the Otto Arc factory warranty.

TO CHANGE BITS:

- 1) Unplug the electric motor power connection from the electric power source before installing the tool bits.
- 2) Clean the tool bits and the tool bit seats on the cutter holding plate.
- 3) Select the correct combination of tool bits (cutting inserts) and slip them into the cutter holding plate. Be sure to place the tool bits in a position where the blades will butt the entire area required. Make sure that when putting in the tool bits, the cutting edge is facing away from the set-screw.
- 4) Depending on the applications, in the case of two or more operations needed at the same time, the tool bits should be set in a set order. ID (inside diameter) tool bits should be set first, facing or squaring bits next and OD (outside diameter) tool bits last. When each tool bit is in the correct position, secure the tool bits by tightening the set screws with the hex wrench.
- 5) On production jobs, it may also be beneficial to set and test the tool bit settings on a test piece of pipe or tube.



TOOL BIT SELECTION FOR TSM-6000:

Part Number	Description
TB-0202	Extended reach standard style
TB-0202-LC	Extended reach laser coated
TB-1506	For use on 316 or 304 stainless
TB-1506-LC	Laser coated for abrasion resistance
TB-1506-TIN	Tin coated for superior heat resistance
TB-5000	For soft and gummy stainless steel tubing
TB-0206	Heavy duty for larger wall thicknesses
TB-0168	Counterbore bit
TB-0167	37.5 degree bevel
TB-6900	"J" bevel 25 degree w/.032 radius
TB-1510	Double sided tool insert (carbide)
TSM-AD-3000	Tool bit adapter/holder for inserts

(Tool bits can be requested with TIN or Laser coating)

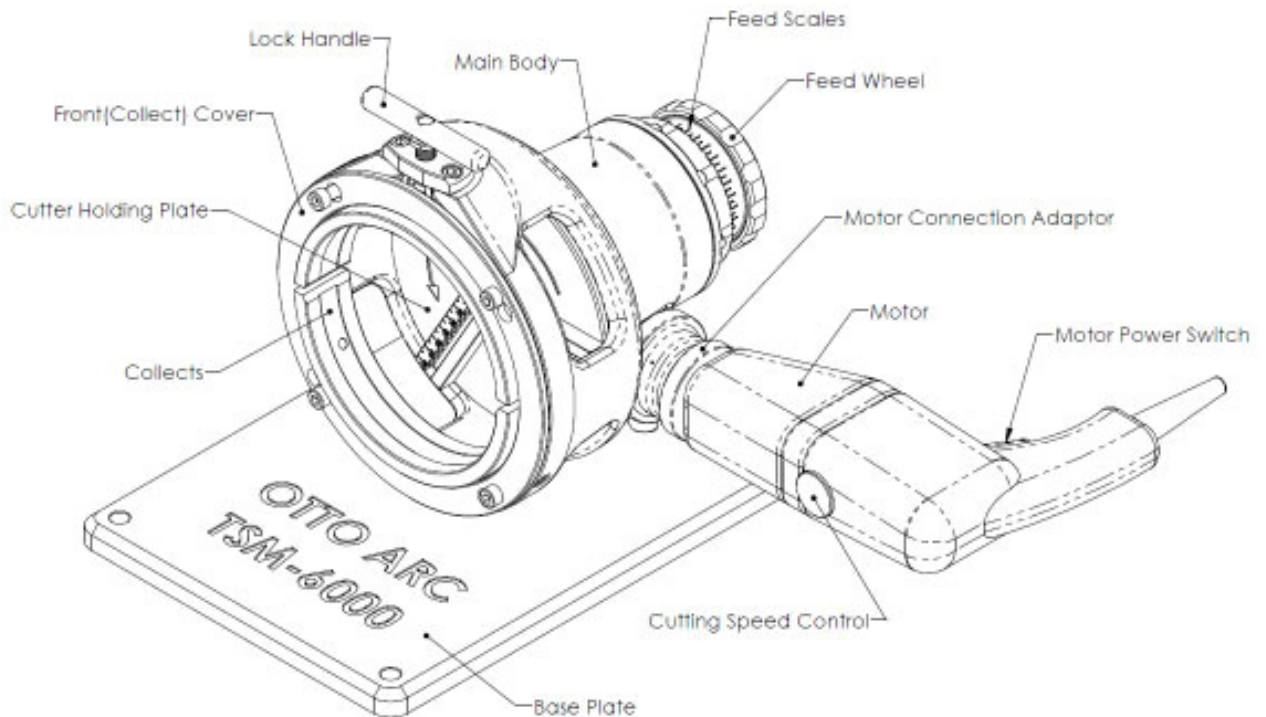
NOTE:

**Slower speeds produce minimum burrs when working with
electro polished stainless tubing.**

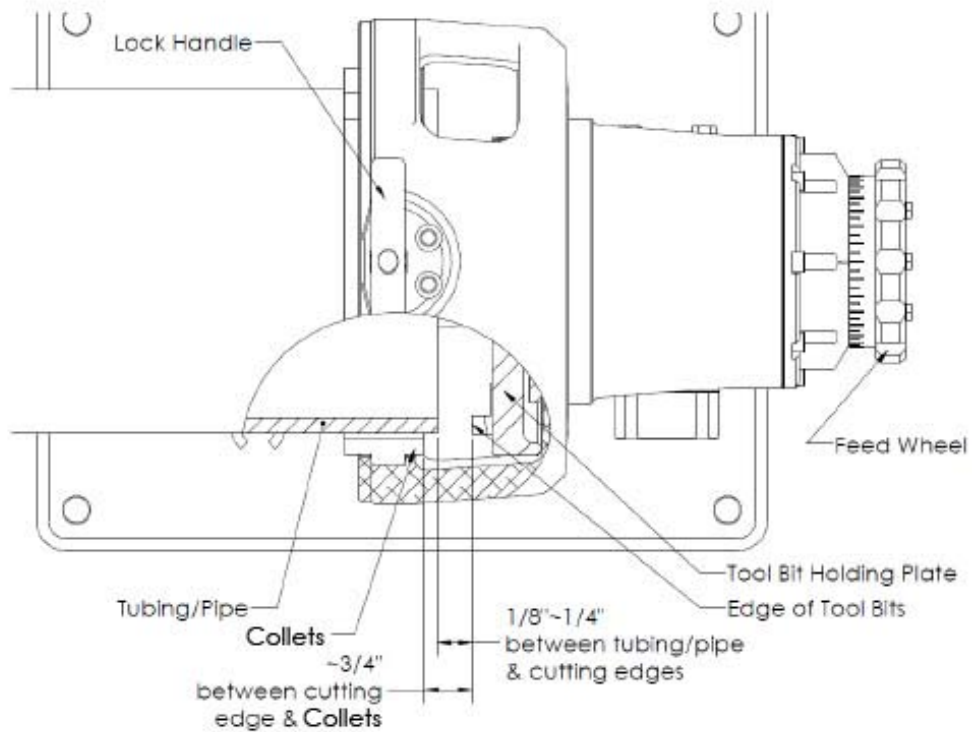
CAUTION!

**Running the drill too fast will harden the stainless steel tubing and
quickly damage the tool bits.**

7. OVERVIEW OF OPERATIONS



- 1) Unplug the electric motor power connection from the electric power source before operation setup.
- 2) Install collets per the section "Setup of Collets".
- 3) Install tool bit based on the section "Selecting and Setting Tool Bits".
- 4) On the facing, adjust the tool bits (cutting tools) initial position by turning the feeding wheel. Keep the distance between the tool bits cutting edge and the collect around .75". Please refer to picture.
- 5) Put tubing into collets and adjust tubing to leave 1/8" to 1/4" gap between tool bit and tubing/pipe, and tighten down the lock handle "Clockwise". See picture below.
- 6) Connect the electric motor to the electric power source, and remember to have your safety glasses on.



7) Turn the machine in the proper rotation direction shown on the cutter holding plate, adjust the rotation speed on the electric motor to a desired value, and cut tubing/pipe by turning the feeding wheel into the tubing/pipe. "Remember" you want to have the motor turning at a low speed so that the tool bit doesn't lock into the tubing or pipe when cutting stainless steel.

8) When you have finished facing the tubing or pipe, un-screw the lock handle and release the collet around the tubing/pipe. Remove tubing/pipe and repeat.

8. MAINTENANCE

GENERAL MACHINE MAINTENANCE

During heavy operation, regularly use a brush to clean chips away from the machine. Wipe the machine down thoroughly when you are through with the machine. Do not spray anything into the electric motor body.

ELECTRIC MOTOR MAINTENANCE

Periodically check the motor brushes for excess wear or damage. Replace as needed. Check the power cord for cuts, tears, or abrasions.

COLLET MAINTENANCE

Keep clamp collets together in their respective sets. When not in use, store in case. Collet repair kits are available from your retailer.

TOOL BIT MAINTENANCE

When possible, leave unused tool bits in their packages to prevent them from being damaged. Please store tool bits that have been taken from their original package in a safe place.

9. WARRANTY

EVERY OTTO ARC MACHINE IS THOROUGHLY INSPECTED AND TESTED BEFORE LEAVING OUR MANUFACTURING FACILITIES. ALL PRODUCTS MANUFACTURED BY OTTO ARC SYSTEMS, INC. ARE WARRANTED TO THE ORIGINAL PURCHASER TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP. UNDER NORMAL USE, THE MACHINE IS WARRANTED FOR A PERIOD OF ONE YEAR FROM THE DATE OF PURCHASE. THIS DOES NOT INCLUDE TOOL BITS OR OTHER CONSUMABLE ITEMS. SHOULD ANY TROUBLES OR CONCERNS DEVELOP, RETURN THE COMPLETE TOOL PREPAID TO OTTO ARC SYSTEMS, INC. OR TO THE NEAREST AUTHORIZED SERVICE CENTER. IF INSPECTION SHOWS THE TROUBLE IS CAUSED BY DEFECTIVE WORKMANSHIP OR MATERIAL, OTTO ARC AT ITS OPTION WILL REPAIR OR REPLACE WITHOUT CHARGE FOR EITHER PARTS OR LABOR. THE PRODUCT WILL BE RETURNED TO THE PURCHASER FREIGHT PREPAID AND BILLED TO THE PURCHASER.

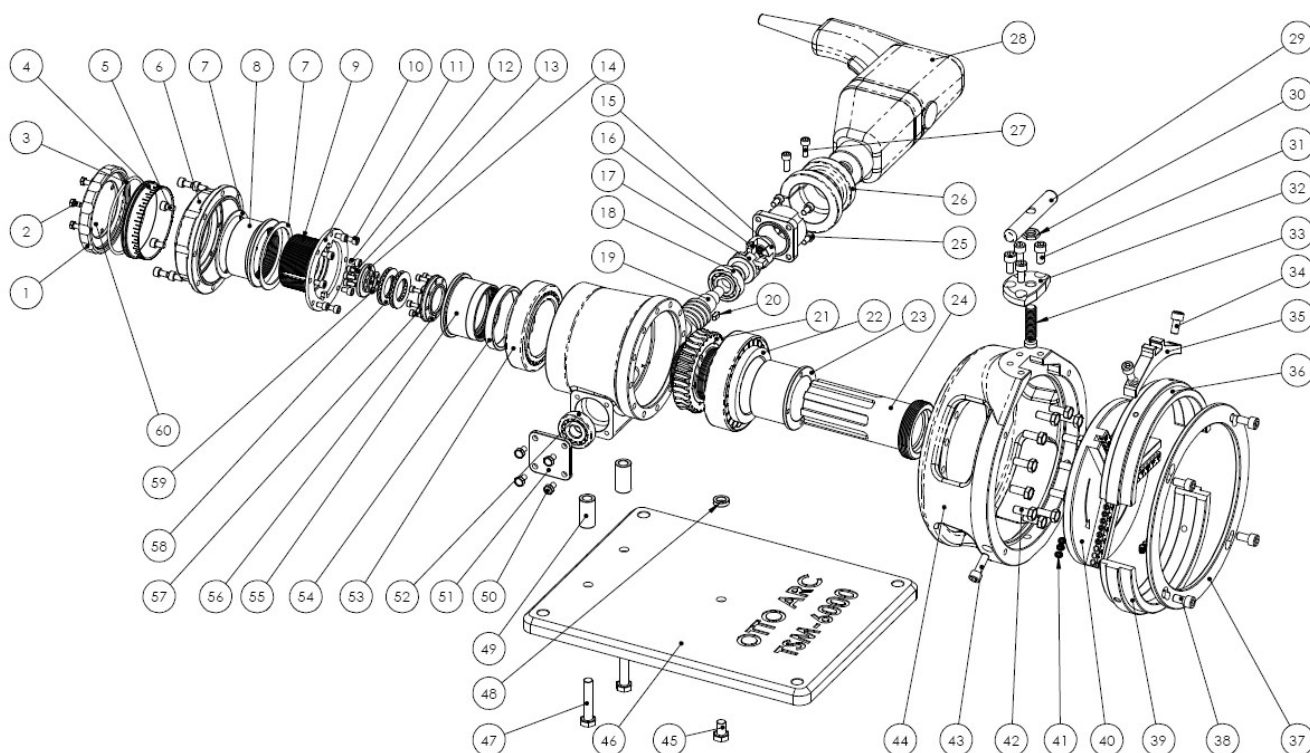
WARRANTY IS TWELVE MONTHS (12MO) 1 YEAR WARRANTY FROM DATE OF PURCHASE. PLEASE REVIEW BELOW INFORMATION REGARDING THE WARRANTY DETAILS. THIS DOES NOT INCLUDE TOOL BITS OR OTHER CONSUMABLE ITEMS.

WARRANTY DOES NOT APPLY IF:

- 1) REPAIRS OR ATTEMPTED REPAIRS HAVE BEEN MADE BY PERSONS OTHER THAN OTTO ARC PERSONAL, OR UNAUTHORIZED SERVICE REPAIR PERSONNEL.
- 2) REPAIRS ARE REQUIRED BECAUSE OF NORMAL WEAR.
- 3) THE TOOL HAS BEEN ABUSED OR INVOLVED IN AN ACCIDENT.
- 4) MISUSE IS EVIDENT, SUCH AS OVERLOADING THE TOOL BEYOND ITS RATED CAPACITY. THE TOOL HAS BEEN USED AFTER PARTIAL FAILURE, OR THE TOOL HAS BEEN USED WITH AN IMPROPER ACCESSORIES.
- 5) THE MOTOR IS DAMAGED DUE TO NOT USING OILER/MISTER WHILE USING (PENDING MOTOR TYPE).

NO OTHER WARRANTY VALID IF EITHER WRITTEN OR VERBALLY IS AUTHORIZED.

10. TSM-6000 EXPLODED VIEWS AND PARTS LIST



TSM-6000 EXPLODED VIEW

OTTO ARC SYSTEMS, INC. | TSM-6000 FACING/SQUARING MACHINE

Item	Description	Part #	Qty
1	FEED WHEEL	TSM-6000-001	1
2	SCREWS	TSM-6000-002	6
3	O-RING	TSM-6000-003	1
4	RING, FEED SCALE	TSM-6000-004	1
5	SCREWS	TSM-6000-005	8
6	REAR COVER	TSM-6000-006	1
7	RING, THRUST BEARING	TSM-6000-007	2
8	FEED ID THREAD	TSM-6000-008	1
9	FEED OD THREAD	TSM-6000-009	1
10	RING, FEED ROTATION STOP	TSM-6000-010	1
11	SCREWS	TSM-6000-011	6
12	SCREWS	TSM-6000-012	4
13	SCREWS	TSM-6000-013	6
14	COVER, THRUST BEARING	TSM-6000-014	1
15	SHAFT COUPLING, THREAD ID	TSM-6000-015	1
16	INSERT, SHAFT COUPLING	TSM-6000-016	1
17	SHAFT COUPLING, KEY WAY	TSM-6000-017	1
18	ROLLER BEARING	TSM-6000-018	1
19	WORM SHAFT	TSM-6000-019	1
20	KEY	TSM-6000-020	1
21	GEAR	TSM-6000-021	1
22	ROLLER BEARING	TSM-6000-022	1
23	SLEEVE, BEARING	TSM-6000-023	1
24	MAIN SHAFT	TSM-6000-024	1
25	BRACKET, MOTOR MOUNT	TSM-6000-025	1
26	COUPLING, MOTOR MOUNT	TSM-6000-026	1
27	SCREWS	TSM-6000-027	2
28	ELECTRIC MOTOR	TSM-6000-028	1
29	HANDLE, LOCK	TSM-6000-029	1
30	NUT, THICK	TSM-6000-030	1
31	SCREWS	TSM-6000-031	4

OTTO ARC SYSTEMS, INC. | TSM-6000 FACING/SQUARING MACHINE

32	HOLD PLATE	TSM-6000-032	1
33	LOCK SCREW	TSM-6000-033	1
34	SCREWS	TSM-6000-034	2
35	BRACKET, COLLECT MOUNT	TSM-6000-035	1
36	COLLECT, UPPER	SEE COLLECT LIST	
37	COVER, FRONT	TSM-6000-036	1
38	SCREWS	TSM-6000-037	4
39	COLLECT, LOWER	SEE COLLECT LIST	
40	PLATE, TOOL BIT HOLD	TSM-6000-038	1
41	SET SCREWS	TSM-6000-039	22
42	SCREWS	TSM-6000-040	12
43	SCREWS	TSM-6000-041	2
44	BRACKET, TUBING HOLD	TSM-6000-042	1
45	BOLT	TSM-6000-043	1
46	BASE	TSM-6000-044	1
47	BOLTS	TSM-6000-045	2
48	SPACER, SHORT	TSM-6000-046	1
49	SPACER, LONG	TSM-6000-047	2
50	BOLTS	TSM-6000-048	4
51	COVER, WORM SHAFT	TSM-6000-049	1
52	ROLLER BEARING	TSM-6000-050	1
53	ROLLER BEARING, MAIN SHAFT	TSM-6000-051	1
54	SPACER, BEARING	TSM-6000-052	1
55	SLEEVE, BEARING	TSM-6000-053	1
56	BASE, THRUST BEARING	TSM-6000-054	1
57	SCREWS	TSM-6000-055	8
58	THRUST BEARINGS	TSM-6000-056	2
59	SPACER, THRUST BEARINGS	TSM-6000-057	1
60	COVER	TSM-6000-058	1

SQUARING TOOL | TSM-6000 (1"- 6.625" Pipe) 25.4mm - 168.3mm

HOLDS 3 TOOL BITS! FACES, BEVELS AND COUNTERBORES!

OD MOUNT / ELECTRIC

This lightweight 42 lb. facing machine has a wide working range of 1" to 6.625" OD. With our machine you do not have to change adapters if you change tubing size.

PERFORMANCE

- Size range for pipe 1.315" to 6.625"
- Size range for tube 1" to 6"
- 110V variable speed control motor with electronic feedback maintains constant RPM under load
- Rugged two speed design to fit more applications
- Quick close latching system reduces setup time
- Comes with bench stand
- Easy replacement of collets and size ranges
- Adjustable measure indicator for accurate facing 0.001" or longer
- Large view port for easy bit replacement
- Faces most metals and plastics, including high nickel and carbon steel materials
- Tool bit designed to keep chip out of polished ID



PART NUMBERS / ORDER INFO:

TSM-6000 Machine Kit Includes: Machine, Tool Bits (2), Tooling, Manual and Case

TSM-6000 Kit with Variable Speed Control 110v Motor	P/N: TSM-6000-10
TSM-6000 Kit with Variable 230v Motor	P/N: TSM-6000-10-230
TSM-6000 Kit with Variable Battery Powered Motor	P/N: TSM-6000-10-BP
TSM-6000 Kit with Variable Battery Powered Motor (230v)	P/N: TSM-6000-10-BP-230

COLLETS FOR THE TSM-6000

(Please note: some millimeter sizes are also equivalent to standard US standards)

Standard

Part Number	Description (Inches)
TSM-6001	1" TUBE COLLET / 25.4mm
TSM-6002	1" PIPE COLLET
TSM-6003	1-1/2" TUBE COLLET / 38.1mm
TSM-6004	1-1/2" PIPE COLLET
TSM-6005	2" TUBE COLLET / 50.8 mm
TSM-6006	2" PIPE COLLET
TSM-6007	2-1/2" TUBE COLLET / 63.5mm
TSM-6008	2-1/2" PIPE COLLET
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TSM-6014	5" TUBE COLLET / 127mm
TSM-6015	6" TUBE COLLET / 152.4mm
TSM-6016	6" PIPE COLLET

Part Number	Description (Millimeters)
TSM-6017	28mm TUBE COLLET
TSM-6018	35mm TUBE COLLET
TSM-6019	52mm TUBE COLLET
TSM-6020	57.15mm TUBE COLLET
TSM-6021	60.5mm TUBE COLLET
TSM-6022	69.85mm TUBE COLLET
TSM-6023	76.2mm TUBE COLLET
TSM-6024	82.55mm TUBE COLLET
TSM-6025	95.25mm TUBE COLLET

*Looking for a special size collet?
Contact our sales department for
pricing and delivery time.*

TOOL BITS

(Tool bits can be requested with TIN or Laser coating)

Part Number	Description
TB-0202	Extended reach standard style
TB-0202-LC	Extended reach laser coated
TB-1506 *	For use on 316 or 304 stainless
TB-1506-LC	Laser coated for abrasion resistance
TB-1506-TIN	Tin coated for superior heat resistance
TB-5000	For soft and gummy stainless steel tubing
TB-0206 *	Heavy duty for larger wall thicknesses
TB-0168	Counterbore bit
TB-0167	37.5 degree bevel
TB-6900	"J" bevel 25 degree w/.032 radius
TB-1510	Double sided tool insert (carbide)
TSM-AD-3000	Tool bit adapter/holder for inserts

* Tool bits that are included in machine kit.

For TSM-6000 accessories, please visit our website or contact our sales department for further assistance.

OTTO ARC SYSTEMS, INC • 1-800-878-BITS (2487) • WWW.OTTOARC.COM