

OTTO TOOL

**MODEL TSM-1501M
TUBE SQUARING
MACHINE**

OPERATING INSTRUCTIONS



OTTO TOOL, INC

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TUBE SQUARING MACHINE
MODEL TSM-1501M**

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TSM-1501M TUBE SQUARING MACHINE

INTRODUCTION

The information in this manual is up to date at time of printing. Otto Tool is committed to continued product improvement, the machine you receive may be slightly different than the one described herein.

Warning:

Moving machine parts can seriously injure untrained operators. Understand all instructions before operating this machine. This manual describes how to use your Model TSM-1501M Tube Squaring Machine. This machine tool is designed for facing short tubing and elbows from 1/8" to 1-1" diameter and piping from 1/4" to 3/4" with lengths greater than .20". For maximum safety and performance, read the entire instruction manual before operating this machine.

Applications:

This model Tube Squaring Machine can be used in a wide variety of applications but is specifically designed for facing tubing. The modular design and versatile setup allow you to be creative in solving difficult machine problems, however, it is very important to follow the operating manual and maintain integrity of the machine. Do not modify it in any unspecific manner.

When you receive it:

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

TSM-1501M TUBE SQUARING MACHINE

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 Tools 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.

TSM-1501M TUBE SQUARING MACHINE

DESCRIPTION

The TSM-1501M Tube Squaring Machine is designed for facing short tubing and elbows from 1/8" to 1-1" diameter and piping from 1/4" to 3/4" with lengths greater than .20". 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 in the following materials: stainless steel, iconel, hastelloy, carbon steels, aluminum, and a variety of other alloys.

The standard TSM-1501M-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:

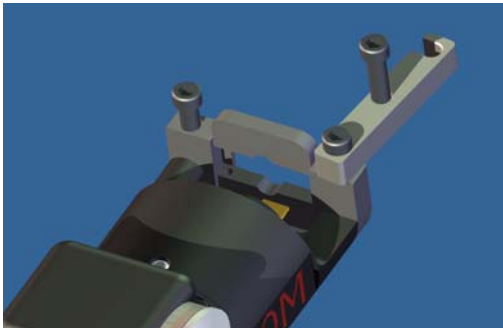
- Weight (with motor, without collets): 8 lbs. (3.6 kg)
- Overall length: 15 inches (381. mm)
- Overall height: 8 inches (203 mm)
- Motor: 120VAC 60Hz-US style
220VAC 50 Hz-CE Compliant

TSM-1501M TUBE SQUARING MACHINE

SET UP AND OPERATION

COLLET

- 1) Unscrew latch on Head Assembly on facing machine. You will need to back out the screw on the top of the head before unscrewing the screw on outer latch.
- 2) Take lower half collet (with 2 springs attached) that fits the size of tubing or pipe and insert into assembly head. Now take the upper half of the collet and insert into head.



STANDARD TUBE AND MILLMETERS			
PART #	SIZE	PART #	SIZE
M1-001	1/8"	M1-11	6mm
M1-002	1/4"	M1-12	8mm
M1-003	3/8"	M1-13	10mm
M1-004	1/2"	M1-14	12mm
M1-005	5/8"	M1-15	14mm
M1-006	3/4"	M1-16	15mm
M1-007	1"	M1-17	18mm
M1-008	7/8"	M1-18	22mm
		M1-19	25mm

TSM-1500 TUBE SQUARING MACHINE

EXTENDED TUBE	
PART #	SIZE
M2-030	1/8"
M2-031	1/4"
M2-032	3/8"
M2-033	1/2"
M2-034	5/8"
M2-035	3/4"
M2-038	1"
M2-036	7/8"

ELECTRIC DRILL MOTOR

The electric motor can be rotated 360 degrees to allow for comfortable machine operation.

To rotate machine:

1. Loosen the socket head cap screw on the split collar.
2. Rotate the motor to the most comfortable and or convenient position.
3. Tighten the socket head cap screw before turning on the machine.

TOOL BIT SELECTION

Select the right tool bit for your application. Note that using the wrong type of tool bit or using dull bits may result in poor performance.

You have to remember that these tool bits are design to move the chip away from the tubing so not to scratch the inside of the EP Tubing. This is done by have angle that cause the chip to flow away from the tubing by the radius angle built into the tool bit. This is important to understand, because of the design of the tool bit; you want to set the cutting bit closes to the inside of the tool bit as possible.

TSM-1501M TUBE SQUARING MACHINE

This will give you the best cutting edge on the tool bit.

To change bits:

1. Unplug the motor from the power source before installing the tool bits.
2. Insert the tool bit into the slot and align the tool bit to the size of tubing or piping to the marking on the cutter head. This will give you a starting point.
3. Make sure the cutting edge is facing counterclockwise and set screws are facing away from cutting edge.
4. Tighten down the set screws.

TOOL BITS FOR TSM-1501M	
PART #	
TB-1506	Standard Tool Bit for SS Material
TB-1506-TIN	Tin-Coated Tool Bit for SS Material
TB-1506-LC	Laser Coated Tool Bit for SS Material
TB-1506-C	Carbide Tip for use on High Nickel Material
TB-1479	Left Handed Tool Bit for SS Material
TB-0205	Heavy Duty for Larger Wall thickness
TB-0167	37-1/2 Degree Bevel Bit

NOTE

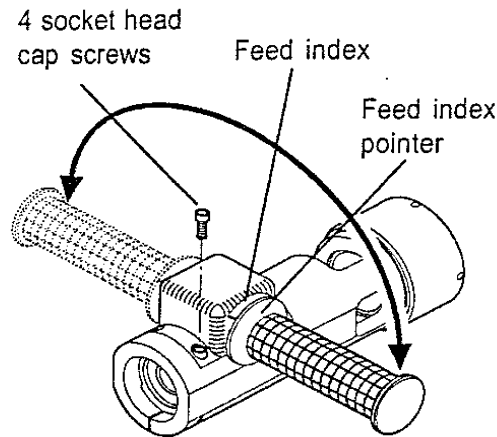
Slower speeds produce minimum burrs when working With Electropolished Stainless Tubing.

CAUTION

Running the drill to fast will work harden the Stainless Steel Tubing and quickly damage the tool bits

TSM-1501M TUBE SQUARING MACHINE

FEED HANDLE & FEED DIAL INDICATOR



The cover and handle are moved as one piece. Remove cap screws and reposition assembly 180°.

For the comfort and convenience of the operator, or if there are room constraints in the work area, the feed handle can be changed from one side of the main body to the other.

The feed handle has an index and an index pointer that is used to accurately feed the tool bit into the work piece. The index is calibrated in .015" markings.

To change the feed handle mounting:

1. Remove the four socket head cap screws.
2. Remove the entire handle assemblies and position it as desired on the right or left side of the main body.
3. Replace the four socket head cap screws and tighten securely.

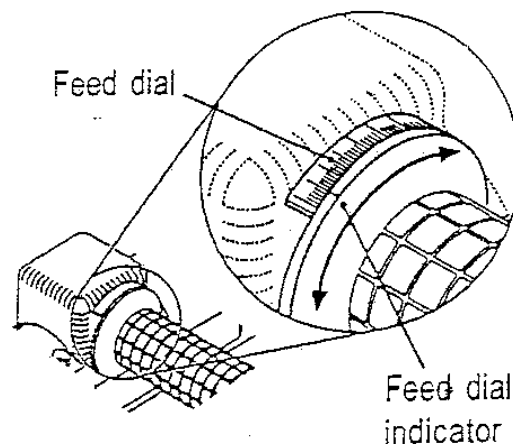
TSM-1501M TUBE SQUARING MACHINE

FEED DIAL INDICATOR

The feed dial indicator is only used when a certain amount of travel is needed. Typically, just giving the tube end a 100% clean up is enough.

To use feed dial indicator:

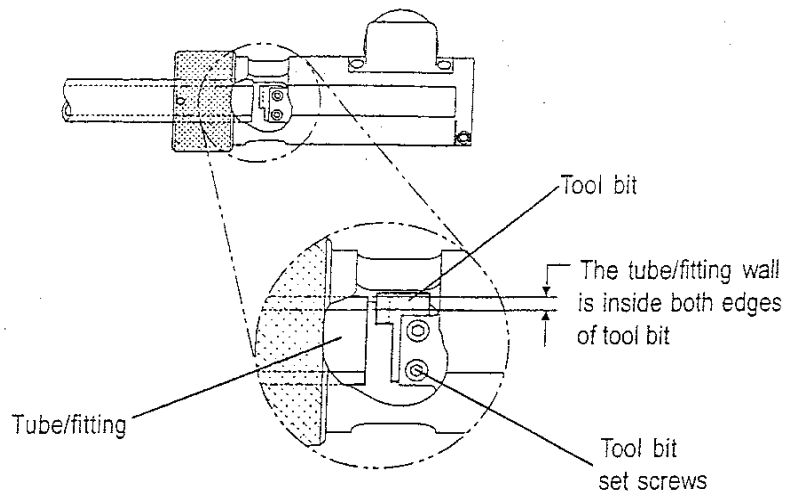
1. With the motor off, use the feed handle to advance the tool bit forward just until it contacts the work piece.
2. Holding the cutter against the work piece, rotate feed dial indicator to any reference mark on the feed dial. The feed dial is stamped in .015" increments.
3. Back the tool bit away from the work piece.
4. Start the motor and feed as before using the referenced feed dial setting as a depth of cut guide.



OVER VEIW OF OPERATIONS

- 1) Install collect per section "Collect"
- 2) Put tubing or pipe into collect and adjust tubing to leave 1/4" gap between cutting bit and tubing, and tighten down cap "Clockwise"
See picture below

TSM-1501M TUBE SQUARING MACHINE



- 3) Adjust tool bit per section "Tool Bit" See above picture
- 4) Plug in motor, and put safety glass on
- 5) Sit dial indicator per section "Feed Dial Indicator"
- 6) Turn motor in Clockwise direction and feed tubing or pipe by turn the handle into the tubing. "**Remember**" you only want to have the motor turning as slow as you can without having the tool bit lock into the tubing or pipe when cutting stainless steel
- 7) Make your pass around the tool bit with the tool bit and as soon as you take a full rotation around the tubing and pipe and take a full cut, you have now completed a square end. You would only want to take more off the tubing if you need to bring to a certain size length.
- 8) When you have finish facing the tubing or pipe, un-screw the cap and release the collect around the tube or pipe. Remove tubing and repeat on next part.

The Otto Tool Facing machine will last for many years with care and maintenance. Keep your equipment clean and repair for long life.

TSM-1501M TUBE SQUARING MACHINE

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 if dropped. Store tool bits that have been taken from their original package in a safe place.

WARRANTY

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

TSM-1501M TUBE SQUARING MACHINE

THE PURCHASER FREIGHT PREPAID AND BILLED TO THE PURCHASER.

THIS WARRANTY DOES NOT APPLY WHERE:

- A) REPAIRS OR ATTEMPTED REPAIRS HAVE BEEN MADE BY PERSONS OTHER THEN OTTO TOOL PERSONAL, OR AUTHORIZED SERVICE REPAIR PERSONAL.
- B) REPAIRS ARE REQUIRED BECAUSE OF NORMAL WEAR.
- C) THE TOOL HAS BEEN ABUSED OR INVOLVED IN AN ACCIDENT.
- D) MISUSE IS EVIDENT, SUCH AS CAUSED BY OVERLOADING THE TOOL BEYOND IT RATED CAPACITY.
- E) THE TOOL HAS BEEN USED AFTER PARTIAL FAILURE, OR THE TOOL HAS BEEN USED WITH AN IMPROPER ACCESSORY.
- F) AIR MOTOR WILL NOT BE COVER IF DAMAGE IS CAUSED BY NOT USING OILER/MISER WHILE USING.

NO OTHER WARRANTY EITHER WRITTEN OR VERBAL IS AUTHORIZED.

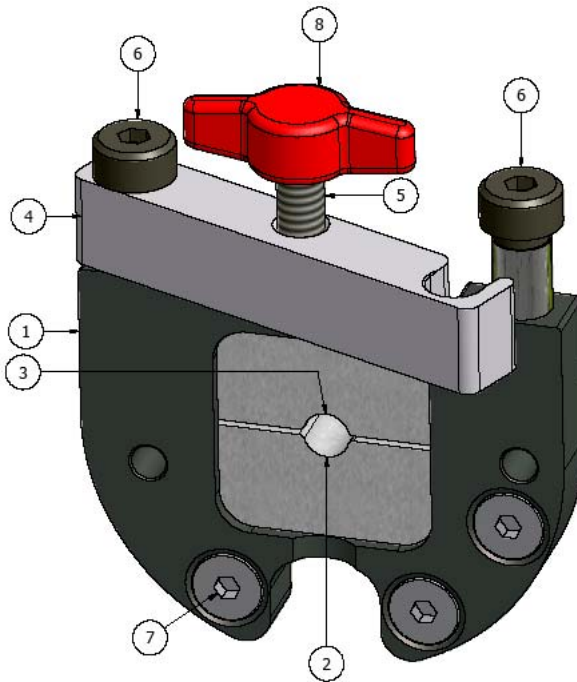
TSM-1501M TUBE SQUARING MACHINE

**EXPLODED
VIEWS
AND
PARTS LISTS**

STANDARD TUBE	
PART #	SIZE
M1-001	1/8"
M1-002	1/4"
M1-003	3/8"
M1-004	1/2"
M1-005	5/8"
M1-006	3/4"
M1-007	1"
M1-008	7/8"

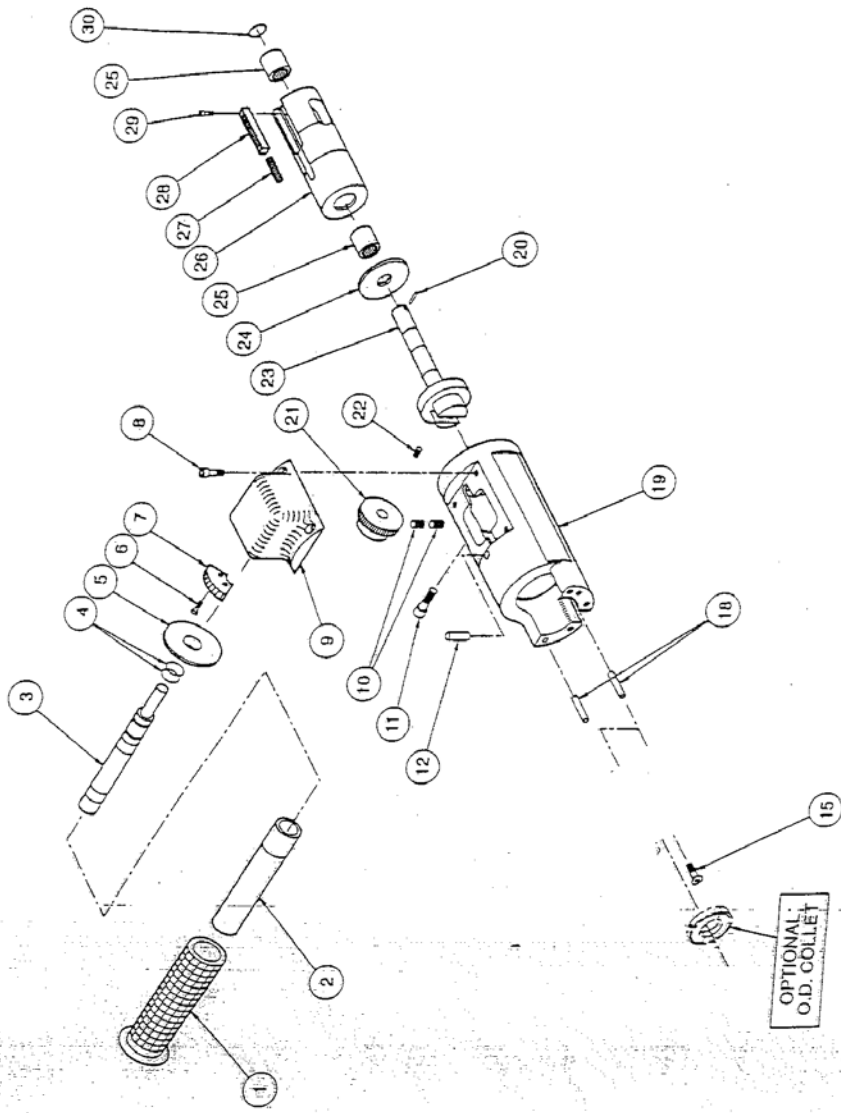
MILLIMETERS	
PART #	SIZE
M1-011	6MM
M1-013	8MM
M1-014	10MM
M1-015	12MM
M1-017	14MM
M1-018	15MM
M1-019	18MM
M1-020	22MM
M1-021	25MM

EXTENDED STYLE COLLET	
PART #	SIZE
M2-030	1/8"
M2-031	1/4"
M2-032	3/8"
M2-033	1/2"
M2-034	5/8"
M2-035	3/4"
M2-036	7/8"
M2-037	1"



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TSM-293	1500M1 CLAMP BODY
2	1	LOWER JAW	SEE TABLES FOR PART NUMBERS
3	1	UPPER JAW	SEE TABLES FOR PART NUMBERS
4	1	TSM-291	RAIL CLAMP
5	1	SHCS-English-UNC	1/4-20 X 3/4" SOCKET HEAD CAP SCREW
6	2	ShoulderBolt	5/16" X 1/2" SOCKET HEAD SHOULDER BOLT
7	3	FHMS-English-UNF	10-32 X 3/4" FLAT HEAD CAP SCREW
8	1	WING KNOB	1/4-20 SOCKET HEAD CAP SCREW WING NUT

ANGLES = ±1°		.X = ±.015	.XX = ±.010	.XXX = ±.005	.XXXX = ±.0005
DRAWN	Brian Rodman	4/23/2007	OTTO TOOL		
CHECKED					
QA	QA				
MFG					
APPROVED					
MATERIAL			TITLE		
			CLAMP ASSEMBLY-1500M1		
SIZE	B	DWG NO	CLAMP ASSEMBLY- 1500M1		REV
SCALE					A
INVENTOR		2008	SHEET 1 of 1		



MAIN MACHINE ASSEMBLY

Otto Tool
 El Dorado Hills, CA 95762

TSM-1501M MAIN MACHINE ASSEMBLY

1	TSM-218	GRIP FEED HANDLE
2	TSM-216A	HANDLE FEED OUTER
3	TSM-216	HANDLE FEED INNER
4	60054	RING O 1/16 X 1/2 ID X 5/8 OD
5	TSM-361	DIAL FEED
6	62598	SCREW 6-32 X 3/8 FHCS
7	TSM-360	INDEX FEED
8	60035	SCREW 10-32 X 1/2 SHCS
9	TSM-203	HOUSING GEAR
10	60074	SCREW 1/4-20 X 1/4 SSS
11	60233	SCREW 1/4-20 X 3/4 SHCS
12	60036	PIN DOWEL 1/4 DIA X 3/4
15	60188	SCREW 10-32 X 3/4 FHCS
18	60702	PIN DOWEL 3/16 DIA X 1
19	TSM-201M	BODY MAIN
20	TSM-219	PIN SHEAR 1/8 DIA X 3/4 SPIRAL
21	TSM-210	DRIVE GEAR
22	62187	SCREW 10-32 X 1/4 SSS
23	TSM-200M	SHAFT CUTTER
24	TSM-224	WASHER THRUST
25	TSM-212	BRG NEEDLE 1/2 ID X 3/4 OD X .750
26	TSM-204	BODY INSIDE
27	60034	SPRING COMP .234 OD X .05X2.22
28	TSM-209	RACK FEED
29	60196	SCREW 4-40 X 1/4
30	60022	RING SMAP 1/2 OD