



OTTO ARC

www.ottoarc.com

OPERATING INSTRUCTIONS

MODEL PBM-6000 BEVELING MACHINE

REV 8/2011



USA

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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. Safe machining practices should always be followed when operating Otto Arc Machines.

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

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

The motor should always be disconnected from the drive battery when servicing the machine or when changing cutting inserts, collets, or other components.

Moving machine parts can seriously injure untrained operators. Understand and read all instructions before operating this machine. This manual describes how to use your Model PBM-6000 Beveling Machine. **For maximum safety and performance, read the entire instruction manual before operating this machine.**

SAFETY INFORMATION

WARNING!

MOVING PARTS. Keep hands, loose clothing, and hair away from rotating or moving parts. Remove the drive battery from the machine and 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

The model PBM-6000 is a right angled pipe (tube) end prep machining tool designed to face, bevel and counter bore for cutting end prep configurations for welding. These operations can be performed separately or in combination simultaneously. The current model uses a pneumatic powered motor or an electric motor. This machine uses an internal expanding clamping mandrel with interchangeable jaw sets, which will accommodate internal diameters from 1.939" to 6.065" ID. Components, operation and maintenance are covered in detail in this manual.

Pipe weld end preparation that meets all existing conventional codes including the more stringent nuclear codes may use the PBM-6000 beveling machine.

The various interchangeable mandrel blades and ramps inserted onto the mandrel will secure the pipe beveling machine to the pipe and tubing having an inside diameter ranging from 1.939" to 6.065".

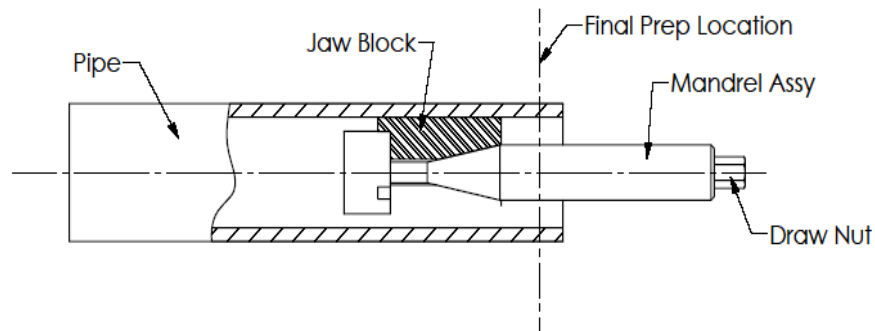
The expanding mandrel provides fast, accurate self-centering and alignment to the pipe or tubing to be machined. You do have to be careful when aligning the mandrel blade; do not align directly on the bead on the inside of the pipe.

The standard PBM-6000-10 package includes:

- Beveling Machine assembled with air or electric motor
- Custom carrying case
- Ramp inserts
- Two tool bits
- Tool kit
- Operating manual

4. SET-UP AND OPERATION

- 1) Cutter head must be secure and mandrel seal with the head must be in proper condition to insure a smooth operation and to prevent damage to the beveling machine and / or mandrel assembly.
- 2) Before putting the mandrel into the beveling machine, make sure you have loosened the torque acceptance key adjustment screws on the beveling machine so that the mandrel will be able to align with the 2 slots on the mandrel shaft.
- 3) Clean and gently install the selected clamping mandrel assembly into the cutter head end of the tool (front end), while keeping the mandrel keyway oriented 180 degrees from the motor. Looking at the front end of the pipe beveling tool with the motor pointing down (6 o'clock position), the keyway would be straight up (12 o'clock position). Check to make sure the mandrel blades are not on weld seam. If on weld seam this will cause misalignment.

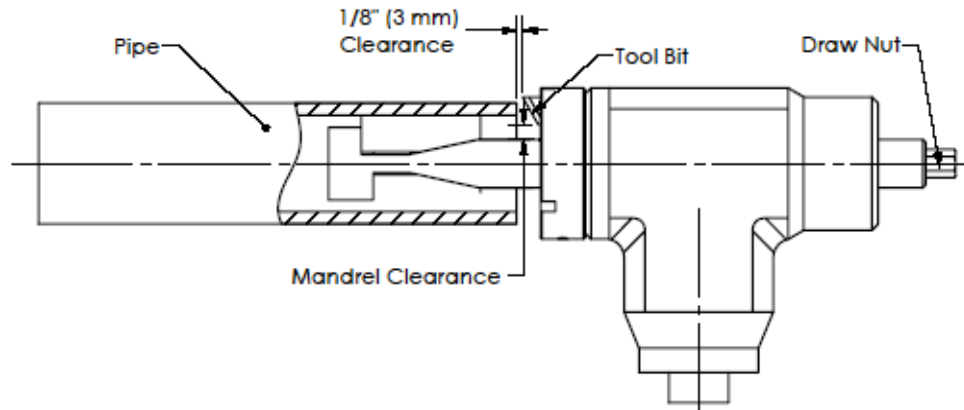


Mandrel to Pipe End Clearance

- 4) Gently apply inward pressure while turning the feed nut on the rear of the beveller. The clamping mandrel threads should engage and the clamping mandrel should be moving into the tool as the feed nut is turned. Continue turning the feed nut until the threads on the end of the mandrel begin to extend beyond the feed nut.
- 5) **NOTE:** A minimum of 10 threads must be engaged to prevent thread stripping of the threads during the machining operation
- 6) After you have moved the mandrel into the beveling machine, check the backlash on the mandrel and adjust the torque acceptance keys to take out the backlash as required. Make sure you do not over tighten the adjustment screw, if they are too tight, you will not be able to move the mandrel while operating the machine.
- 7) Slide the clamping mandrel into the inside of the tube/pipe to begin. Then gently tighten the mandrel clamping nut (draw rod nut) until the internal clamping mechanism begins to grip the work piece.

OTTO ARC SYSTEMS, INC. | PBM-6000 BEVELING MACHINE

- 8) With the mandrel loose enough for the mandrel to slide along the inside of the tube/pipe, move the cutting head about 1" away from the end of the tube/pipe, and tighten the draw rod nut while gently working the tool back and forth so that the clamping blades seat evenly. It is very important to make sure the mandrel blades are not on the inside of the weld bead; this will cause misalignment of head.

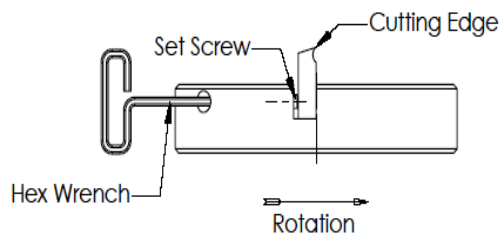


Tool Bit to Pipe Clearance

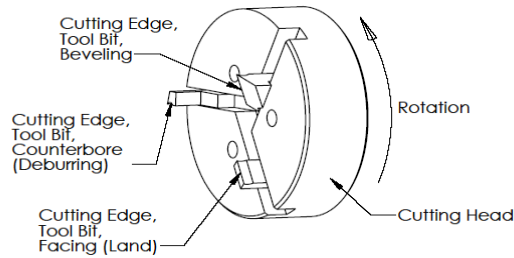
5. SELECTING AND SETTING TOOL BITS

WARNING! Use of dull or improperly designed tool bits or cutting inserts not manufactured by OTTO ARC SYSTEMS, INC. may result in poor performance and may constitute abuse of this machine and therefore voids the Otto Arc Systems, Inc. factory warranty.

- 1) Select the correct combination of cutting inserts (tool bits) and slip them into the cutter head. Be sure to place the cutting blades in the correct position. Make sure that when putting in the tool bits, the cutting edge is facing to the set-screw.

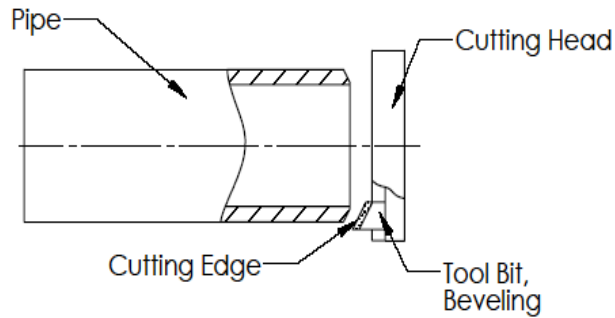


Tool Bit Tightening

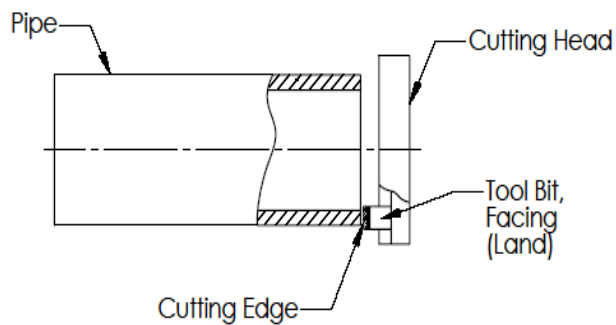


Tool Bit Positioning

- 2) Depending on the required bevel configuration, the blades should be set in a set order. Facing or squaring blades should be set first, and then OD (outside diameter) beveling blades. When each blade is in the correct position, secure the blade by tightening the cutting blade wedge clamp with the hex key wrench.

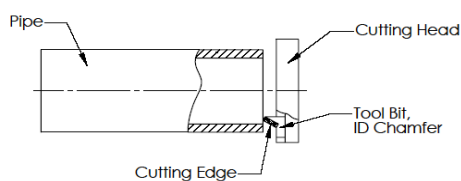


Beveling Tool Bit

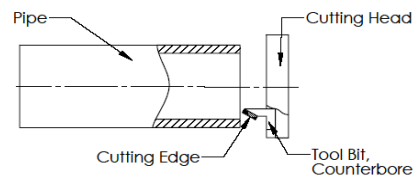


Facing (Land) Tool Bit

- 3) When a land is required on the end of the tube/pipe, use a facing blade in combination with the beveling blades. The width of the land can be controlled by adjusting the position of the beveling blade or by using a facing blade with a higher or lower overall height. It is recommended that the beveling blade be adjusted to regulate land width.



ID Chamfer Tool Bit



Counterboring Tool Bit

- 4) On production jobs, it may also be beneficial to set and test the cutting blade settings on a test piece of pipe or tube.

6. TOOL BIT SELECTION FOR PBM-6000

Part Number	Description
TB-2905	37.5 degree bevel bit (lower range)
TB-2906	37.5 degree bevel bit (upper range)
TB-2930	30 degree bevel bit (lower range)
TB-2931	30 degree bevel bit (upper range)
TB-2913	45 degree bevel bit (lower range)
TB-2914	45 degree bevel bit (upper range)
TB-2915	"J" bevel bit (lower range)
TB-2916	"J" bevel bit (upper range)
TB-2904	Facing bit
TB-2907	C-Bore 14.5 degree (lower range)
TB-2908	C-Bore 14.5 degree (middle range)
TB-2909	C-Bore 14.5 degree (upper range)
TB-2910	C-Bore 10 degree (lower range)
TB-2911	C-Bore 10 degree (middle range)
TB-2912	C-Bore 10 degree (upper range)

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

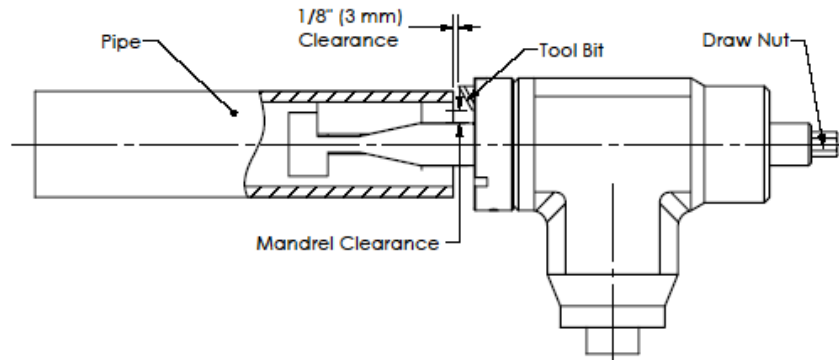
7. STARTING & OPERATING THE PIPE BEVELING MACHINE

SPECIFICATIONS

- Model TSM-6000 Beveling Machine
- Weight: 48.3 lbs.
- Power requirements: 55 cfm at 90 psi.
- Basic Pipe sizes: 2" Pipe / 1.939" ID. to 6" Pipe / 6.06" ID
- Schedules 80 through 160 and wall thickness to 2"
- Counter boring operations: 2.6" to 6" ID
- Material cutting capabilities: Mild Steels, chrome steels (35 Rc. Max), Stainless Steel, Copper-Nickel, Inconel, and Aluminum without limitations except size and wall thickness as specified above.

OTTO ARC SYSTEMS, INC. | PBM-6000 BEVELING MACHINE

- 1) Slide the tool into a position where the cutting tool bits will just clear the end of the tube or pipe when the cutting blades are rotated, and securely clamp the tool in place. Be sure the tool is firmly clamped in the tube or PIPE (Tighten the draw rod nut while gently moving the tool back and forth until the tool no longer moves and the mandrel clamp is securely seated). The clamping mandrel must be tight to prevent slippage, but must not be over tightened.
- 2) Connect the air supply hose to the air motor and jog the air motor throttle to insure that the cutters are not touching the tube or pipe.
- 3) Depress and hold the throttle on the air motor and feed the cutter head forward using the wrench on the feed nut wrench (item #).



- 4) Continue feeding the beveling head into the work piece until you begin to get a smooth curly (ribbon) chip. You may wish to add a small amount of cutting oil to the cut as the beveler is cutting the work piece.
- 5) Do not stop the air motor while the tool is cutting the work piece. When the desired bevel is present on the end of the tube or pipe, let the cutting head rotate a few turns without feeding the machine forward. As the chip diminishes, reverse the feeding motion and back the cutter head assembly away from the work piece.
- 6) Release the throttle on the air motor assembly and disconnect the air supply hose. Back off the feed mechanism until the threads on the mandrel shaft assembly are even with the end of the feed nut. Loosen the draw rod nut and gently rock the tool to loosen the clamping mandrel and remove the beveling machine from the work piece.

8. SET UP CLAMPING MANDREL AND BLADE

- 1) Measure the inside diameter of the tube or pipe to be beveled. This measurement is important for correct sizing and selection of the clamping mandrel and components.
- 2) Select the proper clamping mandrel and set of clamping blades from the drawing or chart on clamping mandrel selection.

MANDREL BLADES PARTS LIST			
ITEM	QTY	PART/NUMBER	NAME / SIZES
Block A	3	PBM-6016A	PAD # 1 2.3" TO 2.9"
Block B	3	PBM-6016B	PAD # 2 2.8" TO 3.4"
Block C	3	PBM-6016C	PAD # 3 3.4" TO 4.0"
Block D	3	PBM-6016D	PAD # 4 4.0" TO 4.6"
Block E	3	PBM-6016E	PAD # 5 4.6" TO 5.2"
Block F	3	PBM-6016F	PAD # 6 5.2" TO 5.8"
Block G	3	PBM-6016G	PAD # 7 5.8" TO 6.4"

Part #	Clamp Range for 2" Mandrel Head		Clamp Range for 3" Mandrel Head		Clamp Range for 4" Mandrel Head PBM-8000-EXT.		Clamp Range for 6" Mandrel Head	
	inch	mm	inch	mm	inch	mm	inch	mm
N/A	2.0"-2.3"	50-58	3.0"-3.3"	75-84	4.0"-4.3"	100-109	6.0"-6.3"	150-160
A	2.3"-2.9"	58-74	3.3"-3.9"	84-99	4.3"-4.9"	109-124	6.3"-6.9"	160-175
B	2.8"-3.4"	71-86	3.8"-4.4"	97-112	4.8"-5.4"	122-137	6.8"-7.4"	173-188
C	3.4"-4.0"	86-102	4.4"-5.0"	112-127	5.4"-6.0"	137-152	7.4"-8.0"	188-203
D	4.0"-4.6"	102-117	5.0"-5.6"	127-142	6.0"-6.6"	152-168	8.0"-8.6"	203-218
E	4.6"-5.2"	117-132	5.6"-6.2"	142-157	6.6"-7.2"	168-183	8.6"-9.2"	218-234
F	5.2"-5.8"	132-147	6.2"-6.8"	157-173	7.2"-7.8"	183-198	9.2"-9.8"	234-249
G	5.8"-6.4"	147-163	6.8"-7.4"	173-188	7.8"-8.4"	198-213	9.8"-10.4"	249-264
H			7.4"-8.0"	188-203	8.4"-9.0"	213-229	10.4"-11.0"	264-279
I					9.0"-9.6"	229-244	11.0"-11.6"	279-295
J					9.6"-10.2"	244-259	11.6"-12.2"	295-310
K					10.2"-10.8"	259-274	12.2"-12.8"	310-325

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- 3) Install the correct clamping blade set on the ID clamping mandrel, being sure all mandrel blades are secure and seated properly.

9. MAINTENANCE

GENERAL MACHINE MAINTENANCE

During heavy operation, regularly use a brush to clean chips away from the machine and clamping mandrel assembly between each use. This is especially important around the mandrel feed nut and threads. Wipe the machine down thoroughly when you are through with the machine. Dirt and grit can severely shorten the life of the machine. Do not spray anything into the electric motor body.

MONITOR THE TEMPERATURE

Monitor the temperature of the beveller housing during operation. Any heat buildup that can be felt on the aluminum housing is usually an indication that the bearings need lubrication or maintenance. Heat buildup should be handled immediately to insure proper life of the tool. **Note: heat buildup can also be the result of improperly set bearing clearances. If this problem exists, it is recommended that you contact the factory.**

THREAD INSPECTION

Inspect all visible thread areas for excessive wear. Parts that have threads that are showing wear need to be replaced before they damage the mating thread assemblies.

DRIVE ASSEMBLY

Although the drive assembly is greased and lubricated, it is recommended that each beveling machine drive assembly be cleaned, inspected and greased after approximately 600 hours of use. This will help maintain the gear backlash and will help isolate seal or bearing problems. The inspection should be performed by a qualified individual.

AIR MOTOR

The air motor assembly needs periodic lubrication and cleaning. Light, high quality oil is recommended, in conjunction with an automatic oiling system. An air caddy oiling system must be used with all Otto Arc beveling machines to keep the air motor warranty in effect. If automatic oiling is not available, add a couple drops of oil to the air inlet at the end of each day. Do not put an excessive amount of oil in the air inlet or sludge will build up and cause problems. If you are interested in our Air Caddy please contact our sales office.

MANDREL CLAMP

It is very important that the mandrel clamping mechanism and components remain free of dirt and corrosion. All machined surfaces and the surfaces that come in contact with seals should be cleaned and inspected periodically. A light coat of oil can be put on all metal surfaces to protect from rusting.

DRIVE SHAFT

After approximately 50 hours of operation on a new (or newly assembled) machine, the drive shaft end play should be checked for main bearing preload and gear backlash. In certain instances, this area may need adjustment as the new parts wear into (seat) their mating surfaces. This adjustment should be performed by a qualified individual or by the factory if a qualified individual is not available.

PROPER HANDLING

Do not drop, hit or otherwise abuse your pipe beveling machine. This equipment is designed as a portable machining assembly, and as such, is not designed to withstand excessive abuse. Care for your equipment will increase your utilization, the life of the machine, and will minimize your repair cost.

TOOL BITS

Remember that tool bits (cutting tools) in good condition perform better. Do not try to use dull tool bits or force the tool bits into the work piece. If excessive back pressure exists, if the tool bits seem to be tearing rather than cutting, or if the chips begin to turn blue or brown, replace your cutting tool bits right away. 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.

10. 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.

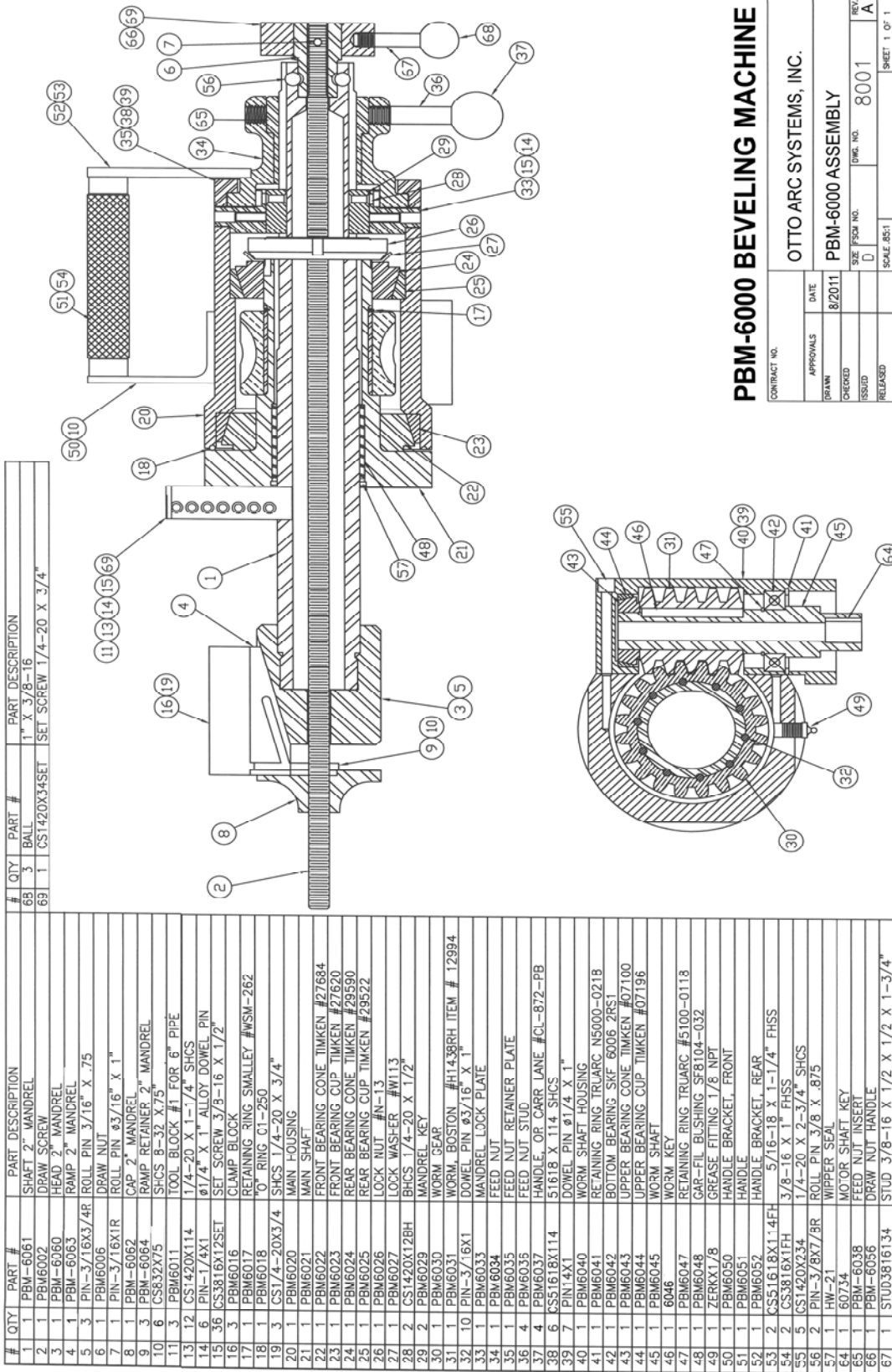
WARRANTY DOES NOT APPLY IF:

- 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.

11. EXPLODED VIEW AND PART NUMBER BREAKDOWN

OTTO ARC SYSTEMS, INC. | PBM-6000 BEVELING MACHINE



PBM-6000 BEVELING MACHINE

CONTRACT NO.	DATE	APPROVALS	OTTO ARC SYSTEMS, INC.
	8/2011	DRAWN	PBM-6000 ASSEMBLY
CHECKED		ISSUED	SIZE FSCM NO. DIM. NO. 8001
RELEASED			SCALE: AS1
			REV. A
			SHEET 1 OF 1

BEVELING TOOL | PBM-6000 (2" - 6" Pipe) 50.8mm - 152.4mm

**BUILT WITH A WORM GEAR DRIVE UNIT FOR EXTRA TORQUE!
EXPANDABLE FROM 2" TO 8"!**

ID MOUNT / AIR OR ELECTRIC

The PBM-6000 machine comes with a torque accepting mandrel, built with a worm gear drive unit for extra torque to handle extra thick pipe walls.



This machine can bevel, face, and counter-bore 1.25" wall - worry free from damaging the gears.

PERFORMANCE:

- Lock in mandrel blades (*no springs to lose*)
- Adjustable keyway on machine and mandrel (*eliminates backlash and chatter*)
- 2 hp pneumatic motor
- 52 lbs. approximate working weight
- Hardened mandrel 45 Rc. (*less chance of gouging with metal chips*)
- Three slots to do beveling, facing, deburring or counter-boring
- Single mandrel with mandrel blades to cover size ranges

TECHNICAL SPECS:

- Size range 2" to 6" Pipe (50.8 mm - 152.4 mm)
- Max wall thickness to 1.25"
- Air Power requirements: 70 cfm at 90 psi.

PBM-6000



TB-2904



TB-2906

PART NUMBERS / ORDER INFO:

PBM-6000 Machine Kit Includes: Machine, Tool Bits (2), Tooling, Manual and Case	
PBM-6000 Kit with Electric 110v Motor	P/N: PBM-6000-10-E
PBM-6000 Kit with Electric 230v Motor	P/N: PBM-6000-10-E-230
PBM-6000 Kit with Air Motor	P/N: PBM-6000-10
2" to 6" Standard Mandrel	P/N: PBM-8920
3" to 8" Extension Mandrel Kit	P/N: PBM-8925
3" to 8" Mandrel	P/N: PBM-8912
Air Caddy - Includes air regulator, filter and oil mister	P/N: PBM-AF

TOOL BITS

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

Part Number	Description
TB-2905	37.5 degree bevel bit (lower range)
TB-2906 *	37.5 degree bevel bit (upper range)
TB-2930	30 degree bevel bit (lower range)
TB-2931	30 degree bevel bit (upper range)
TB-2913	45 degree bevel bit (lower range)
TB-2914	45 degree bevel bit (upper range)
TB-2915	"J" bevel bit (lower range) 25 Degree
TB-2916	"J" bevel bit (upper range) 25 Degree
TB-2904 *	Facing bit
TB-2907	C-Bore 14.5 degree (lower range)
TB-2908	C-Bore 14.5 degree (middle range)
TB-2909	C-Bore 14.5 degree (upper range)
TB-2910	C-Bore 10 degree (lower range)
TB-2911	C-Bore 10 degree (middle range)
TB-2912	C-Bore 10 degree (upper range)

* Tool bits that are included in machine kit.

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