



## PBM-4500 End Prep Machine Operating Manual

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## ABOUT US

Superior Plant Rentals, LLC. (SPR) specializes in portable machining, bore welding, line isolation, and testing solutions, providing equipment and tools manufactured under the highest standards of quality control and engineering expertise along with 24/7 service and support. Designed with the operator in mind, our tools and equipment deliver dependable and precise performance, providing cost-effective solutions and reduced downtime, making them beneficial resources in the Oil and Gas, Mining, Heavy Construction, Shipbuilding, Aerospace, Defense, and Power Generation industries.

SPR rents and sells equipment and tools; we offer our own line of portable ID/OD flange facers, linear/gantry and rotary mills, end prep bevelers, isolation and test plugs, line boring, and bore welders, as well as custom-designed equipment and tools.

Our team includes machining, test and isolation, and engineering experts, all with a thorough working knowledge of applications to support you with our equipment on any job. We understand the urgency of your projects and are committed to delivering the highest quality equipment and tools to satisfy the requirements of your clients.

SPR delivers outstanding customer service, specialized training by seasoned professionals, and tools as tough as the jobs you need them to do.



## WARNING:

SPR 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 guideline for our customers. SPR will do its best to ensure that the information and procedures contained in this manual are correct and up-to-date. Superior cannot guarantee that the information and procedures contained herein are correct for all applications or situations.

The contents of this manual are subject to change without notice. It is 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. Any modifications will void all warranty claims, as well as increase the risk of injury or harm.** Do not operate this equipment if all parts are not functioning at 100% efficiency. Notify us immediately for any needed repairs.



***Note: SPR will supply all repair and replacement parts necessary for maintenance and operation of this machine. For repair, service, or additional information, please locate repair and replacement part description/part numbers within the O&M manual in the exploded view section and contact us for ordering.***

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SPR York Portable Machine Tools  
1641 17th Ave, Campbell River, BC, Canada, V9W 4L5 | Phone: 250.286.6400

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# SUPERIOR

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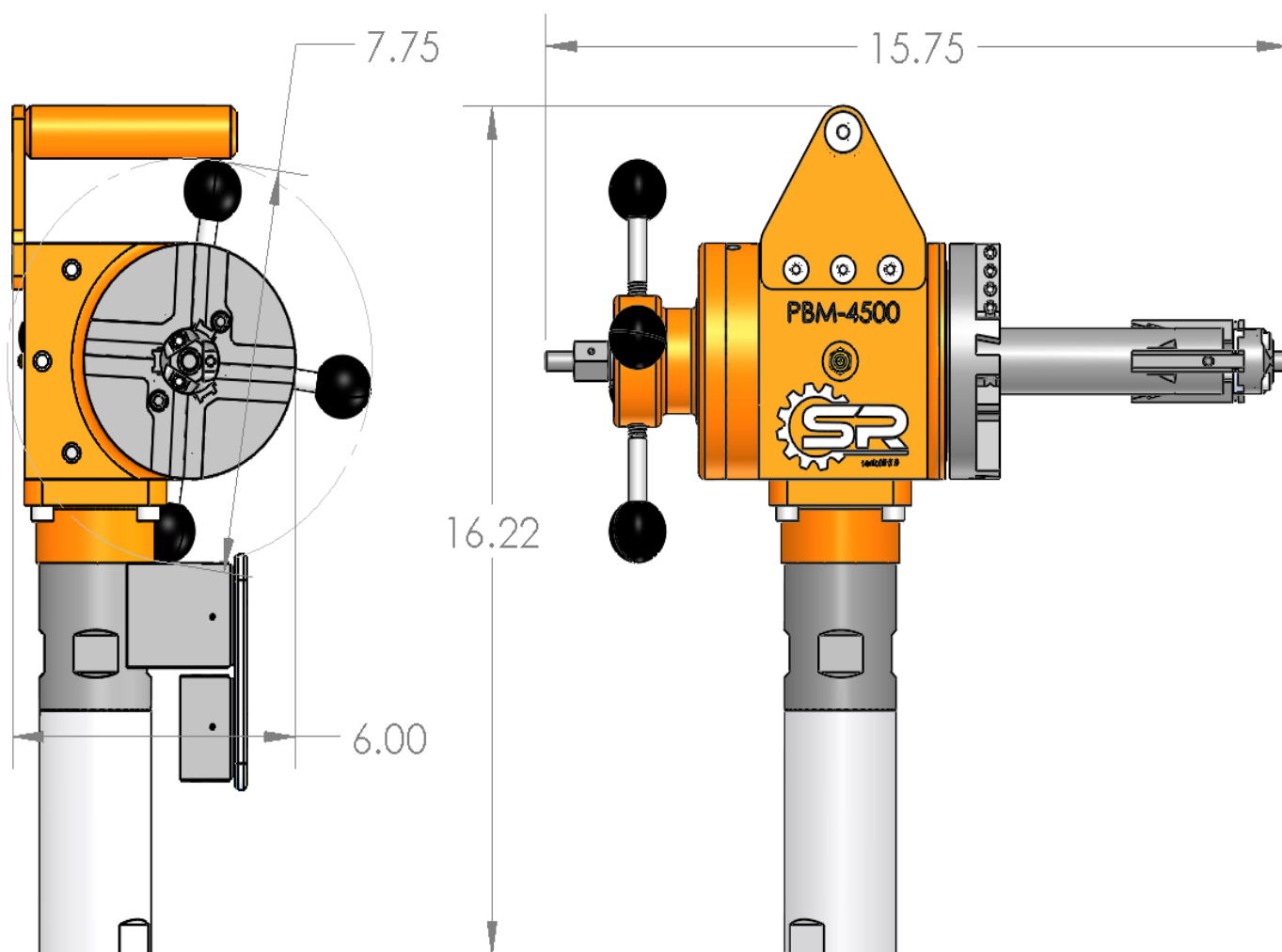
## INTRODUCTION

### APPLICATIONS

The PBM-4500 is 25 lbs in weight and is designed to bevel larger pipes. The tool bits are held in place by our wedge lock system. The clamping mandrel with bolt-on locator pads (no springs) stops any pieces from dropping down into the work piece. Our worm drive system provides exceptional torque for demanding applications.

#### When you receive the PBM-4500:

Inspect the machine for shipping damage. Verify that all of the parts listed below, or on the Bill of Materials, are present. If any parts are missing, or if you have questions regarding the PBM-4500, please contact a Superior Plant Rentals or SPR York location nearest you immediately.



## SPECIFICATIONS CHART

Machining Performance Range		4500
ID Mounting Range:	Standard Mandrel	1.250 in - 4.850 in (31.75 mm – 123.19 mm)
	Large Mandrel (Optional)	4.630 in – 8.000 in (117.60 mm – 203.20 mm)
	Elbow Mandrel (Optional)	N/A
Cutting Range		1.250 in - 8.000in (31.75 mm – 203.20 mm)
Radial Clearance		7.750 in (196.85 mm)
Max Wall Thickness		1.000 in
Optional Flange Facer		Yes
Drive System		
Motor		2.50 HP (1864.25 W)
Recommended Air Pressure		55 CFM @ 90 PSI
Speed		510 rpm @ Max output
Electric Motor		Available Upon Request
Measurements		
Machine Weight		25 lbs (11.34 kg)
Shipping Weight		45 lbs (20.41 kg)
Dimensions		
Machine (LxWxH)		Refer to drawing below
Crate/Shipping (LxWxH)		24 in x 20 in x 10 in (609.6 mm x 508 mm x 254 mm)



## SAFETY PRECAUTIONS

Please follow this list of general safety guidelines when operating the PBM-4500 tool. Safe machining practices should always be followed when operating SPR 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 PBM-4500 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 air supply or drive battery when servicing the machine or when changing cutting inserts, collets, or other components.

Moving machine parts can seriously injure operators. Understand and read all instructions before operating this machine.

**For maximum safety and performance, read the entire instruction manual before operating this machine.**



**WARNING!**  
**MOVING PARTS.**

Keep hands, loose clothing, and hair away from rotating or moving parts. Disconnect the air supply from the machine and unplug all equipment prior to adjusting or servicing. If electric, remove power from the machine 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.**

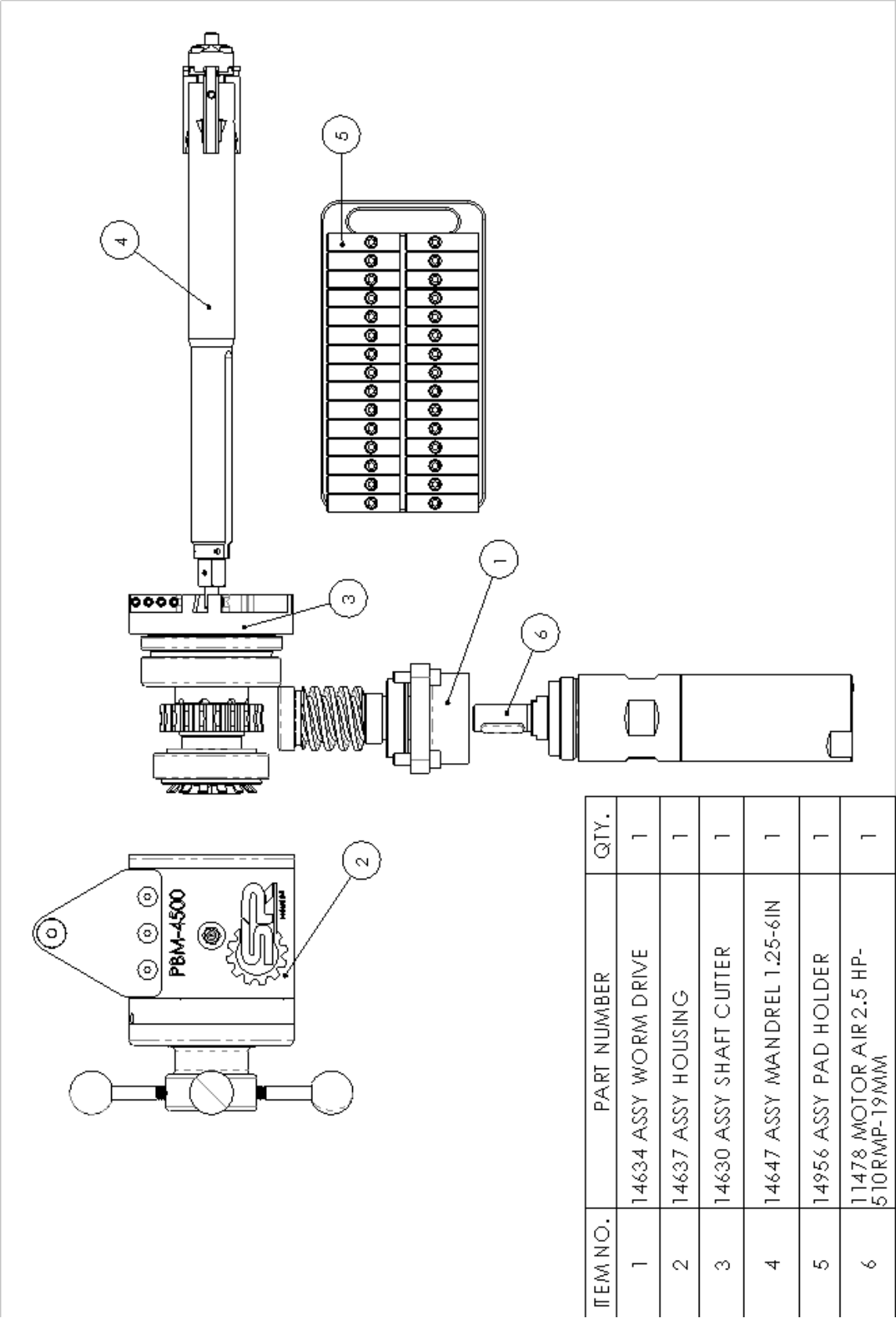
Eye protection must be worn while operating or working near powered equipment.



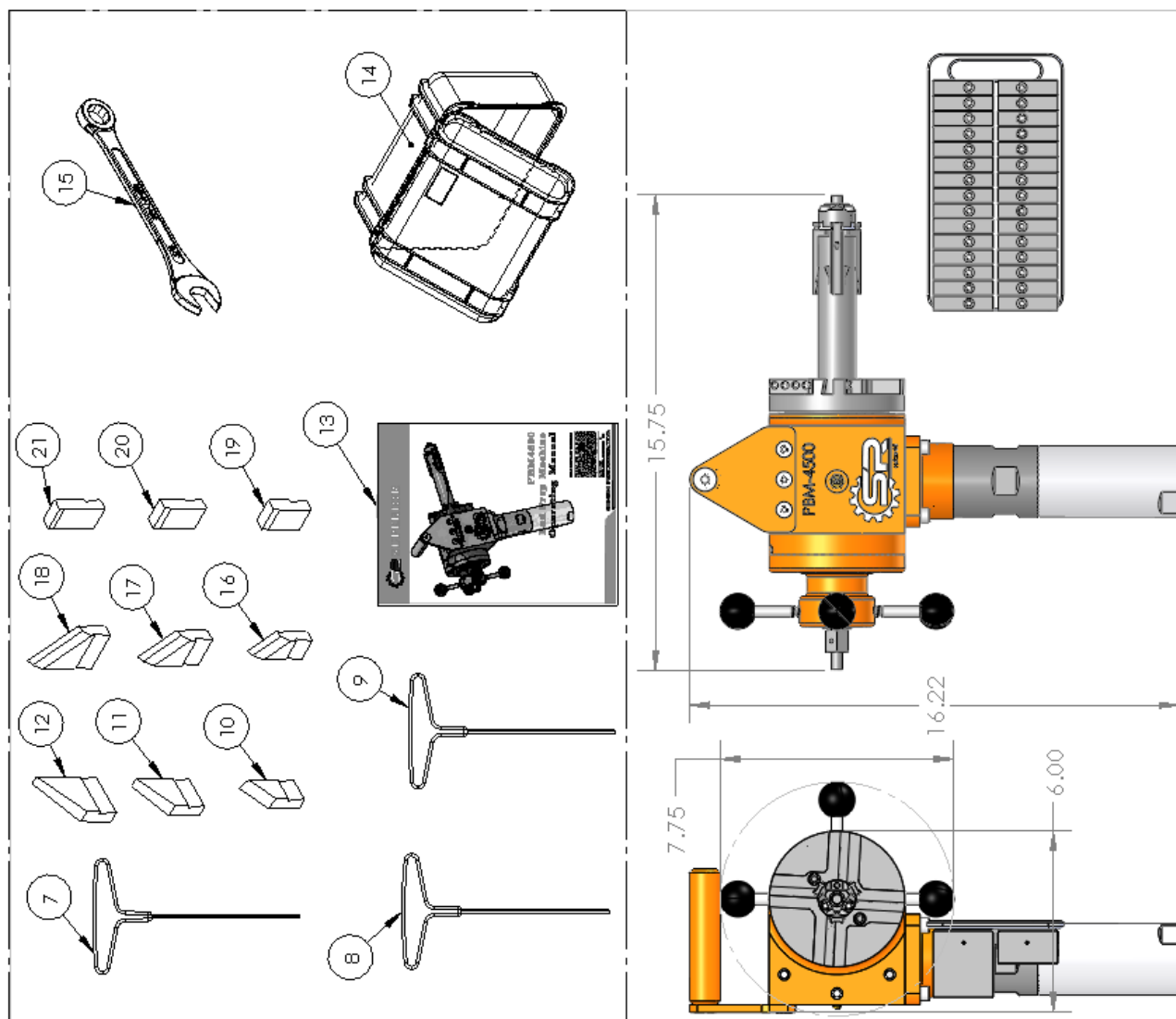
**WARNING!**  
**EAR PROTECTION.**

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

STANDARD EQUIPMENT



ITEM NO.	PART NUMBER	QTY.
7	14790 KEY ALLEN T HANDLE 0.1875 IN	1
8	14791 KEY ALLEN T HANDLE 0.15625 IN	1
9	15090 KEY ALLEN T HANDLE 0.125 IN	1
10	14669 TOOL BIT 37.5 DEG BEVEL BIT 1.25-2 PIPE	1
11	14670-0 TOOL BIT 37.5 DEG BEVEL BIT 2-3.5 PIPE	1
12	14671 TOOL BIT 37.5 DEG BEVEL BIT 3-4 PIPE	1
13	15120 MANUAL	1
14	15118 CASE	1
15	15119 WRENCH RATCHET 0.75	1
16	15122 TOOL BIT BEVEL ID 37.5 DEG 1.25-2	1
17	15123 TOOL BIT BEVEL ID 37.5 DEG 2-3.5	1
18	15124 TOOL BIT BEVEL ID 37.5 DEG 3-4	1
19	14681 TOOL BIT .75 FACING BIT TALL 1 IN TO 2 IN	1
20	14682 TOOL BIT .875 FACING BIT TALL 2 IN TO 3 IN	1
21	14683 TOOL BIT 1 IN FACING BIT TALL 3 IN TO 4 IN	1



## PRODUCT DESCRIPTION

The PBM-4500 is a right-angled pipe (tube) end-prep machining tool designed to face, bevel, and counterbore for cutting end-prep configurations for welding. These operations can be performed separately or simultaneously. The current model uses a pneumatic powered motor. An optional electric motor is available upon request.

This machine uses an internal expanding clamping mandrel with interchangeable pad sets, which will accommodate internal diameters from a 1.25 in to 4.85 in ID (Standard Mandrel) and 4.63 in to 8.00 in ID (Large Mandrel Option)

The PBM-4500 beveling machine is capable of tube and pipe weld-end preparation that meets all existing conventional codes including the more stringent nuclear codes.

The expanding mandrel provides fast, accurate, self-centering alignment to the pipe or tube to be machined.

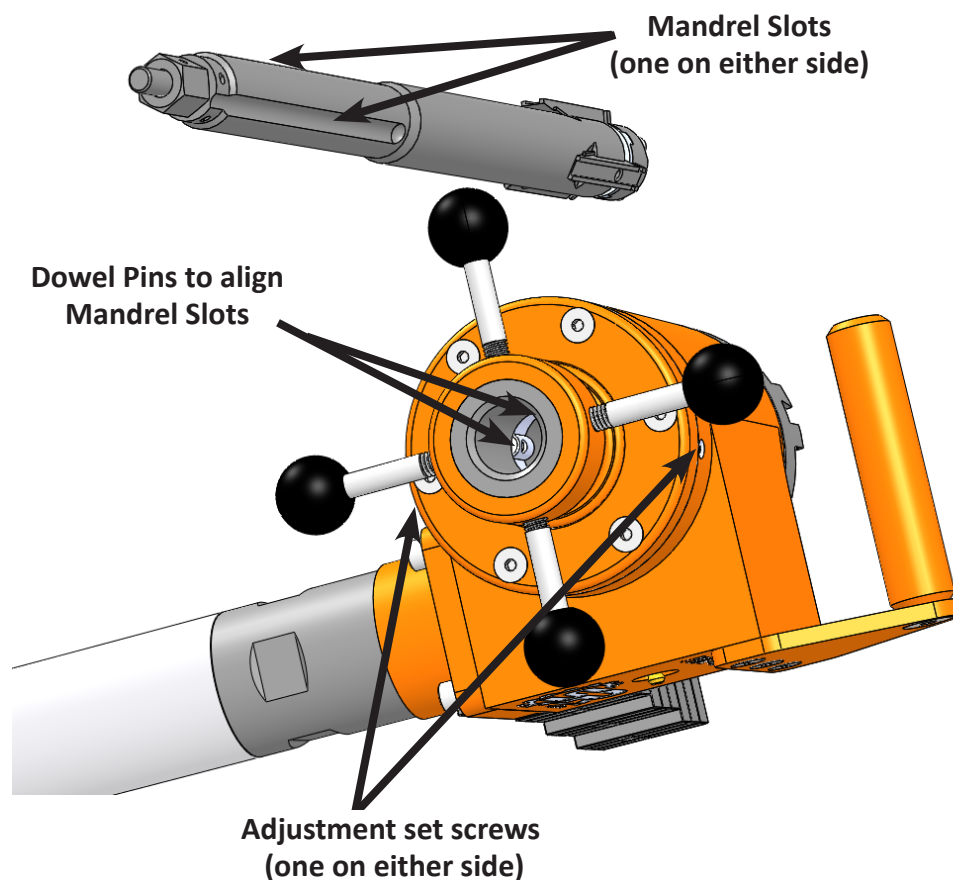
The standard PBM-4500 package includes:

- Beveling Machine assembled with air or electric motor (air motor comes with in-line oiler)
- Custom carrying case
- Mandrel pad set (standard mandrel 1.25 in to 4.85 in ID)
- Tool Bits - OD bevel angle, ID bevel angle, facing
- Allen keys t-handle: 5/32 in, 3/16 in & 1/8 in
- Ratchet Wrench: 3/4 in
- Operating manual
- In-line oiler whip hose

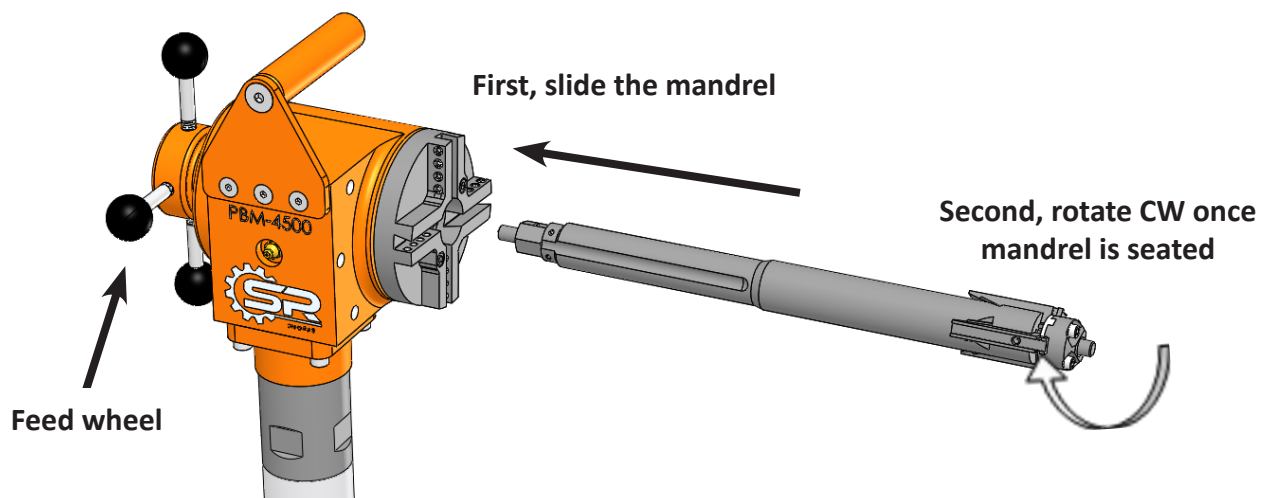
## INITIAL SET-UP

### INSTALL A MANDREL

1. In the event you need to install a mandrel, make sure to loosen the torque adjustment set screws on the beveling machine in order to allow alignment with the slots on either side of the mandrel shaft:



2. Gently feed the mandrel into the cutter head end of the tool (front end) until the mandrel is seated. Once seated, twist the mandrel in a clockwise direction (this will engage the mandrel into the feed wheel's nut). Once the mandrel begins threading into the nut, you may also turn the feed wheel to install the mandrel.

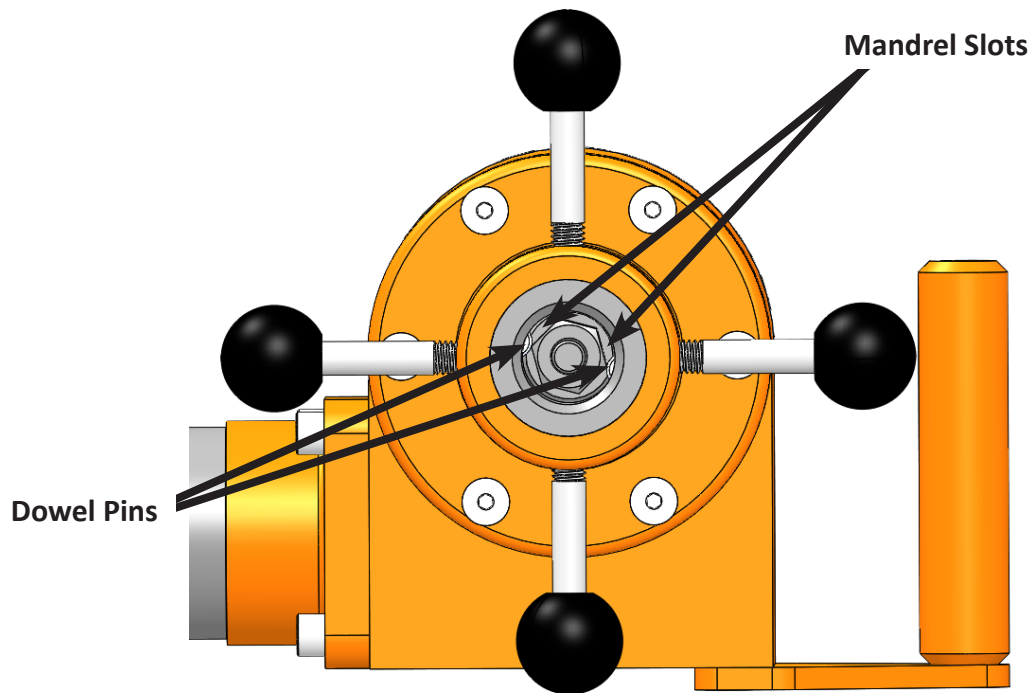


## INSTALL A MANDREL (CONT'D)

- When the mandrel has been fed through the feed nut enough to see it from the back side of the tool, hold and twist the mandrel to align the two mandrel slots to the two dowel pins. Once aligned, continue turning the feed nut until the threads on the end of the mandrel begin to extend beyond the feed nut.



**Note:** Ensure set screws as per step 1 have been loosened.



**Note:** A minimum of 10 threads must be engaged to prevent stripping of the threads during the machining operation.

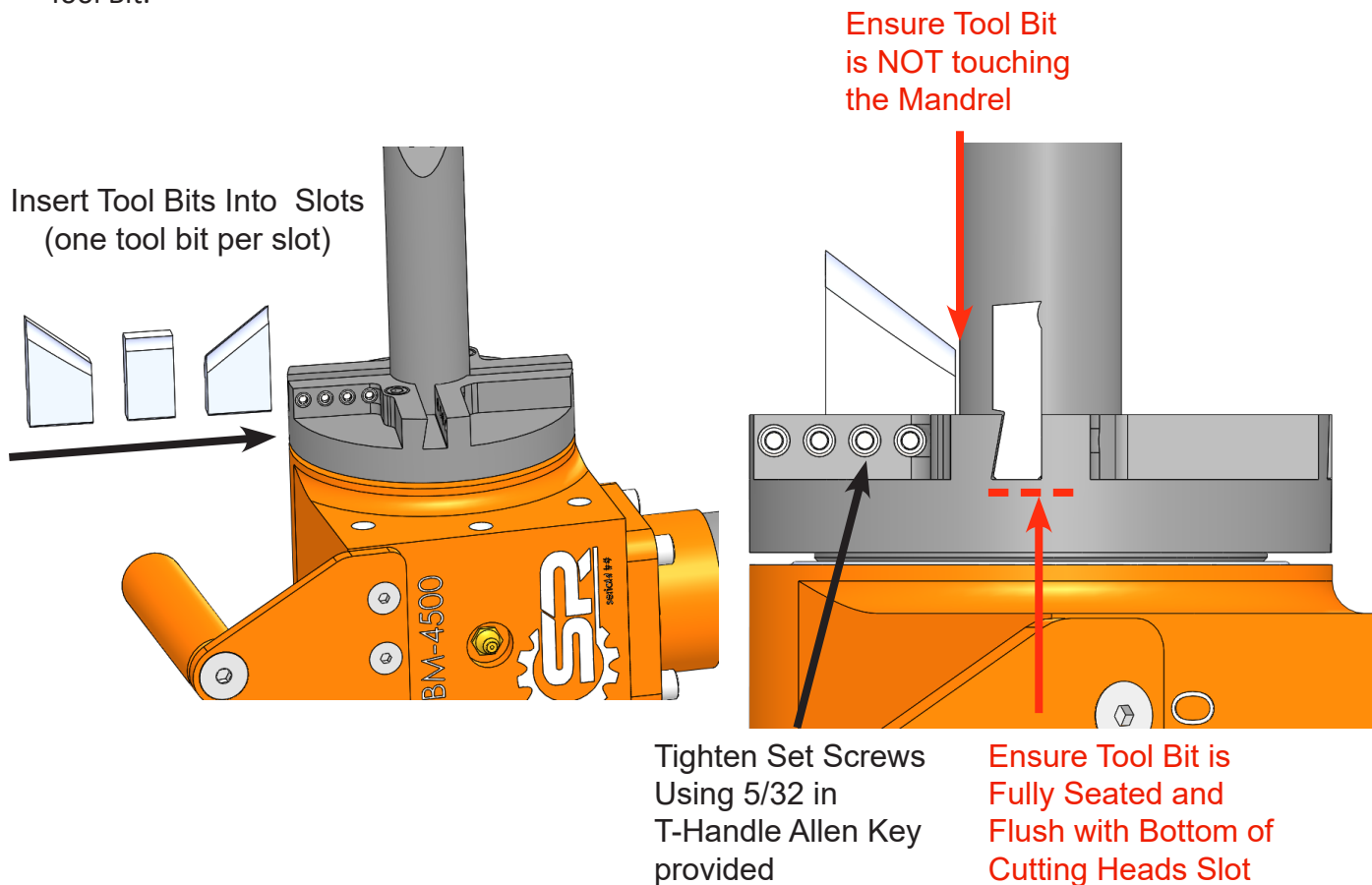
- After you have installed the mandrel into the beveling machine, check the backlash on the mandrel and tighten the torque adjustment set screws to take out the backlash as required. **Make sure you do not over tighten the adjustment set screw. If they are too tight, you will not be able to move the mandrel while operating the machine.**

## SELECTING & SETTING TOOL BITS



**WARNING!** Use of dull or improperly designed tool bits or cutting inserts not manufactured by SPR may result in poor performance and may constitute abuse of this machine and therefore voids the SPR factory warranty.

1. Select the correct Tool Bit or combination of Tool Bits and slip them into the cutter head. When putting in the Tool Bits, ensure the tapered surfaces align with each other, fasten the 2x set-screws to lock in Tool Bit.



**Note:** Depending on the required bevel configuration, the tool bits should be set in a certain order. Facing or squaring tool bits should be set first, and then either ID (inner diameter) or OD (outside diameter) beveling tool bits should follow.

## TOOL BIT SELECTION

### Standard Tool Bits Available for the PBM-4500

PART NUMBER	DESCRIPTION
14669	TOOL BIT 37.5 DEG BEVEL BIT 1.25 in - 2 in PIPE
14670	TOOL BIT 37.5 DEG BEVEL BIT 2 in - 3.5 in PIPE
14671	TOOL BIT 37.5 DEG BEVEL BIT 3 in - 4 in PIPE
14672	TOOL BIT 37.5 DEG HEAVY BEVEL BIT 2.5 in - 3.5 in PIPE
14673	TOOL BIT 30 DEG BEVEL BIT (LOWER RANGE)
14674	TOOL BIT 30 DEG BEVEL BIT (UPPER RANGE)
14675	TOOL BIT 45 DEG BEVEL BIT (LOWER RANGE)
14676	TOOL BIT 45 DEG BEVEL BIT (UPPER RANGE)
14677	TOOL BIT 25.5 DEG "J" BEVEL BIT (LOWER RANGE)
14678	TOOL BIT 25.5 DEG "J" BEVEL BIT (UPPER RANGE)
14679	TOOL BIT 20 DEG "J" BEVEL BIT (LOWER RANGE)
14680	TOOL BIT 20 DEG "J" BEVEL BIT (UPPER RANGE)
14681	TOOL BIT FACING BIT .750 in TALL FOR 1 in - 2 in PIPE
14682	TOOL BIT FACING BIT .875 in TALL FOR 2 in - 3 in PIPE
14683	TOOL BIT FACING BIT 1 in TALL FOR 3 in - 4 in PIPE
14684	TOOL BIT 4 DEG CHAMFER
14685	TOOL BIT 10 DEG COUNTERBORE (LOWER RANGE)
14686	TOOL BIT 10 DEG COUNTERBORE (UPPER RANGE)

\* Tool Bit can be requested with TIN or laser coating

Additional ID and OD bevel tool bit angles (degree) are available.



## SETTING UP CLAMPING MANDREL AND PAD/SIZES

1. Measure the inside diameter of the tube or pipe to be beveled or faced. 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 pad blocks from the chart:

### STANDARD MANDREL

PART NUMBER	QTY	DESCRIPTION	SIZES
		Without Pads	1.25 in – 1.72 in
14658	3	BLOCK A	1.72 in – 2.10 in
14657	3	BLOCK B	2.10 in – 2.55 in
14656	3	BLOCK C	2.55 in – 3.00 in
14655	3	BLOCK D	3.00 in – 3.45 in
14654	3	BLOCK E	3.45 in – 3.95 in
14653	3	BLOCK F	3.95 in – 4.40 in
14659	3	BLOCK G	4.40 in – 4.85 in

### LARGE MANDREL (Optional)

PART NUMBER	QTY	DESCRIPTION	SIZES
		Without Pads	4.63 in – 5.10 in
14658	3	BLOCK A	5.10 in – 5.50 in
14657	3	BLOCK B	5.50 in – 5.92 in
14656	3	BLOCK C	5.92 in – 6.37 in
14655	3	BLOCK D	6.37 in – 6.81 in
14654	3	BLOCK E	6.81 in – 7.26 in
14653	3	BLOCK F	7.26 in – 7.71 in
14659	3	BLOCK G	7.71 in – 8.00 in

3. Install the correct clamping pad set on the ID clamping mandrel, being sure all mandrel pads are secure and seated properly.

## STARTING AND OPERATING THE MACHINE

1. Once the correct mandrel, tool bit(s) and mandrel pads have been installed, slide the mandrel into the inside of the tube/pipe. Leave about 1" clearance from tool bit to end of pipe. Then, gently tighten the mandrel clamping nut (draw rod nut) until the internal clamping mechanism begins to grip the work piece.



**Note: Ensure there is enough room between the tool bit and mandrel pads to complete desired cutting operation; otherwise, the tool bit may cut into the mandrel pads.**

2. Once the pads begin to touch the ID of the pipe, tighten the draw rod nut with the 3/4" wrench provided while gently working the tool back and forth so that the clamping pads seat evenly. It is very important to make sure the mandrel pads are fully set on the ID of the work piece; this will cause the misalignment of the head. The clamping mandrel must be tight to prevent slippage; however, do not over-tighten.

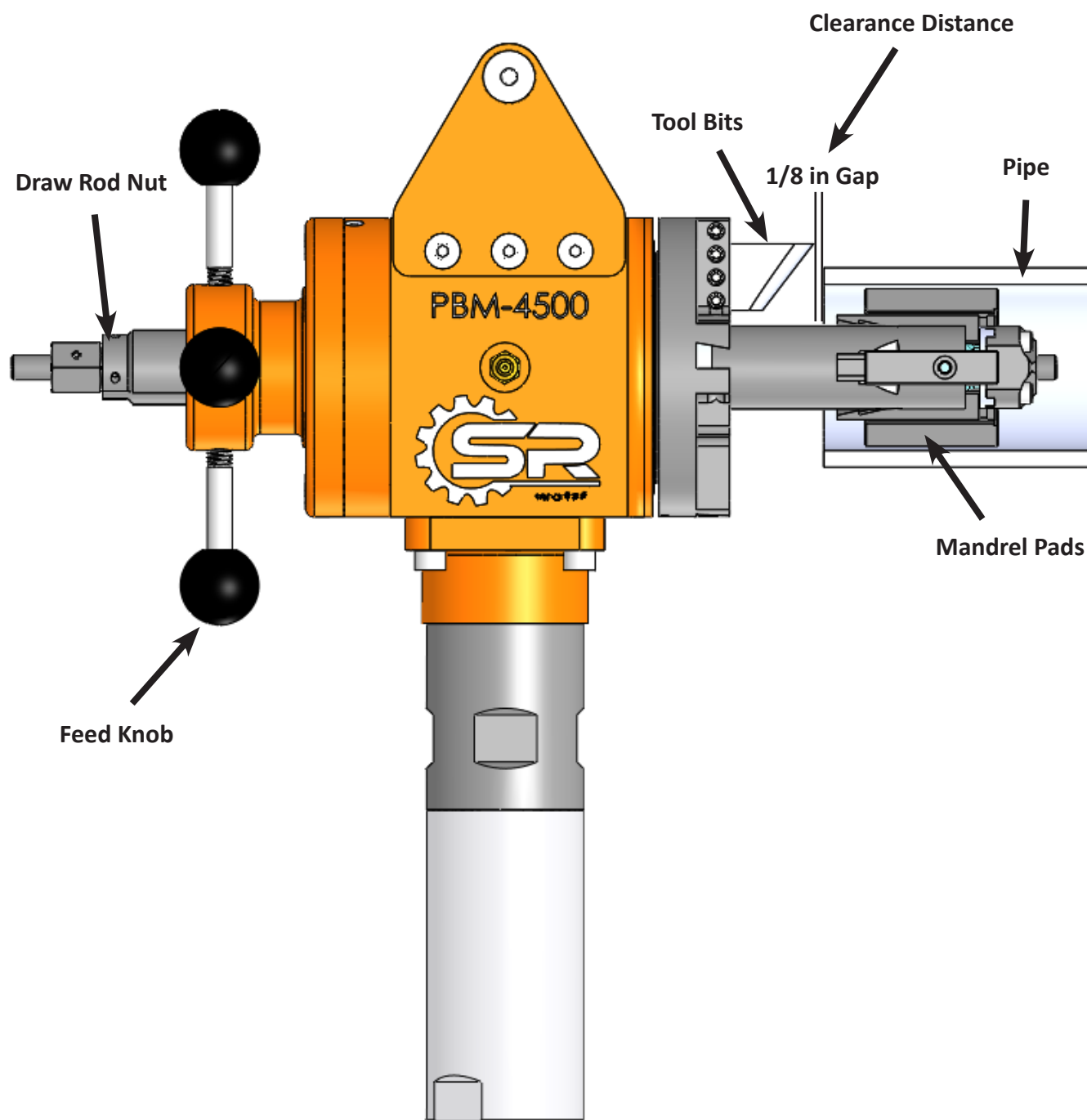


**Note: Hand tighten only; do not power tighten.  
The closer the tube/pipe clamp mount is to the PBM, the more ridged the machine.**

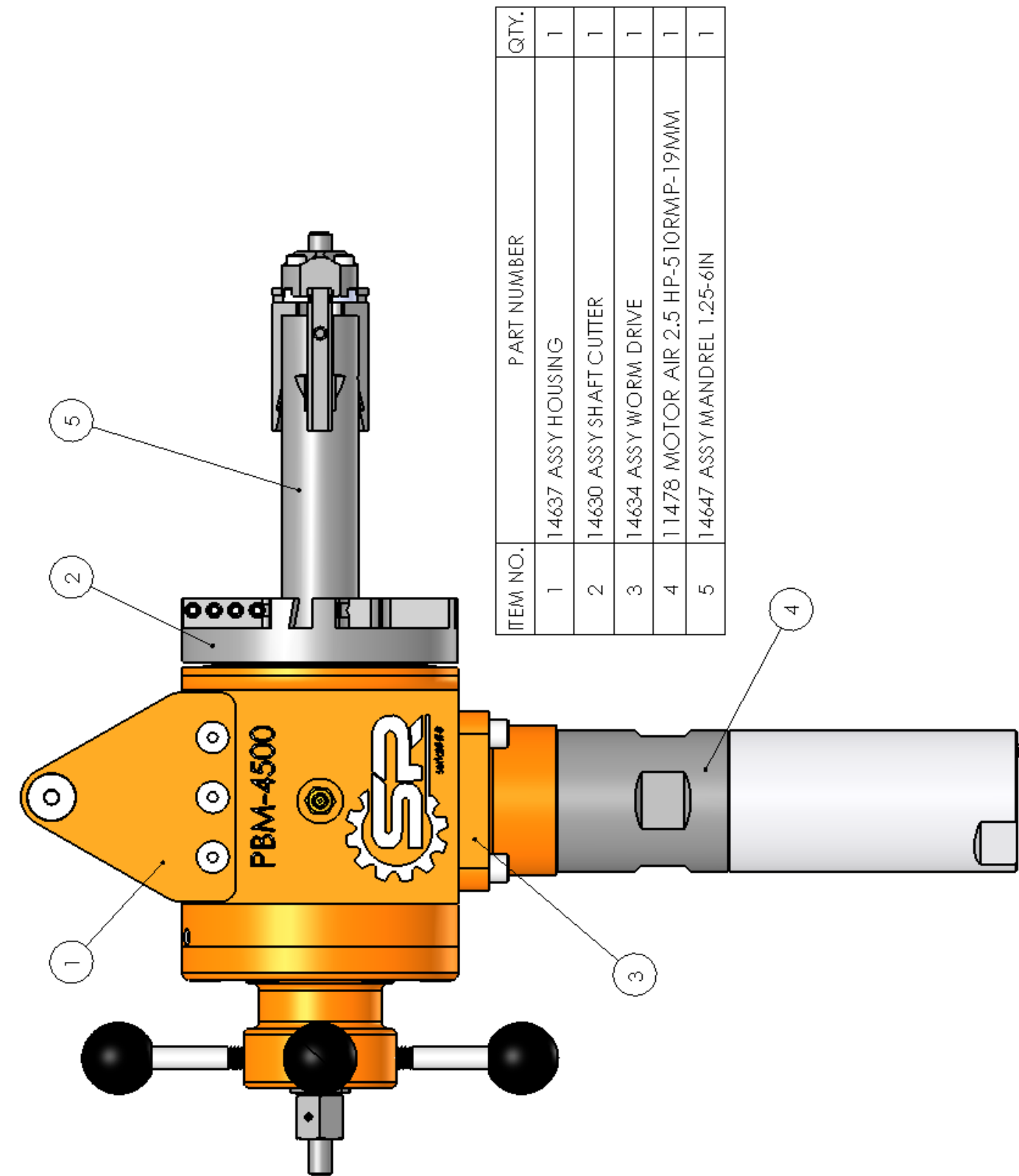


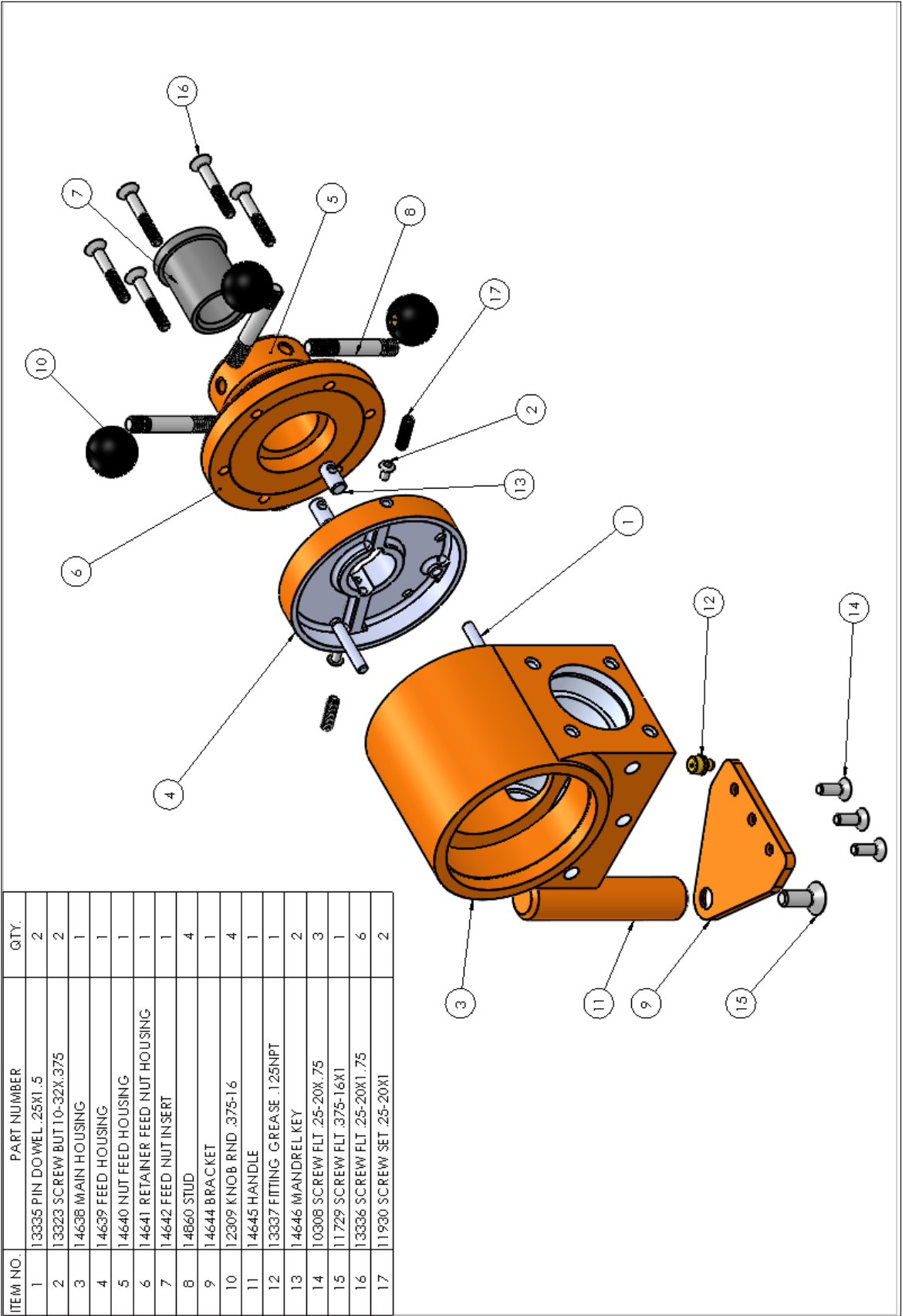
**Note: Check the backlash on the mandrel and adjust the torque adjustment set screws (see Initial Set-Up) to take out the backlash as required. Do not over tighten the torque adjustment set screws. If they are too tight, you will not be able to move the mandrel while operating the machine.**

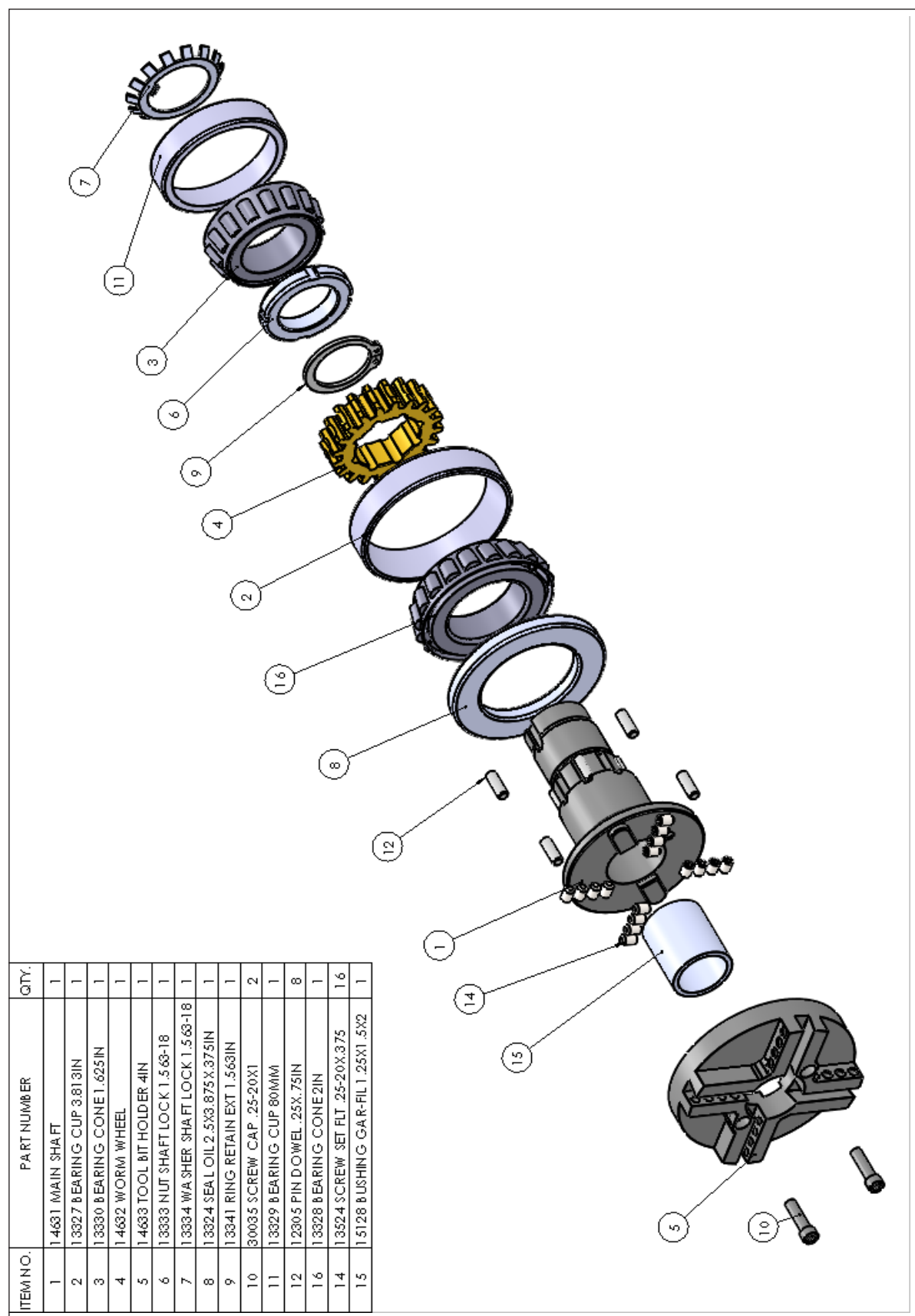
3. Position the machine with the tool bit roughly 1/8" above the pipe surface to be cut. Connect the air supply line to the tool and jog the motor throttle to ensure that the cutter(s) are not touching the tube/pipe.
4. Depress and hold the throttle on the air motor and feed the cutter head forward using Feed Knob.
5. Continue feeding the beveling head into the work piece until you begin to get a smooth curly (ribbon) chip. Do not over-feed the tool bits; this will cause the machine to torque, resulting in damage of the machine and tool bits. You may wish to add a small amount of cutting oil to the cut as the beveller is cutting the work piece.
6. 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.
7. 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.



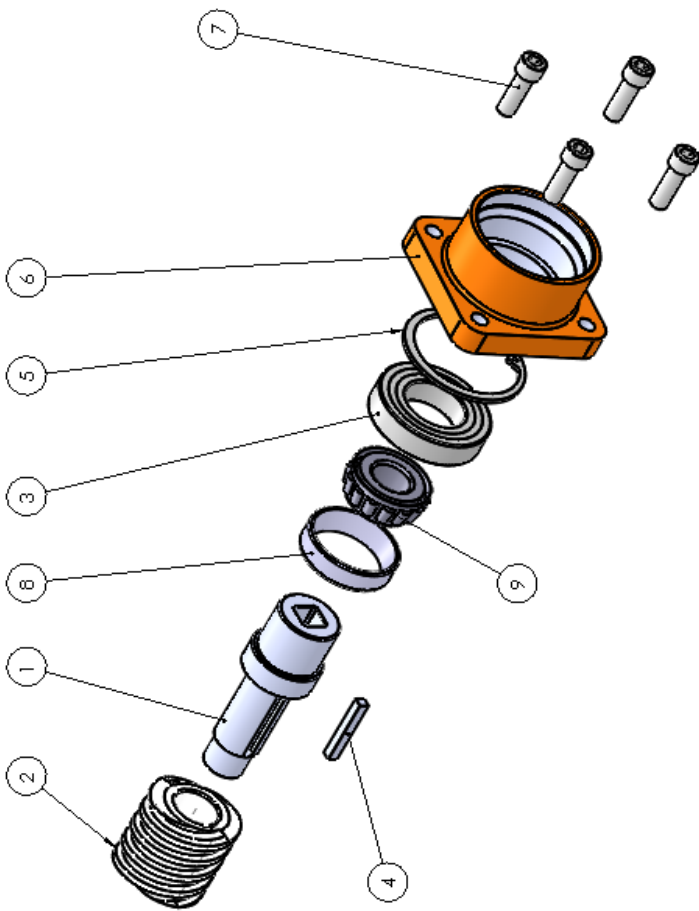
EXPLODED VIEWS

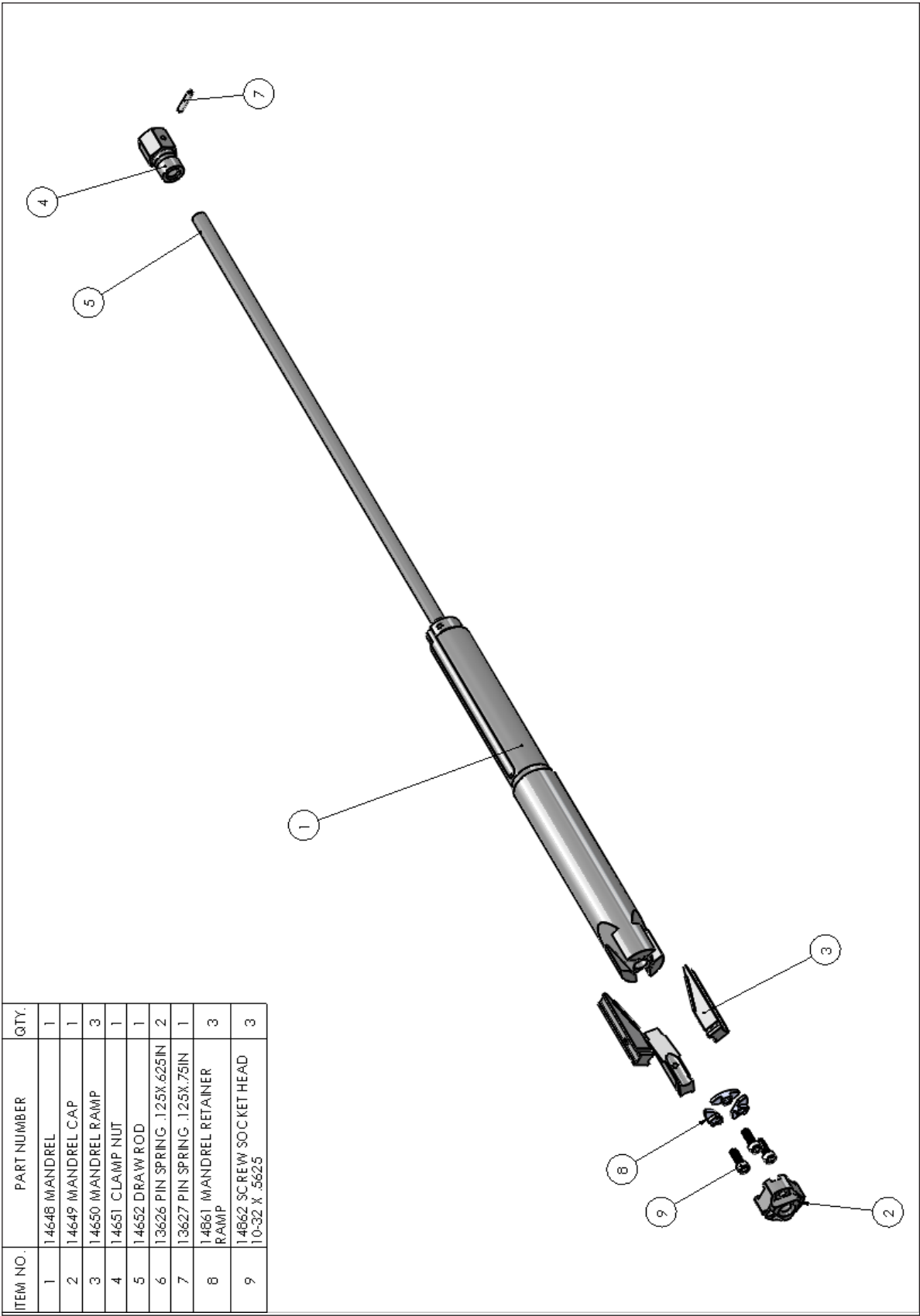






ITEM NO.	PART NUMBER	QTY.
1	14635 INPUT SHAFT	1
2	13338 WORM HI 427RH	1
3	13339 BEARING DEP 30X55X13	1
4	12060 KEY SQR .188X.188X1.375IN	1
5	13340 RING RETAIN INT 55MM	1
6	14636 MOTOR MOUNT	1
7	30078 SCREW CAP .313-18X1	4
8	13331 BEARING CUP 1.75IN	1
9	13332 BEARING CONE .75IN	1







## MAINTENANCE

### GENERAL MACHINE MAINTENANCE

During heavy operation, use a brush regularly 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. Thoroughly clean the machine after use. 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 beveler housing during operation. Heat buildup on the aluminum housing is an indication that the bearings need lubrication or maintenance and 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 worn threads should be replaced before damage to the mating thread assemblies occurs.

### DRIVE ASSEMBLY

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 isolate seal or bearing problems. The inspection should be performed by a qualified individual. To grease the machine, remove the 3/8" plug and install a grease fitting. Once greased, replace the grease fitting with the plug.

### AIR MOTOR

Clean and lubricate the air motor assembly periodically. Light, high-quality oil is recommended, in conjunction with an automatic oiling system. An in-line hose/oiler must be used with all SPR beveling machines to keep the air motor warranty in effect.

If automatic oiling is not available, add a few drops of oil to the air inlet at the end of each hour of operation. 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/In-line oiler please contact our sales office.

### MANDREL CLAMP

It is important that the mandrel clamping mechanism and components remain free of dirt and corrosion. All machined surfaces and 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 pre-load 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 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.

## WARRANTY

Superior Plant Rentals, LLC (SPR) warrants that the equipment manufactured by it will: (i) conform to SPR's written specifications and descriptions, and (ii) be free from substantial defects in design, materials, and workmanship for a period of one year from date of shipment to the original buyer, or six months from date of placing in service by buyer, whichever date is earlier.

During this period, if any equipment is proved to SPR's satisfaction to be defective, SPR will, at our sole and absolute discretion, and as SPR's sole warranty liability and buyer's sole remedy, repair, replace, or credit buyer's account for any equipment that fails to conform to the warranties, provided that: (i) SPR is notified in writing within 10 days following discovery of such failure with a detailed explanation of any alleged deficiencies; (ii) SPR is given a reasonable opportunity to investigate all claims; and (iii) SPR's examination of such equipment confirms the alleged deficiencies and that the deficiencies were not caused by accident, misuse, neglect, improper use, unauthorized alteration, repair, or improper testing.

Shipping cost of the alleged defective equipment to SPR is to buyer's account. However, if SPR agrees that the equipment is defective, then pursuant to this warranty, SPR will reimburse buyer its shipping cost to return the equipment to SPR.

The warranty against defects does not apply to: (1) consumable components or ordinary wear items, and (2) use of the equipment with equipment, components, or parts not specified or supplied by SPR or contemplated under the equipment documentation.

The following actions will void the one-year warranty:

1. Repairs or attempted repairs have been made by persons other than SPR personnel, or authorized service repair personnel;
2. Repairs are required because of normal wear;
3. The tool has been abused or involved in an accident;
4. There is evidence of misuse, such as overloading of the tool beyond its rated capacity, use after partial failure, or use with improper accessories.
5. Damage to the motor due to lack of oiler/mister while tool was in use (pending motor type).

## **NO OTHER WARRANTY IS VALID**



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