

MACTECH 848 CLAMSHELL

**OPERATING MANUAL
& PARTS LIST**

SERIAL NO. _____

Mactech Equipment Available

for Sale, Rental & On-Site Field Service

<u>Machinery</u>	<u>Model</u>	<u>Pipe Sizes</u>			
CLAMSHELL LATHES:	802	1/2" - 2"			
	804	2" - 4"			
	806	4" - 6"			
	808	6" - 8"			
	810	8" - 10"			
	812	10" - 12"			
	816	12" - 16"			
	820	16" - 20"			
	824	20" - 24"			
	830	24" - 30"			
	832	26" - 32"			
	836	30" - 36"			
	843	36" - 43"			
	860	44" - 60"			
END PREP LATHES:	2-6B	2" - 6"			
	4-12B	4" - 12"			
	12-24	12" - 24"			
	<u>Model</u>	<u>Travel X Axis</u>	<u>Travel Y Axis</u>	<u>Travel Z Axis</u>	
PORTABLE MILLS:	12"	6"	2"	4"	
	36"	30"	2"	4"	
	72"	66"	2"	4"	
3 - AXIS MILLS:	12"	6"	12"	4"	
	36"	30"	12"	4"	
	72"	66"	12"	4"	
HEAVY DUTY MILLS:	12"	NA	NA	6"	
	18"	NA	NA	12"	
	24"	NA	NA	18"	

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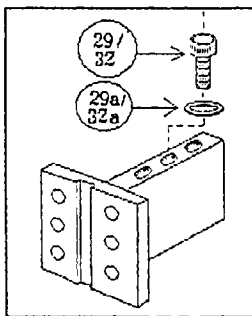
ADDENDUM UPDATE

Dear Customer,

The following corrections and amendments to this technical manual are important and may be critical to the operation of your machine. Please review these notes and insert them on the correct pages. Read this manual before attempting to operate your Mactech equipment.

Technical Writing Dept. Mactech 1-800-328-1488

- >> NOTE: P. 6, Installation - Feed Pins must be positioned correctly to avoid pin breakage during contact with star wheel. See Fig. 2a & 2b for proper pin location.
- >> NOTE: P. 12, Severing - If it becomes necessary to halt operation while cutting, disengage feed pin, continue 3 revolutions, then close control valve. This will release pressure on bit tip and prevent gouging at restart.
- >> NOTE: Appendix, Clamshell Body Assembly Diagrams - The Manual Adjustable Feed Bracket includes the following changes which are in effect on 1/1/92.



Models 804, 806, 808, 810, 812

<u>ID No.</u>	<u>Part No.</u>	<u>Part Description</u>	<u>Qty.</u>
29	070-0028	Capscrew, Hex Soc Hd, 1/4 - 20 UNC Thd x 2 1/2	2
29a	480-1014	Washer, Flat .255 x .560 OD	2

Models 816, 820, 824, 830

<u>ID No.</u>	<u>Part No.</u>	<u>Part Description</u>	<u>Qty.</u>
32	070-0028	Capscrew, Hex Soc Hd, 1/4 - 20 UNC Thd x 2 1/2	3
32a	480-1014	Washer, Flat .255 x .560 OD	3

SAFETY INSTRUCTIONS

- Wear Protective Clothing, including Safety Glasses and Steel Toe Boots.
- Don't Allow loose clothing or long hair near machine operations.
- Keep work site and machine Clean. Use brush to remove chips. Do not use hands or air hose.
- Ensure adequate Clearance around pipe before mounting Clamshell.
- Support Pipe for total machine weight. If severing pipe, support both ends.
- Do Not Rush the job. Read This Manual and understand the operating procedure before attempting any cutting operation. Call our toll free number (1-800-328-1488) if any problems arise.
- Before connecting the hoses to the machine, be sure the following components are tightly Secured: Tool Blocks, Tool Bits, Locator Pads, Squaring and Centering Screws, Motor Mounts, Feed Pin Bracket.
- Be sure Clamshell is totally Secured to pipe Before starting the machine.
- During actual machine operation, Do Not Touch or rest hand on the feed pin bracket or near any moving parts or sharp edges.
- Disconnect air hose or hydraulic power source Before dismantling lathe from pipe.
- NEVER MOVE LATHE WHILE CONNECTED TO AIR OR HYDRAULIC SUPPLY. Always turn off control valve and Disconnect hoses **before** attempting to move machine.

INTRODUCTION

General Description

Mactech Clamshells are portable pipe lathes designed to simultaneously sever and bevel in-line pipe, plus form machine any angle bevel as they cut. The frame is split for easy installation and the tool bits automatically feed into the work piece with each rotation of the lathe to assure precision machining.

MACHINE SPECIFICATIONS

Machining Functions & Capacities

- Sever In-Line Pipe
- Sever and Bevel In-line Pipe
- Sever and J-Bevel In-Line Pipe
- Sever and Double-Bevel In-Line Pipe
- I.D. Counterbore (accessory required)
- Socket Weld Removal
- Weld Overlay Machining (accessory required)
- Weld Crown Reduction (accessory required)
- Single Point (accessory required)

The Mactech 830 Clamshell can machine 20" to 30" pipe; the 832 can machine 22" to 32" pipe, the 836 can machine 26" to 36" pipe, and the 848 can machine 44" to 48" pipe of the following materials: steel and various steel alloys, stainless steel, aluminum, copper-nickel, nickel-copper, nickel-copper-iron, bronze.

Tooling

1/2" TO 1" high speed tool steel inserts of various size depending upon the machining operation. Any degree of bevel or counterbore can be manufactured. Mactech stocks standard prep configurations, including right hand bits for beveling on the side of the cut on which the machine is mounted, and left hand bits for beveling on the opposite side of the cut.

COMPONENTS

Frame

A split ring assembly capable of being disassembled for installation on in-line piping. The solid aluminum frame has bearing mountings for the rotating head, mounting brackets for the drive motor(s) and locator pads for clamping the clamshell securely to the pipe.

Cutting Head and Assembly

The cutting head runs on precision bearings which provide for axial and radial force reaction. The cutting head assembly has gear teeth on the outside diameter of the cutting head and mounting devices for tool holders. Made from heat treated 4140 alloy steel, this split ring assembly will align with the split lines of the frame when the clamshell is separated into halves.

Drive Assembly

Mounted to the frame and arranged with a pinion gear on a shaft with sealed ball bearings. The drive mountings are designed to accept the reaction torque generated by the drive motor(s). Pneumatic (Air) drive Includes Air Caddy (filter & lubricator). Hydraulic drive (OPTION) requires Hydraulic Power Supply.

Tool Holders

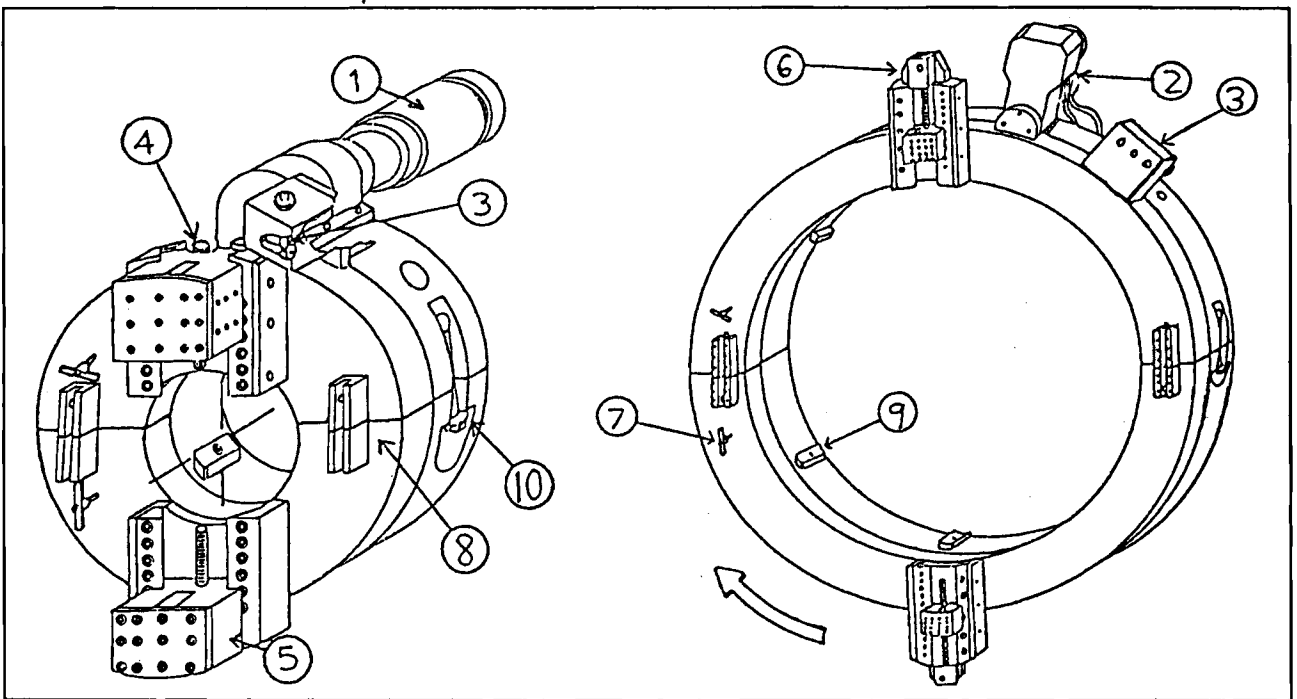
The tool holders are designed to hold the cutting tool bit at the desired location on the wall of the pipe. They are mounted on slides to the cutting head assembly and feature automatic "star wheel" feed mechanisms, adjustable tapered gibs and are driven by a worm drive.

Adjustable Locator Pads

Actuated by turning set screws located on the inside of the housing, the pads are in 2" increments. The 830 has 30" standard locator pads, 20" - 28" optional pads. The 832 has 32" standard locator pads, 22" - 30" optional pads. The 836 has 36" standard pads, 26" - 34" optional pads. The 848 has 48" standard pads, 46" - 44" optional pads.

MACTECH 830/832/836/848 CLAMSHELLS

Figure 1: Various Clamshell Combinations: (Left) View of Clamshell with In - Line Air Drive, US tool blocks on #3 Slide, and Feed Pin exposed; (Right) View of Clamshell with Hydraulic Drive, #6 Slide and Worm Drive.



Refer. No.	Part Description
1.	In-Line Air Drive, 4800U
2.	Hydraulic Drive
3.	Feed Pin Assembly
4.	Star Wheel
5.	US Tool Block and #3 Slide
6.	#6 Slide and Worm Drive
7.	Locking Pin
8.	Face Eye Bolt
9.	Locator Pad
10.	Side Eye Bolt

Shipping Weights

	830	836	843
Clamshell with US blocks:	745 lbs.	875 lbs.	940 lbs.
Included with Clamshell:	Tool blocks, Slides, Drive, Operating Manual, Hand Tools, Steel Gang Box.		

MACHINE SET UP

| Read SAFETY INSTRUCTIONS on Page 1.

Pre-Installation Procedure

»» NOTE: Motor should be removed from the Clamshell.

● **Separating Clamshell Halves**

1. Rotate gear by hand until both the gear and housing split lines are aligned. If the lock pin holes in the gear will not line-up with the holes in the housing, rotate gear 180 degrees for proper alignment.

2. Place two (2) locking pins (provided) into the holes through the gear and frame to prevent gear rotation when the clamshell is split. Press the pins top button to allow pin to slip into the hole.

3. Loosen and unlatch the (2) face eye bolts, loosen and unlatch the (2) side eye bolts and separate the clamshell halves by pulling straight apart and then open.

»» CAUTION: DO NOT FORCE OPEN USING TOOLS

4. Determine pipe OD and select proper locator pad set. The pad adjustment set screws are accessed from the outside of the housing using an Allen Wrench. Back-off all locator pads as needed for proper clearance of pipe outer diameter.

Installation on In-Line Pipe

● **Joining Clamshell Halves**

» NOTE: If Clamshell will not close, check locator pads for proper size and clearance, back-off further if necessary.

Figure 2a: Adjusting feed pin for star wheel contact.

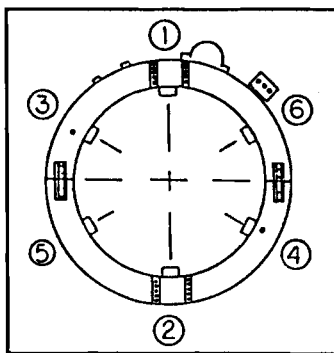
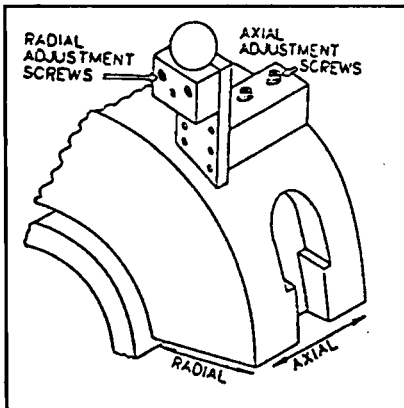


Figure 2b: Locator Pad Tightening Sequence

1. Swing the two halves of the Clamshell closed around the pipe and tighten the swinging eye bolts on the sides and the face of the frame.
2. Lightly tighten the adjustable locator pads around pipe diameter, just enough to secure the clamshell to the pipe. Do not tighten down completely until the squaring and centering operations are completed.
3. Remove the (2) locking pins from the face of the clamshell. This allows the gear to rotate freely. Rotate gear by hand to check for smooth rotation and proper feed pin / star wheel contact. Adjust feed pin position if necessary. (See Fig. 2a)

● **Squaring & Centering** (See page 7, Photos 1 & 2)

4. Squaring: Place a square on the back of the Clamshell, against the outside diameter of the pipe, at the locator pad position #1 (See Fig. 2b) Adjust pads #1 & #2 until clamshell is squared. Then place square at #3 pad position and adjust pads #3 & #4 until squared. Then just tighten pads #5 & #6 until secure. For accurate machining the Clamshell should be perpendicular to the pipe.
5. Centering: Using a ruler, measure the distance from the pipe OD to the clamshell ID at #1 and #2 pad positions. Adjust pads #1 & #2 until they are equal distance, while maintaining secure fit and squareness to pipe. Repeat on #3 & #4 pads. Then just tighten pads #5 & #6 until secure.
6. Fine centering: Mount a Dial Indicator (not included) on the face of the cutting head to indicate the OD of the pipe. Rotate the gear by hand, checking for proper centering and minor adjustments with the dial indicator. Repeat step 5 using dial indicator instead of ruler.

Photo 1: Squaring Clamshell at each locator pad position.

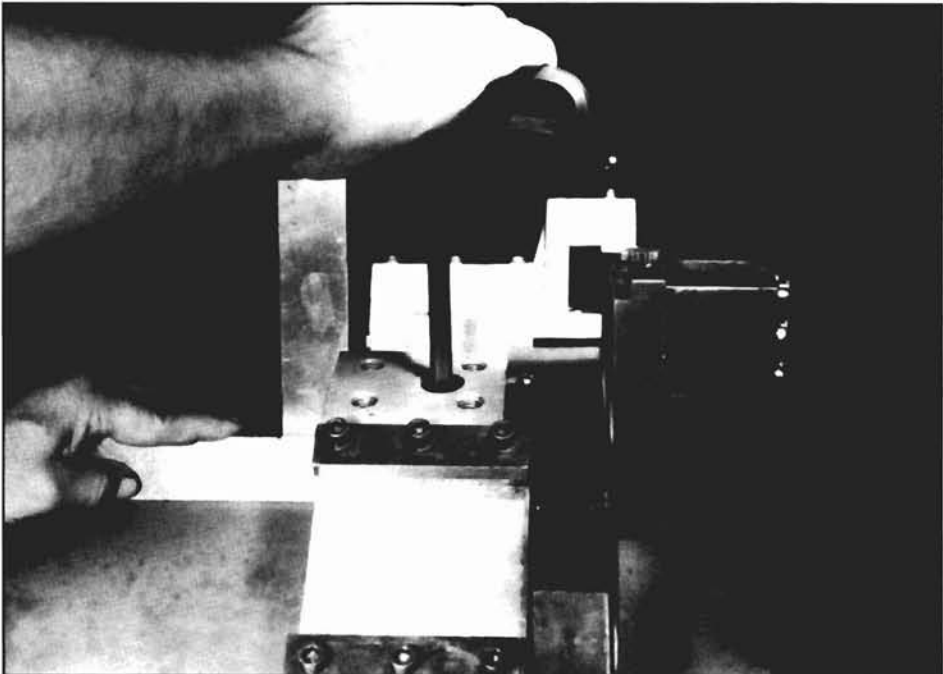


Photo 2: Centering clamshell with six inch (6") scale at each locator pad position.



Setting Tool Bits

1. Prior to installation of tool bits, determine which tool bits must be used for your specific machining operation. The following steps describe installation of tool bits for severing. (See page 18a, Tooling Reference Sheet)

» NOTE: The Clamshell rotates and cuts in a clockwards direction, when viewed at its face. There are right-hand and left-hand bevel tool bits, right hand bits bevel on the side of the cut which the clamshell is mounted, left hand bits bevel on the opposite side of the cut.

» NOTE: For those clamshells using the Worm Drive system with #6 or #7 slides, use 5/8" wrench to move blocks, otherwise use star wheel wrench. If severing extra heavy wall pipe, use the Bit Inserts - Thin (440-0302) and Thick (440-0303) in the Indexing tool holders. Otherwise, use the following sever bits- Thin (440-0168) and Thick (440-0169).

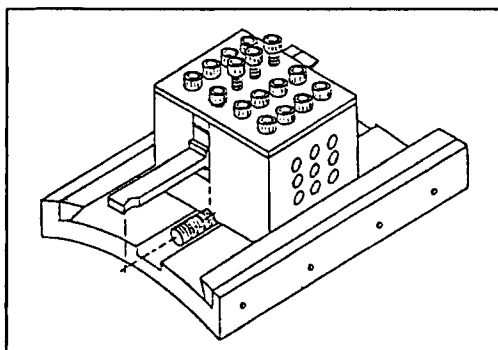
2. Using wrench, back tool blocks away from the pipe until they stop, to give room for bits. Disengage feed pin.

NOTE: When using Tool Blocks, shims should be inserted with Tool Bits, to position bits axially.

3. Insert proper tool bits so that the cutting tip touches the pipe OD and stems from the center (not offset) of the tool block and slide. Hold bits with one capscrew, snug but not tight. (See Figure 3 below).

4. Manually rotate cutting head counterclockwise 1 revolution. This will push bits up away from any bumps which could cause gouging. Tighten cap screws and set screws on both bits.

Figure 3: Positioning Tool Bit



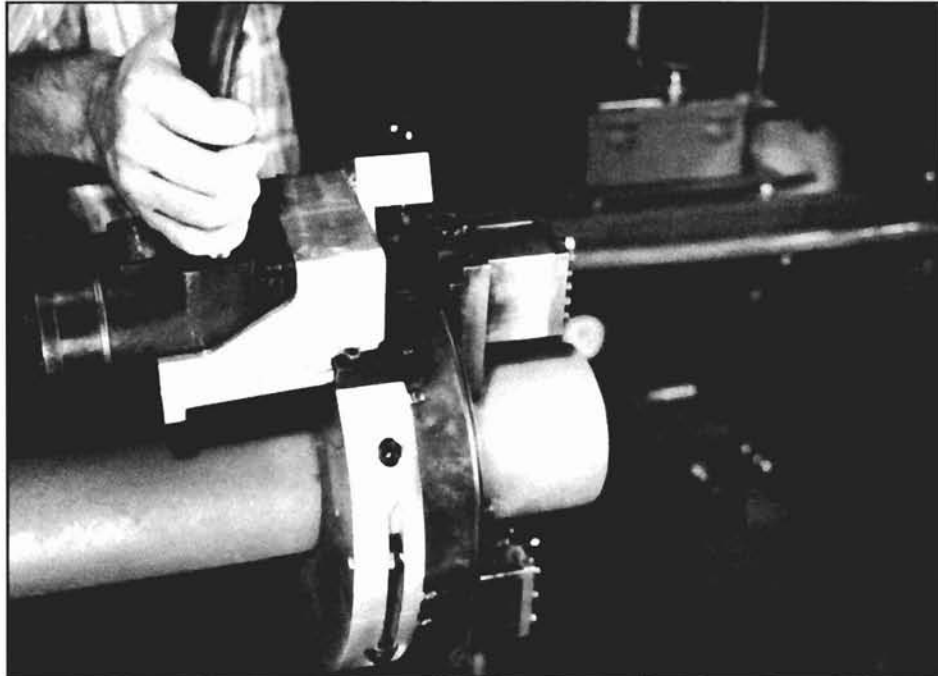
Installing Motor

» CAUTION: BOTH LOCKING PINS MUST BE REMOVED FROM CLAMSHELL, AND CONTROL VALVE MUST BE TURNED OFF BEFORE INSTALLING MOTOR.

1. Position motor housing toward rear of Clamshell into groove and slide motor forward until the gear is engaged with the housing gear. Tighten motor mount capscrews.

» NOTE: If motor will not engage with housing gear, check to make sure gear is properly aligned. Rotate gear head to align teeth.

Photo 3: Installing Hydraulic motor into motor mounting. Pneumatic (Air) motors install similarly.



Hydraulic Power Supply Set Up

» NOTE: See MACTECH Hydraulic Power Supply Handbook for further information.

1. Select 230 or 460 outlet, See inside electric control box for directions on how to change voltage connections.

» CAUTION: ALL ELECTRICAL WORK MUST BE DONE BY A QUALIFIED ELECTRICIAN.

2. Connect hoses to couplings (#7).

3. With Pendant Knob (#4) off, and control lever (#5) Neutral, turn on Main Switch (#1).

4. While viewing Direction Indicator (#2), turn on Pendant Knob; Shaft should spin in the direction of the arrow. If not, turn off Pendant Knob and Main Switch, change wiring rotation and reattempt step 3. When spinning properly, the power supply is ready to use.

SPECIFIED COMPONENTS

- 1. Main Switch (Control Box)
- 2. Motor Direction Indicator
- 3. Hydraulic Fluid Reservoir
- 4. Pendant On-Off Knob
- 5. Pendant Control Lever
- 6. Pressure Release Lever
- 7. Couplings, Fem./Male
- 8. Fluid Sight Glass

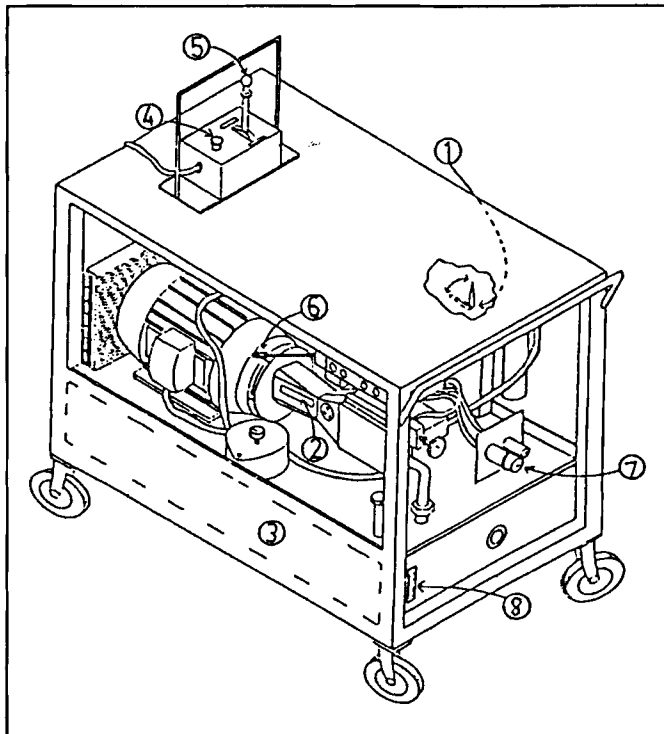


Figure 4: Hydraulic Power Supply & Remote Control.

MACTECH CLAMSHELLS

Photo 4: Double Bevelling & Severing pipe. Clamshell with US blocks holding bits, with feed pin engaged.

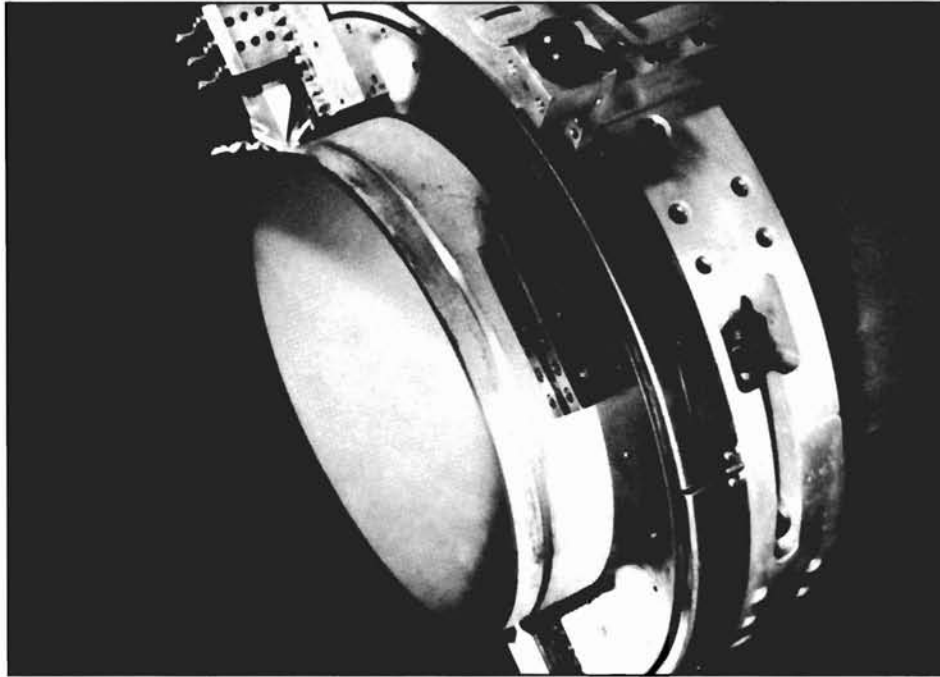
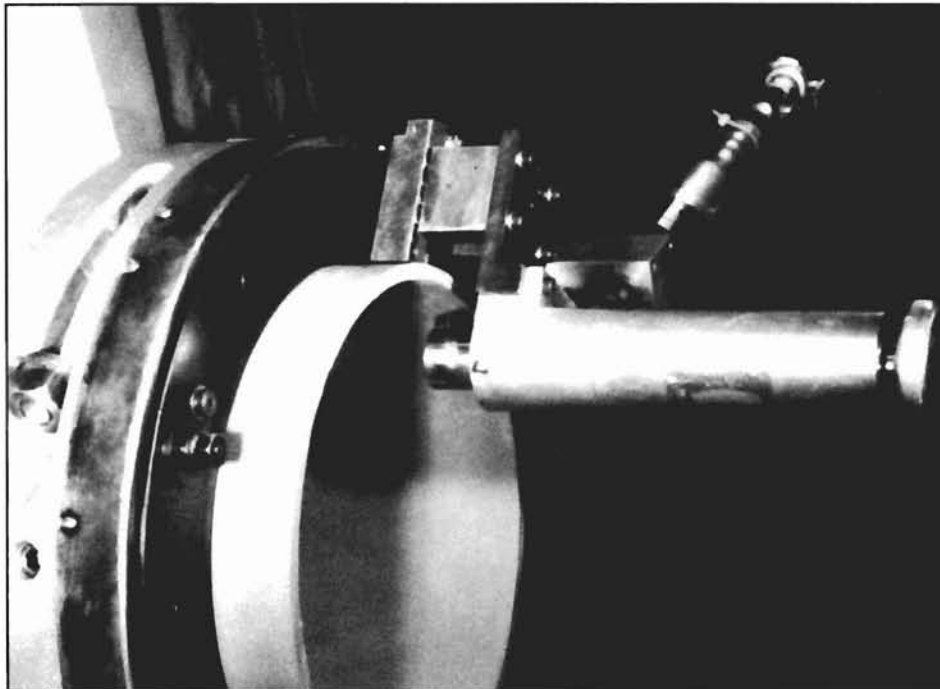


Photo 5: Counterboring pipe, with boring bar and right angle air drive, with feed pin dis-engaged.



MACHINE OPERATION

Starwheels/ Radial Feed

4 Point: 3 Rev. / .025"
 7 Point: 1 Rev. / .025"
 9 Point: 1 Rev. / .025"

To prevent damage to feed pin, before (re)starting a cut, remove backlash from feed screw by turning starwheel counter-clockwise until tool block begins to move. Leave bottom starwheel point set 2 degrees to the right of the vertical centerline. This is the optimal position for indexing the feed pin, and starwheel should return to this position after each index, as seen in diagram at right.

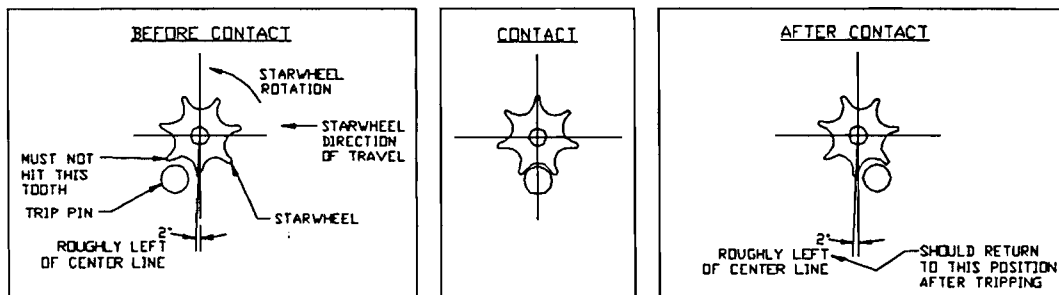
Severing In-Line Pipe

1. Follow Set-Up Procedures. Back up thick bit .025" out (Turn 7- & 9-pt. starwheel 1 rev., 4-pt. starwheel 3 revs.). Attach air or hydraulic supply to the motor while control valve is OFF. Disengage feed pin, open control valve slowly to check function & speed.

Review **SAFETY INSTRUCTIONS** on Page 1.

» **CAUTION: THE CUTTING OPERATION IS CONTINUOUS UNTIL TERMINATED BY THE OPERATOR. TO STOP MACHINE DURING CUTTING, PULL FEED PIN, CUT 3 REVOLUTIONS, THEN CLOSE CONTROL VALVE.** This will prevent tool damage and gouging.

Connect the air caddy between the air supply and the lathe, and adjust filter and lubricator to match operating speed.



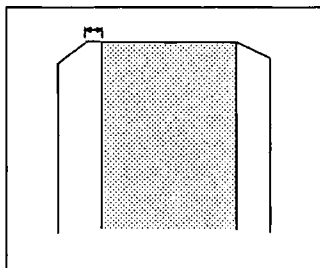
To prevent damage to the tool bits, the pipe must be supported properly to keep the tool bit from binding when the pipe is severed.

2. Engage feed pin, use control valve to control cutting speed. Each feed pin contact moves bit inwards radially .0028" (9 pt.), .0036" (7 pt.), or .0021" (4 pt.). If chatter or vibration occurs, reduce speed. If tool bit(s) chip or become dull, replace them with sharp bits. Use Coolant to reduce friction on cutting edge until done.

Worm Drive: Use 2 or 3 feed pins only when severing pipe with special sever bit inserts, to increase the speed of cutting heavy wall pipe.

3. Close control valve to stop motor, and disconnect hoses. Back out tool blocks to FULL OUT POSITION.

Severing and Beveling In-Line Pipe



1. Follow Tool Bit Set-Up Procedures, replacing both sever bits with a left or right hand sever/bevel combination. Back up the bevel bit .025" (Turn 7- & 9-pt. starwheel 1 rev., 4-pt. starwheel 3 revs.) and follow the above procedure, until the pipe is beveled to a sharp (feathered) edge. If the pipe is out of round, the pipe end may appear as shown to the left. If so, re-center the lathe to the pipe ID and finish beveling to a feathered edge all around the pipe end.

NOTE: If tool block(s) do not move smoothly along slide, the tapered gibs may need adjusting. (See Page 16.)

2. Land Prep - To make a land, first sever the pipe. Replace sever bits with the boring bar, re-center to the pipe ID and counterbore. Replace boring bar with bevel bit and bevel down to the desired land thickness.

Sever and J-Bevel In-Line Pipe

Special J Bevel tool bit is required. First sever the pipe, then center the clamshell to the pipe ID, then counter-bore. Install J bevel bit and shim the bit towards the pipe face until the tip of the radius is directly above the edge. For an extended land, move the bit axially the distance of the land. Bevel down to the specified thickness.

Severing and Double Beveling In-Line Pipe

Similar to Severing and Beveling with appropriate tooling. Use 3 or 5 bits. See page 18a, Tooling Reference Sheet and page 11, Photo 4.

I.D. Counterbore

Contact Mactech Factory for special attachment, the US 6", 9" or 13" Clamshell Boring Bar. See page 18a, Tooling Reference Sheet and page 11, Photo 5.

1. Clamshell must first be centered to the pipe ID. Pull out Feed Pin. With tool block at middle of slide, remove block cap, insert boring bar into block and secure. Insert boring bit and tighten.
2. Position bit at the edge of the inner wall, open control valve slowly and cut for one or two revolutions, turning knob 1/3 turn each revolution until the ID is rounded. Bit moves 1" deep axially per 16 boring bar knob revolutions.
3. Counterbore to desired axial depth and wall thickness.

Socket Weld Removal

Operation is similar to Severing In-Line pipe except a special tool bit must be inserted. Operator must determine number of revolutions before crack appears in the weld root area. If weld root material does not break, repeat.

Operation completion

1. Close control valve, disconnect air or hydraulic supply. To remove clamshell, support halves and reverse Set-Up.

Single Point Machining

The Single Point Attachment (optional) is bolted to the clamshell as shown in the diagram below.

1. Assemble the slide bar, spacer blocks and single point mechanism together and mount them to the clamshell. Disengage feed pin on clamshell, be sure the clamshell is squared and centered. (see Page 18b, Single Point info.)

2. Loosen the 2 (two) angle adjusting screws on the angle plate, rotate the plate to the desired angle and retighten the screws. Insert and secure single point tool bit into single point tool bit holder.

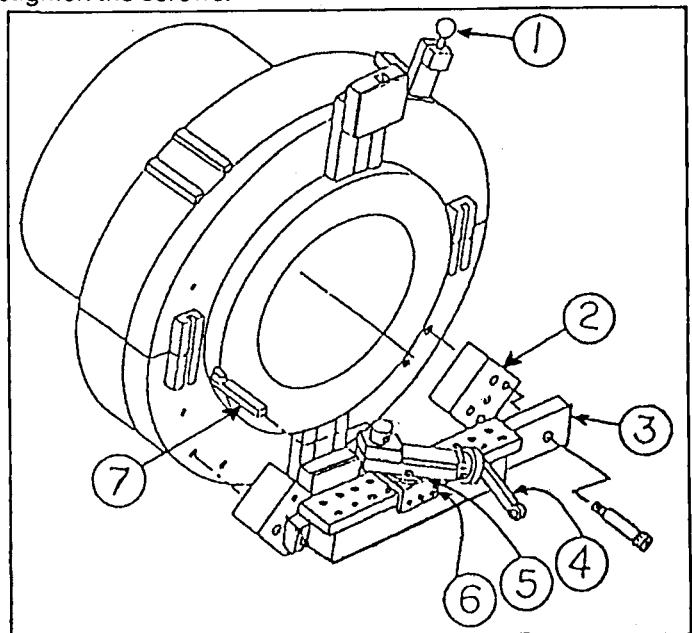
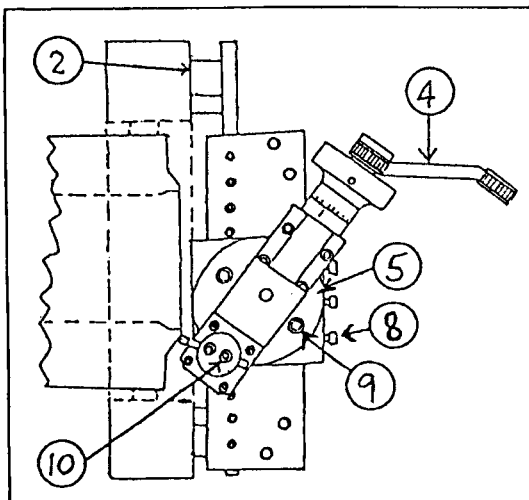
3. Using ratchet, move bit tip 1/8" past pipe edge along angle plane. Open control valve slowly. With every revolution of the slide bar around the clamshell, rotate the ratchet approx. 1/2 revolution (.045" movement along angle plane), continue until bit tip is through wall or at transition height. Then close control valve. Loosen the bit adjusting screws, with ratchet, move bit to pipe edge. Push bit approx. 1/8" forward axially and secure bit.

4. Repeat step 3 until bevel is completed. If compound angle is desired, stop at transition height and change the angle. On heavy wall, if the bit can't reach, loosen the bottom slide adjusting screws and move the slide radially towards the ID, retighten the screws.

Figure 5: Single Point compound 37-10 bevel with land, and 15 deg counterbore on heavy wall pipe.

SPECIFIED COMPONENTS

1. Feed Pin (Disengaged)
2. Spacer Block
3. Slide bar
4. Ratchet Wrench
5. Angle Plate
6. Bottom Slide
7. Single Point Tool Bit
8. Bottom Slide Adjusting Screw
9. Angle Adjusting Screw
10. Bit Adjusting Screw



Floating Axial Feed Weld Overlay Removal

The Weld Overlay Module (optional) is bolted to the clamshell as shown below. The tool bit, secured within the tool block and top cap, is fed inwardly along the radial feed screw by the micro-knob. This assembly rides on the axial feed screw between the two floating wheels and is fed by indexing of the starwheel on the tripper pin(s). The 3 spring screws can be adjusted, making the axial feed screw either parallel to the module's body for straight pipe, or at an angle for contoured reducers. The adjustable floating wheel can be positioned radially with its adjusting capscrew. CAUTION: During operation, keep hands away from all moving parts.

Total Axial Feed

824	3.7"
828	7.0"
830	4.1"

Maximum axial feed per index of tripper feed pin

824	.005"
828	.005"
830	.006"

1. Install, square and center the clamshell about 10 inches behind the overlay to be machined. Attach the Overlay Module and the forward and reverse axial feed tripper brackets to the clamshell. The overlay to be removed should lie between the floating wheels. On straight pipe, adjust the spring screws to make the axial feed screw parallel to the top of the module body. Adjust the adjustable floating wheel radially so that the wheel applies pressure equally around the pipe.

2. Insert proper tool bit and secure. Move block to starting point by turning axial feed screw with 4 point star wheel wrench. To adjust depth of cut, turn micro-knob, moving bit radially to (but not gouging) the overlay surface. (Each knob revolution moves bit .025" radially). Open control valve.

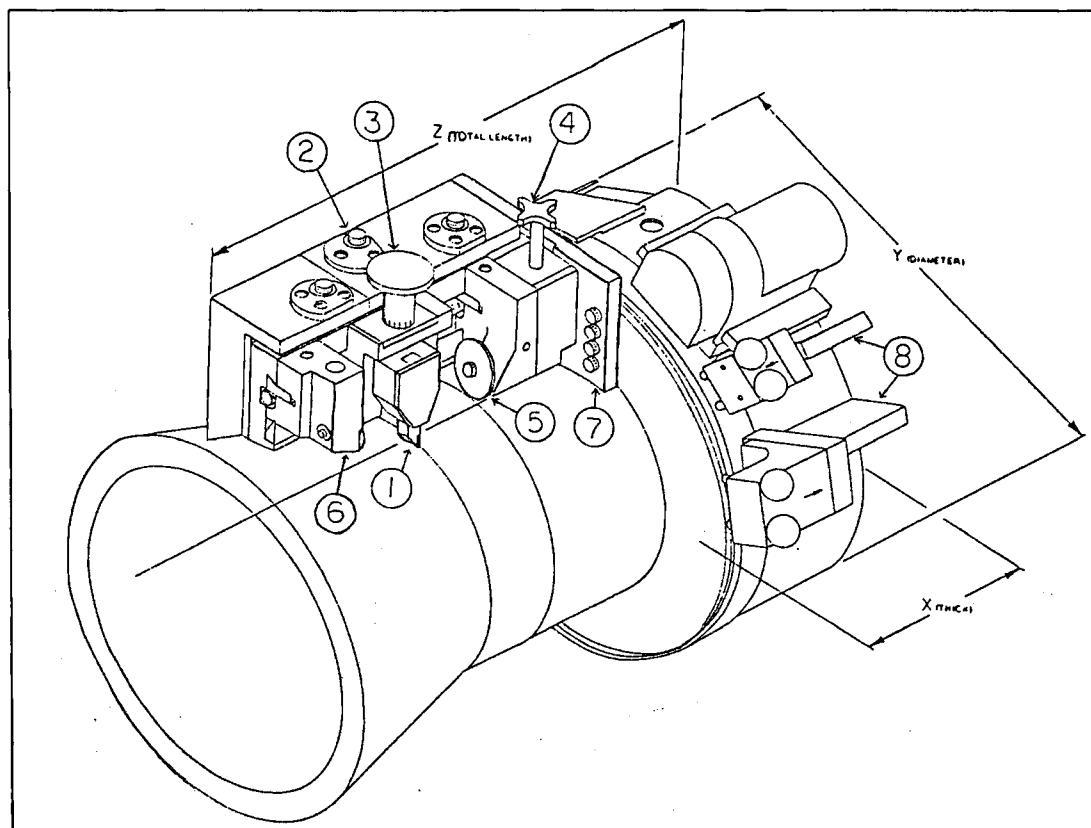
3. With each index of the starwheel, the tool bit automatically moves axially the distance shown in the box at left. After each pass, stop machine and reset radial depth of cut with knob. On slightly angled reducers, adjust spring screws to angle the axial feed screw to match the reducer's original angle. Continue cutting until overlay is removed. When finished, reverse set up procedure.

COMPONENTS

1. Tool bit and tool block
2. Spring screws
3. Radial feed screw w/ micro-knob
4. Axial feed screw w/ starwheel
5. Fixed floating wheel assy.
6. Adjustable floating wheel
7. Adapter plate
8. Axial feed tripper brackets

DIMENSIONS

Model	X	Y	Z
808	4.3	14.7	15.4
810	4.3	16.7	15.4
812	4.8	18.7	16.1
816	5.5	23.3	16.7
820	5.5	27.3	16.7
824	5.5	31.3	16.7
828	5.5	35.5	19.5



Adjusting Tapered Gibs

» NOTE: Each tool block slide includes a tapered gib which may be adjusted for wear after heavy use. It must always fit exactly parallel to the slide for proper feed screw action.

1. With Control Valve off, turn star wheel clockwise until the block stops. Remove and set aside 2 (two) Flat Head capscrews holding the starwheel feed screw in position.

2. Pull out the tool block and feed screw assembly, remove the feed screw assembly from the tool block. replace the tool block (alone) into the slide.

3. Turn set screws (on side of slide) 1/4 turn clockwise. Slide the block up and down by hand, the block should fit very snug with no sideways sloppiness, yet not bind. Readjust set screws if block is too loose or too tight. (The gibs capscrews may be slightly loosened if necessary).

4. Remove tool block, replace feed screw, install block and feed screw into slide, secure 2 flat head capscrews. Using star wheel wrench, move block up and down slide to check if block moves easily yet securely. Turn star-wheel clockwise until the block is stopped.

Machine Maintenance

Prevent corrosion by cleaning machine exterior with a solvent, then apply rust inhibitors and store in a dry area. Grease internal gears regularly depending on use.

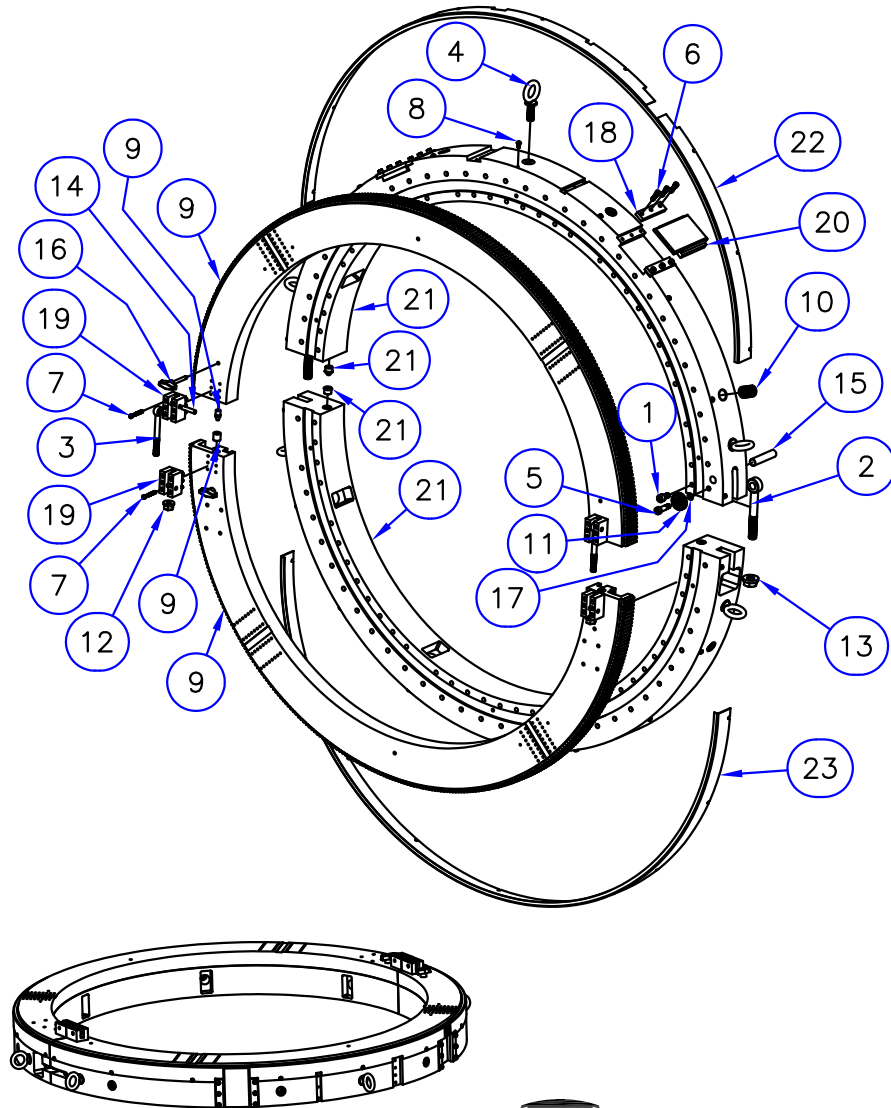
» NOTE: Mactech recommends sending the machine to our service facility after every 250 machining hours for inspection and tune up, for a nominal service fee.

• Record of Machining

Date	Hours	Date	Hours	Date	Hours

Parts List			
ITEM	PART NO.	QTY	DESCRIPTION
1	020-0182	64	3/4" CAM ROLLER BEARING
2	030-0004	2	3/4-10 UNC x 6" EYE BOLT
3	030-0005	2	1/2-13 X 5 EYE BOLT
4	030-0006	6	5/8-11 X 1-3/4 FORGED EYE BOLT
5	061-0023	62	12MM X M10 X 1 SHOULDER BOLT
6	070-0006	12	5/16-18 X 1 SHCS
7	070-0011	24	1/4-20 X 1-3/4 SHCS
8	072-0019	18	1/4-20 X 1/2 BHCS
9	100-0316C	1	848WD SPLIT GEAR SET
9-4	200-0102	2	1/2" BULLET NOSE DOWEL
9-1	040-0026	2	1/2" LOCATING PIN LINER
9-3	100-0316B	1	848WD SPLIT GEAT SET - LOWER HALF
9-2	100-0316A	1	848WD SPLIT GEAR SET - UPPER HALF
10	120-0008	8	1-8 X 1-1/2" HELICOIL
11	120-0009	62	#3 DUAL V BEARING
12	170-0006	2	1/2-13 FLANGE NUT
13	170-0007	2	3/4-10 FLANGE NUT
14	200-0008	2	3/8 X 1-3/4 DOWEL PIN
15	200-0097	2	3/4 X 3-1/2 HARDENED DOWEL PIN
16	205-0003	2	5/16 LOCK PIN 2-1/2 L GRIP
17	480-1079	62	SPACER WASHER 12MM X 18 MM X 1 MM THICK
18	620-0452	4	US MOTOR CLAMP
19	620-0601	4	US SWING BOLT BRACKET
20	620-3829	1	WD DRIVE BLANK COVER
21	620-3835	1	848WD MAIN HOUSING
21-1	040-0003	2	BND FLANGED BUSHING - 1/2" ID
21-4	620-3835B	1	848WD MAIN HOUSING NON-DRIVE HALF
21-2	200-0006	2	BULLET NOSE PIN - 1/2"
21-3	620-3835A	1	848WD MAIN HOUSING - DRIVE HALF
22	630-1348	1	848WD GEAR SHIELD - MOTOR HALF
23	630-1349	1	848WD GEAR SHIELD - NON-MOTOR HALF

848WD MAIN BODY ASSEMBLY 600-2896C



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Parts List

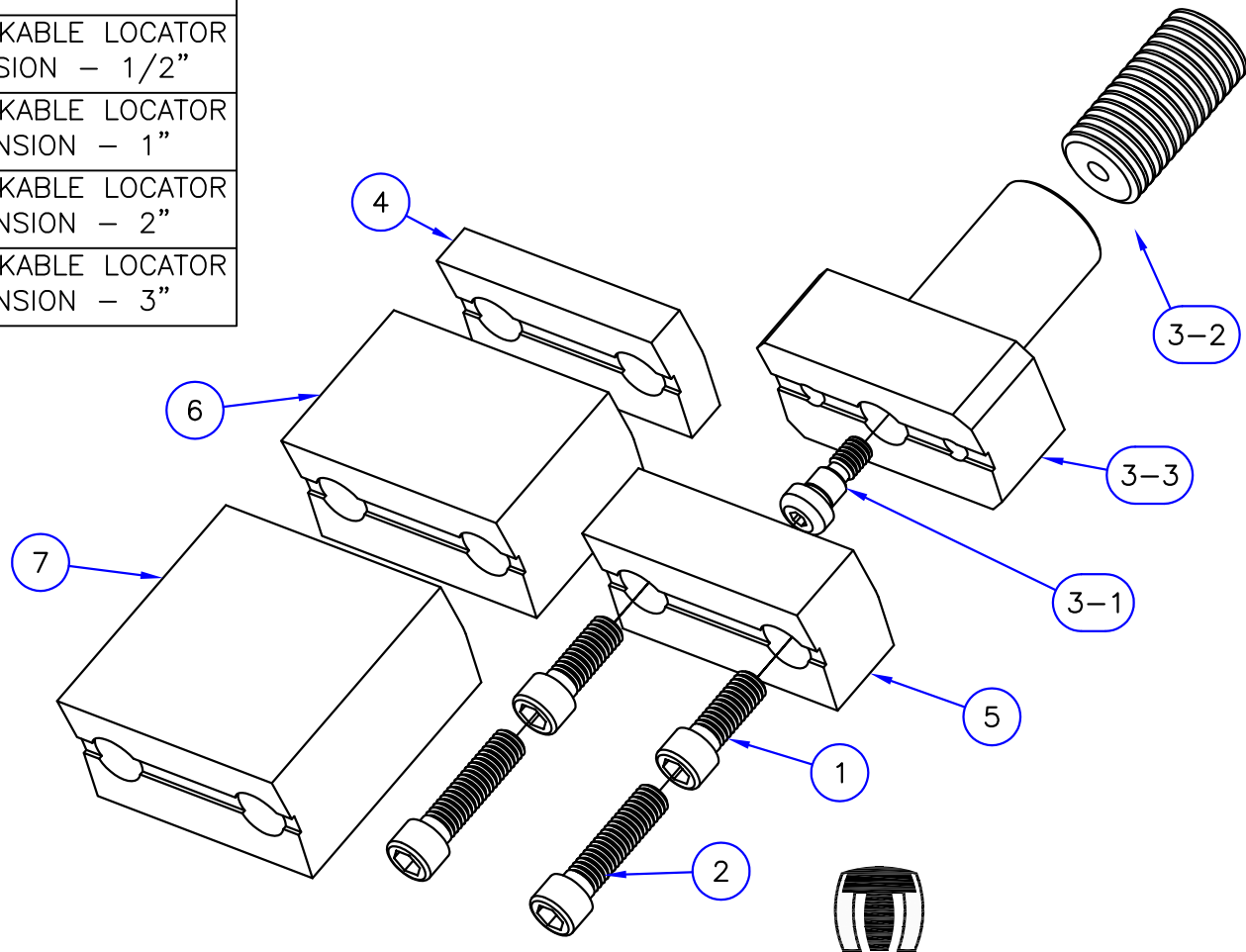
ITEM	PART NO.	QTY	DESCRIPTION
1	070-0014	2	3/8-16 x 1 SHCS
2	070-0060	2	3/8-16 X 1-1/2 SHCS
3	600-2886	1	WD STACKABLE LOCATOR BASE ASSY
3-1	061-0005	1	3/8 X .375 SHOULDER SCREW
3-2	490-0030	1	1"-8 X 2 JACK SCREW
3-3	620-3780	1	WD STACKABLE LOCATOR BASE
4	620-3781	1	WD STACKABLE LOCATOR EXTENSION - 1/2"
5	620-3782	1	WD STACKABLE LOCATOR EXTENSION - 1"
6	620-3783	1	WD STACKABLE LOCATOR EXTENSION - 2"
7	620-3784	1	WD STACKABLE LOCATOR EXTENSION - 3"

OPTIONAL:

- 4" EXTENSION 620-3785
- 5" EXTENSION 620-3786
- 6" EXTENSION 620-3787

WD STACKABLE LOCATOR ASSEMBLY

600-2887



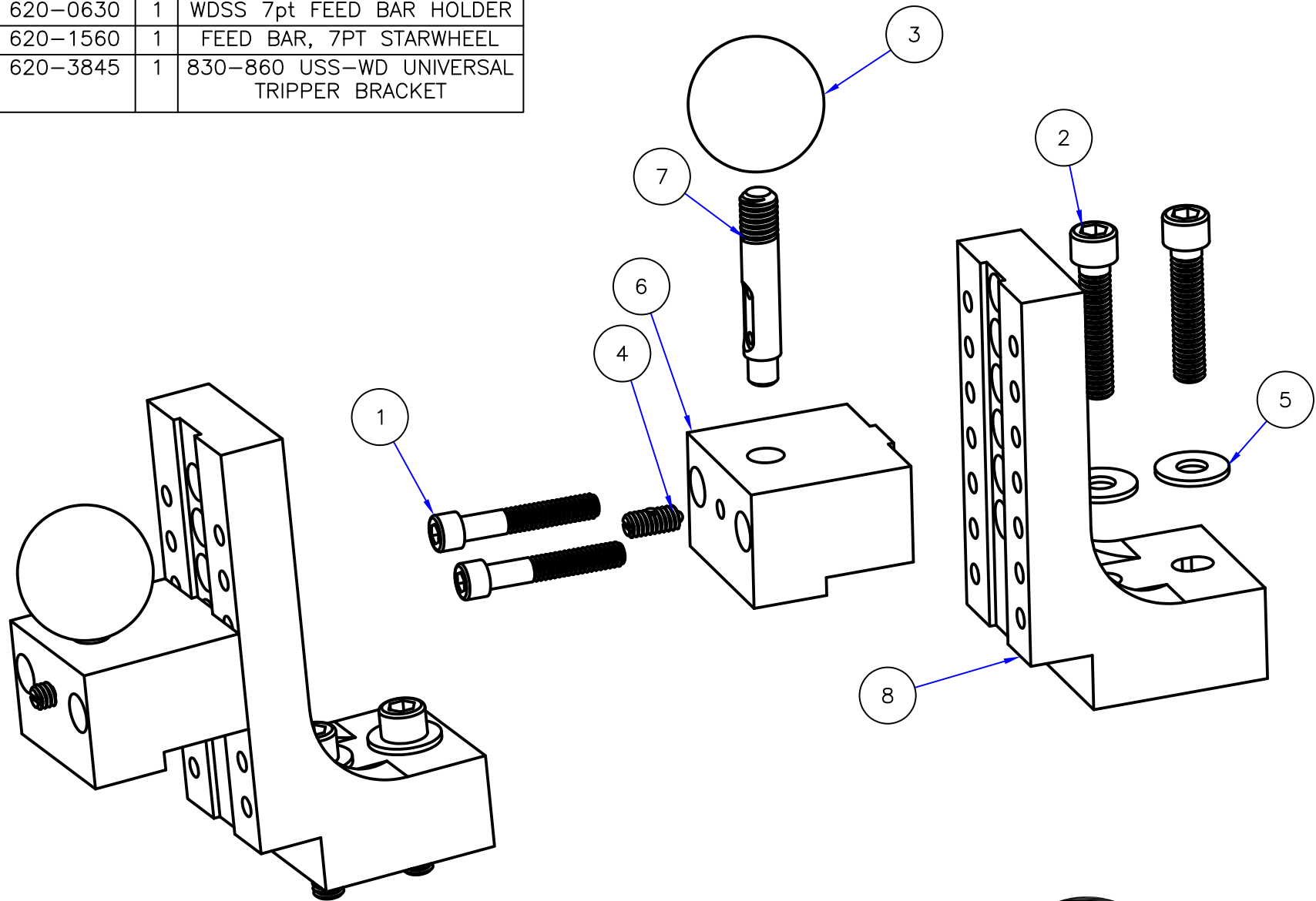
MACTECH, INC

ITEM	PART NO.	QTY	DESCRIPTION
1	070-0005	2	1/4-20 X 1-1/2 SHCS
2	070-0013	2	5/16-18 X 1-1/2" SHCS
3	120-0003	1	1-3/8 DIA 3/8 THREADED BALL
4	120-0028	1	1/4-20 SPRING PLUNGER
5	480-1070	2	1/4" USS HARDENED WASHER
6	620-0630	1	WDSS 7pt FEED BAR HOLDER
7	620-1560	1	FEED BAR, 7PT STARWHEEL
8	620-3845	1	830-860 USS-WD UNIVERSAL TRIPPER BRACKET

WD 7pt TRIPPER BRACKET ASSEMBLY

830-860 WD CLAMSHELLS

600-2781



MACTECH, INC

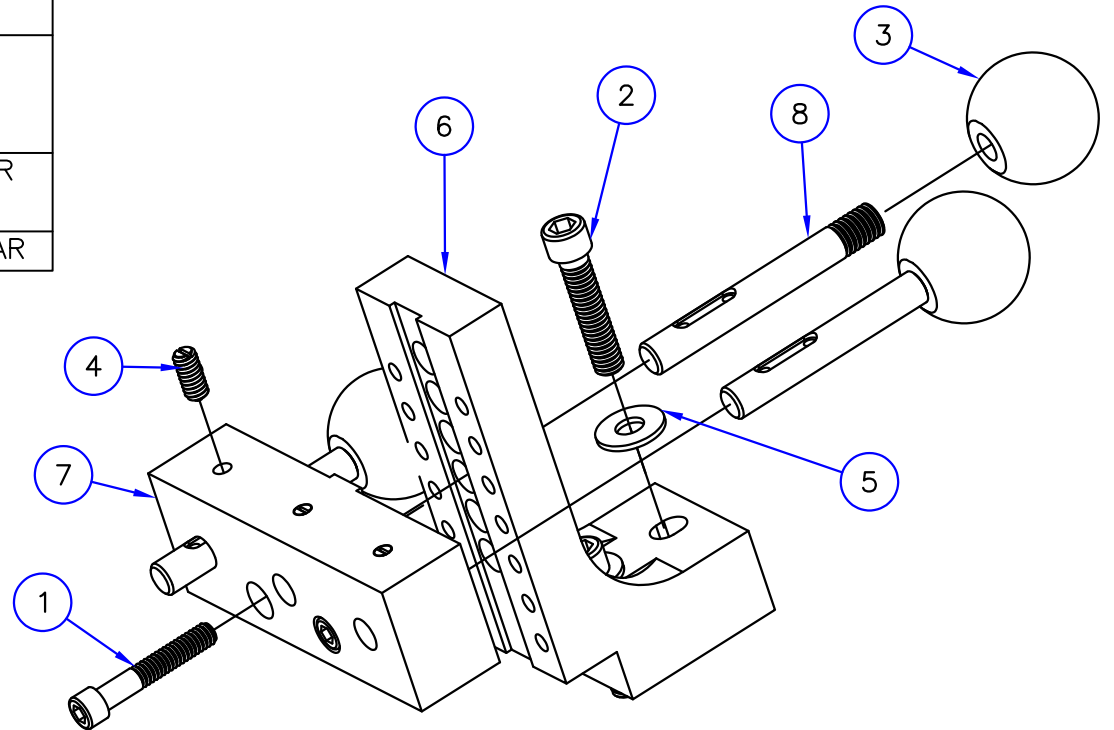
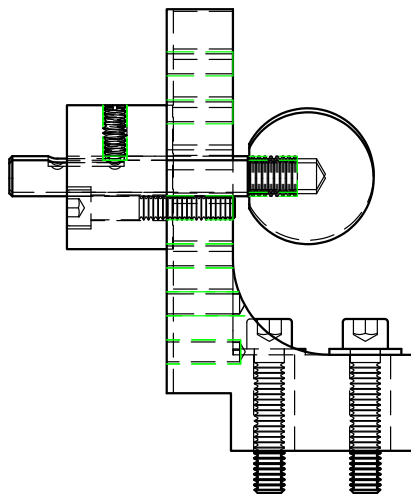
Parts List

ITEM	PART NO.	QTY	DESCRIPTION
1	070-0005	2	1/4-20 X 1-1/2 SHCS
2	070-0013	2	5/16-18 X 1-1/2" SHCS
3	120-0003	3	1-3/8 DIA 3/8 THREADED BALL
4	120-0028	3	1/4-20 SPRING PLUNGER
5	480-1070	2	1/4" USS HARDENED WASHER
6	620-3845	1	830-860 USS-WD UNIVERSAL TRIPPER BRACKET
7	620-3846	1	WD TRIPLE FEED BAR HOLDER 830-860
8	620-3847	3	WD TRIPPER FEED BAR

WD TRIPLE FEED ASSEMBLY

830-860 WD/WDS CLAMSHELLS

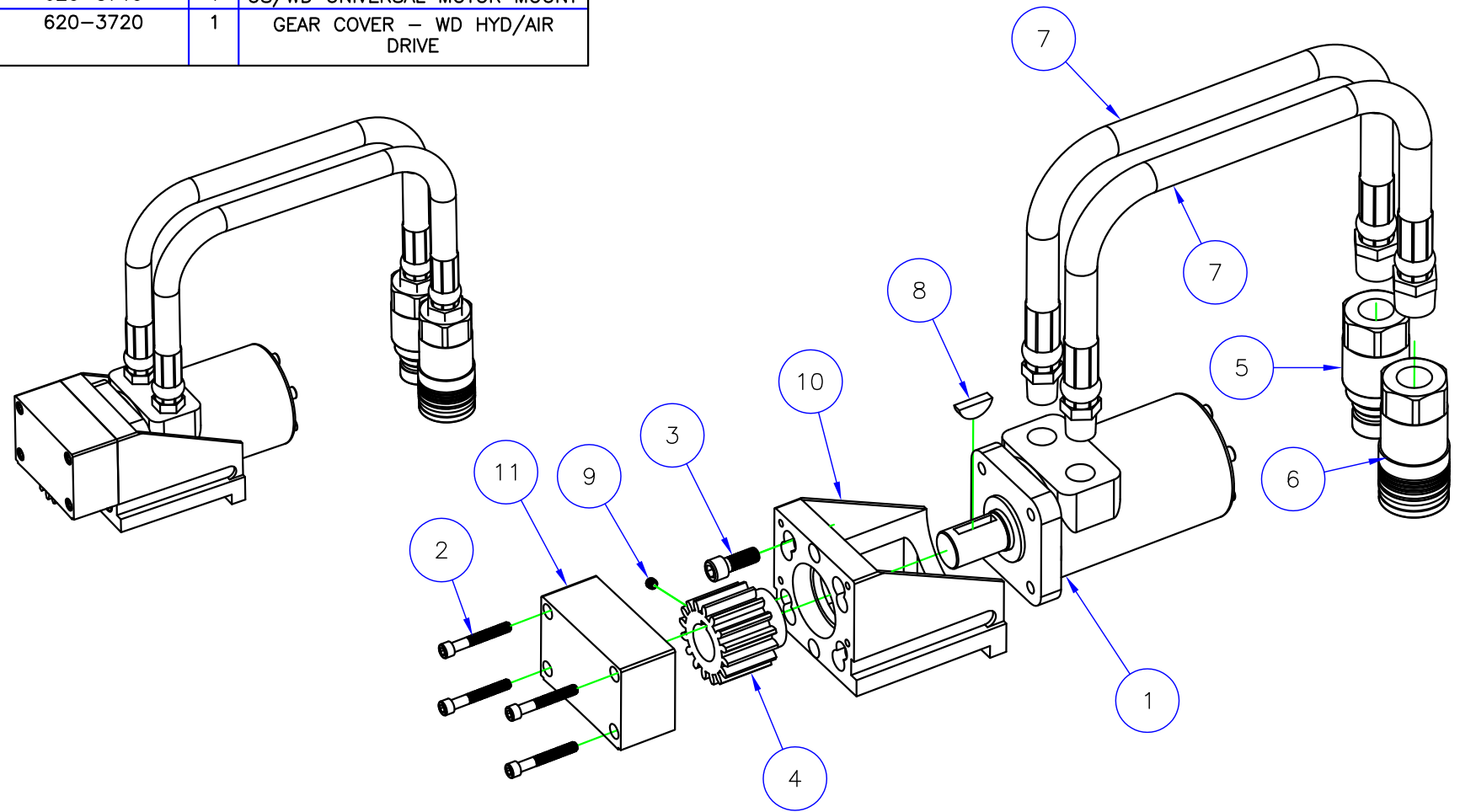
600-2820



ITEM	PART NO.	QTY	DESCRIPTION
1	011-1000	1	CHAR LYNN 101-1004 MOTOR
2	070-0011	4	1/4-20 X 1-3/4 SHCS
3	070-0014	4	3/8-16 X 1 SOCKET HEAD CAP SCREW
4	100-0025 MOD-A	1	SPUR GEAR 2" PD 8 DP
5	128-0091	1	3/4" DRIPLESS MALE HYD FITTING
6	128-0092	1	3/4" DRIPLESS FEMALE HYD FITTING
7	128-0101	2	1/2"X 36" HYD HOSE - 1/2" NPTM & 3/4" NPTM
8	150-0013	1	NO. 808 WOODRUF KEY
9	340-0006	1	1/4-20 X 1/4 SOCKET HEAD SET SCREW
10	620-3719	1	US/WD UNIVERSAL MOTOR MOUNT
11	620-3720	1	GEAR COVER - WD HYD/AIR DRIVE

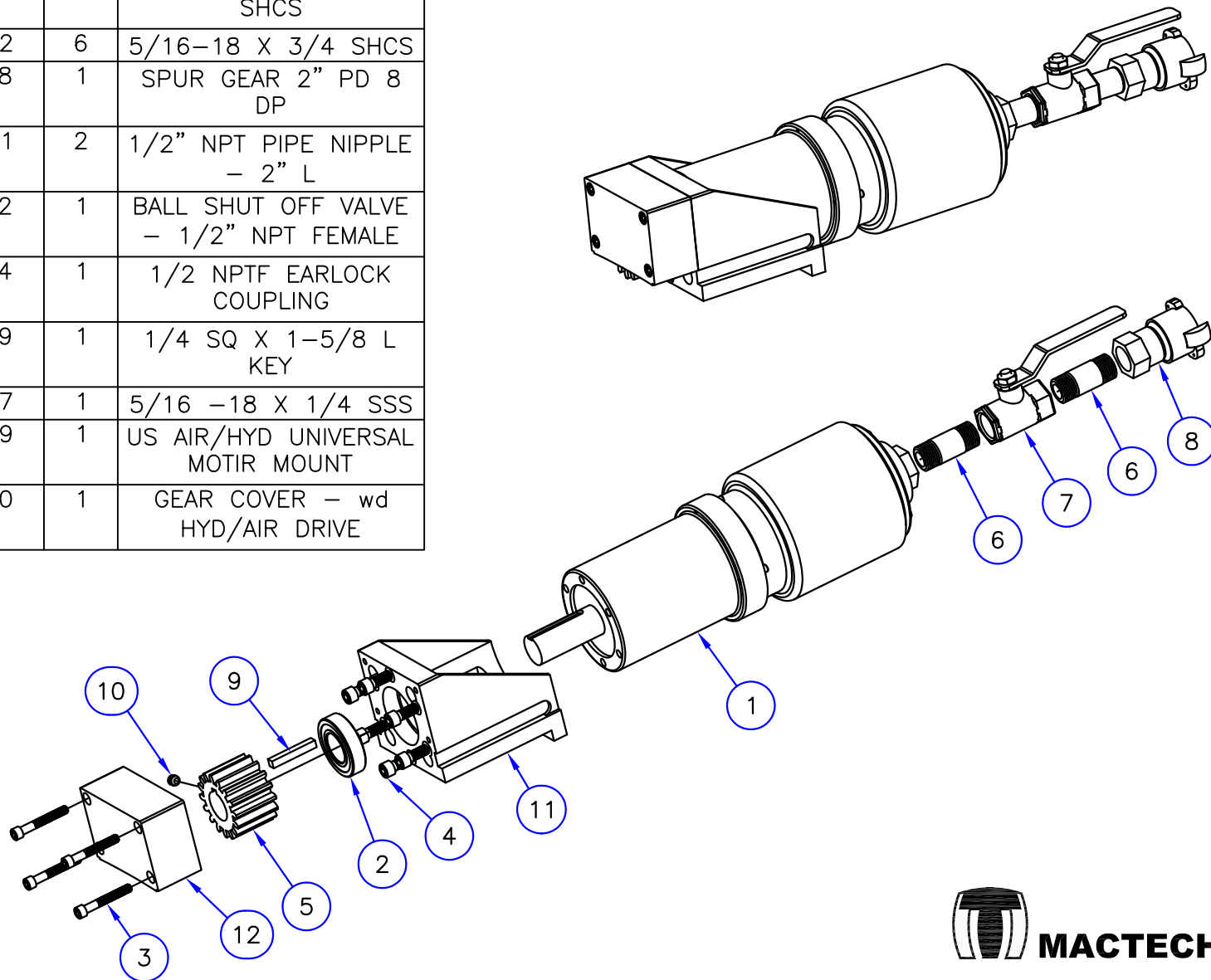
WD UNIVERSAL HYD. DRIVE ASSEMBLY

600-2747



Parts List			
ITEM	PART NO.	QTY	DESCRIPTION
1	010-1008	1	4800U AIR MOTOR
2	020-0083	1	BALL BEARING 1 X 2 X .5 SEALED
3	070-0011	4	1/4-20 X 1-3/4 SHCS
4	070-0032	6	5/16-18 X 3/4 SHCS
5	100-0078	1	SPUR GEAR 2" PD 8 DP
6	127-0001	2	1/2" NPT PIPE NIPPLE - 2" L
7	127-0002	1	BALL SHUT OFF VALVE - 1/2" NPT FEMALE
8	128-0024	1	1/2 NPT F EARLOCK COUPLING
9	150-0049	1	1/4 SQ X 1-5/8 L KEY
10	340-0007	1	5/16 -18 X 1/4 SSS
11	620-3719	1	US AIR/HYD UNIVERSAL MOTIR MOUNT
12	620-3720	1	GEAR COVER - wd HYD/AIR DRIVE

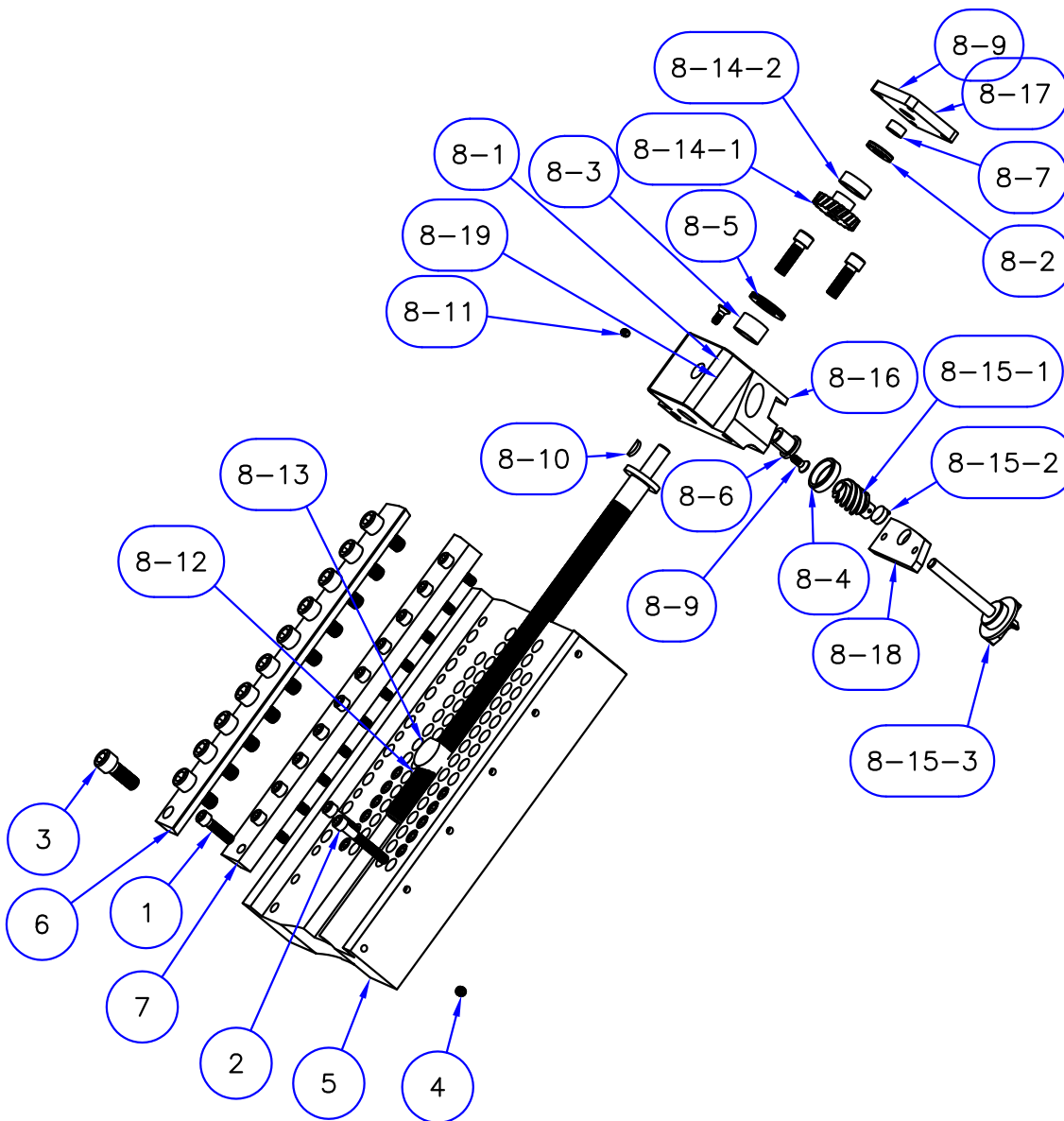
4800U WD UNIVERSAL AIR DRIVE ASSEMBLY 600-2748



#11 WD SLIDE ASSEMBLY 830-860

605-2045

ITEM	PART NO.	QTY	DESCRIPTION
1	070-0003	11	1/4-20 X 1 SHCS
2	070-0011	12	1/4-20 X 1-3/4 SHCS
3	070-0014	11	3/8-16 x 1 SHCS
4	340-0006	6	1/4-20 X 1/4 SHSS - CUP POINT
5	460-0057	1	#11 TOOL BLOCK SLIDE
6	460-0058	1	#11 STATIONARY GIB
7	460-0059	1	#11 ADJUSTABLE GIB
8	600-1221	1	#11 WD FEED SCREW ASSEMBLY
8-1	020-0039	1	5/8 X 1-1/8 NEEDLE THRUST BEARING SET
8-2	020-0071	1	THRUST BEARING SET 3/8 X .140 THICK
8-3	022-0021	1	5/8 OIL IMP. BRONZE BEARING
8-4	022-0023	1	13/16 X 1 X .25 BEARING
8-5	022-0024	1	THRUST BEARING 1/2 X 3/16 THICK
8-6	022-0043	1	5/16 X 1/2 X 5/8L FLANGE BEARING
8-7	022-0047	1	3/8 X 1/2 X 1/4L BEARING
8-9	071-0013	6	10-24 X 1/2 FHCS
8-10	150-0041	1	#304 WOODRUFF KEY
8-11	340-0010	1	10-24 X 1/4 SHSS CUP POINT
8-12	460-0072	1	#11 WD FEED SCREW 5/8-24 RH
8-13	460-0090	1	WD FEED NUT, 5/8-24 RH
8-14	600-0480	1	WORM GEAR ASSY -16 DP, 20 TOOTH
8-15	600-0490	1	WORM GEAR DRIVE SHAFT ASSY
8-16	620-0636	1	WORM GEAR FEED HOUSING
8-17	620-0637	1 <td WORM GEAR DRIVE SHAFT COVER	
8-18	620-0639	1	WORM GEAR DRIVE FEED COVER PLATE
8-19	620-0641	1	HEX KNOB - 5/16 HOLE
8-8	070-0071	2	5/16-24 X 1 SHCS

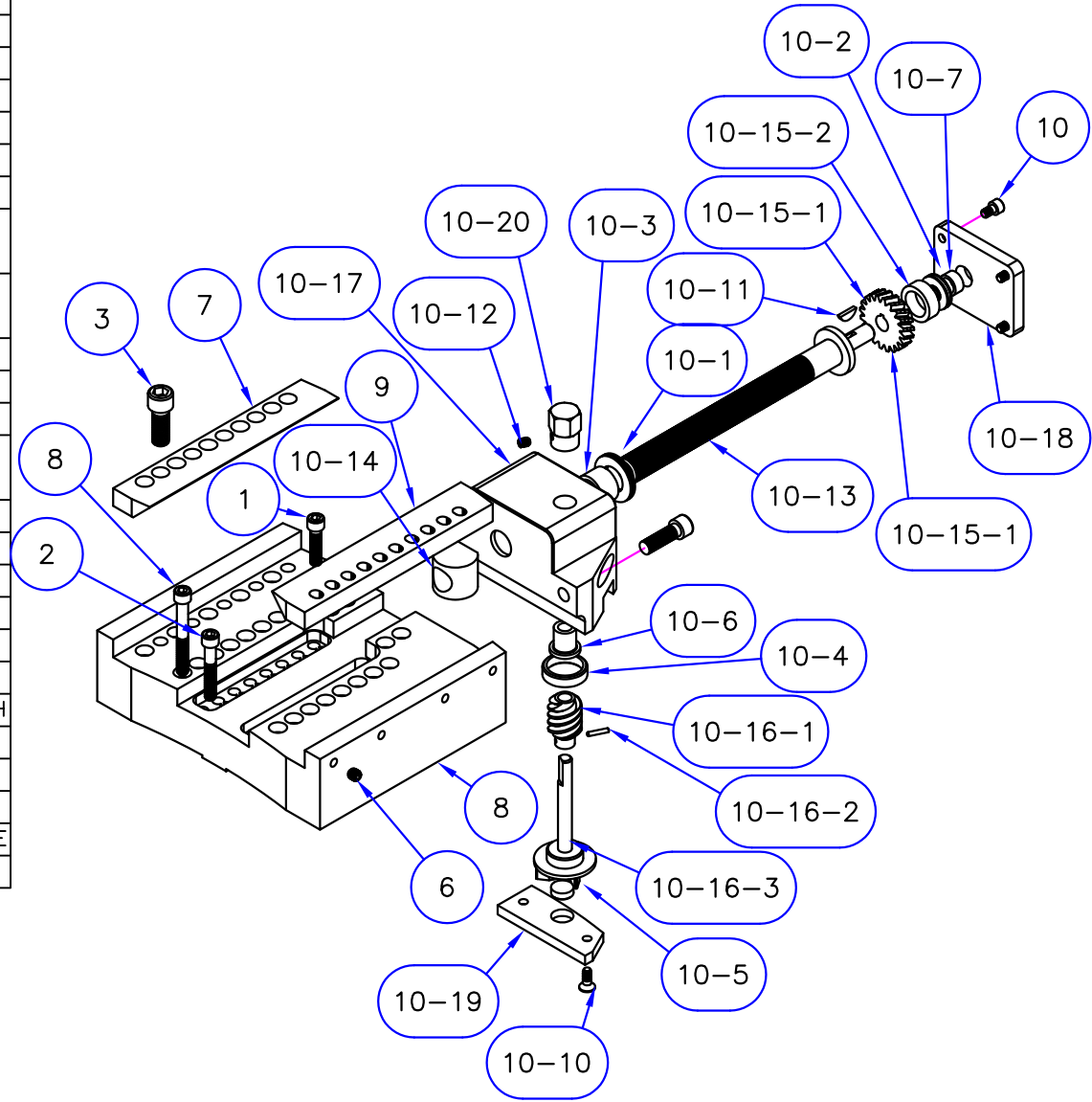


MACTECH, INC

#6 WD SLIDE ASSEMBLY 830-860

605-0189

ITEM	PART NO.	QTY	DESCRIPTION
1	070-0003	10	1/4-20 X 1 SHCS
2	070-0005	8	1/4-20 X 1-1/2 SHCS
3	070-0014	5	3/8-16 x 1 SHCS
4	070-0020	8	1/4-20 X 2 SHCS
6	340-0006	4	1/4-20 X 1/4 SHSS - CUP POINT
7	460-0092	1	#6 GIB - NON-ADJUSTABLE
8	460-0093	1	#6 SLIDE
9	460-0094	1	#6 GIB - ADJUSTABLE
10	600-0488	1	#6 WD FEED SCREW ASSEMBLY
10-8	070-0071	2	5/16-24 X 1 SHCS
10-9	070-0148	4	10-24 X 5/16 SHCS
10-1	020-0039	1	5/8 X 1-1/8 NEEDLE THRUST BEARING SET
10-2	020-0071	1	THRUST BEARING SET 3/8 X .140 THICK
10-3	022-0021	1	5/8 OIL IMP. BRONZE BEARING
10-4	022-0023	1	13/16 X 1 X .25 BEARING
10-5	022-0024	1	THRUST BEARING 1/2 X 3/16 THICK
10-6	022-0043	1	5/16 X 1/2 X 5/8L FLANGE BEARING
10-7	022-0047	1	3/8 X 1/2 X 1/4L BEARING
10-10	071-0013	2	10-24 X 1/2 FHCS
10-11	150-0041	1	#304 WOODRUFF KEY
10-12	340-0010	1	10-24 X 1/4 SHSS CUP POINT
10-13	460-0089	1	#6 WD FEED SCREW 5/8-24 RH
10-14	460-0090	1	WD FEED NUT, 5/8-24 RH
10-15	600-0480	1	WORM GEAR ASSY -16 DP, 20 TOOTH
10-16	600-0490	1	WORM GEAR DRIVE SHAFT ASSY
10-17	620-0636	1	WORM GEAR FEED HOUSING
10-18	620-0637	1	WORM GEAR DRIVE SHAFT COVER
10-19	620-0639	1	WORM GEAR DRIVE FEED COVER PLATE
10-20	620-0641	1	HEX KNOB - 5/16 HOLE



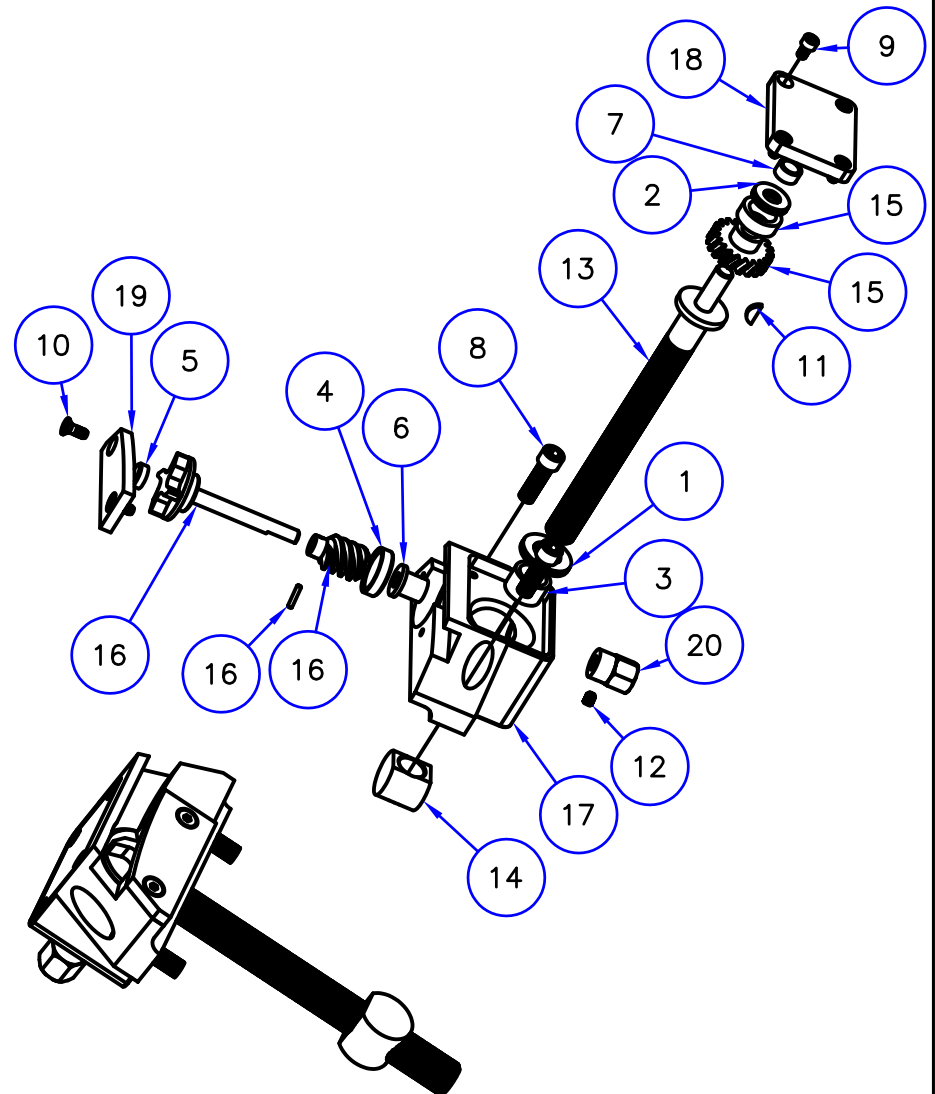
MACTECH, INC

Parts List

ITEM	PART NO.	QTY	DESCRIPTION
1	020-0039	1	5/8 X 1-1/8 NEEDLE THRUST BEARING SET
2	020-0071	1	THRUST BEARING SET 3/8 X .140 THICK
3	022-0021	1	5/8 OIL IMP. BRONZE BEARING
4	022-0023	1	13/16 X 1 X .25 BEARING
5	022-0024	1	THRUST BEARING 1/2 X 3/16 THICK
6	022-0043	1	5/16 X 1/2 X 5/8L FLANGE BEARING
7	022-0047	1	3/8 X 1/2 X 1/4L BEARING
8	070-0071	2	5/16-24 X 1 SHCS
9	070-0148	4	10-24 X 5/16 SHCS
10	071-0013	2	10-24 X 1/2 FHCS
11	150-0041	1	#304 WOODRUFF KEY
12	340-0010	1	10-24 X 1/4 SHSS CUP POINT
13	460-0089	1	#6 WD FEED SCREW 5/8-24 RH
14	460-0090	1	WD FEED NUT, 5/8-24 RH
15	600-0480	1	WORM GEAR ASSY -16 DP, 20 TOOTH
15-1	100-0072	1	WORM GEAR 16 DP, 20 TOOTH QUAD
15-2	460-0081	1	5/8 GEAR COLLAR
16	600-0490	1	WORM GEAR DRIVE SHAFT ASSY
16-1	100-0073	1	WORM 16 DP QUAD
16-2	200-0047	1	3/32 X 1/2 HARDENED DOWEL PIN
16-3	620-0638	1	DRIVE SHAFT - WORM DRIVE FEED
17	620-0636	1	WORM GEAR FEED HOUSING
18	620-0637	1	WORM GEAR DRIVE SHAFT COVER
19	620-0639	1	WORM GEAR DRIVE FEED COVER PLATE
20	620-0641	1	HEX KNOB - 5/16 HOLE

#6 WD FEED SCREW ASSEMBLY

600-0488

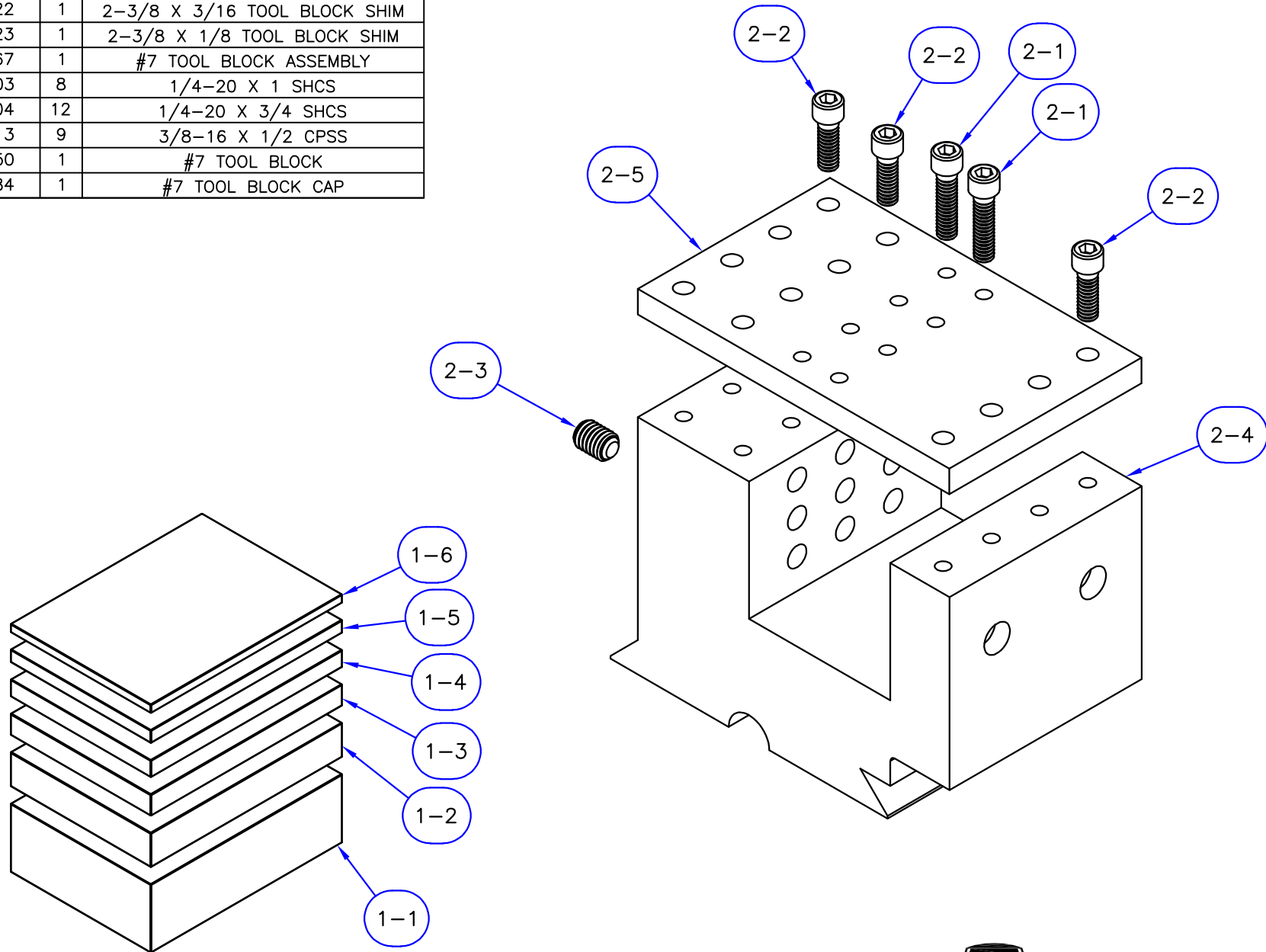


MACTECH, INC

ITEM	PART NO.	QTY	DESCRIPTION
1	600-0464	1	#7 TOOL BLOCK SHIM SET
1-1	620-0629	1	2-3/8 X 1 TOOL BLOCK SHIM
1-2	620-0619	1	2-3/8 X 1/2 TOOL BLOCK SHIM
1-3	620-0620	1	2-3/8 X 5/16 TOOL BLOCK SHIM
1-4	620-0621	1	2-3/8 X 1/4 TOOL BLOCK SHIM
1-5	620-0622	1	2-3/8 X 3/16 TOOL BLOCK SHIM
1-6	620-0623	1	2-3/8 X 1/8 TOOL BLOCK SHIM
2	600-0467	1	#7 TOOL BLOCK ASSEMBLY
2-1	070-0003	8	1/4-20 X 1 SHCS
2-2	070-0004	12	1/4-20 X 3/4 SHCS
2-3	340-0013	9	3/8-16 X 1/2 CPSS
2-4	460-0050	1	#7 TOOL BLOCK
2-5	460-0084	1	#7 TOOL BLOCK CAP

#7 TOOL BLOCK & SHIM GROUP

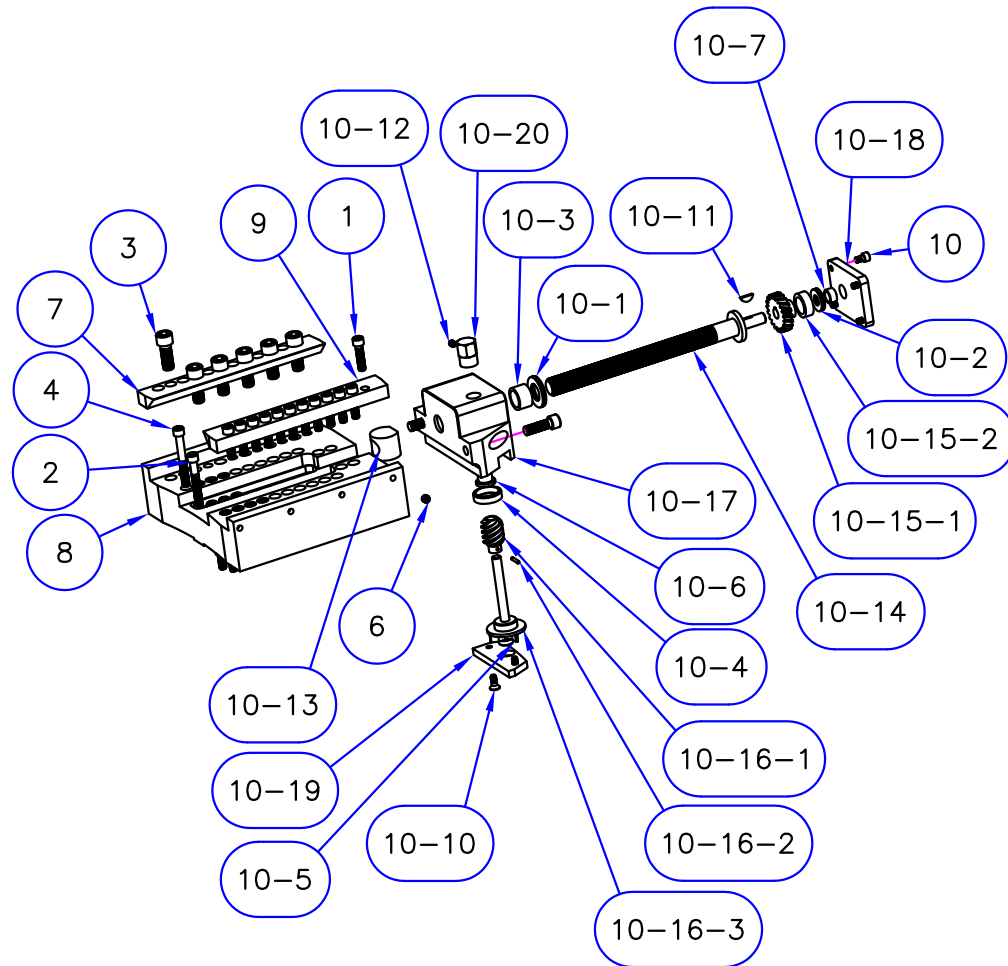
605-0146



#7 WD SLIDE ASSEMBLY 830-860

605-0190

ITEM	PART NO.	QTY	DESCRIPTION
1	070-0003	12	1/4-20 X 1 SHCS
2	070-0011	8	1/4-20 X 1-3/4 SHCS
3	070-0014	6	3/8-16 x 1 SHCS
4	070-0020	8	1/4-20 X 2 SHCS
6	340-0006	4	1/4-20 X 1/4 SHSS - CUP POINT
7	460-0051	1	#7 NON-ADJUSTABLE GIB
8	460-0052	1	#7 TOOL BLOCK SLIDE
9	460-0053	1	#7 ADJUSTABLE GIB.
10	600-1201	1	#7 WD FEED SCREW ASSEMBLY
10-8	070-0071	2	5/16-24 X 1 SHCS
10-9	070-0148	4	10-24 X 5/16 SHCS
10-1	020-0039	1	5/8 X 1-1/8 NEEDLE THRUST BEARING SET
10-2	020-0071	1	THRUST BEARING SET 3/8 X .140 THICK
10-3	022-0021	1	5/8 OIL IMP. BRONZE BEARING
10-4	022-0023	1	13/16 X 1 X .25 BEARING
10-5	022-0024	1	THRUST BEARING 1/2 X 3/16 THICK
10-6	022-0043	1	5/16 X 1/2 X 5/8L FLANGE BEARING
10-7	022-0047	1	3/8 X 1/2 X 1/4L BEARING
10-10	071-0013	2	10-24 X 1/2 FHCS
10-11	150-0041	1	#304 WOODRUFF KEY
10-12	340-0010	1	10-24 X 1/4 SHSS CUP POINT
10-13	460-0090	1	WD FEED NUT, 5/8-24 RH
10-14	460-0091	1	#7 WD FEED SCREW 5/8-24 RH
10-15	600-0480	1	WORM GEAR ASSY -16 DP, 20 TOOTH
10-16	600-0490	1	WORM GEAR DRIVE SHAFT ASSY
10-17	620-0636	1	WORM GEAR FEED HOUSING
10-18	620-0637	1	WORM GEAR DRIVE SHAFT COVER
10-19	620-0639	1	WORM GEAR DRIVE FEED COVER PLATE
10-20	620-0641	1	HEX KNOB - 5/16 HOLE



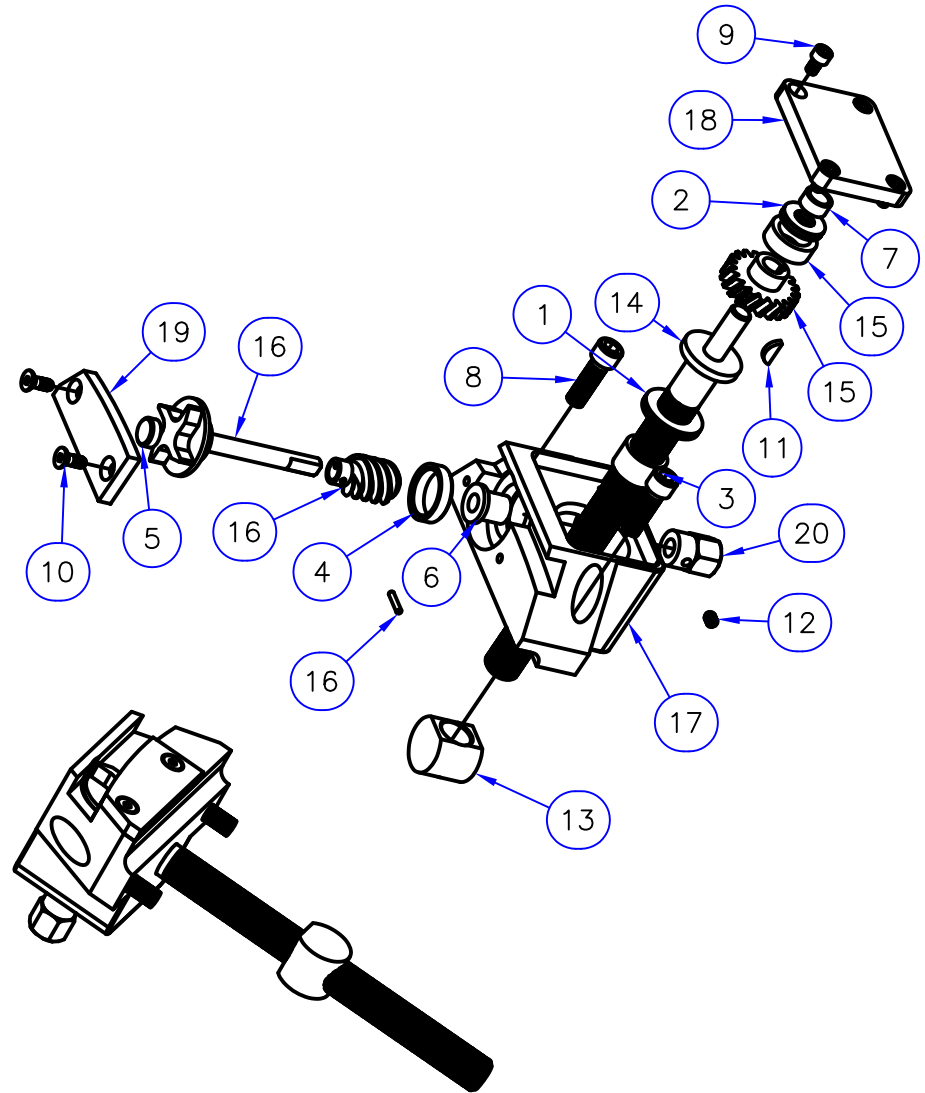
MACTECH, INC

Parts List

ITEM	PART NO.	QTY	DESCRIPTION
1	020-0039	1	5/8 X 1-1/8 NEEDLE THRUST BEARING SET
2	020-0071	1	THRUST BEARING SET 3/8 X .140 THICK
3	022-0021	1	5/8 OIL IMP. BRONZE BEARING
4	022-0023	1	13/16 X 1 X .25 BEARING
5	022-0024	1	THRUST BEARING 1/2 X 3/16 THICK
6	022-0043	1	5/16 X 1/2 X 5/8L FLANGE BEARING
7	022-0047	1	3/8 X 1/2 X 1/4L BEARING
8	070-0071	2	5/16-24 X 1 SHCS
9	070-0148	4	10-24 X 5/16 SHCS
10	071-0013	2	10-24 X 1/2 FHCS
11	150-0041	1	#304 WOODRUFF KEY
12	340-0010	1	10-24 X 1/4 SHSS CUP POINT
13	460-0090	1	WD FEED NUT, 5/8-24 RH
14	460-0091	1	#7 WD FEED SCREW 5/8-24 RH
15	600-0480	1	WORM GEAR ASSY -16 DP, 20 TOOTH
16	600-0490	1	WORM GEAR DRIVE SHAFT ASSY
17	620-0636	1	WORM GEAR FEED HOUSING
18	620-0637	1	WORM GEAR DRIVE SHAFT COVER
19	620-0639	1	WORM GEAR DRIVE FEED COVER PLATE
20	620-0641	1	HEX KNOB - 5/16 HOLE
15-1	100-0072	1	WORM GEAR 16 DP, 20 TOOTH QUAD
15-2	460-0081	1	5/8 GEAR COLLAR
16-1	100-0073	1	WORM 16 DP QUAD
16-2	200-0047	1	3/32 X 1/2 HARDENED DOWEL PIN
16-3	620-0638	1	DRIVE SHAFT - WORM DRIVE FEED

#7 WD FEED SCREW ASSEMBLY

600-1201



MACTECH, INC

ITEM	PART NUMBER	QTY	DESCRIPTION
1	020-0182	118	3/4" CAM ROLLER BEARING
2	030-0004	2	3/4-10 X 6" EYE BOLT
3	030-0005	2	1/2-13 x 5 EYE BOLT
4	061-0023	78	M10 X 25mm SHOULDER SCREW
5	070-0006	12	5/16 - 18 x 1 SHCS
6	070-0011	24	1/4-20 X 1 3/4 SHCS
7	072-0019	18	1/4 - 20 x 1/2 BHCS
8	100-0290C	1	WD CLAMSHELL MAIN BODY ASSEMBLY
8-1	040-0026	2	1/2" LOCATING PIN LINER
8-2	100-0290CA	1	WD SPLIT GEAR SET - UPPER HALF
8-3	100-0290CB	1	WD SPLIT GEAR SET - LOWER HALF
8-4	200-0102	2	1/2" BULLET NOSE DOWEL PIN
9	120-0008	8	1-8 X 1-1/2" HELICOIL
10	120-0009	78	#3 DUAL V BEARING
11	170-0006	2	1/2-13 FLANGE NUT
12	170-0007	2	3/4-10 UNC FLANGE NUT
13	200-0008	2	3/8 x 1 3/4 HARDENED GROUND PRODUCTION DOWEL PIN
14	200-0097	2	3/4 x 3 1/2 HARDENED GROUND PRODUCTION DOWEL PIN
15	205-0003	2	5/16 LOCK PIN /-1/2 L GRIP
16	480-1079	78	SPACER WASHER - 12mm X 18mm X 1mm THICK
17	600-2886	8	WD STACKABLE LOCATOR BASE ASSEMBLY
17-1	061-0005	1	3/8 X 3/8 SHOULDER SCREW
17-2	490-0030	1	1-8 X 2 JACK SCREW
17-3	620-3780	1	WD STACKABLE LOCATOR BASE
18	620-0452	4	MOTOR MOUNTING CLAMP
19	620-0601	4	US SWING BOLT BRACKET
20	620-3807	1	960WD SPLIT HOUSING ASSEMBLY
20-1	040-0002	2	FLANGED BUSHING - BULLET NOSE, 3/8
20-2	200-0002	2	LOCATING PIN - BULLET NOSE, 3/8
20-3	620-3807A	1	860WD SPLIT HOUSING SET - UPPER HALF
20-4	620-3807B	1	860WD SPLIT HOUSING ASSEMBLY - LOWER HALF
21	620-3829	1	WD CLAMSHELL DRIVE SLOT BLANK
22	630-1360	1	860WD GEAR SHIELD - MOTOR HALF
23	630-1361	1	860WD GEAR SHIELD - HOUSING HALF

860WD CLAMSHELL 600-2888C

