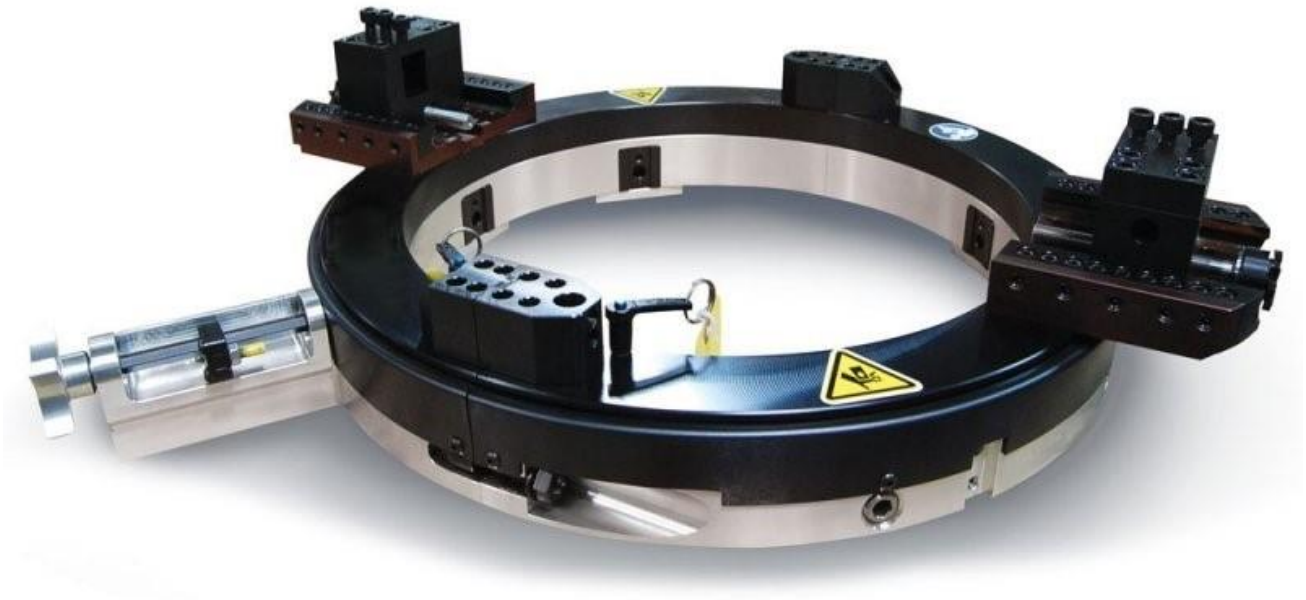

(NB) NARROW BODY CLAMSHELL

OPERATING AND MAINTENANCE MANUAL

Contents

VERSION HISTORY

Enerpac documentation is quality controlled and audited in accordance with **BS EN ISO 9001:2015**; the scope of which covers design, manufacture and repair of in-situ machine tools.

Version No.	Implemented By	Revision Date	Approved By	Approval Date	Comments
1	STH	28/03/2019	DS	28/03/2019	1st Issue
2	STH	08/2020	-	-	Enerpac rebrand
3	STH	18/05/2021	CC	18/05/2021	Updated manufacturer address and added compliance statement

Operation & Maintenance Manual Approval

The undersigned acknowledge they have reviewed this Machine Operation & Maintenance Manual and agree with the approach it presents. Changes to this Operation & Maintenance Manual will be coordinated with, and approved by, the undersigned or their designated representatives.

Approver 1

Signature: S. Thompson **Date:** 28/03/2019

Name: Shailini Thompson

Title: Document Engineer

Approver 2

Signature:  **Date:** 28/03/2019

Name: Daniel Stephens

Title: Engineering Manager

1.0 HEALTH AND SAFETY

Enerpac has made every effort to ensure that the Information given in this Operation & Maintenance manual, and other publications relating to this machine is correct and understandable. However, it is acknowledged that there may be errors or omissions in this publication.
The company also reserves the right not to provide updates, corrections or amendments to this publication but will endeavour to keep its customers up to date with all changes that may affect the machine operation or safety.

1.1 Mandatory Safety Signs

(for the purpose of trials at Enerpac)

ISO 7010 SYMBOL	SAFETY DESCRIPTION
	WEAR EYE PROTECTION
	EAR PROTECTION MUST BE WORN
	HARD HATS MUST BE WORN
	PROTECTIVE GLOVES MUST BE WORN
	PROTECTIVE FOOTWEAR MUST BE WORN
	OVERALLS MUST BE WORN
	MACHINE GUARDS MUST BE USED

1.2 Machine Hazards Signs

ISO 7010 SYMBOL	HAZARD DESCRIPTION
	DANGER HIGH VOLTAGE
	WARNING MOVING MACHINERY
	CAUTION MOVING MACHINERY
	WARNING KEEP HANDS CLEAR

1.3 Safety Procedures

Detailed in this chapter is a list of good Health and Safety practices that Enerpac advise users to adhere to. Due to the nature of portable machine tools, not every eventuality can be catered for and the following is not exhaustive, as such Enerpac strongly advise that the user carries out their own task specific risk assessments based on the machining and environment in which they intend to use the machinery

1.4 Pre-Operational Safety Checks

- Always read safety signs / labels
- Ensure no slip / trip hazards are present in workspaces and walkways
- Locate and ensure you are familiar with the operation of the ON / OFF starter and E-Stop (if fitted)
- Do not leave equipment on top of the machine
- Ensure each tool is in good condition and securely mounted
- Secure / Remove loose items
- Faulty equipment must not be used. Immediately report any suspect machinery

1.5 Operational Safety Checks

- Operator is fully conversant and trained in use of equipment
- Keep clear of moving machine parts
- Never leave the machine running unattended
- Follow correct clamping procedures - keep overhangs as small as possible and check work piece is secure
- Set the correct speed to suit the tool, the depth of cut and the material
- Before making adjustments and measurements or before cleaning swarf accumulations switch off and bring the machine to a complete standstill.

1.6 Housekeeping

- Switch off the machine
- Remove milling cutters, drill attachments and tap attachments and store them safely (if applicable)
- Leave the machine and work area in a safe, clean and tidy state

1.7 Potential Hazards

- Sharp cutters
- Moving components – hair / clothing entanglement
- Eye injury
- Skin irritation
- Metal splinters and burrs
- Flying debris

1.8 Handling

Customers, users and operators of the machines must be aware of the nature of the equipment supplied.

Although inherently robust, the machine is a precision tool and may be damaged by poor handling, tipping and falling, inadequate transport arrangements over e.g. rough terrain, misuse by operators and use outside its design specification.

Such poor handling may result in either broken or damaged parts or disturbance to fine settings resulting in an inability to meet the specified machining tolerances and capabilities.

2.0 Compliance Statement

•DLR-NB

CE These tools conform with the requirements for CE.

Enerpac declares that these products have been tested and conforms to applicable standards and is compatible to all CE Requirements.

A copy of an EU Declaration of Conformity is enclosed with each shipment of this product.

3.0 INTRODUCTION

3.1 General Description

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

3.2 Machining Function and 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
- Socket Weld Removal
- Reface Flange Faces (requires an additional attachment)

3.3 Drive Assembly

There are many different drive arrangements available for the NB Clamshells (see Fig1). Straight back drives are standard and are available in pneumatic, hydraulic, or electric motors. The front drive reversible (FDR) mount allows for forward or rearward mounting positions and can be used with the hydraulic, electric or pneumatic motor. The Right Angle Adjustable (RAA) mount allows for angularly adjustable mounting positions and can be used with pneumatic or hydraulic motors.

3.4 Tooling

Standard available tooling includes ½" X 1" sever bits and 1" X 1" bevel or sever combination bits. Enerpac stocks all standard prep configurations for right hand severing and bevelling, left hand severing and beveling and counter boring. Specialty bits with any angle of bevel or counter bore are made to order.

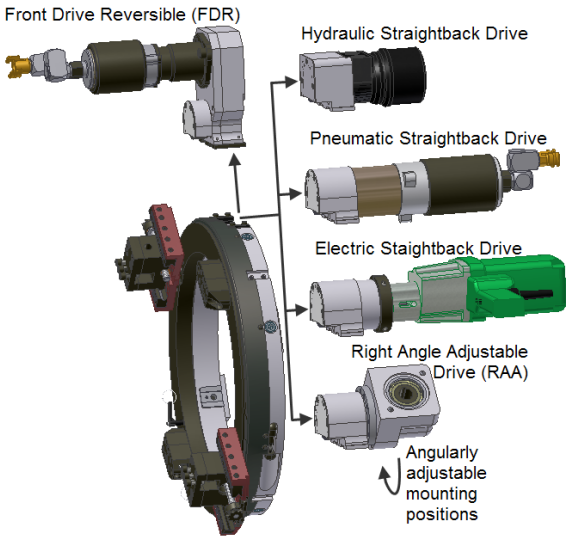

Figure 1

4.0 COMPONENTS

4.1 Housing

An aluminium split ring housing that is capable of being disassembled for installation on in-line piping. The housing has bearing mountings for the rotating cutting head, a mount for the drive motor.

4.2 Cutting Head and Assembly

Made from 4140-alloy steel, this split ring assembly will align with the split lines of the housing when the Clamshell is split into halves. The cutting head assembly has gear teeth on the outside diameter of the cutting head and mounting locations for tool block slide assemblies. An internal bearing race allows the cutting head to rotate about the housing.

4.3 Drive Assembly

The drive assembly is mounted to the housing and arranged with a pinion gear on a shaft. The motor and mounting bracket is designed to accept the reaction torque generated by the drive motor.

4.4 Bearing

The cutting head assembly runs on precision bearings mounted in the housing. The bearings are designed to provide for the axial and radial forces created during cutting operations.

4.5 Slide Assembly

The slide assembly has a tool block, which is designed to hold the cutting tool (tool bit). The slide assembly also has adjustable gibs and a feed screw assembly, which is used to feed the tool bit into the work piece. The slide assemblies are bolted to the face of the Clamshell assembly and can be adjusted in ½" increments.

4.6 Tripper Assembly

The tripper assembly is designed to hold the tripper pin. The tripper pin is used to turn the star wheel on the feed screw assembly, which "feeds" the tool bit into the work pieces. There are two different styles of tripper assemblies that may be provided with the clamshell, a sliding style and a flip style. The tripper assembly is bolted to the OD of the housing. There is 1, 3, or 4 different mounting locations (depending on the Clamshell size) that allow for more flexibility in machine mounting (see Fig. 2).

4.7 Locator Pad Assembly

The NB Clamshell uses adjustable locator pad assemblies with 3/8" of travel. Turning set screws located on the outside of the housing actuates the adjustable locators. To mount the Clamshell on smaller diameters, locator extensions are bolted to the locator pads.

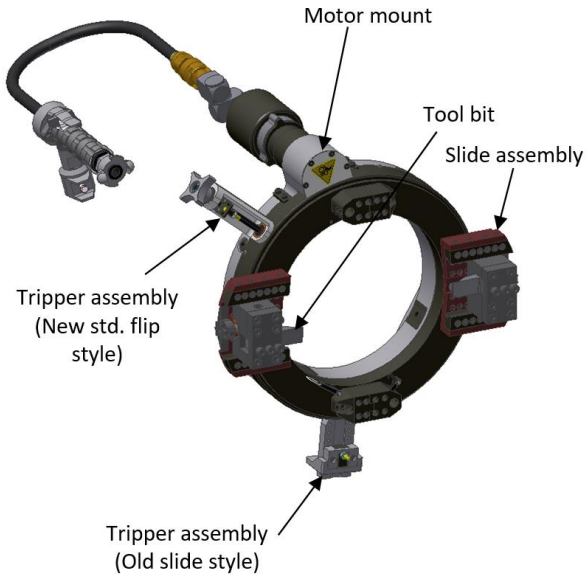

Figure 2

5.0 MACHINE WEIGHTS

The following chart lists the machine weights. Weights do not include motors or any additional components, locator extensions or attachments.

Clamshell	Weight (lbs)	Weight (Kgs)
NB4	28	13
NB6	37	17
NB8	43	19
NB10	50	23
NB12	56	26
NB14	63	29
NB16	70	32
NB18	75	34
NB20	83	38
NB24	98	44
NB26	104	47
NB28	112	51
NB30	118	54
NB32	124	56
NB36	135	61
NB39	145	66
NB40	147	67
NB43	158	72

6.0 MACHINE SET-UP

6.1 Pre-Installation Procedure

NOTE: ***Motor must be removed from the Clamshell.***

6.1.1 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 the gear 180 degrees for proper alignment.

2. Place the locking pins into the holes through the gear and housing to prevent gear rotation when the Clamshell is split. Press the top button to allow pin to slip into the hole.

3. Loosen the 2 swing bolt flange nuts in the housing and swing the bolts out of the pockets. Unscrew the 2 clamp bolts on the gear halves and separate the Clamshell halves by pulling them straight apart (see Fig. 3).

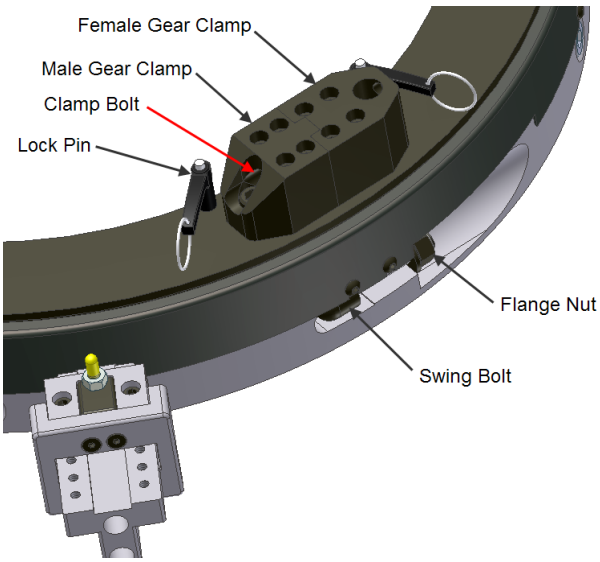

Figure 3

CAUTION: ***DO NOT FORCE THE CLAMSHELL OPEN USING TOOLS***

4. Determine pipe OD and select proper locator extensions (see charts on next page). Recommended NB locator extension ranges with standard locator. NB10 and up use ½" locator pads, NB8 and below use 3/8" pads

5. If required, bolt the locator extensions to the locator pads (see Fig. 4). The locator pads are adjusted by turning the set screws that are accessed from the outside of the housing with a 3/8" Allen wrench. Back-up the locator pads as needed for proper clearance of pipe diameter. Ensure the motor mount area will be accessible when Clamshell is tightened into place

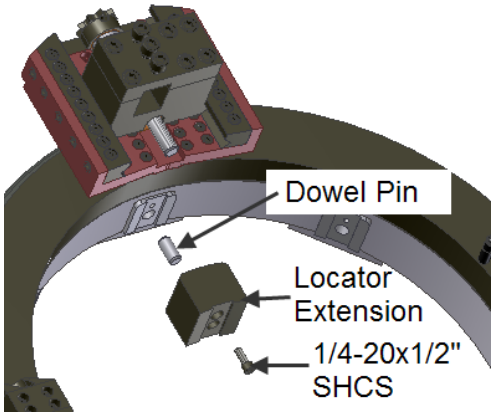

Figure 4

		NB SIZE											
		4		6		8		10		12		14	
EXTENSION	NONE	4 5/8	3 7/8	6 5/8	6	8 3/4	8 1/8	10 7/8	10 1/4	12 7/8	12 1/4	14	13 3/8
	1/4	4	3 1/4	6 1/8	5 1/2	8 1/4	7 5/8	10 3/8	9 3/4	12 3/8	11 3/4	13 1/2	12 7/8
	3/8	3 3/4	3	5 7/8	5 1/4	8	7 3/8	10 1/8	9 1/2	12 1/8	11 1/2	13 1/4	12 5/8
	1/2	3 1/2	2 3/4	5 5/8	5	7 3/4	7 1/8	9 7/8	9 1/4	11 7/8	11 1/4	13	12 3/8
	3/4	3	2 1/4	5 1/8	4 1/2	7 1/4	6 5/8	9 3/8	8 3/4	11 3/8	10 3/4	12 1/2	11 7/8
	1	2 5/8	1 7/8	4 5/8	4	6 3/4	6 1/8	8 7/8	8 1/4	10 7/8	10 1/4	12	11 3/8
	1 1/4			4 1/4	3 5/8	6 1/4	5 5/8	8 3/8	7 3/4	10 3/8	9 3/4	11 1/2	10 7/8
	1 1/2			3 5/8	3	5 3/4	5 1/8	7 7/8	7 1/4	9 7/8	9 1/4	11	10 3/8
	1 3/4			3 1/4	2 1/2	5 1/4	4 5/8	7 3/8	6 3/4	9 3/8	8 3/4	10 1/2	9 7/8
	2			2 5/8	2	4 3/4	4 1/8	6 7/8	6 1/4	8 7/8	8 1/4	10	9 3/8
	2 1/4					4 1/4	3 5/8	6 3/8	5 3/4	8 3/8	7 3/4	9 1/2	8 7/8
	2 1/2					3 3/4	3 1/8	5 7/8	5 1/4	7 7/8	7 1/4	9	8 3/8
	2 3/4					3 1/4	2 5/8	5 3/8	4 3/4	7 3/8	6 3/4	8 1/2	7 7/8
	3					2 3/4	2 1/8	4 7/8	4 1/4	6 7/8	6 1/4	8	7 3/8
	3 1/4							4 3/8	3 3/4	6 3/8	5 3/4	7 1/2	6 7/8
	3 1/2							3 7/8	3 1/4	5 7/8	5 1/4	7	6 3/8
	4							2 7/8	2 1/4	4 7/8	4 1/4	6	5 3/8

		NB SIZE											
		16		18		20		24		26		28	
EXTENSION	NONE	16	15 3/8	18	17 3/8	20	19 3/8	24	23 3/8	26	25 3/8	28	27 3/8
	1/4	15 1/2	14 7/8	17 1/2	16 7/8	19 1/2	18 7/8	23 1/2	22 7/8	25 1/2	24 7/8	27 1/2	26 7/8
	3/8	15 1/4	14 5/8	17 1/4	16 5/8	19 1/4	18 5/8	23 1/4	22 5/8	25 1/4	24 5/8	27 1/4	26 5/8
	1/2	15	14 3/8	17	16 3/8	19	18 3/8	23	22 3/8	25	24 3/8	27	26 3/8
	3/4	14 1/2	13 7/8	16 1/2	15 7/8	18 1/2	17 7/8	22 1/2	21 7/8	24 1/2	23 7/8	26 1/2	25 7/8
	1	14	13 3/8	16	15 3/8	18	17 3/8	22	21 3/8	24	23 3/8	26	25 3/8
	1 1/4	13 1/2	12 7/8	15 1/2	14 7/8	17 1/2	16 7/8	21 1/2	20 7/8	23 1/2	22 7/8	25 1/2	24 7/8
	1 1/2	13	12 3/8	15	14 3/8	17	16 3/8	21	20 3/8	23	22 3/8	25	24 3/8
	1 3/4	12 1/2	11 7/8	14 1/2	13 7/8	16 1/2	15 7/8	20 1/2	19 7/8	22 1/2	21 7/8	24 1/2	23 7/8
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	2 1/2	11	10 3/8	13	12 3/8	15	14 3/8	19	18 3/8	21	20 3/8	23	22 3/8
	2 3/4	10 1/2	9 7/8	12 1/2	11 7/8	14 1/2	13 7/8	18 1/2	17 7/8	20 1/2	19 7/8	22 1/2	21 7/8
	3	10	9 3/8	12	11 3/8	14	13 3/8	18	17 3/8	20	19 3/8	22	21 3/8
	3 1/4	9 1/2	8 7/8	11 1/2	10 7/8	13 1/2	12 7/8	17 1/2	16 7/8	19 1/2	18 7/8	21 1/2	20 7/8
	3 1/2	9	8 3/8	11	10 3/8	13	12 3/8	17	16 3/8	19	18 3/8	21	20 3/8
	4	8	7 3/8	10	9 3/8	12	11 3/8	16	15 3/8	18	17 3/8	20	19 3/8

		NB SIZE											
		30		32		36		39		40		43	
EXTENSION	NONE	30	29 3/8	32	31 3/8	36	35 3/8	39	38 3/8	40	39 3/8	43	42 3/8
	1/4	29 1/2	28 7/8	31 1/2	30 7/8	35 1/2	34 7/8	38 1/2	37 7/8	39 1/2	38 7/8	42 1/2	41 7/8
	3/8	29 1/4	28 5/8	31 1/4	30 5/8	35 1/4	34 5/8	38 1/4	37 5/8	39 1/4	38 5/8	42 1/4	41 5/8
	1/2	29	28 3/8	31	30 3/8	35	34 3/8	38	37 3/8	39	38 3/8	42	41 3/8
	3/4	28 1/2	27 7/8	30 1/2	29 7/8	34 1/2	33 7/8	37 1/2	36 7/8	38 1/2	37 7/8	41 1/2	40 7/8
	1	28	27 3/8	30	29 3/8	34	33 3/8	37	36 3/8	38	37 3/8	41	40 3/8
	1 1/4	27 1/2	26 7/8	29 1/2	28 7/8	33 1/2	32 7/8	36 1/2	35 7/8	37 1/2	36 7/8	40 1/2	39 7/8
	1 1/2	27	26 3/8	29	28 3/8	33	32 3/8	36	35 3/8	37	36 3/8	40	39 3/8
	1 3/4	26 1/2	25 7/8	28 1/2	27 7/8	32 1/2	31 7/8	35 1/2	34 7/8	36 1/2	35 7/8	39 1/2	38 7/8
	2	26	25 3/8	28	27 3/8	32	31 3/8	35	34 3/8	36	35 3/8	39	38 3/8
	2 1/4	25 1/2	24 7/8	27 1/2	26 7/8	31 1/2	30 7/8	34 1/2	33 7/8	35 1/2	34 7/8	38 1/2	37 7/8
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	2 3/4	24 1/2	23 7/8	26 1/2	25 7/8	30 1/2	29 7/8	33 1/2	32 7/8	34 1/2	33 7/8	37 1/2	36 7/8
	3	24	23 3/8	26	25 3/8	30	29 3/8	33	32 3/8	34	33 3/8	37	36 3/8
	3 1/4	23 1/2	22 7/8	25 1/2	24 7/8	29 1/2	28 7/8	32 1/2	31 7/8	33 1/2	32 7/8	36 1/2	35 7/8
	3 1/2	23	22 3/8	25	24 3/8	29	28 3/8	32	31 3/8	33	32 3/8	36	35 3/8
	4	22	21 3/8	24	23 3/8	28	27 3/8	31	30 3/8	32	31 3/8	35	34 3/8

6.1.2 Positioning the Tool block slide

Note -There are two styles of slides. Clamshells that are manufactured after 12/31/2013 are supplied with the Quick Slide, which makes for fast setup and adjustment (see Figure 4a).

Clamshells manufactured prior to the above date were supplied with the slides shown in figure 4b.

Make sure the slide assemblies are positioned so they clear the work piece but are as close to the OD as possible (see Fig. 5a & 5b).

6.1.3 Setup for Quick Slide (5a)

1. The slides can be moved by loosening the 4 clamp screws (3/8”-16 SHCS). The slide can be repositioned in ½” increments as marked on the side of the slide assembly.

2. Re-tighten the screw once the slide is in the desired location.

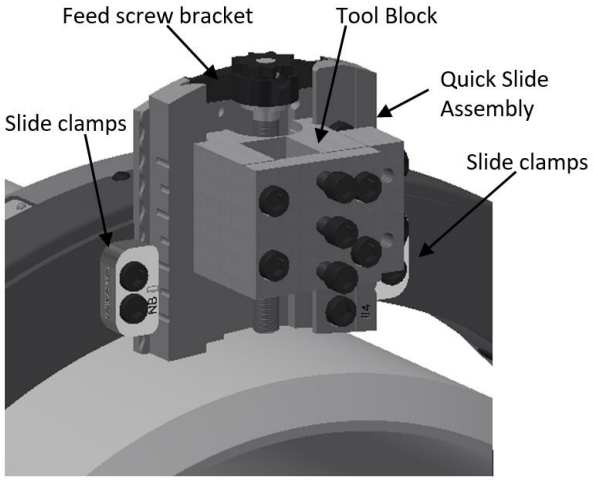


Figure 5a
(New Quick Slide design)

6.1.4 Setup of old style slide (5b)

1. The slides can be moved by removing the feed screw bracket, tool block, and 12 socket head cap screws (1/4”-20).

2. Reposition the slide base, reinstall the screws, tool block and feed screw bracket.

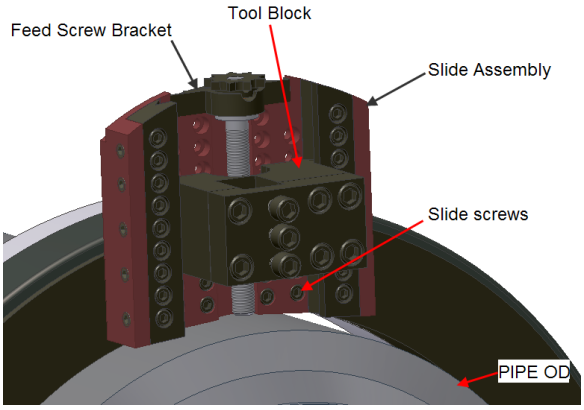


Figure 5b
(Old slide design)

6.1.5 Positioning the Tripper pin

Note – there are two different styles of tripper assemblies. The new flip style and an older sliding version. The following instructions will cover both setups.

6.1.6 Setup for Flip Style Tripper

1. Remove the lock pin and rotate the gear until the star wheel on the slide is over the Tripper assembly (see Fig. 6).

2. Loosen the set screw that clamps the tripper slide to the hex shaft and loosen the two button head screws.

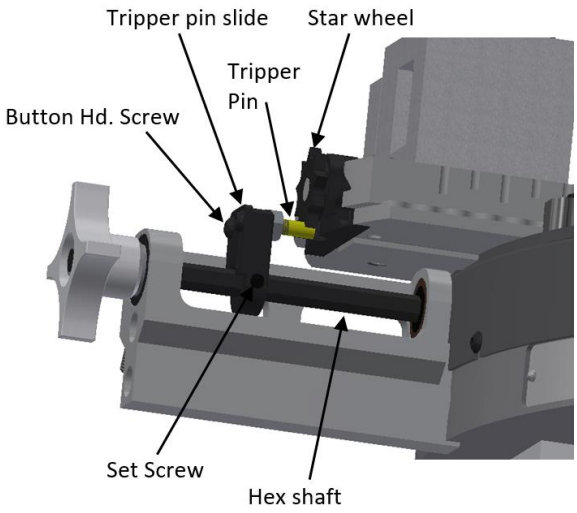
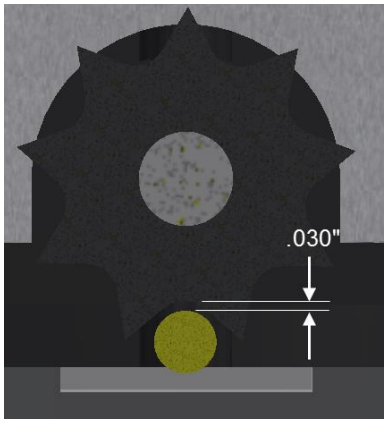


Figure 6
(New flip tripper style)

3. Position the tripper pin so that the pin makes full contact with width of the star wheel and is .030” away from the root diameter of the star.



4. Tighten the set screw and two button Hd. Screws to secure the tripper pin in position.

5. Rotate the gear back and forth over the pin to verify the star wheel indexes properly.

6.1.7 Setup for Old tripper style

Remove the lock pin. Push the handle of the tripper pin assembly in so the tripper pin is in the “engaged” position. If the tripper pin does not line up with the star wheel, reposition the handle. After the tripper pin height is set, check the tripper pin length (see Fig. 7). The end of the tripper pin should be spaced .030” away from the cavity between 2 of the points of the star wheel. Lift the handle to disengage the tripper pin and reinsert the lock pin.

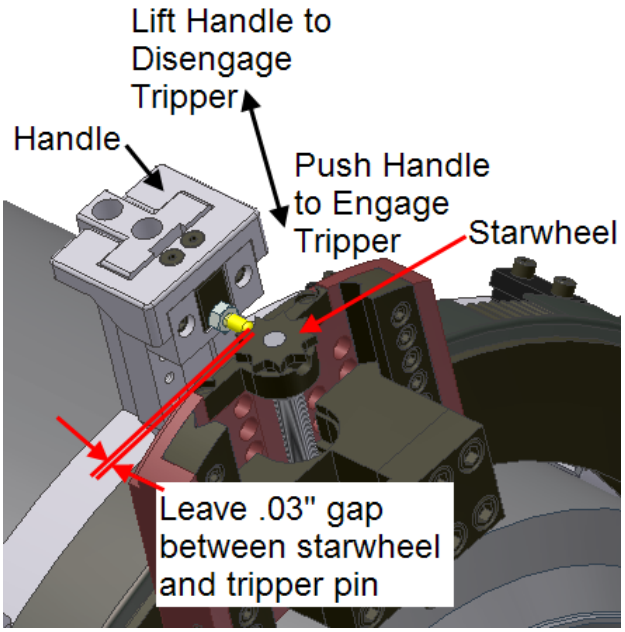


Figure 7
(Old sliding tripper style)

7.0 INSTALLATION ON IN-LINE PIPE

7.1 Joining Clamshell Halves

1. Install the 2 halves of the Clamshell around the pipe and tighten the housing bolts and the clamp bolts on the gear (see Fig. 8).

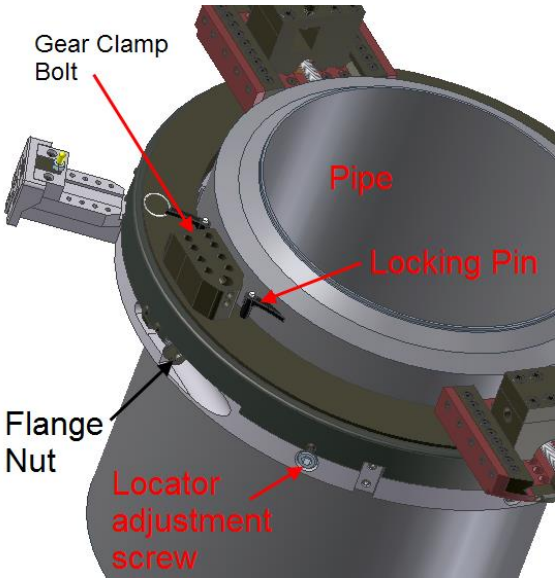


Figure 8

Note: If Clamshell will not close, check locator pads for proper size and clearance. Adjust the locators if necessary.

2. Lightly tighten two adjustable locator pads directly across from each other (locators 1 and 2 in Fig. 9), just enough to secure the Clamshell while trying to keep it centered on the work piece.

   Lightly tighten two more locator pads that are directly across from each other and close to 90 degrees away from the first set of locators (locators 3 and 4 in Fig. 9). DO NOT TIGHTEN down completely until the Clamshell has been both squared and centered to the pipe.

7.2 Squaring & Centering

1. Squaring: Place a square on the back of the Clamshell, directly in line with a locator, hold the square against the housing and the work piece and square the machine to the pipe at four locations around the pipe (see Fig 9).

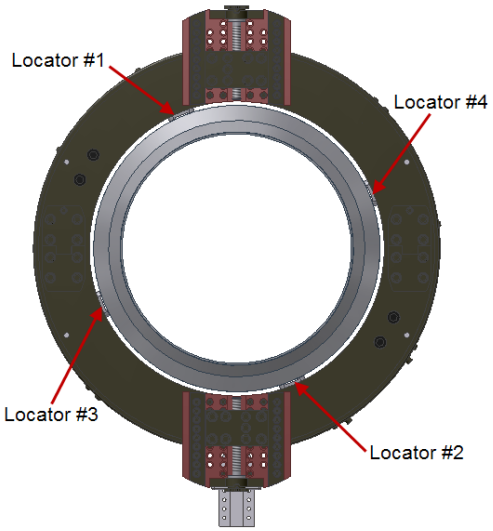


Figure 9

2. Centering: Using a 6” scale, measure the distance from the work piece to the Clamshell ID at the four lightly tightened locator positions. Tighten the four locators so the 6-inch scale reads the same at all four positions. Pull out the locking pins so the Clamshell gear can rotate.

3. Mount a dial indicator on the gear face with the tip resting on the work piece OD. Turn the gear so the indicator is positioned over one of the tighten locators (locator 1) and set the dial to zero. Slowly rotate the gear 180 degrees to another locator (locator 2) and take an indicator reading. If the reading is not zero, adjust the locators until the indicator reads one-half of the original reading. Reset the indicator dial to zero and repeat. If the Clamshell cannot be centered, different locators are required.

4. Rotate the gear so the indicator is positioned over another locator (locator 3) and set the dial to zero. Slowly rotate the gear 180 degrees to another locator (locator 4) and take an indicator reading.

If the reading is not zero, adjust the locators until the indicator reads one-half of the original reading. Reset the indicator dial to zero and repeat. The first two locators may need to be slightly loosened in order to zero the Clamshell to the work piece.

5. Repeat steps 3 and 4 for all of the other locators. Most thin wall pipes are out of round; therefore a zero reading all the way around may not be possible.

7.3 Setting Tool Bits

1. Prior to installation of tool bits, determine which tool bits must be used for your specific machining operation.

NOTE: The Clamshell cuts in a clockwise direction, when viewed at its face. There are right hand and left hand bevel and sever bits, right hand bits bevel on the side which the Clamshell is mounted, left hand bits bevel on the opposite side.

2. Using the star wheel wrench, back the tool blocks away from the pipe, to allow enough room for the tool bits to pass completely through the pipe without running the tool blocks into the work piece. Disengage the feed pin on the tripper bracket.

3. Insert proper beveling and severing bits so that the tip touches the pipe OD and stems from the center of the tool block. Hold the bit with one cap screw, snug but not tight.

4. Manually rotate the cutting head counter-clockwise 1 revolution. This reverse action will put the tool bits away from any high spots in the pipe that could cause tool damage. After one complete revolution has been made tighten the cap screws on both tool blocks. Back the bevel bit 1/32” away from the work piece with the star wheel wrench (see Fig. 10)

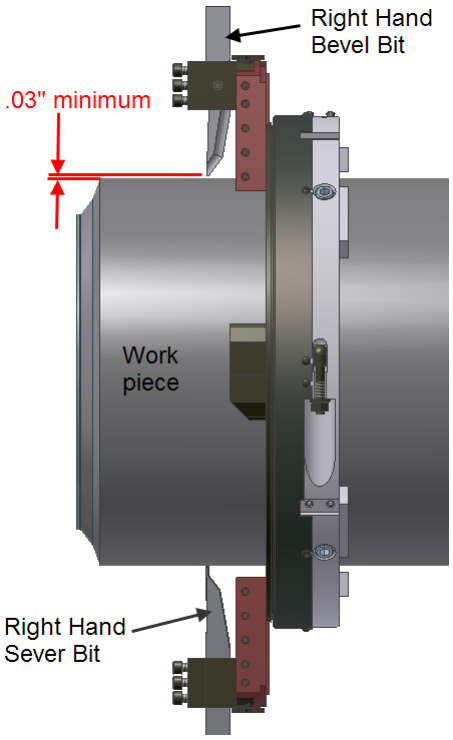


Figure 10

NOTE: Always cut with the sever bit leading the bevel bit by 1/32” in depth of cut.

7.4 Motor Installation

CAUTION: Both locking pins must be removed from the gear face before installing the motor, and all power must be turned off.

1. Loosen the four motor mount clamp screws. Position the motor mount toward the rear of the Clamshell (see Fig. 11).

2. Slide the motor mount under the motor mount clamps and slide the motor forward until the back of the motor mount is flush with the back of the Clamshell housing. If the motor mount does not slide in all the way, rotate the cutter head to align the gear teeth. Tighten the motor mount cap screws.

NOTE: If the motor does not engage, check to make sure the two gears are properly aligned. Rotate the cutting head by hand if necessary to align gear teeth.

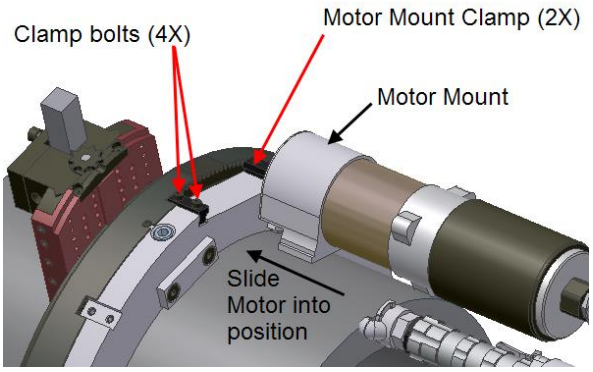


Figure 11

8.0 MACHINE OPERATION

CAUTION: ***To prevent damage to the tool bit, the pipe to be cut must be rigged properly to keep the tool bits from binding when the pipe is severed. Improperly rigged piping may result in personal injury.***

CAUTION: ***The operator should take a stance in relation to the cutting application that minimizes the risk of falling or ejected objects.***

8.1 Severing In-Line Pipe

1. Follow set-up procedures, replacing the bevel bit with another sever bit. Back up both bits (out approx. 1/32”). Attach drive motor to the Clamshell, disengage tripper pin, and open the control valve slowly to check function and speed.

NOTE: ***If the tool blocks do not move smoothly in the slides during the test rotation the adjustable gibs may need adjustment.***

CAUTION: ***The cutting operation is continuous until terminated by the operator. To stop the cutting feed during rotation, disengage the tripper pin and let the machine rotate a few times to clear the tool bit. Turn off the power to stop Clamshell rotation. Letting the tool bit clear will prevent tool damage and gouging.***

2. Engage the feed pin by pushing down on the tripper handle, after machine has been started. Each rotation will advance the tool bits approx. .003 with the tripper pin engaged. Use the tripper pin to advance the feed of the tool bits until both of the tool bits are cutting. If chatter or vibration occurs, reduce cutting RPM. If the tool bits chip or become dull, replace them immediately with sharp bits. Use coolant during the cutting operation to reduce friction on the cutting edge.

   The following noise levels were recorded during the operation of the machine:

Hydraulic noise level

- Background noise - 66 dB
- 106 dB at machine
- 101 dB at 5’ from machine
- 96 dB at 10’ from machine

Pneumatic noise level

- 4800 motor
- Background noise 66 dB
- 108 dB at machine
- 105 dB at 5’ from machine
- 94 dB at 10’ from machine

3. Stop the machine when the severing is complete. Back out the tool blocks with the star wheel wrench to the full position.

CAUTION: Never try to re-sharpen the tool bits. They must be sent back to the factory for regrinding to maintain proper relief angles. Improperly ground tool bits can cause damage to the machine.

8.2 Severing and Beveling In-Line Pipe

Follow tool bit set-up procedures replacing both sever bits with either left hand or right hand SEVER, BEVEL combinations. Back the BEVEL bit up 1/32" above the sever bit and follow the procedures above, until the pipe is severed and beveled.

9.0 I.D. BORING

9.1 Counter Bore Attachment

The counter bore attachment comes with either a 6" or 10" long counter bore tube. The counter bore attachment can also be used for flange facing, OD beveling and flange face grooving.

1. Square and center the Clamshell on the work piece. Disengage the tripper pin. Remove the cap from the tool block on one slide assembly. Bolt the counter bore attachment to the tool block.

2. Insert the counter bore bit into the counter bore bar. The cutting side of the bit should face the set screws in the bar (see Fig. 12).

3. Adjust the counter bore tube height and lock into place. Use the star wheel wrench and the hand wheel to position the tool bit at the edge of the inner wall of the work piece.

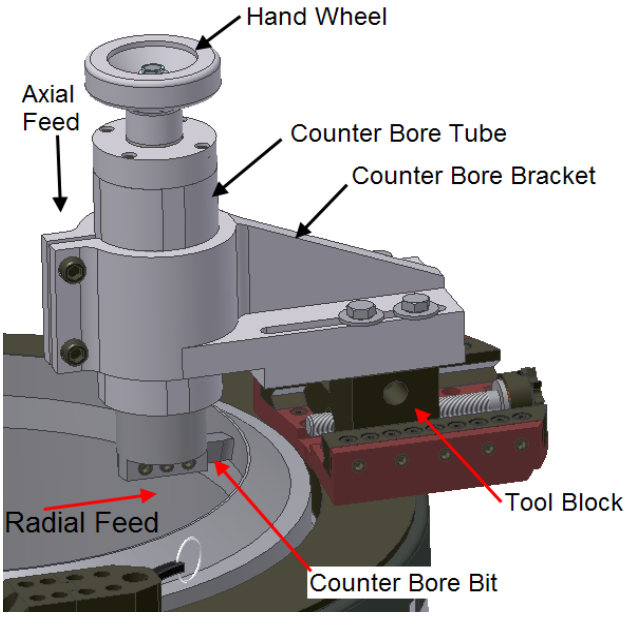


Figure 12

4. Install the motor and start the machine. Feed the tool bit axially by turning the hand wheel counter-clockwise approximately ¼ turn for every revolution of the Clamshell. Continue to feed until the correct counter bore depth is reached. Turn the hand wheel clockwise to back the tool bit up to make another cut. Stop the machine.

5. Use the star wheel wrench to radially position the counter bore attachment. Start the machine and feed the tool bit axially by turning the hand wheel. Continue to feed until the cut blends into the previous cut. Stop the machine.

6. Repeat step 3 until the desired counter bore diameter is reached.

9.2 Swivel Head Attachment

The swivel head attachment comes with either a 6” or 10” long counter bore tube. The swivel head attachment can also be used for flange facing, OD beveling and flange facing grooving.

1. Square and center the Clamshell on the work piece. Disengage the tripper pin. Remove the cap from the tool block on one slide assembly. Bolt the swivel head attachment to the tool block.

2. Insert the facing bit into the counter bore bar. The cutting side of the bit should face the setscrews in the bar (see Fig. 13). Loosen the lock down screws and swivel the counter bore to match the desired counter bore profile. Tighten the lock down screws. Adjust the counter bore tube height and lock into place with the setscrews on the flat of the counter bore tube. Use the star wheel wrench and the hand wheel to position to counter bore attachment at the edge of the inner wall of the work pieces.

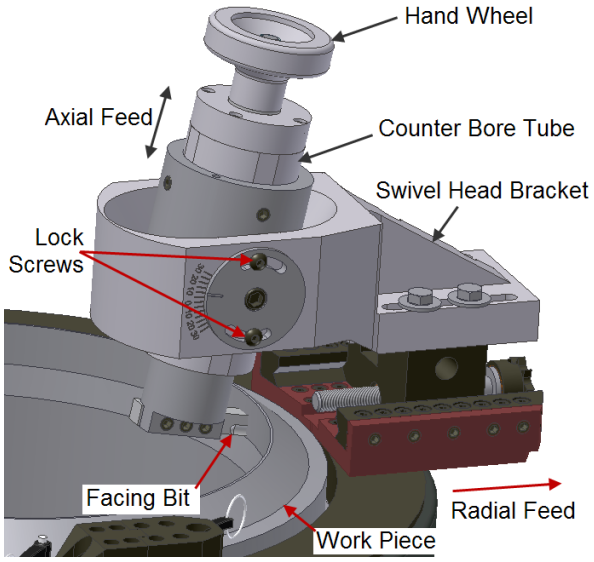


Figure 13

3. Install the motor and start the machine. Feed the tool bit axially by turning the hand wheel counter-clockwise approximately ¼ turn for every revolution of the Clamshell. Continue to feed until the correct counter bore depth is reached. Turn the hand wheel clockwise to back the tool bit up to make another cut. Stop the machine.

4. Use the star wheel wrench to radially position the counter bore attachment. Start the machine and feed the tool bit axially by turning the hand wheel. Continue to feed until the cut blends into the previous cut. Stop the machine.

5. Repeat step 4 until desired counter bore diameter is reached.

10.0 FLANGE FACING

10.1 Single Point Head Attachment

The single point attachment comes with either a 6” or 10” long counter bore tube. The single point attachment can also be used for ID boring, OD beveling and flange face grooving.

1. Square and center the Clamshell on the work piece. Disengage the tripper pin. Remove the cap from the tool blocks on both slide assemblies. Remove the feed screws assembly from one slide assembly. Bolt the swivel head attachment to the tool block with the slotted end of the bar pointing toward the slide assembly that has the feed screw assembly (see Fig. 14).

2. Insert the facing bit into the bore bar. The cutting side of the bit should face the set screws in the bar (see Fig. 14). Adjust the counter bore tube height and lock into place. Slide the single point attachment into position along the bar and tighten the 2 set screws to lock it in place. Tilt the counter bore tube to the desired angle and lock by tightening the 4 hex bolts on the single point attachment. Use the star wheel wrench and the hand wheel to radially and axially position the tool bit at the edge at the outer wall of the flange. Install the motor.

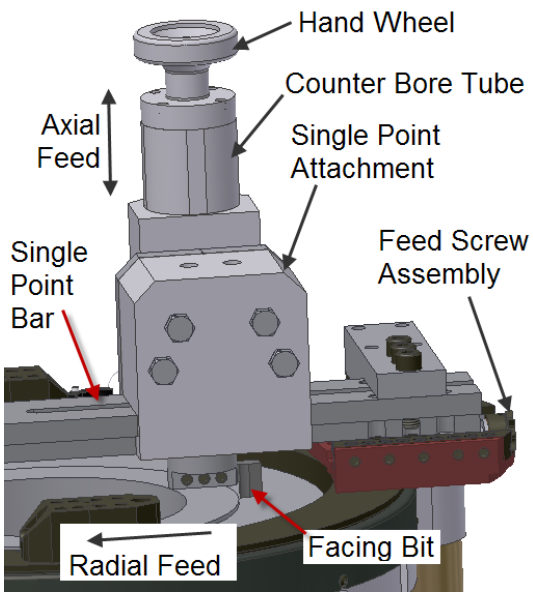


Figure 14

3. Start the machine. Engage the tripper pin to feed the tool bit radially. When the tool bit has travelled across the entire surface that needs to be faced, disengage the tripper pin and turn the hand wheel to lift the tool bit away from the surface. Stop the machine.

4. Use the star wheel wrench to radially position the tool bit at the flange OD. Turn the hand wheel to axially position the tool bit up to make another cut.

5. Repeat steps 3 and 4 until the flange face is flat.

11.0 MACHINE MAINTENANCE

We recommend that in the event of failure or of general maintenance, the Clamshell is returned to Enerpac, where our experience Service Technicians and Engineers can carry out the necessary repairs.

CAUTION: ***Disconnect the power source prior to cleaning or making adjustments to the machine.***

11.1 Adjusting Tapered Gibs on the Tool Block Slide

NOTE: ***Each tool block slide has tapered gibs, which may be adjusted for wear after heavy use. It must always fit exactly parallel to the slide for proper feed screw action.***

1. Remove the two socket head screws holding the star wheel and feed screw assembly into place on the back of the slide.

2. Pull out the tool block and feed screw assembly. Remove the feed screw assembly from the feed nut pocket on the tool block (usually this is a tight fit). Replace the tool block into the slide. Put a tool bit into the tool block and tighten it down. *Always adjust the gibs with a tool bit installed.*

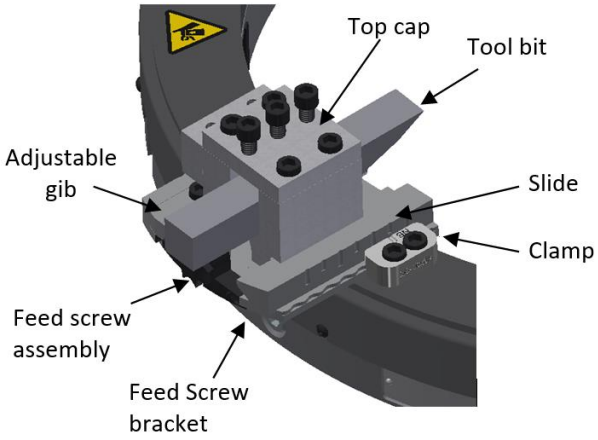


Figure 15 – Quick Slide

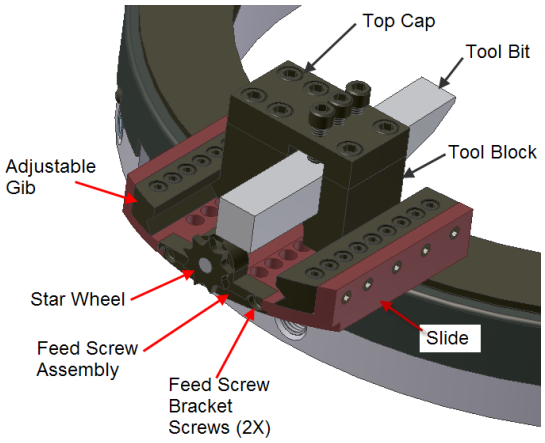


Figure 16 – old style slide

1. Slide the tool block up and down by hand in the slide, adjust the side set screws until a snug fit is achieved with no sideways slop, yet not binding.

2. Remove the tool block; replace the feed screw assembly and tool block. Secure the feed screw assembly with two socket head screws. Using the star wheel wrench, move the tool block up and down the slide to check for a proper fit (***moving easily yet snug)***.

- **11.2 Cleaning and Inspecting the Drive Gear and Housing**

1. Remove the motor and any attachments from the clamshell.

2. Install the locking pins in both halves of the clamshell. Place the clamshell on a flat surface with the gear facing up. Split the machine in half. Check the split line surfaces for burrs, debris or damage.

3. Remove the locking pin from the half being serviced. Remove the gear from the housing by rolling it off of the bearings.

4. With the bearings now exposed, use a clean rag to wipe off the bearings. Inspect the bearings for debris and swarf and remove if present. Inspect the bearings for damage and replace if necessary (see Bearing Replacement section).

5. Clean the housing. Inspect the housing for deformation, cracking or pitting and replace it if necessary.

6. Place the gear face down on a flat surface. Use a clean rag to clean off the bearing races. Inspect the bearing races for damage. Inspect the gear for deformation, cracking or pitting and replace it if necessary.

7. Lubricate the bearings as described in the Machine Lubrication section.

8. Roll the gear on to the housing. Install the locking pin.

9. Repeat steps 1 -8 for the other half of the clamshell.

11.3 Machine Lubrication

Slides – lubricate all moving parts, with the exception of the feed screw, with copper anti-seize after every 50 hours of operation.

Feed Screws – lubricate feed screw threads after every 50 hours of operation. Use LPS 70606 thermaplex multipurpose bearing grease or equivalent. DO NOT USE ANTI-SEIZE ON THE FEED SCREW.

Housing bearings – Lubricate the clamshell bearings after every 50 hours of operation using bearing greaser (part #500-1258). Use LPS 70606 thermaplex multipurpose bearing grease or equivalent.

Air motor – An in-line oiler lubricates the air motor. Adjust the drip rate of the oiler by turning the valve located on top of the reservoir using a 5/32” allen wrench. Set the drip rate to 3-6 drips per minute. Use the site gage located on the side of the reservoir to ensure an adequate level of lubrication before running. An in-line moisture separator is used to remove water from the supply air. Check reservoir levels frequently and drain as needed.

For additional air motor maintenance instructions, refer to the manufacturer’s instructions.

11.4 Bearing Replacement

1. Remove a broken or damaged bearing by unscrewing the flat head cap screw located at the top of the bearing with a 5/32” allen wrench.

2. If the flat head cap screw unscrews from the bearing post, remove the bearing sleeve by prying it up away from the clamshell housing. Clamp a vise grip onto the bearing post and unscrew the post from the housing.

3. Remove any debris from the hole.

4. Apply red Loctite 262 to the threads of the new bearing. Use 5/32” Allen wrench to screw the bearing into the housing. Torque the bearing screw 90-110 in-lbs.

11.5 Storage

Thoroughly clean and lubricate the clamshell if it will be stored or unused for 30 days or more. Apply a rust inhibitor to the exposed surfaces

11.6 Handling and Transport

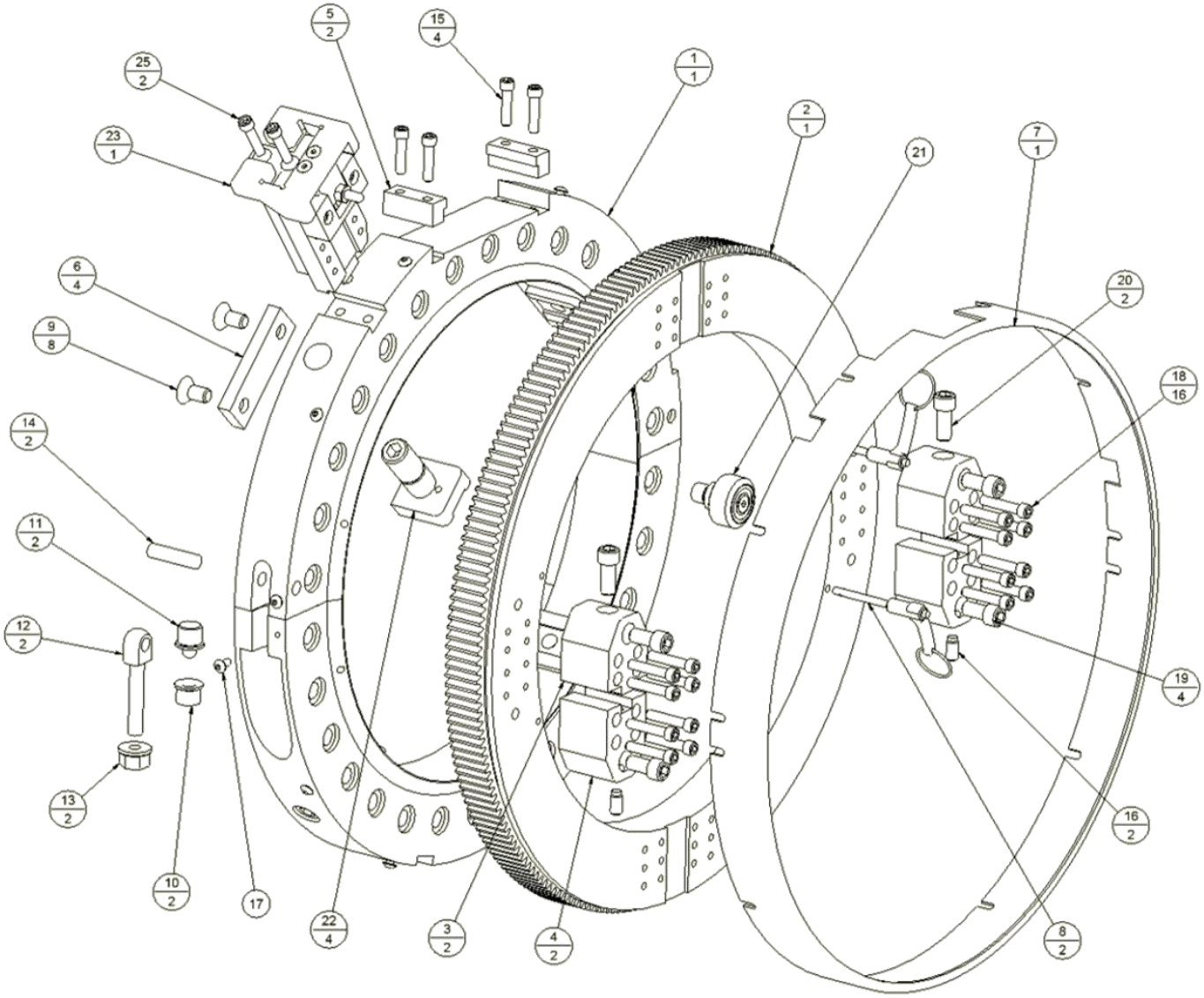
1. Larger diameter machines within this range of product are equipped with threaded holes in which lifting fixtures must be secured for the purpose of transport.

2. If no lifting fixture is supplied, precautions should be taken not to damage components.

3. Make sure that equipment is packed in a manner as to avoid damage during shipment or storage

12.0 PART NUMBERS AND DRAWINGS

12.1 NB4-NB12 Diagram



12.2 Chart 1 - NB4-NB12 common parts

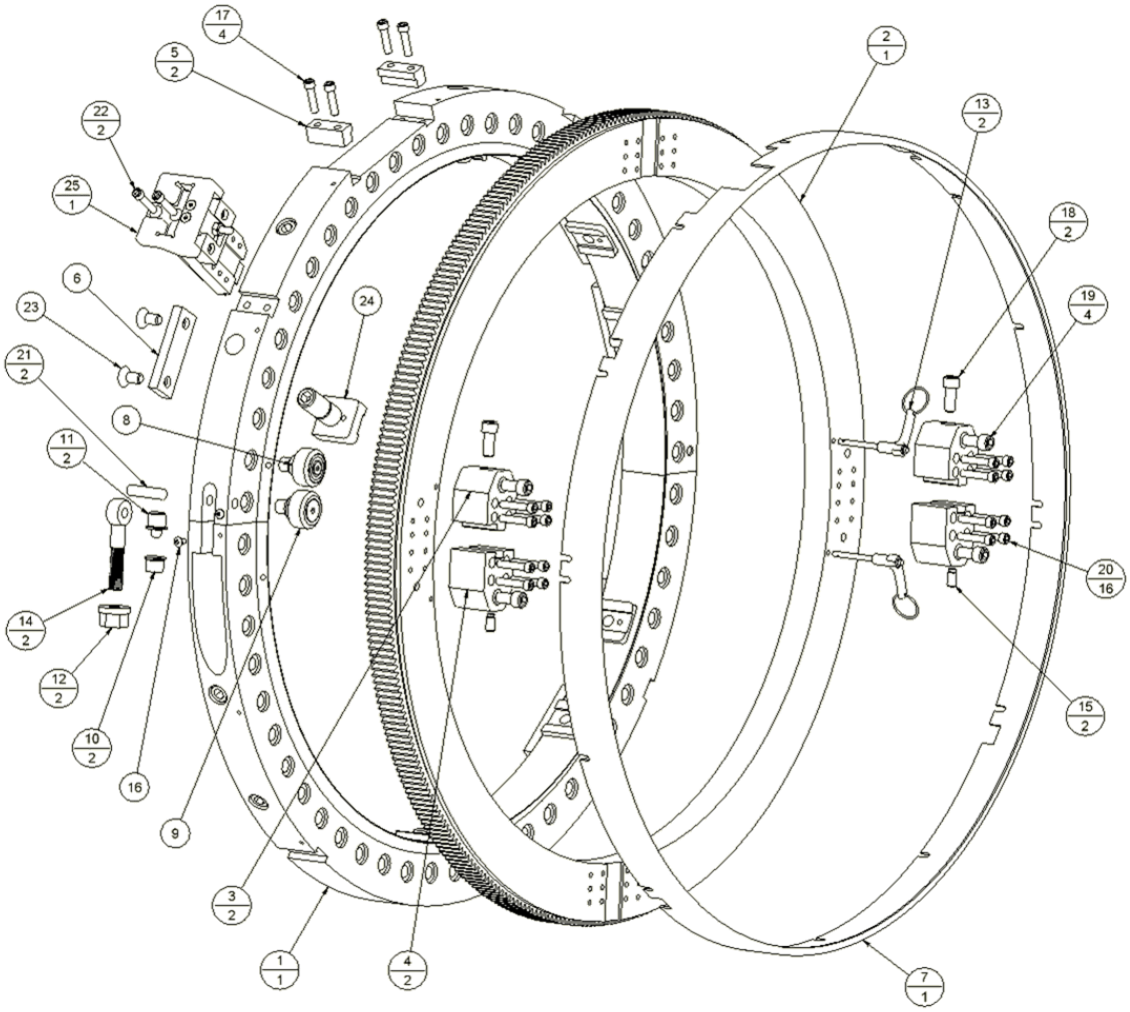
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	006AA00xxxx	HOUSING - NB
2	1	006BN00xxxx	GEAR - NB
3	2	006BL0034404	GEAR CLAMP - MALE
4	2	006BL0034397	GEAR CLAMP - FEMALE
5	2	006BA0033632	BRACKET - NB MOTOR MOUNT LOCK
6	See Chart 2	006BL0034381	CLAMP - NB LOCATOR
7	1	006AU00xxxx	GEAR SHIELD - NB
8	2	017AM0035244	LOCKING PIN - NB
9	See Chart 2	001BT0044246	FHCS - 3/8-16 X 3/4
10	2	006AM0038832	DOWEL - FEMALE BULLET NOSE
11	2	006AM0038833	DOWEL - MALE BULLET NOSE
12	2	See Chart 2	SWING BOLT
13	See Chart 2	001NA0035243	FLANGE NUT
14	2	017AA0035256	DOWEL - .375 X 1.5
15	4	001AE0037294	SHCS 1/4-20 1
16	2	001DE0035937	S.S.S - 5/16-18 X 5/8 DOG
17	See Chart 2	001CE0035253	B.H.C.S. 10-24 X 3/8
18	16	001AE0036526	SHCS 1/4-20 X 1 1/4
19	4	001AE0035939	SHCS 3/8-16 X 3/4
20	2	001AE0035938	SHCS 3/8-16 X 7/8
21	See Chart 2	006AW0035235	BEARING - NB BALL
22	See Chart 2	F0120A0014XX	LOCATOR ASSEMBLY - NB 1/2
23	1	F0145A1189XX or F0145A0024XX	TRIPPER PIN ASSEMBLY - NB

12.3 Chart 2 – NB4 – 12 Parts list – for Clamshell dependent quantities

(Use with NB4 – 12 Clamshell Diagram)

	ITEM	***QUANITY***	***PART #***	***DESCRIPTION***
	6	4	006BL0034381	CLAMP NB LOCATOR
	9	8	001BT0044246	FHCS - 3/8-16 X 3/4
NB 4	12	2	001GK0035238	SWING BOLT 3/8-16
	13	2	001NM0035239	FLANGE NUT 3/8-16
	17	9	001CE0035253	B.H.C.S. 10-24 X 3/8
	21	16	006AW0035235	BEARING - NB BALL
	22	4	F0120A0113XX	LOCATOR ASSEMBLY - NB 1/2
	6	4	006BL0034381	CLAMP NB LOCATOR
	9	8	001BT0044246	FHCS - 3/8-16 X 3/4
NB 6	12	2	001GK0035238	SWING BOLT 3/8-16
	13	2	001NM0035239	FLANGE NUT 3/8-16
	17	8	001CE0035253	B.H.C.S. 10-24 X 3/8
	21	20	006AW0035235	BEARING - NB BALL
	22	4	F0120A0113XX	LOCATOR ASSEMBLY - NB 1/2
	6	4	006BL0034381	CLAMP NB LOCATOR
	9	8	001BT0044246	FHCS - 3/8-16 X 3/4
NB 8	12	2	001GK0035238	SWING BOLT 3/8-16
	13	2	001NM0035239	FLANGE NUT 3/8-16
	17	8	001CE0035253	B.H.C.S. 10-24 X 3/8
	21	24	006AW0035235	BEARING - NB BALL
	22	4	F0120A0113XX	LOCATOR ASSEMBLY - NB 1/2
	6	4	006BL0034381	CLAMP NB LOCATOR
	9	8	001BT0044246	FHCS - 3/8-16 X 3/4
NB 10	12	2	001GK0035238	SWING BOLT 3/8-16
	13	2	001NM0035239	FLANGE NUT 3/8-16
	17	8	001CE0035253	B.H.C.S. 10-24 X 3/8
	21	26	006AW0035235	BEARING - NB BALL
	22	4	F0120A0113XX	LOCATOR ASSEMBLY - NB 1/2
	6	4	006BL0034381	CLAMP NB LOCATOR
	9	8	001BT0044246	FHCS - 3/8-16 X 3/4
NB 12	12	2	001GK0035238	SWING BOLT 3/8-16
	13	2	001NM0035239	FLANGE NUT 3/8-16
	17	12	001CE0035253	B.H.C.S. 10-24 X 3/8
	21	30	006AW0035235	BEARING - NB BALL
	22	4	F0120A0113XX	LOCATOR ASSEMBLY - NB 1/2

12.4 NB14-NB43 diagram



12.5 Chart 3 - NB14-NB43 Common Parts

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	006AA00xxxx	HOUSING - NB
2	1	006BN00xxxx	GEAR - NB
3	2	006BL0034404	GEAR CLAMP - MALE
4	2	006BL0034397	GEAR CLAMP - FEMALE
5	2	006BA0033632	BRACKET - NB MOTOR MOUNT LOCK
6	See chart 4	006BL0034381	CLAMP - NB LOCATOR
7	1	006AU00xxxx	GEAR SHIELD - NB
8	See chart 4	006AW0035235	BEARING - NB BALL
9	See chart 4	006AW0035236	BEARING - NB NEEDLE
10	2	006AM0038832	DOWEL - FEMALE BULLET NOSE
11	2	006AM0038833	DOWEL - MALE BULLET NOSE
12	See chart 4	001NA0035243	FLANGE NUT
13	2	017AM0035244	LOCKING PIN - NB
14	2	See chart 4	SWING BOLT
15	2	001DE0035937	S.S.S - 5/16-18 X 5/8 DOG
16	See chart 4	001CE0035253	B.H.C.S. 10-24 X 3/8
17	4	001AE0037294	SHCS 1/4-20 1
18	2	001AE0035938	SHCS 3/8-16 X 7/8
19	4	001AE0035939	SHCS 3/8-16 X 3/4
20	16	001AE0036526	SHCS 1/4-20 X 1 1/4
21	2	017AA0035256	DOWEL - .375 X 1.5
22	2	001AE0036526	SHCS 1/4-20 X 1.25
23	See chart 4	001BT0044246	FHCS - 3/8-16 X 3/4
24	See chart 4	F0120A0014XX	LOCATOR ASSEMBLY - NB 1/2"
25	1	F0145A1189XX or F0145A0024XX	TRIPPER PIN ASSEMBLY - NB

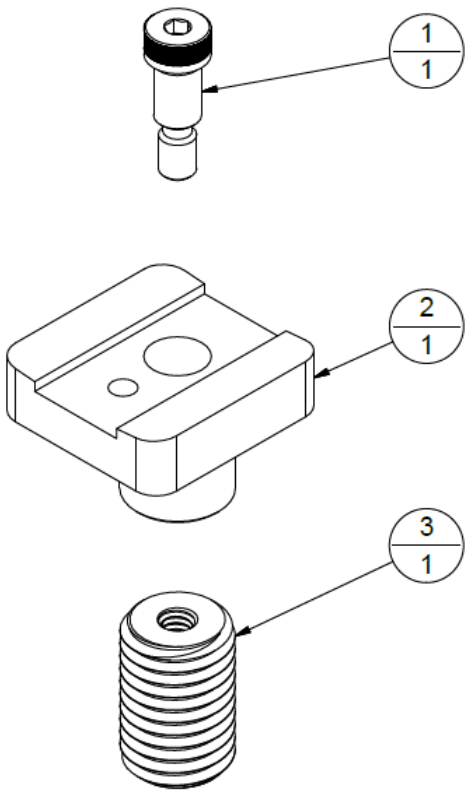
12.6 Chart 4 – NB14 – NB43 Parts list – for Clamshell dependent quantities

(Use with NB14 – 43 Clamshell Diagram)

NB PARTS LIST *(USE WITH NB 14-43 CLAMSHELL DRAWING)*				
	ITEM	***QUANTITY***	***PART #***	***DESCRIPTION***
NB 14	6	6	006BL0034381	CLAMP NB LOCATOR
	8	32	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NM0035239	FLANGE NUT 3/8-16
	14	2	001GK0035238	SWING BOLT 3/8-16
	16	10	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	12	001BT0044246	FHCS - 3/8-16 X 3/4
	24	6	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"
NB 16	6	6	006BL0034381	CLAMP NB LOCATOR
	8	36	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NM0035239	FLANGE NUT 3/8-16
	14	2	001GK0035238	SWING BOLT 3/8-16
	16	10	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	12	001BT0044246	FHCS - 3/8-16 X 3/4
	24	6	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"
NB 18	6	6	006BL0034381	CLAMP NB LOCATOR
	8	36	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NM0035239	FLANGE NUT 3/8-16
	14	2	001GK0035238	SWING BOLT 3/8-16
	16	10	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	12	001BT0044246	FHCS - 3/8-16 X 3/4
	24	6	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"
NB 20	6	6	006BL0034381	CLAMP NB LOCATOR
	8	46	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NM0035239	FLANGE NUT 3/8-16
	14	2	001GK0035238	SWING BOLT 3/8-16
	16	16	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	12	001BT0044246	FHCS - 3/8-16 X 3/4
	24	6	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"
NB 24	6	10	006BL0034381	CLAMP NB LOCATOR
	8	52	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NA0035243	FLANGE NUT 1/2-13
	14	2	001GK0035245	SWING BOLT 1/2-13
	16	16	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	20	001BT0044246	FHCS - 3/8-16 X 3/4
	24	10	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"

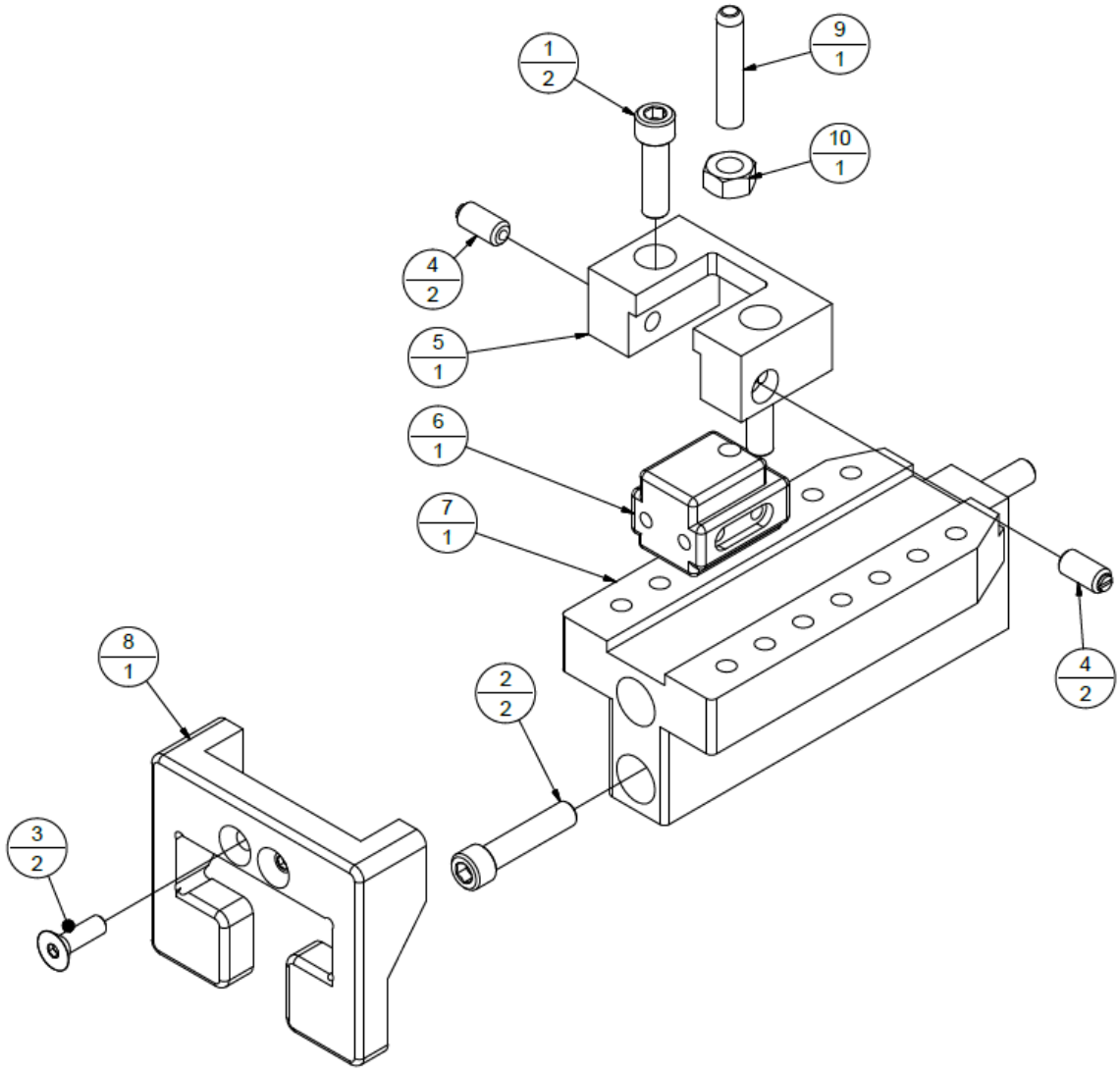
NB PARTS LIST *(USE WITH NB 14-43 CLAMSHELL DRAWING) (continued)*				
	ITEM	***QUANTITY***	***PART #***	***DESCRIPTION***
NB 26	6	10	006BL0034381	CLAMP NB LOCATOR
	8	52	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NA0035243	FLANGE NUT 1/2-13
	14	2	001GK0035245	SWING BOLT 1/2-13
	16	16	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	20	001BT0044246	FHCS - 3/8-16 X 3/4
	24	10	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"
NB 28	6	10	006BL0034381	CLAMP NB LOCATOR
	8	64	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NA0035243	FLANGE NUT 1/2-13
	14	2	001GK0035245	SWING BOLT 1/2-13
	16	16	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	20	001BT0044246	FHCS - 3/8-16 X 3/4
	24	10	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"
NB 30	6	10	006BL0034381	CLAMP NB LOCATOR
	8	68	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NA0035243	FLANGE NUT 1/2-13
	14	2	001GK0035245	SWING BOLT 1/2-13
	16	16	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	20	001BT0044246	FHCS - 3/8-16 X 3/4
	24	10	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"
NB 32	6	10	006BL0034381	CLAMP NB LOCATOR
	8	68	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NA0035243	FLANGE NUT 1/2-13
	14	2	001GK0035245	SWING BOLT 1/2-13
	16	16	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	20	001BT0044246	FHCS - 3/8-16 X 3/4
	24	10	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"
NB 36	6	10	006BL0034381	CLAMP NB LOCATOR
	8	68	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NA0035243	FLANGE NUT 1/2-13
	14	2	001GK0035245	SWING BOLT 1/2-13
	16	16	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	20	001BT0044246	FHCS - 3/8-16 X 3/4
	24	10	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"
NB 43	6	10	006BL0034381	CLAMP NB LOCATOR
	8	80	006AW0035235	BEARING - NB BALL
	9	4	006AW0035236	BEARING - NB NEEDLE
	12	2	001NA0035243	FLANGE NUT 1/2-13
	14	2	001GK0035245	SWING BOLT 1/2-13
	16	16	001CE0035253	B.H.C.S. 10-24 X 3/8
	23	20	001BT0044246	FHCS - 3/8-16 X 3/4
	24	10	F0120A0013XX	LOCATOR ASSEMBLY - NB 3/8"

12.7 Locator Assembly – 3/8 NB F0120A0013XX (A)



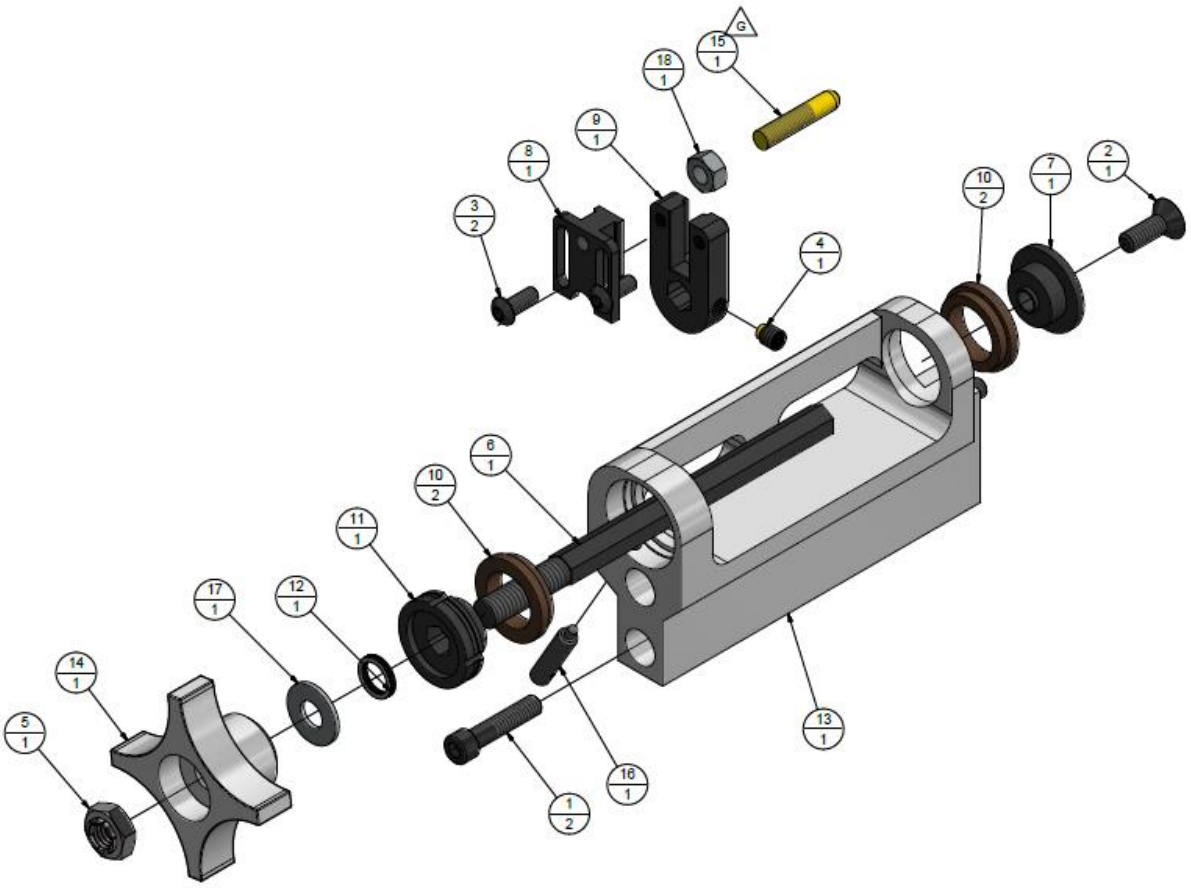
ITEM	P/N	LEGACY #	QTY	DESCRIPTION
1	001BE0035260		1	Shoulder Screw - DIA 0.3125 in X 0.5 in lg - 1/4-20 UNC
2	006AM0035959	101-1005	1	LOCATOR - NB 3/8" PAD
3	006AN0035237	500-1012	1	SET SCREW - 3/4-10 LOCATOR

12.8 Tripper Assembly (Slide style) F0145A1189XX (B)



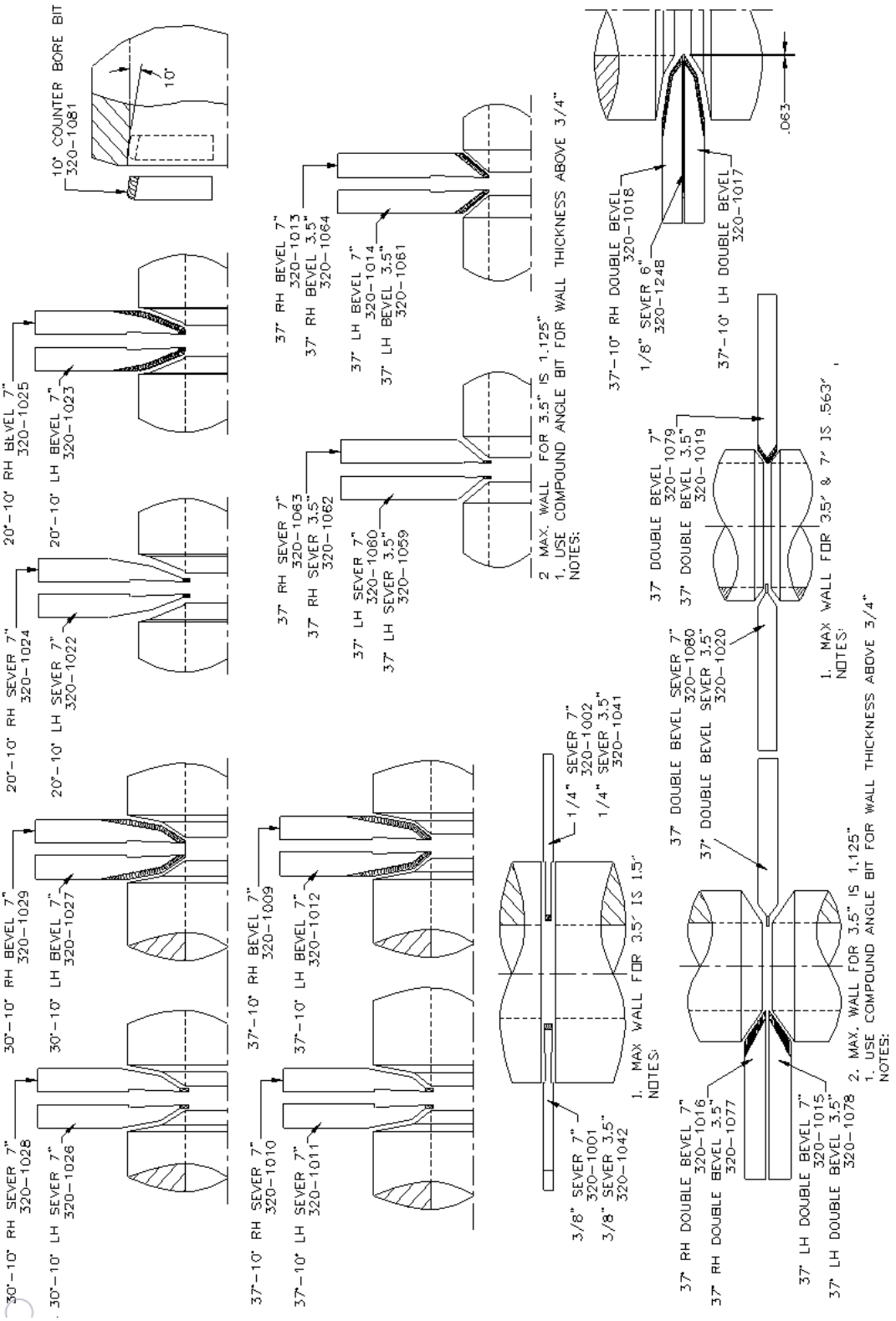
ITEM	P/N	QTY	DESCRIPTION
1	001AE0035481	2	Socket Head Cap Screw 1/4-20 UNC X 7/8 Gr. 8
2	001AE0035491	2	Socket Head Cap Screw 1/4-20 UNC X 1- 1/8 Gr. 8
3	001BU0035482	2	Flat Head Cap Screw 10-32 UNF X 5/8
4	003AB0038831	2	SPRING PLUNGER - 1/4in-20UNC SHORT
5	006AP0033039	1	HOLDER - TRIPPER PIN SLIDE
6	006AR0033069	1	SLIDE - NB SAFETY TRIPPER PIN
7	006BA0033650	1	BRACKET - NB TRIPPER
8	006BB0033867	1	HANDLE - NB SAFETY TRIPPER
9	006CA0035815	1	TRIPPER PIN 1/4-28
10	F0145A1012XX	1	HEX NUT ZINC PL - 1/4-28

12.9 Tripper assembly (Flip style) F0145A0024XX (G)



ITEM	P/N	QTY	DESCRIPTION
1	001AE0035491	2	Socket Head Cap Screw 1/4-20 UNC X 1- 1/8 Gr. 8
2	001BT0044276	1	Flat Head Cap Screw 1/4-20 UNC X 3/4
3	001CF0044829	2	Button Head Cap Screw 10-32 UNF X 1/2
4	001GE0044931	1	SOCKET SET SCREW - FLAT POINT 1/4-20 UNC X 1/4 BRASS TIP
5	001NB0044860	1	LOCK NUT - 3/8-16 HEX JAM
6	006AJ0041967	1	HEX SHAFT - FLIP TRIPPER
7	006AJ0041971	1	SHAFT END - HEX TRIPPER FLIP STYLE
8	006AP0042354	1	PIN HOLDER - FLIP TRIPPER
9	006AP0042355	1	PIN HOLDER SLIDE - FLIP TRIPPER
10	006AW0043446	2	BUSHING LARGE - TRIPPER FLIP STYLE
11	006AW0043469	1	BUSHING - FLIP TRIPPER DETENT
12	006AX0043450	1	SPRING-WAVE 0.375IDX0.562ODX0.1950 FREE LENGTH 0.06 WIRE DIA
13	006BA0033788	1	BRACKET - TRIPPER FLIP STYLE
14	006BB0044508	1	KNOB - FLIP STYLE TRIPPER
15	006CA0035815	1	TRIPPER PIN 1/4-28
16	017AM0044936	1	DETENT PIN ZINC PL- 1/4-20, 5/64 HEX
17	023BD0043319	1	WASHER - THRUST 0.375IDX0.812ODX0.0625W IN
18	F0145A1012XX	1	HEX NUT ZINC PL - 1/4-28

12.10 Bevel Cut/Sever Bits



13.0 ADDITIONAL TECHNICAL INFORMATION

13.1 Vibration

Vibration produced at the control handle was insufficient and did not generate a reading (0.00 mm/s).

13.2 Power source

IR 4800U air motor requirements

- For safety, top performance and maximum durability of parts, operate this motor at 90 psig (6.2 bar/620 kPa) air pressure at the inlet with 3/4" (19 mm) air supply hose.

DS 315 hydraulic motor requirements

13.3 CE Marking

An EC declaration of conformity shall be available with the machine for any shipment to European Market. This declaration includes the following statement:

1. The machinery;
   - is in conformity with the provisions of the Machinery Directive 2006/42/EC as amended, and with national implementing legislation;
   - is in conformity with the provisions of the following other EC directives:

     Low Voltage Directive (Directive 2006/95/EC), as amended, and with national implementing legislation; EMC Directive (Directive 2004/108/EC), as amended, and with national implementing legislation.
2. The following (parts/clauses of) harmonized standards as amended have been applied:

- **EN ISO 12100-1 -** Safety of machinery - Basic concepts, general principles for design – Part 1 - Basic terminology, methodology
- **EN ISO 12100-2 -** Safety of machinery - Basic concepts, general principles for design – Part 2 – Technical Principles

3. The product covered by this declaration has been designed, manufactured and tested in accordance with sound engineering practice and Enerpac ISO 9001 quality management system requirements.

4. We commit to transmit, in response to a reasoned request by the national authorities, relevant information on the partly completed machinery. Method of transmission and delivery time will be determined with the national authorities according to the requested information.

   The declaration shall be signed by the legal representative of Enerpac with specific address if different from the manufacturer.

13.4 MANUFACTURER

Enerpac Tool Group (Hydratight)
2010 Clermont St.
Antigo
WI 54409
USA

13.5 PRODUCTS COVERED

Trade Mark:	Enerpac
Model:	Specific to each declaration
Product Name:	CLAMSHELL
Serial Number:	Specific to each declaration