

445 Series

Stall Torque Pneumatic Rolling Motors



Tube & Pipe Cleaners ◦ Tube Testers ◦ Tube Plugs ◦ Tube Removal ◦ Tube Installation



Operating and Maintenance Instructions

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INTRODUCTION

Thank you for purchasing this Elliott product. More than 100 years of experience have been employed in the design and manufacture of this control, representing the highest standard of quality, value and durability. Elliott tools have proven themselves in thousands of hours of trouble-free field operation.

If this is your first Elliott purchase, welcome to our company; our products are our ambassadors. If this is a repeat purchase, you can rest assured that the same value you have received in the past will continue with all of your purchases, now and in the future.

Elliott's Right Angle Rolling Motor has been designed for the following types of equipment:

Heat Exchangers

Chillers

Boilers - Firetube

Feedwater Heaters

Fin Fan Coolers

If you have any questions regarding this product, manual or operating instructions, please call Elliott at +1 800 332 0447 toll free (USA only) or +1 937 253 6133, or fax us at +1 937 253 9189 for immediate service.

SAFETY GUIDELINES

Read and save all instructions. Before use, be sure everyone using this machine reads and understands this manual, as well as any labels packaged with or attached to the machine.

- Know Your Elliott Tool. Read this manual carefully to learn your tool's application and limitations as well as the potential hazards specific to this tool.
- Avoid Dangerous Environments. Do not use power tools in damp or wet locations
- Keep Work Area Clean and Well Lit. Cluttered, dark work areas invite accidents.
- Dress Properly. Do not wear loose clothing or jewelry. Wear a protective hair covering to contain long hair. It is recommended that the operator wear safety glasses with side shields or a full face shield eye protection. Gloves and water repellent, nonskid footwear are also recommended. Keep hands and gloves away from moving parts.
- Use Safety Equipment. Everyone in the work area should wear safety goggles or glasses with side shields complying with current safety standards. Wear hearing protection during extended use, respirator for a confined space and a dust mask for dusty operations. Hard hats, face shields, safety shoes, respirators, etc. should be used when specified or necessary. Keep a fire extinguisher nearby.
- Keep Bystanders Away. Bystanders should be kept at a safe distance from the work area to avoid distracting the operator and contacting the blade.
- Use The Right Tools. Do not force a tool or attachment to do a job or operate at a speed it was not designed for.
- Use Proper Accessories. Use Elliott accessories only. Be sure accessories are properly installed and maintained.
- Repetitive Motion. Repetitive work motions and/or vibration can injure hands and arms.
- Entanglement Risk. Use minimum hand grip force consistent with proper control and safe operation.
- Check for Damaged Parts. Inspect guards and other parts before use. Check for misalignment, binding of moving parts, improper mounting, broken parts or any other conditions that may affect operation. If abnormal noise or vibration occurs, turn the tool off immediately and have the problem corrected before further use. Do not use a damaged tool. Tag damaged tools "Do Not Use" until repaired. A damaged part should be properly repaired or replaced by an Elliott service facility. For all repairs, insist on only identical replacement parts.
- Keep Hands Away from All Moving Parts.
- Do Not Overreach. Maintain Control. Keep proper footing and balance at all times.
- Stay Alert. Watch what you are doing, and use common sense. DO NOT use a tool when you are tired, distracted or under the influence of drugs, alcohol or any medication causing decreased control.
- Maintain Labels and Nameplates. These carry important information and will assist you in ordering spare and replacement parts. If unreadable or missing, contact an Elliott service facility for a replacement.

SAFETY GUIDELINES

- These tools are designed to operate on 90 psi (6.2 bar) maximum air pressure. If the tool is properly sized and applied, higher air pressure is unnecessary. Excessive air pressure increases the loads and stresses on the tool parts, sockets, and fasteners and may result in breakage. Installation of a filter-regulator-lubricator in the air supply line ahead of the tool is recommended. Only use approved air lubrication.
- Before the tool is connected to the air supply, check the throttle for proper operation (i.e., throttle moves freely and returns to closed position). Clear the air hose of accumulated dust and moisture.
- Be careful not to endanger adjacent personnel. Before removing a tool from service or changing sockets, make sure the airline is shut off and drained of air. This will prevent the tool from operating if the throttle is accidentally engaged.
- It is essential for safe operation for any operator of a rolling motor to use good balance, sure footing, and proper posture in anticipation of a torque reaction. Insure that the operator's hand will not be wedged or pinched between the work and the tool when operating. Always use ambient light to ensure safe operation.
- Higher torque right angle motors are supplied with splined torque reaction mounting plates which accept torque reaction bars. These bars can be braced against the work, adjacent tubes, or other suitable points to absorb and relieve the operator of the torque reaction transmitted by the tool. Tool balance arms are also available to absorb the torque reaction transmitted by the tool. Due to their squared design, the reaction mounting plates also prevent the motor from rolling off the work station, preventing further injury. Tool balance arms are also available to absorb the torque reaction of the tool for improved ergonomic applications if work is accessible.

CAUTION

When using right angle motors, be sure the throttle is positioned relative to the right angle head so the throttle will not become wedged against an adjacent object in the "ON" position due to torque reaction. The angle head may be repositioned with respect to the lever (on tools with levers) to accommodate proper location for task. If tool is to be reversed, locate throttle lever in a neutral position that will prevent entrapment. Refer to operating instructions for additional information.

CAUTION

Operator must be prepared to resist stall torque until throttle is released. ALWAYS use torque reaction bar.

SAFETY GUIDELINES



Tasks should be performed in such a manner that the wrists are maintained in a neutral position, which is not flexed, hyperextended or turned side to side.



Stressful postures should be avoided and can be controlled through tool selection and work location.

Any user suffering from prolonged symptoms of tingling, numbness, blanching of fingers, clumsiness or weakened grip, nocturnal pain in the hand, or any other disorder of the shoulders, arms, wrists or fingers is advised to consult with a physician. If it is determined that the symptoms are job related or aggravated by movements and postures dictated by the job design, it may be necessary for the employer to take steps to prevent further occurrences. These steps might include, but are not limited to, repositioning the workpiece or redesigning the workstation, reassigning workers to other jobs, rotating jobs, altering work pace, and/or changing the type of tool used so as to minimize stress on the operator. Some tasks may require more than one type of tool to obtain the optimum operator/tool/task relationship.

The following recommendations will help reduce or moderate the effects of repetitive work motions and/or extended vibration exposure:

1. Use a minimum handgrip force consistent with proper control and safe operation.
2. Keep wrists as straight as possible.
3. Keep body and hands warm and dry.
4. Avoid anything that inhibits blood circulation (smoking tobacco, cold temperatures, certain drugs, etc.)
5. Avoid highly repetitive movements of hands and wrists and continuous vibration exposure.

OPERATION INSTRUCTIONS

⚠ WARNING	
	HIGH TORQUE TOOL: Always use proper reaction bar.

NOTE: The reaction bracket, PN: 445-6001, must fully engage the spline on the right angle head. Position the bracket forward on the small diameter of the head and then move it rearward to engage the spline. Securely tighten screws and jam nuts.

NOTE: USE ONLY SOCKETS APPROVED FOR POWER TOOL SERVICE.

⚠ CAUTION	
ALWAYS WEAR APPROVED EYE PROTECTION. (See the latest edition of ANSI Z87.1 American National Standard for Occupational and Educational Eye and Face Protection). Position exhaust deflector 180° away from face, eyes, etc.	

⚠ CAUTION	
READ, UNDERSTAND, AND PRACTICE the requirement of ANSI B186.1, Safety Code for portable air tools. Standards are available from the American National Standards Institute, Inc. 1430 Broadway, New York, NY 19918.	

The Right Angle Rolling Motor is designed to operate on 90 PSI (t2 bar) air pressure using a ½” hose up to 8 ft. in length. The Right Angle Rolling Motors are designed to operate on 90 PSI air pressure, but do not depend on controlled air pressure to maintain accurate torque. Accurate torque is achieved by setting the clutch to the desired torque on the application. The tool will shut off automatically at the torque. Releasing the throttle will allow the tool to reset for the next cycle.

Motor Activation

There are two models available, a roll throttle style and lever throttle style. The lever style is activated by simply pressing down the lever and is de-activated by releasing the lever. For the roll throttle style, simply rotate the handle in either direction. This will automatically engage a direction of rotation while simultaneously activating the motor. To shut off motor, simply release the handle and it will return to its center off position. With the angle head end facing away, rotate the handle in a clockwise direction to drive the motor in a forward direction (marked by an ‘F’ on the handle). Rotate the handle in a counter-clockwise direction to drive the motor in a reverse direction (marked by an ‘R’ on the handle).

OPERATION INSTRUCTIONS

! CAUTION

If the motor has stalled, do not attempt to apply additional torque by rotating the motor as if it were an air ratchet. This will break the rotor paddles and may damage the motor cylinder.

Operational Check

Grip tool securely and be prepared to counteract stall torque in case clutch is improperly adjusted. Use proper reaction bar.

Air Supply

An automatic in-line filter-lubricator is highly recommended. This will supply the tool with clean, dry, lubricated air; keep it in sustained operation; and increase tool life. A mesh screen is supplied in the motor to help prevent debris from entering motor. This should be removed and cleaned regularly. For maximum performance, use a 1/2" I.D. air hose no longer than 8' in length. If additional length is required, a 3/4" or larger hose should be connected to the 1/2" hose. The air hose should be cleared or accumulated dirt and moisture, then one (1) teaspoon of pneumatic oil or a good grade of 10W machine oil should be poured into the tool's air inlet before connecting the hose to the tool. Always position air hose as to prevent it from being crushed or pose a threat as a trip hazard.

Lubrication

The in-line lubricator should be checked and filled regularly with a good grade of 10W machine oil, as well as, set to provide 2-3 drops of oil per minute.

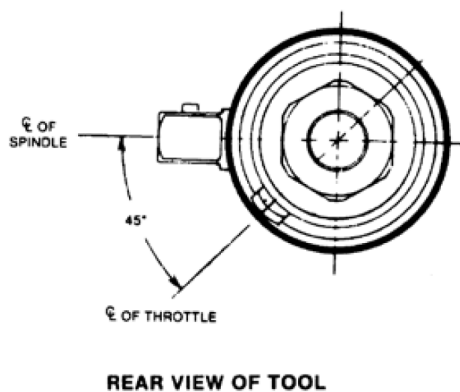
Safety Check

After repair or replacement of parts, tools equipped with an automatic shutoff device should be tested to verify that they are functioning properly.

! WARNING



ENTANGLEMENT RISK:
To prevent hand entrapment from torque reaction, the square drive should be positioned from the throttle as shown below.



TECHNICAL INFORMATION

	445L1753-190ST	445R1753-190ST	445L1752-90ST	445R1752-90ST
Tube OD Range*	2" - 3" (50.8 - 76.2mm)		2" - 4" (50.8 - 101.6mm)	
Free Speed RPM	190		90	
Torque Range**	70 - 155 ft lbs (95 - 210 Nm)		150 - 325 ft lbs (200 - 440 Nm)	
Throttle Type	Lever	Roll	Lever	Roll
Weight	17 (7.7kg)		19 (8.6kg)	
Air Usage	70 cfm @ po PSI			
Air Supply Hose	3/4" (19.05mm)			
Spindle Drive Size	5/8" Sq. Male		3/4"	
Standard Drive Socket	3/4" Fem. Sq.		1" Fem. Sq.	
<i>*May vary due to tube wall, material and tube sheet thickness. **Measured using industry standard Hard Joint Torque.</i>				

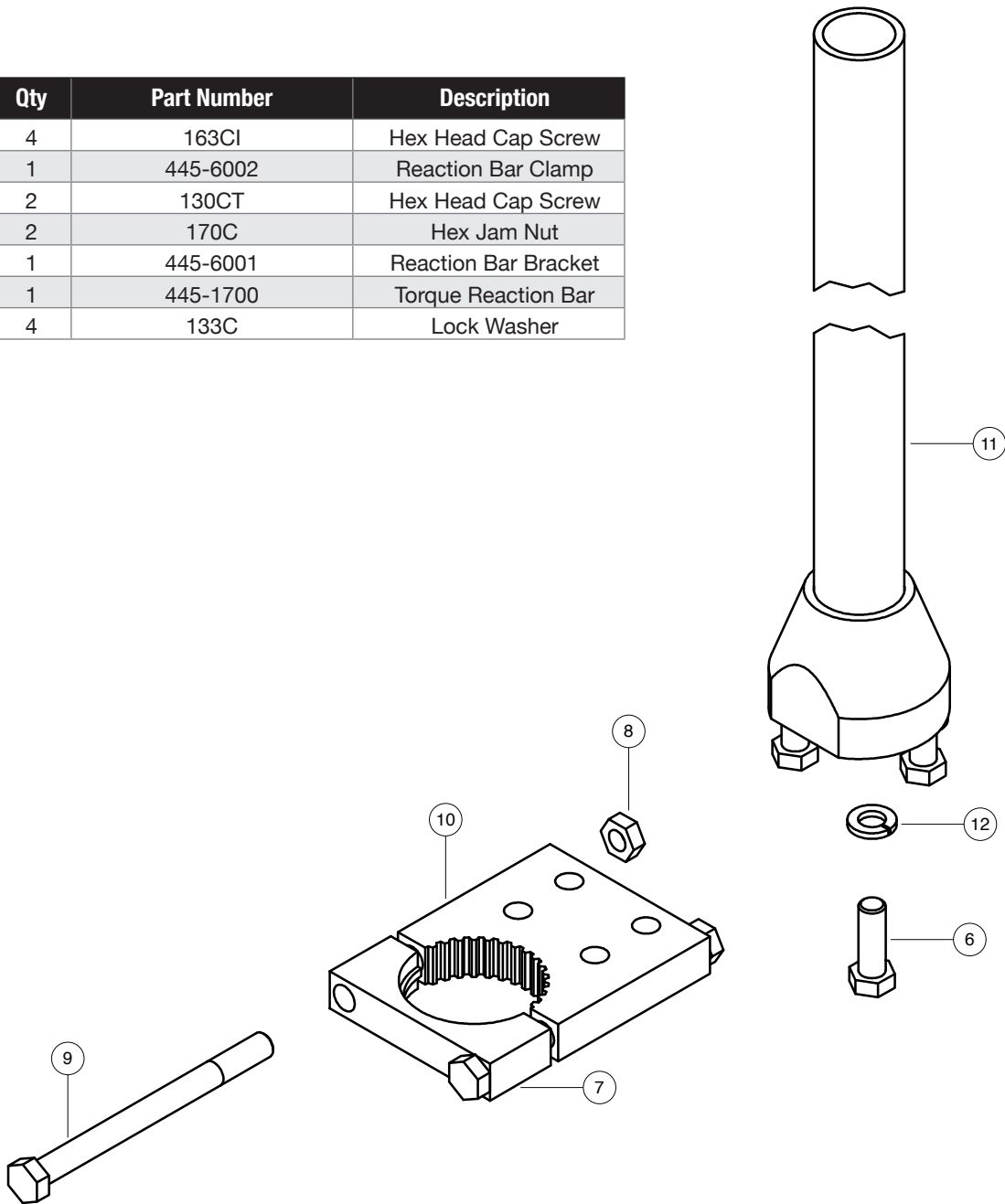
Operating Noise Level: 116 dBA

Spares Kit (445SK-ST)		
Qty	Part Number	Description
1	P8309-119	O-Ring
1	445-1024	Muffler
1	P8309-138	O-Ring
1	P8309-24	O-Ring
2	P8309-38	O-Ring
5	445-2002-5	Paddle Set
2	PC80-6000ZZ	Bearing
1	445-7005	Bearing Seat Tool
1	445-7006	Hex Drive
1	P8263C	Locknut
1	41-9722K25	Shim

PARTS LISTS & DIAGRAMS

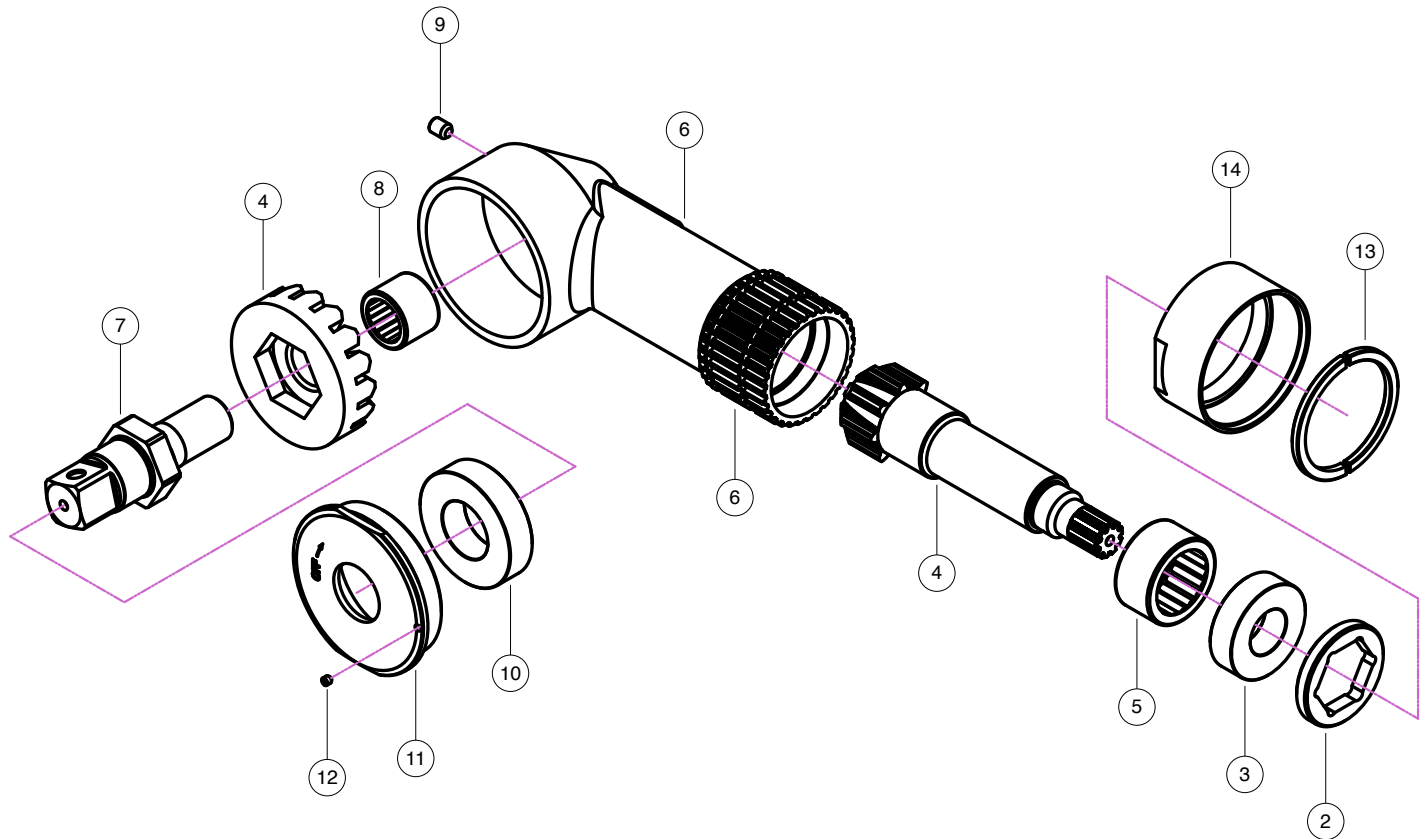
Torque Reaction Bar

Item	Qty	Part Number	Description
6	4	163CI	Hex Head Cap Screw
7	1	445-6002	Reaction Bar Clamp
8	2	130CT	Hex Head Cap Screw
9	2	170C	Hex Jam Nut
10	1	445-6001	Reaction Bar Bracket
11	1	445-1700	Torque Reaction Bar
12	4	133C	Lock Washer



PARTS LISTS & DIAGRAMS

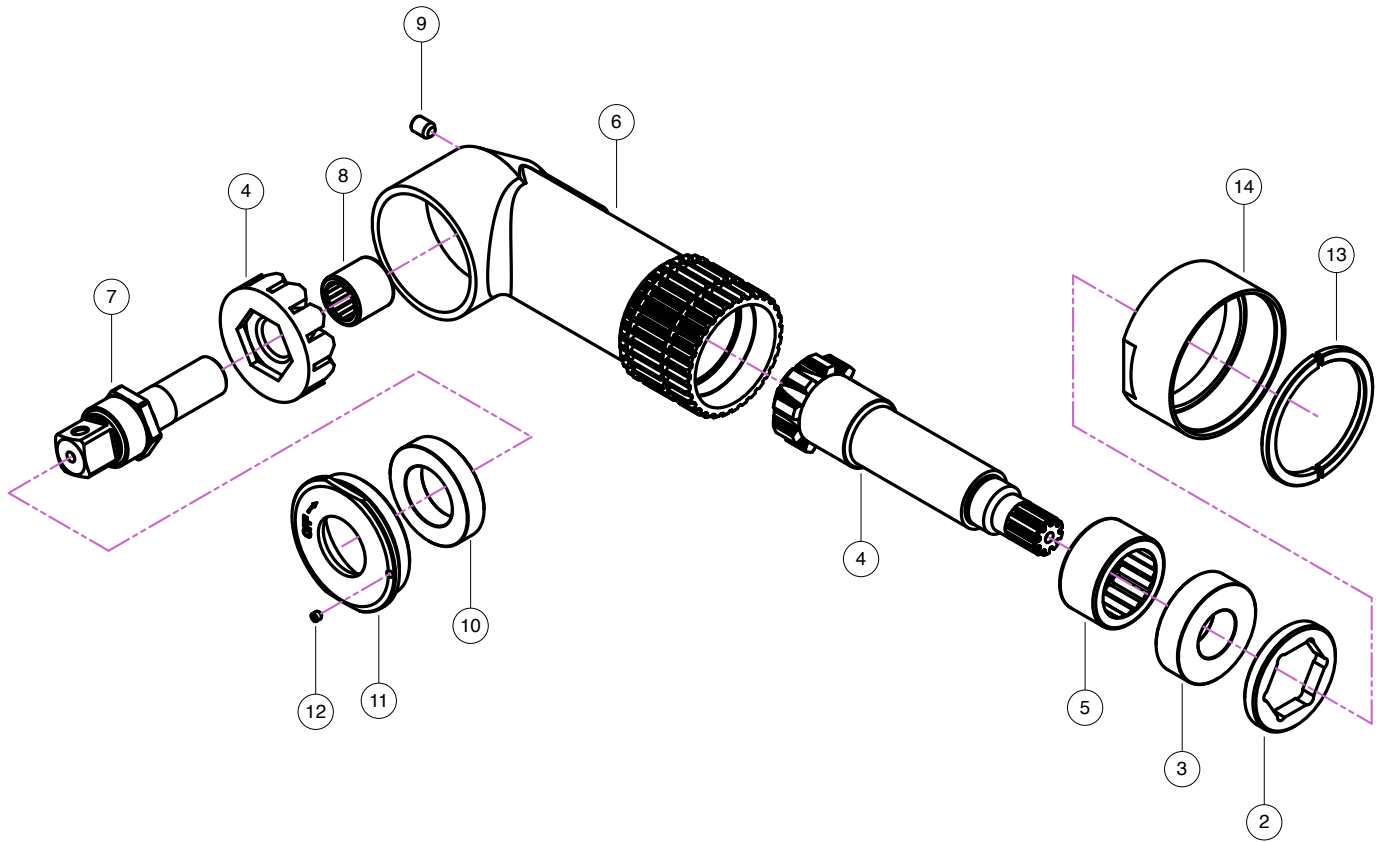
90 RPM Head Assembly



Item	Qty	Part Number	Description
	1	445H0090	90 RPM Head
2	1	445-5011	Bearing Retainer
3	1	PC80-6004ZZ	Bearing
4	1	445-5003-90	90 RPM Gear Set
5	1	PC80BH-1812	Needle Bearing
6	1	445-5001-90	Right Angle Head
7	1	445-5007-90	Drive Shaft
8	1	PC80M-12121	Needle Bearing
9	1	41-4534K39	Plug
10	1	PC80R16ZZ	Bearing
11	1	445-5005-90	Bearing Cap
12	1	128T	Set Screw
13	2	445-5015	Split Ring
14	1	Split Ring Nut	1

PARTS LISTS & DIAGRAMS

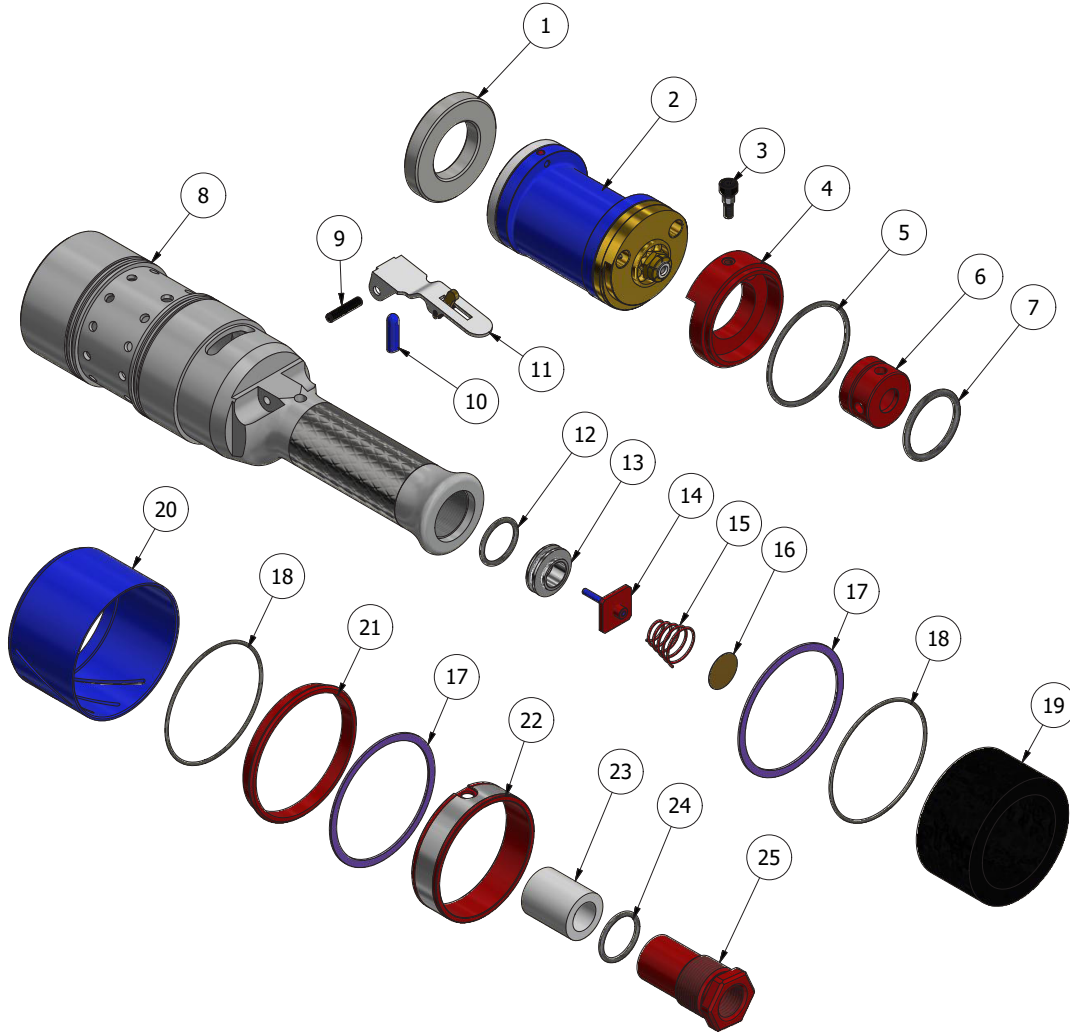
190 RPM Head Assembly



Item	Qty	Part Number	Description
		445H0190	190 RPM Head
2	1	445-5011	Bearing Retainer
3	1	PC80-6004ZZ	Bearing
4	1	445-5003-190	190 RPM Gear Set
5	1	PC80BH-1812	Needle Bearing
6	1	445-5001-190	Right Angle Head
7	1	445-5007-190	Drive Shaft
8	1	PC80M-10121	Needle Bearing
9	1	41-4534K39	Plug
10	1	PC80-6905RS	Bearing
11	1	445-5005-190	Bearing Cap
12	1	128T	Set Screw
13	2	445-5015	Split Ring
14	1	445-5014	Split Ring Nut

PARTS LISTS & DIAGRAMS

Lever Throttle Assembly

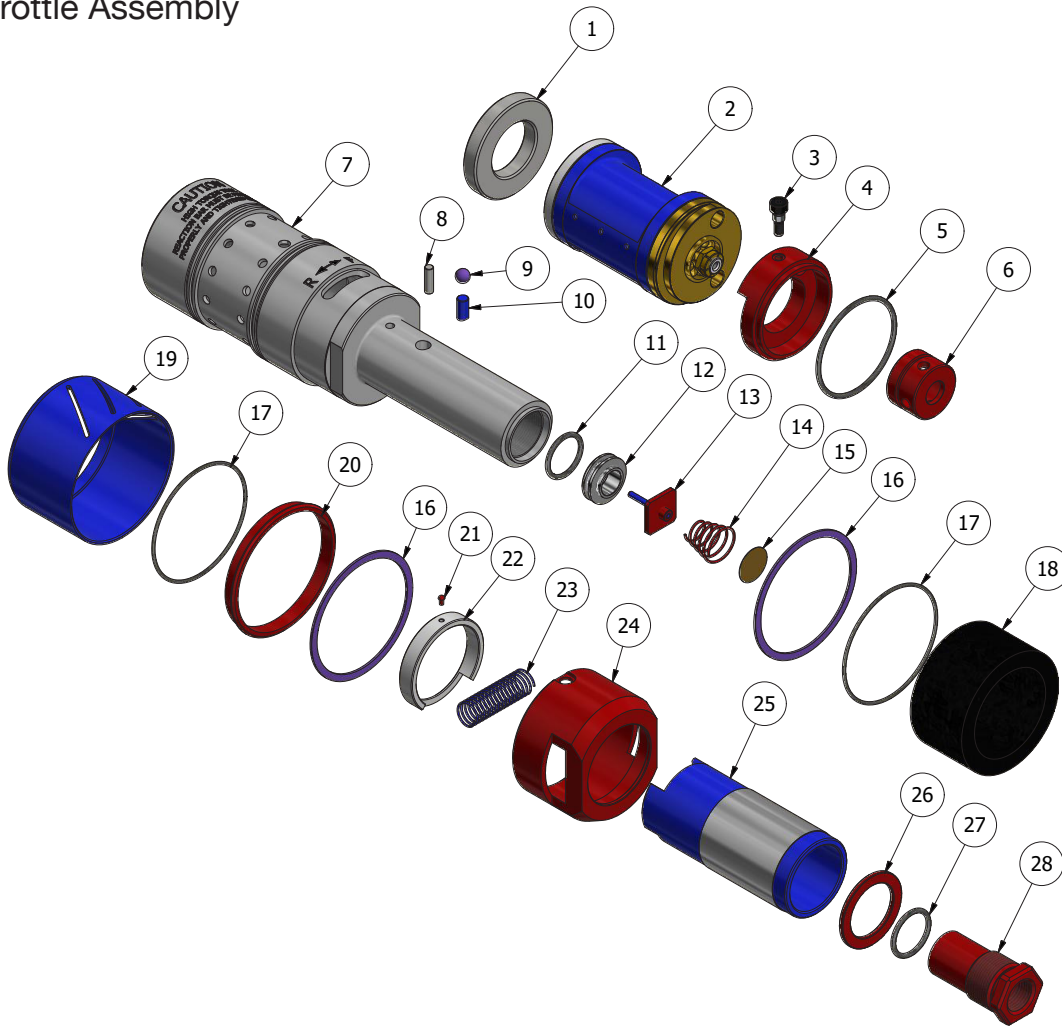


Item	Qty	Part Number	Description
1	1	445-8000	Spacer
2	1	445-2000	Air Motor
3	1	539R	Shoulder Screw, #10-32 x 1/4
4	1	445-1019	Reversing Valve
5	1	P8309-138	O-Ring, 3/32 x 2-1/8
6	1	445-1020	Spacer
7	1	P8309-24	O-Ring, 1/16 x 1-1/8
8	1	445-1201	Lever Handle Body
9	1	P8384-14	Spring Pin, 3/16 x 7/8
10	1	445-1208	Valve Pin
11	1	445-1216	Throttle Lever
12	1	P8309-118	O-Ring, 3/32 x 7/8
13	1	445-1002	Throttle Valve Seat
14	1	445-1004	Throttle Valve

Item	Qty	Part Number	Description
15	1	37-TA-2102	Tapered Compression Spring
16	1	445-1006	Filter Screen
17	2	P8286-275	Retaining Ring, Spiral, External, 2 Turn, 2-3/4
18	2	P8309-38	O-Ring, 1/16 x 2-5/8
19	1	445-1024	Muffler
20	1	445-1025	Exhaust Deflector
21	1	445-1026	Exhaust Muffler Retainer
22	1	445-1211	Reversing Ring
23	1	445-1210	Valve Block
24	1	P8309-119	O-Ring, 3/32 x 15/16
25	1	445-1005	Inlet Bushing

PARTS LISTS & DIAGRAMS

Roll Throttle Assembly

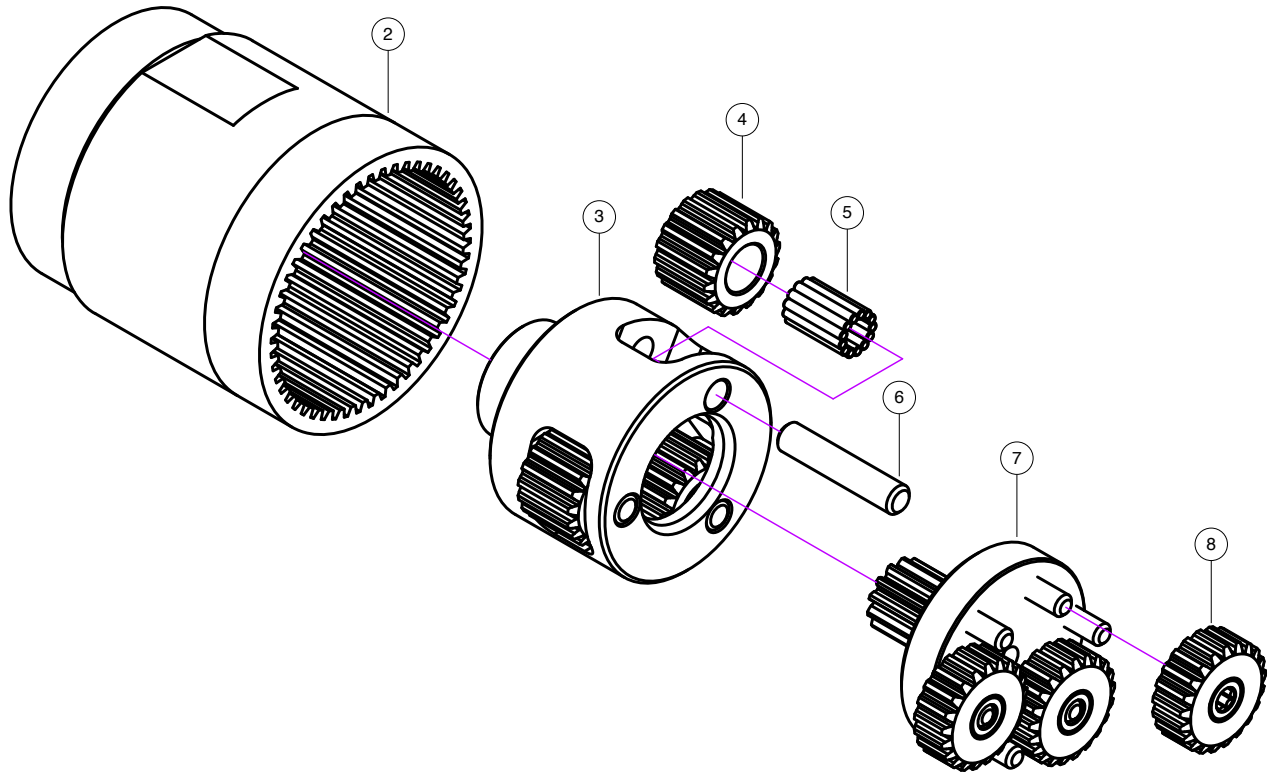


Item	Qty	Part Number	Description
1	1	445-8000	Space
2	1	445-2000	Air Motor
3	1	539R	Shoulder Screw, #10-32 x 1/4
4	1	445-1019	Reversing Valve
5	1	P8309-138	O-Ring, 3/32 x 2-1/83
6	1	445-1020	Spacer
7	1	445-1301	Roll Handle Body
8	1	580-18	Dowel Pin, 3/16 x 5/8
9	1	109HA	Ball, Steel, 5/16
10	1	445-1308	Valve Pin
11	1	P8309-118	O-Ring, 3/32 x 7/8
12	1	445-1002	Throttle Valve Seat
13	1	445-1004	Throttle Valve
14	1	37-TA-2102	Tapered Compression Spring
15	1	445-1006	Filter Screen
16	2	P8286-275	Retaining Ring, Spiral, External, 2 Turn, 2-3/4

Item	Qty	Part Number	Description
17	2	P8309-38	O-Ring, 1/16 - 2-5/8
18	1	445-1024	Muffler
19	1	445-1025	Exhaust Deflector
20	1	445-1026	Exhaust Motor Retainer
21	1	445-2009	Alignment Pin
22	1	445-1312	Spring Retainer
23	1	37-70902	Spring
24	1	445-1313	Reversing Ring
25	1	445-1316	Roll Throttle Sleeve
26	1	445-1315	Throttle Retainer
27	1	P8309-119	O-Ring, 3/32 x 15/16
28	1	445-1005	Inlet Bushing

PARTS LISTS & DIAGRAMS

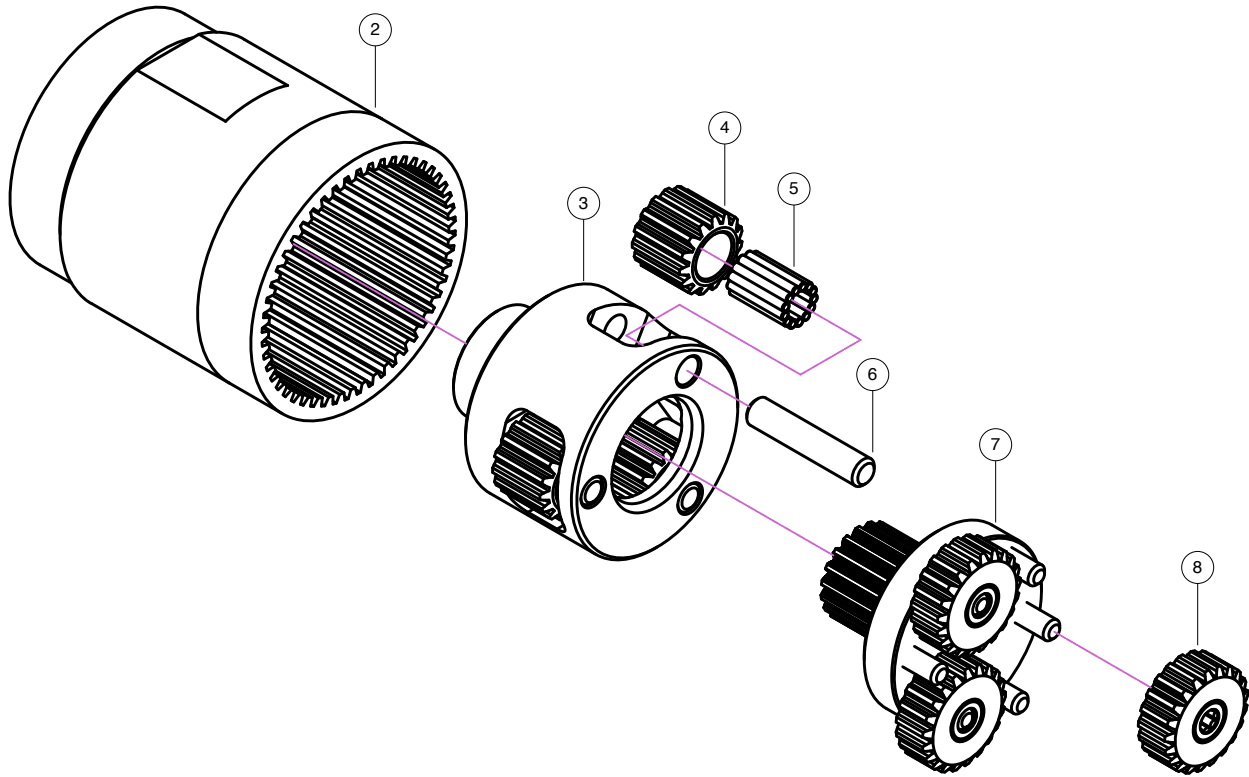
90 RPM Gearbox Assembly



Item	Qty	Part Number	Description
		445-4000-90	90 RPM Gearbox Assembly
2	1	445-4001	Gear Case
3	1	445-4005	Second Stage Spider
4	3	445-4008	Second Stage Planet Gear
5	39	P8573-27	Needle Roller
6	3	445-4013	Gear Pin
7	1	445-4004	First Stage Spider
8	3	445-4007	First Stage Planet Gear

PARTS LISTS & DIAGRAMS

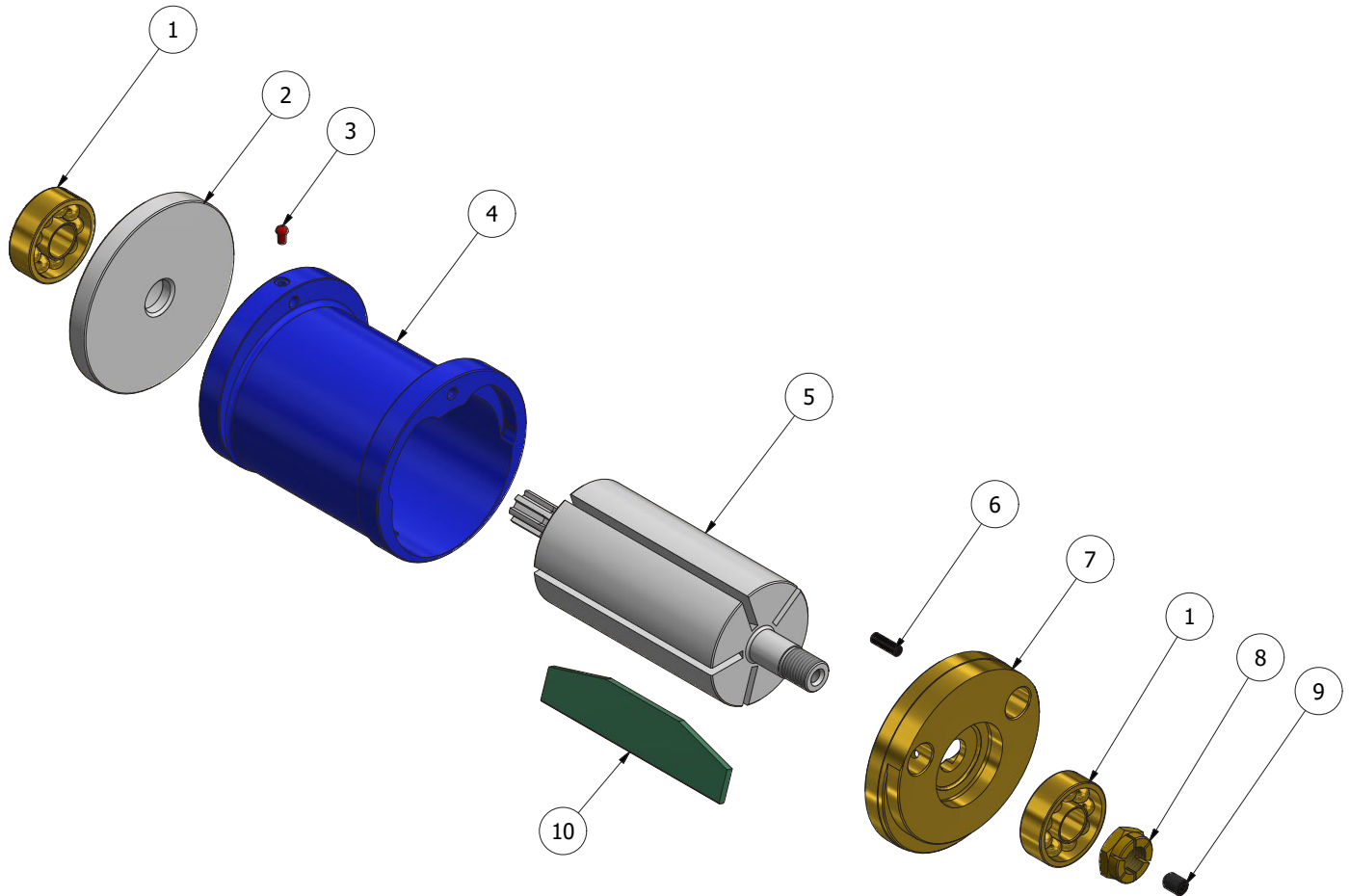
190 RPM Gearbox Assembly



Item	Qty	Part Number	Description
		445-4000-190	190 RPM Gearbox Assembly
2	1	445-4001	Gear Case
3	1	445-4012	Second Stage Spider
4	3	445-4011	Second Stage Planet Gear
5	39	P8573-27	Needle Roller
6	3	445-4013	Gear Pin
7	1	445-4010	First Stage Spider
8	3	445-4007	First Stage Planet Gear

PARTS LISTS & DIAGRAMS

Air Motor



Item	Qty	Part Number	Description
1	2	PC80-6000ZZ	Radial Ball Bearing
2	1	445-2007	Front Bearing Plate
3	1	445-2009	Alignment Pin
4	1	445-2005	Cylinder
5	1	445-2001	Rotor Assembled
6	1	P8382-6	Spring Pin, 1/8 x 3/8
7	1	445-2004	Rear Bearing Plate
8	1	P8263C	Flex-Loc Nut, 3/8-24
9	1	128P	Cup Point Set Screw, #10-32 x 1/4
10	5	445-2002	Paddle

MAINTENANCE INSTRUCTIONS

The proper performance and service life of every machine depends on how well it is maintained. The following should become a regular routine of operations.

1. It is recommended that the right angle gears receive a generous amount of No. 2 moly grease through the grease plug (located on top of right angle head) after 40 hours of operation.
2. A wire mesh screen is included in motor to prevent introduction of large debris particles into the motor. This should be checked regularly and cleaned accordingly.
3. Within the exhaust deflector is an exhaust filter. This should be checked regularly and changed accordingly. This will be dependent on the amount of lubrication used, clean lines of air, etc.
4. When changing the bearings, it is recommended to use the specially designed Bearing Seat Tool (445-7005) that is included in the Spares Kit (445SK-ST).

WARRANTY

Should any part, of Seller's own manufacture, prove to have been defective in material or workmanship when shipped (as determined by Seller), Seller warrants that it will, at its sole option, repair or replace said part f.o.b., point of manufacture, provided that Buyer notifies, in writing, of such defect within twelve (12) months from date of shipment from the manufacturing plant.

On request of Seller, the part claimed to be defective will be returned, transportation, insurance, taxes and duties prepaid, to the factory where made, for inspection. Any item, which has been purchased by Seller, is warranted only to the extent of the original manufacturer's warranty to Seller. Seller shall not be liable for any damages or delays caused by defective material or workmanship.

No allowance will be made for repairs or alterations made by others without Seller's written consent or approval. If repairs or alterations are attempted without Seller's consent, Seller's warranty is void.

THE WARRANTIES PROVIDED IN THE OBLIGATIONS AND LIABILITIES OF SELLER HEREUNDER, AND THE RIGHTS AND REMEDIES OF BUYER HEREUNDER ARE EXCLUSIVE AND IN SUBSTITUTION FOR, AND BUYER HEREBY WAIVES ALL OTHER WARRANTIES, GUARANTEES, OBLIGATIONS, CLAIMS FOR LIABILITIES, RIGHTS AND REMEDIES, EXPRESS OR IMPLIED, ARISING BY LAW OR OTHERWISE, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTY FOR MERCHANTABILITY AND FITNESS FOR PURPOSE.

Seller's total liability is limited to the lower of the cost of repair or replacement.

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Contact Us

Elliott Tool offers a complete line of precision tube tools to meet your needs. Contact us or your local support.

Elliott Tool Technologies, Ltd.
1760 Tuttle Avenue
Dayton, Ohio 45403-3428
Phone: +1 937 253 6133 • +1 800 332 0447
Fax: +1 937 253 9189
www.elliott-tool.com

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