

445 Series Motors

Models 445L1753-190, 445R1753-190, 445L1752-90, 445R1752-90



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 our products, 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.

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

Boilers - Firetube

Chillers

Heat Exchangers

Feedwater Heaters

Fin Fan Coolers

If you have any questions regarding this product, manual or operating instructions, please contact Elliott for immediate service.

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Safety Instructions

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

! WARNING



EYE HAZARD:
Wear protective glasses.

Impact-resistant eye protection must be worn while operating or working near this tool.

For additional information on eye and face protection, refer to Federal OSHA Regulations, 29 Code of Federal Regulations, Section 1910.133., Eye and Face Protection and American National Standards Institute, ANSI A87.1, Occupational and Educational Eye and Face Protection. Z87.1 is available from the American National Standards Institute, Inc. 1430 Broadway, New York, NY 10018.

! WARNING



NOISE HAZARD:
Wear approved ear protection in this area.

Personal hearing protection is recommended when operating or working near this tool.

Hearing protectors are required in high noise areas, 85 dBA or greater. The operation of other tools and equipment in the area substantially contribute to, and increase the noise level in the area. For additional information on hearing protection, refer to Federal OSHA Regulations Section 1910.95, Occupational Noise Exposure, and American National Standards Institute, ANSI S12.6 Hearing Protectors.

! WARNING



REPETITIVE MOTION:
Repetitive work motions and/or vibration can injure hands and arms.

Some individuals are susceptible to disorders of the hands and arms when exposed to tasks, which involve highly repetitive motions and/or vibration.

Those individuals predisposed to vasculatory or circulatory problems may be particularly susceptible. Cumulative trauma disorders such as carpal tunnel syndrome and tendonitis can be caused or aggravated by repetitions, forceful exertions of the hands and arms. These disorders develop gradually over periods of weeks, months and years.

! WARNING



ENTANGLEMENT RISK:
Use minimum hand grip force consistent with proper control and safe operation.

Insure that the operator's hand will not be wedged or pinched between the work and the tool when operating.

Safety Instructions (cont.)

- Always wear protective clothing, safety boots, gloves, dust mask, etc, when operating or in an area where the equipment is being used. This prevents crushing, inhalation and skin exposure hazards from the equipment and/or lubricant used in the equipment.
- 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.

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

Tools with clutches can stall rather than shut-off if adjusted over maximum power output of tool, or if there is a drop in air pressure. Operator must then resist stall torque until throttle is released. ALWAYS use torque reaction bar.

- 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.

Safety Instructions (cont.)



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.

Operating 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.

Operating Instructions

The Right Angle Rolling Motor is designed to operate on 90 PSI (t2 bar) air pressure using a 1/2" 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).

Torque Adjustment

When motor is not running, rotate the adjustment cover until the adjustment slot is uncovered. With the angle head end to the tool facing away, use a 5/32" diameter pin to rotate the adjusting nut clockwise to increase the torque setting and counterclockwise to decrease the setting. After adjustment, rotate the cover over the slot to lock the nut in place. The direction in which to rotate adjusting nut is marked on the cover for reference. A1 is the MIN torque setting, E8 is the MAX torque setting. DO NOT exceed E8. When storing this motor, set the torque back down to A1. This will take a majority of the tension off the clutch before storage.



NOTE: If the motor has stalled due to over adjustment of clutch, release throttle and do not try to continue using motor by rotating it as if it were an air ratchet. This will break the rotor paddles and most likely the cylinder also.

⚠ CAUTION

If the clutch is adjusted over the maximum power output of the tool, the clutch will not function and the tool will operate like a stall-type tool. Also, if the tool is being operated at its upper torque limits, a drop in air pressure could cause the clutch not to function due to a loss of motor power and the tool will function like a stall-type tool.

Operating Instructions

Operational Check

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

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.

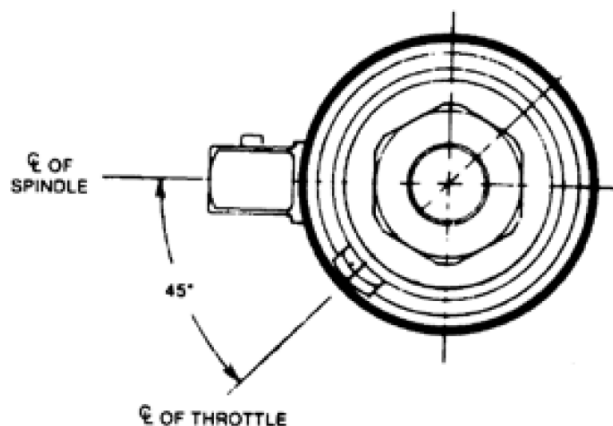
Safety Check

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.



REAR VIEW OF TOOL

Maintenance

Application of the tool should govern how frequently it is checked for maintenance.

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.

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.

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.

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).

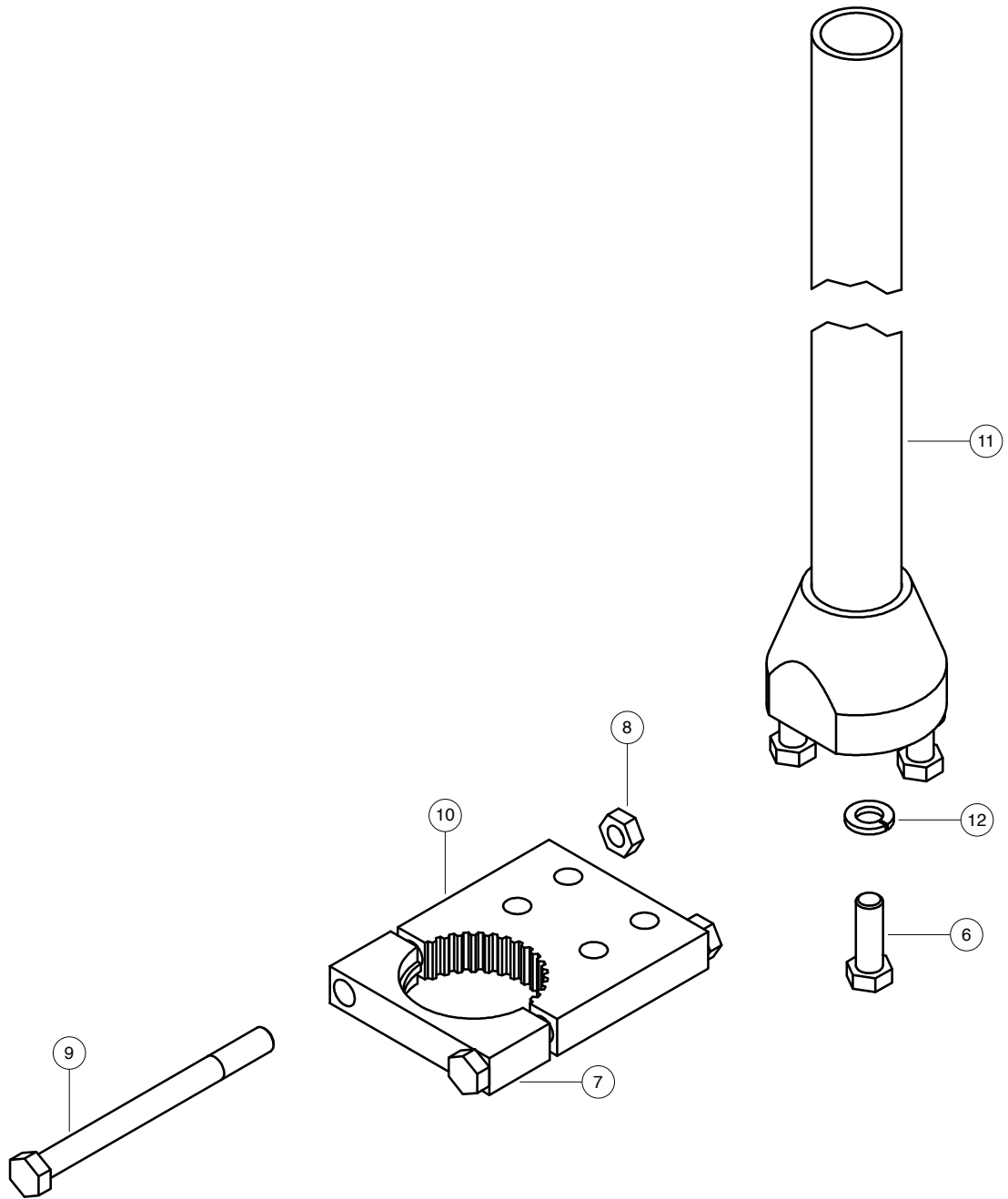
Technical Specifications

		445L1753-190**	445R1753-190	445R1752-90	445L1752-90**
Tube OD Range*		2" - 3" (50.8 - 76.2mm)		2" - 4" (50.8 - 101.6mm)	
Free Speed RPM		190		90	
Torque Range***		70 - 140 ft lbs (95 - 190 Nm)		150 - 305 ft lbs (200 - 410 Nm)	
Weight (With Reaction Bar)	lbs	20		22	
	kg	9.0		9.9	
Air Usage		70 cfm @ 90 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.	
<p>*May vary due to tube wall, material and tube sheet thickness. **Motor is supplied with lever style throttle. ***Measured using industry standard Hard Joint Torque.</p>					

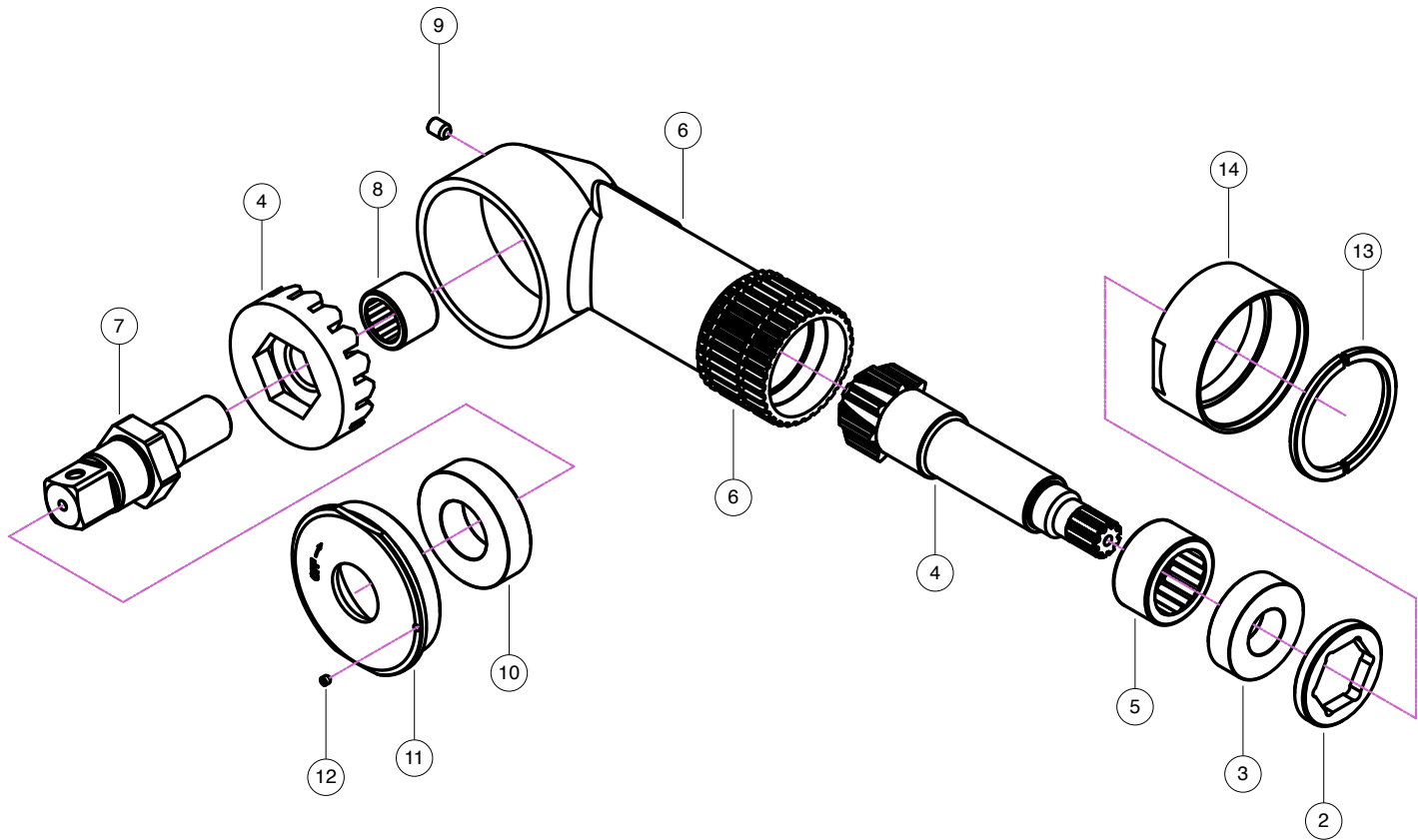
Operating Noise Level: 116 dBA

Spares Kit (445SK)

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
3	PC80-6000ZZ	Bearing
1	PC80B540	Bearing
1	445-7005	Bearing Seat Tool
1	445-7006	Hex Drive
1	P8263C	Locknut
1	37-70580S	Spring
1	41-9722K25	Shim

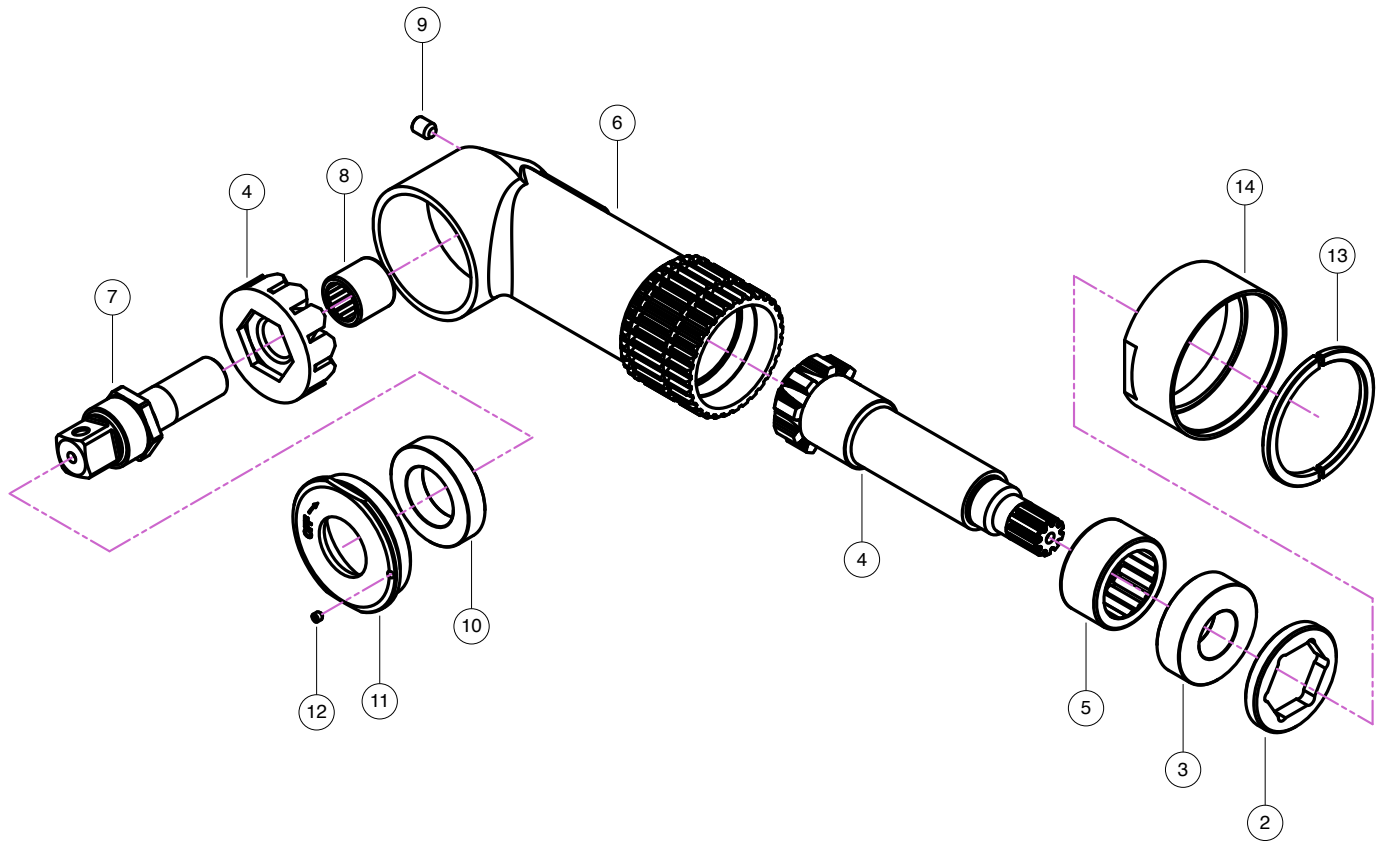


Torque Reaction Bar			
	Part Number	Description	Qty
6	163CI	Hex Head Cap Screw	4
7	445-6002	Reaction Bar Clamp	1
8	130CT	Hex Head Cap Screw	2
9	170C	Hex Jam Nut	2
10	445-6001	Reaction Bar Bracket	1
11	445-1700	Torque Reaction Bar	1
12	133C	Lock Washer	4



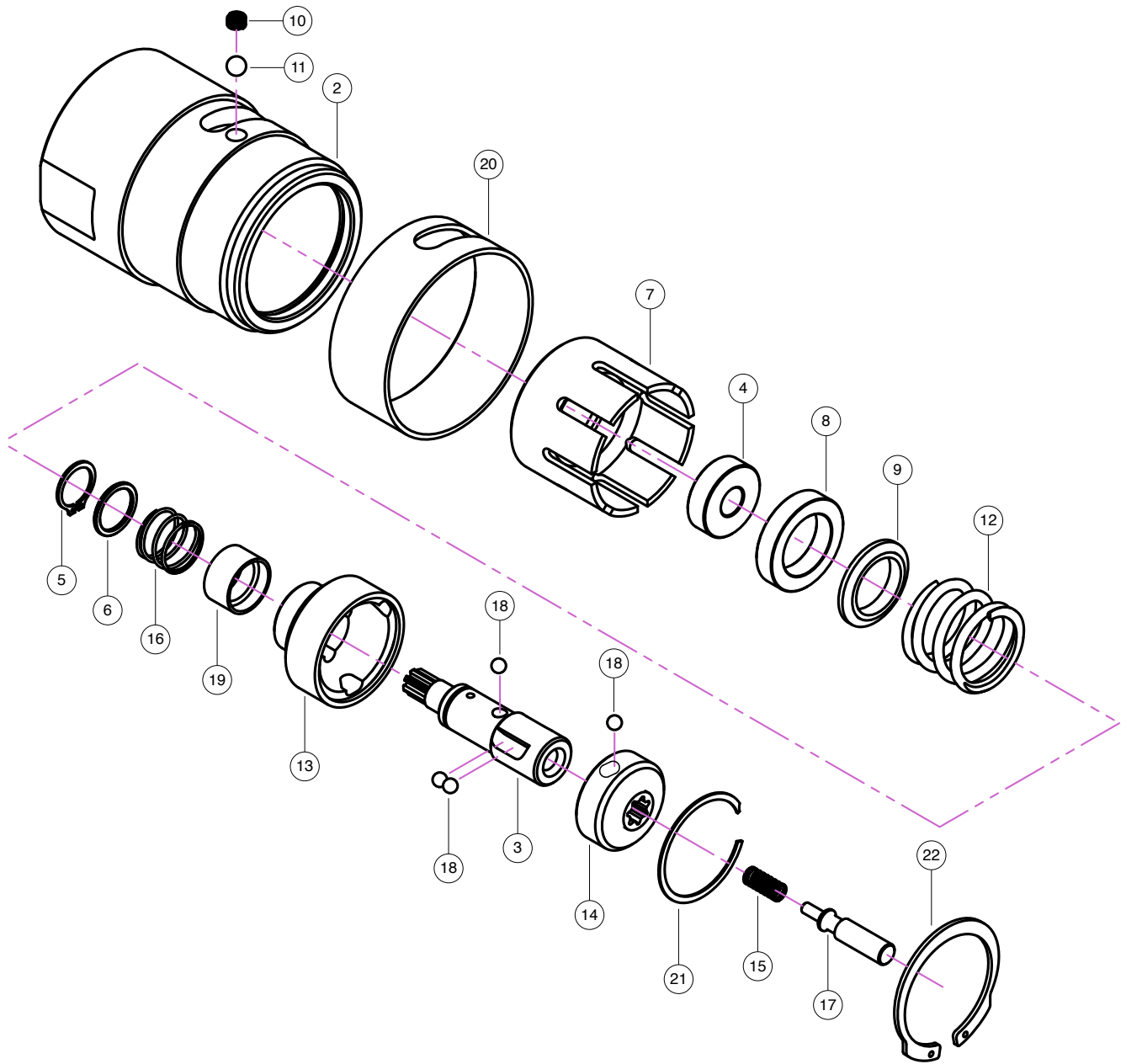
Parts List – 90 RPM Head Assembly

	Part Number	Description	Qty
	445H0090	90 RPM Head	
2	445-5011	Bearing Retainer	1
3	PC80-6004ZZ	Bearing	1
4	445-5003-90	90 RPM Gear Set	1
5	PC80BH-1812	Needle Bearing	1
6	445-5001-90	Right Angle Head	1
7	445-5007-90	Drive Shaft	1
8	PC80M-12121	Needle Bearing	1
9	41-4534K39	Plug	1
10	PC80R16ZZ	Bearing	1
11	445-5005-90	Bearing Cap	1
12	128T	Set Screw	1
13	445-5015	Split Ring	2
14	445-5014	Split Ring Nut	1



Parts List – 190 RPM Head Assembly

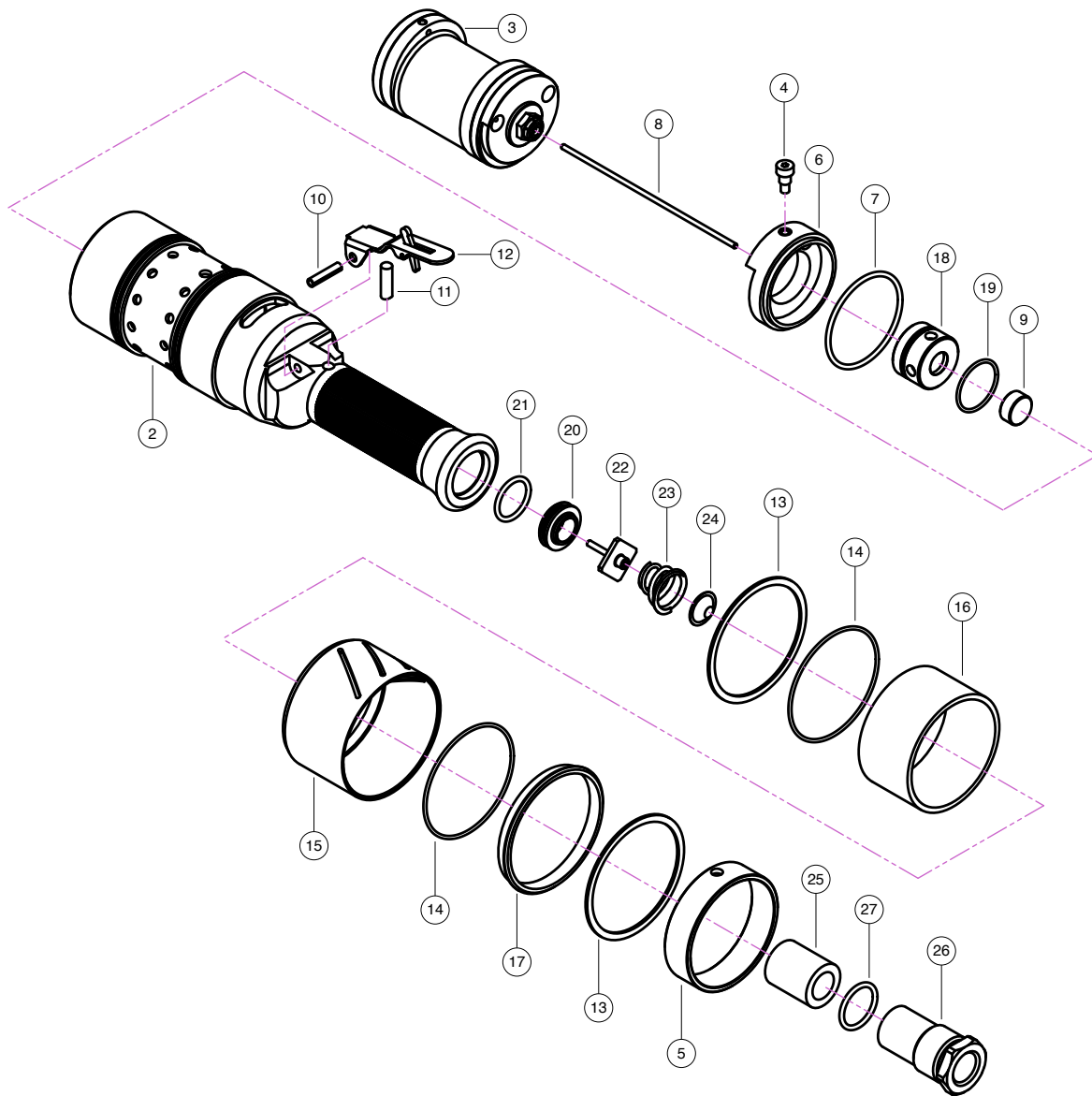
	Part Number	Description	Qty
	445H0190	190 RPM Head	
2	445-5011	Bearing Retainer	1
3	PC80-6004ZZ	Bearing	1
4	445-5003-190	190 RPM Gear Set	1
5	PC80BH-1812	Needle Bearing	1
6	445-5001-190	Right Angle Head	1
7	445-5007-190	Drive Shaft	1
8	PC80M-10121	Needle Bearing	1
9	41-4534K39	Plug	1
10	PC80-6905RS	Bearing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



Parts List – Clutch Assembly

	Part Number	Description	Qty
	445-3000	Clutch Assembly	1
2	445-3015	Clutch Housing	1
3	445-3011	First Stage Pinion	1
4	PC80-6000ZZ	Bearing	1
5	P8375-59	Retaining Ring	1
6	445-3021	Spring Retainer	1
7	445-3012	Torque Adjusting Nut	1
8	PC80B540	Bearing	1
9	445-3019	Bearing Adaptor	1
10	37-70580S	Spring	1
11	109FA	Ball	1

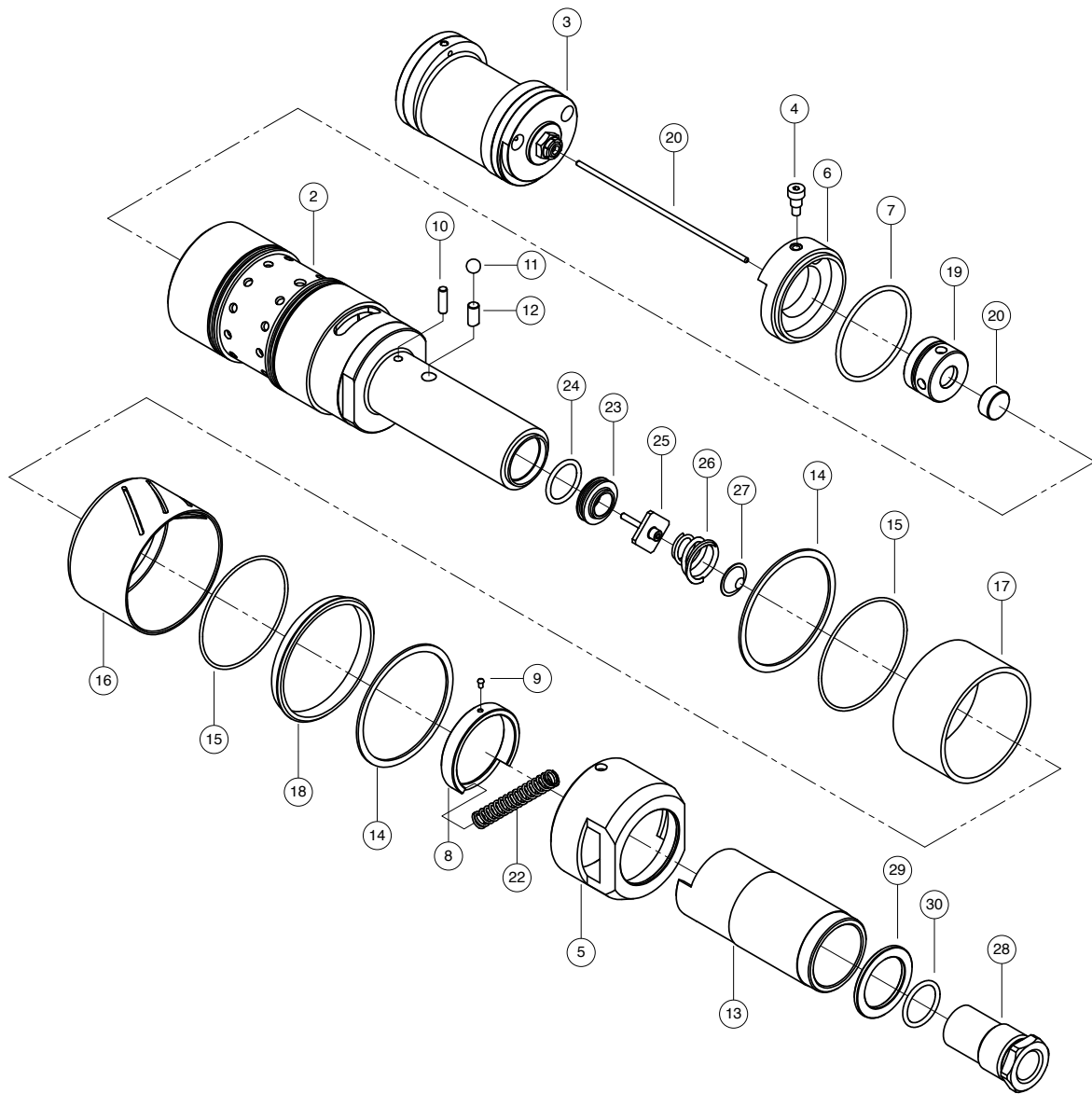
	Part Number	Description	Qty
12	445-3022	Spring	1
13	445-3005	Clutch Body	1
14	445-3002	Clutch Cam	1
15	37-70545	Spring	1
16	37-S-3180	Spring	1
17	445-3001	Plunger	1
18	109DA	Ball	11
19	445-3017	Trip Sleeve	1
20	445-3007	Clutch Ring	1
21	P8397-150	Retaining Ring	1
22	P8787-187	Retaining Ring	1



Parts List – Lever Throttle Assembly

	Part Number	Description	Qty
	445-1200	Lever Throttle Assembly	1
2	445-1201	Lever Handle Body	1
3	445-2000	Air Motor	1
4	539R	Shoulder Screw	1
5	445-1211	Reversing Ring	1
6	445-1019	Reversing Valve	1
7	P8309-138	O'Ring	1
8	445-1027	Trip Rod	1
9	445-1017	Shut-Off Valve	1
10	P8384-14	Spring Pin	1
11	445-1208	Valve Pin	1
12	445-1216	Throttle Lever	1
13	P8286-275	Retaining Ring	2
14	P8309-38	O'Ring	2

	Part Number	Description	Qty
15	445-1025	Exhaust Deflector	1
16	445-1024	Muffler	1
17	445-1026	Exhaust Muffler Retainer	1
18	445-1020	Spacer	1
19	P8309-24	O'Ring	1
20	445-1002	Throttle Valve Seat	1
21	P8309-118	O'Ring	1
22	445-1004	Throttle Valve	1
23	37-TA-2102	Throttle Valve Spring	1
24	445-1006	Filter Screen	1
25	445-1210	Valve Block	1
26	445-1005	Inlet Bushing	1
27	P8309-119	O'Ring	1

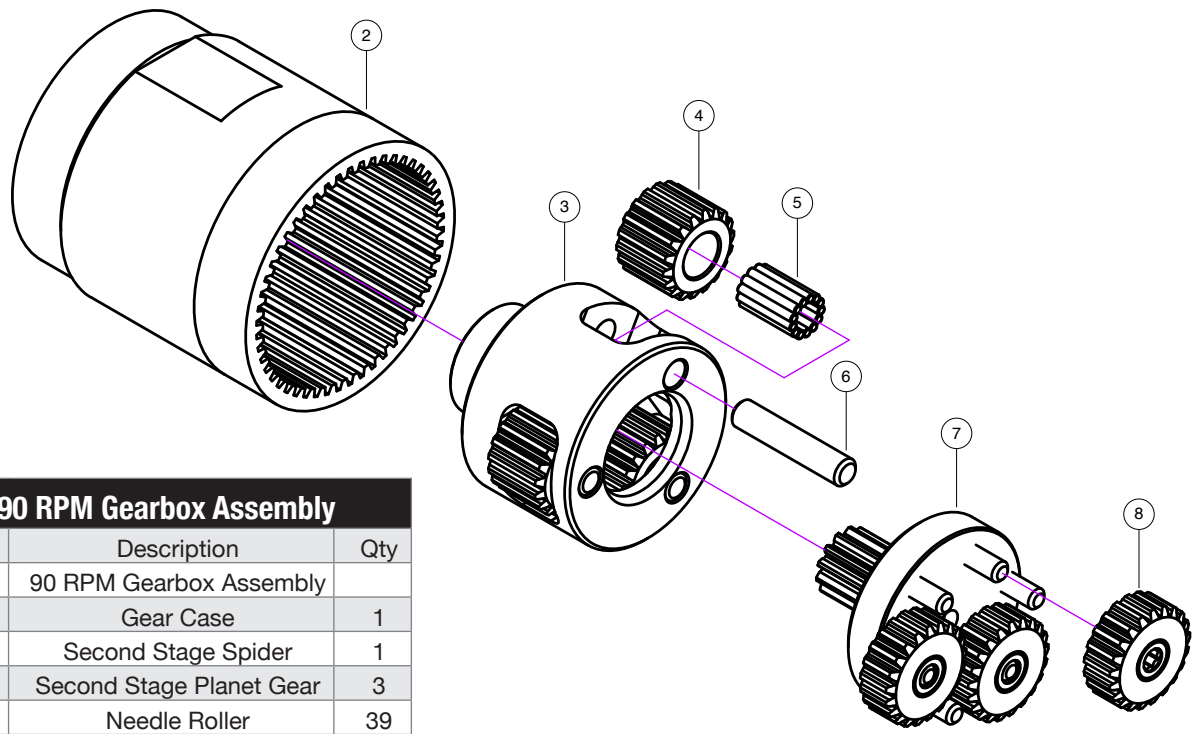


Parts List – Roll Throttle Assembly

	Part Number	Description	Qty
	445-1300	Roll Throttle Handle	1
2	445-1301	Roll Handle Body	1
3	445-2000	Air Motor	1
4	539R	Shoulder Screw	1
5	445-1313	Reversing Ring	1
6	445-1019	Reversing Valve	1
7	P8309-138	O'Ring	1
8	445-1312	Spring Retainer	1
9	445-2009	Alignment Pin	1
10	580-18	Dowel Pin	1
11	109HA	Ball	1
12	445-1308	Valve Pin	1
13	445-1316	Roll Throttle Sleeve	1
14	P8286-275	Retaining Ring	2
15	P8309-38	O'Ring	2
16	445-1025	Exhaust Deflector	1

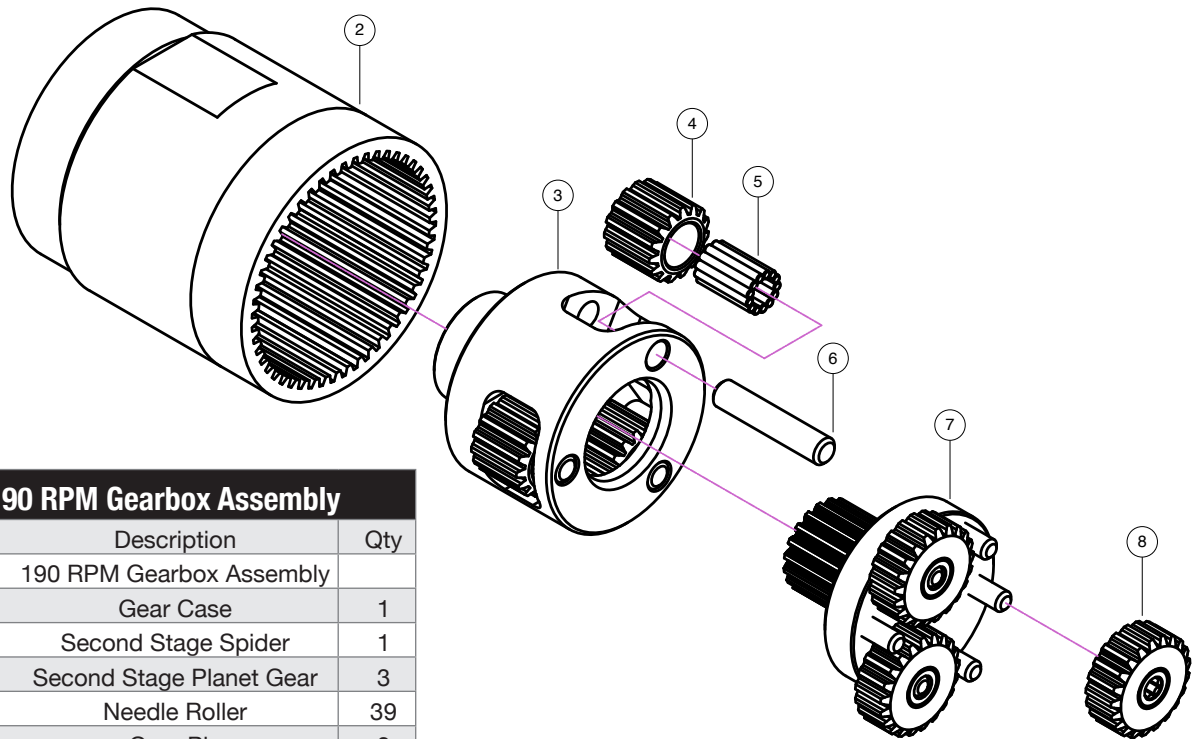
Parts List – Roll Throttle Assembly

	Part Number	Description	Qty
17	445-1024	Muffler	1
18	445-1026	Exhaust Muffler Retainer	1
19	445-1020	Spacer	1
20	445-1027	Trip Rod	1
21	445-1017	Shut-Off Valve	1
22	37-70902	Spring	1
23	445-1002	Throttle Seat Valve	1
24	P8309-118	O'Ring	1
25	445-1004	Throttle Valve	1
26	37-TA-2102	Spring	1
27	445-1006	Filter Screen	1
28	445-1005	Inlet Bushing	1
29	445-1315	Throttle Retainer	1
30	P8309-119	O'Ring	1



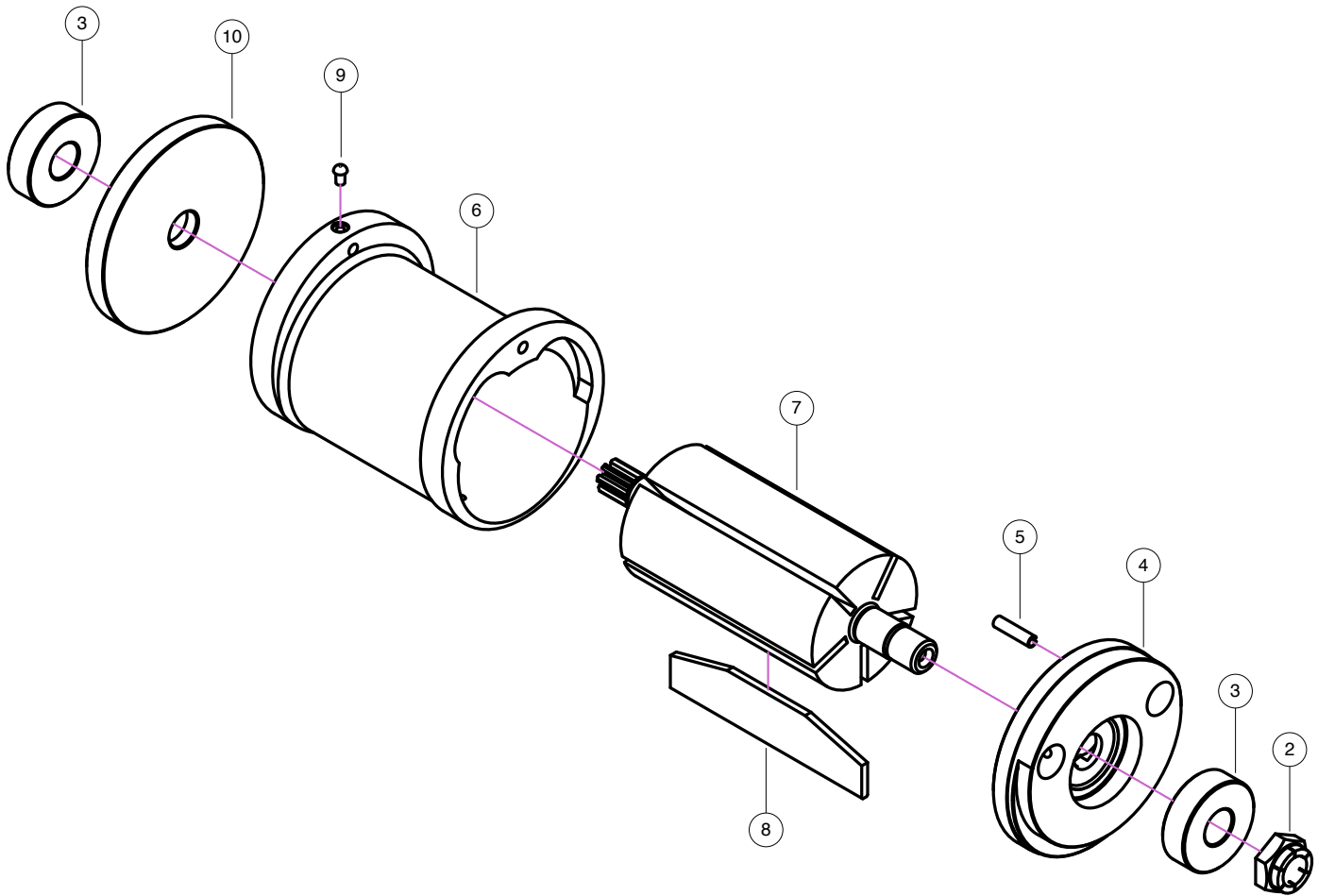
Parts List – 90 RPM Gearbox Assembly

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



Parts List – 190 RPM Gearbox Assembly

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



Parts List – Air Motor Assembly

	Part Number	Description	Qty
	445-2000	Air Motor Assembly	1
2	P8263C	Locknut	1
3	PC80-6000ZZ	Bearing	2
4	445-2004	Rear Bearing Plate	1
5	P8382-8	Spring Pin	1
6	445-2005	Cylinder	1
7	445-2001	Rotor	1
8	445-2002-5	Paddle Set	1
9	445-2009	Alignment Pin	1
10	445-2007	Front Bearing Plate	1

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.



Contact Us

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

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