Wilson
Smarter Tools for Smarter Work

909-1900
909-2000
909-2100

SERIES 909
RIGH ANGLE TUBE ROLLER

OPERATING INSTRUCTIONS
&
SERVICE MANUAL

Rev: A, 2/23/2007

TO REDUCE THE RISK OF INJURY AND EQUIPMENT DAMAGE
USER MUST READ AND UNDERSTAND OPERATOR'S MANUAL.

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SAFETY INSTRUCTIONS

WARNING!

READ AND UNDERSTAND ALL INSTRUCTIONS
Failure to follow all instructions listed below, may result in accident, fire and/or personal injury.
SAVE THESE INSTRUCTIONS

1. Do not allow corrosive gases or foreign material to enter the unit. Moisture, oil-based contaminants, or other liquids must be filtered out.

2. Eye protection is always required when running motor.

3. Hearing protection is recommended when in close proximity to all operating air motors.

4. Dust mask, non-skid safety shoes, hard hat, gloves and other personal safety equipment must be used.

5. Stay alert, watch what you are doing, and use common sense when operating a power tool.

6. Dress properly. Do not wear loose clothing or jewelry.

7. Keep your work area clean and well lit.

8. Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.

9. Disconnect the tool from the air supply before installing, making any adjustment, changing accessories, servicing or storing tool.

OPERATION

Always operate, inspect and maintain this tool in accordance with American National Standards Institute Safety Code for Portable Air Tools (ANSI B186.1) and any other applicable safety codes and regulations.
FOR TOP PERFORMANCE AND MAXIMUM DURABILITY OF PARTS, OPERATE THIS TOOL AT 90 psig (6.2bar/620kPa) AIR PRESSURE WITH ½" (13mm) DIAMETER HOSE.

WARNING: Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool. Failure to do could result in injury.

Air powered tools can vibrate in use. Repetitive motions, uncomfortable positions, vibrations can cause injury to hands, fingers, wrists of some persons. Stop using any tool if discomfort, tingling felling or pain occurs. Seek medical advice before resuming use.

HOSE AND HOSE CONNECTIONS

Use ½" (13mm) hose or hose fitting with a Male Hose Nipple (1/2" hose to ½" male pipe) for attaching it to the tube Roller. A smaller hose or hose fitting will reduce the power and efficiency of the Tube Roller.

LUBRICATION

After each two or three hours of operation, unless an Air Line Lubricator is used, disconnect the air hose and pour into the inlet about 3cc of SAE No. 10 or 'Wilsolub' Pneumatic motor oil Cat. No. 9047. The use of an Air Line Lubricator is recommended with any air-operated tool. Install a Wilson automatic lubricator Cat. No. 8597 as close to the tool as possible. Gearing and Right-Angle Assembly should be grease lubricated approximately every 160 hours of operation. Inject bearing type grease, 1 to 2 strokes through grease fitting in housing.

HIGH TORQUE TOOL - ALWAYS USE PROPER REACTION BAR

IMPORTANT: The reaction bracket, No. 909-2103, 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 reaction bar (with pipe wrench), screws and jam nuts.

USE ONLY SOCKETS APPROVED FOR POWER TOOL SERVICE.

ALWAYS WEAR APPROVED EYE PROTECTION. (See the latest edition of ANSI Z87.1 American National Standard for Occupational and Educational Eye and Face Protection.

READ, UNDERSTAND, AND PRACTICE the requirements of ANSI B186.1, Safety Code for portable air tools.

OPERATION (Cont')

909-2000 & -2100 TUBE ROLLER

The Model 909-2100 Tube Roller is designed to operate on 90 PSIG air pressure, but does 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 this torque. Releasing the throttle will allow the tool to reset for the next cycle.

Clutch Adjustment

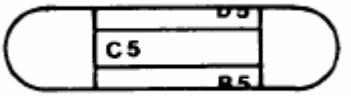
Rotate the adjustment cover until the adjustment slot is uncovered. With the angle head end of the tool facing away, use the 909-2127 adjusting tool or a 5/32" diameter pin to rotate the adjusting nut clockwise to increase the torque setting and counterclockwise to decrease the setting. After adjustment, rotate the cover over the slot to lock the nut in place.

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.

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

Torque Setting

By looking into the clutch adjustment access hole, markings can be seen on the adjusting nut.



NOTE: The marking centered in the access slot is the one to read.

Five revolutions of the adjusting nut covers the complete torque range of the tool. The markings start at A-1(lowest torque setting) and go thru A-8 on the first revolution of the nut. The second revolution starts with B-1, the third starts with C-1, etc. The fifth revolution ends with E-8 (highest torque setting).

NOTE: The torque setting marks are for reference only and do not relate to a specific amount of torque.

OPERATION (Cont')

909-1900 TUBE ROLLER
The 1900 Stall Type Model Tube Roller is designed to develop max torque at 90 PSIG air pressure and it doesn't have clutch adjustment. Torque output can be controlled by a pressure regulator installed in the air supply line.

MAINTENANCE

WARNING
Always turn off the air supply and disconnect the air supply hose before installing, removing or adjusting any accessory on this tool, or before performing any maintenance on this tool. Failure to do could result in injury.

Air tools are made of precision parts and should be handled with reasonable care when servicing.

Excessive pressure exerted by a holding device may cause distortion of a part. Apply pressure evenly when disassembling (or assembling) parts which have a press fit.

When removing or installing bearing, apply pressure to the bearing race that will be the press fit to mating part; if this is not practiced, Brinelling of the bearing race may occur making replacement necessary.

It is important that the correct tools and fixtures are used when servicing this tool.

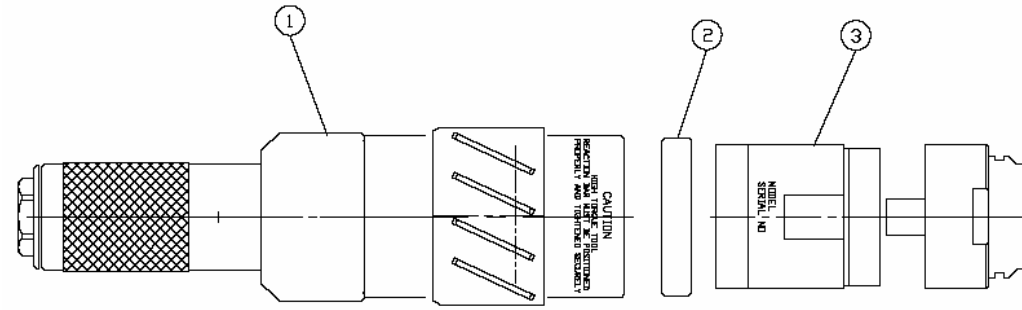
Disassembly should be done on a clean work bench with a clean cloth spread to prevent the loss of small parts. After disassembly is completed; all parts should be thoroughly washed in a clean solvent, blown dry with air and inspected for wear levels, abuse and contamination.

Double sealed or shielded bearings should never be placed in solvent unless a good method of re-lubricating the bearing is available. Open bearings may be washed but should not be allowed to spin while being blown dry. When replacement parts are necessary, consult drawing containing the parts for identification.

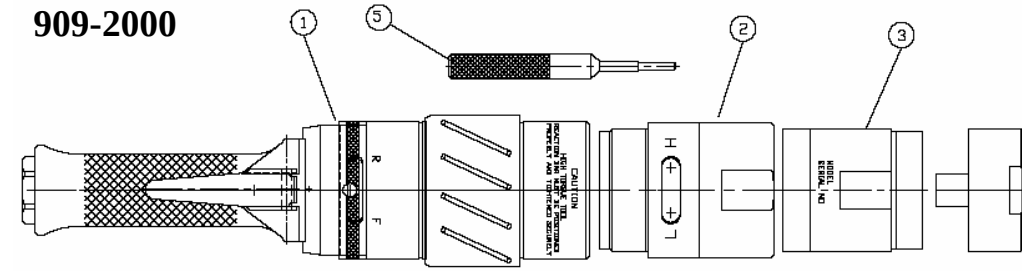
Before reassembling, lubricate parts where required. Use bearing grade grease in bearings. When assembling 'O' ring, care must be exercised to prevent damage to the rubber sealing surfaces. A small amount of grease will usually hold steel balls and small parts in place while assembling.

When ordering parts, be sure to list PART NUMBER, PART NAME, MODEL NUMBER AND SERIAL NUMBER OF TOOL. USE ONLY GENIUE REPLACEMENT PARTS.

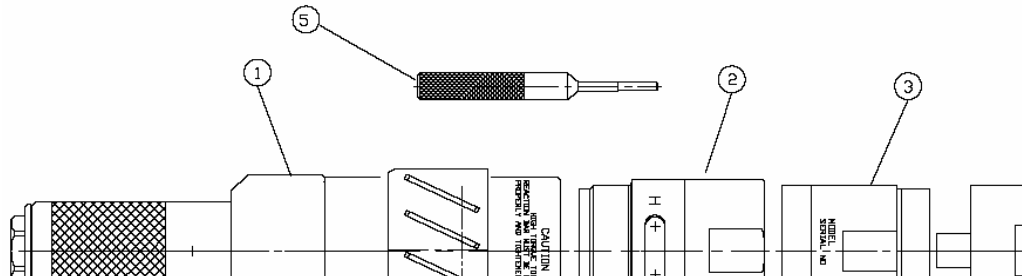
909-1900



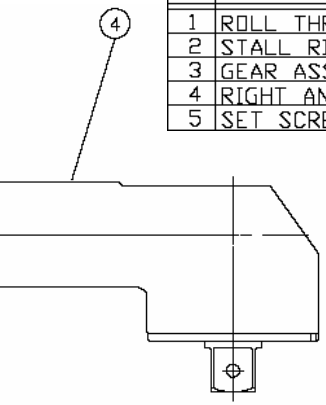
909-2000



909-2100

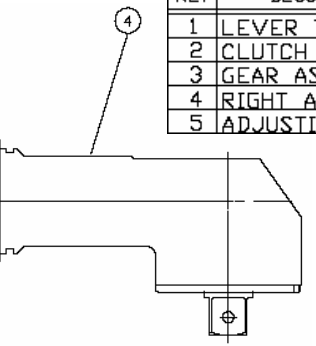


KEY	DESCRIPTION	PART NO.	QTY.
1	ROLL THROTTLE & MOTOR ASS'Y	909-2270	1
2	STALL RING	909-1920	1
3	GEAR ASS'Y	909-2250	1
4	RIGHT ANGLE HEAD ASS'Y	909-2240	1
5	SET SCREW	20006-0000	1

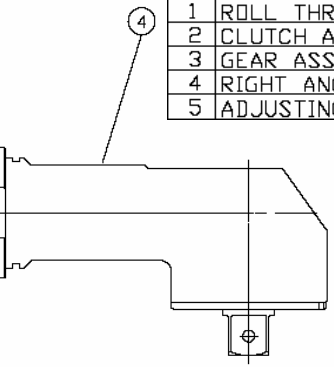


NOTE:
On 909-1900 Model the trip rod, No. 909-2199 and shut off valve, No. 909-2198 is removed from the throttle assembly and the set screw, No. 20006-0000 is assembled in place on the rotor, No. 909-2186

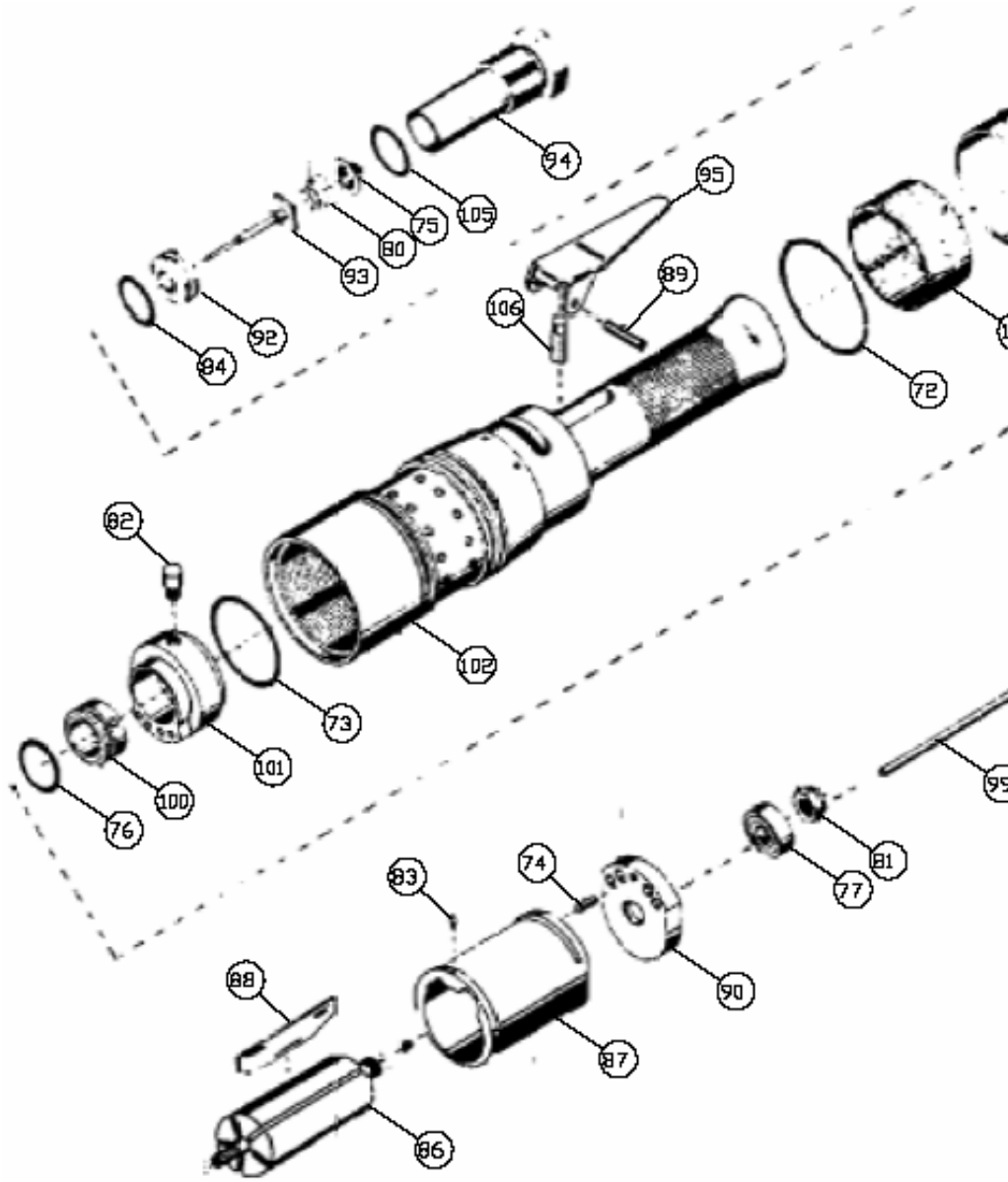
KEY	DESCRIPTION	PART NO.	QTY.
1	LEVER THROTTLE & MOTOR ASS'Y	909-2280	1
2	CLUTCH ASS'Y	909-2260	1
3	GEAR ASS'Y	909-2250	1
4	RIGHT ANGLE HEAD ASS'Y	909-2240	1
5	ADJUSTING TOOL	909-2127	1

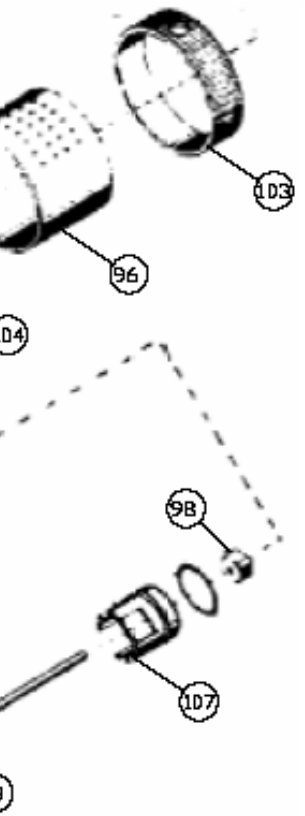


KEY	DESCRIPTION	PART NO.	QTY.
1	ROLL THROTTLE & MOTOR ASS'Y	909-2270	1
2	CLUTCH ASS'Y	909-2260	1
3	GEAR ASS'Y	909-2250	1
4	RIGHT ANGLE HEAD ASS'Y	909-2240	1
5	ADJUSTING TOOL	909-2127	1



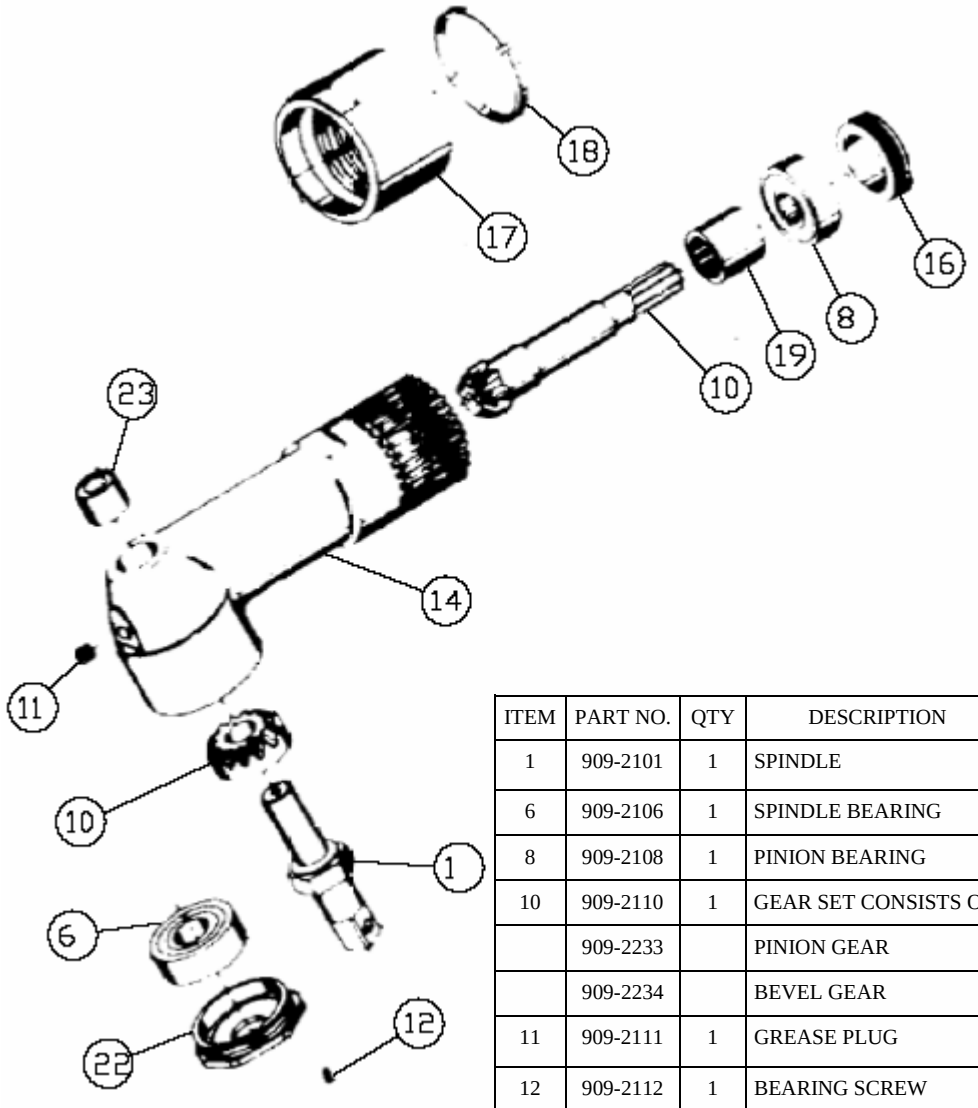
PARTS LIST, 909-2280





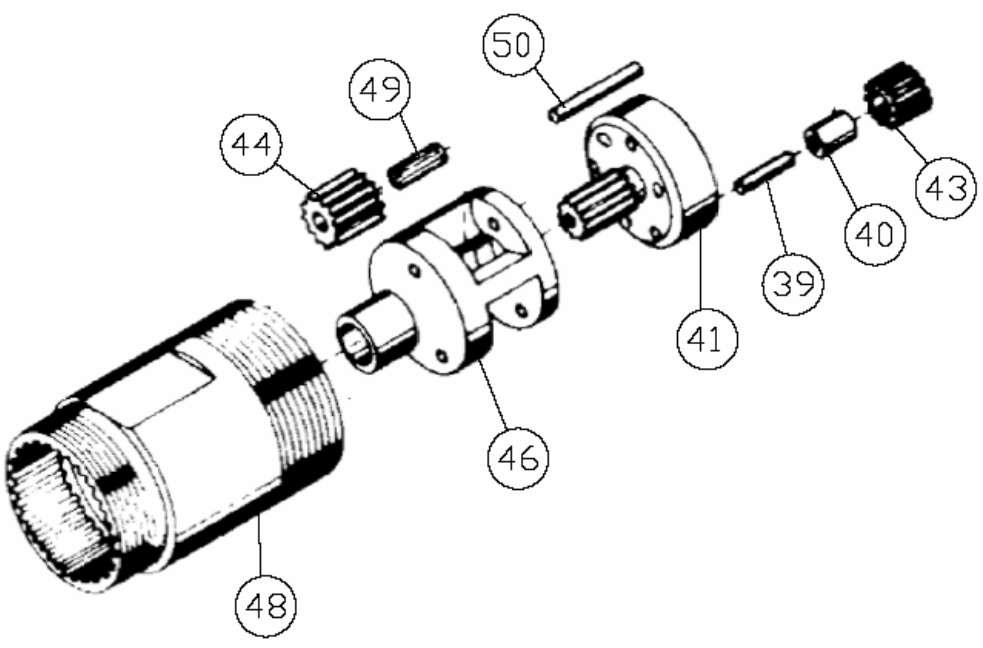
ITEM	PART NO.	QTY	DESCRIPTION
72	909-2172	4	'O' RING
73	909-2173	1	'O' RING
74	25170-0000	1	CYCLINDER PIN
75	909-2175	1	AIR INLET SCREEN
77	909-2154	1	ROTOR BEARING
80	909-2180	1	THROTTLE VALVE SPRING
81	909-2181	1	ROTOR LOCK NUT
82	909-2182	1	REVERSING VALVE SCREW
83	6896-0000	1	MOTOR ALIGNMNET PIN
84	909-2184	1	'O' RING
86	909-2236	1	ROTOR ASSEMBLY
87	909-2187	1	CYLINDER INCL. PIN
88	909-2188X	5	ROTOR BLADE
89	28136-0000	1	LEVER PIN
90	909-2190	1	REAR BEARING PLATE
92	909-2192	1	THROTTLE VALVE SEAT
93	909-2193	1	THROTTLE VALVE
94	909-2194	1	INLET BUSHING
95	909-2195	1	THROTTLE LEVER
96	909-2196	1	EXHAUST DEFLECTOR
98	909-2198	1	SHUT-OFF VALVE
99	909-2199	1	TRIP ROD
100	909-2200	1	MOTOR SPACER
101	909-2201	1	REVERSING VALVE
102	909-2202	1	HANDLE
103	909-2203	1	REVERSING RING
104	909-2204	1	MUFFLER
105	909-2205	1	'O' RING
106	909-2206	1	VALVE PIN
107	909-2235	1	SPACER
N.S.	909-2207	1	DEFLECTOR SPACER

PARTS LIST, 909-2240



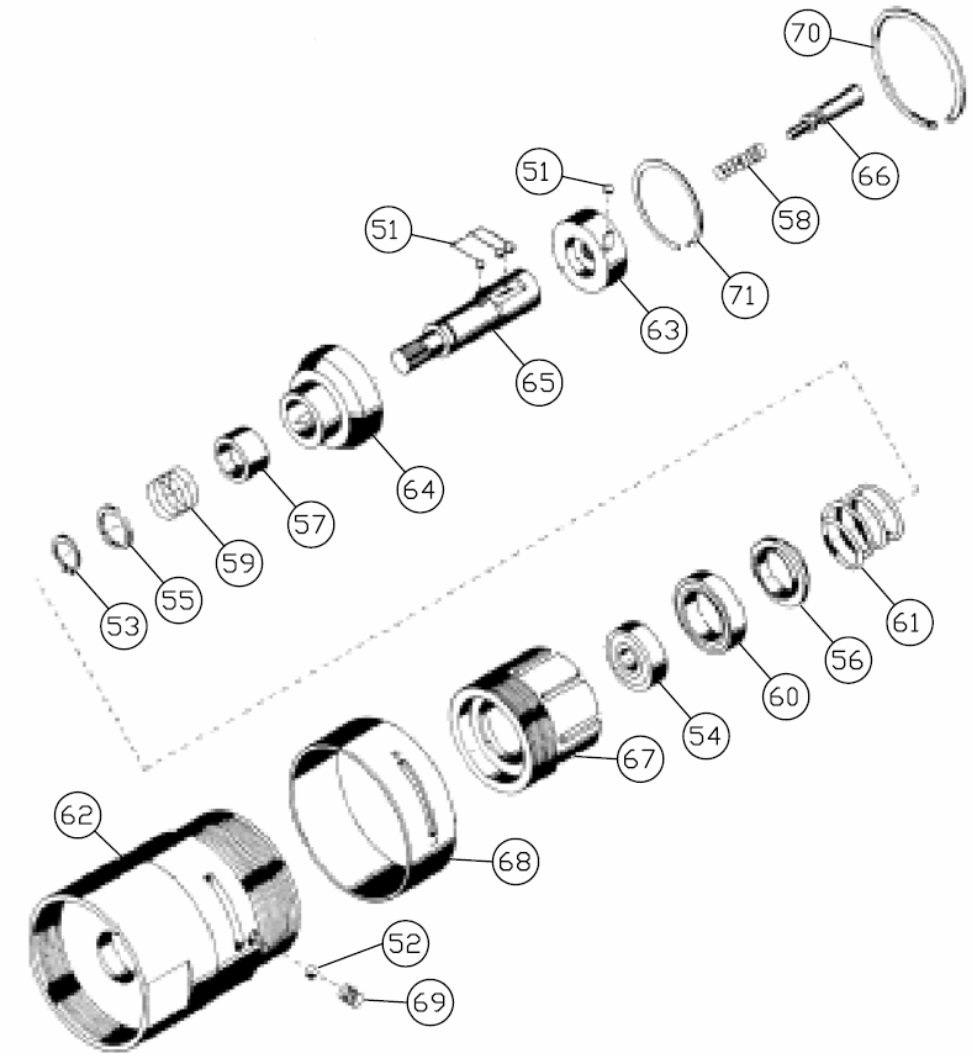
ITEM	PART NO.	QTY	DESCRIPTION
1	909-2101	1	SPINDLE
6	909-2106	1	SPINDLE BEARING
8	909-2108	1	PINION BEARING
10	909-2110	1	GEAR SET CONSISTS OF:
	909-2233		PINION GEAR
	909-2234		BEVEL GEAR
11	909-2111	1	GREASE PLUG
12	909-2112	1	BEARING SCREW
14	909-2114	1	RIGHT ANGLE HEAD
16	909-2116	1	BEARING RETAINER
17	909-2117	1	CLAMP NUT
18	909-2118	1	CLAMP RING
19	909-2119	1	PINION BEARING
22	909-2122	1	BEARING CAP
23	909-2123	1	SPINDLE BEARING

PARTS LIST, 909-2250



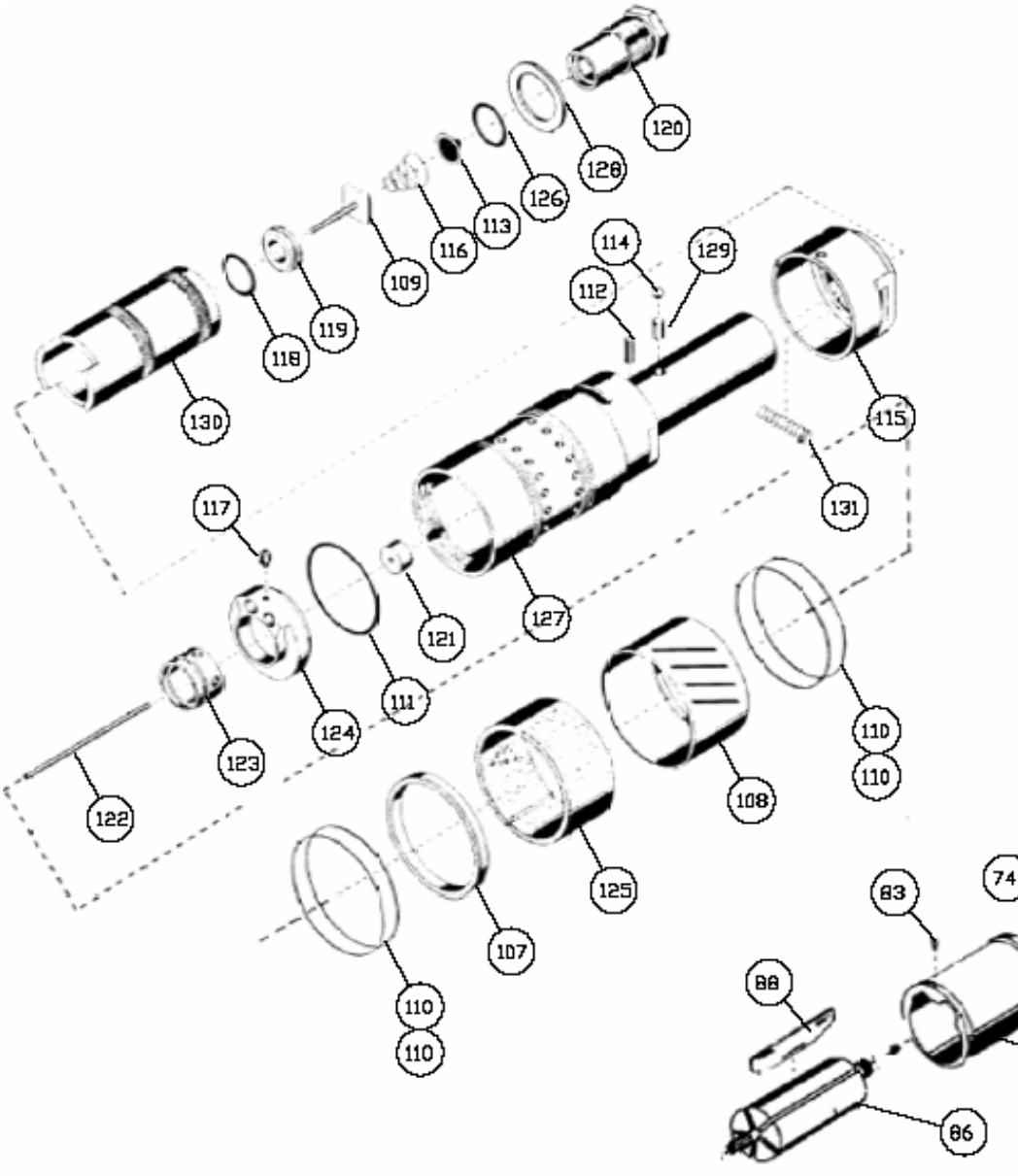
ITEM	PART NO.	QTY	DESCRIPTION
39	6633-0000	3	DOWEL PIN
40	909-2140	3	IDLER BEARING
41	909-2141	1	SPIDER
43	909-2143	3	IDLER GEAR
44	909-2144	3	IDLER GEAR
46	909-2146	1	SPIDER
48	909-2148	1	GEAR CASE
49	909-2149	39	NEEDLE ROLLER
50	6637-0000	3	DOWEL PIN

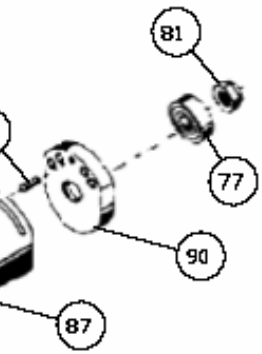
PARTS LIST, 909-2260



ITEM	PART NO.	QTY	DESCRIPTION
51	34272-0000	11	STEEL BALL
52	24031-0000	1	STEEL BALL
53	909-2153	1	RETAINING RING
54	909-2154	1	BALL BEARING
55	909-2155	1	DRIVE SHAFT WASHER
56	909-2156	1	TORQUE SPRING PLATE
57	909-2157	1	TRIP SLEEVE
58	909-2158	1	TRIP PLUNGER SPRING
59	909-2159	1	TRIP SLEEVE SPRING
60	909-2160	1	TORQUE SPRING BEARING
61	909-2161	1	TORQUE SPRING
62	909-2162	1	CLUTCH HOUSING
63	909-2163	1	CLUTCH CAM
64	909-2164	1	BALL RETAINER
65	909-2165	1	DRIVE SHAFT
66	909-2166	1	TRIP PLUNGER
67	909-2167	1	ADJUSTING NUT
68	909-2168	1	ADJUSTMENT COVER
69	909-2169	1	BALL SPRING
70	909-2170	1	CLUTCH RETAINING RING
71	909-2171	1	CAM RETAINING RING

PARTS LIST, 909-2270





ITEM	PART NO.	QTY	DESCRIPTION
74	25170-0000	1	CYCLINDER PIN
77	909-2154	1	ROTOR BEARING
81	909-2181	1	ROTOR LOCK NUT
83	6896-0000	1	MOTOR ALIGNMNET PIN
86	909-2236	1	ROTOR ASSEMBLY
87	909-2187	1	CYLINDER INCL. PIN
88	909-2188X	5	ROTOR BLADE
90	909-2190	1	REAR BEARING PLATE
107	909-2207	1	DEFLECTOR SPACER
108	909-2196	1	EXHAUST DEFLECTOR
109	909-2193	1	THROTTLE VALVE
110	909-2172	4	‘O’ RING
111	909-2173	1	‘O’ RING
112	909-2212	1	DOWEL PIN
113	909-2175	1	SCREEN
114	21941-0000	1	BALL
115	909-2215	1	REVERSE RING
116	909-21880	1	SPRING
117	909-2182	1	REVERSE VALVE SCREW *Loctite In Place
118	909-2184	1	‘O’ RING
119	909-2192	1	THROTTLE VALVE SEAT
120	909-2194	1	INLET BUSHING
121	909-2198	1	SHUT-OFF VALVE
122	909-2199	1	TRIP ROD
123	909-2200	1	MOTOR SPACER
124	909-2201	1	REVERSING VALVE
125	909-2204	1	MUFFLER
126	909-2205	1	‘O’ RING
127	909-2227	1	HANDLE
128	909-2228	1	THROTTLE RETAINER
129	909-2229	1	VALVE ROD
130	909-2230	1	THROTTLE SLEEVE
131	909-2231	1	THROTTLE RETURN SPRING

DISASSEMBLY

DISASSEMBLY - General

Clamp the flats of the handle in a vise with the tool in a vertical position. Using a suitable wrench, loosen (left hand threads) the clamp nut, No. 909-2117, and remove the angle head assembly. Unscrew and remove the clutch housing and gear case assemblies. Clamp the gear case in the vise and unscrew the clutch housing. Slip the motor unit out the front of the handle. It may be necessary to bump the handle on the work bench to loosen the motor.

Right Angle Head

Remove the bearing cap lock screw (1/16 hex), No. 909-2112, and unscrew (left hand threads) the bearing cap. Clamp the square drive in the vise and use a soft mallet to drive the angle head off. Press the spindle out of the driven gear and then press the spindle out of the ball bearing.
Unscrew and remove the bearing retainer, No. 909-2116, and grease plug, No. 909-2111. Use a suitable driver to drive the pinion gear out of the housing.

Clutch

CAUTION: The adjustment cover, No. 909-2168, retains the ball spring, No. 909-2169, and steel ball, No. 24031-0000, and care should be exercised to prevent their loss.
Use a 5/32" (3.96mm) diameter pin to lower the clutch adjustment. This will allow the clutch retainer ring, No. 909-2170, to be removed from the clutch housing. Remove the clutch assembly from the housing. Use a suitable bearing puller to remove ball bearing, No. 909-2154. Remove retainer ring, No. 909-2153, drive shaft washer, No. 909-2155, trip sleeve spring, No. 909-2159, and trip sleeve, No. 909-2157, from the drive shaft, No. 909-2165. NOTE: Trip Plunger, No. 909-2166, trip plunger spring, No. 909-2158, and two (2) balls, No. 909-2151, should also be removed at this time. Use a sharp pointed instrument to remove the cam retainer ring, No. 909-2171, from the ball retainer, No. 909-2164. Slip the drive shaft, No. 909-2165, and clutch cam, No. 909-2163, out the rear of the ball retainer, No. 909-2164.

Gear Case

Slip the entire gear train out the rear of the gear case. The 2nd reduction idler gears may be removed for inspection by driving the idler gear pins, No. 6637-0000, out the rear of the spider.

Motor

Use a soft-faced mallet to drive the rotor out of the front rotor bearing, No. 909-2154. This will allow the removal of the front bearing plate, No. 909-2185, cylinder, and five (5) rotor blades, No. 909-2188, from the rotor, No. 909-2186. Clamp the rotor lightly in the vise and unscrew the rotor lock nut, No. 909-2181. Rest the rear bearing plate on the vise jaws and use a soft faced mallet to drive the rotor out of the rear rotor bearing.

DISASSEMBLY

Handle
Unscrew the inlet bushing, No. 909-2194, for inspection of the throttle components. The air inlet screen, No. 909-2175, should be washed in a solvent and blown out in the reverse of normal airflow. Replace if damaged or clogged.

Reassembly
The tool is reassembled in the reverse order of disassembly. Clean all parts thoroughly in a solvent and inspect for damage or wear. Check all bearings for wear which can be detected by excessive endplay and/or roughness that would indicate a brinelled condition. The rotor blades should be replaced if they measure less than 3/8" (9.5mm) at either end. All gear teeth, bearings, and pins should receive a close inspection and be replaced if necessary. All gears and open bearings should receive a generous amount of No 2 Moly grease during reassembly.

Motor Reassembly
To assemble the motor, install the rear rotor bearing into the rear bearing plate. Make sure the outer bearing race is firmly seated in the bearing plate. Clamp the rotor body lightly in the vise with the threaded end up and slip the rear bearing plate assembly onto the rotor shaft far enough for the bearing lock nut to start. Tighten the lock nut until there is approximately .001 "/ .001 5" (0.025/0.038mm) clearance between the rotor and bearing plate. The outer bearing race should be firmly seated and the rotor bumped forward when checking this clearance. Pack both rotor bearings with a good grade of No. 2 Moly grease after assembly of the motor unit.
IMPORTANT:During reassembly of the complete tool, it is important that the motor be free. After the tool is completely assembled, the right angle square drive spindle should turn freely using a small hand wrench. If the spindle does not turn freely, the motor should be checked for proper spacing Do not run the tool until the spindle turns freely. Failure to do this could result in damage to motor components.

1st REDUCTION GEAR TRAIN REASSEMBLY

- 2 Gear Train (13 Tooth Spider)
21 Tooth idler gears on inner set of gear pins.

-3 Gear Train (19 Tooth Spider)
21 Tooth idler gears on inner set of gear pins.

Clutch Reassembly
The clutch is reassembled in the reverse order of disassembly. The torque spring bearing, No. 909-2160, must be assembled so that the solid side of the ball separator is facing the torque spring plate, No. 909-2156.

DISASSEMBLY

Right Angle Head
When installing needle bearings, press only on the bearing's stamped end. The pinion needle bearing should be slipped on the pinion gear and pressed into the housing to the following depth:
#230 Right Angle Head = 3-3/16" (81 mm)
#110 Right Angle Head = 3" (76.2 mm)

The pinion bearing retainer, No. 909-2116, should be securely tightened to ensure proper gear make-up.

The driven gear bearing cap should be torqued to 100/ 110 ft.-lb, (1 35/1 49Nm) and the bearing cap lock screw torqued to 10 in -lb (1 1.52cmkg) minimum.

NOTE: When assembling the angle head to the complete tool, the clamp nut, No. 909-2117, (left hand threads) must be torqued to 100/110 ft.-lbs. (135/ 149Nm).

Trip Rod Sizing
During reassembly of the tools, the trip rod must be ground flush (+0/-1/32) (+0/-0.793mm) with the end of the rotor. Hold the motor firmly in the handle at the time the trip rod is being sized to length.

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.

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

TROUBLE-SHOOTING

PROBLEM	CAUSE & REMEDY
Motor will not run.	1. Insufficient air supply —Check 90 psi and 90 CFM air supply. 2. Clogged air inlet screen —Replace or Clean 3. Broken or severely worn rotor blades —Replace. 4. Rust due to improper storage of tool —Disassemble and clean– Refer to Disassembly procedure. 5. Broken throttle valve pin or lever
Motor will not reach RPM.	1. Insufficient air volume —Check 90 CFM supply. 2. Dirty air inlet screen —Clean. 3. Worn rotor blades —Replace. 4. Air supply hose chocked or too small —See Operating Procedure recommended hose. 5. Rotor Assembled incorrectly —Re-assemble referring to assembly procedure.
Motor stalls at high torque	1. Insufficient air pressure —Check 90 psi supply 2. Dirty air inlet screen —Clean. 3. Rotor blades worn, chipped or broken —Replace.
Motor fails to stop	1. Broken throttle valve spring —Replace. 2. Valve ball does not seal —Replace or rework valve seat.

SPECIFICATIONS

Model no.	909-1900	909-2000	909-2100
Type	Roll Throttle Stall Type	Lever Throttle Torque Control	Roll Throttle Torque Control
Free Speed (RPM)	90	90	90
Min. Torque Ft-Lb	150	150	150
Max. Torque Ft-Lb	305	305	305
Air Pressure psi	90	90	90
Air Inlet	1/2” NPT	1/2” NPT	1/2” NPT
Hose	1/2” I.D.	1/2” I.D.	1/2” I.D.
Air Flow @Free Speed	90 CFM	90 CFM	90 CFM
Spindle	3/4” square	3/4” square	3/4” square
Weight	18.5 Lb (8.8kg)	18.5 Lb (8.8kg)	18.5 Lb (8.8kg)

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