

Quackenbush®

15QDA-RAB-SU-RS RIGHT ANGLE POSITIVE FEED DRILLS



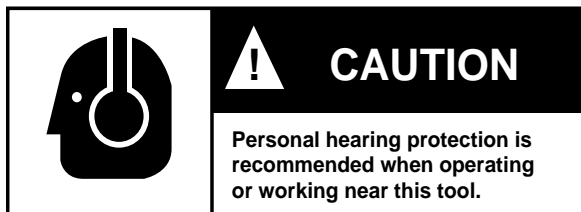
Safety Recommendations

For your safety and the safety of others, read and understand the safety recommendations and operating instructions.

Always wear protective equipment:



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 Z87.1, Occupational and Educational Eye and Face Protection. Z87.1 is available from the American National Standards Institute, Inc., 11 West 42nd Street, New York, N.Y. 10036.



Hearing protection is recommended in high noise areas, 85 dBA or greater. The operation of other tools and equipment in the area, reflective surfaces, process noises and resonant structures can substantially contribute to and increase the noise level in the area. For additional information on hearing protection, refer to Federal OSHA Regulations, 29 Code of Federal Regulations, Section 1910.95, Occupational Noise Exposure, and American National Standards Institute, ANSI S12.6, Hearing Protectors.



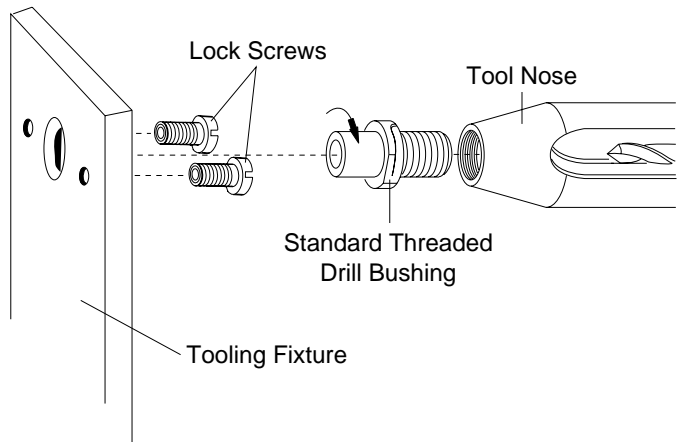
Follow good machine shop practices. Rotating shafts and moving components entangle and entrap, and may result in serious injuries. Never wear long hair, loose-fitting clothes, gloves, ties, or jewelry when working with or near a drill of any type.

CAUTION

- Quackenbush drills are designed to operate on **90psig (6.2 bar) air pressure**. Excessive air pressure can increase the loads and stresses on tool parts and drills, and may result in breakage. The installation of a filter-regulator-lubricator in the air supply line is highly recommended.
- Before removing a tool from service or changing drill bits, make sure the air line is shut off and drained of air. This will prevent the tool from operating if the throttle is accidentally engaged.
- Cutting tools used with these Quackenbush drill motors are sharp. Handle them carefully to avoid injury.

CAUTION

Before mounting any positive feed drill, check the lock screws in the tooling fixture and drill bushing. Make sure both are in good condition and securely tightened.



Positive feed drills can exert high torques and high thrust loads. If failure of the lock screws or drill bushing occurs, the drill may suddenly spin and back away from the drill fixture.

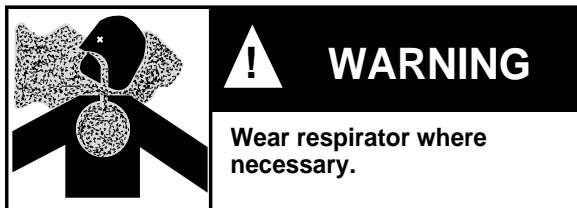
Warning Labels

The warning labels found on these tools are essential parts of this product. Labels should not be removed. Labels should be checked periodically for legibility. Replace warning labels when missing or when the information can no longer be read. Replacement labels can be ordered from the manufacturer.

Safety Recommendations

⚠ CAUTION

The spindle on right angle positive feed drills retracts at a much faster rate than it feeds. Care should be taken to avoid entrapment. Nose pieces usually used with these drills are generally slotted for visibility and access to chuck, cutter, and retract stop adjustments. A spindle guard should be used when operating tool. Spindle guards in one inch increments are available to accommodate any length spindle. Slotted spindle guards are available for tools with fluid swivels.

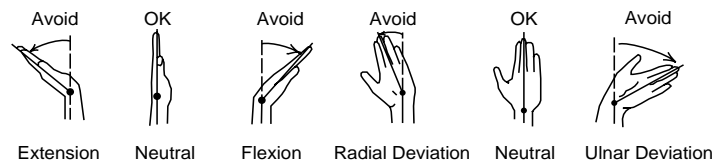


Drilling or other use of this tool may produce hazardous fumes and/or dust. To avoid adverse health effects utilize adequate ventilation and/or a respirator. Read the material safety data sheet for any cutting fluids or materials involved in the drilling process.

⚠ WARNING

- Most dusts are combustible. See material safety data sheets for combustibility of a specific dust.
- Non ferrous metal dusts are particularly hazardous.
Examples: Aluminum, Magnesium, Titanium, Zirconium
(Never collect Magnesium in a dry dust collector)
- Never collect spark generating material in the same dust collector with combustible material.
Examples: Collecting both Steel and Aluminum dust or Steel and Titanium dust.
- Never use flammable finishing lubricants.

Some individuals are susceptible to disorders of the hands and arms when exposed to tasks which involve repetitive work motions. Those individuals predisposed to vasculatory or circulatory problems may be particularly susceptible. Cumulative trauma disorders such as carpal tunnel syndrome and tendinitis may be caused or aggravated by repetitious, forceful exertions of the hands and arms. These disorders develop gradually over periods of weeks, months, and years.



- **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 tool operator should be aware of the following warning signs and symptoms so that a problem can be addressed before it becomes a debilitating injury. Any user suffering 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 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, changing work pace, and/or changing the type of tool used 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. The operator of any drill should:

- Use a minimum hand grip force consistent with proper control and safe operation
- Keep body and hands warm and dry
- Avoid anything that inhibits blood circulation
 - Smoking Tobacco
 - Cold Temperatures
 - Certain Drugs
- Avoid awkward postures
- Keep wrists as straight as possible
- Interrupt work activities, or rotate jobs to provide periods free from repetitive work motions.

OPERATING INSTRUCTIONS

The tool is designed to operate on 90 psig air pressure using a 3/8" I.D. hose up to 8 feet in length. If additional length is required, a 1/2" I.D. or larger hose should be connected to the 3/8" hose.

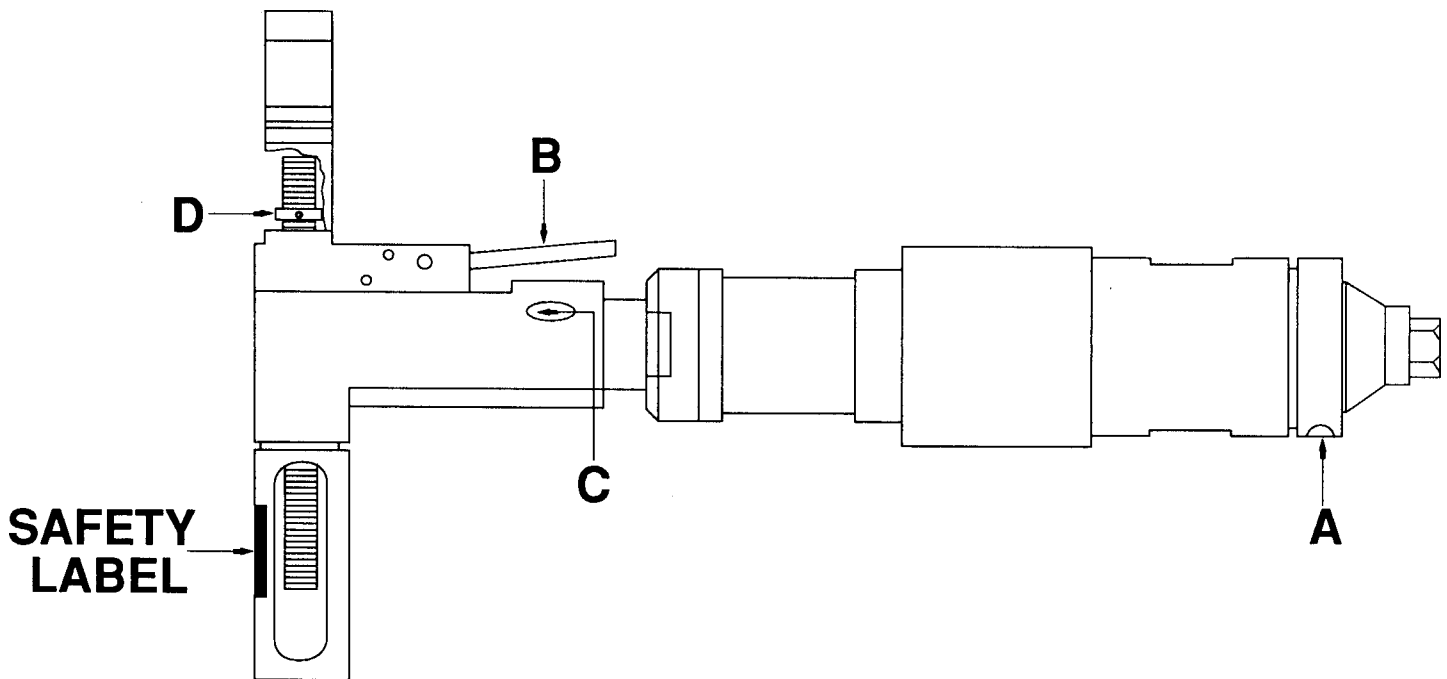
NOTE: Safety Labels can be ordered using part no. 202691.

The tool is started by turning the Throttle Ring **A** to the "ON" position.

The feed cycle is started by pushing the Retract Lever **B** down. The spindle may be controlled by the Automatic Stop **D** or it may be manually retracted at any point by pulling the Retract Lever **B** up. Rapid retraction of the spindle takes place while the spindle continues to rotate.

NOTE: The Gear Stop 622985, can be adjusted by turning the two 1/8" hex set screws 867502 **C**, on either side of the angle head.

Before installing or removing a cutting tool, or such accessory, be sure the tool is disconnected from the air supply. If the air supply line has a valve, shut the valve off and bleed off the air in the line.



LUBRICATION

An automatic in-line filter-regulator-lubricator is recommended as it increases tool life and keeps the tool in sustained operation. The in-line lubricator should be regularly checked and filled with a good grade of 10W machine oil. Proper adjustment of the in-line lubricator is performed by placing a sheet of paper next to the exhaust ports and holding the throttle open approximately 30 seconds. The lubricator is properly set when a light stain of oil collects on the paper. Excessive amounts of oil should be avoided.

STORAGE

In the event that it becomes necessary to store the tool for an extended period of time (overnight, weekend, etc.), it should receive a generous amount of lubrication at that time and again when returned to service. The tool should be stored in a clean and dry environment.

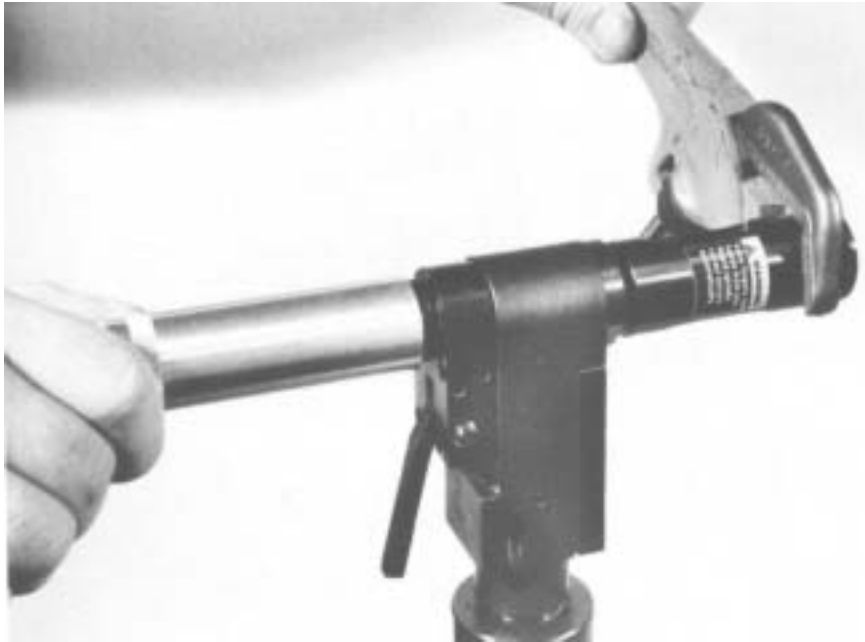
SERVICE INSTRUCTIONS

⚠ WARNING

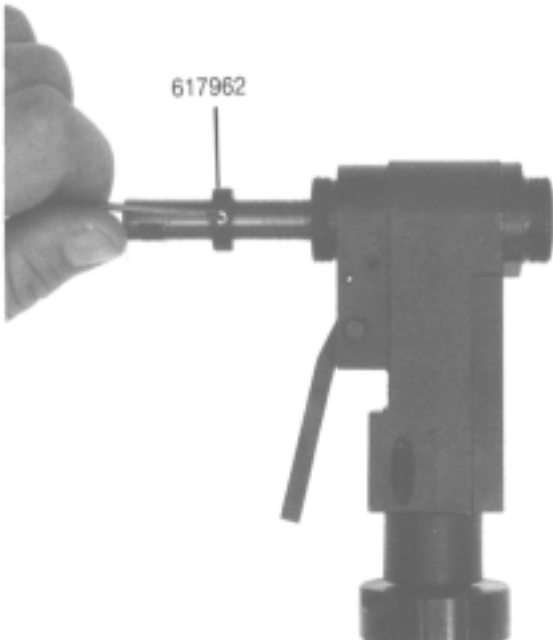
Eye protection must be worn when disassembling tool or when air line is turned on. A self relieving valve in close proximity to the repair station to bleed off air is recommended.

DRILL HEAD DISASSEMBLY

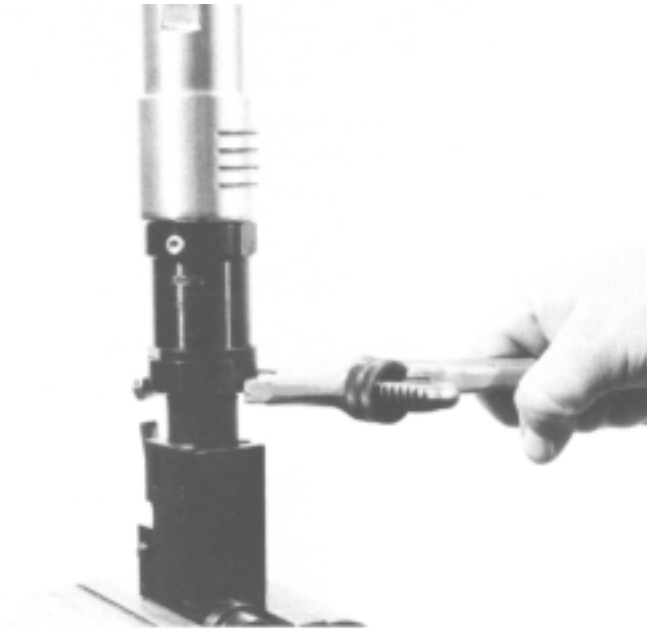
Turn off and bleed air line. Disconnect tool from air line.



1. Clamp tool in soft jawed vise and remove spindle guard with strap wrench and nose piece with appropriate wrench (left hand threads).



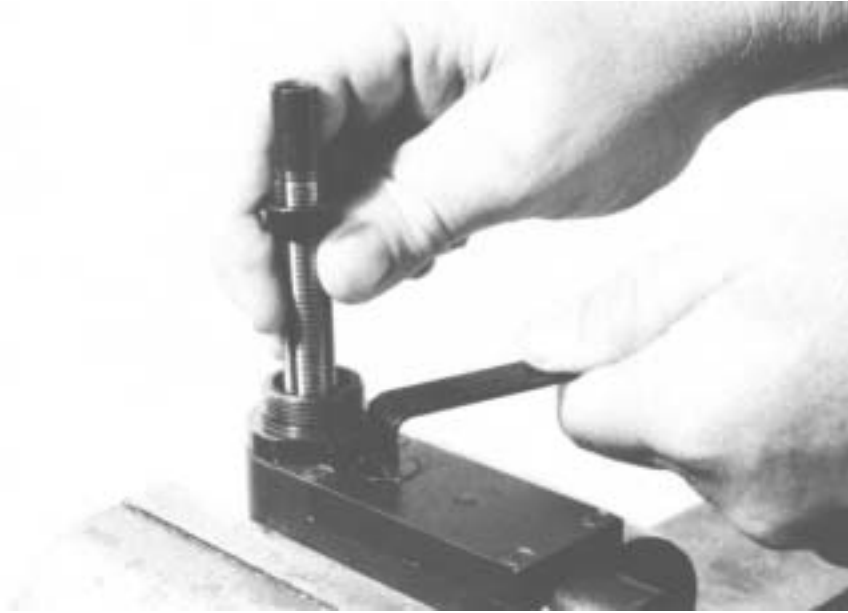
2. Remove front stop collar 617962, by loosening stop collar set screw 617785, with 5/64" hex wrench. Connect air and turn on tool. Start feed cycle by pushing down retract lever. Spindle will feed out. Turn off and bleed off air line. Disconnect tool from air line.



3. Clamp drill head in soft jawed vise in a vertical position and remove drill head and drill head adapter 613544 (both left hand threads).



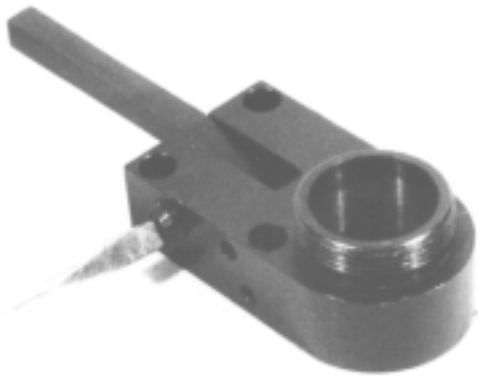
4. Remove drive coupling 622951. The spacer 617149, bearing 847095 and driving bevel gear 622947, will come out when drill head is tapped on soft surface.



5. Insert spindle in front of drill head until it engages spindle drive gear 622950. Then with appropriate wrench 849902 remove drive gear retainer screw 622976.



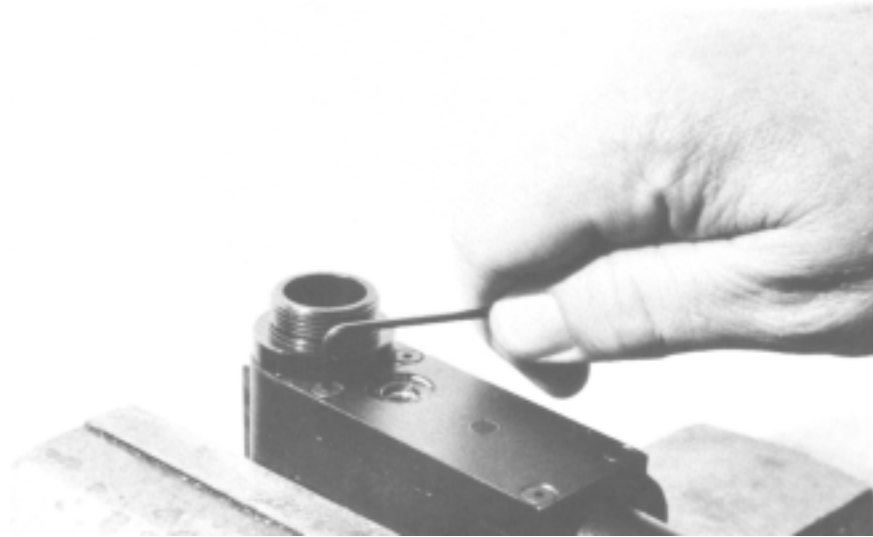
6. Remove four 7/64" socket head cap screws 863337 and lift off retract body 624094.



7. To remove lever from retract body, loosen the two ball plungers 622954, with screwdriver. Push lever pin 844111, out and drive roll pin 844787, with punch if needed to be replaced.



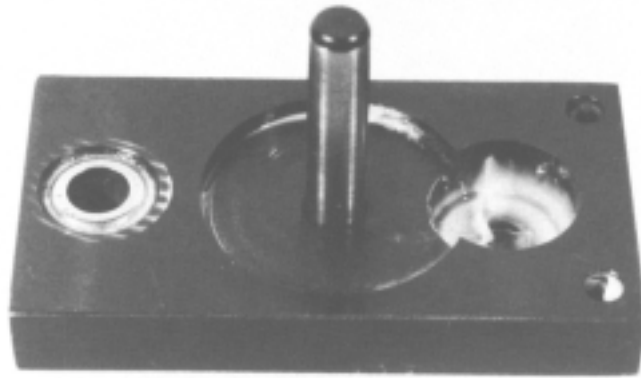
8. Remove two set screws 867502, with 1/8" hex wrench. This will release the two roller springs 844247 and four clutch rollers 622984. Remove gear stop 622985, at this time also.



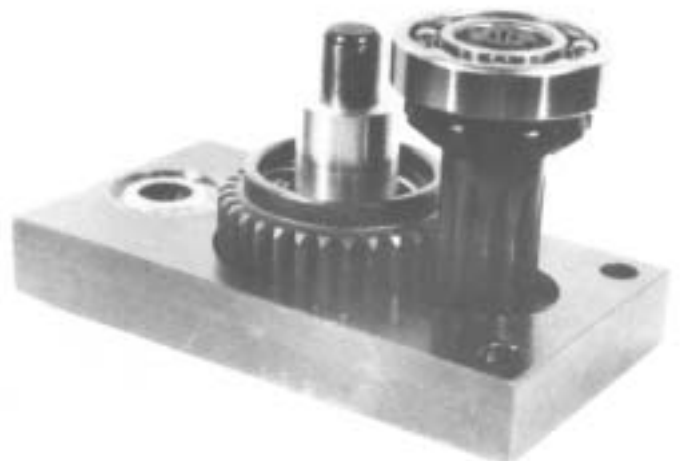
9. Loosen nose adapter and turn flats so two (6/32" X 3/8") flat head screws 863463, in cover 622974, can be removed. Then remove two (6/32" X 5/8") flat head screws from other end of cover.



10. Remove cover 622974. Idler gear 622984, pinion and shaft 622952, driven bevel gear 622946 and bearing 847609, and idler gear spacers 614574 (long) and 614575 (short) will come out at the same time.



11. Press drive gear needle bearing 847430, out if necessary. Installing new bearing, press bearing slightly below inside face of cover.
12. Press idler gear shaft 622980, out if necessary. Press new shaft flush with outside face of cover.



13. Press driven bevel gear 622946, out of bearing if necessary.
14. Remove two retainer rings 619016, to replace bearing 617980, in idler gear 622948.
15. Press pinion and shaft 622952, out of bearing if necessary.

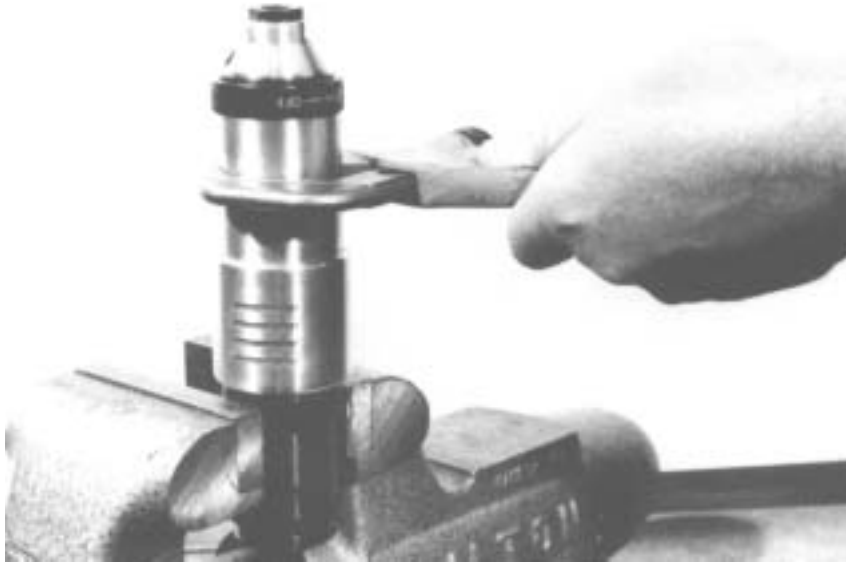


16. Press differential drive gear 622949 and differential feed gear together and slip out of housing 622986.



17. Remove nose adapter (left hand threads), spindle drive gear 622950, spindle feed gear and spindle feed gear bearing 617168.

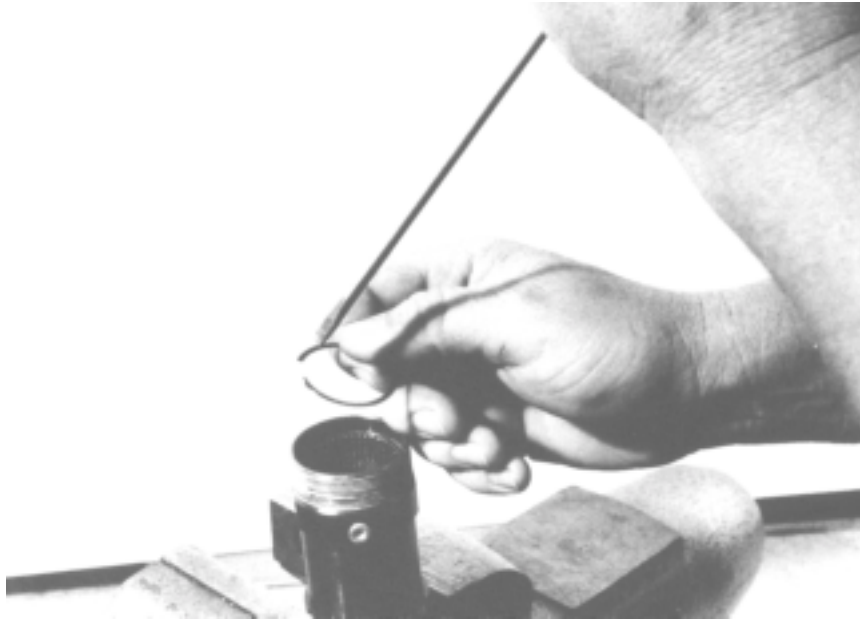
GEAR CASE DISASSEMBLY



18. Clamp gear case on large flats in vertical position. With appropriate wrench on flats loosen motor housing 613226.



19. Slip 1st reduction spider and bearing out rear of gear case.



20. Clamp gear case in vise and remove retainer ring 864240, with two screwdrivers.



21. Push 2nd reduction spider and bearing out of gear case. Remove retainer ring 844364, from front of gear case and remove bearing 843615. After removing the spider bearing with a suitable bearing puller, the idler gears may be removed by driving the idler gear pins out the rear of the two spiders. Pinion gear 864239, which is used in the 1400 RPM gear train, can then be removed from the first reduction spider.

MOTOR UNIT DISASSEMBLY



22. Clamp rotor shaft 864337, in vise and pull motor housing 613226, off motor.

23. Drive rotor 864337, out of front bearing plate 864235 and front bearing 844772, with soft mallet.

24. Remove cylinder 864236 and four rotor blades 864234.

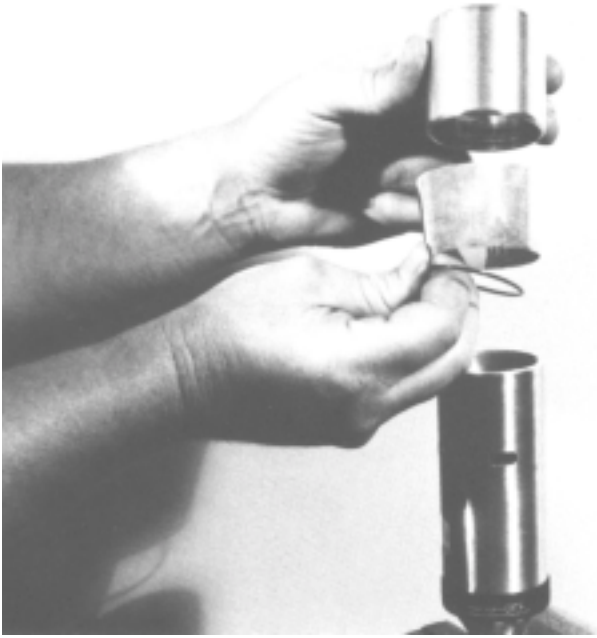


25. Remove retainer ring 812231 and shims.

26. Drive rotor out of rear bearing plate 864232.

27. Remove bearings from bearing plates to check for wear.

BACKHEAD DISASSEMBLY



28. Remove exhaust deflector 612982, muffler 612983 and "O"-ring 617754, for inspection . Clamp hose adapter 624119, in vise and with wrench loosen motor housing. Remove hose adapter and screen 613066, for inspection. Clean or replace.



29. To remove throttle ring 613263 and throttle parts. Remove pipe plug 843434 and retainer ring 613059, and lift off throttle ring.



30. Unscrew spring retainer 613060 and remove spring 613058, ball 844077 and push rod 613264, for inspection.

REASSEMBLY

General

The tool should be reassembled in the reverse order of disassembly.

As all of the various gears and bearings are being assembled, they should be coated with a generous amount of "LUBRIPLATE #907" grease.

After power unit is reassembled, place a few drops of 10W machine oil in the hose before attaching the air hose. This will insure immediate lubrication of all motor parts as soon as the air is applied.

During reassembly, be sure that the drive coupling hex and spline are engaged in the power unit and drill head respectively.

Adjustment of retract lever must be done after tool is fully assembled. When the lever is pushed down into feed cycle it should stay there until the stop collar engages the lever and tool goes into retract.

Right Angle Drill Head

When reinstalling pinion and shaft and bearing into cover, the idler gear must be slipped onto the idler gear shaft simultaneously. Refer to steps 13,14 and 15 in Disassembly.

Gear Case

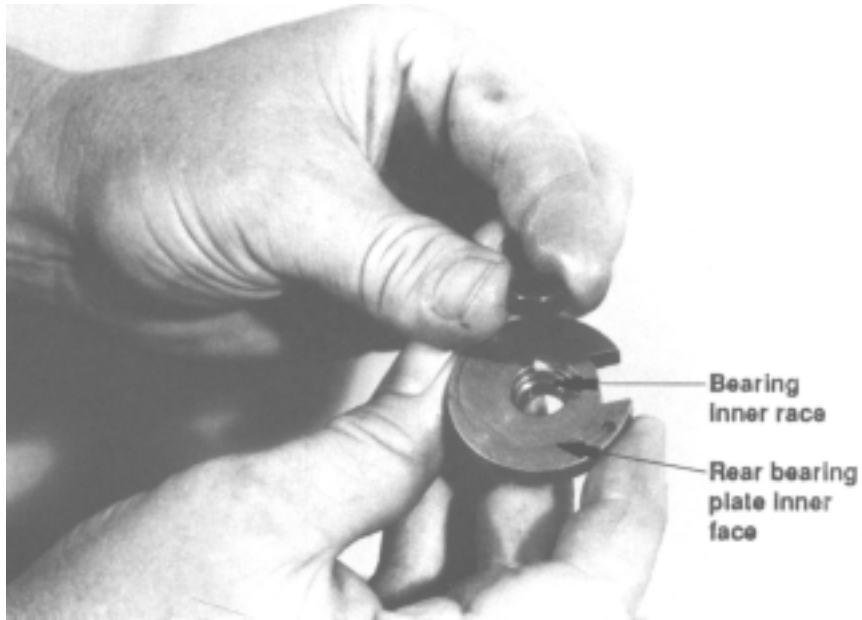
When reinstalling the front bearing 843615, in the gear case, the shield on the bearing must be facing out. Refer to step 21 in Disassembly.

Gear Stop Adjustment

In order to make the adjustment, there are two methods that can be used. The preferred method is to make the adjustment during assembly of drill before the retract body and its' related components are attached to the angle head. With the 622985 gear stop in position with and the 622984 clutch rollers positioned on top of the cam lobes, rather than in the detents, the 867502 set screws are turned clockwise until the springs just begin to make up solid, but are not crushed or distorted. The screws are then rotated counterclockwise 45° minimum to 90° By using this method, it's easier to determine when the spring makes up solid so that there is tendency to force the screw in too deep and damage the springs.

If the adjustment is to be performed with the drill fully assembled, the clutch rollers will normally be resting in the detents. The screws are then rotated in the clockwise direction until the springs just begin to go solid. Care must be used so as not to distort the springs. Once the solid state is achieved, the set screws are backed out (counterclockwise) one full turn plus the 45° to 90°.

Motor Unit



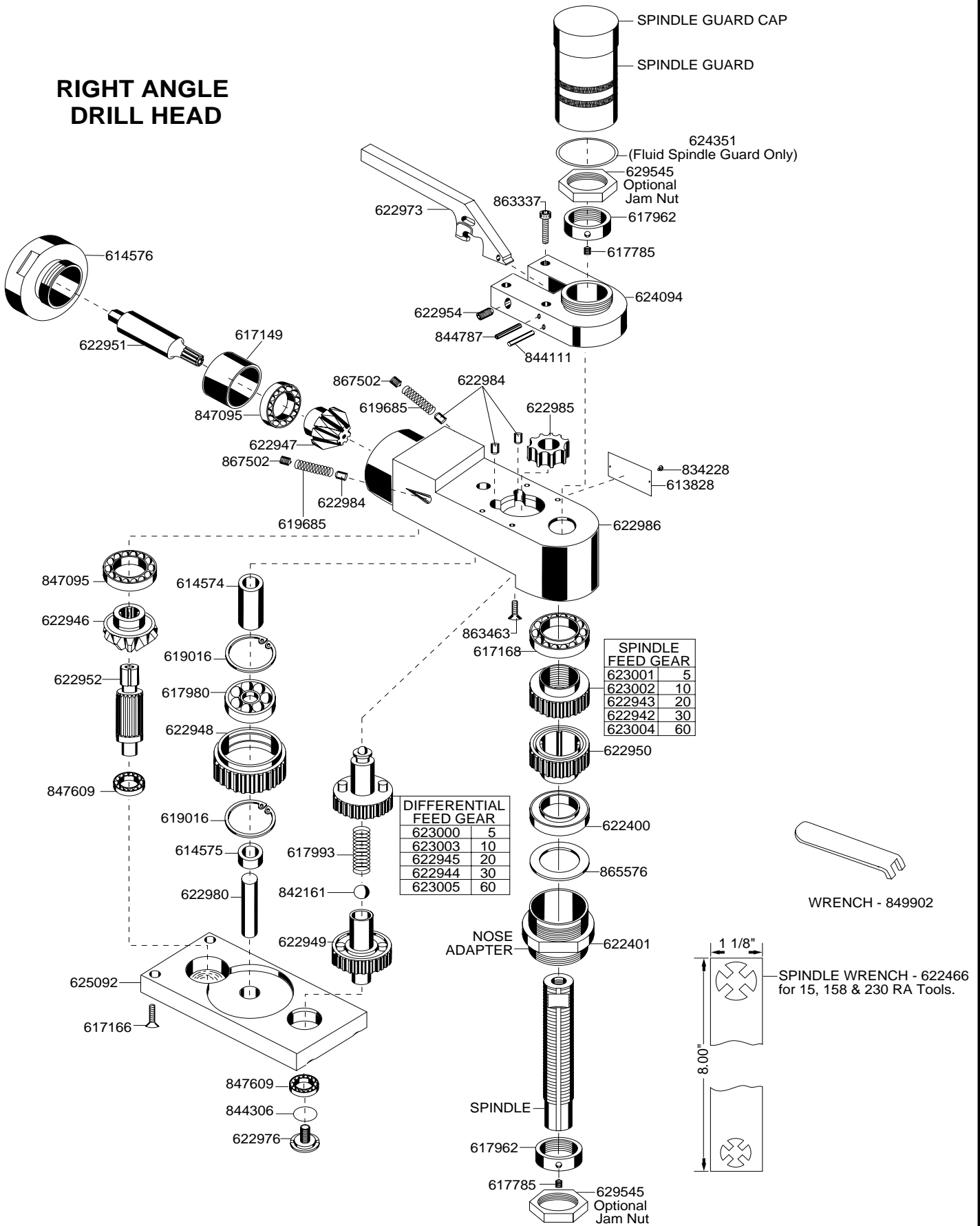
31. When reassembling motor, measure rear bearing plate's inner face down to the bearing's inner race with micrometers. Cut new rotor collar 843913 .0015" longer than this measurement. Install rotor collar in bearing plate chamfer side out.



32. After installing shims between retainer ring 812231 and rear rotor bearing to keep rotor collar tight against bearing. Check clearance between rotor and rear bearing plate. Clearance between rotor and bearing plate should be .0015".

33. Rotor blades should be replaced at every repair cycle or when any blade measures less than 7/32" at either end.

RIGHT ANGLE DRILL HEAD



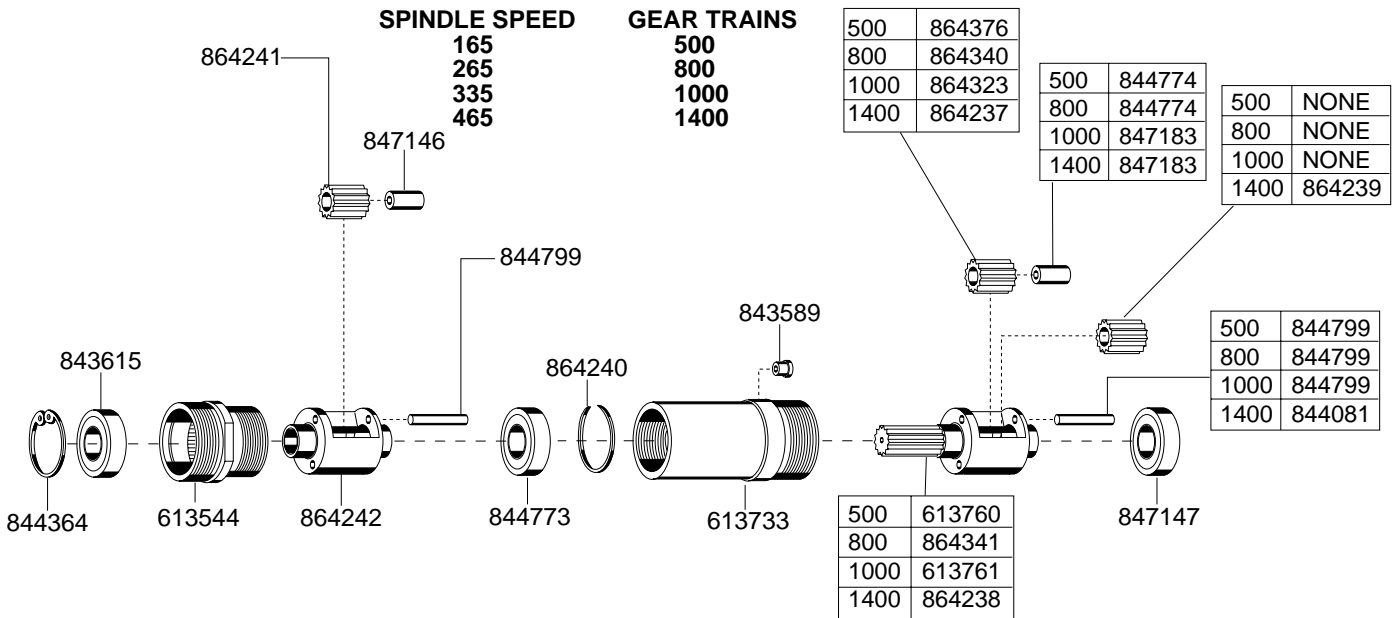
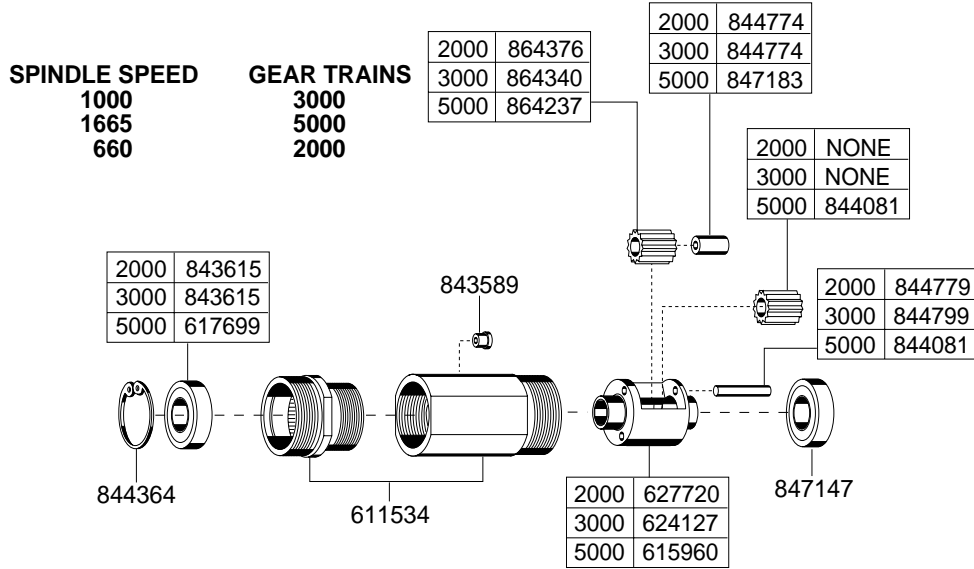
PART LISTS — RIGHT ANGLE DRILL HEAD

PART NO.	NAME OF PART	QUANTITY
613828	Name Plate	1
614574	Idler Gear Spacer (Long)	1
614575	Idler Gear Spacer (Short)	1
614576	Angle Head Adapter	1
617149	Spacer	1
617166	Flat Head Screw (6/32" x 5/8")	2
617168	Feed Gear Ball Bearing	1
617785	Stop Collar Set Screw	2
617962	Stop Collar	2
617980	Ball Bearing	1
617993	Spring	1
619016	Retainer Ring	2
619685	Roller Spring	2
622400	Ball Bearing	1
622401	Nose Adapter	1
622942	.003" Spindle Feed Gear (32T)	1
622943	.002" Spindle Feed Gear (40T)	1
622944	.003" Differential Feed Gear (31T)	1
622945	.002" Differential Feed Gear (38T)	1
622946	Driven Bevel Gear	1
622947	Driving Bevel Gear	1
622948	Idler Gear	1
622949	Differential Drive Gear	1
622950	Spindle Drive Gear	1
622951	Drive Coupling	1
622952	Pinion & Shaft	1
622954	Ball Plunger	2
622973	Retract Lever	1
622976	Drive Gear Retainer Screw	1
622980	Idler Gear Shaft	1
622984	Clutch Roller	4
622985	Gear Stop	1
622986	Housing	1
623000	.0005" Differential Feed Gear (34T)	1
623001	.0005" Spindle Feed Gear (37T)	1
623002	.001" Spindle Feed Gear (43T)	1
623003	.001" Differential Feed Gear (40T)	1
623004	.006" Spindle Feed Gear (31T)	1
623005	.006" Differential Feed Gear (32T)	1
624094	Retract Body	1
624351	Fluid Spindle Guard Shims (.010")	1
624355	Spindle Guard Cap**	1
625092	Cover	1
834228	Drive Screw	2
842161	Steel Ball (3/16")	1
844111	Lever Pin	1
844306	"O"-Ring 5/16" x 7/16"	1
844787	Roll Pin	1
847095	Bevel Gear Ball Bearing	2
847609	Pinion Shaft & Drive Gear Ball Bearing	2
863337	Socket Head Cap Screw	4
863463	Flat Head Screw (6/32" x 3/8")	2
865576	Thrust Race	1
867502	Set Screw	2

Drill Head Assemblies With Nose Adapter 622401 (1-20 L.H. Male Thread)	
Feed	Code No.
.0005"	621615
.001"	621616
.002"	621617
.003"	621618
.006"	621619

**Included with Spindle Guards

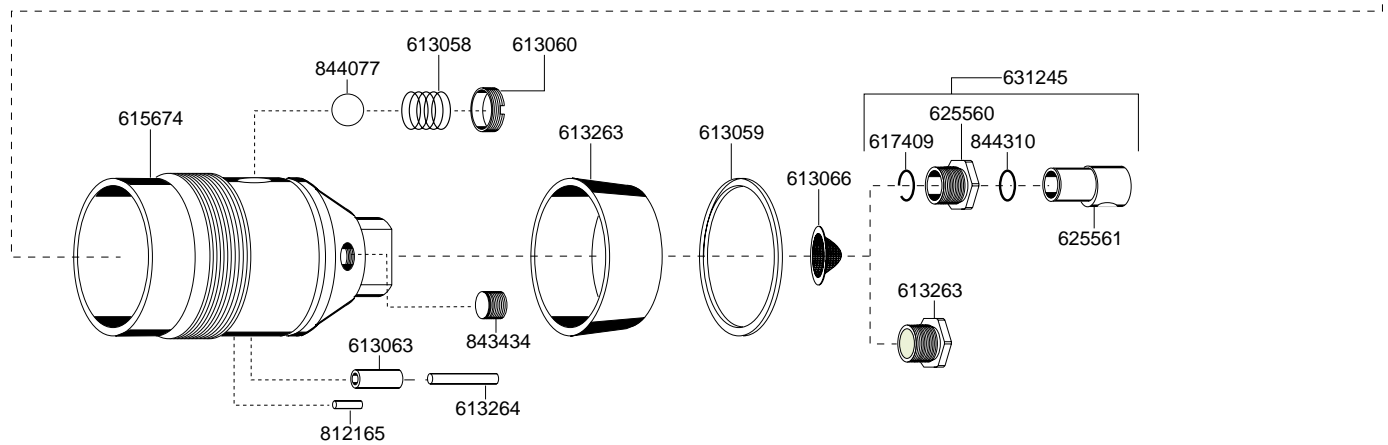
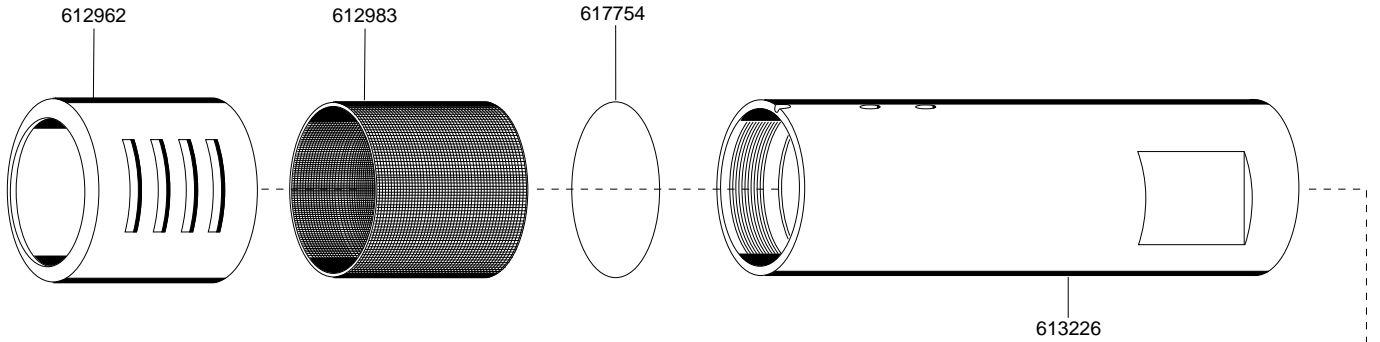
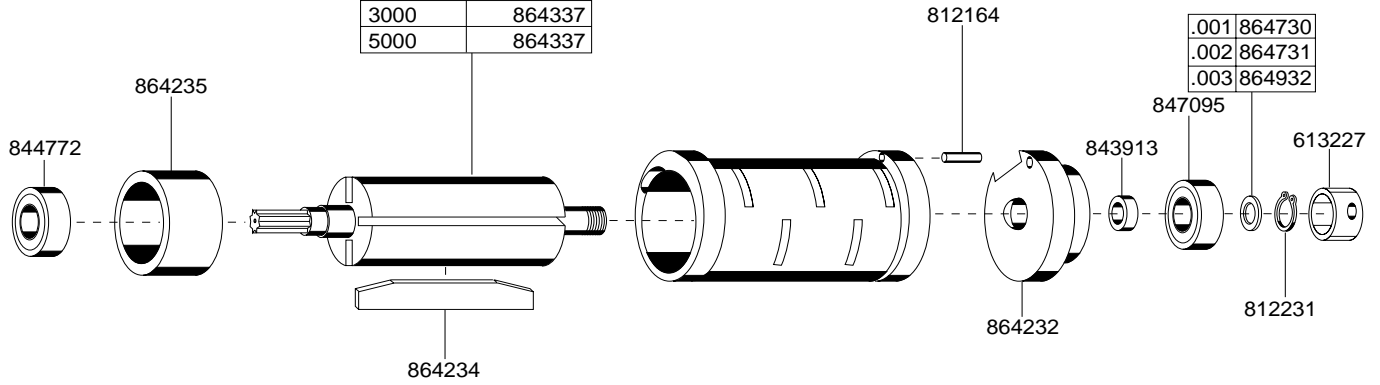
RIGHT ANGLE GEAR TRAINS FOR POWER UNITS



RIGHT ANGLE MOTOR & MOTOR HOUSING FOR POWER UNITS

500	864660
800	864337
1000	864338
1400	864337
2000	864660
3000	864337
5000	864337

.001	864730
.002	864731
.003	864932



PARTS LIST — POWER UNIT

PART NO.	NAME OF PART	QTY.	SUBASSEMBLIES																								
611534	3000 RPM GEAR CASE (INCL. 846412, 613544, 843589)	1	THROTTLE BODY — 611104 INCLUDES 615674, 613063, 812t65 EXHAUST DEFLECTOR — 621065 INCLUDES 612982, 612983, 617754																								
612982	EXHAUST DEFLECTOR	1																									
612983	MUFFLER	1																									
613058	SPRING	1																									
613059	SPIRAL RETAINER RING	1																									
613060	SPRING RETAINER	1																									
613063	THROTTLE ROD BUSHING	1																									
613066	INLET SCREEN	1																									
613226	MOTOR HOUSING	1																									
613227	BEARING CAP	1																									
613263	THROTTLE RING	1																									
613264	THROTTLE PUSH ROD	1																									
			POWER UNIT SUBASSEMBLIES																								
			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">CODE NO.</th> <th style="width: 20%;">MOTOR RPM</th> <th style="width: 20%;">SPINDLE RPM</th> </tr> </thead> <tbody> <tr><td>621187</td><td style="text-align: center;">500</td><td style="text-align: center;">165</td></tr> <tr><td>621175</td><td style="text-align: center;">800</td><td style="text-align: center;">265</td></tr> <tr><td>621288</td><td style="text-align: center;">1000</td><td style="text-align: center;">335</td></tr> <tr><td>621174</td><td style="text-align: center;">1400</td><td style="text-align: center;">465</td></tr> <tr><td>631579</td><td style="text-align: center;">2000</td><td style="text-align: center;">660</td></tr> <tr><td>621739</td><td style="text-align: center;">3000</td><td style="text-align: center;">1000</td></tr> <tr><td>621340</td><td style="text-align: center;">5000</td><td style="text-align: center;">1665</td></tr> </tbody> </table>	CODE NO.	MOTOR RPM	SPINDLE RPM	621187	500	165	621175	800	265	621288	1000	335	621174	1400	465	631579	2000	660	621739	3000	1000	621340	5000	1665
CODE NO.	MOTOR RPM	SPINDLE RPM																									
621187	500	165																									
621175	800	265																									
621288	1000	335																									
621174	1400	465																									
631579	2000	660																									
621739	3000	1000																									
621340	5000	1665																									
613544	MOTOR ADAPTER (INCLUDED WITH 3000 RPM GEAR CASE)	1	* NUMBER REQUIRED VARIES																								
613733	500, 800, 1000, 1400 RPM GEAR CASE (INCL. 843589)	1																									
613760	500 RPM 1ST RED. SPIDER	1																									
613761	1000 RPM 1ST RED. SPIDER	1																									
615674	THROTTLE HANDLE	1																									
615960	5000 RPM SPIDER	1																									
617699	BALL BEARING (5000 RPM ONLY)	1																									
617754	"O"-RING	1																									
624119	INLET BUSHING	1																									
624127	3000 RPM SPIDER	1																									
627720	2000 RPM SPIDER	1																									
631254	OPT. SWIVEL INLET (INCL. 617409, 625560, 844310 & 625561)	1																									
812164	ROLL PIN	1																									
812165	ROLL PIN	1																									
812231	RETAINER RING	1																									
843434	PIPE PLUG	1																									
843589	GREASE FITTING	1																									
843615	BALL BEARING	1																									
843913	ROTOR COLLAR	1																									
844077	5/16" DIA. STEEL BALL	1																									
844081	1400 RPM 1ST RED. IDLER GEAR PIN	2																									
844364	RETAINER RING	1																									
844772	BALL BEARING	1																									
844773	BALL BEARING	1																									
844774	NEEDLE BEARING (INCLUDED IN 864376, 864340, 864323)	2																									
844799	500, 800, 1000, 1400 RPM 2ND RED. AND 500, 800, 1000, 3000 1ST RED. IDLER GEAR PIN (3000 REQ. ONLY 2)	4																									
847095	BALL BEARING	1																									
847146	NEEDLE BEARING (INCLUDED IN 844799) (3000 RPM REQ. ONLY 2)	4																									
847147	BALL BEARING	1																									
864232	REAR BEARING PLATE	1																									
864234	ROTOR BLADE	4																									
864235	FRONT BEARING PLATE	1																									
864236	CYLINDER	1																									
864237	1400 RPM 1ST RED. IDLER GEAR (INCL. 847183)	2																									
864238	1400 RPM 1ST RED. SPIDER	1																									
864239	PINION (1400, 5000 RPM ONLY)	1																									
864240	BEARING RETAINER RING	1																									
864241	500, 800, 1000, 1400 RPM 2ND RED. IDLER GEAR (INCL. 847146)	2																									
864242	500, 800, 1000, 1400 RPM 2ND RED. SPIDER	1																									
864323	1000 RPM 1ST RED. IDLER GEAR (INCL. 844774)	2																									
864337	800, 1400, 3000, 5000 RPM ROTOR	1																									
864338	1000 RPM ROTOR	1																									
864340	800 RPM 1ST RED. AND 3000 RPM IDLER GEAR (INCL. 844774)	2																									
864341	800 RPM 1ST RED. SPIDER	1																									
864376	500 RPM 1ST RED. IDLER GEAR (INCL. 844774)	2																									
864660	500 RPM ROTOR	1																									
864730	.001" SHIM	*																									
864731	.002" SHIM	*																									
864732	.003" SHIM	*																									

SPINDLE GUARDS 15

SOLID SPINDLE GUARDS

Part No.	Name of Part	Qty.
624339	Spindle Guard 1"	1
624340	Spindle Guard 2"	1
624341	Spindle Guard 3"	1
624095	Spindle Guard 4"	1
624342	Spindle Guard 5"	1

Spindle Guard Caps 624355 are included with Spindle Guards.

FLUID SPINDLE GUARDS

Part No.	Name of Part	Qty.
624328	Spindle Guard 2"	1
624329	Spindle Guard 3"	1
624330	Spindle Guard 4"	1
624331	Spindle Guard 5"	1

Positioning Shims 624351 and Spindle Guard Caps 624355 are included with Fluid Spindle Guards.

Other guards for special length spindles are available upon request.



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