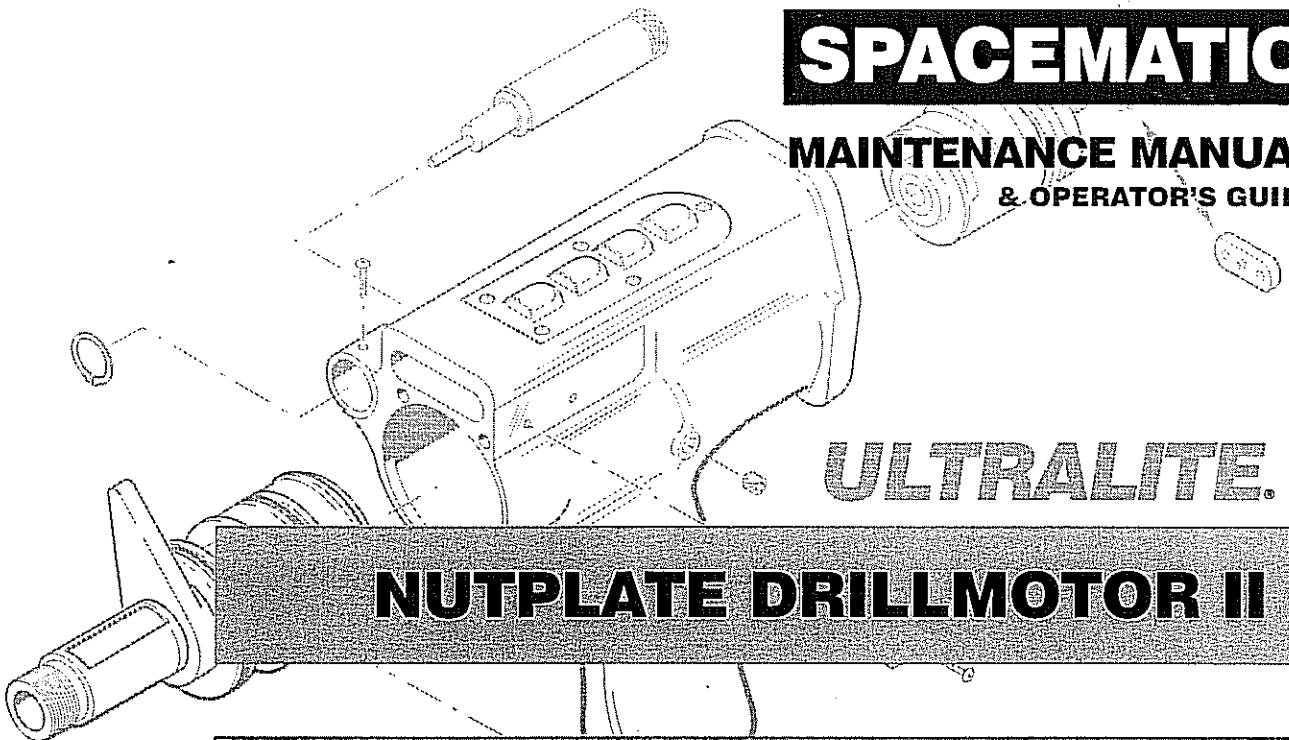


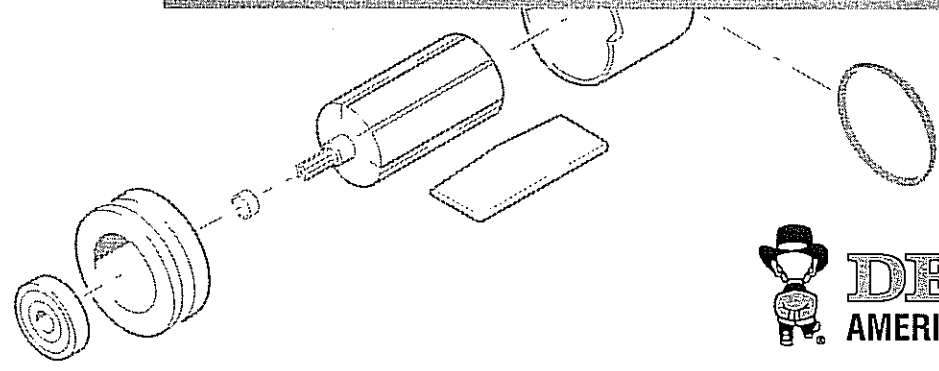
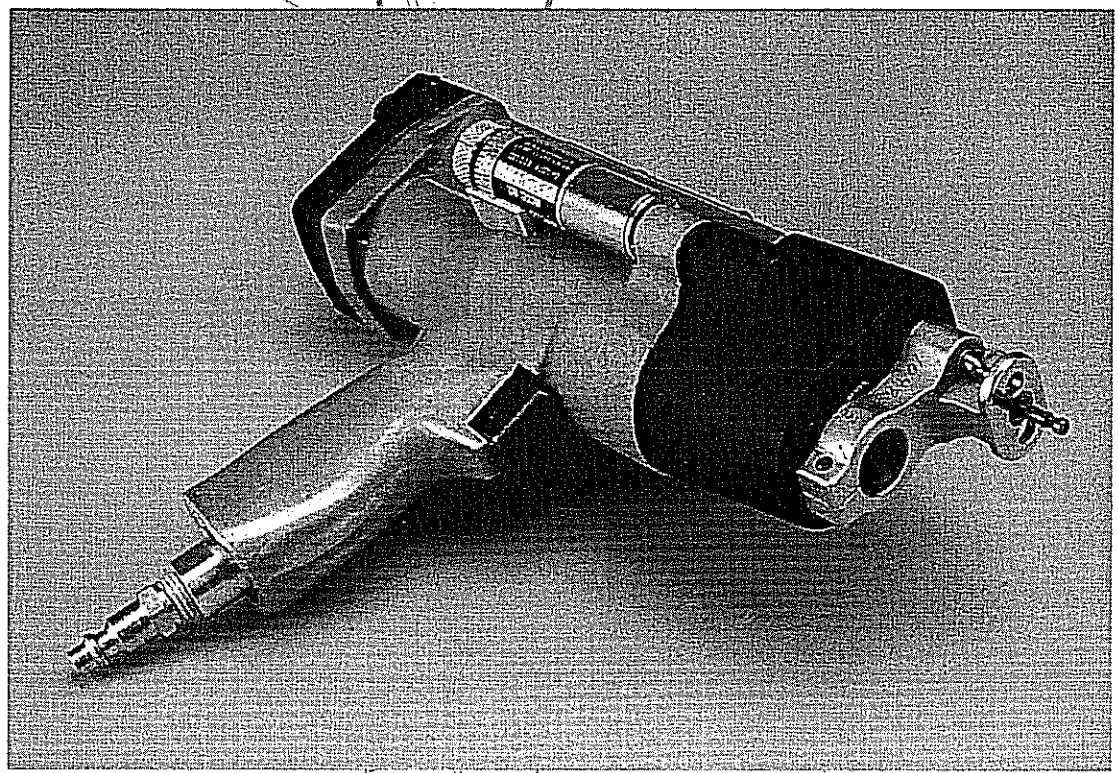
**SPACEMATIC**

**MAINTENANCE MANUAL  
& OPERATOR'S GUIDE**



**ULTRALITE.**

**NUTPLATE DRILLMOTOR II**



 **DEUTSCH**  
AMERICAN PNEUMATIC TOOL

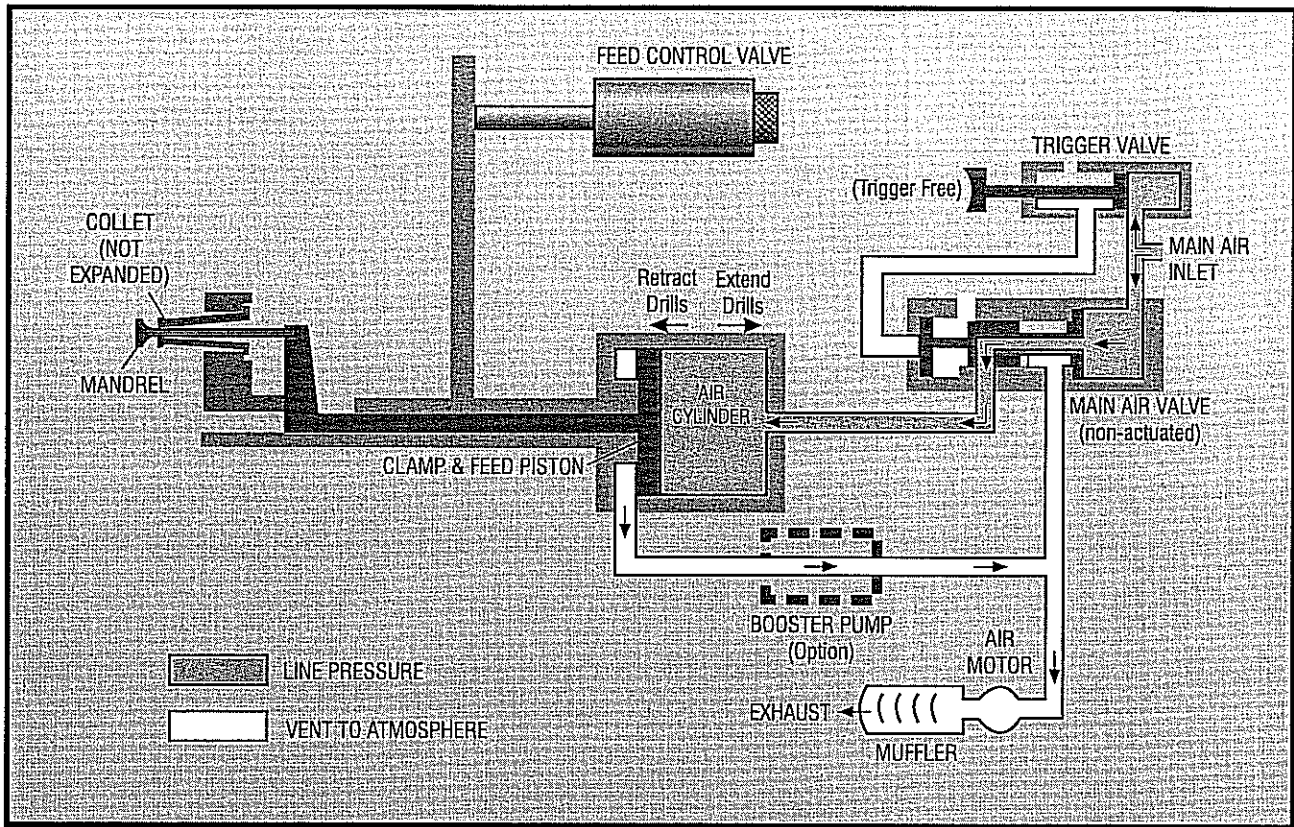


FIGURE 5-1. STANDBY CONDITION

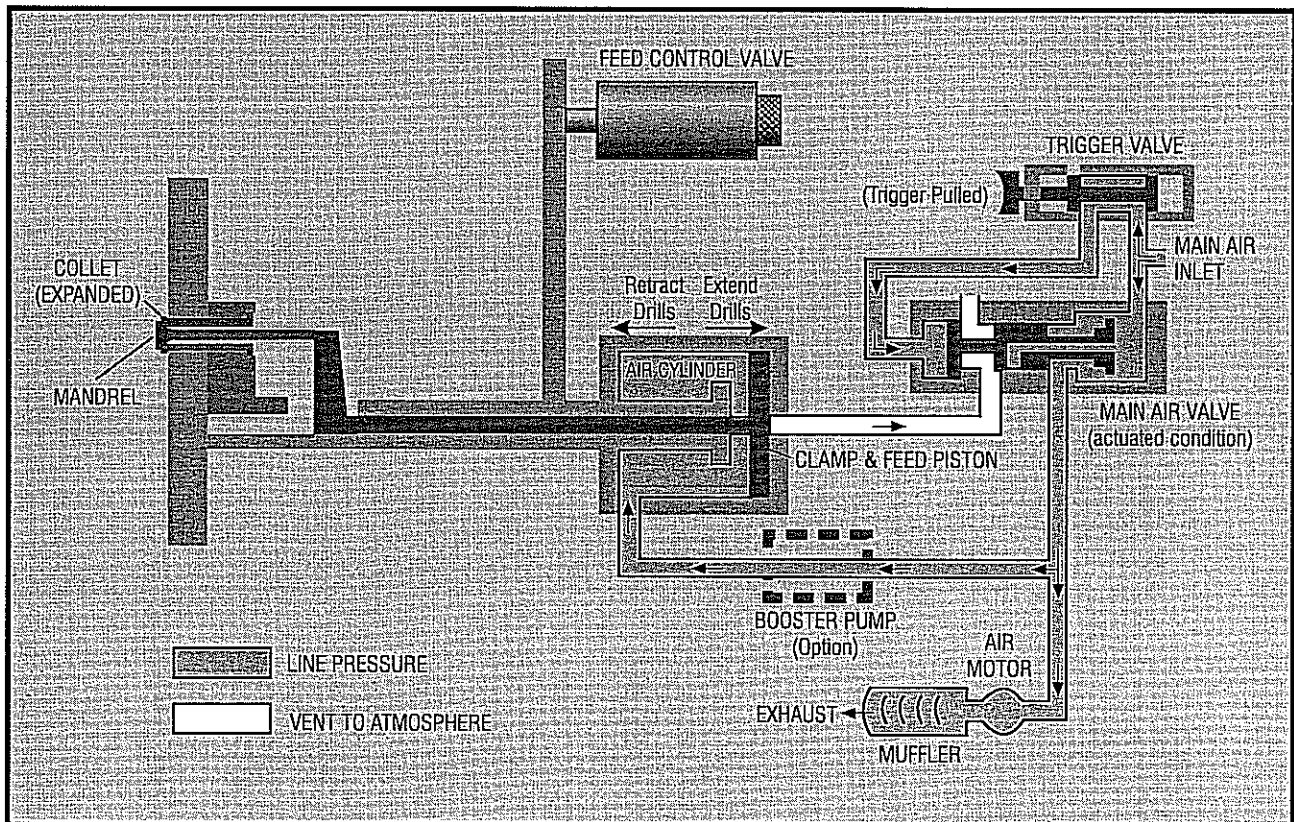


FIGURE 5-2. CLAMP AND FEED CONDITION

# **SPACEMATIC**

**MAINTENANCE MANUAL  
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*ULTRALITE.*

## **NUTPLATE DRILLMOTOR II**



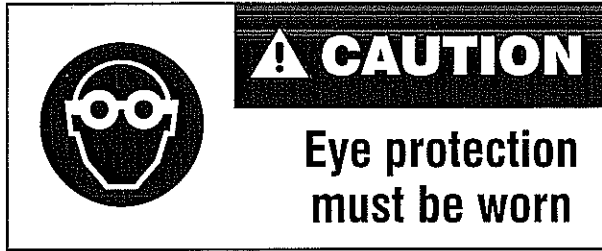
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## GENERAL PRECAUTIONS



### Always wear protective equipment.

For additional information on eye protection, read the latest edition of ANSI Z87.1, Occupational and Educational Eye and Face Protection. This standard is available from the American National Standards Institute, Inc., 1430 Broadway, New York, N.Y. 10018.



Hearing protection is recommended in high noise areas (above 85dMA). Close proximity of additional tools, reflective surfaces, process noises, etc., can contribute substantially to the sound level experienced by the operator.

### Never wear long hair, loose-fitting clothes, gloves, ties, or jewelry when working with or near a drill of any type.

Follow good machine shop practices. Rotating shafts and moving components entangle and entrap, and may result in serious injuries.

## SAFE USE OF DRILLMOTORS

Spacematic tools are designed to operate on 90 - 100 PSI at 20 CFM air pressure using the proper hose. Excessive air pressure increases 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 ahead of the tool is highly recommended.

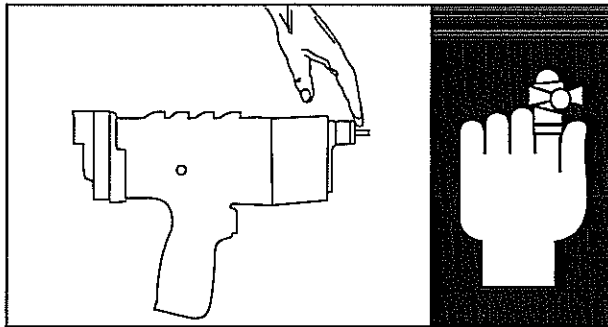
- Before the tool is connected to the air supply, the throttle should be checked for proper operation (i.e., throttle valve moves freely and returns to closed position).
- Before removing a tool from service or changing drill bits, make sure the air line is shut off and drained of air. This will prevent the tool from operating if the throttle is accidentally engaged.
- Cutting tools used with these drill motors are sharp. Handle them carefully to avoid injury.
- The collet and mandrel must be inserted into a properly sized pre-drilled hole before starting the tool. An improperly sized pre-drilled hole prevents the mandrel from engaging the collet and could result in slippage of the tool. An improperly selected collet and mandrel can also result in slippage of the tool.



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 of any cutting fluids or materials involved in the drilling process.

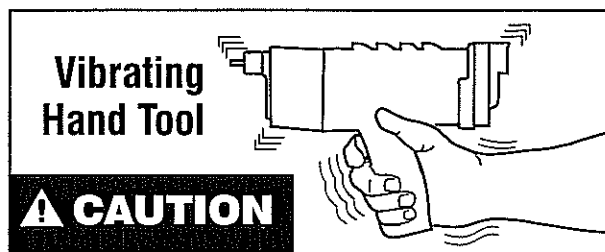


### MINIMIZING HAND, WRIST AND ARM INJURY

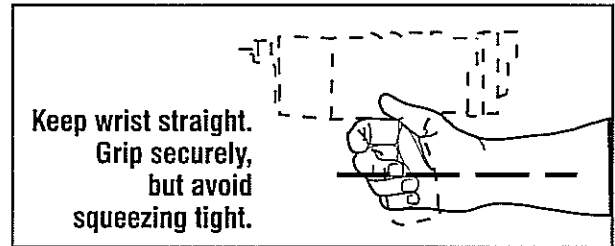


The clamping and feed mechanisms of self-colleting drill motors can move when the air supply is connected or disconnected. Keep fingers and hands away from these areas when handling or operating this tool.

Hazards that may be associated with each specific application of this product must be considered in order to provide adequate operator protection from inadvertent contact with moving components.



Some individuals are susceptible to disorders of the hands and arms when exposed to vibration and/or 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 can 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 user suffering from prolonged symptoms of tingling, numbness, blanching of fingers, clumsiness or weakened grip, inability to hold objects, nocturnal pain in the hand, or any other disorder of the shoulders, arms, wrists, or fingers should notify their employer to review what steps might be taken to prevent further occurrences. These steps might include, but are not limited to, repositioning the workpiece or redesigning the workstation, reassigning tool users to other jobs, rotating jobs, change in worker 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. **The operator of any drills 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 including cold temperature, tobacco and 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.

## INTRODUCTION

This technical manual contains principles of operation, setup, disassembly and assembly instructions, trouble shooting chart and illustrated parts list for the Spacematic ULTRALITE® Nutplate Drill Motor II, manufactured by Deutsch American Pneumatic Tool.

The Spacematic ULTRALITE® Nutplate Drill Motor II is a pneumatic portable hand held tool that drills and countersinks the two rivet holes which are subsequently used to mount various types of nutplates. The tool is completely automatic in that operation consists of inserting the collet-mandrel assembly into the pre-drilled pilot hole and activating the trigger. The collet-mandrel assembly grips the work piece, holding the tool securely while both drill-countersinks are simultaneously rotated and advanced into the work piece under controlled feed conditions. When both drill-countersinks have reached their pre-set depth, releasing the trigger completes the cycle.



## OPTIONS

All Spacematic Nutplate Drill Motor IIs have the **VARIABLE SELECTION** feature of completely interchangeable, standard foot assemblies, spacer blocks, collet-mandrels, spindle assemblies, drills and RPM gear changes. These options configure a given tool to have drill-countersink capability for producing the rivet mounting holes for 234 different types (sizes) of nutplates. Refer to section 8, Selection Charts.

**TABLE 2-1. TECHNICAL CHARACTERISTICS**

<b>Feed System</b>	Pneumatic feed with simultaneous clamp-up.
<b>Feed Control</b>	Self-contained hydraulic control module.
<b>Spindle Speeds</b>	600 and 7000 RPM easily interchangeable.
<b>Feed Stroke</b>	0.500 inches.
<b>Feed Rate Range</b>	0.001 to 0.012 inches per revolution.
<b>Air Motor Power</b>	0.45 h.p.
<b>Air Consumption</b>	18 CFM at 90 PSI.
<b>Colleting Stroke</b>	0.250 inches.
<b>Weight</b>	4.75 lbs.

**OPTIONAL ACCESSORIES**

These accessories are for use with the Spacematic ULTRALITE® Nutplate Drill Motor II in special applications.

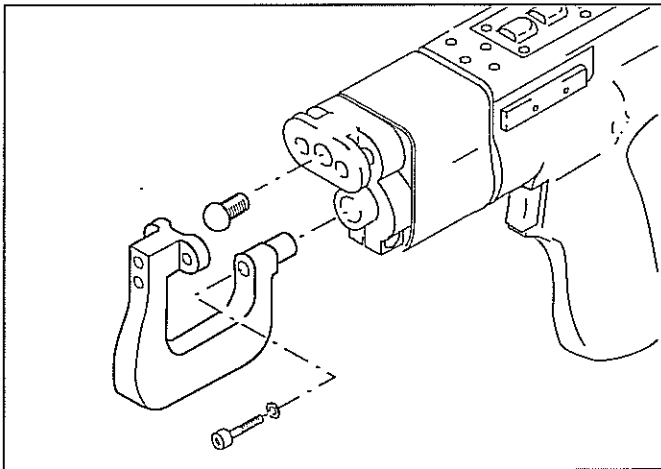


FIGURE 2-1. C-YOKE FOOT ASSEMBLY 5425815

Used for drilling the rivet mounting holes for nutplates that are located around the edge of structure. Examples are removable panels, window and door frames. The C-yoke foot assembly does not require a collet-mandrel system for clamping the tool to the workpiece while drilling. Instead, it relies on the backside or rear clamp pad to offer resistance much in the same way that a regular turn-screw type C-clamp tool functions.

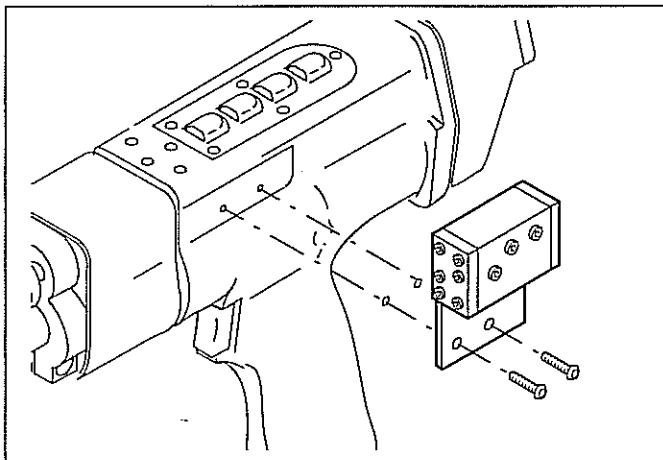


FIGURE 2-2. POWER BOOSTER PUMP 8001406

Provides an increase in the feed and clamp force required when drilling in hard to drill materials such as stainless steel, inconel, titanium, etc.

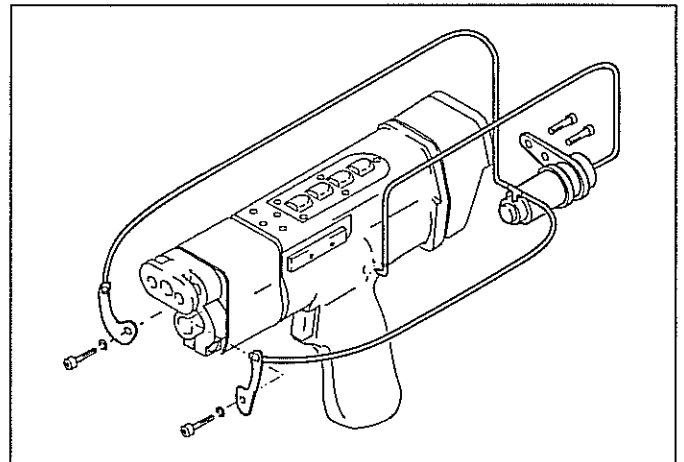


FIGURE 2-3. MISTMATIC COOLANT SYSTEM 8001556

Used in many cases where the workpiece consists of harder to drill material, or when a better quality hole is required on a consistent basis. Coolant during drilling also enhances cutter life. The system is activated when the trigger is engaged and de-activated when the trigger is released.

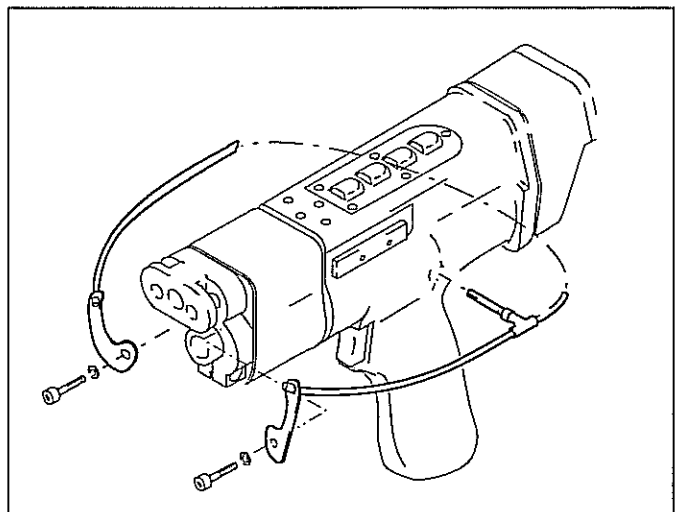


FIGURE 2-4. AIR BLAST COOLANT SYSTEM 8001620

Used to cool the cutter and remove chips during the drilling process. The system is activated when the trigger is engaged and de-activated when the trigger is released.



## MODEL NUMBERS

Model numbers for the ULTRALITE® Nutplate Drill Motor II are referenced according to spindle-to-spindle spacing or according to collet-to-spindle spacing, as indicated below.

### SINGLE WING

**A** = Pilot hole to nearest drill hole spacing

**B** = Drill hole to drill hole spacing

(.313 on inch series, 8mm (.315) on metric series)

**DIA** = Pilot hole in workpiece and collet bore in tool foot assembly

MODEL NUMBER = SW A

Example: dim. A (collet to spindle) = .344,  
model number is SW344

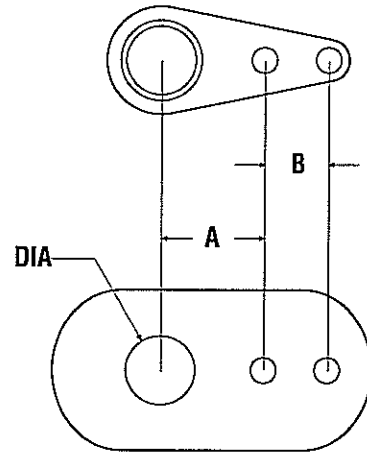


FIGURE 2-5. SINGLE-WING NUTPLATE

### MICKY MOUSE

**A** = Pilot hole to either drill hole spacing

**B** = Drill hole to drill hole spacing

**DIA** = Pilot hole in workpiece and collet bore in tool foot assembly

MODEL NUMBER = MM A

Example: dim. A (collet to spindle) = .250,  
model number is MM250

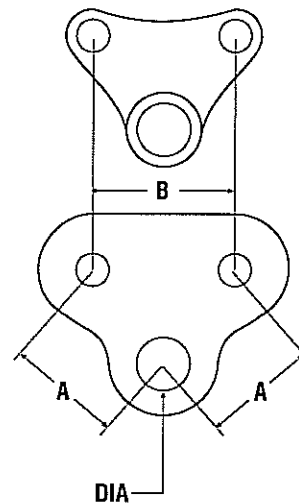


FIGURE 2-6. MICKY MOUSE NUTPLATE

### DOUBLE WING

**A** = Pilot hole to either drill hole spacing

**B** = Drill hole to drill hole spacing

**DIA** = Pilot hole in workpiece and collet bore in tool foot assembly

MODEL NUMBER = DW B

Example: dim. B (spindle to spindle) = .562,  
model number is DW562

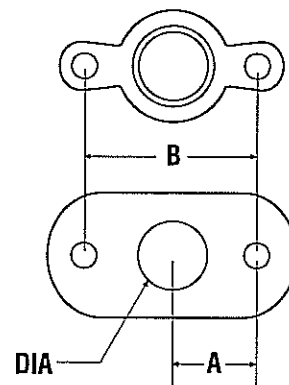


FIGURE 2-7. DOUBLE-WING NUTPLATE

**AIR SUPPLY**

Proper operation of the ULTRALITE® Nutplate Drill Motor II requires 90 to 100 PSI air supply measured at the air inlet when drilling. A 16 micron filter and in-line lubricator are recommended. Both items assure longer tool life and efficient performance.

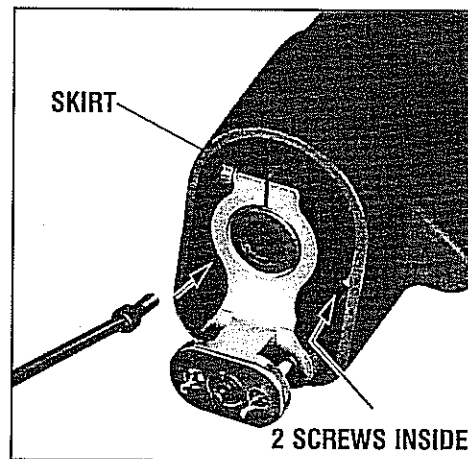
**SETUP PROCEDURES**

All ULTRALITE® Nutplate Drill Motor II tools are set-up and ready for shop use when received from the Deutsch APT factory. The tools are assembled with the correct foot assembly, collet-mandrel, cutters (if customer specifies), and RPM as specified by the customer order. The feed rate and cutter countersink depth are pre-adjusted to performance requirements.

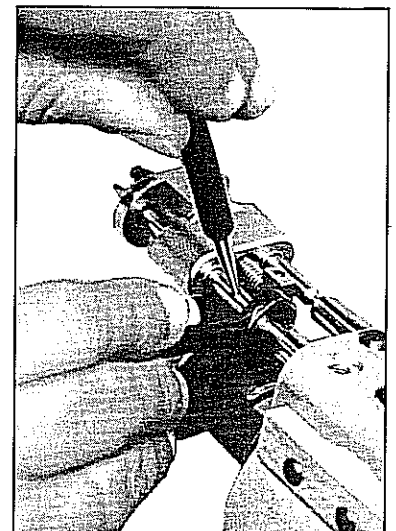
**HOLE PATTERN CONVERSION**

Changing foot assembly to another style (i.e., double wing to single wing), or changing the same style to another spacing (i.e., .688 spacing to .562 spacing). Requires removal and replacement of specific parts via the following process.

**Step 1** Remove two 8-32 x 3/8" socket head cap screws and protective skirt. ▼



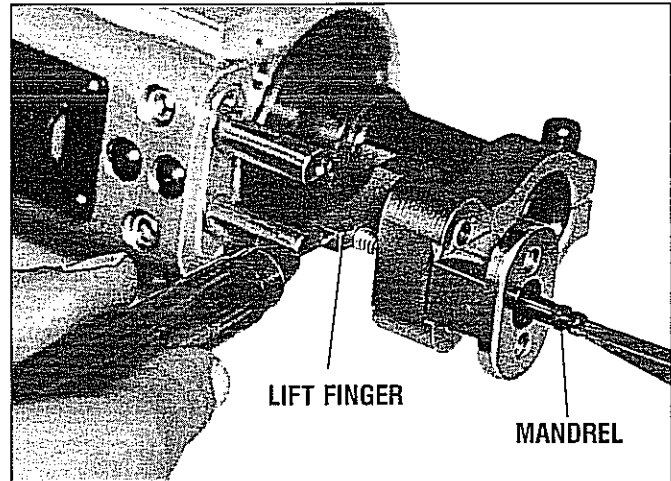
**Step 2** Loosen and remove both drills using a piece of 1/8" dia. drill rod and wrench no. 1006010 (1/4" open end wrench). Hold spindle with wrench. Insert drill rod into hole in drill to prevent it from turning. Turn each spindle counter-clockwise to remove. ▼



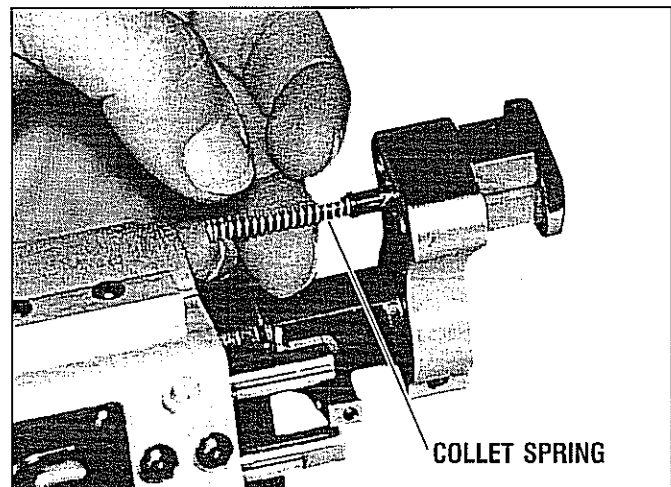
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## TOOL CONVERSIONS

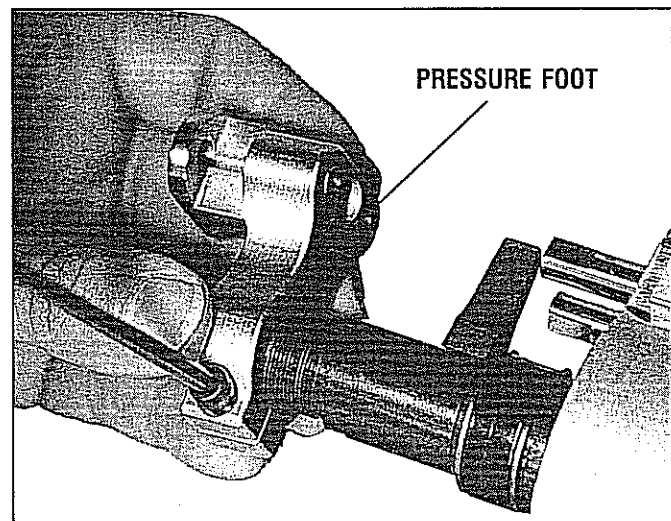
**Step 3** Loosen small set screw located on top of lift finger. Turn mandrel with straight screwdriver counter-clockwise to remove. ▶



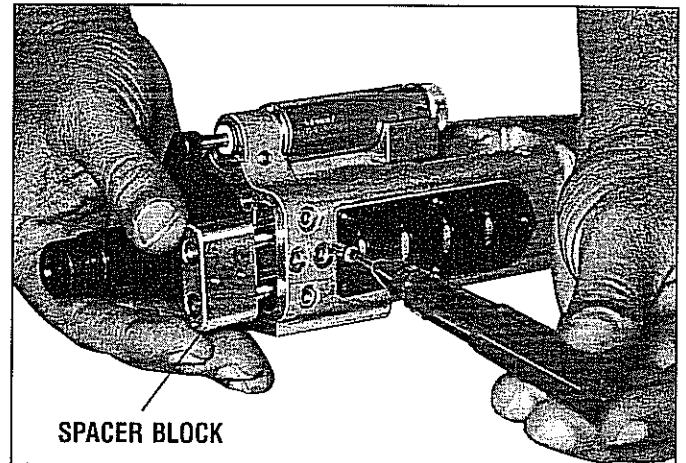
**Step 4** Once mandrel is removed, carefully remove collet spring. ▶



**Step 5** Loosen socket head cap screw located at the bottom of the pressure foot assembly. Turn the pressure foot assembly counter clockwise to remove it. Withdraw collet out from back side of pressure foot assembly. ▶

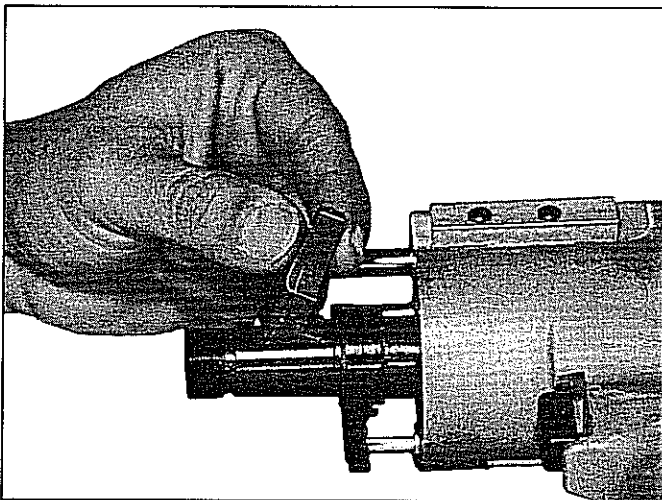
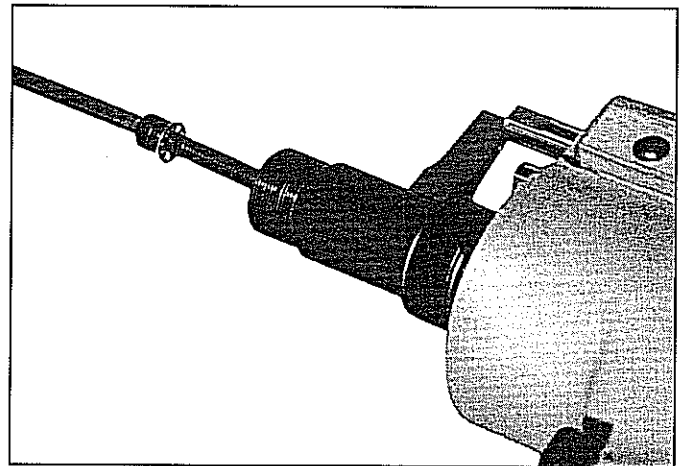


**Step 6** Remove both socket head screws which are holding spacer block. Install mandrel removed in step 4 into threaded hole located in front of spacer block. Carefully withdraw spacer block.



**Step 7** Conversion to single wing spacing also requires removing lift finger. Loosen and remove socket head screw and washer from feed piston rod.

The lift finger can now be pulled out of slot in feed piston rod.



The tool is now ready for installation of either new items or different items from those removed. Reinstall the selected conversion items in reverse order of removal.

**IMPORTANT NOTE**

When the collet-mandrel diameter is to be changed, a different pressure foot assembly is required for the following drill motor model numbers:

- SW203 SW213 SW234 SW250 (chart 8000429)
- MM273 MM234 MM236 MM250 MM284 MM468
- MM500 MM512 MM625 (chart 8000430)
- DW343 DW375 DW406 DW437 DW450 DW468
- DW500 DW525 DW551 DW562 DW568 DW590
- DW600 certain: DW718 DW750 DW875 DW1000
- DW1125 (chart 8000431)

All other pressure foot assemblies are machined to accept a collet bushing. The collet, mandrel and applicable collet bushing are listed in Section 8, chart 1292171.

### RPM INTERCHANGE

Spacematic ULTRALITE® Nutplate Drill Motor II is designed to operate at 600 RPM (low speed) or 7000 RPM (high speed). Changing from one speed to the other is a simple process.

**Step 1** Remove skirt and two drills. See page 9, steps 1 and 2.

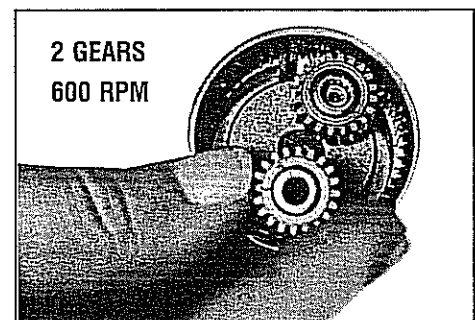
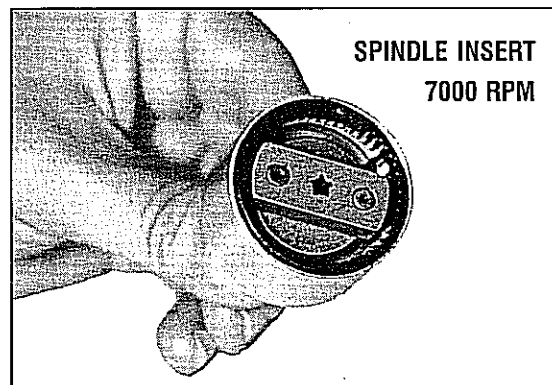
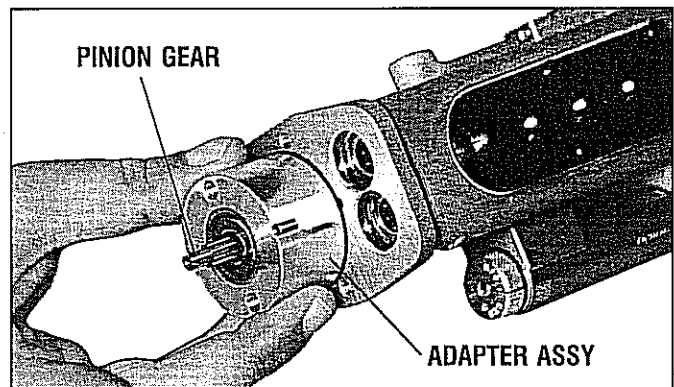
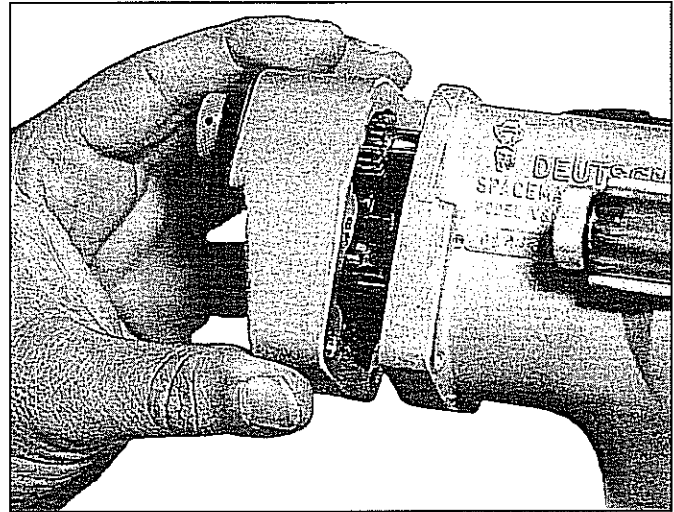
**Step 2** Remove four socket head screws holding gear cap to housing. Gear cap assembly, including gasket and spindle assemblies, is withdrawn rearward by moving cap side to side and up and down.

**Step 3** Remove spacer block. See page 11, step 6.

**Step 4** Grasp pinion gear with soft-nosed pliers and remove adapter assy.

**Step 5** Changing RPM from high (7000 RPM) to low (600 RPM) requires replacing spindle insert (8000463) with two planetary gear assemblies (8000469). Changing from low to high RPM is inverse of above.

When desired RPM items are installed, gear cap assembly with gasket, spacer block and drills are re-installed in reverse order of above.



### DRILLING OF TEST HOLES

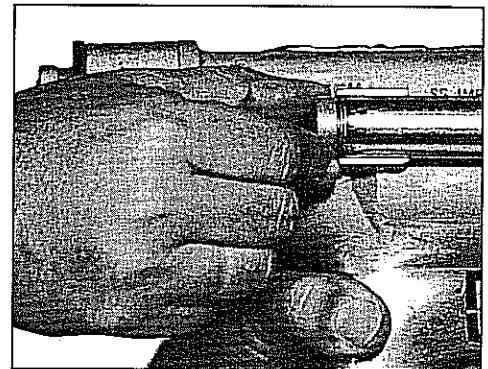
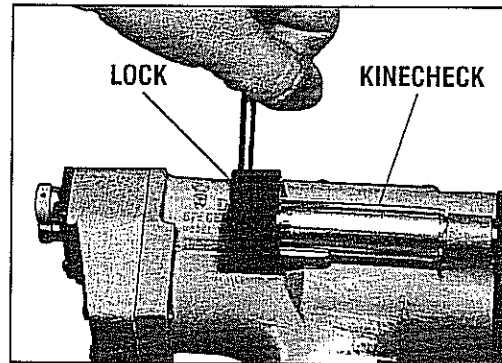
When the Spacematic ULTRALITE<sup>®</sup> Nutplate Drill Motor II is completely assembled after conversion or repair, a series of test holes should be drilled and inspected.

**Feed rate adjustment** is controlled by the Kinecheck feed control valve.

**Step 1** Remove Kinecheck security lock. ▶

**Step 2** Turn adjustment knob in small increments until desired feed rate is achieved (when mark on adjustment knob is set at zero, there is zero control). For most aluminum, the proper rate is approx. 4 seconds for one complete feed stroke. (Refer to drawing 8000485). ▶

**Step 3** Replace Kinecheck security lock.

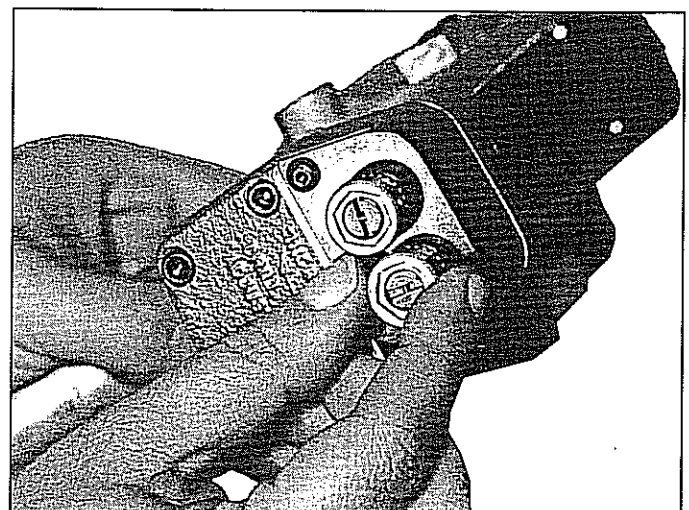


**Countersink depth** is controlled by the spindle adjustment thimbles.

**Step 4** Lift and turn adjustment thimble counterclockwise or clockwise to decrease or increase countersink depth. ▶

Countersink depth is checked by drilling test holes in scrap material as follows:

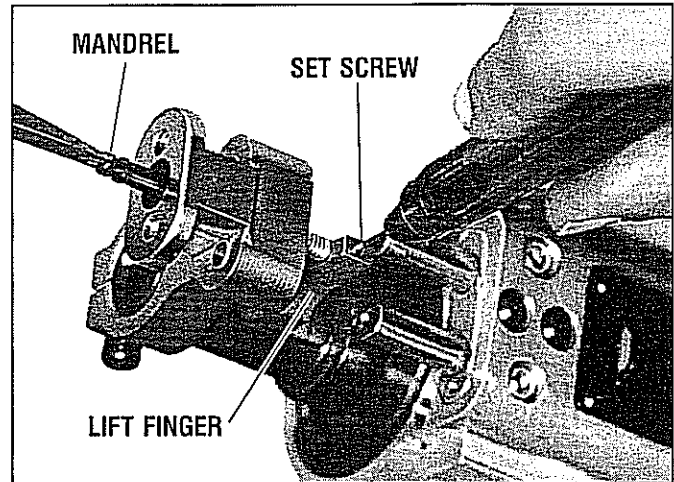
Activate trigger and let tool cycle through its complete feed stroke. Release trigger and remove tool from scrap piece. Inspect countersink depth of each hole by inserting rivet. Repeat process if necessary.



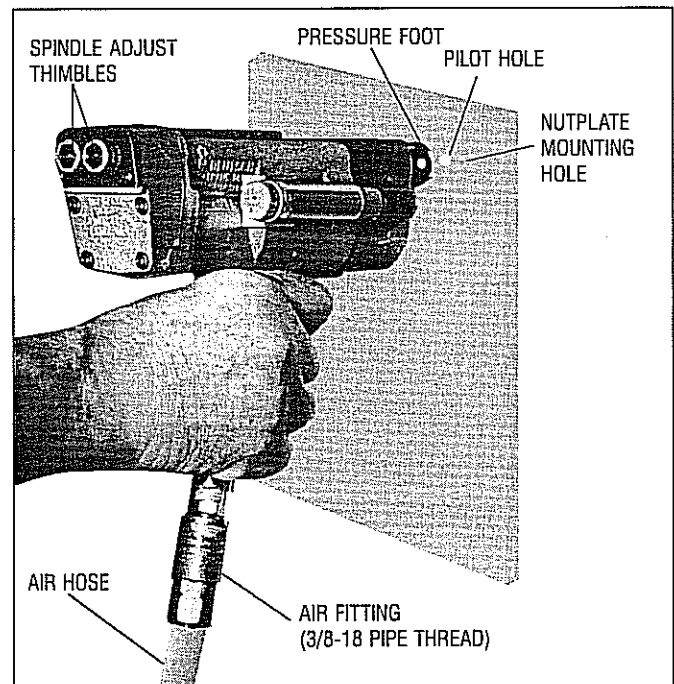


**Collet-mandrel adjustment** is required to provide proper and consistent clamp-up.

**Step 5** Loosen set screw in lift finger. Connect air line. With fine blade screwdriver, turn mandrel in or out until slots in collet just start to open from closed position. Tighten setscrew only enough to prevent mandrel from turning. The tool is now ready for operation. ▶



Put a few drops of air motor oil in the air inlet fitting. Connect the air to the tool, depress the trigger and operate the tool through a few cycles of feed and retract. The drills passing through the foot will align the foot in its running position. Hold the trigger depressed with the tool at the end of this stroke and tighten the clamp screw in the bottom of the foot.



## INTRODUCTION

This section explains the principles of operation of the ULTRALITE® Nutplate Drill Motor II. The schematic diagrams (inside front and back covers) show the conditions and locations of internal components as the tool operates from beginning cycle through ending cycle. This description, along with Troubleshooting Table, 6-2, pg. 18, assist in locating faults and preventing failures.

## OPERATING CYCLE

The pilot hole or bolt hole over which the Nutplate fastener is mounted is first provided or drilled by conventional means in the work piece. This hole is the collet-clamping pilot hole for the Nutplate Drill Motor. Refer to each of the schematic diagrams (inside front cover) and follow through the two principle operating cycles explained as follows.

### STANDBY CONDITION

See figure 5-1, Inside Front Cover.

With the air supply connected to the tool and the trigger free, air at line pressure is fed to the trigger inlet and through the main air valve to the retract-drills side of the air cylinder. The tool is now in the retracted state and ready for operation.

### FEED AND CLAMP CONDITION

See figure 5-2, Inside Front Cover.

- A. The collet-mandrel is inserted in the pilot hole and the tool positioned where the two rivet mounting holes will be drilled as required.
- B. The trigger is activated which actuates the main air valve. All further functions operate simultaneously.
- C. The main air valve feeds air at line pressure to the extend drills side of the air cylinder and to the air motor which through the gear train, begins spindle rotation.
- D. As the clamp and feed position begins its stroke, the mandrel is drawn into the collet and the tool is firmly clamped to the work.
- E. At the same time, the rotating drills are being advanced into the work at a controlled feed rate.
- F. The feed control valve is mounted in a fixed position on the tool housing, but its plunger controls movement of the advancing drills. The feed rate is therefore controlled by turning the adjustment knob clockwise or counter-clockwise.  
A four or five second time of full stroke is usually ideal to provide the acceptable two drilled and countersunk holes. When the feed rate is finalized the adjustment knob should be locked from turning by tightening the set screw in the adjustment knob.
- G. On reaching a pre-set countersunk depth, the trigger is released and the main air valve returns to its non-actuated position which in turn un-clamps the collet-mandrel and retracts the tool from the work to the Stand By condition ready for the next drill cycle.
- H. All of the above cycles should be performed in a simulated piece of the actual work material. The purpose is to set up the tool with the proper feed rate and the proper countersink depth. The latter is determined by inserting a rivet in both of the drilled holes to measure countersink depth.

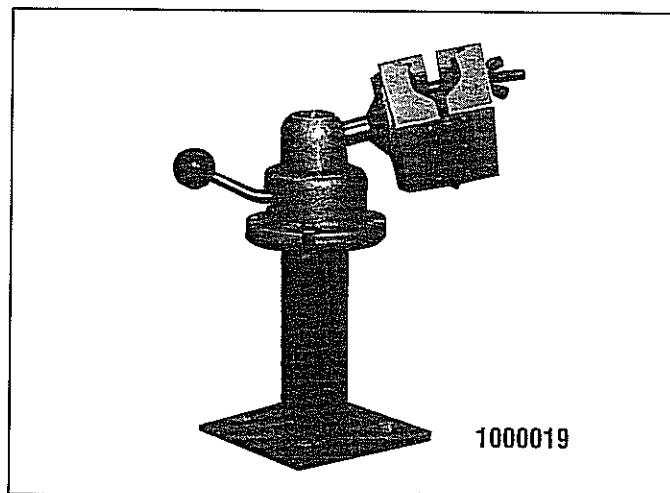
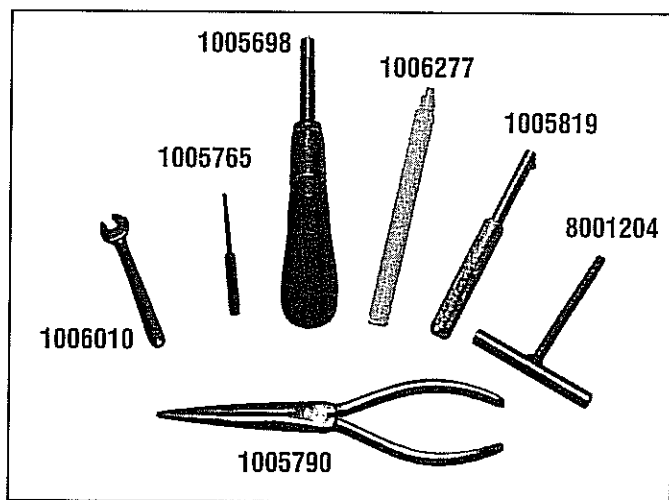


**INTRODUCTION**

This section provides a list of maintenance tools, troubleshooting chart, and step-by-step assembly and disassembly procedures.

**SPECIAL MAINTENANCE TOOLS**

Special maintenance tools are required for disassembly and assembly of accessories, parts replacement and conversions from one model to another. Parts numbers, their descriptions and uses are listed in Table 6-1.



**TABLE 6-1 SPECIAL MAINTENANCE TOOLS**

PART NO.	DESCRIPTION	TOOL USE
1005698	Collet bushing adjust tool	Used to install and adjust collet bushings.
1005765	Pull Pin	Used to remove main air valve spool.
1005790	Snap Ring Pliers	Used to remove retaining ring from front of tool housing.
1005819	Removal Hook	Used to remove main air valve sleeve.
1006010	Spindle Wrench	Used to hold spindles when removing drills.
1006277	Nylon Punch	Used to install main air valve sleeve.
8001204	Tee Wrench	Used to remove and install Kinecheck security.
1000019	Tool Vise	Used to hold Spacematic Drillmotors

## TROUBLESHOOTING

Table 6-2 is a troubleshooting chart listing possible problems, probable causes and suggested corrective actions for each problem. Should this chart not help solve the problem, please contact Deutsch American Pneumatic Tool with a

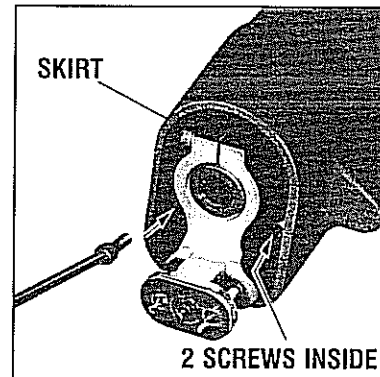
detailed description of the problem. Please keep in mind that most problems and tool failures are caused by dirt entering the air passage and control valves.

<b>TABLE 6-2 TROUBLESHOOTING</b>		
<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>SOLUTION</b>
Air motor will not run when trigger is activated.	Main air valve clogged with dirt or rust.	Remove the main air valve. Clean the spool and sleeve. Replace O-rings.
	Air passages in housing are clogged.	Disassemble tool. Blow out all air passages with compressed air until clean. Assemble tool.
	Air motor stopped on dead center	Rotate spindles manually to free motor to off center position.
	Defective motor or spindle bearings. Worn vanes or motor end plates.	Remove air motor. Check for worn parts. Clean and replace all worn parts and bearings.
Housing becomes hot when tool is running.	Air motor not installed correctly.	Rotate the motor where the slots are opposite the muffler exit. Clean the exhaust passages.
Variation in feed rate.	Feed control valve (kine-check) is broken or stuck.	Readjust feed control valve or remove and replace with an operable unit.
Motor runs without activating the trigger.	Dirt in main air valve or O-ring damage.	Remove main air valve and clean thoroughly. Replace all O-rings.
Air motor stalls or slows down during drilling cycle.	Insufficient air pressure or air volume.	Required air pressure is 90-100 PSI at 20 CFM.
	Main air valve clogged or stuck.	Remove the valve and clean. Blow out all air passages in the tool housing. Replace all O-rings.
	Defective air motor or motor bearings.	Remove the air motor and check for worn end plates, vanes, bearings, and O-rings. Replace defective parts and re-install motor in correct position.

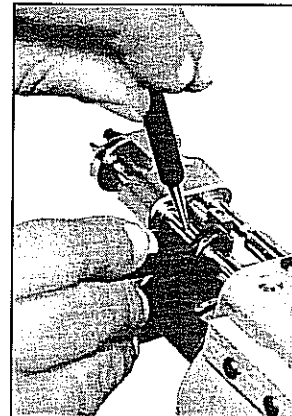
**DISASSEMBLY**

Basic breakdown sequence of the major components. Refer to Section 7, Illustrated Parts List, for breakdown of sub-assemblies and ordering numbers for all replacement parts.

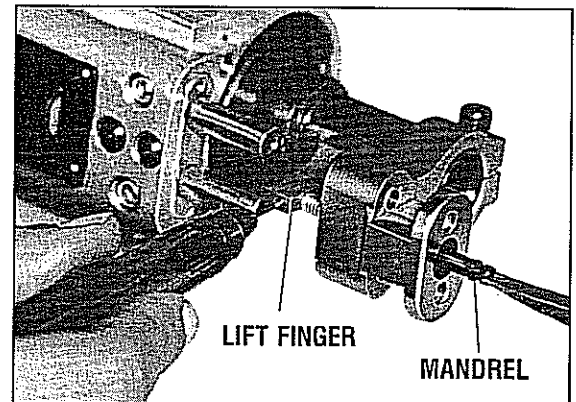
**Step 1** Remove both socket head cap screws and protective skirt. ▶



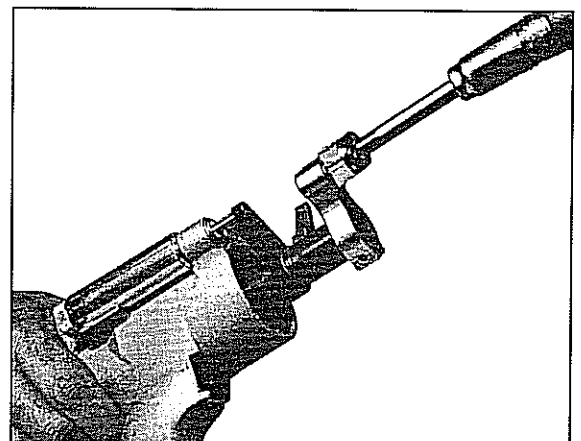
**Step 2** Loosen and remove both drills using 3/32" dia. drill rod or punch, and wrench no.1006010 (1/4" open-end wrench). Hold spindle with wrench. Insert rod or punch into hole in drill to prevent turning. Turn each spindle counter-clockwise to remove. ▶



**Step 3** Loosen setscrew in lift finger and unscrew mandrel using a small screwdriver. Remove mandrel and collet spring. Loosen set screw in foot piece. Rotate clamp finger right or left from collet position. Remove the collet. ▶

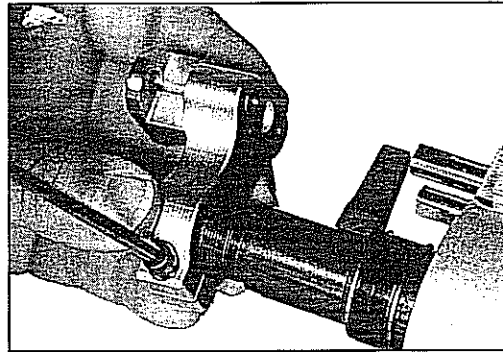


**Step 4** Unscrew collet bushing using collet bushing adjust tool no. 1005728 (if collet size is to be changed) ▶

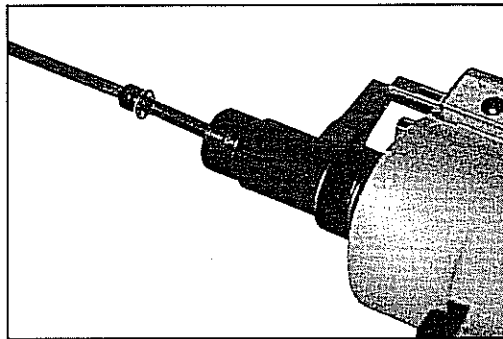




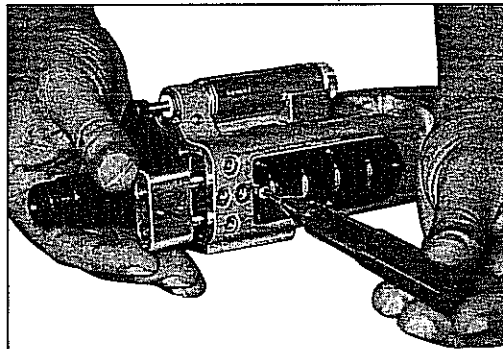
**Step 5** Unscrew the pressure foot from piston rod. (Counter-clockwise looking from front of tool). ▶



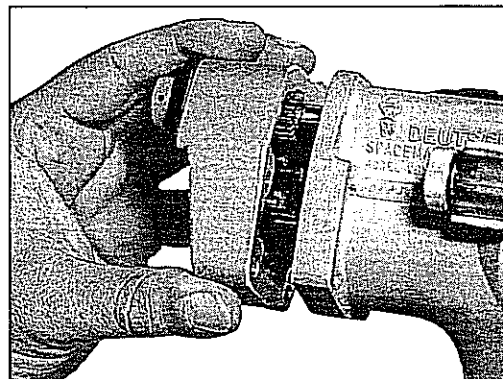
**Step 6** The lift finger requires replacement whenever a different part number is specified on the master chart. Loosen and remove socket head screw and washer. The lift finger can now be lifted out the top of slot in feed piston rod. ▶



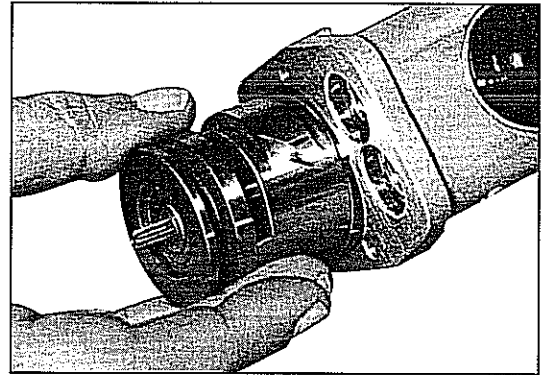
**Step 7** Remove two socket head screws holding spacer block. Install mandrel removed in step 3, in threaded hole in front of spacer block. Carefully withdraw spacer block. ▶



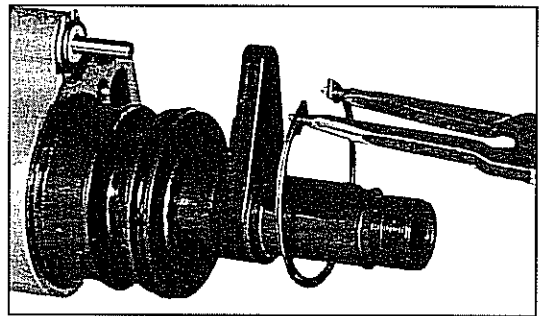
**Step 8** Remove 4 socket head cap screws holding gear cap to rear of tool housing. Gear cap assembly with spindles attached is withdrawn rearward by moving the cap side to side and up and down. ▶



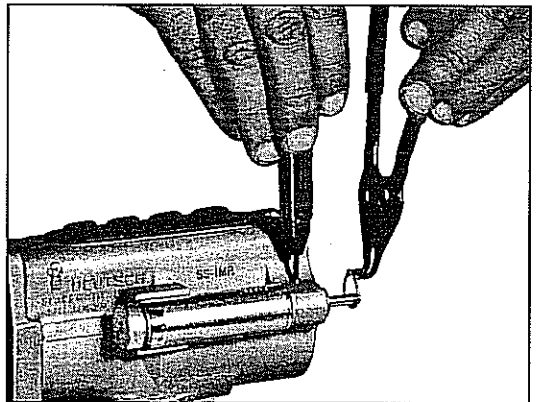
**Step 9** Using soft nose pliers, grasp output pinion gear. Carefully move adapter assembly back and forth while pulling to remove. Next, grasp air motor rotor output shaft and again move air motor back and forth while pulling to remove air motor. ▶



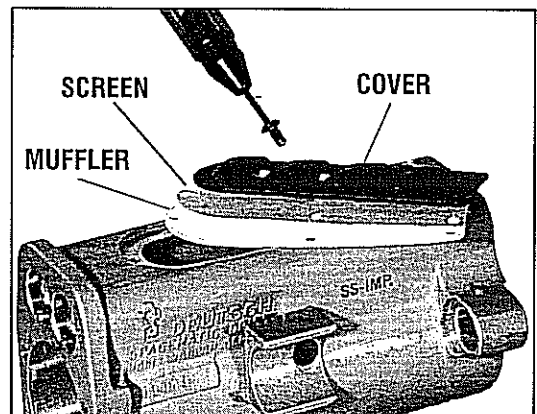
**Step 10** To remove clamp and feed group which includes bulkhead assembly, refer to front of tool. Using retaining ring pliers 1005790, remove retaining ring. Temporarily reinstall the pressure foot on the piston rod. Grasp the pressure foot and move back and forth while pulling to remove complete assembly. ▶



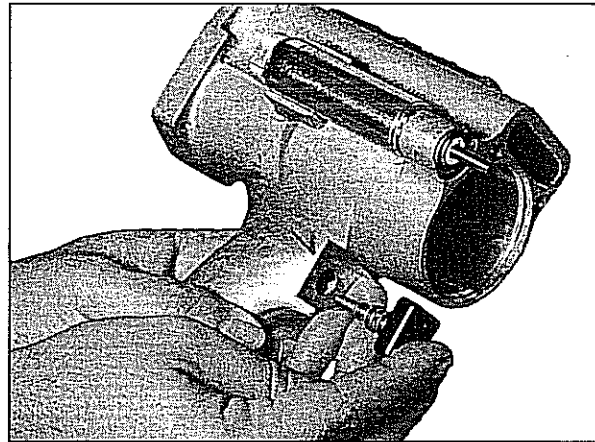
**Step 11** Remove Kinecheck feed control assembly, Remove retaining ring with retaining ring pliers. Loosen set screw. Pull Kinecheck rearward to remove. ▶



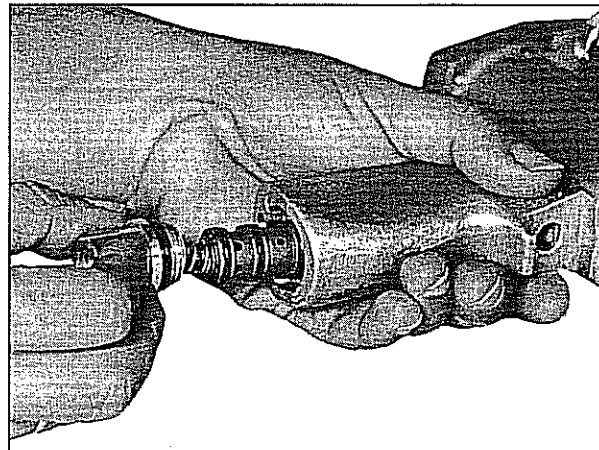
**Step 12** Remove five 6-32 x 1/4" socket head screws to release cover, screen, and muffler. ▶



- Step 13** To remove trigger valve assembly, loosen set screw and remove trigger button. Drive out roll pin with light hammer and drift punch. Grasp trigger pin with soft nose pliers and pull out complete assembly. Be sure not to lose spring.



- Step 14** To remove main air valve assembly, loosen and remove inlet adapter. Spring will remove itself with inlet adaptor. Use pull pin 1005765 to remove valve spool. Use removal hook to remove valve sleeve. Use thin nose pliers 1005790 to remove piston.



## RE-ASSEMBLY

Sequence and notes for the re-assembly of the major components. Refer to Section 7, Illustrated Parts List, for repair part numbers and details.

### Step 1 Muffler Instl.

Install muffler in cavity in top of housing assembly. Install screen and cover on top of muffler. Fasten with five 6-32 x 1/4" socket head screws. (Step 12, pg. 21.)

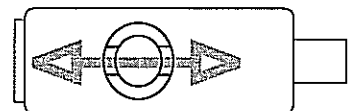
### Step 2 Kinecheck Instl.

Slide front of Kinecheck into machined passageway on right hand side of housing assembly. Hold forward and install retaining ring into groove. Tighten set screw until Kinecheck will not rotate. (Step 11, pg. 12.)

### Step 3 Main Air Valve Instl.

Apply white grease to assembled main air valve. Apply liberally to O-ring. Install lower piston first using long nose pliers. Install main air valve assembly with tool 1005765. **Be sure to install main air valve assembly with slot in top located fore and aft:**

ORIENTATION OF SLOT  
ON MAIN AIR VALVE



Position spring on bottom of main air valve assembly. Place O-ring on air inlet adapter. Install into tool handle, rotate clockwise to tighten. (Step 14, above; fig. 7-10, pg. 39.)

**Step 4 Clamp and Feed Group Instl.**

Lubricate assembly with white grease, with special care to O-ring areas. Insert assembly into housing by moving back and forth, push in until seated. Install retaining ring. (Step, 10, pg. 21; fig. 7-7, pg. 36.)

**Step 5 Air Motor**

Lubricate assembly with white grease. Insert into rear of housing, **with exhaust openings pointed downward (180° from muffler)** when motor is seated. Install planetary gear assembly to mate with air motor. (Step 9, pg. 21; fig. 7-9, pg. 38)

**Step 6 Gear Cap/Spindles**

Lubricate all gears in gear cap with black moly type grease. Install gasket between gear cap and tool housing. Guide spindles through bearings in rear of housing. Feed forward until gear cap is flush with rear of housing. Install four screws and tighten. (Step 8, pg. 20; fig. 7-5, pg. 32.)

**Step 7 Spacer Block**

Carefully guide on to both spindles until threaded holes align with holes in top of housing. Install two 6-32 x 1/2" button head screws. (Step 7, pg. 20; fig. 7-1, pg. 26)

**Step 8 Lift Finger, Foot Assembly, Collet, Mandrel and Collet Spring Instl.**

Remove 10-32 x 1 1/2" socket head cap screw and lock washer from piston rod. Work lift finger down into piston rod and slide back until it stops. Reinstall socket head cap screw and washer. (Step 6, pg. 20.)

Thread foot assembly onto piston rod, tighten screw in bottom of foot. Rotate foot out of line with lift finger. Install collet into pilot hole in foot from back side until it protrudes through front. Slide mandrel through collet from front. Slide collet spring over protruding mandrel. Rotate foot to align mandrel with threaded hole in lift finger. (Step 4, pg. 19; step 5, pg. 20; step 4, pg. 10.)

**IMPORTANT:** Apply air pressure to air inlet. Lift finger will move forward and mandrel will protrude from collet. Screw mandrel into lift finger until taper of mandrel begins to expand collet. Disconnect air line from tool. Tighten small setscrew in top of lift finger just enough to secure mandrel.

**Step 9 Trigger Instl.**

Secure trigger button by tightening set screw. Insert trigger assembly into tool housing and tap roll pin into place. (Step 13, pg. 22; fig. 7-8, pg. 37.)

**Step 10 Drill Instl.**

Insert drill through front of foot through hole to either side of collet-mandrel. Screw drill into spindle using 1/8 dia. rod. Hold spindle with small open end wrench 1006010, tighten with rod.



## **INTRODUCTION**

This section contains illustrations and repair parts lists for the ULTRALITE® Nutplate Drill Motor II. Most of the drawings and charts include a bill of materials listing all parts or assemblies by part number. The master charts list specific items such as foot assemblies, cutters, collets, mandrels, collet bushings, gear groups, spindle groups, collet clamp fingers and spacer blocks. Items listed as Purchased may be obtained from Deutsch American Pneumatic Tool or directly from commercial sources.

## **PARTS ORDERING PROCEDURE**

When ordering parts from Deutsch American Pneumatic Tool directly or through an authorized distributor, please provide the following information:

- State the exact part number.
- Give the best description possible.
- State the exact quantity of each part required.
- Include the serial number of the tool.
- State exact billing and shipping address and transportation method preferred. Deutsch American Pneumatic Tool freight policy is FOB Gardena, California.

## **RETURN POLICY**

Before returning any tool or part for repair or replacement, contact the Deutsch American Pneumatic Tool sales department to request a Return Authorization Form number (RAF). Send a complete written description of the problem along with the tools or parts being returned. Upon receipt of the product, Deutsch APT will diagnose the problem and determine whether the corrective action falls under the category of warranty repair or warranty replacement. If the tools or parts are determined to not be under warranty, the sender will be notified of repair costs. The tools or parts will not be fixed until written consent for repair costs is received from the sender. Any product returned to Deutsch APT without a Return Authorization Form number will be returned to sender at his expense.



Gearcap/Spindle group breakdown:  
Model II tools- See pg. 34 -35  
Model IIB tools- See pg. 31-33

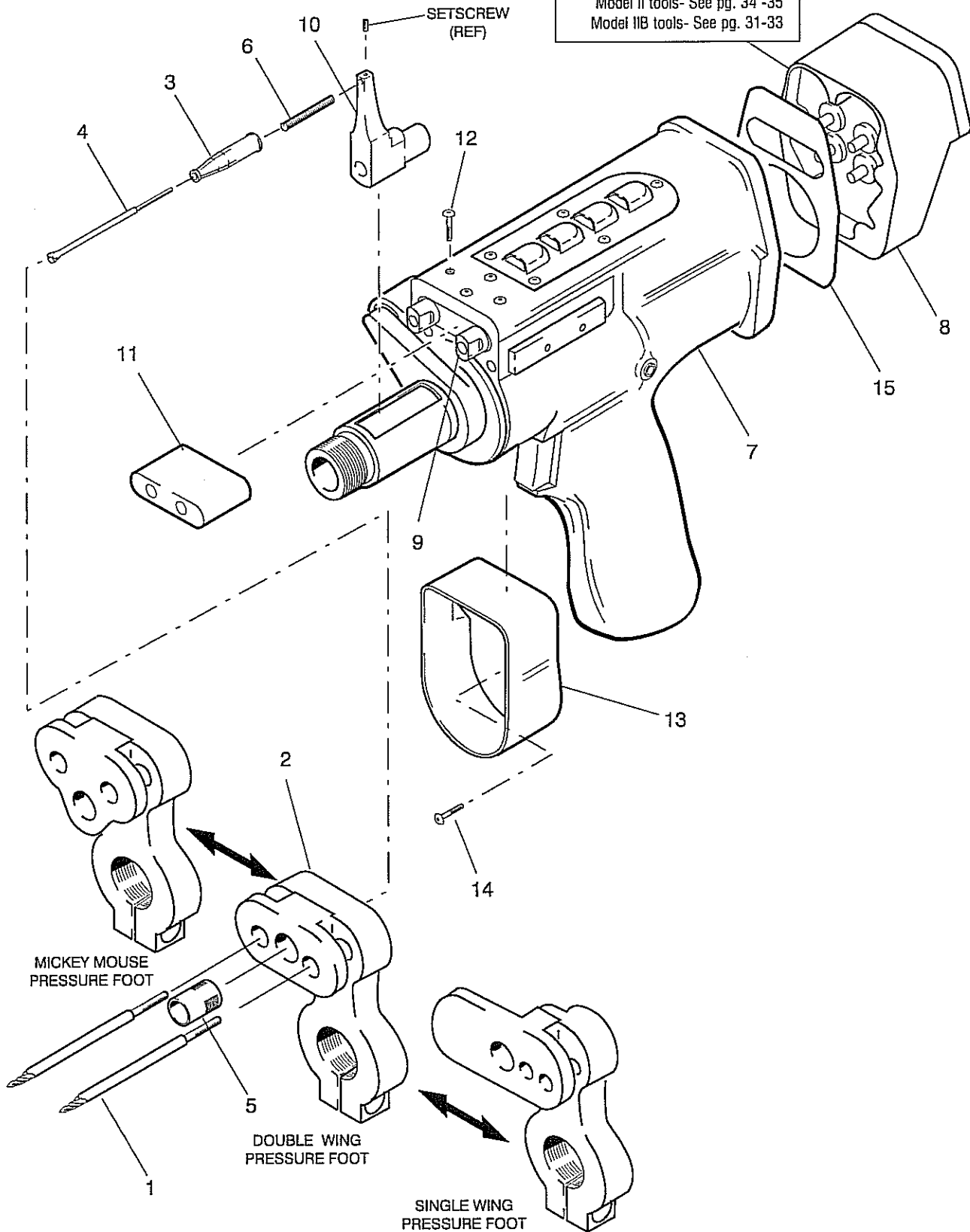


FIGURE 7-1. MASTER ASSEMBLY

SERIES 8000480		MASTER ASSEMBLY	
ITEM	PART NUMBER	DESCRIPTION	QTY
1	Series WD WDS- See Note 1	Cutter	2
2	Series 5420490- See Note 2	Pressure foot DW	1
	Series 5420489- See Note 2	Pressure foot MM	1
	Series 5420477- See Note 2	Pressure foot SW	1
3	See Note 2	Collet, clamp	1
4	See Note 2	Mandrel, clamp	1
5	See Note 2	Bushing, collet	1
6	See Note 2	Spring, collet	1
7	8000432- See Notes 2, 3	Basic housing assy. (.688, 7000)	1
	8000433- See Notes 2, 3	Basic housing assy. (1.00, 7000)	1
	8000459- See Notes 2, 3	Basic housing assy. (.688, 600)	1
	8000460- See Notes 2, 3	Basic housing assy. (1.00, 600)	1
8	8001309- See Note 2	Gear cap group (.688)	1
	8001310- See Note 2	Gear cap group (1.00)	1
9	8001303	Spindle assy. (5/16 front)	2
	8001305	Spindle assy. (1/4 front)	2
	8001307	Spindle assy. (3/16 front)	2
10	Series 10157- See Note 2	Finger, collet clamp	1
11	See Note 2	Spacer block	1
12	16238	Screw, but. hd (6-32 x 3/8)	2
13	8000512- See Note 4	Skirt, protector, mach.	1
14	17488	Screw, cap, sc head (#8-32 x 1/2)	2
15	8000651	Gasket, gear cap	1

**NOTES - VARIABLE PARTS**

- 1 For Cutter selection, see Cutter Selection and Application chart 5415260 (pg. 42)
- 2 For selection and part numbers, see:
  - Master Assy. Chart, Single Wing, Model IIB, 8001312 (pg. 43) / Model II, 8000429 (pg. 44)
  - Master Assy. Chart, Mickey Mouse, Model IIB, 8001313 (pg. 52) / Model II, 8000430 (pg. 45)
  - Master Assy. Chart, Double Wing, Model IIB, 8001314 (pg. 54) / Model II, 8000431 (pg. 46)
- 3 In order to change RPM from high (7000) to low (600), replace spindle insert 6000463 with two planetary gear assemblies 6000469 and vice versa
- 4 8000512 for all foot assemblies except for DW748 through DW1000; SW203; SW218; SW250; SW335 and SW344--use 8001316. For SW500 use 8001365. For SW468 use 8001440

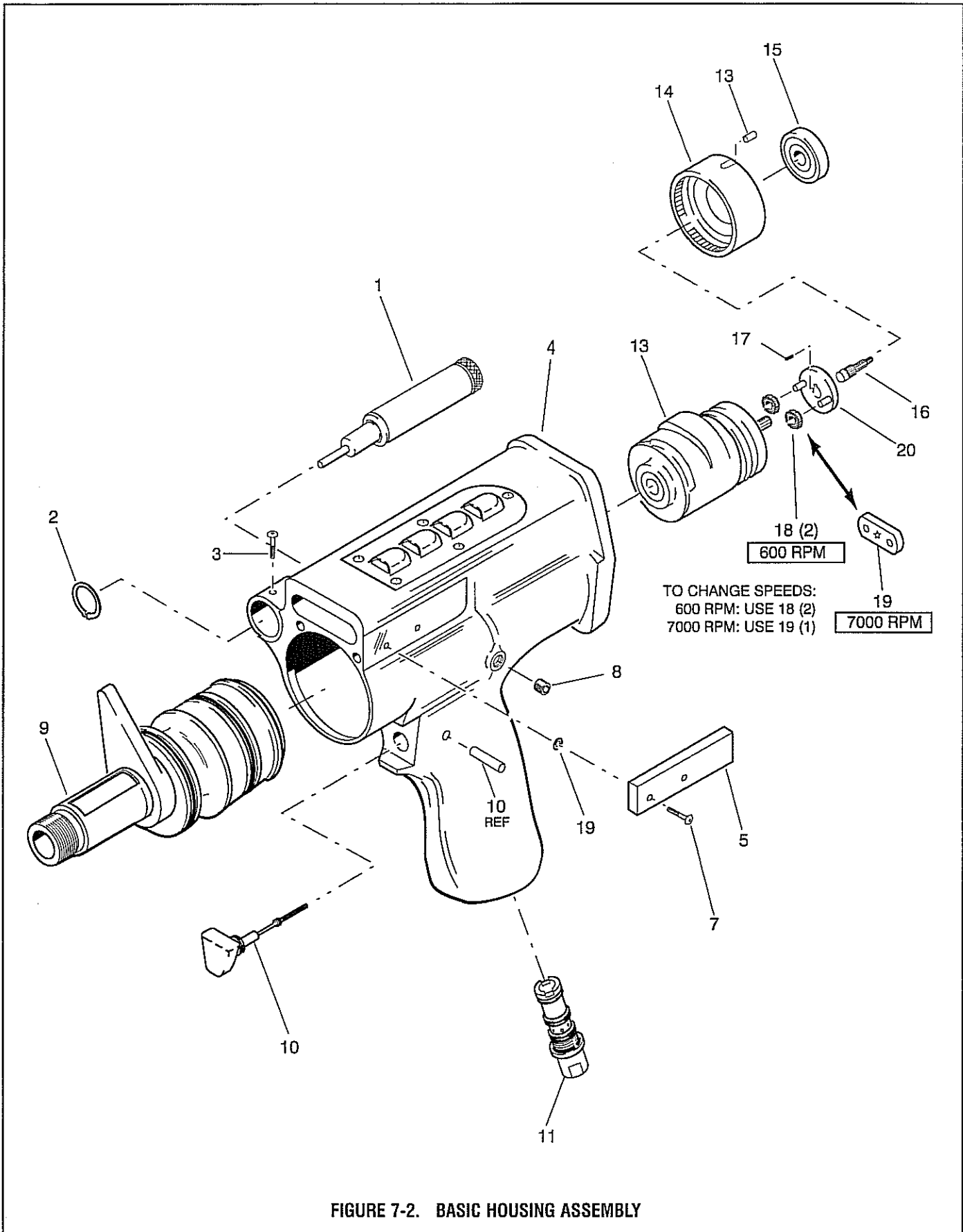


FIGURE 7-2. BASIC HOUSING ASSEMBLY

VARIABLE		BASIC HOUSING ASSEMBLY	SERIES 8000480	SERIES 8000486
			600 RPM	7000 RPM
ITEM	PART NUMBER	DESCRIPTION	QTY	QTY
1	8000461	Kinecheck II	1	1
2	1441	Ring, retaining (5100-50)	1	1
3	8000462	Screw, set, nylon (10-32 x 1/4)	1	1
4	SEE TABLE 7-1	Housing Sub-assy.	1	1
5	5425657	Plate, by-pass, pump assy.	1	1
6	566	Seal, O-ring (2-008)	2	2
7	16840	Screw, buttn soc head (6-32 x 7/16)	2	2
8	16189	Plug, pipe soc, (1/8 MP)	1	1
9	8000451	Clamp and feed group	1	1
10	8000441	Trigger valve assy.	1	1
11	8000446	Main air valve assy.	1	1
12	8000434	Air motor, offset vains, assy.	1	1
13	16178	Pin, dowel (1/8 x 1/4 lg)	1	1
14	8000466	Planetary adaptor, assy.	1	1
15	1155	Bearing, ball	1	1
16	5425797	Gear, pinion, output	1	1
17	J-1302	Key, woodruff	1	1
18	8000469	Gear, planetary, assy.	2	—
19	8000463	Insert, spindle	—	1
20	8000464	Cage, assy., gear, planetary	1	1

**TABLE 7-1**

Basic Housing Assy.	Description	Housing Sub-assy.
<b>SERIES 8000480 (600 RPM)</b>		
8000459	0.688 Rear	8000472
8000460	1.00 Rear	8000473
8000817	DW 1.125	8000814
<b>SERIES 8000486 (7000 RPM)</b>		
8000432	0.688 Rear	8000472
8000433	1.00 Rear	8000473
8000813	DW 1.125	8000813

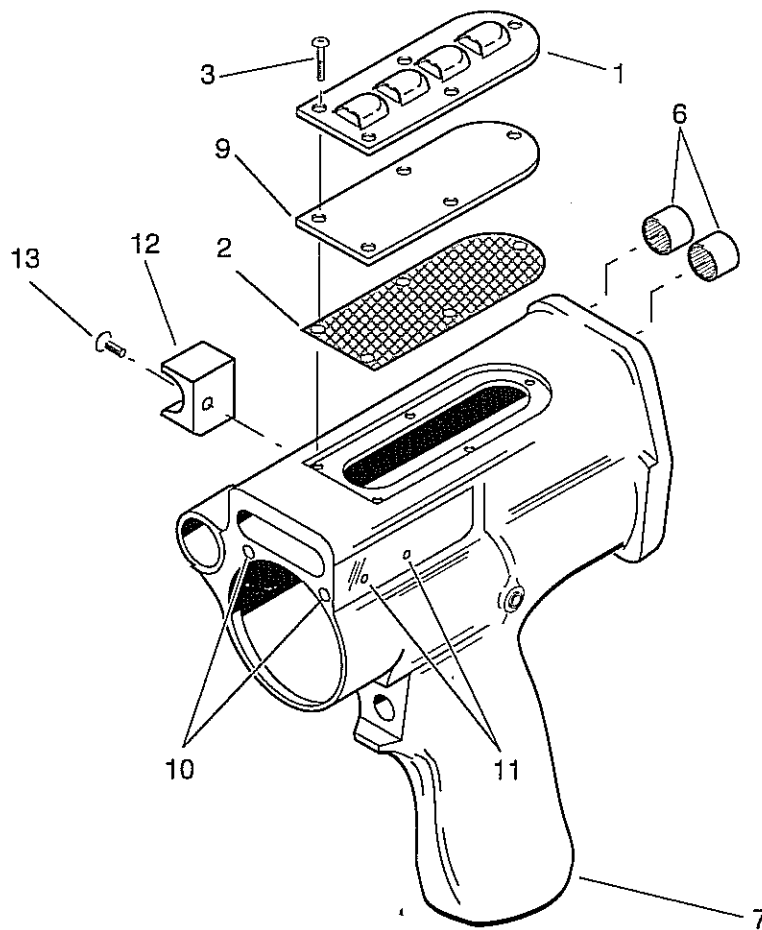
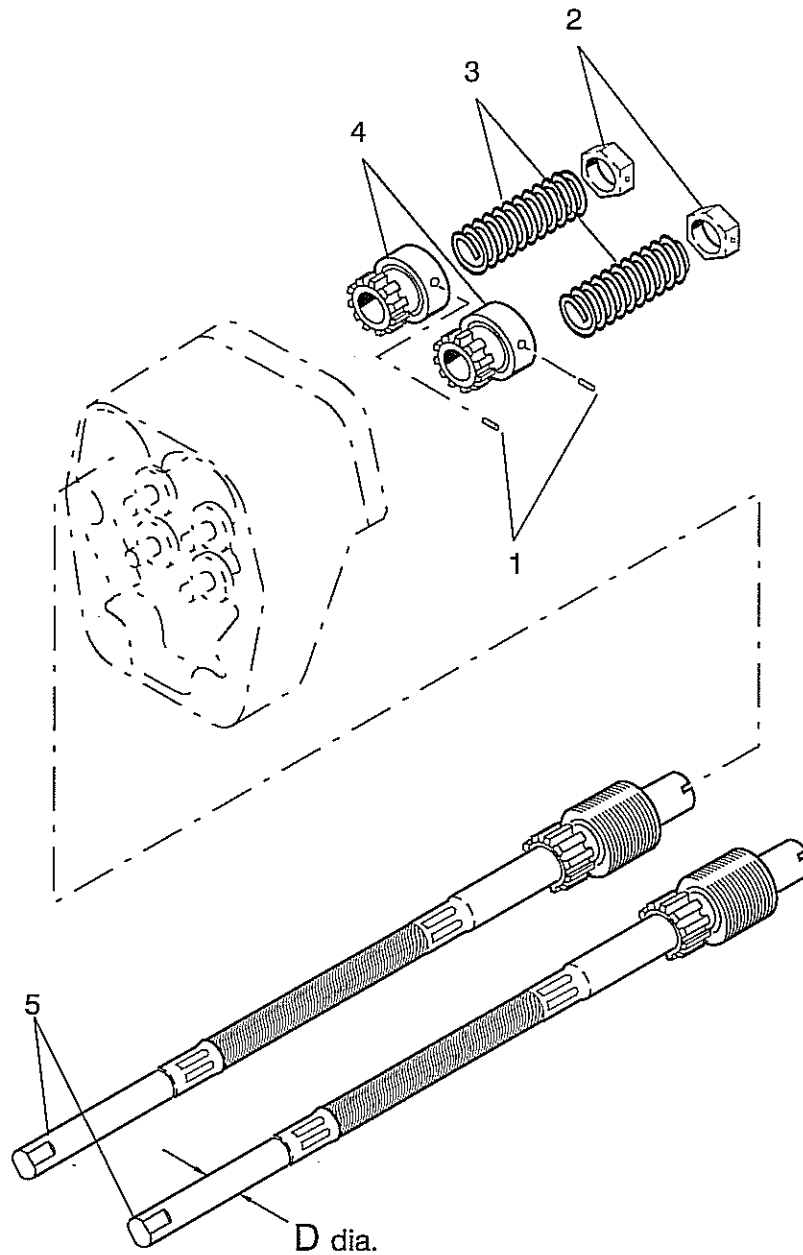


FIGURE 7-3. HOUSING SUB-ASSEMBLY

SERIES 8000471		HOUSING SUB-ASSY.	
ITEM	PART NUMBER	DESCRIPTION	QTY
1	8000475	Cover (Standard)*	1
2	8000476	Muffler	1
3	1175257	Plug, lee (0.281)	2
4	1258084	Plug, lee (0.187)	5
5	6352	Screw (6-32 x 1/4) (Standard)**	5
6	5426017	Bearing, needle	2
7	8000479	Housing, .688 rear	1
	8000473	Housing, 1.00 rear	
	8000814	Housing, DW 1125	
8	1175129	Plug, lee (0.125)	1
9	8000513	Screen	1
10	5430379	Tap-Lok insert	2
11	1281872	Tap-Lok insert	2
12	8000895	Bracket, Kinechek	1
13	8000896	Screw, nylon modified	1

\* Optional covers available: 8000562- Backward exhaust, 8001172- Side exhaust, 8001173- Right hand exhaust; 8001174- Left hand exhaust

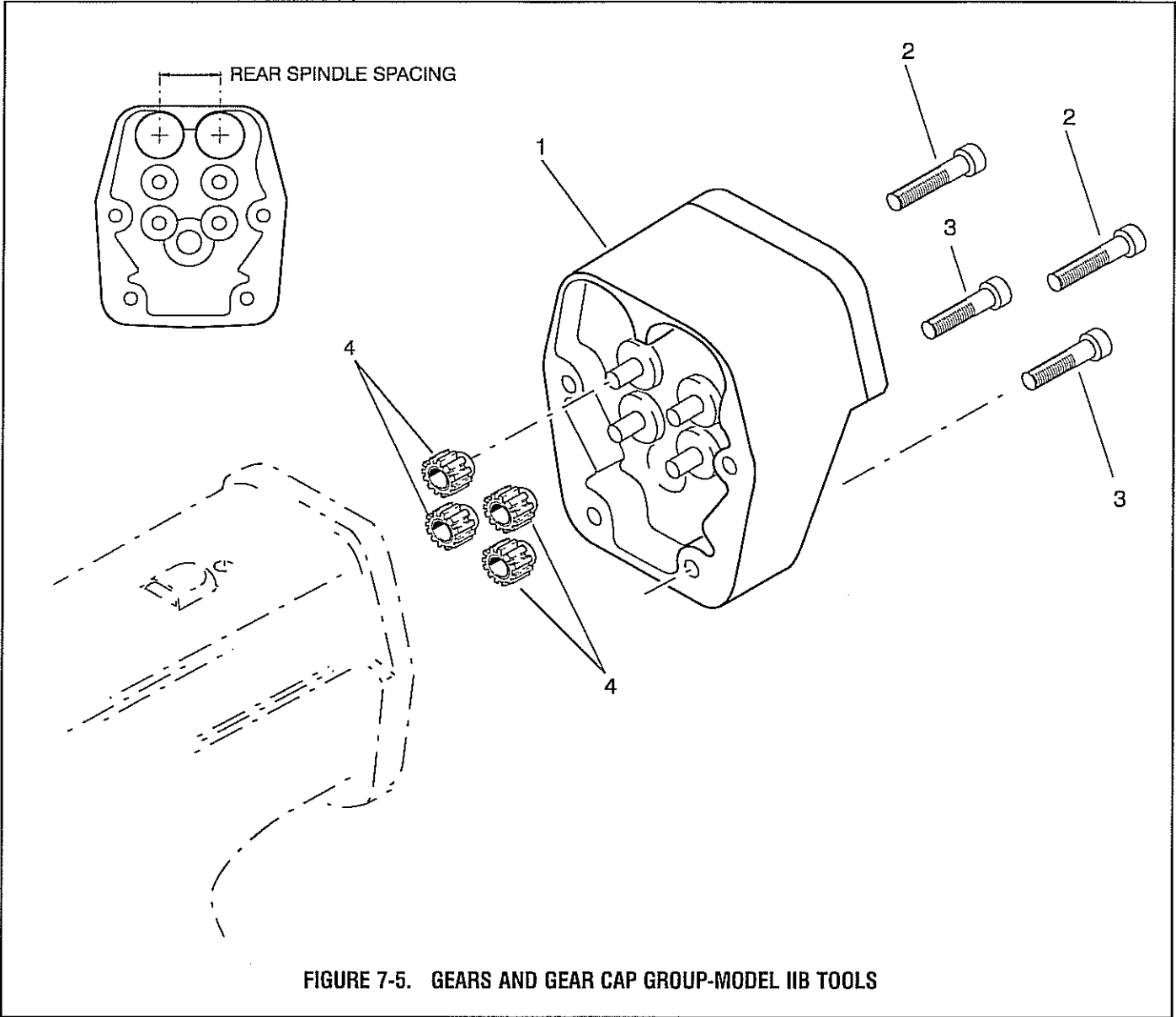
\*\* Use screws 16085 for optional covers 8001172, 8001173, and 8001174.



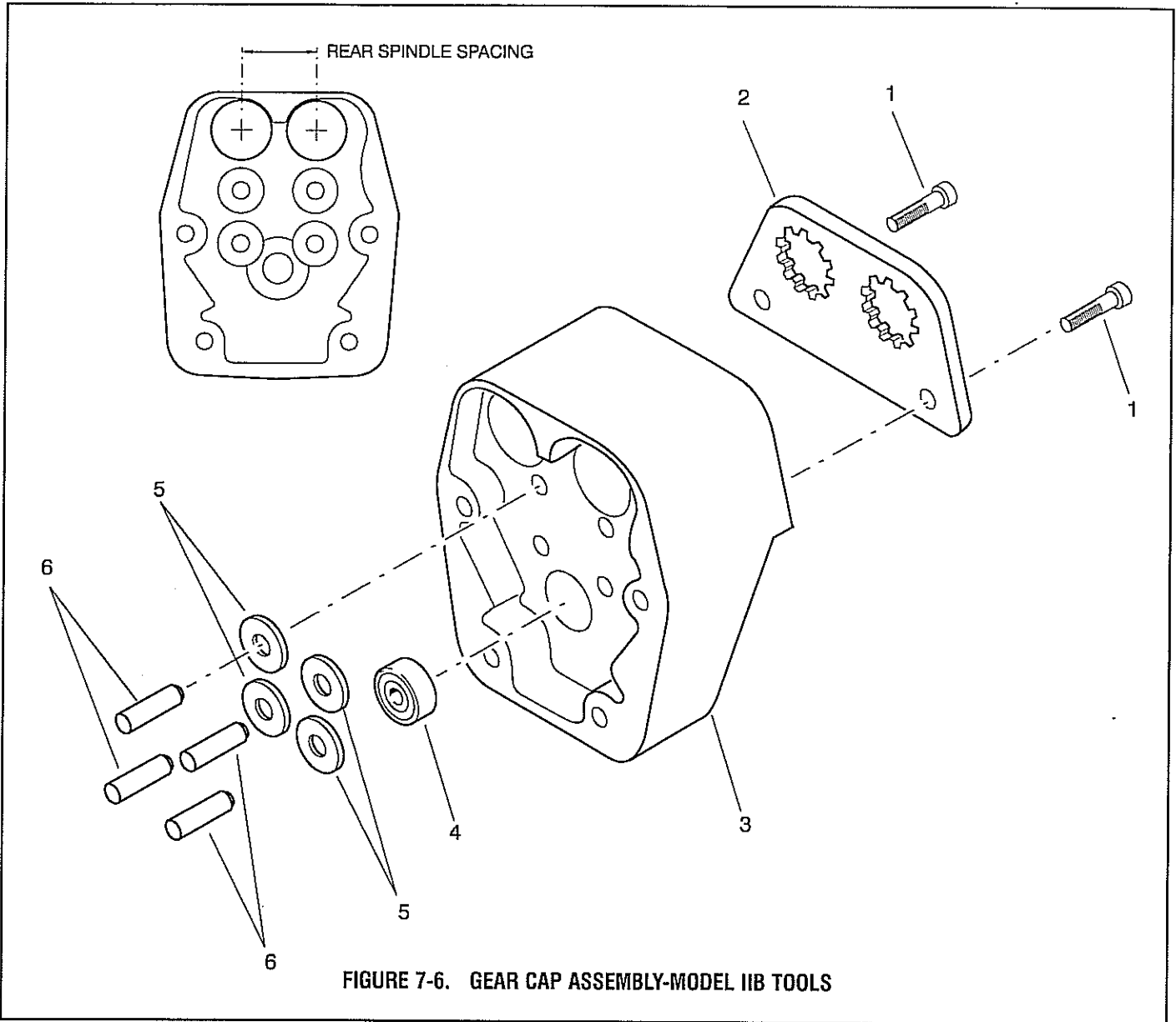
**FIGURE 7-4. SPINDLE GROUP-MODEL IIB TOOLS**

VARIABLE		SPINDLE GROUP-MODEL IIB	8001303	8001305	8001307
		D dia.	5/16	1/4	3/16
ITEM	PART NUMBER	DESCRIPTION	QTY	QTY	QTY
1	16202	Pin, roll	1	1	1
2	1011649	Collar, retainer, spring (7/16 hex)	1	1	1
3	1013105	Spring, compression	1	1	1
4	1011625	Thimble, adjust, index (.600 O.D. serration)	1	1	1
5	8001304	Spindle assy.	1	-	-
5	8001306	Spindle assy.	-	1	-
5	8001308	Spindle assy.	-	-	1





VARIABLE		GEARS & GEAR CAP GROUP-MODEL IIB	8001309	8001310
		REAR SPINDLE SPACING	.688	1.000
ITEM	PART NUMBER	DESCRIPTION	QTY	QTY
1	5445802	Cap assy., gear	1	-
	5445826	Cap assy., gear	-	1
2	16243	Screw, cap, soc. head (10-32 x 1 1/4)	2	2
3	11611	Screw, cap, soc. head (10-32 x 1)	2	2
4	1011807	Gear assy., idler	4	4



**FIGURE 7-6. GEAR CAP ASSEMBLY-MODEL IIB TOOLS**

VARIABLE		GEAR CAP ASSEMBLY-MODEL IIB	5445802	5445826
		REAR SPINDLE SPACING:	.688	1.000
ITEM	PART NUMBER	DESCRIPTION	QTY	QTY
1	16169	Screw, cap, socket, bt. head (8-32 x 1/2)	2	2
2	5445991	Plate, lock, index	1	-
	5445978	Plate, lock, index	-	1
3	5445796	Cap, gear, machined (.688)	1	-
	5445814	Cap, gear, machined (1.000)	-	1
4	1172116	Bearing, ball	1	1
5	1013233	Washer, gear, idle	4	4
6	1027207	Pin, gear idler	4	4

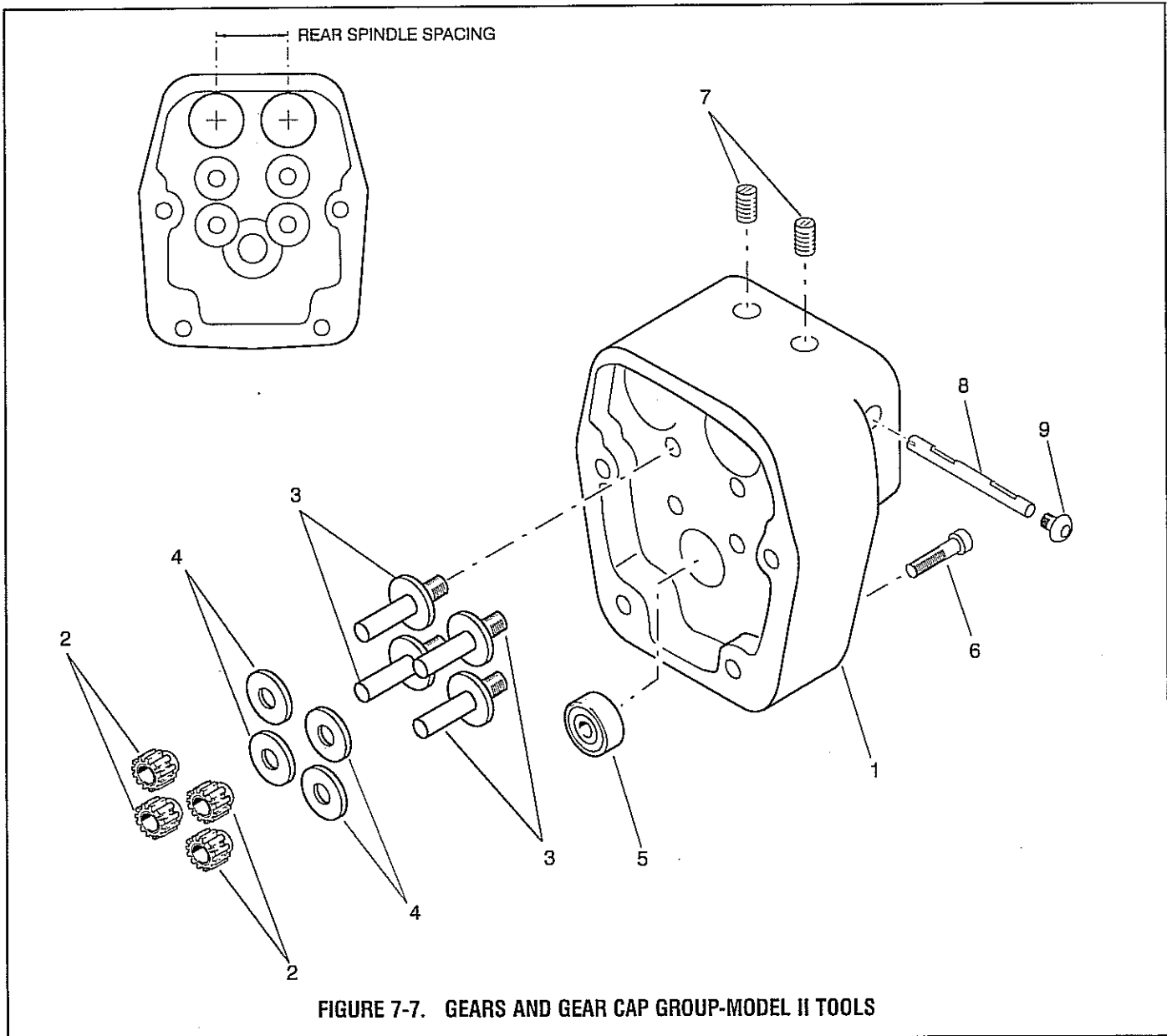
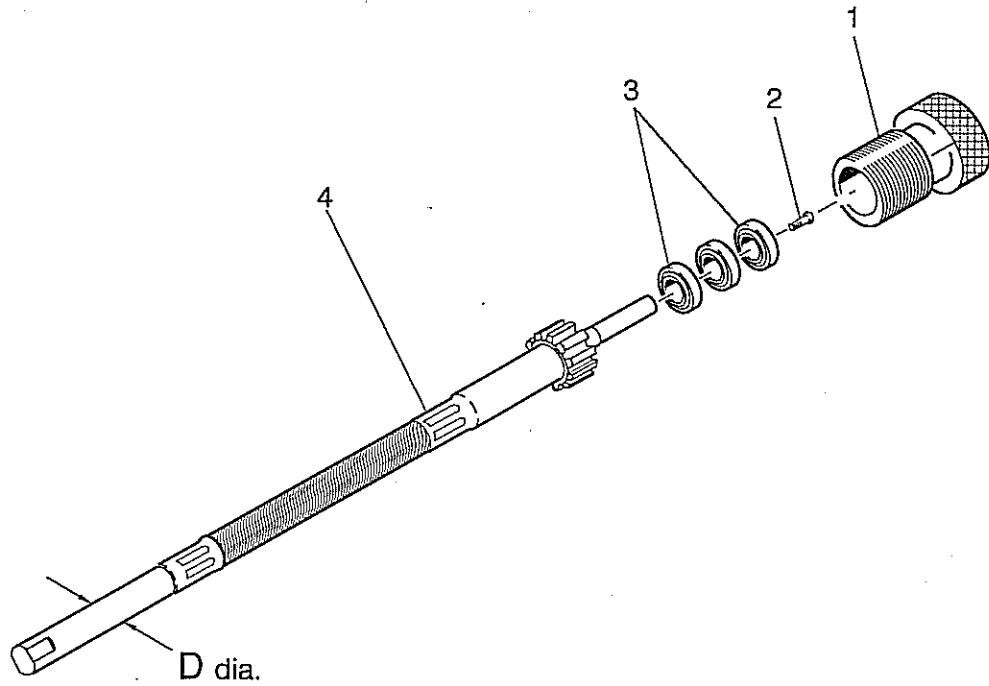


FIGURE 7-7. GEARS AND GEAR CAP GROUP-MODEL II TOOLS

VARIABLE		GEARS AND GEAR CAP GROUP-MODEL II	8000487	8000488
		REAR SPINDLE SPACING:	.688	1.000
ITEM	PART NUMBER	DESCRIPTION	QTY	QTY
1	8000481	Cap, gear machined (.688)	1	-
	8000618	Cap, gear machined (1.00)	-	1
2	1011807	Gear assy., idler	4	4
3	1027207	Pin, gear idler	4	4
4	1013233	Washer, gear, idle	4	4
5	1172116	Bearing, ball	1	1
6	J-235	Screw, cap (10-32 x 3/4)	4	4
7	16294	Screw, set, cup pt. (10-32 x 1/4)	2	2
8	8000796	Insert	1	-
	8001236	Insert	-	1
9	17316	Scw, cap, button head (8-32 x 1/8)	1	1



**FIGURE 7-8. SPINDLE ASSEMBLY - MODEL II TOOLS**

VARIABLE		SPINDLE ASSEMBLY - MODEL II	8000491	8000496	8000501
		D dia.	5/16	1/4	3/16
ITEM	PART NUMBER	DESCRIPTION	QTY	QTY	QTY
1	8000504	Housing, bearing, spindle	1	1	1
2	7002407	Screw, cap, button head, nylok	1	1	1
3	1172116	Bearing, ball	1	1	1
4	8000492	Spindle assy.	1	-	-
4	8000497	Spindle assy.	-	1	-
4	8000502	Spindle assy.	-	-	1

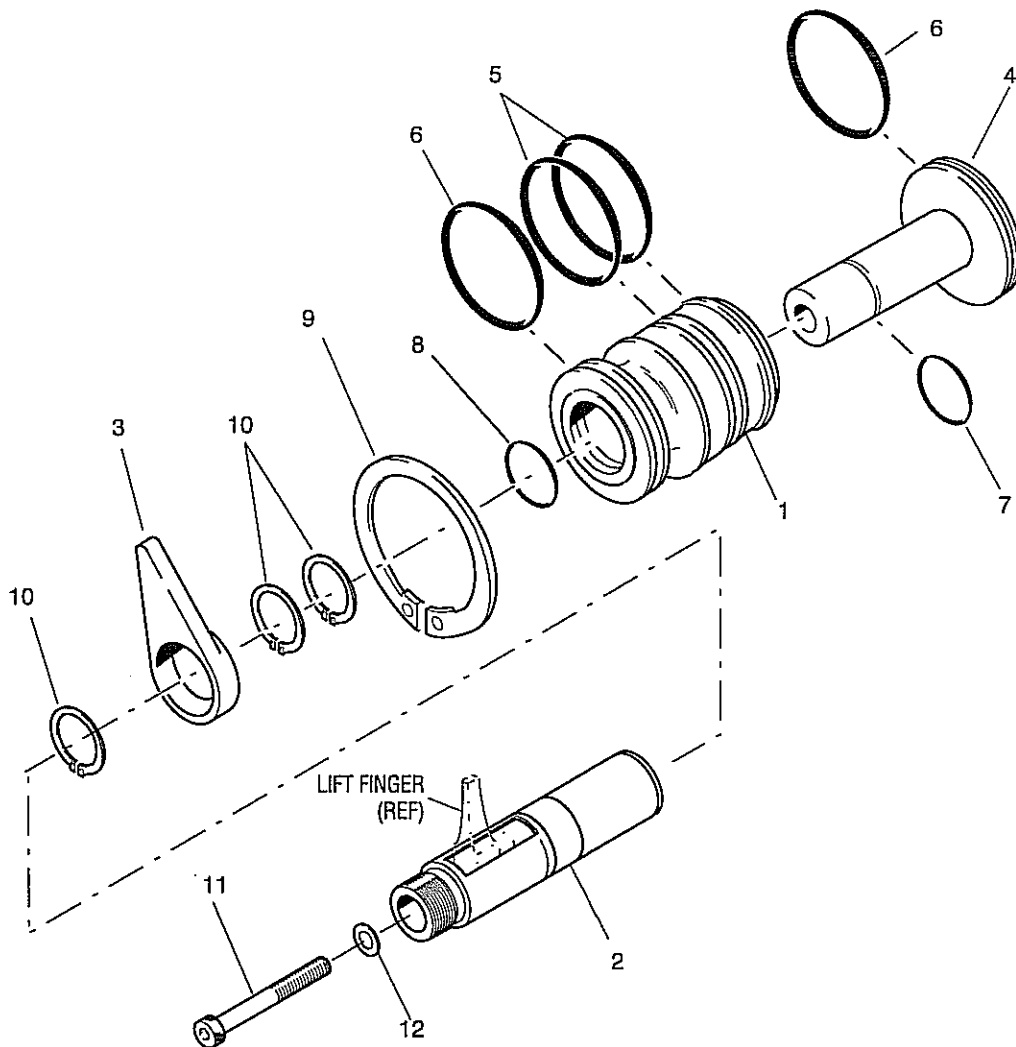
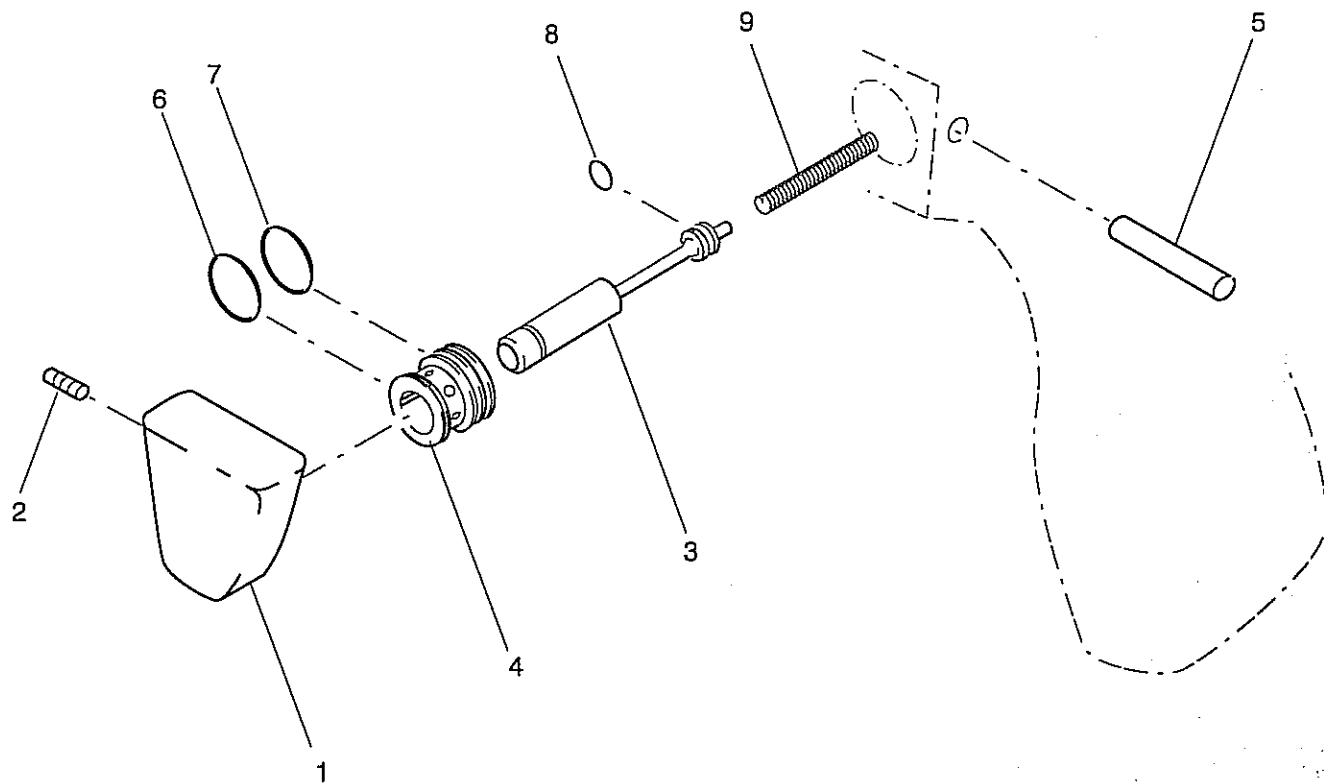


FIGURE 7-7. CLAMP AND FEED GROUP

8000451

## CLAMP AND FEED GROUP

ITEM	PART NUMBER	DESCRIPTION	QTY
1	8000452	Bulkhead assy.	1
2	8000456	Rod, piston, feed	1
3	8000455	Bracket, feed control	1
4	8000457	Rod-piston assy.	1
5	8001016	Seal, O-ring (Parker 2-031)	2
6	3002	Seal, O-ring (Parker 2-222)	1
7	922	Seal, O-ring (Parker 2-112)	1
8	150	Seal, O-ring (Parker 2-212)	1
9	16028	Ring, retaining (5000-193)	1
10	8001019	Ring, retaining (5100-87)	3
11	16060	Screw, cap, sc. head (10-32 x 1 1/2)	1
12	2781	Washer, lock, int. (10)	1



**FIGURE 7-8. TRIGGER ASSEMBLY**

8000441		TRIGGER ASSY.	
ITEM	PART NUMBER	DESCRIPTION	QTY
1	8000442	Trigger, machined	1
2	16119	Screw, set (4-40 x 3/16" lg.)	1
3	8000444	Pin, trigger	1
4	8000445	Sleeve, trigger	1
5	16180	Pin, roll (1/16 x 3/4")	1
6	1786	Seal, O-ring (Parker 2-010)	1
7	1506	Seal, O-ring (Parker 2-009)	1
8	564	Seal, O-ring (Parker 2-006)	1
9	1011856	Spring, compression	1

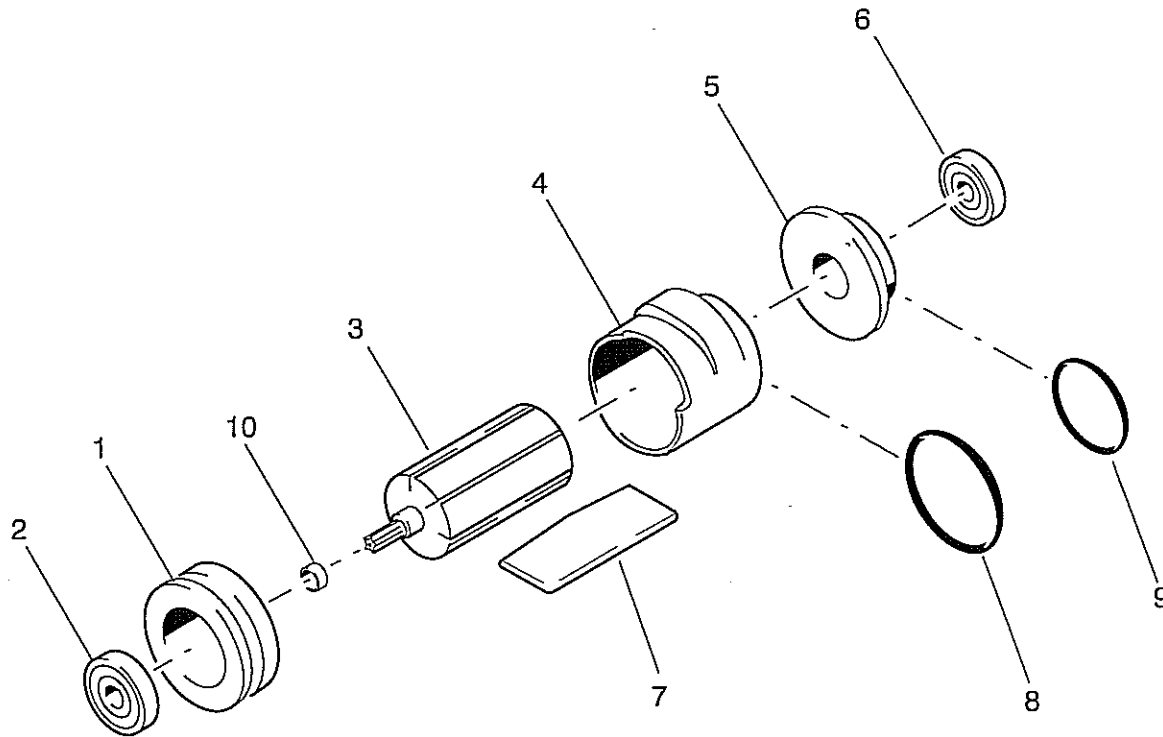
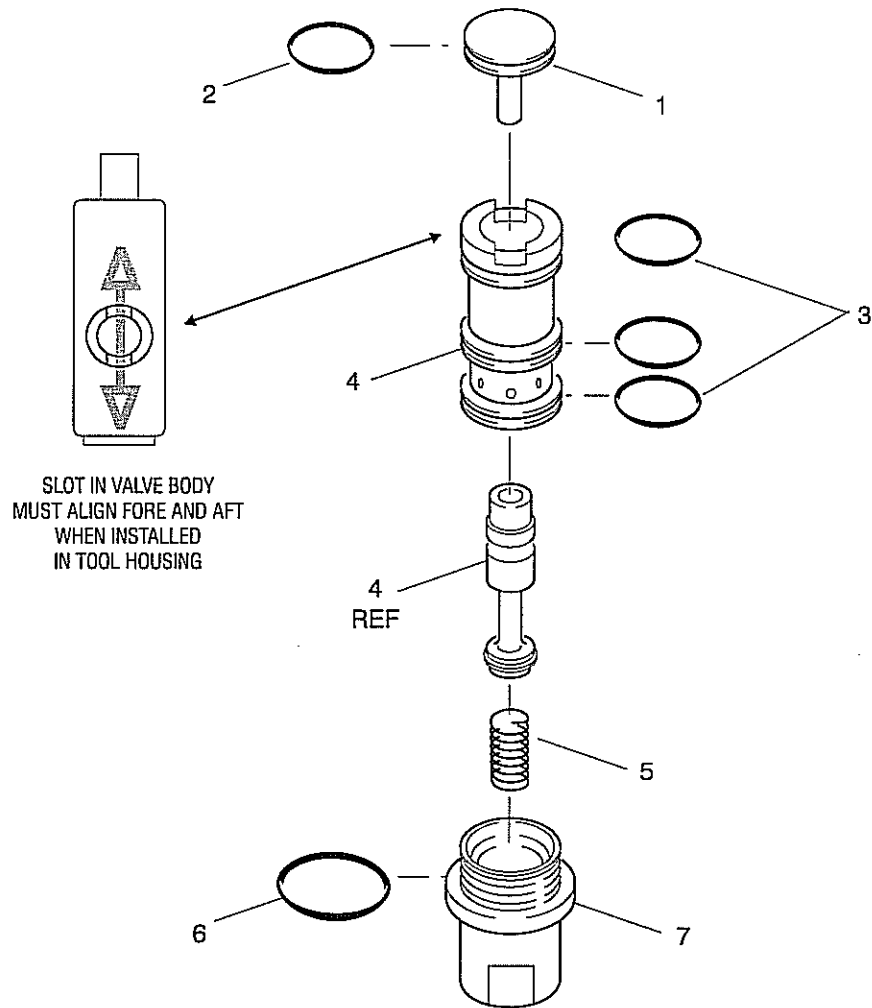


FIGURE 7-9. AIR MOTOR ASSEMBLY

8000434		AIR MOTOR	
ITEM	PART NUMBER	DESCRIPTION	QTY
1	8000436	Plate, front	1
2	1172153	Bearing	1
3	8000435	Rotor, air motor	1
4	8000437	Barrel, air motor	1
5	8000438	Plate, rear	1
6	1172128	Bearing	1
7	8000439	Vane	5
8	9554	Seal, O-ring (Parker 2-209)	1
9	1653	Seal, O-ring (Parker 2-214)	1
10	8000444	Spacer	1



**FIGURE 7-10. MAIN AIR VALVE ASSEMBLY**

8000446		MAIN AIR VALVE ASSY.	
ITEM	PART NUMBER	DESCRIPTION	QTY
1	1013385	Piston	1
2	548	Seal, O-ring (Parker 2-111)	1
3	922	Seal, O-ring (Parker 2-112)	3
4	8000447	Valve assy.	1
5	5447355	Spring	1
6	1139	Seal, O-ring (Parker 2-113)	1
7	8000450	Adapter, inlet	1





**CUTTER SELECTION AND APPLICATION**  
**CHART NO. 5412560 - FOR ULTRALITE™ NUTPLATE DRILLMOTOR II/IIIB**

DRILL DIA	MAX C'SINK AND CUTTER SHANK DIA.	CUTTER PART NUMBER/STOCK NUMBER (SEE NOTES BELOW)					
		MATERIAL THICKNESS AND TYPE					
		0 - .187		0 - .312		0 - .437	
		ALUMINUM	TITANIUM AND STEEL	ALUMINUM	TITANIUM AND STEEL	ALUMINUM	TITANIUM AND STEEL
.0670	.1250	1216193	1216211	1216223	7000421	NOT AVAILABLE	NOT AVAILABLE
		WDS51-100-25	WDS51M3-100-25	WDS51-100-35	WDS51M3-100-35	WDS51-100-50	WDS51M3-100-50
	.1875	1216399	1216405	1216417	7002521	7002523	7002524
		WDS51-100-25	WDS51M3-100-25	WDS51-100-35	WDS51M3-100-35	WDS51-100-50	WDS51M3-100-50
.0960	.1875	1216119	1216120	1204828	1204853	1216144	1216181
		WD40-100-25	WD40M3-100-25	WD40-100-35	WD40M3-100-35	WD40-100-50	WD40-M3-100-50
	.2500	1216284	1216296	1216132	1216314	1216168	7002530
		WDS40-100-25	WD40M3-100-25	WDS40-100-35	WDS40M3-100-35	WDS40-100-50	WDS40M3-100-50
.1285	.2500	1215966	1246367	1204816	1204841	1216028	1216041
		WD30-100-25	WD30M3-100-25	WD30-100-35	WDS30M3-100-35	WD30-100-50	WDS30M3-100-50
	.3125	1268132	1268144	1216004	1216247	1216016	1216260
		WDS30-100-25	WDS30M3-100-25	WDS30-100-35	WDS30M3-100-35	WDS30-100-50	WDS30M3-100-50
.1590	.3125	1246276	1246288	1215899	1246318	1215905	1246343
		WD21-100-25	WD21M3-100-25	WD21-100-35	WD21M3-100-35	WD21-100-50	WD21M3-100-50
	.3750	1246306	NOT AVAILABLE	1215917	NOT AVAILABLE	1246355	NOT AVAILABLE
		WDS21-100-25	WDS21M3-100-25	WDS21-100-35	WDS21M2-100-35	WDS21-100-50	WDS21M2-100-50

**NOTES:**

1. Part numbers and stock numbers were carried over from Winslow Mfg. Co. (WD meant Winslow Drill). M3 is a common symbol for steel with cobalt used for drilling steel. 100 is the countersink angle (degrees) and -25, -35 and -50 are flute lengths. The 7-digit stock no. is the ordering number.
2. Cutters are always ordered in matched pairs of equal length. When re-sharpened, the equal length should be maintained.
3. Cutters of equivalent diameters and length, but with a solid carbide drill portion for drilling composite materials are available on special order only.