COOPER Tools

**Operation & Service Manual**

**823005** **2/01**

# Quackenbush®

# 136SC-B-118 SELF-COLLETING DRILLS


**Houston Operation**
7007 Pinemont
Houston, TX 77040

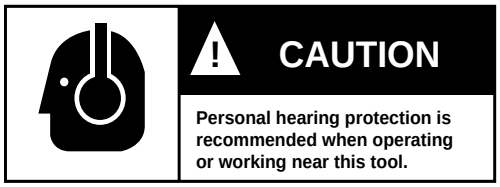
**Recoules Operation**
Zone industrielle - B.P. 28
Avenue Maurice Chevalier
77831 Ozoir-la-Ferriere Cedex France

# Safety Recommendations

**For your safety and the safety of others, read and understand the safety recommendations and operating instructions before operating any drill motor.**

**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., 11 West 42nd Street, New York, N.Y. 10036.




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


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.

Quackenbush drills are designed to operate on 90psig (6.2 bar) maximum 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.

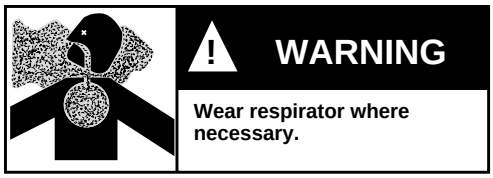
**CAUTION**

- 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 accidently 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.



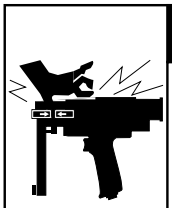

Drilling or other use of this tool may produce hazardous fumes and/or dust. To avoid adverse health effects utilize adequate ventilation and/or a respirator. Read the material safety data sheet of any cutting fluids or materials involved in the drilling process.

**CAUTION**

Some non-ferrous metal chips (or dusts) are combustible. Examples: Aluminum, magnesium, Titanium, and Zirconium. See the material safety data sheets for combustibility of materials drilled. Never collect spark generating material with combustible material. Examples: Collecting both steel and aluminum or steel and titanium.


Quackenbush drills are often used with lubricant or cooling systems which must be properly maintained to avoid leakage. Failure to do so can result in serious injuries from slipping on oily surfaces.

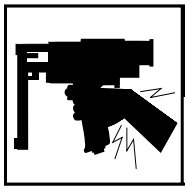
# Safety Recommendations



**WARNING**

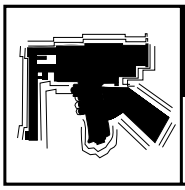
**Pinch Hazard. Clamping and feed mechanism can move when the air supply is connected or disconnected.** Disconnect air supply before servicing. To avoid injury, keep fingers and hands away from the clamping and feed mechanism areas.

Due to the number and variety of tooling applications, the user's methods engineering departments, ect., must consider any hazards that may be associated with each specific application of this product and provide adequate operator protection from inadvertent contact with any moving components. The clamping and feed mechanisms of self-colleting drill motors are exposed for visibility and can move when the air supply is connected or disconnected. To avoid injury, keep fingers and hands away from these areas when handling or operating this tool.



**WARNING**

**Repetitive work motions can injure your hands and arms.**

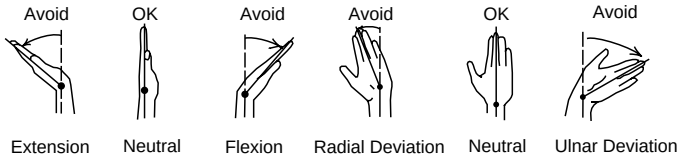


**WARNING**

**Exposure to vibration can injure your hands and arms.**

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 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 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 so that a review of what steps might be taken to prevent further occurances. These steps might include but are not limited to, repositioning the workpiece or redesigning the workstation, reassigning tool users to other jobs, rotating jobs, changing 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.

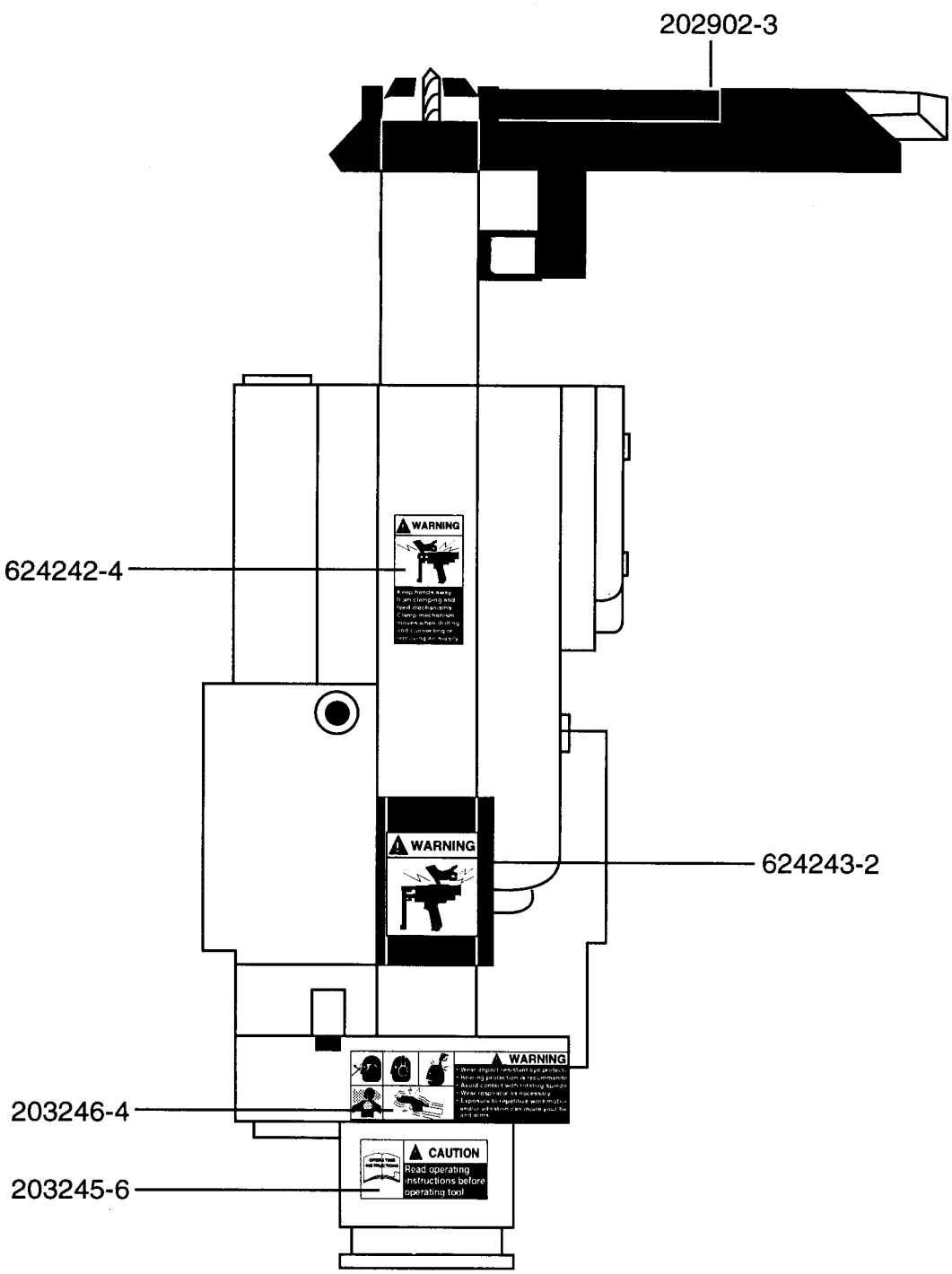



The following recommendations will help reduce or moderate the effects of repetitive work motions. The operator of any drill should:

- 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.

## Safety Labels

The safety labels found on this tool are an essential part of this product. Labels should not be removed. Labels should be checked periodically for legibility. Replace safety labels when missing or when the information can no longer be read. Replacement labels can be ordered by the part numbers shown on this page.



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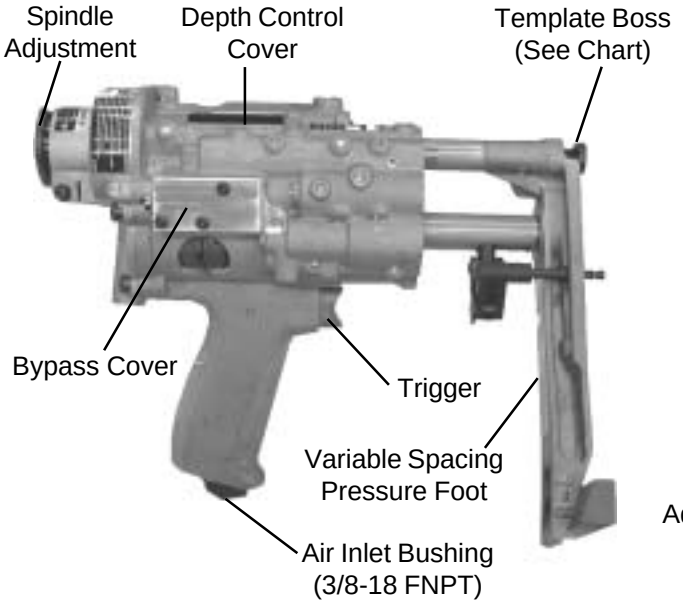
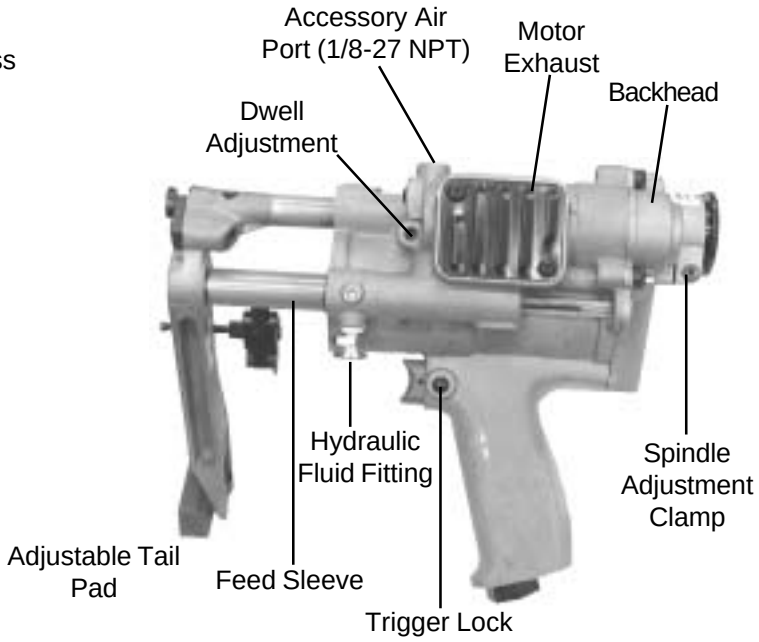
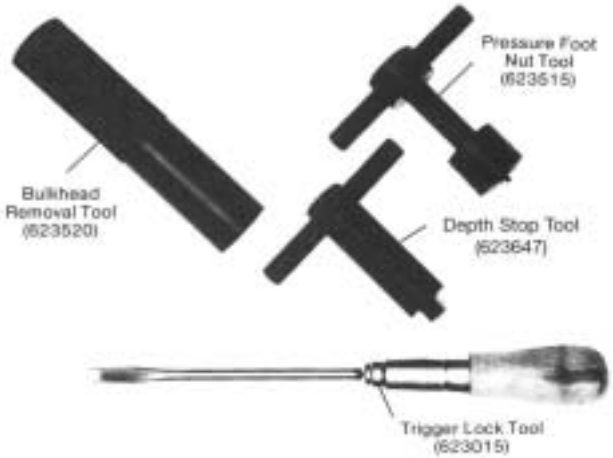
# Major Tool Components




# Specials Tools



# Introduction and General Information

The 136SC-B-118 is an air operated, hydraulically controlled tool that automatically clamps to the material, drills and countersinks close tolerance holes in one operation. This drill will produce high quality holes in aluminum, steel, titanium and petroleum hybrid materials primarily found in the aircraft/aerospace industries. This drill motor has been designed using state-of-the-art technology that provides maximum power, minimum weight and the highest degree of accuracy for demanding hole preparation requirements.

**Technical Data**

**Feed Stroke:** Feed stroke of the 136SC-B-118 is 1.18 inches to drill and countersink in 1 inch stacked material. The feed stroke is unaffected by the collet stroke.

**Collet Stroke:** The 136SC-B-118 will clamp throughout its .56 inch stroke. Collet stroke is unaffected by feed stroke. **Spindle Adjustment:** The spindle adjustment of .312 inch allows for drill length variations. See Spindle Adjustment information.

**Countersink Depth Control:** A micrometer adjustment provides for countersink stop repeatability within .001 inch.

**Cutter Sizes:** The 136SC-B-118 will accommodate .312 diameter drills without countersink and .250 diameter drills with .505 countersink diameter.

**Feed Rate:** An adjustable drill feed rate mechanism enables the 136SC-B-118 to drill from 5 seconds per inch to 1 minute per inch. See Feed Rate Adjustment information.

**Cutter to Collet Spacing:** The cutter to collet distance is adjustable between .500 inch minimum to 2.75 inch maximum.

**Coolant:** The 136SC-B-118 has a drill point coolant port in the pressure foot. A coolant mist lubricator is available (See Accessories).

**Air Motor:** The air motor develops .88 horsepower when supplied with air at 90 p.s.i.

**Air Consumption:** Air consumption of the 136SC-B-118 is 35 c.f.m. at 90 p.s.i. dynamic.

**Weight:** Tool weight with the steel pressure foot is 7.0 pounds.

**Spindle Speeds:** Eight geared spindle speeds are available: 400, 950, 2100, 3100, 6000, 7800,11500, and 22500 RPM. Any gear set can be used with the 136SC-B-118 tool.

**Trigger Lock:** A trigger lock is provided which allows the tool to be locked in the “Operate” position. With the lock activated, the tool will run through the clamp, feed and retract cycles, but it will not unclamp or stop the motor until the trigger lock is manually released.

**Tool Start-Up**

The 136SC-B-118 drill is shipped from the factory equipped to the customer’s specifications: spindle RPM, spindle to accommodate cutter type desired, pressure foot type, collet guide to accommodate collet desired and optional booster pump (if required).

After unpacking, examine the customer-specified equipment on this tool to verify type and speed of components.

Attach air line to 3/8-18 NPT inlet bushing. If quick disconnect fittings are used, 3/8 in. ID are minimum. The 136SC-B-118 drill requires a supply of clean 90-100 PSI air. Air consumption is 35 CFM at 90 PSI. The use of the in-line lubricator will provide the proper lubrication for the air motor and will significantly increase the tool life expectancy. Because O-rings are extensively used to seal systems within the tool, the elimination of foreign particles and other contaminants will reduce the possibility of damage to these parts. Always inspect O-rings for damage or wear and replace as required. The use of silicone O-ring lubricant is strongly recommended during reassembly. The addition of oil in the air line will also increase motor and valve life as well as the life of the O-rings.

**136SC-B-118 DRILL MOTOR SPECIFICIATIONS**

| | |
|---|---|
| WEIGHT | 7.0 LBS. MAX. W/ALUMINUM FOOT |
| AIR CONSUMPTION | 35 C.F.M. @ 90 P.S.I. DYNAMIC |
| HORSE POWER | APPROX. .88 @ 90 P.S.I. |
| O/A LENGTH | 10.12 IN. MAX WITH SPINDLE ADJUST AT FULL EXTENSION |
| STROKE | 1.18 IN. (DRILL & C/SINK 1 IN. STACK) |
| COLLET STROKE | .56 IN. (NO LOSS OF FEED STROKE) |
| COUNTERSINK | COUNTERSINK STOP REPEATS WITHIN .001 IN. |
| FEED RATE | MIN. 5 SEC. PER INCH, MAX 1 MIN. PER INCH |
| SPINDLE SPEEDS<br>DRILLING THRUST | 400, 950, 2100, 3100, 6000, 7800, 11,500 & 22,500 RPM<br>130 LBS. MAX. (UNREGULATED AIR) |
| CLAMP FORCE | 230 LBS. START CLAMP FORCE (UNREGULATED AIR) |
| SPINDLE ADJUSTMENT | .312 IN. ADJUSTMENT TO ALLOW FOR DRILL LENGTH VARIATIONS |
| MAX. DRILL SIZES | .312 (NO C/SINK), .250(.505 C/SINK DIA.) |
| COLLET FOOT SPACING | .500 IN. MIN.-2.75 IN. MAX. |
| SPINDLE | .375 IN. DIA. W/1/4-28 THR'D FOR I.D.<br>THREAD TYPE DRILLS OR 1/4-28 MALE THD. DRILLS |
| COOLANT | AIR BLAST PORT & DRILL POINT PORT IN TEMPLATE STD.,<br>COOLANT MIST LUBRICATOR AVAILABLE. |

# 1. DIAGRAM OF AIR AND HYDRAULIC SYSTEMS IN STANDBY CONDITION. Trigger released, compressed air attached, collet unclamped, cutter fully retracted, air motor stopped.

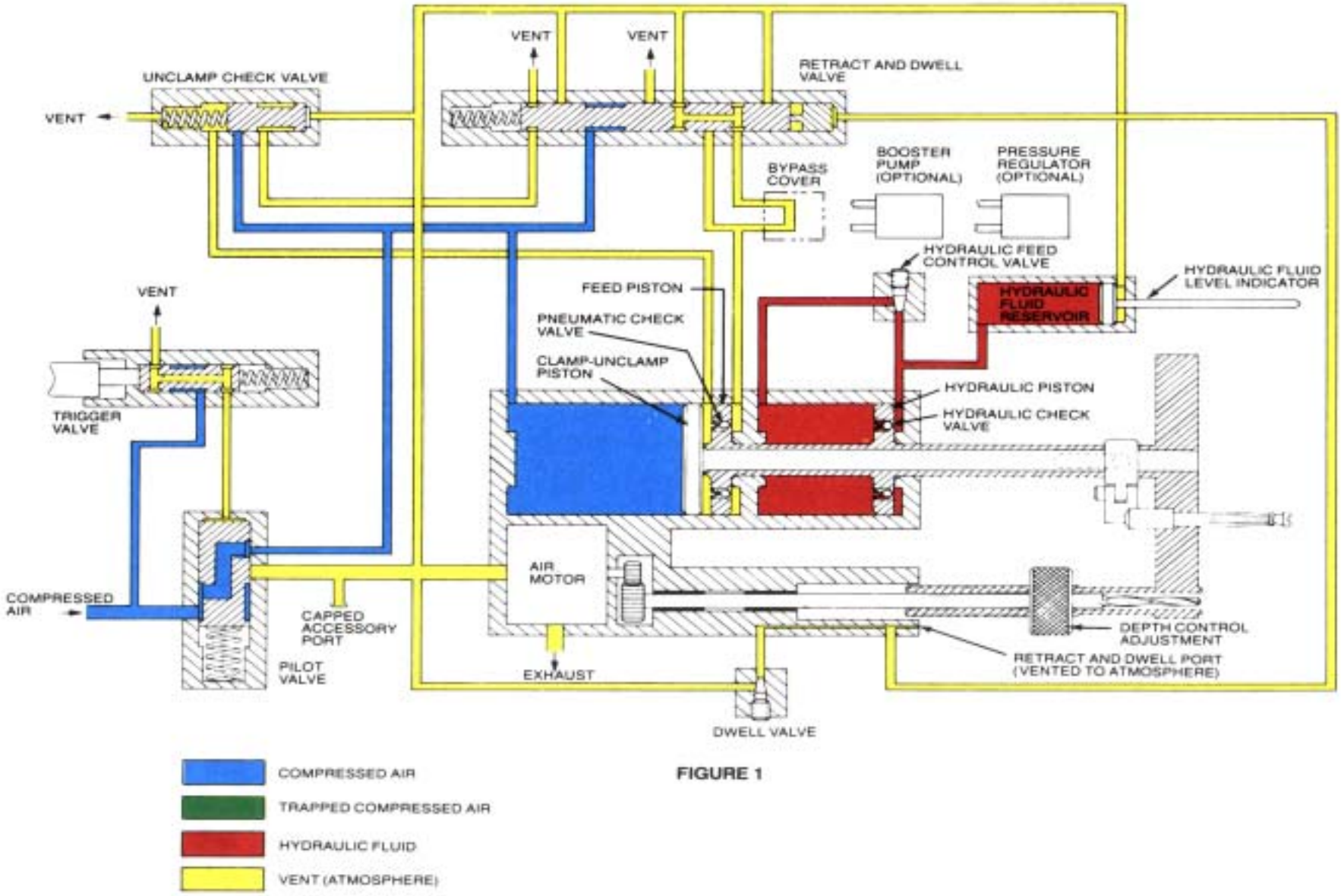



**FIGURE 1**

## 2. DIAGRAM OF AIR AND HYDRAULIC SYSTEMS AT FULL COLLET STROKE AND START OF CUTTER FEED. Trigger depressed, pilot and unclamp check valves shift, air motor starts, collet first clamps fully, then cutter starts feeding and continues to feed until pre-set depth has been reached.(See Figure 3).

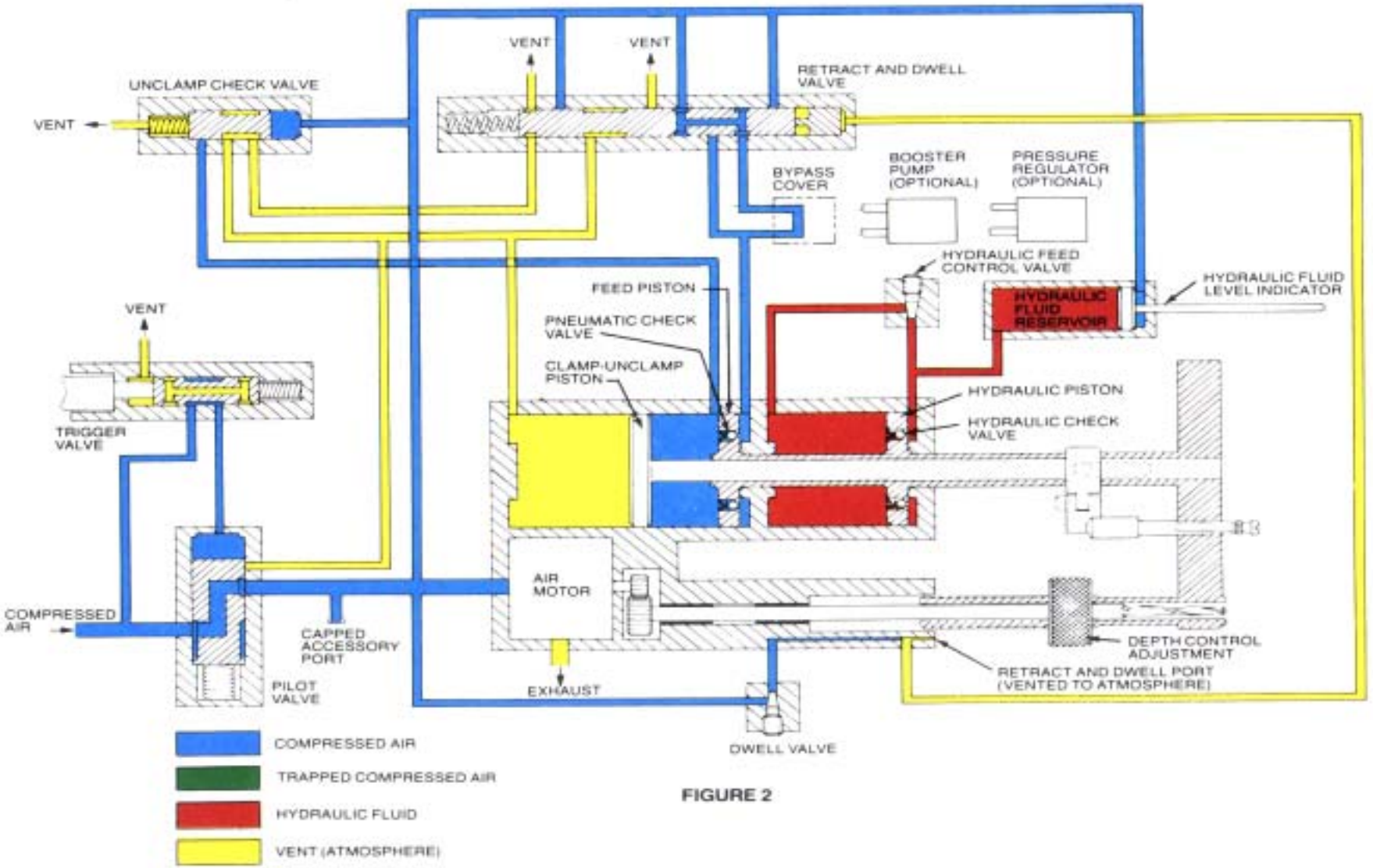



FIGURE 2

3. DIAGRAM OF AIR AND HYDRAULIC SYSTEMS AT PRE-SET CUTTER DEPTH AND START OF RETRACT. Trigger depressed, air motor running, collet clamped, cutter continues feeding until depth control adjustment covers retract and dwell port, shifting retract and dwell valve, initiating rapid cutter retract.

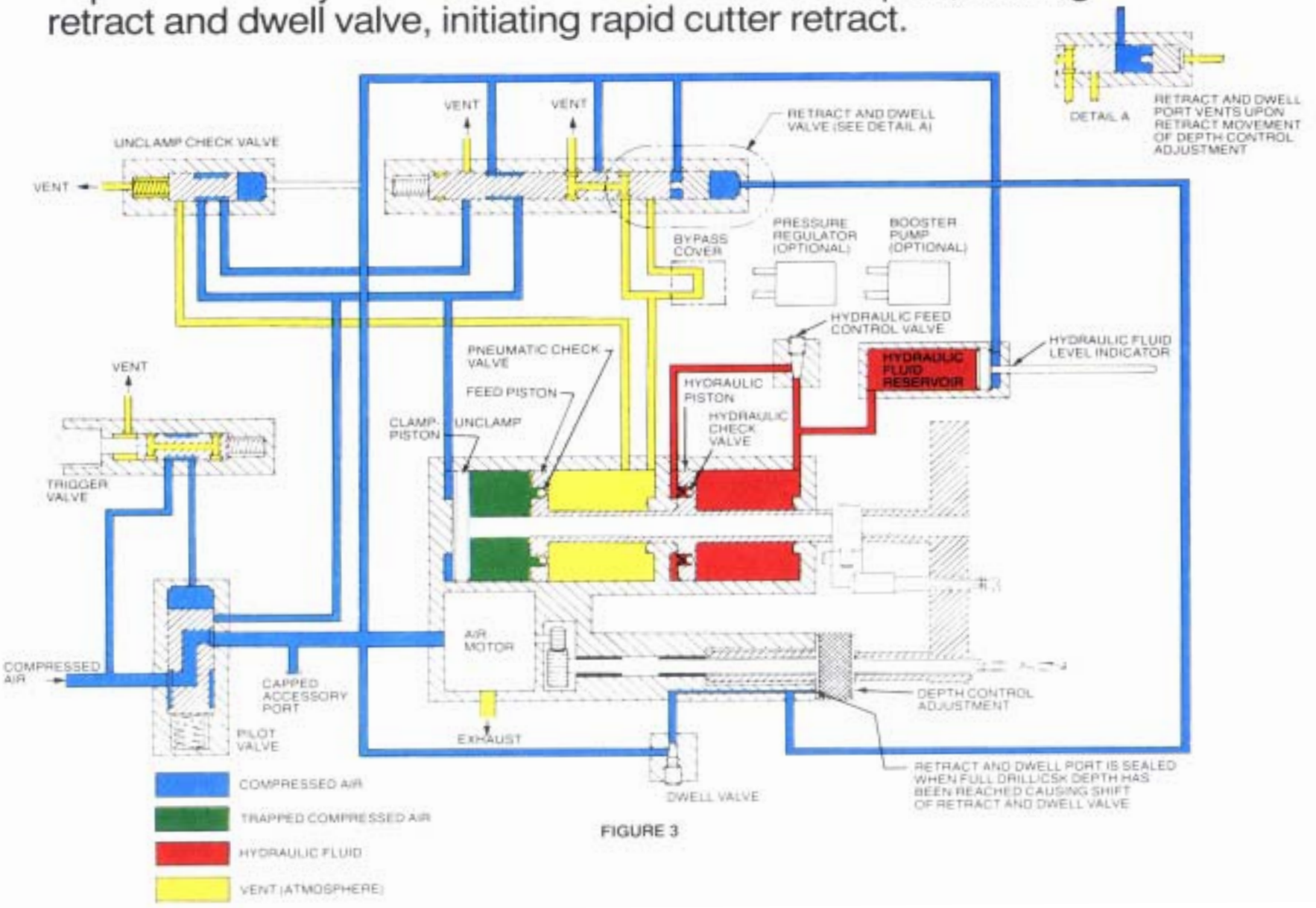



FIGURE 3

4. DIAGRAM OF AIR AND HYDRAULIC SYSTEMS AT COMPLETION OF RETRACT STROKE. Trigger depressed, collet clamped, air motor running.
NOTE: Release trigger causes shifting of pilot, clamp-unclamp and retract valves, collet unclamps and air motor stops (See Figure 1).

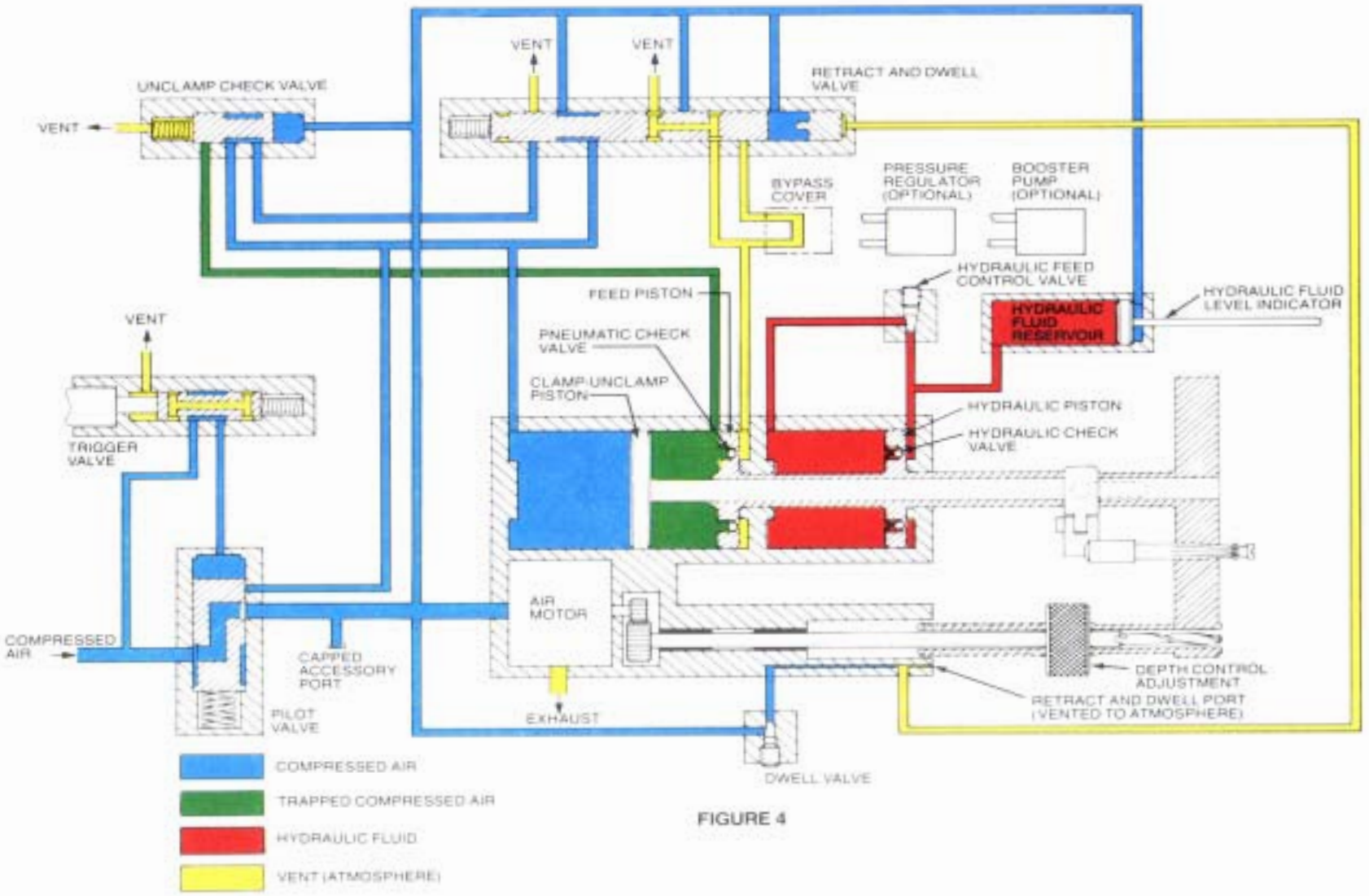



FIGURE 4

# I. Backhead Disassembly

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

1. Remove four ¼"-20 cap screws.

2. Pull backhead with spindle attached straight out of tool.

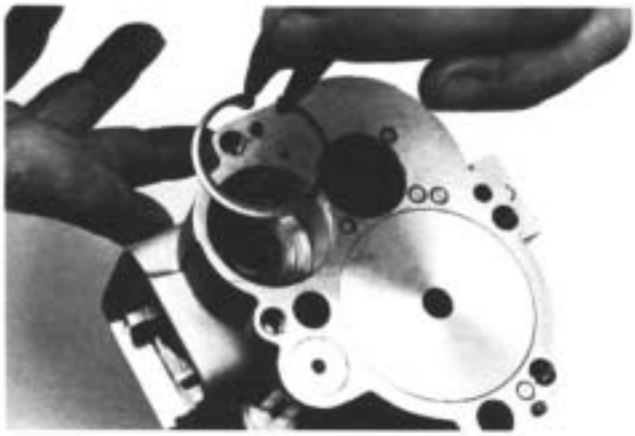
**NOTE:** Four O-rings in recessed cavities should remain in place in backhead mating surface.

# II. Air Motor Disassembly

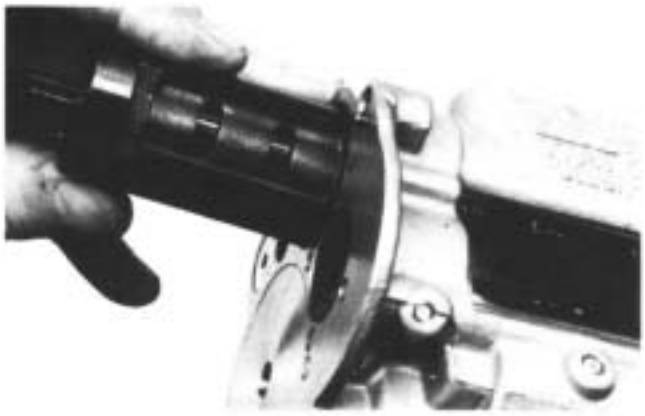
WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

1. Remove planet gear assembly and internal gear.

2. Remove two button head screws which hold exhaust cover in place, then remove the muffler plates and muffler pads.



3. Compress and remove beveled retaining ring. Beveled edge faces out.



4. Tap housing gently on surface to remove air motor. The complete motor includes rotor with blades, cylinder, and front and rear bearing plates.

**NOTE:** Exhaust slots on cylinder should be indexed approx. 180° from muffler)

## III. Spindle Adjustment Disassembly

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

**NOTE:** Spindle adjustment disassembly is necessary only to service bearings and to change spindles. Otherwise, the backhead assembly can be removed intact to service other internal assemblies, such as the air motor.

1. Use suitable spanner wrench to unscrew bearing retaining nut.

2. Use Allen wrench to loosen and remove tapered locking screw in rear housing.

3. Unscrew spindle adjustment nut and remove nut with spindle.

4. Tap spindle adjustment nut to remove spindle and duplex ball bearings.
5. Unscrew bearing lock nut and bearing lock nut washer.
6. To remove spindle gear, remove retaining ring and slide gear off spindle.

**NOTE:** To reassemble, 1st duplex ball bearing must seat firmly on spindle shoulder. Add 2nd ball bearing back-to-back with part number on bearings facing away from each other. Then add bearing lock washer and bearing lock nut. Tighten until inner race seats solid. Screw in bearing adjustment nut and bearing retaining nut and tighten until nut seats solid.

**NOTE:** Bearing lock nut and bearing retaining nut must be seated solidly to prevent end play in spindle and cutter.

## IV. Quill & Pressure Foot Removal

WARNING: Disconnect air-supply before servicing. Clamp mechanism moves when connecting or removing air supply. Keep hands and fingers away from clamping and feed mechanism.

1. Remove Pressure foot nut with appropriate spanner wrench or with Special Pressure foot nut tool (Part No. 623515).

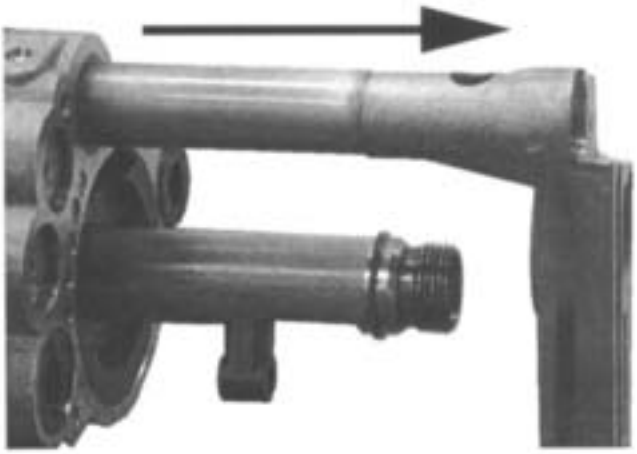
2. Unscrew depth stop from quill.

## V. How To Change Quills

WARNING: Disconnect air-supply before servicing. Clamp mechanism moves when connecting or removing air supply. Keep hands and fingers away from clamping and feed mechanism.

1. Follow Quill and Pressure Foot disassembly instructions.

**NOTE:** If tool is equipped with template boss, remove socket cap screw and remove template boss.



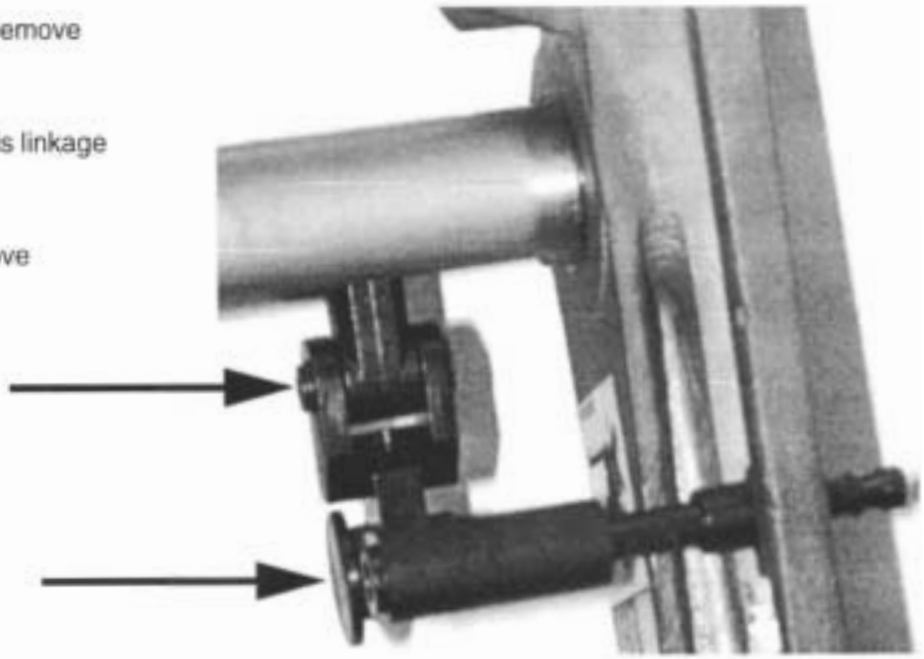
2. Remove Foot & Quill by pulling foot forward from tool housing & feed sleeve.

Remove depth stop with tool #623647.

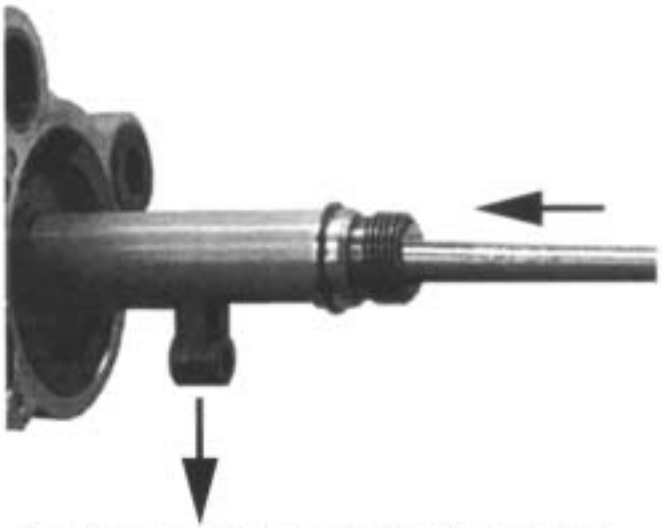
## VI. Feed Clamp Disassembly

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

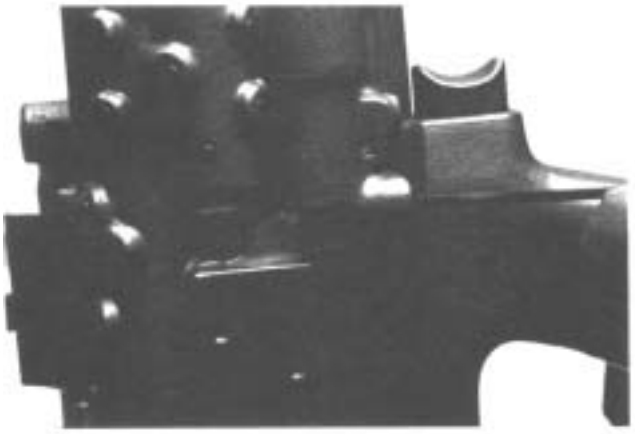
1. Follow instructions in Step 4 above to remove quill and pressure foot.
2. Remove retainer ring 845733 and clevis linkage pin 625696.
3. Remove lift lever pin 623509 and remove bushing assembly 621519.



4. Unscrew pull rod bushing 625698.



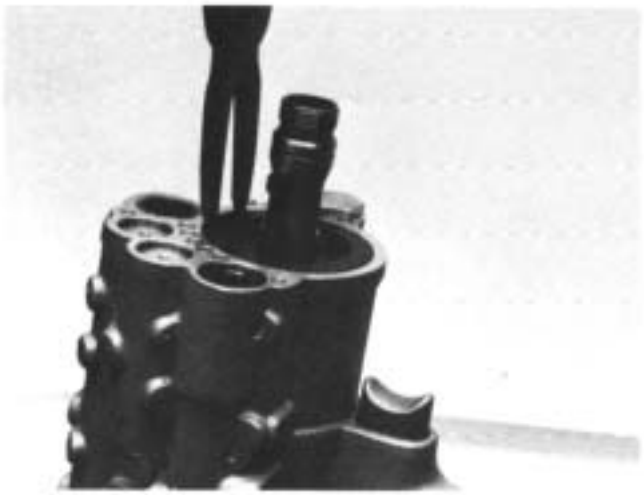
4a. With air supply disconnected, Push in on pull rod 625697 and remove lift finger 625700.



5. Remove bleed port screw from side of tool. Remove ⅛" steel ball from bleed port with small magnet. Bleed hydraulic fluid by pulling and pushing feed sleeve. Fluid will run out of opening.

6. Insert rod through end of feed sleeve and push to remove rear bulkhead with clamp/unclamp piston and collet spring assembly.

**NOTE:** Examine O-ring on rear bulkhead and replace if damaged.



7. Compress front bulkhead retaining ring, then pull on 2 screws inserted in front bleed port holes and remove front bulkhead.

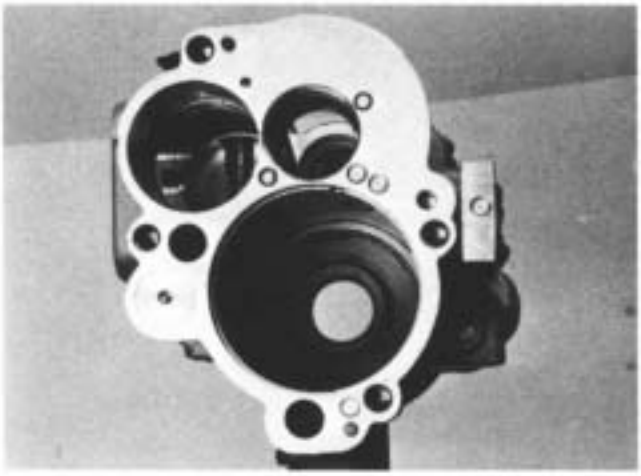
**NOTE:** During reassembly, retaining ring grooves should be liberally packed with O-ring lubricant to prevent damage to inner O-rings while slipping past grooves on sleeve. While compressing retaining ring, tap front bulkhead flush with front of handle.

9. To remove feed piston, carefully apply short air blast to side bleed hole while holding feed sleeve. Drain remaining hydraulic fluid from cavity.

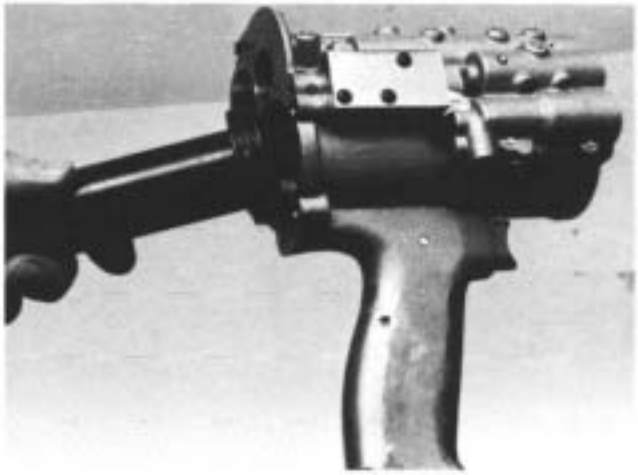
8. Expand and remove retaining ring on feed sleeve.

10. Expand and remove retaining ring from feed sleeve.

11. Feed sleeve and rear feed piston are removed by applying pressure on feed sleeve toward rear of tool.



12. Compress and remove large retaining ring located at the rear of the tool from large diameter bore of cavity. Be careful not to score or scratch inner bore.



13. Screw threaded end of special Bulkhead Removal Tool (Part No. 623520) into threaded hole in air/hydraulic bulkhead and pull to remove from *rear* of tool.

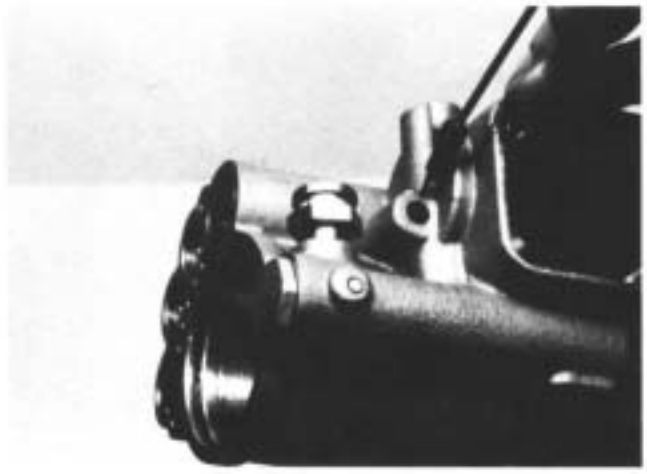
**NOTE:** The O-rings on the outer diameter of the air/hydraulic bulkhead must pass by two retaining ring grooves. Before reinserting the bulkhead, pack the retaining ring grooves with O-ring lubricant to prevent O-ring damage.

**NOTE:** A small orifice on the right side of the tool housing is provided to check the condition of the O-rings on the air/hydraulic bulkhead. Air seepage indicates a damaged O-ring on the air side; hydraulic fluid seepage indicates O-ring damage on the fluid side.

**NOTE:** One large retaining ring will remain in the inner bore. It should not be necessary to remove this ring.

## VII. Dwell Valve Disassembly

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.



1. Remove needle valve from housing with Allen wrench.

## VIII. Disassembly of Feed Rate Adjustment Valve

WARNING:
Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

1. Remove valve retainer and spring.

2. Remove feed control valve assembly with threaded rod (7/16-20).

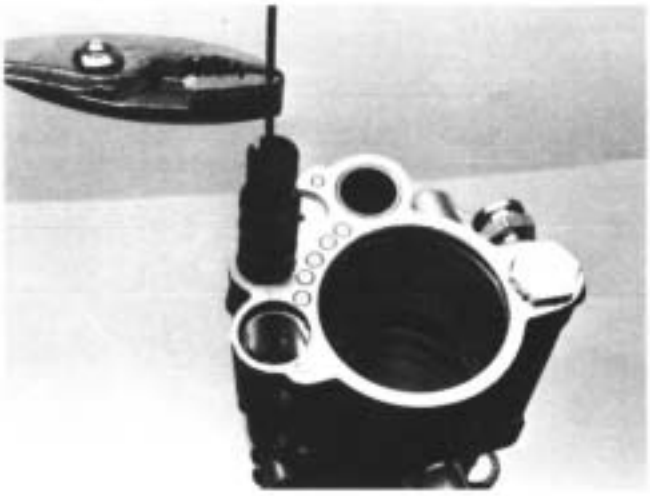
3. Remove pipe plug from rear of feed adjust boss and push forward to remove filter and O-ring.

# IX. Unclamp Check Valve Disassembly

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

1. Remove retaining ring and valve retaining plug. Remove plug using 4-40 screw if necessary.

2. Lift spool and spring out of cavity and place in clean area.

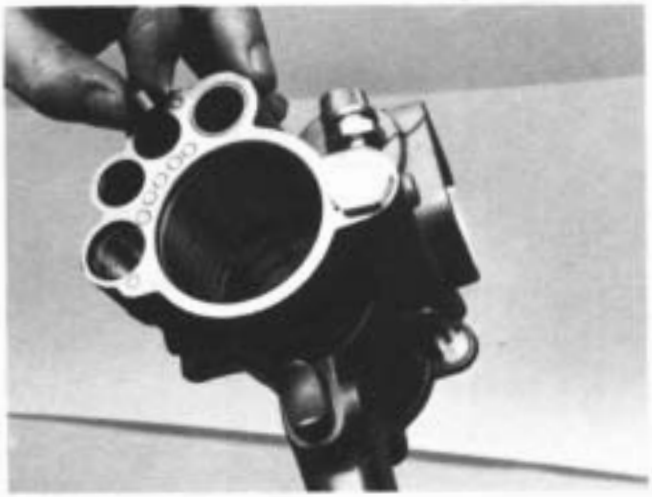


3. Carefully insert soft metal hook into hole in valve sleeve and lift out with pliers applied to wire. Be careful not to score or scratch the inside diameter of the sleeve. Carefully inspect O-rings for damage and replace if necessary.

# X. Retract and Dwell Valve Disassembly

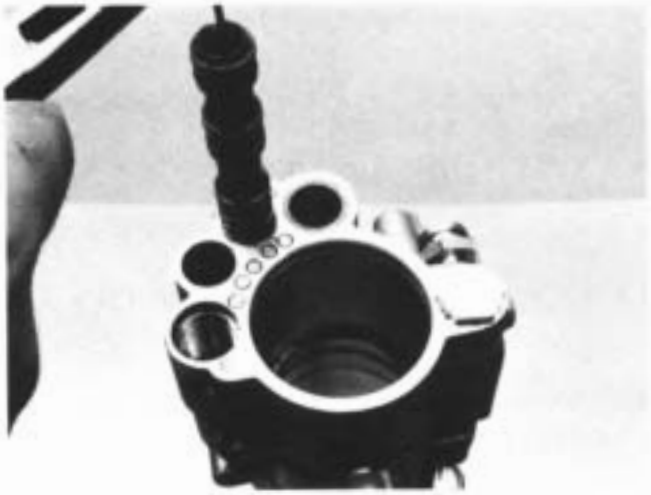
WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

1. Remove retaining ring on valve retaining plug. Remove valve retaining plug using 4-40 screw if necessary.



2. Lift out latching spool.

3. Remove retract and dwell valve spool and spring.



4. Carefully insert soft metal hook into hole in sleeve and lift out with pliers applied to the wire. Be careful not to score or scratch the inside diameter of the sleeve. Carefully inspect O-rings for damage and replace if necessary.

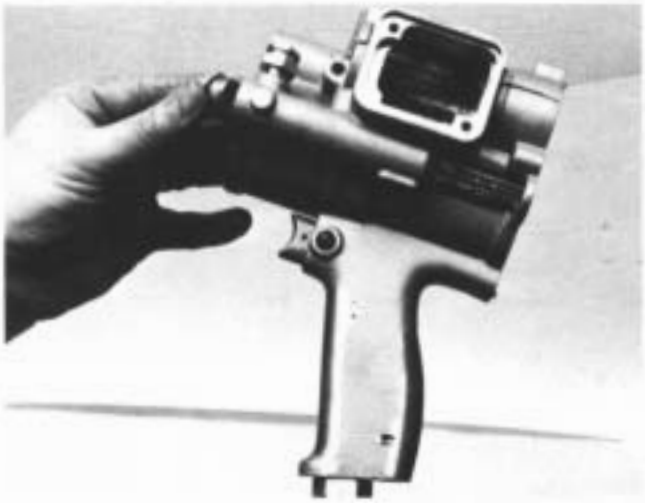
   **NOTE:** Valve spool-to-sleeve is a hand-lapped fit. Exercise extreme caution against scratching and scoring when handling. Always place components in a clean, dry area.

5. When reassembling, apply O-ring lubricant liberally to prevent damage to O-rings as they are pushed past ports on the inside cavity.

   **NOTE:** Spring on end of spool should be retained in hole in end of spool with grease during reassembly.

# XI. Hydraulic Fluid Reservoir Disassembly

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.



1. Unscrew hex head reservoir plug.

2. Remove set screw

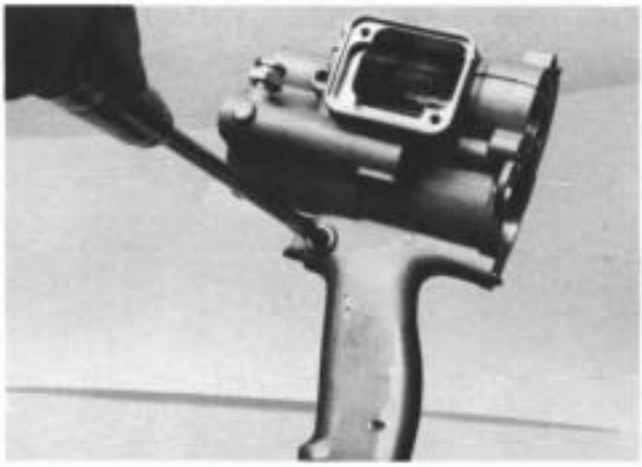
3. With suitable driver, drive out oil indicator guide, piston and rod assembly through the rear of the housing. Caution: Do not score or scratch inside of bore with driver.

4. When reassembling, the oil indicator guide must be inserted from the rear of the tool, and the indicator piston and rod assembly must be inserted from the front of the tool as shown. Failure to follow reassembly instructions will result in damaged O-rings.

**NOTE:** Inspect O-rings for damage and replace if necessary.

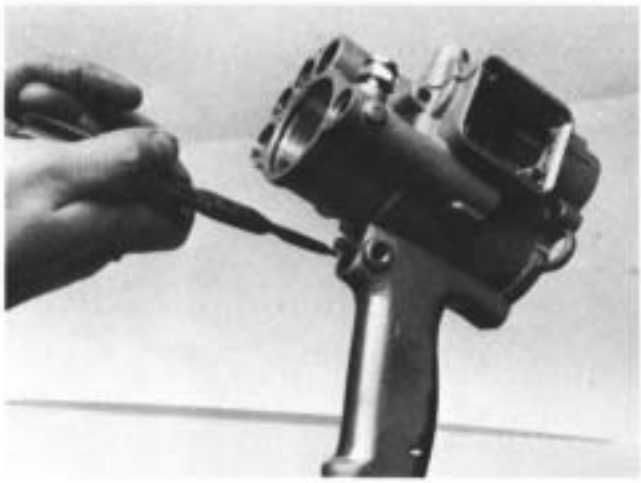
# XII. Trigger Disassembly

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.



1. Use special Trigger Lock Assembly Tool (Part No. 623015) to remove trigger lock by unscrewing from handle.

2. Loosen and remove set screw in trigger and remove trigger.



3. Remove the retaining ring from the trigger bore.

4. Lift out trigger spool and sleeve.
5. Remove spring from trigger cavity.

# XIII. Pilot Valve Disassembly

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

1. Remove inlet bushing.

2. Remove spring and spacer.

3 Insert long 8-32 screw into tapped hole provided in base of pilot spool and lift out.
**NOTE:** Be careful not to bend pilot spool when removing or inserting. A bent spool will cause the tool to malfunction and will require spool replacement.

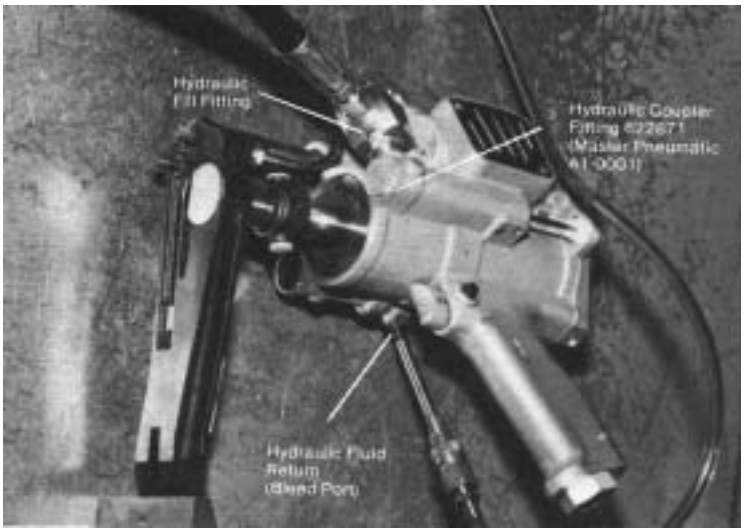
# Filling & Bleeding the Hydraulic System

WARNING: Disconnect air-supply before servicing.
Clamp mechanism moves when connecting or removing air supply.
Keep hands and fingers away from clamping and feed mechanism.

The 136-118 drill hydraulic system will periodically require filling and/or bleeding. If the oil level indicator is near the "Add Fluid" mark, replenish the system using Mobil D.T.E. light or equivalent hydraulic fluid.

FILLING
Connect the hydraulic fluid source to the tool using filler fitting number 622871 or the new 624235/624942 filler assembly. The fluid supply pressure should be 100-150 P.S.I. so the tool's internal check valve can be opened. Start the hydraulic fluid source and fill the tool until the oil level indicator shows full. Bleeding the tool should not be necessary if air has not been introduced into the system. Disconnect the tool from the fluid source and return to service.

BLEEDING
Remove the 10-32 set screw and the .125 diameter steel ball from the bleed port. This bleed port is located on the lower left hand side of the main housing (see section C-C items 59 and 101 for more detail). Open feed control valve to the fastest setting. This allows the fluid to flow unrestricted. Set the depth stop to the longest stroke. This must be done to completely bleed the air from the hydraulic fluid. Attach the filler fitting 622871 or the new 624235/624942 filler assembly to the hydraulic fill fitting. Thread the return stem part number 624235 into the 10-32 bleed port and hand tighten. Attach air line to tool and turn on air supply. Turn on hydraulic pump to circulate fluid. With the hydraulic fluid circulating though the tool, depress the trigger and cycle the tool several times to remove any air from within the tool. Visually check the clear return line for any air bubbles. When no bubbles are seen disconnect the air supply. Turn off the hydraulic supply and remove the filler fitting and return stem from the tool. Reinstall the .125 diameter steel ball and 10-32 set screw into the bleed port and tighten. Test the tool for proper feed control before returning to service.




# Tool Adjustments

WARNING: Disconnect air-supply before servicing. Clamp mechanism moves when connecting or removing air supply. Keep hands and fingers away from clamping and feed mechanism.

**Spindle Stroke Adjustment**
Loosen spindle adjustment lock, then turn spindle adjustment knob. Right hand rotation advances cutter forward; left hand rotation returns cutter. Correct cutter point position is flush with face of template boss. When cutter is properly adjusted, lightly tighten spindle adjustment lock to hold adjustment.

**Micrometer Depth Adjustment**
Loosen set screws, and rotate depth adjustment nut.
Clockwise rotation increases depth; counterclockwise decreases depth. Graduations scribed on barrel are in .001" increments. When proper depth is achieved, lightly tighten set screws.

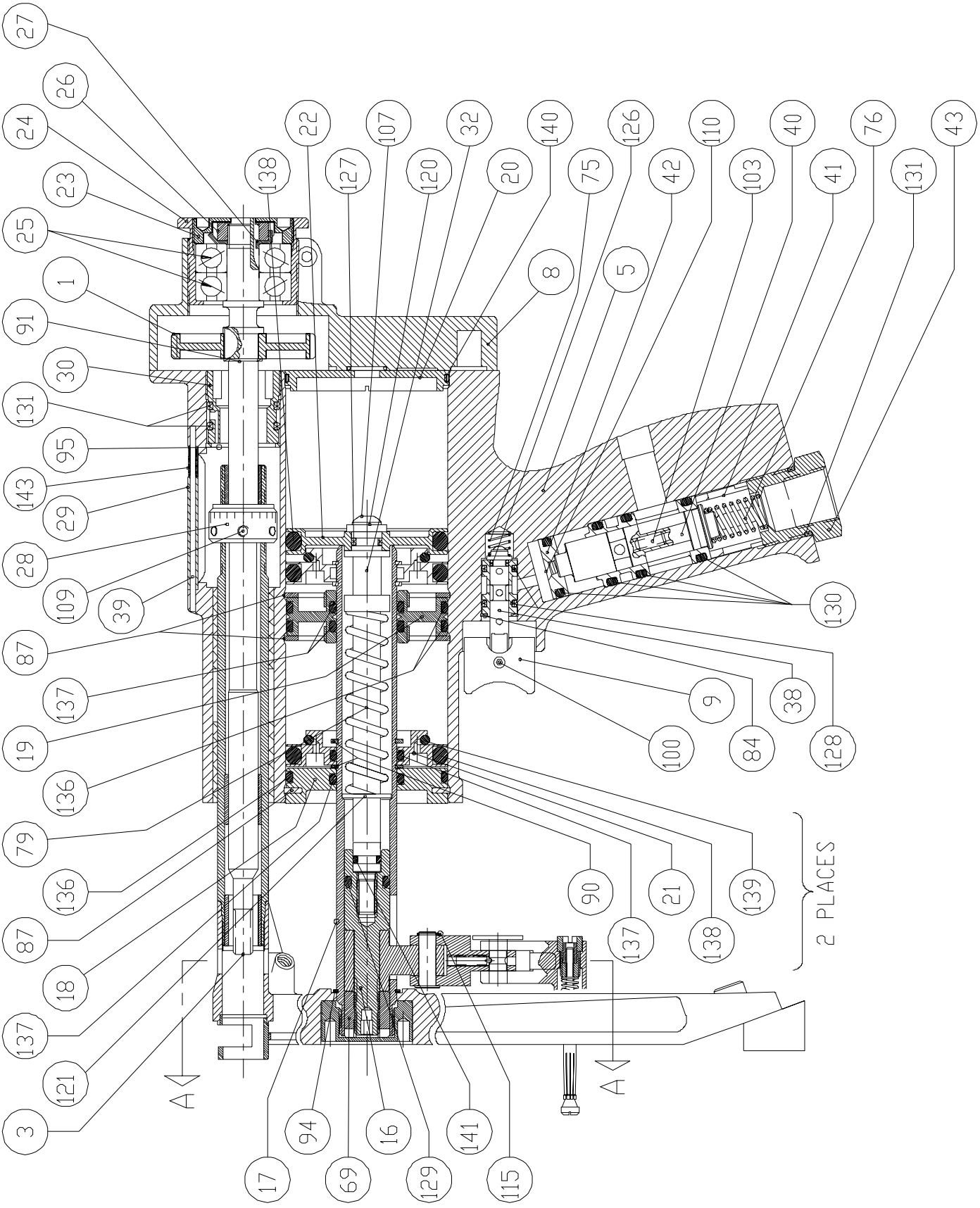
**Feed Rate Adjustment**
With appropriate tool, turning feed rate adjustment counterclockwise, increases feed rate. Turning the screw clockwise decreases feed rate. Feed rate can be measured by using the following formula:

$$\text{Time} = \frac{60 \text{ seconds}}{\text{Feed Rate} \times \text{Spindle Speed (rpm)}}$$

**Dwell Adjustment**
Insert appropriate size hex wrench into dwell adjustment valve opening. Rotate wrench clockwise until valve seats lightly. Rotate valve counterclockwise 1/4 turn to obtain base setting.

Note: If adjustment valve is opened too far, drill motor will not cycle, and feed cycle cannot be obtained. To correct, turn valve clockwise to seat valve and set according to instructions above.
If valve is closed too far, retract cycle cannot be obtained. To correct, turn valve counterclockwise and set according to instructions.
Closing valve increases countersink dwell time; opening valve decreases countersink dwell time.

**Tail Pad Adjustment**
The purpose of the tail pad is to compensate for slight surface curvature of the workpiece being drilled and to assure that the hole being drilled is perpendicular to the surface.
To adjust to a flat plane for drilling flat surfaces, use a straight edge between the tail pad and face of template boss and adjust the tail pad until the straight edge is flush with the face of the template boss.
An optional tail pad is available for high curvature sur faces. (See Accessories for additional information.)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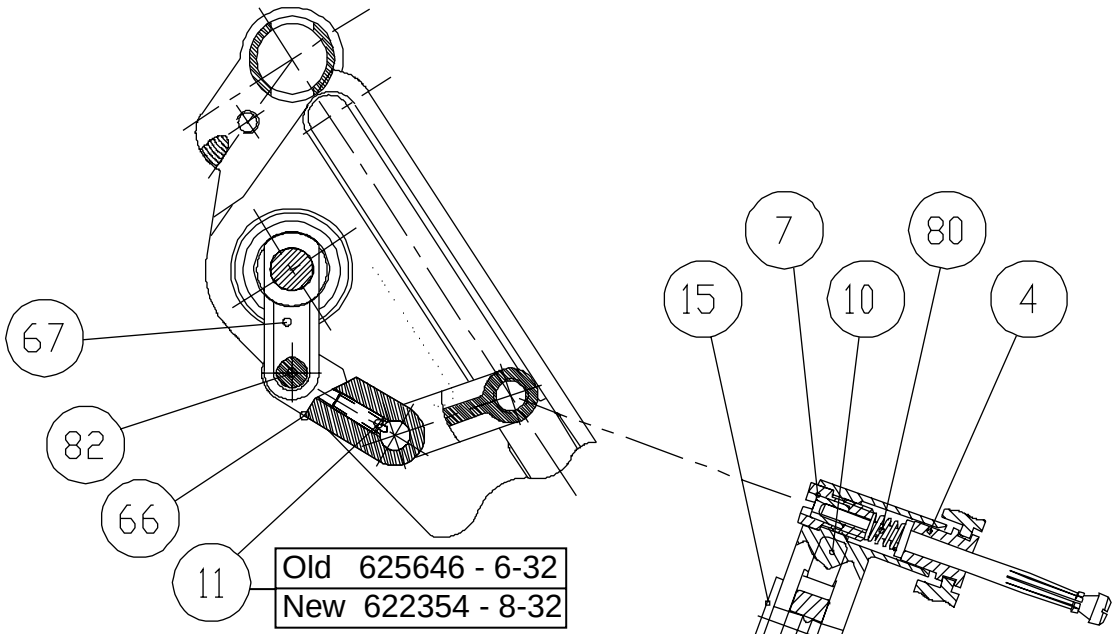
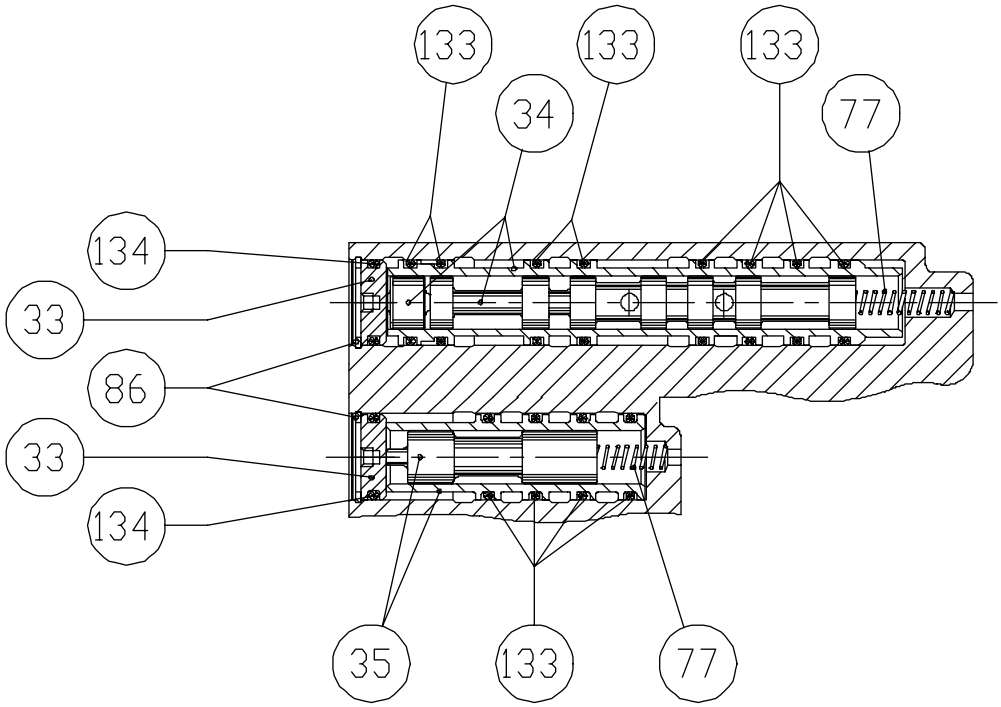
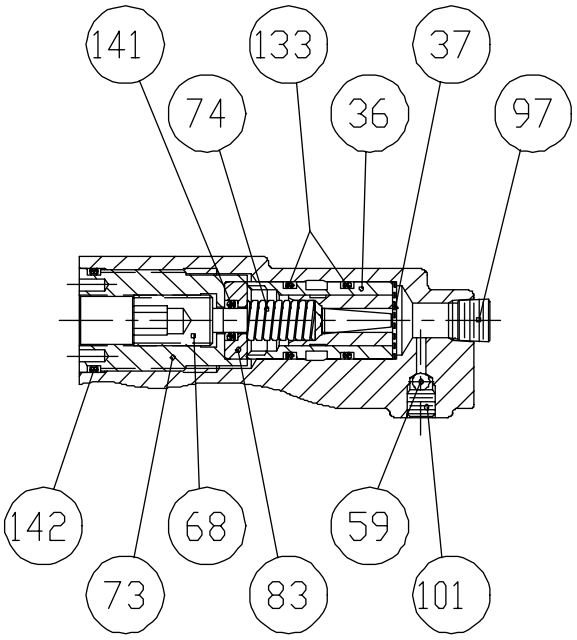


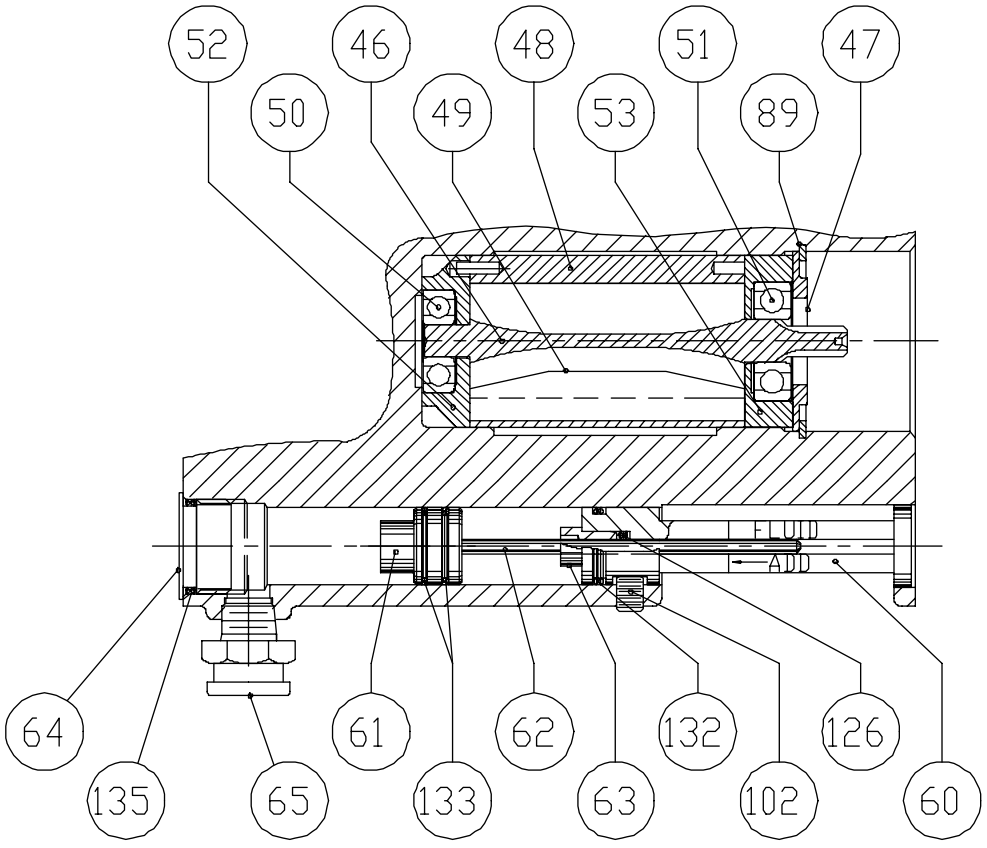

SECTION A-A



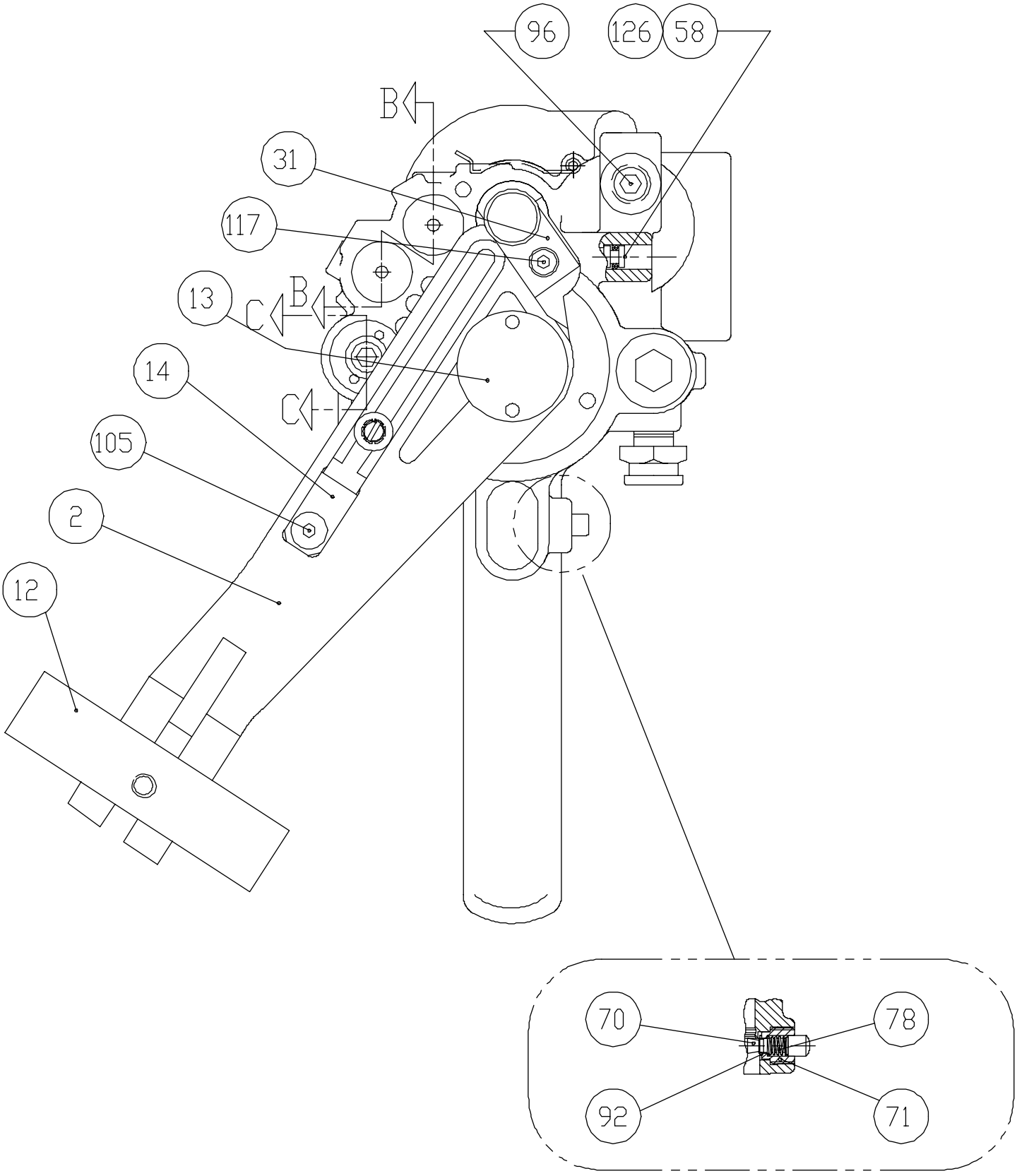

SECTION B-B




SECTION C-C




SECTION D-D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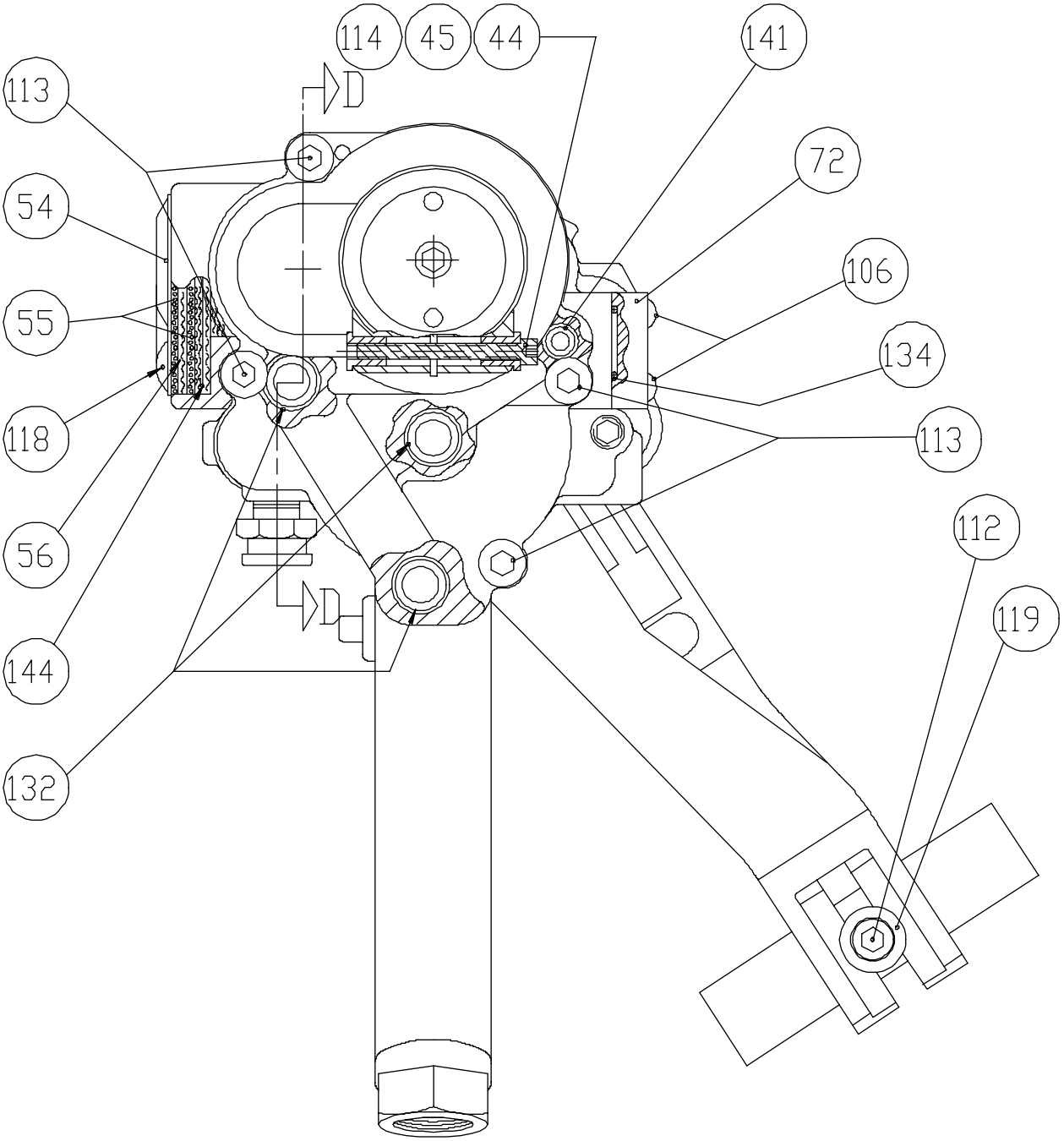
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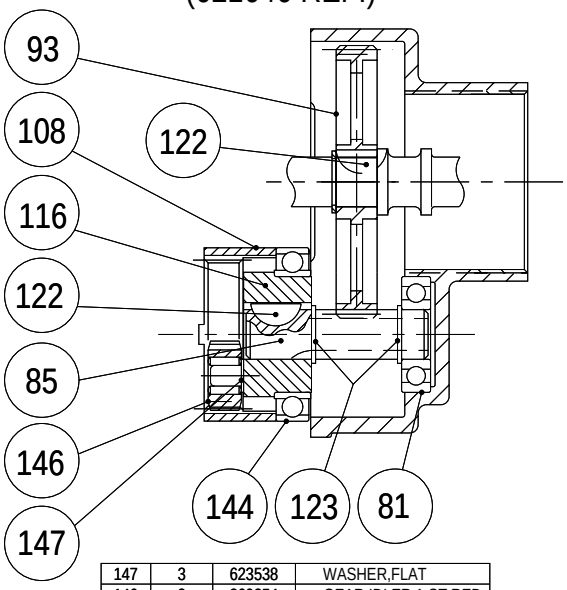
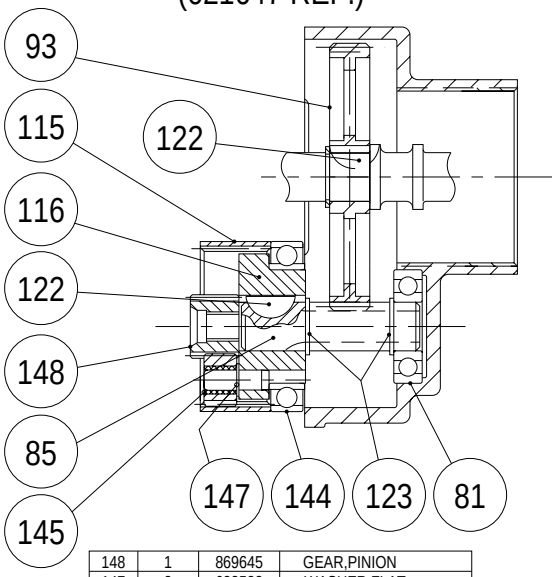
| ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION | ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION | ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION | ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 621646 | ASS'Y,GEAR SET, 400 RPM | 33 | 2 | 622277 | PLUG,VALVE RETAINING | 77 | 2 | 622353 | SPRING,COMPRESSION | 134 | 4 | 847710 | O-RING |
| 1 | 1 | 621647 | ASS'Y,GEAR SET, 950 RPM | 34 | 1 | 622757 | ASS'Y,RETRACT/DWELL VALVE | 78 | 1 | 622616 | SPRING,COMPRESSION | 135 | 1 | 863454 | O-RING |
| 1 | 1 | 621648 | ASS'Y,GEAR SET, 2100 RPM | 35 | 1 | 622620 | ASS'Y,UNCLAMP CHECK VALVE | 79 | 1 | 623588 | SPRING,COMPRESSION | 136 | 3 | 622143 | O-RING |
| 1 | 1 | 621649 | ASS'Y,GEAR SET, 3100 RPM | 36 | 1 | 623042 | ASS'Y,FEED CONTROL VALVE | 80 | 1 | 623793 | SPRING,COMPRESSION | 137 | 5 | 615947 | O-RING |
| 1 | 1 | 621650 | ASS'Y,GEAR SET, 6000 RPM | 37 | 1 | 623071 | FILTER | 82 | 1 | 625696 | CLEVIS PIN,LINKAGE | 138 | 3 | 849931 | O-RING |
| 1 | 1 | 621651 | ASS'Y,GEAR SET, 7800 RPM | 38 | 1 | 623691 | SLEEVE & SPOOL,TRIGGER | 83 | 1 | 623041 | INSERT,BODY | 139 | 2 | 617290 | O-RING |
| 1 | 1 | 621652 | ASS'Y,GEAR SET, 11500 RPM | 39 | 1 | 623589 | PIN,COVER | 84 | 1 | 864271 | RING,RETAINING,INTERNAL | 140 | 1 | 864737 | O-RING |
| 1 | 1 | 621653 | ASS'Y,GEAR SET, 22500 RPM | 40 | 1 | 622329 | ASS'Y,PILOT VALVE | 86 | 2 | 622376 | RING,RETAINING,INTERNAL | 141 | 3 | 844303 | O-RING |
| 2 | 1 | 625844 | PRESSURE FOOT,R-L | 41 | 1 | 622279 | SPACER,PILOT VALVE | 87 | 3 | 622065 | RING,RETAINING,INTERNAL | 142 | 1 | 847272 | O-RING |
| 2 | 1 | 625845 | PRESSURE FOOT,L-R | 42 | 1 | 622280 | SHAFT,PISTON | 89 | 1 | 623594 | RING,RETAINING,INTERNAL | 143 | 1 | 869465 | SPRING |
| 3 | 1 | 621658 | ASS'Y SPINDLE SET | 43 | 1 | 622284 | BUSHING,INLET | 90 | 4 | 843179 | RING,RETAINING,EXTERNAL | 144 | 1 | 622781 | MUFFLER |
| 4 | 1 | 623539--623566 | GUIDE,COLLET .1230-.2595 DIA. | 44 | 1 | 623880 | BUSHING,CLAMP | 91 | 1 | 812231 | RING,RETAINING,EXTERNAL | | | | ITEMS NOT SHOWN |
| | | | | 45 | 1 | 623881 | NUT,CLAMP | 92 | 1 | 622615 | RING,RETAINING,EXTERNAL | | | | |
| | | | | 46 | 1 | 623611 | ROTOR | 94 | 1 | 869148 | RING,RETAINING,EXTERNAL | | 1 | 202901 | WARNING LABEL (BACKHEAD) |
| 5 | 1 | 623587 | HANDLE | 47 | 1 | 623508 | SPACER | 95 | 1 | 623595 | RING,RETAINING,EXTERNAL | | 1 | 202902 | WARNING LABEL (PRES. FOOT) |
| 7 | 1 | 621519 | ASS'Y,BUSHING | 48 | 1 | 869451 | CYLINDER | 96 | 1 | 843434 | PLUG,PIPE | | 1 | 202903 | WARNING LABEL (BACKHEAD) |
| 8 | 1 | 623613 | BACKHEAD | 49 | 4 | 869788 | BLADE,ROTOR | 97 | 1 | 844892 | PLUG,PIPE | | | | |
| 9 | 1 | 622073 | TRIGGER | 50 | 1 | 843446 | BEARING,BALL,REAR | 100 | 1 | 622054 | SCREW,SOCKET SET | | | | OTHER ITEMS |
| 10 | 1 | 623571 | HOLDER,COLLET | 51 | 1 | 869445 | BEARING,BALL,FRONT | 101 | 1 | 843518 | SCREW,SOCKET SET | | | | |
| 11 | 1 | 625646 | SPRING,PLUNGER (OLD 6-32) | 52 | 1 | 863654 | PLATE,REAR BEARING | 102 | 1 | 622642 | SCREW,SOCKET SET | | 1 | 623222 | FITTING,ADAPTER 1/8NPT |
| 11 | 1 | 622354 | SPRING,PLUNGER (NEW 8-32) | 53 | 1 | 869585 | PLATE,FRONT BEARING | 103 | 1 | 623084 | SCREW,ORIFICE | | 1 | 882209 | FITTING,ELBOW 1/8NPT |
| 12 | 1 | 622250 | PAD,PRESSURE FOOT | 54 | 1 | 622761 | COVER,EXHAUST | 105 | 1 | 619684 | SCREW,BUTTON HEAD CAP | | | 624043 | TUBING; 1/4 X .06 X 10" LG. |
| 13 | 1 | 623514 | NUT,PRESSURE FOOT | 55 | 2 | 622760 | PAD,MUFFLER | 106 | 3 | 622053 | SCREW,BUTTON HEAD CAP | | | 624044 | TUBING; 1/4 X .06 X 6" LG. |
| 14 | 1 | 623512 | CLIP,COLLET GUIDE | 56 | 1 | 623869 | MUFFLER | 107 | 1 | 812963 | SCREW,BUTTON HEAD CAP | | | 624045 | TUBING; 1/4 X .04 X 2-1/2" |
| 15 | 1 | 623509 | PIN,LIFT LEVER | 58 | 1 | 622026 | VALVE,NEEDLE | 109 | 6 | 623597 | SCREW,SOCKET SET | | | 624054 | TUBING; 1/8 X .04 X 6" LG. |
| 16 | 1 | 625697 | PULL ROD,CLAMP-UNCLAMP | 59 | 1 | 844265 | BALL,STEEL (1/8 DIA.) | 110 | 1 | 619656 | SCREW,FLAT HEAD | | | | |
| 17 | 1 | 625701 | SLEEVE,FEED | 60 | 1 | 622762 | GUIDE,OIL LEVEL INDICATOR | 112 | 1 | 622384 | SCREW,HEX SOCKET CAP | | | | |
| 18 | 1 | 623522 | BULKHEAD,FRONT | 61 | 1 | 622308 | PISTON,OIL LEVEL INDICATOR | 113 | 4 | 844407 | SCREW,HEX SOCKET CAP | | | | |
| 19 | 1 | 623519 | BULKHEAD,AIR/HYDRAULIC | 62 | 1 | 622763 | ROD,OIL LEVEL INDICATOR | 114 | 1 | 623596 | SCREW,HEX SOCKET CAP | | | | |
| 20 | 1 | 623521 | BULKHEAD,REAR | 63 | 1 | 622764 | SPACER,OIL LEVEL INDICATOR | 115 | 1 | 845733 | RING,RETAINING,EXTERNAL | | | | |
| 21 | 2 | 623523 | PISTON,FEED | 64 | 1 | 622765 | PLUG,RESERVOIR | 117 | 1 | 883731 | SCREW,HEX SOCKET CAP | | | | |
| 22 | 1 | 623518 | PISTON,CLAMP-UNCLAMP | 65 | 1 | 622870 | FITTING,HYDRAULIC | 118 | 2 | 622059 | SCREW,BUTTON HEAD CAP | | | | |
| 23 | 1 | 623525 | NUT,BEARING RETAINER | 66 | 1 | 625699 | LINKAGE,CLEVIS | 119 | 1 | 612625 | WASHER,FLAT | | | | |
| 24 | 1 | 623527 | NUT,SPINDLE ADJUST | 67 | 1 | 625700 | LIFT FINGER | 120 | 1 | 622387 | WASHER,FLAT | | | | |
| 25 | 1 | 623591 | BEARING,BALL (DUPLEX PAIR) | 68 | 1 | 623040 | SCREW,FEED RATE ADJUST | 121 | 1 | 623598 | WASHER,FLAT | | | | |
| 26 | 1 | 623592 | NUT,BEARING LOCK | 69 | 1 | 625698 | BUSHING,PULL ROD | 126 | 3 | 844301 | O-RING | | | | |
| 27 | 1 | 623593 | WASHER,BEARING LOCK | 70 | 1 | 622617 | PIN,TRIGGER LOCK | 127 | 1 | 844305 | O-RING | | | | |
| 28 | 1 | 623648 | NUT,DEPTH CONTROL | 71 | 1 | 622618 | BUSHING,TRIGGER LOCK | 128 | 2 | 844306 | O-RING | | | | |
| 29 | 1 | 623590 | COVER,DEPTH CONTROL | 72 | 1 | 621439 | COVER,ASS'Y | 129 | 1 | 844308 | O-RING | | | | |
| 30 | 1 | 623646 | STOP,DEPTH | 73 | 1 | 623039 | BODY,FEED ADJUST | 130 | 4 | 844312 | O-RING | | | | |
| 31 | 1 | 623573--623586 | TEMPLATE BOSS | 74 | 1 | 623076 | SPRING,COMPRESSION | 131 | 3 | 863009 | O-RING | | | | |
| | | | | 75 | 1 | 622088 | SPRING,COMPRESSION | 132 | 4 | 844307 | O-RING | | | | |
| 32 | 1 | 623517 | SHAFT,CLAMP-UNCLAMP | 76 | 1 | 622351 | SPRING,COMPRESSION | 133 | 16 | 615645 | O-RING | | | | |

## 400 RPM GEAR SET ASS'Y
(621646 REF.)



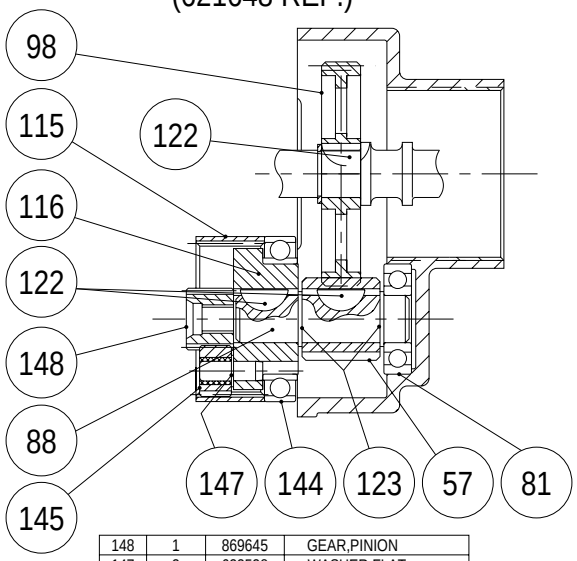

| ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION |
|---|---|---|---|
| 147 | 3 | 623538 | WASHER,FLAT |
| 146 | 3 | 869254 | GEAR,IDLER,1-ST RED. |
| 144 | 1 | 623572 | BEARING |
| 123 | 2 | 812231 | RING,RETAINING |
| 122 | 2 | 622134 | KEY,WOODRUFF |
| 116 | 1 | 623507 | CARRIER,PLANET |
| 108 | 1 | 623536 | GEAR,INTERNAL |
| 93 | 1 | 623535 | GEAR,SPINDLE |
| 85 | 1 | 623504 | GEAR,REDUCTION |
| 81 | 1 | 847095 | BEARING,BALL |

## 950 RPM GEAR SET ASS'Y
(621647 REF.)



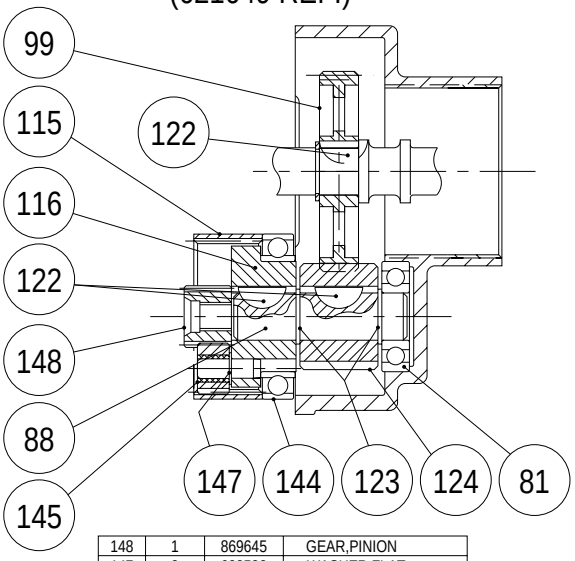

| ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION |
|---|---|---|---|
| 148 | 1 | 869645 | GEAR,PINION |
| 147 | 3 | 623538 | WASHER,FLAT |
| 145 | 3 | 869637 | GEAR,IDLER,1-ST RED. |
| 144 | 1 | 623572 | BEARING |
| 123 | 2 | 812231 | RING,RETAINING |
| 122 | 2 | 622134 | KEY,WOODRUFF |
| 116 | 1 | 623506 | CARRIER,PLANET |
| 115 | 1 | 623537 | GEAR,INTERNAL |
| 93 | 1 | 623535 | GEAR,SPINDLE |
| 85 | 1 | 623504 | GEAR,REDUCTION |
| 81 | 1 | 847095 | BEARING,BALL |

## 2100 RPM GEAR SET ASS'Y
(621648 REF.)




| ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION |
|---|---|---|---|
| 148 | 1 | 869645 | GEAR,PINION |
| 147 | 3 | 623538 | WASHER,FLAT |
| 145 | 3 | 869637 | GEAR,IDLER,1-ST RED. |
| 144 | 1 | 623572 | BEARING |
| 123 | 2 | 812231 | RING,RETAINING |
| 122 | 3 | 622134 | KEY,WOODRUFF |
| 116 | 1 | 623506 | CARRIER,PLANET |
| 115 | 1 | 623537 | GEAR,INTERNAL |
| 98 | 1 | 623534 | GEAR,SPINDLE |
| 88 | 1 | 623505 | SHAFT,GEAR |
| 81 | 1 | 847095 | BEARING,BALL |
| 57 | 1 | 623529 | GEAR,REDUCTION |

## 3100 RPM GEAR SET ASS'Y
(621649 REF.)




| ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION |
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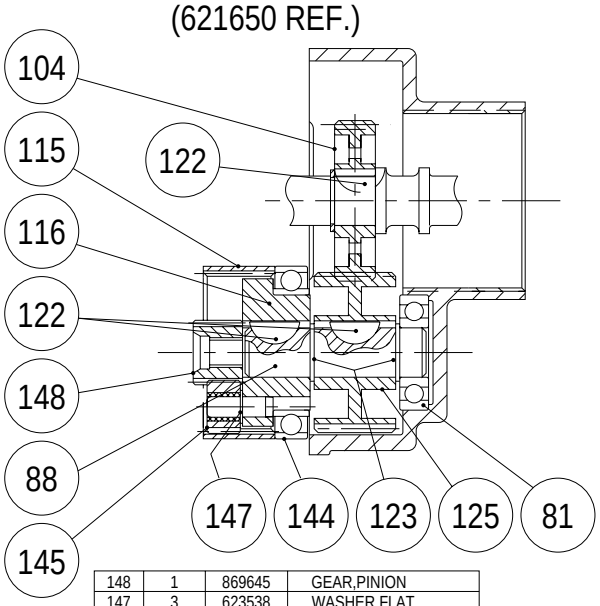
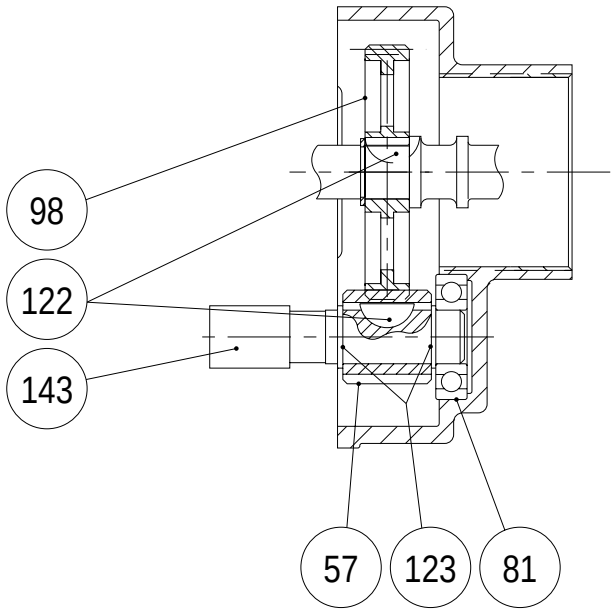
| 148 | 1 | 869645 | GEAR,PINION |
| 147 | 3 | 623538 | WASHER,FLAT |
| 145 | 3 | 869637 | GEAR,IDLER,1-ST RED. |
| 144 | 1 | 623572 | BEARING |
| 124 | 1 | 623530 | GEAR,REDUCTION |
| 123 | 2 | 812231 | RING,RETAINING |
| 122 | 3 | 622134 | KEY,WOODRUFF |
| 116 | 1 | 623506 | CARRIER,PLANET |
| 115 | 1 | 623537 | GEAR,INTERNAL |
| 99 | 1 | 623533 | GEAR,SPINDLE |
| 88 | 1 | 623505 | SHAFT,GEAR |
| 81 | 1 | 847095 | BEARING,BALL |

## 6000 RPM GEAR SET ASS'Y
## (621650 REF.)



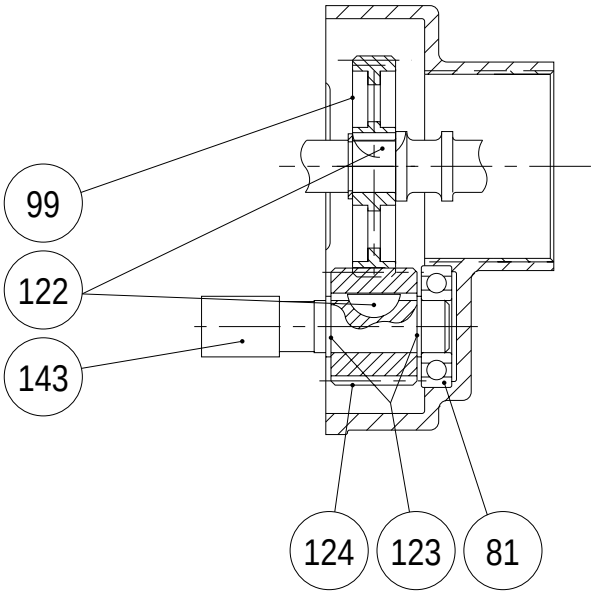

| ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION |
|---|---|---|---|
| 148 | 1 | 869645 | GEAR,PINION |
| 147 | 3 | 623538 | WASHER,FLAT |
| 145 | 3 | 869637 | GEAR,IDLER,1-ST RED. |
| 144 | 1 | 623572 | BEARING |
| 125 | 1 | 623531 | GEAR,REDUCTION |
| 123 | 2 | 812231 | RING,RETAINER |
| 122 | 3 | 622134 | KEY,WOODRUFF |
| 116 | 1 | 623506 | CARRIER,PLANET |
| 115 | 1 | 623537 | GEAR,INTERNAL |
| 104 | 1 | 623532 | GEAR,SPINDLE |
| 88 | 1 | 623505 | SHAFT,GEAR |
| **81** | 1 | 847095 | BEARING,BALL |

## 7800 RPM GEAR SET ASS'Y
## (621651 REF.)



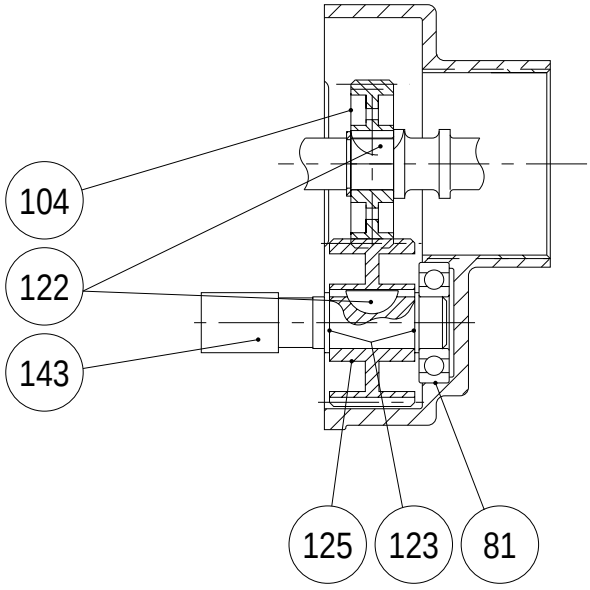

| ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION |
|---|---|---|---|
| 143 | 1 | 623612 | SHAFT,GEAR |
| 123 | 2 | 812231 | RING,RETAINING |
| 122 | 2 | 622134 | KEY,WOODRUFF |
| 98 | 1 | 623534 | GEAR,SPINDLE |
| 81 | 1 | 847095 | BEARING,BALL |
| 57 | 1 | 623529 | GEAR,REDUCTION |

## 11500 RPM GEAR SET ASS'Y
## (621652 REF.)




| ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION |
|---|---|---|---|
| 143 | 1 | 623612 | SHAFT,GEAR |
| 124 | 1 | 623530 | GEAR,REDUCTION |
| 123 | 2 | 812231 | RING,RETAINING |
| 122 | 2 | 622134 | KEY,WOODRUFF |
| 99 | 1 | 623533 | GEAR,SPINDLE |
| 81 | **1** | 847095 | BEARING,BALL |

## 22500 RPM GEAR SET ASS'Y
## (621653 REF.)

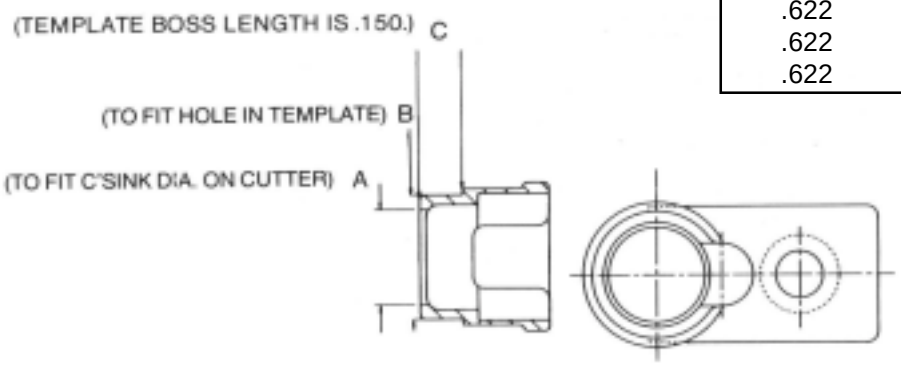



| ITEM NO. | Q'TY REQ'D | CODE NO. | DESCRIPTION |
|---|---|---|---|
| 143 | 1 | 623612 | SHAFT,GEAR |
| 125 | 1 | 623531 | GEAR,REDUCTION |
| 123 | 2 | 812231 | RING,RETAINING |
| 122 | 2 | 622134 | KEY,WOODRUFF |
| 104 | 1 | 623532 | GEAR,SPINDLE |
| 81 | 1 | 847095 | BEARING,BALL |

# Accessories

## Template Boss


| APPLICATION | | TEMPLATE BOSS CODE NO. |
|---|---|---|
| B TEMPLATE HOLE DIA. | A CUTTER DIA. | |
| .434 | .271 | 623573 |
| .434 | .286 | 623574 |
| .434 | .317 | 623575 |
| .497 | .271 | 623576 |
| .497 | .286 | 623577 |
| .497 | .317 | 623578 |
| .497 | .349 | 623579 |
| .497 | .380 | 623580 |
| .622 | .317 | 623581 |
| .622 | .349 | 623582 |
| .622 | .380 | 623583 |
| .622 | .411 | 623584 |
| .622 | .489 | 623585 |
| .622 | .505 | 623586 |




# Jig Collet Foot Attachments

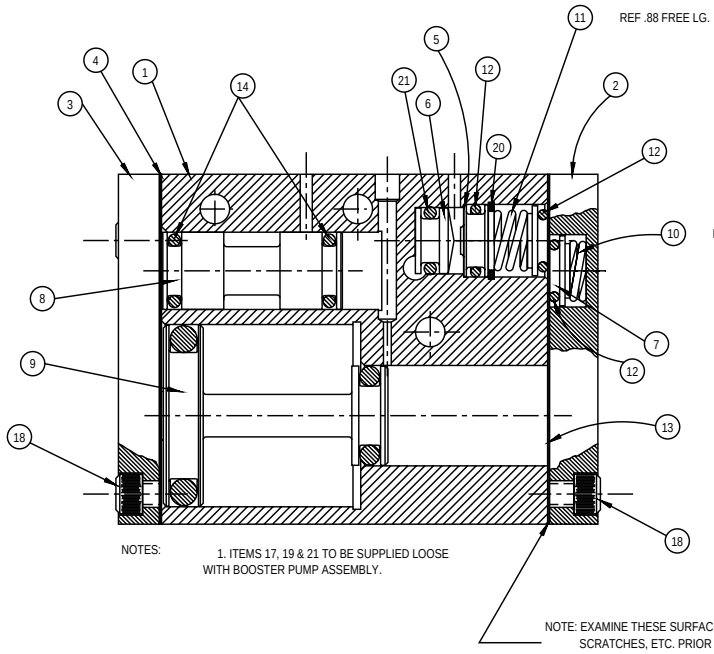
**Depth Sensing Jig Collet Foot (Pictured)**
Depth sensing jig collet foot is used for accurately drilling and countersinking hole layouts utilizing a simple fixture plate. The cutter passes centrally through the drillmotor collet to produce holes concentric with the fixture plate holes. The depth sensing sleeve will drill and accurately countersink with fixture-to-workpiece variations of up to .125". Coolant and air blast port is fitted to the foot.
User must specify template hole and drill-countersink size as well as drill-countersink configuration.

**Non Depth Sensing Jig Collet Foot**
Non-depth sensing jig collet foot is similar to the above foot without depth sensing capability. This foot is used for straight drilling applications where “rough” depth sensing only is required. This foot grips straight shank drills utilizing an “O-W” type collet (not supplied).
User must specify template hole and drill size.

**High Curvature Pad Assembly**
A high curvature pad (Part No.621522) is available for use in place of the standard pressure foot pad. The high curvature pad enables the drill to be used on surfaces with a greater curvature than the standard pad is capable of handling.

# Accessories

## Booster Pump Assembly



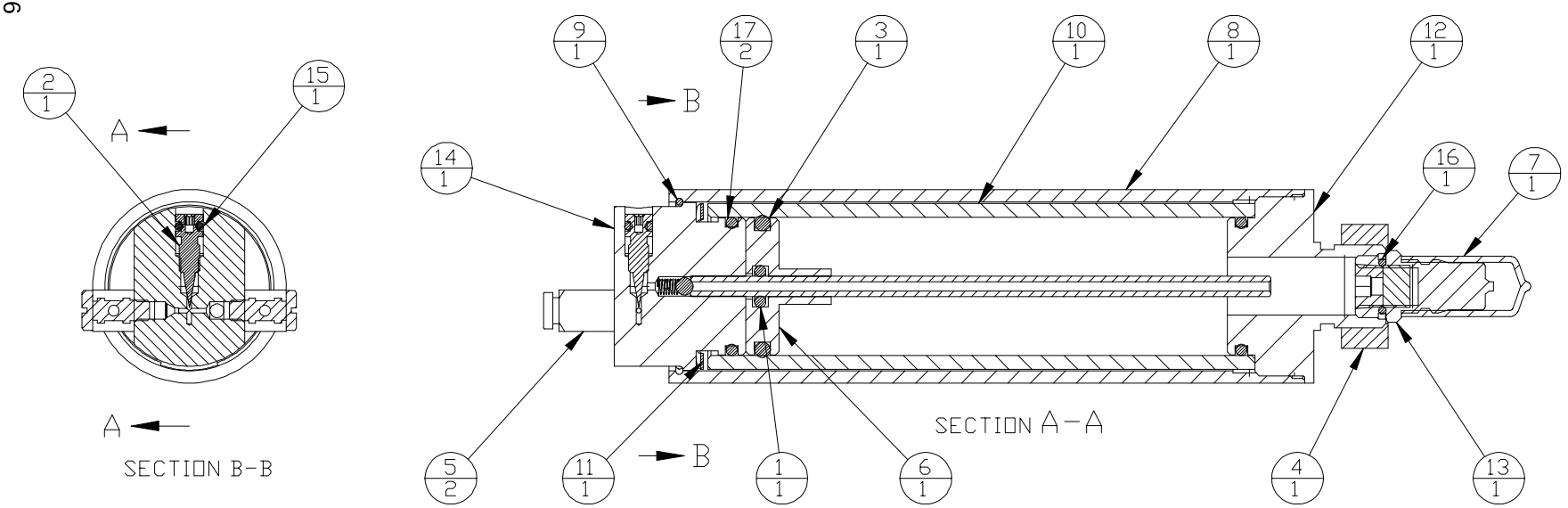

| | ITEM NO. | NO. REQ'D. | CODE NUMBER | DESCRIPTION |
|---|---|---|---|---|
| | 1 | 1 | 621500 | ASSY, BODY |
| | 2 | 1 | 621501 | ASSY, END PLATE (HIGH PRESS.) |
| | 3 | 1 | 622660 | END PLATE (LOW PRESS.) |
| | 4 | 1 | 622792 | GASKET, END PLATE |
| | 5 | 1 | 622662 | VALVE, PRESS. RELIEF |
| | 6 | 1 | 622663 | PISTON, PRESS. RELIEF |
| | 7 | 2 | 622664 | VALVE, CHECK |
| | 8 | 1 | 622665 | VALVE, SHUTTLE |
| | 9 | 1 | 622666 | PISTON |
| | 10 | 1 | 622652 | SPRING, COMPRESSION |
| | 11 | 1 | 622653 | SPRING, COMPRESSION |
| | 12 | 3 | 844304 | O-RING |
| | 13 | 1 | 625112 | GASKET |
| | 14 | 2 | 622654 | O-RING |
| | 15 | 1 | 844308 | O-RING |
| | 16 | 1 | 844315 | O-RING |
| SEE NOTE 1 | 17 | 2 | 847710 | O-RING |
| | 18 | 10 | 863337 | SCREW |
| SEE NOTE 1 | 19 | 3 | 617245 | SCREW |
| | 20 | 1 | 622845 | RETAINER RING |
| SEE NOTE 1 | 21 | 3 | 844303 | O-RING |

For increased clamping force or feed pressure, an optional Booster Pump (621482) is available. The pump provides extra clamp and feed pressures when drilling Titanium or taper drilling applications. The Booster Pump assembly will increase both clamp and feed forces by a factor of 2.5. The pump is easily installed on the Q-Matic Drill by replacing the cover supplied with the tool with the Booster Pump using the three screws supplied with the pump.

## Mist Lubricator Assembly

The mist lubricator assemblies are available to introduce coolant and an air blast to the cutter. The lubricator is actuated by air from the accessory air tap on the motor side and only functions when the motor is running. The following three pages show the three different types available. The mist lubricators and mounting brackets can be purchased as complete subassemblies using these numbers: Manual fill small capacity - 631878, Pressure fill small capacity - 631879, Pressure fill large capacity - 631880. The reservoirs and individual parts can be ordered using numbers listed on drawings.

# PRESSURE FILL MIST LUBRICATOR



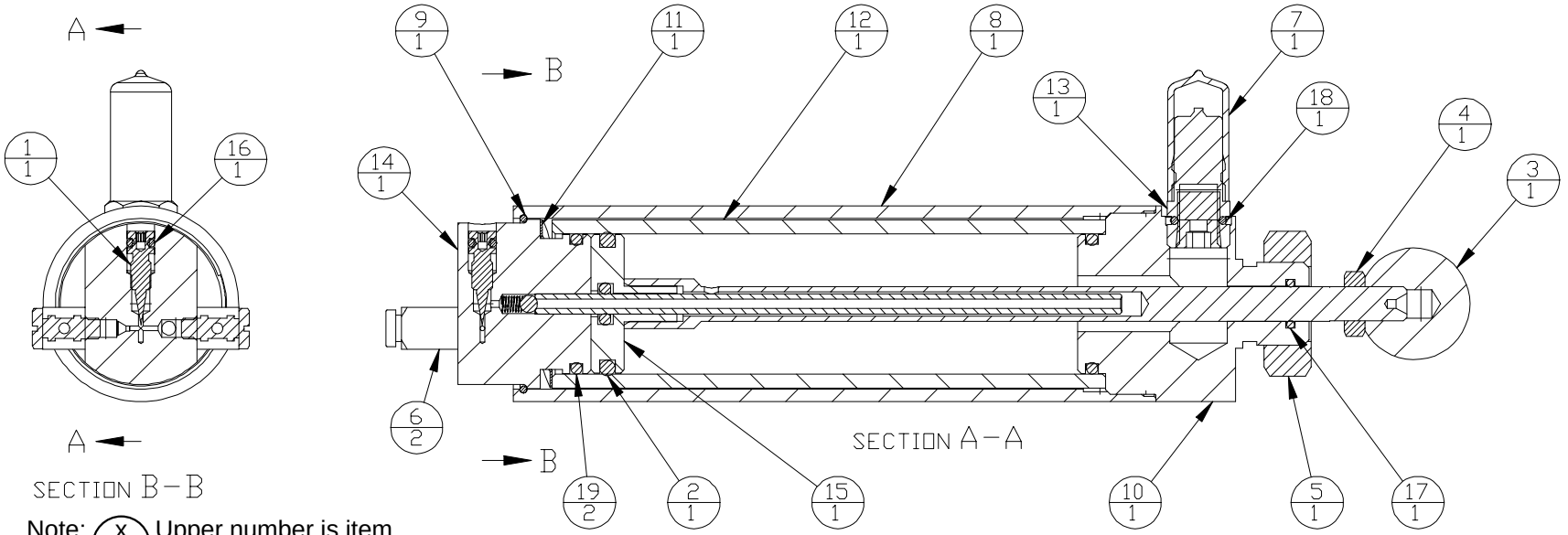

Note: (X/X) Upper number is item.
Lower number is quantity required.

631802 PRESSURE FILL LARGE CAPACITY

| ITEM | PART NO. | PART NAME | QTY. |
|---|---|---|---|
| 1 | 203568 | RING, O | 1 |
| 2 | 622026 | VALVE, NEEDLE | 1 |
| 3 | 622881 | RING, O | 1 |
| 4 | 624903 | NUT, JAM HEX | 1 |
| 5 | 624905 | FITTING | 2 |
| 6 | 624914 | PISTON | 1 |
| 7 | 625015 | S-CAP | 1 |
| 8 | 629086 | COVER, LARGE CAPACITY | 1 |
| 9 | 629093 | WIRE, RETAINING | 1 |
| 10 | 629090 | CYLINDER, LARGE CAPACITY | 1 |
| 11 | 629148 | SPRING, WAVE | 1 |
| 12 | 629095 | CAP, MOUNT (PRESSURE FILL) | 1 |
| 13 | 631586 | FILTER ASSEMBLY | 1 |
| 14 | 631756 | END CAP ASSEMBLY (LARGE) | 1 |
| 15 | 844301 | RING, O | 1 |
| 16 | 844307 | RING, O | 1 |
| 17 | 869025 | RING, O | 2 |

631801 PRESSURE FILL SMALL CAPACITY

| ITEM | PART NO. | PART NAME | QTY. |
|---|---|---|---|
| 1 | 203568 | RING, O | 1 |
| 2 | 622026 | VALVE, NEEDLE | 1 |
| 3 | 622881 | RING, O | 1 |
| 4 | 624903 | NUT, JAM HEX | 1 |
| 5 | 624905 | FITTING | 2 |
| 6 | 624914 | PISTON | 1 |
| 7 | 625015 | S-CAP | 1 |
| 8 | 629097 | COVER, SMALL CAPACITY | 1 |
| 9 | 629093 | WIRE, RETAINING | 1 |
| 10 | 629094 | CYLINDER, SMALL CAPACITY | 1 |
| 11 | 629148 | SPRING, WAVE | 1 |
| 12 | 629095 | CAP, MOUNT (PRESSURE FILL) | 1 |
| 13 | 631586 | FILTER ASSEMBLY | 1 |
| 14 | 631757 | END CAP ASSEMBLY (SMALL) | 1 |
| 15 | 844301 | RING, O | 1 |
| 16 | 844307 | RING, O | 1 |
| 17 | 869025 | RING, O | 2 |




Note: (X/X) Upper number is item.
Lower number is quantity required.

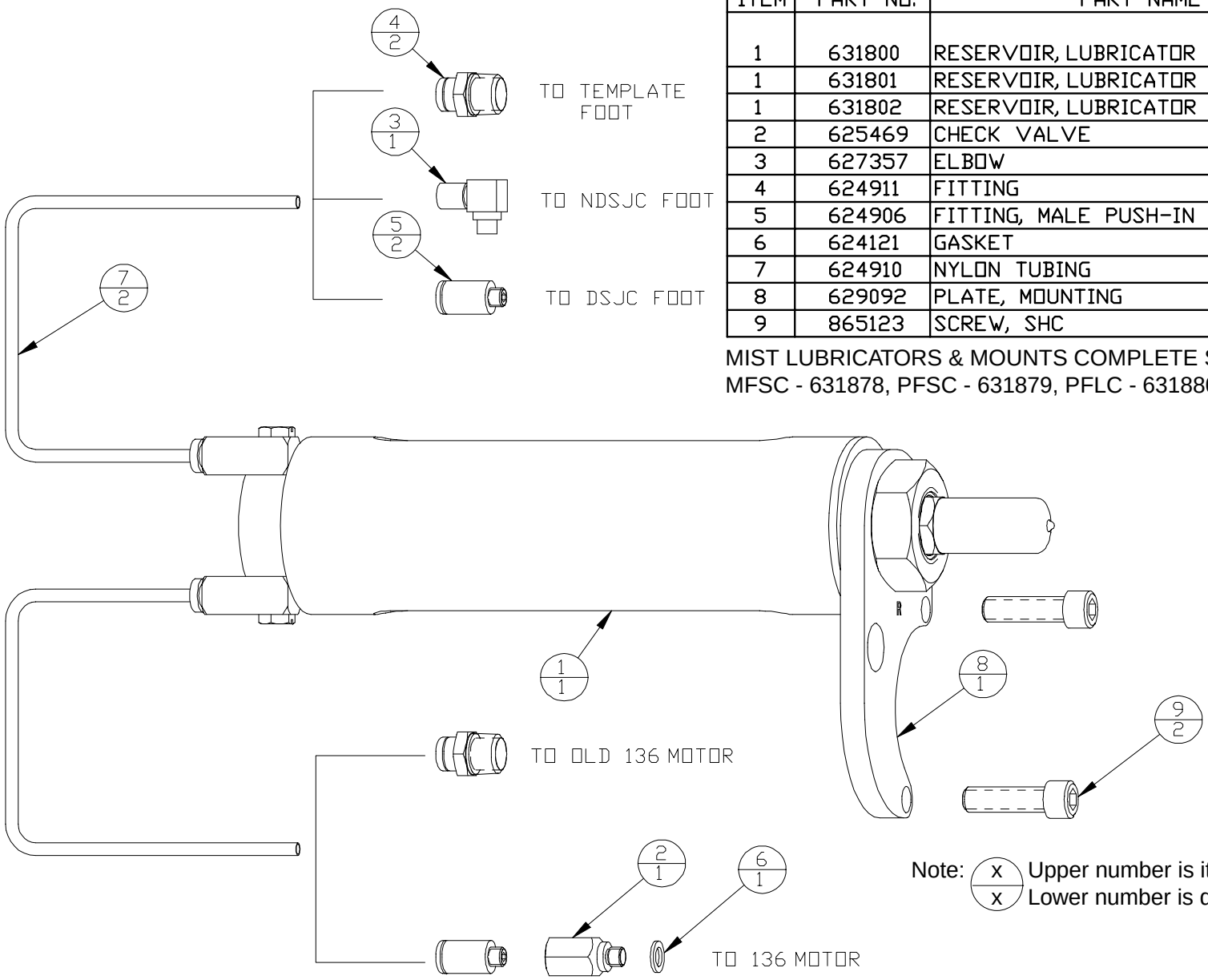
631799 MANUAL FILL LARGE CAPACITY

| ITEM | PART NO. | PART NAME | QTY. |
|---|---|---|---|
| 1 | 622026 | VALVE, NEEDLE | 1 |
| 2 | 622881 | RING, O | 1 |
| 3 | 623422 | KNOB | 1 |
| 4 | 624902 | NUT, JAM HEX | 1 |
| 5 | 624903 | NUT, JAM HEX | 1 |
| 6 | 624905 | FITTING | 2 |
| 7 | 625015 | S-CAP | 1 |
| 8 | 629086 | COVER, LARGE CAPACITY | 1 |
| 9 | 629093 | WIRE, RETAINING | 1 |
| 10 | 629088 | CAP, MOUNT (PUMP FILL) | 1 |
| 11 | 629148 | SPRING, WAVE | 1 |
| 12 | 629090 | CYLINDER, LARGE CAPACITY | 1 |
| 13 | 631586 | FILTER ASSEMBLY | 1 |
| 14 | 631756 | END CAP ASSEMBLY (LARGE) | 1 |
| 15 | 631759 | PISTON ROD ASSY (LARGE) | 1 |
| 16 | 844301 | RING, O | 1 |
| 17 | 844306 | RING, O | 1 |
| 18 | 844307 | RING, O | 1 |
| 19 | 869025 | RING, O | 2 |

631800 MANUAL FILL SMALL CAPACITY

| ITEM | PART NO. | PART NAME | QTY. |
|---|---|---|---|
| 1 | 622026 | VALVE, NEEDLE | 1 |
| 2 | 622881 | RING, O | 1 |
| 3 | 623422 | KNOB | 1 |
| 4 | 624902 | NUT, JAM HEX | 1 |
| 5 | 624903 | NUT, JAM HEX | 1 |
| 6 | 624905 | FITTING | 2 |
| 7 | 625015 | S-CAP | 1 |
| 8 | 629097 | COVER, SMALL CAPACITY | 1 |
| 9 | 629093 | WIRE, RETAINING | 1 |
| 10 | 629088 | CAP, MOUNT (PUMP FILL) | 1 |
| 11 | 629148 | SPRING, WAVE | 1 |
| 12 | 629094 | CYLINDER, SMALL CAPACITY | 1 |
| 13 | 631586 | FILTER ASSEMBLY | 1 |
| 14 | 631757 | END CAP ASSEMBLY (SMALL) | 1 |
| 15 | 631758 | PISTON ROD ASSY (SMALL) | 1 |
| 16 | 844301 | RING, O | 1 |
| 17 | 844306 | RING, O | 1 |
| 18 | 844307 | RING, O | 1 |
| 19 | 869025 | RING, O | 2 |

# 136SC-B-118 MIST LUBRICATOR MOUNTING




| ITEM | PART NO. | PART NAME | QTY. |
|---|---|---|---|
| 1 | 631800 | RESERVOIR, LUBRICATOR (MFSC) | 1 |
| 1 | 631801 | RESERVOIR, LUBRICATOR (PFSC) | 1 |
| 1 | 631802 | RESERVOIR, LUBRICATOR (PFLC) | 1 |
| 2 | 625469 | CHECK VALVE | 1 |
| 3 | 627357 | ELBOW | 1 |
| 4 | 624911 | FITTING | 2 |
| 5 | 624906 | FITTING, MALE PUSH-IN | 2 |
| 6 | 624121 | GASKET | 1 |
| 7 | 624910 | NYLON TUBING | 2 |
| 8 | 629092 | PLATE, MOUNTING | 1 |
| 9 | 865123 | SCREW, SHC | 2 |

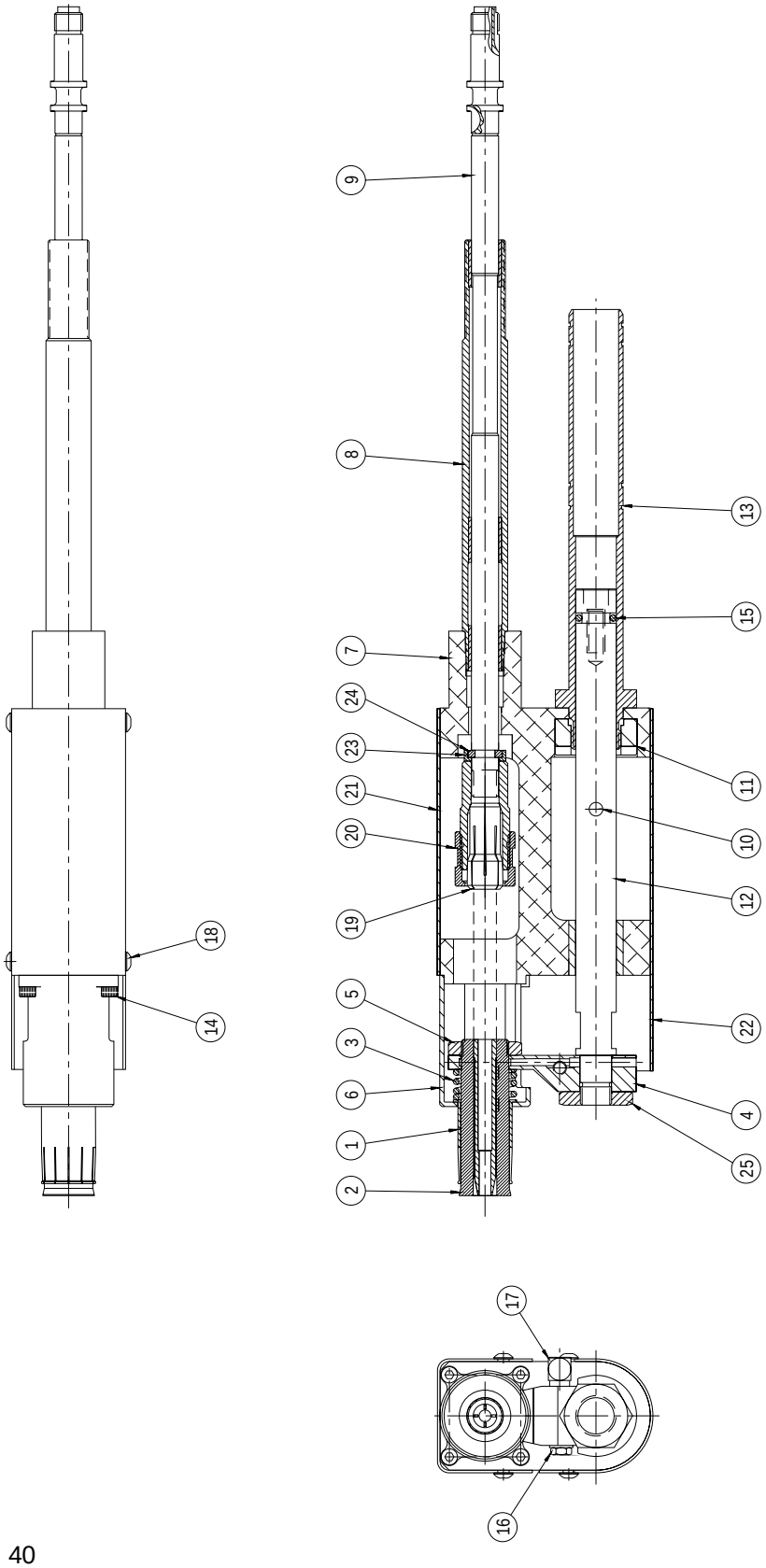
MIST LUBRICATORS & MOUNTS COMPLETE SUBASSEMBLIES:
MFSC - 631878, PFSC - 631879, PFLC - 631880.

Note: (x/x) Upper number is item.
Lower number is quantity required.

# TROUBLE SHOOTING

| SYMPTOM | REASON | SOLUTION |
|---|---|---|
| Air motor and/or clamp and feed functions do not start when trigger is depressed. | Trigger or pilot valves clogged with foreign matter. | Remove trigger and pilot valves (separately) and inspect for rust or debris. Inspect O-rings and replace if necessary. |
| Air motor does not run when trigger is depressed, but feed and clamp functions properly. | Gears damaged or jammed with debris. | With air line disconnected check for free spindle rotation with hex key wrench in end of spindle. Remove backhead, clean and inspect gears for damage. |
| | Foreign matter in motor inlet. | Remove motor and clean debris from motor inlet. |
| | Broken rotor blades, rotor or gear bearings. | Remove motor and inspect rotor blades and bearings. Replace if necessary. |
| Air motor “idles” when trigger valve is released. | Pilot valve or retract and dwell valve sticky (not fully reset), or bad O-ring. | Remove and check valves for debris and free movement of spool. Inspect O-rings, lubricate and reassemble. |
| | Leaking O-ring on air motor rear bearing support. | Remove and inspect O-rings. Replace if necessary and reassemble. |
| Motor runs, but clamp & feed functions do not start. | Unclamp check valve doesn’t shift when trigger is depressed. | Remove unclamp check valve and inspect for debris, free movement and damaged O-rings. Lubricate and reassemble. |
| Motor runs, clamps but doesn’t feed. | Feed control valve “closed” | Back off feed control valve counterclockwise until feed commences. |
| | Debris in the hydraulic system. | Remove bleed port and bleed hydraulic system until fluid is clear. |
| Lunge during feed or variation in feed rate. | Air in hydraulic system. | Back feed control valve two turns from seat, and bleed as above. |
| | Persistent air in hydraulic system. | Remove hydraulic reservoir piston and check or replace O-rings. |
| Tool doesn’t retract at end of feed stroke. | Dwell valve seated too tightly. | Back dwell valve off from seat 1/8 turn to 1-1/2 turn. |
| | Retract and dwell valve doesn’t shift. | Remove retract and dwell valve and inspect for debris, free movement and damaged O-rings. Lubricate and reassemble. |
| | Depth control adjusted out of the max. range of the tool. | Readjust depth control nut within the feed stroke of the tool (ref.: 1.10 max. stroke). |
| Tool retracts shortly after trigger depressed. | Dwell valve opened too far off of seat. | Turn dwell valve clockwise (should be 1/8 to 1-1/2 turns of seat). |
| Tool “pulses” on retract (rapid ‘‘feed retract-feed retract”). | Damaged O-rings on retract and dwell valve. | Remove retract and dwell valve, inspect O-rings and replace as necessary. Lubricate and reassemble. |

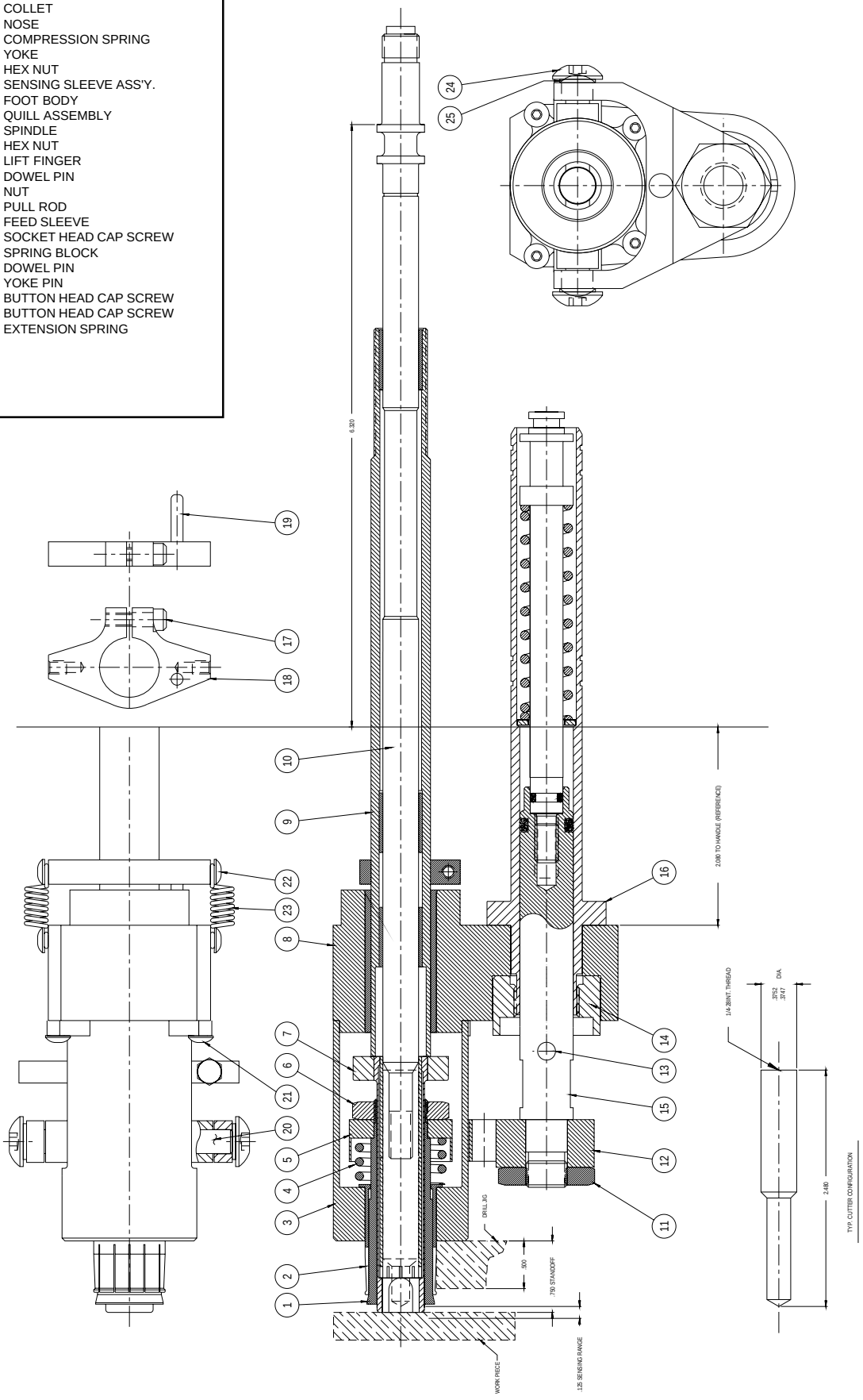
# 136SC-B-118 NON-DEPTH SENSING JIG COLLET FOOT KIT FOR .500-631400, .625-631401, .750-631402 & .875-631403




| ITEM NO. | QTY. | CODE NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 1 | 624568 | COLLET .500 STRAIGHT |
| 1 | 1 | 624569 | COLLET .625 STRAIGHT |
| 1 | 1 | 623436 | COLLET .750 STRAIGHT |
| 1 | 1 | 623437 | COLLET .875 STRAIGHT |
| 2 | 1 | Specified by Customer | MANDREL ASSEMBLY |
| 3 | 1 | 625357 | COLLET SPRING .500 |
| 3 | 1 | 625390 | COLLET SPRING .625 |
| 3 | 1 | 625358 | COLLET SPRING .750 |
| 3 | 1 | 623452 | COLLET SPRING .875 |
| 4 | 1 | 625963 | LIFT FINGER .500 |
| 4 | 1 | 625964 | LIFT FINGER .625 |
| 4 | 1 | 625965 | LIFT FINGER .750 |
| 4 | 1 | 625966 | LIFT FINGER .875 |
| 5 | 1 | 625159 | HEX NUT .500 |
| 5 | 1 | 625160 | HEX NUT .625 |
| 5 | 1 | 625161 | HEX NUT .750 |
| 5 | 1 | 625162 | HEX NUT .875 |
| 6 | 1 | 625176 | .500 - NOSE. .375 - .500 GRIP RANGE |
| 6 | 1 | 625177 | .500 - NOSE, .625 - 1.000 GRIP RANGE |
| 6 | 1 | 625178 | .625 - NOSE. .375 - .500 GRIP RANGE |
| 6 | 1 | 625179 | .625 - NOSE, .625 - 1.000 GRIP RANGE |
| 6 | 1 | 625180 | .750 - NOSE. .375 - .500 GRIP RANGE |
| 6 | 1 | 625181 | .750 - NOSE, .625 - 1.000 GRIP RANGE |
| 6 | 1 | 625182 | .875 - NOSE. .375 - .500 GRIP RANGE |
| 6 | 1 | 625183 | .875 - NOSE, .625 - 1.000 GRIP RANGE |
| 7 | 1 | 627033 | FOOT BODY |
| 8 | 1 | 621645 | QUILL ASSEMBLY |
| 9 | 1 | 627032 | SPINDLE |
| 10 | 1 | 832128 | DOWEL PIN |
| 11 | 1 | 624531 | PRESSURE FOOT NUT |
| 12 | 1 | 627035 | PULL ROD |
| 13 | 1 | 624533 | FEED SLEEVE |
| 14 | 4 | 622774 | SCREW. SOCKET HEAD |
| 15 | 1 | 844308 | "O"-RING |
| 16 | 1 | 623223 | PLUG |
| 17 | 1 | 624905 | HOSE FITTING WITH GASKET |
| 18 | 8 | 622063 | SCREW. BUTTON HEAD |
| 19 | 1 | Specified by Customer | ERICKSON COLLET |
| 20 | 1 | 863888 | COLLET CHUCK |
| 21 | 1 | 627030 | HAND GUARD |
| 22 | 1 | 627031 | HAND GUARD |
| 23 | 1 | 627029 | CUP RETAINER |
| 24 | 1 | 627028 | RETAINER RING |
| 25 | 1 | 622922 | HEX NUT |

# 136SC-B-118 DEPTH SENSING JIG COLLET FOOT KIT FOR .750- 631325

| ITEM NO. | QTY. | CODE NO. | DESCRIPTION |
|---|---|---|---|
| 1 | 1 | 623431 | MANDREL |
| 2 | 1 | 623436 | COLLET |
| 3 | 1 | 625747 | NOSE |
| 4 | 1 | 622872 | COMPRESSION SPRING |
| 5 | 1 | 623448 | YOKE |
| 6 | 1 | 623441 | HEX NUT |
| 7 | 1 | 631327 | SENSING SLEEVE ASS'Y. |
| 8 | 1 | 624663 | FOOT BODY |
| 9 | 1 | 621303 | QUILL ASSEMBLY |
| 10 | 1 | 624918 | SPINDLE |
| 11 | 1 | 622922 | HEX NUT |
| 12 | 1 | 624553 | LIFT FINGER |
| 13 | 1 | 832128 | DOWEL PIN |
| 14 | 1 | 624556 | NUT |
| 15 | 1 | 624554 | PULL ROD |
| 16 | 1 | 624555 | FEED SLEEVE |
| 17 | 1 | 863337 | SOCKET HEAD CAP SCREW |
| 18 | 1 | 624673 | SPRING BLOCK |
| 19 | 1 | 843280 | DOWEL PIN |
| 20 | 2 | 623274 | YOKE PIN |
| 21 | 4 | 622053 | BUTTON HEAD CAP SCREW |
| 22 | 4 | 622063 | BUTTON HEAD CAP SCREW |
| 23 | 2 | 622873 | EXTENSION SPRING |



# MAINTENANCE KIT - 621953

| PART NO. | NAME OF PART | QTY. |
|---|---|---|
| 382370 | TOOL BOX | 1 |
| 622849 | ASSEMBLY TOOL | 1 |
| 623014 | ASSEMBLY TOOL, PRESS. FOOT NUT | 1 |
| 623015 | ASSEMBLY TOOL, TRIGGER LOCK | 1 |
| 623334 | ASSEMBLY TOOL, PRESSURE HYDRAULIC & FRONT ENCLOSURE | 1 |
| 623515 | ASSEMBLY TOOL, PRESSURE FOOT NUT | 1 |
| 623520 | ASSEMBLY TOOL, BULKHEAD REMOVAL | 1 |
| 623647 | ASSEMBLY TOOL, DEPTH STOP | 1 |
| 632424 | REMOVAL TOOL, VALVE | 1 |
| 624759 | SLIDE HAMMER PULLER | 1 |
| 624760 | ASSEMBLY FIXTURE | 1 |
| 624761 | WRENCH, SPINDLE BEARING LOCKNUT | 1 |
| 624762 | BEARING INSTALLER | 1 |
| 624763 | REMOVAL TOOL, FEED CONTROL VALVE | 1 |
| 624764 | REMOVAL TOOL, PILOT VALVE | 1 |
| 624765 | ARBOR PRESS FIXTURE | 1 |
| 624766 | VALVE INSTALLATION TOOL | 1 |
| 624767 | WRENCH, FEED CONTROL VALVE | 1 |
| 624768 | TEE WRENCH, FOOT BODY | 1 |

# NOTES

COOPER Tools

**CooperTools**
7007 Pinemont
Houston, Texas 77040
Phone: (713) 462-4521
Fax: (713) 460-7008
www.cooperindustries.com