ARO
Tool Products

OPERATOR'S MANUAL

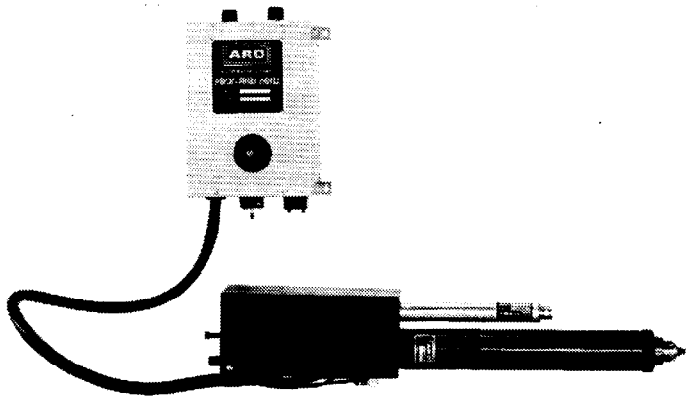
INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

PAR–A–MATIC SELF–FEED DRILL

Models 8360–A( )–3

SECTION	M103
MANUAL	77
Released:	1–10–80
Revised:	10–6–95
Form:	1693–2

IMPORTANT: READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.



FEATURES:

MODELS 8360–A( ) ARE THRU–HEAD TYPE
ADJUSTABLE STROKE LENGTHS (3/16" MIN. – 2–3/4" MAX.)
PECKING STROKE 29/32" MIN. – 2–1/4" MAX.
ADJUSTABLE FEED RATES (I.P.M.) 0 MIN. – 40 MAX.
RAPID ADVANCE 5/16" MIN. – 1–21/32" MAX.
SPEED RANGES FROM 500 TO 17,000 R.P.M. AVAILABLE
1/2" – 20 SPINDLE THREAD
3/8" CAPACITY CHUCK
1/4" MALE N.P.T.F. AIR INLET TO MOTOR

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For additional Maintenance/Repair information, Form 1461–2 (English) is available at $5.00 each. Send request to The ARO Corporation, One Aro Center, Bryan, Ohio 43506, Attn: "Sales Training".

For parts and service information, contact your local ARO distributor, or the Customer Service Dept. of the Ingersoll–Rand Distribution Center, White House, TN at PH: (615) 672–0321, FAX: (615) 672–0801.

ARO Tool Products
Ingersoll–Rand Company
1725 U.S. No. 1 North • P.O. Box 8000 • Southern Pines, NC 28388–8000

INGERSOLL-RAND®
PROFESSIONAL TOOLS

MODEL IDENTIFICATION

2-3/4" STROKE					
MODELS	R.P.M.	GEARING		MOTOR ASSEMBLY	TOTAL REDUCTION
		AUXILIARY	DRIVE		
8360-A5-3( )	500	33837-1	33836-1	37959-1	30.9:1
8360-A8-3( )	850	33837-1	33835-1	37959-1	18.9:1
8360-A14-3( )	1450	33853-1	33835-1	37959-1	11.6:1
8360-A21-3( )	2100		34009-1	37960-1	6.86:1
8360-A28-3( )	2800		33836-1	37959-1	5.56:1
8360-A50-3( )	5000		33835-1	37959-1	3.4:1
8360-172-3( )	17,000		39940	37959-1	1:1

MODELS WITH -EU SUFFIX ARE "EC" COMPLIANT MODELS.

MODEL IDENTIFICATION

Safe and efficient operation of your ARO self-feed drill can best be attained by observing proper operating and maintenance procedures. Keep hands and clothing away from rotating end of tool and all other moving parts. Eye protection should be worn at all times while operating power tools. Disconnect air supply line to tool or shut off air supply line to tool and exhaust (drain) air line of compressed air BEFORE removing or installing a bit, reamer or other such device or otherwise performing service or maintenance to the tool.

The ARO 8360-A( ) peck drill is a self-feed unit, entirely air operated, designed to produce accurate deep hole drilling in non-metals and non-work hardening grades of metal.

The model 8360-A( ) is designed to "rapid advance" to the workpiece, drill, retract to the initial drilling point, re-advance to the point the drill has reached on the first operation, drill and retract, continuing the cycle until the desired pre-set depth of hole is reached.

Each time the drill bit is retracted, the generated chips are propelled rearward and out of the entrance hole in the workpiece. This action clears the hole and drill flutes of chips that produce frictional heat, drag, drill skew and hole mis-alignment (or bending). The "peck feed" action is superior to a simple "jogging" action or "advance interuption" since neither of these will clear the hole completely.

Use of the ARO peck feed drill will greatly increase the life of small drills (3/32" thru no. 80) that are sensitive to excessive thrust and radial loading.

GEARING: The gearing for these models is available in single or double reduction planetary gearing assemblies to provide seven final spindle speeds.

AIR MOTOR: The vane type air motor develops a minimum of .4 horsepower. The motor will start within the first 1/4" of stroke and remain running thru the forward and retract stroke, automatically shutting off upon completion of the cycle.

AIR PISTON: The air piston is of the double acting type, providing the forward and retract stroke movement. The piston has an area of 2.0 square inches and develops approximately 170 pounds of thrust with 90 p.s.i.g. at the piston inlet.

CONTROLS

Manual start and retract buttons operate elements in the controller unit, that in turn operate the tool. To achieve start or retract functions, simply depress and release the proper control button.

Remote start and retract functions are achieved by connecting tubing or porting block provided at the bottom of the controller - ports F and G (see circuit diagram, page 3 and controller diagram, page 8). NOTE: A 3-way valve must be used with both the remote start and the retract circuits to provide proper exhausting of signal.

FEED CONTROL VALVE (48441-1): The needle type control valve marked "slow feed", located on the head of the tool, controls the forward feed rate of the piston. This valve must remain set as it is shipped from the factory.

HYDRAULIC CHECK (43697): Controls rate of feed of drill into workpiece. To adjust, rotate the extended knob (at nameplate end) and align slot in plunger rod with desired number on nameplate. To increase rate of feed, rotate slot in rod towards a smaller number. To decrease the rate of feed, rotate the slot towards a larger number.

PECK CONTROL: Timing element (59116) regulates the pecking time interval (time required for drill to penetrate into the work piece). Turn adjusting dial to a larger number to increase penetration, turn to a smaller number to decrease penetration. Timer (59116) has a timing range from 0.1 to 10.0 seconds. Adjustment of the timer to a point less than total systems response will create hysteresis and should be avoided. Proper balance of the feed rate (hydraulic check) and the timer (59116) can be achieved for any job.

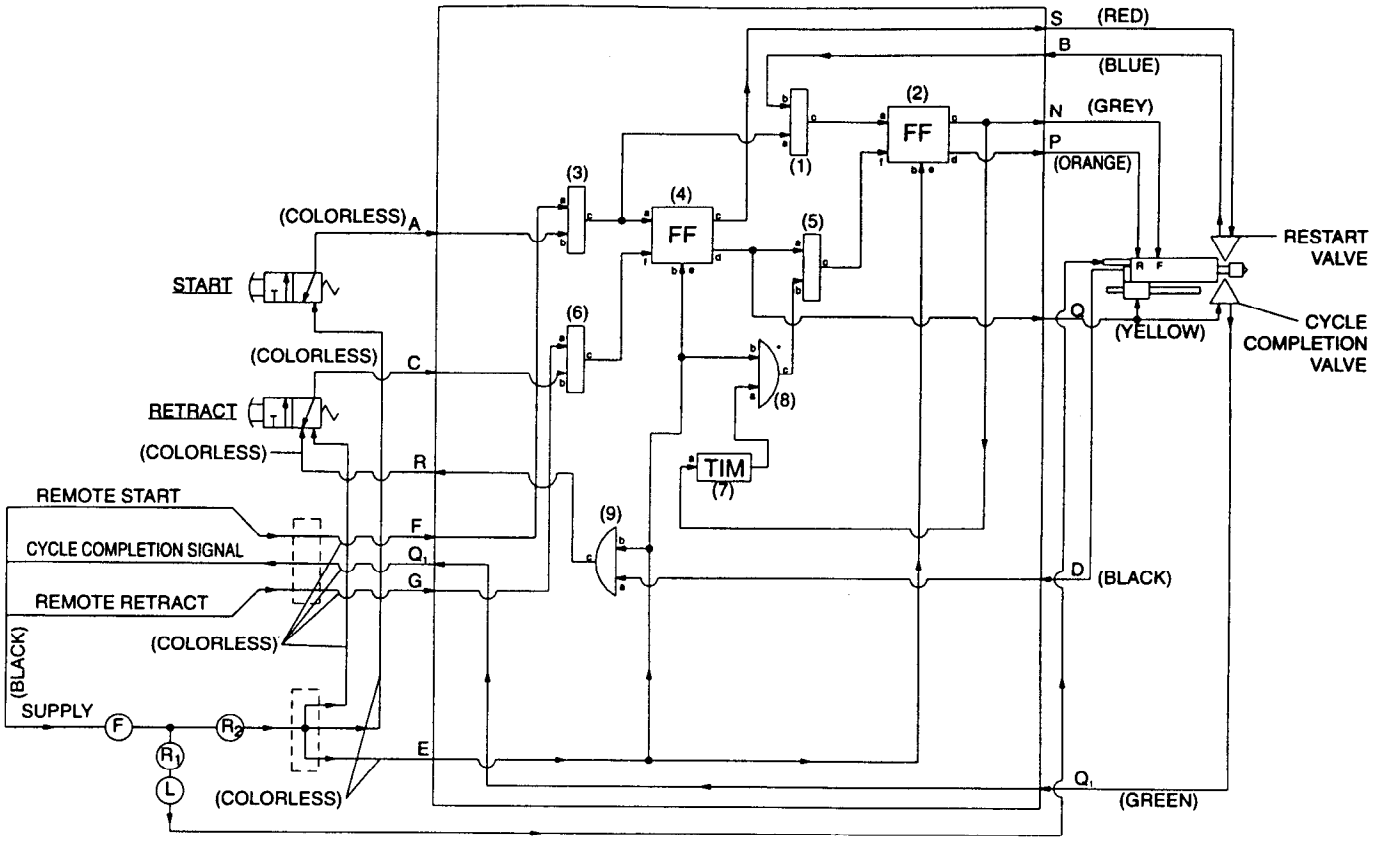
Stroke adjustment screw (44866) regulates the distance the tool will advance. The adjusting screw contacts the bleed port located in the orifice block (43688) attached to the rear of the tool head. The adjusting screw closes off the air bleeding (exhausting) from the orifice block, allowing a build up of air pressure in the block. This sends a pressure signal to an element in the controller which actuates the retract circuit, causing the unit to retract and stop.

Restart valve (202-C) sends a pressure signal to the element in the controller which actuates the forward stroke circuit, causing the unit to advance.

Cycle completion valve (202-C) sends a pressure signal to Q1 port located in the porting block at the bottom of the controller (pages 3 and 8) when signal is completed and the tool is retracted. The pressure signal from Q1 can be used as an interlock with other devices. Port Q1 on the controller should remain plugged, as supplied, when not in use. Valve actuator bracket (44499) must be positioned so as to assure cycle completion valve (202-C) is actuated when unit is fully retracted, if the use of this circuit is desired.

CONTROLS

PECK CHECK CONTROL (43698): Hold the hydraulic check rod in the forward position during the pecking cycle, allowing the drill to retract and re–advance to the point drilling is resumed. After each peck cycle, the peck check allows the hydraulic check rod to drift rearward approximately .010" before holding. This assures that the drill goes into controlled feed before the drill point strikes the hole bottom. The peck check adjustment arm may be adjusted for set–up reasons to achieve proper initial length of rapid advance.



CIRCUIT SCHEMATIC

FIGURE 1

MOUNTING

The nose end of the outer sleeve is provided with 2" – 16 L.H. threads (remove thread guard for use) and a 2" x 1–1/8" long pilot diameter for fixture mounting. A groove is also provided in the outer sleeve for a retaining ring which is supplied with the foot and flange type brackets. Foot and flange type mounting brackets are available for tool mounting – see "ACCESSORIES", pages 13 and 14. The tool can be mounted in any position desired without impairing the function of the tool.

SET–UP PROCEDURE

1. Loosen three screws (Y8–104–C) and remove cover (43699) by lifting upward.
2. Position the peck feed drill in the fixture, being certain the unit is in the full retract position (piston rod all the way back). Determine the total distance the drill bit must travel (distance "A", figure 2). Also determine the length of rapid advance (distance "B", figure 2).
3. Turn the stroke adjusting screw (44866) so the distance between the leading edge of the screw and the orifice block (43688) – distance "D" in figure 3 – equals the total distance the drill bit must travel (distance "A", figure 2).
4. Turn the hydraulic check adjustment to the zero setting. Loosen the "adjust stroke" screw on the peck check control (figure 4) and tighten "shut–off adjustment screw" (figure 4).
5. Position the peck check adjustment arm ("adjust stroke" screw must be loose to allow positioning of the bracket) and hydraulic check rod to set the distance of rapid advance (distance "C", figure 3). NOTE: Distance "C" in figure 3 should be .005" to .015" less than distance "B" in figure 2 to assure the drill point does not strike the work piece during the rapid advance. Secure the peck check adjustment arm by tightening the "adjust stroke" screw, loosen shut–off adjustment screw five full turns from tightened position and adjust the hydraulic check setting to twenty. *
6. Install the work piece. With the peck control (timing element) set at ten, start the drill. Slowly turn the hydraulic check adjustment toward zero until the desired rate of feed is reached. When rate of feed is achieved, turn peck control (timing element) toward zero to set control for the desired number of pecks.
7. Proper balance between the rate of feed and the peck rate will be achieved by minor adjustments to the feed and peck controls during trial runs on two or three work pieces. On both controls, the lower the number setting, the faster the feed rate or peck rate.
8. Replace the cover and secure with screws (Y8–104–C).

* **NOTE: SOME HYDRAULIC CHECKS DO NOT HAVE A NUMBERED SCALE – ADJUST TO HIGH POSITION.**

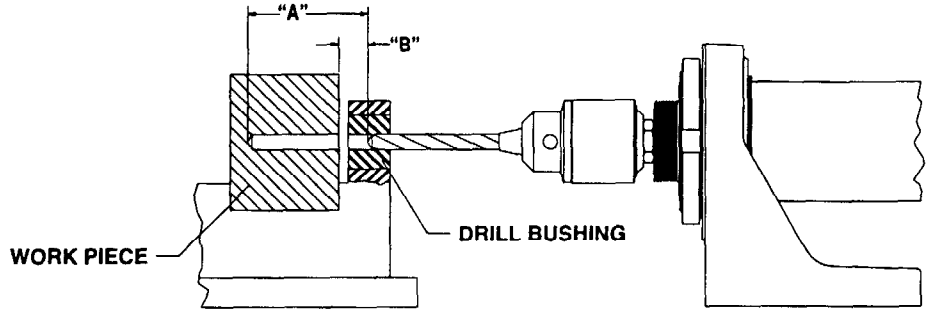


FIGURE 2

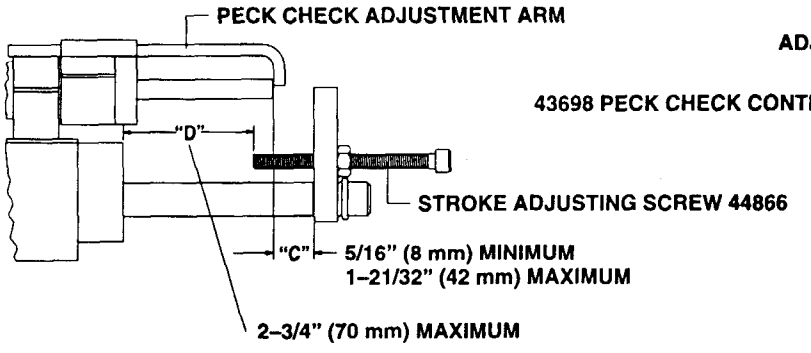


FIGURE 3

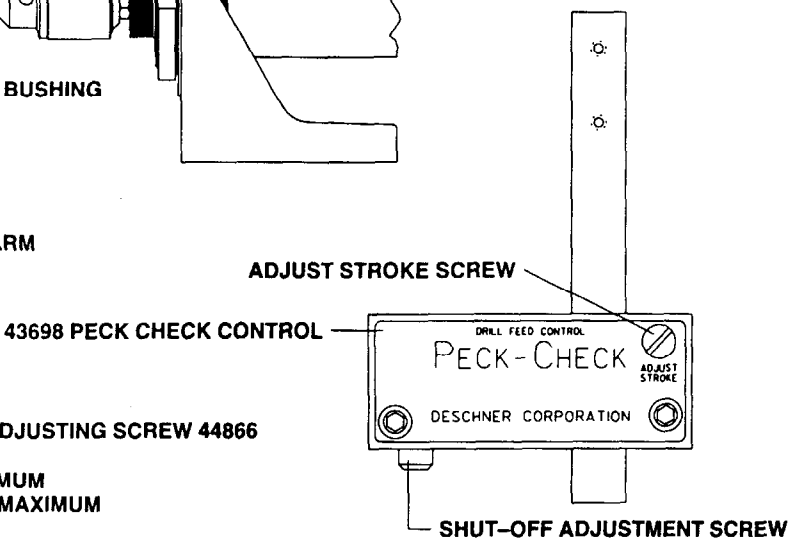


FIGURE 4

SET–UP TIPS

1. CAUTION: When setting up the tool with air on, never place fingers in the operating portion of the mechanism. Inadvertent stroking of the restart valve (202–C) will start the tool if the peck controller program has not been properly reset by normal cycle completion or by depressing the retract button on the controller. Always replace cover and setup.
2. Proper balance between the feed rate and peck rate must be achieved to yield a hold that is true and with a minimum cycle time. Too high a feed rate "crowds" the drill, making the chips larger and more difficult to expel. A feed rate too slow tends to allow the drill bit to "wallow", producing greater rates of wear on the drill bit and drill bushing and produces a hole that is less true. A peck rate too slow will increase the chances of the drill flutes becoming clogged with chips. Too high a peck rate increases the total cycling time with the drill bit spending more time "cutting air".
3. Holding the start button down cancels the pecking action and produces continuous forward movement of the drill.
4. Chips can be more readily expelled if proper clearance is maintained between the work piece and the drill bushing (figure 2).
5. Coolant produces a more efficient cutting action and flushing of chips with less chip welding.
6. The drill must be properly sharpened for efficient cutting and to produce a true hole.
7. Drill bit speed may be varied by adjusting the regulator on the air supply line to the motor (see figure 5).

AIR AND LUBE REQUIREMENTS

Air pressure of 90 p.s.i. at the air inlet of the tool is required for maximum motor efficiency. Motor speed may be varied by adjustment of air inlet pressure at regulator R1 (figure 5). Regulator R1 should be set to deliver not less than 75% of pressure setting at regulator R2 (under operating conditions).

Pressure regulator R2 controls supply pressure at the A.P.L.C. controller and the air piston of the tool. Air pressure may be varied by adjustment of regulator R2. Operating pressure range of R2 is 50 to 90 p.s.i.

Filtered and oiled air will allow the tool to operate more efficiently and yield a longer life in operating parts and mechanisms. ARO model F25231–120 air line filter will provide clean (40 micron) air for the tool. Model L26231–120 air line lubricator visually set from 15 to 20 drops per minute of flow thru the lubricator will adequately lubricate the air motor of the tool. NOTE: Oiled air should not be allowed to pass thru the controller – see figure 5 for recommended installation of filter, regulator and lubricator.

RECOMMENDED LUBRICATION: Gearing should be grease lubricated every 160 hours of operation. Inject 1 to 2 strokes of 33153 grease, or equivalent, thru grease fitting in gear housing.

NOTE: Spindle must be extended from outer sleeve sufficiently to expose grease fitting in gear housing.

The motor is lubricated thru the air inlet of the unit by use of a lubricator installed in the air line. Spindle oil 29665, 1 qt. (.9 liter) container, or equivalent, type 1 light spindle oil is recommended for motor lubrication. Consult the manufacturer of the air line lubricator being used to insure oil used is compatible with construction of the lubricator bowl.

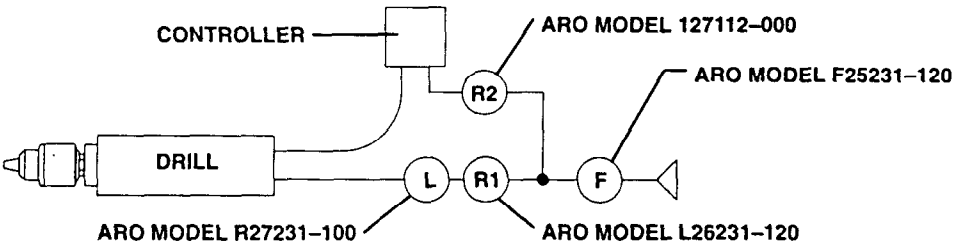
Bearings, gears, etc.: Grease 33153, 5 lb (2.3 kg) can, or equivalent grade.

"O" rings: Lubricant 36460, 4 oz. (113 g) tube for lubrication and installation of "O" rings.

CAUTION: An excessive amount of lubricant in a tool will affect the speed and power. Each set of planetary gearing should contain approximately 1/8 oz. (3.5 g) of grease.

RECOMMENDED HOSE SIZE: 3/8" (10 mm) nominal inside diameter.

PART NO.	WHERE USED	DESCRIPTION
29665	AIR MOTOR	A HIGH QUALITY LIGHT TURBINE OR SPINDLE OIL, RUST INHIBITED, WITH A VISCOSITY OF 100 – 150 S.U.S. AT 100° F. OIL IS COMPATIBLE WITH POLYCARBONATE TYPE AIR LINE LUBRICATOR BOWLS.
33153	GEARS & BEARINGS	A HIGH QUALITY "EP" EXTREME PRESSURE ANTI-FRICTION BEARING AND GEAR GREASE, NLGI NO. 1, FREE OF CORROSIVE MATTER AND FILLERS, WITH A VISCOSITY OF APPROXIMATELY 750 S.U.S. AT 100° F.
36460	"O" RINGS & LIP TYPE SEALS	A STRINGY LUBRICANT FOR RUBBER SEALS, WITH GOOD ADHESIVE QUALITIES.



TYPICAL INSTALLATION WHEN CONTROLLER AND DRILL WILL HAVE INDEPENDENT PRESSURE REGULATION
FIGURE 5

MAINTENANCE

Disconnect air supply from tool or shut off air supply and exhaust (drain) line of compressed air before performing maintenance or service to tool.

Air tools are made of precision parts and should be handled with reasonable care when servicing. Excessive pressure exerted by a holding device may cause distortion of a part. Apply pressure evenly when disassembling (or assembling) parts which have a press fit. When removing or installing bearings, apply pressure to the mating part; if this is not practiced, Brinelling of the bearing races may occur, making replacement necessary. It is important that the correct tools and fixtures are used when servicing the air tool.

Disassembly should be done on a clean work bench with a clean cloth spread to prevent the loss of small parts. After disassembly is completed, all parts should be thoroughly washed in a clean solvent, blown dry with air and inspected for wear levels, abuse and contamination. Double sealed or shielded bearings should never be placed in solvent unless a good method of re-lubricating the bearing is available. Open bearings may be washed but should not be allowed to spin while being blown dry. When replacement parts are necessary, consult drawing containing the part for identification.

Before assembling, lubricate parts where required. Use 33153 grease, or equivalent, in bearings. Use 36460 lubricant for "O" ring assembly. When assembling "O" rings or parts adjacent "O" rings, care must be exercised to prevent damage to the rubber sealing surfaces. A small amount of grease will usually hold steel balls and other small parts in place while assembling.

When ordering parts, be sure to list part number, part name and model number of tool. Use only genuine ARO replacement parts.

For additional maintenance information, the manual "Tips on Air Tools", Form 5948 is available at $5.00 each. Send request to: The ARO Corporation, One Aro Center, Bryan, Ohio 43506, Attn: "Sales Training".

DISASSEMBLY AND REASSEMBLY OF TOOLS

Disconnect air supply from tool or shut off air supply and exhaust (drain) line of compressed air before performing maintenance or service to tool.

Before starting to disassemble or assemble this tool (any part or completely), be sure to read "Maintenance" section.

To minimize the possibility of parts damage and for convenience, the steps for disassembly and assembly listed on the following pages are recommended.

The basic sections and instructions for removing them from the tool are as follows:

CONTROLS SECTION

The controller unit may be disconnected from the tool for tool maintenance if necessary. Shut off the air supply to both the tool and controller unit. Loosen the three screws (Y8–104–C) and lift cover (43699) from the tool. Disconnect the seven tubes (B, D, S, N, P, Q1 and Q) from fittings on the tool. NOTE: Using a flat blade screwdriver or similar tool, depress the brass insert on the fitting and pull the tube out of the fitting. Remove screw (Y8–85–C) and washer (Y14–8) and remove clamp (12890), releasing tubing from the tool.

The controller unit should not be disassembled, with the exception of the removal of cover (43685) for visual check of the unit and to check tubing and tube connections for possible air pressure leaks. Should a malfunction occur and can not be remedied as outlined in the "Trouble Shooting" section, then the problem should be referenced to an Aro representative or the complete tool – drill unit and controller unit – returned to the factory for service. The drill unit and controller unit must be considered as one tool – if it should become necessary to return the tool for service, return both the controller and the self–feed drill as one complete tool.

GEARING SECTION

Disconnect air from tool. Remove chuck. Loosen three screws (Y8–104–C) and lift cover (43699). Disconnect the seven tubes (B, D, S, N, P, Q1 and Q) from fittings. NOTE: Using a flat blade screwdriver or similar tool, depress the brass insert on the fitting and pull the tube out of the fitting. Remove screw (Y8–85–C) and washer (Y14–8) and remove clamp (12890), releasing tubing. Remove screw (Y157–62), washer (Y14–616), trip mount bracket (44498) and piston rod bracket (43694) with stroke adjustment screw (44866). Push forward on piston rod (40807–1) until flats on motor housing are exposed and, using wrenches on flats of motor housing and gearing, unscrew and remove gearing section. See page 9 for complete disassembly of gearing.

MOTOR AND PISTON SECTION

Remove gearing from tool as outlined in "Gearing Section". The motor assembly, along with spacer (32310), can be removed from the motor housing after the removal of the gearing section. See page 10 for complete motor disassembly. Remove two cap screws (Y157–44) and washers (30997) and remove the hydraulic check, peck check control and restart valve (202–C) with components, from housing (41299–2). Place housing (41299–2) in a suitable holding device with the outer sleeve (40806) in an upright position. Using a strap wrench, Unscrew and remove outer sleeve from housing – LEFT HAND THREADS. CAUTION: Do not clamp on the outer sleeve of the piston and motor section, as it may cause distortion of the piston air cylinder (38866–2), impairing the function of the tool. NOTE: Motor housing, piston rod, piston and components will remain inside the outer sleeve when the outer sleeve is removed from the valve housing. CAUTION: Remove the outer sleeve with care. Pull the outer sleeve straight up and away from the valve housing so as not to bend the air cylinder (38866–2), damaging the inside diameter. The air cylinder may

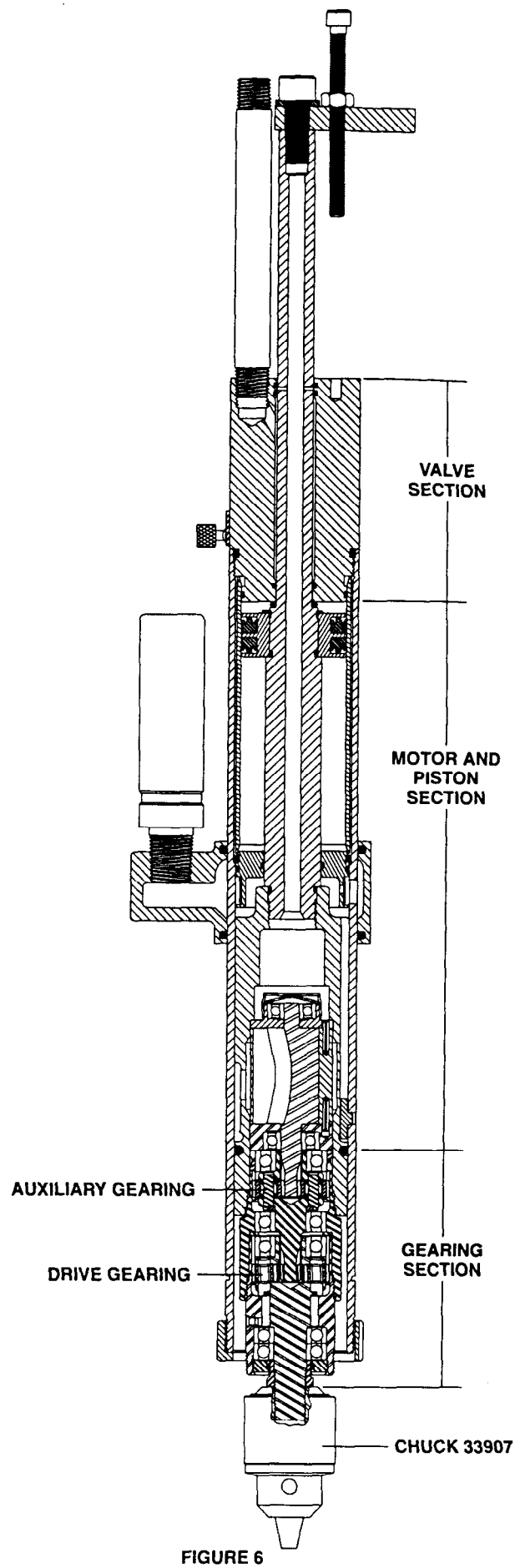


FIGURE 6

remain attached to the valve housing when the outer sleeve is removed. If this is the case, pull the air cylinder straight off the valve housing,exercising caution so as not to damage the inside diameter of the cylinder. If the cylinder remains inside the outer sleeve, refer to page 11 for removal procedure.

VALVE SECTION

The valve section may be removed from the tool without the removal of the gearing, if desired. Remove cover, tubing, screw (Y157–62), washer (Y14–616), trip mount bracket (44498), piston rod bracket (43694) and hydraulic check and components from the tool as outlined in previous sections. Place housing (41299–2) in a suitable holding device and remove the outer sleeve as outlined in "Motor and Piston Section", page 6.

CONTROLS SECTION

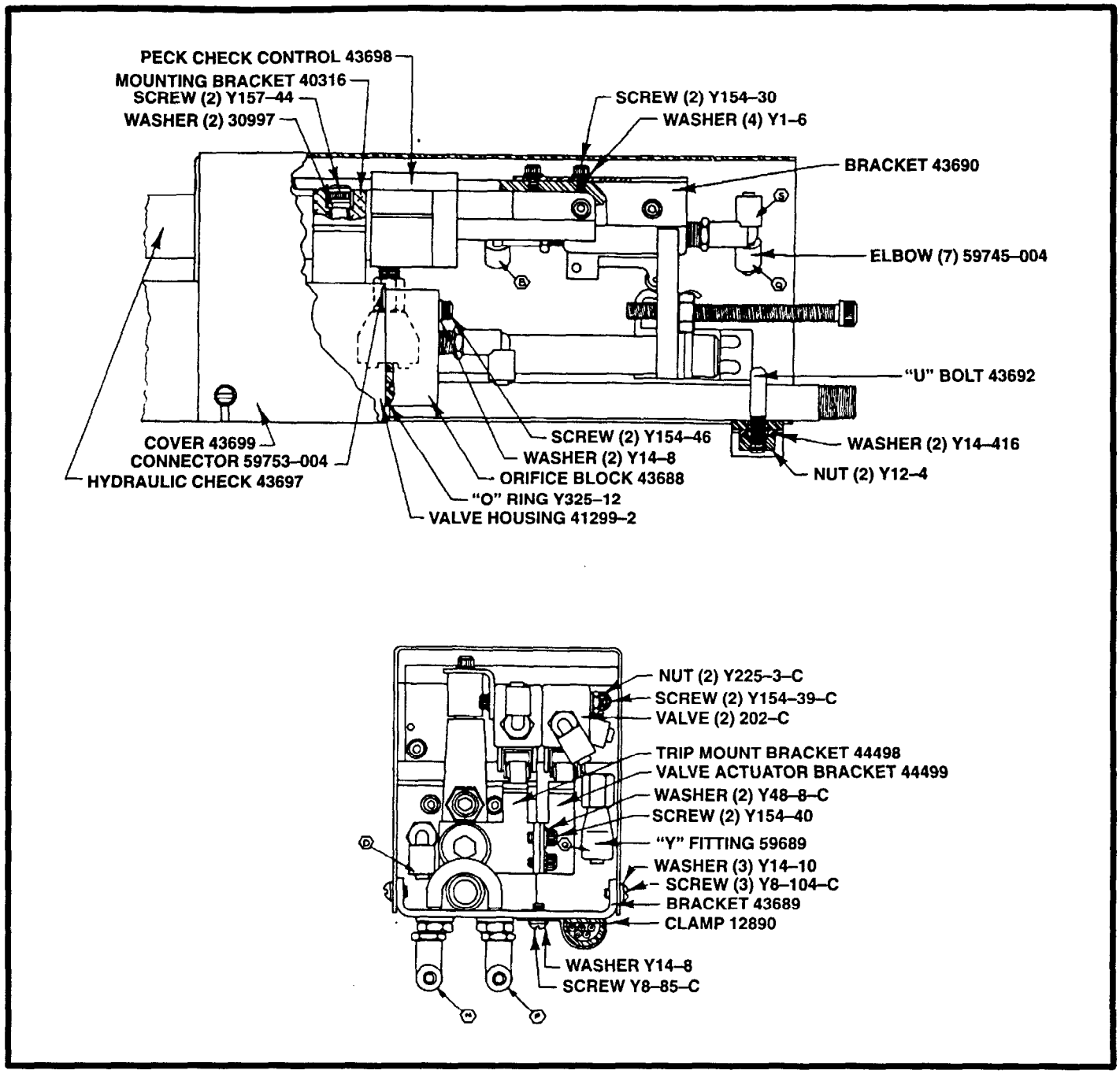
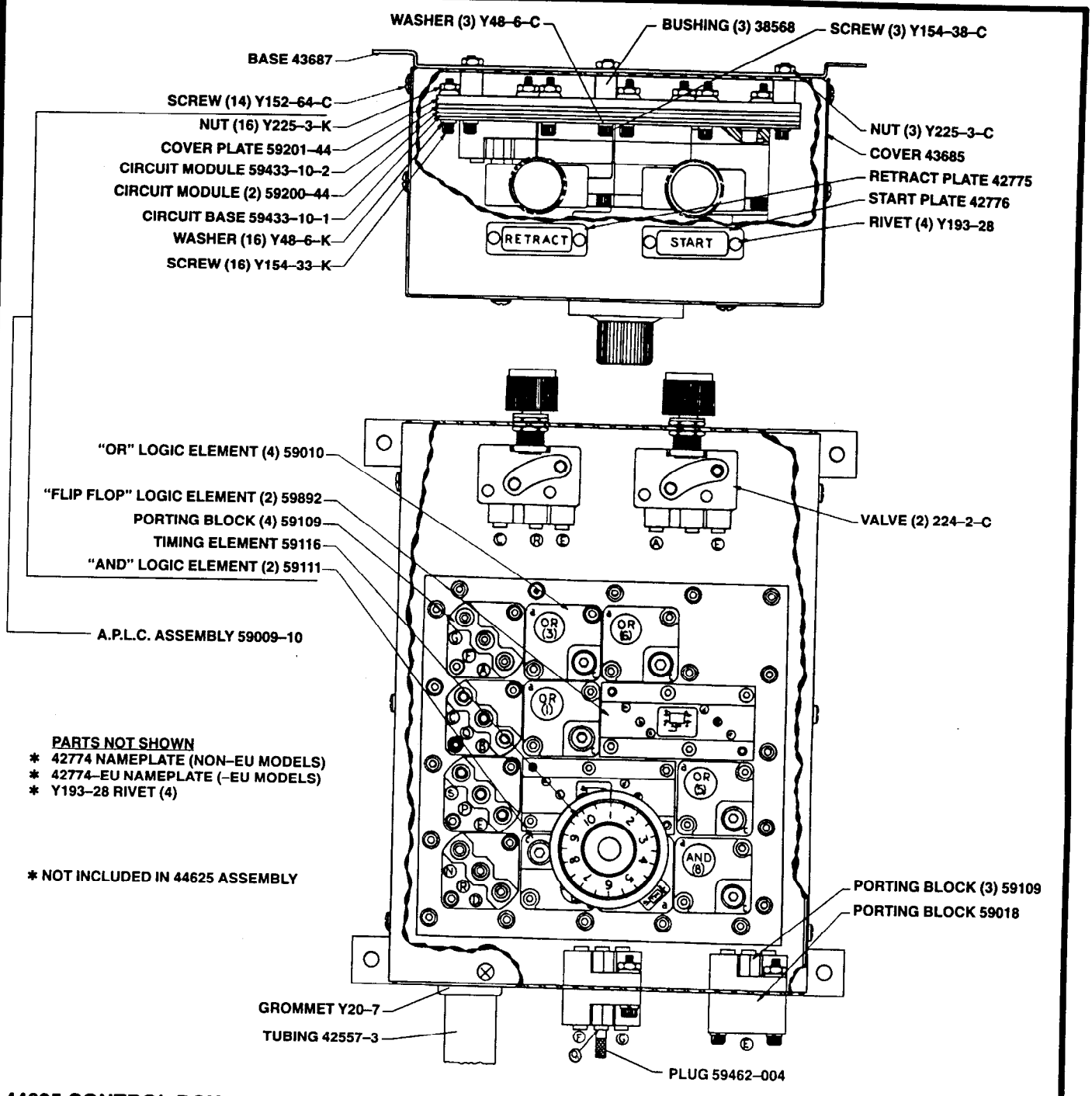


FIGURE 7

CONTROLS SECTION



44625 CONTROL BOX ASSEMBLY

TUBING PART NO.	COLOR	LENGTH
44631–004–H	COLORLESS	4–1/2"
44631–006–M	COLORLESS	6–3/4"
44631–007	COLORLESS	7"
44631–007–H	COLORLESS	7–1/2"
44631–007–M (2)	COLORLESS	7–3/4"
44631–008–H	COLORLESS	8–1/2"
44631–009	COLORLESS	9"
44632–062	BLACK	62"
44633–050	GREEN	50"
44634–050	RED	50"
44635–050	BLUE	50"
44636–056	YELLOW	56"
44637–062	GREY	62"
44638–050	ORANGE	50"

FIGURE 8

GEARING SECTION

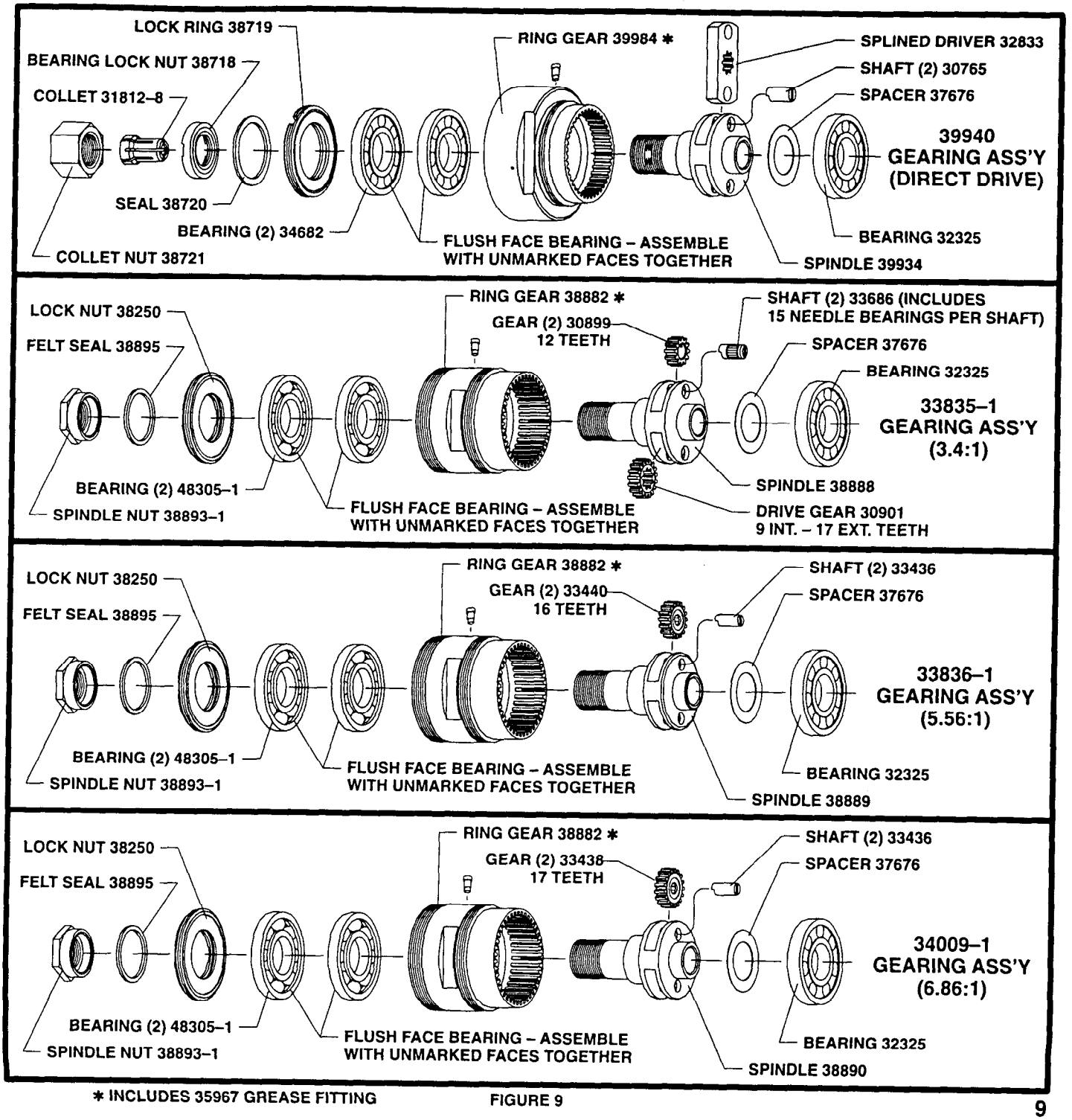
DRIVE GEARING

DISASSEMBLY

Remove gearing from tool as outlined on page 6. Remove spindle nut (38893–1) from spindle. Grasp ring gear in one hand and tap threaded end of spindle with a soft face hammer; spindle and components will loosen from ring gear. Using a suitable punch or similar tool, alternately tap ends of shafts, loosening bearing (32325). Remove bearing (32325), spacer (37676) and shafts from spindle to remove gears. To remove bearings from ring gear, remove lock nut (38250).

ASSEMBLY

Pack bearings and lubricate gears and shafts liberally with grease (33153), or equivalent, during assembly. Gearing assembly should contain approximately 1/8 oz. (3.5 g) of grease.
Assemble gears to spindle and secure with shafts. Align notch in end of shaft with step on spindle. NOTE: Be sure each shaft (33686) contains fifteen needle bearings. Assemble spacer (37676) and bearing (32325) to spindle. Assemble bearings into ring gear (NOTE: Bearings are flush face type bearings and must be assembled with the unmarked faces together) and secure with lock nut (38250). Be sure lock nut contains seal (38895). Assemble spindle into ring gear and assemble spindle nut (38893–1) to spindle. Assemble gearing to tool and tighten securely.



* INCLUDES 35967 GREASE FITTING

FIGURE 9

GEARING SECTION

AUXILIARY GEARING

Disassembly and assembly of the auxiliary gearing is similar to that of the drive gearing. Gearing should only be disassembled if it is necessary to replace a part, as Brinelling of the bearing races may occur, making replacement necessary.

Remove bearing (32325) and spacer from drive end of spindle. Then, remove the other bearing and gears from the spindle as outlined for drive gearing. Pack bearings and lubricate gears liberally upon assembly as per drive gearing.

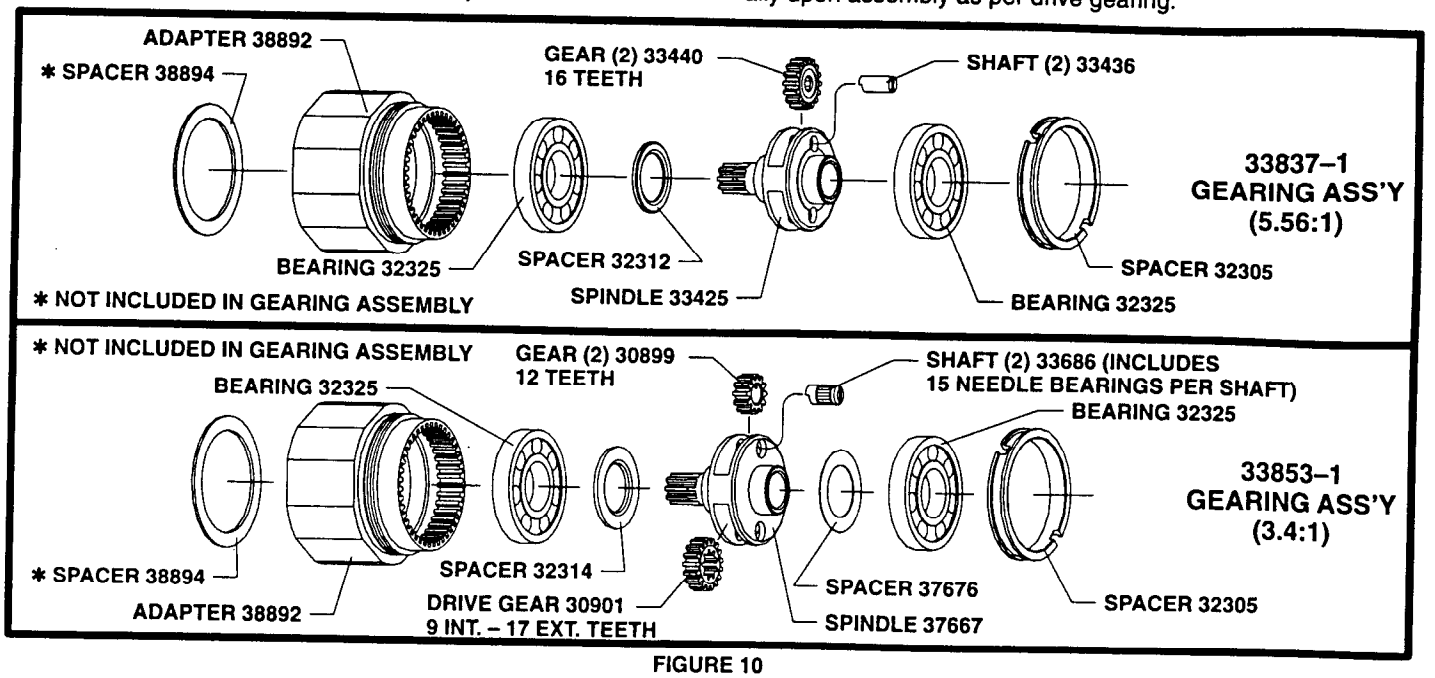


FIGURE 10

MOTOR AND PISTON SECTION

AIR MOTOR

DISASSEMBLY

Remove motor assembly from tool as outlined on page 6. Grasp cylinder in one hand and tap splined end of rotor with a soft face hammer; motor will come apart. Remove cap (38783) and shield (38805) to remove bearing (Y65–7) from end plate.

ASSEMBLY

Assemble bearings into end plates and assemble end plate (37956) to rotor. When assembling bearing to rotor, be certain pressure is applied squarely to the inside race of the bearing. Coat i.d. of the cylinder with spindle oil 29665 and assemble cylinder over rotor, aligning air inlets and roll pin of cylinder with air inlet and hole in end plate for roll pin. Assemble blades to rotor and assemble end plate (31158), with bearing, to rotor, aligning roll pin and hole in end plate. Apply pressure to the inside bearing race when assembling to rotor. Assemble shield (38805) and cap (38783) to end plate (37956). Be sure motor does not bind (if rotor binds, tap splined end lightly to loosen) and assemble motor, with spacer (32310), to motor housing and assemble gearing to tool.

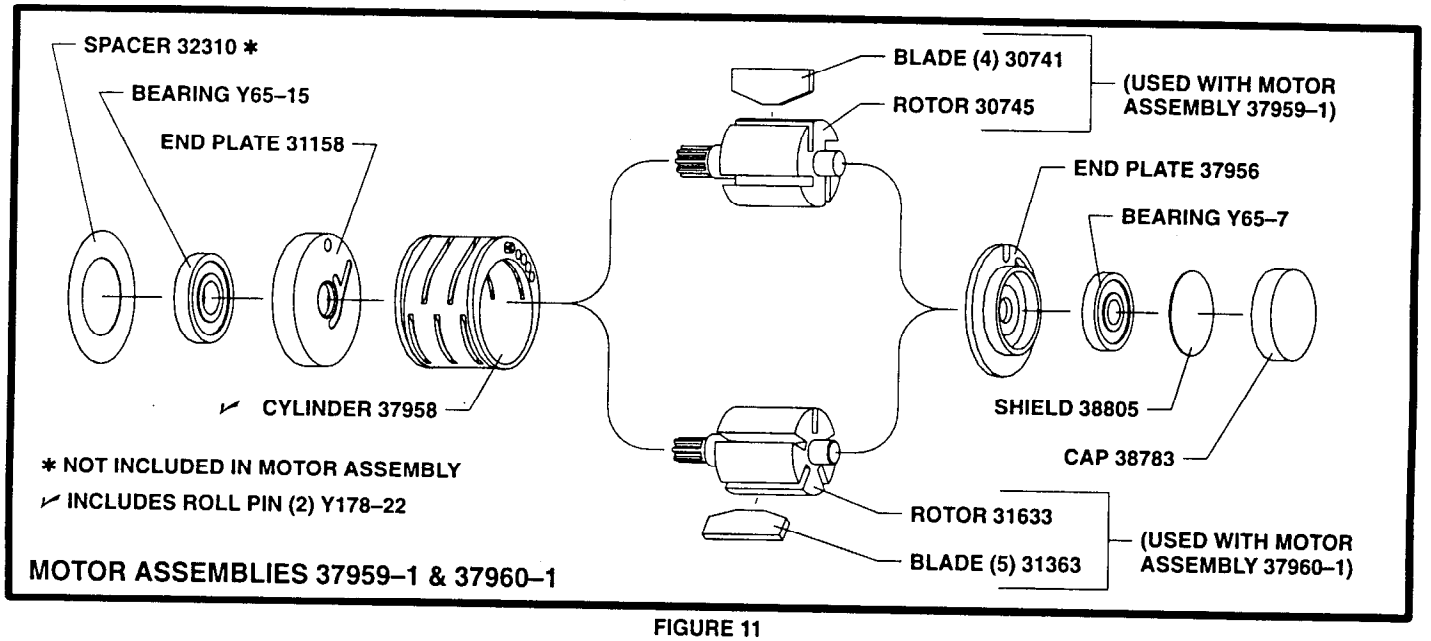


FIGURE 11

AIR PISTON

DISASSEMBLY

Remove motor and piston section from tool as outlined on page 6. If the air cylinder has remained inside the outer sleeve, push the piston rod forward then pull it rearward to remove the air cylinder. CAUTION: Handle the air cylinder carefully so as not to damage the inside diameter. Remove "O" ring (41535) from the piston rod and remove retaining ring (Y145–23). Push the piston rod and motor housing out thru the gear end of the outer sleeve and remove from outer sleeve. Piston (38867–1) will drop out of outer sleeve when piston rod is removed. Using a suitable rod, insert rod thru gear end of outer sleeve and push muffler cap (38865) out thru valve end of outer sleeve. Piston rod and motor housing are locked together with a hard drying thread adhesive at assembly. If it should become necessary to disassemble these parts, heat the threaded area lightly to facilitate removal – RIGHT HAND THREADS.

ASSEMBLY

NOTE: Whenever a part containing "O" rings has been removed from the tool, it is recommended that the "O" rings be replaced with new ones when assembling the part to the tool. Lubricate all "O" rings with "O" ring lubricant (36460) when assembling.
Assemble retaining ring (35619), "O" rings (Y325–20 and Y325–30) and screen (38886) to muffler cap (38865). Assemble muffler cap into outer sleeve from end of sleeve with internal threads, with screen end of cap positioned to enter sleeve first. Push muffler cap down into sleeve until it bottoms against offset in sleeve. Coat torque pin (40312–1) with grease to retain pin in place and assemble into outer sleeve in hole provided. Assemble "O" ring (Y325–16) to groove in piston rod and assemble "O" ring (Y325–222) to groove around motor housing. Assemble piston rod and motor housing into outer sleeve from end of sleeve with external threads, exercising care so as not to damage "O" ring (Y325–20) when inserting piston rod thru muffler cap already assembled into sleeve. The slot in the motor housing must be aligned with torque pin (40312–1). Assemble seals (38860) to piston (38867–1) with lips of seals facing away from each other and assemble piston over piston rod and push piston down over rod until it seats against step on rod. Secure with retaining ring (Y145–23). Assemble "O" ring (41535) over piston rod and push it down over rod until it seats against step on rod.
Clamp valve housing in a suitable holding device with the sleeve end upright. Assuming "O" rings have been assembled to valve housing; coat i.d. of air cylinder (38866–2) with "O" ring lubricant and place air cylinder on valve housing over "O" ring (Y325–29). Assemble motor and piston section, with outer sleeve, to valve housing and over air cylinder, exercising care to maintain proper alignment so as not to damage i.d. of air cylinder and thread outer sleeve to valve housing. Tighten securely using a strap type wrench. Assemble motor, gearing and trip bracket to tool.

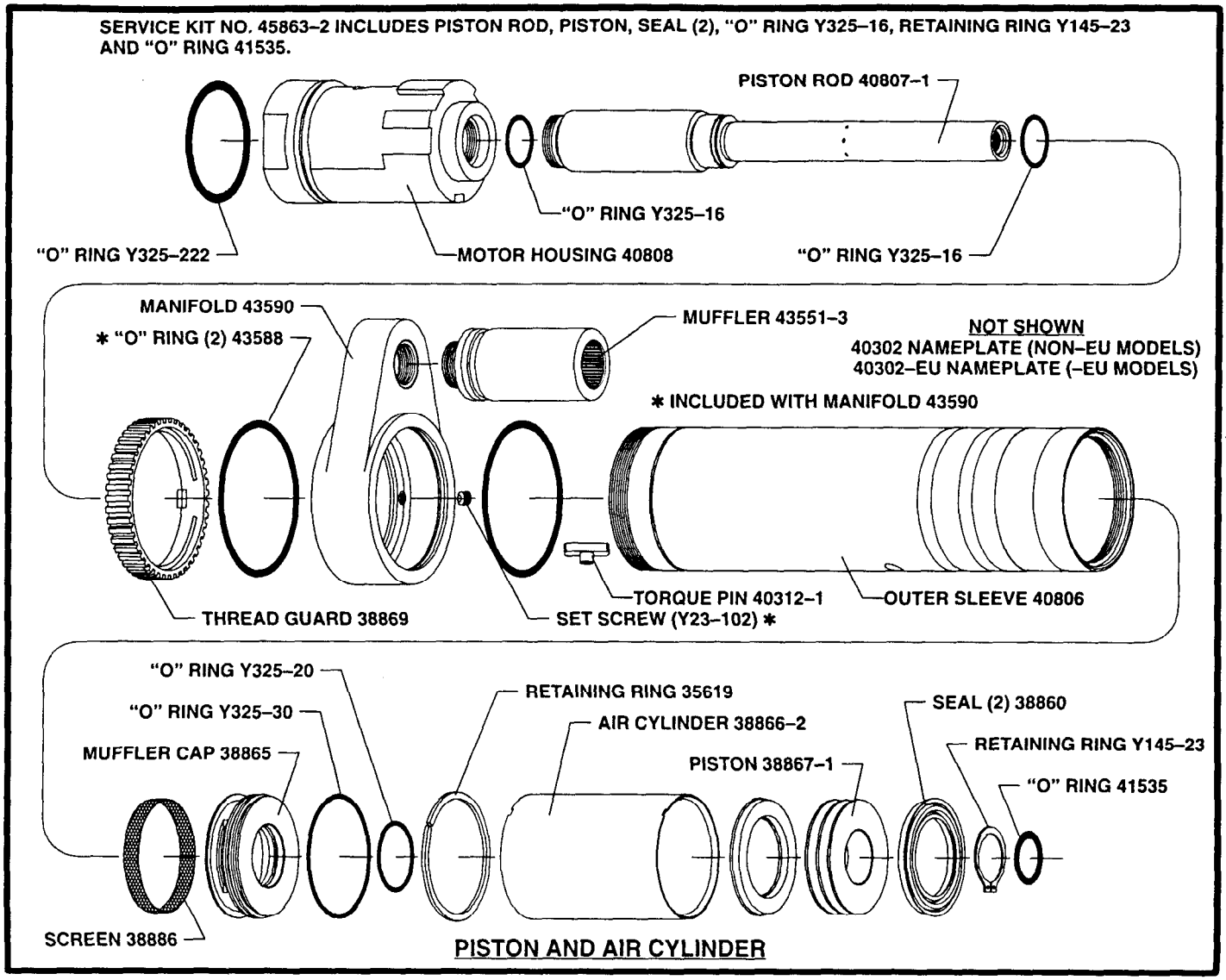


FIGURE 12

VALVE SECTION

FEED CONTROL VALVE

DISASSEMBLY

Remove screws (Y211–1) and plate (48440–1). Unscrew and remove needle valve (48441–1) with "O" ring (Y325–7).

ASSEMBLY

NOTE: Whenever a part containing "O" rings has been removed from the tool, it is recommended that the "O" rings be replaced with new ones when assembling the part to the tool. Lubricate all "O" rings with "O" ring lubricant when assembling.
Assemble "O" ring (Y325–7) to needle valve (48441–1) and assemble to housing, securing with plate (48440–1) and screws (Y211–1).

CHECK VALVE

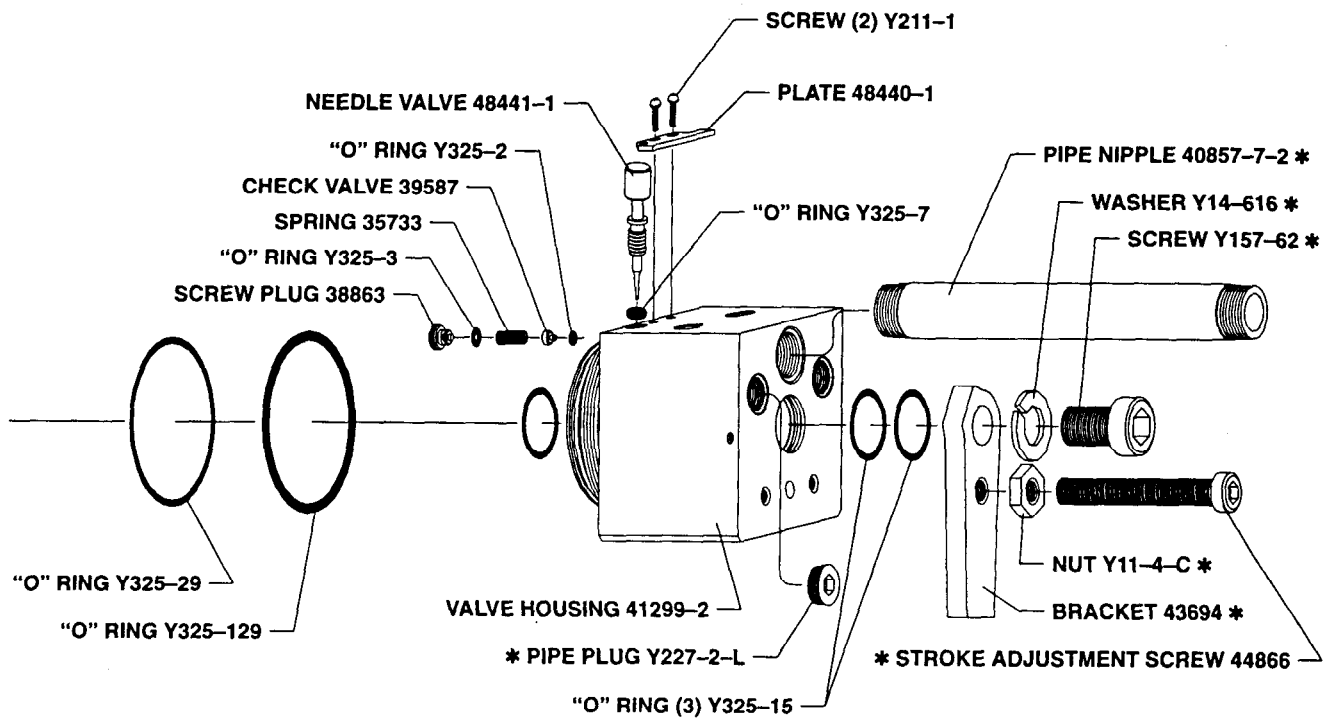
DISASSEMBLY

Unscrew and remove screw plug (38863) with "O" ring (Y325–3), releasing spring (35733) and check valve (39587) with "O" ring (Y325–2).

ASSEMBLY

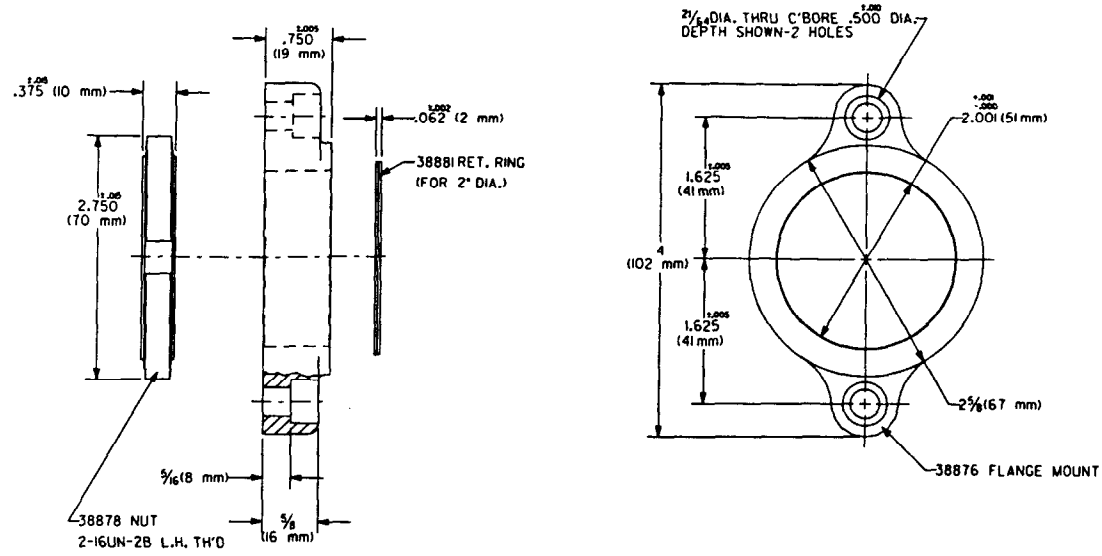
Assemble "O" ring (Y325–2) to check valve (39587). Assemble "O" ring (Y325–3) to screw plug (38863). Assemble check valve, spring (35733) and screw plug to housing.
Assemble "O" rings (Y325–15, Y325–129 and Y325–29) to housing, if removed.

* NOT INCLUDED IN 41302–3 HOUSING ASSEMBLY.

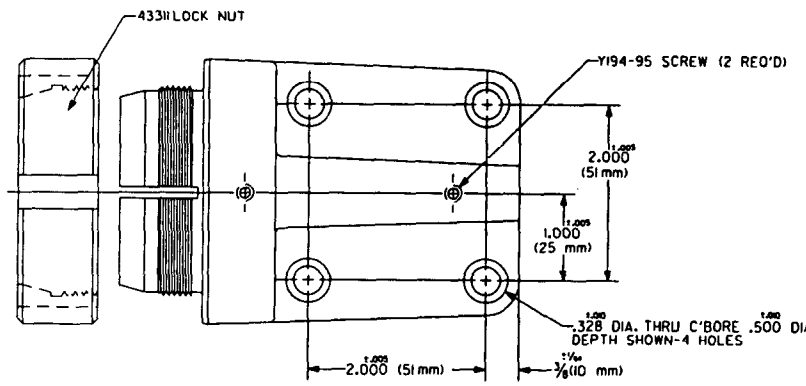


HOUSING ASSEMBLY 41302–3

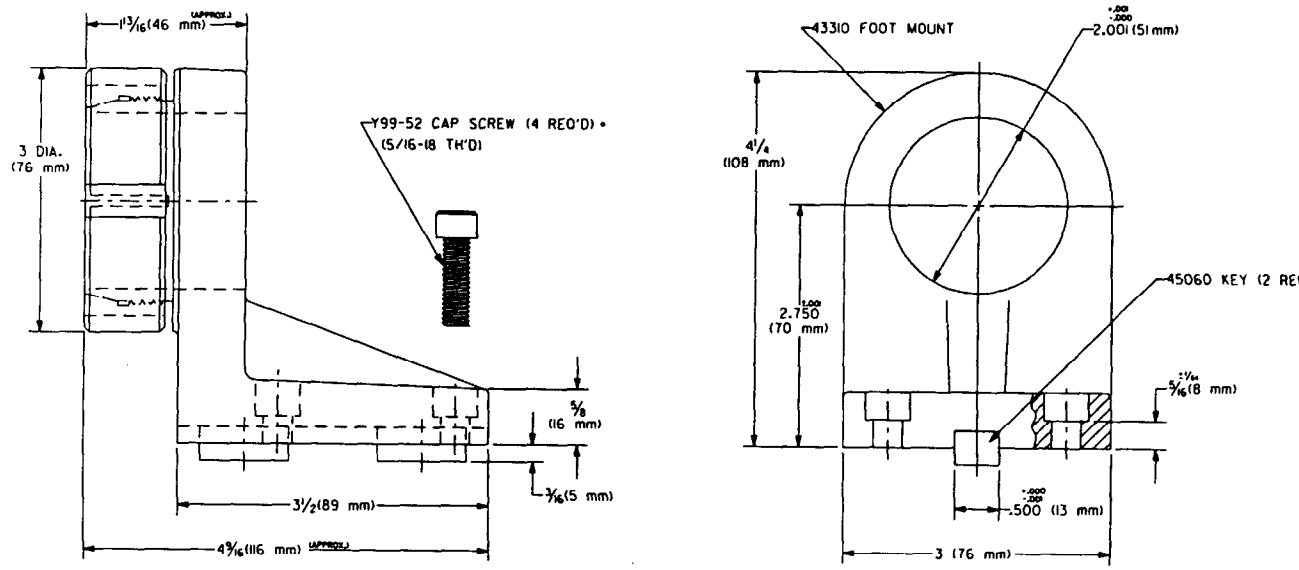
FIGURE 13



38877 FLANGE MOUNT ASSEMBLY

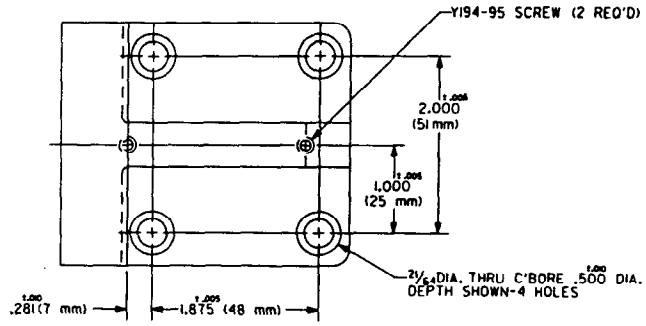


• NOT INCLUDED IN FOOT MOUNT ASSEMBLY

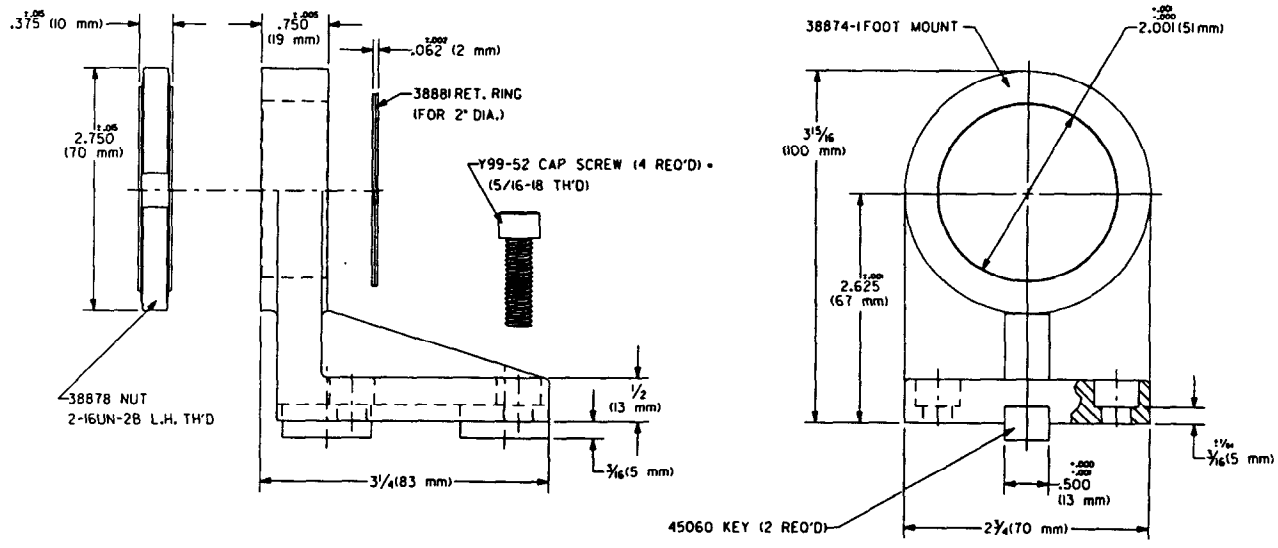


43313 COLLET TYPE FOOT MOUNT ASSEMBLY

ACCESSORIES



• NOT INCLUDED IN FOOT MOUNT ASSEMBLY



38875–1 FOOT MOUNT ASSEMBLY

22827 BARBED INSERT FOR 1/2" I.D. HOSE (CLOSED EXHAUST SYSTEM)

TROUBLE SHOOTING

LISTED BELOW ARE SOME OF THE MOST COMMON CAUSES FOR THE SELF–FEED DRILL TO MALFUNCTION. MALFUNCTIONS BEYOND THE SCOPE OF THIS MANUAL SHOULD BE BROUGHT TO THE ATTENTION OF YOUR REPRESENTATIVE OR RETURN THE TOOL TO THE FACTORY FOR REPAIR.

FAILURE TO START:

a. Air supply to controller or system is incomplete or regulators not properly adjusted (figure 5).
b. Hydraulic check set rearward too far and adjusted to a high number setting (minimum distance "C" = 5/16", see figure 3, page 4).
c. Controller malfunction (depressing start button should provide a sustained supply at tube "N" at tool – and NO supply at tube "P").

FAILURE TO PECK:

a. Tool starts, pecks once and returns. Restart valve is not properly engaged during retraction. Adjust trip bracket (44498) to stroke restart valve adequately.
b. Tool starts and continues forward without pecking.
   1. Timer setting too high. Adjust to a lower number.
   2. Controller malfunction (port "C" of "flip–flop" (2) should show pressure as tool strokes forward, port "C" of "and" (8) should show pressure sometime after tool starts forward stroke).

* CAUTION: Read item 1, "Set Up Tips", page 4.

FAILURE TO RETRACT:

a. AUTOMATICALLY–
   1. Stroke adjustment screw (44866) not properly blocking bleed port at head. Adjust position of piston rod bracket (43694), if necessary.
   2. Start signal is being maintained. Remove start signal.
   3. Controller malfunction (depressing retract button should provide a sustained supply at tube "P" at tool – and NO supply at tube "N").
b. MANUALLY–
   1. See paragraph 2 of "Automatically".
   2. See paragraph 3 of "Automatically".

ERRATIC FORWARD FEED:

a. Feed control needle valve or check valve dirty (see figure 13, page 12).
b. Piston seal (38860) damaged.
c. Damaged hydraulic check.

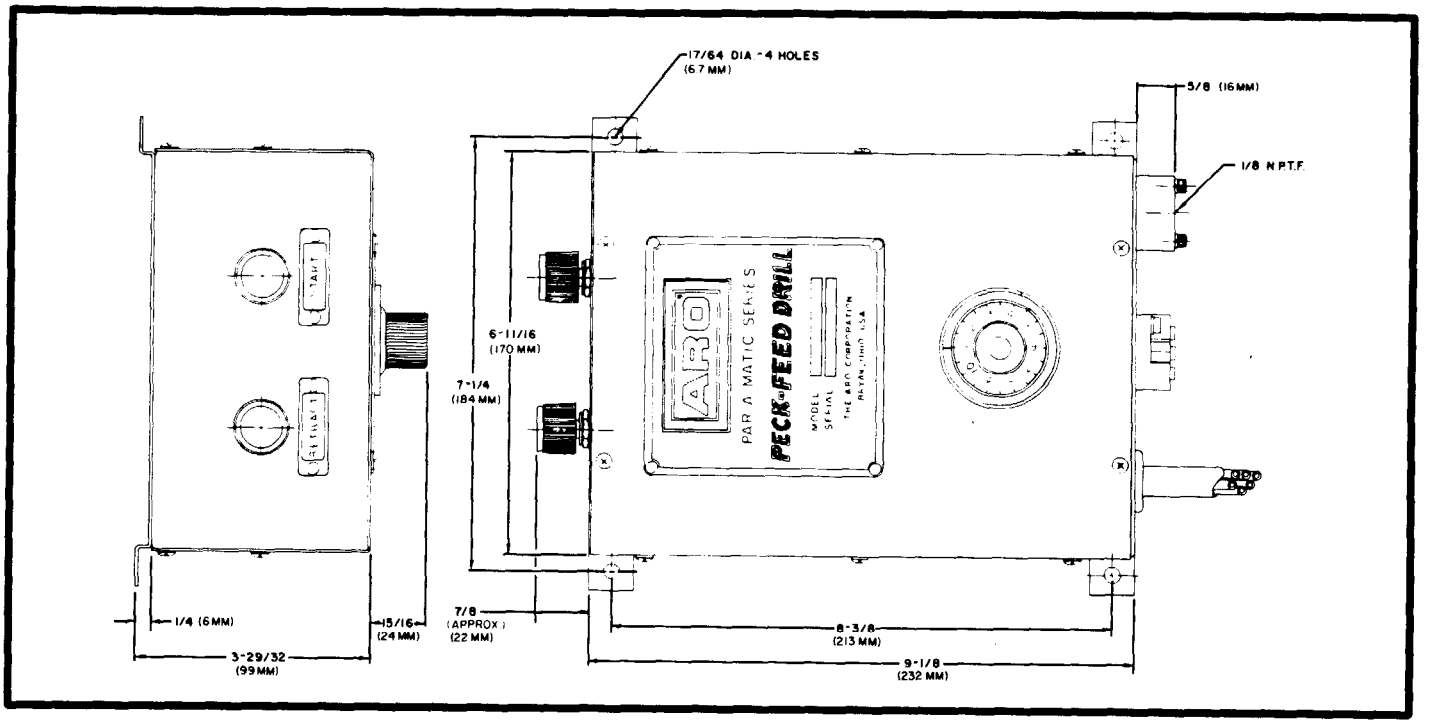
FAILURE TO HOLD "LAST POSITION" DURING PECKING:

a. Pecking switch on peck check unit set to "off". Turn to "on" position (see figure 4, page 4).
b. Controller malfunction – signal at tube "Q" should be on only when tool is in manual or automatic retract mode.
c. Damaged peck check unit.

MOTOR SHUTS OFF DURING RETRACTION OF PECK CYCLE:

a. Restart valve adjusted rearward too far. Minimum distance "C" is 5/16" (see figure 3, page 4).

DIMENSIONAL DATA



DIMENSIONAL DATA