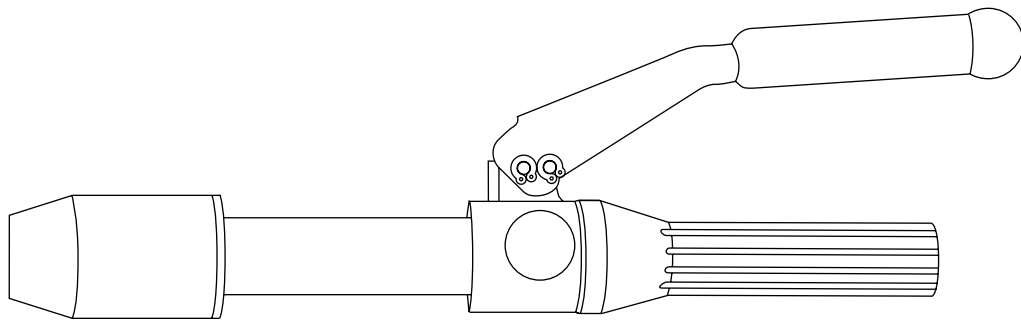


INSTRUCTION MANUAL



7704SB / 7706SB Quick Draw Flex™ Hydraulic Punch Driver

Serial Code AHJ



Read and understand all of the instructions and safety information in this manual before operating or servicing this tool.

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Description

The Quick Draw Flex™ is a self-contained hydraulic punch driver.

The flexible body allows hole punching at a variety of angles. The handle and release mechanisms rotate nearly 360° for convenient actuation. The Quick Draw Flex™ and Greenlee punches, dies, and draw studs form a complete system for punching holes of various shapes and sizes through mild steel, aluminum, fiberglass and plastic. Slug Splitter® punches, dies and studs are available for punching all of these materials and stainless steel.

Safety

Safety is essential in the use and maintenance of Greenlee tools and equipment. This manual and any markings on the tool provide information for avoiding hazards and unsafe practices related to the use of this tool. Observe all of the safety information provided.

Purpose of this Manual

This manual is intended to familiarize all personnel with the safe operation and maintenance procedures for the following Greenlee tool:

7704SB / 7706SB Hydraulic Punch Driver

Keep this manual available to all personnel.

Replacement manuals are available upon request at no charge.

All specifications are nominal and may change as design improvements occur. Greenlee Textron shall not be liable for damages resulting from misapplication or misuse of its products.

KEEP THIS MANUAL

IMPORTANT SAFETY INFORMATION



**SAFETY
ALERT
SYMBOL**

This symbol is used to call your attention to hazards or unsafe practices which could result in an injury or property damage. The signal word, defined below, indicates the severity of the hazard. The message after the signal word provides information for preventing or avoiding the hazard.

⚠ DANGER

Immediate hazards which, if not avoided, **WILL** result in severe injury or death.

⚠ WARNING

Hazards which, if not avoided, **COULD** result in severe injury or death.

⚠ CAUTION

Hazards or unsafe practices which, if not avoided, **MAY** result in injury or property damage.



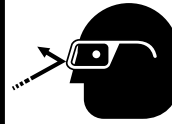
⚠ WARNING

Electric shock hazard:

Do not use this tool near live circuits. This includes, but is not limited to, the following:

- near circuit breaker panels or fuse boxes with energized circuits
- near junction boxes with energized circuits

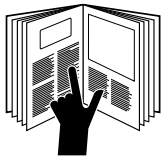
Failure to observe this warning can result in severe injury or death.



⚠ WARNING

Wear eye protection when operating or servicing this tool.

Failure to wear eye protection can result in serious eye injury from flying debris or hydraulic oil.

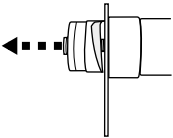


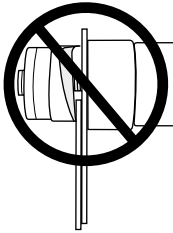
⚠ WARNING

Read and understand all of the instructions and safety information in this manual before operating or servicing this tool.

Failure to observe this warning can result in severe injury or death.

IMPORTANT SAFETY INFORMATION

	⚠ WARNING
	<p>A component failure could throw broken parts.</p> <ul style="list-style-type: none">• Do not allow anyone to stand in front of the punch or behind the hydraulic ram.• Close access doors or covers on any equipment that is in line with the punch or ram. <p>Failure to observe this warning can result in severe injury or death.</p>

	⚠ WARNING
	<p>Do not attempt to punch a hole through two or more layers of material. This will bend or break the draw stud, and could throw parts with great force.</p> <p>Failure to observe this warning can result in severe injury or death.</p>

⚠ WARNING
<p>Set up the tool properly. An improper setup could cause a component to fail and strike nearby personnel with great force.</p> <ul style="list-style-type: none">• Thread the punch completely onto the draw stud. All of the punch threads must be engaged by the draw stud threads. Incomplete assembly could cause a component failure.• Use only Greenlee punches, dies and draw studs. Other manufacturers' components might not withstand the forces generated by this punch driver. <p>Failure to observe these warnings can result in severe injury or death.</p>

⚠ WARNING
<ul style="list-style-type: none">• Inspect tool for wear or damage. Replace any worn, damaged, or missing components with Greenlee replacement parts. A damaged or improperly assembled tool can break and strike nearby personnel with sufficient force to cause severe injury or death.• Inspect the punch, die, draw stud and spacers for wear or damage. Replace any worn or damaged items with Greenlee replacement parts. Replace any punches that have dull cutting surfaces.

⚠ WARNING
<p>Do not exceed the rated capacity of this tool. Exceeding the rated capacity could cause a component failure, which could throw broken parts with great force.</p> <p>Failure to observe this warning can result in severe injury or death.</p>

⚠ WARNING
<p>Do not operate the pump lever after the ram motion stops. Continuing to operate the pump lever after the ram motion stops will damage the driver and could propel internal parts with great force, striking nearby personnel.</p>

⚠ CAUTION
<p>Use this tool for the manufacturer's intended purpose only. Any other use can result in injury or property damage.</p>

Note: Keep all decals clean and legible, and replace when necessary.

Specifications

Application Information

See Capacity and Draw Stud Selection Guide

Dimensions

Length:

Without Draw Stud	406 mm (16.00")
With 3/4" Draw Stud	482 mm (19.00")
Width (with handle extended)	260 mm (10.25")
Mass/Weight	2.60 kg (5.75 lb)

Mechanical Data

Stroke (maximum)	22 mm (.850") Minimum Draw Stud Travel
Handle Force (maximum)	356 N (80 lb)
Draw Stud Force (maximum)	71,168 N (16,000 lb)
Punch Diameter (maximum)	See Capacity and Draw Stud Selection Guide
Material Thickness (maximum)	See Capacity and Draw Stud Selection Guide





Hydraulic Data

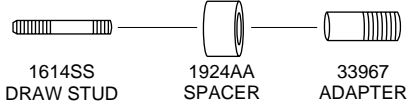

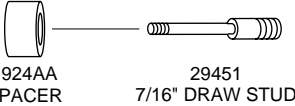

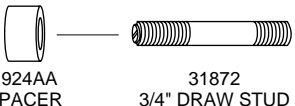
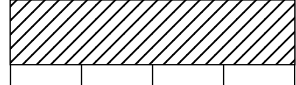
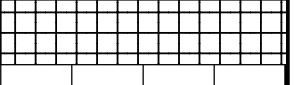

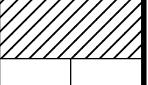


Circuit Type	Closed
Operating Pressure (maximum)	44,480 N (10,000 lb)
Volume:	
Stroke034 cm ³ per mm (.053 in ³ per inch)
Usable	33.9 mm ³ (2.07 in ³)
Reservoir	38.0 mm ³ (2.32 in ³)
Total	57.4 mm ³ (3.50 in ³)
Seals	Nitrile, Fluorocarbon and Teflon Backup Rings
<i>Fluid Compatibility:</i>	<i>Compatible with hydraulic oils, water, oil emulsions, synthetic oils rated for use with nitrile (Buna N) and fluorocarbon (Viton) seal material.</i>
Recommended Fluid	Greenlee Hydraulic Oil

Miscellaneous

Operating Temperature	-12° to 43°C (10° to 110°F)
Operating Position	No restrictions

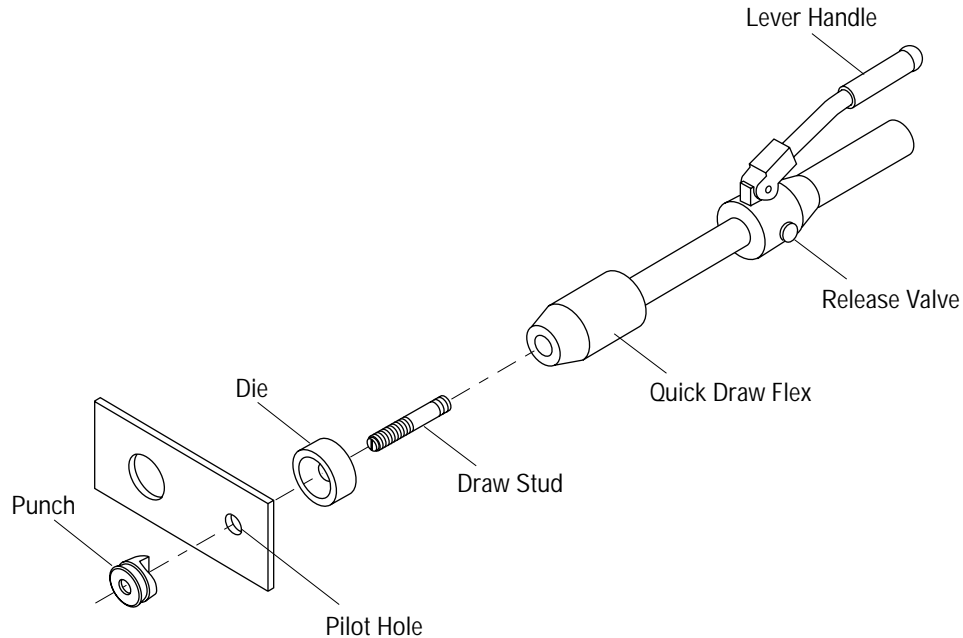
Capacity and Draw Stud Selection Guide


**14 Ga. (0.0747" [1.9 mm])
Mild Steel**

**10 Ga. (0.1345" [3.4 mm])
Stainless Steel**

**10 Ga. (0.1345" [3.4 mm])
Mild Steel**

**16 Ga. (0.0598" [1.5 mm])
Mild Steel & 1/8" Soft Aluminum**

Stud and Accessories	Standard & Slug-Buster® Punches							Slug-Splitters®						
	1/2" con. Ø 0.885" 15.2 mm	3/4" con. Ø 1.115" 28.3 mm	1-7/32"	1" con. Ø 1.362" 34.6 mm	1-1/4" con. Ø 1.701" 43.2 mm	1-1/2" con. Ø 1.951" 49.6 mm	2" con. Ø 2.416" 61.5 mm	1/2" con. Ø 0.885" 15.2 mm	3/4" con. Ø 1.115" 28.3 mm	1-7/32"	1" con. Ø 1.362" 34.6 mm	1-1/4" con. Ø 1.701" 43.2 mm		
 <p>1614SS DRAW STUD 1924AA SPACER 33967 ADAPTER</p>														
 <p>1924AA SPACER 29451 7/16" DRAW STUD</p>														
 <p>1924AA SPACER 31872 3/4" DRAW STUD</p>														
 <p>31872 3/4" DRAW STUD</p>														
 <p>33967 ADAPTER</p>														

**Electronic Connector Punches
RS-232, 229, 231, 234, 238.**

Operating Instructions



1. Drill pilot hole.
2. Turn release valve counterclockwise to fully extend ram.
3. Assemble appropriate die and draw stud components. Insert into the pilot hole.
4. Thread the punch onto the draw stud until it is tight. If the punch is not tight, the hole may not be completed.
5. Close the release valve. Pump the lever handle until the punch is completely through the material.
6. Open the release valve. Remove the punch.

⚠ WARNING

Do not operate the pump lever after the ram motion stops. Continuing to operate the lever handle will damage the hydraulic driver and could propel internal parts with great force, striking nearby personnel.

“Step-up Punching”

The 1/2" conduit-size punch is often used to increase the size of the pilot hole; this is called “step-up punching.” After enlarging the pilot hole, the 3/4" draw stud is used to punch the final hole.

Maintenance

Maintenance and repairs should be performed in a dust-free area by qualified technicians.

This unit requires minimum maintenance because it has a closed hydraulic system and all internal parts are lubricated by the hydraulic fluid. Lubricate lever pins lightly. Keep contaminants away from ram and housing. Store with lever down and hydraulic pressure released.

Adding Hydraulic Oil

1. Place driver in vise in vertical position with handles up. Unscrew bladder handle (1) and remove bladder plug (20). Open release valve knob (27) to assure the piston is fully extended.
2. Fill rubber bladder to point of overflow with Greenlee hydraulic oil.
3. Purge air from system:
Pump lever handle several times to remove air from the pumping chamber. Close release valve knob and pump lever handle until piston (6) completes its full travel. Repeat as necessary.
Note: Open release valve knob slowly so piston extends slowly. Rapid return of oil and air may cause oil to overflow the rubber bladder.
If this procedure fails to remove air, remove bladder plug and open release valve knob. Place thumb over plug hole in bladder and squeeze bladder while pumping lever handle several times. Close the release valve knob and pump the lever handle until the piston completes its full travel. Repeat as necessary.
If this procedure does not remove air, remove plunger (24) and fill plunger cavity with clean oil as outlined in Reassembly in the maintenance section of this manual.
4. Fill rubber bladder to the point of overflow and replace bladder plug. Wipe bladder clean of excess oil and reassemble bladder handle.

Oil Leaks

Check for external oil leaks.

Check that release valve knob and stem are closed tightly and seating properly.

Remove bladder handle (1) and check for oil leaks around rubber bladder (29) and bladder plug (20).

Troubleshooting

Problem	Probable Cause	Probable Remedy
Will not punch hole.	Improper assembly or use of punch, die or accessories.	See Operating Instructions and Capacity Chart. Low oil level. See Adding Hydraulic Oil in Maintenance Section.
Requires excessive lever force.	Improper assembly or use of punch, die or accessories.	See Operating Instructions and Capacity Chart. Material being punched is too thick or too hard. See Capacity Chart.
Pump will not build pressure.	Air in system.	See step 3, Adding Hydraulic Oil.
Excessive number of strokes strokes are required to punch hole.	Inoperative intake check valve.	See Inspection and Adjustments, Intake Check Valve Inspection.
	Inoperative discharge check valve.	See Inspection and Adjustments, Discharge Check Valve Inspection.
	Leaking Release Valve.	See Inspection and Adjustment, Release Valve Inspection.
	Damaged piston, piston extension, pump plunger seals or mating surfaces.	See Maintenance and Repairs, Cylinder and Pump Block sections.
		Clogged filter screen. Clean or replace filter screen (39).
Will not return piston.	Weak or damaged return spring, excess oil in unit.	See Piston Travel Inspection.
External oil leaks.	Damaged seals or surfaces.	Damaged piston, piston extension, pump plunger seals or mating surfaces. See Maintenance and Repairs, Cylinder and Pump Block sections. Damaged Release Valve Stem seal. See Inspection and Adjustment, Release Valve Inspection.

Service

If no leaks are visible and the unit will not build oil pressure, disassemble and rebuild the punch driver.

Disassembly

1. Remove bladder handle (1), and bladder plug (20); drain oil from the rubber bladder (29).
2. Remove O-ring retainer (35) and the rubber bladder (29). Remove retaining rings (21) from one end of both handle pins (30) and disassemble handle pins and lever handle (2).
3. Grasp plunger (24) with pliers; pull and twist to remove. Loosen set screw (12) from release valve knob (27); remove knob. Unscrew release valve stem (28) to remove from pump block (5). Ball (32) is also accessible.
4. Loosen set screw (12) from cylinder (4) and unscrew cylinder from pump block (5).
5. Remove compression spring (7), retaining plate (22) and ram coupler (26). Spring (23) and ball (37) can also be removed.
6. Screw a draw stud into end of piston (6); push the piston out of the cylinder (4).
7. Remove retaining ring (25) and filter (31). Remove seat (3) and ball (32). Retaining ring (13) will also be accessible.

You have now disassembled the punch driver. Thoroughly clean all parts and inspect the three ball seats (intake, discharge and release valve stem) for nicks, scratches, or other damage.

Ball Seat Repair

Re-seating:

Minor seat imperfections may be corrected by re-seating. Use a soft brass rod and hammer to tap the ball against its seat.

	<h2>⚠ WARNING</h2>
	<p>Wear eye protection when servicing this tool.</p> <p>Failure to wear eye protection can result in serious eye injury from flying debris or hydraulic oil.</p>

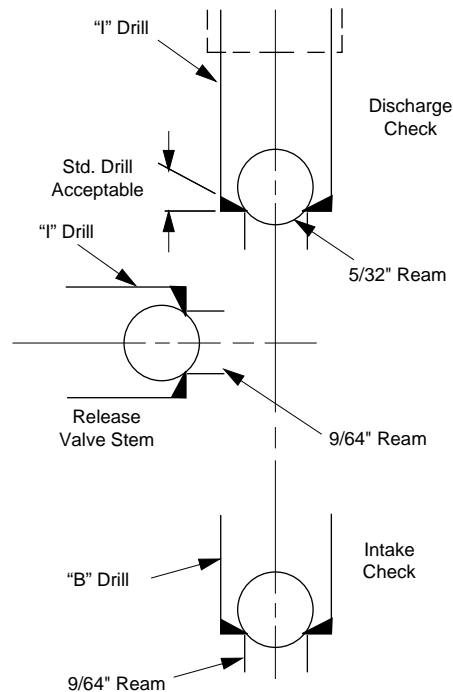
Re-drilling:

Badly worn or damaged seats may be reworked by re-drilling and then re-seating.

The pump block is manufactured with seats of 118°, the standard drill point angle; use standard drills for re-drilling.

- To re-drill the 3/16" ball seat for release valve stem (28): Use an "I" drill and a 9/64" diameter reamer.
- To re-drill the 7/32" ball seat for the discharge check: Use an "I" drill and a 5/32" diameter reamer.
- To re-drill the 3/16" ball seat for the intake check: Use a 1/4" drill and a 1/8" diameter reamer.

When drilling; remove a minimum of material to obtain maximum seat life. Re-seat the balls before reassembly.



Reassembly

Reassembly is done in reverse sequence of disassembly.

1. Use repair kit 503 7161.4 to replace all O-ring seals, balls and springs.
2. Inspect drilled oil passage in piston (6); be sure this passage is not blocked.
3. Before reinserting piston (6) in cylinder (4), lightly coat O-ring seals and bores of the cylinder with clean hydraulic oil.
4. Coat discharge check spring (23) with petroleum gel and insert it into the counter bore of the ram coupler (26).
5. Fill plunger bore in pump block (5) with clean oil. Then coat plunger O-ring seals with clean oil, and reinsert in the pump block with release valve knob (27) closed.
6. Fill unit with clean oil and purge air per Adding Hydraulic Oil in the Maintenance section of this manual.

Service (cont'd)

Inspection and Adjustments

After reassembly, check the following:

Piston Travel Inspection

Piston Extended

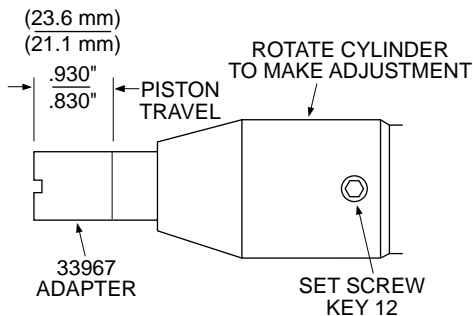
With the draw stud removed and release valve knob open, observe whether end of piston (6) is flush to 1/64" (.396 mm) below the end of cylinder (4). If it is not, the rubber bladder (29) contains too much oil.

To remove excess oil:

- Remove bladder handle (1) and bladder plug (20).
- Slowly open release valve knob (27); excess oil should come out of the rubber bladder and piston move to become flush to 1/64" (.396 mm) below the end of cylinder (4).
- If excess oil does not come out, replace the compression spring (7).

Piston Retracted

Measure piston travel distance (difference between piston completely extended and completely retracted). Adjust cylinder (4) so travel distance is .830" (21.1 mm) to .930" (23.6 mm). Tighten set screw (12).



Pump Section Inspection

Intake Check Valve

Close the release valve knob and operate lever handle (2) until piston (6) bottoms and handle resistance increases.

If the piston bottoms in 30 strokes or less, the intake check valve is operating properly.

More than 30 strokes indicates an intake check leak. Re-seat, re-drill or replace the intake check seat.

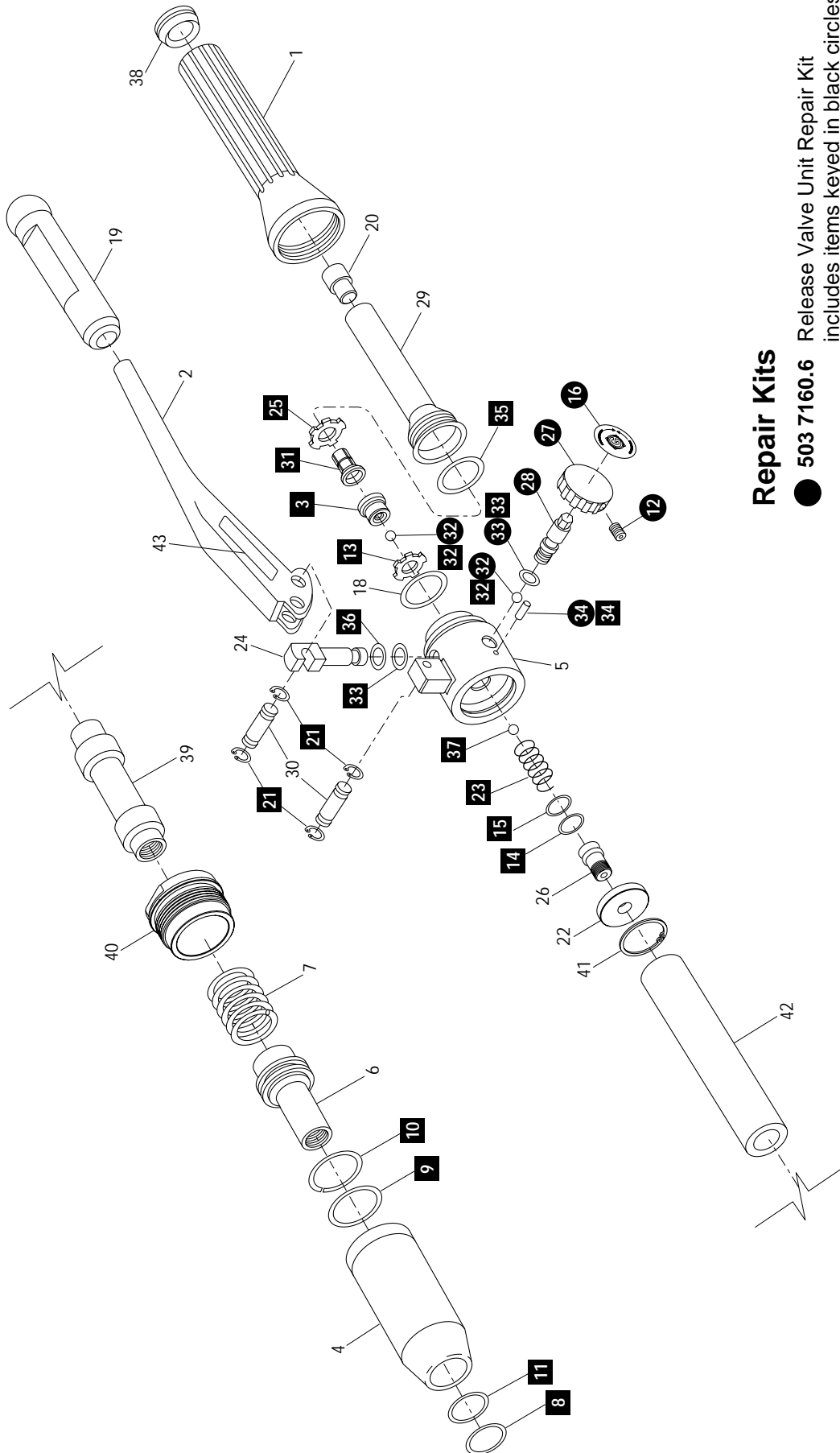
Discharge Check Valve

If the lever handle (2) returns to the raised position by itself, this indicates a discharge check valve leak. Re-seat or re-drill the discharge check seat and replace the discharge compression spring (23).

Release Valve

Pump the lever until the piston bottoms. Gently apply and maintain additional force on lever handle (2). If the lever handle remains solid, the release valve ball (32) is operating properly. If the lever handle (2) goes down slowly, this indicates leakage at the release valve. Re-seat or re-drill the release valve stem seat and replace O-ring (33).

Illustration



Repair Kits

- **503 7160.6** Release Valve Unit Repair Kit includes items keyed in black circles (12, 16, 27, 28, 32, one of 33, 34)
- **501 0477.2** Hydraulic Repair Kit includes items keyed in black squares (3, 8-11, 13-15, 21, 23, 25, 31-37)

Parts List

Key	Part No.	Description	Qty	Key	Part No.	Description	Qty
1	503 6889.3	Handle, reservoir	1	23	905 3845.5	Spring, compression, .152 x .180 x .380	1
2	503 6887.7	Handle, pump	1	24	503 7715.9	Plunger	1
3	503 6890.7	Seat, inlet check	1	25	905 3503.0	Retaining ring, .562 Truarc	1
4	503 4271.1	Cylinder, hydraulic	1	26	501 0386.5	Coupler, ram	1
5	501 0390.3	Block weld assembly, pump	1	27	503 6886.9	Knob, release valve	1
6	501 0384.9	Ram	1	28	503 6893.1	Stem, release valve	1
7	503 4272.0	Spring, compression, 1.07 x 1.37 x 3.18	1	29	503 4269.0	Bladder, rubber	1
8	905 3847.1	Backup ring, spiral, 1.00 x 1.24 x .027	1	30	503 7714.0	Pin, handle	2
9	905 1316.9	O-ring, 1.50 x 1.75 x .125 Nitrile	1	31	503 6899.0	Filter, oil	1
10	905 3849.8	Backup ring, spiral, 1.50 x 1.74 x .027	1	32	905 0678.2	Ball, steel, .187 diameter	2
11	905 1330.4	O-ring, 1.00 x 1.25 x .125 Nitrile	1	33	905 3854.4	O-ring, .250 x .375 x .062	2
12	905 5281.4	Screw, set #8-32 x .312 cup point	1	34	905 0458.5	Pin, roll, .125 x .375	1
13	905 3761.0	Retaining ring, .125 Truarc	1	35	905 0376.7	O-ring, 1.125 x 1.375 x .12 Nitrile	1
14	905 5121.4	Backup ring, spiral, .373 x .479 x .056	1	36	905 4230.4	Backup ring, spiral, .265 x .318 x .050	1
15	905 0168.3	O-ring, .364 x .500 x .068 Nitrile	1	37	905 0452.6	Ball, steel, .218 diameter	1
16	503 1878.0	Decal, Punch Release	1	38	503 6894.0	Cap, reservoir handle	1
18	905 1130.1	O-ring, 1.50 x 1.62 x .062 Nitrile	1	39	501 0392.0	Hose	1
19	502 3258.4	Grip, rubber	1	40	501 0387.3	Retainer, spring	1
20	503 2488.8	Plug, bladder	1	41	905 4142.1	Ring, retaining	1
21	905 4186.3	Retaining ring, .217 Truarc	4	42	501 0393.8	Cover, hose	1
22	501 0388.1	Retainer, coupler	1	43	500 1592.3	Decal, Identification	1

Draw Studs and Accessories

Cat. No.	Part No.	Description	Qty
31872	503 1872.1	Draw stud, 3/4-16 x 4.12	1
1924AA	503 3248.8	Spacer, .767 x 1.37 x .875	1
1614SS	503 0043.1	Screw, 3/8" short adapter	1
33967	503 3967.2	Adapter, stud, 3/8-24 x 3/4-16	1

GREENLEE **TEXTRON**

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