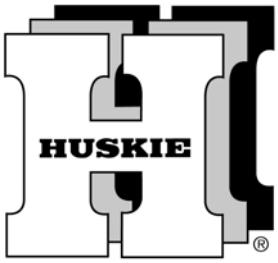
HYDRAULIC HAMMERS

SERVICE MANUAL

HH750
HH1000



HYDRAULIC HAMMERS

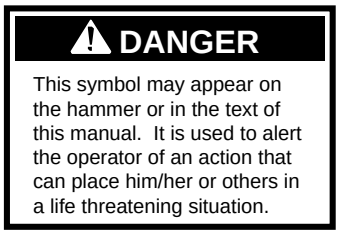
CONTENTS

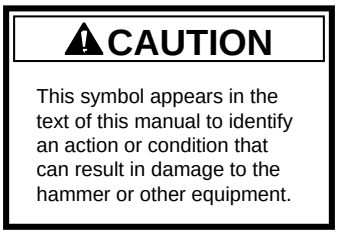
1. SAFETY INFORMATION

- Always read the information in this manual before operating the hammer. Failure to do so can result in personal injury or damage to the equipment.
- Check that all safety decals attached to the hammer and carrier are legible. Replace worn or illegible decals.
- Do not use drugs or alcoholic beverages that impair alertness or coordination while operating the carrier or hammer. An operator taking prescription drugs must obtain professional medical advice to determine if he/she can safely operate the carrier and hammer.
- Work at a slow pace when learning to operate the hammer.
- Operator training must consist of a demonstration and verbal instruction.
- New operators must start in an area free of bystanders. He/she must become familiar with all carrier controls before operating the hammer.
- Be aware of any prohibited uses in work areas. (Excessive slopes, poor or dangerous terrain conditions and utility hazards.)
- Operate the carrier or hammer from the operator's seat **ONLY**. Make sure the seat is fastened securely before activating controls.
- Keep hands and feet on the controls at all times while the hammer is operating.
- Always operate the carrier with the outriggers firmly positioned on the surface.
- Make sure all controls (levers and pedals) are in **NEUTRAL** before starting the carrier.
- **NEVER** leave the carrier with the engine running. **ALWAYS ENGAGE THE PARKING BRAKE.**
- Make certain there are no persons within the arc determined by the movement of stabilizers, front bucket or backhoe boom with the hammer at full extension.
- Never operate with any person near the hammer or between the hammer and the operator.
- Replace all faulty or leaking hydraulic hoses or fittings before operation.
- Travel with the hammer in the full tuck (transport) position only.
- Never operate the hammer with the tool retaining pin removed.
- Wear safety goggles, hearing protection and hard hat while operating the hammer.
- Before leaving the operator's seat, always lower the carrier boom or bucket arms.
- Stop the engine before attempting to make any repairs or adjustments to either the carrier or the hammer.
- **ALWAYS OBSERVE ALL SAFETY INSTRUCTIONS APPLICABLE TO YOUR CARRIER.**

SAFETY DECALS

The decals shown below are attached to the hammer when shipped from the factory. Read and understand them before operating the hammer. Replace any decal that has become worn, damaged or illegible. Decals can be ordered through Repair Parts Department.





The notice below is included in the shipping carton. It contains information relating to operator safety. Read and understand this notice before unpacking or operating the hammer. We suggest you retain this notice and include it in your local safety program.

CAUTION

Never operate the hammer unless the following Safety Instructions have been read and understood.

- Projectiles from the hammer, tool, rock or other broken material may enter the operator's area and cause serious or fatal injury. Use personal protection equipment.
- Projectiles from the hammer, tool, rock or other broken material may cause serious or fatal injury to bystanders. Do not operate the hammer when bystanders are in the area.
- In some cases, the hammer may enter the operator's area if a bracket or cylinder breaks. Make sure appropriate shields are used when operating the hammer with this type of equipment.

- Shown above is a copy of a decal that must be installed on a surface of the hammer that faces the operator and on the carrier operator's control area.
- Never operate the hammer if these decals are missing. Decals must be inspected periodically to ensure that all wording is legible. Decals should be replaced if illegible.
- Decals can be obtained at no charge from your IPC Distributor or by contacting IPC's Customer Service Department.

2. OPERATING INSTRUCTIONS

HOW THE HAMMER OPERATES

The main valve (Figure 1) for the hammer is built into the cylinder. Hydraulic oil is supplied into the hammer through this valve. During the upward stroke, the pressure in the upper chamber is released via the main valve and through the outlet. High pressure in the lower chamber then forces the piston upward.

As soon as the piston reaches the upper end of the stroke, the main valve directs flow to the upper chamber causing it to become high pressure.

Since surface **A** is greater than surface **B**, the piston is driven downward with the help of the accumulated energy from the gas chamber, creating the impact stroke of the hammer.

At the point of impact, the main valve shifts, releasing the high pressure from the upper chamber, enabling the upward stroke to occur again.

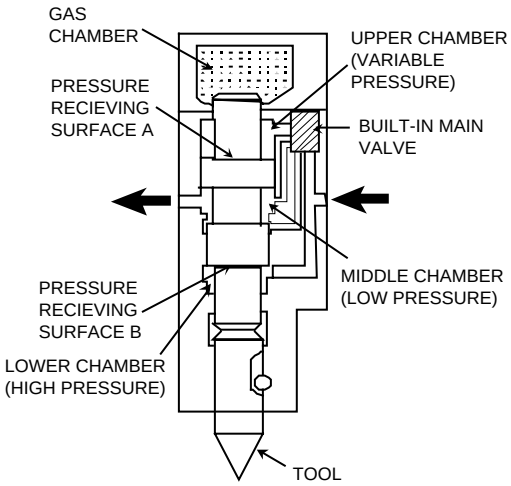


Figure 1. Principles of Operation.

⚠ CAUTION

MATCH CARRIER HYDRAULIC FLOW TO CORRECT FLOW RANGE FOR HAMMER TO PREVENT INTERNAL DAMAGE TO HAMMER. CONTACT YOUR DEALER FOR CARRIER SPECIFICATIONS.

(Refer to Table 10.)

MOUNTING THE HAMMER TO THE CARRIER

1. Skid Steer Loader

All hammers are mounted to hammer brackets, which are then mounted to an adapter plate using two pins. The adapter plate is mounted to the quick mount of the carrier. To remove the hammer, first disconnect the hydraulic couplers from the inlet and outlet ports and detach the quick mount. Seal off all plugs and hoses to prevent dust, dirt and foreign particles from entering the system.

2. Rubber-Tired Backhoes and Excavators

All hammers are mounted to hammer brackets. The hammer brackets are mounted to the stick of the carrier using two pins. To remove the hammer, first disconnect the hydraulic couplers from the inlet and outlet ports. Seal the couplers and hoses to prevent dust, dirt, and foreign particles from entering the system. Remove the "mounting pins" to detach hammer and bracket from the carrier stick.

CONNECTING HOSES

Connect the two hydraulic hoses to the inlet and outlet ports of the carrier using hose couplers. When connecting, make sure that the couplers are clean and engaged securely.

DAILY INSPECTION BEFORE OPERATION

1. Check the carrier hydraulic oil level before operation. The hydraulic oil level must be correct for proper operation.
2. Check the hydraulic oil for any signs of contamination or discoloration. If any signs of contamination appear, change the oil. (Refer to Table 2.)

NOTE: Do not mix different types of hydraulic oil.

3. Inspect all hoses and fittings for leaks or damage. Check all fasteners and tighten as required. Replace any broken fasteners.
4. The hammer must be greased daily before use. Ten shots of grease with a grease gun is adequate. The hammer should be greased every 2-3 hours during operation. (See Figure 2)
5. Check the temperature of the hydraulic oil. Optimum operating temperature is 100°/ 180° F (40°/80°C). The unit may not function properly and seal damage may result if the hydraulic oil temperature goes beyond the recommended range.

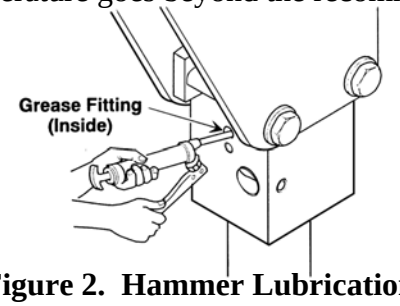


Figure 2. Hammer Lubrication Point

INITIAL STARTUP, HAMMER BREAK-IN

New or rebuilt hammers require 20-40 minutes of operation at half the rated speed as a break-in period. This allows for proper lubrication of all moving parts and for all sliding surfaces to mate properly.

GENERAL OPERATING INSTRUCTIONS

1. Never apply the tool with a side load. The tool must always be pressed firmly against, and be perpendicular to the material to be broken. Failure to do so can cause tool or seal failure.
2. Impact action must be stopped immediately when the object has been broken.
3. Do not pry with the tool. This may cause the tool to break or cause abnormal wear to the tool bushings.
4. Avoid continuous impact on the same area for more than one minute. Continuous impact may cause a rapid increase in oil temperature and improper hammer operation.
5. Break large objects from the outside edges and work inward.
6. Do not submerge the hammer in water. The hammer is not watertight, and damage can occur if used in this manner. Consult your dealer for underwater applications (Ref. Figure 3.)
7. Do not use the hammer to move very large or heavy broken objects. This can cause damage to the hammer and carrier.
8. Do not use the hammer as a lifting device.
9. Do not operate the hammer when boom cylinders are at their extreme ends. This may cause damage to the cylinders.
10. Stop operation immediately if hoses vibrate abnormally or impact energy is dramatically reduced. Consult Section 7. “Troubleshooting Diagnosis” for additional information.

COLD WEATHER STARTUP AND OPERATION

Note: Internal parts of the hammer will be damaged if proper warm-up procedures are not applied in cold weather.

1. Warm the hydraulic system of the carrier before starting the hammer. Circulate the oil in carrier system until it is warm to the touch or approximately 60°F (15°C)
2. With engine at half throttle, activate the hammer for 5 seconds and stop for 15 seconds. Repeat cycle for 2 to 3 minutes.

UNDERWATER OPERATION

Operation of hydraulic hammers under water requires proper preparation to prevent internal damage to hammer parts and carrier hydraulic system.

⚠ CAUTION

DO NOT OPERATE MOUNTED HYDRAULIC HAMMER UNDERWATER WITHOUT AIR SUPPLY TO THE HAMMER. SERIOUS DAMAGE WILL RESULT TO THE PISTON, SEALS AND OTHER INTERNAL PARTS AS WATER AND ABRASIVE SOLIDS ARE DRAWN INTO THE FRONT CAP CAVITY AND FORCED INTO THE HYDRAULIC CIRCUIT DURING OPERATION.

⚠ CAUTION

DO NOT SUBMERGE HOT HAMMER BODY IN WATER. HAMMER BODY WILL CONTRACT AND CAUSE PISTON SCORING AND SEIZURE.

1. To prepare the hammer for underwater operation you will need an external compressed air supply.
   a. For HH100 through HH500, 5 –10 CFM at 50 to 90 psi is adequate.
   b. For HH750 and larger, 20 to 50 CFM is required.
2. Connect air supply line to front cap threaded port (remove plug P/N 3Z01-FP0038 as shown.) Thread is 3/8 inch pipe tapered.
3. Set pressure regulator to 50 – 90 psi.
4. Maintain air supply to hammer at all times when operating under water

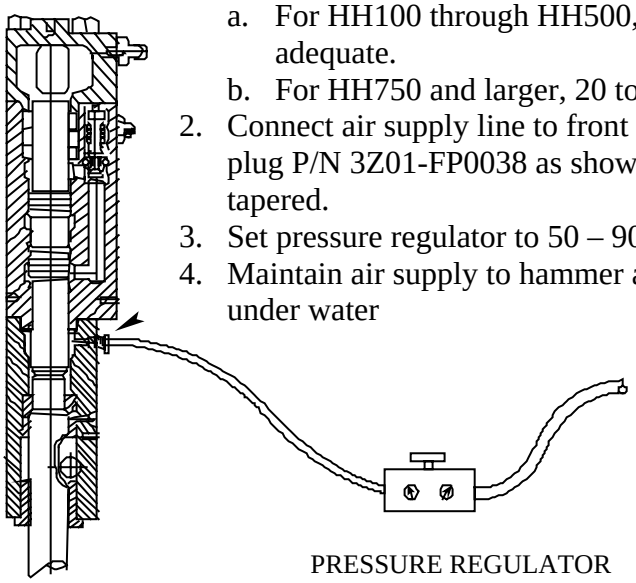


Figure 3. Air Compressor Supply

STORAGE

⚠ WARNING

INCORRECT STORAGE OF HAMMER CAN CAUSE CORROSION AND FAILURE OF INTERNAL PARTS.

1. **Short Term**

If the hammer will not be used for periods of one week or more, the tool should be removed from the hammer and hydraulic oil must be applied to the piston bottom. The hammer should be stored indoors standing vertically in the working position.

2. **Long Term**

For storage of more than 2 - 3 weeks or where condensation or corrosion is prevalent (salt-water areas) note the following instructions. Remove and clean the tool. Flush the front cap with clean solvent or hydraulic oil. Coat the exposed portion of the piston with grease, apply grease to the tool and re-install. Store the hammer vertically and away from standing moisture. To start the hammer after long term storage, remove the tool and inspect the exposed portion of the piston for corrosion. If corrosion is found do not use the hammer until the defective piston has been repaired or replaced.

TOOL REPLACEMENT

⚠ WARNING

TOOL MAY BE HOT FROM OPERATION. USE GLOVES TO PROTECT AGAINST BURNS AND POSSIBLE SHARP EDGES.

⚠ DANGER

TOOLS ARE HEAVY. REFER TO TABLE 1 BEFORE PROCEEDING.

- Carefully drive out the tool spring pin.
- Push the tool set pin up and out of the front cap using a screwdriver or round bar.

Note:

- Check Table 1, Page 11, before handling tools.
- For models HH100 through HH750, manual removal is possible.
- For hammer models HH1000 and larger use hoist and sling as shown. Check for sling load rating and compare to Table 1, Page 11.
- When installing the tool in the hammer, reverse steps 1 through 4 above. Note that tool spring pin must be inserted with the slot or open side away from the tool set pin.

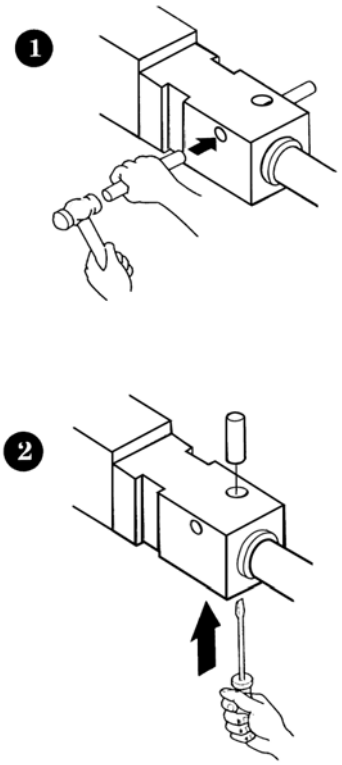


Figure 4. Tool Replacement

Table 1. Standard Tool Weights

HAMMER MODEL	WEIGHTS	
	kg	lbs.
HH100	3.6	8.
HH150	7.	15.
HH300	14.	30.
HH500	15.	32.
HH750	23.	51.
HH1000	37.	82.
HH1500	45.	99.
HH2000	74.	162.
HH3600	118.	260.
HH4500	152.	334.
HH5800	174.	381.
HH8000	214.	470.

3. MAINTENANCE

HYDRAULIC OIL

Note: It is not recommended to mix types of hydraulic oils. Check carriers hydraulic oil recommendations before adding hydraulic oil.

1. Check the oil level, oil filter condition and oil cooler in the carrier periodically.

2. Replace the hydraulic oil every 600 hours and the filter every 100 hours, or according to carrier recommendations.

3. Always be aware of any abnormalities in the operation of the hammer such as changes to hammer blow speed, impact force or oil temperature. The oil temperature should not exceed 180°F (80°C).

4. Check the condition of the hydraulic oil as specified in Table 2.

CHECKING CONDITION OF HYDRAULIC OIL

Note: Refer to carrier service manual for proper class and type of hydraulic oil.

Hydraulic oil must be changed more frequently than the carrier instruction manual recommends. This is because hammer operation requires more oil circulation than normal operation. Oil condition can be visually checked as specified in Table 2.

Table 2. Hydraulic Oil Conditions

COLOR	CONDITION
Transparent and no color change	Good
Transparent but too bright	Oil Mixed
Milky white	Air and / or water mixed
Dark and dirty with odor	Deteriorated
Transparent but with black spots	Foreign particles mixed
Bubbly	Grease mixed

FASTENERS

Inspect all bolts and nuts for tightness. Tighten as required. (Refer to Table 4.) Replace all missing or damaged fasteners before operating the hammer.

⚠ WARNING

USE ONLY ORIGINAL MANUFACTURER PARTS WHEN REPLACING BOLTS, NUTS AND WASHERS. SUBSTITUTE PARTS MAY APPEAR SIMILAR BUT MAY FAIL AND CAUSE SERIOUS INJURY OR DEATH.

Fastener bolt and nut sizes are listed in Table 3. These are wrench sizes (distance across flats.)

Table 3. Bolt Sizes

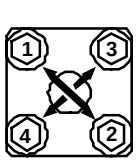
					VALVE BOX		GAS VALVE	
HAMMER	NIPPLES (mm.)	BRACKET BOLTS (mm.)	SIDE RODS (mm.)	LIFTING EYES (inches)	*CAP BOLTS	SET BOLTS (mm.)	CAP (inches)	BODY (mm.)
100	19	*28	14	½”-13pt	NA	NA	1” Crow Foot	36
150	30	36	32	½”-13pt	NA	NA	1” Crow Foot	36
300	30	36	41	½”-13pt	NA	NA	1” Crow Foot	36
500	30	36	41	¾”-10pt	NA	NA	1” Crow Foot	36
750	30	36	46	¾”-10pt	NA	NA	1” Crow Foot	36
1000	36	50	46	¾”-10pt	NA	NA	1” Crow Foot	36
1500	36	50	54	¾”-10pt	*14	30	1” Crow Foot	36
2000	36	50	54	7/8”-9unc	*17	30	1” Crow Foot	36
3600	46	60	63	7/8”-9unc	*17	32	1” Crow Foot	36
4500	46	75	71	1”-8unc	*17	32	1” Crow Foot	36
5800	46	75	85	1 ¼”-8unc	*19	41	1” Crow Foot	36
8000	50	75	90	1 ½”-6unc	*19	41	1” Crow Foot	36

* Allen Wrench Sizes

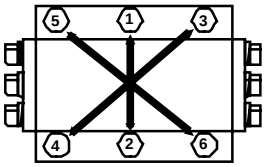
Table 4. Tightening Torque Requirements

	HH100	HH150	HH300	HH500	HH750	HH1000
Side Rod	NA	400 ±35	550 ±35	550 ±35	NA	NA
Side Rod Back Nut	NA	NA	NA	NA	730 ±35	770 ±35
Front Cap Set Bolt	175 ±35	NA	NA	NA	NA	NA
Back Cap Set Bolt	175 ±35	NA	NA	NA	NA	NA
Bracket Bolt	175 ±35	260 ±35	260 ±35	260 ±35	260 ±35	400 ±35

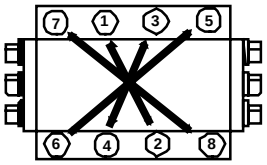
	HH1500	HH2000	HH3600	HH4500	HH5800	HH8000
Side Rod	880 ±35	880 ±35	1100 ±35	1850 ±75	2560 ±75	3300 ±75
Side Rod Back Nut	280 ±20	280 ±20	330 ±20	330 ±20	590 ±35	590 ±35
Front Cap Set Bolt	175 ±20	280 ±20	330 ±20	330 ±20	480 ±35	480 ±35
Back Cap Set Bolt	NA	70 ±3	70 ±3	70 ±3	70 ±3	70 ±3
Bracket Bolt	400 ±35	840 ±35	1320 ±35	2600 ±35	2600 ±35	2600 ±35



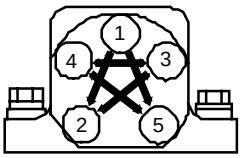
Side Rod
Side Rod Back Nut
Mode Valve Set Bolt
Valve Cap Bolt(HH100)
Front Cap Set Bolt(HH100)



Valve Box Set Bolt (HH1500, HH2000, HH3600)



Valve Box Set Bolt (HH4500, HH5800, HH8000)



Valve Cap Bolt (HH2000 and up)

Figure 5. Tightening Sequence

GREASING REQUIREMENTS

The hammer should be greased each startup and after every 2-3 hours of operation. The grease nipple is located at the front cap as shown in Figure 6. Approximately 10 shots in the front cap are recommended when the tool is at the upper limit of travel.

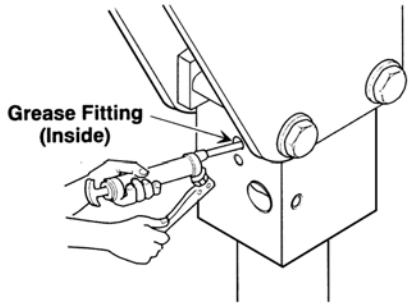


Figure 6. Grease Fitting

NITROGEN (N_2) GAS PRESSURE ADJUSTMENT

The hammer will not operate properly and may not start due to an incorrect gas charge. Follow the procedure described below to adjust nitrogen (N_2) gas pressure.

1. Gas Pressure Testing.

a. With the gas charger disconnected from the hammer, plug the inlet (the nitrogen hose connection port) of the gas charger with the cap provided, then turn the "T" handle fully to the left (counter clockwise.)

b. Remove the gas valve cap located on the hammer back cap and attach gas charger, see Figure 7.

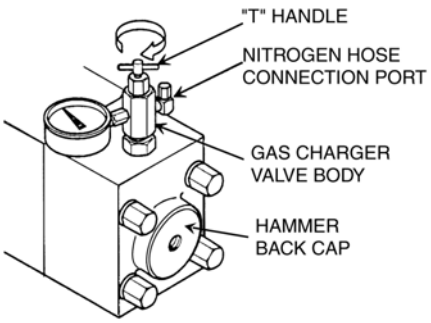


Figure 7. Connecting Gas Charger to Hammer

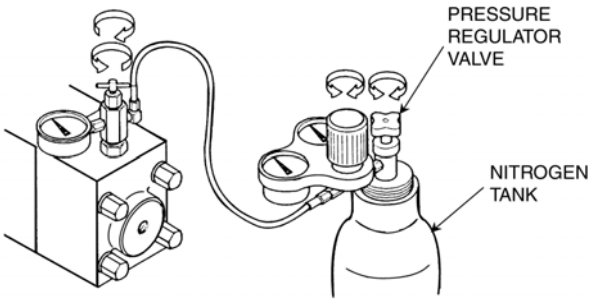


Figure 8. Connecting Gas Charger to Nitrogen (N_2) Supply

c. Turn the "T" handle on the gas charger valve clockwise, and then measure the N_2 gas pressure.

2. Releasing Gas Pressure (if over charged or prior to disassembly.)

a. Test the gas pressure as described in paragraph 1.
b. **For disassembly** loosen the bleeder screw on the gas charger very slowly and release the N_2 gas. Watch the pressure gauge until the nitrogen pressure is fully released; (see Figure 7 and 10.)
c. **If overcharged** close the Bleeder Screw when the gas pressure reaches 140-160 psi/10-11 bar (160-175 psi/11-12 bar on HH500 model), then turn the "T" handle to the left (counter clockwise).
d. Finally, remove the gas charger. Install and tighten the gas valve cap.

3. Refilling Nitrogen (N_2) Gas

a. Perform paragraph 2 procedure.
b. Remove the cap on the gas charger, nitrogen hose connection port. See Figure 10.
c. Attach the N_2 gas pressure regulator to the gas container. Connect the nitrogen (N_2) Supply tank to the gas charger with the charging kit hose.

Figure 9.

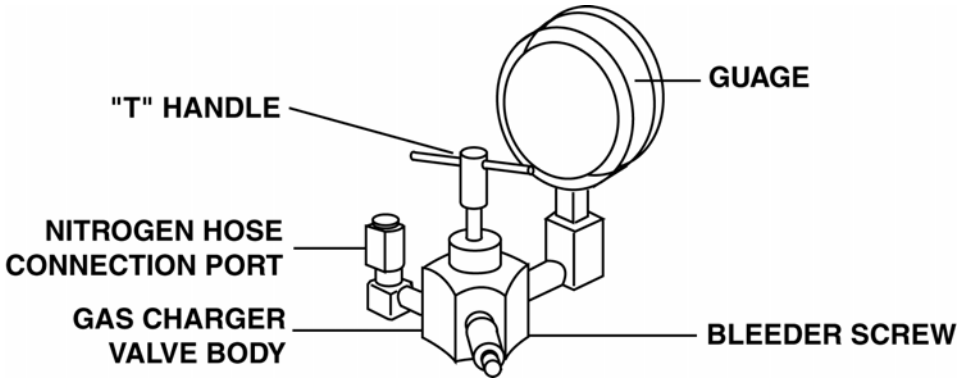


Figure 10. Gas Charger Valve

d. Open the main gas valve on the N_2 gas container and regulate the N_2 gas pressure (see Figure 8.)
e. Turn the gas charger "T" handle clockwise and adjust N_2 gas pressure in the gas chamber to 140-160 psi/10-11 bar (160-175 psi/11-12 bar on HH500 model).
f. Turn the gas charger "T" handle fully counter clockwise and remove the hose. Attach the cap to the gas inlet of the charger.
g. Remove the gas charger and attach the gas valve cap and "O" ring firmly to the gas valve nut on the hammer back cap.

OIL LEAKAGE INSPECTION

Check for oil leakage at the points shown in Table 5. It is not unusual to have a small amount of oil leakage along the tool or cylinder, (refer to Figure 11.)

Table 5. Diagnosis of Oil Leakage

LEAK LOCATION	POSSIBLE CAUSE	REMEDY
Between front cap and tool (E).	Damaged or worn U-packing.	Replace seal kit.
Between cylinder and nipple (F).	Loose nipple or damaged O-ring or nipple.	Tighten or replace nipple, and / or O-ring.
Between cylinder and back cap (G).	Damaged U-packing or main Valve outer sleeve O-ring, or Back cap O-ring.	Replace seal kit.
Plug ports (H).	Plugs loosen	Remove plugs and reinstall with sealant

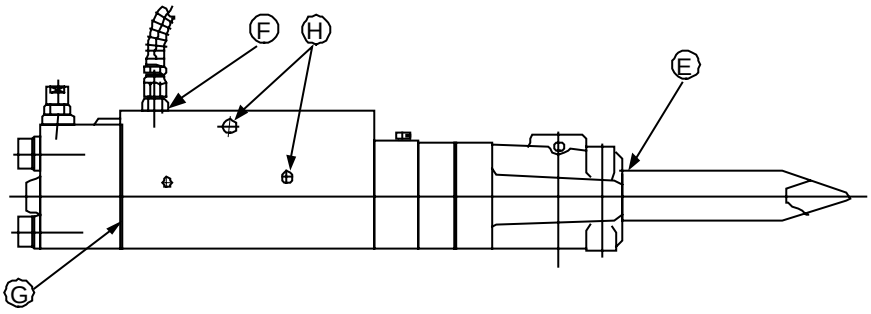


Figure 11.

GAS LEAKAGE INSPECTION

Gas leakage can be easily detected using soapy water (refer to Table 6 and Figure 12.)

⚠ CAUTION

ALWAYS MAINTAIN SPECIFIED NITROGEN GAS PRESSURE. IF GAS PRESSURE IS TOO LOW, HAMMER IMPACT FORCE MAY BE LOW. IF GAS PRESSURE IS TOO HIGH, AN INCREASE IN HYDRAULIC OIL TEMPERATURE MAY RESULT, CAUSING MALFUNCTION AND SHORT SEAL LIFE.

Table 6. Diagnosis of Gas Leakage

LEAK LOCATION	POSSIBLE CAUSE	REMEDY
Gas valve assembly (A) or Between gas valve assembly and back cap (B).	Defective O-ring, damaged Spring or gas valve.	Replace gas valve assembly.
Between back cap and cylinder (C).	Defective back cap O-ring.	Replace back cap O-ring.

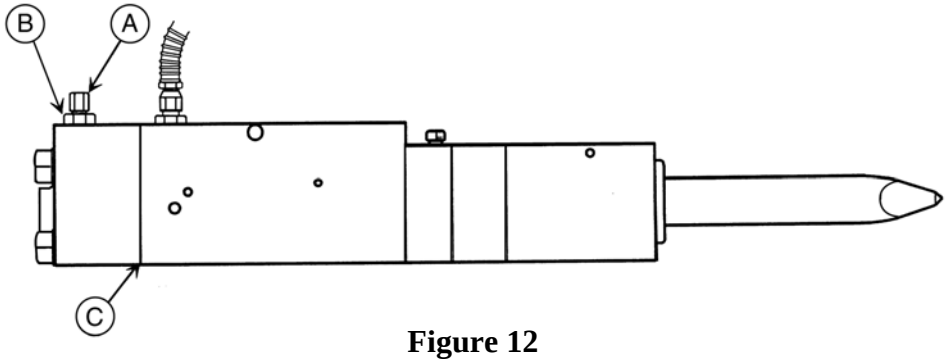


Figure 12

4. DISASSEMBLY AND ASSEMBLY

⚠ DANGER

NITROGEN N_2 GAS MUST BE RELEASED BEFORE DISASSEMBLY OF HAMMER.

SEE "NITROGEN (N_2) GAS PRESSURE ADJUSTMENT PROCEDURE".

⚠ CAUTION

ASSEMBLY AND DISASSEMBLY MUST BE PERFORMED UNDER CLEAN CONDITIONS, FREE FROM DIRT AND FOREIGN PARTICLES.

DISASSEMBLY

1. **Tool**
   Refer to tool replacement procedures on page 10 and Figure 4.

2. **Back cap**
   Support the cylinder (Figure 13). Loosen and remove four side rods and washers, then remove the back cap.

3. **Front cap** (See Table 3 for eyebolt sizes)
   Install an eyebolt and suspend the front cap as shown in Figure 13. Pull out the front cap, being careful not to damage the piston.

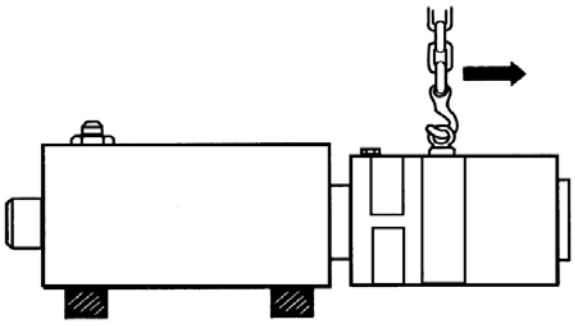


Figure 13. Connecting Hoist to Front Cap.

4. Main valve

Attach an eye bolt to outer sleeve and remove it by pulling the eyebolt. (Figure 14.) Remove the main valve. The inner sleeve cannot be removed as it is press fitted and requires a special tool. Contact the factory for further details.

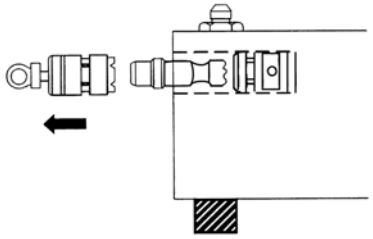


Figure 14. Removing the Main Valve

5. Piston (See Table 7 for Piston weights)

Note: For large hammers, you may wish to stand the hammer upright with proper support, and pull the piston upward using a lifting device.

a. Attach an eye bolt to the top of the piston and pull out together with cylinder sleeve toward the top.
b. It may be useful to use a pry bar as a lever as shown in Figure 15. Be careful to not damage the piston.

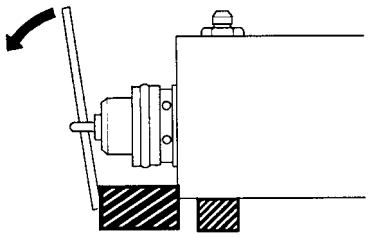


Figure 15. Removing the piston.

6. Cylinder sleeve

Note: Support piston on wood blocks.

Remove the cylinder sleeve from the piston. A plastic hammer or nylon bar can be used for removal as shown in Figure 16. Do not force the cylinder sleeve. Tap uniformly on all sides of the sleeve.

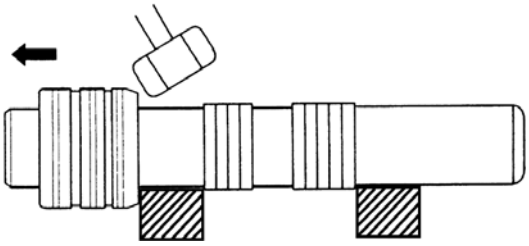


Figure 16. Removing Cylinder Sleeve
Table. 7. Piston Weights

HAMMER MODEL	WEIGHTS	
	kg	lbs.
HH100	5.8	12.7
HH150	6.0	13.2
HH300	9.7	21.3
HH500	10.0	22.0
HH750	17.1	37.6
HH1000	25.4	55.9
HH1500	41.0	90.1
HH2000	64.3	141.5
HH3600	101.0	222.2
HH4500	122.6	269.7
HH5800	153.4	337.5
HH8000	198.1	435.8

INSPECTION OF PARTS

1. Seals

Seals that are deformed, scratched, worn or aged should be replaced (see Figure 17). **It is recommended that all seals be replaced when disassembling the hammer.**

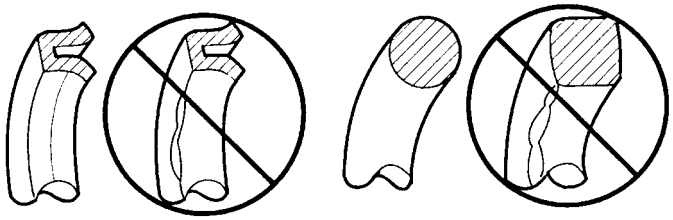


Figure 17. Seal Conditions

2. Moving parts

Check for any scratches or damage on the surface of the piston, cylinder sleeves, main valve and bottom part of the piston where it strikes the tool. Significantly damaged or scratched parts must be replaced.

3. Front cap

a. Deformed or worn shank bushings or front cap bushings must be replaced, see Table 8.
b. A severely worn or damaged tool set pin must be replaced.

4. Replacing the front cap bushing

a. Measure shank and front cap bushings and refer to Table 8 and 9.
b. Remove bushing set pin and bushing spring pin using a hammer and drive pin.
c. The front cap bushing must be torch cut at three locations (at three 120° grooves) if it is the only bushing to be replaced. Press out the front cap bushing only if both bushings need replacement.
d. Any scratches in the front cap must be smoothed after bushing removal.
e. Install the new front cap bushing in the correct direction with part numbers on the bushing facing the installer (away from the hammer.) Because the bushings are a press, or interference fit, heating of the front cap and cooling of the bushing will help installation.
f. Insert the bushing set pin and the bushing spring pin.

5. Replacing the shank bushing

Note: Replacement of the front cap bushing is highly recommended when replacing the shank bushing, as the front cap bushing must be removed to replace the shank bushing.

a. Measure the shank and front cap bushing, refer to Table 8 and 9.
b. Remove bushing spring pin and bushing set pin for shank bushing on the front cap using a punch and hammer.
c. Press out shank bushing from the cylinder side together with front cap bushing using a round bar. If the shank bushing is too tight, cutting it with a torch may be required. A worn moil or chisel can be machined to a square end (at the working end) to serve as a press mandrel to remove the bushing.
d. Any scratches on the front cap during the cutting operation must be smoothed out using a hand grinder.
e. Install a new shank bushing after greasing. As bushings are a press, or inference fit, heating of the front cap or cooling of the bushing will ease installation of the bushing.
f. Install the bushing set pin and the bushing spring pin.

6. Refinishing surface scratches (see Section 6. Page 28)

a. Cylinder and Cylinder Sleeve

Scratches on the inside surface of the cylinder should be smoothed using a flap wheel with 240 grit and finish with 360 grit.

b. Piston

Grind off any scratches on the outside surface using a flapwheel with 240 grit and finish with 360 grit. When polishing the piston or the cylinder bore, it is not necessary to completely remove scratches as this may remove excess material. (See Figures 20, 21 and 22.)

c. Main Valve and Sleeves

Main valve and sleeves cannot be polished. Replace if these parts do not slide freely by finger pressure.

COMPONENT WEAR LIMITS

Parts are to be replaced if they are not within the wear parameters. See Table 8 and Figure 18, for new dimensions see Table 9.

Table 8. Component Wear Limits

COMPONENT	WEAR LIMITS
Front cap bushing	When the clearance between the tool and the front cap bushing exceeds .200 in. (5mm), a new front cap bushing is required. (Approximately 500 hours of use).
Shank bushing	When the clearance between the tool and the shank bushing exceeds .160 in. (4mm), a new shank bushing is required. (Approximately 700 hours of use).
Tool	If .120 in. (3mm) of wear in the diameter is observed, a new tool is required. (Approximately 500 hours of use). Keep tool sharp.
Tool set pin	If .080 in. (2mm) of wear in the diameter is observed, a new tool set pin is required.
Front cap	If the corner of the front cap is worn to the edge of the front cap bushing, a new front cap is required.
Piston	When indentation or serious damage on the piston surface is observed, a new piston is required. (Approximately 2,000 hours of use).

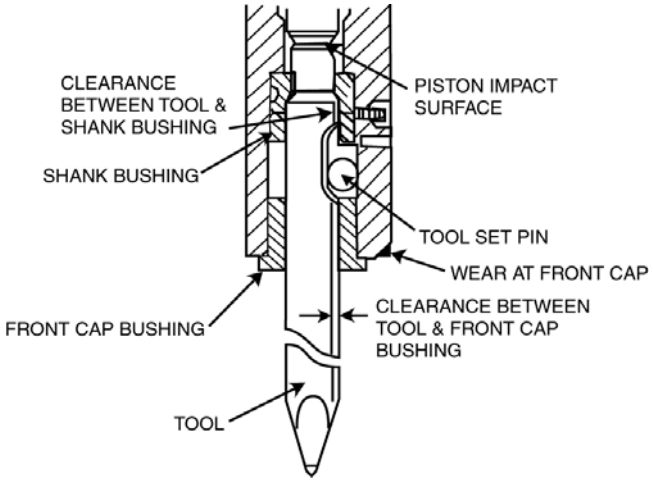


Figure 18. Wear Limit Points

Table 9. New Component Dimensions

PART	HH100	HH150
Front Cap Bushing I.D.	76. mm. 3.0 in.	91. mm. 3.583 in.
Shank Bushing I.D.	76. mm. 3.0 in.	91. mm. 3.583 in.
Tool O.D.	75. mm. 2.953 in.	90. mm. 3.543 in.

ASSEMBLY

Note: Clean every part before assembly. Keep parts clean and do not scratch during assembly. Assembly can basically be done in the reverse order of disassembly. Make sure parts are installed in the correct direction.

1. Lubricate the U-packing, O-ring, piston, cylinder and main valve with hydraulic oil before assembly.
2. Place cylinder sleeve on the piston.
3. Insert the piston fully into the cylinder to its bottom position.

    a. Make sure that all seals are positioned correctly.
    b. Handle seals very carefully in order not to cause scratches.
    c. To avoid scratching the piston, the cylinder sleeve can be installed with a plastic hammer or nylon bar.

4. Install the front cap on the cylinder.
5. Insert the main valve and the outer sleeve.
6. Apply about 1.7 ounces (50cc) of hydraulic oil into the back cap for lubrication of the seals as shown in Figure 19.
7. Attach the back cap to the cylinder.

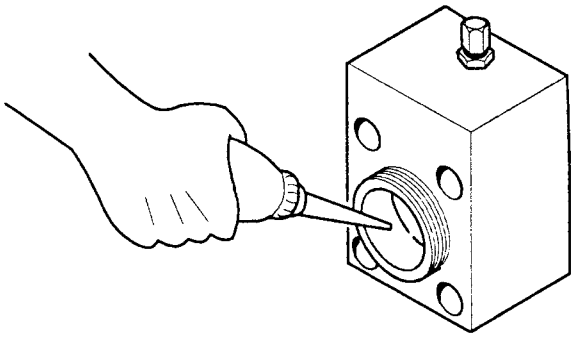


Figure 19. Lubricating Seal in Back Cap.

8. Insert and tighten the four side rods together with the washer to the specified torque (see Table 4.) Follow the tightening order shown in Table 5.

9. Refill the hammer with Nitrogen (N_2) gas. Ref. Figure 9.

Make sure that the piston is positioned at the lower end of its stroke before charging. The piston and the cylinder may be damaged during gas charging by sudden movement (due to a pressure increase) if the piston is not at the bottom of its stroke in the cylinder.

5. SPECIFICATIONS

Table 10. Specifications

ITEM		MODEL HH750	MODEL HH750
Impact energy (ft-lbs) (kg-m)		750 102	1000 136
Blows per minute	bpm	530-1,070	580-850
Required oil flow	gpm l/min	6.7-13.3 25-50	14.7-21.3 55-80
Operating pressure	psi bar	1,700-2,000 120-140	1,860-2,140 130-150
Nitrogen gas pressure	psi bar	140 – 160 10 – 11	140 – 160 10 – 11
Total weight with tool	lbs. kg	675 307	1,070 487
Total length	inch mm	57 1,435	64 1,620
Tool diameter	inch mm	3.0 75	3.5 90
Applicable carrier	lbs. kg	7,500-15,000 3,400-6,800	11,000-26,000 4,990-11,790

Remarks:

- The hammer is to be used within the specified oil pressure, oil flow and gas pressure parameters.
- The carrier hydraulic system relief pressure is to be set at 2,400-2,600 psi (170-185 bar). This is 600 to 800 psi above the hammer "Operating Pressure."
- Hydraulic pressure is to be measured at the hose end of the carrier (output or pressure hose) when disconnected from the hammer.

6. REFINISHING OF PISTONS & CYLINDERS

If the pistons and cylinders should be scored or scratched due to dirty oil, or improper hydraulic oil specifications, the piston and cylinder can in many cases be polished and salvaged, instead of being replaced.

This is possible because the IPC Huskie components are high quality alloy steel and do not use chromium surface finishes which cannot be polished.

Follow the procedures in Figures 20, 21 & 22 and finish by thorough flushing and cleaning. These parts can usually be salvaged.

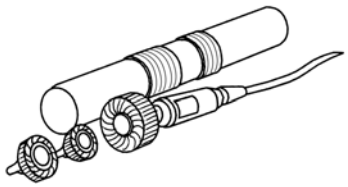


Figure 20.

Caution: Wear safety glasses for eye protection

Use hand held air grinder with flap type wheels.
Two grit wheels were used:
#240 for Heavy Polish.
#360 for Finishing.

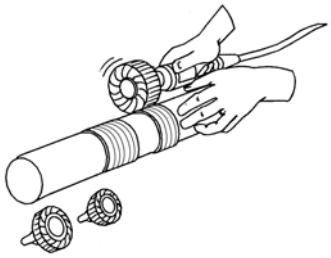


Figure 21.

Rotate piston and polish with brushing motion of grinder.

Polish total area before changing to fine grit for finishing.

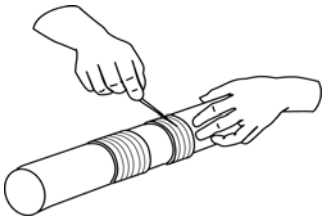


Figure 22.

After completion of fine polishing, clean labyrinth grooves carefully with fine needle file to remove all burrs and rough edges.

After polishing all rough surfaces and edges, clean all parts by flushing thoroughly. Lubricate with hydraulic oil before reassembling.

Note: It is not necessary to completely remove all scoring or scratching to full depth of the scratches. Instead polish the surfaces until any raised edges are flush and smooth with the original surface. If this procedure is followed excess material will not be removed and normal tolerances can be maintained inside the hammer.

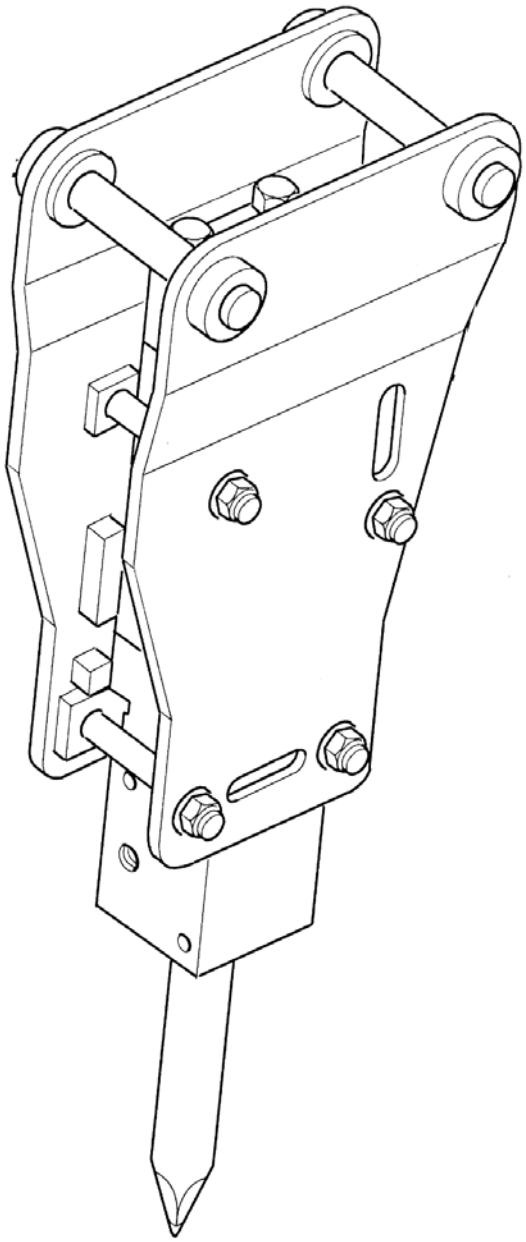
7. TROUBLESHOOTING DIAGNOSIS

Table 11. Troubleshooting

SYMPTOM	POSSIBLE CAUSE	REMEDY
Hammer does not run	Couplers are not engaged	Connect couplers securely
	Relief valve set incorrectly	Adjust main and secondary relief valve
	Malfunction of the hydraulic pump	Repair pump
	Nitrogen gas pressure is too high	Adjust gas pressure
	Main valve is damaged	Repair or replace main valve
	Piston is damaged	Repair or replace piston
Hesitation or erratic operation	Couplers are not fully engaged	Connect couplers securely
	Relief valve set incorrectly	Adjust main and secondary relief valve
	Malfunction of the hydraulic pump	Repair pump
	Oil temperature is too high (exceeds 180°F or 80°C)	Check oil cooler
	Main valve is damaged	Repair or replace damaged main valve
	Decreased oil flow	Avoid simultaneous axis movement
	Auto shut-off in operation, tool is suspended	Apply proper down force
	Excessive bushing wear	Replace worn bushings
	Piston is damaged	Repair or replace piston
Slow impact speed	Nitrogen pressure is too high	Adjust gas pressure
	Hydraulic oil leakage into the gas chamber	Replace seal kit
	Malfunction of the hydraulic pump	Repair pump
	Deteriorated or contaminated oil	Change oil
Low impact power	Nitrogen gas pressure is low	Adjust gas pressure
	Relief valve set incorrectly	Adjust main and secondary relief valve
	Malfunction of the hydraulic pump	Repair pump

8. PARTS LIST AND ILLUSTRATIONS

HH750
HH1000

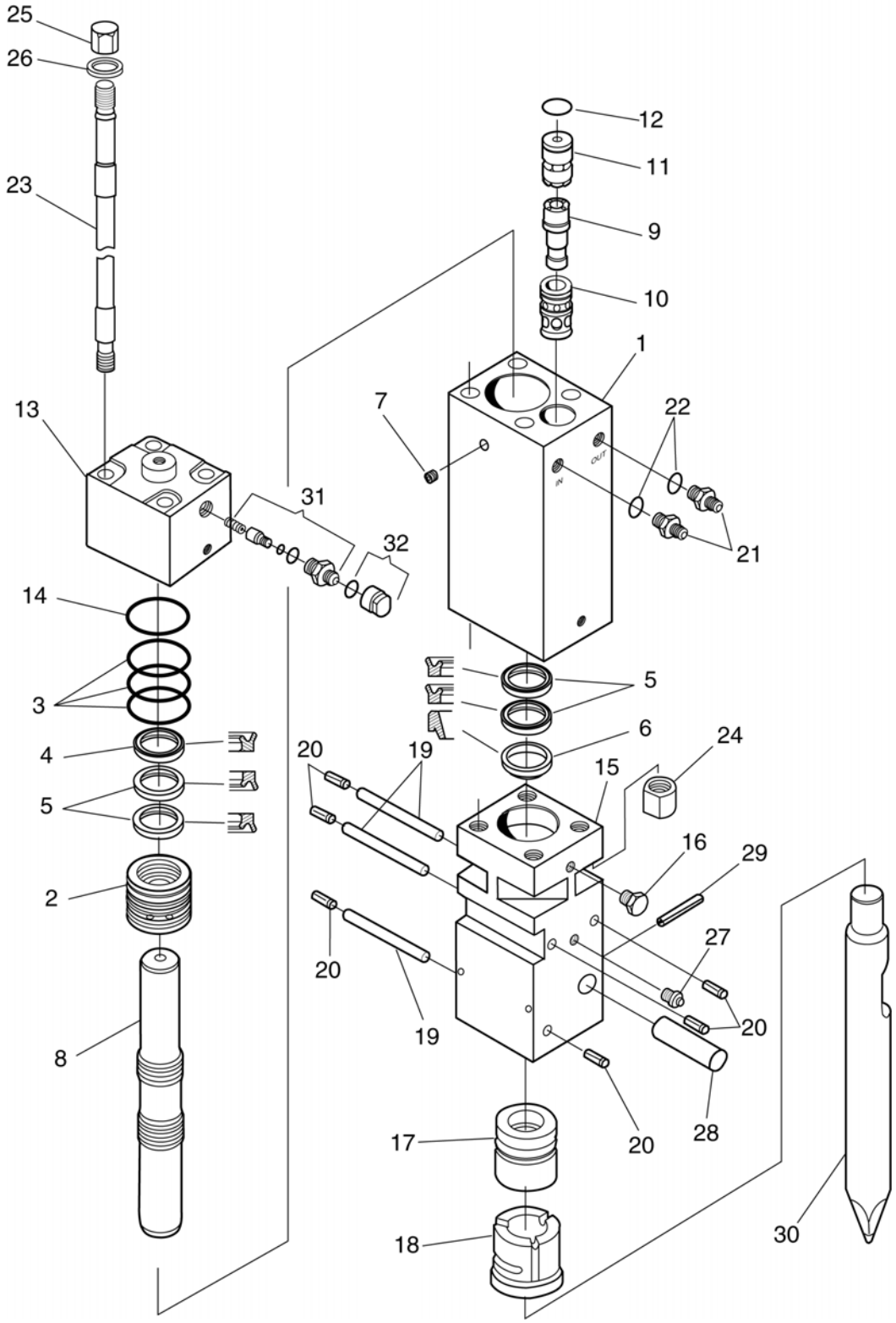


HH750 PARTS LIST UP TO S/N: 6F349

ITEM	NAME	NUMBER	QTY.
1	Cylinder	3E01-2060001	1
2	Cylinder Sleeve	3E01-2060002	1
3	Cylinder Sleeve O-Ring*	3E01-07208B	3
4	Gas U-Packing*	3E01-U06000G	1
5	U-Packing*	3E01-U06000I	4
6	Dust Seal*	3E01-D06000D	1
7	Drain Plug	3Z01-DP0014	1
8	Piston	3E01-2060011	1
9	Main Valve	3E01-2060622	1
10	Main Valve Inner Sleeve	3E01-2060623	1
11	Main Valve Outer Sleeve	3E01-2060624	1
12	Main Valve O-Ring*	3E01-09092B	1
13	Back Cap	3E01-2060031	1
14	Back Cap O-Ring*	3E01-07208A	1
15	Front Cap	3E01-2060041	1
16	Front Cap Plug	3Z01-FP0038	1
17	Shank Bushing	3E01-060042	1
18	Front Cap Bushing	3E01-060043	1
19	Bushing Set Pin	3D01-060344	3
20	Bushing Spring Pin	3E01-S34088	6
21	Nipple PF—1/2in.—3/4in. UN	3C03-N00001	2
22	O-Ring 1BG-30	3C03-07058B	2
23	Side Rod Assembly	3E03-060051	4
24	Side Rod Front Nut	3E01-060052	4
25	Side Rod Back Nut	3E01-060053	4
26	Side Rod Washer	3E01-060054	4
27	Grease Nipple	3Z01-GN0018	1
28	Tool Set Pin	3E01-060061	1
29	Tool Spring Pin	3E01-S34188	1
30	Tool Moil (Chisel, Blunt)	3E01-206P(Fx,E)	1
NI	Seal Kit	3E01-206SK	1
NI	Gas Charger	3Z01-202GC	1
31	Gas Valve Assembly	3Z01-G00001	1
32	Gas Valve Cap with O-Ring	3Z01-G00004	1

*Included in seal kit. NI denotes not illustrated. Effective 9/98

HH750 HAMMER UP TO S/N: 6F349



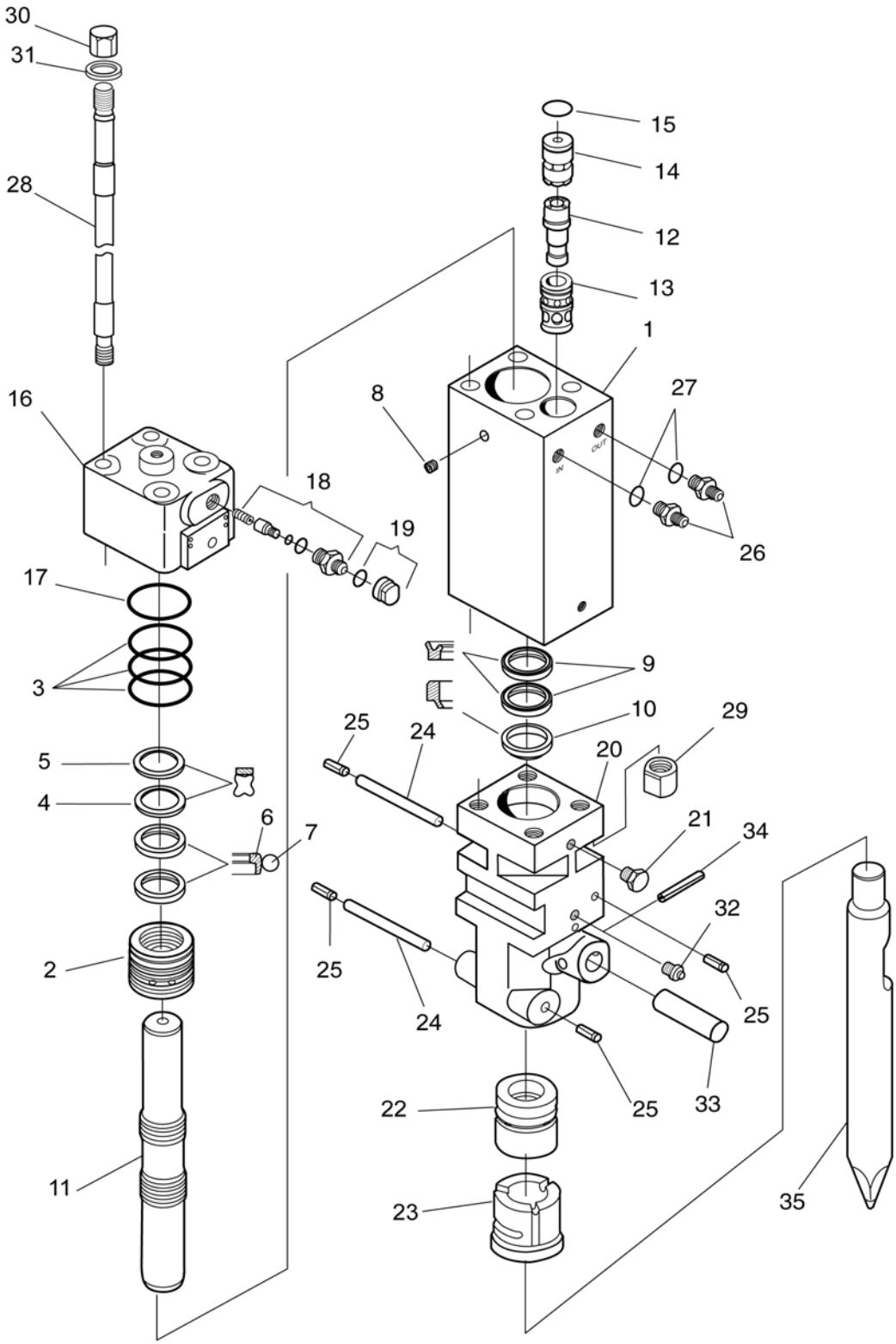
Effective 9/98

HH750 HAMMER S/N: 6F350 & UP

ITEM	NAME	NUMBER	QTY.
1	Cylinder	3E01-2060001	1
2	Cylinder Sleeve	3E01-2060002X	1
3	Cylinder Sleeve O-Ring*	3E01-07208B	3
4	Quad Ring*	3E01-QD206000	1
5	Back Up Ring*	3E01-BU206000	1
6	Step Seal*	3E01-ST206000	2
7	Buffer O-Ring*	3E01-OR206000	2
8	Drain Plug	3201-DP0014	1
9	U-Packing*	3E01-U06000I	2
10	Dust Seal*	3E01-D06000D	1
11	Piston	3E01-2060011	1
12	Main Valve	3E01-2060622	1
13	Main Valve Inner Sleeve	3E01-2060623	1
14	Main Valve Outer Sleeve	3E01-2060624	1
15	Main Valve O-Ring*	3E01-09092B	1
16	Back Cap	3E01-2060031	1
17	Back Cap O-Ring*	3E01-07208A	1
18	Gas Valve Assembly	3Z01-G00001	1
19	Gas Valve Cap with O-Ring	3Z01-G00004	1
20	Front Cap	3E01-2060041	1
21	Front Cap Plug	3Z01-FP0038	1
22	Shank Bushing	3E01-060042	1
23	Front Cap Bushing	3E01-060043	1
24	Bushing Set Pin	3E01-060344	2
25	Bushing Spring Pin	3E01-S34068	4
26	Nipple PF—1/2in.—3/4in. UN	3C03-N00001	2
27	O-Ring 1BG-30	3C03-07058B	2
28	Side Rod Assembly	3E01-060051	4
29	Side Rod Front Nut	3C01-060052	4
30	Side Rod Back Nut	3C01-060053	4
31	Side Rod Washer	3E01-060054	4
32	Grease Nipple	3Z01-GN0018	1
33	Tool Set Pin	3E01-060061	1
34	Tool Spring Pin	3E01-S34188	1
35	Tool Moil (Chisel, Blunt)	3E01-206P(Fx,E)	1
NI	Seal Kit	3E01-206SKX	1
NI	Gas Charger	3Z01-202GC	1

***Included in seal kit. NI denotes not illustrated. Effective 9/98**

HH750 HAMMER S/N: 6F350 & UP



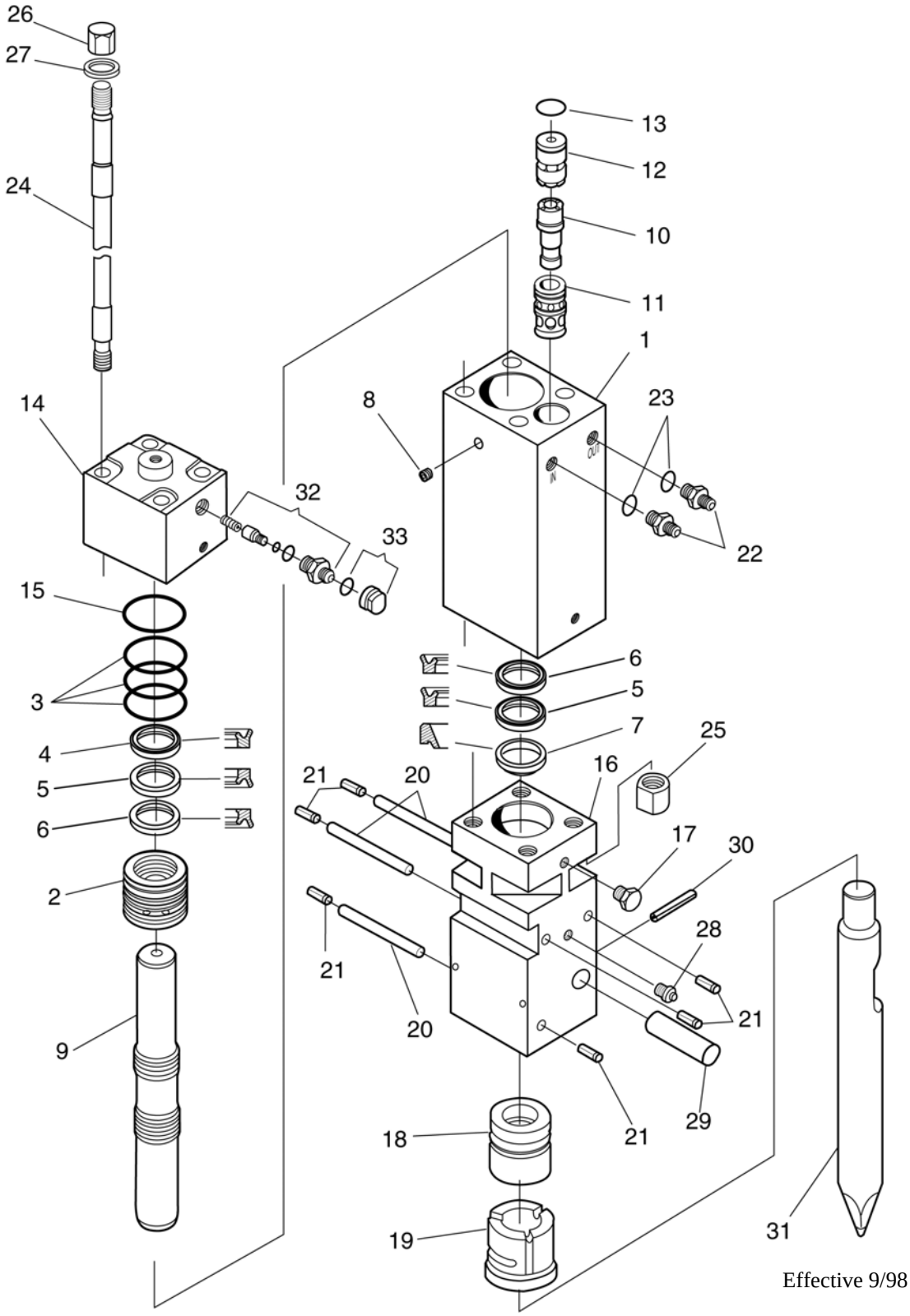
Effective 9/98

HH1000 PARTS LIST UP TO S/N: 6H399

ITEM	NAME	NUMBER	QTY.
1	Cylinder	3F01-2100001	1
2	Cylinder Sleeve	3F01-2100002	1
3	Cylinder Sleeve O-Ring*	3F01-07228B	3
4	Gas U-Packing*	3F01-U10000G	1
5	U-Packing*	3F01-U10000I	1
6	U-Packing*	3F01-U10000H	1
7	Dust Seal*	3F01-D10000D	1
8	Drain Plug	3Z01-DP0014	1
9	Piston	3F01-2100011	1
10	Main Valve	3F01-2100622	1
11	Main Valve Inner Sleeve	3E01-2060623	1
12	Main Valve Outer Sleeve	3E01-2060624	1
13	Main Valve O-Ring*	3E01-09092B	1
14	Back Cap	3F01-2100031	1
15	Back Cap O-Ring*	3F01-07228A	1
16	Front Cap	3F01-2100041	1
17	Front Cap Plug	3Z01-FP0038	1
18	Shank Bushing	3F01-100042	1
19	Front Cap Bushing	3F01-100043	1
20	Bushing Set Pin	3F01-100044	3
21	Bushing Spring Pin	3E01-S34088	6
22	Nipple PF—3/4in.—1.1/16in. UN	3F03-N00002	2
23	O-Ring 1BG-30	3F03-07068B	2
24	Side Rod Assembly	3F01-100051	4
25	Side Rod Front Nut	3F01-100052	4
26	Side Rod Back Nut	3F01-100053	4
27	Side Rod Washer	3F01-100054	4
28	Grease Nipple	3Z01-GN0018	1
29	Tool Set Pin	3F01-100061	1
30	Tool Spring Pin	3E01-S34188	1
31	Tool Moil (Chisel, Blunt)	3F01-201P(Fx,E)	1
NI	Seal Kit	3F01-210SK	1
NI	Gas Charger	3Z01-202GC	1
32	Gas Valve Assembly	3Z01-G00001	1
33	Gas Valve Cap with O-Ring	3Z01-G00004	1

***Included in seal kit. NI denotes not illustrated. Effective 9/98**

HH1000 HAMMER UP TO S/N: 6H399



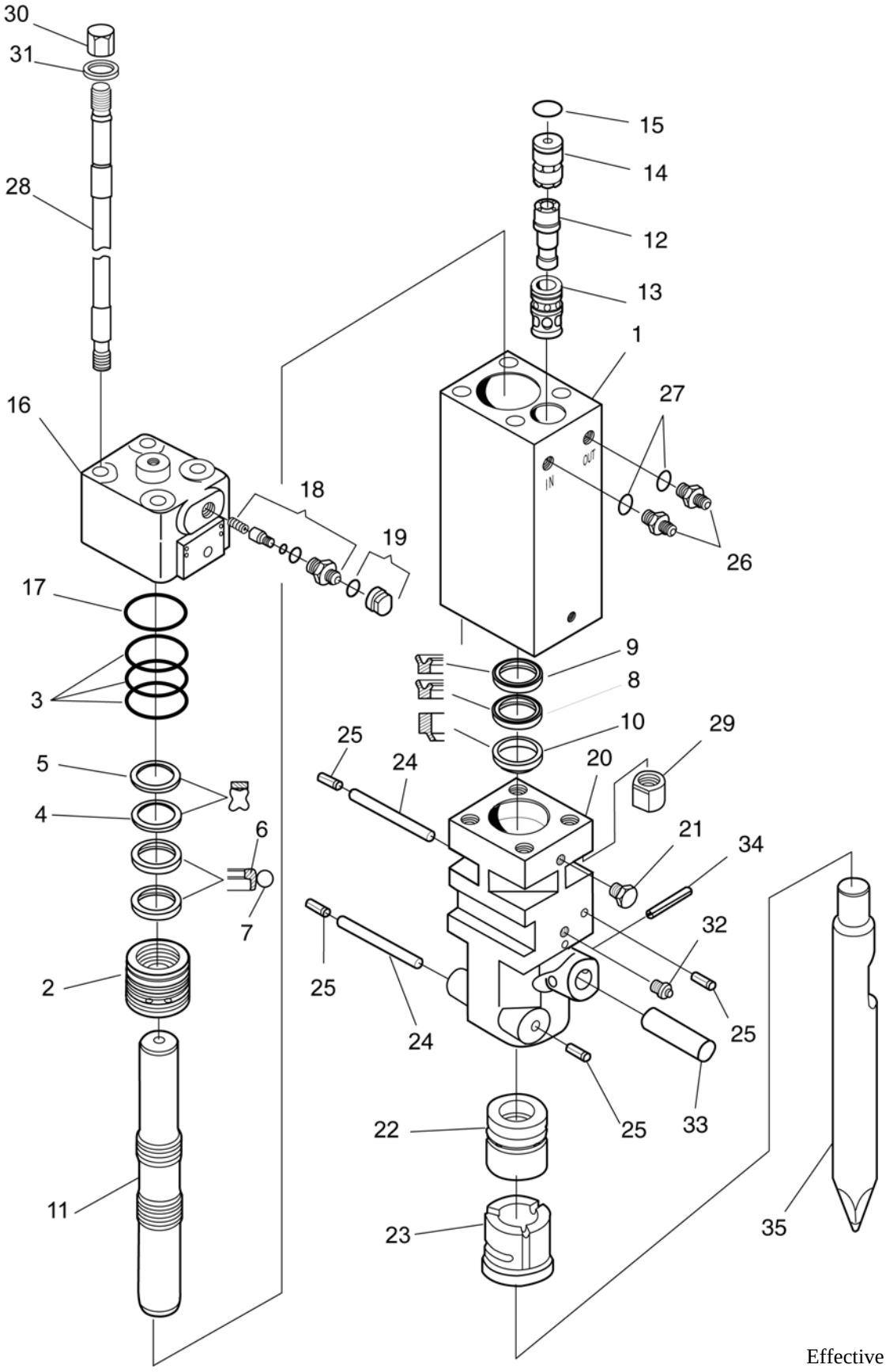
Effective 9/98

HH1000 PARTS LIST S/N:6H400 & UP

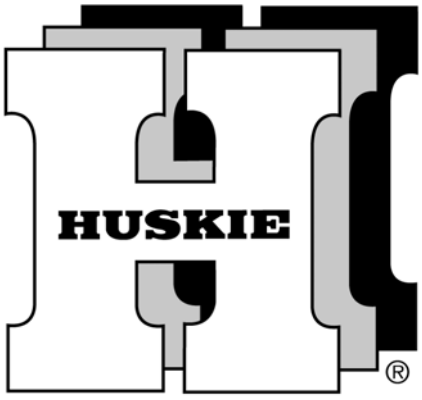
ITEM	NAME	NUMBER	QTY.
1	Cylinder	3F01-2100001	1
2	Cylinder Sleeve	3F01-2100002X	1
3	Cylinder Sleeve O-Ring*	3F01-07228B	3
4	Quad Ring*	3F01-QD210000	1
5	Back Up Ring*	3F01-BU210000	1
6	Step Seal*	3F01-ST210000	2
7	Buffer O-Ring*	3F01-OR210000	2
8	U-Packing*	3F01-U10000I	1
9	U-Packing*	3F01-U10000H	1
10	Dust Seal*	3F01-D10000D	1
11	Piston	3F01-2100011	1
12	Main Valve	3F01-2100622	1
13	Main Valve Inner Sleeve	3E01-2060623	1
14	Main Valve Outer Sleeve	3E01-2060624	1
15	Main Valve O-Ring*	3E01-09092B	1
16	Back Cap	3F01-2100031	1
17	Back Cap O-Ring*	3F01-07228A	1
18	Gas Valve Assembly	3Z01-G00001	1
19	Gas Valve Cap with O-Ring	3Z01-G00004	1
20	Front Cap	3F01-2100041	1
21	Front Cap Plug	3Z01-FP0038	1
22	Shank Bushing	3F01-100042	1
23	Front Cap Bushing	3F01-100043	1
24	Bushing Set Pin	3F01-100044	2
25	Bushing Spring Pin	3E01-S34068	4
26	Nipple PF—3/4in.—1.1/16in. UN	3Z03-N00002	2
27	O-Ring 1BG-30	3F03-07068B	2
28	Side Rod Assembly	3F01-100051	4
29	Side Rod Front Nut	3F01-100052	4
30	Side Rod Back Nut	3F01-100053	4
31	Side Rod Washer	3F01-100054	4
32	Grease Nipple	3Z01-GN0018	1
33	Tool Set Pin	3F01-100061	1
34	Tool Spring Pin	3E01-S34188	1
35	Tool Moil (Chisel, Blunt)	3F01-201P(Fx,E)	1
NI	Seal Kit	3F01-210SKX	1
NI	Gas Charger	3Z01-202GC	1

***Included in seal kit. NI denotes not illustrated. Effective 9/98**

HH1000 HAMMER S/N: 6H400 & UP



Effective 9/98



HYDRAULIC HAMMERS

IPC INDUSTRIES, INC.
194 N. BRANDON DRIVE
GLENDALE HEIGHTS, IL 60139
TOLL FREE 1-800-487-5431
PHONE 630-893-5558
FAX 630-790-3751