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HR190

HAMMEROC



Operation Maintenance Manual & Part List

HAMMEROC Corp.

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Operation
Maintenance
Manual & Part List

HR 190

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HAMMEROG Corp.

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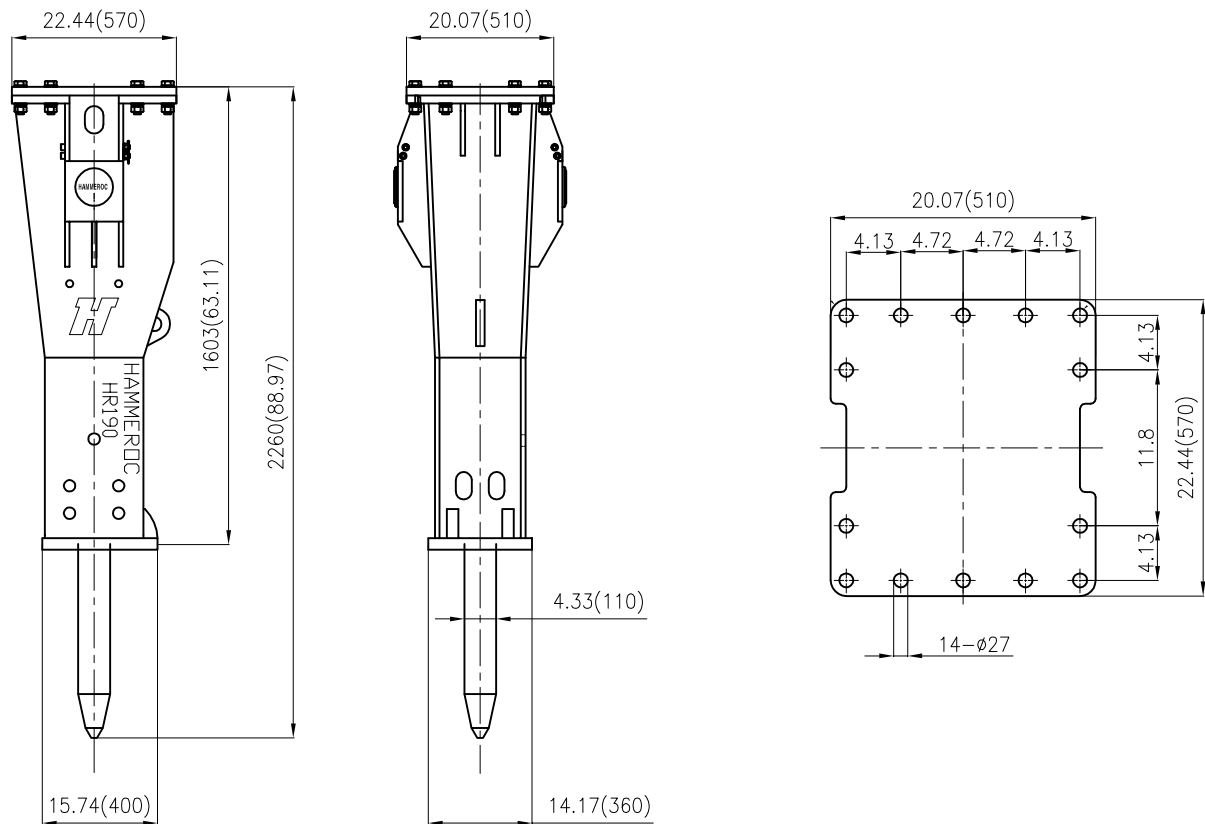
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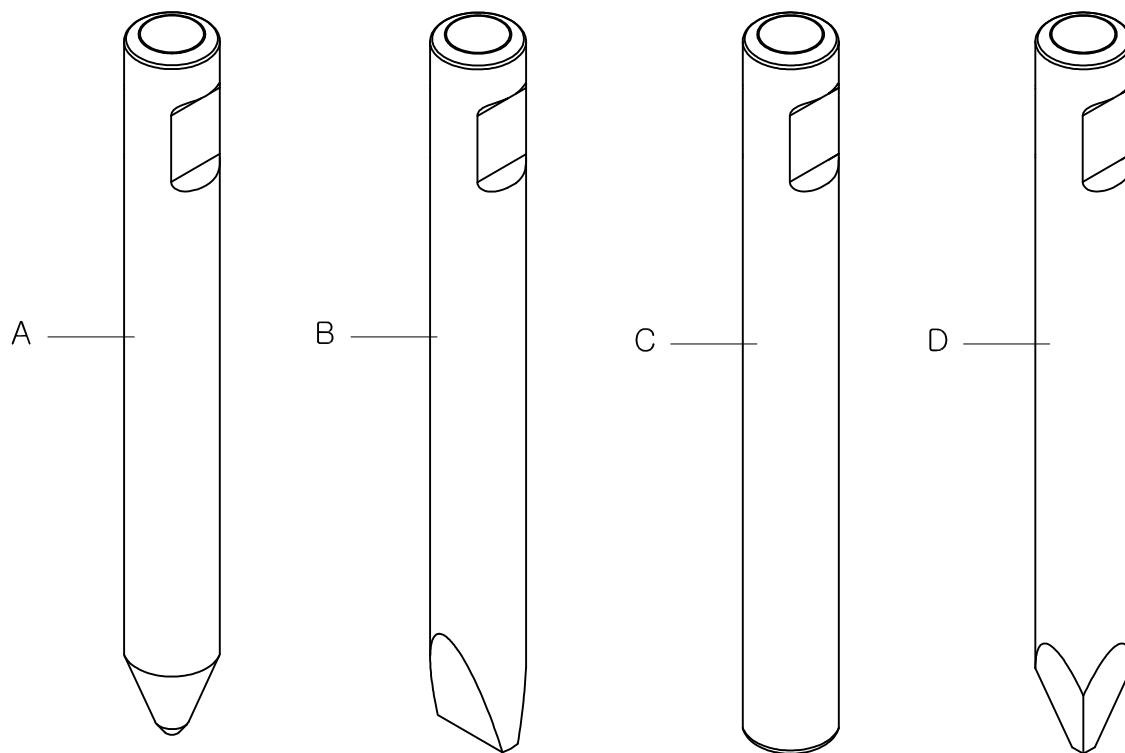
1. SPECIFICATION

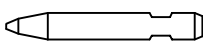
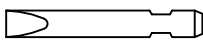
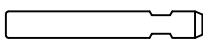
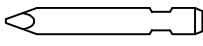
1-1. General specifications



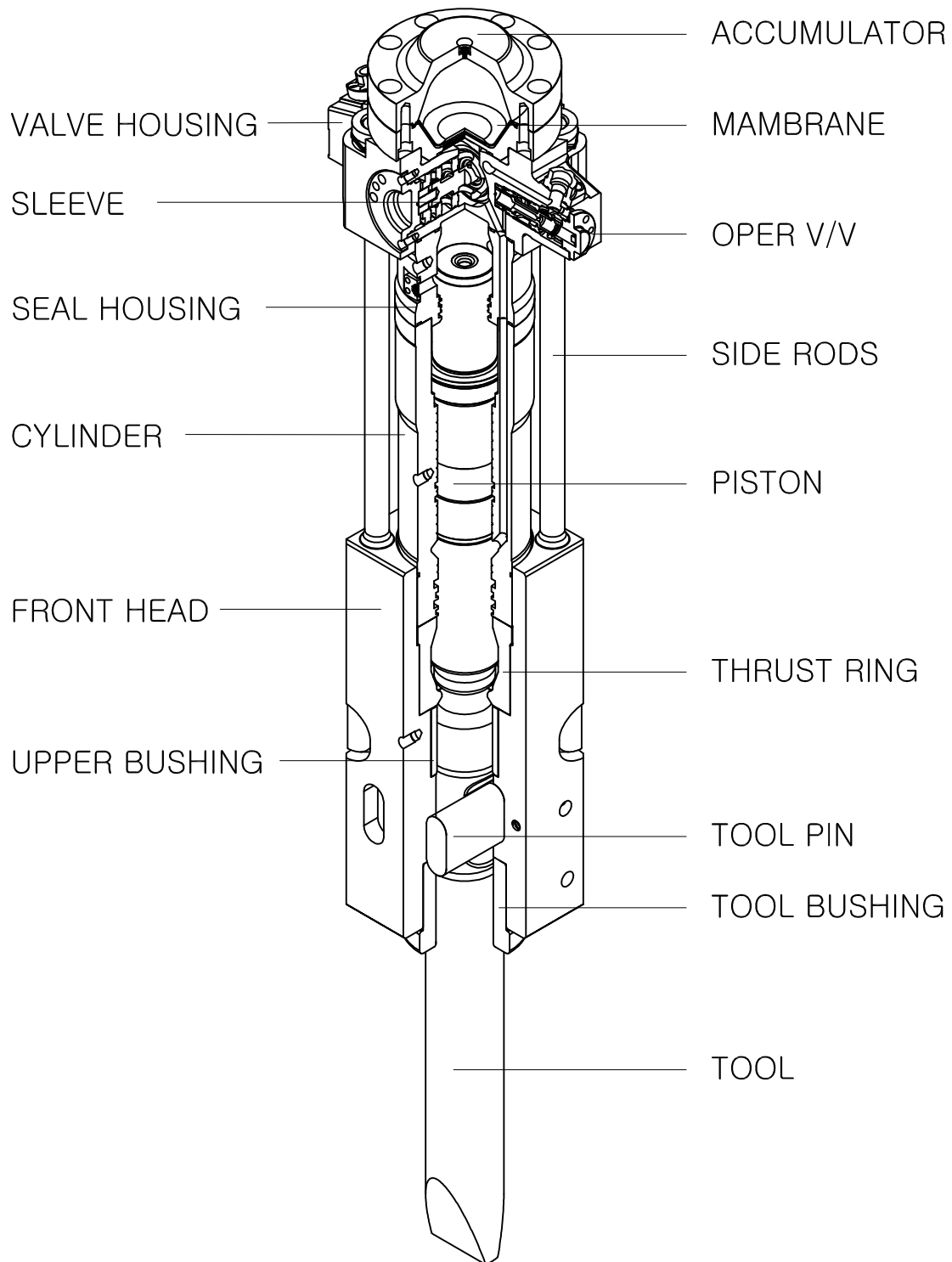
Item	specifications
Working weight	2640 lb
Impact frequency	400 ~ 500 BPM
Operating pressure	1740 ~ 2030 psi (120~140 bar)
Relief pressure	2460 ~ 2750 psi (170 ~ 190 bar)
Oil flow	21~26 g/min (80~100 l/min)
Back pressure	145 psi (10 bar)
Tool diameter	4.33 in (110mm)
Oil temperature	-20 ~+80 °C (-4 ~+176 °F)
Hydraulic oil viscosity	1000 ~15 cSt (131~2.35 °E)
Pressure line size	3/4 in (19 mm)
Return line size	1 in (25 mm)
Carrier weight	31000~40000 lb (14~18 ton)

1-2. Tool specifications



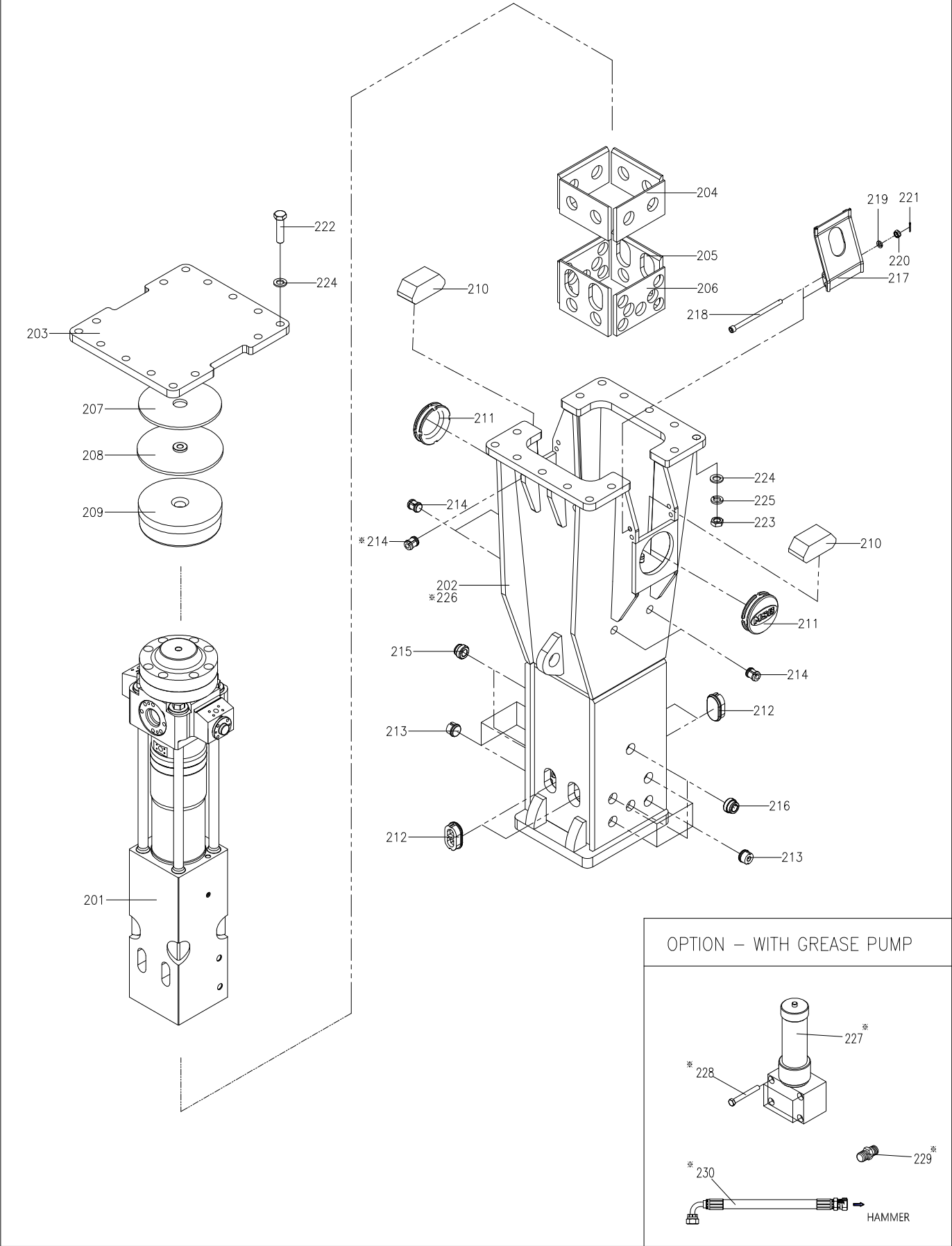
	Name	Length in (mm)	Weight lb (kg)	Diameter in (mm)	Remarks
◎ 	Cone tool (A)	37.4 (950)	139 (63)	4.3 (110)	
⊕ 	Chisel tool (B)	37.4 (950)	142 (64.5)	4.3 (110)	
○ 	Blunt tool (C)	34.2 (870)	137 (62)	4.3 (110)	
⊗ 	Moil tool (D)	37.4 (950)	134 (61)	4.3 (110)	

1-3. Structure detail



2. PART LIST

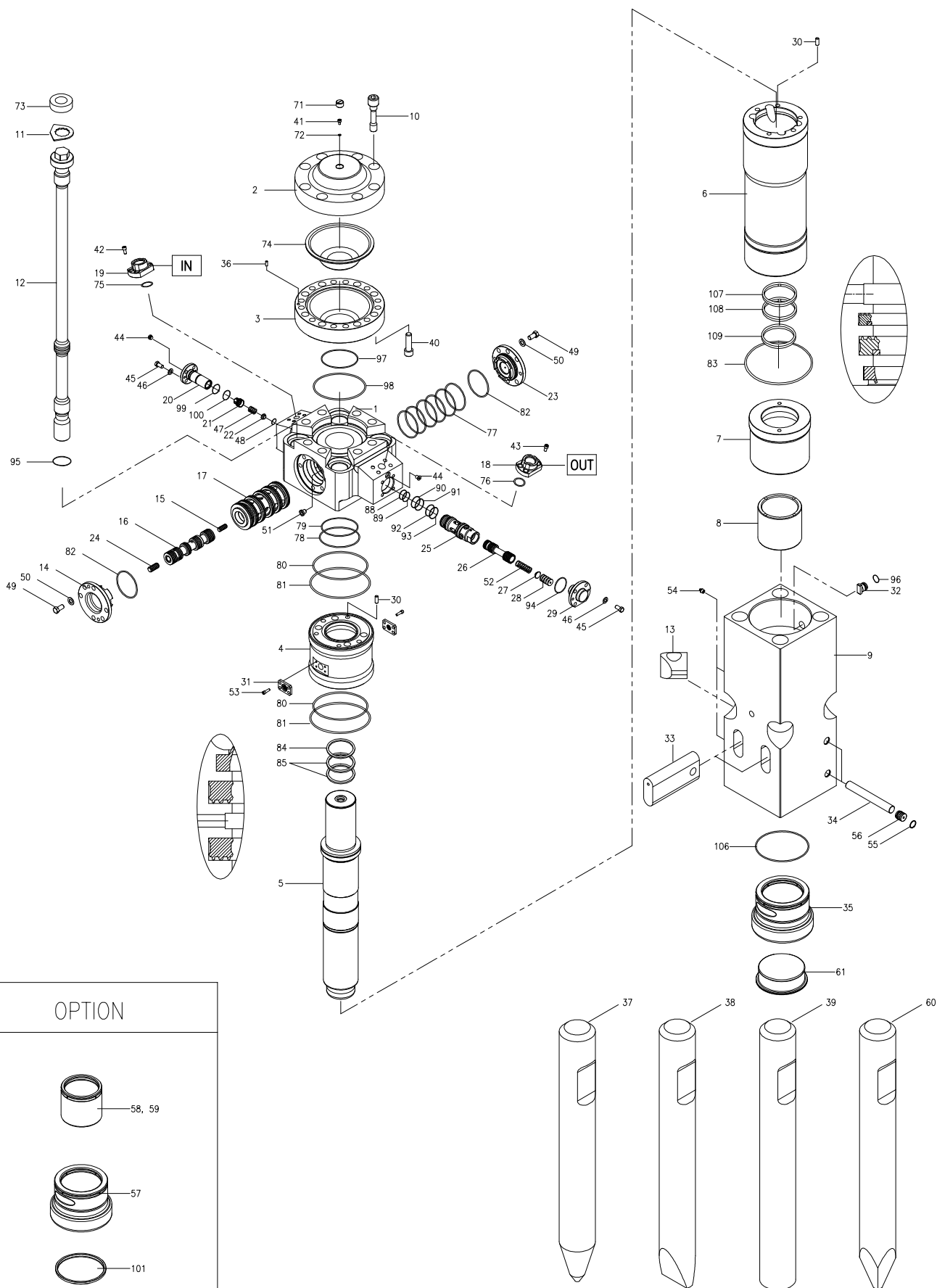
2-1. HR190 HOUSING



2-1. HR190 HOUSING Part List

NO	PART NO.	PART NAME	Q'TY	REMARK
201	—	HAMMER ASS'Y	1	
202	B1600010	HOUSING ASS'Y (Standard)	1	
203	B1500020	TOP COVER PLATE	1	
204	B1500030	WEARING PLATE	4	
205	B1500040	WEARING PLATE	2	
206	B1600050	WEARING PLATE	2	
207	B1500060	WEARING PLATE	1	
208	B1500070	TOP PLATE ASS'Y	1	
209	B1500080	TOP BUFFER	1	
210	B1500090	SIDE BUFFER	2	
211	B1500100	RUBBER	2	
212	B1800110	RUBBER	4	
213	B1800130	RUBBER	8	
214	B3000140	RUBBER	4 (5)*	Auto grease Option
215	B3200040	RUBBER	2	
216	B3200050	RUBBER	2	
217	B1500150	PORT COVER (IN,OUT)	2	
218	SB1420225	BOLT	4	
219	SW140000	S/WASHER	4	
220	HN142000	NUT	4	
221	SP20000	SPLIT PIN	4	
222	HB2430100	BOLT	14	
223	NN243000	NUT	14	
224	PW240000	P/WASHER	28	
225	SW240000	S/WASHER	14	
226	B1603500	HOUSING ASS'Y (Auto grease)	1	
227	HL11CU-400	GREASE PUMP	1	Option
228	SB12175100	SOCKET BOLT	4	Option
229	BHSSG101	ADAPTER	1	Option
230	BHSSG100	HOSE	1	Option

2-2. HAMMER ASS'Y (Standard type)



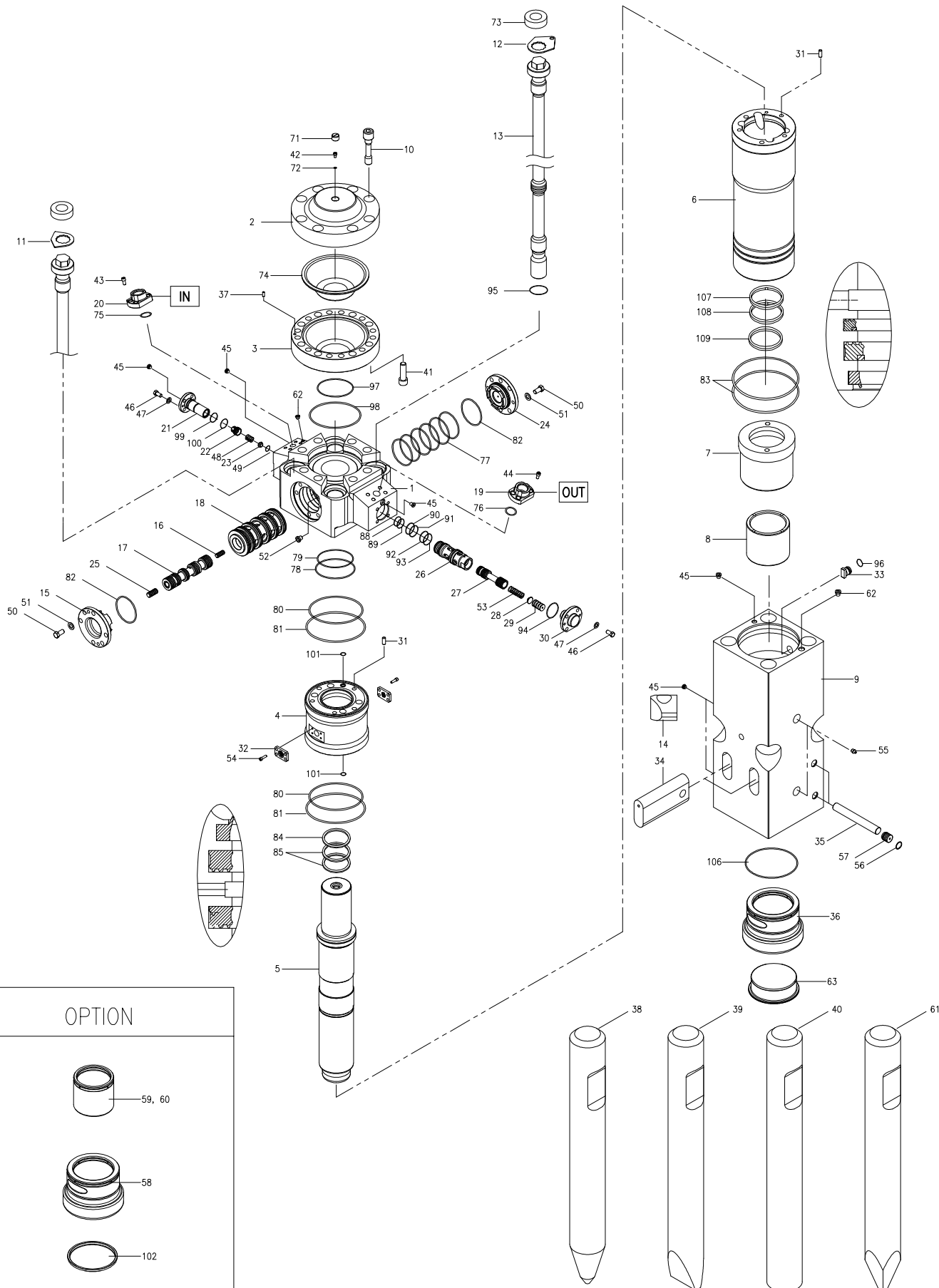
2-2. HAMMER ASS'Y (Standard type) PartList

NO	PART NO.	PART NAME	Q'TY	REMARK
1	B1506010	V/V HOUSING	1	
2	B1506020	ACCUMULATOR COVER	1	
3	B1606030	ACCUMULATOR BOTTOM	1	
4	B1506040	SEAL HOUSING	1	
5	B1606050	PISTON	1	
6	B1606060	CYLINDER	1	
7	B1506070	THRUST RING	1	
8	B1506080	UPPER BUSHING	1	
9	B1606090	FRONT HEAD	1	
10	B1506100	ACC. COVER BOLT	8	
11	B1506110	LOCK WASHER	4	
12	B1506130	SIDE ROD	4	
13	B1506140	SIDE ROD NUT	4	
14	B1506150	SLEEVE COVER 1.	1	
15	B1506160	SPOOL 2.	1	
16	B1506170	MAIN SPOOL	1	
17	B1506180	SLEEVE	1	
18	B4006200	FLANGE(PT1") OUT	1	
19	B1506200	FLANGE (PT 3/4") IN	1	
20	B1506210	CHECK V/V HOUSING	1	
21	B2506220	CHECK V/V SPOOL	1	
22	B2506230	CHECK V/V SPRING GUIDE	1	
23	B1506240	SLEEVE COVER 2.	1	
24	B2506160	SPOOL 1.	1	
25	B1506260	OPER. V/V GUIDE	1	
26	B1506270	OPER. V/V SPOOL	1	
27	B1506280	OPER. V/V SPRING GUIDE	1	
28	B1506290	OPER. V/V SHIM PLATE	5	
29	B1506300	OPER. V/V COVER	1	
30	B4006370	V/V HOUSING GUIDE PIN	2	
31	B4006320	AIR BREATHER COVER	2	
32	B4006330	WEDGE	1	

NO	PART NO.	PART NAME	Q'TY	REMARK
33	B1506340	TOOL PIN	2	
34	B1506350	BUSHING PIN	2	
35	B1506820	TOOL BUSHING	1	
36	B4006370	ACC. GUIDE PIN	1	
37	B1506380	TOOL(CONE)	1	
38	B1506390	TOOL (CHISEL)	1	
39	B1506400	TOOL (BLUNT)	1	
40	SB2015060	ACC. BOTTOM BOLT	12	
41	B4006420	ACC. GAS BOLT	1	
42	SB1015040	FLANGE BOLT (IN)	4	
43	SB1217540	FLANGE BOLT (OUT)	4	
44	B4006450	HEX.SOCKET PLUG	2	
45	HB1217530	OPER. V/V COVER BOLT	8	
46	CW120000	LOCK WASHER	8	
47	B2506480	CHECK V/V SPRING	1	
48	B2506490	LOCK RING	1	
49	HB1420030	SLEEVE COVER BOLT	12	
50	CW140000	LOCK WASHER	12	
51	B4006530	HEX. SOCKET PLUG	1	
52	B1606880	OPER. V/V SPRING	1	
53	SB1015030	AIR BREATHER COVER BOLT	8	
54	B4006560	GREASE NIPPLE(STEEL)	2	
55	B1806570	SNAP RING	2	
56	B1806580	RUBBER PLUG	2	
57	B1506840	TOOL BUSHING	1	OPTION
58	B1506830	TOOL INNER BUSHING	1	OPTION
59	B1506860	TOOL INNER BUSHING(P)	1	OPTION
60	B1506620	TOOL (MOIL)	1	
61	B1506650	TOOL BUSHING CAP	1	
71	B4007010	ACC. CAP	1	
72	B4007020	USIT-RING	1	

NO	PART NO.	PART NAME	Q'TY	REMARK
73	B1507030	RUBBER RING	4	
74	B1507040	MEMBRANE	1	
75	B1507050	O-RING	1	
76	B4007050	O-RING	1	
77	B1507070	O-RING	6	
78	B1507080	O-RING	1	
79	B1507090	BACK-UP RING	1	
80	B1507100	O-RING	2	
81	B1507110	BACK UP RING	2	
82	B1507120	O-RING	2	
83	B1507130	O-RING	1	
84	B1507140	WIPER	1	
85	B1507150	SEAL	2	
88	B1507350	BACK-UP RING	1	
89	B2507290	O-RING	1	
90	B1507200	O-RING	1	
91	B1507360	BACK-UP RING	1	
92	B2507190	O-RING	1	
94	B2507200	O-RING	1	
95	B1507250	O-RING	4	
96	B4007260	O-RING	1	
97	B1507270	O-RING	1	
98	B1507280	BACK-UP RING	1	
99	B2507290	O-RING	1	
100	B2507300	O-RING	1	
93	B2507350	BACK-UP RING	1	
106	B4007080	O-RING	1	
107	B1607370	STEP SEAL	1	
108	B1607380	U-PACKING	1	
109	B1607390	WIPER	1	
101	B1507320	WIPER	1	OPTION

2-3. HAMMER ASS'Y (Auto grease type)



2-3. HAMMER ASS'Y (Auto grease type) PartList

NO	PART NO.	PART NAME	Q'TY	REMARK
1	B1506700	V/V HOUSING	1	
2	B1506020	ACCUMULATOR COVER	1	
3	B1606030	ACCUMULATOR BOTTOM	1	
4	B1506710	SEAL HOUSING	1	
5	B1606050	PISTON	1	
6	B1606720	CYLINDER	1	
7	B1506730	THRUST RING	1	
8	B1506080	UPPER BUSHING	1	
9	B1606740	FRONT HEAD	1	
10	B1506100	ACC. COVER BOLT	8	
11	B1506110	LOCK WASHER	3	
12	B1506120	LOCK WASHER	1	
13	B1506130	SIDE ROD	4	
14	B1506140	SIDE ROD NUT	4	
15	B1506150	SLEEVE COVER 1.	1	
16	B1506160	SPOOL 2.	1	
17	B1506170	MAIN SPOOL	1	
18	B1506180	SLEEVE	1	
19	B4006200	FLANGE(PT1") OUT	1	
20	B1506200	FLANGE (PT 3/4") IN	1	
21	B1506210	CHECK V/V HOUSING	1	
22	B2506220	CHECK V/V SPOOL	1	
23	B2506230	CHECK V/V SPRING GUIDE	1	
24	B1506240	SLEEVE COVER 2.	1	
25	B2506160	SPOOL 1.	1	
26	B1506260	OPER. V/V GUIDE	1	
27	B1506270	OPER. V/V SPOOL	1	
28	B1506280	OPER. V/V SPRING GUIDE	1	
29	B1506290	OPER. V/V SHIM PLATE	5	
30	B1506300	OPER. V/V COVER	1	
31	B4006370	V/V HOUSING GUIDE PIN	2	
32	B4006320	AIR BREATHER COVER	2	
33	B4006330	WEDGE	1	

NO	PART NO.	PART NAME	Q'TY	REMARK
34	B1506340	TOOL PIN	2	
35	B1506350	BUSHING PIN	2	
36	B1506820	TOOL BUSHING	1	
37	B4006370	ACC. GUIDE PIN	1	
38	B1506380	TOOL(CONE)	1	
39	B1506390	TOOL (CHISEL)	1	
40	B1506400	TOOL (BLUNT)	1	
41	SB2015060	ACC. BOTTOM BOLT	12	
42	B4006420	ACC. GAS BOLT	1	
43	SB1015040	FLANGE BOLT (IN)	4	
44	SB1217540	FLANGE BOLT (OUT)	4	
45	B4006450	HEX.SOCKET PLUG	6	
46	HB1217530	OPER. V/V COVER BOLT	8	
47	CW120000	LOCK WASHER	8	
48	B2506480	CHECK V/V SPRING	1	
49	B2506490	LOCK RING	1	
50	HB1420030	SLEEVE COVER BOLT	12	
51	CW140000	LOCK WASHER	12	
52	B4006530	HEX. SOCKET PLUG	1	
53	B1606880	OPER. V/V SPRING	1	
54	SB1015025	AIR BREATHER COVER BOLT	8	
55	B4006560	GREASE NIPPLE(STEEL)	2	
56	B1806570	SNAP RING	2	
57	B1806580	RUBBER PLUG	2	
58	B1506840	TOOL BUSHING	1	OPTION
59	B1506830	TOOL INNER BUSHING	1	OPTION
60	B1506860	TOOL INNER BUSHING(P)	1	OPTION
61	B1506620	TOOL (MOIL)	1	
62	B2506530	HEX.SOCKET PLUG	2	
63	B1506650	TOOL BUSHING CAP	1	
71	B4007010	ACC. CAP	1	
72	B4007020	USIT-RING	1	

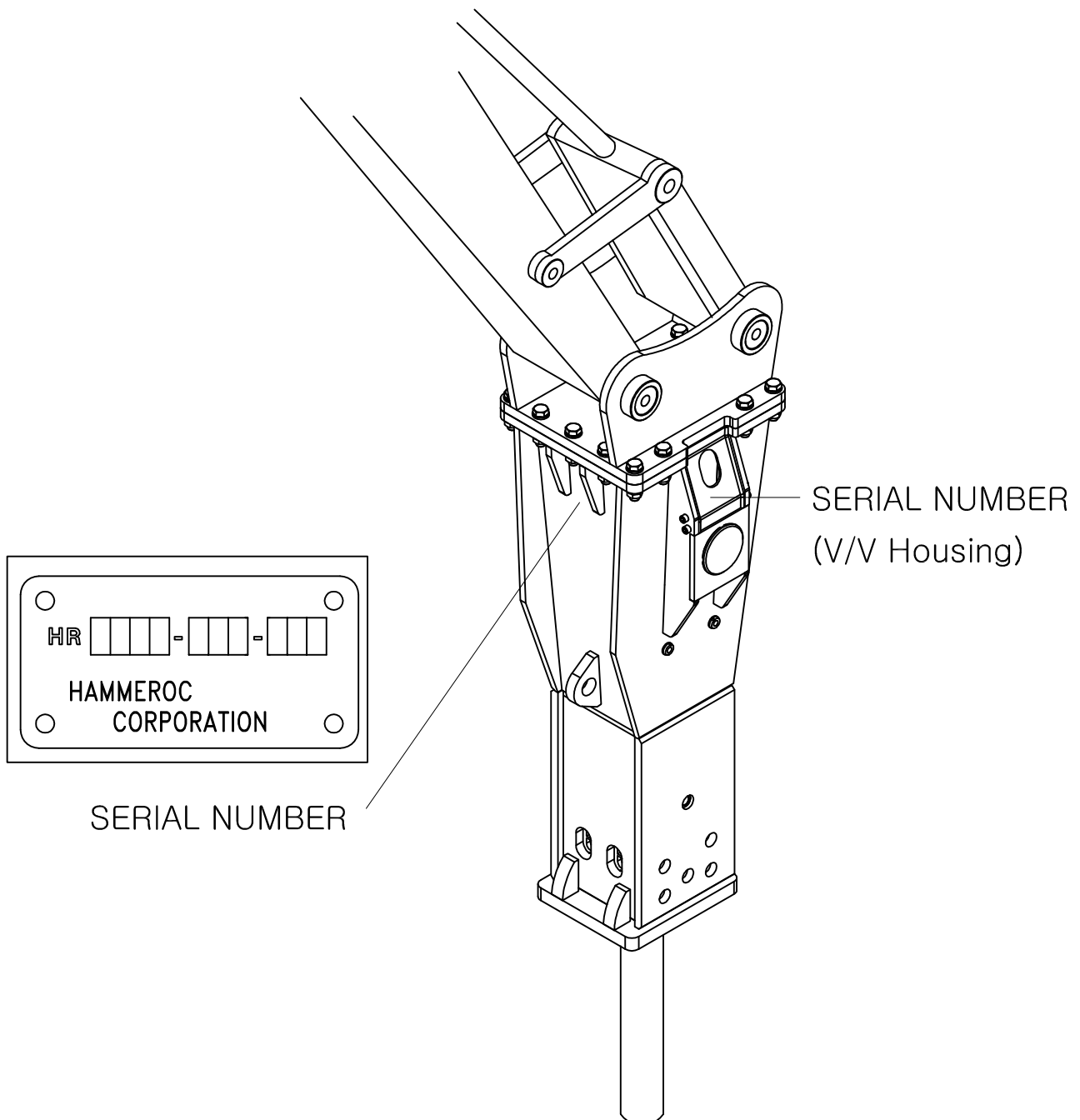
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74	B1507040	MEMBRANE	1	
75	B1507050	O-RING	1	
76	B4007050	O-RING	1	
77	B1507070	O-RING	6	
78	B1507080	O-RING	1	
79	B1507090	BACK-UP RING	1	
80	B1507100	O-RING	2	
81	B1507110	BACK UP RING	2	
82	B1507120	O-RING	2	
83	B1507130	O-RING	2	
84	B1507140	WIPER	1	
85	B1507150	SEAL	2	
88	B1507350	BACK-UP RING	1	
89	B2507290	O-RING	1	
90	B1507200	O-RING	1	
91	B1507360	BACK-UP RING	1	
92	B2507190	O-RING	1	
93	B2507350	BACK-UP RING	1	
94	B2507200	O-RING	1	
95	B1507250	O-RING	4	
96	B4007260	O-RING	1	
97	B1507270	O-RING	1	
98	B1507280	BACK-UP RING	1	
99	B2507290	O-RING	1	
100	B2507300	O-RING	1	
101	B1807310	O-RING	2	
106	B4007080	O-RING	1	
107	B1607370	STEP SEAL	1	
108	B1607380	U-PACKING	1	
109	B1607390	WIPER	1	
102	B1507320	WIPER	1	OPTION

3. OPERATION

3-1. Product numbers

The serial number is stamped on the valve housing and housing.

It is important to make correct reference to the serial number of the attachment when making repairs or ordering spare parts. Identification of the serial number is the only proper means of maintaining and identifying parts for a specific product.



3-2. Selection of tools

HAMMEROC can offer the selection of standard and special tools to suit each application.

The correct type of the tool must be selected to get the best possible working result and the longest life time for tool.

1) Blunt

* For igneous(e.g. granite) and tough metamorphic rock(e.g.gneiss)into which the tool doesn't penetrate.

- * Concrete
- * Breaking boulders.

2) Chisel, cone,moil

* For sedimentary(e.g. sandstone) and weak metamorphic rock into which the tool penetrates.

- * Concrete
- * Trenching and benching

1) Penetrative breaking

* In this form of breaking, a hydraulic breaker with a high impact frequency is normally used, as the impact energy is not important.

Themoil point or chisel tool is forced into the material causing it to crack and break up.

This method is most effective in soft, layered, low abrasive material such as concrete, asphalt, hard or frozen ground and other similar materials.

2) Impact breaking

In impact breaking the impact energy of the hydraulic breaker is the most important factor, therefore larger breakers are used.

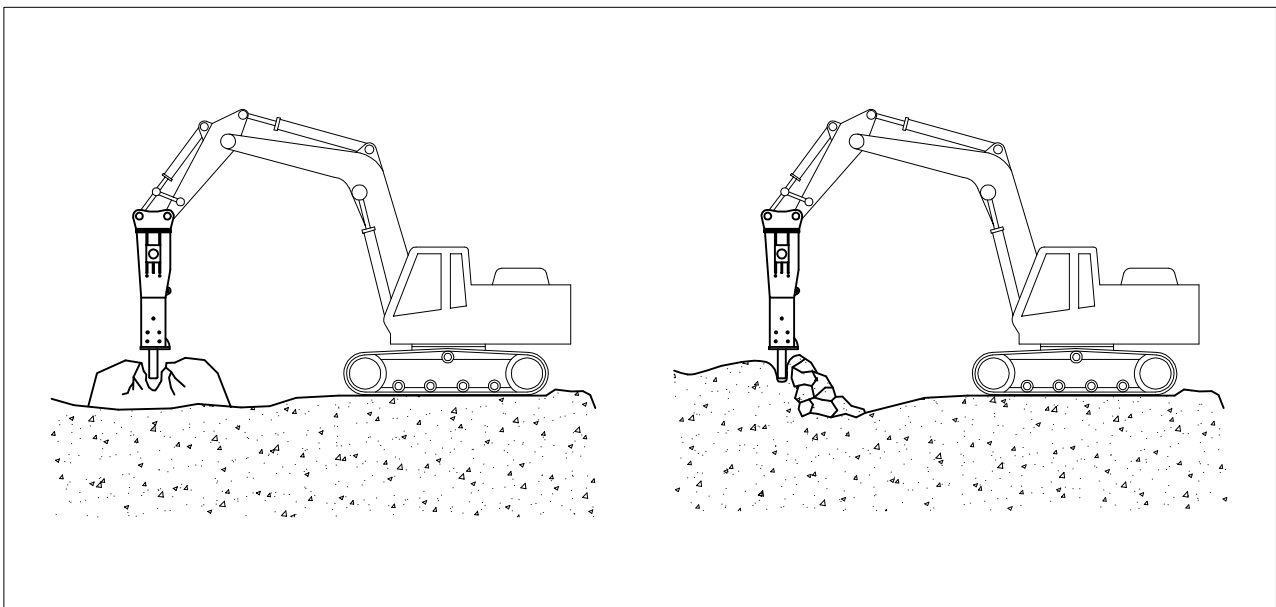
* In impact breaking, material is broken by transferring a strong stress wave from the piston via the tool into material to be broken.

This stress wave causes the material to disintegrate from inside.

* Best possible energy transfer between the tool and object is achieved with a blunt tool. Impact breaking is most effective in hard, brittle and very abrasive materials.

3-3. Principles of breaking

* There are basically two ways of breaking with a hydraulic breaker.



3-4. Correct working methods

1) Prepare the carrier as for normal excavation work.

- a. Move the carrier to the required position.
- b. Engage the parking brake.
- c. Set the drive to neutral.
- d. Disengage the boom lock(if fitted).

2) Set the engine speed to the recommended engine RPM.

3) Place the tool against the object to be broken at 90 degrees.

- a. Avoid small irregularities on the object which will break easily and cause either idle strokes or incorrect working angle.
- b. Incorrect working methods may cause failure in the operation of the breaker or housing.

4) Use the carrier machine boom to press the breaker firmly against the material to be broken. Do not lift the front of the carrier machine off of the ground. Only apply sufficient down-force to keep the breaker tool against the object to be broken.

- a. Do not pry the breaker with the boom.
- b. Do not press too much or too little with the boom.

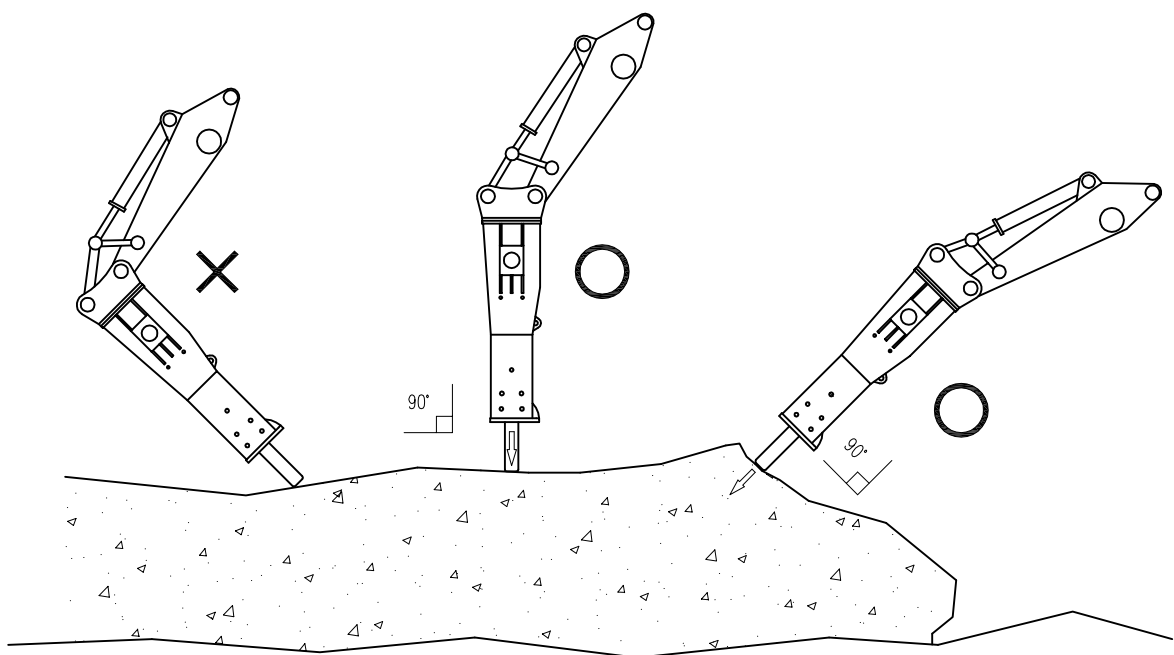
5) Start the breaker.

6) Keep the tool firmly against the object all the while that the breaker is operating.

* Feed the breaker towards the object all the time with the carrier machine boom.

7) Keep the tool at 90 degrees to the object all the times.

- a. If object moves or its surface breaks, correct the angle immediately.
- b. keep feed force and tool aligned.



3-5. Operating temperature

- 8) Stop the breaker as soon as object breaks.
- a. Do not allow the breaker to drop and make idle strokes when the object breaks. Constant idle strokes can damage the breaker.
 - b. If breaker falls down against the broken material, it can cause damage to the housing.

9) Do not strike in one spot for more than 15 seconds at a time.

* If the object does not break after fifteen seconds, stop the breaker and change the position of the tool. Otherwise the tool will only make an indentation, which will fill with dust. This dampens the impact effect and will cause the tool to overheat.

10) When breaking concrete, hard or frozen ground, or any similar material, never strike and bend with the tool at the same time. This could cause the tool to break.

The acceptable operating temperature is $-20^{\circ}\text{C} \sim 80^{\circ}\text{C}$ ($-4^{\circ}\text{F} \sim 176^{\circ}\text{F}$).

If the temperature is lower than -20°C (-4°F), the breaker and tool must be preheated before starting the operation in order to avoid breakage of the accumulator membrane and the tool. During operation they will remain warm.

3-6. Other important points.

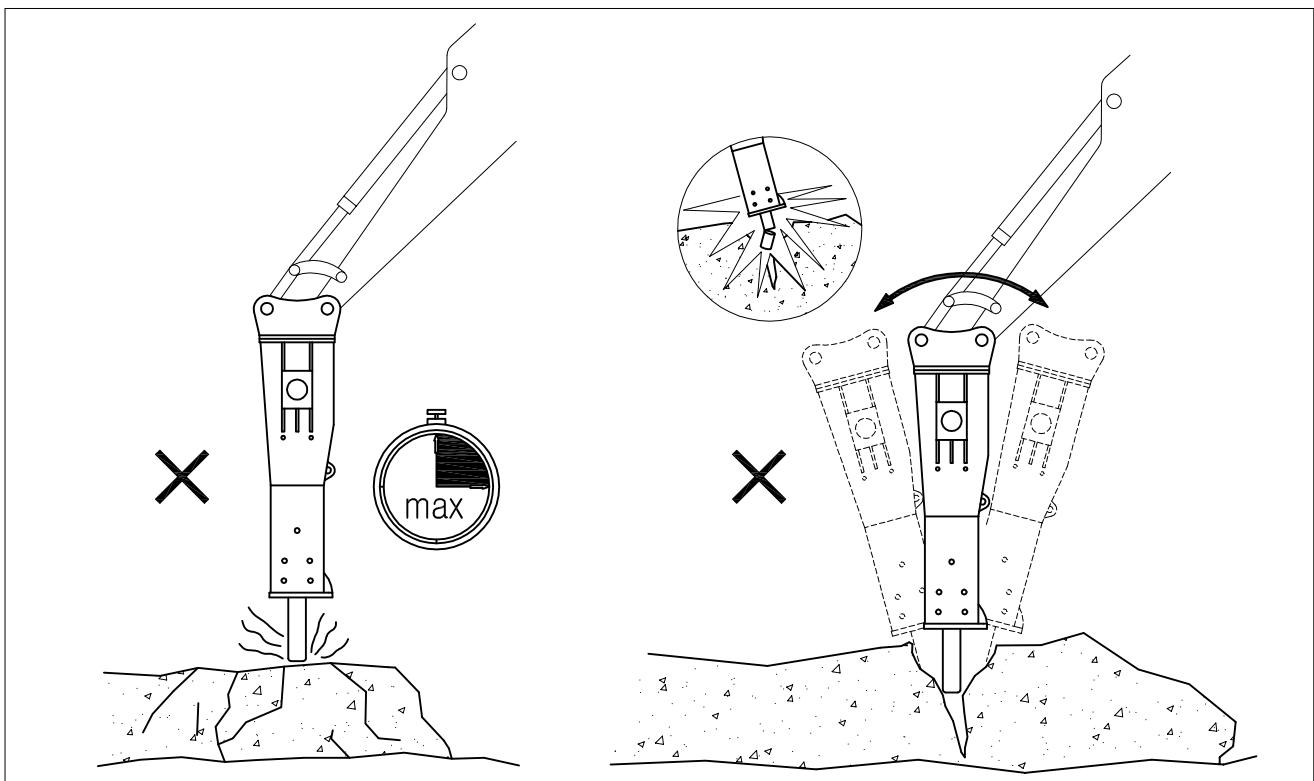
a. Listen to the breaker's sound while you are using it.

* If the sound becomes thinner and the impact less efficient, the tool is not aligned with the material and/or there is not enough "down" force on the tool.

* Realign the tool and press the tool firmly against the material.

b. The breaker as a standard assembly, must not be used under water.

* If water fills the space where the piston strikes the tool, a strong pressure wave is generated and the breaker may be damaged.



3-7. Storage

LONG TERM STORAGE

Observe the following points when the hammer is stored.

In this way the major parts of the attachment are protected from rust and the machine is ready to be used whenever necessary.

- a. The storage area must be dry.
- b. The tool must be removed from the hammer.
- c. The lower end of the piston, tool and tool bushing must be well protected with grease in all hydraulic hammers.
- d. Connections must be sealed with clean plugs to prevent oil leakage and dirt from getting into couplings.
- e. The product must be stored in the vertical position.
- f. Make sure the product can not fall.

3-8. Mounting and dismounting the hammer

REMOVAL FROM CARRIER

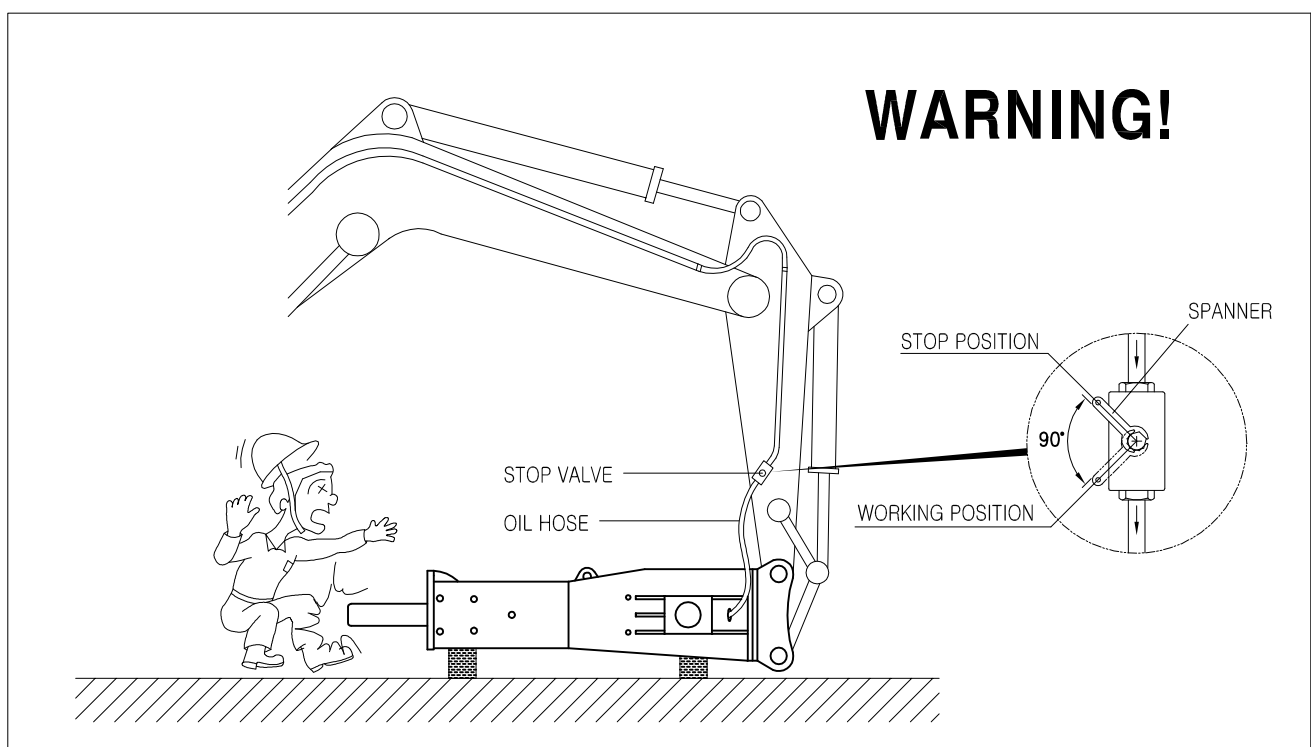


Warning! The hammer must be secured from rolling over when disconnecting from the carrier. Only use skilled operator to position carrier for hammer removal.
Warning! Hydraulic pressure inside hammer must always be released before opening hose connection!

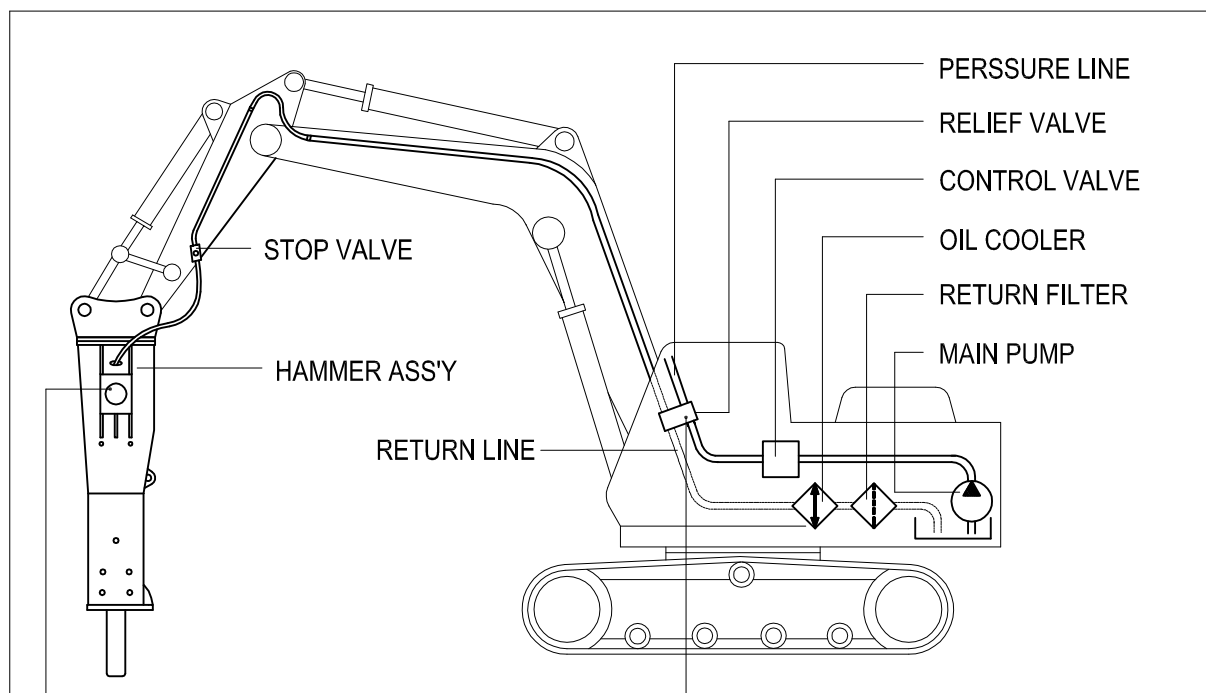
- Position hammer horizontally on the floor and remove the tool.
- Stop carrier engine. Operate boom and hammer controls to release pressure trapped inside hoses. Wait ten minutes for oil pressure to drop.
- Close hammer inlet and outlet lines. If quick couplers are used, disconnection automatically closes hammer lines.
- Disconnect hoses. Plug the hoses and the hammer inlet and outlet ports.
- Remove mounting pins and other parts.
- The carrier can be moved aside.

INSTALLATION

- Install hammer in the same way as mounting a bucket. Install bucket pins.
- Connect hoses. Hammer inlet port is marked on the valve housing with "IN" and outlet port with "OUT".
- Open hammer inlet and outlet lines.



3-9. Setting of operating pressure.



MODEL	OPERATING PRESSURE
HR190	1740~2030psi (120~140bar)

MODEL	RELIEF PRESSURE
HR190	2460~2750psi (170~190bar)

1) Operating Pressure

- Stop the carrier engine.
- Assemble the high pressure gauge to the high pressure measuring port. Start the engine.
- Set the tool of the breaker e.g. on a thick steel plate.
- Adjust operating engine revolution and start to operate the breaker.
- Read the average pressure from the high pressure gauge operating pressure.
- Operating pressure is preadjusted at the factory and there should be no reason to adjust it.
- Stop the carrier and remove the gauge.
- Tighten the plug of the pressure measuring point.

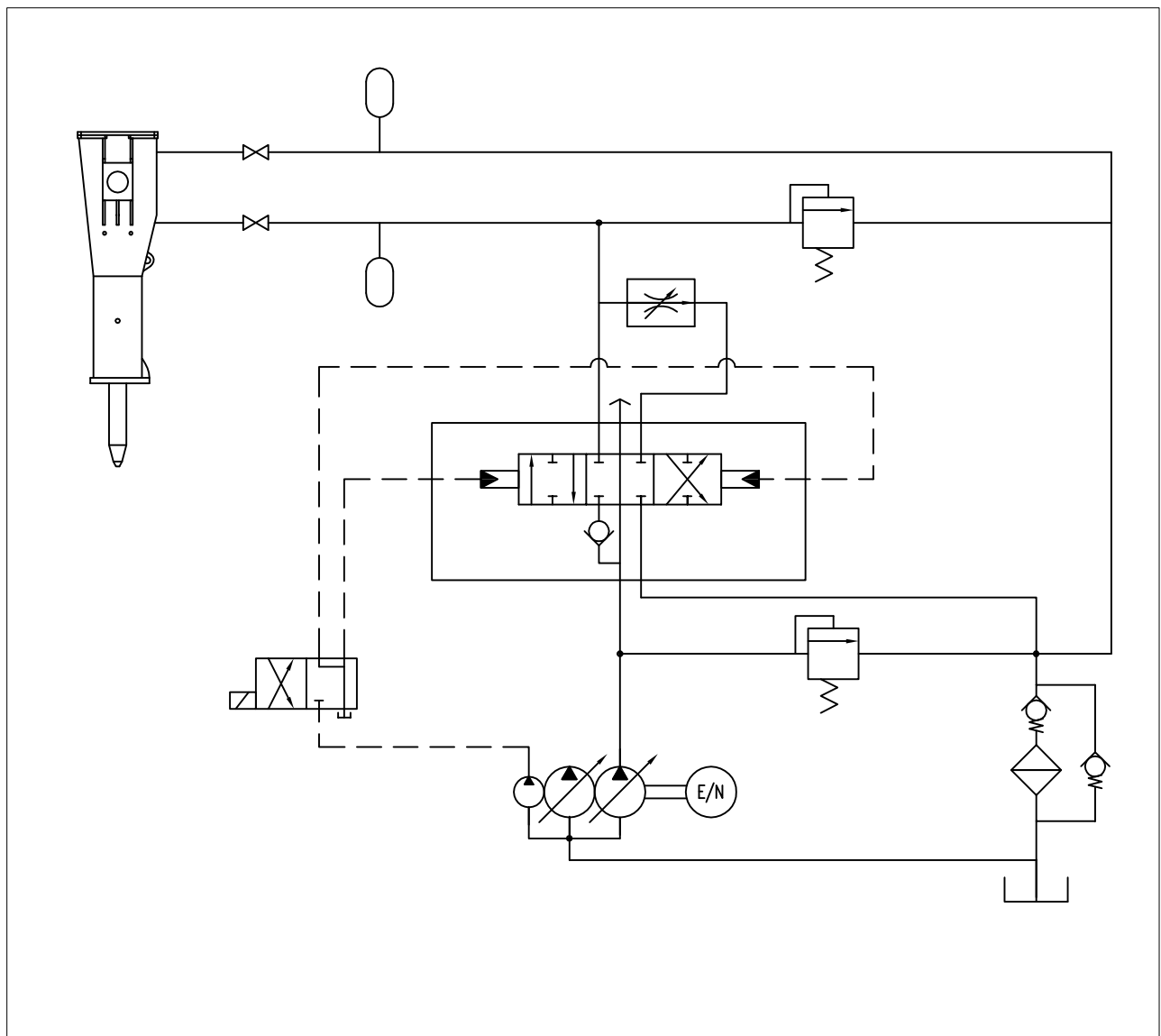
2) Relief valve

- The relief valve is a safety device which is used to protect the breaker when the pressure rises in hydraulic circuit.
- The operating pressure of the breaker determines the setting of the relief valve in the pressure line.
- The relief valve setting should be acceptable as per the specifications of each HAMMERO C models.

3-10. Specification of hoses and pipes

MODEL	HOSE ASSEMBLY			PIPING LINE SIZE	
	IN	OUT	Length	IN	OUT
HR 190	PF 3/4"	PF 1"	1800mm	PF 3/4"	PF 1"

3-11. Hydraulic circuit



4. LUBRICATION

4-1. Manual lubrication

* Grease interval

1. Tool shank must be well lubricated before installing tool at regular intervals.
2. 5~10 strokes from grease gun to tool bushing and tool at regular intervals.
3. Adapt interval and amount of grease to decrease wearing of tool and good working conditions.

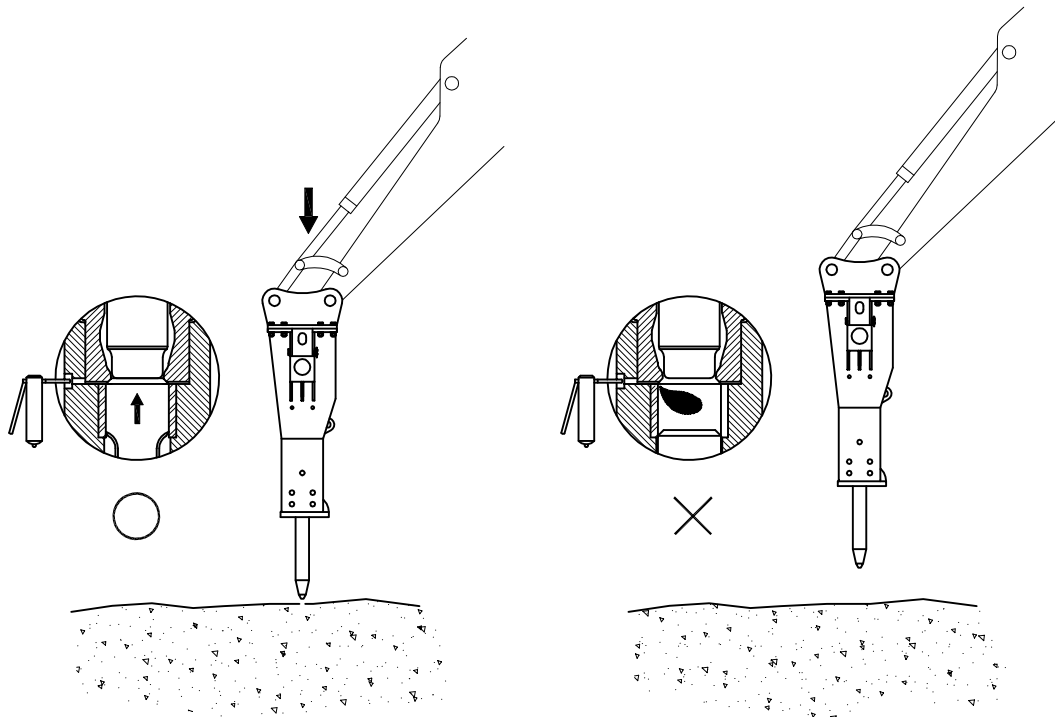
This should be done every 2 hours.

Insufficient greasing or improper grease may cause:

- Abnormal wear of tool bushing and tool
- Tool breakage

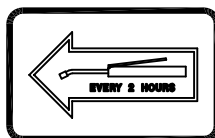
Technical data :

- NLGI grade2
- Synthetic oil base with aluminium complex soap
- Approximately 15% graphite copper solids to reduce metal to metal contact damage
- Dropping point 500°F (260°C)
- Viscosity 15 cSt
- Temperature range -20°F ~ 450°F (-30°C~230°C)



GREASING POINT

The greasing point on the hammer have been marked with the following sticker.



4-2. Automatic lubrication

Lubrication of the hammer can be made automatically by equipping the carrier with a lubrication pump. The tool grease is supplied from the pump into the hammer by hose.

The advantages of the automatic lubrication system are longer service life for wear parts and a higher utilization rate for the hammer.

4-3. Hydraulic oil

When the breaker is used continuously, the temperature of the hydraulic oil normalizes at a certain level depending on conditions and on the carrier. At this temperature, the viscosity of the hydraulic oil should be 20~40cSt(2.90~5.35°C)

The HAMMERO hydraulic breaker must not be started if the viscosity of the hydraulic oil is above 1000cSt(131°C) or operated when the viscosity of the hydraulic oil is below 15cSt(2.35°C)

1) When the oil is too thick, the following problems may occur:

- a. Difficult start up.
- b. Stiff operation.
- c. The breaker strikes irregularly and slowly.
- d. Danger of cavitations in the pumps and hydraulic breaker.
- e. Sticky valves.
- f. Filter bypass, impurities in oil not removed.

2) When the oil is thin, the following problems may occur:

- a. Efficiency losses(internal leaks).
- b. Damage to gaskets and seals leaks.
- c. Accelerated wearing of parts, because of decreased lubrication efficiency.

3) Special oils

- * In some cases special oils(e.g. biological oils and non-inflammable oil) can be used, please observe following aspects when considering the use of special oil; the viscosity range in the special oil must be in the given range of 15~1,000cSt (2.35~131°C)

4) Cleanness of hydraulic oil

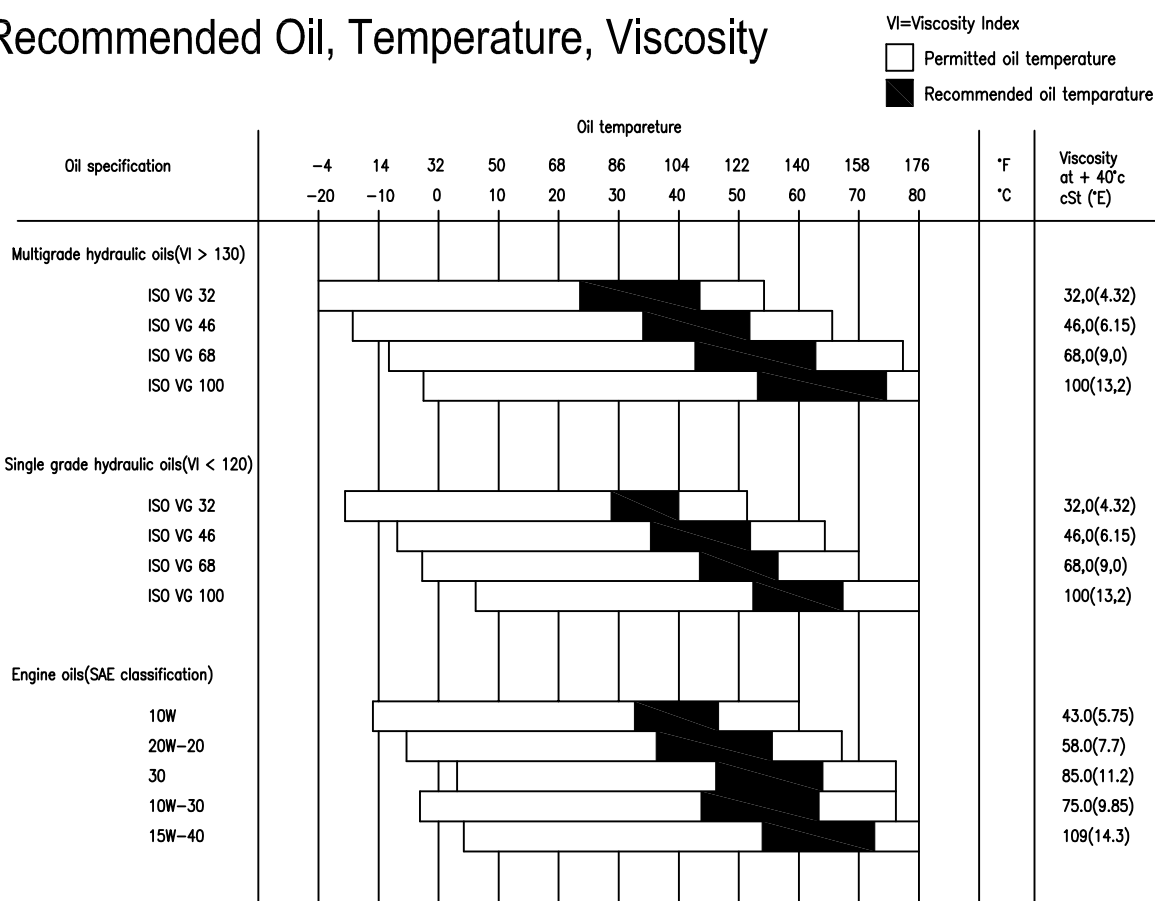
- * The hydraulic oil filter of the carrier will clean the oil flowing through the breaker.
- * The purpose of the oil filter is to remove impurities from the hydraulic oil since they cause accelerated component wear, blockages and even seizure.
- * Impurities also cause the oil to overheat and deteriorate.
- * Air and water are also impurities in oil.

5) Oil filter

- * When working with hydraulic breaker, the carrier oil filter must fulfil the following specifications:
 - a. The oil filter must be rated at 25 microns maximum.
 - b. The oil filter must be a standard return line filter rated to maximum working pressure.

- c. The oil filter must have a volume flow capacity of at least twice the breaker's maximum flow.
 - d. The cooler must withstand a dynamic pressure of 290 psi(20bar).
 - e. If the carrier's oil cooler is too small either the original cooler must be replaced with a larger one or an auxiliary cooler must be installed.
- 6) The auxiliary hydraulic cooler can be installed:
- a. In front of the radiator, in which case an additional fan is not required, i.e. maximum rise of the cooling air is 5°C(40°F).
 - b. Any other suitable place, using a fan either hydraulically or electrically driven.
- 7) Damage caused by hydraulic oil contamination in the carrier and breaker circuits:
- a. The working life of the pumps is significantly shortened.
 - Premature wear of parts
 - Cavitation
 - Recommended Oil, Temperature, Viscosity
 - b. Valves do not function properly.
 - Spools bind
 - Premature wear of parts
 - Blocking of small holes
 - c. Wear of cylinders and gaskets.
 - d. Reduced breaker efficiency of hydraulic Oil.
 - Premature wear of moving parts and seals
 - Danger of piston seizing up
 - Oil overheats
 - e. Shorter working life and reduced efficiency of hydraulic oil.
 - Oil overheats
 - Oil quality deterioration
 - Electrochemical changes in hydraulic oil.

* Recommended Oil, Temperature, Viscosity



5. MAINTENANCE

5-1. Maintenance intervals

a. Every two hours.

- Grease the tool shank and bushing.
- Observe hydraulic oil temperature, all line and connections as well as impact efficiency of operation.
- Tighten loose connections.

b. Every 10 hours at least once a week

- Remove the bushing pin and tool and check their condition.

Grind burrs away if necessary.

- Check that the tool has received sufficient greasing, grease more frequently, if necessary.

c. Every 50 hours or at least once a month

- Check the tool shank and tool bushings for wear.
- Check the hydraulic hoses, replace if necessary. Do not let dirt get into the hammer or hoses.

d. Every 600 hours or once a year

- This service is recommended to be done by your HAMMEROC dealer after 600 operating hours. Neglecting the yearly service can cause severe damage to the hammer.

Your HAMMEROC dealer will reseal the hammer, replace the accumulator membranes.

Contact HAMMEROC dealer will reseal the hammer, replace the accumulator membranes.

Contact your HAMMEROC dealer for more information about yearly service.

- Check all hydraulic connections.
- Check that the hydraulic hoses do not rub against anything in any boom/stick position.
- Replace and inspect the hydraulic oil filters of the carrier.

5-2. Special application

a. Maintenance intervals in underwater use.

After every half hour operation

- Grease the tool shank and the tool bushings through the grease nipple.
- Check that the hammer moves normally inside the housing and that the buffers are in good conditions.
- Check all hoses and connections.
- Check the operation of the air pressure switch.

Daily maintenance

- Remove the bushing pin and the tool for inspection. Grind the burrs away if necessary.
- Check that the tool has received sufficient grease.
- Service the hammer after underwater jobs.

The hammer must be totally dismantled and serviced after working under water.

6. SERVICE

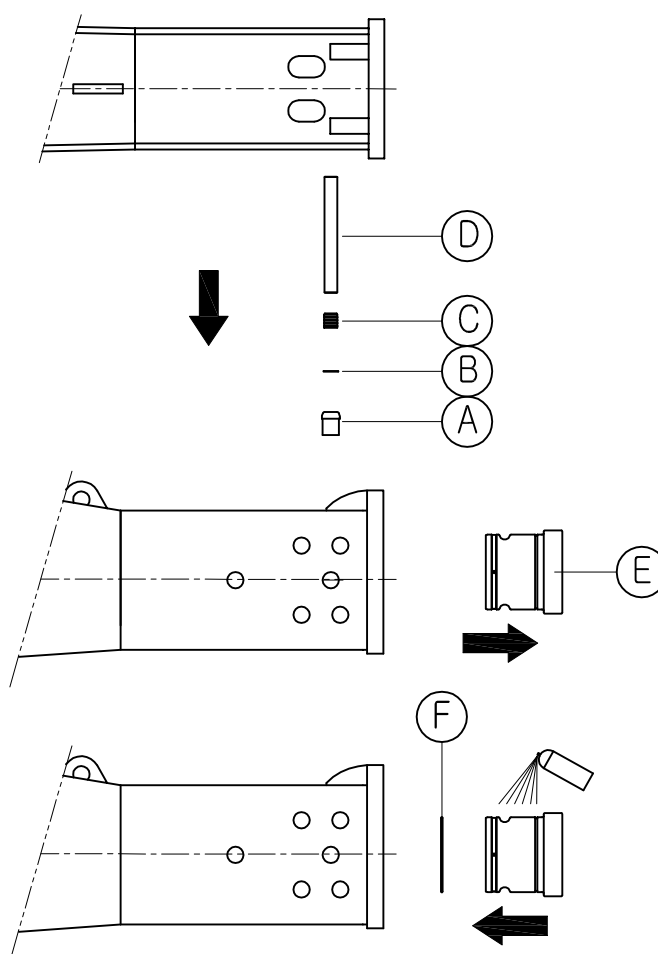
6-1. Changing tool bushing

1) Removal

- a. Remove the Tool.
- b. Remove Rubber plug A , Snap ring B, Rubber plug C, Bushing pin D
- c. Remove the Tool bushing E

2) Installation

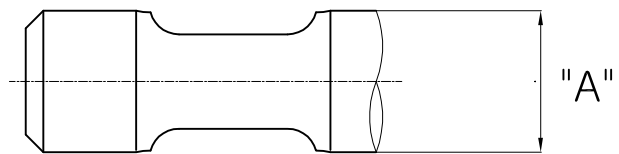
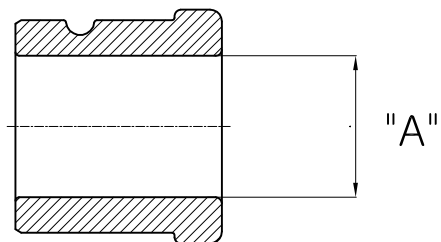
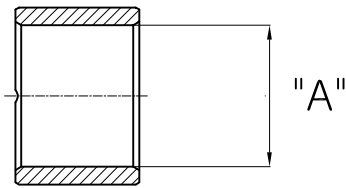
- a. Clean all parts carefully.
- b. Install O-ring F
- c. Lubricate the contact surfaces of Tool bushing E and front head.
- d. Install Tool bushing E
- e. Install Rubber plug A , Snap ring B, Rubber plug C, Bushing pin D



6-2. Wear limit for upper bushing and tool bushing and tool

The maximum clearances between the tool bushing and the tool are different for each model.(see below table.)

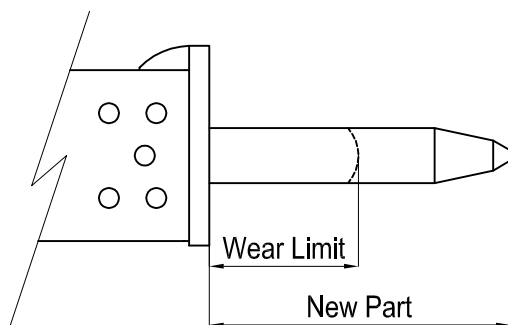
Please check the tool bushing once a month. If the diameter of tool bushing(A) is beyond the wear limit, replace it with the new tool bushing.



(unit:inch)

	NEW	REJECT	REMARK
UPPER BUSHING	4.33	4.41	
TOOL BUSHING	4.33	4.41	
TOOL	4.33	4.25	

6-3. Wear limit of Tool



UNIT(inch)

MODEL	NEW	REJECT
HR190	29.5	17.72

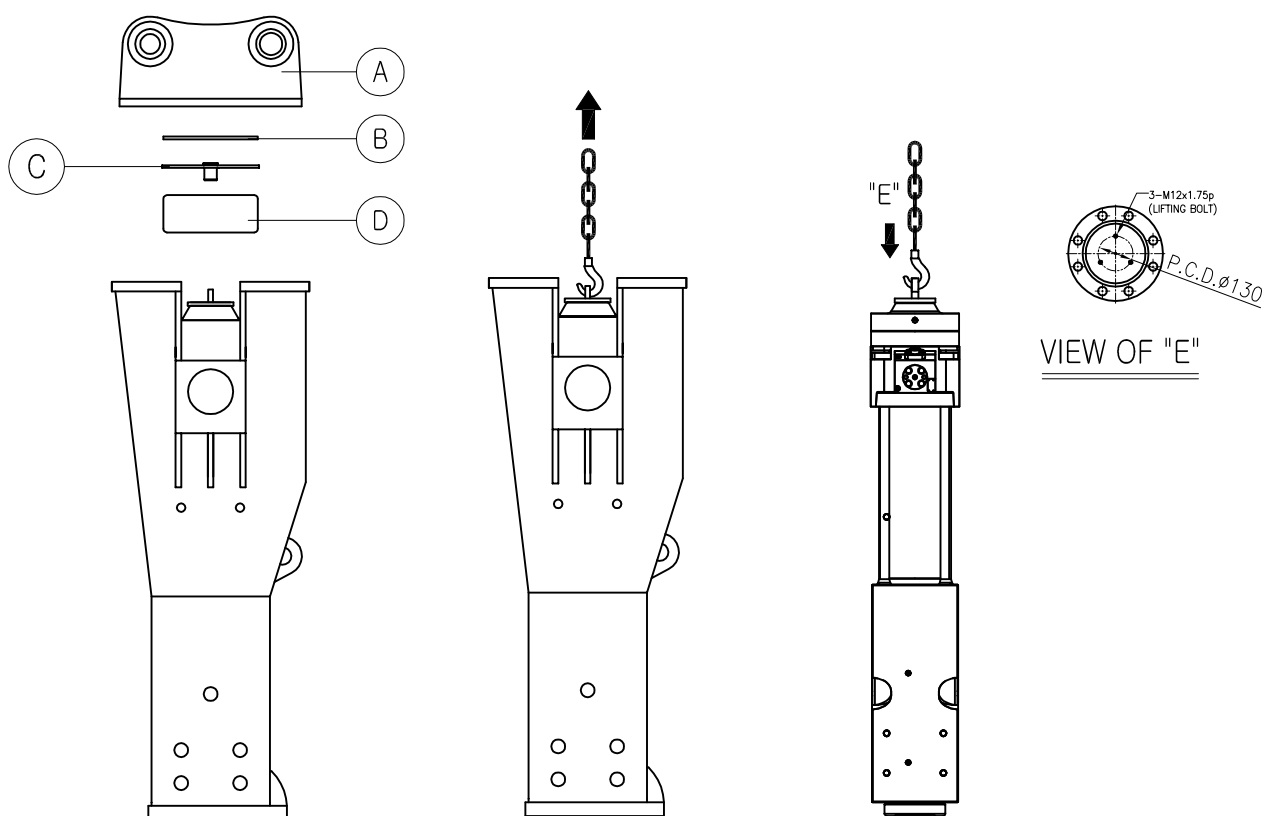
6-4. Removal and installation of breaking mechanism

1) REMOVAL

- a. Remove the tool and set the breaker to the vertical position on the floor and support.
- b. Disconnect the hoses and plug them as well as the breaker inlet and outlet.
- c. Open the top cover bolts.
- d. Remove the top bracket A.
- e. Remove the top buffer wearing plate B and the top buffer plate C.
- f. Remove the top buffer D.
- g. Lift the hammer ass'y so that there is 10mm in clearnace between the valve housing and the side buffer.
- h. Shake the hammer ass'y, if the hammer ass'y moves more than 10mm at the level of the check, replace the wearing plates.
- i. Lift the hammer ass'y out of the housing and if necessary, change the wearing plates.

2) ASSEMBLING

- a. After changing the wearing plates, set the hammer ass'y into the housing and check the clearance by shaking the hammer ass'y.
- b. After placing the hammer ass'y into the housing, the buffer system, hoses and mounting bracket refitted. Install the tool.



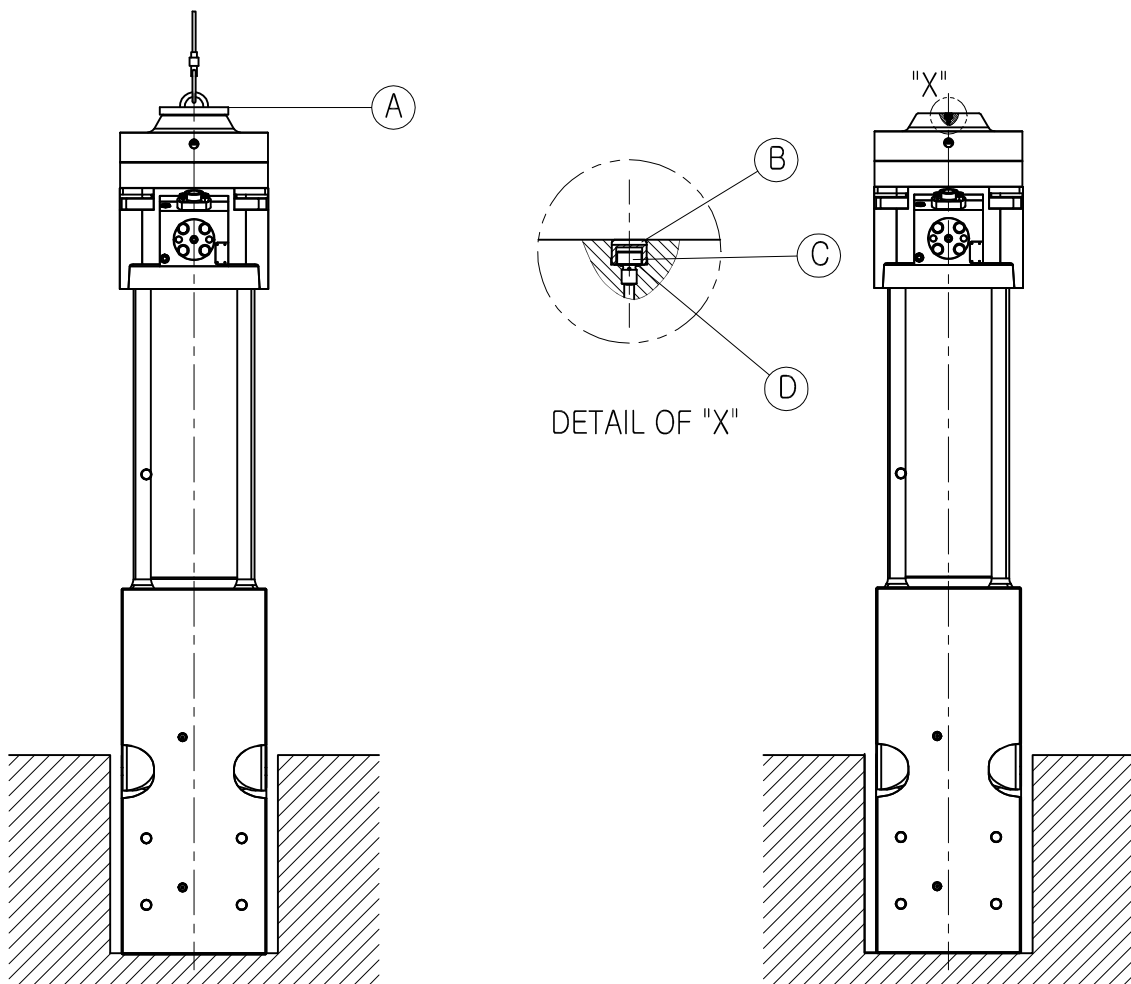
6-5. Assembling and installation of accumulator

1) RELEASING THE PRESSURE FROM THE ACCUMULATOR

- a. Remove the hammer from housing.
- b. Set the hammer into the assembly stand by removing the plate the pressure accumulator and lifting the hammer with a lifting ring A.
- c. Remove the lifting ring A and the accumulator cap B.
- d. Carefully open the accumulator gas bolt C to allow the nitrogen gas to flow out.
- e. Remove the accumulator gas bolt C and usit ring D when all the pressure is released from the accumulator.



WARNING! Do not open the accumulator before releasing the 40 bar(580 psi) nitrogen pressure via the gas bolt.

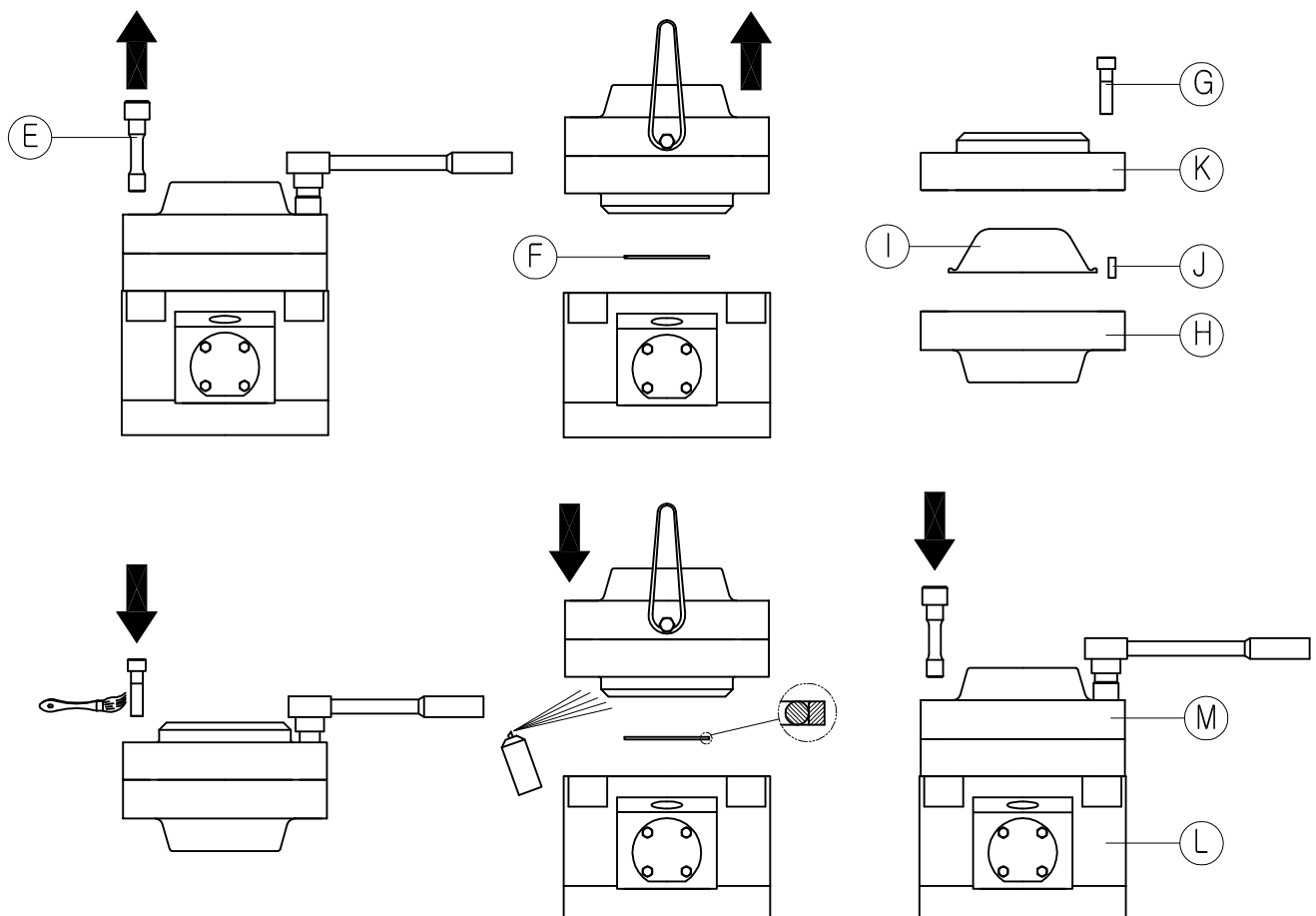


2) REMOVAL

- a. Open the accumulator cover bolt E.
- b. Lift the accumulator and remove the seal F.
- c. Set the accumulator on the assembly stand and the accumulator bottom bolt G.
- d. Remove the accumulator cover H and membrane I and guide pin J.

3) ASSEMBLING

- a. Clean and dry parts carefully.
- b. Set the accumulator bottom K on the assembly stand and install the guide pin J.
- c. Fit a new membrane I in place. Apply silicon grease on the gas side of the membrane as well as on the accumulator cover H.
- d. Install accumulator cover H.
- e. Apply the thread grease to the thread area and the accumulator bottom bolt G.
- f. Install the bottom bolt G. Tighten the bottom bolt G with a torque wrench to the torque 500 Nm.



4) FITTING THE ACCUMULATOR

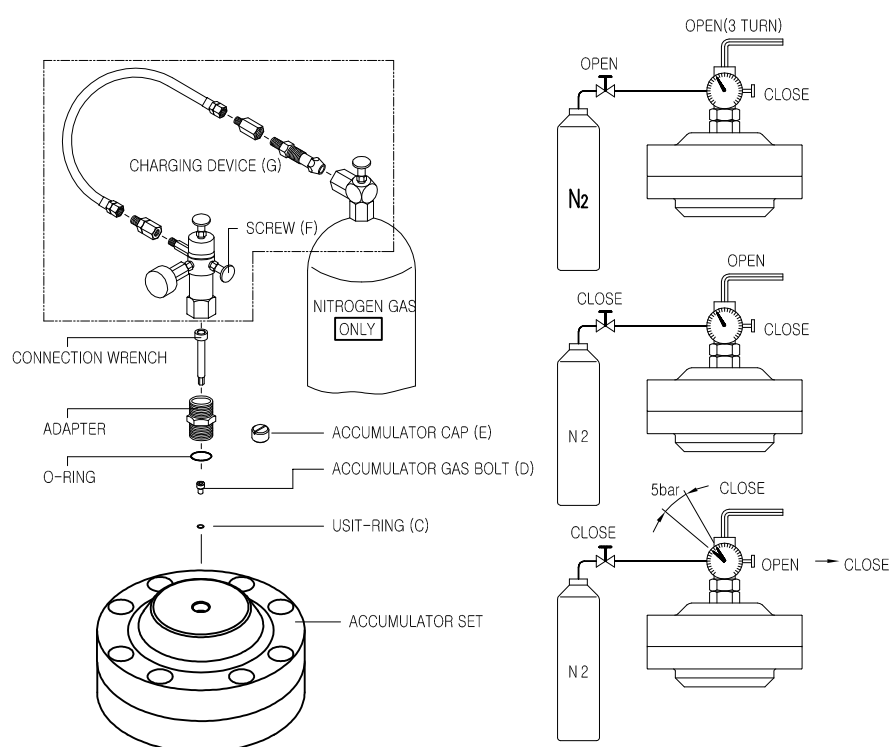
- a. Install the seal F into the groove in the bottom of the accumulator. Use grease to prevent the seal from failing out during mounting.
- b. Apply MoS2 spray on the contact surfaces of accumulator M , housing L.
- c. Lift the accumulator into place on the valve housing.
- d. Apply thread grease to the thread area and the accumulator cover bolt E.
- e. Tighten the bolts with a torque wrench to the value shown in the torque specifications.

6-6. Charging accumulator



WARNING! Use only nitrogen gas.

- Furnish the accumulator with a new usit ring C and gas bolt D.
- Connect the charging device G to the low pressure accumulator.
- Open the screw F through the charging device.(3 turns)
- Open the discharge valve of the charging device. Open carefully the nitrogen gas bottle valve and check that the nitrogen gas flows properly. Shut the nitrogen gas bottle valve. Shut the discharge valve of the charging device.
- Open carefully nitrogen gas bottle valve and observe the gage pressure.
- Shut the nitrogen gas bottle valve when the pressue is 45 bar(650 psi). Wait 10 minutes.
Adjust the pressure to 40 bar(580psi) in the accumulator by carefully opening and closing the discharge valve of the charging device. Shut the gas bolt D, torque 20 Nm.
- Let the pressure out of the hose by opening the discharge valve of the charging device.
Remove the charging device.
- Check the gas-tightness by dropping some oil on the gas bolt D.
- Insert accumulator cap E.



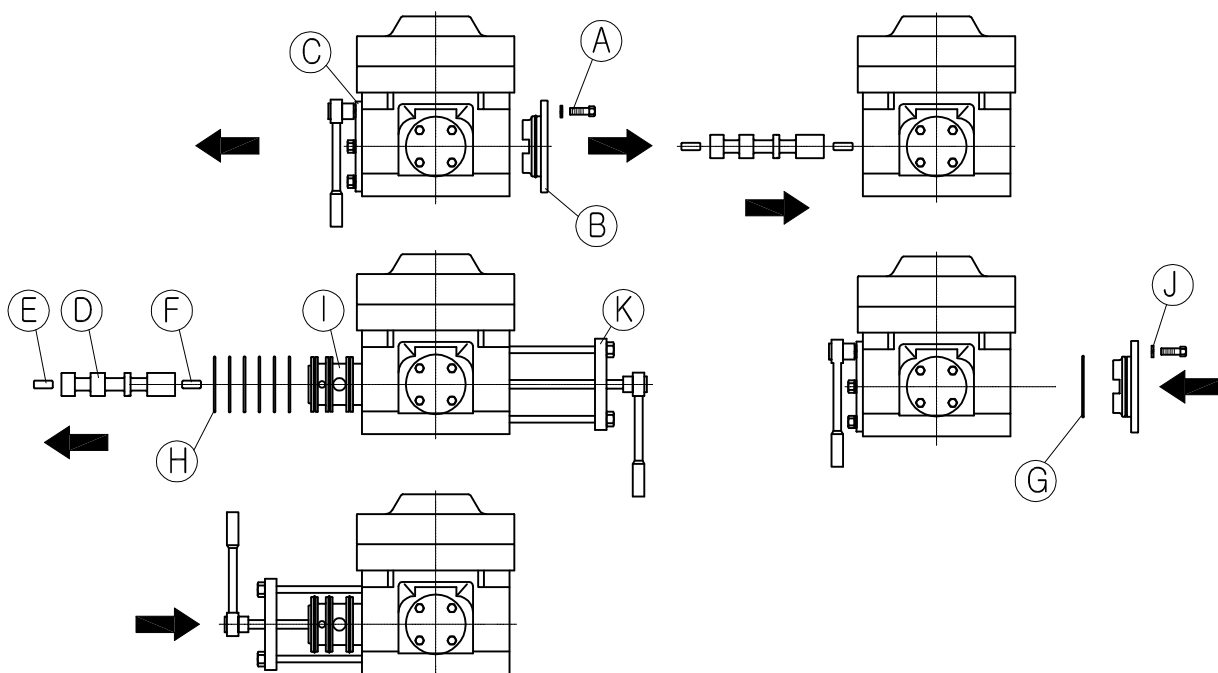
6-7. Removal and installation of main spool

1) REMOVAL

- a. Loosen the sleeve cover bolt A, cover B and C. Use M20 bolts to pull the covers out.
- b. Push the main spool D. Carefully remove the small spools E and F in the ends of the spool D.
- c. Fasten the puller in the holes of bolts A of valve housing. Put the flange against the sleeve I and drive the sleeve carefully out.

2) INSTALLATION

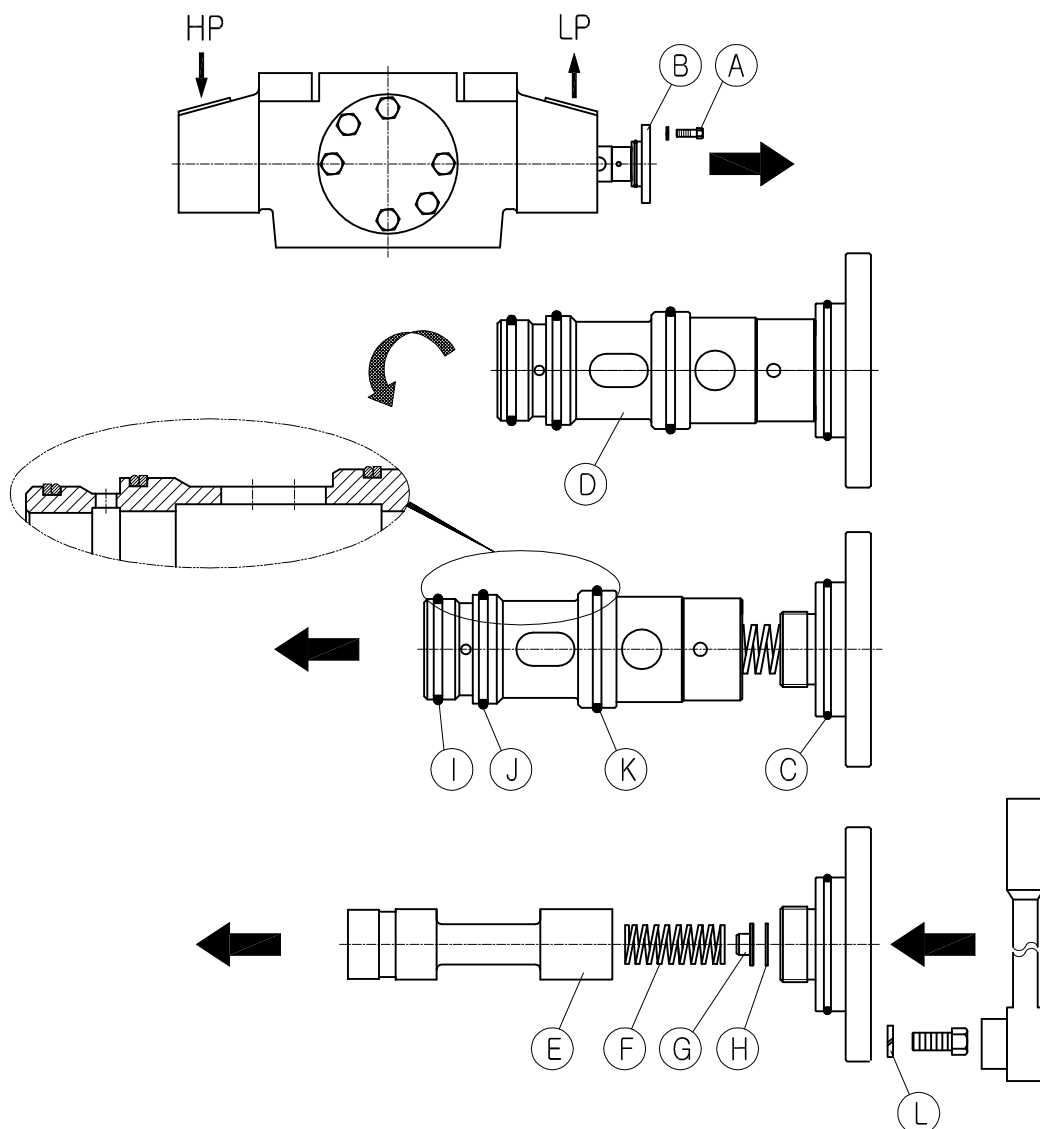
- a. Check the parts carefully. If necessary use fine emery cloth or grinding agent to remove any scratch or burrs. Clean and oil grease parts.
- b. Install new O-rings G on the covers B and C. Install new O-rings H (6pcs) in the sleeve I.
- c. Fasten the extractor on the valve housing side marked with X. Install the sleeve so that X on its end comes to the same side with valve housing X.
- d. Install the spool D so that X on its end will be again on the X side of the valve housing. Do not forget the spools E and F. Check that the spools move freely and apply some oil.
- e. Install covers B (cover marked with X comes to the same side with valve housing X)
- f. Grease tab area and cover bolts A. Install locking washers J and cover bolts A.
- g. Tighten the bolts with a torque wrench. Refer to the torque specifications.
- h. When assembling and disassembling the main spool, sleeve the extractor K must be used.



6-8. Removal and installation of operating valve

1) REMOVAL

- a. Open the bolts A (4pcs). The operating valve is located in the valve housing, on the return side. Screw four of the A bolts into the threaded holes in the covers and use them to pull the covers B out.
- b. Use the special pusher device to push the valve out.
- c. Fix the valve cover B in the valve housing or on a bench vise and loosen the guide D.
- d. Remove the spool E, the spring guide G, and the spring F, the pressure adjusting shim(s) H.
- e. Remove the seals I,J,K and the O-ring C.

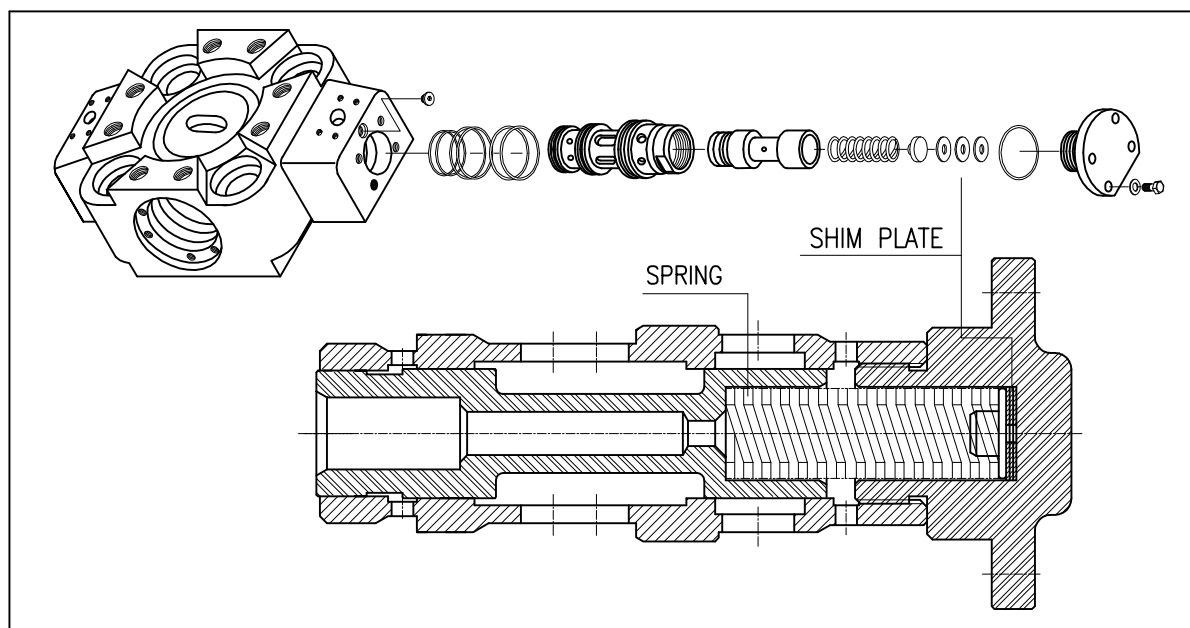


2) ADJUSTMENT

- a. When the pre-loading of the spring changes, the operating pressure changes as well.
- b. The operating pressure of the hammer is adjusted by adding or removing the pressure adjusting shims H between the cover B and spring guide G.

3) INSTALLATION

- a. Check parts carefully. If necessary, use fine emery cloth or grinding agent to remove any scratch or burrs. Clean and oil/grease parts.
- b. Set new O-ring C on the oper. valve cover B.
- c. Fix the oper.valve cover B on a bench vise and insert the operating valve shim(s)H, spring guide G and spring F.
- d. Install the operating valve spool E.
- e. Fasten the operating valve guide D to thr cover B.
- f. Install the seals I,J,K.
- g. Push the operating valve into the valve housing with special pusher device.
Grease the tab area, bolts and screws.
- h. Install locking washers L and bolts A.
- i. Tighten the bolts A with a torque wrench. Refer to the torque specifications.



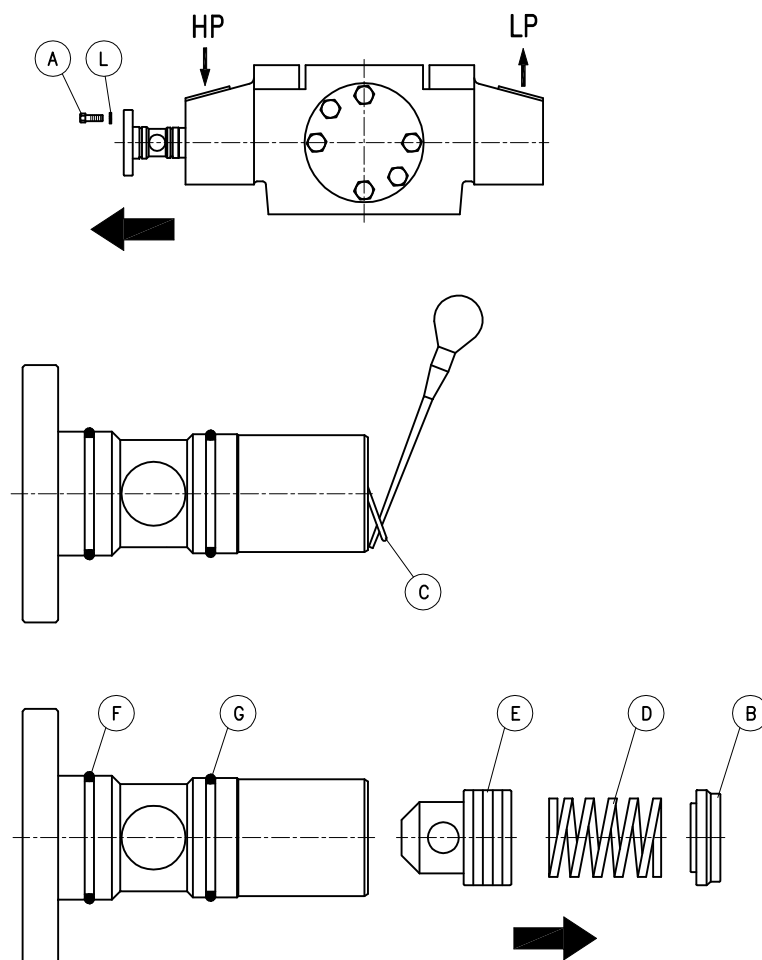
6-9. Removal and installation of check valve

1) REMOVAL

- Undo the bolts A and remove the valve by screwing to of the bolts into the threaded holes in the valve cover. The check valve is located in the valve housing on the pressure side.
- Push the spring guide B in with a screwdriver.
- Pull out the lock ring c with a screwdriver.
- Remove spring guide B, spring D, spool E, O-ring F and G.

2) INSTALLATION

- If necessary, use fine clean cloth or grinding agent to remove any scratch or burrs.
- Install new O-ring F and G, Install the spool E spring D and the spring guide B.
- Install the lock ring C. Check that the spool moves properly.
- Install the check valve into the valve housing, fit the bolts A and the locking washer L.
- Tighten the bolts A with a torque wrench. Refer to the torque specifications.



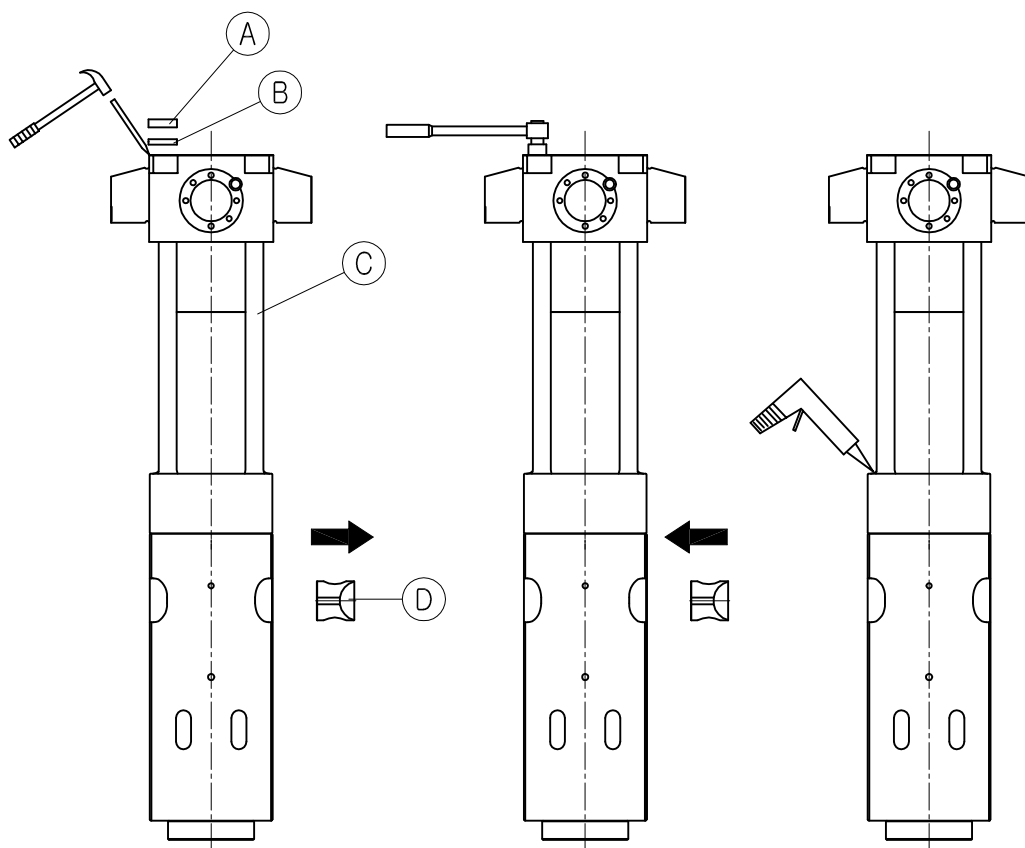
6-10. Loosening and tightening side rods

1) LOOSENING

- Remove the accumulator. Remove rubber rings A and lock washers B (4 pcs).
- Mark each side rod C and its nut D as pairs.
- Heat the side rods with propane flame to loosen the side rods.(max. temperature 200°C).
- Remove the nuts D. Do not turn the nuts D upside down.

2) TIGHTENING

- Use the crack detecting equipment to check if there are any cracks in the side rods.
- Clean the side rods and grease the screw threads and the contact surface of the rods and the valve housing. Install the side rods C. Check that each side rod has the correct nut as its pair. Do not turn the nuts upside down.
- Using a torque wrench tighten the side rods in three steps. Refer to the torque specifications.
- Heat the side rods with propane flame (max. temperature 200°C) and tighten side rods.
- Install the lock washer B so that the side rods can not become loose. Install the rubber rings A.
- Fill the groove between the side rods and the front head with silicon compound.



STEP	TORQUE
1 ST	150 N.m
2 ND	300 N.m
3 RD	500 N.m
4 TH	500 N.m
5 TH	+100°

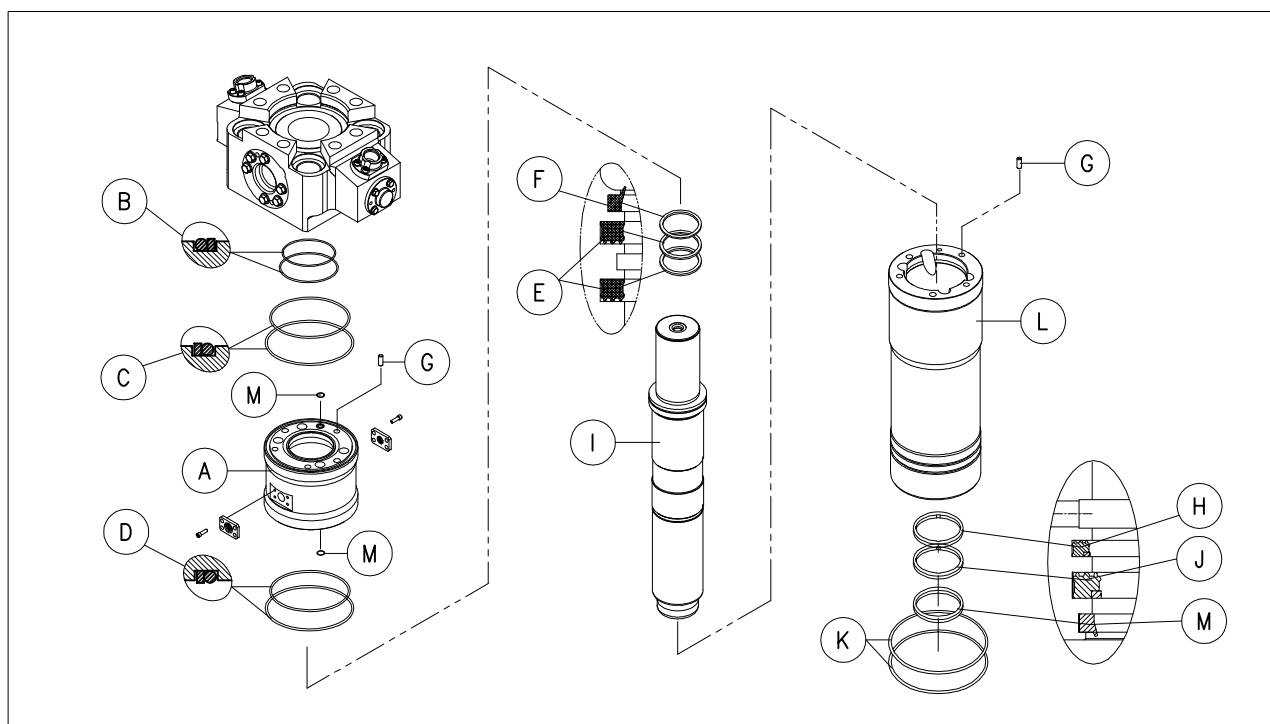
6-11. Disassembling and assembling cylinder

1) LOOSENING

- a. Remove the accumulator and side rods and valve housing.
- b. Screw M24 lifting eyes into the seal housing A and lift out the seal housing.
- c. Screw M24 lifting eye into the piston I and lift it carefully out. Install M24 lifting eyes in the holes of the cylinder and carefully remove the cylinder from the front head.
- d. Remove the seals B,C,E and wiper F, O-ring M.
- e. Remove from the cylinder, the guide pins G, the seal H, the wiper J and the O-ring K.

2) ASSEMBLING

- a. Check the condition of the cylinder L, the seal housing A, and the front head. If necessary, use fine emery cloth or grinding agent to remove any scratches or burrs. Clean and oil parts carefully.
- b. Install the seal H,J and the wiper M into the cylinder. Install the M24 lifting eyes into the holes of the cylinder and insert into the front head. Fit the guide pin G in place.
- c. Install the piston into the cylinder.
- d. Install the seal B,C,D,E and wiper F and O-ring M of the seal housing A into the cylinder.
- e. Lift the seal housing into place so that guide pin on the cylinder fits in the corresponding hole of the seal housing. Fit the seal housing carefully in its place.
- f. Check that opposite surface are clean. Put the guide pin G into place in the seal housing. Lift the valve housing onto the seal housing using a lifting cable. Install the side rods and the accumulator.



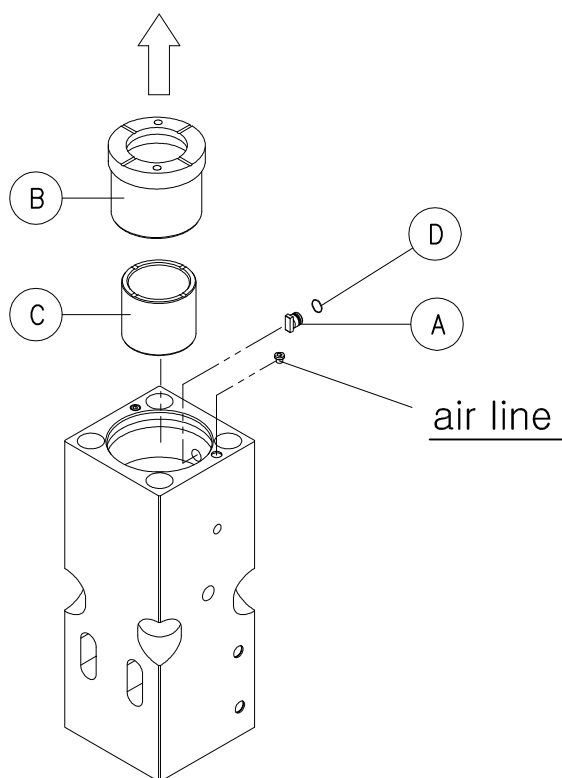
6-12. Disassembling and assembling front head

1) DISASSEMBLING

- a. Remove the cylinder, the piston, the seal housing, distributor, the valve housing, the side rods and the accumulator.
- b. Remove the wedge A and the thrust ring B and the upper bushing C.
USing the sleeve extractor, pull the bushing out. If the bushing is tight, warm the under part of the front head. If there is a steel upper bushing, check it for wear and if necessary replace it.

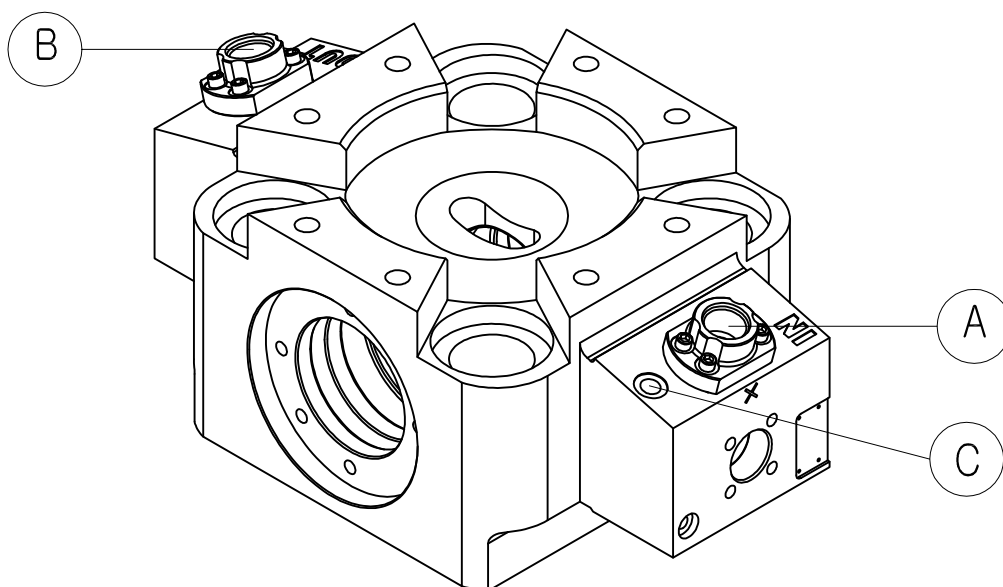
2) ASSEMBLING

- a. Check the parts carefully. If necessary, use fine emery cloth or grinding agent to remove any scratches or burrs. Clean and oil/grease parts.
- b. For the steel upper bushing, heat the front head with propane flame and assemble the steel upper bushing.
- c. Install the thrust B.
- d. Install the wedge A complete with the O-ring.
- e. Install the cylinder, the piston, the seal housing, the valve housing, the side rods and the accumulator.

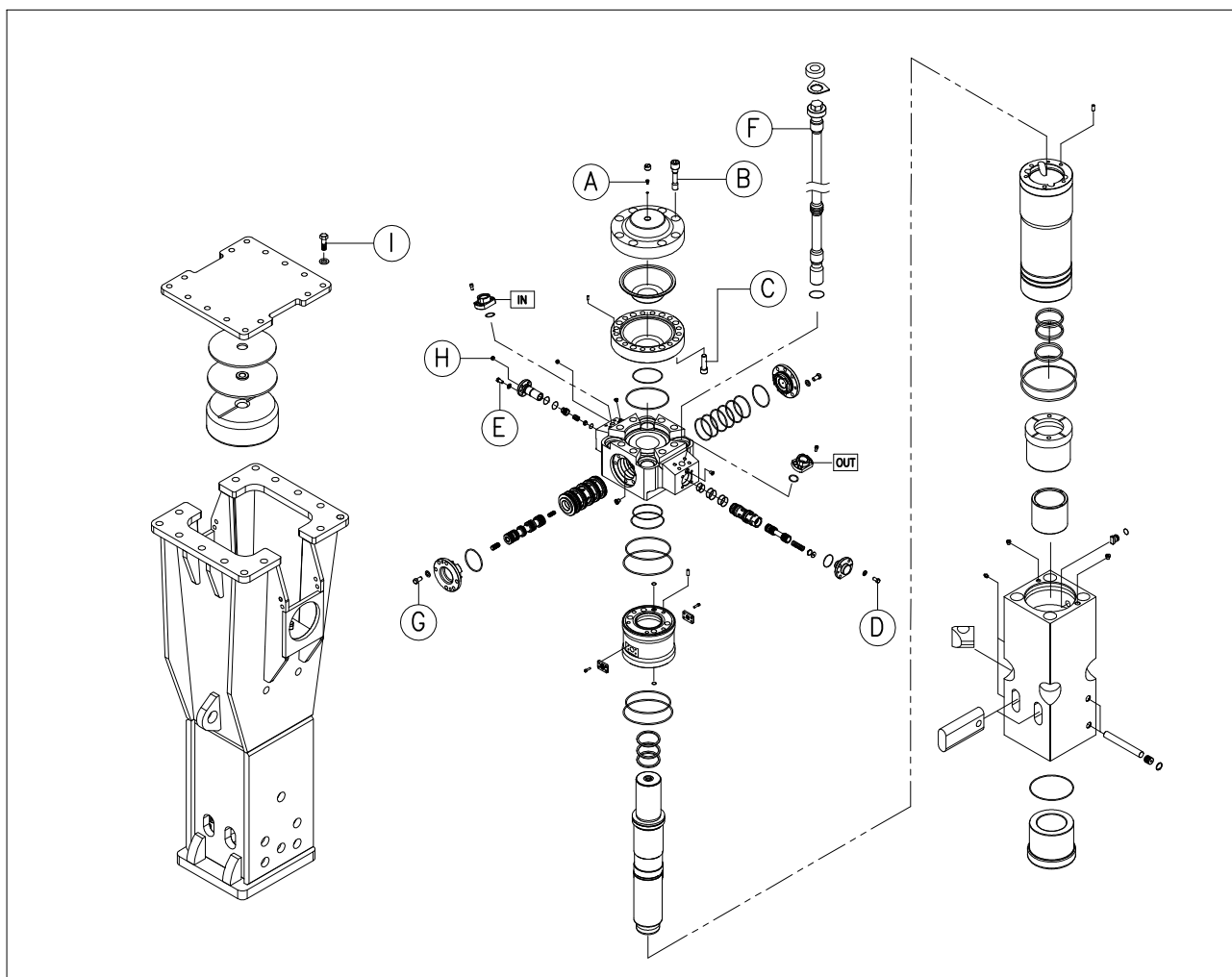


6-13. Connections

Item	Remarks	Specification
A	IN-port	PF 1"
B	OUT-port	PF 1"
C	Grease	PF 3/8"



6-14. Torques



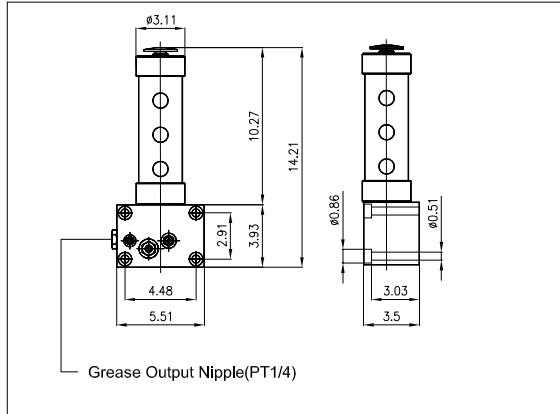
ITEM	Nm	kg.m	ft.lb	Remarks	Q'ty
A	20	2	15	Accumulator gas bolt	1
B	500	50	365	Accumulator cover bolt	8
C	500	50	365	Accumulator bottom bolt	12
D	160	16	115	Operating valve cover bolt	4
E	160	16	115	Check valve cover bolt	4
F	500	50	365	Siderod tighten further 100°	4
G	240	24	175	Sleeve cover bolt	12
H	33	3.3	24	Plug	1
I	800	80	580	Top cover bolt	14

6-15. HR190 Tool list

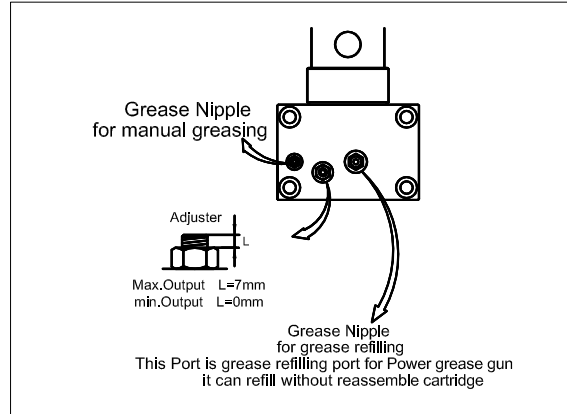
Parts name	Specs	Q'ty	Remarks
N2 GAS CHARGING DEVICE	N ₂ GAS	1	ACCUMULATOR
ADAPTER	-	1	
CONNECTION WRENCH	-	1	
O-RING	1BP18	1	
TORQUE WRENCH	100~800 Nm	1	
	300~1000 Nm	1	
PRESSURE GAUGE	100 BAR	1	
	250 BAR	1	
LIFTING CHAIN BLOCK	3 ton	1	
WORKING TABLE	-	1	
GREASE GUN	-	1	
L-WRENCH	6mm	1	
	8mm	1	
	10mm	1	
	12mm	1	
	17mm	1	
	19mm	1	
SPANNER	19mm	1	
	22mm	1	
	30mm	1	
	36mm	1	
	38mm	1	
	41mm	1	
	46mm	1	
LIFTING EYE BOLT	M16x2.0p	1	
	M24x3.0p	2	
HOOK	PF1"	2	
HEX. SOCKET	19mm	1	
	22mm	1	
	30mm	1	
	36mm	1	
	41mm	1	

6-16. Grease Pump

1) Dimension



2) Adjustment of the quantity of Grease



3) Grease filling procedure



a. Insert an injection port into the Grease



b. Pull the handle and wait for 2seconds (Grease gets into the inside of pump)



c. Inset the handle (Grease becomes compressed in the refilling cartridge)

< Repeat 2,3 >



e. When grease is sufficiently filled fasten the handle by turning it clockwise

7. TROUBLE SHOOTING GUIDE

7.1 Hammer does not start

PISTON IS IN ITS LOWER HYDRAULIC BREAKER

- Keep the hammer control valve open and force the tool against the object. The tool head will push the piston out of its area.

HAMMER CONTROL VALVE DOES NOT OPEN

- (When operating the hammer control valve, check that the pressure line pulsation this indicates the hammer control valve is opened.) (If the valve does not operate, check the operating means : mechanical connections, pilot pressure or electrical control.)

RELIEF VALVE IN HYDRAULIC CIRCUIT IS OPENED AT A LOW PRESSURE.

- Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

LEAKAGE FROM RETURN LINE IN CARRIER HYDRAULIC CIRCUIT.

- Check the installation. Check the pump and the other hydraulic components.

PRESSURE AND RETURN HOSES INSTALLED BACKWARDS

- Change the pressure and return hoses.

FAILURE IN HAMMER VALVE OPERATION

- The hammer must be serviced in an authorised HAMMEROCC service shop.

PISTON FAILURE

- The hammer must be serviced in an authorised HAMMEROCC service shop.

7.2 The hammer operates irregularly but the blow has full power

RELIEF VALVE IN HYDRAULIC CIRCUIT OPENS AT A LOW PRESSURE.
HAMMER OPERATING PRESSURE IS NOT REACHED

- Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

FAILURE IN HAMMER VALVE OPERATION

- The hammer must be serviced in an authorized HAMMEROCC service shop.

NOT ENOUGH FEED FORCE FROM THE CARRIER

- Refer to correct working methods.

7.3 Hammer operates poorly and blow has no power

RELIEF VALVE IN HYDRAULIC CIRCUIT OPENS AT A LOW PRESSURE.
HAMMER OPERATING PRESSURE IS NOT OPENED.

- Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

PRESSURE LOSS IN THE ACCUMULATOR

- The hammer must be serviced in an authorized HAMMEROCC service shop.

THE WORKING METHOD IS NOT CORRECT

- Refer to correct working methods.

PRESSURE CONTROL VALVE SETTING IS INCORRECT

- The hammer must be serviced in an authorized HAMMEROCC service shop.

7.4 Impact rate slow down

OIL OVERHEATED (over 176°F/80°C)

- Check for a fault in the oil cooling system or an internal leakage in the hammer. Check the hydraulic circuit of the carrier. Check the relief valve operation in the carrier. Check the line size. Assemble an extra oil cooler.

RELIEF VALVE IN HYDRAULIC CIRCUIT OPENS AT A LOW PRESSURE.
HAMMER OPERATING PRESSURE IS NOT REACHED

- Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

LEAKAGE FROM RETURN LINE IN CARRIER HYDRAULIC CIRCUIT

- Check the installation. Check the pump and the other hydraulic components.

PRESSURE LOSS IN THE ACCUMULATOR

- The hammer must be serviced in an authorized HAMMEROCC service shop.

FAILURE IN HAMMER VALVE OPERATION

- The hammer must be serviced in an authorized HAMMEROCC service shop.

HYDRAULIC VISCOSITY IS TOO LOW

- Check hydraulic oil.

7.5 Oil overheats

RELIEF VALVE IN HYDRAULIC CIRCUIT OPENS AT A LOW PRESSURE.
HAMMER OPERATING PRESSURE IS NOT REACHED

- Check the installation. Check the relief valve operation. Adjust the relief valve in hydraulic circuit. Measure the high pressure in the hammer inlet line.

LEAKAGE FROM RETURN LINE IN CARRIER HYDRAULIC CIRCUIT

- Check the installation. Check the pump and the other hydraulic components.

INTERNAL OIL LEAK IN THE HAMMER

- The hammer must be serviced in an authorized HAMMEROCC service shop.

HYDRAULIC VISCOSITY IS TOO LOW

- Check hydraulic oil.

COOLING CAPACITY OF THE FACTORY OIL COOLER IS TOO LOW

- Assemble an extra oil cooler.

8. GENERALS AND SAFETY INFORMATIONS

8-1. General

Do not use or install the breaker until you can use the carrier machine. Do not rush the job of learning. Take your time and learn safety.

- * If there is anything you do not understand, ask your HAMMEROC service center for advice.
- * The breaker serial number is stamped on a metal plate, which is on the valve body, near by the in line connection.
- * Correct reference to the serial number of the breaker is important in case of repairs or ordering spare parts. Identifying parts for specific breaker is possible only through serial number.

8-2. Safety

1) Manuals

- a. Read this manual before installing, operating or maintaining the breaker. If there is anything you don't understand, ask your employer or your HAMMEROC dealer to explain it.
- b. Keep this manual in good condition.

2) Clothing

- a. You can be injured if you do not wear proper clothing. Loose clothing can get caught in the machinery.
Wear protective clothing to suit the job.
Example are : a safety helmet, safety shoes, safety glasses, well-fitting overalls, ear-protectors and industrial gloves.
Keep cuff fastened.

3) Work site

- a. Inspect the site before working on it.
- b. Check for potholes, weak ground, hidden rocks etc.
- c. Check for utilities(electric cables, gas and water pipes etc.)

4) Metal splinters

- a. You can be injured by flying splinters when driving metal pins in and out.
- b. Always wear safety glasses.

5) Accumulator

- a. The accumulator is pressurized even when there is no hydraulic pressure in the breaker.
- b. Attempting to dismantle pressure accumulator without first releasing the pressure can cause serious injury.
- c. Do not try to dismantle pressure accumulator, contact your HAMMEROC service center first.

6) Hydraulic pressure

- a. Hydraulic fluid at system pressure is dangerous.
- b. Before disconnecting or connecting hydraulic hoses, stop the carrier engine and operate the control to release pressure trapped in the hoses.
- c. Keep people away from the hydraulic hoses during breaker operation.

Regulation and laws

- * Observe all laws, work-site and local regulation which affect you and your equipment.

Practice

- * You and others can be seriously injured if you carry out unfamiliar operations without practicing them first.
- * Practice away from job-site, on a clear area.
- * Keep other people away.
- * Do not perform new operations until you are sure you can do them safely.

Equipment condition

- * Defective equipment can injure you or others.
Do not operate equipment which is defective or has missing parts.
- * Make sure the maintenance procedures in this manual are completed before using the equipment.

Equipment limits

- * Operating the equipment beyond its design limits can cause damage. It can also be dangerous.
- * Do not operate the equipment beyond its limits.
- * Do not try to upgrade the equipment's performance by non-approved modifications.



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