FOREWORD

WARNING!

It is very important for you to read and understand this manual before operating and to keep the instructions provided herewith. Never fail to follow the instruction related to safety.

This manual contains instructions and information on safe and correct use of HYUNDAI hydraulic breakers.

- Please read and understand this manual before operation, inspections and maintenance of the hydraulic breaker.

  Keep this manual with your equipment all the time for your quick and easy reference, and read it regularly.

- Do not operate the hydraulic breaker until you have been trained in the use of all operating controls and understand the hydraulic breaker operation.
- Get a replacement manual from HYUNDAI dealer if you lost it.
- If you transfer the hydraulic breaker to the other, do transfer this manual as well.
- The figures in this manual are for better understanding and may not correspond exactly to the hydraulic breaker. For exact shape, refer to the parts list or ask HYUNDAI.
- For the purpose of constant product improvement, some parts of this manual may be changed. If you found the parts unclear or not corresponding to the hydraulic breaker, call and consult HYUNDAI dealer or service center
- Important information on safety is described in the safety information chapter of this book. Be familiarized with the instructions on the safe operation and observe the instructions before and during operation
- Injury, death or damage caused by unauthorized product modifications and operation under unallowed application will not be responsible by HYUNDAI. Consult HYUNDAI COREMOTION for such modifications and applications.
- Use HYUNDAI COREMOTION genuine parts. HYUNDAI takes no responsibility for damages caused by use of non-HYUNDAI spare parts.
- For warranty, we refer you to the warranty conditions provided separately.

We always exert all our efforts for your satisfaction, and promise you quick and constant service.

We thank you for using HYUNDAI hydraulic breaker and wish you a good luck in every your job,

June. 2020

HYUNDAI CORE MOTION

TABLE OF CONTENTS

* Specifications and features presented in this document are subject to change without notice.

1. Safety Information

This manual describes the correct use of the product and basic safety instructions. Important instructions in this manual are marked with this symbol ⚠. When you see this symbol in this manual or stickers on the product, you must be alert to the possibility of personal injury or death. Be sure to observe the instruction in the safety message.

The safety messages in this manual do not describe all the possibilities that could cause personal injury, death or damage to the product. These safety messages are intended to provide basic instructions for safe operation and service.

Although this manual does not cover all the possible situations, it is the operator's responsibility to observe the safety instructions and regulations.

Remember! Safety is up to you.

Safety Alert Symbol

The Safety Alert Symbol represents that **ATTENTION** is involved.

If you see the mark in this manual or on the products, never fail to read and observe the instructions for safe operation.

Signal Words

The words "**DANGER**", "**WARNING**", "**CAUTION**" and "**IMPORTANT**" appeared with the above **Safety Alert Symbol** indicate degree of risk of hazards or unsafe practices. All four degrees of risk indicate that safety is involved. Observe precautions indicated whenever you see the **Safety Alert Symbol**, no matter which signal word appears next to the "Exclamation Point" symbol.

⚠ **DANGER!**	Indicates imminent hazard of a situation that, if not avoided, is very likely to cause death or extremely serious injury. It may also be used to alert against product that may exploded or detonate if handled or treated carelessly.
⚠ **WARNING!**	Indicates potential of a hazardous situation that, if not avoided, could result in serious injury or death. It may also be used to alert against a highly unsafe practice.
⚠ **CAUTION!**	Indicates potential of a hazardous situation that, if not avoided, could result in minor or moderate injury. It may also be used to alert against a general unsafe practice.
⚠ **IMPORTANT!**	Indicates potential of damages that, if not avoided, could caused to the product or shorten the product life.

1.1 Basic Safety Information

WARNING!

The following instructions are those that should **ALWAYS** be observed in operation of construction equipment.

Know yourself

Operators and service personnel must wear appropriate safety equipment, including hearing protection, respirator, hardhat, safety shoes, eye protection, heavy gloves etc, as required.

Note: The wearing of loose clothing or any accessories such as neckties, scarves, untied shoe laces, rings, wrist watches or long hair could cause personal injury or death.

Always use the proper tools for inspection or maintenance work, which must only be carried out after ensuring that the equipment has been stopped completely, and it is placed suitably in a safe place.

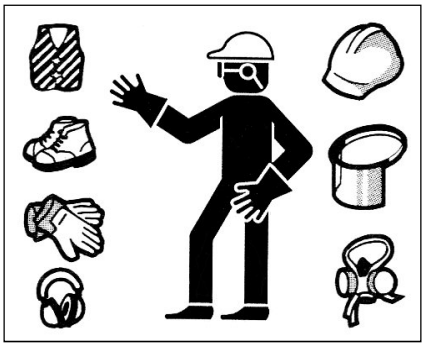


Figure 1

Know your equipment

Before installation or operation of the breaker, the operator and maintenance personnel must read and understand the safety messages, operation manual and service instructions.

Only the operator who has been trained and qualified to operate the carrier and breaker should do so. Be skilled and knowledgeable in all operational and technical aspects of the carrier and breaker.

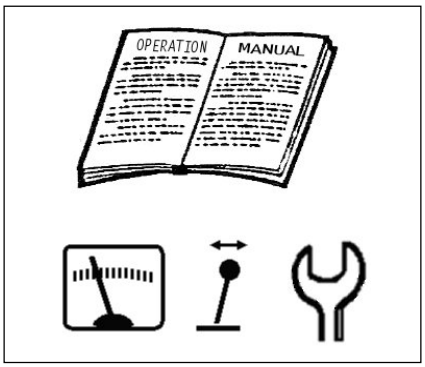


Figure 2

Know the work site

Before operating the breaker, check the area of work site for any unusual conditions that could be dangerous, and prepare the appropriate warnings for safe working. Be careful, particularly when working in the vicinity of electric power lines, gas pipes or other buried services.

Pay particular attention to other workers, bystanders and other machinery that may pass by near to the work site. Immediately stop operation of the breaker if personnel enter the danger area.

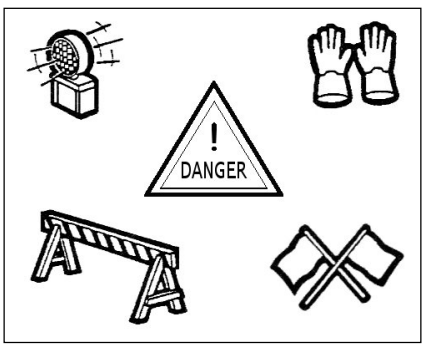


Figure 3

Know the rules

Everybody who operates or maintains the equipment should know the meaning of the rules and laws in terms of handling the equipment. Use the breaker in accordance with all regulations regarding construction practice and public safety.

For emergency use, keep the fire extinguisher and the first-aid case in the operator's cab.

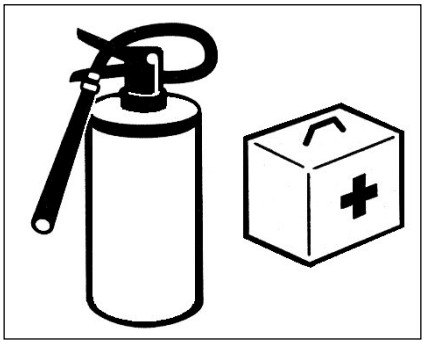


Figure 4

1.2. Preparation for safe operation

Some prior checks and scheduled maintenance must be performed on installing a new hydraulic breaker.

- The hydraulic breaker should only be mounted on a carrier with sufficient load capacity.
- In case of using a quick coupler (hitch), determine the total weight including the quick coupler.
- Carriers below this weight class will not provide the required degree of stability and could even fall over during breaker use, causing personnel injury or machine damage. Carriers above this weight class may apply excessively high mechanical loads to the breaker.
- Make sure the breaker is compatible and match in capacity with carrier hydraulic systems.
- To protect the operator from injury due to flying rock splinters, the operator's cab should be equipped with a protective shield or splinter guard. For information on the cab protector, consult carrier manufacturer or HYUNDAI dealer.
- Mounting the hydraulic breaker requires the presence of an assistant, who must be instructed by the carrier driver. The carrier driver and assistant should agree beforehand on clear hand signals.
- To avoid equipment damage, follow the carrier maintenance schedule before operating the breaker.
- Check the breaker for wear, getting loose, breakage or crack. Do not operate in case any damages or failure is found.

Recommended carrier weight (in tonne) for breaker models:

Breaker Model	Carrier class (Standard)	Breaker Model	Carrier class (Standard)
HEB010P	0.7 ~ 1.2	HEB140P	12 ~ 16
HEB020P	1.0 ~ 2.0	HEB220P	20 ~ 26
HEB030P	1.5 ~ 3.0	HEB310P	26 ~ 32
HEB040P	2.5 ~ 4.5	HEB400P	32 ~ 40
HEB050P	4.0 ~ 6.0	HEB500P	40 ~ 60
HEB060P	6.0 ~ 8.0	HEB700P	65 ~ 85
HEB100P	8.0 ~ 12		

1.3. Safety information on safe operating

- Always operate the breaker from the operator's seat in the carrier cab, and also close the splinter guard on the driver's cab during breaker operations.
- The hydraulic breaker must not be used for disallowed applications. Refer to Section "**5.2. Correct working methods**" of this manual for instructions on how to handle the hydraulic breaker, and applications for which the hydraulic breaker is unsuitable and must not be used.
- Stop the operation if an abnormal noise or vibration is detected during the operation. Check the carrier and breaker.
- Never use the breaker in or underwater unless compressed air is supplied to the breaker. Refer to Section "**5.2. Correct working methods** for details".

1.4. Safety information on maintenance

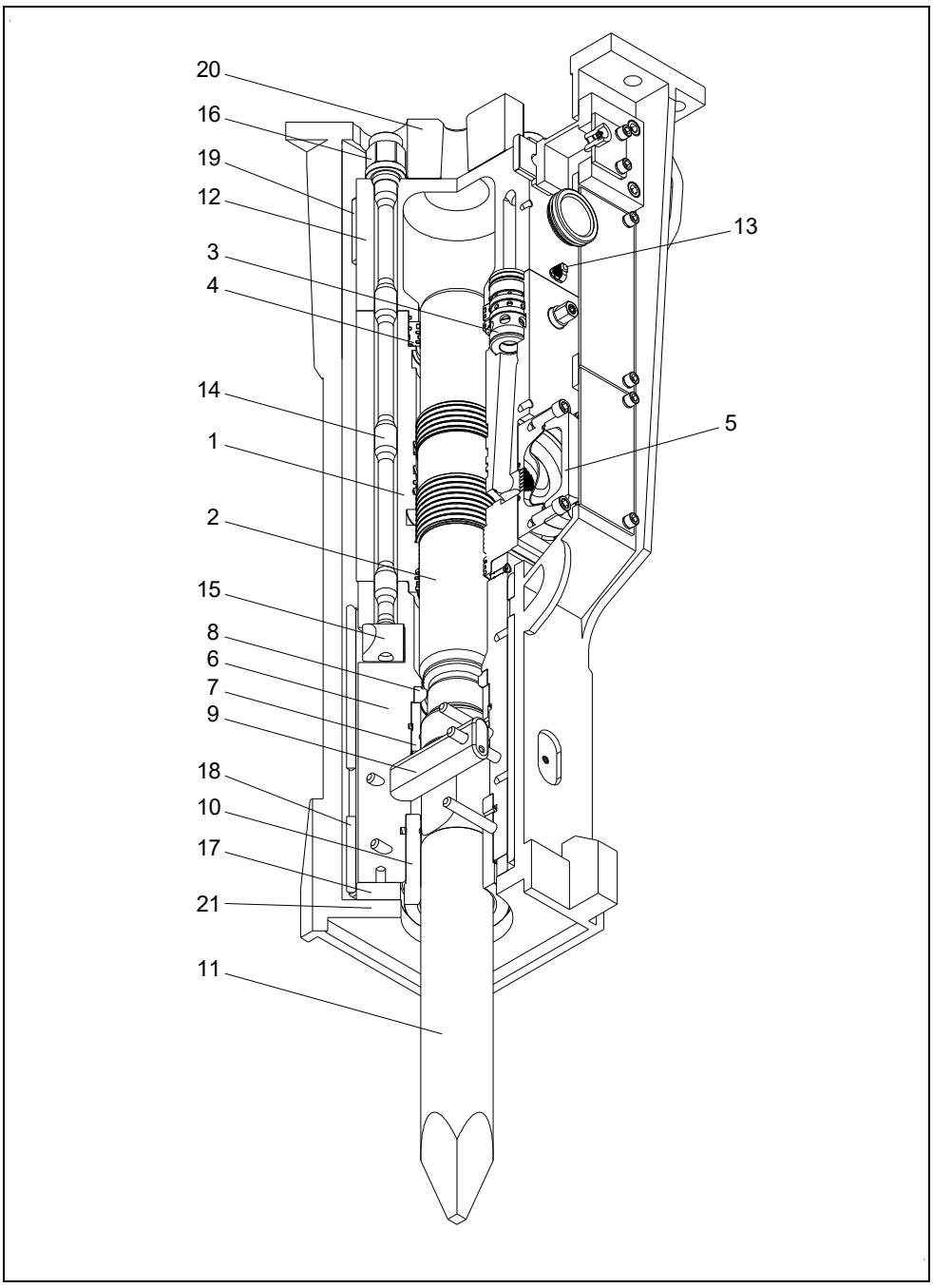
Always follow the instructions described in this manual when performing maintenance work on the breaker.

- Pay careful attention to all relevant safety regulations. Most accidents occur when the instructions are not observed.
- Maintenance work should be performed with the carrier completely stopped, the stop valves shut off. The carrier must be on firm and flat ground with all the control levers switched off.
- Use only the lifting points provided and sufficiently strong lifting equipment when lifting the breaker.
- Do not start maintenance on the breaker until it has cooled because the breaker is heated up during operation. Some components, for example, chisel (tool), valve, piston or hydraulic connection parts become very hot.
- The hydraulic oil may be very hot and may cause severe scald. Before disconnecting hydraulic lines, bleed all hydraulic pressure in the lines. And, always relieve tank pressure of the carrier.
- Oil spouted out from the crack or small hole on hydraulic system can penetrate the skin and cause serious injury. Therefore, be sure that all the connections are tight and pipes and hoses are in good condition. Use a sheet of cardboard or wood to search for suspected oil leaks.
- To avoid an explosion and equipment damage, use only pure nitrogen gas (99.8% or over) in the gas chamber of the back-head and accumulator.
- Only the proper tools should be used for maintenance. Use of improper tools may cause personal injury, or damage to the breaker.
- Oily, greasy ground may be very slippery. Collect any oil and grease, and dispose it correctly for safety and environment.
- Keep personnel away from the breaker while servicing the chisel, gas chambers or hydraulic system.
- Unauthorized alteration on the breaker may cause the breaker serious troubles or reduce breaker life and performance. These cases cannot be guaranteed by HYUNDAI.

2. Product information

2.1. Configuration of the HYUNDAI hydraulic breaker

The HYUNDAI hydraulic breaker has the following main components or assemblies



1. *Cylinder*
2. Piston
3. Valve
4. Cylinder bush
5. Accumulator
6. Front-head
7. Chisel bush
8 Thrust ring
9. Chisel pins
10. Front bush
11. Chisel
12. Back-head
13. Minimess coupling
14. Through bolts
15. Front-head nuts
16. Back-head nuts
17. Lower damper
18. Wear plates
19. Support damper
20. Upper damper
21. Bracket

The graphic shows only a general view of the main components, the actual details may vary on different models of hydraulic breaker.

The breaker is hydraulically operated equipment, and can be used on any carrier that meets the necessary hydraulic and mechanical installation requirements (Refer to Section "**3. Technical specifications**").

2.2. Information for ordering and service

The equipment serial number is marked with the type and serial number on the nameplate (refer to Section "**2.3. Markings and labels**". It is important to make correct reference to the serial number of the breaker when making repairs or ordering spare parts. Identification by serial number is the only proper means of maintaining and identifying parts for specific breakers.

Available bracket version

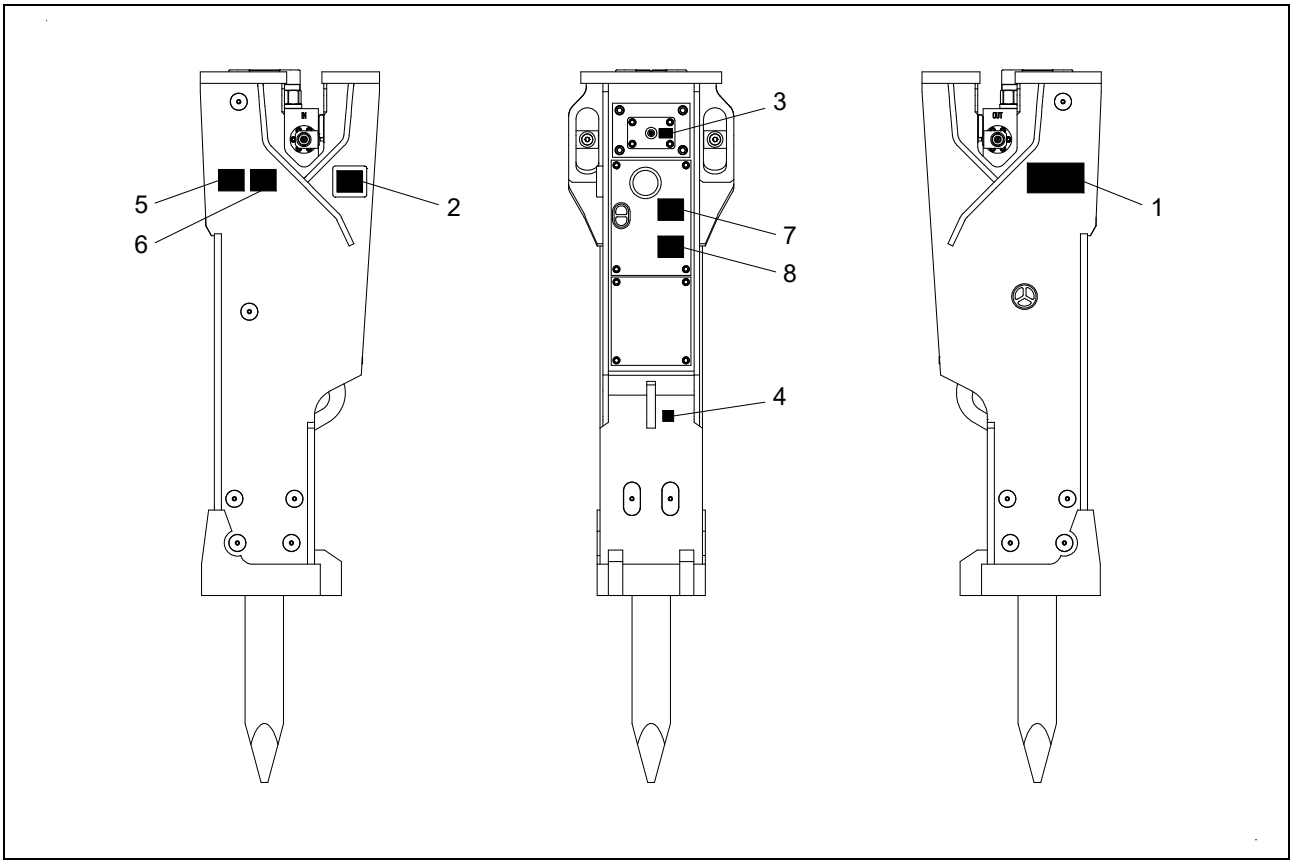
Breaker model code:		010P	020P	030P	040P	050P	060P	100P	140P	220P	310P	400P	500P	700P
Open Housing	*Adapter mounted side-plate bracket*	✓	✓	✓	✓	✓	✓	✓						
Box Housing	*Adapter mounted silenced bracket*	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BL						✓	✓							
SL					✓									

Available features (standard & option)

Breaker model code:	010P	020P	030P	040P	050P	060P	100P	140P	220P	310P	400P	500P	700P
2-speed control	–	–	–	–	–	–	–	**ALL**	**ALL**	**ALL**	**ALL**	**ALL**	**ALL**
Auto-greasing kit option	–	–	–	–	–	–	–	*all*	*all*	*all*	*all*	*all*	*all*

Note: Depending on bracket type;
BOLD: standard features for the designated bracket version
Italic: optional features for the designated bracket version
–: not available

2.3. Markings and labels

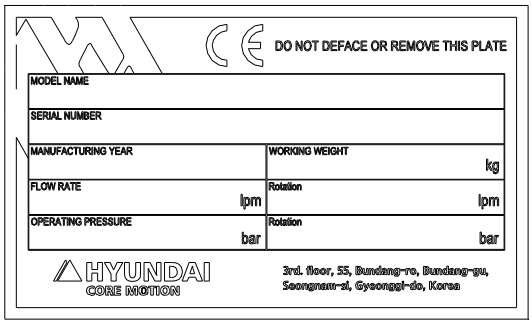


This figure shows only a general view. Details may vary on different breaker models.

1. HYUNDAI Logo

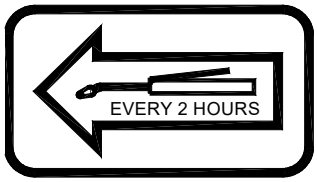
HYUNDAI

2. Name plate (with CE label)



3. Greasing Port

Indicates grease point. Apply grease at the interval prescribed.



4. Lifting Point

Indicates the hooking points used when lifting the breaker

Pay special attention to the marks and labels related to safety such as follows.

5. General safety

⚠ DANGER

- The operator must be fully protected by a protection shield from the breaker during operation.
- Do not operate breaker when bystanders are in working area. The working breaker, carrier and/or rock splinters can be fatally dangerous to the operator or bystanders.

⚠ IMPORTANT

- Lubricate the tool every 2 hours or anytime the tool dried.
- Never operate the breaker in or under water unless compressed air is supplied to the breaker.
- Follow the maintenance timetable and short / long-period storage instruction.

Read the manuals prior to initial use and follow the instructions for safety.

6. Stay clear

Indicates the distance that must be kept from the breaker, to be safe from the flying rock splinter

7. Safety on gas charging in Back-head

⚠ DANGER

- Never disassemble the back-head before discharging gas from the back-head.
- Use pure nitrogen gas only. Other gas may cause to explode.

⚠ IMPORTANT

- Gas charging pressure :
- Check every 2 weeks and refill if necessary.
- Refer to operation manuals for charging instruction.

8. Safety on gas charging in Accumulator

⚠ DANGER

- Never disassemble the accumulator cover before discharging gas from the accumulator.
- Use pure nitrogen gas only. Other gas may cause to explode.
- The maintenance of the accumulator is recommended to be served by authorized service.

⚠ IMPORTANT

- Gas charging pressure : 60 ± 2 bar
- Check every 6 months and contact service if necessary.

3. Technical specifications

■ HEB010P / 020P / 030P / 040P

Model		HEB010P		HEB020P		HEB030P		HEB040P		
Bracket version [1]		*Box*	*Open*	*Box*	*Open*	*Box*	*Open*	*Box*	*Open*	*SL*
Working weight [2]	kg	116	116	116	116	142	144	243	211	255
Weight w/o mounting adapter	kg	98	98	98	98	124	126	213	181	130
Overall length [3]	mm	1,215	1,207	1,215	1,207	1,242	1,257	1,403	1,390	1,352
Required oil flow rate	l/min	15 ~ 25		20 ~ 35		25 ~ 35		30 ~ 50 / 50 ~ 75 (SL)		
Operating pressure	bar	100 ~ 130		100 ~ 130		100 ~ 130		110 ~ 140		
Input power (max.)	kW	5.4		7.6		7.6		11.7 / 17.5 (SL)		
Impact rate										
Low speed mode	bpm	n/a		n/a		n/a		n/a		
High speed mode	bpm	700 ~ 1,200		700 ~ 1,200		550 ~ 1,000		550 ~ 1,000		
Impact Energy [4]										
Low speed mode	Joule	n/a		n/a		n/a		n/a		
High speed mode	Joule	180		200		300		450		
Tool shank diameter	mm	45		45		50		58		
Applicable carrier weight										
Optimal range	tonne	0.7 ~ 1.2		1.0 ~ 2.5		1.5 ~ 3.0		2.5~4.5 / 4.0~6.0(SL)		
Available range	tonne	*0.7 ~ 2.5*		*1.0 ~ 4.0*		*1.5 ~ 4.5*		*2.5~6.0 / 2.5~8.0(SL)*		
Gas charging pressure										
Back-head	bar	8~10		8~10		8~10		10~12		
Accumulator	bar	n/a		n/a		n/a		n/a		
Hydraulic piping										
Line size; min. internal diameter	mm (in)	9.5 (3/8)		12 (1/2)		12 (1/2)		12 (1/2)		
Acceptable back pressure [5]	bar	15		15		15		15		
Hose connection ports for Oil supply(IN) & return(OUT)		BSP 3/8" O-Ring boss female		BSP 1/2" O-Ring boss female						
Pressure relief (min.)	bar	30 bar higher than measured maximum operating pressure								
Acceptable Hydraulic oil										
Operating temperature	°C	-20 ~ +80		-20 ~ +80		-20 ~ +80		-20 ~ +80		
Viscosity	cSt	1,000 ~ 12		1,000 ~ 12		1,000 ~ 12		1,000 ~ 12		

Note: 1) For the specifications of other versions of bracket, contact your HYUNDAI dealer or service.

2) Including standard tool, standard mounting adapter and spacers but excluding hydraulic hoses, fittings and mounting pins.

3) Measured from the tool tip of the standard tool to the top of the breaker excluding standard mounting adapter.

4) Measured in accordance with the certified test procedure which comply with the AEM Tool Energy Rating for hydraulic breakers.

5) The maximum allowed oil pressure at the breaker's connection point to the return line (measured statically without the breaker)

■ HEB050P / 060P / 100P

Model		HEB050P			HEB060P			HEB100P	
Bracket version [1]		*Box*	*Open*	*BL*	*Box*	*Open*	*BL*	*Box*	*Open*
Working weight [2]	kg	314	330	312	468	455	400	552	549
Weight w/o mounting adapter	kg	268	284	-	398	385	-	482	479
Overall length [3]	mm	1,682	1,674	1,585	1,933	1,916	1,767	2,066	2,049
Required oil flow rate	l/min	35 ~ 65			45 ~ 90			60 ~ 110	
Operating pressure	bar	130 ~ 170			130 ~ 170			140 ~ 180	
Input power (max.)	kW	18.4			25.5			33	
Impact rate									
Low speed mode	bpm	n/a			n/a			n/a	
High speed mode	bpm	550 ~ 1,000			520 ~ 1,000			500 ~ 1,000	
Impact Energy [4]									
Low speed mode	Joule	n/a			n/a			n/a	
High speed mode	Joule	700			1,000			1,350	
Tool shank diameter	mm	68			80			93	
Applicable carrier weight									
Optimal range	tonne	4.0 ~ 6.0			6.0 ~ 8.0			8.0 ~ 12	
Available range	tonne	*3.5 ~ 8.0*			*5.0 ~ 11*			*7.0 ~ 15*	
Gas charging pressure									
Back-head	bar	15~17			15~17			15 ~ 17	
Accumulator	bar	n/a			n/a			n/a	
Pressure adjust valve setting (No. of turns open from full-close)					n/a			n/a	
Hydraulic piping									
Line size; min. internal diameter	mm (in)	12 (1/2)			19 (3/4)			19 (3/4)	
Acceptable back pressure [5]	bar	15			15			15	
Hose connection ports for Oil supply(IN) & return(OUT)		BSP 1/2" O-Ring boss female			BSP 3/4" O-Ring boss female				
Pressure relief (min.)	bar	30 bar higher than measured maximum operating pressure			40 bar higher than measured maximum operating pressure				
Acceptable Hydraulic oil									
Operating temperature	°C	-20 ~ +80			-20 ~ +85			-20 ~ +85	
Viscosity	cSt	1,000 ~ 12			1,000 ~ 10			1,000 ~ 10	

Note: 1) For the specifications of other versions of bracket, contact your HYUNDAI dealer or service.

2) Including standard tool, standard mounting adapter and spacers but excluding hydraulic hoses, fittings and mounting pins.

3) Measured from the tool tip of the standard tool to the top of the breaker excluding standard mounting adapter.

4) Measured in accordance with the certified test procedure which complies with the AEM Tool Energy Rating for hydraulic breakers.

5) The maximum allowed oil pressure at the breaker's connection point to the return line (measured statically without the breaker)

■ HEB140P / 220P / 310P / 400P / 500P / 700P

Model		HEB140P	HEB220P	HEB310P	HEB400P	HEB500P	HEB700P
Bracket version [1]		*Box*	*Box*	*Box*	*Box*	*Box*	*Box*
Working weight [2]	kg	1,148	1,799	2,461	3,433	4,119	6,484
Weight w/o mounting adapter	kg	1,000	1,527	2,084	2,921	3,549	5,494
Overall length [3]	mm	2,375	2,935	3,281	3,531	3,735	4,236
Required oil flow rate	l/min	80 ~ 140	130 ~ 180	170 ~ 240	200 ~ 280	230 ~ 330	320 ~420
Operating pressure	bar	140 ~ 180	160 ~ 180	165 ~ 185	165 ~ 185	165 ~ 185	165 ~ 185
Input power (max.)	kW	42	54	74	86	102	130
Impact rate							
Low speed mode	bpm	380 ~ 700	330 ~ 500	310 ~ 490	330 ~450	250 ~ 370	280 ~ 370
High speed mode	bpm	550 ~ 850	430 ~ 650	400 ~ 680	420 ~ 600	350 ~ 500	370 ~ 480
Impact Energy [4]							
Low speed mode	Joule	2,500	4,300	6,100	7,600	10,400	13,000
High speed mode	Joule	2,150	3,200	4,200	6,000	7,900	10,000
Tool shank diameter	mm	105	135	150	165	180	205
Applicable carrier weight							
Optimal range	tonne	12 ~ 16	20 ~ 26	26 ~ 32	32 ~ 40	40 ~ 60	65 ~ 85
Available range	tonne	*12 ~ 20*	*20 ~ 30*	*26 ~ 35*	*32 ~ 45*	*40 ~ 70*	*60 ~ 110*
Gas charging pressure							
Back-head	bar	15 ~ 17	15 ~ 17	15 ~ 17	16 ~ 18	16 ~ 18	16 ~ 18
Accumulator	bar	n/a	60	60	60	60	60
Pressure adjust valve setting (No. of turns open from full-close)		n/a	2.5 ~ 3.0	2.5 ~ 3.0	3.0 ~ 3.5	3.0 ~ 3.5	2.0 ~ 2.5
Hydraulic piping							
Line size; min. internal diameter	mm (in)	19 (3/4)	25 (1)	32 (1-1/4)	32 (1-1/4)	32 (1-1/4)	32 (1-1/4)
Acceptable back pressure [5]	bar	15	10	10	10	10	10
Hose connection ports for Oil supply(IN) & return(OUT)		BSP 3/4" O-Ring boss female	BSP 1" O-Ring boss female		BSP 1-1/4" O-Ring boss female	BSP 1-1/2" O-Ring boss female	
Pressure relief (min.)	bar	40 bar higher than measured maximum operating pressure					
Acceptable Hydraulic oil							
Operating temperature	°C	-20 ~ +85	-20 ~ +85	-20 ~ +85	-20 ~ +85	-20 ~ +85	-20 ~ +85
Viscosity	cSt	1,000 ~ 10	1,000 ~ 10	1,000 ~ 10	1,000 ~ 10	1,000 ~ 10	1,000 ~ 10

Note: 1) For the specifications of other versions of bracket, contact your HYUNDAI dealer or service.

2) Including standard tool, standard mounting adapter and spacers but excluding hydraulic hoses, fittings and mounting pins.

3) Measured from the tool tip of the standard tool to the top of the breaker excluding standard mounting adapter.

4) Measured in accordance with the certified test procedure which complies with the AEM Tool Energy Rating for hydraulic breakers.

5) The maximum allowed oil pressure at the breaker's connection point to the return line (measured statically without the breaker)

4. Installation

IMPORTANT!
Improper installation can cause serious damage to the breaker and to the carrier. Do not install the breaker if you are unsure. Contact your Hyundai dealer for more information.

4.1. Carrier requirements

The HYUNDAI breaker can be installed on any carrier that meets necessary mechanical and hydraulic installation requirements. Refer to Section "**3. Technical specifications**" to determine the carrier specification required.

Check following points when installing the breaker:

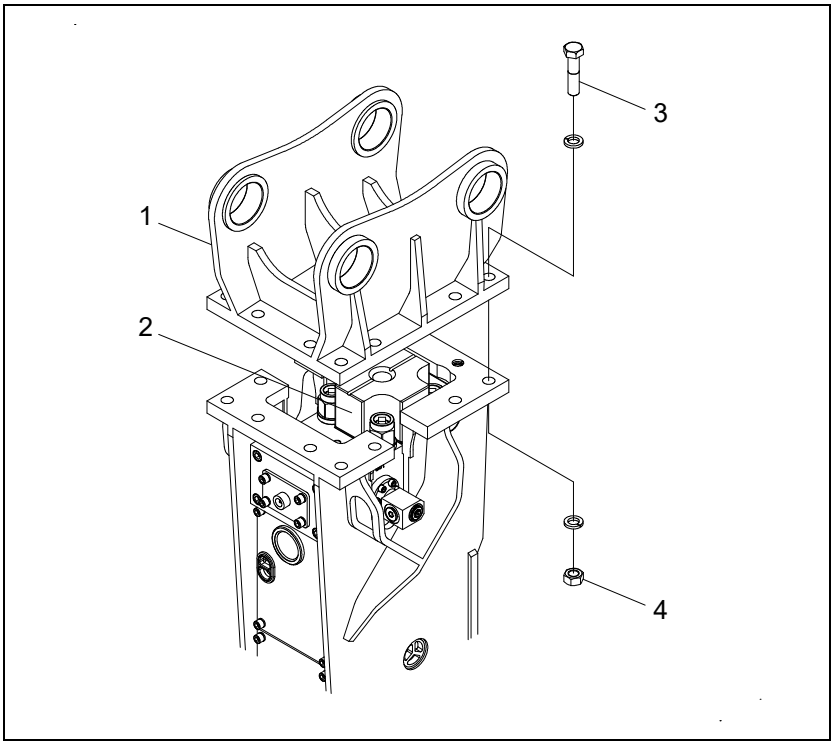
- **Carrier weight:**
  The hydraulic breaker should only be mounted on a carrier with sufficient load capacity. In case of using a quick coupler (hitch), determine the total weight including the quick coupler.
- **Mounting dimension:**
  To fit the breaker on the carrier, proper mounting adapter must be used. This mounting adapter varies according to carrier model and should be ordered separately with follows:
  - ✓ Excavator model and year built
  - ✓ Arm(stick) type

  HYUNDAI's standard mounting adapters are designed to fit most carrier, and parts for fitting, such as spacers and pins can also be provided.
- **Hydraulic line:**
  Check the nominal bore size of the breaker piping lines on the carrier. Both supply and return lines must have sufficiently large inner diameters. Small line size causes backpressure increase, overheating of oil or irregular blows.
- **Hydraulic pressure:**
  The hydraulic pressure and oil flow of the carrier's breaker piping should be adequate for operating the breaker.
  The maximum hydraulic pressure of the carrier must be higher than the recommended relief pressure setting for the breaker. If not, the impact rate of the breaker becomes slow or the breaker does not start blowing.
- **Oil flow:**
  Oil flow, which controls impact rate of breaker, is the most important factor in the hydraulic parameters to operate breaker with a good performance, and should not only be too low but also be too high. Insufficient oil flow cause low impact rates, and on the contrary excessive oil flow causes an increase in the operating pressure and overheating of the oil. If the output of the pump is more than the maximum acceptable flow of the breaker, a flow control valve is needed.
- **Oil cooler:**
  Too low or too high oil temperature reduces the working performance of a breaker. The temperature of the hydraulic oil shall never exceed 90°C (194°F), maximum allowed limit, which may cause damage to the breaker as well as the carrier. If the carrier's oil cooler is too small, either the original cooler should be replaced with a larger one or an auxiliary cooler must be installed.
  For sufficient cooling of oil, return oil from the breaker must run through oil cooler to oil tank.

4.2. Attaching the mounting adapter

1. Stand the breaker on the flat and stable base or lay the hydraulic breaker on squared beams or a pallet with the service window of the breaker box facing upwards.
2. Fix the adapter (1) to the breaker box with two screws.
   For silenced breaker, insert the upper damper (2) in the breaker box before fixing the adapter.
3. Then fit all screws (3) and tighten to the specified torque. The sizes of screws for different breaker types are as follows;

   - HEB010P ~ 030P : 12 mm
   - HEB040P ~ 140P : 20 mm
   - HEB220P ~ 310P : 30 mm
   - HEB400P ~ 700P : 36 mm



1. Adapter
2. Upper damper
3. Screw and washer
4. Nuts and washer
(Number of nuts -single or double- may vary on different breaker models)

4.3. Mounting the hydraulic breaker on the carrier

DANGER!

While mounting the breaker or removing the bucket, make sure that there are no persons in the vicinity of the carrier.

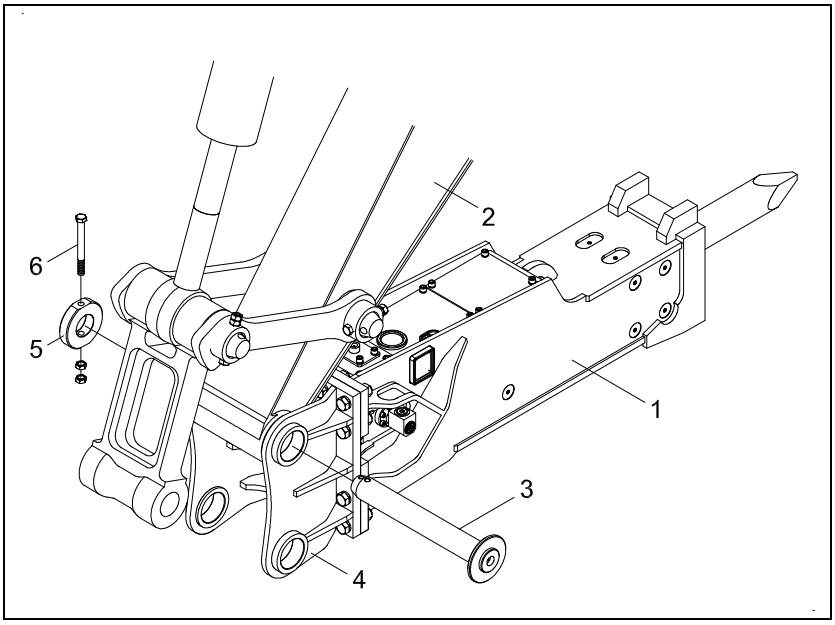
When moving the carrier, do not touch any part of the carrier or hydraulic breaker. Keep hands away from linkage area and pin-bores.

When aligning pin-bores, never put a finger into the bore, align only by sight or with using drift pin.

Agree with the assistant on clear hand signals.

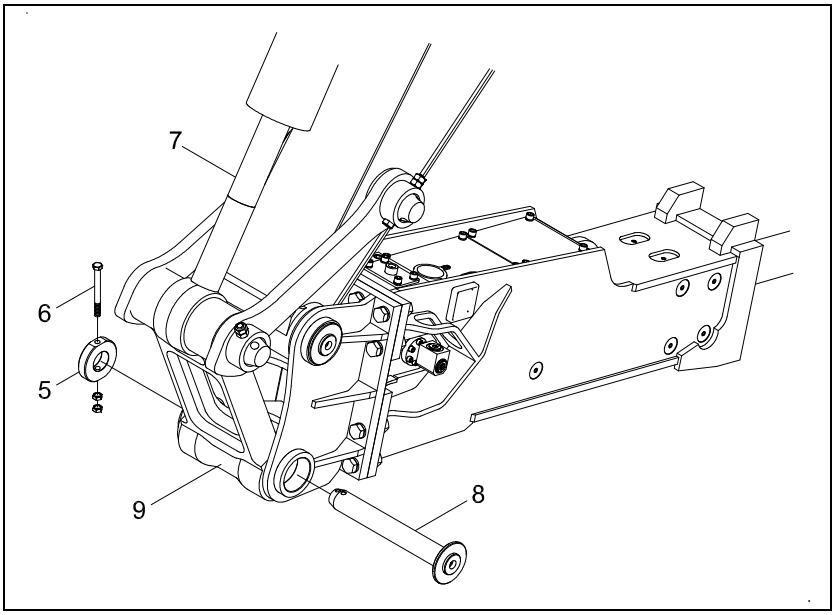
During breaker mounting, the carrier should only be operated from the operator's cab.

1. Following the direction of an assistant, carefully move the excavator arm (2) into the adapter (4), until the bore in the arm is flush with those in the adapter.
2. Insert the arm pin (3).
3. Fit the stop ring (5) to the arm pin (3) and lock by using the bolt and nuts (6).



1. Hydraulic breaker
2. Excavator arm
3. Arm pin
4. Mounting adapter
5. Stop ring
6. Bolt and nuts

4. Lift up the breaker (1) to a proper height.
5. Extend the bucket cylinder (7) until the bore in the link (9) is flush with those in the adapter (4).
6. Insert the link pin (8).
7. Fit the stop ring (5) to the bucket pin (8) and lock by using the bolt and nut (6).
8. Check there are any mechanical difficulties, slacks or incompatibility in manipulating.



5. Stop ring
6. Bolt and nuts
7. Bucket cylinder
8. Link pin
9. Link

IMPORTANT!

After mounting the breaker, extend and retract the carrier's cylinder to its full extent in each direction to ensure that carrier's cylinder can move without any difficulty or damage.

If problems are encountered, consult your local HYUNDAI dealer.

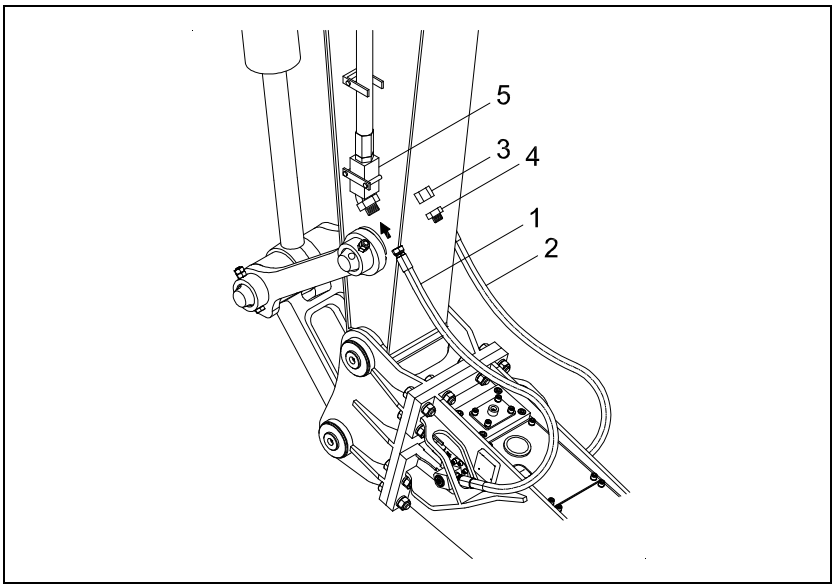
4.4. Connecting the hydraulic lines of the breaker

Before connecting the hydraulic lines to the carrier, check following points:

- To avoid breaker damage, the hydraulic oil of the carrier must be kept clean. Check the contamination of the oil, then, if necessary, change the oil or flush the oil through a external filtration system, and replace the carrier oil filter according to the maintenance schedule of the carrier.
- In case of using a newly installed breaker piping, remove the contamination in the hydraulic line through bypass flushing (without connecting the breaker).
- Check the pressure setting of the relief valve on the breaker hydraulic line, this pressure-relief setting should be at least 30 ~ 40 bar higher than the measured maximum operating pressure of the hydraulic breaker.
- The sealing faces and connecting threads of the hoses or fittings must be undamaged and free of sand or similar foreign particles.

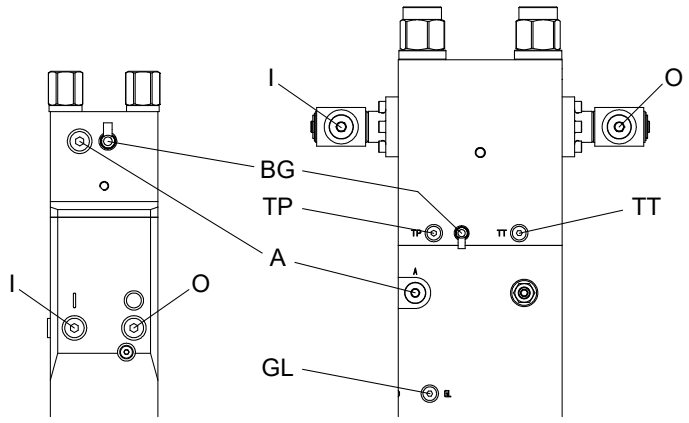
If the hydraulic lines are in good preparation for operating the breaker, connect the breaker as follows:

1. If the connection hoses are not installed on the breaker, remove the cover plate on the service window and connect the "IN" & "OUT" hoses (1, 2) to the breaker.
2. Confirm both of the stop valves (5) are closed.
3. Remove the end caps (3) from the stop valves (5) and remove the hose plugs (4) from the hoses. Put them in the toolbox for safekeeping.
4. Connect the "IN" & "OUT" hoses (1, 2) to the stop valves on both sides of the carrier arm.
5. Open the stop valves (5).



1. High pressure hose (In)
2. Low pressure hose (Out)
3. End caps
4. Hose plugs
5. Stop valves

4.5. Connection ports of the breaker



HEB010P ~ 100P HEB140P ~ 700P

I : Inline port (high pressure) marked with 'I'

O : Outline port (low pressure) marked with 'O'

BG : Back-head gas charging port

A : Compressed air supply port for underwater operation

GL : Greasing port for chisel lubricating, connected to external grease nipple on bracket

TP : Test port to measure the operating pressure

TT : Test port to measure the return pressure

The graphic shows only a general view of the connection ports on the breaker power-cell, and the brackets are not shown for explanation. The details of port location and port size may vary on different breaker models. Refer to followings:

Connection ports	**HEB010P ~ 040P**	**HEB050P ~ 100P**	**HEB140P ~ 700P**
I / O	Varies according to breaker model, refer to Section "3. Technical specifications".		
BG	Minimess coupling (plastic cap) Use the gas charging kit provided with the breaker.		
A	Not available.	BSP 1/2" O-ring boss port 10 mm Hex. socket plug.	BSP 3/4" O-ring boss port Steel plug (12mm Hex. socket)
GL	Not available.		BSP 3/8" O-ring boss port Steel plug (8mm Hex. socket)
TP	Not available.		BSP 3/8" O-ring boss port Steel plug (8mm Hex. socket)

4.6. Dismounting the hydraulic breaker from the carrier

WARNING!

Wear safety shoes to protect feet.

Personal injury can result from dropping pins during dismounting.

Put the hydraulic breaker on a clean, flat, level surface, and engage the parking brake on the carrier machine.

1. Close the stop valves completely.
2. Disconnect the hydraulic hoses (I, O) from the stop valves.
3. Ensure no leakage occurs from hoses and stop valves.
4. To prevent contamination, apply the end caps to the stop valves and hose plugs to the hoses.
5. Remove the stop rings from the arm and link pins.
6. Lift the arm away from the hydraulic breaker, so that the hydraulic breaker can be carried away, or another attachment mounted on the carrier.

4.7. Fitting / removing the chisel

WARNING!

The chisel shall only be installed in the way described. Failure to do so could allow the chisel to be drawn out from the breaker with force possibly causing safety accidents.

When installing the chisel, the carrier must be switched off before fitting or removing the chisel. Always wear safety glasses and gloves because metal chips or debris may fly off when driving the chisel or the chisel pins.

Never put fingers in the chisel pin-bores of the breaker.

Do not stand in front of chisel; possible blank blow caused by the pressure trapped inside the breaker can cause personnel injury.

In case of large size breaker, the chisels are very heavy and difficult to lift by hands. Always use a hoist with a sling when lifting the chisel. Be careful of falling down.

After operating the breaker, the chisel, especially the tip, may remain very hot for some time and can cause severe burn.

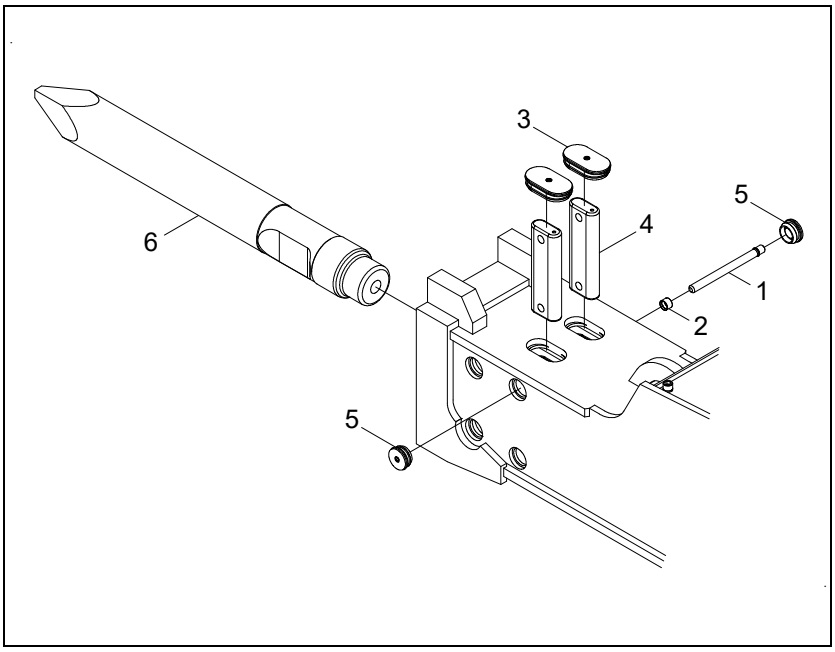
IMPORTANT!

Use only genuine HYUNDAI chisels. Use of other brands of chisel may occur serious trouble to the breaker and cause warranty rejected.

It is important that the chisel be used correctly for longer chisel life. Pay particular attention to Section “**5.2. Correct working methods**”, and refer to a extra document “A guide for profer use of tool” to determine the warranty guide for chisel failure.

In general the chisel is not fitted when the breaker is delivered. Before fitting the chisel, move the hydraulic breaker into a horizontal position using the carrier and place it on a suitable support (e.g. squared beams).

■ Silenced version bracket (BOX HOUSING version)



1. Stop pins
2. PU-sleeves
3. Plugs
4. Chisel pins
5. Plugs
6. Chisel

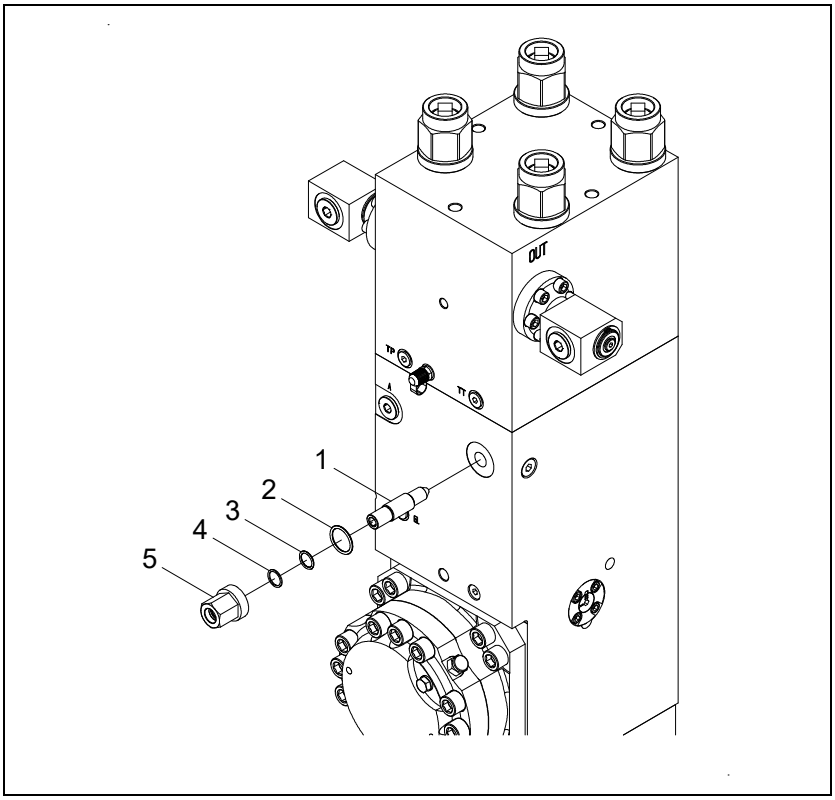
This figure shows only a case of the BOX HOUSING version. Detail configurations may vary on different bracket version and breaker models.

For the entire bracket version, fit the chisel as follows:

1. Remove the plugs (3), (5) by using the screw bolt and remove the stop pins (1) by using a hand-breaker and the special tool provided. Drive the stop pins out from the chamfered small diameter side to the large diameter side.
2. If the PU-sleeve (2), which was inserted in the hole, is damaged, replace it with a genuine replacement.
3. Remove the chisel pins (4).
4. Check the inside of the front-head for wear or foreign bodies. In case of replacing the chisel after use, do check and maintenance work according to Section “**6.6. Chisel, wear bushings and chisel pins**”.
5. While lifting up the chisel, clean away any dirt adhering to the chisel shank in the inserted portion, then sufficiently lubricate the chisel shank and the bushes in the breaker. For details of chisel lubricating and applicable grease refer to Section “**6.4. Grease**”.
6. Insert the chisel (6) to the chisel bore of the front-head.
7. Align the recesses of the chisel shank to the chisel pin holes on the front-head by turning the chisel.
8. Then insert the chisel pins (4).
9. Drive the stop pin (1) into the front-head, small diameter side first, making sure that the stop pin is inserted completely and insert the plugs (3), (5).
10. Moving the carrier and stand the breaker vertically on the chisel. Check that the chisel can move up and down smoothly by applying contact pressure and releasing it.

4.8. Adjusting the pressure-adjusting valve

For HEB140P and bigger model



1. Pressure-adjusting valve
2. O-ring
3. O-ring
4. Backup ring
5. Adjuster nut

The graphic shows only a general view of the pressure-adjusting valve. The position of the pressure-adjusting valve may vary on different breaker models.

The HEB140P ~ HEB700P hydraulic breakers have a pressure-adjusting valve to allow adjustment of the operating pressure which have an effect on the blow power. The pressure-adjusting valve controls the breaker's drain pressure during the piston raising operation. By controlling the working pressure, the blow power can be increased or decreased.

- To increase the blow power, turn the pressure-adjusting valve clockwise.
- To decrease the blow power, turn the pressure-adjusting valve anticlockwise.

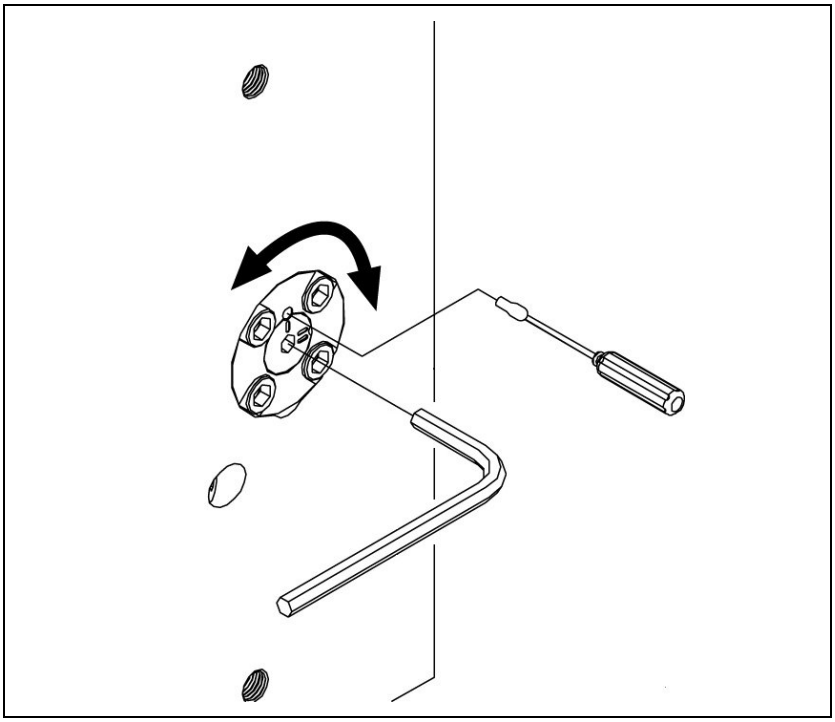
The pressure adjusting-valve is set in the factory before delivery; if you need to reset it, follow instructions below:

1. Loosen the adjuster nut (5) to enable the adjust valve to be turn.
2. Turn the pressure-adjusting valve (1) clockwise or anticlockwise as required.
3. Tighten the adjuster nut (5) to the prescribed torque (140 ~ 180 N·m)
4. The standard factory settings are as follows:
   No. of turns open from the full-close:

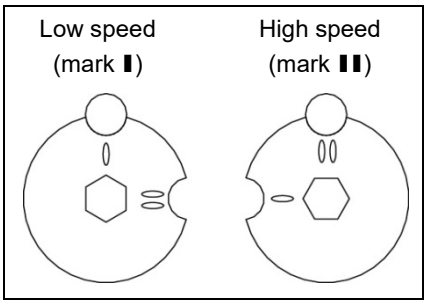
■ HEB140P	2.0 ~ 2.5	■ HEB220P / 310P	2.5 ~ 3.0
■ HEB400P / 500P	3.0 ~ 3.5	■ HEB700P	2.0 ~ 2.5

4.9. Adjusting impact rate – 2-speed selection

For HEB140P and bigger model



1. Speed selection switch
2. Locking button
3. Cylinder



The HEB140P ~ 700P hydraulic breakers have a 2-speed selection valve on the cylinder body to change the impact rate and the impact energy according to working condition.

■ Low speed: working with normal impact rate and maximum percussive power

Breaking large rocks embedded underground, or breaking heavy-reinforced concrete structures requires strong percussive power rather than high impact rate. When impact energy per blow of breaker is not sufficient to make breakage on material, however fast impact rate may be, the breaker does not give expected breaking productivity because the chisel cannot penetrate into the material.

For this kind of work, maximum percussive power, even though low impact rate, is needed.

The speed selection switch is set to the low speed mode (mark I) in the factory when delivered, as shown in the previous figure.

■ High speed: working with increased impact rate and reduced percussive power

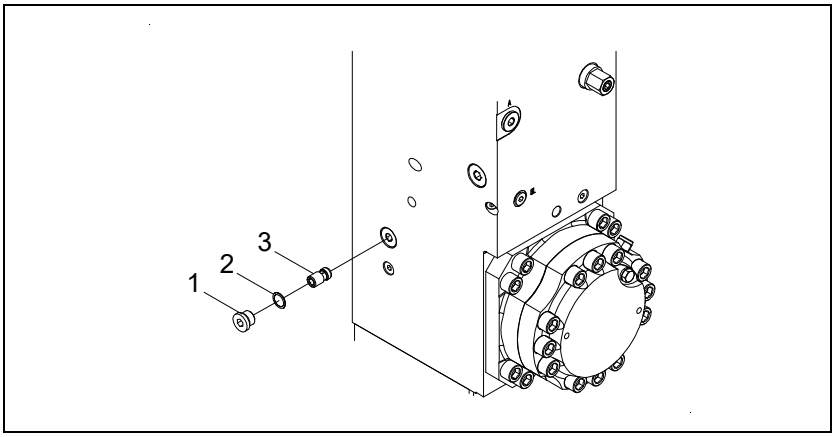
When breaking small or soft rocks, or when tearing up thin concrete surfaces reduced percussive power is sufficient, and the impact rate switching system allows the breaker to be operated at a higher impact rate, by reducing the stroke. The impact energy is thus adapted to the lighter application.

To change impact rate to high speed:

1. Push the locking button (2) with a small size screwdriver.
2. Turn the speed selection switch (1) counter-clockwise by using an 8 mm hex L-wrench so that the locking button (2), faces toward the high speed mode (mark ▮▮)

4.10. Anti-Blank-Blow (Auto-Stop) function

For HEB220P and bigger model



1. Plug
2. O-ring
3. Shut-off valve

The HEB220P ~ HEB700P hydraulic breakers are equipped with Anti-Blank-Blow (Auto-Stop) function as standard for easier operation and longer product life. The Anti-Blank-Blow function prevent the breaker operating in no-load condition, i.e., when the chisel is not properly pre-loaded by contact with the object to be broken.

Blank blows –in other word, idle blows– which apply impact on the chisel without contact with the object, are very harmful for the breaker. Therefore, without the Anti-Blank-Blow function, the breaker always should be pressed down onto the object before starting the breaker and should be stopped immediately as soon as the object is broken. When operated without pre-load or operated furthermore after that the object is broken completely, blank blows could result in excessive wear, deformation or breakage to major components such as chisel, chisel pins, stop pins and front head.

With the Anti-Blank-Blow function, the breaker does not start operating unless the chisel is pre-loaded by contact with the object, and the breaker stop operating automatically when the chisel does not contact with the object according as the object is completely broken even though the operator keep operating switch pressed ‘on’.

The Anti-Blank-Blow function is constructed with a by-pass line and a Shut-off Valve in the cylinder. The Shut-off Valve is a switching valve to disable the Anti-Blank-Blow function for special application.

■ Disabling the Anti-Blank-Blow function

For special working condition, e.g. breaking over-size boulders or non-rigid object, the Anti-Blank-Blow function can be disabled by inserting the Shut-off valve as shown in the figure above.

To disable the Anti-Blank-Blow function,

1. Stop the carrier, and close the stop valves
2. Remove the plug (1) (which include O-ring).
3. Insert the shut-off valve (3) using a M10 bolt.
4. Tighten the plug (1) again with the specified torque.

To enable the Anti-Blank-Blow function again, remove the shut-off valve in the same way above.

Important! When operating the breaker with the Anti-Blank-Blow function disabled, be sure to not operating the breaker in blank blowing condition.

4.11. Inspection after installation

After the breaker has been installed on the carrier and set ready to operate, installation inspection must be carried out. Check inspection items and specifications as follows:

- The **oil flow supplied to the breaker;**
  should be measured from the 'IN' line with a flowmeter while operating the breaker. As alternative, oil flow can be measured, without breaker operating, using a flowmeter that has a throttle valve, which set to the operating pressure of the breaker.
- The **operating pressure of the breaker;**
  should be measured as close to the breaker 'IN' port as possible.
  Note: The oil flow and the operating pressure should be measured in minimum and maximum values because those fluctuate slightly while operating the breaker.
- The **relief pressure of the breaker piping;**
  should be measured with the stop valve shut off. And, it must be set to 30~40 bar higher than the measured maximum operating pressure of the breaker.
- The **prefill gas pressures in the back-head gas chamber and the accumulator;**
  must be measured statically, the breaker not operating, at the ambient temperature before operating. Refer to Section "**6.5. Gas**" for details about measuring the gas pressures.
- The **impact rate;**
  can be measured if a blow frequency counter is available. It is highly recommended to measure the impact rate.
- Refer to Section "**3. Technical specifications**" for given limits of the specification.

5. Operating the hydraulic breaker

This chapter describes how to choose the correct chisel for the job and how to operate the breaker correctly. To increase the breaker's breaking performance and working life, pay attention to this chapter.

The breaker is powerful machinery and lots of damage can be done if you do not know how to use the breaker safely. Read this chapter before operating the breaker.

5.1. Selecting the right chisel

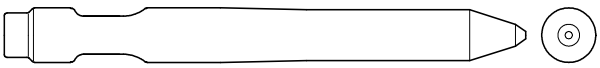
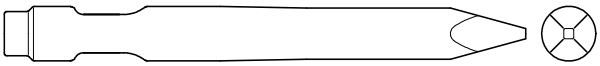
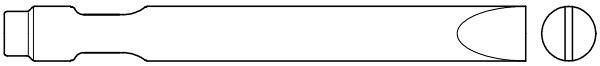
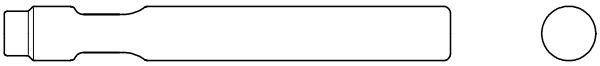
The correct type of chisel must be selected to get the best possible working results and longest lifetime for chisel.

The recommended selections of standard chisels for various kind of job are depicted as follows:

Basically, there are two types of breaking principle with a hydraulic breakers.

- Penetrative (or cutting) breaking:
  A conical, pyramid or wedge type tool is forced into the material. This method is most effective in soft, layered or plastic material. The sharper edge the chisel has, the better the breaker penetrate the material. However, breaking hard material will cause the sharp edges to wear very quickly.
- Impact breaking:
  Transferring strong mechanical stress wave into material breaks material. Best possible energy transfer between chisel and material is achieved with a blunt chisel. This impact breaking is more effective in hard, brittle and very abrasive materials. Generally, small size breaker is not suitable for impact breaking.

Standard chisels:

Type of Chisel		Application
Conical		Universal use; Breaking concrete, bedrock and pavement
Moil		Universal use; Breaking concrete, bedrock and pavement
Flat wedge		Mining, Foundation, Trenching and benching, Concrete demolition, Finishing slopes
Blunt		Breaking oversize boulders, Concrete demolition

Note:

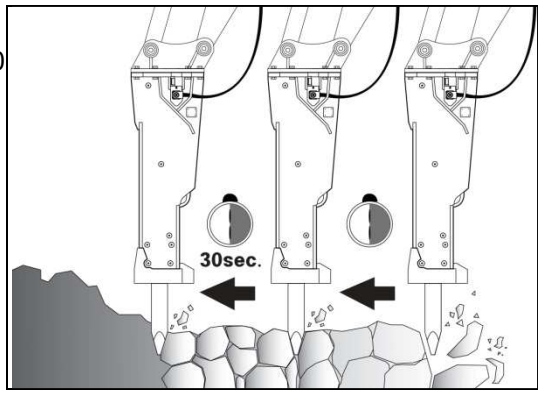
- Chisels are subject to wear and tear in the course of normal operations. (Replacement of these parts due to wear is not covered by the warranty.)
- Only genuine HYUNDAI chisels should be used, if other makes of chisels are used the warranty may become void.
- Special designs available on request.

5.2. Correct working methods

■ Advance:

Move the impact point from the edge to the interior. Never try to break off a too large block, if the object has not broken within 30 seconds. The object should be broken up piece by piece in small blocks. Large distance steps will not improve working results.

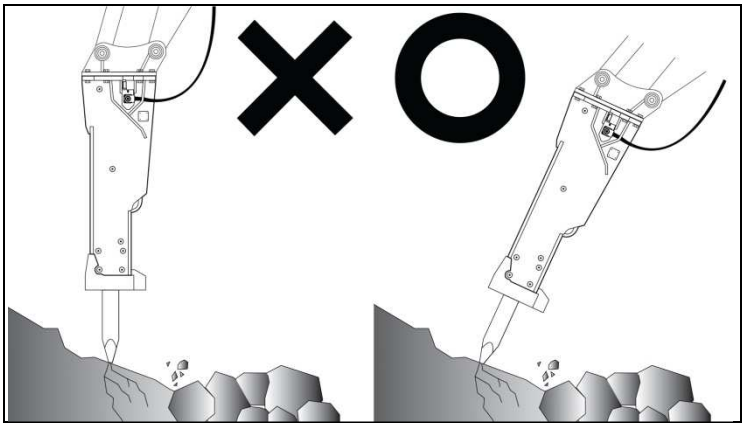
Operating the breaker longer than 30 seconds may cause damage to the breaker.



■ Angle of attack:

The breaker should always be positioned at right angles to the surface of the material. If the breaker is operated at slant angle,

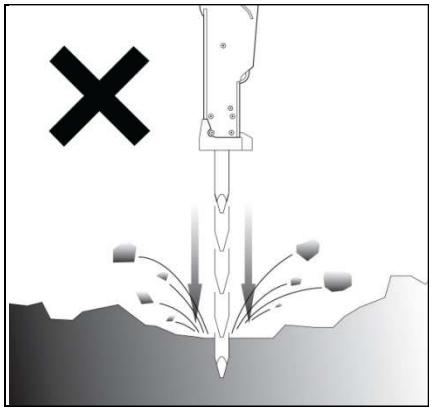
The chisel slide off the material surface and it cause blank blows that damage the breaker. And the chisel will wear more quickly, or broken more frequently.



■ Never use as a sledge breaker:

Before starting up, place the chisel point on the ground.

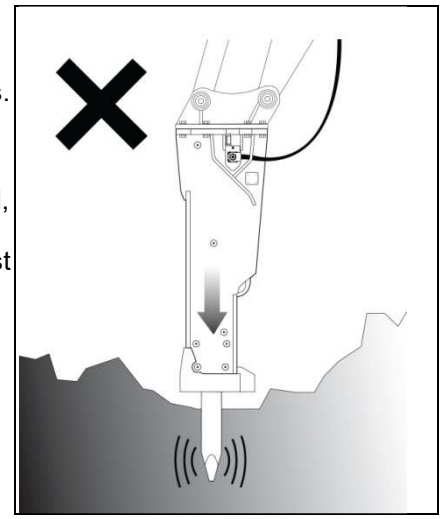
Never attempt to use the breaker as a sledge breaker to break material, as the result of such action will cause damage to the breaker and the carrier.



■ Never drive the chisel into the ground:

If the advance is too large and the chisel is not rocked to release the dust, the chisel will be driven into the material without breaking the material. This causes the chisel tip to glow red-hot and lose its hardness. As a result, the chisel wears out more quickly. Operating in this way is not permitted.

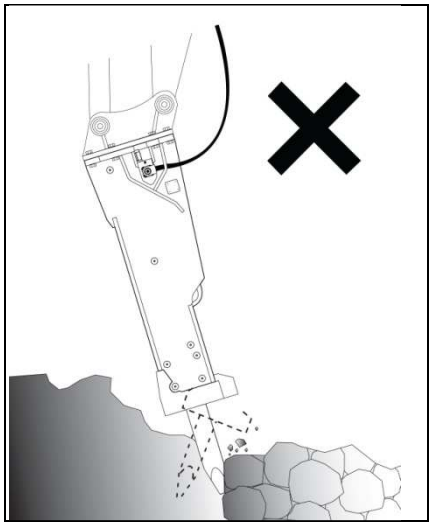
Dust dampens impact power, when the chisel is inserted into the ground, and reduces the efficiency of the breaker. Tilt the breaker slightly backward and forward, not more than 5°, while operating so that the dust can escape. Do not rock the breaker at angles greater than 5° or the chisel will be broken.



■ Never use as a lever:

Do not use the chisel as a lever; e.g. crowbar, as this will cause the chisel to break.
Under any circumstances, operating in this way is not permitted.

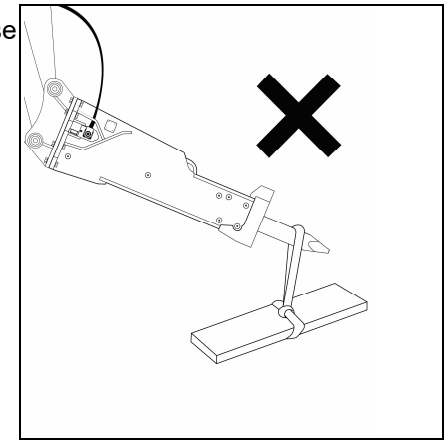
Most of bending failure of the chisel may be caused by lever action in stone that is inside hard or frozen ground. Be careful and stop operating if you feel sudden resistance under the chisel.



■ Never use for transport purposes:

The hydraulic breaker is not designed to lift or transport loads. Never use the chisel as a lifting point.

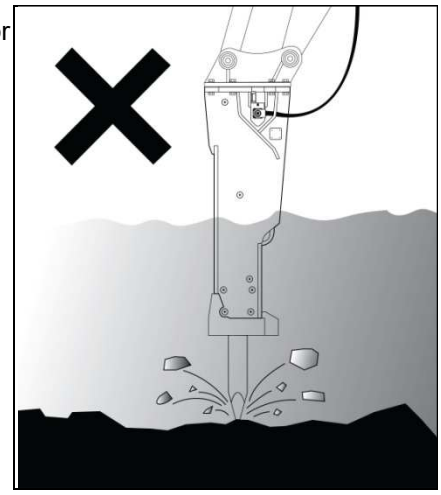
This is dangerous and could damage the breaker or the chisel.



■ Never use the hydraulic breaker under water:

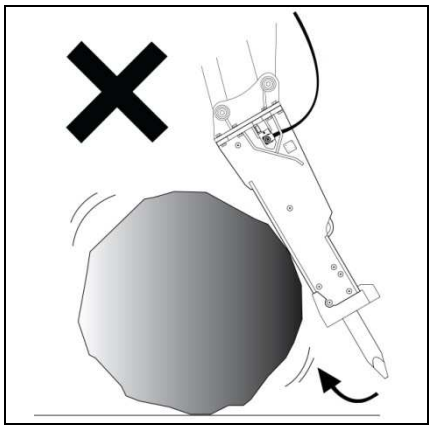
The hydraulic breaker, as a standard assembly, must never be used in or under water without prior conversion. If you use under water, water fills the impact chamber between the piston and the chisel, a strong hydraulic pressure wave is generated and will damage the seals in the breaker. And, in addition, corrosion, lack of lubrication or penetration of water could result in further damage to components of the breaker and the carrier.

To operate the breaker under water, compressed air must be supplied into the breaker, into the impact chamber of the front-head, prior to use. Refer to the manual of underwater kit, which is a separate document, provided with the underwater kit.



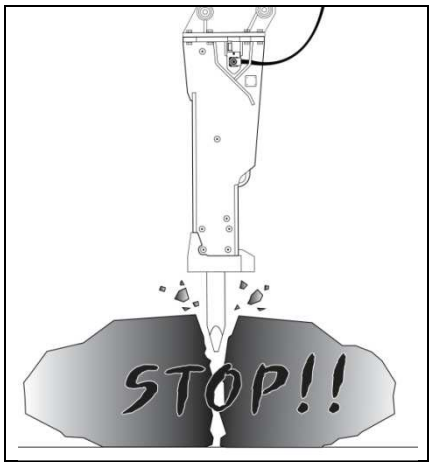
■ Never use the chisel or hydraulic breaker to move rocks or other objects:

The hydraulic breaker is not designed for this usage.
Do not use the breaker or chisel to roll, push the object or reposition the carrier.
This may cause damage to the breaker and the carrier.



■ Blank blows:

Blank blows, which are impact on the chisel without contact with the object, are very harmful for the breaker. Always press the chisel down onto the material before starting the breaker. And stop operation immediately as soon as the object has been broken. If operation is continued, blank blows could result in excessive wear to major components.



Consult HYUNDAI dealer for the operating the breaker in special applications such as:
operation under water, operation in very high or low temperature, operation in chemical factory, etc.

6. Maintenance

IMPORTANT!

Always follow the instructions described in this section when performing maintenance work on the breaker. Neglecting the maintenance schedule can cause damage to the breaker.

This section of the manual describes how to care and maintain your breaker. Check every item before and after operating the hydraulic breaker to always keep the breaker in good condition.

Neglecting the maintenance schedule and improper maintenance can cause damage to the breaker and the carrier.

6.1. General Information

Whenever maintenance work is carried out, always follow the basic rules:

- Absolute cleanliness and great care are basic and essential matters in the handling of any hydraulic components of the breaker. **(Dirt is the worst enemy of hydraulic systems.)**
- Breaker parts should be handled carefully and stored clean using lint free cloth or cleaning papers for hydraulic use.
- Do not use anything other than the correct cleaning fluid for cleaning hydraulic parts.
  (Never use water, steam, paint thinners or acid fluid)
- Sealing components, such as O-rings, packings and wipers in the hydraulic breaker should be oiled with clean hydraulic oil before assembling. Especially, for sealing parts used for tight fitting, apply lubricant paste onto the sliding portions of the seals.
- Always release the prefill gas in the back-head and accumulator before carrying out maintenance or repair work to the hydraulic breaker.
- Only the proper tools should be used for maintenance. Use of improper tools may cause personal injury, or damage to the breaker.
- Unauthorized alteration on the breaker may cause the breaker serious troubles or reduce breaker life and performance. HYUNDAI cannot guarantee these cases.

Since the hydraulic breaker is a precision machine, never disassemble the power-cell and main moving parts. If it needs disassembly, contact your local HYUNDAI dealer. If the customer disassembles the breaker, we don’t take responsibility for it.

Prior to maintenance work, perform the following sequence:

1. Put the breaker in a stable position on a level surface, for easy maintenance and repair.
2. Turn off the carrier.
3. Shut off the stop valves.
4. Disconnect the hoses if needed and seal them with plugs to prevent entry of impurities.

In special application such as: tunneling, scaling, operating in ironwork, underwater use, etc., service interval is considerably shorter than usual usage.

6.2. Care and maintenance schedule

To keep the breaker condition at its best, maintenance must be done regularly to the schedule below.

Every 2 hours	▪ Grease the chisel and chisel bush. ▪ Check hydraulic oil temperature, piping & connection and impact efficiency. ▪ Tighten loose connections.
Every 10 hours or daily	▪ Remove the retaining pin and the chisel and check their condition. Grind off any burrs that may be present. ▪ Check that the chisel has been receiving sufficient grease. Grease more frequently, if you needed.
Every 50 hours or weekly (Main inspection)	▪ Check gas pressure in the back-head. Refill the gas if necessary. ▪ Check for wear of the chisel, front bush, chisel bush and piston lower part. ▪ Check the hydraulic hoses, Replace if necessary ▪ Check through bolts, Replace and/or re-tighten if necessary.
Every 100 hours or monthly	It is recommended to have the main inspection done by your local HYUNDAI dealer. ▪ Check all hydraulic hoses and pipe connections. ▪ Check interference between hoses with carrier.
Every 600 hours or 6 monthly	It is recommended that the annual maintenance be carried out by your local HYUNDAI dealer, or after 600 operating hours. ▪ Check all hydraulic pipe, hose connections and conditions of oil filters ▪ Check through bolts for cracks on the threads and shanks. ▪ Change all seals including the accumulator diaphragm. ▪ Check the conditions of the power cell and bracket.

6.3. Hydraulic oil

Most of the hydraulic oil brands prescribed by the carrier manufacturer are suitable for the HYUNDAI hydraulic breaker. However, operating the hydraulic breaker will heat up the oil much more than the usual earth moving work.

Therefore, the hydraulic oil should correspond to viscosity class HLP32 or higher; in general case viscosity class HLP46 is recommended. In summer and in hotter climates, oils of viscosity class HLP 68 or higher should be used.

- Optimum viscosity range: 20 ~ 60 cSt
- Maximum initial viscosity: 1,000 cSt
- Minimum viscosity: 12 cSt for HEB010P ~ 040P
  10 cSt for HEB050P ~ 700P
- Maximum oil temperature (with HLP46 oil):
  80°C (176°F) for HEB010P ~ 040P
  85°C (185°F) for HEB050P ~ 700P

In some working environments with a high ambient temperature, the oil temperature may affect breaker in its performance and durability. The hydraulic system of the carrier must have a proper cooling system according to these working environments.

The temperature of the hydraulic oil must never exceed the permissible maximum oil temperature. If higher temperatures are measured in the tank, the hydraulic system and/or the pressure-relief valve have to be checked. Troubles due to incorrect oil viscosity or improper oil temperature are as follows:

Too thick oil (too low oil temperature) may cause:

- Slow or irregular blows and difficult to start
- Damage to the breaker parts by cavitation
- Low impact power

Too thin oil (too high oil temperature) may cause:

- Decreasing of flow delivery from carrier's pump
- Low impact rate; low breaking efficiency
- Insufficient lubrication; accelerated wear of breaker parts and damage to the sealing parts

When using special oils (e.g. biological oils or fire-resistive oils), contact oil manufacturer or HYUNDAI.

■ Hydraulic oil filter

Contamination of the hydraulic oil may result in parts damage, not only to the breaker, but also to the hydraulic components of carrier.

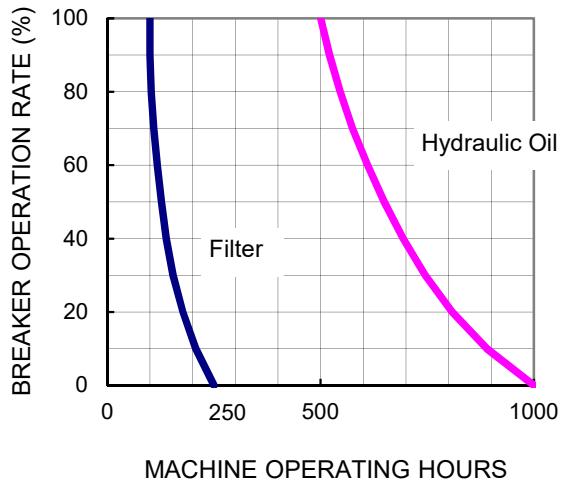
Impurities in the hydraulic oil can cause

- Accelerated parts wear
- Stick or seizure of moving parts or Score on the sliding surface of moving parts
- Oil leak and decreasing of breaker efficiency
- Deterioration of oil quality

Air bubble and water are also impurities in hydraulic oil and may induce cavitation failure.

Check the oil filter in the return line of the carrier's hydraulic system, the grade of this filter should not exceed 50 micrometers and a magnetic separator should be fitted.

We recommend hydraulic oil and oil filter replacement, as shown in the following table, and this is based on 100% breaker operation.**Replacement intervals for hydraulic oil and oil filter:**



← Full time breaker operation
Hydraulic oil replacement : 500 hours
Filter replacement : 100 hours

← Operation without breaker work
Hydraulic oil replacement : 1,000 hours
Filter replacement : 250 hours

■ Working in high or low ambient temperatures

IMPORTANT!

Feeding hot hydraulic oil to an extremely cold breaker will cause internal stresses in the breaker resulting in its failure.

If the breaker is used without pre-heating the oil:

- The sealing parts of the breaker may fracture.
- The diaphragm in the accumulator may tear.

High ambient temperature:

When operating the breaker in high ambient temperature: summer or tropical climates, above 30°C (86°F), the temperature of the hydraulic oil must be monitored to ensure it does not exceed the specified temperature limits.

If the oil temperature exceeds the maximum permissible operating temperature limits, use hydraulic oil of proper viscosity. In this case the hydraulic oil of viscosity class HLP68 should be used. If the oil temperature is still too high in spite of using the high viscosity oil, the auxiliary hydraulic cooler must be installed.

Low ambient temperature:

At temperatures below 0°C (32°F), the carrier must be warmed up prior to use in the way described by the carrier manufacturer. Ensure that the hydraulic oil of the carrier is at least at 0°C (32°F), before starting up the hydraulic breaker.

Note:

The hydraulic breaker and the carrier will not operate to full capacity until the oil temperature has reached at least 60°C (140°F).

6.4. Grease

IMPORTANT!

If grease is not supplied sufficiently, then high heat is generated due to friction at the chisel of the breaker. The heat can cause premature wear and cracking of the parts related to the chisel.

Always observe the relevant safety regulations when handling oils and greases.

Lubricate and check the grease regularly (refer to Section “6.2. Care and maintenance schedule”). Every two hours of continuous operation lubricate the chisel with appropriate amount of moly-based grease. Inject grease between the chisel and the chisel bush, through the grease nipple provided.

- Every 2 hours
- 5 ~ 10 strokes for HEB010P ~ 140P
  12 ~ 15 strokes for HEB220P ~ HEB700P
  using a large size grease gun
- Adjust greasing interval and amount of grease to the breaker models and working conditions.

When lubricate the chisel, the breaker must be standing upright against the chisel with enough down pressure applied to force the chisel into the breaker. This will prevent excessive grease getting into the impact chamber which could cause the breaker to lose power due to cushioning, or to stop operating due to a hydraulic lock in the impact chamber.

Failure to lubricate the breaker regularly will reduce the life of the chisel, the chisel bush and front bush.

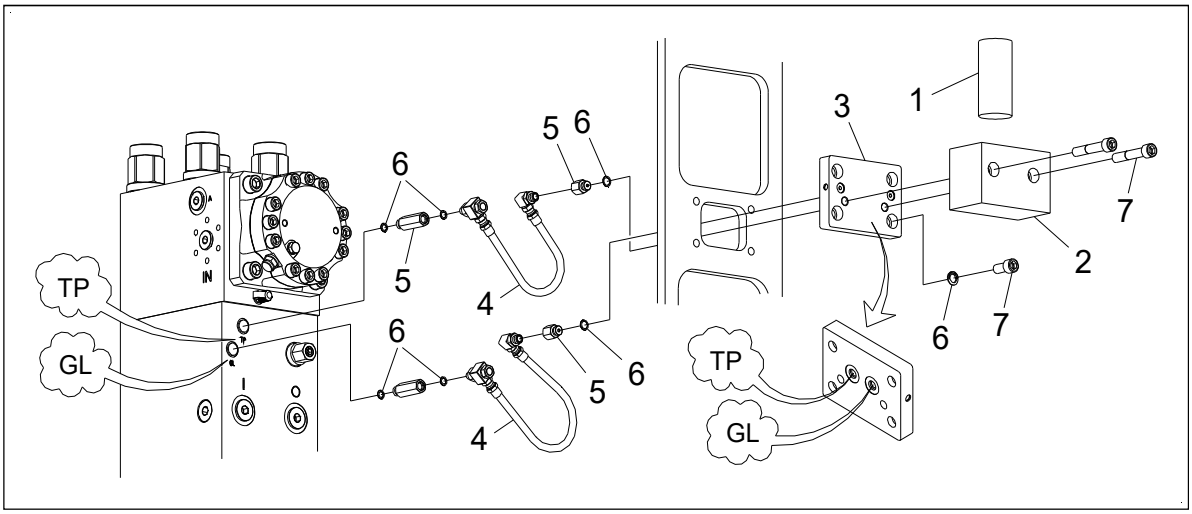
Recommended grease products by makers:

Maker	Grease Product Name
CALTEX	MULTIFAC EP2
CASTROL	SPHEEROL EP2
ESSO	RONEX MP2
GULF	CROWN EP2
MOBIL	MOBILUX EP2
SHELL	ALVANIA EP2
TOTAL	MULTIS EP2

For other than those recommended consult HYUNDAI or our dealer prior to use.

Auto-Greasing Kit is the device that operates through using the internal pressure change when the hydraulic breaker hits, and automatically greases during operation.
Therefore, if the Auto-Greasing Kit is installed, the "manual injection every 2 hours" performance described above is not required.
Instead, when the grease in the cartridge runs out, the cartridge must be replaced immediately.

Auto-Greasing Kit consists of separate parts as shown in the figure below.



1. Grease cartridge
2. Auto greasing unit
3. Mounting plate
4. Hose & Swivel joint
5. Reducer
6. O-Ring
7. Bolt

As an option item, the box housing product can be equipped with "Auto-Greasing Kit".

Models that can be installed
HEB 140P / 220P / 310P / 400P / 500P / 700P

Warning:
: The user should check the leftover amount of grease in the cartridge at any time and replace a new cartridge as soon as the grease runs out. Thus Auto-Greasing Kit can continue supplying grease to hydraulic breaker.
: When assembling the Auto-Greasing Kit to the hydraulic breaker body, must be careful of hose connection and arrangement with the hydraulic breaker body and assembly of parts.
: User (Operator, Mechanic) should check the cartridge and related parts at any time to prevent damage.

6.5. Gas

DANGER!

Using other gases could result in an explosion. Use pure nitrogen; 99.8% purity, only.

The HYUNDAI breaker is a gas assisted type hydraulic breaker. The gas prefilled in the back-head gives strong impact power and the gas prefilled in the accumulator decrease the pressure fluctuation in the breaker. For this type of breaker, operating performance of breaker is under the control of the gas pressure. Therefore, the charging pressures in these gas chambers are very important factor in the breaker and must always be maintained within the specified limits(refer to Section “**3. Technical specifications**”).

This section describes how to fill the gas and check the gas pressure in the back-head and accumulator of your breaker. Use only pure nitrogen of 99.8% purity and ensure that no other gas, e.g. air or oxygen is used. Gas charging kits should be on hand all the time, to allow the following checking and maintenance work to be performed.

6.5.1. Checking and charging the gas in the back-head

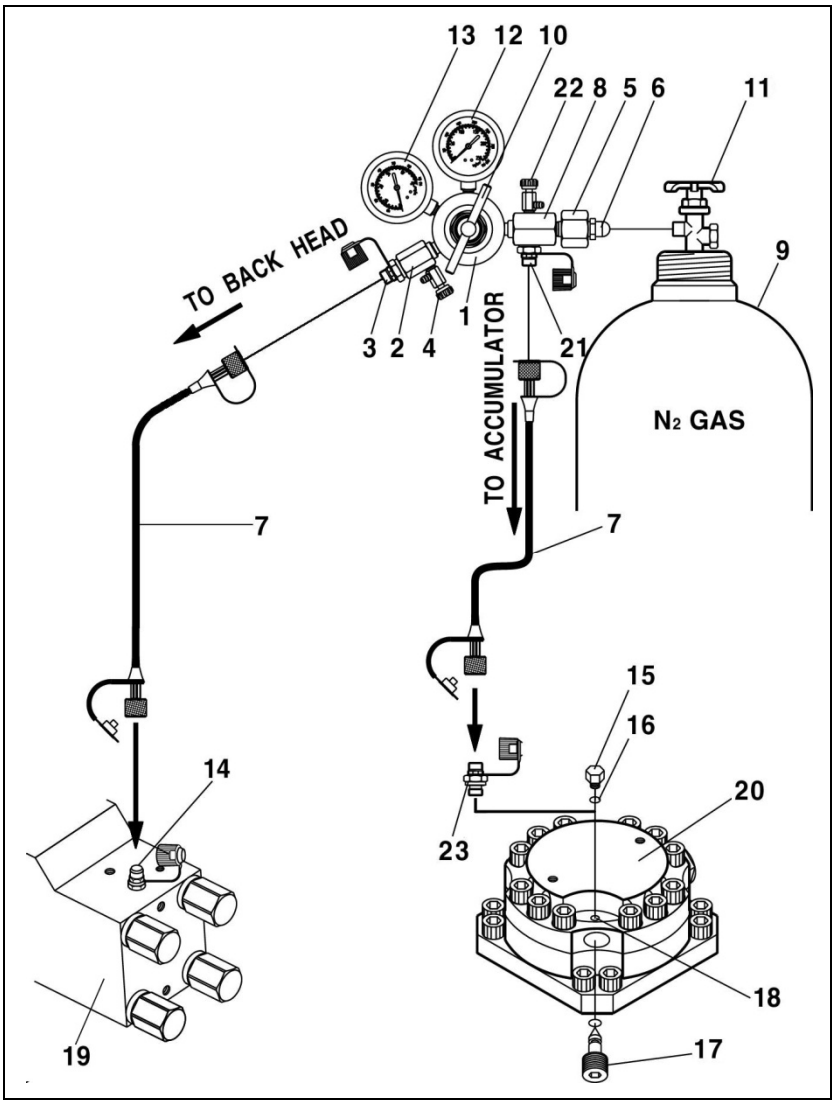
If the impact power of the hydraulic breaker starts to drop, the gas pressure in the back-head should be checked.

The back-head need not to be refilled until the gas pressure has decreased to below the specified value. In general, checking the back-head gas pressure recommended at least every 50 hours or weekly. And, Refill the gas if necessary.

Note:

When checking or charging the gas pressure, always lay the hydraulic breaker flat without any contact force applying to the chisel. The gas pressures should be checked with the breaker at the ambient temperature before operating or at the gas temperature of 60°C to 70°C (140 to 158°F) after operating.

Gas charging kit:



1. Regulator
2. Adapter
3. Mini-mess coupling I
4. Exhaust valve I
5. Cap nut
6. Coupling
7. Hose
8. Adapter
9. Nitrogen gas bottle
10. Handle
11. Gas valve
12. Accumulator gauge
13. Back-head gauge
14. Back-head mini-mess coupling
15. Accumulator charging plug
16. O-ring
17. Accumulator charging valve
18. Gas charging port
19. Back-head
20. Accumulator
21. Mini-mess coupling II
22. Exhaust valve II
23. Exhaust valve III

1. Ensure the exhaust valve I (4) and gas valve (11) are closed, and then connect the cap nut (5) to the nitrogen bottle.
2. Be sure handle (10) is fully opened (loosened).
3. Connect each end of the hose (7) to the Mini-mess coupling I (3) and the Mini-mess coupling (14) on the back-head.
4. Open the gas valve (11). And, turn the handle (10) clockwise to charge.
5. Adjust the handle (10) until the back-head gauge (13) pointer indicates the specified gas pressure.
6. If the back-head is charged over the specified gas pressure, adjust the gas pressure by opening the exhaust valve I (4) slightly to reduce the gas pressure.
7. Close the gas valve (11), and carefully vent the hose (7) by opening the exhaust valve I (4) before removing it.

Back-head gas charging pressure:

Breaker model	**CHARGING** **at ambient temperature;** **20°C (68°F)** bar *(psi)*	**CHECKING** **at operating temperature;** **60~70°C (140~158°F)** bar *(psi)*
HEB010P HEB020P HEB030P	8 ~ 10 *(116 ~ 145)*	9.1 ~ 11.4 *(132 ~ 165)*
HEB040P	10 ~ 12 *(145 ~ 174)*	11.4 ~ 13.7 *(132 ~ 187)*
HEB050P HEB060P HEB100P HEB140P HEB220P HEB310P	15 ~ 17 *(218 ~ 247)*	17.0 ~ 19.3 *(247 ~ 280)*
HEB400P HEB500P HEB700P	16 ~ 18 *(232 ~ 261)*	18.2 ~ 20.5 *(264 ~ 297)*

Notes: In general, as a basic rule, if the gas temperature increases 30°C (86°F) higher, then the gas pressure increases of about 10% on the initial pressure.

6.5.2. Checking and charging the gas in the accumulator

1. Ensure the exhaust valve II (22) and the gas valve (11) are closed, and connect the cap nut (5) to the nitrogen bottle.
2. Be sure the handle (10) is fully opened (loosened).
3. Remove the accumulator charging plug (15) and the O-ring (16) from the accumulator (20). Put them in the toolbox for safekeeping.
4. Connect the Mini-mess coupling III (23) to the gas charging port (18).
5. Connect each end of the hose (7) to the Mini-mess couplings II (21) and III (23), respectively.
6. Open the accumulator charging valve (17), by turning it counter-clockwise a half turn.
7. Open the gas valve (11) to charge the accumulator, until the gauge pointer on the accumulator gauge (12) indicates the specified gas pressure.If the accumulator is charged over the specified gas pressure, open the exhaust valve II (22) slowly to reduce the gas pressure.
8. After the gas charging is completed, close the accumulator charging valve (17).
9. Close the gas valve (11), and carefully vent the hose (7) by opening the exhaust valve II (22).
10. Remove the Mini-mess coupling III (23) from the accumulator, and close the accumulator charging port (18) with the plug (15) and O-ring (16).

Accumulator gas charging pressure:

breaker model	**CHARHING** **at ambient temperature;** **20°C (68°F)** bar *(psi)*	**CHECKING** **at operating temperature;** **60~70°C (140~158°F)** bar *(psi)*
HEB220P HEB310P HEB400P HEB500P HEB700P	60 ± 2 *(870 ±30)*	68 ± 2 *(990 ±30)*

6.6. Chisel, wear bushings and chisel pins

Operating the breaker, even though it is regular and correct, wear the chisel and its wear parts such as:

- Wear bushings; chisel bush, front bush
- Thrust ring
- Chisel pin, stop pins and PU-sleeves

These wear of chisel and wear parts is caused by:

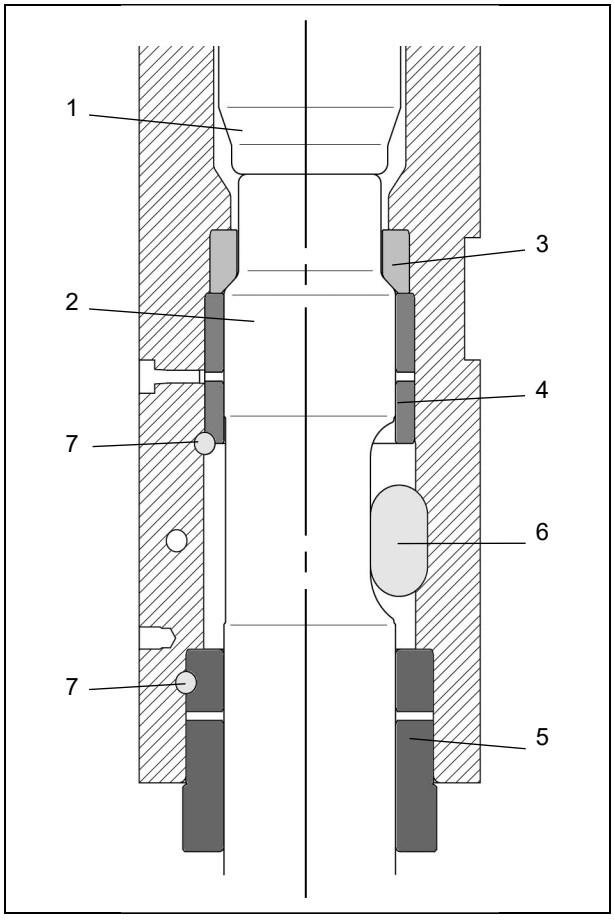
- Wear by metal-to-metal sliding
- Tear of contact point by micro-welding
- Particle engaged abrasive wear
- Collapse or peeling of surface by extremely high contact pressure
- Heat generated by friction accelerates wear

Check the chisel, chisel bush and front bush for wear every 50 hours of hydraulic breaker use or weekly. And, replace them if the amounts of wear exceed the permissible wear limits.

If these parts are used beyond their wear limits, the piston and chisel may be damaged severely. Especially, when the hydraulic breaker has too much clearance between the chisel and both wear bushes, the chisel can be broken by bending through wrong impacts.

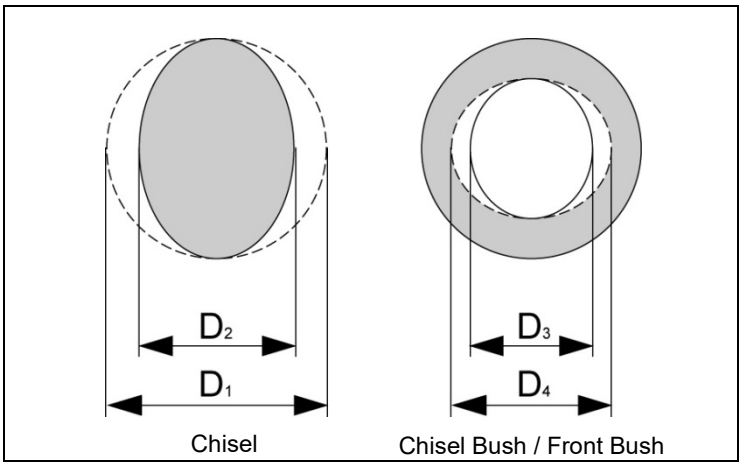
Replacement of the parts below due to wear is not covered by the warranty.

Chisel and wear parts in the front-head:



This is a general angled section view of front-head.

1. Piston
2. Chisel
3. Thrust ring
4. Chisel bush
5. Front bush
6. Chisel pin
7. Stop pin



D_1 : Original diameter of chisel

D_2 : Minimum diameter of chisel worn out

D_3 : Original diameter of bush

D_4 : Maximum diameter of bush worn out

Chisel:

Initial diameter (D1) for the chisel is shown in the following table. The chisel diameter should be measured in the direction of minimum diameter. Replace the chisel if the diameter is worn down to below the lower limit (D2) specified in the table.

Chisel bush and front bush:

The inner diameters of the chisel bush and front bush are the same when new. The initial diameter (D3) for chisel bush and front bush is shown below. Replace the both bushes, if the diameter (D4) is exceeded upper limit specified in the table.

HEB010P ~ 040P is equipped with the 1-piece type front bush, so checking of the front-head is required.

When replacing the chisel bush and the front bush, ensure the bushes and bore of the front head are cleaned without any dirts. And, apply Moly-based grease to their mating surfaces.

Dimension limits of Chisel, Chisel Bush and Front Bush: Unit: mm

Breaker model	Nominal diameter of Chisel and bushes (D1, D3)	Lower limit of Chisel diameter (D2)	Upper limit of Chisel Bush & Front Bush (D4)
HEB010P / 020P	45	43	47
HEB030P	50	47	52
HEB040P	58	55	60
HEB050P	68	65	71
HEB060P	80	77	83
HEB100P	93	90	96
HEB140P	105	102	109
HEB220P	135	132	140
HEB310P	150	147	155
HEB400P	165	162	171
HEB500P	180	177	186
HEB700P	205	201	211

Chisel pins:

Check the chisel pins for wear, every 50 hours of hydraulic breaker use or weekly as well as each time the chisel is replaced. Any burr and swelling on the chisel pins must be smoothed off carefully by grinding.

■ Circular type chisel pins (HEB010P ~ HEB100P):

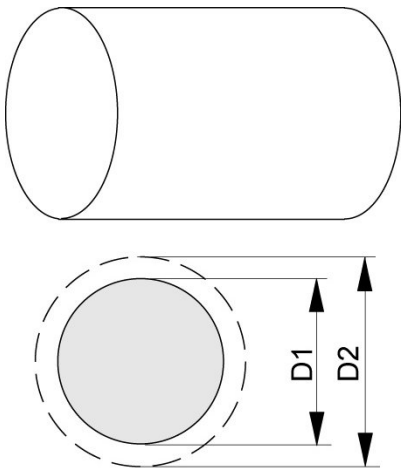
The initial diameters (D1) of the chisel pins are shown in the following table. Replace the chisel pin, if the diameter is less than the lower limit (D2) of the diameter.

■ Plate type chisel pins (HEB140P ~ HEB700P):

Check the width of the chisel pins including the worn out portion.

If the wear on the first side exceeds 1.5 mm, both chisel pins must be inverted together to use the other side.

Replace the chisel pins, if the final widths are less than lower limits (D2) of the width.



Circular type chisel pin
HEB010P ~ HEB100P

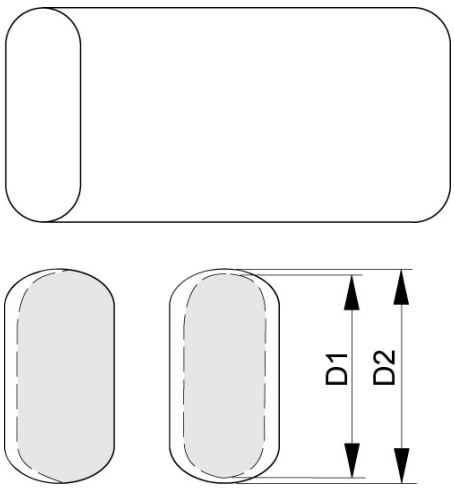


Plate type chisel pin
HEB140P ~ HEB700P

Dimension limits of Chisel Pins: Unit: mm

Breaker Model	Original Dimensions (D1)	Lower Limits (D2)	Pin shape
HEB010P / 020P / 030P /040P	25	23	Circular
HEB050P	30	28	
HEB060P	38	36	
HEB100P	34	32	
HEB140P	69	65	Plate
HEB220P	90	85	
HEB310P	89	85	
HEB400P	108	103	
HEB500P	118	113	
HEB700P	130	125	

6.7. Bracket and Adapter

Check the bracket and the adapter installed at the top, whenever the chisel is replaced or at least 4 times a year, to see if there are any cracks. If any crack is found out, the breaker must not be used until it is repaired.

If the bottom of the bracket is worn away, replace the bottom plate as needed.

If it is necessary to repair by welding, contact your local HYUNDAI dealer for advice.

6.8. Screw tightening

On percussive tools such as hydraulic breakers, the screw fasteners are subjected to particularly high loads and extreme vibration. During the first 50 operating hours the screw fasteners on the breaker must be checked daily, and thereafter once a week. Tighten any loose screws taking care not to exceeding the specified tightening torque below.

■ Screws to check and/or re-tighten regularly:

Applied part		Hex. size mm	Tightening Torque N·m (ft·lbs)	Applied breaker models
Accumulator body		17 (socket)	500 ~ 550 (370 ~ 410)	HEB220P ~ 700P
Accumulator cover		14 (socket)	250 ~ 300 (185 ~ 220)	HEB220P
Through bolts		30	400 ~ 450 (300 ~ 330)	HEB010P, 020P
		36	450 ~ 500 (330 ~ 370)	HEB030P
		41	830 ~ 880 (610 ~ 650)	HEB040P, 050P
		46	1080 ~ 1180 (800 ~ 870)	HEB060P
		50	1370 ~ 1470 (1010 ~ 1085)	HEB100P
		55	1660 ~ 1760 (1220 ~ 1300)	HEB140P
		65	2350 ~ 2450 (1730 ~ 1800)	HEB220P
		71	3920 ~ 4120 (2900 ~ 3040)	HEB700P
		75	3720 ~ 3920 (2740 ~ 2890)	HEB310P
		85	4700 ~ 4900 (3470 ~ 3610)	HEB400P
		90	6170 ~ 6370 (4550 ~ 4700)	HEB500P
Side bolts on the bracket	Open Housing Version	30	300 ~ 350 (200 ~ 230)	HEB010P, 020P, 030P
		41	550 ~ 600 (220 ~ 440)	HEB040P
		46	850 ~ 950 (630 ~ 700)	HEB050P
Mounting adapter		19	100 ~ 120 (75 ~ 90)	HEB010P, 020P, 030P
		30	550 ~ 600 (410 ~ 440)	HEB040P, 050P, 060P, 100P, 130P
		46	800 ~ 1000 (590 ~ 740)	HEB220P, 310P
		55	1000 ~ 1200 (740 ~ 890)	HEB400P, 500P, 700P

■ **Screws for common use (reference for assembling):**

Application	Hex. size mm	Type of head	Torque N·m (ft·lbs)	Applied breaker models
Grease nipple	14	H	50 ~ 60 (37 ~ 44)	All models
Air plug	30	S	200 ~ 250 (148 ~ 184)	
Air check valve	36	H	250 ~ 300 (184 ~ 221)	
Mini-mess gas coupling (back-head and accumulator)	14	H	50 ~ 60 (37 ~ 44)	
Pressure control valve fixing nut	24	H	140 ~ 180 (103 ~ 133)	HEB220P, 310P HEB400P, 500P HEB700P
Accumulator gas charging valve	8	S	40 ~ 60 (30 ~ 44)	
Fixing cap for accumulator gas charging valve	24	H	140 ~ 160 (103 ~ 118)	
Plug for accumulator gas charging port	10	S	80 ~ 100 (59 ~ 74)	
	19	H	40 ~ 60 (30 ~ 44)	
Connecting adapters for hose, Swivel nuts of hose	22	H	150 ~ 200 (111 ~ 148)	HEB010P
	27	H	200 ~ 250 (148 ~ 184)	HEB020P, 030P HEB040P, 050P
	36	H	300 ~ 350 (221 ~ 258)	HEB060P, 100P, HEB140P
	41	H	500 ~ 550 (369 ~ 406)	HEB220P
	50	H	600 ~ 650 (443 ~ 479)	HEB310P, 400P
	55	H	700 ~ 750 (520 ~ 550)	HEB500P, 700P
Plugs for blocking oil line of the cylinder	5, 6	S	20 ~ 30 (15 ~ 22)	
	8	S	80 ~ 100 (59 ~ 74)	
	10	S	120 ~ 140 (89 ~ 103)	
	12	S	40 ~ 60 (30 ~ 44)	Thread size BSP 1/4
	12	S	200 ~ 250 (148 ~ 184)	Thread size BSP 3/4
	14	S	250 ~ 300 (184 ~ 221)	

6.9. Replacing the through bolts

The through bolts connect and retaining the body sections of the hydraulic breaker.

- The through bolts for HEB010P ~ HEB140P models are directly assembled directly into the female threads in the front-head.
- The through bolts for HEB220P ~ HEB700P models use the separate nuts (the front-head nuts) at the front-head.

The through bolts can be checked visually, once the sealing plugs in the inspection holes in the top of the bracket have been removed.

If the through bolts get loose or damaged during operation, stop breaker work. And, repairs must be done immediately in the following manner:

1. Place the breaker on flat and firm ground. Separate the power-cell of the breaker from the bracket.
2. Discharge the nitrogen gas from the back-head completely.
3. Remove all the through bolts, and inspect for the presence of any cracks at the threads and the shank of the bolts.
4. Always apply thread paste, made of molybdenum disulphide (MoS2), to the threads of the through bolts before installing.
5. At first, tighten the entire bolts to the **half of the specified torque** in diagonal pattern.
6. Tighten the bolts to the specified torque in diagonal pattern.
7. Repeat 1~2 times in the same way.

6.10. Checking the bottom of the piston

CAUTION!

Be sure to turn off the power switch of the carrier and to shut off the stop valves before checking the bottom of the piston. Never insert hands into the front-head. Check only by sight.

Check the bottom of the piston, which impact the chisel directly, every week, at least every 50 hours or whenever the chisel is changed. Check the impact surfaces of the piston for wear, sinking or cracking.

If the breaker is continuously used once the bottom of the piston has any failure or crack, the breaker can be seriously damaged.

■ **Permissible dent depth:**

- HEB010P ~ HEB140P : less than 1mm
- HEB220P ~ HEB700P : less than 2mm

Any modification such as re-machining, welding or heat treatment is not allowed.

Use only genuine replacement parts, or it may invalidate the warranty.

6.11. Storage of the breaker

Short periods of non-use

Dismount the breaker from the carrier according to the instruction in Section "**4.6. Dismounting the hydraulic breaker from the carrier**". Storing the hydraulic breaker in horizontal position can be permitted for short period (maximum 2 weeks).

Long periods of non-use

If the breaker is to remain out of use for more than 2 weeks, the following maintenance work must be performed:

- The chisel must be removed.
- The gas in the back-head must be discharged completely.
- The percussion piston must be positioned at the upper end of its stroke.
- The lower end of the piston, chisel and bushes must be well protected with grease or anti-lust fluid.
- All the hydraulic connections must be sealed with clean plugs to prevent oil leak or dirties from getting in to the breaker.
- The breaker must be stored in a vertical position.
- The breaker must be stored in a dry location.

Washing the hydraulic breaker

When the hydraulic breaker is working, dirt, mud, rock powder etc. can attach itself to the breaker. Always wash the outside of the hydraulic breaker with a pressure washer before sending it to the workshop otherwise dirt can cause difficulties in the disassembly and reassembly of the breaker.

7. Troubleshooting

Trouble	Probable cause	Remedy
The breaker will not start.	Pressure and return lines inverted	Connect breaker hoses correctly
	Stop valve in pressure and/or return lines closed	Open stop valves
	Gas pressure in back head too high	Check gas pressure in back head, reset to correct value
	Hydraulic oil level in tank to low	Check and refill hydraulic oil tank
	Relief valve opens at to low a pressure	Re-adjustment relief pressure
	Failure in valve and piston	Contact your HYUNDAI dealer
	Leakage from pressure to return in excavator hydraulic circuit	Check the installation, pump and other hydraulic components
	Operating pressure too low	Check carrier engine speed and/or operating pressure
The impact rate of hydraulic breaker is too low	Insufficient hydraulic oil delivery from carrier	Contact your HYUNDAI dealer
	Flow resistance too high on oil filter or oil cooler	Check oil filter/cooler, clean or replace
	Hydraulic oil overheated	Check and replace filter, cooler
	Gas pressure in back head too low	Check and refill back head gas pressure
	Chisel out of range for piston	Push down chisel by carrier
	Inside diameter of return line too small	Increase inner diameter of the return line. (Refer to section 5.1.)
	Return pressure too high	Check and lower return pressure
	Relief valve opens at too low a pressure	Re-adjust the relief pressure
	Hydraulic oil level in tank to low	Check and refill hydraulic oil tank
	Poor pump performance	Contact authorized service man
	Diaphragm in accumulator defective	Replace diaphragm
	Pressure adjustment valve is screwed too much	Re-adjust pressure adjusting valve (Refer to section 5.8.)
	Delivery flow rate of hydraulic system is inadequate	Check pump characteristics with measuring device and compare with original specifications
The impact rate is irregular	Gas pressure of accumulator is too low	Check and refill with nitrogen gas
	Failure in breaker valve or distributor operation	Contact your HYUNDAI dealer
Oil leaks between back head and cylinder	Seals defective	Check and replace seals

Oil leaks at accumulator	O-ring and or back-up ring defective	Check and replace o-ring and back-up ring
Oil leaks from chisel	Cylinder seals defective	Disassemble hydraulic breaker and replace the seals
Hydraulic oil temperature too high	Hydraulic oil level in tank too low Carrier pump delivery too high High outside temperature and no cooler fitted Pressure-relief valve defective	Refill hydraulic oil tank Correct carrier engine speed. Reset pump Fit oil cooler Fit new pressure-relief valve
Back head gas leaks	Loose through bolts Defect in back head gas valve Defective O-ring on back head Defective cylinder bush seals	Tighten through bolts (Refer to section 7.9.) Replace back head gas valve Replace O-ring Check and replace the piston bush seals

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