

# Operating manual and Spare parts list

Forced air ventilation for hydraulic breakers in underwater applications



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# 1 Introduction

This manual is a complement to the regular Safety and operating instructions for your Epiroc hydraulic breaker if the hydraulic breaker is to be used in following applications:

Underwater application

For this reason it is important to read both manuals very carefully prior to using the Epiroc hydraulic breaker.

The Epiroc hydraulic breaker models MB 750 to HB 10000 are prepared in principle for underwater applications. However, **certain additional protective measures have to be taken first on the excavator and the hydraulic breaker.**

The aim of these additional measures is to keep water out of the percussion chamber of the hydraulic breaker and ultimately out of the hydraulic system of the excavator.

This ensures the functionality and availability of the unit excavator + hydraulic breaker permanently. External compressed air is fed into the percussion chamber of the hydraulic breaker to prevent water ingress.

In the chapters of this manual you will find all conversion works, setting items and safety regulations in question.

In the general handling of a hydraulic breaker used in underwater application, too, serious differences to the use in normal application has to be considered.



**NOTE:** *Trouble-free operation of the Epiroc hydraulic breaker can only be guaranteed if these measures have been taken and are used during operation. Operation underwater without required protective measures will lead to loss warranty.*

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## 1.1 About these Instructions

Please read these Instructions carefully.

The different designation of the texts means as follows:

►	Action step in a safety instruction
◆	Action step
1. 2.	Established operation process
A B C	Explanation of the elements of a drawing
• • •	Listing

## 1.2 Signal words

The signal words Danger, Warning, Caution, and Notice are used as follows in these Safety and operating instructions:

<b>DANGER</b>	indicates a hazardous situation which, if not avoided, will result in death or serious injury.
<b>WARNING</b>	indicates a hazardous situation which, if not avoided, could result in death or serious injury.
<b>CAUTION</b>	indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
<b>NOTICE</b>	The signal word NOTICE is used to address practices related to possible property damage but not related to personal injury.

## 2 Conversion of the excavator

### 2.1 Hydraulic connection of the hydraulic breaker

The carrier hydraulic system must be suitable for operating hydraulic breakers or adjusted accordingly. Even if the carrier has already been equipped with a genuine Epiroc conversion kit for breaker operation, the protective measures indicated must be taken before using breakers in special applications for the first time.

#### 2.1.1 Electric switch-on

For underwater application the Epiroc connecting kit includes an automatic facility for preventing the breaker from being started up without forced ventilation of the percussion chamber. However, this automatic facility only works in conjunction with electrically-actuated breaker switch-on valves, such as those in Epiroc's conversion kits.

#### 2.1.2 Hydraulic switch-on

Excavators with hydraulically-actuated switch-on valves require additional measures to guarantee safety shut-off of the hydraulic breaker! For further information please contact the Epiroc Customer Center / dealer in your region.

### 2.2 General installation

The circuit diagrams on the following pages of this manual (see chapter 2.2.4 and 2.2.5) show, beside the section A-A for electrically-actuated breakers, all the other additional groups for these special applications and their locations inside the whole system (Sections B-B, C-C and D-D).

#### 2.2.1 Connecting kit with automatic shutoff and air ventilation

Section B-B in the general installation circuit diagram shows the automatic shut-off facility with compressed air feed to the hydraulic breaker. This facility prevents the breaker from being switched on if the compressed air supply is inadequate or has failed completely.

#### 2.2.2 External compressed air supply

Section C-C shows the required external compressed air supply for the forced ventilation of the breaker. This takes the form either of a compressor installed on the carrier or a connection to a flexible/rigid compressed air line fed from a stationary compressor. Details of air flow rates and pressures are provided (see chapters 4.1.1 to 4.1.3).

## 2.3 Circuit diagram - General installation (SB 52 - SB 1102, MB 750 - HB 4700)

HB 2000 up to Serial number DEQ130170

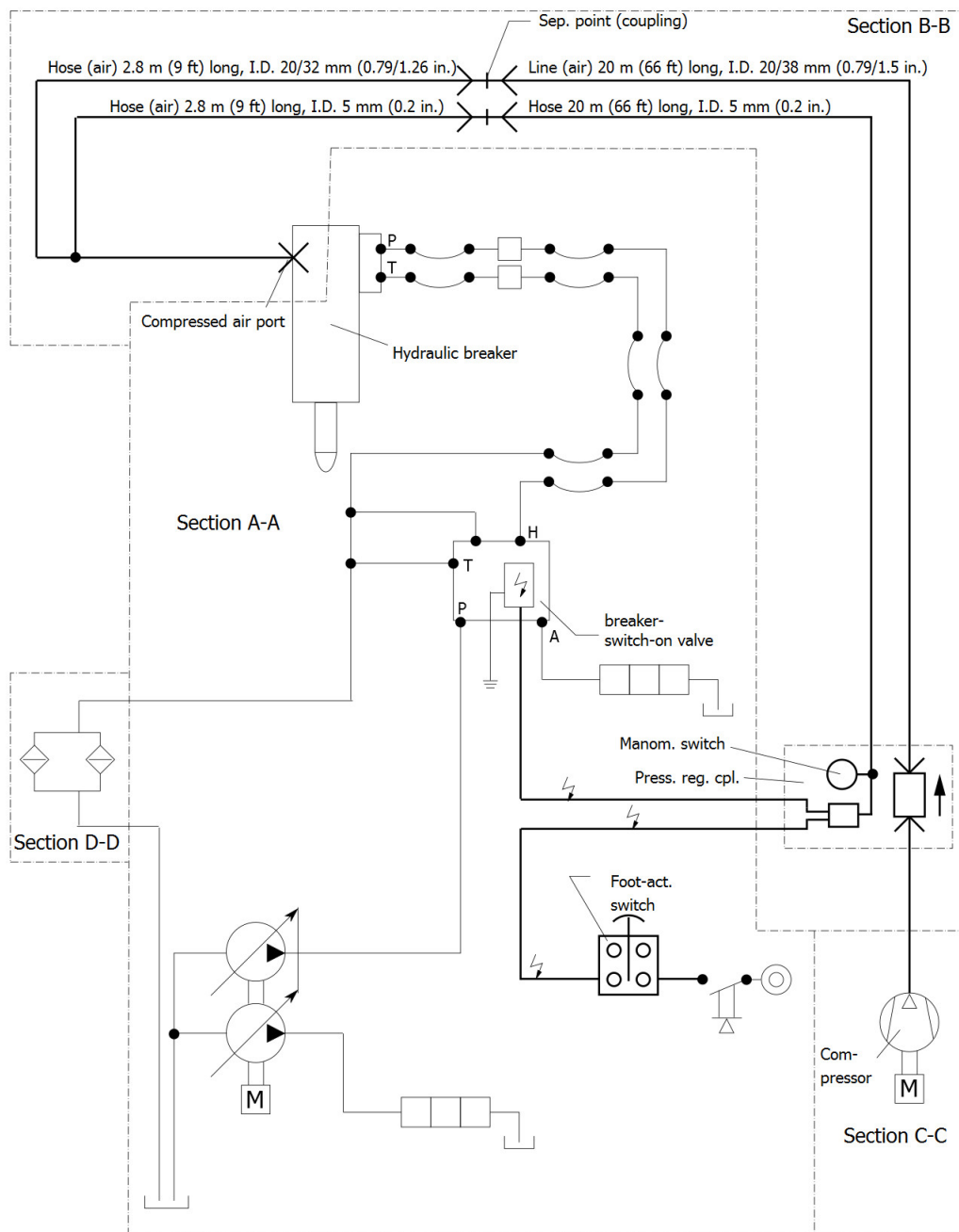
HB 3600 up to Serial number DEQ130612

HB 2500 up to Serial number DEQ130313

HB 4100 up to Serial number DEQ130128

HB 3100 up to Serial number DEQ130409

HB 4700 up to Serial number DEQ131273



## 2.4 Circuit diagram - General installation (HB 2000 - HB 10000)

HB 2000 **from** Serial number DEQ130171

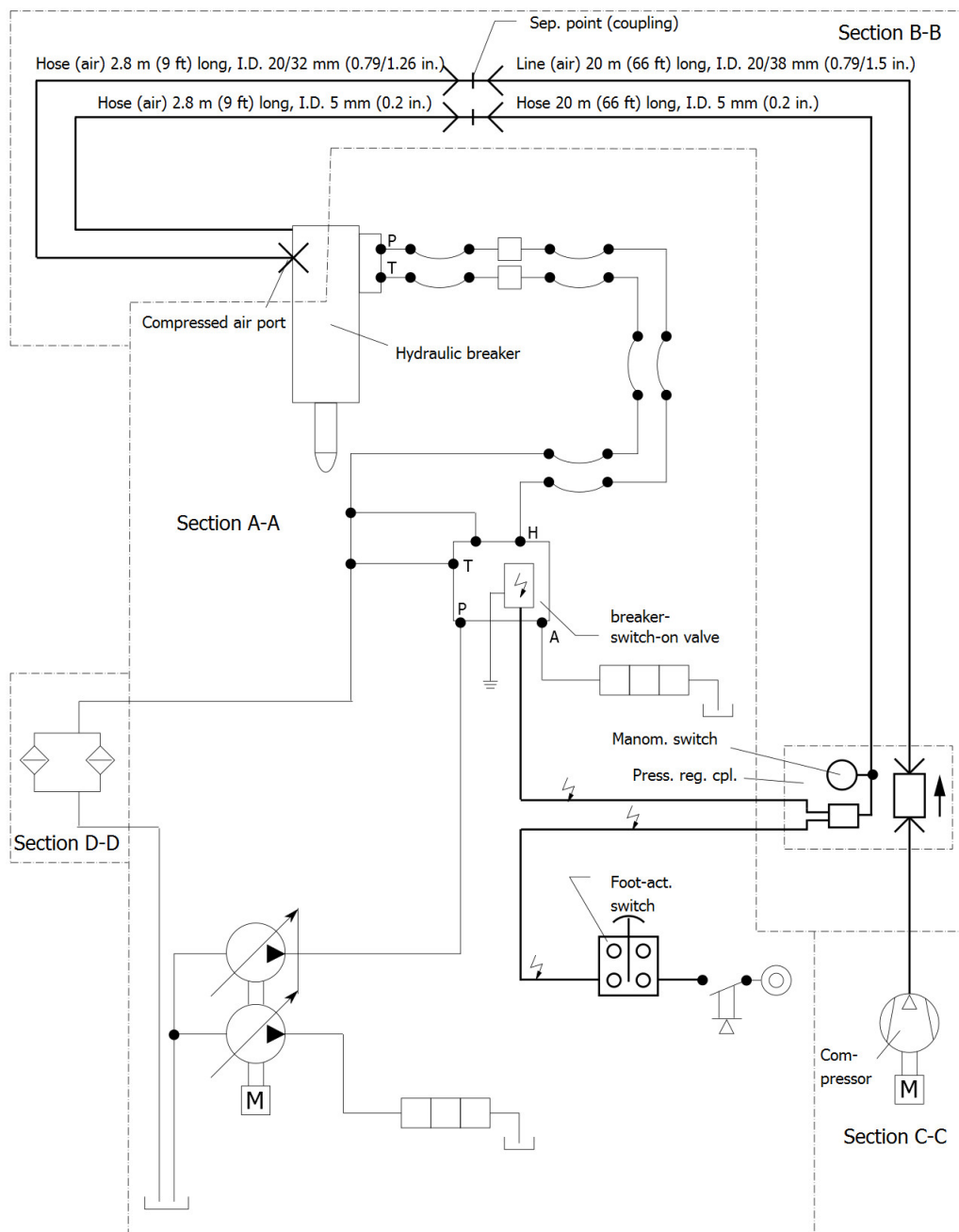
HB 3600 **from** Serial number DEQ130613

HB 2500 **from** Serial number DEQ130314

HB 4100 **from** Serial number DEQ130129

HB 3100 **from** Serial number DEQ130410

HB 4700 **from** Serial number DEQ131274



## 3 Breaker conversion

### 3.1 Required measures prior to usage

The following measures have to be taken prior to usage:

The installation of the connecting kit with automatic facility and air ventilation has to be made in accordance with the following information (see chapter 3.2 to 3.10).



**NOTE:** Please note there are two different connections for compressed air (marked **A**) on the hydraulic breakers. The location is different depending on the different hydraulic breaker types.

#### ⚠ WARNING Hydraulic oil squirting out under high pressure

Hydraulic oil squirting out can lead to serious injury.

- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.



**NOTE:** On all breakers of the Dust-Protector version the plugs of the lower breaker part must be removed, otherwise they would be forced out by the compressed air. (Plugs should collected and stored for later usage.)

#### Preparation MB 750

Actual details may differ.

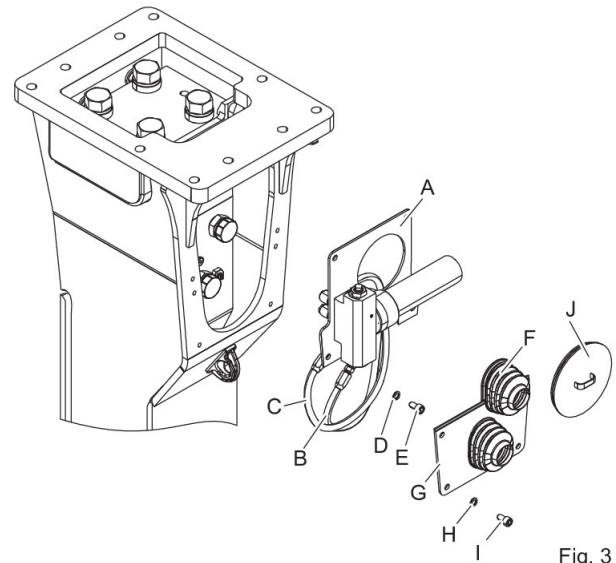


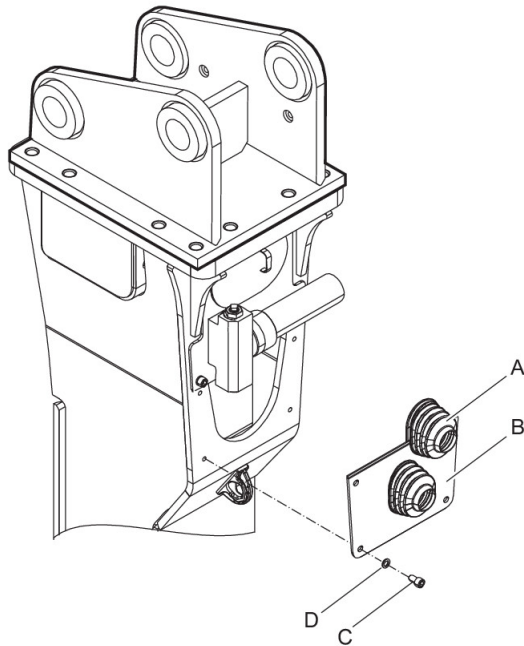
Fig. 3

- Remove cover (J).
  - Remove Allen screws (I) and the pairs of lock washers (H) using Allen key size 10.
  - Remove bellows (F).
  - Remove cover (G).
  - Dismantle grease line (B) and oil line (C) between ContiLube® II and percussion unit.
  - Remove Allen screws (E) and the pairs of lock washers (D) using size 10 Allen key.
  - Remove cover (A) with the attached ContiLube® II unit.
  - Remove the ContiLube® II unit from cover (A).
  - Keep all parts for further use.
  - Change the cover (A) according to the assembly sketch.
  - Remount the ContiLube® II unit to the cover (A).
  - Fit grease line (B) and oil line (C) between ContiLube® II and percussion unit.
  - Fit cover (A) with the attached ContiLube® II unit.
  - Fit Allen screws (E) and the pairs of lock washers (D) and fasten using size 10 Allen key.
- Tightening torque 85 Nm (63 ft lbs).



### Preparation MB 1000 to MB 1650

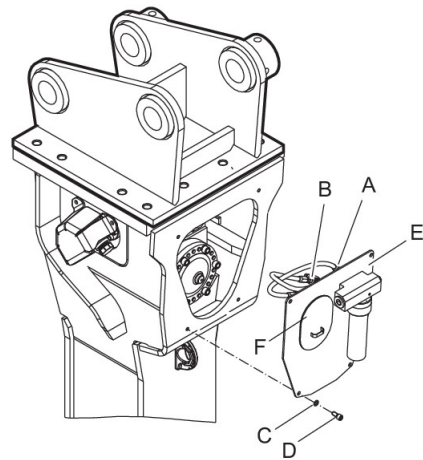
Actual details may differ.



- Remove Allen screws (C) and pair of lock washers (B) using size 10 Allen key.
- Remove bellows (A).
- Remove lower plate (B).
- Keep all parts for further use.

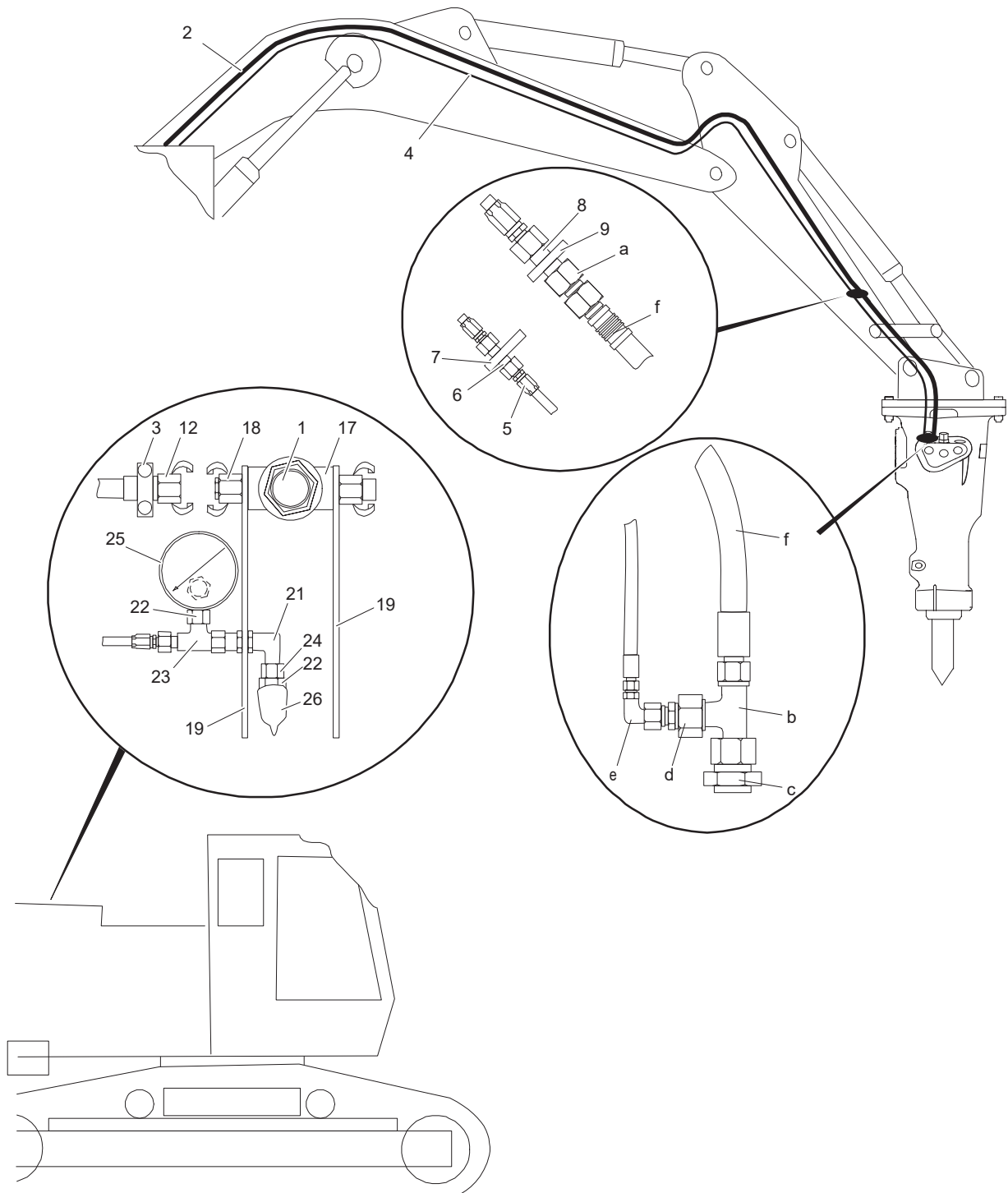
### Preparation HB 2000 to HB 4700

Actual details may differ.



- Remove cover (F).
- Dismantle grease line (A) and oil line (B) between ContiLube® II and percussion unit.
- Remove Allen screws (D) and pair of lock washers (C) using size 10 Allen key.
- Remove cover (E) with the attached ContiLube® II unit.
- Remove the ContiLube® II unit from cover (E).
- Change the cover (E) according to the assembly sketch.
- Remount the ContiLube® II unit to the cover (E).
- Fit grease line (A) and oil line (B) between ContiLube® II and percussion unit.
- Fit cover (E) with the attached ContiLube® II unit.
- Fit Allen screws (D) and the pairs of lock washers (C) and fasten using size 10 Allen key.  
Tightening torque 85 Nm (63 ft lbs).

## 3.2 Conversion SB 52 - SB 552



### ⚠ WARNING Hydraulic oil squirting out under high pressure

Hydraulic oil squirting out can lead to serious injury.

- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.

No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 0905 31
1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
19	Support		2	3362 2351 29
21	Fitting		1	3360 2045 65
22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

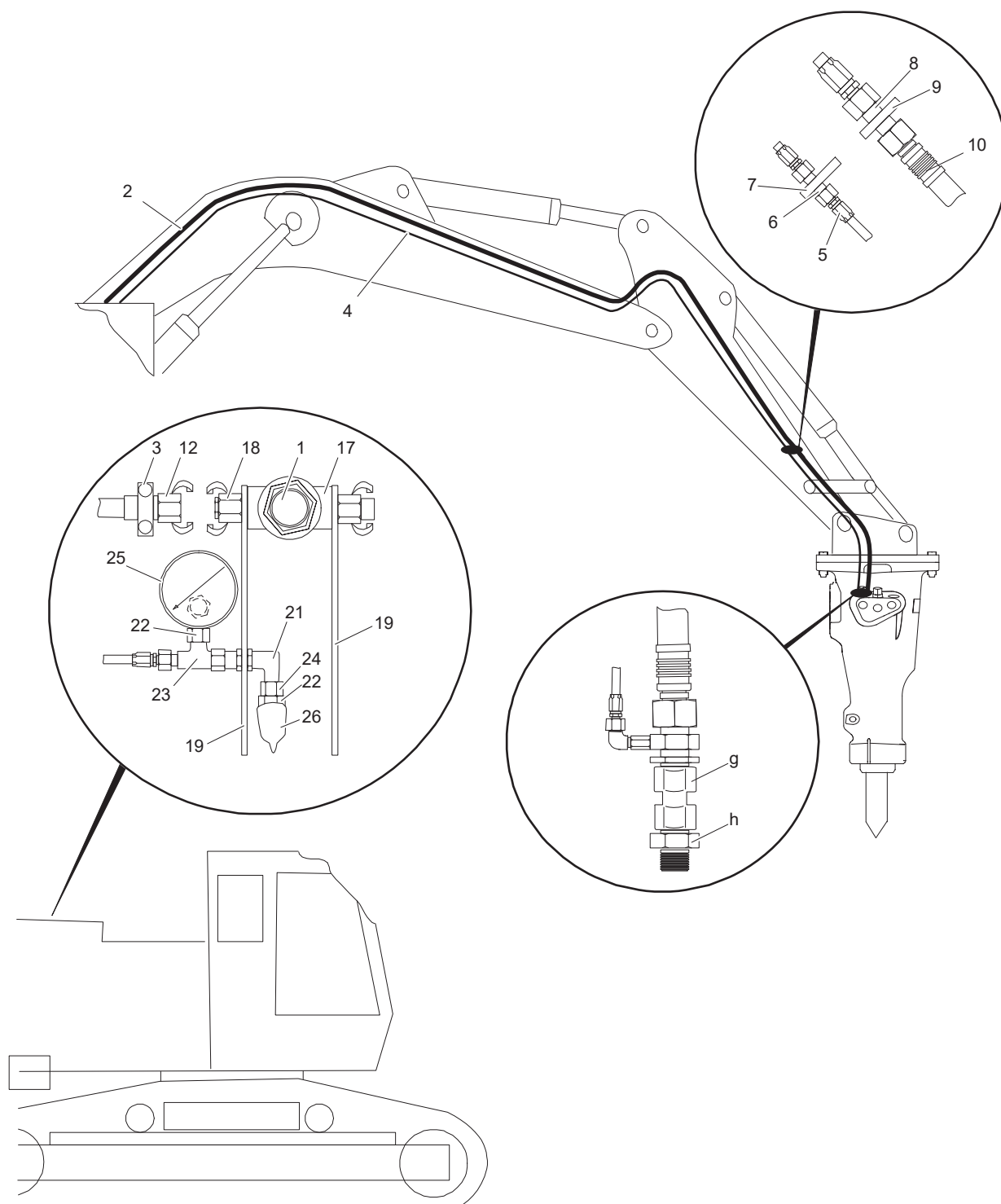
No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

### 3.3 Conversion SB 702 and SB 1102



#### ▲ WARNING Hydraulic oil squirting out under high pressure

Hydraulic oil squirting out can lead to serious injury.

- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.

No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 0905 31
1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
19	Support		2	3362 2351 29
21	Fitting		1	3360 2045 65
22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

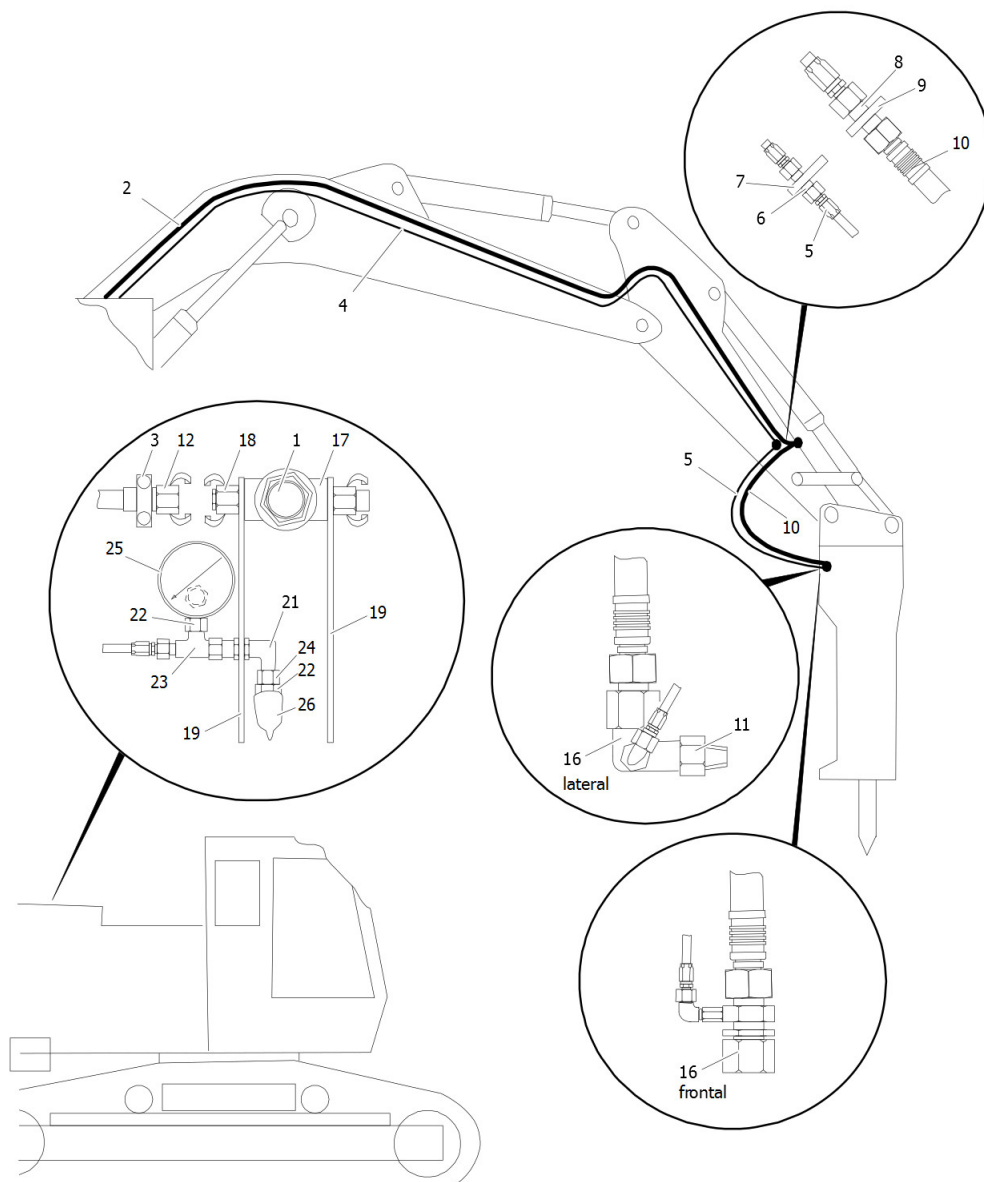
No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

### 3.4 Conversion MB 750



#### ▲ **WARNING Hydraulic oil squirting out under high pressure**

Hydraulic oil squirting out can lead to serious injury.

- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.



No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 0905 31
1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
19	Support		2	3362 2351 29
21	Fitting		1	3360 2045 65
22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

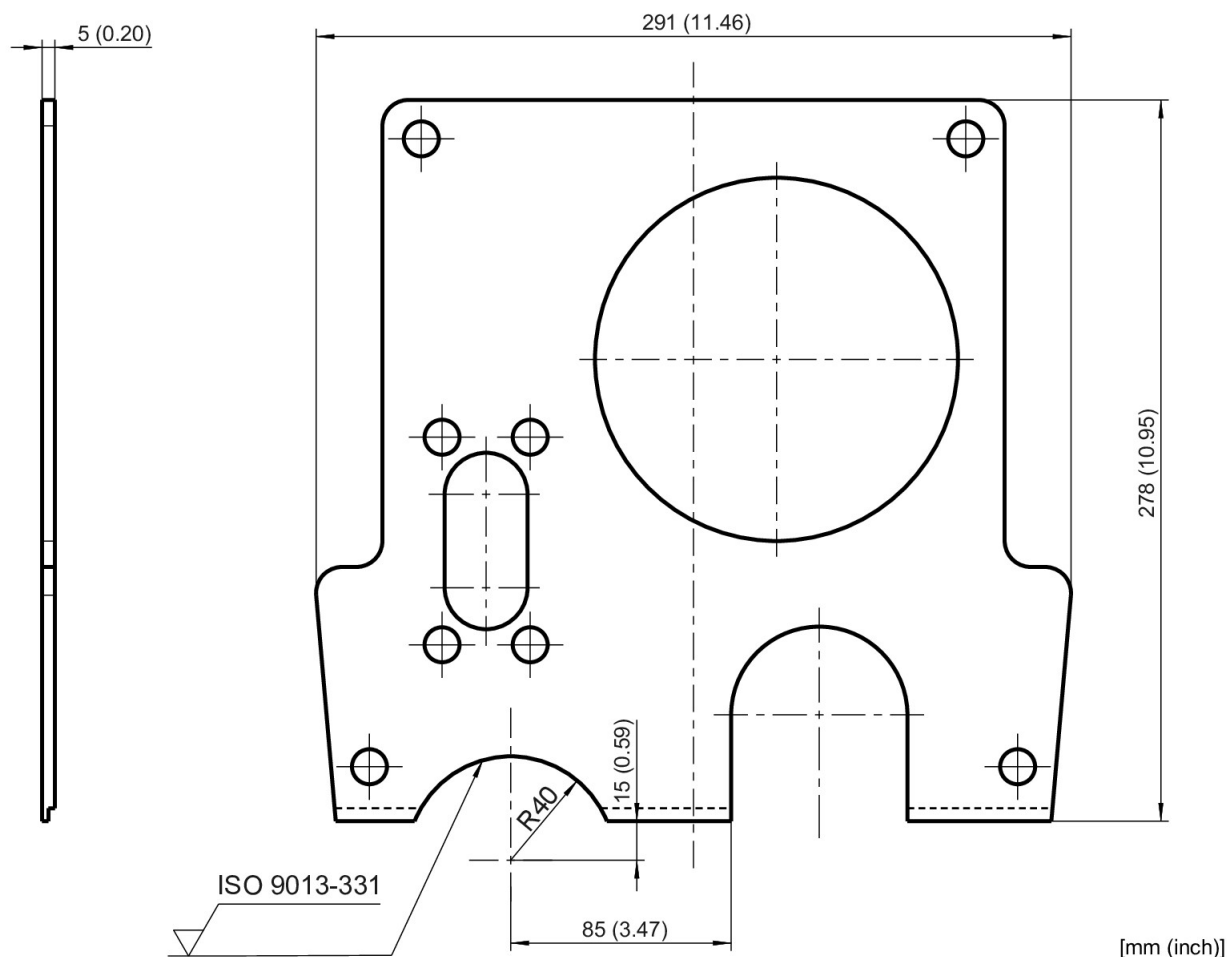
Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

#### Assembly sketch MB 750

The change at the cover sheet of the service opening is to be made according to the assembly sketch:



### 3.5 Conversion MB 1000 - HB 4700

HB 2000 **up to** Serial number DEQ130170

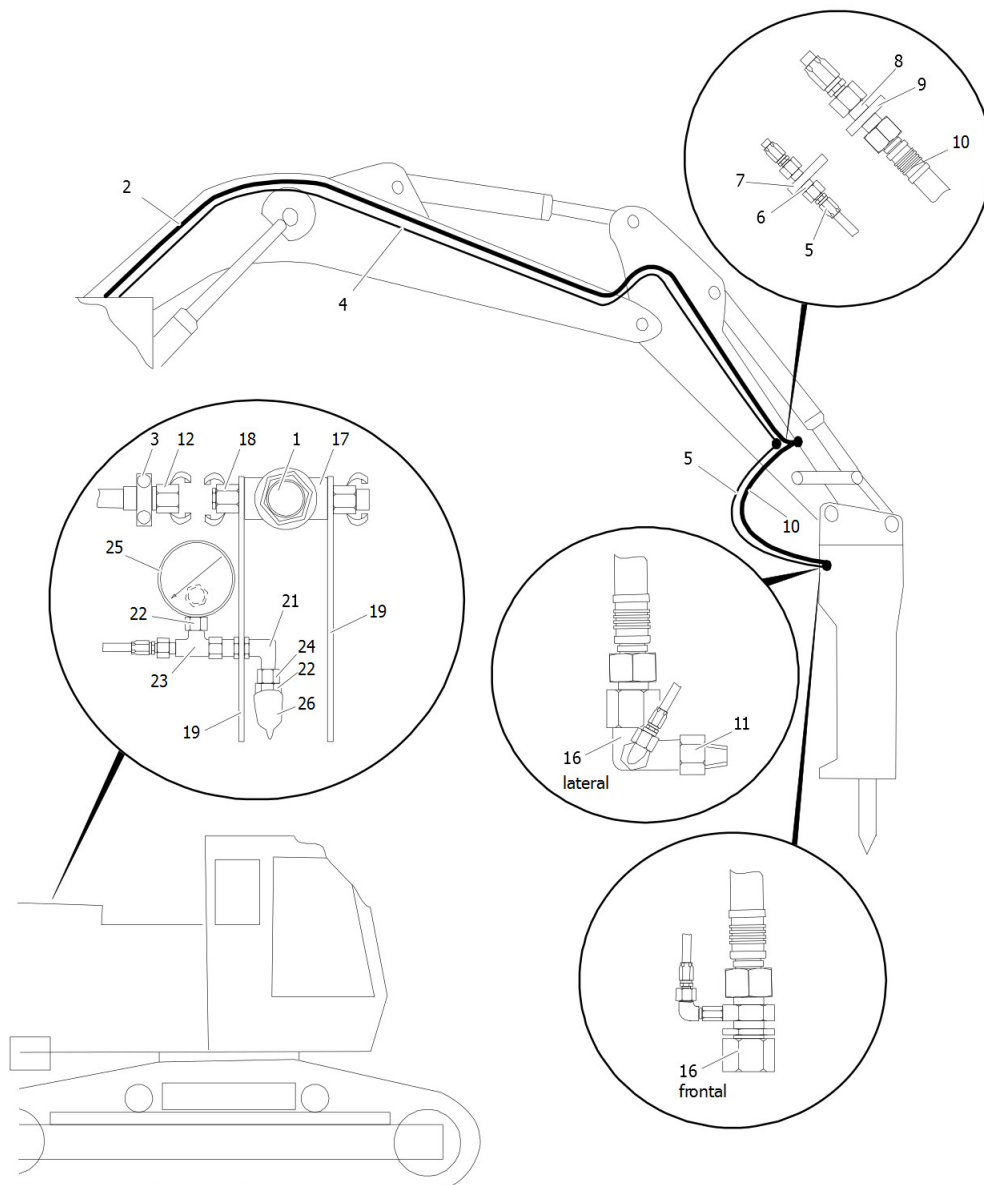
HB 3600 **up to** Serial number DEQ130612

HB 2500 **up to** Serial number DEQ130313

HB 4100 **up to** Serial number DEQ130128

HB 3100 **up to** Serial number DEQ130409

HB 4700 **up to** Serial number DEQ131273



#### ▲ **WARNING Hydraulic oil squirting out under high pressure**

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- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.

No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 0905 31
1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
19	Support		2	3362 2351 29
21	Fitting		1	3360 2045 65
22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.



No.	Description	Remark	Quantity	Part number
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1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
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22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

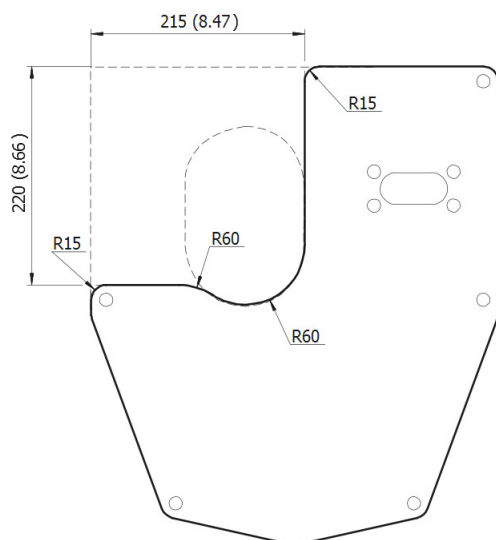


**Assembly sketch HB 2000, HB 2000 DP from DEQ130171**

The change at the cover sheet of the service opening is to be made according to the assembly sketch:

HB 2000 from Serial number DEQ130171 to DEQ140423

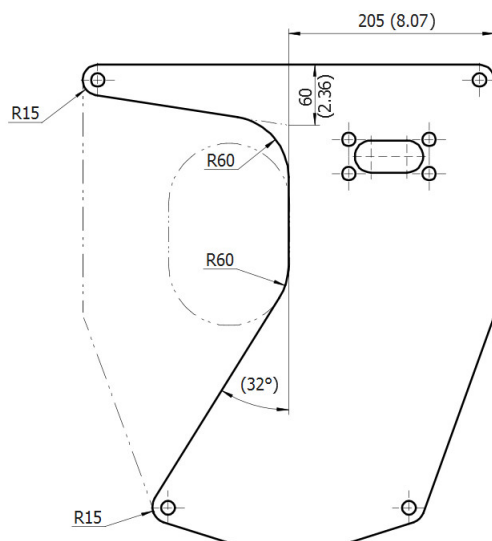
HB 2000 DP from Serial number DEQ130171 to DEQ140403



[mm (inch)]

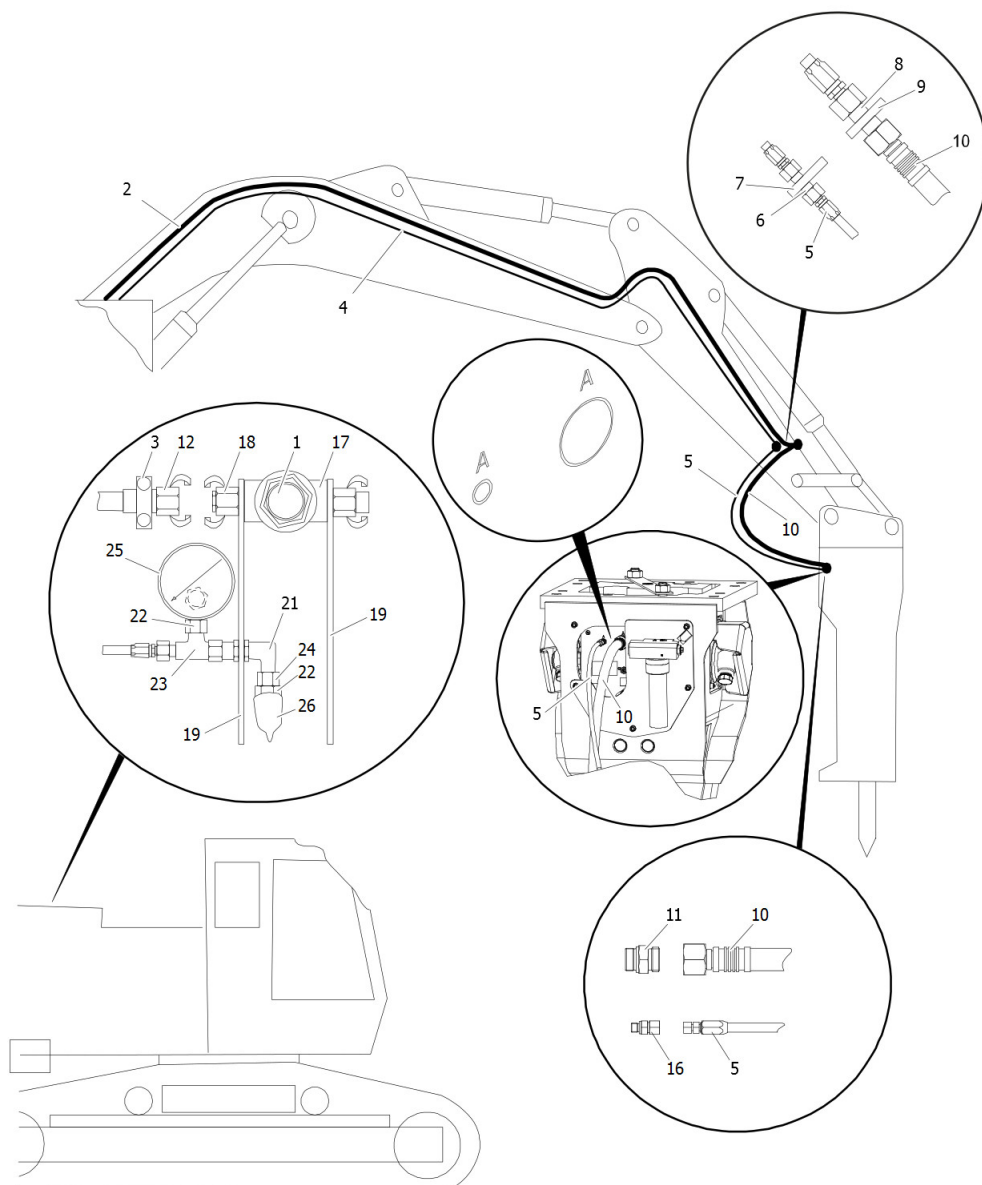
**Assembly sketch HB 2000 from DEQ140424, HB 2000 DP from DEQ140404**

The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

### 3.7 Conversion HB 2500 from DEQ130314



#### **▲ WARNING Hydraulic oil squirting out under high pressure**

Hydraulic oil squirting out can lead to serious injury.

- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.

No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 0905 31
1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
19	Support		2	3362 2351 29
21	Fitting		1	3360 2045 65
22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

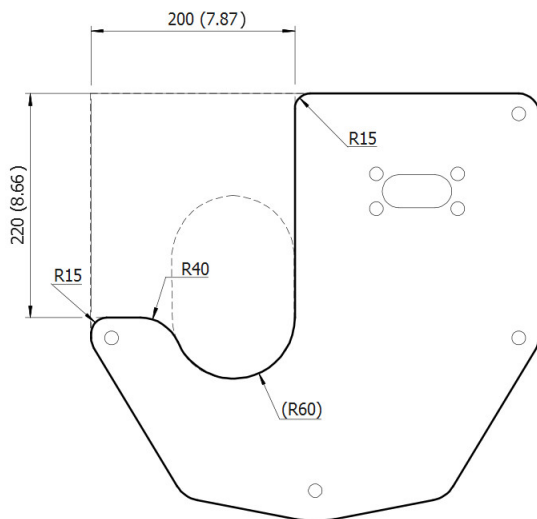
Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

**Assembly sketch HB 2500, HB 2500 DP from DEQ130314**

The change at the cover sheet of the service opening is to be made according to the assembly sketch:

HB 2500 from Serial number DEQ130314 to DEQ140408

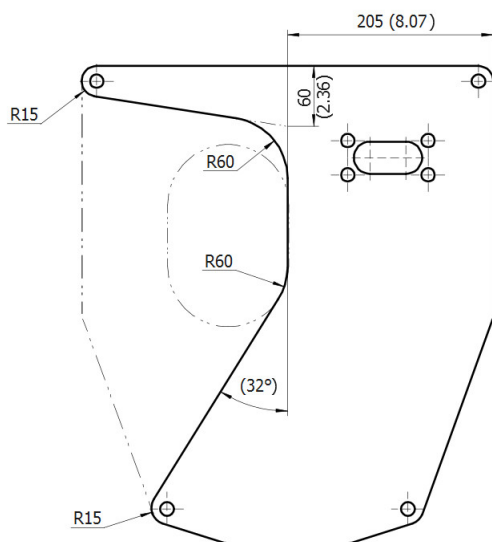
HB 2500 DP from Serial number DEQ130314 to DEQ140438



[mm (inch)]

**Assembly sketch HB 2500 from DEQ140409, HB 2500 DP from DEQ140439**

The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]



No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 0905 31
1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
19	Support		2	3362 2351 29
21	Fitting		1	3360 2045 65
22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

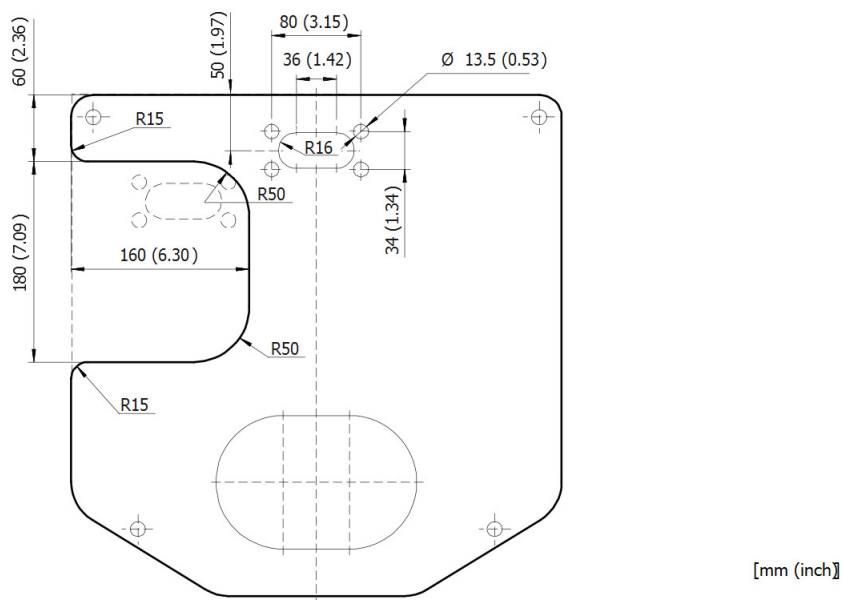
Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

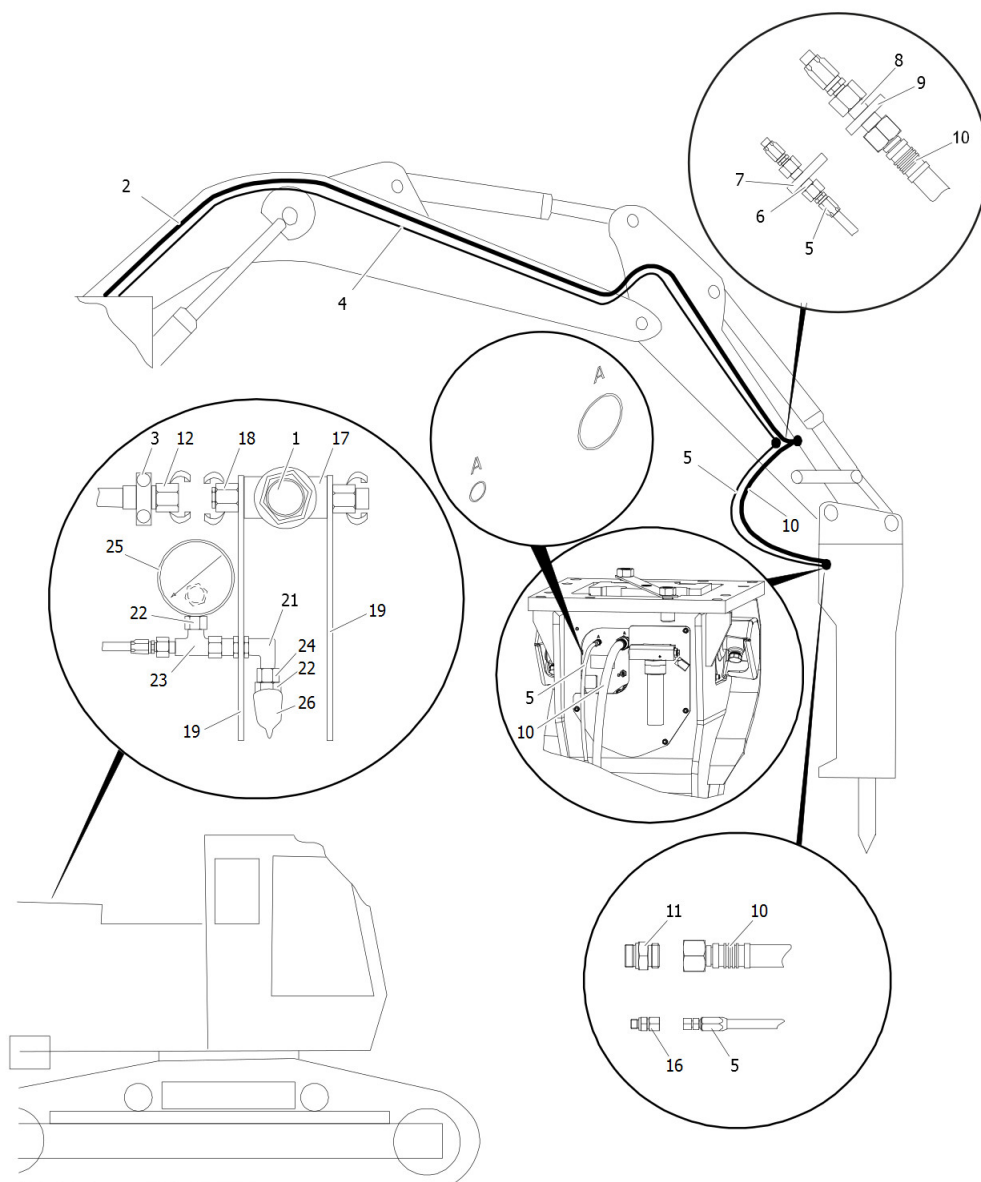
**Assembly sketch HB 3100, HB 3100 DP from DEQ130410**

The change at the cover sheet of the service opening is to be made according to the assembly sketch:





### 3.9 Conversion HB 3600 from DEQ130613



#### ▲ **WARNING Hydraulic oil squirting out under high pressure**

Hydraulic oil squirting out can lead to serious injury.

- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.

No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 0905 31
1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
19	Support		2	3362 2351 29
21	Fitting		1	3360 2045 65
22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

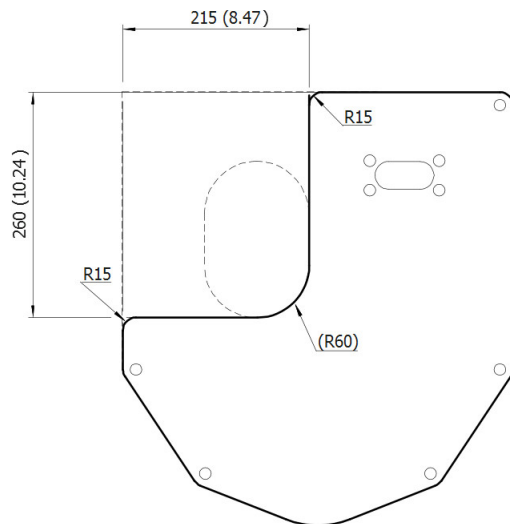
Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

### Assembly sketch HB 3600, HB 3600 DP from DEQ130613

The change at the cover sheet of the service opening is to be made according to the assembly sketch:

HB 3600 from Serial number DEQ130613 to DEQ140532

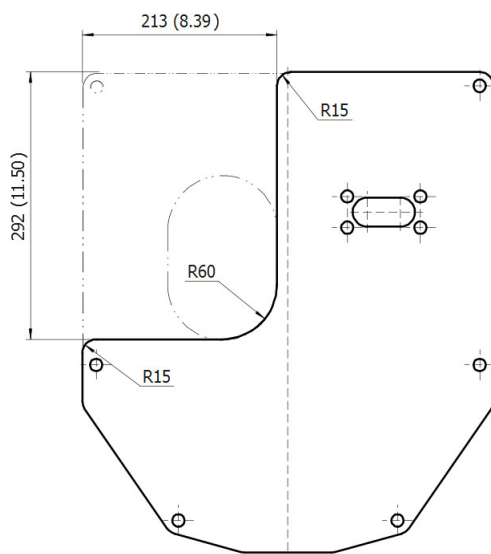
HB 3600 DP from Serial number DEQ130613 to DEQ141039



[mm (inch)]

### Assembly sketch HB 3600 from DEQ140533, HB 3600 DP from DEQ141040

The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]



No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 0905 31
1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
19	Support		2	3362 2351 29
21	Fitting		1	3360 2045 65
22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

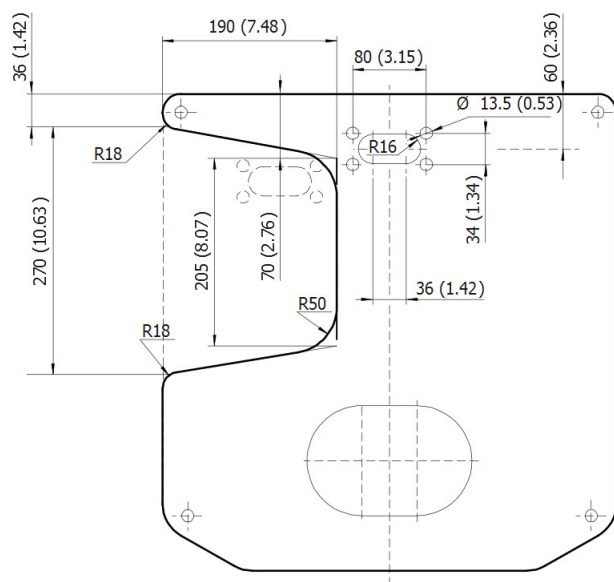
Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

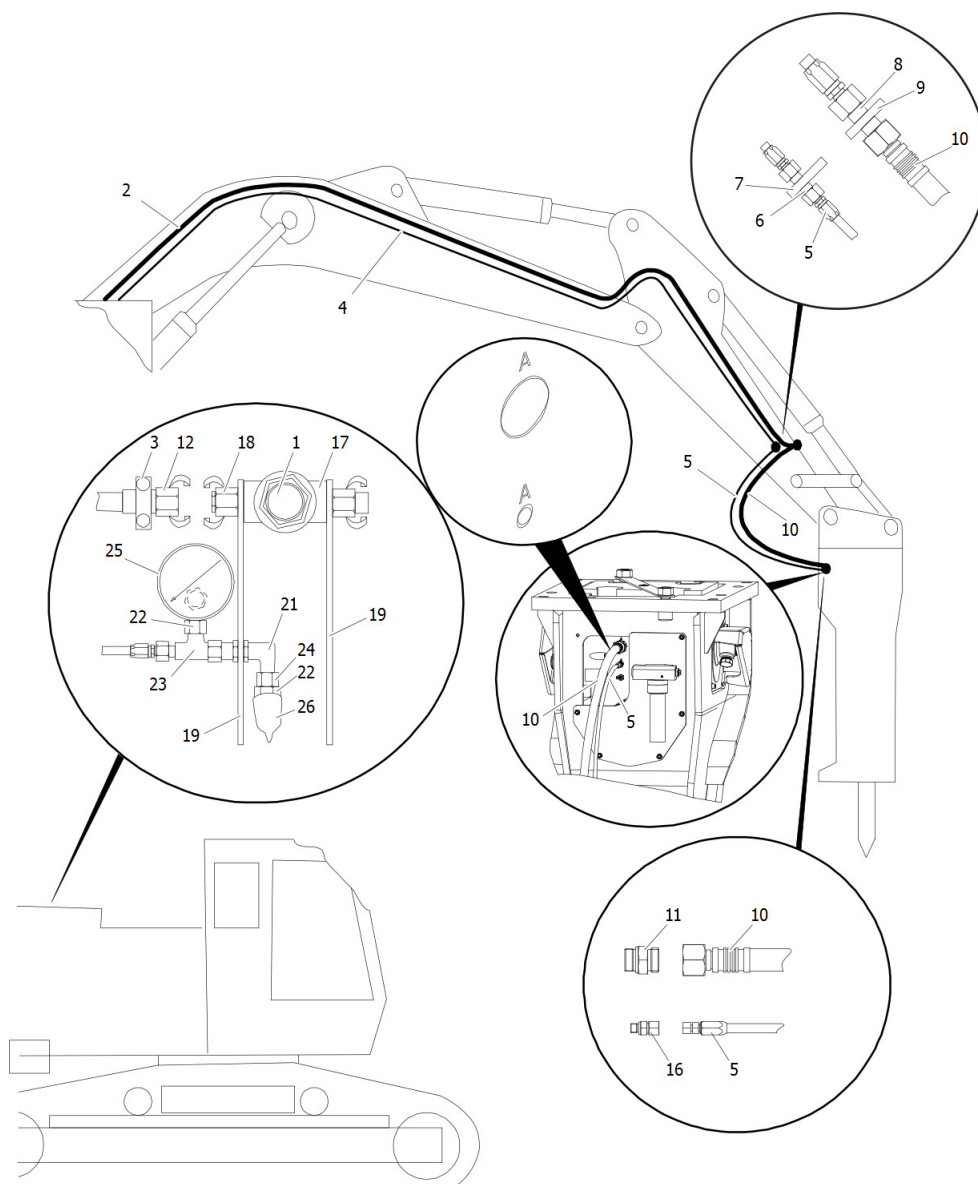
#### Assembly sketch HB 4100, HB 4100 DP from DEQ130129

The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

### 3.11 Conversion HB 4700 from DEQ131274



#### **▲ WARNING Hydraulic oil squirting out under high pressure**

Hydraulic oil squirting out can lead to serious injury.

- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.



No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 0905 31
1	Pressure controller	with parts 17 to 25	1	3362 2622 55
2*	Hydraulic hose	I.D. 20 mm (0.79 in.); 20 m (66 ft) long	1	3362 2615 32
3	Clamp		2	3360 0652 75
4*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
5*	Hydraulic hose	I.D. 6 mm (0.24 in.); 2.8 m (9 ft) long	1	3362 2615 33
6	Fitting		1	3360 2044 82
7	Welding plate		1	3360 9152 19
8	Fitting		1	3360 2044 88
9	Welding plate		1	3360 3282 55
10*	Hydraulic hose	I.D. 20 mm (0.79 in.); 2.8 m (9 ft) long	1	3362 2615 34
11	Fitting		1	3360 2045 79
12	Coupling		2	3360 1195 95
16	Manifold lateral		1	3362 2351 57
16	Manifold frontal		1	3362 2351 33
17	Pressure controller		1	3360 3324 66
18	Coupling		2	3360 1199 23
19	Support		2	3362 2351 29
21	Fitting		1	3360 2045 65
22	Pressure switch		1	3362 2615 36
23	Fitting		1	3360 4781 08
24	Fitting		2	3362 2615 35
25	Pressure gauge		1	3362 2615 37
26	Protection cap		1	3362 2615 38
a	Fitting		1	3360 3147 11
b	Fitting		1	3360 3145 43
c	Fitting		1	3363 1260 38
d	Fitting		1	3360 3146 40
e	Fitting		1	3360 3145 83
f	Hose		1	3363 1260 39
g	Fitting		1	3363 1260 40
h	Fitting	GE 25 S G ½"	1	3363 1260 41
-*	Cable strap		40	3360 1868 30
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Fitting		1	3360 2047 58

No.	Description	Remark	Quantity	Part number
-	Cap		1	3360 3145 92
-	Cap		1	3360 4788 59
-	Screw plug		1	3361 0319 59
-	Screw plug		1	3361 0319 01

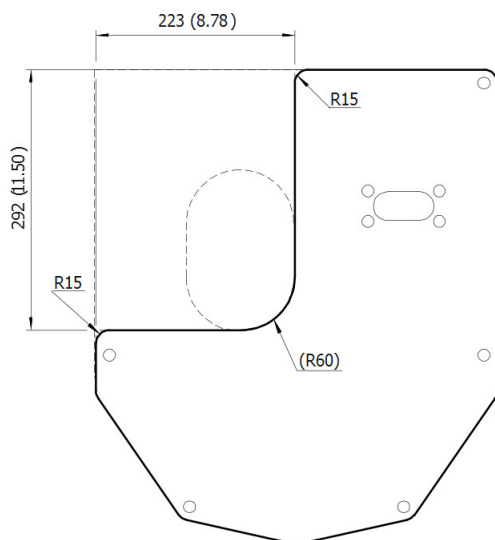
Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

**Assembly sketch HB 4700, HB 4700 DP from DEQ131274 to DEQ140631**

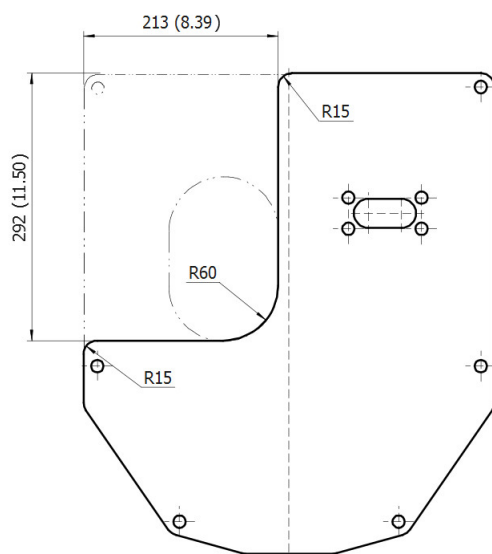
The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

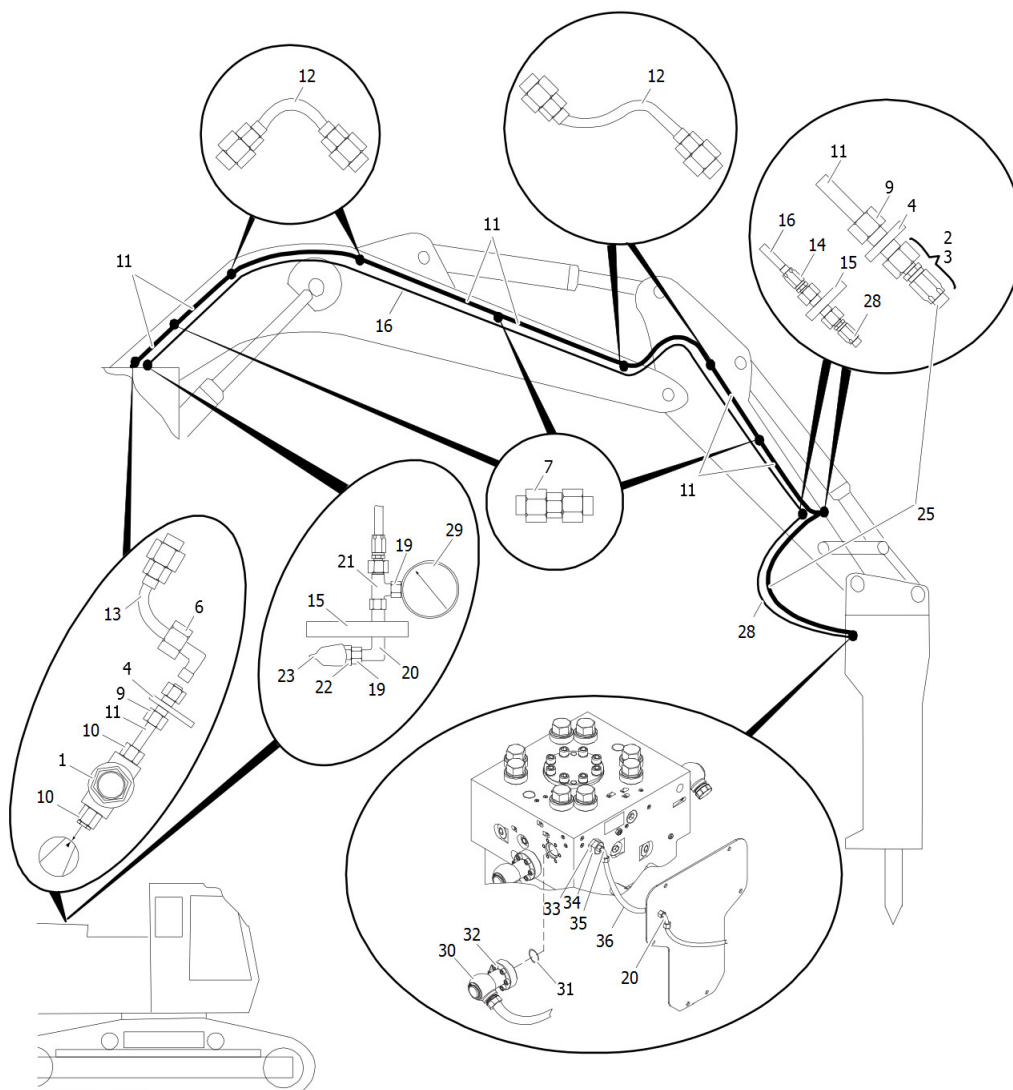
**Assembly sketch HB 4700, HB 4700 DP from DEQ140632**

The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

## 3.12 Conversion HB 5800



### ⚠ WARNING Hydraulic oil squirting out under high pressure

Hydraulic oil squirting out can lead to serious injury.

- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.

No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 1030 77
1	Pressure controller		1	3363 1065 99
2	Reducer		1	3363 0825 55
3	Reducer		1	3363 0835 26
4*	Welding plate		2	3360 9816 41
6	Fitting		3	3360 3142 41
7	Fitting		5	3360 2045 90
9	Fitting		2	3363 0837 12
10	Fitting		2	3363 0834 05
11	Pipe	42 x 3 x 3000 mm (1.65 x 0.11 x 118 in.)	5	3363 0837 16
12*	Hydraulic hose	I.D. 40 mm (1.58 in.); 2.1 m (7 ft) long	2	3363 1218 52
13*	Hydraulic hose	I.D. 40 mm (1.58 in.); 2.1 m (7 ft) long	1	3363 1218 53
14	Fitting		2	3360 2044 82
15	Welding plate		2	3360 9152 19
16*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
19	Fitting		2	3362 2615 35
20	Fitting		2	3360 2045 65
21	Fitting		1	3360 4781 08
22	Pressure switch		1	3362 2615 36
23	Protection cap		1	3362 2615 38
25*	Hydraulic hose	I.D. 32 mm (1.26 in.); 2.8 m (9 ft) long	1	3361 8538 60
28*	Hydraulic hose	I.D. 5 mm (0.2 in.); 2.8 m (9 ft) long	1	3362 2615 33
29	Pressure gauge		1	3362 2615 37
30	Swivel joint		1	3363 1168 88
31	O-ring		1	3360 3143 73
32	Allen screw		6	3360 0265 13
33	Fitting		1	3360 2045 79
34	Fitting		1	3362 3281 65
35	Fitting		2	3360 3145 83
36	Hydraulic hose		1	3363 0838 79
-	Plug		1	3361 0319 48
-	Clamp		12	3363 0835 55
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Cable strap		30	3360 1868 30

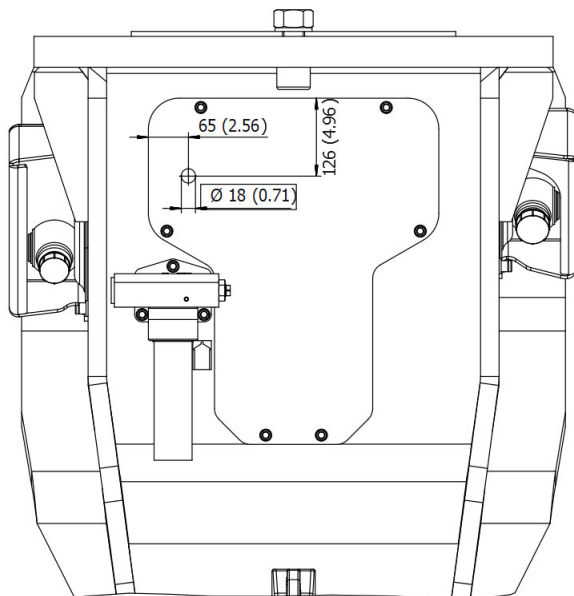
Parts marked with \* will be subject to wear in the normal course of operations.

This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

#### Assembly sketch HB 5800, HB 5800 DP - single ContiLube

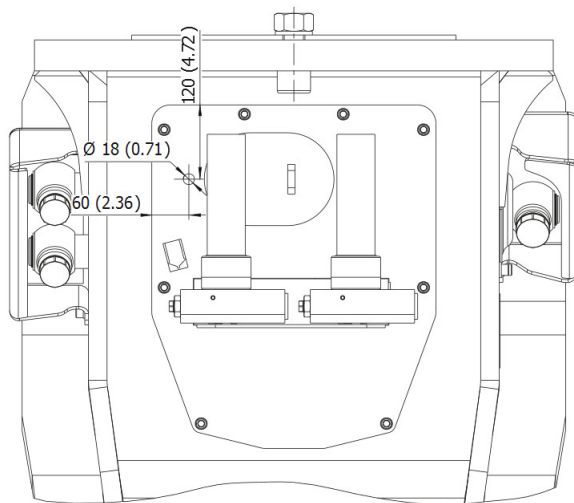
The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

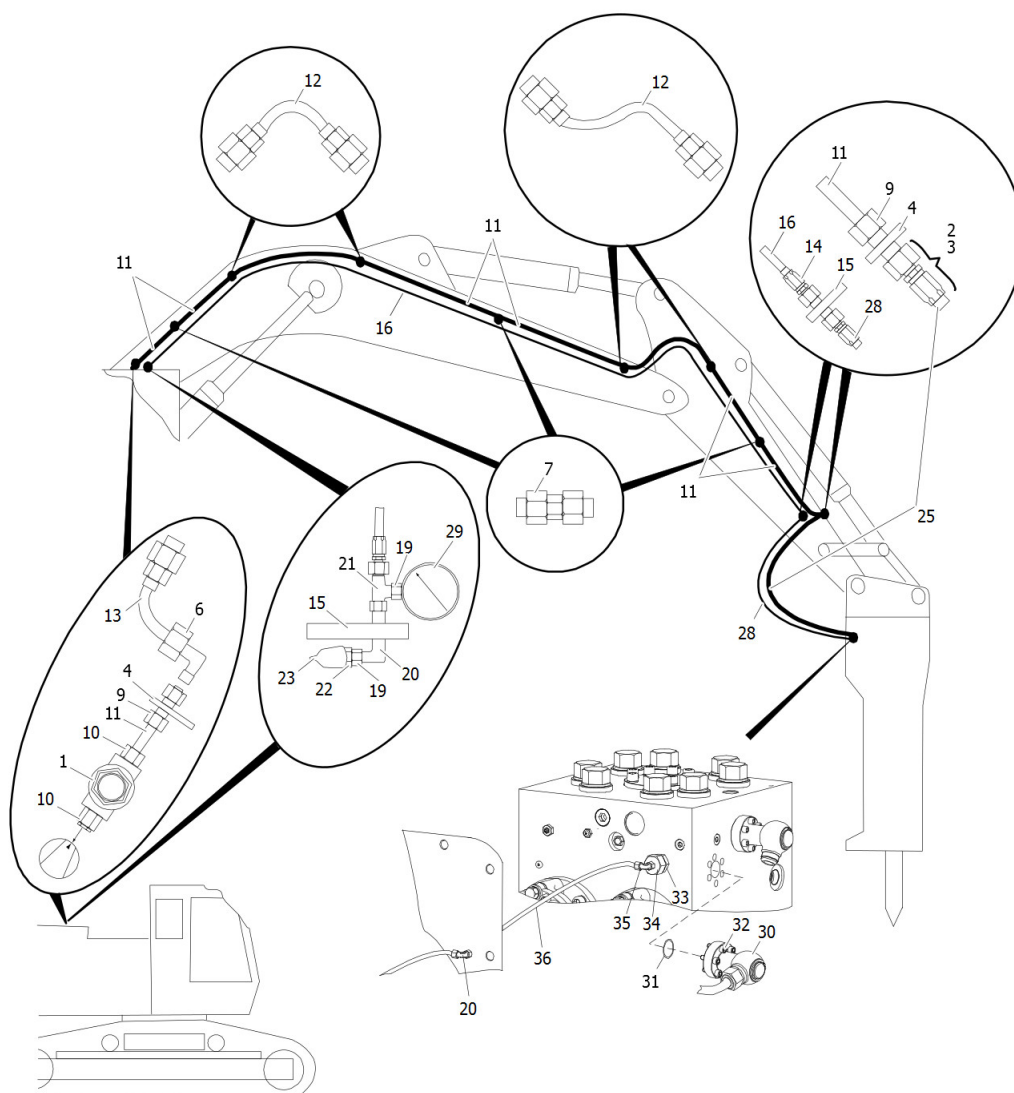
#### Assembly sketch HB 5800, HB 5800 DP - double ContiLube

The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

### 3.13 Conversion HB 7000 - HB 10000



#### ⚠ WARNING Hydraulic oil squirting out under high pressure

Hydraulic oil squirting out can lead to serious injury.

- ▶ While breaker conversion never open screw connections not marked **A**.
- ▶ Exclusively use parts contained in the Epiroc connecting kit.
- ▶ Exclusively connect the air hoses to the designed ports. The ports are marked **A**.
- ▶ Contact the Epiroc Customer Center / Dealer in your area.

No.	Description	Remark	Quantity	Part number
	Connecting kit			3363 1030 77
1	Pressure controller		1	3363 1065 99
2	Reducer		1	3363 0825 55
3	Reducer		1	3363 0835 26
4*	Welding plate		2	3360 9816 41
6	Fitting		3	3360 3142 41
7	Fitting		5	3360 2045 90
9	Fitting		2	3363 0837 12
10	Fitting		2	3363 0834 05
11	Pipe	42 x 3 x 3000 mm (1.65 x 0.11 x 118 in.)	5	3363 0837 16
12*	Hydraulic hose	I.D. 40 mm (1.58 in.); 2.1 m (7 ft) long	2	3363 1218 52
13*	Hydraulic hose	I.D. 40 mm (1.58 in.); 2.1 m (7 ft) long	1	3363 1218 53
14	Fitting		2	3360 2044 82
15	Welding plate		2	3360 9152 19
16*	Hydraulic hose	I.D. 6 mm (0.24 in.); 20 m (66 ft) long	1	3363 0898 39
19	Fitting		2	3362 2615 35
20	Fitting		2	3360 2045 65
21	Fitting		1	3360 4781 08
22	Pressure switch		1	3362 2615 36
23	Protection cap		1	3362 2615 38
25*	Hydraulic hose	I.D. 32 mm (1.26 in.); 2.8 m (9 ft) long	1	3361 8538 60
28*	Hydraulic hose	I.D. 5 mm (0.2 in.); 2.8 m (9 ft) long	1	3362 2615 33
29	Pressure gauge		1	3362 2615 37
30	Swivel joint		1	3363 1168 88
31	O-ring		1	3360 3143 73
32	Allen screw		6	3360 0265 13
33	Fitting		1	3360 2045 79
34	Fitting		1	3362 3281 65
35	Fitting		2	3360 3145 83
36	Hydraulic hose		1	3363 0838 79
-	Plug		1	3361 0319 48
-	Clamp		12	3363 0835 55
-	Cable lug		2	3360 3333 59
-	Wire	10 m (33 ft)	1	3360 9200 81
-	Cable strap		30	3360 1868 30

Parts marked with \* will be subject to wear in the normal course of operations.

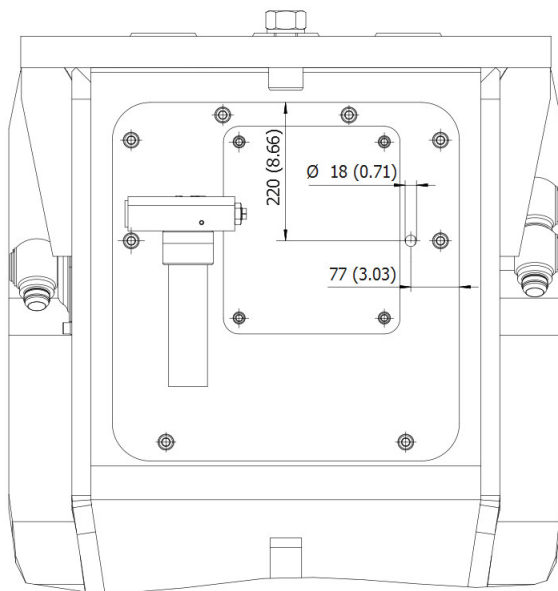


This connecting kit for underwater operation is intended for use with electrically-actuated switch-on valves, such as those in Epiroc's conversion kits.

Additional measures are required when using hydraulically-actuated valves; in such cases please contact the Epiroc Customer Center / dealer in your region.

#### Assembly sketch HB 7000, HB 7000 DP - single ContiLube

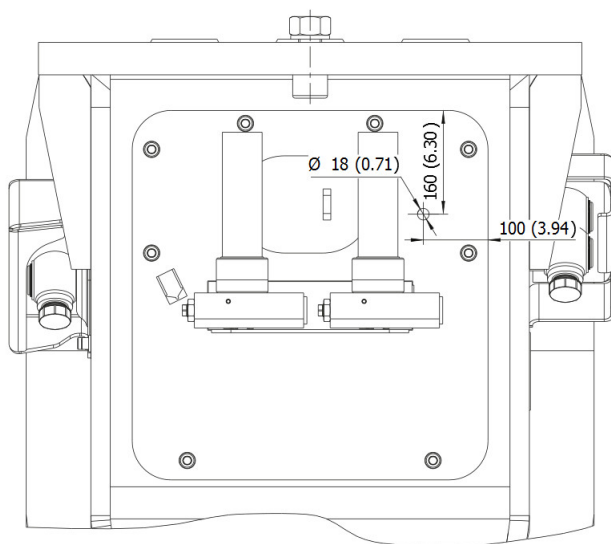
The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

#### Assembly sketch HB 7000, HB 7000 DP - double ContiLube

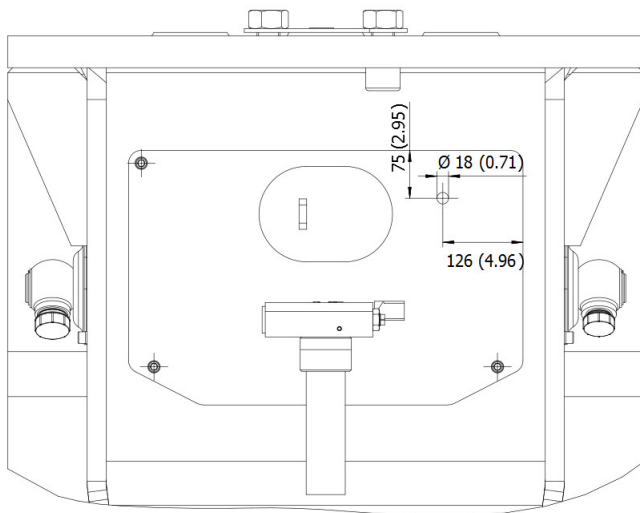
The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

### Assembly sketch HB 10000 DP - single ContiLube

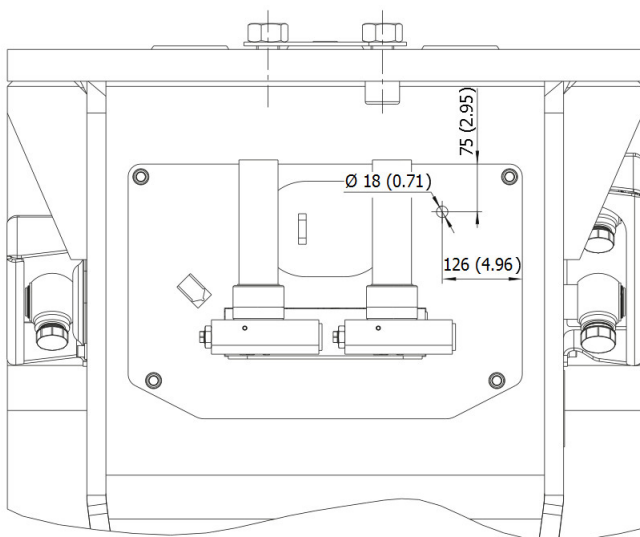
The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

### Assembly sketch HB 10000 DP - double ContiLube

The change at the cover sheet of the service opening is to be made according to the assembly sketch:



[mm (inch)]

## 4 Settings / Checking the equipment

### 4.1 Matching compressor / Air flow rates

#### 4.1.1 Quality of compressed air

The compressed air for underwater breaker operations should be as dust/water-free as possible (compressor with water separator).

#### 4.1.2 Underwater application

The compressed air required for underwater breaker operations can be delivered by a compressor installed on the carrier. This makes the carrier independent of an external compressed air supply. In other water-related applications the carrier is mounted on a floating platform and can then be supplied with compressed air from a separate compressor on the platform via a short flexible hose.

The required air flow rate differs from breaker to breaker as shown in the table below (up to 10 m (33 ft) depth).

Type	minimum air flow rate
MB 750 - MB 1700	3 m <sup>3</sup> /min (106 cfm)
HB 2000 - HB 2500	4 m <sup>3</sup> /min (141 cfm)
HB 3100 - HB 3600	5 m <sup>3</sup> /min (177 cfm)
HB 4100	6 m <sup>3</sup> /min (212 cfm)
HB 4700 - HB 5800	7.5 m <sup>3</sup> /min (265 cfm)
HB 7000	10 m <sup>3</sup> /min (353 cfm)
HB 10000	15 m <sup>3</sup> /min (530 cfm)

For water depths more than 10 m (33 ft) the required minimum air flow rates for each breaker model has to be calculated with the following formular:

Flow = 0.1 x depth [m] x flow up to 10 meters [m<sup>3</sup>/min] from table above, (0.0305 x depth [ft] x flow up to 33 ft [cfm]) from table above.

Calculated item is an approximate! Refer to the note at the below!

#### 4.1.3 Pressure controller and pressure switch

The pressure controller (part 1 of the connecting kit) is used to set the air pressure level in the percussion chamber of the hydraulic breaker.

The air pressure in the lower breaker part must be around 1.5 bar (22 psi) higher than the water pressure at working depth.

For example, working at a depth of 10 meters (33 ft), the water pressure is around 1 bar (15 psi), so the air pressure in the percussion chamber must be kept at 1 + 1.5 = 2.5 bar (15 + 22 = 37 psi).

This is the only way to reliably prevent water ingress in the breaker percussion chamber.

To set the air pressure, press down the breaker with working tool vertically on solid ground until the working tool is in contact with the impact ring. Then lift up the breaker for approx. 50 mm (2 in.).

With the compressed air supply activated, set the required air pressure on the pressure controller as shown in the table below.



**NOTE:** When installing the connecting kit on the carrier, care should be taken to ensure that the pressure gauge on the pressure controller is fitted at a point outside the cabin where it is visible to the excavator driver.

#### Adjusting the pressure switch for depths greater than 10 meters (33 ft):

- Set pressure controller to the required shut-off pressure
- Disconnect breaker switch-on valve from electricity supply
- Replace with a pilot light
- Depress foot-actuated switch (pilot light comes on)
- Slowly screw the setting screw into the pressure switch until the pilot light goes out (set switch-off pressure attained)
- Check shut-off pressure by raising and lowering air pressure using pressure controller
- Connect breaker switch-on valve back up to electricity supply
- Then set pressure controller in accordance with table above
- If possible check shut-off pressure with breaker running on dry land (e.g. by putting a kink in the air supply hose)

Before using hydraulic breakers in water depths greater than 20 meters (66 ft) please contact the Epiroc Customer Center / dealer in your area.

#### 4.1.3.1 Adjustments for Underwater application

Adjustments for **Underwater application**: Air pressure and shut-off pressure

Water depth	Required air pressure	Shut-off pressure	Change on pressure controller
2 m (7 ft)	1.7 bar (25 psi)	1.5 bar (22 psi) (pre-adjusted on pressure controller)	no
4 m (13 ft)	1.9 bar (28 psi)		
6 m (20 ft)	2.1 bar (31 psi)		
8 m (26 ft)	2.3 bar (33 psi)		
10 m (33 ft)	2.5 bar (36 psi)		
12 m (39 ft)	2.7 bar (39 psi)	1.7 bar (25 psi)	yes
14 m (46 ft)	2.9 bar (42 psi)	1.9 bar (28 psi)	
16 m (53 ft)	3.1 bar (45 psi)	2.1 bar (31 psi)	
18 m (59 ft)	3.3 bar (48 psi)	2.3 bar (33 psi)	
20 m (66 ft)	3.5 bar (51 psi)	2.5 bar (36 psi)	

## 5 Operating the hydraulic breaker under water

**NOTICE** Total damage to the hydraulic breaker

The hydraulic breakers must never be submerged in water without a supply of compressed air to the percussion chamber! This will cause serious damage to the breaker. Risk of water hits!

► Carefully follow all instructions below.

Using hydraulic breakers underwater requires not only more conversion work but also increased attention by the carrier operator to a few rules applying before, during and after use.

The following instructions are aimed at ensuring the full functionality of the hydraulic breaker and the carrier.

- The air supply to the lower breaker part must always be switched on before immersing the breaker.
- Leave the air supply running during short breaks in operations!
- Before use, the air supply must be set in accordance with Chapter 4.
- If operations are interrupted for a lengthy period (several hours), lift the breaker out of the water and position it upright on the working tool, applying gentle contact pressure. The compressed air, which is still running, can thus evacuate any water which may be remaining in the lower breaker part. This procedure should be continued for at least 15 minutes. If possible, the hammer should perform a few blows on solid ground to strip any drops of water adhering to the piston. This will prevent corrosion on the percussion piston.
- The condition of the air supply pipes/hoses should be checked at regular intervals. Damaged parts must be replaced immediately.
- Oil samples should be taken regularly from the carrier's oil tank to check for water contamination.
- The lubricant supply must also be checked regularly to avoid damage to the lower breaker part. The flow of compressed air removes the grease more quickly than normal.
- Colored depth markings on the boom and the shovel stick will help the operator attain the required working depth.
- Never leave hydraulic breakers underwater when not in use as this would cause corrosion.
- Switching on the breaker underwater without the compressed air supply running (only possible if the automatic shut-off facility has been tampered with) will cause serious damage to the breaker. Risk of water hits!

- When work on the underwater site is completed and the breaker is to be put in storage for a lengthy period, it should be cleaned on the outside (e.g. to remove salt water residue); then the gas should be bled from the gas piston accumulator and the piston pushed into uppermost position and held. Refer to the Safety and operating instructions of the hydraulic breaker.



**NOTE:** Epiroc hydraulic breakers are factory tested on a test bed powered by mineral oil. If the carrier is used with special environmentally compatible fluids for underwater applications, ensure that the two kinds of oil do not mix. If hydraulic breakers returned for repair and have previously been operated with special hydraulic fluids, it is essential to inform about that, accordingly, stating the name and type of fluid used.



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