en

Operating manual

Hydraulic excavator
R 934 C

from serial number 26 400

Document identification

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Manufacturer:	LIEBHERR France S.A.S.
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Conformity:	CE

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1 Product description

1.1 Assembly - overview

This section comprises an overview of the machine and descriptions of the components shown.

1.1.1 Machine with backhoe attachment

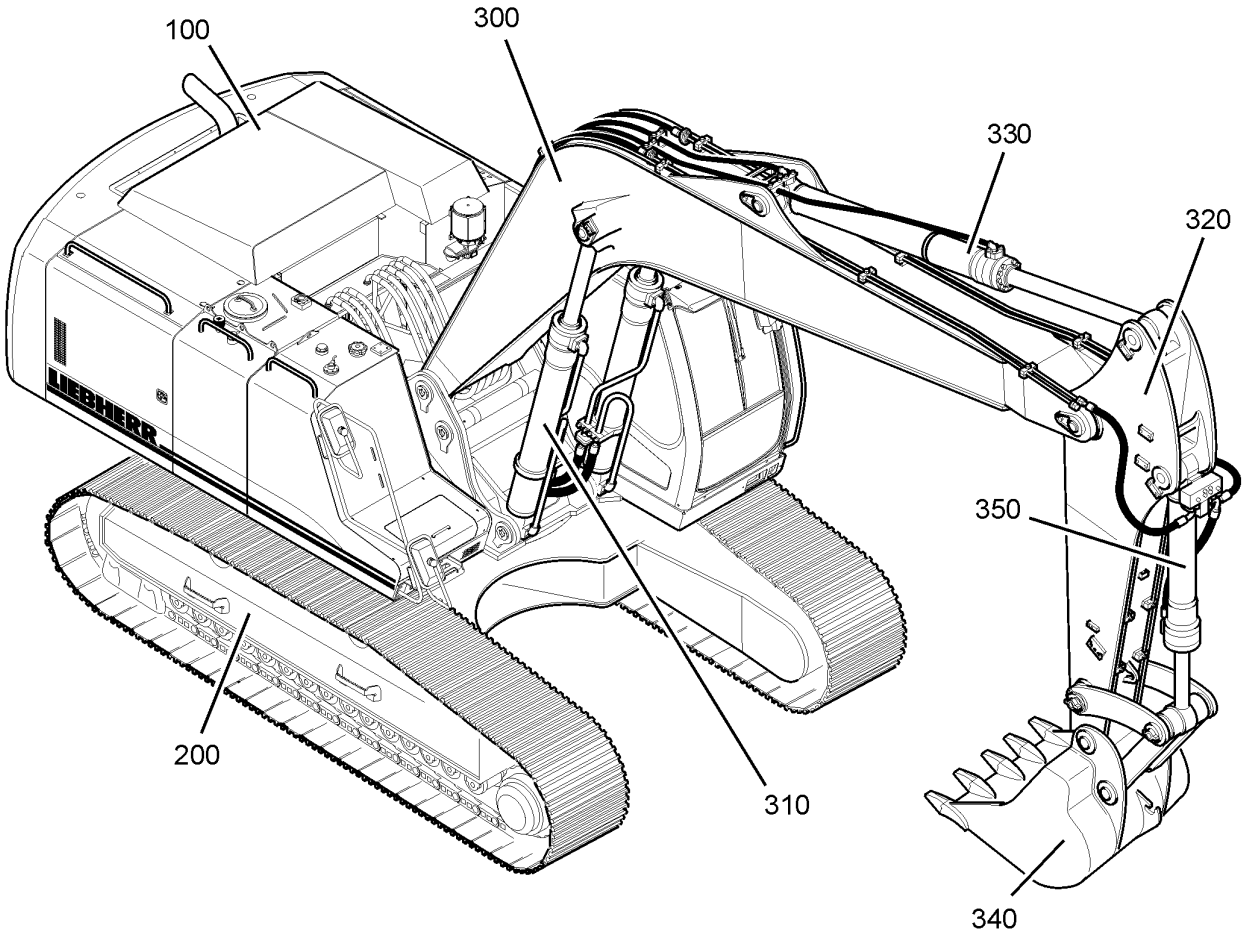

Fig. 1-1 *Machine with backhoe attachment*

100	Uppercarriage	**310**	Boom cylinder	**340**	Bucket
200	Undercarriage	**320**	Stiel	**350**	Bucket cylinder
300	Boom	**330**	Stiel cylinder		

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Performance

Liebherr crawler excavators feature state-of-the-art technology and high-quality workmanship. The most important components of the drive system are all produced by Liebherr factories and are perfectly coordinated to each other.
The engine generation, as further developed for the “C-series”, assures an effective power delivery, a high degree of efficiency, long life expectancy and complies with the emission standard IIIa / Tier 3.

High Productivity

High digging and break-out forces

The R 934 C features high digging and break-out forces due to optimal attachment geometry. The remarkable forces are especially accomplished with the utilization of large-size stick and bucket cylinders.

Regeneration Plus

The feature “Regeneration Plus“ guarantees quicker attachment lowering, less pressure loss and more safety. A high productivity is achieved due to the optimizing and consolidating of the functions “pressure-less lowering”, “regeneration” and “load holding valves” in connection with a high hydraulic output.

Liebherr Engine Technology

Liebherr Diesel Power

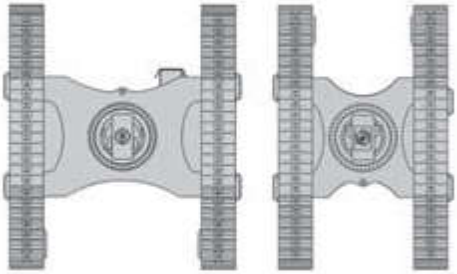
The 4-cylinder in-line engine, developed for the R 934 C with the new common rail injection assures an effective power output, a high efficiency and a long life expectancy.
Already at a low speed range the engine develops a high output and contributes substantially to the economical operation of the entire machine.

Emission reduces combustion

The new engine generation with optimal performance density assures for a more environmentally-friendly fuel combustion. Higher ignition pressures and the newly designed injection technology guarantee the compliance with the emission standard IIIa / Tier 3.

Multi-function tool carrier

- For every material and application the correct digging tool
- Change-over of mechanical and hydraulic tool in a matter of seconds due to a modular quick coupler system designed and manufactured by Liebherr:
- Likufix for the change-over of all hydraulic and mechanical tools from the dash board in the operator station
- Liebherr quick coupler adapter for the change-over of mechanical tools



Heavy-duty undercarriage

- An extensive undercarriage selection for every application: mechanically or hydraulically adjustable, various track- gages and -lengths
- Combination of high-strength steel plates with steel castings for a smooth stress flow

Lift Capacities

with Gooseneck Boom 6,05 m

Stick 2,00 m

Height (m)	Under-carriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0	10,5
10,5	HD-S HD-SL S-HD						
9,0	HD-S HD-SL S-HD						
7,5	HD-S HD-SL S-HD			6,8# (6,8#)			
6,0	HD-S HD-SL S-HD			7,4 (7,8#) 7,8# (7,8#) 7,8# (7,8#)			
4,5	HD-S HD-SL S-HD		10,8# (10,8#) 10,8# (10,8#) 10,8# (10,8#)	7,0 (8,6#) 7,6 (8,6#) 7,4 (8,6#)	4,9 (7,5#) 5,3 (7,5#) 5,2 (7,5#)		
3,0	HD-S HD-SL S-HD		9,8 (13,1#) 10,8 (13,1#) 10,4 (13,2#)	6,5 (9,6#) 7,1 (9,6#) 7,0 (9,6#)	4,7 (7,7) 5,1 (7,8) 5,0 (7,9#)		
1,5	HD-S HD-SL S-HD		9,0 (14,6#) 10,1 (14,6#) 9,7 (14,6#)	6,1 (10,4#) 6,7 (10,4#) 6,5 (10,4#)	4,5 (7,5) 4,9 (7,5) 4,8 (8,3#)		
0	HD-S HD-SL S-HD		8,8 (14,6#) 9,8 (14,6#) 9,5 (14,6#)	5,9 (10,2) 6,5 (10,3) 6,3 (10,7#)	4,3 (7,3) 4,8 (7,4) 4,7 (8,2)		
- 1,5	HD-S HD-SL S-HD	13,0# 13,0#) 13,0# 13,0#) 13,3# 13,3#)	8,8 (13,6#) 9,9 (13,6#) 9,5 (13,6#)	5,8 (10,2) 6,4 (10,2) 6,3 (10,3#)			
- 3,0	HD-S HD-SL S-HD	15,0# 15,0#) 15,0# 15,0#) 14,9# 14,9#)	9,0 (11,8#) 10,1 (11,8#) 9,7 (11,7#)	5,9 (8,9#) 6,6 (8,9#) 6,4 (8,8#)			
- 4,5	HD-S HD-SL S-HD						
- 6,0	HD-S HD-SL S-HD						
- 7,5	HD-S HD-SL S-HD						

Stick 2,50 m

Height (m)	Under-carriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0	10,5
10,5	HD-S HD-SL S-HD						
9,0	HD-S HD-SL S-HD						
7,5	HD-S HD-SL S-HD			6,2# (6,2#) 6,2# (6,2#) 6,3# (6,3#)			
6,0	HD-S HD-SL S-HD			7,4# (7,4#) 7,4# (7,4#) 7,4# (7,4#)	5,1# (5,1#) 5,1# (5,1#) 5,2# (5,2#)		
4,5	HD-S HD-SL S-HD		10,1# (10,1#) 10,1# (10,1#) 10,2# (10,2#)	7,3 (8,2#) 7,9 (8,2#) 7,7 (8,3#)	5,1 (7,3#) 5,6 (7,3#) 5,4 (7,3#)		
3,0	HD-S HD-SL S-HD		10,3 (12,6#) 11,4 (12,6#) 11,0 (12,7#)	6,8 (9,3#) 7,4 (9,3#) 7,2 (9,4#)	4,9 (7,8#) 5,3 (7,8#) 5,2 (7,8#)		
1,5	HD-S HD-SL S-HD		9,5 (14,5#) 10,5 (14,5#) 10,2 (14,5#)	6,4 (10,3#) 7,0 (10,3#) 6,8 (10,4#)	4,6 (7,7) 5,1 (7,7) 5,0 (8,3#)		
0	HD-S HD-SL S-HD	6,7# (6,7#) 6,7# (6,7#) 6,9# (6,9#)	9,1 (15,0#) 10,1 (15,0#) 9,8 (15,0#)	6,1 (10,5) 6,7 (10,5) 6,5 (10,9#)	4,5 (7,5) 4,9 (7,5) 4,8 (8,3)		
- 1,5	HD-S HD-SL S-HD	12,0# (12,0#) 12,0# (12,0#) 12,1# (12,1#)	9,0 (14,4#) 10,1 (14,4#) 9,7 (14,3#)	6,0 (10,4) 6,6 (10,4) 6,4 (10,7#)	4,4 (7,4) 4,9 (7,5) 4,8 (8,3)		
- 3,0	HD-S HD-SL S-HD	17,3# (17,3#) 17,3# (17,3#) 17,2# (17,2#)	9,2 (12,8#) 10,2 (12,8#) 9,9 (12,8#)	6,0 (9,7#) 6,7 (9,7#) 6,5 (9,6#)			
- 4,5	HD-S HD-SL S-HD		9,5 (9,9#) 9,9# (9,9#) 9,8# (9,8#)				
- 6,0	HD-S HD-SL S-HD						
- 7,5	HD-S HD-SL S-HD						

Stick 3,10 m

Height (m)	Under-carriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0	10,5
10,5	HD-S HD-SL S-HD						
9,0	HD-S HD-SL S-HD						
7,5	HD-S HD-SL S-HD						
6,0	HD-S HD-SL S-HD				5,3 (5,4#) 5,4# (5,4#) 5,5# (5,5#)		
4,5	HD-S HD-SL S-HD			7,4 (7,5#) 7,5# (7,5#) 7,5# (7,5#)	5,2 (6,7#) 5,6 (6,7#) 5,5 (6,7#)		
3,0	HD-S HD-SL S-HD	14,0# (14,0#) 14,0# (14,0#) 12,9# (12,9#)	10,6 (11,4#) 11,4# (11,4#) 11,3 (11,5#)	6,9 (8,7#) 7,6 (8,7#) 7,4 (8,8#)	4,9 (7,3#) 5,4 (7,3#) 5,2 (7,3#)	3,6 (4,6#) 4,0 (4,6#) 3,9 (4,7#)	
1,5	HD-S HD-SL S-HD	5,4# (5,4#) 5,4# (5,4#) 5,4# (5,4#)	9,7 (13,7#) 10,7 (13,7#) 10,3 (13,8#)	6,4 (9,9#) 7,1 (9,9#) 6,9 (9,9#)	4,6 (7,7) 5,1 (7,7) 5,0 (7,9#)	3,5 (5,4#) 3,9 (5,4#) 3,8 (5,4#)	
0	HD-S HD-SL S-HD	7,4# (7,4#) 7,4# (7,4#) 7,5# (7,5#)	9,1 (14,8#) 10,2 (14,8#) 9,8 (14,8#)	6,1 (10,5) 6,7 (10,5) 6,5 (10,6#)	4,4 (7,5) 4,9 (7,5) 4,8 (8,3)	3,4 (5,0#) 3,8 (5,0#) 3,7 (4,9#)	
- 1,5	HD-S HD-SL S-HD	10,8# (10,8#) 10,8# (10,8#) 11,0# (11,0#)	8,9 (14,7#) 10,0 (14,7#) 9,6 (14,6#)	5,9 (10,3) 6,5 (10,3) 6,4 (10,7#)	4,3 (7,4) 4,8 (7,4) 4,7 (8,2)		
- 3,0	HD-S HD-SL S-HD	15,2# (15,2#) 15,2# (15,2#) 15,4# (15,4#)	9,0 (13,6#) 10,0 (13,6#) 9,7 (13,5#)	5,9 (10,1#) 6,5 (10,1#) 6,4 (10,1#)	4,4 (7,4) 4,8 (7,4) 4,7 (7,7#)		
- 4,5	HD-S HD-SL S-HD	15,4# (15,4#) 15,4# (15,4#) 15,2# (15,2#)	9,2 (11,3#) 10,3 (11,3#) 9,9 (11,2#)	6,1 (8,4#) 6,7 (8,4#) 6,5 (8,3#)			
- 6,0	HD-S HD-SL S-HD						
- 7,5	HD-S HD-SL S-HD						

Stick 3,90 m

Height (m)	Under-carriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0	10,5
10,5	HD-S HD-SL S-HD						
9,0	HD-S HD-SL S-HD						
7,5	HD-S HD-SL S-HD				4,0# (4,0#) 4,0# (4,0#) 4,0# (4,0#)		
6,0	HD-S HD-SL S-HD				4,7# (4,7#) 4,7# (4,7#) 4,8# (4,8#)	3,0# (3,0#) 3,0# (3,0#) 3,1# (3,1#)	
4,5	HD-S HD-SL S-HD				5,3 (5,6#) 5,6# (5,6#) 5,6# (5,6#)	3,8 (4,2#) 4,2# (4,2#) 4,1 (4,2#)	
3,0	HD-S HD-SL S-HD	14,7# (14,7#) 14,7# (14,7#) 15,0# (15,0#)	9,8# (9,8#) 9,8# (9,8#) 9,9# (9,9#)	7,1 (7,8#) 7,8# (7,8#) 7,6 (7,8#)	5,0 (6,7#) 5,5 (6,7#) 5,3 (6,7#)	3,7 (5,1#) 4,0 (5,1#) 4,0 (5,1#)	
1,5	HD-S HD-SL S-HD	9,5# (9,5#) 9,5# (9,5#) 9,3# (9,3#)	10,0 (12,5#) 11,1 (12,5#) 10,7 (12,6#)	6,6 (9,1#) 7,2 (9,1#) 7,0 (9,2#)	4,7 (7,4#) 5,2 (7,4#) 5,0 (7,4#)	3,5 (5,8) 3,9 (5,9) 3,8 (6,0#)	
0	HD-S HD-SL S-HD	8,0# (8,0#) 8,0# (8,0#) 8,1# (8,1#)	9,3 (14,2#) 10,3 (14,2#) 10,0 (14,2#)	6,1 (10,2#) 6,8 (10,2#) 6,6 (10,2#)	4,4 (7,5) 4,9 (7,5) 4,8 (8,0#)	3,4 (5,7) 3,7 (5,7) 3,7 (6,3)	
- 1,5	HD-S HD-SL S-HD	9,9# (9,9#) 9,9# (9,9#) 10,0# (10,0#)	8,9 (14,7#) 9,9 (14,7#) 9,6 (14,7#)	5,9 (10,3) 6,5 (10,3) 6,3 (10,6#)	4,3 (7,3) 4,7 (7,3) 4,6 (8,1)	3,3 (5,6) 3,6 (5,6) 3,6 (6,0#)	
- 3,0	HD-S HD-SL S-HD	13,0# (13,0#) 13,0# (13,0#) 13,1# (13,1#)	8,8 (14,2#) 9,8 (14,2#) 9,5 (14,2#)	5,8 (10,1) 6,4 (10,2) 6,2 (10,4#)	4,2 (7,2) 4,7 (7,3) 4,6 (8,0#)		
- 4,5	HD-S HD-SL S-HD	17,4# (17,4#) 17,4# (17,4#) 17,6# (17,6#)	8,9 (12,6#) 10,0 (12,6#) 9,7 (12,6#)	5,8 (9,4#) 6,5 (9,4#) 6,3 (9,3#)	4,3 (7,0#) 4,8 (7,0#) 4,7 (6,9#)		
- 6,0	HD-S HD-SL S-HD	13,2# (13,2#) 13,2# (13,2#)	9,3 (9,5#) 9,5# (9,5#) 9,3# (9,3#)	6,1 (6,7#) 6,7# (6,7#)			
- 7,5	HD-S HD-SL S-HD						

The lift capacities on the load hook of the Liebherr quick change adapter 66 without attachment are stated in metric tonnes (t), and can be lifted 360° on firm, level supporting surface. Values quoted in brackets are valid for the undercarriage when in longitudinal position. Capacities are valid for 600 mm wide triple grouser pads. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (indicated via #). Maximum load for the quick change adapter's load hook is 12 t. Without quick change adapter the lift capacities will increase by 330 kg/410 kg*, without bucket cylinder, link and lever they increase by an additional 410 kg/530 kg*. Lifting capacity of the excavator is limited by machine stability, hydraulic capacity and maximum permissible load of the load hook.

According to European Standard, EN 474-5: In the European Union excavators have to be equipped with an overload warning device, a load diagram and automatic check valves on the hoist cylinders, when they are used for lifting operations which require the use of lifting accessories.

* capacities only for stick 2,00 m

Lift Capacities

with Straight Gooseneck Boom 6,50 m and Heavy Counterweight

Stick 2,00 m

Height (m)	Undercarriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0	10,5
10,5	HD-S HD-SL S-HD						
9,0	HD-S HD-SL S-HD						
7,5	HD-S HD-SL S-HD			8,1 (8,2#) 8,2# (8,2#) 8,2# (8,2#)			
6,0	HD-S HD-SL S-HD		10,3# (10,3#) 10,3# (10,3#) 10,4# (10,4#)	7,8 (8,5#) 8,5# (8,5#) 8,3 (8,5#)	5,4 (7,5#) 5,9 (7,5#) 5,8 (7,5#)		
4,5	HD-S HD-SL S-HD		11,3 (12,2#) 12,2# (12,2#) 12,0 (12,3#)	7,4 (9,2#) 8,0 (9,2#) 7,8 (9,3#)	5,2 (7,7#) 5,7 (7,7#) 5,6 (7,7#)		
3,0	HD-S HD-SL S-HD			6,8 (10,0#) 7,5 (10,0#) 7,3 (10,1#)	5,0 (8,0#) 5,4 (8,0#) 5,3 (8,0#)		
1,5	HD-S HD-SL S-HD			6,4 (10,5#) 7,1 (10,5#) 6,9 (10,5#)	4,7 (7,9) 5,2 (7,9) 5,1 (8,2#)		
0	HD-S HD-SL S-HD		9,4 (12,1#) 10,5 (12,1#) 10,1 (12,3#)	6,2 (10,3#) 6,9 (10,3#) 6,7 (10,3#)	4,6 (7,8) 5,1 (7,8) 5,0 (8,1#)		
- 1,5	HD-S HD-SL S-HD		9,5 (11,9#) 10,6 (11,9#) 10,2 (11,8#)	6,2 (9,5#) 6,9 (9,5#) 6,7 (9,4#)	4,6 (7,4#) 5,1 (7,4#) 5,0 (7,3#)		
- 3,0	HD-S HD-SL S-HD		9,6# (9,6#) 9,6# (9,6#) 9,5# (9,5#)	6,4 (7,8#) 7,0 (7,8#) 6,8 (7,7#)			
- 4,5	HD-S HD-SL S-HD						
- 6,0	HD-S HD-SL S-HD						
- 7,5	HD-S HD-SL S-HD						

Stick 2,50 m

Height (m)	Undercarriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0	10,5
10,5	HD-S HD-SL S-HD						
9,0	HD-S HD-SL S-HD						
7,5	HD-S HD-SL S-HD			7,3# (7,3#) 7,3# (7,3#) 7,3# (7,3#)			
6,0	HD-S HD-SL S-HD		9,1# (9,1#) 9,1# (9,1#) 9,2# (9,2#)	8,1 (8,2#) 8,2# (8,2#) 8,2# (8,2#)	5,6 (7,1#) 6,1 (7,1#) 6,0 (7,2#)		
4,5	HD-S HD-SL S-HD	18,5# (18,5#) 18,5# (18,5#)	11,6# (11,6#) 11,6# (11,6#) 11,7# (11,7#)	7,7 (9,0#) 8,3 (9,0#) 8,1 (9,0#)	5,4 (7,6#) 5,9 (7,6#) 5,8 (7,6#)		
3,0	HD-S HD-SL S-HD		10,7 (13,8#) 11,8 (13,8#) 11,3 (13,8#)	7,1 (10,0#) 7,8 (10,0#) 7,6 (10,0#)	5,2 (8,0#) 5,7 (8,0#) 5,5 (8,0#)	3,9 (6,0#) 4,3 (6,0#) 4,2 (6,1#)	
1,5	HD-S HD-SL S-HD		9,9 (12,5#) 11,0 (12,5#) 10,6 (12,4#)	6,7 (10,6#) 7,4 (10,6#) 7,2 (10,6#)	4,9 (8,1) 5,4 (8,1) 5,3 (8,3#)	3,8 (6,2) 4,2 (6,2) 4,1 (6,8)	
0	HD-S HD-SL S-HD		9,7 (13,2#) 10,8 (13,2#) 10,4 (13,3#)	6,5 (10,7#) 7,1 (10,7#) 6,9 (10,7#)	4,8 (7,9) 5,3 (8,0) 5,1 (8,3#)	3,7 (6,1) 4,1 (6,2) 4,0 (6,2#)	
- 1,5	HD-S HD-SL S-HD	8,8# (8,8#) 8,8# (8,8#) 9,0# (9,0#)	9,7 (13,0#) 10,8 (13,0#) 10,4 (12,9#)	6,4 (10,1#) 7,1 (10,1#) 6,9 (10,0#)	4,7 (7,9#) 5,2 (7,9#) 5,1 (7,8#)		
- 3,0	HD-S HD-SL S-HD	12,9# (12,9#) 12,9# (12,9#) 12,7# (12,7#)	9,9 (11,0#) 10,9 (11,0#) 10,6 (10,9#)	6,5 (8,7#) 7,1 (8,7#) 7,0 (8,6#)	4,8 (6,6#) 5,3 (6,6#) 5,2 (6,5#)		
- 4,5	HD-S HD-SL S-HD			6,1# (6,1#) 6,1# (6,1#) 6,0# (6,0#)			
- 6,0	HD-S HD-SL S-HD						
- 7,5	HD-S HD-SL S-HD						

Stick 3,10 m

Height (m)	Undercarriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0	10,5
10,5	HD-S HD-SL S-HD						
9,0	HD-S HD-SL S-HD			5,3# (5,3#) 5,3# (5,3#) 5,4# (5,4#)			
7,5	HD-S HD-SL S-HD			6,1# (6,1#) 6,1# (6,1#) 6,1# (6,1#)	5,0# (5,0#) 5,0# (5,0#) 5,1# (5,1#)		
6,0	HD-S HD-SL S-HD			6,8# (6,8#) 6,8# (6,8#) 6,9# (6,9#)	5,7 (6,3#) 6,2 (6,3#) 6,1 (6,3#)	3,4# (3,4#)	
4,5	HD-S HD-SL S-HD	15,5# (15,5#) 15,5# (15,5#) 15,7# (15,7#)	10,6# (10,6#) 10,6# (10,6#) 10,7# (10,7#)	7,8 (8,4#) 8,4# (8,4#) 8,3 (8,4#)	5,5 (7,2#) 6,0 (7,2#) 5,8 (7,2#)	4,1 (5,3#) 4,4 (5,3#) 4,3 (5,3#)	
3,0	HD-S HD-SL S-HD		11,0 (12,8#) 12,1 (12,8#) 11,7 (12,9#)	7,3 (9,4#) 7,9 (9,4#) 7,7 (9,5#)	5,2 (7,7#) 5,7 (7,7#) 5,6 (7,7#)	3,9 (6,3) 4,3 (6,4) 4,2 (6,6#)	
1,5	HD-S HD-SL S-HD		10,1 (14,4#) 11,2 (14,4#) 10,8 (14,4#)	6,8 (10,3#) 7,4 (10,3#) 7,2 (10,3#)	4,9 (8,1#) 5,4 (8,1#) 5,3 (8,1#)	3,8 (6,2) 4,1 (6,2) 4,1 (6,7#)	
0	HD-S HD-SL S-HD	4,4# (4,4#) 4,4# (4,4#) 4,6# (4,6#)	9,6 (13,9#) 10,7 (13,9#) 10,3 (14,0#)	6,4 (10,6#) 7,1 (10,6#) 6,9 (10,6#)	4,7 (7,9) 5,2 (7,9) 5,1 (8,3#)	3,7 (6,1) 4,0 (6,1) 3,9 (6,7#)	
- 1,5	HD-S HD-SL S-HD	8,1# (8,1#) 8,1# (8,1#) 8,2# (8,2#)	9,5 (13,7#) 10,6 (13,7#) 10,3 (13,6#)	6,3 (10,3#) 7,0 (10,3#) 6,8 (10,3#)	4,6 (7,8) 5,1 (7,8) 5,0 (8,0#)	3,6 (6,0) 4,0 (6,0) 3,9 (6,2#)	
- 3,0	HD-S HD-SL S-HD	12,3# (12,3#) 12,3# (12,3#) 12,4# (12,4#)	9,6 (12,0#) 10,7 (12,0#) 10,4 (11,9#)	6,3 (9,3#) 7,0 (9,3#) 6,8 (9,2#)	4,7 (7,1#) 5,1 (7,1#) 5,0 (7,1#)		
- 4,5	HD-S HD-SL S-HD		9,3# (9,3#) 9,3# (9,3#) 9,2# (9,2#)	6,5 (7,3#) 7,2 (7,3#) 7,0 (7,2#)			
- 6,0	HD-S HD-SL S-HD						
- 7,5	HD-S HD-SL S-HD						

Stick 3,90 m

Height (m)	Undercarriage	Radius of load from centerline of machine (m) 3,0	4,5	6,0	7,5	9,0	10,5
10,5	HD-S HD-SL S-HD			3,7# (3,7#) 3,7# (3,7#) 3,7# (3,7#)			
9,0	HD-S HD-SL S-HD				3,6# (3,6#) 3,6# (3,6#) 4,5# (4,5#)	2,9# (2,9#)	
7,5	HD-S HD-SL S-HD				4,5# (4,5#) 4,5# (4,5#) 5,0# (5,0#)	2,8# (2,8#) 2,8# (2,8#) 4,2# (4,2#)	
6,0	HD-S HD-SL S-HD			6,3# (6,3#)	5,0# (5,0#) 5,0# (5,0#) 6,0# (6,0#)	4,2# (4,2#) 4,2# (4,2#) 4,4 (5,0#)	
4,5	HD-S HD-SL S-HD	16,8# (16,8#)	11,6# (11,6#)	6,2# (6,2#) 6,2# (6,2#) 7,9 (8,7#)	5,6 (5,9#) 5,9# (5,9#) 5,7 (7,2#)	4,1 (5,0#) 4,5 (5,0#) 4,2 (6,0#)	3,0# (3,0#)
3,0	HD-S HD-SL S-HD	18,4# (18,4#) 18,4# (18,4#) 4,5# (4,5#)	11,5# (11,5#) 11,5# (11,5#) 11,1 (13,6#)	7,5 (8,7#) 8,2 (8,7#) 7,4 (9,8#)	5,3 (7,2#) 5,8 (7,2#) 5,3 (7,8#)	4,0 (6,0#) 4,3 (6,0#) 4,1 (6,5#)	3,0 (3,0#) 3,0# (3,0#) 3,2 (3,4#)
1,5	HD-S HD-SL S-HD	4,5# (4,5#) 4,5# (4,5#) 5,3# (5,3#)	10,4 (13,6#) 11,5 (13,6#) 10,4 (14,5#)	6,9 (9,8#) 7,6 (9,8#) 7,0 (10,4#)	5,0 (7,7#) 5,5 (7,7#) 5,1 (8,1#)	3,8 (6,2) 4,1 (6,2) 3,9 (6,6#)	2,9 (3,4#) 3,2 (3,4#)
0	HD-S HD-SL S-HD	5,2# (5,2#) 5,2# (5,2#) 7,5# (7,5#)	9,7 (14,5#) 10,8 (14,5#) 10,2 (14,2#)	6,5 (10,4#) 7,2 (10,4#) 6,7 (10,4#)	4,7 (7,9) 5,2 (7,9) 4,9 (8,1#)	3,6 (6,0) 4,0 (6,1) 3,8 (6,5#)	
- 1,5	HD-S HD-SL S-HD	7,4# (7,4#) 7,4# (7,4#) 10,5# (10,5#)	9,5 (14,2#) 10,5 (14,2#) 10,2 (13,0#)	6,3 (10,4#) 6,9 (10,4#) 6,7 (9,8#)	4,6 (7,7) 5,1 (7,8) 4,9 (7,6#)	3,5 (5,9) 3,9 (6,0) 3,8 (5,8#)	
- 3,0	HD-S HD-SL S-HD	10,4# (10,4#) 10,4# (10,4#) 14,4# (14,4#)	9,4 (13,0#) 10,5 (13,0#) 10,3 (10,8#)	6,2 (9,8#) 6,9 (9,8#) 6,8 (8,3#)	4,5 (7,6#) 5,0 (7,6#) 5,0 (6,3#)	3,5 (5,8#) 3,9 (5,8#)	
- 4,5	HD-S HD-SL S-HD	14,4# (14,4#) 14,4# (14,4#)	9,6 (10,9#) 10,7 (10,9#)	6,3 (8,4#) 6,9 (8,4#) 5,5# (5,5#)	4,6 (6,3#) 5,1 (6,3#)		
- 6,0	HD-S HD-SL S-HD			5,7# (5,7#) 5,7# (5,7#)			
- 7,5	HD-S HD-SL S-HD						

The lift capacities on the load hook of the Liebherr quick change adapter 66 without attachment are stated in metric tonnes (t), and can be lifted 360° on firm, level supporting surface. Values quoted in brackets are valid for the undercarriage when in longitudinal position. Capacities are valid for 600 mm wide triple grouser pads. Indicated loads are based on ISO 10567 standard and do not exceed 75 % of tipping or 87 % of hydraulic capacity (indicated via #). Maximum load for the quick change adapter's load hook is 12 t. Without quick change adapter the lift capacities will increase by 330 kg/410 kg*, without bucket cylinder, link and lever they increase by an additional 410 kg/530 kg*. Lifting capacity of the excavator is limited by machine stability, hydraulic capacity and maximum permissible load of the load hook.

According to European Standard, EN 474-5: In the European Union excavators have to be equipped with an overload warning device, a load diagram and automatic check valves on the hoist cylinders, when they are used for lifting operations which require the use of lifting accessories.

* capacities only for stick 2,00 m

– In case of a thunderstorm :
  • lower the attachment to the ground and if possible anchor the digging tool into the soil.
  • leave the cab and move away from the machine before the storm breaks out. Otherwise, you must stop the excavator, turn off the radio and keep inside the closed cab until the end of the storm.
– Auxiliary control units can have various functions. Always check their functions when starting up the machine.
– Stop the swinging motion of the uppercarriage when lowering the attachment into a ditch without striking the attachment on the ditch walls.
– Inspect the machine for damage if the attachment has been swung into a wall or any other obstacles.
– Applications in which the attachment is to be used to strike the material being extracted are not permitted, even when working in a longitudinal direction.
– Repeated strikes against an object leads to damage to the steel structures and machine components.
– Please refer to your LIEBHERR dealer if special teeth for heavy-duty or special applications are required.
– Do not attach too large bucket or bucket with side cutters or that are during operations with rocky material. This would prolong the work cycles and may lead to damage to the bucket as well as further machine components.
– With the 2x45° offset articulation, the offset position may only be employed if the working tool or the attachment does not touch the material.
– Operation of the offset articulation to drill into the material is not permitted.
– Do not lift the machine during operation. Should this happen, lower the machine slowly back to the ground.
– Do not let the machine fall heavily on the ground and do not hold it back with the hydraulics. This would damage the machine.
– During operation with the attachment it is forbidden to raise the machine with the dozing blade (e.g. carving at the ceiling when tunnelling).

Safe use with a hydraulic hammer

– The hydraulic hammer must be selected with particular care. When using a hydraulic hammer not permitted by LIEBHERR, steel structures or the other machine components can become damaged.
– Before beginning breaking tasks, position the machine on firm and level ground.
– Use a hydraulic hammer designed exclusively for breaking stone, concrete and other breakable materials.
– Only operate the hydraulic hammer in the longitudinal direction of the machine and with the windshield closed or with a front protective grid.
– Ensure during hammer operation that no cylinder is entirely extended or retracted and that the stick is not in the vertical position.
– In order to avoid damages to the machine, try not to break stone or concrete while performing retraction and extension motions of the hydraulic hammer.
– Do not apply the hydraulic hammer uninterrupted for more than 15 secs. at a time to the same place. Change the breaking point. Too long uninterrupted operation of the hydraulic hammer leads to an unnecessary overheating of the hydraulic oil.
– Do not use the drop force of the hydraulic hammer to break stone or other materials. Do not move obstacles with the hydraulic hammer. Misuse of this nature would damage both the hammer and the machine.
– Do not use the hydraulic hammer to lift objects

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– Inexpert assembly and handling of hydraulic accumulators can cause serious accidents.
– Do not operate damaged hydraulic accumulators.
– Before working on a hydraulic accumulator, you must reduce the pressure in the hydraulic system (hydraulic system including hydraulic tank), as described in these operating instructions.
– Do not carry out welding or soldering or do any mechanical work on the hydraulic accumulator.
  The hydraulic accumulator can be damaged by heat penetration and can be made to rupture by mechanical working. RISK OF EXPLOSION!
– Only charge the hydraulic accumulator with nitrogen. There is a RISK OF EXPLOSION if oxygen or air is used.
– The accumulator body can become hot during operation; there is a risk of burning.
– New hydraulic accumulators must be charged with the pressure required for the purpose of use before installation.
– The operating data (minimum and maximum pressure) are marked permanently on hydraulic accumulators. Ensure that this marking remains visible.

Hydraulic hoses and sheathed cables.

– It is forbidden to carry out repair work on hydraulic hoses and sheathed cables!
– All hoses, sheathed cables and bolt connections must be checked regularly every 2 weeks for externally visible damage and any possible damage must be immediately checked for leakage.
– Never check for leaks with your bare hands, use a sheet of paper or something else.
– Any damaged parts must be removed immediately! Spurting oil can lead to injury and burns.
– Even with correct storage and permitted load, hoses and sheathed cables are subject to the natural aging process. This restricts their duration of use.
  • Incorrect storage, mechanical damage and unauthorized load are the most common causes of failure.
  • In relation to duration of use, current norms, regulations and guidelines pertaining to hoses and sheathed cables at place of use must be adhered to.
  • Use at the limit range of permissible load can shorten duration of use (e.g. high temperatures, frequent movement cycles, extremely high pulse frequencies, multiple shift usage).
– Hoses and sheathed cables should be replaced if the following are found during inspection:
  • Damage to the outer sheath as far as the liner (e.g. chafing, cuts and cracks);
  • Brittleness of the outer sheath (fracture formation in hose material);
  • Deformations which do not correspond to the natural form of the hose or sheathed cable, whether in a unpressurized or pressurized state or on bends e.g. sheath separation, blistering;
  • Unsealed areas;
  • Non-adherence to requirements during installation;
  • Damage or deformations to the hose fittings which reduce the tightness of the fittings or the hose / fitting connection;
  • Hoses working themselves out of the fittings;
  • Corrosion of the fittings which reduces function and tightness;
– When replacing hoses and sheathed cables, use only original replacement parts.
– Install and mount hoses and sheathed cables correctly. Do not mix up the connections.

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3 Control and operation

3.1 Operating and control elements

3.1.1 Controls in the operator's cab

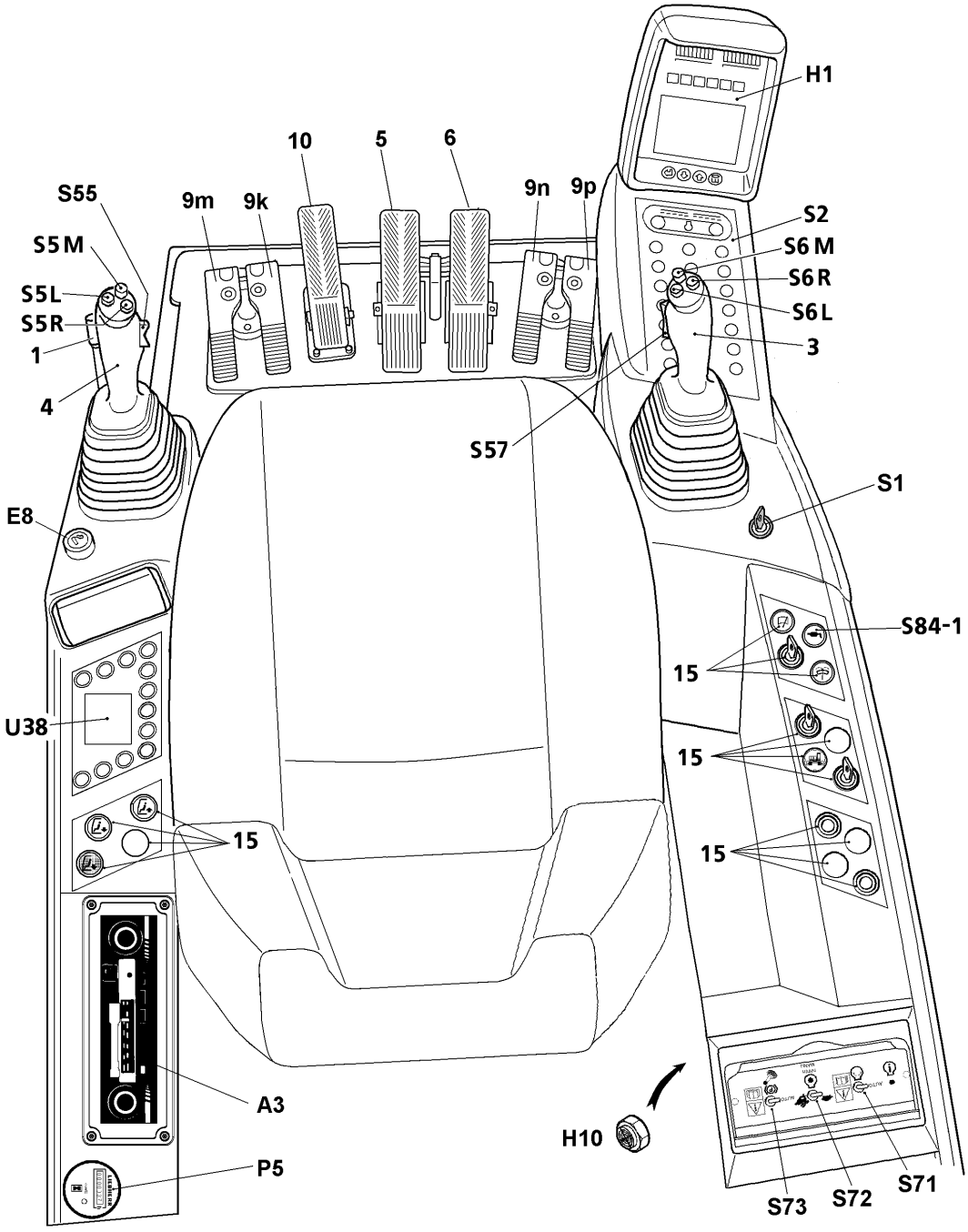


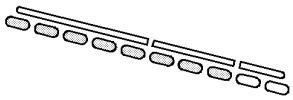
Fig. 3-1 *Controls in the cab*

S86 – Operating mode preselection

Four different operating modes can be selected by pressing the touch.

- **L**: Mode LIFT (RPM stage 5)
- **F**: Mode FINE (RPM stage 10)
- **E**: Mode ECO (RPM stage 8)
- **P**: Mode POWER (RPM stage 10).

The currently active mode is displayed by the LED under the letter.



P4 – Engine RPM indicator

The indicator P4 displays the speed range of the Diesel engine in 10 levels.

S228 – Engine RPM increase

▶ Press the touch:
- ⇩ the engine RPM will be increased by one level,
- ⇩ an additional LED toward right illuminates on indicator P4.

S229 – Engine RPM decrease

▶ Press the touch:
- ⇩ the engine RPM will be decreased by one level,
- ⇩ the most right burning LED on indicator P4 goes out.

S354 – No function

B) Warning symbols for special operating states und system errors

In addition to the above mentioned operating faults, also the symbols of the list below may appear in the SY field of the screen to warn the operator of the occurence of particular operating sequences or of some particular system errors.

Quick change adapter (optional equipment)

This symbol appears during the unlocking procedure or when the locking pins of the quick change adapter are not completely out.
No error code is corresponding to this symbol.

Information symbols in the INF field

Preheating

This symbol appears as long as the preheating of the air in the intake manifold is activated (preglow process).

End of preheating

Preheating will stop automatically after about 20 seconds and the symbol **End of preheating** is displayed for approx. 2 seconds on the main screen.

Manual Diesel speed adjustment

This symbol informs the excavator's operator that the Diesel engine is actually operated in safety mode, either after starting the engine using the switch S71, or due to an automatic commutation consecutive to a communication default in the control system.

Service due

This symbol indicates that the moment for carrying out the next recurring service work has nearly arrived. During this span of time, and each time when the electrical system of the machine is turned on, this symbol and the hours for the next service falling due will be displayed for approx. 10 seconds in place of the current operating hours.

▶ Get the the service work carried out within the prescribed delay,or report the falling due to your supervisor.

The symbol will go out after the execution of the programmed service work has been confirmed, see the menu "set service" thereafter.

Acknowledge error

This symbol appears if an operating fault of the machine (**E5xx type error code**) has occurred and the buzzer sounds simultaneously.

It informs the operator that he can, after having recognised the occured fault, press the **back** key to stop the buzzer.

“Increased care required” - servo-control circuit in safety mode

This symbol alerts the operator that the servo-pressure circuits have been turned into safety mode (switch **S73** is tilted in safety position).

Swing brake not operative

This symbol alerts the operator that the swing brake control circuit is out of function due to the turning into safety mode of the servo-control via switch S73.

A “□” means "Input not active".

A “■”means "Input active".

An “NC” beneath the terminal designation means that the corresponding input has been deactivated in the software.

The durations indicated in the last line of the screen 4/7, under M4/Time repectively B19/Time correspond to the pause time for the windshield wiper in intermittent mode, respectively to the delay time for the engine low idle automatic system.

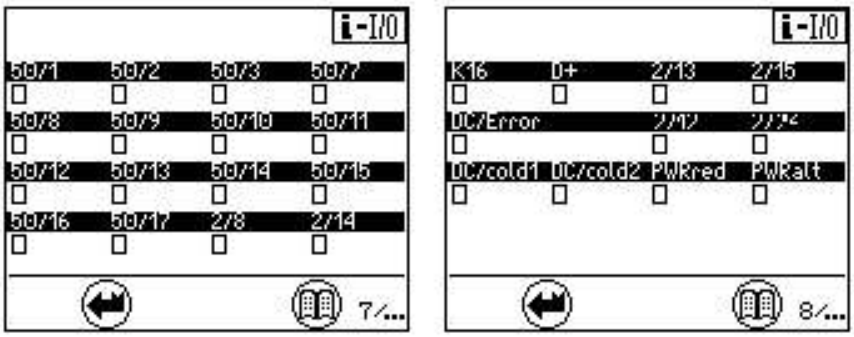


Fig. 3-22 *Menu "Info In/outputs" Status of electrical inputs and outputs*

The screen 7/... gives information concerning the PLD control system of the Diesel engine (Pump line nozzle injection system):

– Input K16 controls the starter operation.
– Input D+ indicates if the generator delivers current.
– Input X2/13 refers to operation of the Diesel engine with standard power curve.
– Input X2/15 refers to external commutation of hydraulic power.
– PWRred refers to power reduction of the Diesel engine.
– Input DC/Error indicates if an error is detected in the function of the Diesel engine monitoring system.
– PWRred refers to power reduction of the Diesel engine in case of an intake air, engine coolant or fuel overheating.
– Input PWRalt control the Diesel engine power limitation in accordance with the atmosphéric pressure.
– Input DC/cold1 controls the function of the preglow of the Diesel engine.
– Input DC/cold2 controls the function of the postglow of the Diesel engine.
– Input X2/24 indicates if the engine control is in safety mode.
– Input X2/12 indicates if an operating fault is detected in the engine monitoring circuit when the engine is in safety mode.

To exit the menu:

▶ Press the **Back** key.
↳ The sub-menu will be aborted.

The control unit **A175** in the operator 's cab allows to monitor the particle filter system. The indications of exhaust back-pressure, Diesel engine RPM. and exhaust gas temperature show the charge conditions of the particle filter. Warning signals are optic and acoustic. The operator can thereby react to possible disturbance cases in the filter system and avoid any imminent damage to the filter and to the Diesel engine.

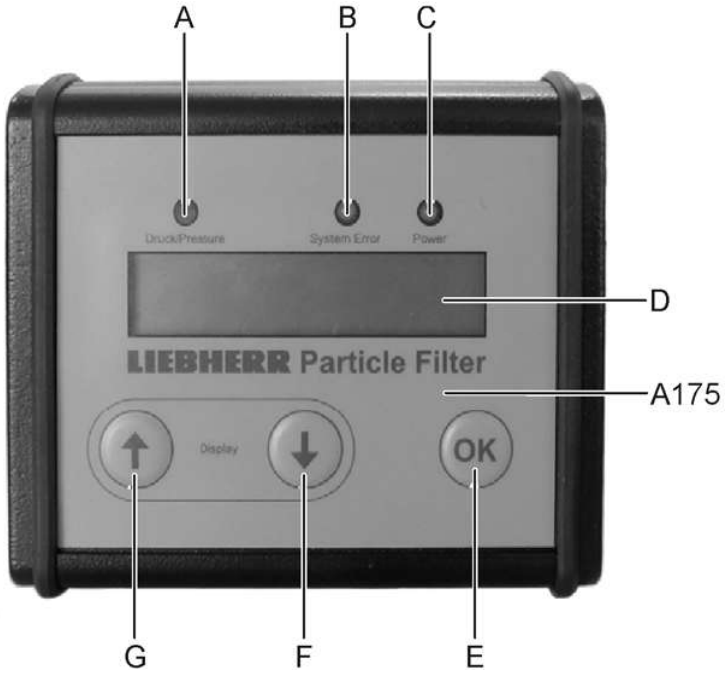


Fig. 3-31 *Control unit A175*

A	Red LED (pressure)	**B**	Orange LED (system error)
C	Green LED (power)	**D**	LCD Display
E	Acknowledge key	**F**	Menu key
G	Without function	**A175**	Control unit for particles filter

Use / monitoring of the particle filter system

After turning the igition key to contact position, the LCD display shows "Data Logger ready for use" (or "Datenlogger betriebsbereit").

After starting the Diesel engine, the last consulted menu appears.

The key **F** is used to change between the LCD display menus.

▶ Hold key **F** depressed for approx. 2 seconds to change to the next menu.

Following menus could be displayed:

– **"Exhaust back pressure (mbar)"** (or "Abgasgegendruck (mbar)") .
Shows the exhaust gas back pressure - only.

– **"Exhaust back pressure (mbar) / Exhaust temperature 1 (°C)**
(or "Abgasgegendruck (mbar) / Abgastemperature 1 (°C)")
Shows in addition the exhaust gas temperature before the filter (engine side)

– **"Exhaust back pressure (mbar) / Exhaust temperature 2 (°C)**
(or "Abgasgegendruck (mbar) / Abgastemperature 2 (°C)")
Shows in addition the exhaust gas temperature after the filter (exhaust side)

– **"Exhaust back pressure (mbar) / Speed (rpm)**
(or "Abgasgegendruck (mbar) / Drehzahl (U/min)")

3.2.5 Sunshade

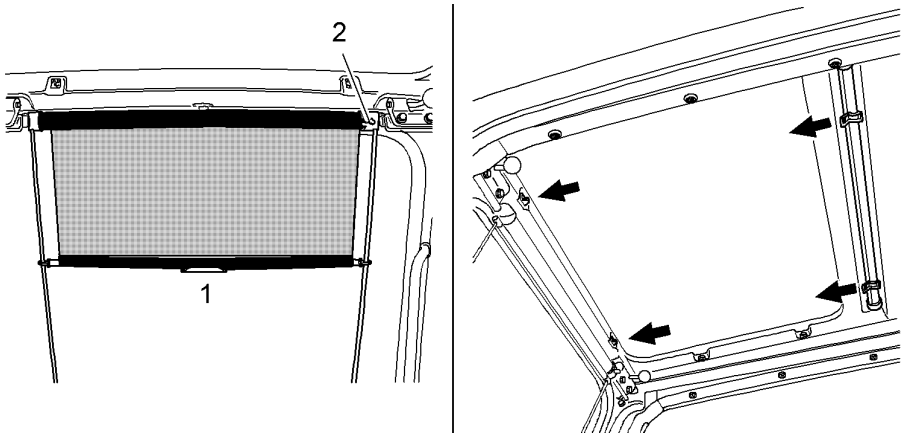


Fig. 3-44 *Sunshades at windscreen and at cab roof*

The cab is provided with two sunshades, located at the windscreen and at the cab roof window.

Maneuvering the sunshade at the windscreen

- ▶ Using the strengthening tongue **1**, pull the sunshade down to the desired position.
- ▶ Press the red button **2**, the sunshade will roll itself up.

Maneuvering the sunshade at the cab roof

- ▶ Pull out the sunshade and secure it in the holders designed for the purpose.
- ▶ To retract the sunshade, take it out of the holders and let it roll up slowly.

3.2.6 Emergency exit – rear window

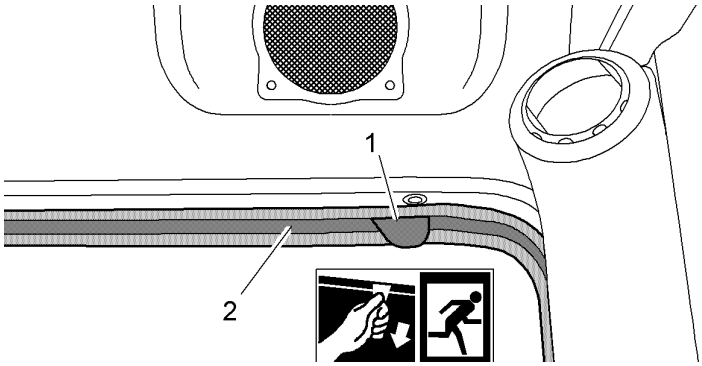


Fig. 3-45 *Emergency exit – rear window*

- ▶ In case of emergency, remove the rubber seal **2** from all around the rear window by pulling the clip **1** on the inner side of the rear window. Thereafter push the window out.

Note !
For the machines equipped with a cab elevation, steps, ladders and hand-rails (grips) are installed to secure the descent.

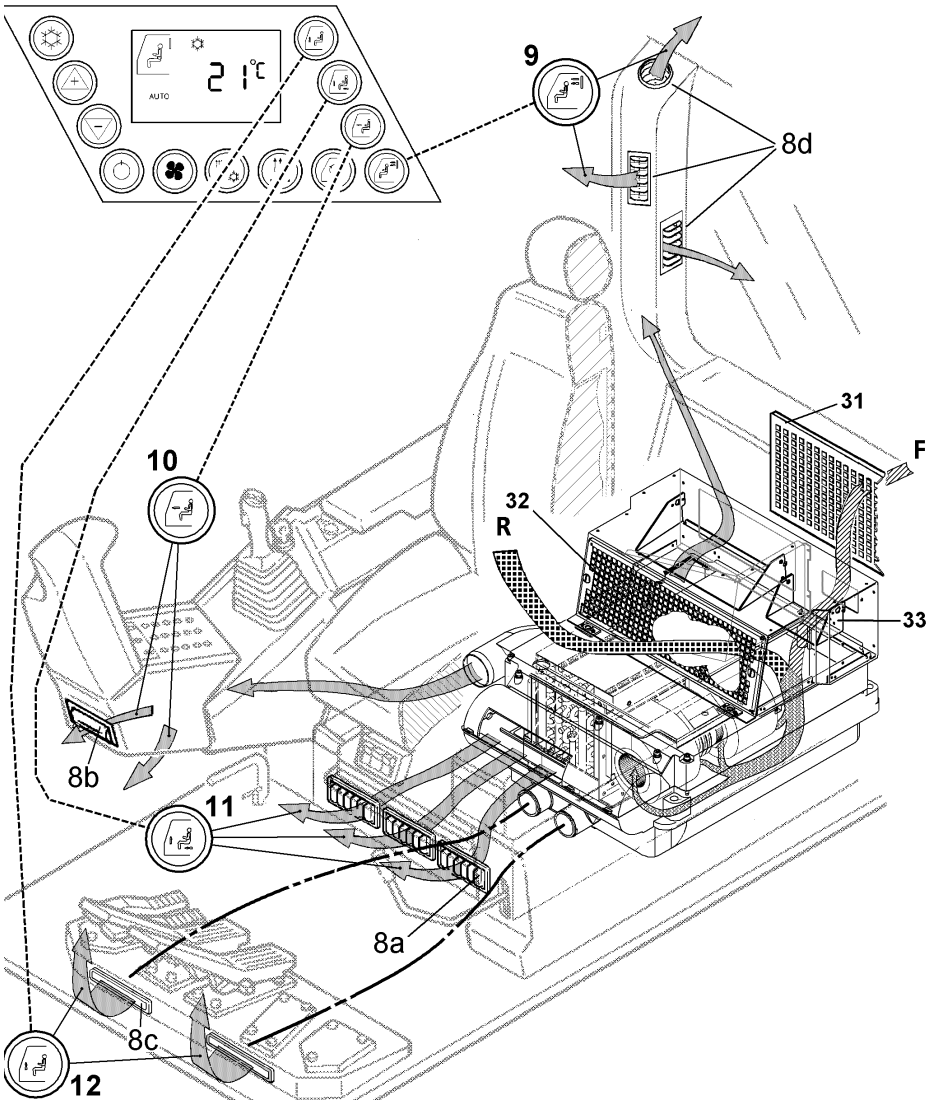


Fig. 3-55 *Air repartition in the cab*

To reach a maximal feeling of comfort:

- For **heating** the air flow must be blown into the cab via the louvers **8a**, **8b** and eventualy **8c**. This is obtained while actuating the keys **10**, **11** and eventualy **12** .
- For **air conditioner operation** the air flow must be blown into the cab via the louvers **8d** and eventualy **8b**. This is obtained while actuating the keys **9** and eventualy **12**.

Note!
To defrost or dehumidify the windshield quickly, blow the whole air flow only out of the louvers 8c at the front windshield and 8b on the right control panel.

- In case of very high outside temperature, preferably close the louvers 8c to avoid an unnecessary warming up of the inside air along the windshield.

▶ After symbol "**Preheating END**" has appeared (about 2 seconds), turn the ignition key to start position **3**.

▶ Release the ignition key as soon as the engine starts.

Starting procedure for exterior temperature below -18 °C (0 °F).

So to improve the starting ability of the engine at temperatures below -18 °C, we recommend to equip the machine with one or several of the original LIEBHERR cold starting kits (see Starting aids).

3.3.4 Speed adjustment and operating modes

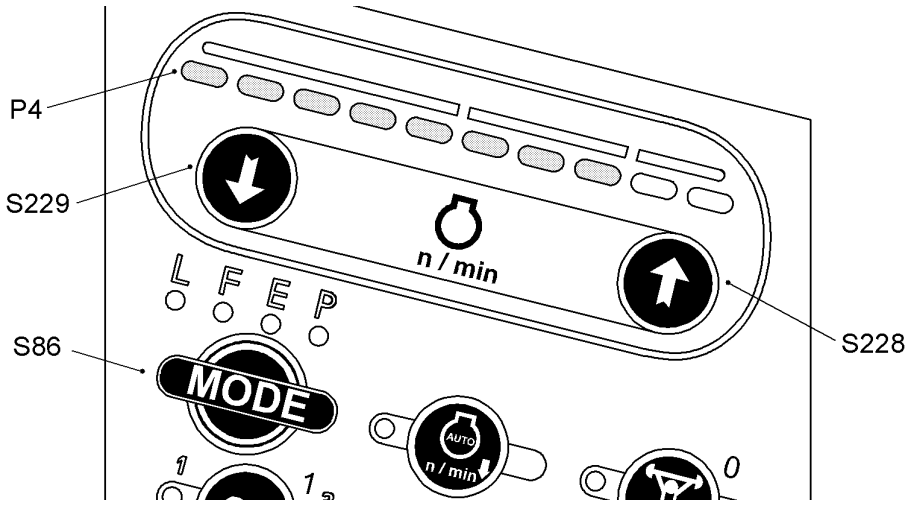


Fig. 3-60 *Speed adjustment and operating modes selection*

The LED chain **P4**, divided into 10 speed levels, displays the actual engine speed.

▶ There are two differents ways to adjust the engine RPM.
- press the mode switch **S86**.
- or-
- press arrow keys **S228** or **S229**.

Engine speed and operating mode selection via the mode switch

Four different modes can be selected by pressing the switch **S86**.

– **L** : LIFT mode (speed level 5 – sensitive lifting of loads).
– **F** : FINE mode (speed level 10 – levelling works).
– **E** : ECO mode (speed level 8 – economical work).
– **P** : POWER mode (speed level 10 - working at rated power).

▶ Press the mode switch **S86**.
  ⇩ The mode selected will be used, with the corresponding speed and power.
  ⇩ The appropriate LED will illuminate permanently.

In mode E and P, the engine is running at its rated power curve, in mode L and F it works at a power reduced by approx. 20%.

The speed level 8 corresponds to the range where the specific fuel consumption of the engine is optimal ("ECO" range).

E52	Printed board for safety operation	**S71**	Switch / engine start in safety mode
H11	Warning light / Diesel engine in safety mode	**S72**	Switch / RPM selection in safety mode
H60	Warning light / operating error on Diesel engine with safety mode turned on	**S73**	Switch / servo pressure circuit in safety mode

Starting the Diesel engine in safety mode

In normal operation, the engine is started via the main electronic circuit when the ignition key is turned to start position.

In case the engine can no longer be started or kept running due to troubles in the control electronics, it can be started in safety operation via the starting switch S71

▶ Turn the ignition key in start position and at the same time push the safety start switch S71 to the right.

▶ Keep the switch pushed to the right until the engine starts
- The warning light **H11** turns on.
- The symbol **S71a** is displayed on the screen.
- The engine is now operating in safety mode.

Safety operation of the Diesel engine

The engine can also be switched into safety operation automatically, as an example consecutively to a communication default in the control system.

In safety operation, the engine works with reduced output in comparison with the normal operation.

In safety operation the stop of the Diesel engine is achieved just like in normal operation, while turning back the ignition key to the "off" position.

It is not possible to return to normal operation when the engine is running, the rocker switch S71 must be tilted back from safety operation into normal operation (position AUTO) only when the excavator is turned off.

Notice !

In safety operation, the communication between the electronic control box of the engine and the main circuit of the excavator may be no longer possible.
The engine operating error codes are in this case no longer displayed on the screen.

The occurence of an operating error of the engine is then indicated as follows:

- the red warning light H60 lights on,
- a buzzer in the cab beginns to sound.
- the error code E525 appears on the monitoring display.

Caution!
In case the warning light H60 lights up, the operator must shut the engine down as soon as possible and recognize which error has occurred.
It's the operator's own responsibility to decide if the machine can be maintained operating or not!

Caution!
Low idle automatic must be switched off when starting the diesel engine and when driving on gradients. The LED in the switch must not illuminate.

3.6.2 Automatic motorstop after low idle (in option)

This system is a complement of the device "low idle automatic". If the operator do not use the machine during a predefined time, the diesel engine stop automatically.

The time begins to be measured when the engine reaches low idle.

The measure stops when the operator acts on a joystick or a pedal.

The time before the automatic stop is ajustable by the customers service Liebherr. By default, it is adjusted to 5 minutes.

20 seconds before the automatic stop, the operator is warned by a symbol shown on the display and with a beep.

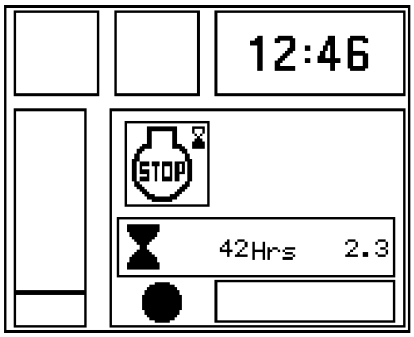


Fig. 3-71 *Symbol admonitoring that the engine will stopped*

3.6.3 Travel functions

Straight travel

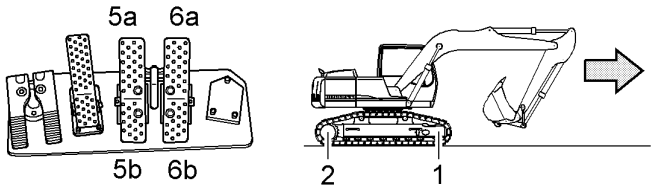


Fig. 3-72 *Travelling straight ahead*

1 Idler wheel
2 Sprocket wheel
5a / 5b Pedal for travel left
6a / 6b Pedal for travel right

As a basic rule, when travelling, the upper carriage must be rotated to the under carriage in such a way that when travelling forwards, the idler wheel **1** is in front and the sprocket wheel **2** is at the rear.

Note!
Turning on the float position of the boom cylinders can, depending on the kind of the material, facilitate the penetration of the shovel in the heap to be hollowed. When leveling out the working area, the bucket follows automatically the solid ground contour during the stick extension (movement "b" controlled by the left joystick **3**), and the shoveling up of the loosen material is made easier.

Control of the bucket or grapple cylinders

The bucket cylinder as well the grapple cylinders are controlled by the right joystick **3**.

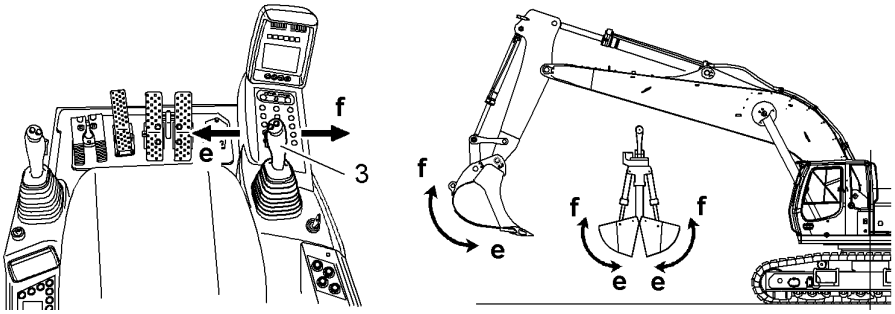


Fig. 3-85 *Operation of the bucket or grapple cylinders*

- ▶ Push the joystick **3** to the left **e**.
  - ↳ The bucket is tilted in, or the grapple closes.
- ▶ Push the joystick **3** to the right **f**.
  - ↳ The bucket is tilted out, or the grapple opens.

Danger
Never allow anybody to guide the grapple by hand!

Combined movements

A diagonal movement of the joystick combines the corresponding movements of the working attachment. This makes it possible for all attachment movements to be actuated at the same time.

3.6.8 Lowering the working attachment with the engine shut down

In an emergency, the attachment can be lowered also when the engine is not running.

Note
The attachment can be lowered thanks to a pressure accumulator mounted to the control oil unit. Due to the small volume of this accumulator only a limited number of movements can be actuated by the pilot control devices.

- ▶ Only operate the joysticks in the directions for lowering the attachment.

Only the movements resulting from the own weight of the attachment parts are possible.

ator attentive to this fact.

↳ now the joystick functions correspond to the information on the label pos. A which is sticked on the side window of the cab

The label A is specific to the special control system which is installed on the machine and has been ordered by the customer.

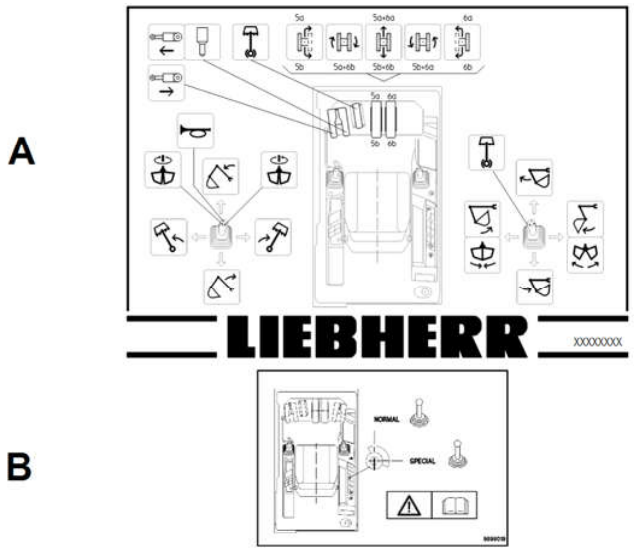


Fig. 3-98 *Instruction plate A and warning plate B*

The label B informs that the excavator is fitted with a special control system which can be turned on via a key switch.

Caution!
Always pay attention that these stickers remain present on the machine and well readable! If necessary they can be reordered at LIEBHERR Spare Parts Department.

3.6.15 Special control system of the joysticks

At delivery, the control system of the joysticks, i. e. the correspondence between the actuated directions at the joystick levers and the resulting working movements of the excavator always correspond to the standard control according to ISO.
You can find the description of this ISO-control-systems in the subgroups "Working attachment control" and "Operating the swing gear" in this manual.

At customer's wish, the excavator can in addition be fitted with the option "commutation for special control system".

With this option, the commutation from the ISO control system into the special control system is achieved by commuting the switching lever situated on the floor of the cabin, under the right joystick.

Emergency operations

If the control of the hydraulically adjustable cab is lost due to a trouble in the engine or another defect, it remains possible to lower the cab thanks to an emergency function.

The emergency lowering can be controlled from two different places:

Emergency lowering from inside the cab:

From the inside of the cab it is possible to engage the emergency lowering procedure using a shutoff valve located on the floor of the cab under the right control panel.

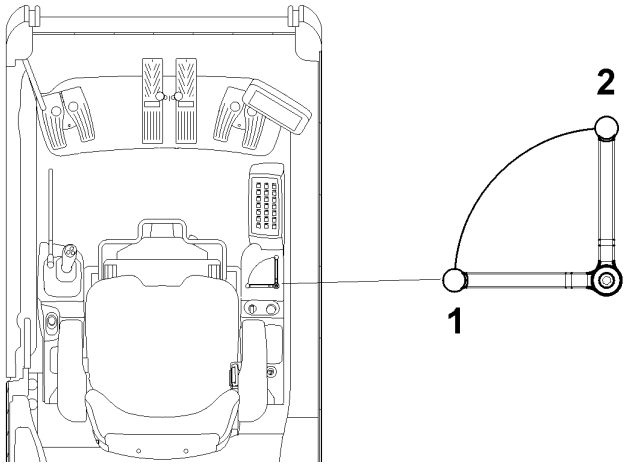


Fig. 3-106 *Shutoff valve in the cab*

- ▶ Turn the shutoff valve into position **2**.
  - ↳ the driver's cab lowers as long as the shutoff valve is maintained in position **2**.
- ▶ Return the shutoff valve into position **1** immediately after an emergency lowering.

Notice!
The driver's cab cannot be raised as long as the valve is in position **2**.

Emergency lowering from outside:

From the outside of the cab it is also possible to engage the emergency lowering procedure using a shutoff valve located on the rear of the cab lifting device.

3.7.4 Attaching and dismounting the grab on the industrial stanchion

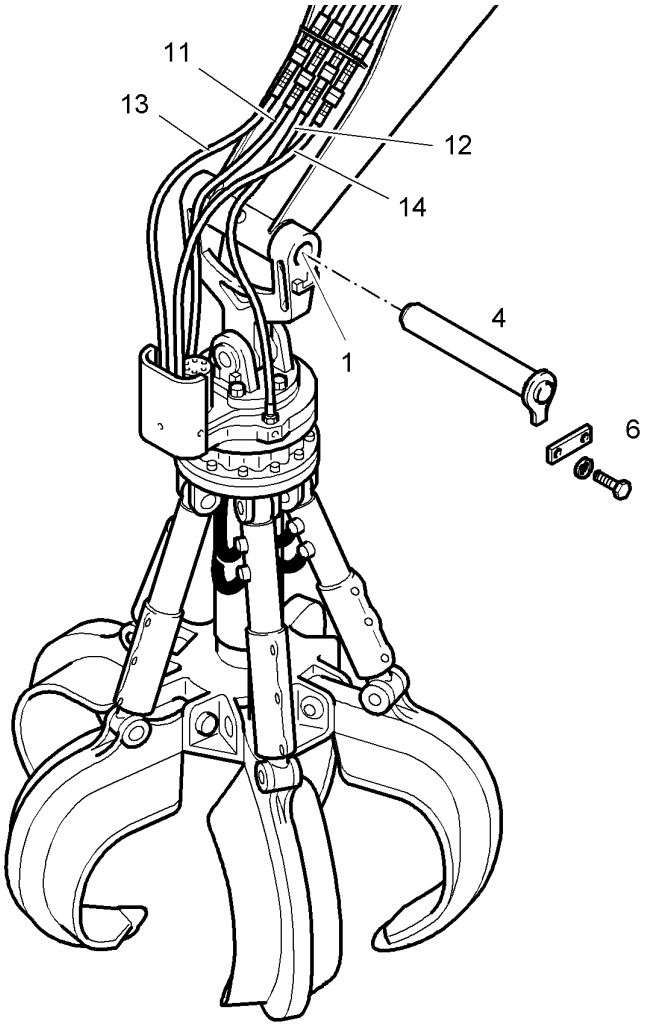


Fig. 3-111 *Attaching and dismounting the grab on the industrial stanchion*

- ❑ Before attaching a clamshell bucket or grapple, ensure that the required hydraulic lines for operating the grab are attached to the industrial stanchion.
- ❑ Attaching and dismounting a grab should be carried out by two people.

Danger!
Risk of injury.

- ▶ Ensure that the machine's operator follows the signaller's hand signals when moving the equipment.

Attaching the grab

- ▶ Position the grab with the shell fully open.
- ▶ Move the equipment until the lower mount of the industrial stanchion is between the bearing points of the grab mounting **1**.
- ▶ Guide in bolt **4** and secure using disk **6**.

Operating elements

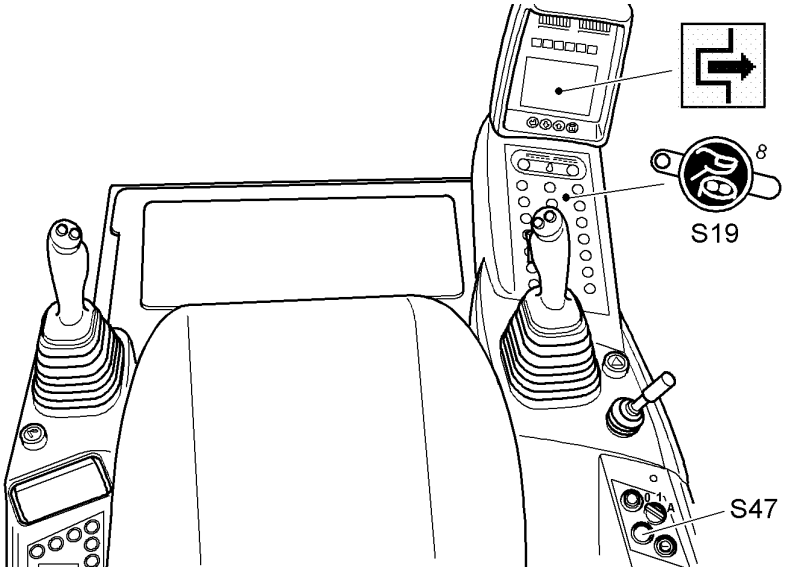
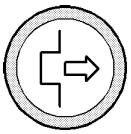


Fig. 3-121 *Operating elements for the hydraulic quick-change adapter*

Switch S19

Use switch **S19** to activate the auxiliary hydraulic device for the grab torsional mechanism and quick-change adapter.

- ▶ Press switch.
  - ↳ Auxiliary device is activated.
  - ↳ LED in switch illuminates.
- ▶ Press switch again
  - ↳ Auxiliary device is deactivated.
  - ↳ LED in the switch goes out.



Key switch S47:

Pressing the button activates the quick-change adapter – it is possible to operate the locking pins.

Pushbuttons L and R

Pushbutton **L** = extend locking pin (lock)
Pushbutton **R** = retract locking pin (unlock)

The pushbuttons are located on the left and/or right joystick (depending on the machine's equipment):

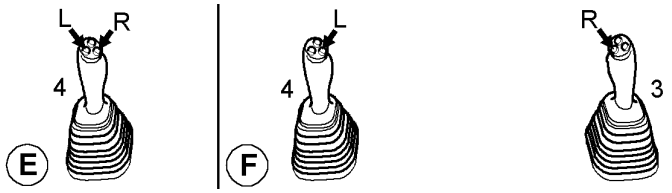


Fig. 3-122 *Pushbutton on the joystick*

E Operation with left joystick (standard) **F** Operation with left and right joystick (optional extras)

❑ The machine must be in the working position.

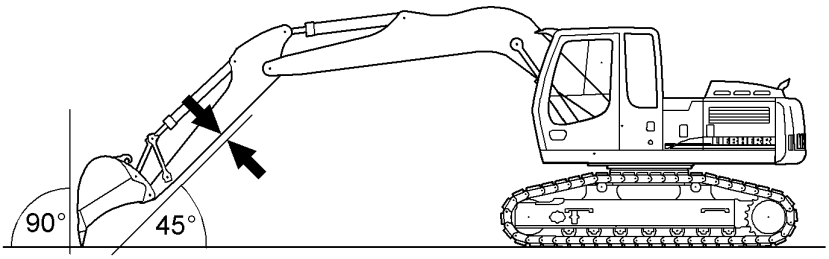


Fig. 3-134 *Aligning the stick and backhoe bucket*

▶ Align the stick in such a way that its underside is at an angle of approx. 45° to the ground.

▶ Align the backhoe backhoebucket in such a way that its ground side can enter the ground at an angle of approx. 90°.

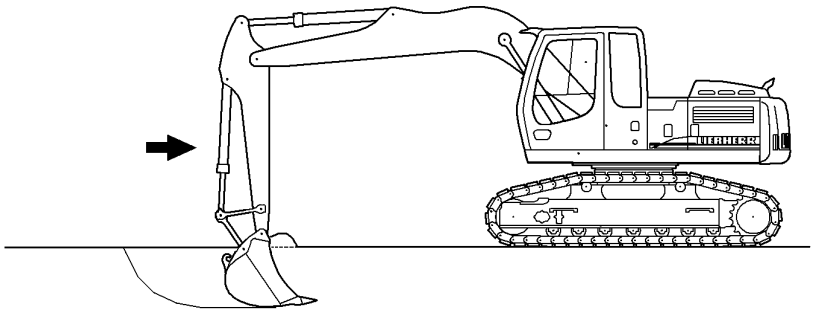


Fig. 3-135 *Taking up grab material*

▶ To lift out the grab material, slowly and evenly slew in the stick and slowly and evenly slew in the backhoe bucket simultaneously.

▶ As soon as the stick is perpendicular to the ground, raise the boom slowly and evenly in addition to slewing in the stick and the backhoe bucket. Stopping suddenly will result in impact loads and vibrations.

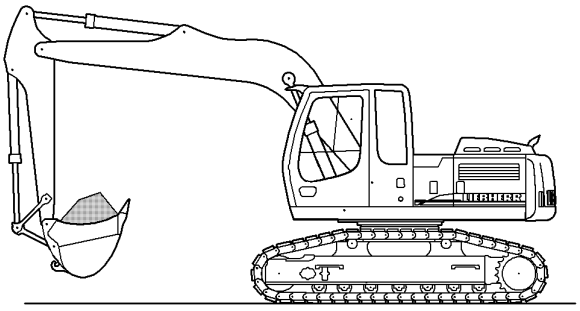


Fig. 3-136 *Raising grab material*

▶ When the backhoe bucket is full or the stick can no longer be slewed in, raise the boom and backhoe bucket until the filled surface is parallel to the ground.

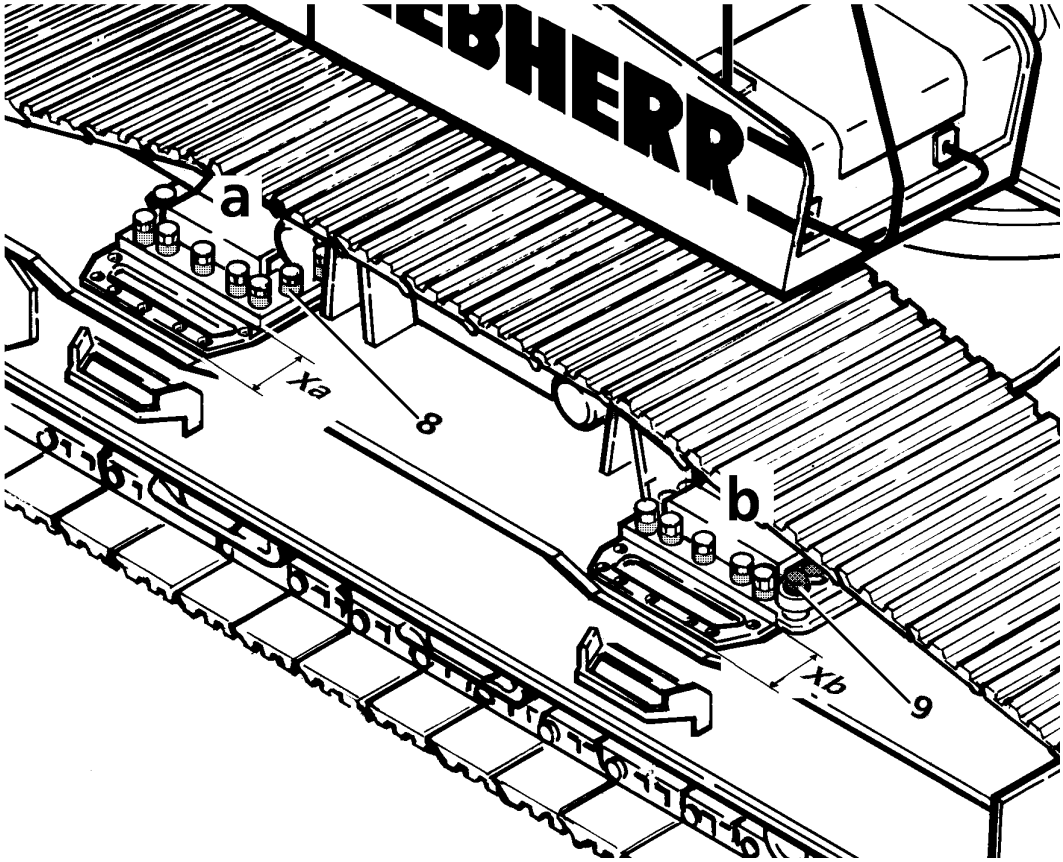


Fig. 3-149 *Side frame mounting bolts 8 und stops mounting bolts 9*

– Before reducing the gauge, the sliding surface covers must be removed if applying, and/or any dirt or dust on the uncovered parts of the sliding surface of the side frames and the center section of the undercarriage must be cleaned off and greased.
– If mounted, the protective covers for the hydraulic hoses to travel motors must be removed from undercarriage central piece before adjustment.

During the gauge adjustment

– The operator is not able to watch the retraction and extension operation from the cab, another person must be used as a guide and signal the operator.
– For the gauge adjustment, it is necessary to control the travel gears very sensitively and slowly. The two manual control levers for travel gear control are used for this purpose.
  The Diesel engine speed must be reduced to no more than 1100 RPM.

3.10.1 Loading the machine with a crane

If the machine is to be loaded using a crane (eg. onto ships or rail freight cars), the type of suspension should be selected according to the equipment.

Danger!
The load could slip or fall if incorrectly loaded.

- ▶ Only permit experienced personnel to secure loads and signal the crane driver.
- ▶ The signaller must position himself within the view of the operator or be in voice contact with him.
- ▶ Ensure that the length of the suspension gear is sufficient.

Loading a machine with a gooseneck boom:

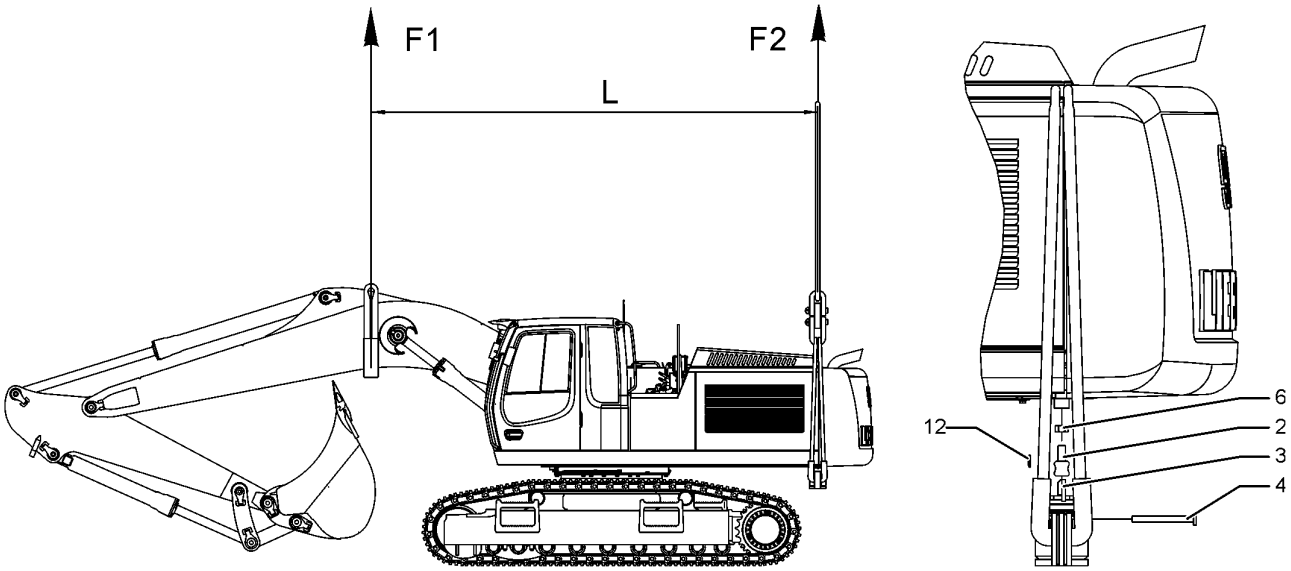


Fig. 3-162 *Suspending the machine with gooseneck boom*

2 Spacer
3 Plate
4 Axle
6 Counternut
12 Pin

❑ Only use cargo handling gear which is sufficiently dimensioned or which has been specially developed by LIEBHERR for this purpose.

The following chart give the forces wich must be considered to size the suspending system.

Excavator's model	F1 [daN]	F2 [daN]	L [mm]
R 934 C	19 000	22 000	4850
R 944 C	23 000	27 000	5785

4.1.5 Coding error

Error code	Effect	Cause	Measure / remedy
E 319	Diesel engine speed cannot be adjusted using keypad, reduced hydraulic power.	Hardware coding not suited to software coding	Switch to emergency control speed adjustment **S71** and **S72** and emergency operation work pumps **Y50**, consult LIEBHERR customer service.
E 321		Keypad has not received a recognised machine type.	
E 322		Unknown hardware coding	

4.1.6 Other errors

Error code	Effect	Cause	Measure / remedy
E 442	Automatic idling on left joystick does not function, i.e. the engine remains at low speed.	Short circuit + 24 V	Deactivate automatic idling **S20**, consult LIEBHERR customer service.
E 443		Short circuit to earth or cable break	
E 445	Automatic idling on right joystick does not function, i.e. the engine remains at low speed.	Short circuit + 24 V	Deactivate automatic idling **S20**, consult LIEBHERR customer service.
E 446		Short circuit to earth or cable break	
E 450	The pressure for pressureless boom down movement not being monitored.	Wiring default; Current < 3mA or > 21 mA	Consult LIEBHERR customer service.
E 454	Swing use cannot be recorded	Short circuit + 24 V	Consult LIEBHERR customer service.
E 455		Short circuit to earth or cable break	
E 456	Incorrect fuel gauge.	Short circuit + 24 V	Check fuel level visually, consult LIEBHERR customer service.
E 458		Short circuit to earth or cable break	
E 601		Connection default for plate ESP01	Consult LIEBHERR customer service.

4.1.7 Error due to warning symbols in SY field

These error codes will not be displayed in the EC field of the operator's menu. They can only be read off the S-Exxx menu list.

Error code	Effect	Cause	Measure / remedy
E 501	H2 telltale light illuminates Buzzer sounds	Diesel engine pressure too low - warning level	See telltale light description.
E 502	Symbol appears Buzzer sounds	Coolant level low	See symbol description
E 503	Symbol appears Engine power reduction Buzzer sounds	Coolant overheating - warning level	See symbol description
E 504	Symbol appears	Hydraulic oil level low	See symbol description
E 505	Symbol appears	Hydraulic oil overheating	See symbol description

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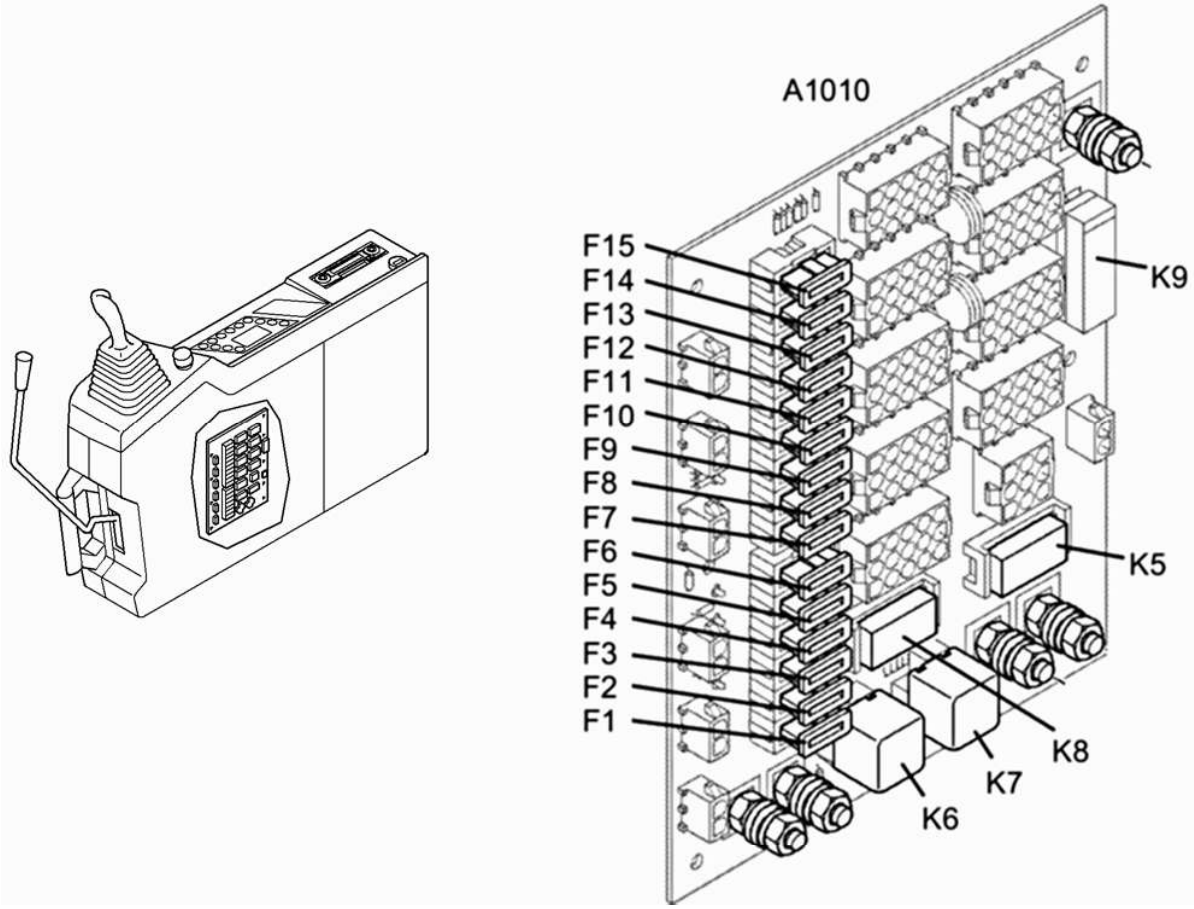


Fig. 4-3 *Fuses and relays, A1010 plate*

Fuses on terminal 15 (Kl15)

F1	15 A	Central lubrication system
F2	15 A	Reserve
F3	15 A	Reserve - windshield wiper and washer on cab roof
F4	15 A	Windshield washer, control circuit of windshield wiper, preheating system control circuit, 24 Volt stabilized for transmitters and switches, Qmin commutation, pressureless lowering beacon*, rotating grab*
F5	7,5 A	Windshield wiper motor (power circuit)
F6	7,5 A	Circuit for “MANU” control of RPM adjustment
F7	7,5 A	Control unit and display
F8	15 A	Safety lever, solenoid valve for servo control, swing brake, travel speed increase, pressure increase
F9	15 A	power supply for BSt regulator

5.3 Lubricants and operating fluids

5.3.1 General information on changing lubricants and operating fluids

Note
The quantities given in the lubrication and operating material chart and on the lubrication chart in the cab are only guide values.

▶ After each oil change or refill, check the level in the relevant unit.

Note!
Adhering to regulations for lubrication, level checks and operating material changes guarantees a high degree of reliability and a long service life for the machine.
It is particularly important to adhere to the oil change intervals and use the specified type of lubricant.

▶ Observe the following when using and checking lubricants and operating fluids:
– see "Lubricants and operating fluids"
– see "Inspection and maintenance schedule"

Note!
Cleanliness is of the utmost importance when changing oil.

▶ Clean all filler plugs, filler covers and drain plugs and their surroundings before opening.

▶ For preference, drain off oil when it is at operating temperature.

▶ Ensure that old oils are collected and disposed of in an environmentally acceptable manner using the removable oil filter cartridges.

Danger!
When checking and changing lubrication and operating materials, ensure that the following precautions are adhered to:

▶ Unless otherwise indicated, carry out all work on the machine on level, solid ground and with the engine switched off.

▶ Whenever you reach into the engine compartment, always secure the cover and side doors against accidentally falling back or closing.

▶ Only refuel the machine when the engine is switched off, do not smoke and avoid naked flame.

▶ Turn the main battery switch to position **0** (off) and remove the ignition key.

Permitted premixed coolants

Note!
The combination of different coolants might impair their properties.

▶ Do not mix different products.

Product description	Manufacturer	Country
Liebherr Antifreeze Mix	Liebherr	D
Caltex Extended Life Coolant Pre-Mixed 50/50 (ready-to-use-version)	Chevron Texaco	*
Chevron DEX-COOL Extended Life Prediluted 50/50 Anti-Freeze/Coolant	Chevron Texaco	*
Coolelf Auto Supra -37 °C	Total, Paris	F
Havoline XLC, 50/50	Arteco	B
Havoline DEX-COOL Extended Life Prediluted 50/50 Anti-Freeze/Coolant	Chevron Texaco	*
Premix = ready-mixed product (50% water and 50% corrosive inhibitor/antifreeze agent) * = global		

Checking and replacing the coolant

Note!
Always replace any lost coolant with a mixture of water and min. 50 Vol.% anti-corrosion/anti-freeze fluid.
Never let the anti-corrosion/anti-freeze content drop below 50 Vol.%.

5.5.2 Changing the diesel engine oil

Note !

- Only carry out the oil change when the engine is warm.

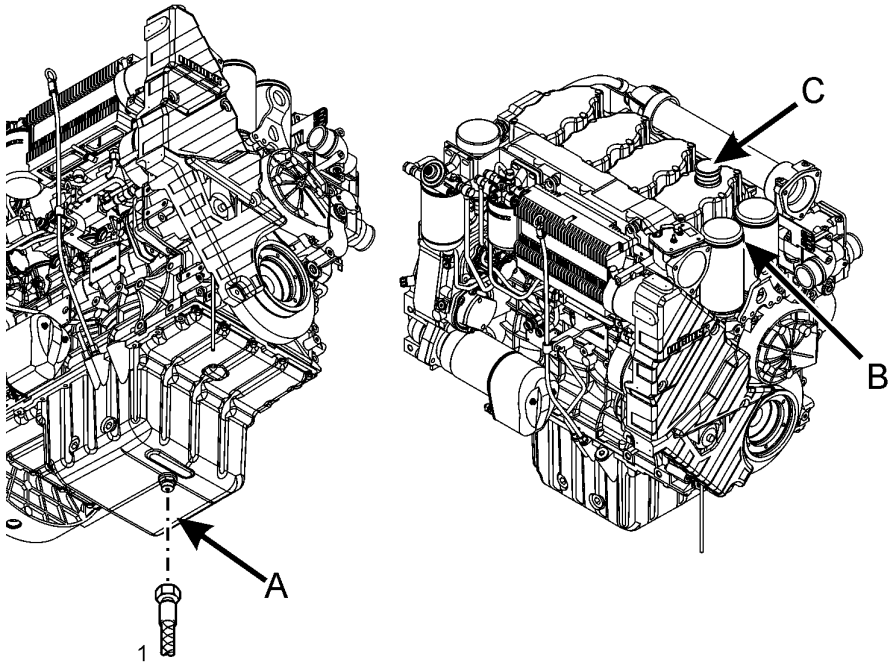


Fig. 5-14 *Drain valve on the oil sump, oil filter cartridges, oil filler cap*

To drain the oil (A):

- Screw the oil drain hose supplied **1** onto the oil sump's drain valve.
- Collect the oil in a suitable container.

To change the oil filter cartridges (B):

- Unscrew the oil filter cartridges with a strap spanner.
- Clean the sealing surface on the filter bracket.

Danger !

- Be careful when removing the filter cartridge to avoid contact with hot oil.
- Protect the ribbed V-belt against escaping oil when replacing the oil filter cartridge!
- After replacing the oil filter, remove all traces of oil on the Diesel engine, as well as behind the vibration damper in order that this will not be later diagnosed as leaks in the rotary shaft seal.

- Oil the rubber sealing ring on the new oil filter cartridges.
- Screw the new filter element on until the sealing ring is laying on the filter head.
- Tighten the oil filter cartridges by 1/2 - 3/4 turn **by hand**.

5.7.2 Checking the coolant level

Danger!
Risk of burning due to hot coolant.
The engine cooling system is hot and pressurized when at operating temperature.

- ▶ Avoid touching coolant or coolant-bearing parts.
- ▶ Only check the coolant level when the cap of the expansion reservoir has cooled sufficiently.

- ▶ Turn the cap a half turn.
- ▶ Relieve any pressure that may be present in this position. After balancing the pressure, slowly turn the cap fully.

When engine is cooled, the coolant must reach the end of the refilling pipe located under the cap of the expansion reservoir.

- ▶ Add coolant if necessary.
- ▶ Close the cap.
- ▶ After adding coolant, allow the engine to run for a short time with the heating switched on and monitor the coolant level once again.

5.7.3 Coolant antifreeze and anti-corrosion fluid

The system must be filled with antifreeze all year round.

Upon dispatch, the coolant contains antifreeze for temperatures up to -37 °C (this is equal to approx. 50 % antifreeze).

Volume: see lubricant chart

- ▶ Keep the concentration of anti-corrosion additive contained in the cooling system constant, particularly when refilling.
- ▶ Check this concentration each time larger amounts of coolant are lost or at regular intervals. If necessary, add anti-corrosion additives to the coolant.

5.7.4 Changing the coolant

Danger!
Risk of burning due to hot coolant.

- ▶ Only change the coolant when the engine is cold.

The following points should be noted when changing the coolant:

– Change the coolant in the entire coolant circuit at least every two years.
– For preference, change the coolant with the shutoff valves **1** for the heating circuit closed.
– Bleed the coolant circuit when refilled.

- ▶ Tighten the water separator reservoir **4** by hand from half a turn.
- ▶ Tighten the drain plug **5**.
- ▶ Check cleanliness of filter head **1** and ensure that the thread adapter is sitting securely in the filter head.
- ▶ Clean the filter head if necessary.
- ▶ Lubricate O-ring **10** of the new filter cartridge **3** with clean fuel.
- ▶ Fill new filter cartridge **3** with clean fuel and screw on until the O-ring **10** is resting on the filter head **1**.
- ▶ Tighten the filter cartridge **3** by hand from half a turn.
- ▶ Reconnect the electrical connections a and b and close the bleeder screw **6**.
- ▶ Bleed the low pressure fuel system.

Changing the fuel fine filter

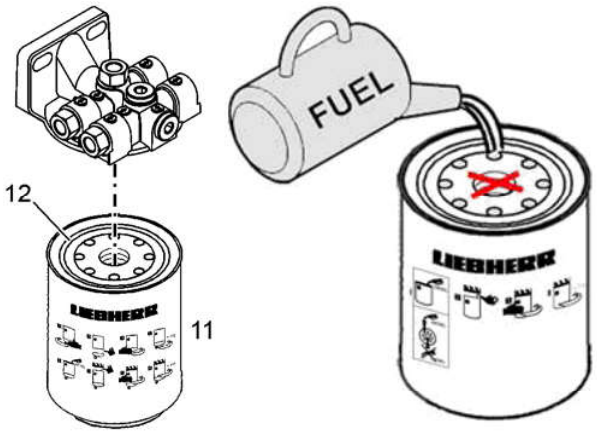


Fig. 5-35 *Changing the fuel fine filter*

11 Fuel fine filter **12** O-ring

- ▶ Position a collecting container under the fuel fine filter **11**.
- ▶ Clean fuel fine filter **11** and the surrounding area thoroughly.
- ▶ Loosen filter cartridge **11** with strap spanner or similar tool and unscrew.
- ▶ Dispose of the old filter cartridge **11**.
- ▶ Check cleanliness of filter head and ensure that the thread adapter is sitting securely in the filter head.
- ▶ Clean the filter head if necessary.
- ▶ Lubricate O-ring **12** of the new filter cartridge **11** with clean fuel.

Warning
Preventing contamination of the fuel system:
– Only fill the new filter cartridge via the small, external openings.
– Avoid dirt entering the filter cartridge via the large opening.

- ▶ Fill new filter cartridge **11** with clean fuel and screw on until the sealing ring **12** is resting on the filter head.

When checking the oil level or refilling the oil:

– the machine must stand level,
– the attachment be laid down on even ground with the stick and bucket cylinder fully extended (bucket and stick fully tilted in),
– Switch off the engine.
– the support (shield or claw support if mounted) must also be extended.

Checking the oil level in the hydraulic tank

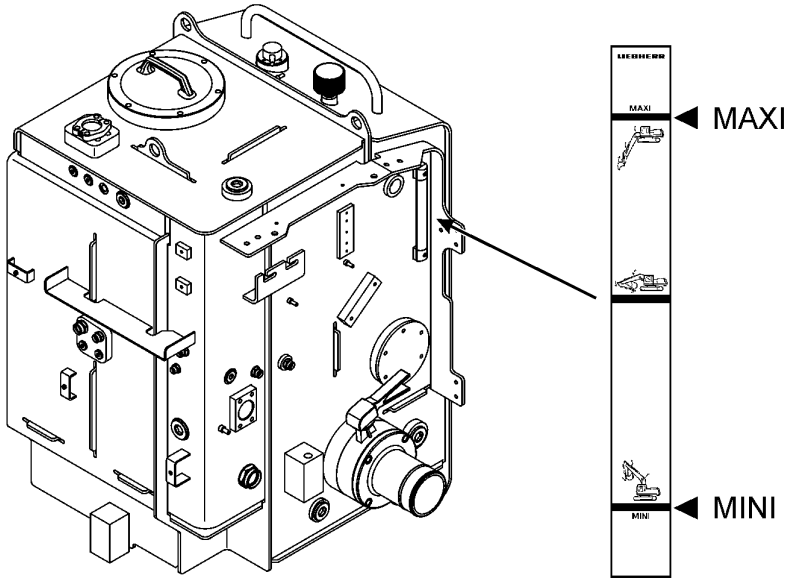


Fig. 5-44 *Hydraulic tank oil level*

When the machine is in the check position, the level must not lie below the central marking on the inspection window.

▶ If this is not the case, fill oil via the return-line filter until the level reaches the central marking.

The upper marking **MAXI** shows the maximum oil level if all cylinders are fully drawn in.

The lower marking **MINI** shows the minimum oil level if all cylinders are fully extended.

If the oil level drops below the lower marking **MINI**, the symbol appears on screen when the lowest quantity is reached.

Danger!
If you do not follow this procedure, it can cause diesel effect (explosion of air bubbles) in the cylinder.

5.10.10 Removing the intake hose to the pumps

For maintenance reason (change of a supply hose, pump dismount), the intake hose to the pumps can be isolated from the hydraulic tank thanks to a shut off valve.

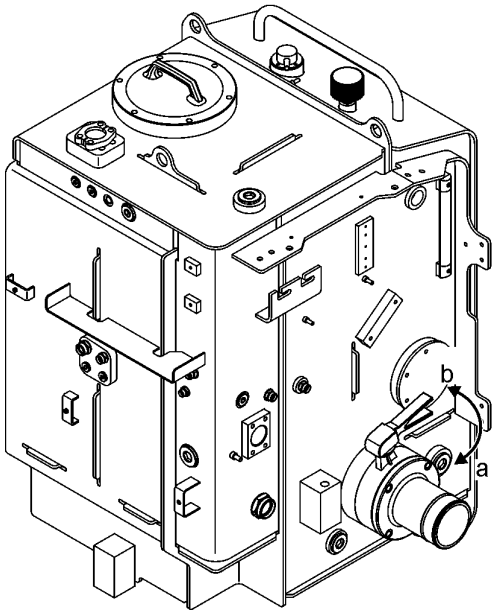


Fig. 5-53 *Shut off valve on the hydraulic tank*

The shut off valve on the hydraulic tank to the intake hose has two positions :

– **a** open
– **b** closed

▶ Depressurize the hydraulic system.

▶ Close the shut off valve on the hydraulic tank **b**.

5.11.3 Travelling gear - changing the oil

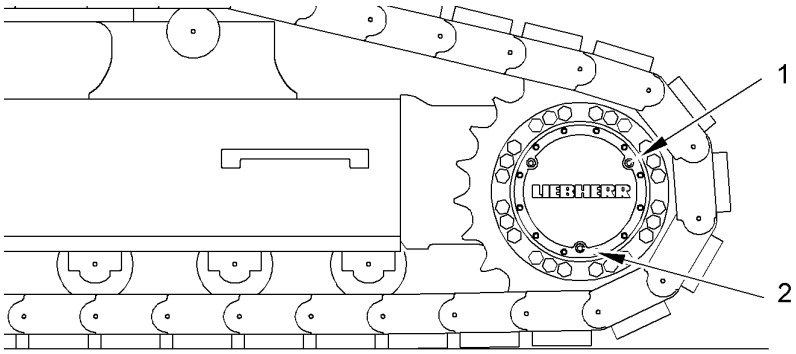


Fig. 5-63 *Travelling gear - adding and draining oil*

❑ Before draining the oil, the drive unit must be operated until one sealing plug is positioned exactly vertical to the centre axle of the transmission (position **2**).

To drain the oil:

❑ Ensure that you have a suitable oil drainage container to hand.

▶ Place the container beneath the drive unit.

▶ Remove sealing plug **1**.

▶ Remove sealing plug **2**.
↳ The oil drains into the container.

To add the oil:

▶ Screw in sealing plug **2**.

▶ Add the oil until the level reaches the bore hole **1**.

▶ Screw in sealing plug **1**.

Push down the front of the left pedal (**5a**) to retract the side frame.

Push down the rear of the left pedal (**5b**) to extend the side frame.

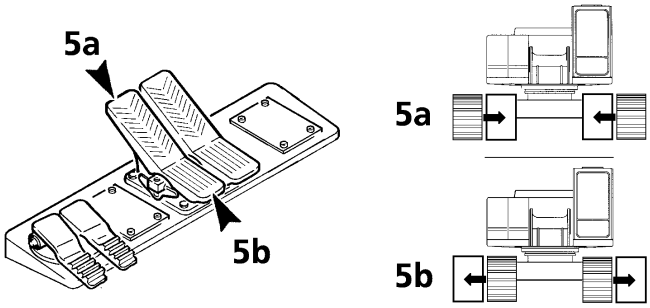


Fig. 5-75 *Retraction and extension of side frames*

Operation of the excavator is only permitted when the undercarriage is in one of either end positions:

– Minimum track width (side frame retracted): provided exclusively for transport of the machine
– Maximum track width (side frame extended): provided for operation of the machine with attachment

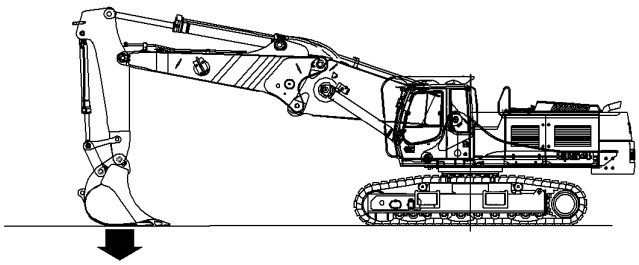
Preparation for width adjustment

Caution !
Adjustment of the undercarriage width may only be resulted on firm, even underground, with the travel gear inactive.

▶ Check that the protective covers for the travel motors are locked in closed position.

▶ Check that the working attachment is aligned with the undercarriage, turn the uppercarriage as necessary.

▶ Lower the working attachment down to the ground and prop the machine up so to relieve the chains partly from the weight of the machine:
  • Prop up the digging attachment on the upright lowerd stick.



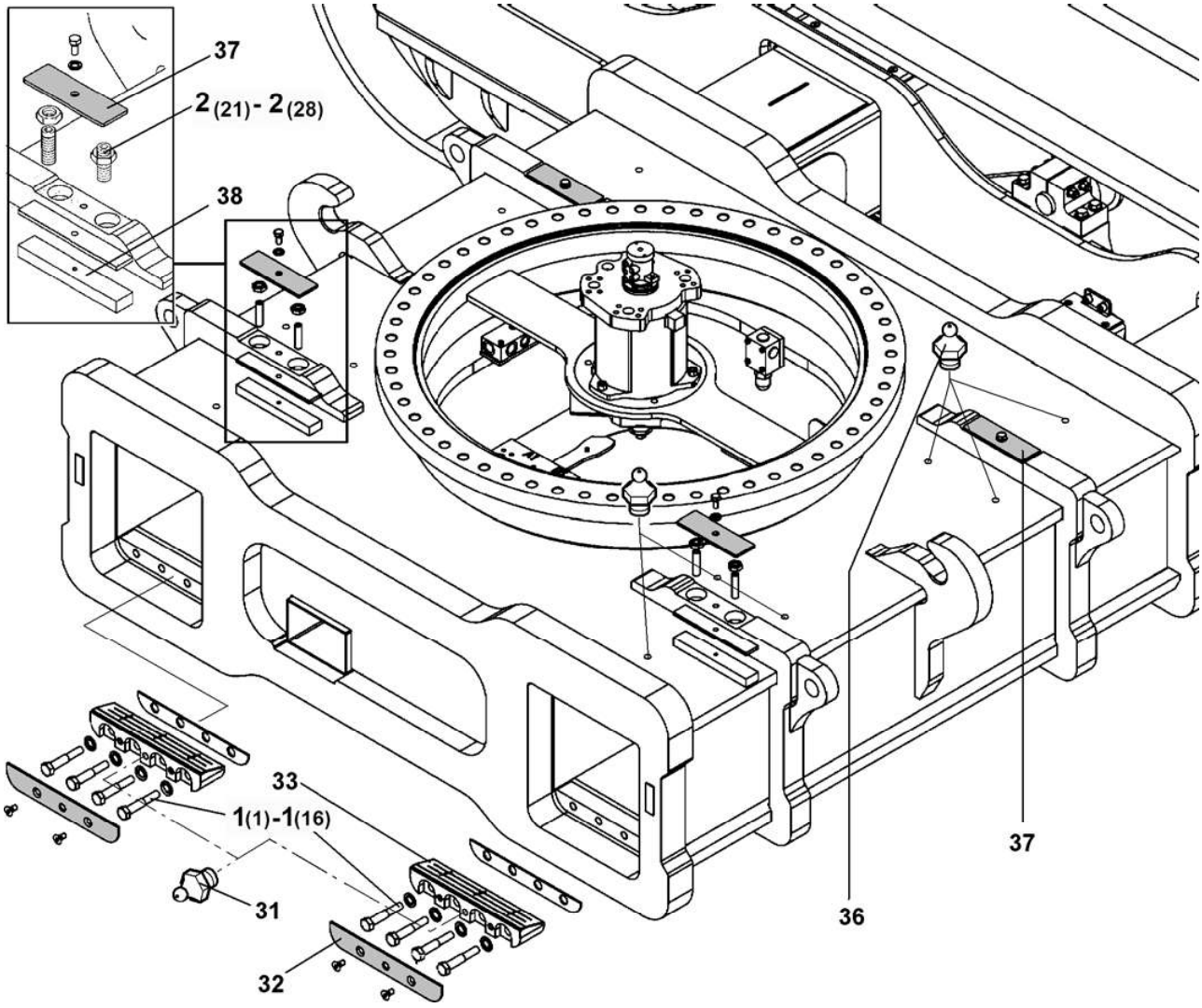
  • Prop up the the demolition attachment on the upright lowered demolition stick ...

- If for a side frame at least one of the two measured spreads is out of the above indicated range:
  - so it is necessary to advise your LIEBHERR after sales representatives in order to have a clearance setting carried through on this side frame.

Checking the clearances on the CVC-2 undercarriages

The setting of the clearance in the connecting links of the track width adjustment is determined by the tightening of the lower wedge plates **33** and the upper adjustment plates **38**.

The setting of the clearance on the track width adjustment, mainly consists in checking if the bolts **1(1)** to **1(16)**, resp the stud bolts **2(21)** to **2(28)** fixing the lower wedge plates **33**, resp. the upper adjustment plates **38** are well tightened.



Caution !
The adjustment procedure described under this heading must be carried out regularly, first after 100 and 250 working hours and afterwards after every further 250 working hours.
The order of the check procedure described as follows must be carefully observed.

4	Sercondary distributor	**13**	Grease container
14	Electric motor	**15**	Grease pump
U4	Lubrication pump complete	**LP**	Lubrication points

During a lubricating procedure, all of the lube points **LP** connected to the system are lubricated one after the other in a predetermined sequence (progressive system).

The flow sequence and amount of lubricant for each lubrication point depend on the combination of the distributors and lubrication lines and on the piston sizes of the different distribution elements.

Lube points connected to the central lubrication system:

– the ball bearing races of the swing ring,
– the housing around the output pinion of the swing ring, which contains the grease reserves for the swing ring teeth lubrication,
– all (or the most of) the lubrication points of standard working attachments.

Lube points which are not connected to the central lubrication system:

Caution!

When operating a machine and especially if it is fitted with a special working attachment, make sure to lubricate daily all the lubrication points which may be installed separately, i. e. which are not connected to the central lubrication system.

– On some backhoe attachments, some grease fittings may be installed separately in the area of the connector bracket and shifting lever for the digging tool.
– With special attachments (telescopic stick, hydraulic offset boom, ...) some bearing points at the attachment or at the working tool are possibly not connected to the central lubrication system.

▶ This bearing points have to be lubricated daily via separately mounted, red marked lubricating nipples and using a grease gun or a manual grease pump.

Notice!

The standard undercarriages of crawler excavators do not require daily lubrication.

On undercarriages with special design necessitating regular lubrication (undercarriages with adjustable track width, ...) the lubrication points are not connected to the centralized lubrication. For description of the corresponding lubrication works, see the subgroups related to the special maintenance for these undercarriages.

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Replacing the sealing ring

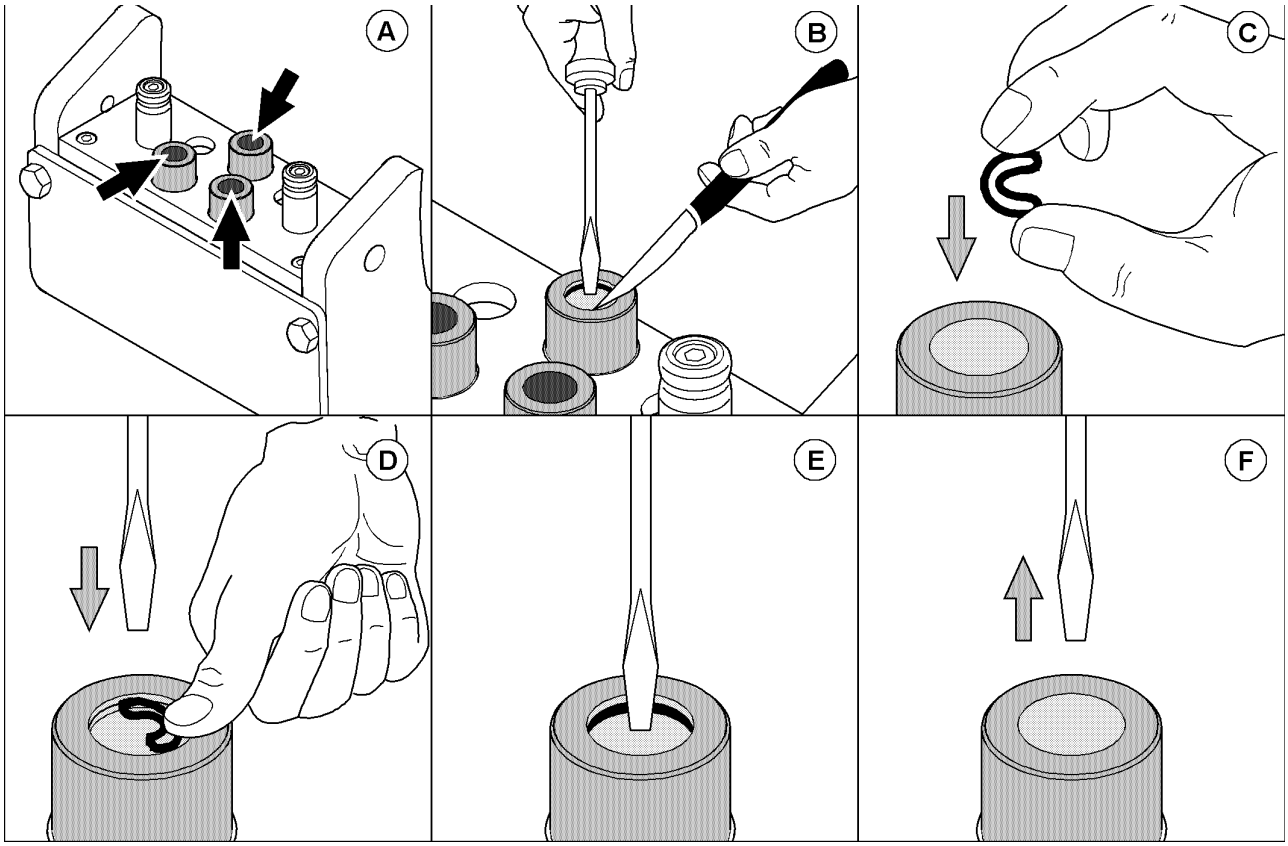

Fig. 5-100 *Replacing the sealing ring*

If leaks occur at the coupler plugs (**A** , see arrows), the sealing rings should be replaced.

- ▶ Use a screwdriver to push down the sealing washer and lever out the defective sealing ring using a pointed object (**B**).
- ▶ Press the new sealing ring together and place it on the sealing washer with the open side down (**C**).
- ▶ Press down the washer as far as the groove, place the screwdriver in the middle of the sealing ring and move your hand away (**D**).
- ▶ Allow the sealing ring to jump into the groove (**E**).
- ▶ Remove the screwdriver (**F**).
  - ↳ The sealing washer must move upwards. If necessary, press the sealingring again until the sealing washer is flexible.