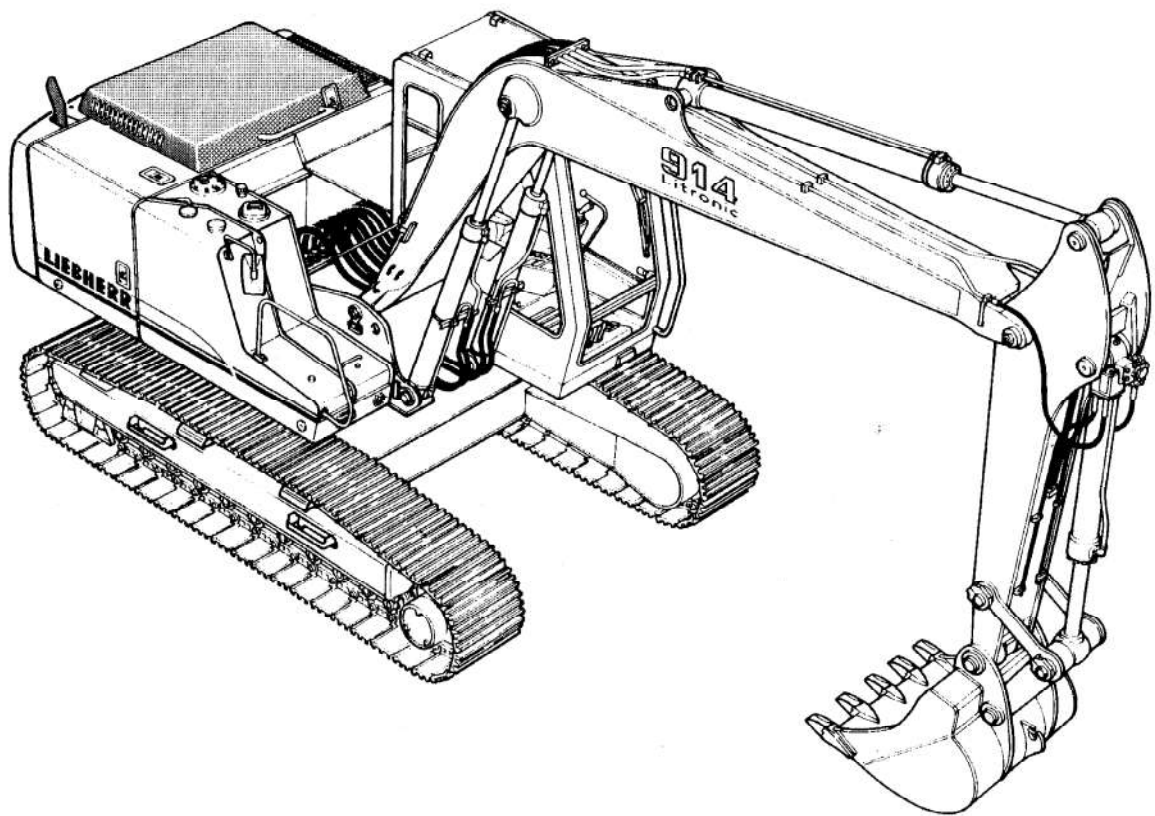


Operation and Maintenance Manual

R 914

Litronic



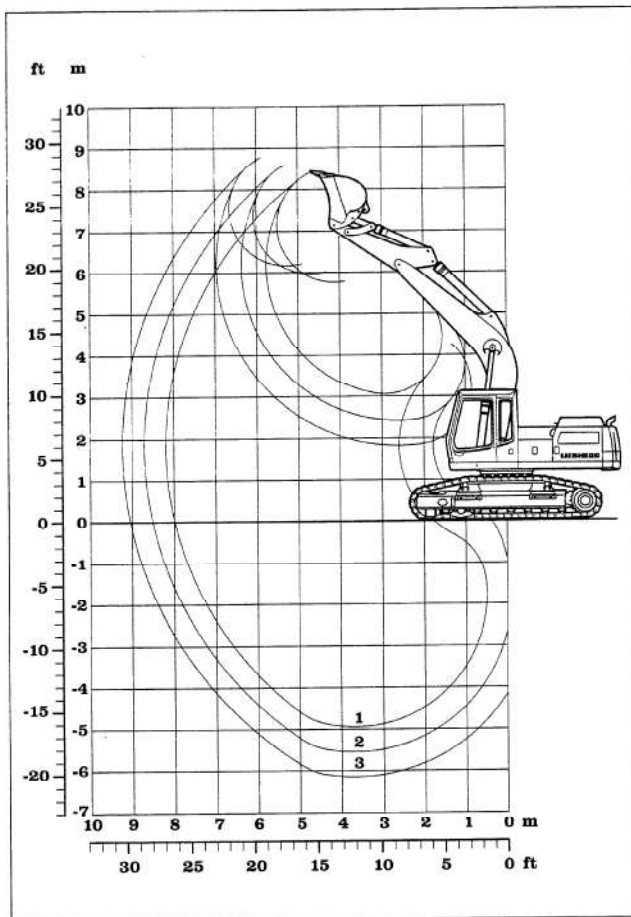
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Digging envelope

- 1 with stick 1,80 m
- 2 with stick 2,40 m
- 3 with stick 3,00 m

Stick length	m	1,80	2,40	3,00
Max. digging depth	m	4,95	5,55	6,15
Max. reach at ground level	m	8,00	8,50	9,05
Max. dump height	m	5,75	6,00	6,20
Max. teeth height	m	8,40	8,60	8,80

Digging force	kN/t	147/15,0	115/11,7	99/10,1
Breakout force	kN/t	159/16,2	147/15,0	147/15,0

Max. breakout force	kN/t			186/19 ²⁾
---------------------	------	--	--	----------------------

Operating Weight and Ground Pressure

Operating weight includes basic machine with 5,00 m gooseneck boom, 2,40 m stick and 1,00 m³ bucket.

Undercarriage		Std			HD-S	
Pad width	mm	500	600	700	500	600
Weight	kg	22380	22640	23020	22950	23300
Ground pressure	kg/cm ²	0,61	0,52	0,45	0,62	0,52

Buckets

Cutting width	mm	370 ¹⁾	440 ¹⁾	490 ¹⁾	550	620 ²⁾	650	850	1050	1250	1400	1400
Capacity ISO 7451	m ³	0,30	0,35	0,40	0,35	0,30	0,40	0,60	0,80	1,00	1,20	1,40
Max. possible material weight	Std t/m ³	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,5	1,2
	HD-S t/m ³	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,5	1,2
Weight with Liebherr teeth Z 13 ³⁾	kg	-	-	-	500	-	545	640	720	805	870	925
Weight with Liebherr teeth Z 16 ⁴⁾	kg	-	-	-	580	850	630	745	830	950	1040	-
Weight with Bofors teeth	kg	70	390	410	-	-	-	-	-	-	-	-
Max. stick length for machine stability per ISO 10567:												
Std undercarriage		3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	2,40	2,40
HD-S undercarriage		3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	2,40	2,40

¹⁾ Bucket with ejector and Bofors teeth

²⁾ Ripper bucket with teeth size Z 16 P

³⁾ Bucket with Liebherr teeth Z 13 (for applications up to surface class 5, heavy soils)

⁴⁾ Bucket with Liebherr teeth Z 16 (for applications over surface class 6, easy diggable material)

Note

When digging in highly abrasive materials, buckets must be protected by appropriate wear material. Optional side cutters with teeth 13 or 16 increase cutting width by approx. 120 mm.

- Weld-on set of adapters
- Set of bolt-on side cutters

Backhoe Attachment with Gooseneck Boom 5,00 m

GENERAL SAFETY INFORMATION

- Study the Operation and Maintenance Manual before operating or working on the excavator.
Make sure that you have additional information for special attachments of your machine, read it and understand it!
- Allow only authorized personnel informed about the safety rules to operate, service or repair the excavator. Make sure to observe any minimum applicable age requirement.
- Allow only properly trained personnel to operate or work on the excavator, make sure to clearly specify the person who is responsible for set up, maintenance and repairs.
- Make sure the operator knows his responsibility regarding the observance of traffic regulations and permit him to refuse any unsafe instructions given by a third person.
- Any persons still in training should only operate or work on the machine under the supervision and guidance of an experienced person.
- Check and observe any person working or operating the excavator periodically and regularly, if they observe safety instructions and guidelines given in the Operation and Maintenance Manual.
- Wear proper work clothing when operating or working on the excavator. Rings, watches, bracelets and loose clothing such as ties, scarves, unbuttoned or unzipped shirts and jackets are dangerous and could cause injury! Wear proper safety equipment, such as safety glasses, safety shoes, hard hats, work gloves, reflector vests and ear protection.
- Consult your employer or supervisor for specific safety equipment requirements and safety regulations on the job site.
- Always tilt up the safety lever before leaving the operator's seat.
- Do not carry tools, replacement parts or other supplies while climbing on or off the excavator. Never use the steering column, control levers or joysticks as handholds.
- Never jump off the excavator, climb on and off the excavator using only the steps, rails and handles provided.
When climbing on or off the excavator, use both hands for support and face the machine.
- If needed, use the front window as an escape hatch.
- If no other guidelines are given, perform maintenance and repairs utilizing the following precautions:
 - Park excavator on firm and level ground. Rest the attachment on the ground.
 - Place all control in neutral position and raise the safety lever.
 - Turn the engine off and remove the ignition key.
- Before working on the hydraulic circuit, move all joysticks and pedals with the ignition key in contact position and the safety lever tilted down to relieve the servo pressure and the remaining pressures in the different main circuits. In addition, relieve the pressure in the hydraulic tank as described in the Operation and Maintenance Manual.
- Secure all loose parts on the excavator.
- Never operate the excavator without a complete walk around inspection. Check if all warning decals are on the machine and if they are all legible.
- Observe all danger and safety guidelines.
- For certain special applications, the excavator must be equipped with specific safety equipment. Use the excavator only, if they are installed and functioning properly.
- Never perform any changes, additions or modifications on the machine, which could influence the safety, without obtaining the written permission from the manufacturer. This also applies to the installation and adjustment of safety devices and safety valves as well as to any welding on load carrying parts.
- Do not install any equipment or attachments made by other manufacturers or any which are not specifically authorized by LIEBHERR for installation without first obtaining the written permission from LIEBHERR.
LIEBHERR will issue any required technical documentation for approved installations.
- Should the electrical circuit be modified or additional components be installed, so the modification must be performed according to the national standards and safety regulations (such as OSHA per the USA).
The installation must be certificated by an approved organization and a copy of the certification has to be sent to the LIEBHERR company.

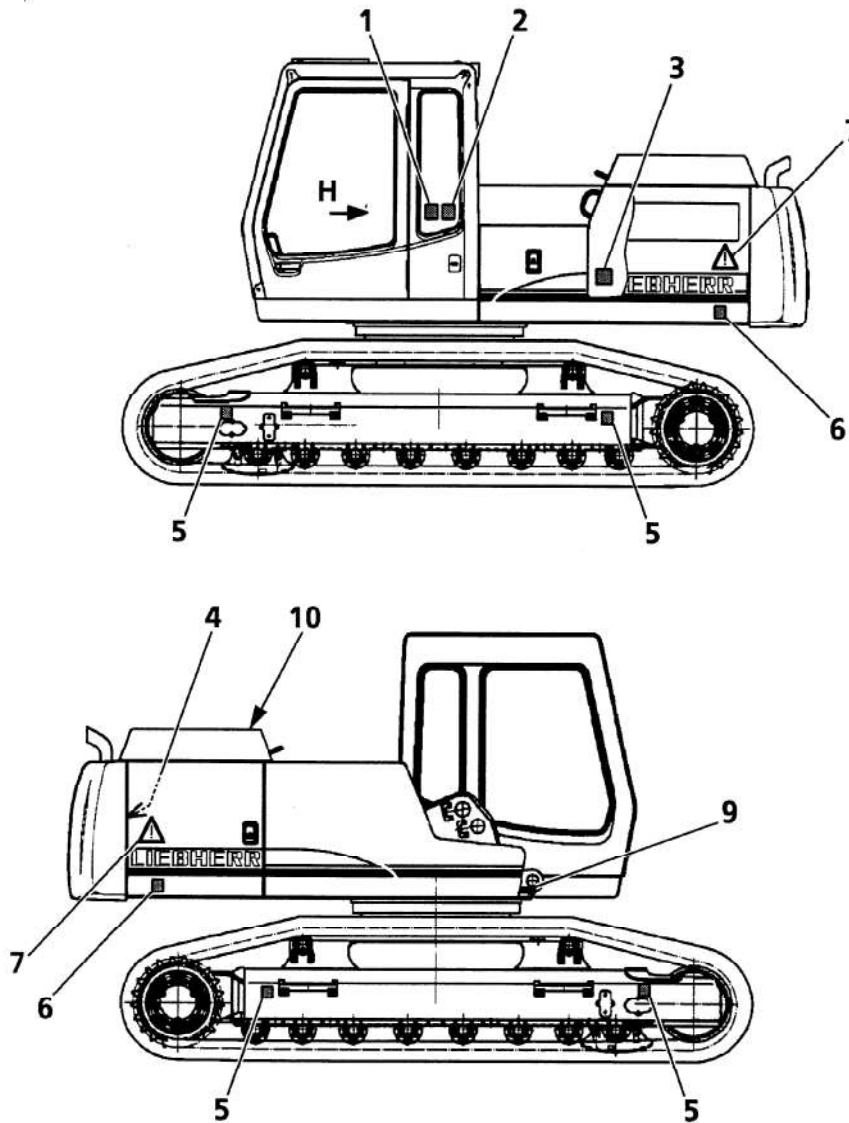
SIGNS ON THE HYDRAULIC EXCAVATOR

Your hydraulic excavator has several kinds of signs.

- **Warning Signs:** Warnings on accident risks with potentially serious or fatal injuries.
- **Notices:** Indicate specific points of control, maintenance and properties of the excavator.
- **Identification Tags**

Contents and location are described hereafter.

Order numbers are contained in the spare parts list



- 1 Notice Sound Pressure Level L pA
- 2 Notice Sound Power Level L WA
- 3 Notice External Start
- 4 Lubrication Chart Diesel Engine
- 5 Notice Latch Points

- 6 Notice Lifting Stop Points
- 7 Warning Sign Danger Zone
- 9 Identification and Registration Number Tag
- 10 Prohibition Sign



S228 - Engine RPM increase

→ Page 4.4



S229 - Engine RPM reduce

→ Page 4.4



S354 - Adaptation of control to precision works

Turn this button on if you want to adapt the operation speed of the machine to precision works. The maximum oil flow of the working pumps is then depending on the actuated movements. The corresponding limitation value can be adjusted using the menu "SF" of the LCD screen (see description further on).

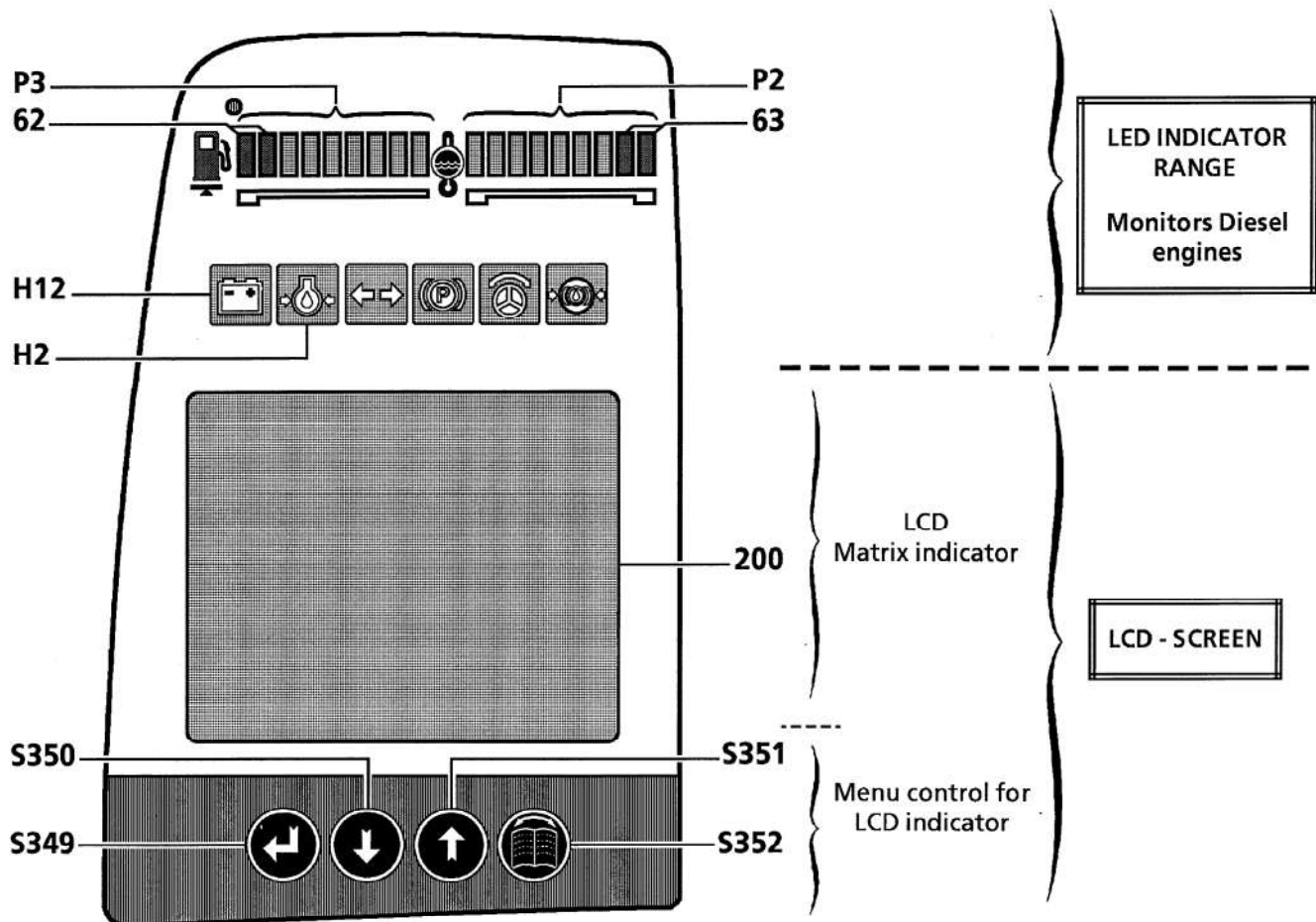
When operating a landscaping attachment (grading of slopes) the button S354 must be turned on to limit the attachment speed, since the full pump flow would be too important for the cylinders of this attachment.

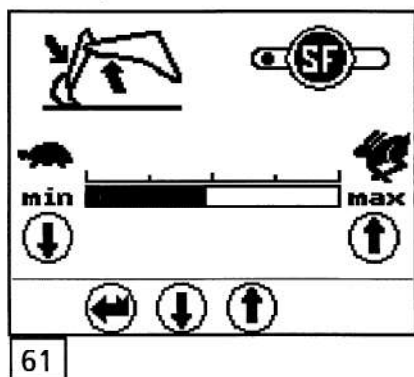
For landscaping attachment the limitation value adjusted on the display via menu SF must be in the lower quarter of the adjustment range

LED indicator P4 for engine RPM

Via this indicator, the engine RPM is displayed.
The complete RPM range is divided into 10 stages.

MONITORING DISPLAY





61

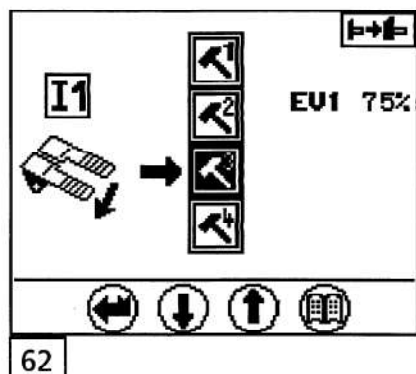
MENU ("set SF")

ADJUSTMENT OF FLOW ADAPTATION BY KEY SF

This function allows to set the control speed of the excavator attachment (or of special attachment) to a defined value.

The adjustment is performed using the key "UP" and "DOWN".

The limitation value adjusted in this menu is activated and deactivated via the push button S354 (key SF).



62

MENU ("set option")

ALLOCATION OF FLOW LIMIT OPTIONS TO EXTERNAL INPUTS (Special attachment input; as an example when operating a hammer pedal)

In this menu , pre-defined flow limitations (options) are allocated to the hardware input I1.

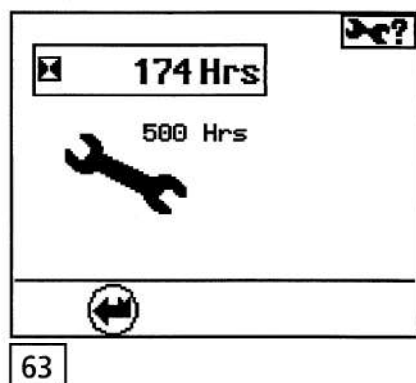
The arrow near the symbol gives the actual allocation.

In example fig. 62, the option 3 is active for the input I1, this means, if the external hardware input I1 is activated, then the nominal pump values allocated in option 3 for the excavator control are given as maximum nominal values.

If another option must be allocated to input I1 (as an example due to a modification of the working attachment), so first select another attachment in the vertical symbol range via the key "UP" or "DOWN".

Confirm the selected option by pressing the "MENU" key, the new option must then appear in the column.

The right part of the screen provides indication for the currently set pump values corresponding to the option shown in the selection window.



63

MENU ? ("set service")

INFORMATION AND CONFIRMATION OF SERVICE INTERVAL

This screen is an information screen and can be used to confirm a completed service interval.

The screen shows the operating hour for the next service interval (in example fig. 63 = "500 hrs") and the current operating hours ("174 hrs").

An upcoming service interval can be confirmed within max. 50 operating hours before the next service interval (fig. 64).

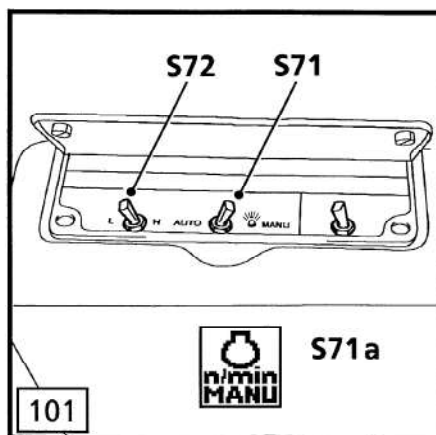
When this time frame is reached, the screen will display a question regarding completion of the service works for this interval.

If the question is answered with "OK" then this menu will be discontinued.

If it is answered with "OK", then the current operating hour will be stored as the last confirmed service interval.



64



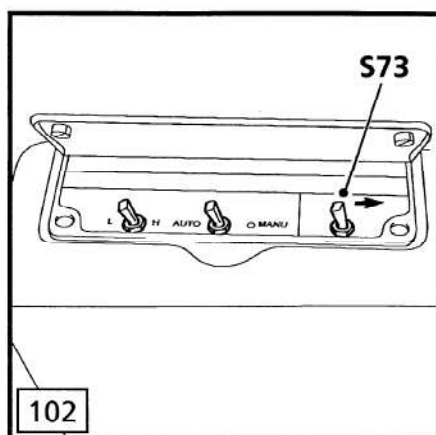
Switch S71 and S72 for safety control of engine RPM

In normal operation, the engine RPM is controlled by an electronic circuit, depending on the rated RPM value which has been set via the buttons S86, S228 and S229 (see page 4.4).

This automatic control may be turned off by tilting the switch S71 to position "MANU" (control light next to the switch goes on and the indicator symbol S71a appears on the display).

The engine RPM can now be controlled by the switch S72:

- tilting the switch to position "L" reduces the RPM,
- tilting the switch to position "H" increases the RPM.



Switch S73 for safety mode of the servo pressure circuits

During normal operation, the servo pressure supply to the swing brake and to the joysticks and pedals is controlled over the electronic circuit of the machine.

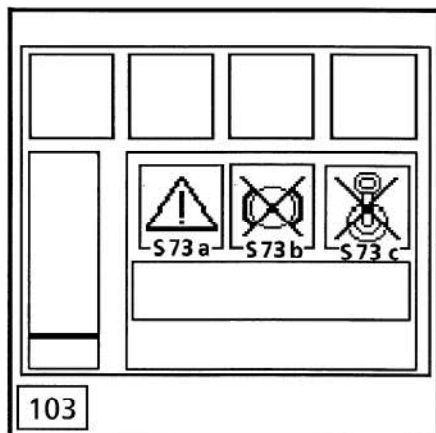
While tilting the switch S73 in safety position, this servo pressure supply can be enforced, and is maintained even in case of a trouble in the normal control circuit.

The operator is alerted that the servo circuits safety mode is turned on by the three indicator symbols S73a, S73b and S73c (fig. 103) appearing on the display of the machine.



The safety mode must be turned on only temporarily and in order to move the machine for emergency reasons and when, due to a trouble in the normal control circuit, releasing the swing brake or supplying the pilot controls is hindered.

In safety mode, the swing brake will be released as soon as the ignition key is turned to contact position, and the normal brake control (see page 4.12) is out of function.

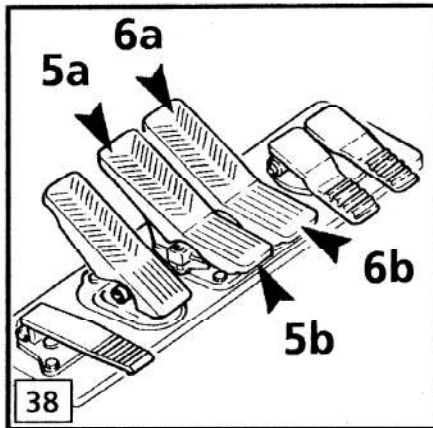


However, even with the switch S73 in safety position, the interruption of the servo pressure supply to the joysticks and pedals when lifting the safety lever (see page 3.3) is maintained.

TRAVEL FUNCTIONS

When traveling, align the uppercarriage up with the undercarriage (idlers in front, sprocket wheels in the rear).

STRAIGHT TRAVEL



- Travel forward :

Push both foot pedals equally forward with your toes (Fig. 38, pos. 5a and 6a).

- Travel reverse :

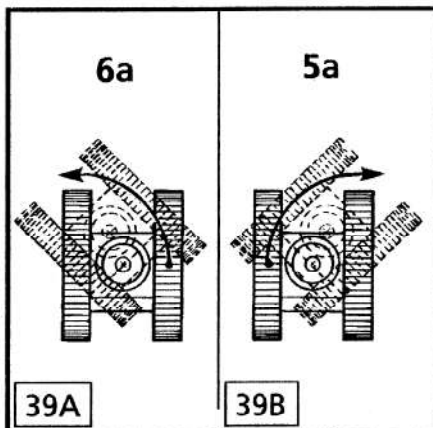
Push both foot pedals equally downward with your heels (Fig. 38, pos. 5b and 6b).



DANGER

Before you travel in reverse make sure , it is clear and nobody is in your way!

TO TURN OVER ONE TRACK



- To turn left forward (Fig. 39 A) :

Push the right foot pedal forward (pos. 6a).

- To turn right forward (Fig. 39 B) :

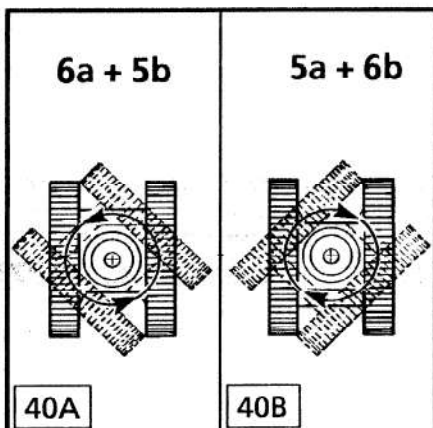
Push the left foot pedal forward (pos. 5a)



CAUTION

To protect the track components, reverse turns should be avoided.

COUNTER ROTATION (Fig. 38)



- To turn left (Fig. 40A) :

Push the right pedal forward (pos. 6a) and at the same time push the left pedal down with your heel (pos. 5b).

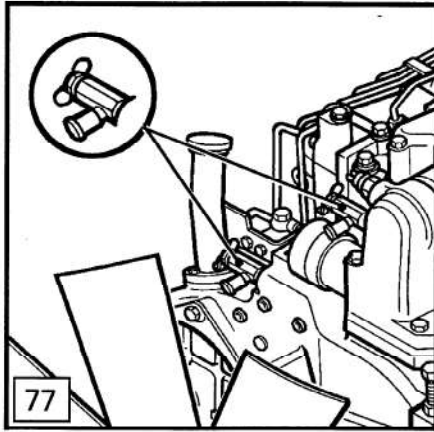
- To turn right (Fig. 40 B) :

Push the right pedal down with your heel (pos. 6b) and at the same time push the left pedal forward (pos. 5a).



DANGER

If the uppercarriage is turned by 180°, note that the direction of travel is reversed when you push the pedals!



IMPORTANT REMARKS

The air flow through the heater and air conditioner unit is controlled by adjustable and swivelling louvers.

To reach a maximal feeling of comfort we recommend to blow the air:

- out of the louvers 3 in the feet area and 2 at the front windshield when heating,
 - out off the louvers 1 in the air duct in the rear cab corners and through the louvers 2 during air conditioner operation,
- so to always meet the rule "cooling off the head and warming up the feet".

The best heating, resp. cooling effect is reached with the knob S92 in position "recirculated air".

In case of high outside temperature, and especially if the cab has been heated up by the sun, decrease as far as possible the temperature inside the cab before turning on the air conditioner.

Open the windows and the door for a few minutes and adjust the blower fan to maximum RPM.

In case of very high outside temperature, preferably close the louver 2, so to avoid an unnecessary warming up of the inside air along the windshield.

Preferably close the warm water shut off valves (fig. 77) on the Diesel engine if the heater is not used for a longer period (sommer time, ...).

Every second week and regardless of the season, turn the thermostat S95 to start the compressor of the air conditioner for about 10 minutes.

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REMOVAL AND INSTALLATION OF STICK TO BOOM

NOTICE: After installation of a new stick and digging bucket combination, the restrictor check valve 222 for stick cylinder must be eventually readjusted so to have the correct velocity of the working attachment (due to weight differences of the attachment parts).
If necessary, consult a LIEBHERR mechanic.

REMOVAL OF STICK (or stick with bucket)

Fig. A :

If necessary, remove the bucket as described on page 4.24.

Retract the bucket and stick cylinder all the way, position the attachment on the ground.

If necessary, tie the connector bracket 7 to the bucket cylinder so it cannot slip out.

Turn the engine off, release the pressure in bucket and stick cylinder circuit by turning the ignition key to contact position, tilting the safety lever down, and moving the right joystick to the left and right, the left joystick forward and backward.

Release the pressure in the hydraulic tank.

Attach the lower part of the stick cylinder 16 to the lift.

Position a wooden block under the stick cylinder, remove the plate of pin 17, drive the pin out and position the stick cylinder on wooden blocks.

Fig. B :

Position the lifting device 19 between bearing of stick cylinder, insert pin 17 and secure it.

Attach the stick to this lifting device 19 and to the top of the bucket cylinder (or to the hook of the bucket, if the stick is removed with the bucket in place), then to the lift hook.

Disconnect both hoses 21 from the tilt cylinder and close them off to prevent contamination.

Remove the cotter pin and the castle nut on pin 20 and drive the pin out. If necessary, start the engine and slightly lift the attachment to reduce the weight of the boom on pin 20.

Raise the stick (or the stick with the bucket) with a lift, pull the stick from the boom and position it on the ground, supported by wooden blocks and remove the lift.

INSTALLATION OF STICK (or stick with bucket)

Fig. B :

Position the lifting device 19 between bearings of stick cylinder, insert pin 17 and secure it.

Attach the stick to this lifting device 19 and to the top of the bucket cylinder (or to the hook of the bucket, if the stick is removed with the bucket in place), then to the lift hook.

Raise the stick (or the stick with the bucket) with a lift inside the bore holes of the boom so that the pin 20 can be inserted. Fix the castle nut and the cotter pin to the pin 20.

Remove the lifting device 19.

Reconnect both hoses 21 to the tilt cylinder.

Fig. A :

Attach the lower part of the stick cylinder 16 to the lift.

Slightly lift the cylinder and if necessary run engine to extend or retract cylinder so that cylinder head fits between the bore holes of the stick.

Insert the pin 17 and secure it with the plate.

If necessary, install the bucket as described on page 4.24.

Lubricate the different lube points of the link shafts stick to boom and bucket to stick.

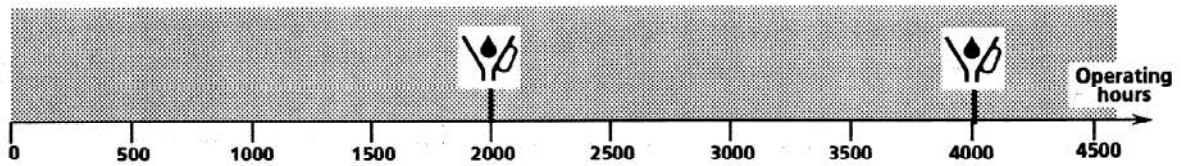
Lift the attachment and tilt the bucket out and in several times to release the air from the hydraulic system.

Hydraulic oil change intervals

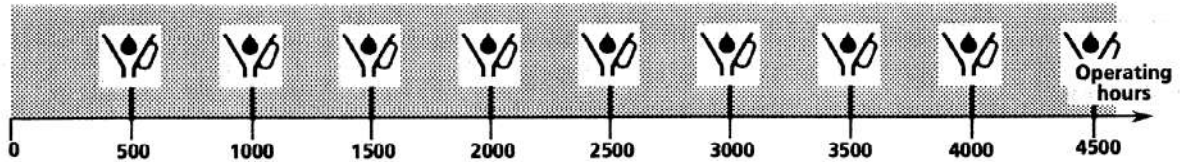
1. Oil changes in preset intervals

Note: Oil changes in preset intervals are only permitted for mineral oils. When using environmentally friendly hydraulic fluids, oil sample analysis reports must be used to determine the time of the oil change, see §2.

a) In standard applications



b) In dust intensive applications



2. Optimized oil change intervals determined through oil sample analysis reports

Use this procedure to take oil samples in preset intervals. The intervals may be extended between two oil changes as long as the properties of the oil are still satisfactory.

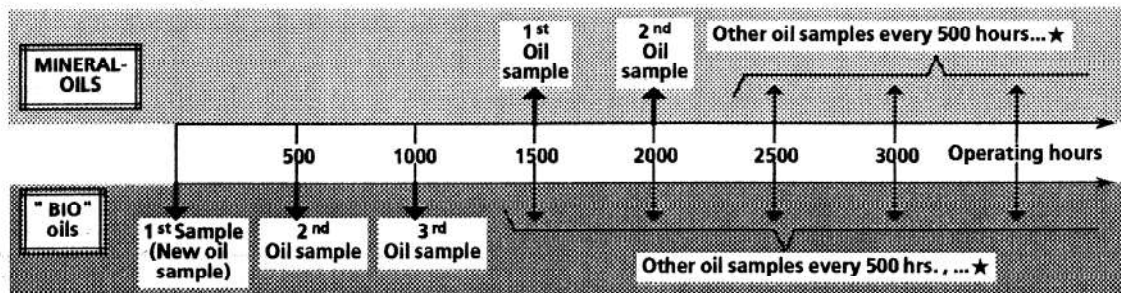
The time when the oil must be changed is determined by the lab report.

LIEBHERR recommends to submit the oil samples to "WEAR - CHECK" for oil analysis.

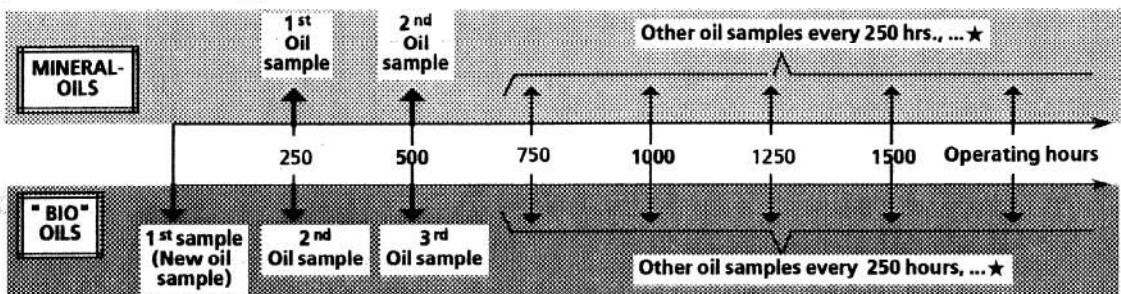
A kit for 6 complete analysis at WEAR - CHECK is available: Id. No. 7018368 (The kit contains the sample containers, documentation, shipping container and oil sample hose).

A hand pump is required to take the oil sample, and should be ordered separately (Id. No. 8145666).

a) In standard applications

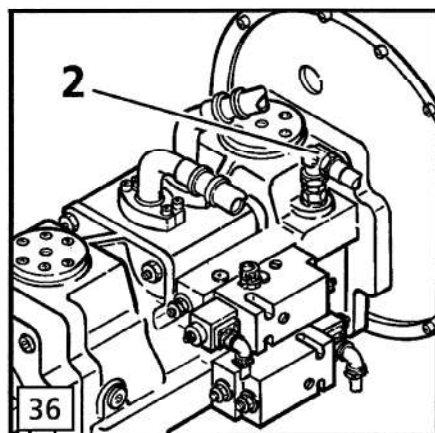
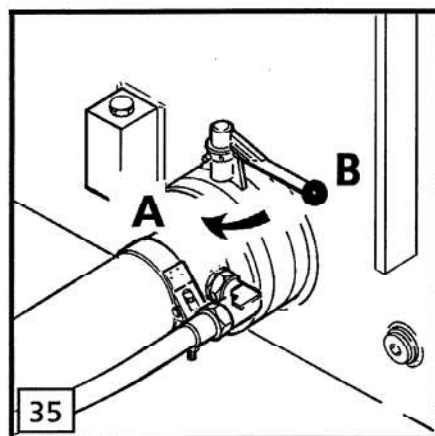
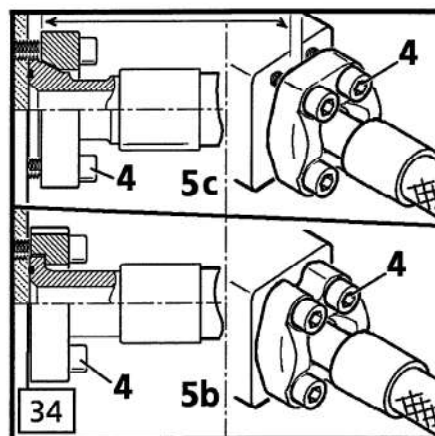
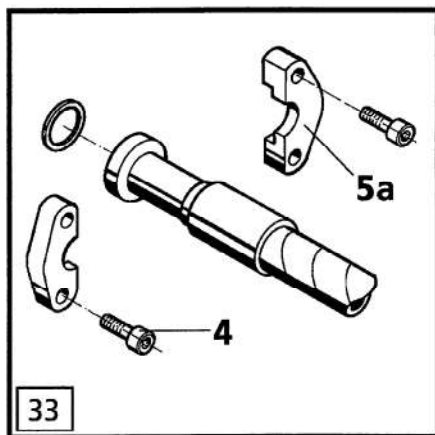


b) In dust intensive applications



★ ...time for oil change determined by lab report

- Observe all product safety guidelines when handling oils, grease, and other chemical substances.
- Make sure service fluids and replacement parts are disposed of properly and in an environmentally sound manner.
- When using hot service fluids, be very careful. (They can cause severe burns and injury!).
- Operate combustion motors and fuel operated heaters only in well ventilated areas. Before operating these units, check ventilation. In addition, always follow applicable local regulations.
- Never try to lift heavy parts. Use appropriate lifting devices with sufficient load carrying capacity. When replacing or repairing parts or components, make sure they are mounted very carefully on lifting devices, to prevent any possible danger. Use only suitable and technically sound lifting devices, make sure that lifting tackle, wire cables, etc. has adequate load carrying capacity. Never position yourself, walk or work underneath suspended loads.
- Never use damaged lifting devices, or devices which are not sufficient to carry the load. Always wear gloves when handling wire cables.
- Ask only experienced personnel to attach loads and guide and signal the crane operator. The guide must be within the visibility range of the operator and / or must be in direct voice contact with the operator.
- When working overhead, use appropriate and safe ladders, scaffolding or other working platforms designated for that purpose. Never step on parts or components on the machine when maintaining or repairing items overhead. When working high above ground, make sure you are fitted with ropes and appropriate safety devices which will prevent a possible fall. Always keep handles, steps, railings, platforms and ladders free of dirt, snow and ice!
- When working on the attachments, for example when replacing the bucket teeth, make sure the attachment is supported properly. Never use metal on metal support!
- For safety reasons, never open and remove a track chain unless having previously totally released the pretension of the chain tensioning unit.
- Never work underneath the machine if it is raised or propped up with the attachment. The undercarriage must be supported with wooden blocks and supports.
- Always support the raised machine in such a way that any shifting to the weight change will not influence the stability. Do not support the machine with metal on metal support.
- Only qualified, especially trained personnel may work on travel gear, brake and steering systems.
- If it becomes necessary that the machine must be repaired on a grade, block the chains with wedges and secure the uppercarriage to the undercarriage with the lock pin.
- Only qualified, especially trained personnel may work on the hydraulic system.
- Never check for leaks with your bare hands, always wear gloves. Fluid escaping from a small hole can have enough force to penetrate the skin.
- Never loosen or remove lines or fittings before the attachment has been lowered to the ground and the engine has been turned off. Then turn the ignition key to contact position with tilted down safety lever, move all servo controls (joysticks and foot pedals) in both direction to release pressures. Then release the tank pressure as outlined in this Operation and Maintenance Manual.
- Check all lines, hoses and screw connections regularly for leaks and externally visible damage. Fix any damage immediately. Oil escaping from fittings etc. can cause serious injury and fires.
- Before any repairs, always relieve pressures before opening up any system sections and pressure lines (hydraulic lines and air pressure lines).
- Always route and install hydraulic and air pressure lines properly. Do not interchange the connections. The length and quality of hoses must match specifications and requirements.
- Change all hydraulic hoses in specified or appropriate time intervals, even though no damage or defects are visible.
- Always disconnect the battery cable before working on the electrical system or before any arc welding on the machine. Always disconnect the negative (-) cable first and reconnect it last.
- Check the electrical system regularly. Make sure that any problems, such as loose connections, burnt out fuses and bulbs, scorched or chafed cables are fixed immediately by an electrician or qualified personnel.
- Use only Original fuses with the specified amperage. Never use a different size or stronger fuse than the original fuse.



High pressure hoses with nominal size NW 20, NW 25 and with SAE fittings are installed on your machine (fig. 33).



Any time a high pressure hoses is defective (bubbles, moisture, damage on the surface, etc...), it must be replaced. When installing the replacement hose, avoid any stress and strain on the hose.

Do not turn or twist the hose!

The following O-rings are needed for hydraulic hoses :

NW 20	25×3,53	Id. No. 7367610
NW 25	32,9×3,53	Id. No. 7367611
NW 32	37,7×3,5	Id. No. 7367612

The mounting screws on the SAE fittings for high pressure hoses must be tightened to the following torque values :

Screw 4 size	Torque value in Nm - Quality 10.9		
	Half flange 5a	Flat flange 5b	Conical flange 5c
M10	62	45	65
M12	108	70	110
M14	172	120	180
M16	264	170	250

Notice: tighten the screws 4 evenly and crosswise!

REMOVING THE SUCTION HOSE

If suction hoses have to be removed, the shut off valve at the hydraulic tank has to be closed.

Turn the valve by 90° to close (fig.35).

- A - Open
- B - Closed

After the tank pressure is relieved, remove the drain valve on the suction hose fitting on the side of the pump and drain the hydraulic oil from the pump into a suitable container.

After repair, be certain to return the valve to its original position, push it in its notch and retighten the bleeder filter of the hydraulic tank.

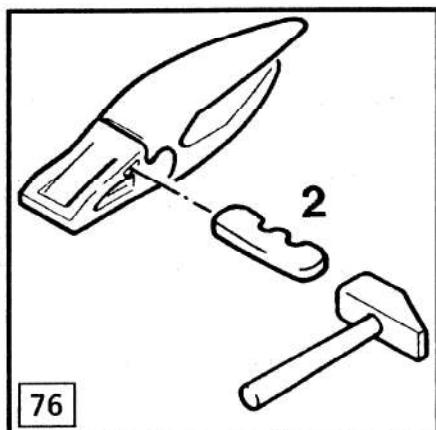
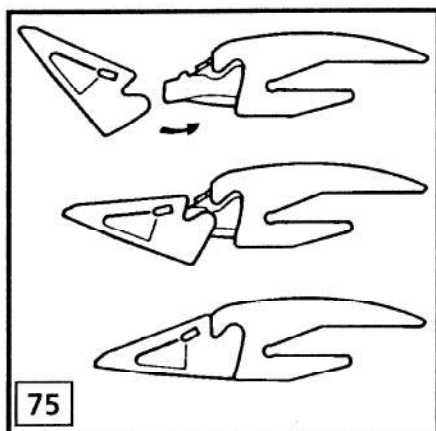
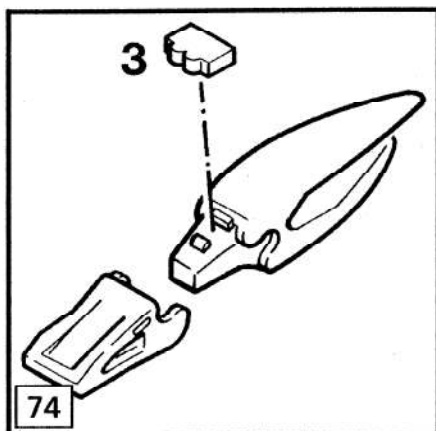
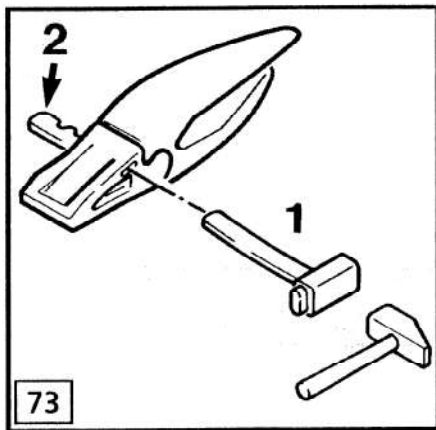
Bleed the hydraulic pumps.

BLEEDING THE HYDRAULIC PUMP

Bleed the hydraulic pump after any repairs on the pump and/ or after every oil change.

Loosen the leak oil hose (fig. 36, pos. 2) and let the air escape. As soon as hydraulic oil flows out of the hose, reconnect the leak oil hose.

Fill the pump with hydraulic oil through the same connection before initial start up, or after repairs or replacement.



REPLACING THE BUCKET TEETH

Check the bucket teeth regularly for wear.

Greater force is needed to dig if bucket teeth are worn.

Always replace the teeth before the adapter is damaged.

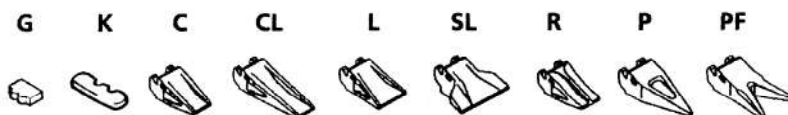
Never work with a missing bucket tooth.

TO REPLACE A TOOTH

- Extract the wedge (fig. 73, pos 2) using a hammer and an extracting tool (fig. 73, pos 1).
- Remove the worn tooth.
- Attach a new rubber fitting on the lock (fig. 74, pos 3).
- Push the tooth onto the adapter (fig. 75).
- Use a hammer to insert the wedge 2 (Fig. 76).

Parts needed for LIEBHERR teeth with horizontal wedges:

Parts (Design./ Order No.)	ST13 914934	ST16 914... ...944	ST 20 934... ...944	ST 25 944... 964...
Wedge K	K13 3001157	K16 3001114	K20 3001158	K25 3001159
Lock G	G13 9335853	G16 9329709	G20 9351304	G25 9351306
Tooth C	Z13C 3001288	Z16C 3001318	Z20C 3001319	Z25C 3001130
Tooth CL	Z13CL 3001579	Z16CL 3001132	Z20CL 3001588	Z25CL 3001589
Tooth L	Z13L 3001262	Z16L 3001216	Z20L 3001232	Z25L 3001235
Tooth SL	Z13SL 3001554	Z16SL 3001556	Z20SL 3001556	
Tooth R	Z13R 3001263	Z16R 3001217	Z20R 3001233	Z25R 3001236
Tooth P	Z13P 3001264	Z16P 3001218	Z20P 3001234	Z25P 3001237
Tooth PF	Z13PF	Z16PF 3001440	Z20PF 3001443	Z25PF



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