Foreword

This manual has been prepared to provide you with technical information on the design and construction of the various components which made up the LIEBHERR excavator.

It contains brief and precise descriptions, guidelines and drawings of adjustment procedures as well as hydraulic and electrical schematics, and graphically depicted diagrams and sectionals to help you with any repairs, which might become necessary on our hydraulic excavators.

We deliberately avoided full drawings and details of each repair stage, a practice often adopted in workshop manuals of this kind, since only skilled mechanics already familiar with most repair work described in this manual, should perform repair work. This manual is also intended to provide you with information regarding certain adjustment values.

Instructions on maintenance is excluded from this manual, since it are covered in the individual Operation and Maintenance Manual.
Be sure to observe all accident prevention guidelines and adhere to all safety information before and during any maintenance and / or repair procedure on the hydraulic excavator.

To perform tests and repairs listed in this manual, a complete set of standard tools, as well as special tools and fixtures shown and listed, is necessary. Always observe utmost cleanliness and order.

No special emphasis is put on replacing sealing components, since it is taken for granted that all removed seals, O-rings and gaskets are replaced during the course of repair. Tighten any screw connections, if no other values are given, to the required tightening torque.

Certain notes are used throughout this manual to emphasize important or critical instructions.



This mark used in our descriptions denotes an important note or reminder, which should be especially noted.



This exclamation mark used in our descriptions denotes an important note or a reminder of safety practices or directs attention to unsafe practices, which could pose a danger for the mechanic and / or the machine. if proper precautions are not taken.

This Service Manual has been issued by the Customer Service Department of **LIEBHERR - FRANCE, 2, avenue J. REY 68000 COLMAR.**

This manual will be updated regularly, as a registered holder of a Service Manual you will automatically receive all revised and new pages according to the latest series status.

Some Service Information bulletins may also need to be filed in this Service Manual.

This book may not be copied nor given to third persons without our approval!

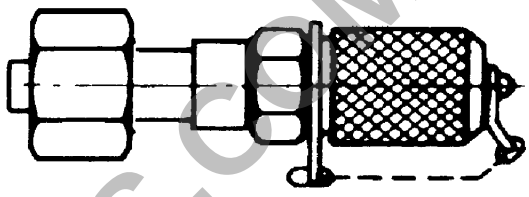
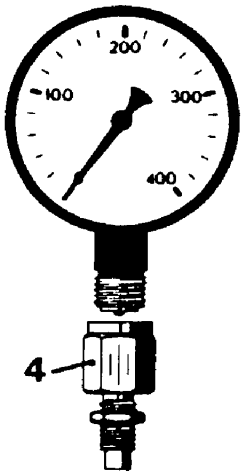
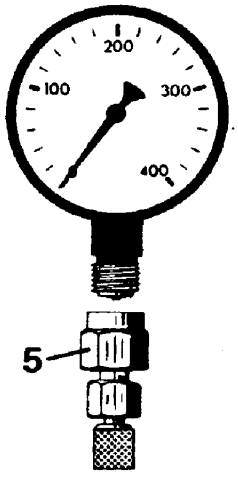
We reserve the right to make changes .

We trust that with this information contained in this manual and your cooperation we have taken another step toward continuing improvement of service on our LIEBHERR hydraulic excavators.

LIEBHERR - FRANCE SA.

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Ident Nr. Order No N° de code	Gerät Model Type											Anwendung Application Application
	A900	R 900	A902	R 902	A912	R 912	A922	R 922	A932	R 932	R 942	
7002404	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	
7008688	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	
7002436	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	
7002435	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	

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SUB GROUP INDEX

3.01.	Technical Data	R 900 Litronic / 101
3.03.	Technical Data	R 902 Litronic / 101
3.05.	Technical Data	R 912 Litronic / 101 R 922 Litronic / 101
3.07.	Technical Data	R 932 Litronic / 101
3.09.	Technical Data	R 942 Litronic / 101
3.11.	Maintenance Guidelines	R 900 Litronic / 101
3.13.	Maintenance Guidelines	R 902 Litronic / 101
3.15.	Maintenance Guidelines	R 912 Litronic / 101 R 922 Litronic / 101
3.17.	Maintenance Guidelines	R 932 Litronic / 101
3.19.	Maintenance Guidelines	R 942 Litronic / 101

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Engine Type		**BF 4 L 913**	**BF 4 L 913**
Series		**Litronic**	**Litronic**
Machine		**A / R 900**	**A 900** **R 900**
S/N		**101**	**901** **176**
General Data :			
Type		4 cylinder- Turbocharged	
Working principle		4 - cycle direct injection	
Bore	mm	102	
Stroke	mm	125	
Displacement	cm^3	4085	
Firing order		1 - 3 - 4 - 2	
Compression ratio		15,5 : 1	
Compression ratio at starting RPM	bar	24 - 28	
Firing sequence	°kW	180	
Weight of engine without radiator	kg	485	
Direction of rotation (when facing flywheel)		left	
Flywheel housing		SAE 2	
Cooling system		Air cooled	
Performance Data per DIN 6271 :			
Engine output	kW / PS	59 / 80	67 (91)
Nominal engine speed	RPM	2000	2000
High idle	RPM	2140	2140
Low Idle	RPM	750 $^{+50}$	750 $^{+50}$
Torque max.	Nm	296 at 1600 RPM	320 at 1650 RPM
Adjustment Values			
Valve clearance - Intake /cold	mm	0,15	
Valve clearance - Exhaust /cold	mm	0,15	
Begin of delivery	°kWvOT	27 ± 1	
Capacities :			
Engine oil in Standard oil pan	l	12 max.	
Engine oil system (Filter/cooler/hoses)	l	ca. 3 / .8 gal.	
Engine oil qty. at oil change w. filter change	l	13.5 / 3.5 gal.	

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Use

The elastic coupling (torsional vibration damper), which is installed between the Diesel engine and the variable displacement double pump, compensates for shaft (crankshaft-pump input shaft) misalignments, which could be caused by manufacturing and dimensional variations and absorbs torque jolts caused by load fluctuations.

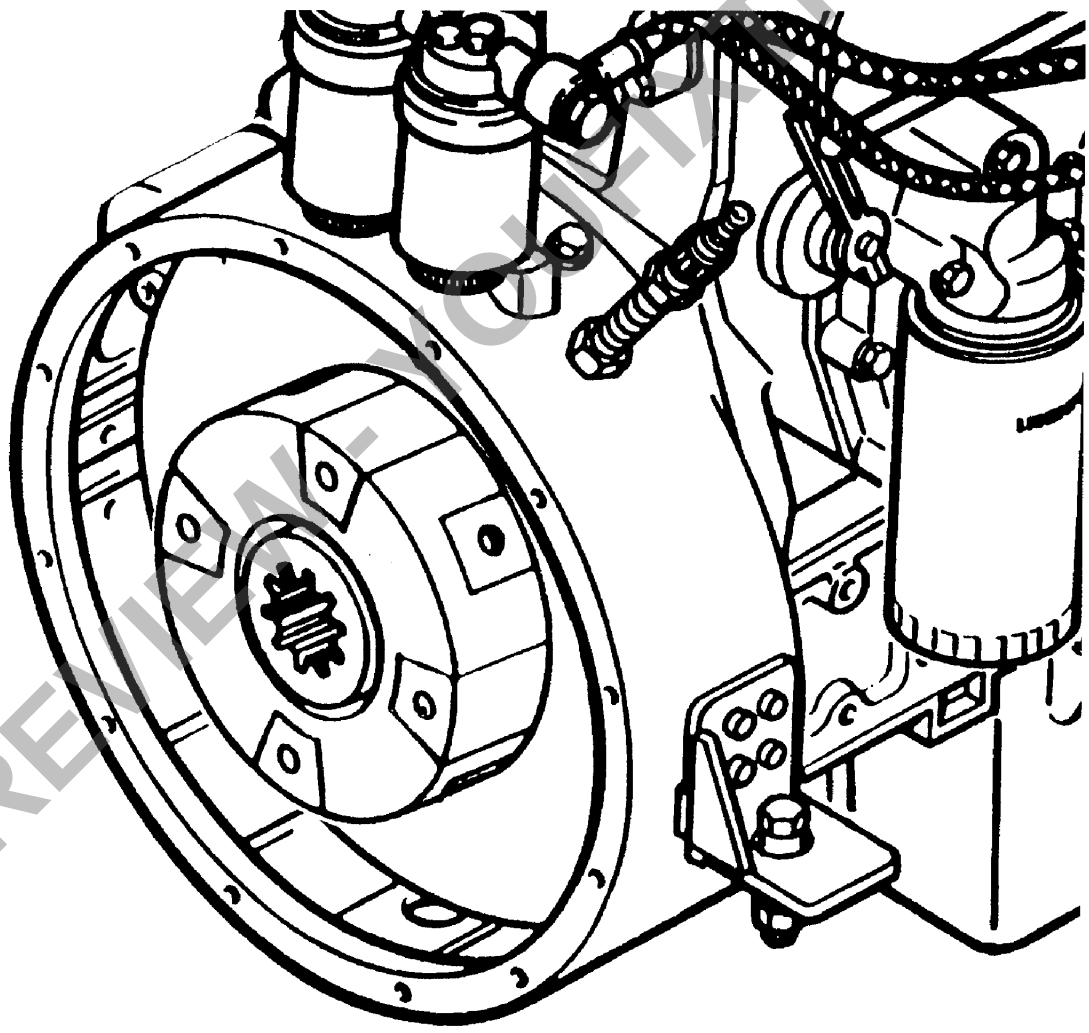
It transfers engine torque to the double pump directly and constantly, which means that it cannot be disengaged.

Construction and function of the torsional vibration damper

Four aluminum segments 2 in the coupling are connected with the flywheel 8 of the Diesel engine and four segments 3 are connected via internally geared hub 4 with the drive shaft of the variable displacement double pump. The elastic disk 5 is installed between the circular aluminum segments 2 and 3, it connects the aluminum segments The frictional but elastic connection between disk 5 and hub 4 consists of eight springs 3, set around the circular disc. The flux of force from the Diesel engine is transferred to the flywheel, mounting screws, Alu part 2, elastic part 5, alu part 3, mounting screws and hub 4 to the input shaft / pump .

Any torsional vibration at Diesel engine start up and any load fluctuations are compensated for by spring compression and relaxation after the shock.

The swing movements of the motor are much reduced before being transferred to the pump.



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Components/ corresponding pressure relief valves	Machine Model: R 900 Litronic Primary Pressure (bar)	Secondary Pressure (bar)
Pressure relief valve 51 Control pressure in control unit 50	32±1	
Pressure cut-off valves 23.3 und 23.4 on hydraulic pump beginning of pressure cut-off end of pressure cut-off	300±5 310±5	
Primary pressure relief valve 120 for working pressure (Boom and bucket cylinders travel motor left) on 7 way control valve bloc left side	320+5	
Primary pressure relief valve 121 for working pressure (Stick cylinder, swing motor travel motor right) on 7 way control valve bloc right side	320+5	
Secondary pressure relief valves 125 and 126 Boom cylinder on 7 way control valve bloc 100		380+10
Secondary pressure relief valves 127 and 128 Bucket tilt cylinder on 7 way control valve bloc 100		380+10
Secondary pressure relief valves 129 and 130 Travel motor left on 7 way control valve bloc 100		380+10
Secondary pressure relief valves 131 and 132 Travel motor right on 7 way control valve bloc 100		380+10
Secondary pressure relief valves 133 and 134 Stick cylinder on 7 way control valve bloc 100		380+10
Pressure relief valves with pressure cut in 191 and 192 (on the swing motor) **Stage 1** **Stage 2**	200	340±10
Regulation begin (P1+P2) at nominal power of engine	220 (from SN 176 = 250)	
Test pressure to check diesel engine output (P1=P2)	210 (from SN 176 = 240)	
Lowering speed of attachment	about 3.5 sec.	

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GENERAL DATA

Serie		LITRONIC			
Model		A / R 900	A 900	R 900	R 900
Serial No		101	901	176	3001
Pump - Type		LPVD 64	LPVD 64		
RPM		2000 min^{-1}	2000 min^{-1}		
Pump output (Power)		58 kW / 78,8 HP	65,7 kW / 89 HP		
Pump Displacement max.		2×128 l/min	2×128 l/min		
min. (remaining flow)		2×19 l/min	2×19 l/min		
Régulation begin P1 + P2 (theor. value)		220 bar	250 bar		
Pressure cut-off - valve in function	Beginning	300±5 bar	300±5 bar		300±5 bar
	End	310±5 bar	310±5 bar		310±5 bar
Pressure cut-off - valve oversteered [1]	Beginning	-----	-----		≥380 bar

Adjustment and Comparison values

		Pump displacement in l/min		Current on solenoid valve in mA	
		P1	P2	P1	P2
Q min	(Remaining flow)	19	19	0	0
Q max	(if boom, stick, bucket, outrigger, adj. on road /off road cylinders and travel motors are actuated)	128	128	750	750
Q réduit	(if swing gear is actuated) [2]	64	128	750	750
Q réduit	(if travel motor / Speeder is actuated	97	97	580	580

A **Minimum flow "Q min"**
(via adjustment screw 3.17)

B **Regulation begin of pumps**
(via adjustment screw 4.38)

C **Pressure cut off**
(via adjustment screw4.36)

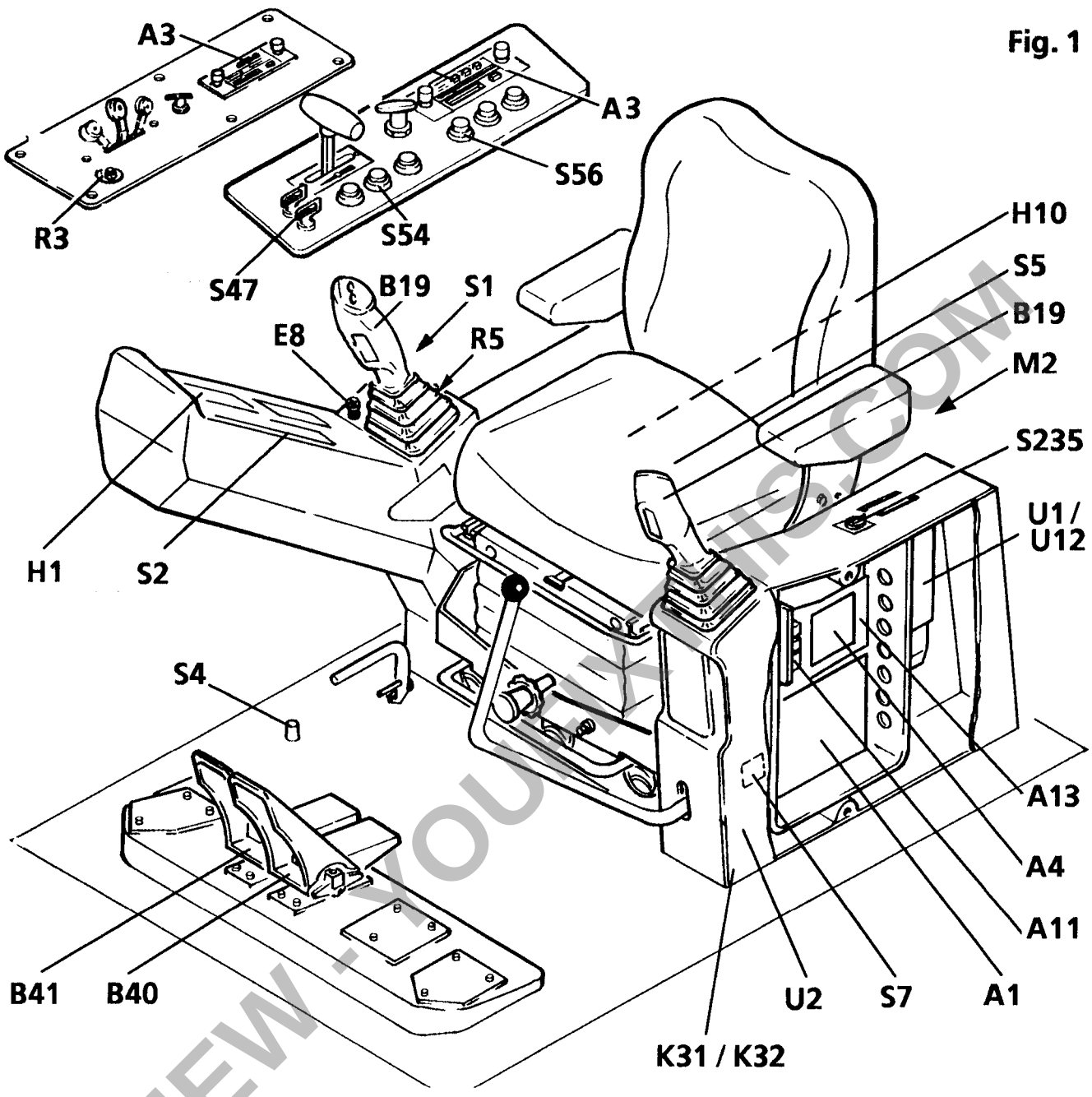
1) at travel movement

2) Flow reduction occurs via the hydraulically controlled stroke limiter on the regulating valve P1

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Fig. 1

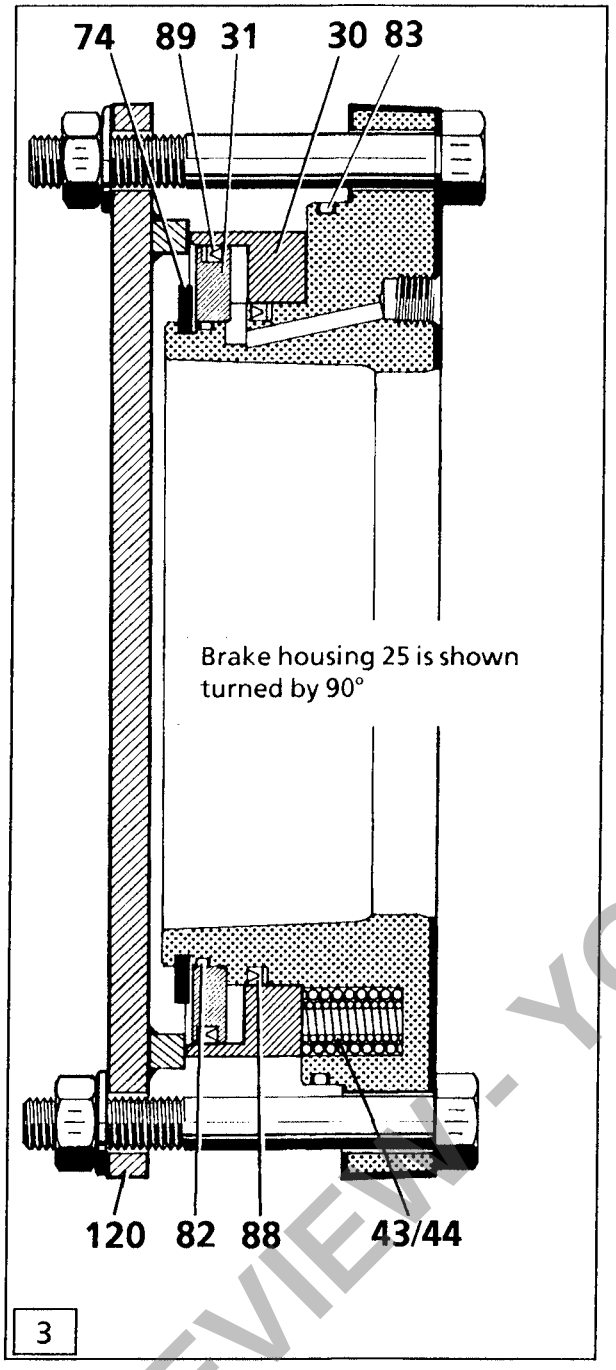


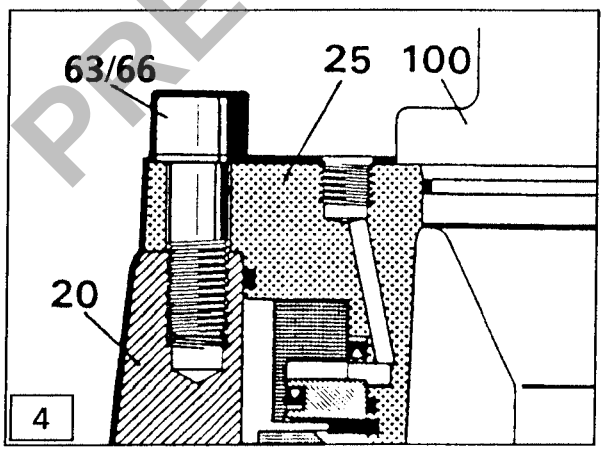
A1	Main circuit board
A3	Radio(A)
A4	Circuit board / pump angle reduction (A)
A11	Circuit board / Swing brake control
A13	Circuit board / optional attachments(A)
B19	Sensor / controls (A)
B40	Proximity switch / travel pedal-left
B41	Proximity switch / travel pedal-right
E8	Cigarette lighter
H1	Indicator unit
H10	Buzzer
K31	Relay / battery switch (A)
K32	Relay / battery switch (A)
M2	Heater blower
R3	Potentiometer - Low idle automatic (A)
R5	Preglow resistor
S1	Starter and preglow switch
S2	Switch Unit
S4	Switch / Horn
S5	Switch / Grapple
S7	Safety Switch - Servo cut off
S47	Switch / Quick disconnect (A)
S54	Switch / Frequency commutation (A)
S56	Switch / Pressure commutation
S235	Power Safety (A) (b)
U1	Electronic - Horsepower control
U2	Electronic - Sensor control (A)

(A) Optional Attachment
(b) Serially mounted from ..., see sub group 1.01

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Note

The ring 31 and piston 30 are spring loaded.

Push down piston 30 with special tool No. 120 - see section 2.01, and two M12x120 screws.

Release lock ring 74. Loosen and remove the special tool. Remove piston 30, complete from brake housing 25 and remove springs 43/44.

Replace O-rings 82, 83 and groove ring 88 with support ring.

Push end ring 31 from ring piston 30 and replace grooved ring 89 with prop ring.

Note :

When installing groove rings 88 and 89, make sure they are seated correctly. (The groove has to point to the pressure side and the support ring to the unpressurized side!) Lightly grease all parts.

2.2 Assembly

Insert ring 31 complete with new groove ring 89 on piston 30.

Insert spring 43/44 and complete piston 30 onto brake housing 25.

With tool, see fig. 3, push piston 30 down and insert snap ring 74, make sure it is seated correctly. Remove tool.

Insert brake housing 25 with new seal into the inner gear 20.

Install screws 63 with washers 66. Make sure screws 63 are torqued correctly, see page 9.05.02.

Mount the oil motor 100, see paragraph 1.

Install gear, see paragraph 1.

For further description, see paragraph "Installation of gear"

For sealing and repair of the complete gear

See separately issued "Repair Instruction of Swing Gear SAT".

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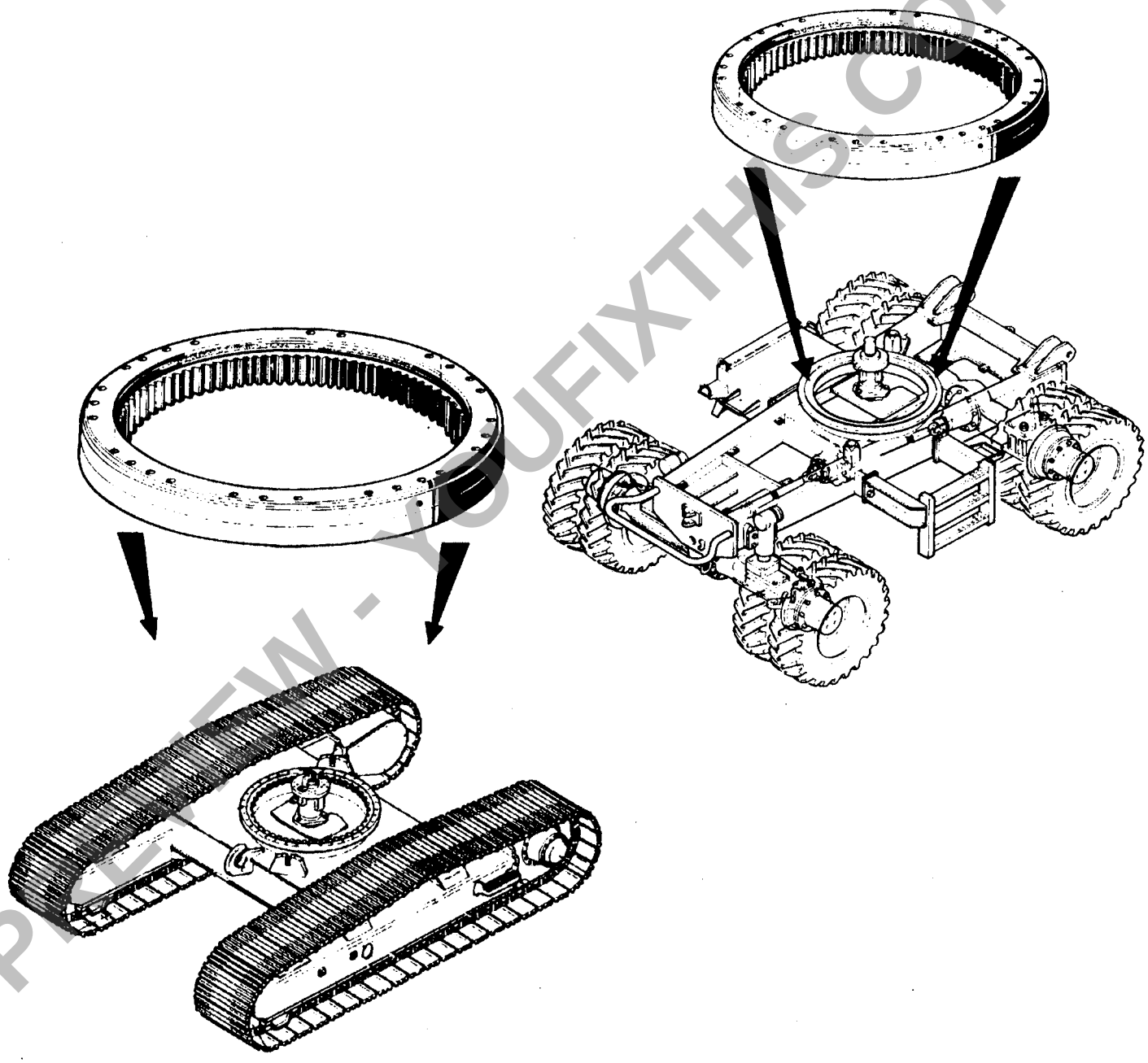
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Construction

The swing ring is used as a connector with gears between the upper and undercarriage and allows the uppercarriage to turn in all directions, 360°.

The swing ring is a single row, axial bearing race with a large diameter.

To turn, the swing gear meshes with the inner gear of the swing ring and moves the uppercarriage.



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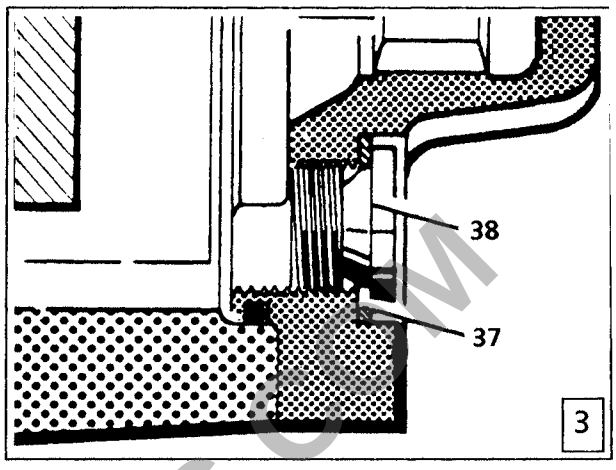
LIEBHERR	Bennenung/Description/Dénomination **Swing ring**	Typ Model Type See page 10. "Sub group index"
Datum/Edition/Date 01.90		Ab/from/à partir de
		Blatt/Page/Feuille **10.10.01**

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To seal the gear

Note :
The drawings on this page are part of diagram on page 11.05.05.

Important :
Clean and check all parts carefully before installation.



1. Drive

Remove plug 38 (oil drain) and drain gear oil. Insert plug 38 with seal 37.

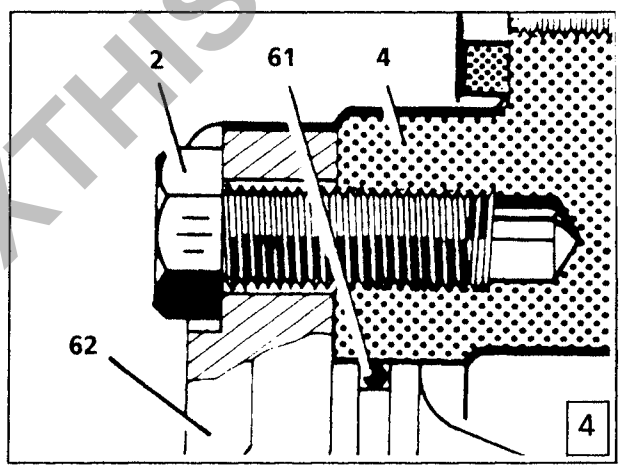
Remove screws 2 and pull oil motor 62 from gear.
Pull off O-ring 61.

Lightly grease a new O-ring 61 and install on oil motor 62. Set oil motor into gear.

Tighten screws 2, torque to 105 Nm.

Remove plug 38 (oil filler plug and oil level check).
Fill with gear oil until the lower edge of the bore hole.

Insert plug 38 with seal ring 37.



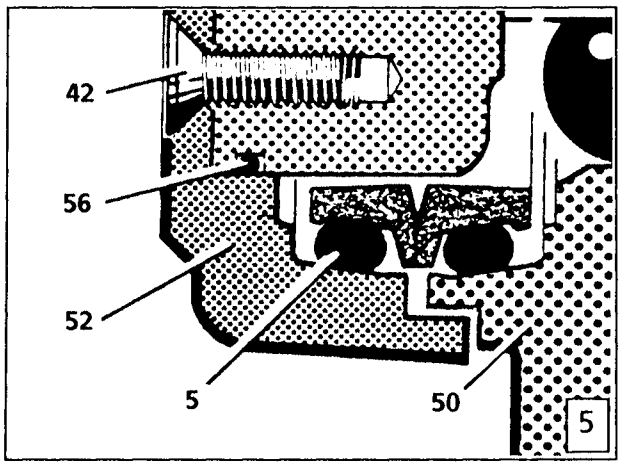
2. Cover 52

Remove gear from side frame, see "Removal of Gear".

Remove countersunk screw 42 and cover 52.
Remove O-ring 56 from hub 4.

Lightly grease the new O-ring 56 and pull it on hub 4. Set cover 52 carefully with half of the lifetime seal onto hub 4 and secure with screws 42. Torque to 70 Nm.

Mount the gear to the undercarriage, see "Installation of Gear".



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12.08	Wear limits of track components D4 - D4D	
12.09	Wear limits of track components B60 - B5 6 D6 - E5	
12.10	Wear limits of track components D7 - B6	
12.12	Removal and installation of track components	R 900 - R 942 Litronic / 101 →
12.13	Removal and installation of track components	R 900 - R 942 Litronic / 3001 →
12.15	Slipring seal	
12.26	Idler	R 900 - R 942 Litronic / 101 →
12.31	Tension unit	R 900 - R 942 Litronic / 101 →
12.32	Tension unit	R 900 - R 942 Litronic / 3001 →
12.41	Track roller	R 900 - R 942 Litronic / 101 →
12.46	Carrier roller	R 900 - R 942 Litronic / 101 →

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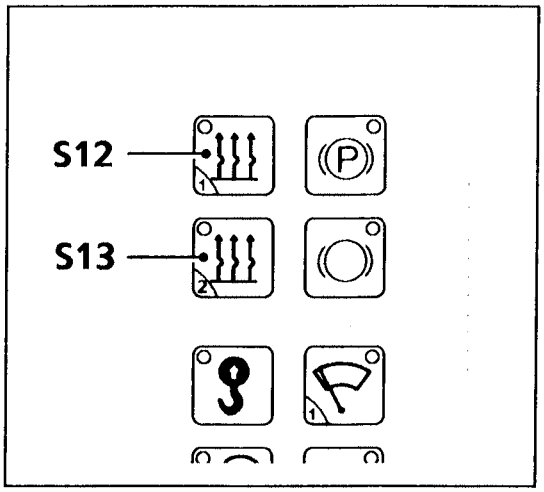
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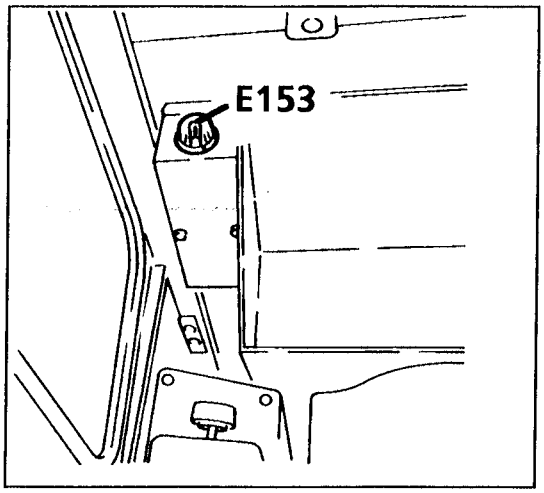
SUB GROUP INDEX

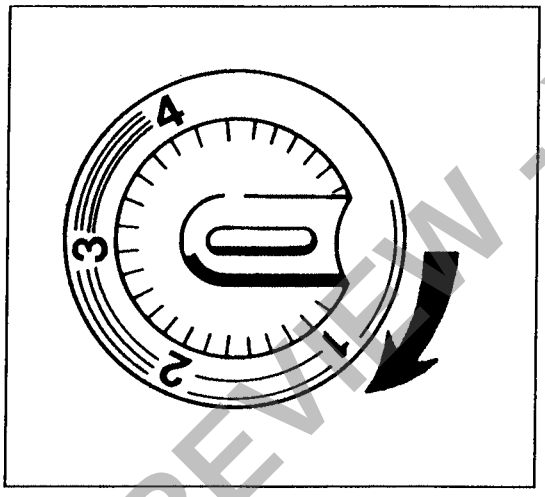
16.03.	Overload Warning Device	A / R 900, A / R 902 Litronic / 101 →
16.05.	Overload Warning Device	A / R 912 - R 942 Litronic / 101 →
16.10.	Load Check Valve / Rexroth	A / R 912 - R 942 Litronic / 101 →
16.12.	Load Check Valve / Oil control	A / R 900 - R 942 Litronic / 101 →
16.13.	Load Check Valve / Oil control	A / R 900 Litronic / 101 →
	Load & pressure independent	A / R 902 Litronic / 07.93 →
16.20.	Hydr. Installation Kit AS 1	A / R 900 - R 942 Litronic / 101 →
16.25.	Hydr. Installation Kit ASH	R 900 - R 942 Litronic / 101 →
16.30.	Hydr. Installation Kit AHS 1	R 900 - R 942 Litronic / 101 →
16.32.	Hydr. Installation Kit AHS 11	R 900 - R 922 Litronic / 3001 →
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16.35.	Hydr. Installation Kit AHS 2	R 900 - R 942 Litronic / 101 →
16.37.	Hydr. Installation Kit AHS 12	R 900 - R 922 Litronic / 3001 →
16.38.	Hydr. Installation Kit AHS 12	R 932 - R 942 Litronic / 3001 →
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16.72.	Pressure Cut In "Lift"	R 902 - R 942 Litronic / 101 → 2999
16.73.	Pressure Cut In "Travel"	R 900 - R 942 Litronic / 101 → 2999
16.75.	Forward / Reverse / hight adjustable Operator's cab	A / R 902 - R 942 Litronic / 101 →
16.77.	Elevated Cab, hydr. adjustable	A / R 902 - R 942 Litronic / 101 →
16.79.	Quick change coupling	A / R 900 - R 942 Litronic / 101 →
16.80.	Quick change coupler	A / R 900 - R 942 Litronic / 101 →
16.90.	Hydraulic hammer - General data	A / R 900 - R 942 Litronic / 101 →

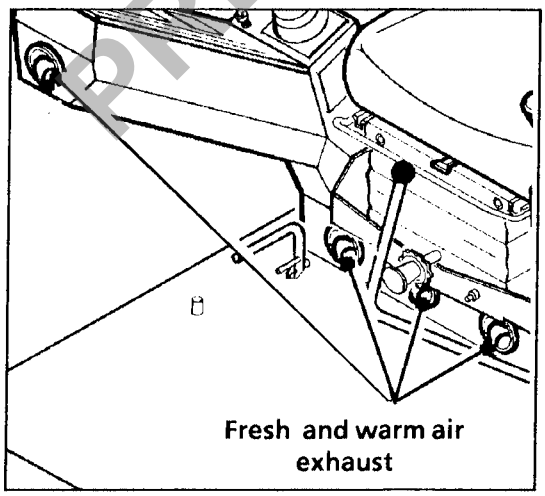
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Heater operation

The heater is controlled via the two pressure pads S12 and S13 - located in the display - and the control E153 - located behind the operator's seat.

Heater or cool air flows into the cab via nozzles under the operator's seat and on the control panel, see drawing below.

1. **Ventilation**

   The ventilation is turn on or off via switch S12 .

2. **Heater**

   The heater is turned on or off via switch S13 .

   When it is turned on, the green light in the control E153 lights up.

3. **Temperature control**

   The temperature is regulated steplessly via control E153, from minimum heat (about 10° C) via stage 1 to maximum heat (stage 4, about 30° C).

4. **Continued fan operation**

   After the heat is turned off via switch S13,the green indicator light turns off.

   The blower continues to run automatically for about 3 minutes to cool the heater off.

Important:

During the 3 minute after run, do not turn the heater on again!

For further guidelines, please consult the heater manufacturer's operating manual.

Important:

- During refueling of the excavator, turn the heater off.
- Do not run the heater while the excavator is parked in a garage.
- When welding on the machine, makes sure to pull the main fuse F205 (25 A - located in the control box / battery area) to protect the control unit.

Troubleshooting

1. **If the heater does not start:**

   - Turn the unit off and on again (max. 2 times).

   - check the fuse.

2. **If the heater overheats:** (the green indicator light will blink)

   - Find and remedy the cause (for example, clogged heater air channels)

   - Turn the heater off and on again.

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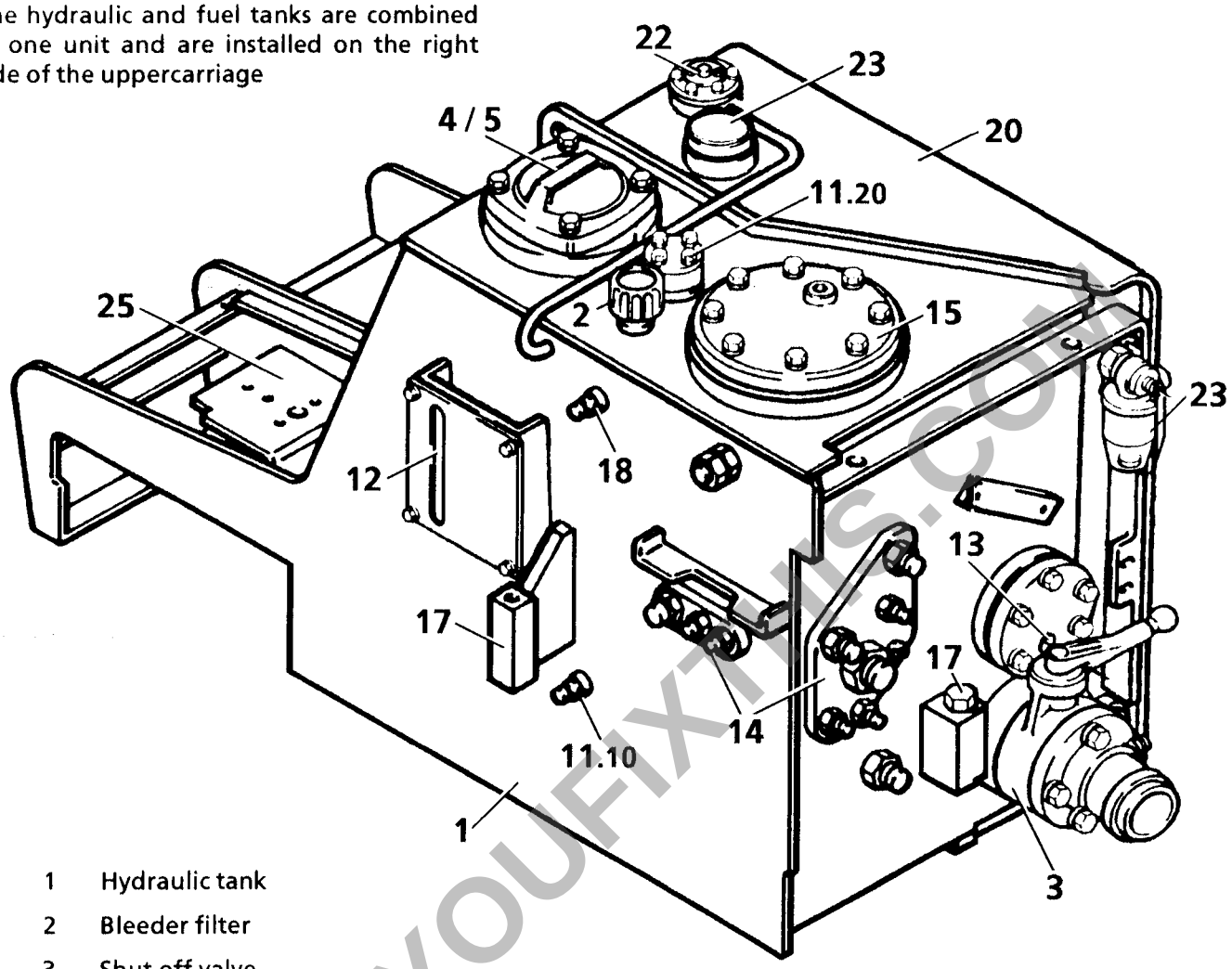
18.10	**Combinations**	A/R 900 - R 942 Litronic / from 101
18.20	**Tooth System**	A/R 900 - R 942 Litronic / from 101
18.35	**Shut off installation for grapple operation**	A/R 900 - R 942 Litronic / from 101

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1. Design and function of the tank system

The hydraulic and fuel tanks are combined in one unit and are installed on the right side of the uppercarriage



1	Hydraulic tank	17	Tank mounting
2	Bleeder filter	18	Bleeder screw (not on all units)
3	Shut off valve	20	Kraftstofftank
4	Return filter	21	Filler cap
5	Bypass valve	22	Fuel level probe (B1*)
11.10	Hydraulic oil level probe (B14*) ●	23	Fuel prefilter
11.20	Hydraulic oil level probe (B14*) ●	25	Space for refueling pump
12	Oil level check		
13	Oil temperature probe		
14	Hydraulic oil return connections		
15	Manhole cover		

* Positions as in electrical schematic, section 8.

● see also reverse page and page No. 19.10.02, reverse page.

Actuation pressure / bleeder filter 2 Air entry at 0.03 bar - air exit at 1.0 bar

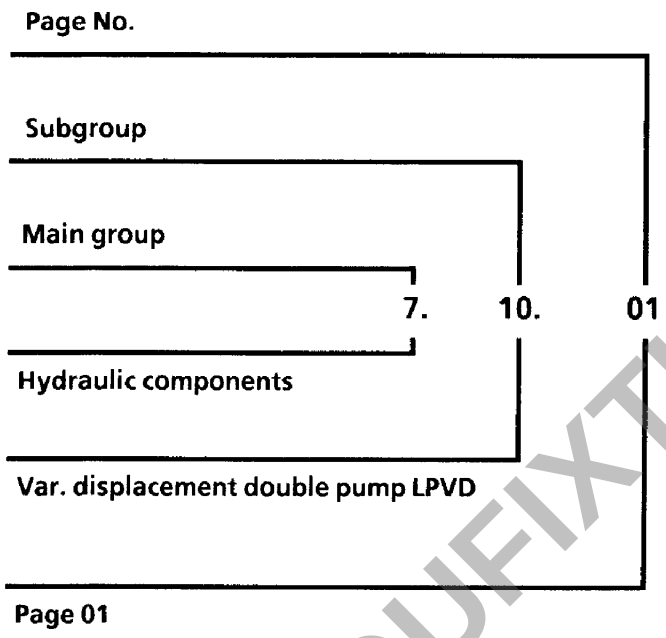
Opening pressure / Bypass valve 5 3 bar

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Explanation

In order to make it easy to find certain information or to remove and/or add pages in case of changes or improvements. the following system has been established:



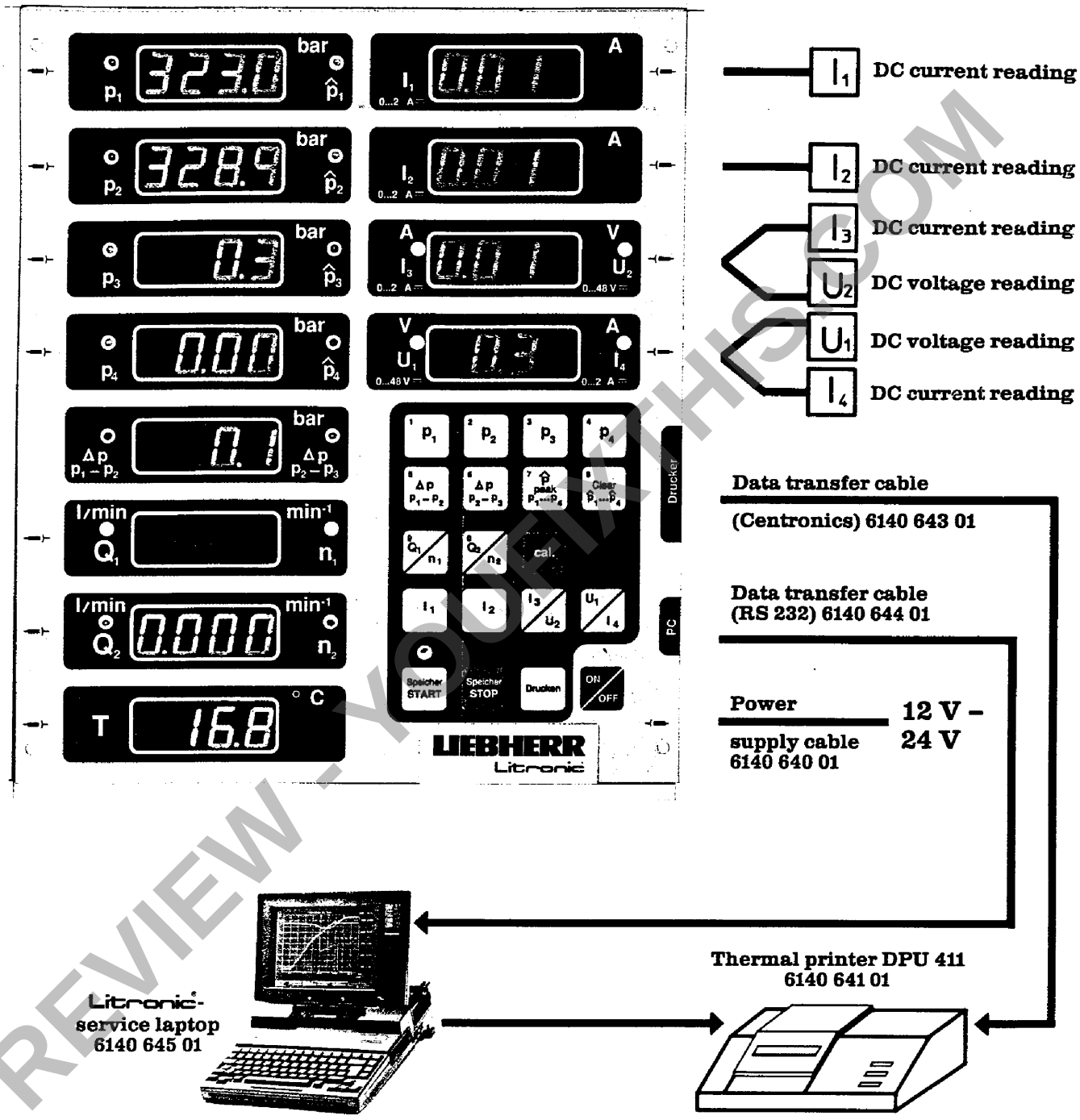
The index for the main groups can be found on the index page.

The subgroups can be found on the index page in front of the main group. In addition, the machines with serial numbers are listed on the index, which is valid for this subgroup.

In case of minor changes we will issue revised pages and update the date. If an already existent sub group is completely revised, we will assign a new sub group number.

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The service laptop (autonomy with its own battery is about 20'), the printer DPU 411 and the measuring system can be supplied from the machine 24 V DC circuit using one and only cable set, order number : 9757 624 01

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LIEBHERR	Benennung/Description/Dénomination	Typ Model Type: See page no. 2.
Datum Edition Date: 09.93	Litronic Measure System L M S	Ab From Depuis:
		Blatt Page Feuille: 2.30.03

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Datum : ..... **Betriebsstunden :** ..... **Name :** .....
Date / Working hours / Name
Date / Heures de marche / Nom

Gerät Nr. ..... **Pumpen Typ** ..... **Pumpen Nr.** .....
Machine / Pump type / Pump no.
Pelle / Type pompe / N° de la pompe

Überprüfung Test or adjustment *Contrôle*	**Meßstelle** Test point *Pt. de mesure*	**Sollwert** Rated value *Valeur théorique*	**Istwert** Measured value *Valeur lue*	**Ev. Einstellung** Evtl. adjustment *Réglage éventuel*	**Bemerkung** Notice *Remarque*
1. Grundeinstellung Basic adjustment *Réglage de base*					
1.1 Öltemperatur Oil temperature *Température huile*		**70 ±10° C**	.....	.....	
1.2 Obere Leerlaufdrehzahl Maximum idle RPM *Régime moteur maxi à vide*		**2110 +50 min⁻¹**	.....	.....	
1.3 Untere Leerlaufdrehzahl Low idle *Moteur au ralenti*		**800 +100 min⁻¹**	.....	.....	
2. Vorsteuerdruck Servo pressure *Pression de servo commande*	**42**	**35 +1 bar**	.....	.....	
3. Potentiometer Einstellung Potentiometer adjustment Réglage potentiomètre					
3.1 Obere Leerlaufdrehzahl Hebel senkrecht Maximum idle RPM Lever in vertical position *Régime maxi.* *Levier en pos. verticale*	**Klemmen A und B** Ports A and B *Bornes A et B*	**0 +0/+0,1 Volt**	.....	.....	**Poti drehen bis die Spannung zunimmt** Turn potentiometer till voltage increases *Tourner le potentiomètre jusqu'à ce que la tension augmente*
3.2 Untere Leerlaufdrehzahl Low idle *Moteur au ralenti.*	**Klemme A/B** Ports A and B *Bornes A et B*	**7,5 -0,2/+0 Volt**	.....	.....	**Gestänge einstellen** Adjust rod *Régler la tringlerie*
4. Grenzlastregel. Überprüfung Electr. Horsepower limiter control *Vérification régulation électronique*					**Messen bei oberer LLD** Measure at max RPM *Mesurer au régime maxi*
4.1 Strom bei Neutralstellung Current in neutral position *Courant en l'absence de pilotage*		**0 mA**	.....	.....	
4.2 Strom bei Arbeitsstellung **Ausrüstung und Fahren,** Current in working position Attachment and travel *Courant pour mouvements de l'équipement et de translation*		**750 -10/+20 mA**	.....	.....	
5. Druckabschneidung P1/P2 Pressure cut off P1/P2 *Commutation de débit P1/P2*					
5.1 Druck bei Schaltbeginn auf Meßst. 41 / 40 ablesen Read on test point 41 / 40 beginning of pressure cut off *Lire la pression de début de commutation sur 41 / 40*	**41/40** **44/43**	**300 ±5 bar** **⟨ 150 bar ↓**	.... / .... /	.... / .... /	**Wenn Stelldruckabfall Mestelle 44 / 43beginnt** When position pressure on 44 /43 begins to drop *Lorsque la pression de positionnement en 44 / 43 commence à chuter.*
5.2 bei Schaltende At end of pressure cut off *En fin de commutation*	**41/40** **44/43**	**310 ±5 bar** **< 10 bar**	.... / .... /	.... / .... /	**Muß Stelldruck circa gleich Tankdruck sein** Positioning pressure must be ~ tank pressure *La pression de positionnement est ~ à la pression du réservoir*

LIEBHERR

Datum/Edition/Date

10.91

Benennung/Description/Dénomination

Einstellprotokoll
Adjustment check list
Rapport de réglage

Typ / Model / Type: R 912 / 2001, R 922 / 101

Ab/from/à partir de: Litronic

Blatt/Page/Feuille: **6.12.05**

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7.70	1 - way Rotary connection	R 902 to R 942 Litronic / 101 →
7.74	5 - and 7 - way Rotary connection	A / R 900 to R 942 Litronic / 101 →
7.81	Primary pressure relief valve - pilot operated	A / R 902 to R 942 Litronic / 101 →
7.83	Pilot operated Pr. relief valve w. pressure cut in	A / R 900 to R 942 Litronic / 101 →
7.85	Pilot operated Pr. relief valve w. suction function	A / R 900 to R 942 Litronic / 101 →
7.86	Pilot operated Pr. relief valve w. suction function	A / R 900 to R 942 Litronic / 3001 →
7.87	Secondary pressure relief valve	A / R 900 to R 942 Litronic / 101 →
7.89	Suction valve	A 900 to A 932 Litronic / 101 →
7.90	Suction valve	A / R 900 to R 942 Litronic / 3001 →
7.91	Restrictor check valve	A / R 900 to R 942 Litronic / 101 →
7.95	Load holding valve	A / R 900 to R 942 Litronic / 101 →
7.96	Load holding valve	R 900 Litronic / 141 → R 902 to R 942 Litronic / from about 11.92
7.97	Brake valve	R 900 to R 942 Litronic / 101 →
7.98	Brake valve	R 900 to R 922 Litronic / 3001 →

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3.3 Check valves 152, 153 ...

3.3.1 To remove check valves

Remove plugs 95 with o-ring 86 and remove spring 63 with poppet 152, 153...

3.3.2 To install check valves 152, 153 ...

Fit the poppet guide 95 with o-ring, insert the poppet 152, 153, ... with the spring 63, screw in the complete guide and torque it to the prescribed value.

3.4 Distributor block 115

3.4.1 To remove the complete distributor block 115

Remove the eight screws 75 and remove the distributor block 115. Remove the seal rings 87, 42 and 43.

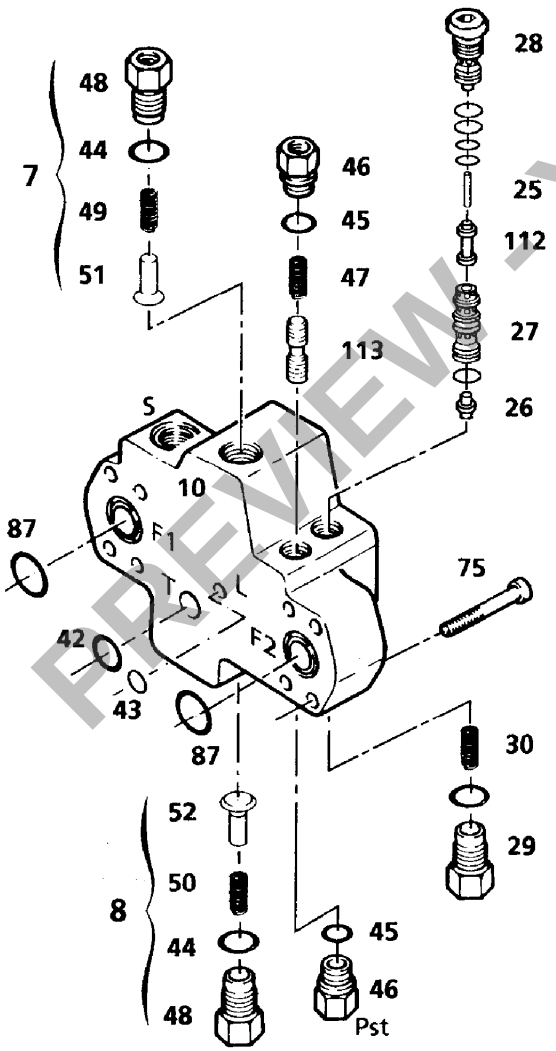
3.4.2 To install the complete distributor block 115

Insert the seal rings 87, 42 and 43 into the corresponding grooves and mount the distributor block with screws 75 .

3.4.3 Removal and installation of the stop valve 7 and pretension valve 8.

Remove the fittings 48 with o-rings 44 and remove springs 49 / 50 and poppet 51 / 52 .

If both stop valve 7 and pretension valve 8 are removed, make sure that they are not mixed up. (Pretension valve 8 with the longer spring is to be installed on the side of connection T, on the bottom of the distributor block).



3.4.4 Removal and installation of the valve 113

Remove both fittings 46 (Connections Pst and L) with o-rings 45 and remove spring 47 .

Push out the piston of the distributor valve 113 and hold it in its installation position to make sure it is installed in the right direction.

For installation, lightly grease piston 113 and push it into the valve housing 10, insert spring 47 and install both fittings 46 with o-rings 45.

3.4.5 Removal and installation of the valve 112

Notice :

This work is to be done preferably with distributor bloc 115 in horizontal position.

- Unscrew the plug 28 and the spring guide 29. Remove the spring 30, the rod 25 and push out the sleeve 27 complete with pistons 26 and 112.

Caution :

The exacte position of mounting parts 25, 26 and 112 must be noticed, so to avoid wrong position during reinstallation.

- Check that pistons 26 and 112 move freely inside sleeve 27 and that rod 25 moves freely inside plug 28.
- Fit the sleeve 27, the guide 29 and the plug 29 with new seal rings, lubricate all this parts with oil and reinstall them.
- Retighten plug 28 and spring guide 29 to prescribed torque.

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Pos.	Description	Step
S1	Starter and preglow switch	11
S2	Switch Unit	12
S4	Switch / Horn	7
S5	Switch / Grapple (A)	18
S7	Safety Switch - Servo cut off	9
S10	Switch / Floodlights	12
S11	Switch /windshield washer	12
S12	Switch / Heater Stage 1	13
S13	Switch / Heater Stage 2	13
S14	Switch / Windshield wiper - Stage 1	14
S15	Switch /Windshield wiper - Stage 2	14
S16	Switch / Travel brakes	16
S17	Switch / Swing brake	16
S18	Switch / Overload warning device	15
S19	Switch / Grapple	17
S20	Switch / Sensor control	17
S21	witch / VariableTravel motors	17
S25	Switch / Fuel pump (A)	11
S55	Reserve switch on left joystick	18
T1	Voltage transformer(A)	8
U1	Electronic - Horsepower control	20
U2	Electronic - Sensor control (A)	17
V1	Diode / Terminal 15	11
V2	Diode / Servo control	9
V3	Diode / Battery charge	5
V30	Diode on U2 / Travel pedals (A)	17
V31	Diode on U2 / Left joystick (A)	17
V32	Diode on U2 / Right joystick (A)	17
X1	Connector - Test plate A1 / 15 poles	
X2- 1	Connector - Test plate A1 / 12 poles	
X2-2	Connector - Test plate A1 / 12 poles	
X3	Connector - Test plate A1 / 12 poles	
X4	Flat Connector - Test plate A1 / 37 poles	
X5-1	Connector - Test plate A1 / 12 poles	20
X5-2	Connector - Test plate A1 / 9 poles	20
X6	Flat Connector - Test plate A1 / 37 poles	3
X7	Connector - Test plate A1 / 9 poles	20
X8	Connector - Test plate A1 / 5 poles	17

Pos.	Description	Step
X9	Connector - Test plate A1 / 10 poles	9
X10	Connector - Test plate A1 / 2 poles	8
X11	Connector - Test plate A1 / 2 poles	11
X12	Connector - Test plate A1 / 2 poles	21
X13	Connector - Test plate A1 / 9 poles	21
X14	Connector - Test plate A1 / 12 poles	12
X15	Connector - Test plate A1 / 5 poles	17
X15-1	Connector - Left joystick / 5 poles	18
X15-2	Connector reserve / 2 poles	18
X16	Connector - Test plate A1 / 2 poles	7
X17	Connector - Test plate A1 / 2 poles	11
X18	Connector - Test plate A1 / 2 poles	9
X19	Connector - Test plate A1 / 2 poles	17
X40	Connector - Test plate A1 / 3 poles	5
X41	Flat Connector Test plate A1 / 1 pole	6
X43	Connector - Test plate A1 / 3 poles	21
X65	Connector T1 + 24 V / 2 poles	8
X66	Connector A3 / 2 poles	8
X67	Connector T1 + 12 V / 2 poles	8
X80	Connector U2 / 3 poles	17
X81	Connector U2 / 3 poles	17
X89	Connector H1 / 15 poles (code plug)	8
X95	Connector - Test plate A1 / 9 poles	16
X98	Connector for bridging over Qmin / 1 pole	19
X115	Connector - test plate A1 / 2 poles	1
X116	Connector - test plate A1 / 3 poles	16
Y1	Solenoid valve / Preglow	10
Y3	Solenoid valve / Servo pressure	9
Y4	Solenoid valve / Pump regulation - P1	20
Y5	Solenoid valve / Pump regulation - P2	20
Y6	Solenoid valve / Travel brakes	16
Y7	Solenoid valve / Swing brake	16
Y22	Solenoid valve / Grapple drive(A)	18
Y23	Solenoid valve / Grapple drive(A)	18
Y24	Solenoid valve / Variable travel motor (A)	17
Y27	Solenoid valve / Sensor control(A)	17

(A) **Optional Attachment**

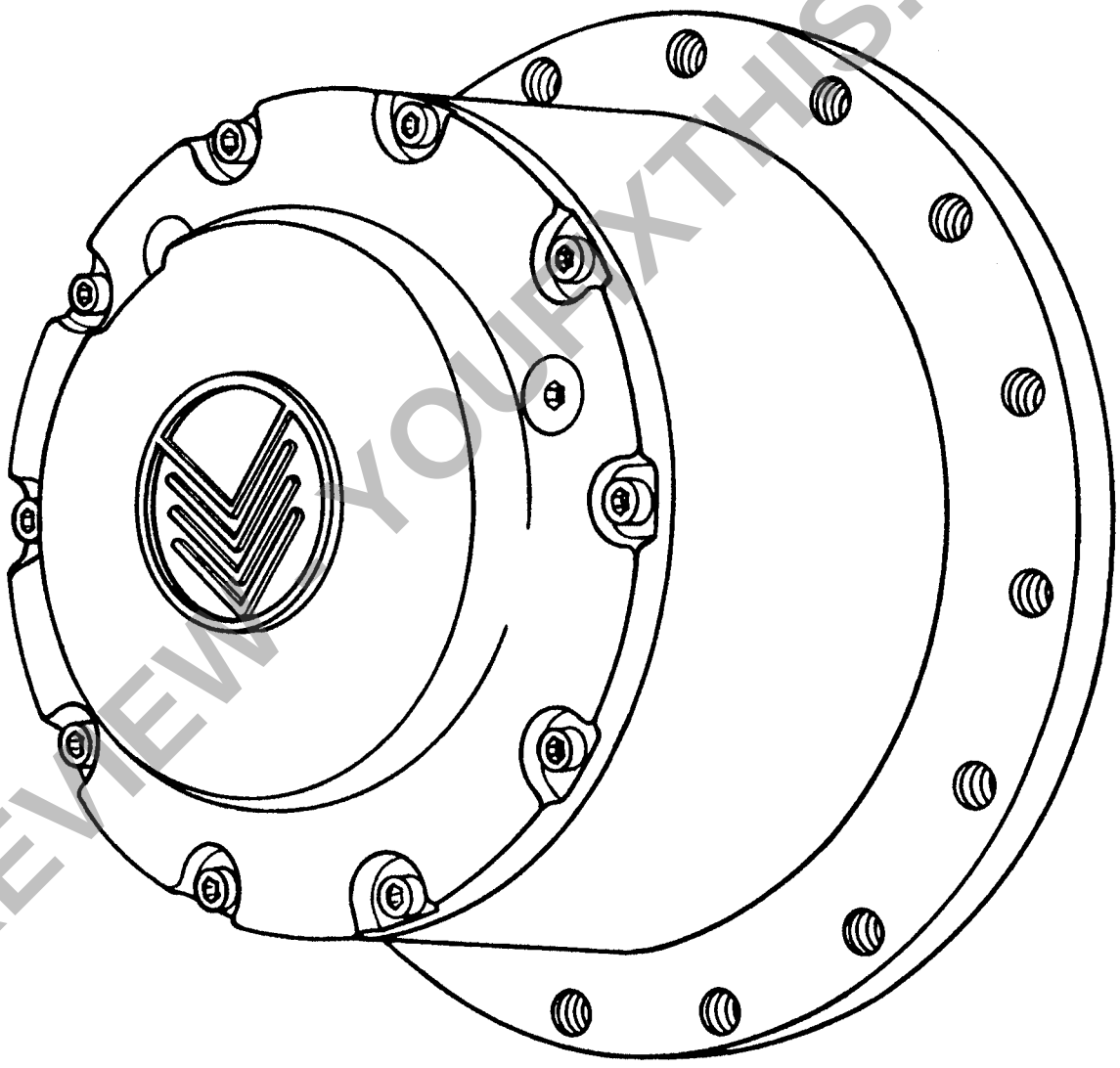
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Construction of travel gear

The three stage planetary gear is driven by the attached hydraulic oil motor.

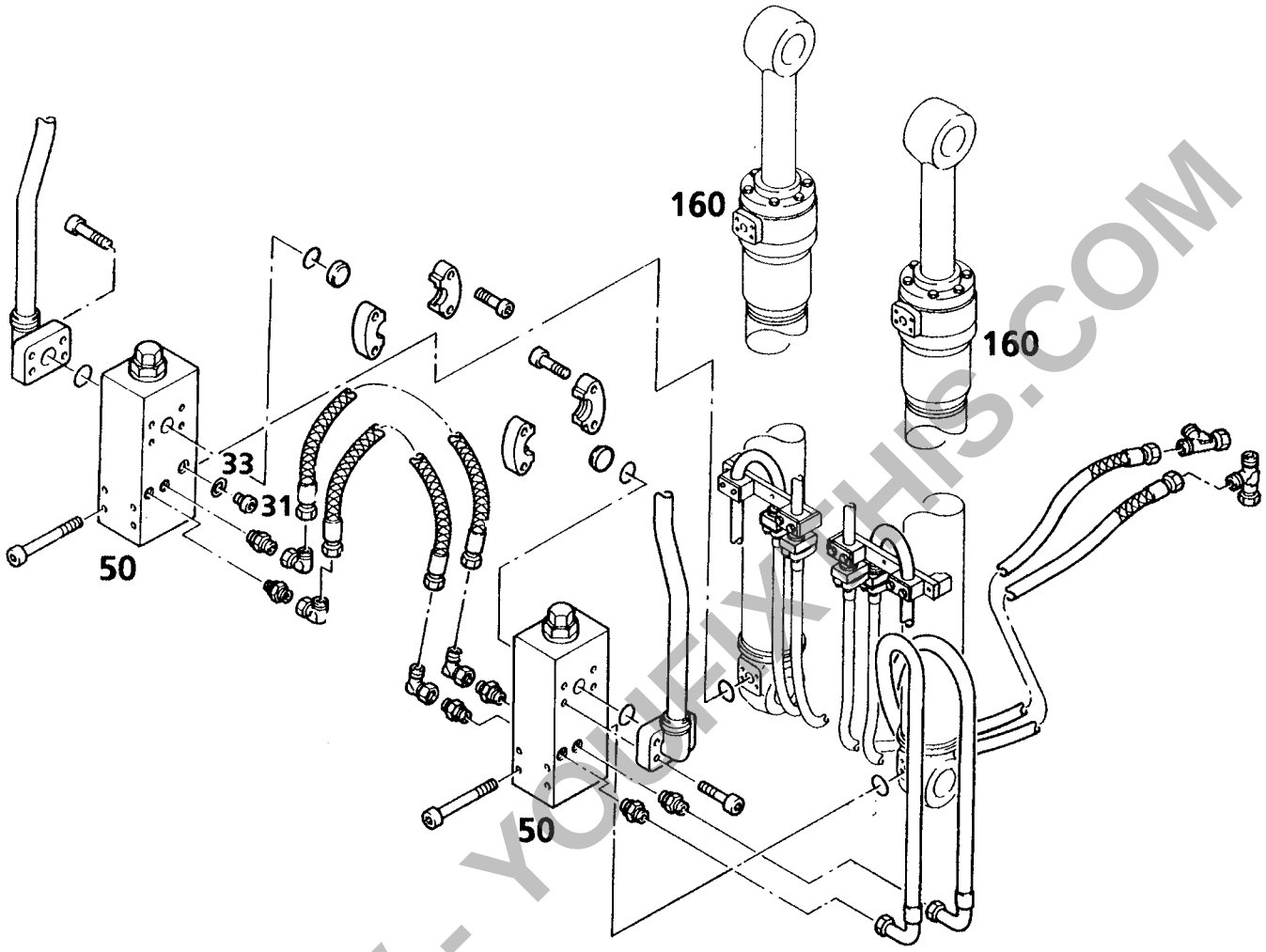
It moves the track chain via the sprocket wheel, which is attached to the gear. The wet disc brakes, which are integrated in the gear are applied directly onto the gear. The brakes are used as spring applied brakes and are hydraulically vented, i.e. if there is no brake pressure, the discs are pressed together by springs, the brake is held closed mechanically.



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3.5 After correct adjustment, install lock nut 21 with seal 34 . Hold stop screw 19 when tightening.



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9 Brake piston
14 Nozzle
16 Sleeve (Check valve)
19 Stop screw (Limit / piston stroke)
20 from Var. displacement pump P2 (*)
31 Plug / connection E
33 Seal
40 Test point Pump P2 (standard) (*)
48 Test point (not standard)
50 Load check valve, complete

81 from right servo control (*)
100 Control block 6 way or 7way (*)
101 Control piston / Boom cylinder (*)
110 Control piston / summation - Boom cylinder (*)
120 Primary - pres. relief valve / left control block (*)
126 Secondary pressure relief valve / extend boom cylinder (*)
160 Boom cylinder (*)
161 Distributor / Boom cylinder (*)
162 Restrictor check valve (*)
165 Lift limit / Control piston 101 (restrictor) - installed from Feb. 91

* Positions in hydraulic schematic, section 6.

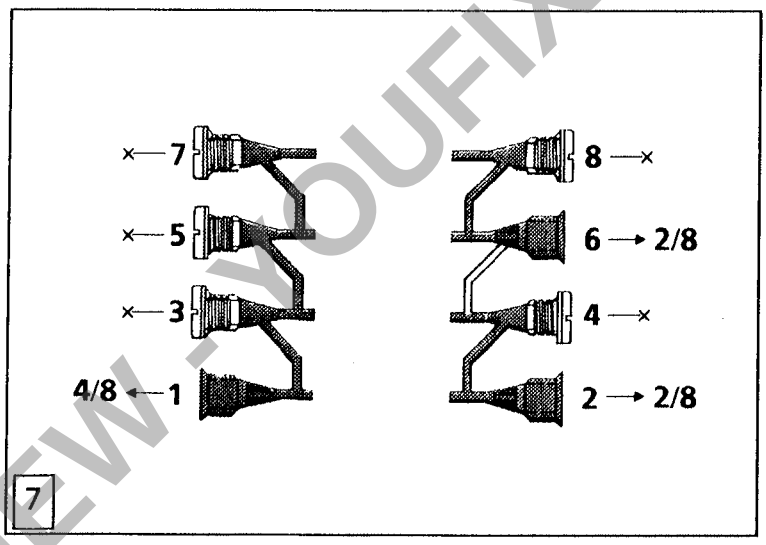
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Exemple (see fig.7)

The outlets 3, 4, 5, 7 and 8 of an 8-outlet metering device are closed.
In this case, half of the total amount of grease flows over outlet 1, and a fourth part is delivered via each outlet 2 and 6.

Importants Notes :

1. **Never close the outlets 1 and 2 of a metering device, or the whole system would be blocked.**
2. **Always use original outlets fittings.**
3. **Always ensure that the brass clamping ring is correctly assembled in outlets to be used.**
   If an outlet must be closed, remove the brass clamping ring, and plug the outlet. Exclusively use the plug (Id. no. 7011340) and the seal (Id. no. 7011344),
   Never close off an unused distribution line.



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