For your information

This manual contains technical data, descriptions of design and function, repair and adjustment guidelines as well as numerous drawings, functional views and illustrations

LIEBHERR - crawler dozers (PR) serial 4.

This manual should simplify competent customer service of our products, does however, not replace expert and qualified training and an attendance of our factory schools.

Information which is in trade considered basic knowledge is not included. Operation and spare parts information can be found in separate manuals.

The manual will be updated as necessary when changes occur in series.

⚠ This symbol is used in the manual for very important notes.

Note!
This sign marks special important notes in the manual.

During the activities on the machine, accident prevention regulations and safety guidelines must be strictly observed.

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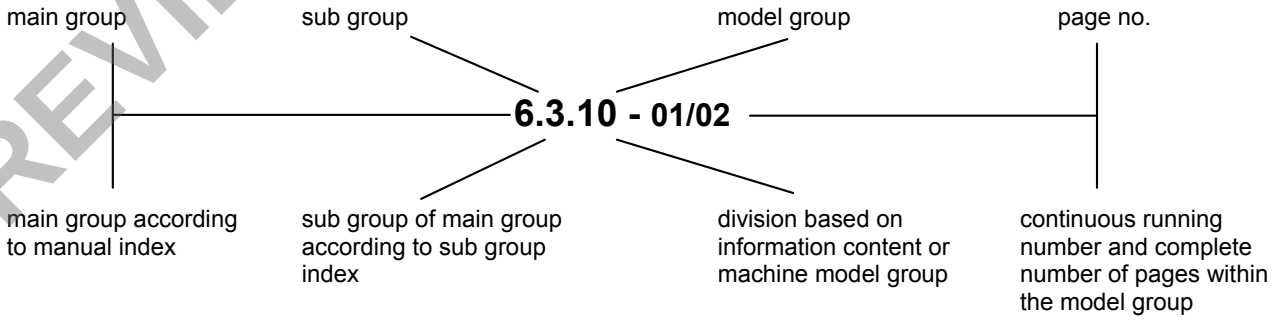
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We reserve the right to make changes of technical details on the machine in comparison to the information and drawings in this manual.

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Explanation of structure (page numbers)

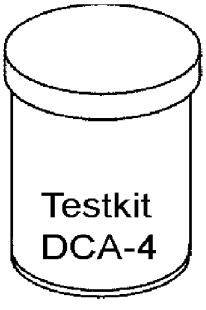
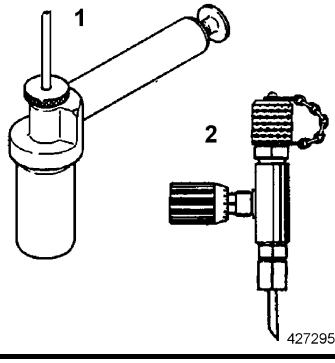
In order to find specific information and add supplements more easily, the following numbering system is being used:



Sometimes there is a number behind the page number, e.g. 9.4.20 - 13/15 - **02**. This number stands for supplements, especially at current flow diagrams, when only one page is supplemented to the schematic.

Updated pages retain the same page number, but receive a more recent date when mailed. Supplements have a new number. If the page is only valid for a certain machine model group, it will so be indicated on the page.

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Description	Id. No.	M-Type	Remarks	Illustration
Digital RPM gauge „Shimpo“	**7364284**	**PR** Series 4 **LR** Series 4 **RL** Series 4	To measure the RPM with Reflexion strip Test range: 6-8300 rpm ±1 rpm	 428065
Reflexion strip	**614063201**			
Digital RPM gauge „Piezzo A2106“	**10286429**	**PR 724** S/Nxxx-6600→9199 **PR 734** S/Nxxx-6200→8219 **PR 764** S/Nxxx-6888→9505	To measure the engine RPM via the impulse frequency of the injection line	 428808
DCA 4 Test Kit „CC2602M“ Consists of: Container 50 Test strips Clear plastic container Pipette	**5608459**	**PR 724** S/Nxxx-6600→9199 **PR 734** S/Nxxx-6200→8219 **PR 764** S/Nxxx-6888→9505	To check the DCA4 concentration in the coolant	 426758
Hand pump [1]	**8145666**	**PR** Series 4 **LR** Series 4 **RL** Series 4	To take oil samples for oil analysis	 427295
Oil sample valve for oil samples [2]	**7019068**			
Oil analysis set – Mineral oil (green lid) Individual set 4 Sets 6 Sets 12 Sets	 **8145660** **10029626** **7018368** **7018369**	**PR** Series 4 **LR** Series 4 **RL** Series 4	Analysis at WEAR CHECK Germany	 427294
Oil analysis set – Bio oil (yellow lid) Individual set 6 Sets	 **7026817** **7026088**			

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Sub Group Index - Technical Data - Maintenance Guidelines

Technical data **3.1**

Maintenance and inspection guidelines **3.2**

Maintenance and inspection instructions **3.3**

Quick reference for machine adjustment **3.4**

Adjustment checklist **3.5**

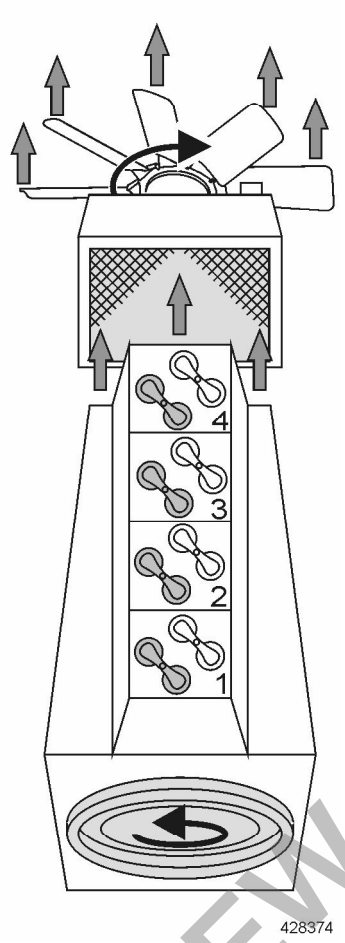
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Fan and cylinder configuration

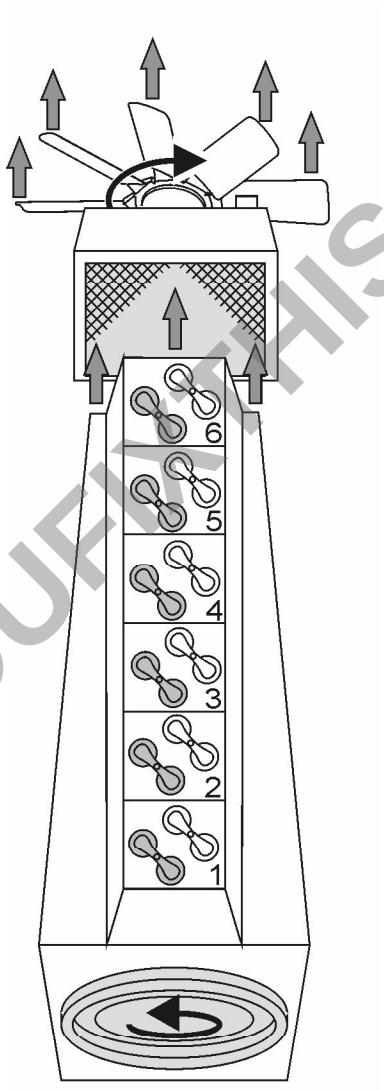
The hydraulically driven fan is installed behind the cooler, as seen in direction of travel. The air flow drawn in through the cooler from the engine compartment is discharged to the outside by the fan.

1. LH - engines

1.1. 4/6 Cylinder in line engines



428374

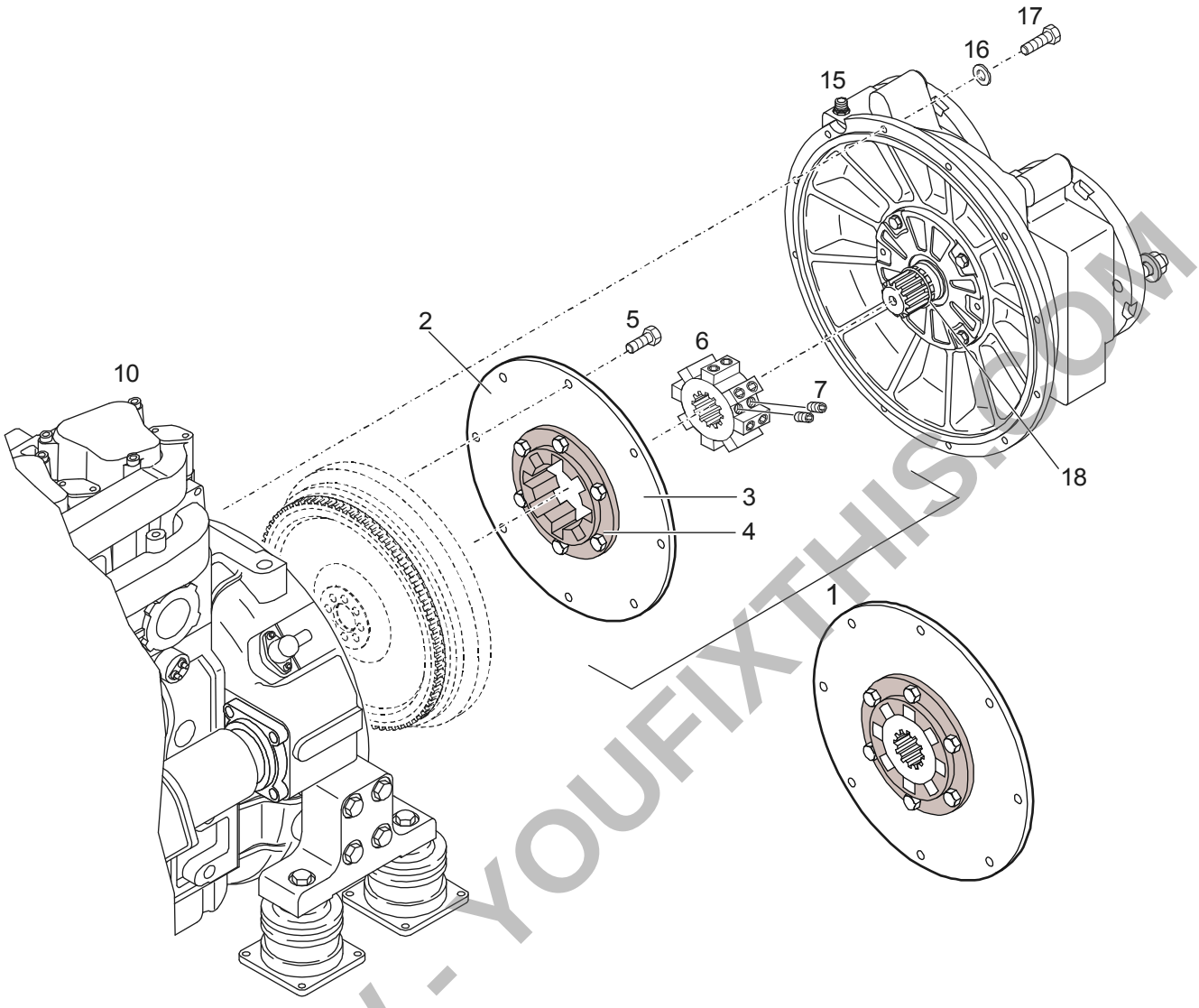


428375

= Inlet

= Outlet

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1 coupling cpl.
2 coupling plate cpl.
3 flange
4 resilient element
5 hex head screw
6 coupling hub
7 set screw

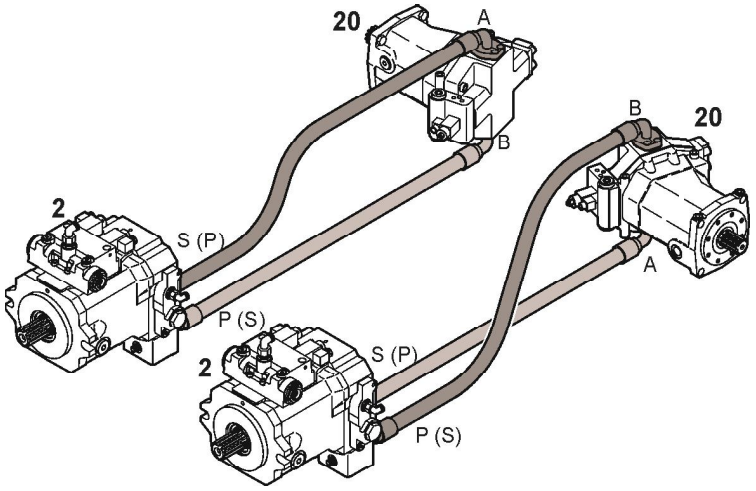
10 Diesel engine

15 splitter box
16 washer
17 hex head screw
18 ring

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1.2. Closed loop circuit / speed regulation

The closed loop circuit consists of a variable flow travel pump 2 which is connected to the variable flow travel motor 20 with two high pressure hoses.



The travel pumps are regulated via two proportional solenoid valves per pump. They determine the direction (= travel direction) and flow (= speed range).

The intake volume of the travel motors (= higher speed) is regulated via pressure lines, also by the pump proportional solenoid valves. The change-over from pump to motor regulating range is stepless.

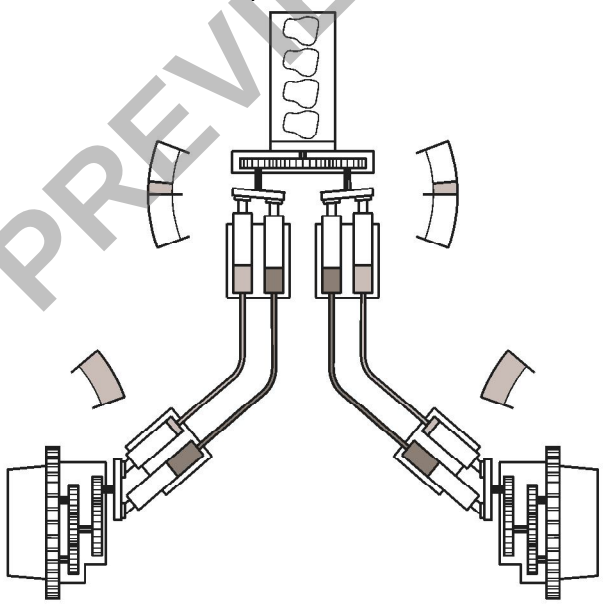
Three speed ranges are available via the electronic control:

- Maximum speed range (stage III): 0 - 11 km/hr.
- Medium speed range (stage II): 0 - 7,8 km/hr.
- Low speed range (stage I): 0 - 4,5 km/hr.

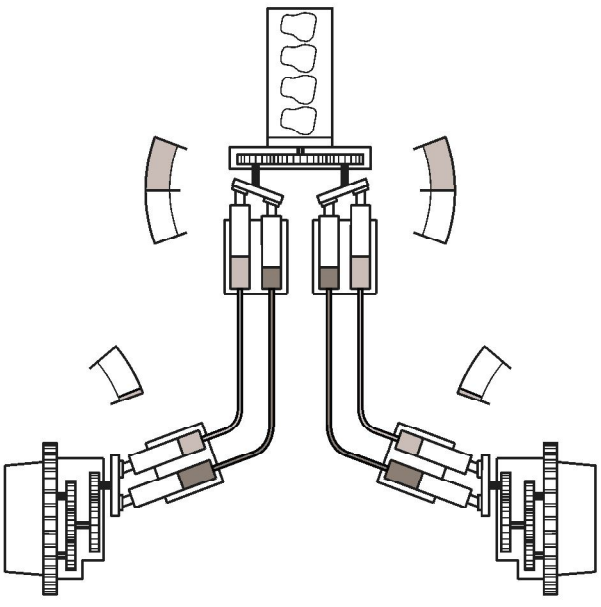
This type of regulation with the same Diesel engine output results in:

- **slow speed = high torque**
  on travel pumps - small pump angle = small flow
  on travel motors - large motor angle = large consumption
- **high speed = reduced torque**
  on travel pumps - large pump angle = large flow
  on travel motors - small motor angle = small consumption

slow speed



maximum speed



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Description

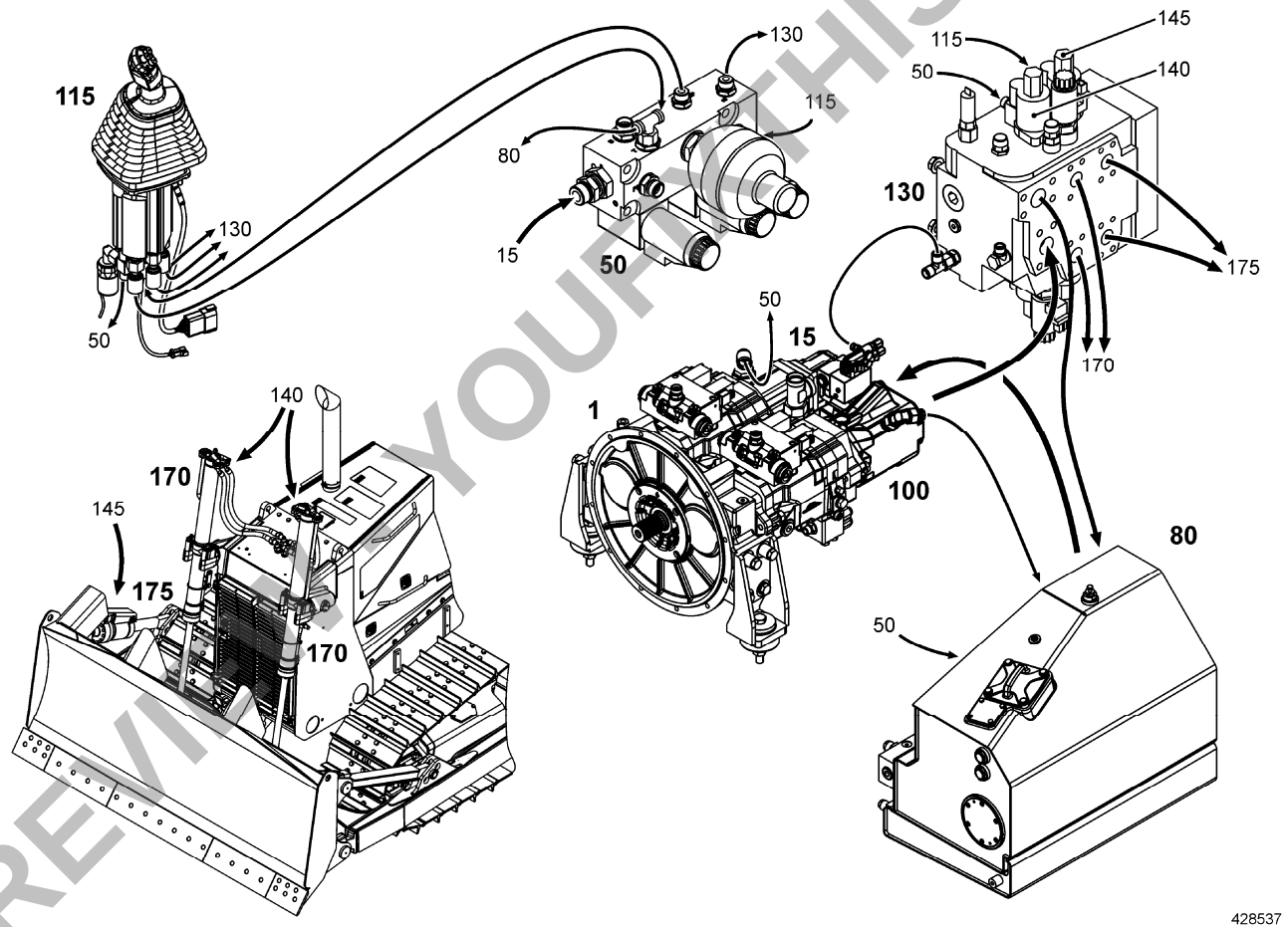
1. Description

The working hydraulic system works in open circuit. During operation, oil is supplied from the hydraulic tank by a regulating pump (on demand controlled) via a spool valve to the user (cylinder). From the opposite side of the user, oil flows back via the spool valve and oil cooler to the hydraulic tank. The oil return is slightly restricted to avoid cavitations.

The pressure created in the system depends on the working resistance and is limited upward by pressure relief valves. The control of the spool valve is made via hydraulic pilot controls with pressurized oil from the travel hydraulic system part "Replenishing".

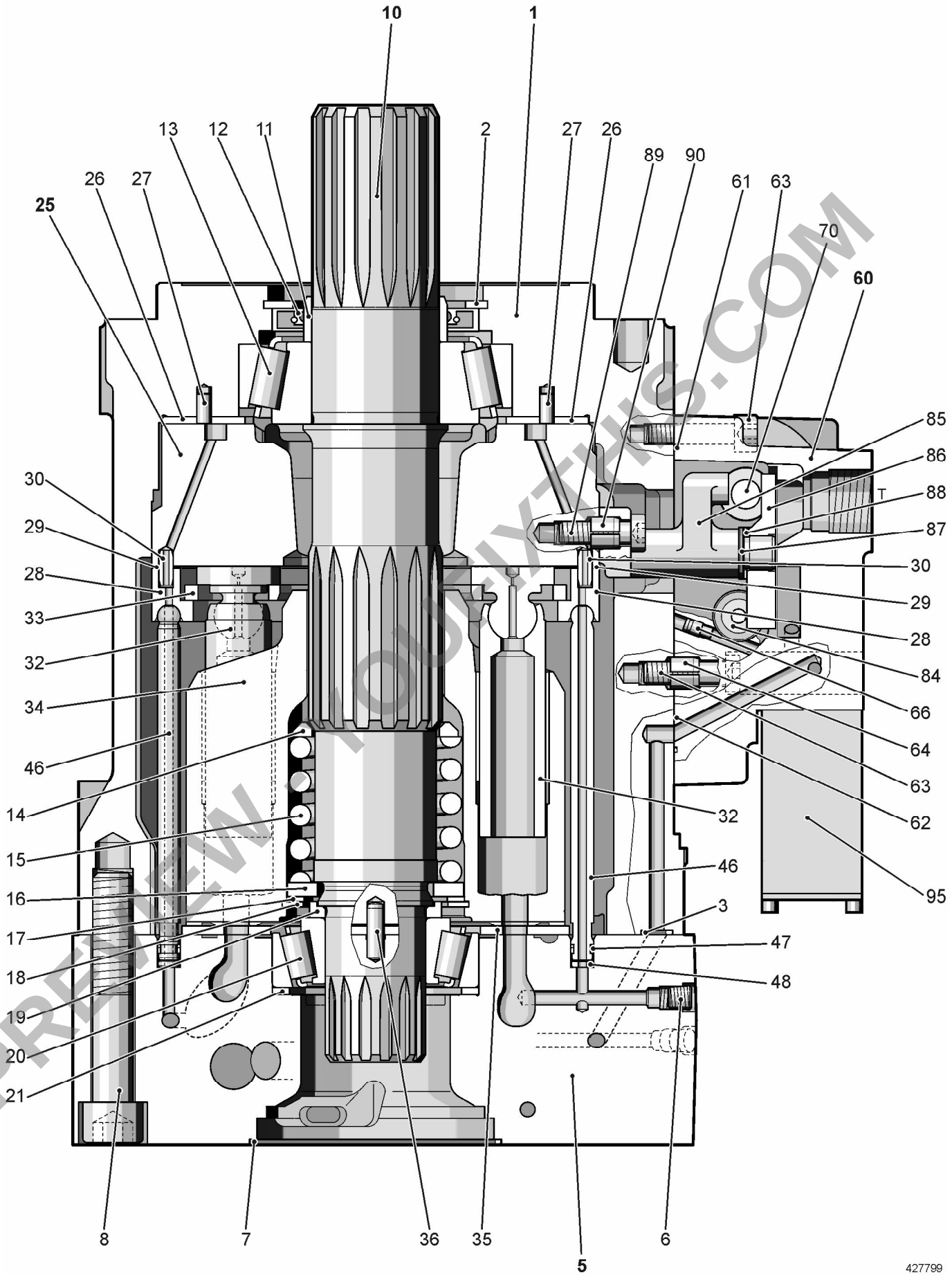
In case of simultaneous actuation of the travel and working hydraulic, the working hydraulic always receives the full output demand from the Diesel engine. The possible horsepower demand of the travel hydraulic is limited by the horsepower regulation to the horsepower still available from the Diesel engine and thus protects the engine constantly from being overloaded.

1.1. Main components - overview



1	Diesel engine / splitterbox	115	Joystick
15	Replenishing pump (Servo control - WH) (Replenishing - TH)	130	Control valve block
		140	Spool valve lift / lower
50	Distributor block	145	Spool valve tilt
80	Hydraulic tank	170	Hoist cylinder
100	Regulating pump	175	Tilt cylinder

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Sub Group Index - Electrical System - Plans and Components

Code letter explanations **9.1**

Functions **9.2**

Fuses, panel points, notes **9.3**

Current flow diagram **9.4**

Instrument panel **9.5**

Component arrangement **9.6**

Travel control devices **9.7**

Travel control joystick 9.7.00

Inching – brake pedal 9.7.25

Inching – brake pedal 9.7.30

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Changes of technical details of machines as compared to data and illustrations in existing documentation are reserved. Illustrations should be considered to be for symbolic purposes only and any descriptions shown might deviate from the displayed version due to technical updates.

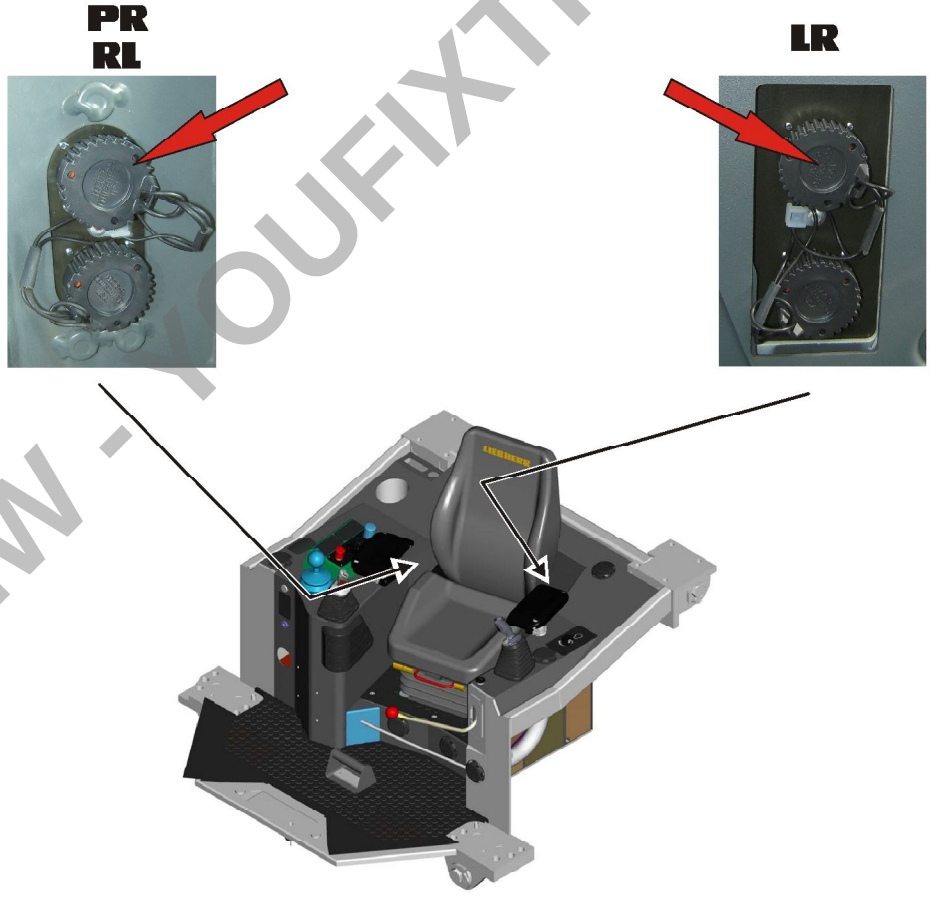
2 Program start LinDiag

Important Notes

Note!
Before working with the LinDiag, deactivate the screen saver and energy saving measures (turn monitor off, hard drive in energy saving mode, etc.) on computers.

▶ Machine ignition off

Establish the connection to the machine



429140

▶ Connect the LinDiag diagnostics cable.
▶ Connect Plug to PC.
▶ Connect Linde USB dongle PC.
▶ Machine ignition on.

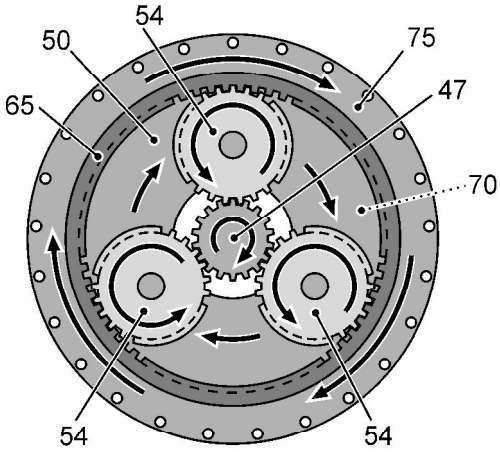
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2.1. Spur gear stage:

The variable displacement motor (VM) drives the drive shaft (30) of the spur gear stage via the gears of the disk carrier (25). The pinion of the drive shaft transfers the rotating movement to the centrally located spur gear (35), whereby the first stage of the speed reduction is reached.

2.2. Planetary stage:

The second stage of the RPM reduction is carried out via the planetary stage, to obtain the required torque and the reduced speed on the output flange (reduced speed = high torque).



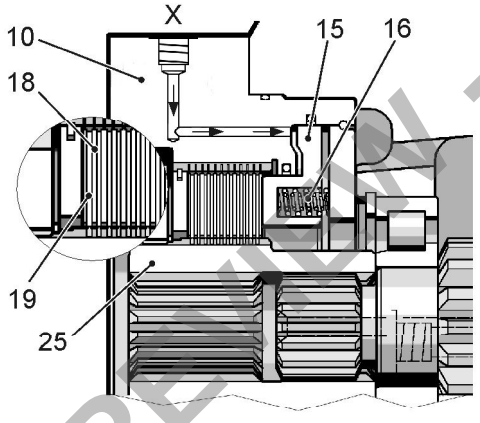
The connection between the spur gear stage and the planetary gear is made via the gear on the extended shaft of the sun gear (47). The sun gear is not set, it is centered via the spur gear (35) and the three planetary gears (54).

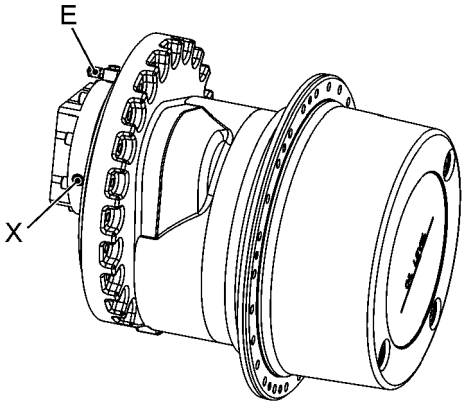
The ring gear (65) is positioned and held by the support flange (70).

The rotating movement of the sun gear (47) is transferred to the three planetary gears (54), which are offset by 120°, and which roll off on the fixed ring gear (65). This reduced rotating movement is transferred via the axles (57) to the planetary carrier (50), which in turn is connected with the output flange (75).

2.3. Brake:

The brake is designed as a "wet disk brake" and acts as a parking brake. The brake housing (10) is rigidly attached to the connector housing and holds the outer disks (18). The disk carrier (25) is connected via a gear with the variable displacement motor as well as the drive shaft and carries the inner disks (19). The hydraulic actuation occurs via the connection (X) on the brake housing. To bleed the brake, an additional connection (E) is installed on the brake housing on newer machines.





Neutral position:

In neutral position (standstill), no oil is available on connection X. The pressure springs (16) press the ring piston (15) against the outer and inner disk assembly. The created friction between the disks prevents the gear from turning and the machine can be held in place even in steep terrain.

Travel operation:

If the travel joystick is moved in travel operation from neutral position, the ring piston (16) is actuated with pressurized oil via connection X and is moved against the pressure springs (15). The friction between the outer and the inner disks is eliminated and the final drive can be driven.

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12.2.00 Design, function, wear and evaluation

1 Design

The drive power of the machine is directed from the travel gear via the sprocket to the track chain and from there via the grouser to the ground.

Idler, track rollers and carrier rollers guide the chain for better distribution of the machine weight to the existing surface, whereby an even ground pressure, good traction and stable travel behavior can be obtained.

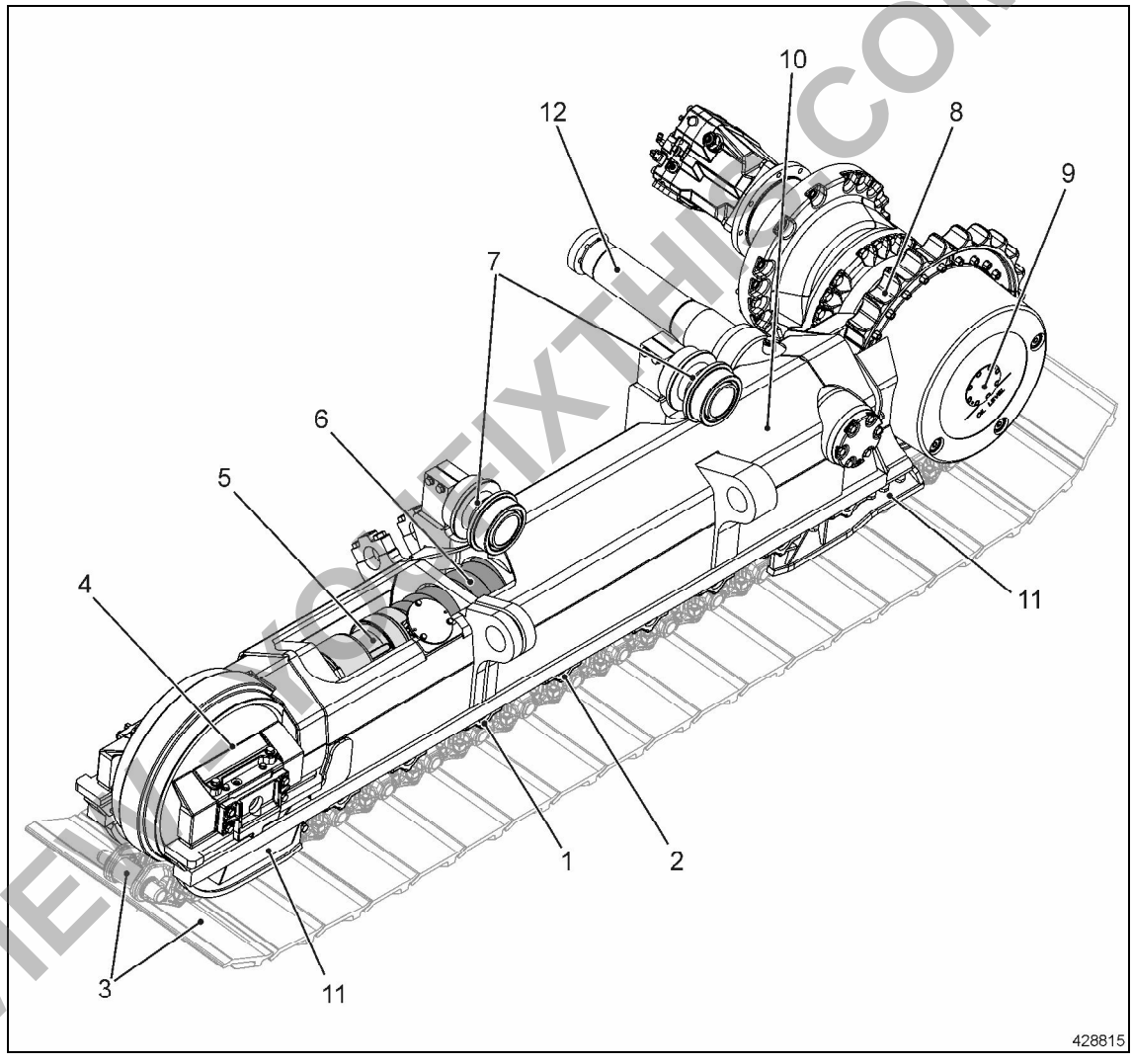


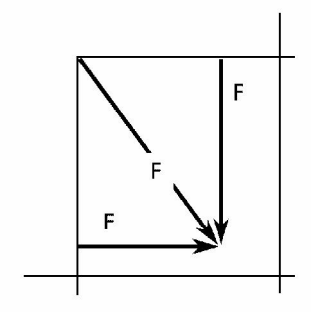
Fig. 1 Track design

1	Track roller, single flange	7	Carrier roller
2	Track roller, double flange	8	Sprocket (segments)
3	Chain with track pads	9	Travel gear
4	Idler with guide and fork	10	Track roller frame
5	Grease cylinder	11	Chain guide
6	Spring assembly	12	Support axle

Additional equipment: Track roller guard or chain guide – center (not shown)

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2. Function of the L-shaped push frame construction

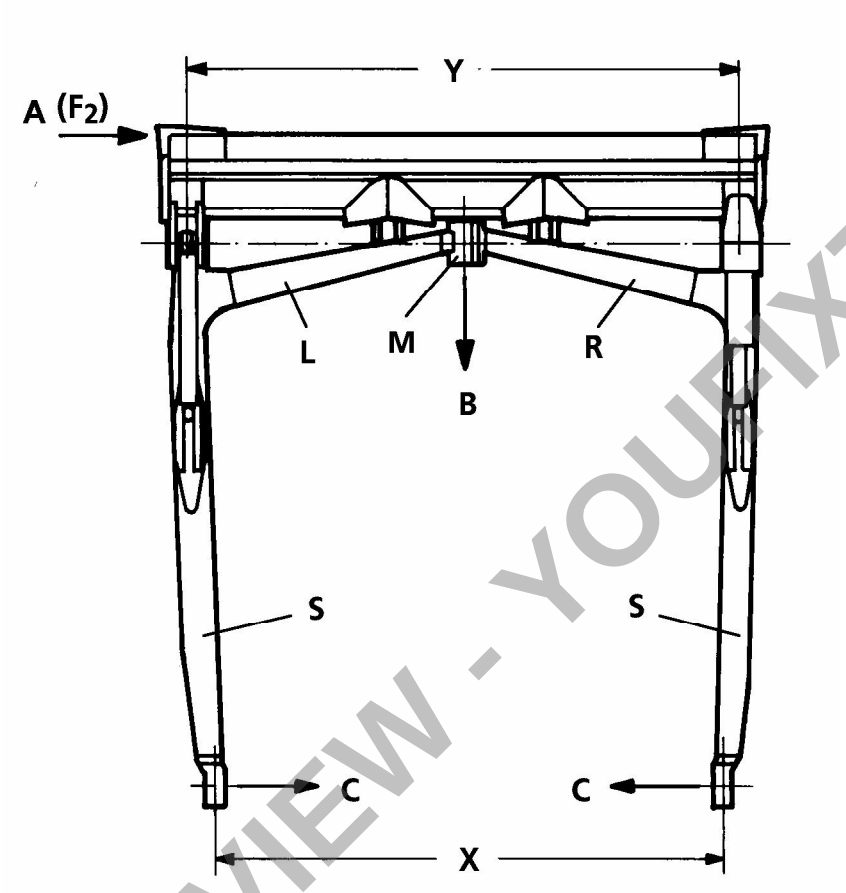


During the working cycle, forces F coming from different directions can be divided on one level into two different single components, which act on the blade in direction of axles y (vertical force components F_1) and x (horizontal force components F_2).

The vertical force onto the blade is absorbed directly and evenly by the push frame and transferred to the roller frame of the machine.

The horizontal force onto the blade is absorbed by the equalizer and evenly spread out.

2.1. Function of equalizer



Due to the horizontal **force A** acting on the blade, the end of the diagonal screw jack **L** tries to move the diagonal screw jack **R** in direction of arrow **B**. Since the ends of the diagonal screw jacks are connected with each other via center bearing **M**, any movement in direction of arrow B is prevented, since in both diagonal jacks forces of the same strength occur, however, in opposite direction.

Therefore, both of diagonal jacks L and R with center bearing M prevent side to side movement of push arms **S**, which assures optimum side to side stability of the blade attachment.

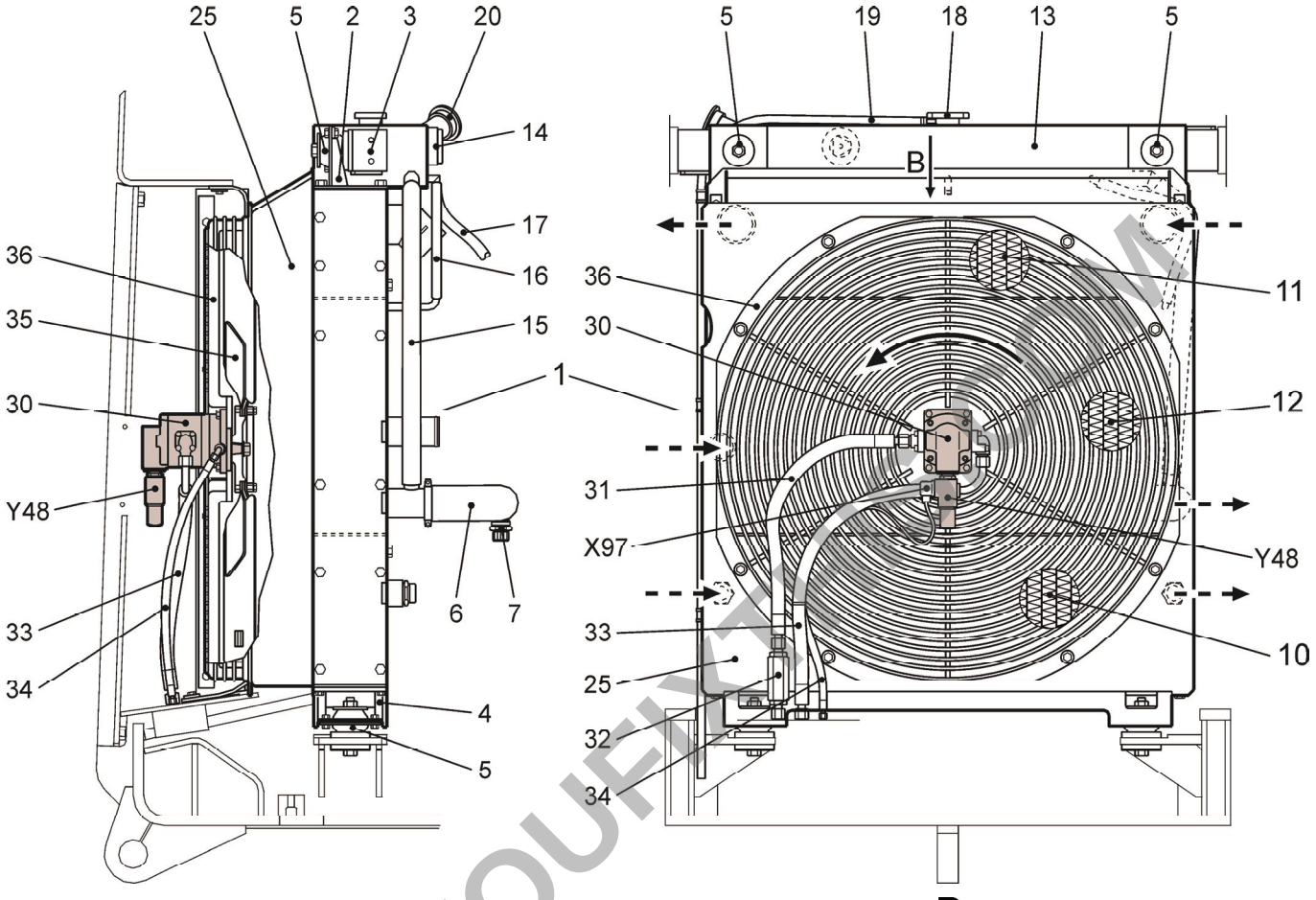
When tilting the blade, the distance **X** decreases in relation to distance **Y**, which means both push frames **S** move in direction **C** and the diagonal frames **L** and **R** push on the back of the blade. This results in a lengthwise change which is equalized in the center bearing **M**.

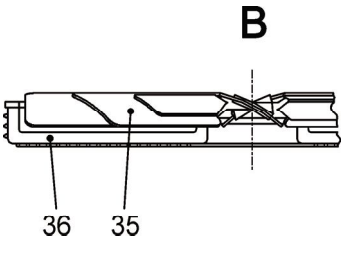
As a whole, an even distribution of force occurs onto both diagonal frames and push frames at all working loads, which virtually eliminates overload of the various parts.

This also assures that the few existing bearing parts wear slowly and nearly evenly, and this wear has little influence on optimum force, force distribution and side to side stability of the blade attachment.

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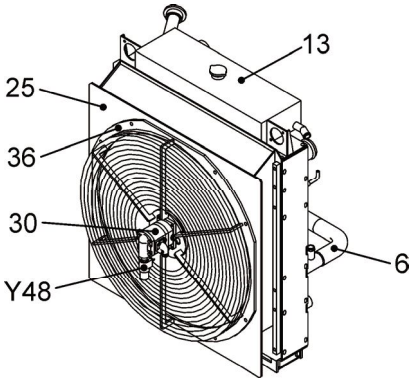
Cooler / radiator arrangement





1 **cooler/ radiator combination, complete**
2 frame section
3 mounting angle with screws and washer
4 frame section button
5 elastic mount
6 water coolant hose
7 coolin water pipe with drain device

10 **hydraulic oil cooler**
11 **charge air cooler**
12 **water cooler / radiator**
13 expansion glas
14 sight gauge
15 connector hose - expansion
16 connector hose - vent
17 connesctor hose - engine vent
18 radiator cap - 0,7 bar
19 overflow hose
20 radiator cap - 1,0 bar



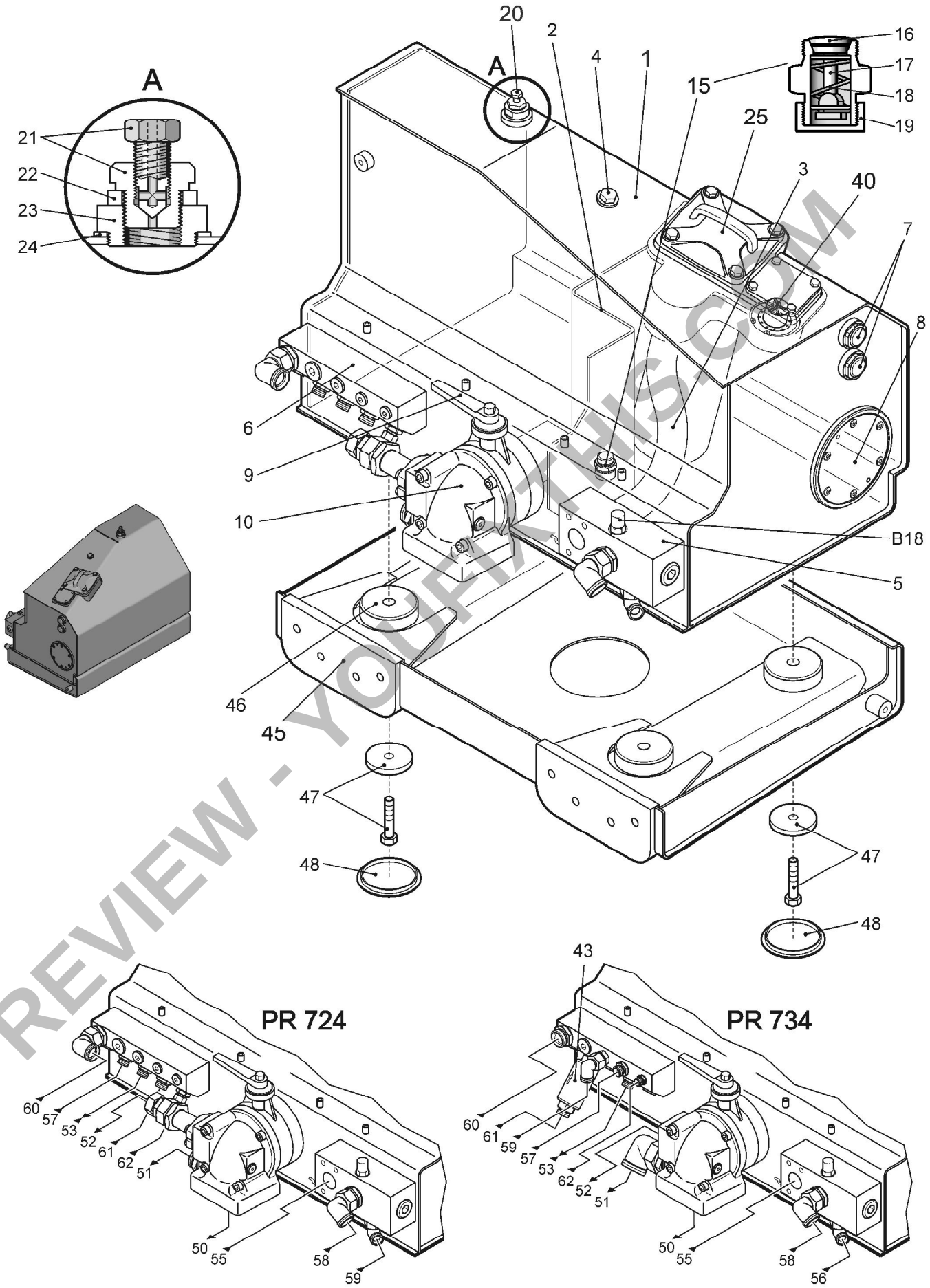
25 fan hood

30 **gear motor**
31 pressure line
32 filter (at 724 directly mounted on the gear motor)
33 return line
34 leak oil line
35 gear motor with mounting flange
36 fan carrier

B mounting position - fan

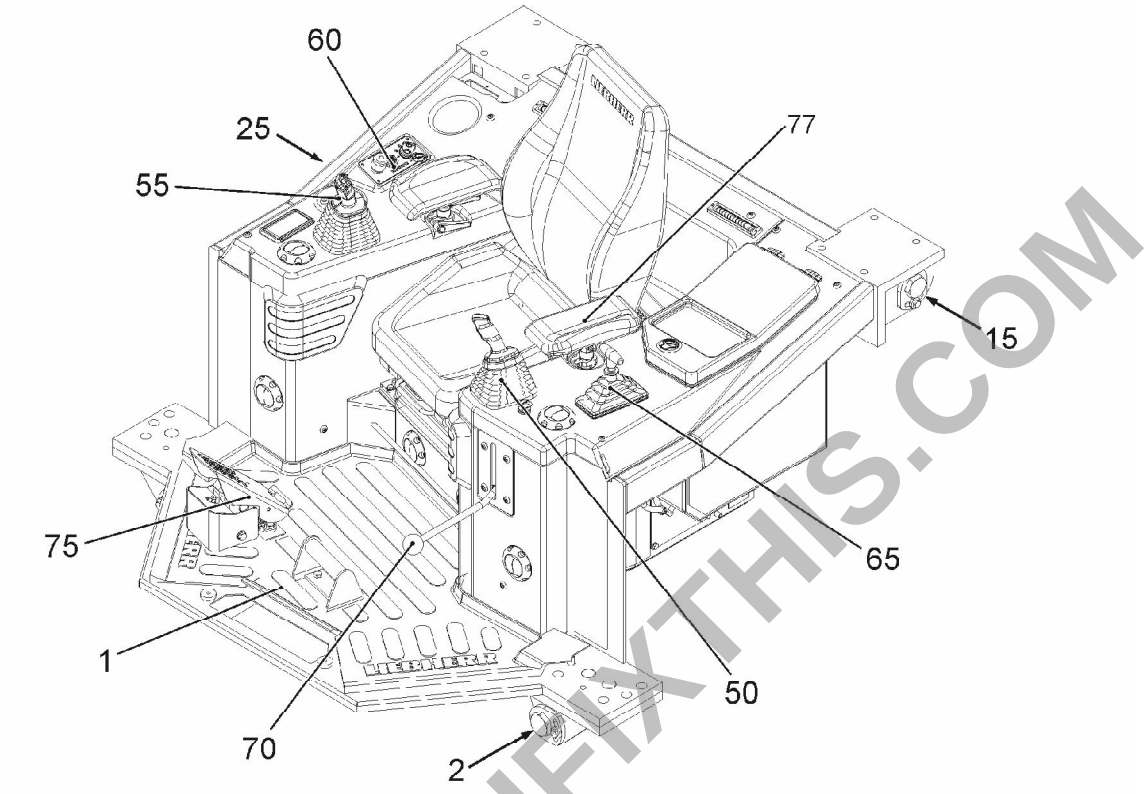
X97 plug
Y48 proportional solenoid - pressure limitation

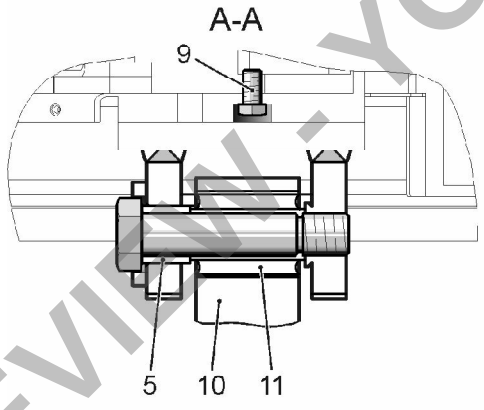
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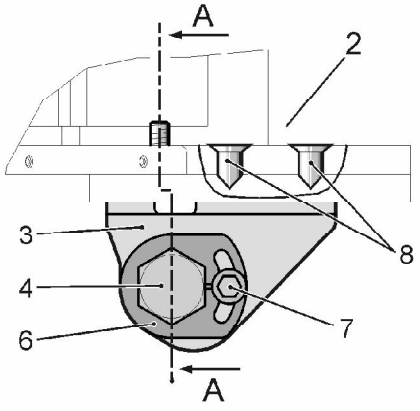


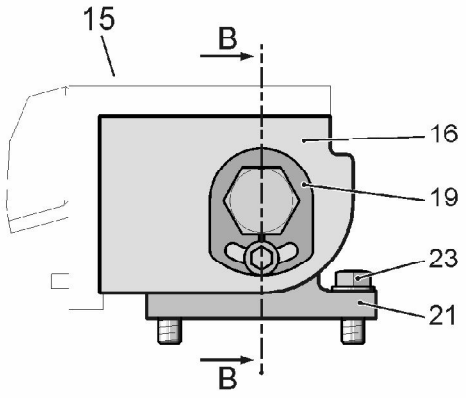
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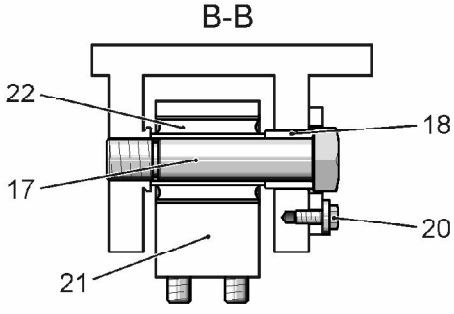
PR724 S/N xxx- 6600→9199
PR734 S/N xxx- 6200→8219











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Refueling pump

1.General, design

The refueling pump is used to easily add Diesel fuel from the refueling container (barrel) into the fuel tank on the machine.
Refueling pumps are vane pumps with constant flow volume. Viewed from the constructive design, it is a self suctioning pump direct current motor.

The shaft seal is made via a shaft seal ring, which is lubricated by the passing Diesel fuel. The pump housing is attached directed to the motor.

2.Type key

For example: **MFZP-1 / 6.X / P / 63 / 13 / 24V-DC**

MFZP-1 …Size
6.X …Type identification
P …Seals = P (Perbunan)
63 / 13 …Motor size and flow quantity
24V-DC …Motor voltage 24V-DC

Size	Motor size	Flow quantity ccm/U	l/min
1	63	13	50
		20	80

3.Operating data

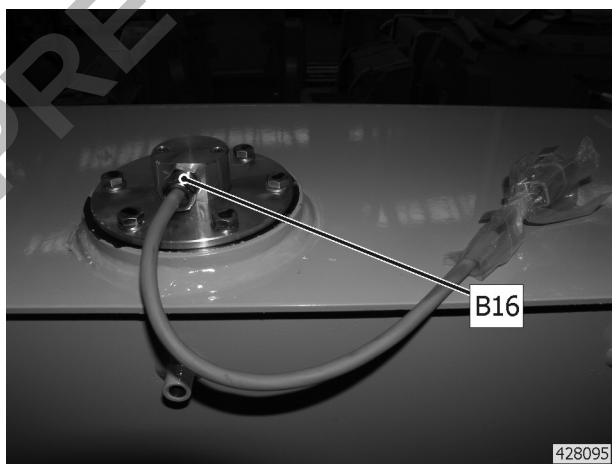
Media temperature: -20 °C - +40 °C
Ambient temperature: -20 °C - +40 °C
Direction of rotation: Provided by description on connector clamps.
Mesh width strainer (2 pieces) max. 0.4 mm
The max. suction pressure on the pump inlet is -0.4 bar.

4.Electrical schematic

Note!
The electrical schematic is described in detail in section 9.4.
For function list, see section 9.2

5.Component description

5.1.Fuel sensor - Refueling pump B16



The fuel sensor for the refueling pump is located at the center of the fuel tank.
When the tank if filled, the relay K57 switches to OFF.

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4.3.00	1→10	Installation kit Liebherr – Diesel particle filter	01.2009
4.4.00	1→4	Installation and check list for Diesel particle filter	05.2008
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6.3.30	1→8	Function	01.2008
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6.3.40	1→10	Function	01.2009
6.3.50	1→10	Function	01.2009
6.3.60	1→10	Function	01.2009
6.4.20	1→12	Test and adjustment	05.2008
6.4.21	1→18	Test and adjustment	01.2009
6.4.60	1→18	Test and adjustment	05.2008
6.5.20	1→2	Component location	01.2006
6.5.21	1→2	Component location	01.2007
6.5.22	1→2	Component location	01.2007
6.5.30	1→2	Component location	03.2008

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1 **Housing**
2 Retaining ring

5 **Swash plate input**
6 Plug
7 O-Ring
8 Socket head screw

10 **Drive shaft**
11 Race
12 Radial shaft seal ring
13 Tapered roller bearing
14 Support plate
15 Pressure spring
16 Washer
17 Shim
18 Retaining ring
19 Support plate
20 Tapered roller bearing
21 Shim

25 **Swash plate**
26 Glide bearing
27 Straight pin
28 Retaining plate
29 Spacer
30 Bushing
31 Socket head screw
32 Piston with glide shoe
33 Return washer
34 Cylinder barrel

35 Swash plate
36 Straight pin

40 **Control piston**
41 Seal ring
42 Adjustment screw Qmin
43 Adjustment screw Qmax
44 Collar nut

45 Oil guide tube
46 O-Ring with support ring
47 Shim*

50 Rod
51 Valve sleeve
52 O-Ring
53 Pressure spring
54 Retaining ring
55 Spring plate
56 Pressure spring
57 Spring plate
58 Pilot piston
59 Support plate

60 **Proportional regulating solenoid Y7/Y8**
61 Adjustment screw with nut
62 O-Ring
63 Bushing

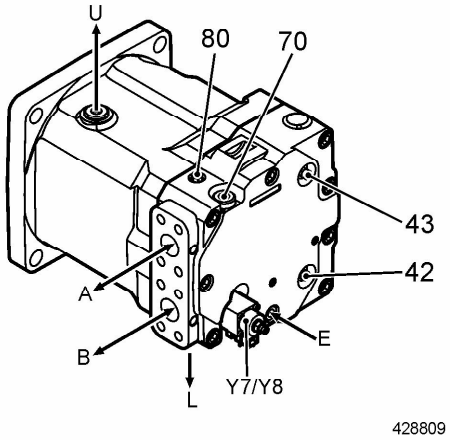
65 Fitting (connection E)
66 Plug
67 Plug

70 **Directional valve, complete**
71 O-Ring
72 Plug
73 Valve sleeve
74 Valve piston
75 Support plate
76 Pressure spring

80 **Pressure relief valve (14bar), complete**
81 Valve housing
82 O-Ring
83 Plug
84 Adjustment plate
85 Pressure spring
86 Ball
87 Orifice (2,5mm)

A Connection – High pressure line
B Connection – High pressure line
E Connection – Control pressure / replenishing
L Connection - Housing
T Tank line - Housing
U Connection - Housing
* = Observe notes on front page!

PR 724



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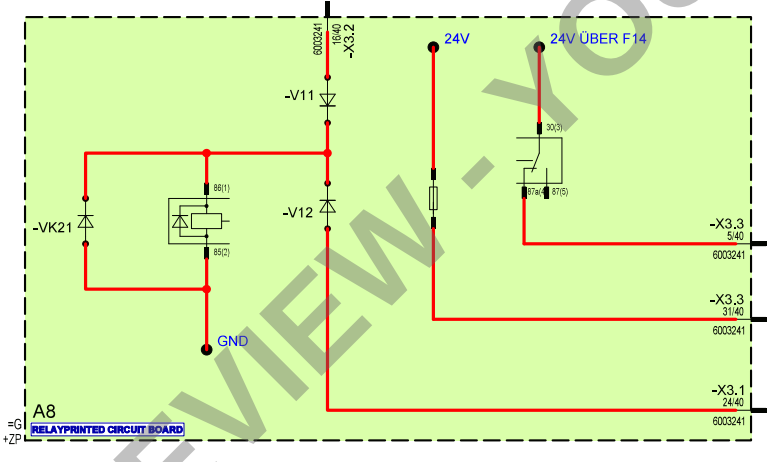
Ident Nr. 9414386

PROJEKT: 9414386_404

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SIEHE EIGENES AUSLEGUNGSPROJEKT RL

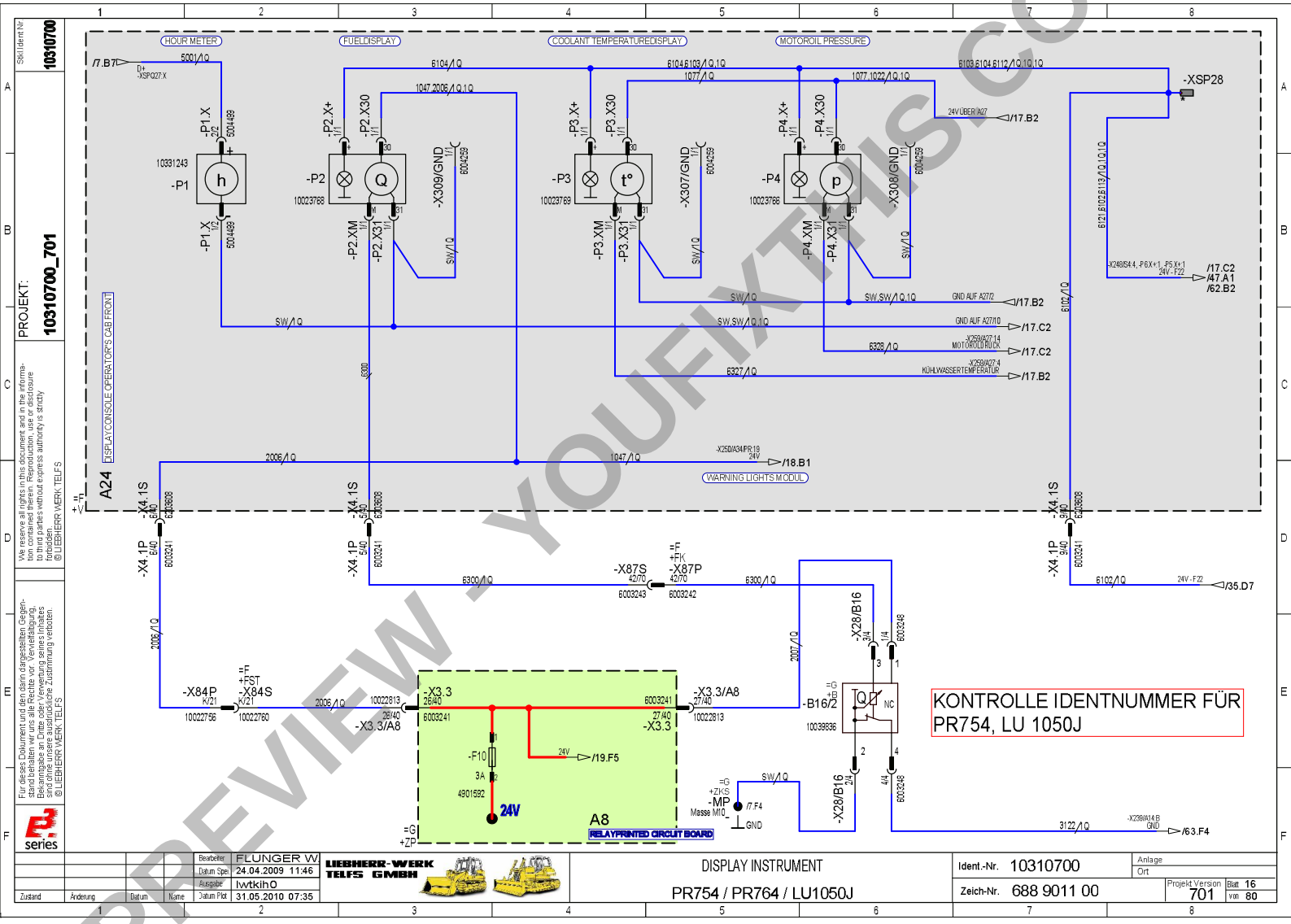


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series STROMLAUFPLAN

				Bearbeiter	Flunger W.	LIEBHERR-WERK TELFS GMBH	STROKE STOP SWITCH AND BRIDGING STROKE RL
				Datum Spez.	03.11.2008 09:53		PR724/734/744/LU950J
				Ausgabe	lwtkih0		
Zustand	Änderung	Datum	Name	Datum Plot	20.10.2009 09:29		

Ident.-Nr.	9414386	Anlage	
Zeich-Nr.	940 9011 00	Ort	
		Projekt Version 404	Blatt 30 von 76



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Stücklisten Nr.	10310700
PROJEKT:	10310700_701

Zustand	Änderung	Datum	Name	Datum Plot	31.05.2010 07:35
			Bearbeiter		FLUNGER W
			Datum Spez.		24.04.2009 11:46
			Ausgabe		lwtkih0

LIEBHERR-WERK TELFS GMBH

DISPLAY INSTRUMENT
PR754 / PR764 / LU1050J

Ident.-Nr.	10310700	Anlage	
Zeich-Nr.	688 9011 00	Ort	
		Projekt Version	701
		Blatt	16
		von	80

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2 Preparations

❑ The machine must be in maintenance position.
❑ The Diesel particle Software PDL must already be installed on the PC.
❑ An adapter cable (see section 2.1 Special tools) must be available.

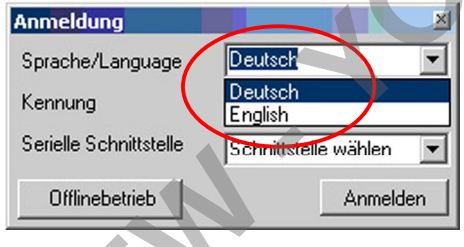
Note!
The connector cable for the LinDiag Software is used as connector cable.
Position of diagnostic plug Particle filter see section 4.3.

▶ Connect the adapter cable to the interface on the machine and the PC.
▶ In the cab, turn the ignition on.
▶ Start the PDL Software on the desktop of the PC.

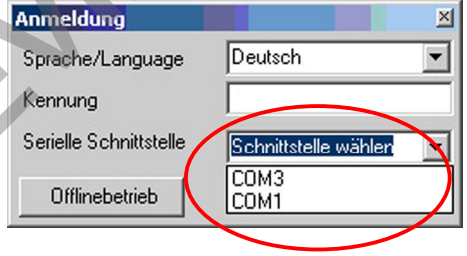
3 Log on [Anmeldung]



After starting the software, a window appears on the desktop.



Under **[Sprache/Language]**, the languages German **[Deutsch]** or English **[English]** can be selected.



Under **[Serielle Schnittstelle],** the interfaces, for example **[COM 1]** or **[COM 3]** can be selected.

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Skl.Ident.Nr. 10310696

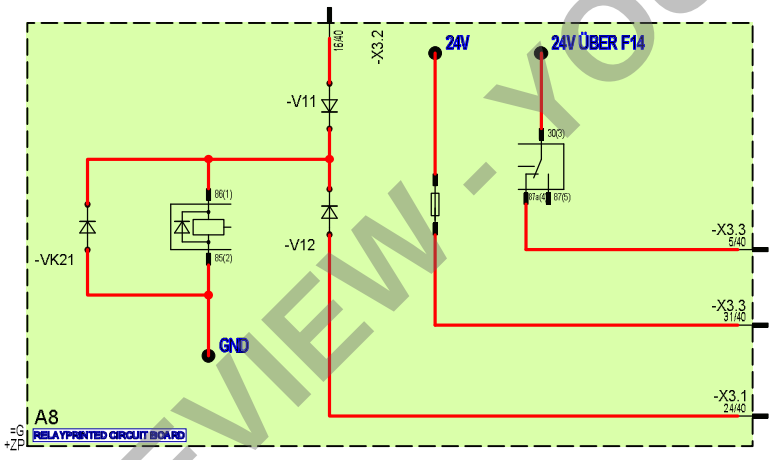
PROJEKT: 10310696_502

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series

SEE OWN DESIGN PROJECT RL



				Bearbeiter	Flunger W.	LIEBHERR-WERK TELFS GMBH	HOIST LIMIT SHUT OFF AND BRIDGING STROKE RL
				Datum Spei	12.04.2010 10:42		PR724/734/744/LU950J
				Ausgabe	lwtkih0		
Zustand	Änderung	Datum	Name	Datum Plot	31.05.2010 07:25		

Ident.-Nr.	10310696	Anlage	
Zeich-Nr.	940 9011 00	Ort	
		Projekt Version 502	Blatt 29 von 75

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