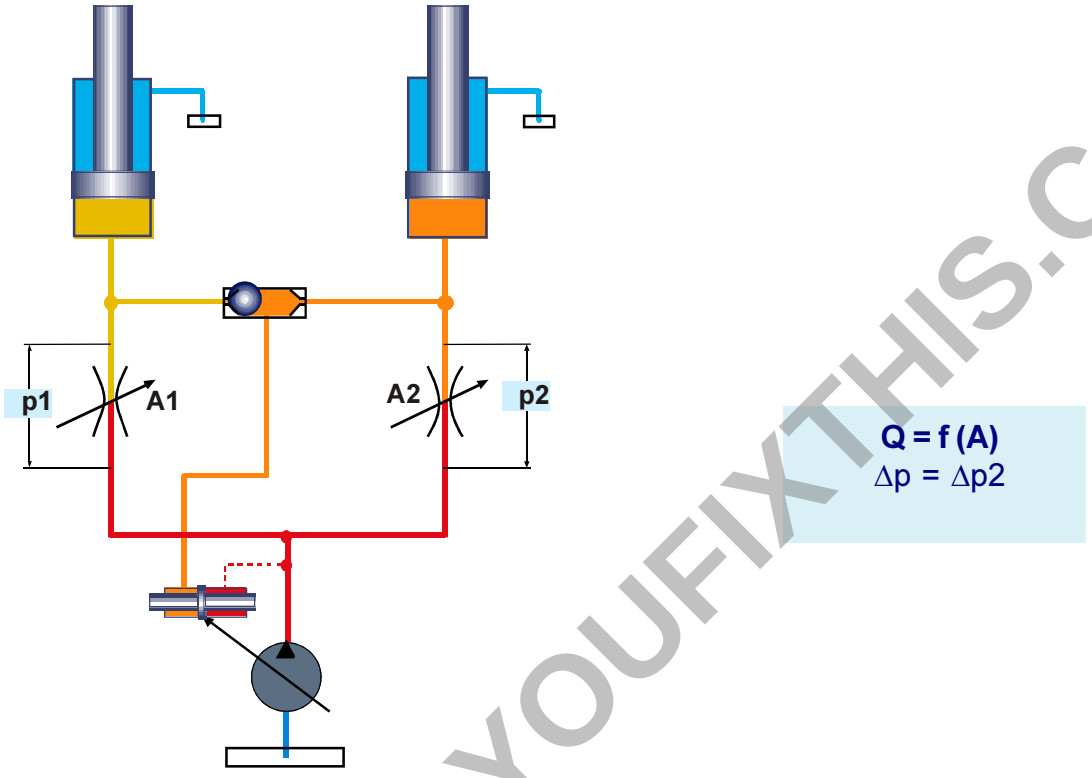
1.2. LUDV-Control systems

1.2.1 Theoretical bases



Picture 1: Principle-Circuit diagram

In the Load-Sensing-System which is known since several years, the loadpressureindependence between the consumers is realized over a pressure scale that is connected to the measuring orifice. The system works independent of load pressure for as long as the total volume requested through the cross-section of the measurement orifice is smaller than the pumpvolume. If, upon the activation of several consumers through the measurement orifice, more volume is requested than the pump is able to convey, i.e. $\sum Q_V > Q_P$, the regular-Δp for the pressure scale breaks down.

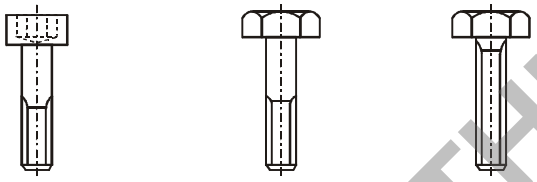
The consequence is that the pressure scale opens and the load-pressure independence is neutralized. The distribution of the pump-volume is no longer proportional to the cross-sections of the measurement orifice, but flows in a load-pressure-independent manner to the consumer with the least load-pressure ($\Delta p \neq \Delta pz$). Consumers with higher load- reduce their speed until a final standstill.

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Tightening torques

1. Shaft screws (according to N 08.001).
   The values apply to shaft screws metric ISO thread in accordance with DIN 13 part 13, as well as connecting surface dimensions in accordance with DIN 912 cylinder head screws, DIN 931 hexagonal bolts with shaft or DIN 933 hexagonal bolts with thread to the head.

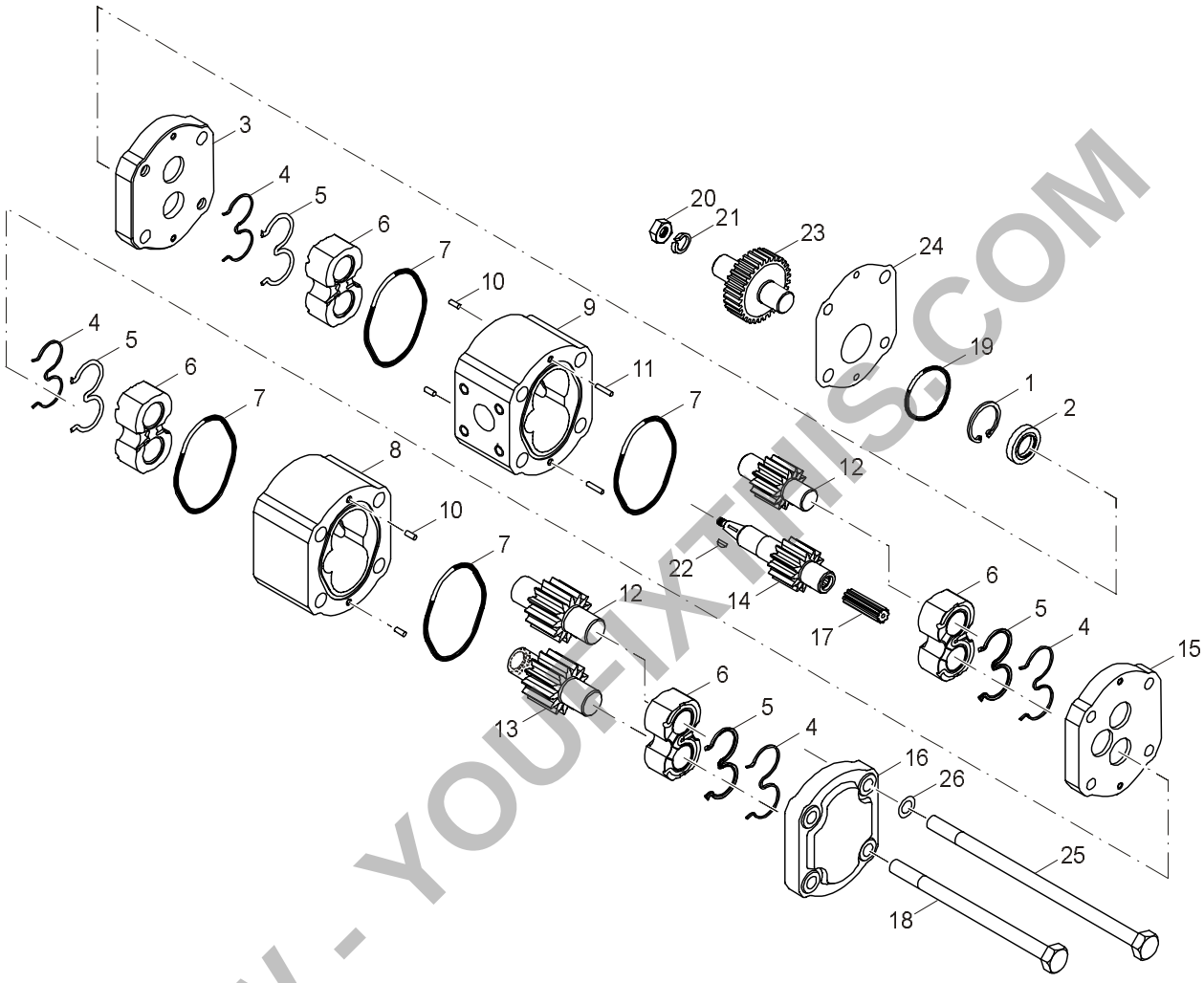


Gewinde/Thread	Festigkeitsklassen/Tensile strength class		
	8.8	10.9	12.9
	Anziehdrehmoment/Tightening torque M_A in Nm		
M 3	1,1	1,6	1,9
M 4	3,1	4,5	5,3
M 5	6,1	8,9	10,4
M 6	10,4	15,5	18
M 8	25	37	43
M 10	51	75	87
M 12	87	130	150
M 14	140	205	240
M 16	215	310	370
M 18	300	430	510
M 20	430	620	720
M 22	580	830	970
M 24	740	1060	1240

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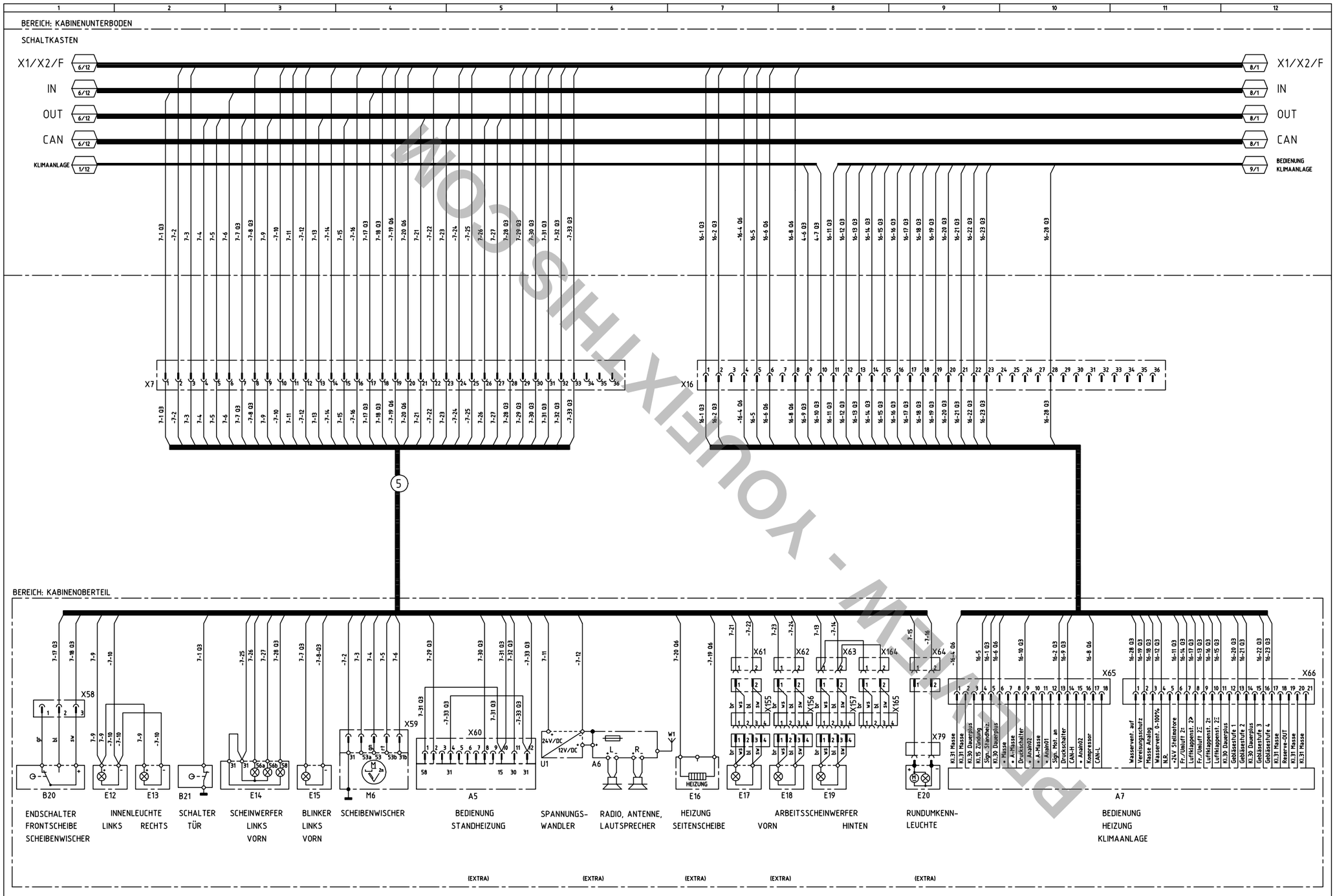
5.2 Oil Pressure pump Steering/VST



1	Locking ring
2	Radial shaft sealing ring
3	Fastening flange
4	Back-up ring
5	Sealing ring
6	Bearing back-rest
7	O-ring
8	Pump housing (D)
9	Pump housing (S-D)
10	Cylinder pin I
11	Cylinder pin II
12	Running pinion I+II
13	Running pinion III
14	Drive pinion
15	Distance plate
16	Cover
17	Coupling
18	Hexagonal bolt
19	O-ring
20	Nut
21	Spring ring
22	Woodruff key
23	Toothed wheel
24	Sealing
25	Hexagonal bolt
26	Washer

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KABEL MIT DER NR.Q3 HABEN EINEN QUERSCHNITT VON 0,75mm2
KABEL MIT DER NR.Q4 HABEN EINEN QUERSCHNITT VON 1,00mm2
KABEL OHNE NR.Q HABEN EINEN QUERSCHNITT VON 1,50mm2
KABEL MIT DER NR.Q6 HABEN EINEN QUERSCHNITT VON 2,50mm2
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KABEL MIT DER NR.Q12 HABEN EINEN QUERSCHNITT VON 25,00mm2
KABEL MIT DER NR.Q15 HABEN EINEN QUERSCHNITT VON 50,00mm2

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Stoff		2				6				Bearb.	S. Bross		ATLAS-WEYHAUSEN GMBH		D	BAUSCHALTPLAN 2			
Rohmasse		1				5				Gepr.	v.d.Graaf		Postfach 1844						
Schutzvermerk nach DIN 34 beachten!	Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name		Datum	10.09.2001		D-27747 Delmenhorst			7800.715.10.12/000		Blatt 7	14 Bl.

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16.4.1 Fault listing

Loc.	Type	Prio	Fault	Description
1	1	3	Excitation of proportional valve left side	The driver for the L.H. magnet coil of the proportional valve has detected a fault. Possible causes: (1) Cable break to magnet coil of the prop valve. (2) Short circuit in the wiring to the prop valve.
2	2	3	Excitation of proportional valve right side	The driver for the R.H. magnet coil of the proportional valve has detected a fault. Possible causes: (1) Cable break to magnet coil of the prop valves. (2) Short circuit in the wiring to the prop valve.
3	3	3	Excitation of redundant proportional valve left side	The driver for the L.H. magnet coil of theredundant proportional valve has detected a fault. Possible causes: (1) Cable break to magnet coil of the prop valve. (2) Short circuit in the wiring to the prop valve.
4	4	3	Excitation of redundant proportional valve right side	The driver for the R.H. magnet coil of theredundant proportional valve has detected a fault. Possible causes: (1) Cable break to magnet coil of the prop valve. (2) Short circuit in the wiring to the prop valve.
5	5	2	Fault steering nominal value transmitter	The steering nominal value transmitter has 2 pulse outputs which are arranged on 2 counters in the steering computer. When functioning correctly, both counter readings have always to be identical. Possible causes: (1) Cable break between steering nominal value transmitter and steering computer. w (2) Steering nominal value transmitter damaged.
6	6	2	Proportional valve non plausible	The proportional valve is provided with a position feedback to the steering computer. This position feedback is then compared to the excitation. Possible causes: (1) Valve slide is jammed. (2) Accidental excitation, by some short-circuit, for instance

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4.2 Setting of valves BF6M 1013FC

Valve free-play

Too much or too little valve free-play may lead to engine damage as a result of mechanical and thermal overload. It must therefore be verified at recommended intervals - see Operating Manual - and readjusted when necessary.

The valve free-play shall be verified and adjusted at an oil temperature of <80 °C. Values for the engines BFM 1012/1013:

Inlet valve = 0.3 mm
Outlet valve = 0.5 mm

After initial assembly or after replacement of the cylinder-head gasket

Inlet valve = 0.4 mm
Outlet valve = 0,6 mm

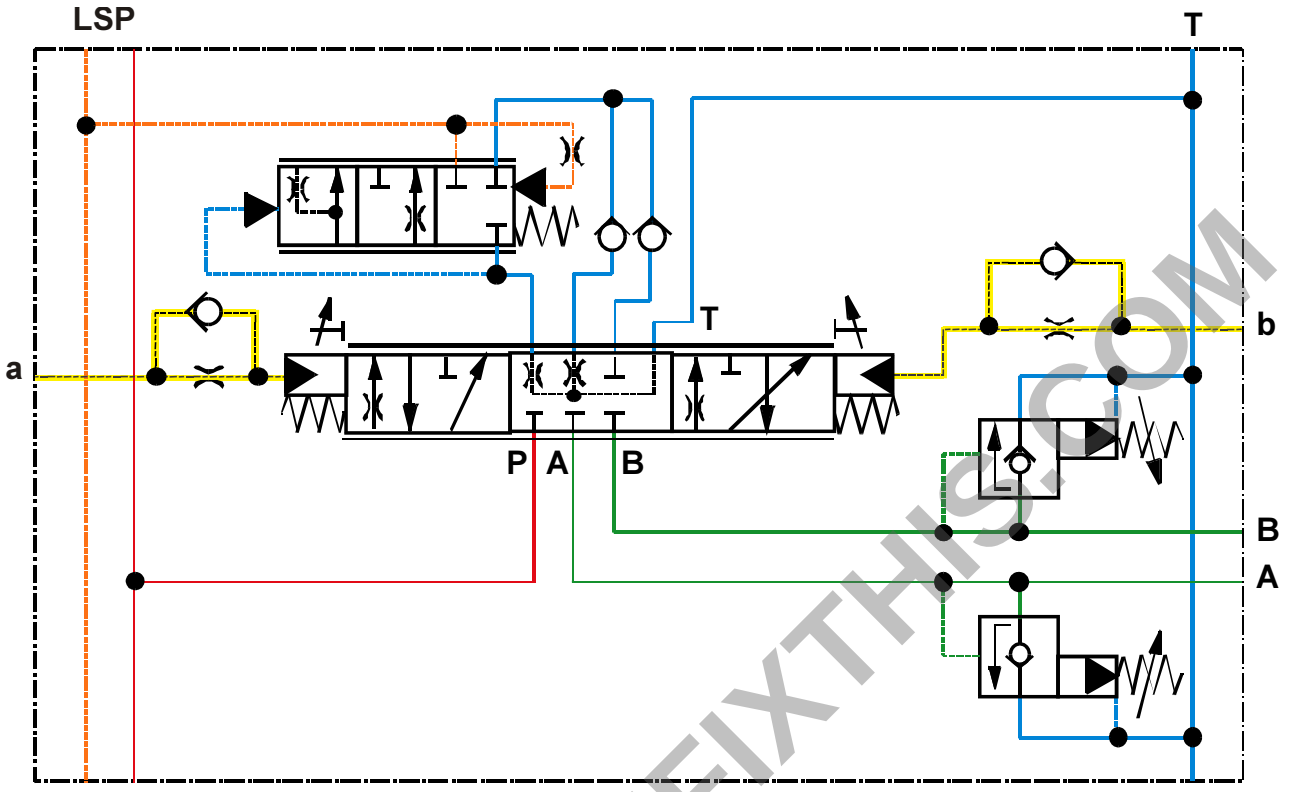
The respective feeler gage must be capable of being pushed between the rocker-arm cog and the valve with little resistance.

If the gap is too wide or too tight for the feeler gage, the free-play must be re-adjusted:

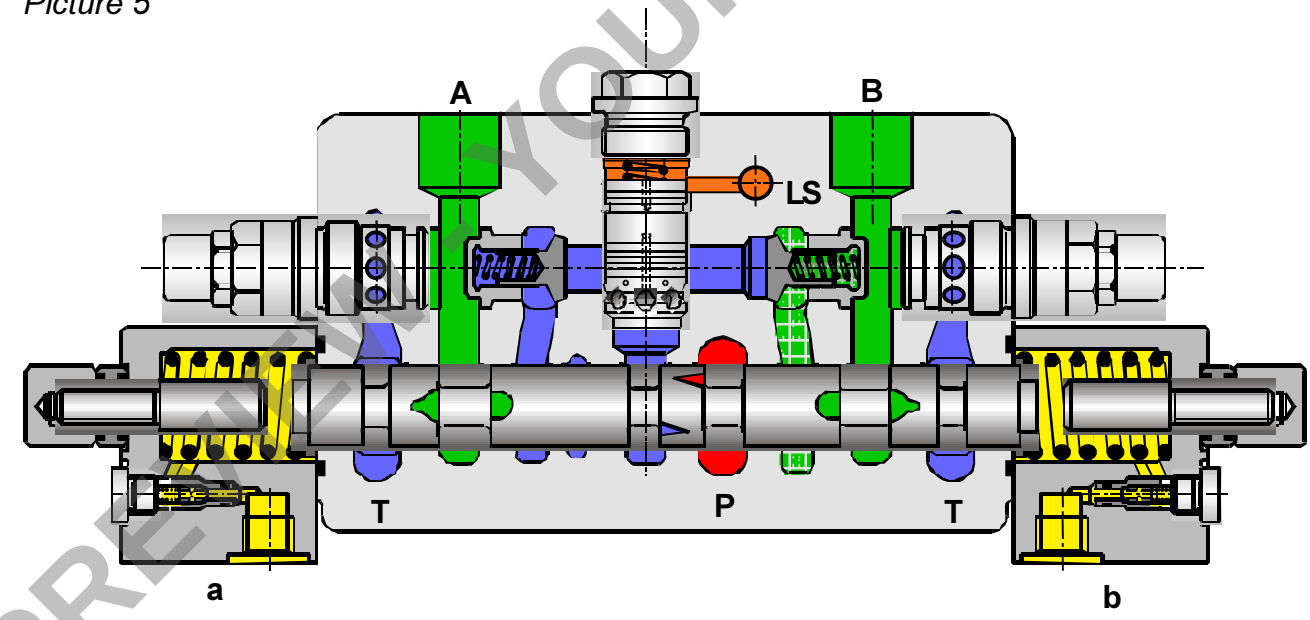
- For the re-adjustment loose the counter-nut 1 with the spanner by 2 - 3 turns.
- Regulate the adjusting screw with the hexagon socket screw key in such a way that the feeler gage can be pushed in and drawn out with less resistance while the counter-nut is tightened.

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Picture 5



Picture 6

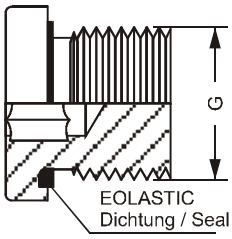
Switch symbol and the cut-illustration of an LUDV-valve, e.g. M7-20

- High-pressure-resistant, cast housing in mono or sandwich construction
- Directional control valve with very good flow-through characteristic and individual adaptation of the measurement orifice and outlet diameter to the consumers
- Directly controlled pressure-scale with load-pressure reporting function

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Tightening torques

2. Screw plugs with hexagon and
Profile packing ring (according to N 02.009).

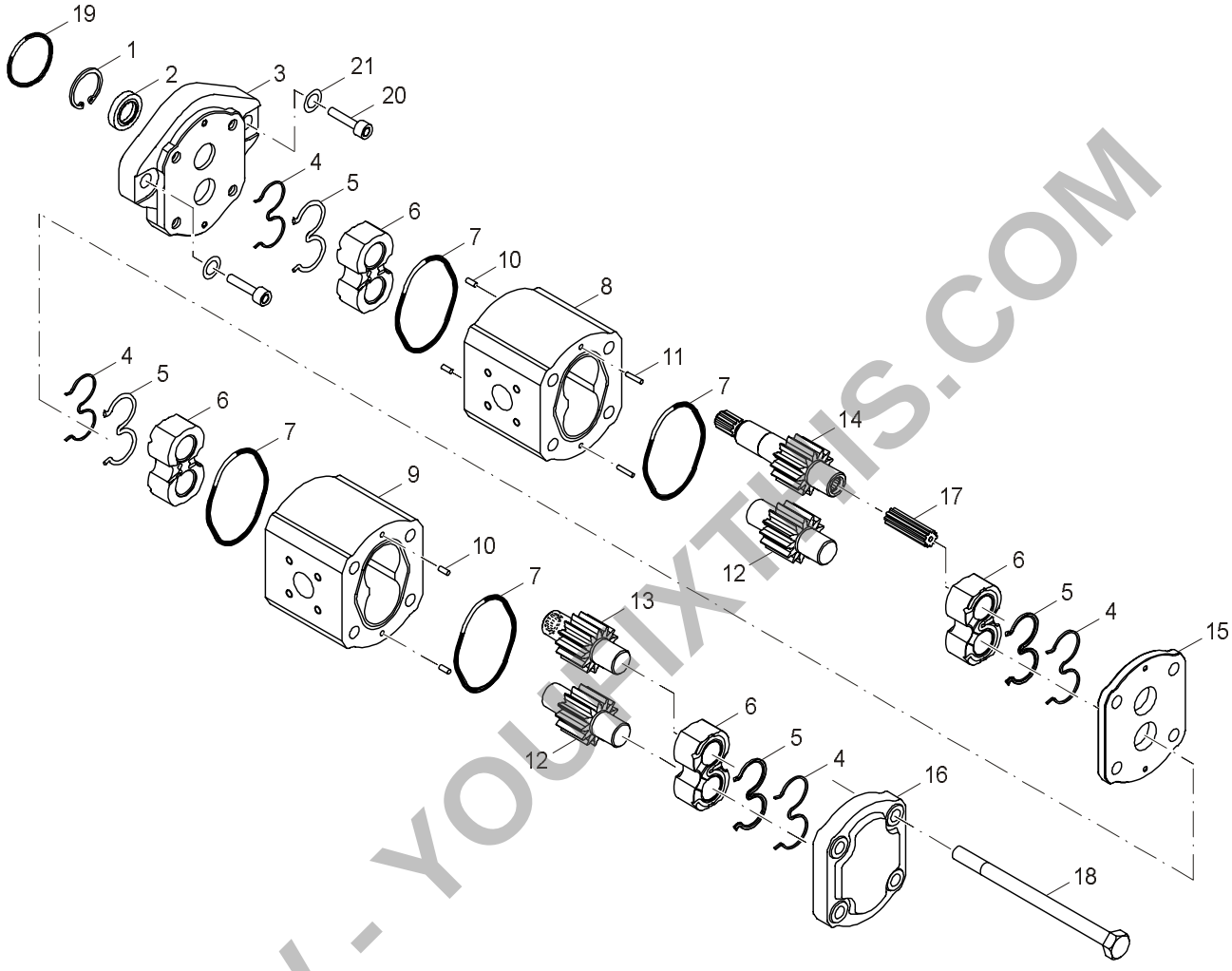


Gewinde/ Thread	Anziehdrehmoment/ Tightening torque M_A in Nm	Gewinde/ Thread	Anziehdrehmoment/ Tightening torque M_A in Nm
M8x1	5	G 1/8 A	10
M10x1	10	G 1/4 A	30
M12x1,5	20	G 3/8 A	35
M14x1,5	30	G 1/2 A	60
M16x1,5	35	G 3/4 A	90
M18x1,5	40	G 1 A	140
M20x1,5	50	G 1 1/4 A	240
M22x1,5	60	G 1 1/2 A	300
M26x1,5	70		
M27x2	90		
M30x1,5	100		
M33x2	140		
M42x2	240		
M48x2	300		

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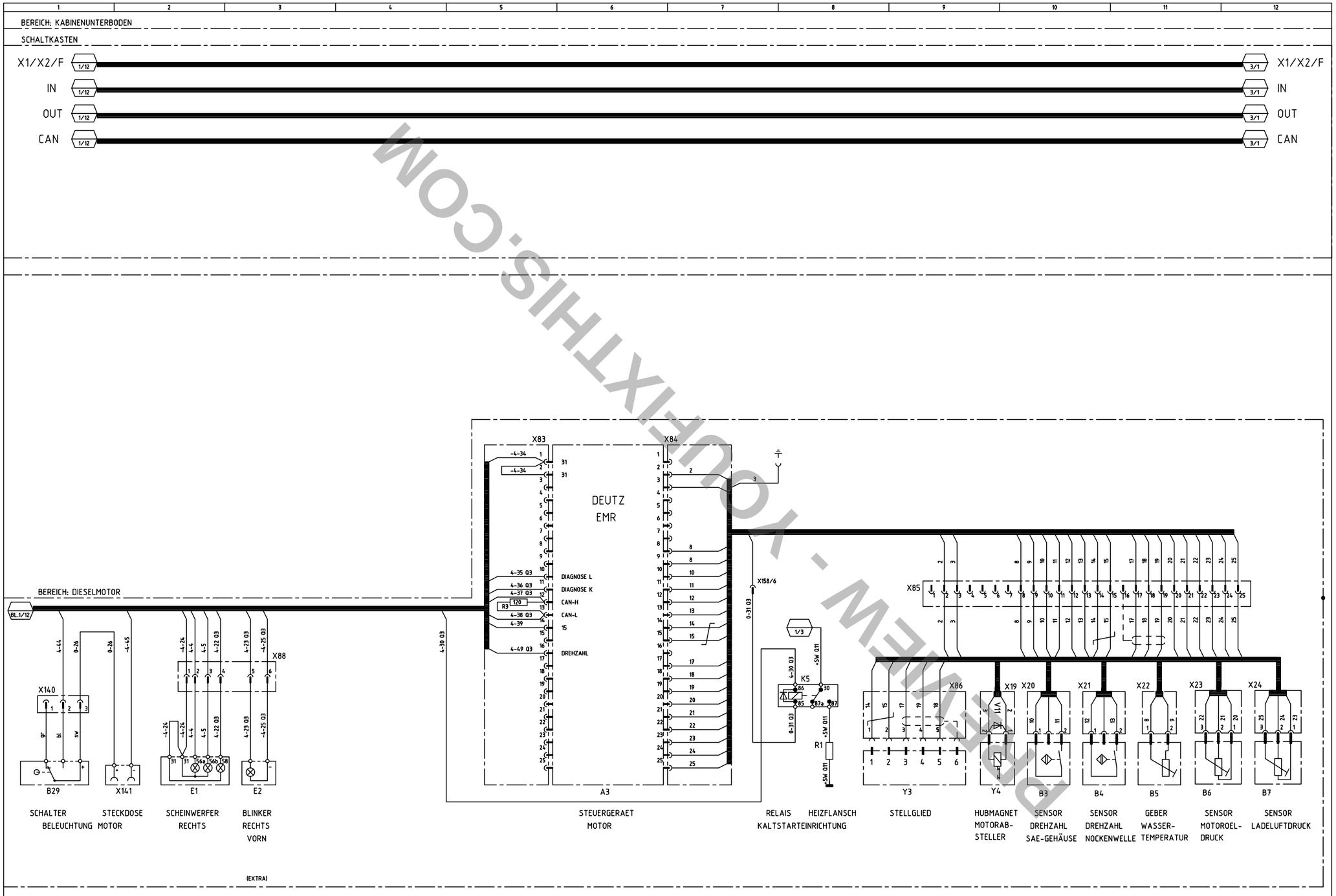
5.3 Oil Pressure pump Fan/Generator



1 Locking ring
2 Radial shaft sealing ring
3 Fastening flange
4 Back-up ring
5 Sealing ring
6 Bearing back-rest
7 O-ring
8 Pump housing I
9 Pump housing II
10 Cylinder pin I
11 Cylinder pin II
12 Running pinion I
13 Running pinion II
14 Drive pinion
15 Distance plate
16 Cover
17 Coupling
18 Hexagonal bolt
19 O-ring
20 Hexagonal bolt
21 Washer

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KABEL MIT DER NR.Q4 HABEN EINEN QUERSCHNITT VON 1,00mm2
KABEL OHNE NR.Q HABEN EINEN QUERSCHNITT VON 1,50mm2
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Stoff		2				6				Bearb.	S. Bross		Postfach 1844						
Rohnasse		1				5				Gepr.	v.d.Graaf		D-27747 Delmenhorst			7800.715.10.12/000		Blatt 2	
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Loc.	Type	Prio	Fault	Description
7	7	2	Position feedback damaged	Output voltage of the position feedback should be within a range defined by parameters. Possible causes: (2) Voltage supply of position feedback is faulty. (3) Position sensor of position feedback is damaged.
8	8	1	Digital output 'Release driving'	Cable break at digital output DA1 (pin J11.1) The "Release driving" signal is not properly connected.
9	-	-	-	-
10	10	1	Diesel engine not running	Digital input DE2 is used for connecting the Diesel engine charge control. A warning is displayed if the steering computer is active and charge control is not connected. Possible causes: (1) Cable break between charge control and steering computer (2) Generator is not working properly.
11 ... 99	-	-	-	-
100	100	2	Error DA 1	Short-circuit or external voltage at digital output 1 (pin J11.1).
101	101	2	Error DA 2	Short-circuit or external voltage at digital output 2 (pin J11.2).
102	102	2	Error DA 3	Short-circuit or external voltage at digital output 3 (pin J11.3).
103	103	2	Error DA 4	Short-circuit or external voltage at digital output 4 (pin J11.4).
104	104	2	Error DA 5	Short-circuit or external voltage at digital output 5 (pin J11.5).
105	105	2	Error DA 6	Short-circuit or external voltage at digital output 6 (pin J11.6).
106	106	2	Error DA 7	Short-circuit or external voltage at digital output 7 (pin J11.7).
107	107	2	Error DA 8	Short-circuit or external voltage at digital output 8 (pin J11.8).
108 115	-	-	-	-
116	116	2	Error DE 1	Digital input 1 (pin J4.1) is not properly read in normally and inverse.
117	117	2	Error DE 2	Digital input 2 (pin J4.2) is not properly read in normally and inverse.
118	118	2	Error DE 3	Digital input 3 (pin J4.3) is not properly read in normally and inverse.

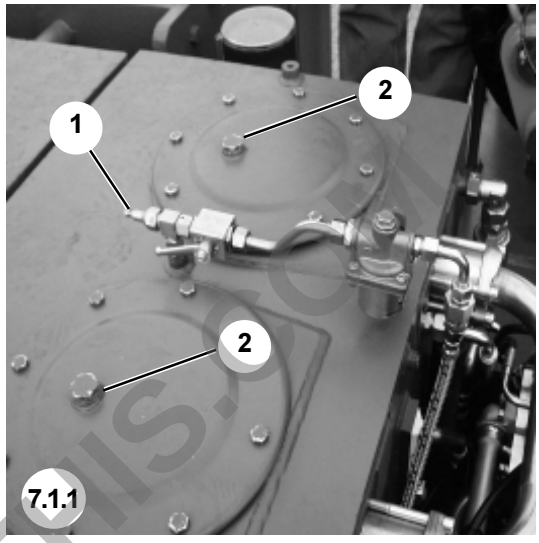
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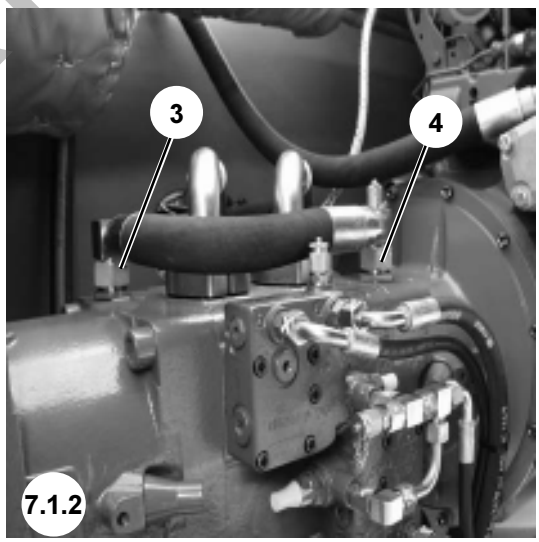
7.1 Deaerate installation

7.1.1 Deaeration of the installation is required prior to the initial operation or after the replacement of the pump.
For deaeration, the application of compressed air is required.
This is realized through the compressed air connection (1).
Attention: The manometer display shall not exceed 0.3 bars.

Compressed air manometer is not available and must be installed in advance.
Detach seaeration screw (2). Tighten-up again as soon as bubble-free hydraulic oil begins to flow off.

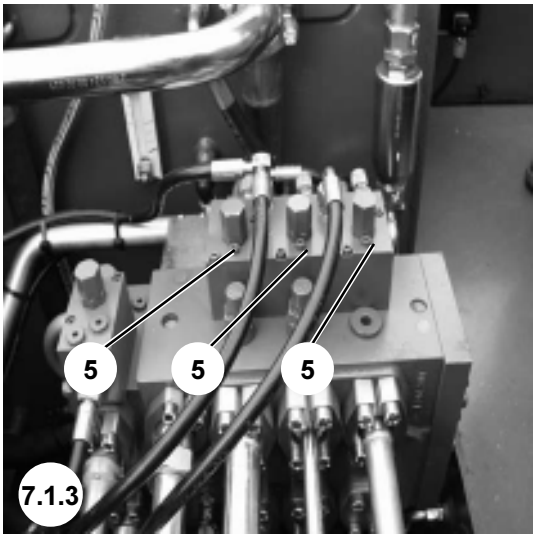


7.1.1 Thereafter, deaerate double pump by loosening the screw connections (3 and 4).



7.1.3 All valve caps must be deaerated in the course of initial operation!

This is also necessary if the valve caps will have to be opened through eventual repair works.
Deaeration is performed through the loosening of the respective deaeration screws (5) up and down.



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TABLE OF CONTENTS 5005

1	**Introduction to the hydraulics**	General information on hydraulics, LUDV-control systems
2	**Technical specifications**	Deutz, Pumps, engines, weights ect.
3	**Cabin**	Overview of cabins, switch panel left, right, operator's control and display panel AEM
4	**Diesel engine**	Deutz EMR, setting valves, diesel engine - Deutz
5	**Pumps**	Repair Guide for pumps, Oil-pressure pump swing/VST, oil pressure pump fan/generator
6	**Control block**	Valve block M7
7	**Settings**	Setting regulations - Pressure settings
8	**Hydraulic engines**	Shiftable engine Slewing motor
9	**Cylinder**	Lifting ram, Jib-folding ram, stabilizer ram, cab lift
10	**Hydraulic accessories**	Pipe-rupture safeguard, Remote-control plate MHFP 04 G4X, check-valve stabilizer, pilot control block, compact braking block Axle blocking
11	**Air-conditioning system**	Technical specifications, Functions on the operator's control, heating-ari conditioning unit, maintenance
12	**Main rotary connection**	Set-up of rotary connection and rotary lead-through, maintenance of the rotary connection
13	**Ball-bearing slewing rim**	Transport and storage, installation, lubrication, maintenance
14	**Transmission**	Travel-drive gear, Slewing transmission
15	**Kessler Axle**	Assembly of axle drive, assembly of wheel side, assembly of planetary gear, assembly of service break
16	**Steering**	Valve block Mobile Electronics
17	**Electrical installation-Circuit diagrams**	Electronics, Electrics
18	**Hydraulic-Circuit diagrams**	Complete hydraulic plan, simple plans, special circuit diagrams
19	**Maintenance**	Central lubrication, maintenance plan, lubricants
20	**Miscellaneous**	Centaflex couplings

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1. Introduction to the hydraulics

Table of contents

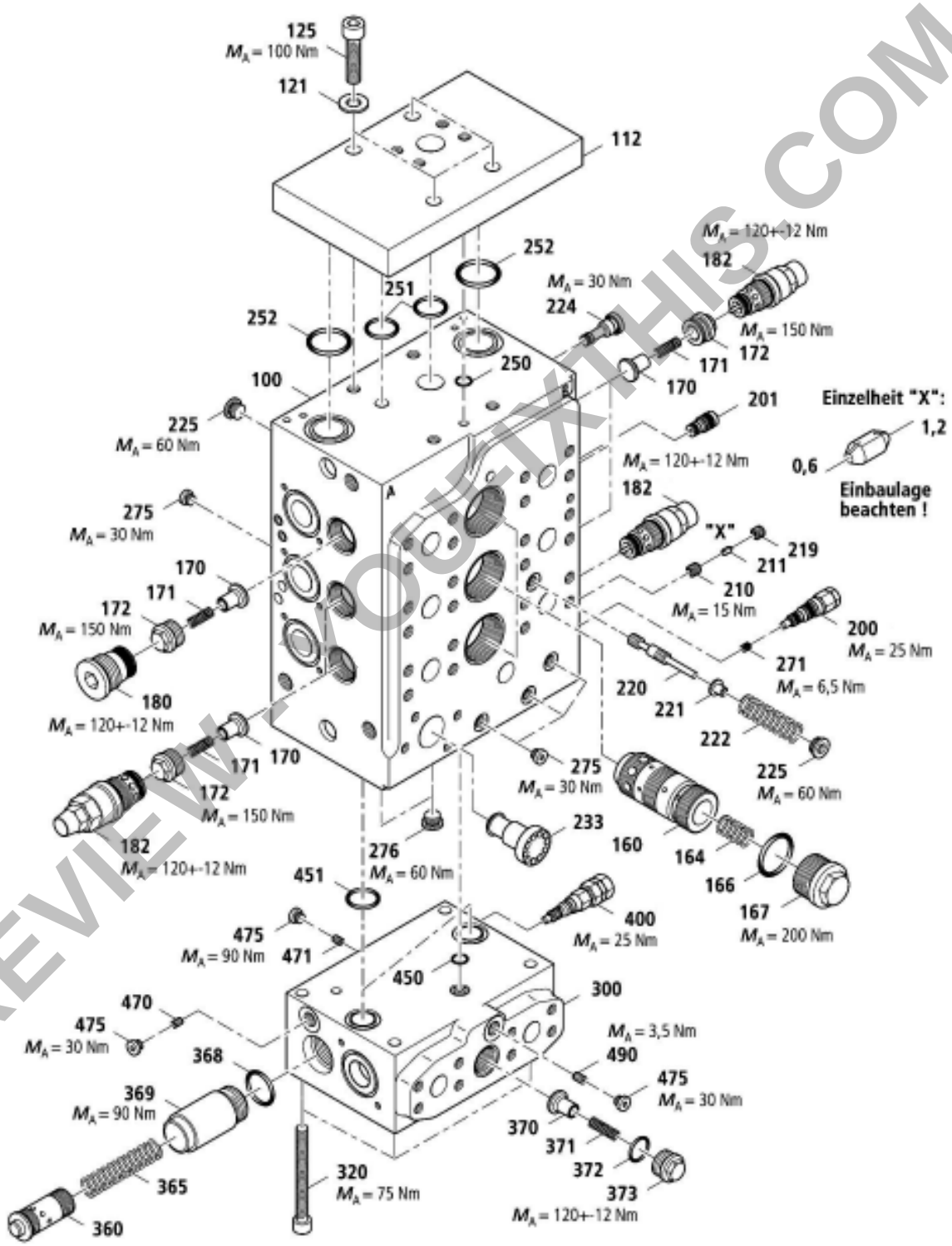
1.1 General information on hydraulics 2
1.2 LUDV-Control systems 4
1.2.1 Theoretical bases 4
1.2.2 System-components for LUDV-Control systems 6

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Housing

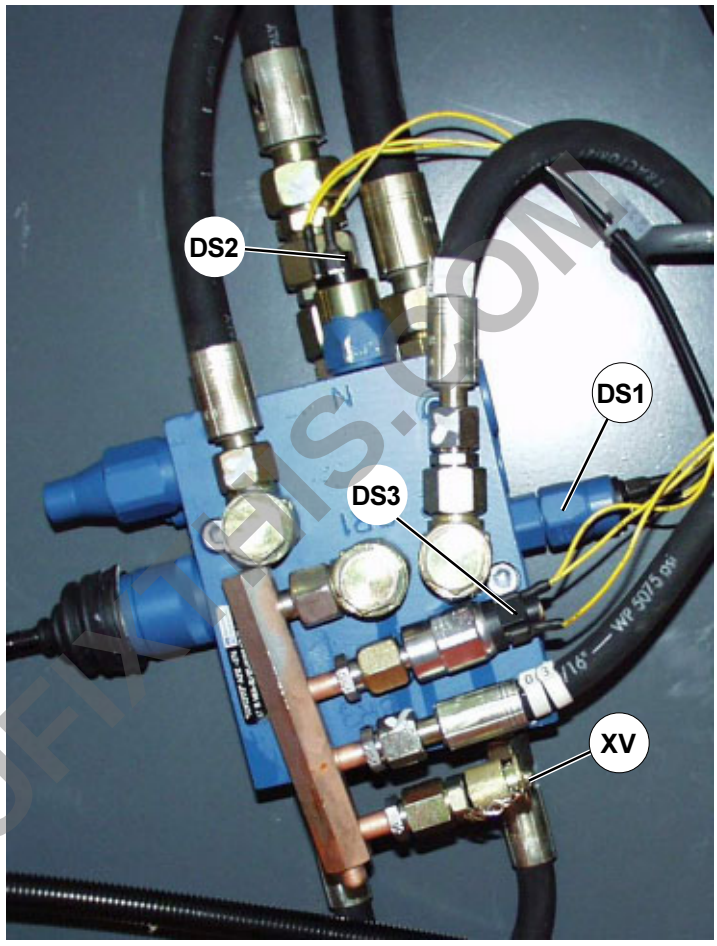
List see page 3



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Power brake valve



Measuring connections:

XIV Reservoir load valve

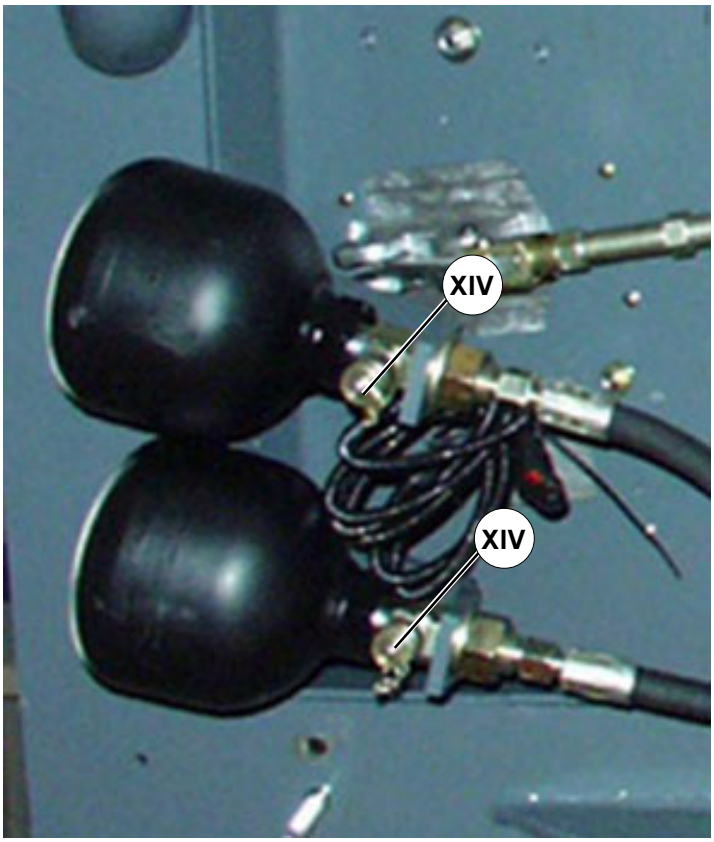
XV Foot Brake

Pressure switch:

DS1 Pressure switch of the brake light

DS2 Pressure switch of the function control

DS3 Pressure switch of the joint cross shaft axle



Ventilation:

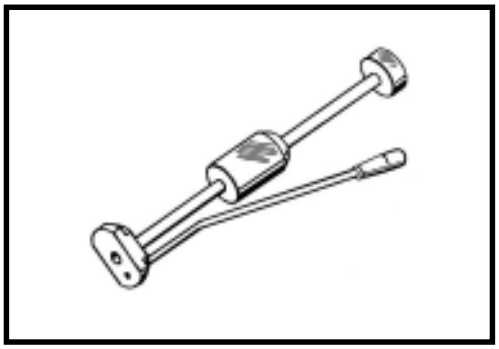
Reservoir load valve - Connect the mini measuring hose with the measuring connection (XIV).
Keep the end of the hose in an appropriate container.

Foot Brake - Connect the mini measuring hose with the measuring connection (XIV).
Keep the end of the hose in an appropriate container.
(Trigger the plate valve lightly)

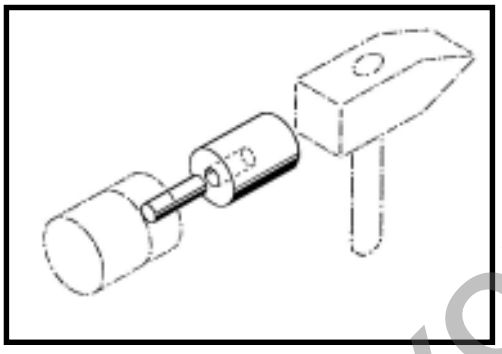
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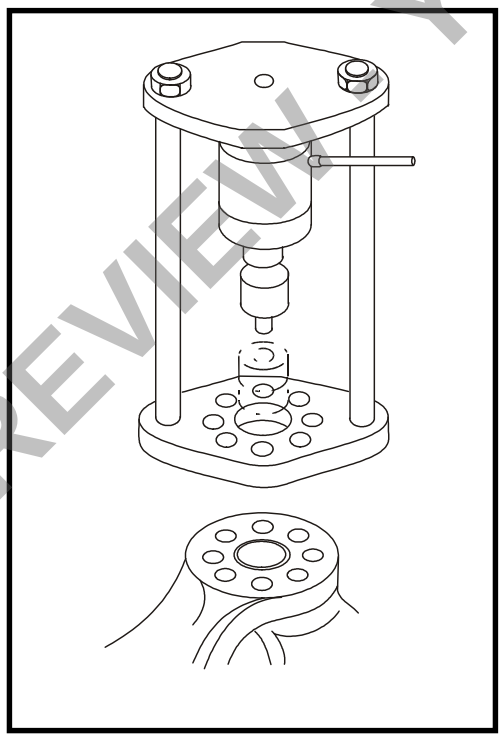
Service tools



Extractor for double-jointed cardan shaft bearing
(needle bearing / bearing bush)



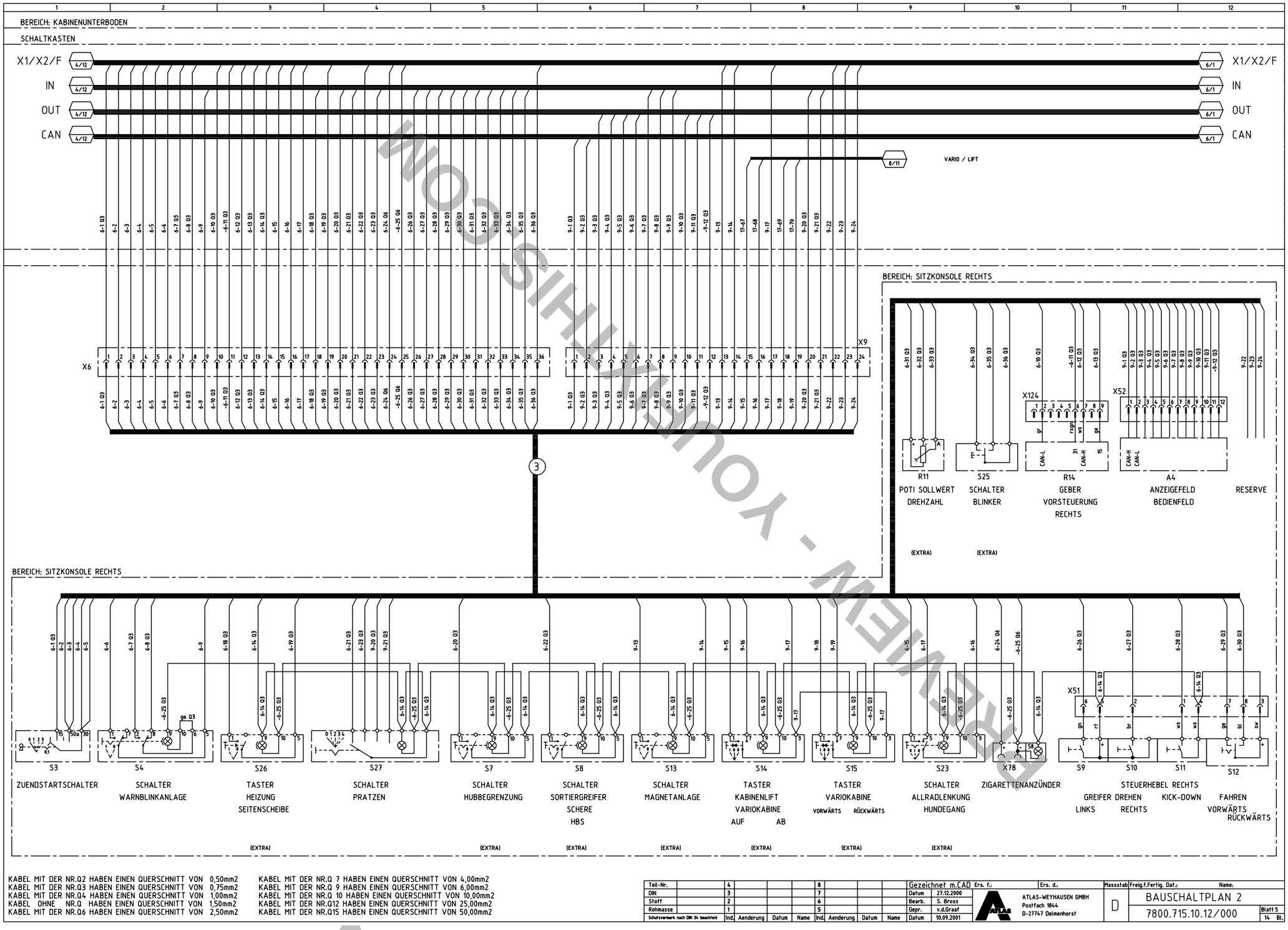
Impact button for steering swivel pin



Hydraulic pressing system for steering swivel pin

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KABEL MIT DER NR.Q 7 HABEN EINEN QUERSCHNITT VON 4,00mm2
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KABEL MIT DER NR.Q12 HABEN EINEN QUERSCHNITT VON 25,00mm2
KABEL MIT DER NR.Q15 HABEN EINEN QUERSCHNITT VON 50,00mm2

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DIN		3				7				Datum	27.12.2000								
Stoff		2				6				Bearb.	S. Bross								
Rohmasse		1				5				Gepr.	v.d.Graaf								
Schutzvermerk nach DIN 34 beachten!		Ind.	Aenderung	Datum	Name	Ind.	Aenderung	Datum	Name	Datum	10.09.2001		ATLAS-WEYHAUSEN GMBH Postfach 1844 D-27747 Delmenhorst		D	BAUSCHALTPLAN 2			
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