OPERATION, MAINTENANCE AND PARTS MANUAL TRUCK - MOUNTED CONCRETE BOOM PUMP MODEL: *XXT42.4R*

***REED*, provides this manual for the guidance of all owners, operators and servicing personnel in order to obtain the longest possible trouble-free service. It contains data, specifications, warranty, schematics, operating instructions, lubrication procedures, maintenance procedures, illustrated parts breakdown, vendor information, service bulletins, and safety rules.

Serial No.:	**08-251-XXT42.4R**
Date Delivered:	**AUGUST 2008**
Customer:	**MOS CONSTRUCTION**

NOTE: Additional copies of this manual may be obtained through the ***REED*** Parts Department.

FIRST EDITION: JULY 28, 2008
SERIAL NUMBER: 251

***REED*, *Technical Publications* • A Member of the Shea Family of Companies**
13822 Oaks Avenue • Chino, California 91710 • USA
Phone 909-287-2100 • Fax 909-287-2140

REED

TRUCK MOUNTED CONCRETE BOOM PUMPS
• ONE • TWO • THREE WARRANTY

REED warrants each of its new Truck Mounted Concrete Boom Pumps to be free of defects in material and workmanship under normal use and service for a period of One • Two • Three years from date of delivery based on the following conditions:

- One (1) year or 2400 pumping hours whichever comes first
- Two (2) years covering the Solid State Black Box
- Three (3) years covering all structural parts

The **WARRANTY** is issued **ONLY** to the **INITIAL USER.** The warranty periods begins when the product is delivered to the initial user or when first put into service, whichever occurs first. Said warranty is void if the machine is subject to misuse, neglect, accident or abuse.

The **STRUCTURAL WARRANTY** will not be honored unless, regular inspections have taken place and repairs as recommended as a result of the inspection. Inspection guidelines are detailed in the **ACPA BOOM INSPECTION BOOK**, attached in the extreme rear of the **PARTS MANUAL**. The frequency of inspection must adhere to the **ACPA BOOM INSPECTION BOOK**. For **WARRANTY** to be considered valid, these inspections must be performed by a "qualified person" as defined by the **ACPA SAFETY MANUAL**.

REED'S obligation under this warranty is limited to correcting without charge, at its factory, any parts or parts thereof which shall be returned to its factory, transportation prepaid and upon ***REED'S*** examination proves to have been originally defective. Correction of such defects by repair or replacement shall constitute fulfillment of all obligations to the initial user. This warranty does not include labor or transportation charges unless specifically identified and authorized in writing by ***REED.*** Nor does the warranty apply to any unit upon which repairs or unauthorized alterations have been made.

This warranty does not apply to normal maintenance service or to normal replacement of certain machine parts,which are subject to normal wear (such as concrete cylinders and wear components, valve mechanisms, delivery systems and bracketry, chassis decking / walkways, steps and hand rails, hopper grate, etc.) ***REED*** makes no warranty in respect to trade accessories or outside vendor components including truck chassis, such being subject to the warranties of their respective manufacturers.

THIS IS A LIMITED WARRANTY AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. In no event shall ***REED*** be liable for incidental, general or consequential damages, loss or any expense directly or indirectly related and resulting from use or lack of use caused by delay in delivery, parts failure, or any other causes associated with the product use. No person, firm or corporation is authorized to assume for ***REED*** any other liability in connection with the sale of ***REED*** products.

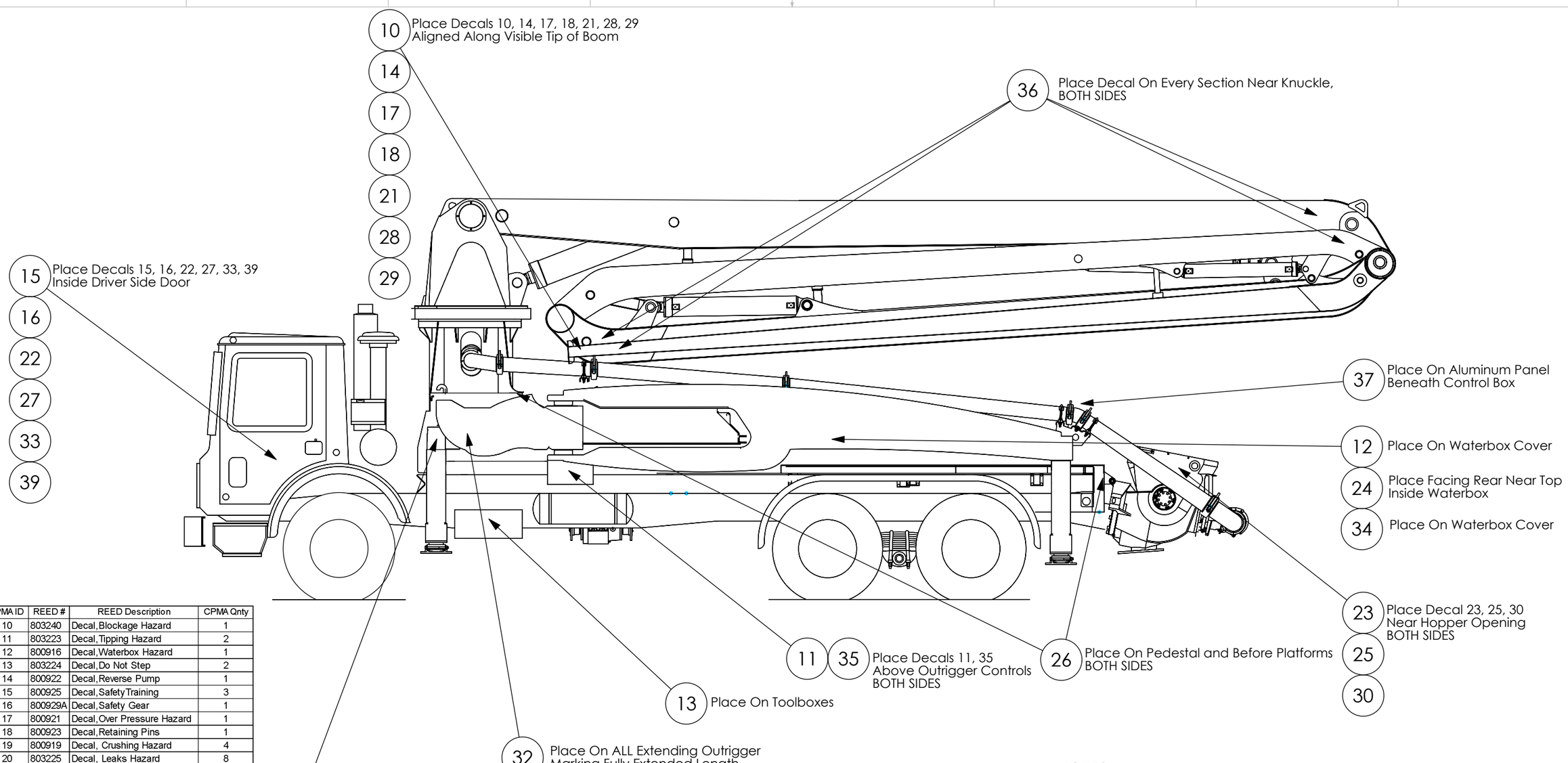
JOB #	XXT-42.4R			SN # 07-251			
	customer: MOS CONSTRUCTION						
VL-8829	BOOM MAKE UP PIPE LENGTHS						
	ARM						LENGTH
	A						26 1/4"
	B						106 3/16"
	B-C						-
	C						106 5/8"
	C-D						-
	D						106 7/8"
	E						-
	TIP HOSE SIZE						5"
	PIPE TYPE						Antonelli Standard
	SPECIAL ELBOWS						
	Turret	A sect					
	A sect	B sect					
	B sect	C sect					802576
	C sect	D sect					801672
	D sect	E sect					
	DECK MAKE UP PIPE LENGTHS						
	PIPE						LENGTH
	#1						10"
	#2						66 1/4"
	#3						-
	SPECIAL ELBOWS						803027
	TURRET PIPE						35 7/8"
	DECK DELIVERY LINE COMPONENTS						
						PART #	
	HOPPER ELBOW					803024	
	ELBOW 6"					803025	
	REDUCER					803026	
	SPECIAL TURRET ELBOW					803028	
	RADIO REMOTE SERIAL NUMBER					SERIAL #	
	RADIO REMOTE					994894193	
	CABLE REMOTE					9909879296	
	TRUCK					SERIAL #	
						1M2K201C95M027513	
	BOOM SIZE					SERIAL #	
	XXT-42.4R					R 76 05	

Baugruppenübersicht construction group survey	Betonpumpe: concrete pump:	Mast: boom:
Typenplan type parts list	**THP 150**	**42R4XXT**

Kunde: / customer:	**REED**	Auftrags.-Nr.: / order no.:	
Fahrzeug: / vehicle:	**Mack**	Bestellnr.: / purchase no.:	**SEMI**

Zusammenstellung	assemble cpl.	(B 00 4 170)			
Aufbaurahmen	sub frame	B 01			
Rahmen	base frame	801405e	Reed Zeichn.		
Rahmenverbindung kpl.	frame connection cpl.	B 03			
Mastbockverbindung	boom connection cpl.	B 03 2 056			
Aufbau	housing	B 04			
Abstützung hinten	outrigger cpl.	B 05			
		B 06			
Podeste / Aufstiege	pedestal / ladder	B 07			
Mastauflagebock	boom support	B 08 1 455b	Reed Zeichn.		
Gegengewicht	counter weight	B 09			
Pumpeneinheit kpl.	pump unit cpl.	B 10			
Pumpenlagerung	pump mounting	B 11 5 005	10,5° bis 1 1°		
Förderzylinder kpl.	conveying cylinder cpl.	B 12 5 010			
Förderkolben kpl.	conveying piston cpl.	B 13 3 020			
Spülkasten kpl.	water box cpl.	B 14 3 000			
Antriebszylinder	drive cylinder	B 15 4 031	WAI 106154a	WAI 104690	WAI 106155
Schiebersystem	s-valve system **1:**	B 17 5 200 R1	Eigener	Typenplan	
Schwenkantrieb	tilting device cpl.				
Zentral / Schmieranlage	central lubrication unit				
Förderkolbenschmierung	lubrication f. conveying piston	B 18 3 006 a			
Förderleitung Pumpeinheit	conveying pipe pump unit				
Förderleitung 6“	conveying pipe 6“				
Trichteroberteil	Hopper top part				
Trichterzubehör	hopper accessories				
Trichteroberteil	hopper upper part	B 22 5 090 a			
		B 23			
		B 24			
Rührwerk mit Antrieb	agitator with drive	B 25 5 080	2 x Nutring		
		B 26			
		B 27			
Rütteleinrichtung	vibrating equipment	B 28			
		B 29			
Wasseranlage	water system	B 30			
Wassertank kpl.	Water tank cpl.	B 31			
Wasserpumpe mit Antrieb	Water pump with drive	B 32 3 070			
Halter für Wasserschlauch	Holder for water hose	B 33			
Halter für Wasserschlauch	Holder for water hose	B 33 0 020	2x		
Schlauchleitung	Hose line	B 34			
Druckluftanlage	Compressed air unit	B 35			
Hochdruckreiniger	High pressure cleaner	B 36			
Kompressor mit Antrieb	Compressor with drive	B 37			
		B 38			
Schlauchleitung	Hose line	B 39			
Hydraulikanlage BP	Hydraulic system	Wai 106474			
Hydrauliks. Pumpe/Rührwerk	Control block	WAI 108404			
		WAI 108403			
Blasenspeicher		WAI 103616			
Hydraulikpumpe	hydraulik pump	WAI 104777			
		WAI 100 938	4x		
		WAI 101 332	8x		
Hydrauliktank / Zubehör	hydraulic tank / accessories	WAI 101 950	4x		
Ölkühlung	oil cooler	WAI 101 979	4x		
Schläuche / Zubehör	hoses / accessories	WAI 103 207	4x		
Elektroanlage	wiring diagram	WAI 106059	B 51 3 017 c		
Steuerpult	control panel				
Motorabstellung	engine stop	B 52			
Pumpenverstellung elektrisch	pump adjustment electrical	B 53			
Drehzahlverstellung	rpm adjustment	B 54			

Elektroanlage Mast	wiring diagram boom	B 55			
Kabelbaum / Zubehör	wiring harness / accessories	B 56 1 070	B 56 1 071	B 56 1 066d	B 56 1 049
Zubehör	accessories	B 57 0 015			
Zubehör Mastkabelbaum		B 56 2 066			
Kabelfernsteuerung	cable remote control	WAI 105983			
Funkfernsteuerung	radio remote control	WAI 105982			
Verteilermast	distributor boom	B 66 2 100	eigener	Typenplan	
Mastbock	boom support	B 61 2 205 d	WAI 108646		
Drehwerk	rotating unit	B 62 2 010 f	WAI 107335		
Drehwerksschutz	swing gear protection	B 62 2 025			
Abstützung kpl.	outrigger cpl.	B 63 2 340 a	B63 2 036 a	B 63 2 037 a	Wai 107364
Abstützung vorne rechts	outrigger front right		B 63 2 330 a	WAI 109673	
Abstützung vorne links	outrigger front left		B 63 2 325 a		
Abstützung hinten rechts	outrigger rear right		B 63 2 050 e		
Abstützung hinten links	outrigger rear left		B 63 2 051 e		
Transportsicherung vorne	transportation safety device f.		B 63 9 197 b		
Transportsicherung hinten	transportation safety device r.		B 63 9 207 b		
Förderleitung	delivery line	B 64			
Endschlauchhalter	end hose holder	B 64			
Endschlauch	end hose	WAI			
		B 65			
Arm 1	boom element 1	B 66			
Arm 2	boom element 2	B 66			
Arm 3	boom element 3	B 66			
Arm 4	boom element 4	B 66			
Arm 5	boom element 5	B 66			
		B 67			
Drehkopf	rotating head	B 68			
Drehwerk Schutz	rotating safety device	B 68			
		B 69			
Hydraulikanlage Mast	hydraulic system boom	WAI 108 874	Befestigung?		12Volt
Hydraulikanlage Mast	hydraulic system boom				
Hydraulikanlage Mastbock	hydraulic sys. boom support	B 72 2 010 R2	Steuerbl. von	Fa. Reed	
		B 73			
Hydraulikanlage Pumpeinheit	hydraulic sys. pump unit	B 74 1 031			
		B 75			
		B 76			
Hydrauliktank Mast	hydrauliktank boom	B 77			
		B 78			
		B 79			
Antrieb	drive	B 80			
Verteilergetriebe 4496	distribution gear	B 81 4 088 R1	i = 1:1,51		
Distanzring	Engine				
Wellenstrang	lineshaft	B 83			
Unterfahrschutz	chassis protection	B 84			
Zubehör Beleuchtung	additional parts lightning				
Trichterbeleuchtung	lightning for hopper	B 86			
Beleuchtung	lightning	B 56			
Kotflügel	fender	B 87			
Federblockierung	spring lock	B 56			
Achse kpl.	axle cpl.	B 89			
Zubehör	accessories	B 90			
Standardzubehör	standard accessories	B 91			
Schilder Pumpe	sticker pump	B 92 1 004			
Schilder Mastbock	sticker boom support				
Schilder Mast	sicker boom				
		B 93			
Werkzeugkasten	tool box	B 94			
Zusatzteile Europa	additional parts europe	B 95			
Rohrmagazin	conveying pipe magazine	B 96			
Satz Verschlußdeckel					
Transportunterzüge					



CPMA ID	REED #	REED Description	CPMA Qnty
10	803240	Decal,Blockage Hazard	1
11	803223	Decal,Tipping Hazard	2
12	800916	Decal,Waterbox Hazard	1
13	803224	Decal,Do Not Step	2
14	800922	Decal,Reverse Pump	1
15	800925	Decal,SafetyTraining	3
16	800929A	Decal,Safety Gear	1
17	800921	Decal,Over Pressure Hazard	1
18	800923	Decal,Retaining Pins	1
19	800919	Decal, Crushing Hazard	4
20	803225	Decal, Leaks Hazard	8
21	800928	Decal, Boom Crack Hazard	1
22	803226	Decal, How to Order	1
23	800918	Decal, Agitator Hazard, Foot	2
24	803227	Decal, Missing Guard	1
25	800917	Decal, Agitator Hazard, Hand	2
26	803228	Decal, Off Platform	4
27	803229	Decal, CPMA	1
28	803230	Decal, Starting Discharge	1
29	800927	Decal, Not a Crane	1
30	803231	Decal, Toxic Dust	2
31	800915	Decal, Stay Clear	4
32	803232	Decal, Extending Outrigger	2
33	803233	Decal, Safety Instructions	1
34	800924	Decal, Remote Control	1
35	803234	Decal, Outriggers	2
36	800913	Decal, 17Ft Hazard	8
37	800930	Decal, 1-14 Op Signals	1
38	803235	Decal, 1-7 Op Signals	0
39	803236	Decal, CPMA	1
40	803237	Decal, Pressurized Pipes	25
41	803238	Decal, Pressurized Hoses	25
42	803239	Safety Tags	25

NOTES
1. Place Decals 40, 41 Next To Clamps ON ALL Straight Pipe
2. Place Decal 42 ON ALL Clamps

REV	DATE	DESCRIPTION OF CHANGE	BY
		REVISION	

DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES:
FRACTIONAL ± 1/16
XX ± .031
XXX ± .010
ANGULAR: MACH ±1 BEND ±1

BREAK ALL SHARP EDGES .010 MAX x 45

ALL MACHINED SURFACES UNLESS OTHERVISE SPECIFIED

DRAWN	CT	0606
CHECKED	CT	0606

REED

CONCRETE PLACING EQUIPMENT
CHINO, CA 91710

TITLE
Decal Legend

MATERIAL
MATERIAL

PART NUMBER
803243

REV.

SHEET 1 OF 1

Waitzinger
Baumaschinen GmbH

User manual

WAITZINGER CONCRETE PUMP

THP 94/42 R 4 XXT
THP 125/42 R 4 XXT
THP 140 H/42 R 4 XXT

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Internet: www.waitzinger.de

This user manual is part of the supply of the following concrete pump:

The machine number is shown on the serial plate on the vehicle frame behind the cab:

Your appointed Waitzinger Service Office / Waitzinger Customer Service is:

Issue: July 2005

0. Contents

1. Foreword

Dear customer,

Please read this user manual carefully before first using your truck-mounted concrete pump, so as to ensure that you use it safely and effectively.

We have written this user manual to familiarise you with the design, use, operation and operating conditions, and to list the servicing and maintenance work required, together with information on safe working.

Before starting to use the truck-mounted concrete pump, be sure that all the safety conditions have been satisfied.

This user manual forms part of the total documentation package for the truck-mounted concrete pump. It relates exclusively to the superstructure that is fitted to the truck. For the truck itself see the separate user manual issued by the truck manufacturer. There may be separate user manuals for certain components and options. These user manuals should also be read and complied with.

All repair work should be performed only by authorised skilled staff.

If maintenance work is neglected or improperly performed, we may no longer be liable to perform our warranty obligations under our conditions of supply.

Only original **WAITZINGER** spare parts ensure quality and interchangeability.

NOTE:

- ☞ **Safety instructions should be complied with at all times!**
- ☞ **We reserve the right to make technical changes and improvements to the equipment and its components from the illustrations and data set out in this user manual.**
- ☞ **This user manual is applicable only insofar as the truck-mounted concrete pump corresponds to the version and equipment described.**
- ☞ **In the following sections the truck-mounted concrete pump is also referred to as the “machine” or “equipment”.**

Only qualified and trained personnel over 18 years of age may work on and with the truck-mounted concrete pump.

Our customer service department will be pleased to offer you further information and advice if despite consulting this user manual you encounter any problem with your truck-mounted concrete pump.

We wish you all the best in trouble-free driving and use of your truck-mounted concrete pump.

The management

2. Safety instructions and information

☞ **In addition, please comply with the safety instructions and information for the truck itself!**
☞ **We expressly draw to your attention that we accept no liability for damage and operating failures that arise due to disregard of this user manual!**

☞ This section contains safety instructions which must be complied with at all times when the machine is in operation. These instructions are highlighted in the text by particular symbols.

2.1 Warranty and liability

☞ After the machine has been delivered, check the completeness of the scope of supply against the delivery note.

☞ If anything is missing, or damage has occurred in transport, please report this immediately to **WAITZINGER**.

☞ The machine as delivered is in accordance with current technology and complies with the mandatory safety standards.

☞ The machine should be operated only when it is in good technical condition and in a proper manner (see section 4.2 “Proper use”). Any use other than this or beyond this is deemed to be improper use.

☞ If the machine is used inappropriately or improperly risks to life and limb can arise, and/or damage to the machine or other property. **WAITZINGER** accepts no liability for damage that arises under such circumstances. The risk is borne solely be the user of the machine.

☞ Proper use of the machine also requires compliance by the user with national regulations for accident prevention and environmental protection, with recognised professional rules for good and safe working practice and with this user manual.

☞ No changes, additions or modifications of any sort may be made to the machine without express permission from **WAITZINGER**. Original spare parts and approved accessories from **WAITZINGER** contribute to safety. No liability is accepted for the consequences arising from use of other parts.

☞ Persons working on or with the machine must have read and understood the user manual before starting work and have appropriate physical and mental capabilities.

☞ Disregard of these instructions and information can lead to risks to life and limb, and/or damage to the machine or other property.

☞ If, due to disregard of / failure to comply with the instructions and information in this user manual or the operating and maintenance handbook for the overall system, accidents leading to personal injuries and/or damage to property occur, this circumstance releases **WAITZINGER** from any liability for direct or consequential damages such as personal injuries, damage to property not covered by the contract, loss of profits and interruption to production that comes under the heading

"**Product liability**"

to **WAITZINGER**.

2.2 Safety symbols

DANGER:
This symbol indicates an immediate danger to life and health of personnel! Disregard of this information can lead to serious effects on health, through to life-threatening injuries and even death.

WARNING:
This symbol indicates a possible danger to life and health of personnel! Disregard of this information can lead to serious effects on health, through to life-threatening injuries.

CAUTION:
This symbol indicates a situation that may possibly be dangerous! Disregard of this information can lead to minor injuries or damage to property.

These symbols are placed in front of the text to which they refer, in order to alert the operator to possible hazards before undertaking any activity on the machine / equipment.

NOTE:
This symbol is used to draw the operator's attention to notes and specially useful information for technical requirements and handling the machine / equipment.
These notes assist in making the best use of the functions of the machine / equipment.

This symbol follows the text to which it relates.

2.3 Safety equipment

☞ The safety equipment fitted to the whole system must be given particular attention.

☞ The safety equipment must be continually checked for correct operation.

☞ Safety equipment that operates on the basis of set values must not be reprogrammed without expressed permission from **WAITZINGER**.

☞ If the safety equipment is not operational or is malfunctioning, the truck-mounted concrete pump must not be used.

2.4 Personal safety equipment

In the entire working area of the truck-mounted concrete pump, suitable safety equipment should be worn, particularly when handling mortar additives.

The symbols for the necessary safety equipment are shown in the graphics panel alongside.

The symbols shown are as follows:

1. Hard hat
2. Safety boots
3. Ear defenders
4. Safety gloves
5. Safety glasses
6. Face mask
7. Protective clothing
8. Safety harness

Fig. 2.1 Symbols for personal safety equipment

2.5 Ensuring safe working and safety

The following safety regulations were taken into account when designing the truck-mounted concrete pump:

☞ pr EN 12001 “Conveying, spraying and distribution machines for concrete and mortar”

☞ EN 292 “Safety of machines, equipment and systems”

☞ EN 60204-1 “Safety of machines; electrical equipment for industrial machines”

☞ EMC “Electromagnetic compatibility - Directive 89/336/EWG”

The following instructions for ensuring health and safety at work must be observed by the user, the supervisor and the operator of the equipment at all times:

- ☞ VBG ZH1/653 “Health and safety when operating truck-mounted concrete pumps”
- ☞ VBG ZH1/573 In the German Federal Republic – “Directives for truck-mounted concrete pumps and distributor booms”
- ☞ BGR 182 “Rules for handling truck-mounted concrete pumps and distributor booms”
- ☞ VDM 24119 “Graphical signs”
- ☞ BGG “Basic requirements, selection and qualification of truck-mounted concrete pump operators”
- ☞ VDMA “Safety Handbook”
- ☞ VBG 1 “General instructions”
- ☞ VBG 4 “Electrical systems and equipment”
- ☞ VBG 5 “Power-operated equipment”
- ☞ VBG 8 “Winches, hoists and drawgear”
- ☞ VBG 9 “Cranes”
- ☞ VBG 9a “Load-bearing equipment for use as lifting gear”
- ☞ VBG 12 “Accident prevention regulations (UVV) for vehicles”
- ☞ VBG 37 “Accident prevention regulations (UVV) for building work”
- ☞ VBG 109 “First aid”
- ☞ VBG 121 “Noise”
- ☞ VBG 125 “Safety signage at the workplace”
- ☞ EC directive 89/655/EWG “Minimum machine instructions guidelines”
- ☞ EC directive 98/37 “Essential machine guidelines”
- ☞ EC directive EN 60204-1 “Electrical equipment of machines, part 1”
- ☞ EG directive 73/23 “Insulation of cables”
- ☞ EG directive “Electromagnetic compatibility EMC”
- ☞ EG directive 92/58 “Personal safety equipment”
- ☞ EG directive 89/689 “Waste disposal”

☞ Work on or with the machine may be performed only by suitably instructed reliable personnel and/or technical staff.

☞ Before starting work it should be determined which personnel shall perform the necessary operating and maintenance work.

☞ When operating the machine the legislation and regulations applicable at the place of use should be observed. In the interests of safe working procedures, the user, supervision and equipment operator are responsible for complying with regulations.

☞ Before starting work, all necessary functional checks should be performed on the machine.

☞ Items not required in the immediate working process (tools, lubricants, cleaning materials, etc.) must be stowed only in their proper places, since otherwise they may obstruct safe operation.

☞ During cleaning work, especially with solvents or petrol washes, safety gloves and safety glasses must be worn. No naked lights or smoking when cleaning is being performed! Disposal of consumable materials to TA waste code 524.02 should be to EC directive 91/689/EWG.

☞ Consumables such as lubricants, cleaning materials during maintenance, repair and oil change should be collected in suitable containers and disposed of in accordance with regulations (to EC directive 75/439/EWG and statutory instruments under §§ 5a, 5b AbfG and AltölV).

2.6 Information on risks of injury

Improper use of the truck-mounted concrete pump may lead to the following injuries:

☞ Injuries to the eyes due to splashes of concrete, concrete mixing water or other chemical substances.

☞ Injuries to the eyes and other injuries due to hydraulic oil spurting out if the system is not depressurised.

☞ Injuries due to centrifugal forces of bursting couplings, bursting pipework or plugs blown out of the concrete conveying pipework.

☞ Hazards of touching electrical cables.

☞ Electric shock (which can be fatal) from machines with electrical drives, if electrical connections are not properly made or the connecting cables are defective.

☞ Danger of tipping over due to collapse of the outriggers.

☞ Injuries due to burns if hot parts are touched.

☞ Injuries due to falling pipes.

☞ Injuries to personnel due to inadvertent operation of the machine controls and hence inadvertent operation of the machine.

- ☞ Head and shoulder injuries due to concrete discharging from the discharge hose or concrete conveying pipes.
- ☞ Injuries due to parts falling from the concrete conveying pipes, if these are not properly aligned.
- ☞ Injury to the hose operator from the discharge hose if this was secured in the catch and then suddenly swings out on release.
- ☞ The truck-mounted concrete pump can roll away if the brakes or outriggers are released.
- ☞ Injuries due to opening the conveying pipes when they are under pressure due to a blockage.
- ☞ Injuries due to reaching into the agitator hopper, or falling into it.
- ☞ Injuries due to slipping from or on the oily and slippery walkways on the machine.
- ☞ Injuries during pumping operations due to reaching into the water tank at the same time as the piston is in motion.
- ☞ Amputation of the hand if the arm is trapped in the S-valve when cleaning with the flap elbow open.
- ☞ Injuries due to tripping over cables, hoses or reinforcing rods.
- ☞ Injuries due to being caught in the mixing hopper or its parts (chute).
- ☞ Injuries due to unsecured conveying pipes slipping down or falling down.
- ☞ Risk of crushing at the complete outriggers.
- ☞ Injuries due to unintended movement of the distributor boom following inadvertent operation of the controls.

2.7 Safety information for setting up

DANGER:

- ☞ **The distributor boom should not be moved before all the outriggers have been fully extended and all support cylinders correctly set!**
- ☞ **The truck-mounted concrete pump must not be driven with the distributor boom deployed!**
- ☞ **The safety regulations for the country in which the truck-mounted concrete pump is being operated must be complied with!**

2.7.1 Set-up location

When selecting the set-up location, the following aspects should be considered:

☞ Check the route to the set-up location, if necessary have someone guide the driver to the location.

☞ Keep a safe distance from obstacles such as site cranes, buildings and equipment.

☞ Check there is sufficient room to extend the outriggers.

☞ Check there is sufficient room to deploy the distributor boom.

☞ Check there is sufficient ventilation to clear the vehicle exhaust gases.

2.7.2 Hazard area

The hazard area is the area around the truck-mounted concrete pump within which a person could encounter movements of the distributor boom, the truck and the outriggers, and thus be at risk.

DANGER:

- ☞ **The is a risk of crushing when slewing and extending the outriggers and when extending the support cylinders!**
- ☞ **The operator must continually monitor the hazard area!**

☞ The outriggers must not be extended when personnel are in their area of movement. Interlock the outriggers hydraulically or mechanically.

☞ Press the Emergency Stop button immediately if anyone approaches the hazard area.

☞ Extending the outriggers on only one side may be performed only of the manufacturer has approved this after consideration of the stability of the arrangement, and the distributor boom is restricted so that it can only move within the slewing arc specified for the situation.

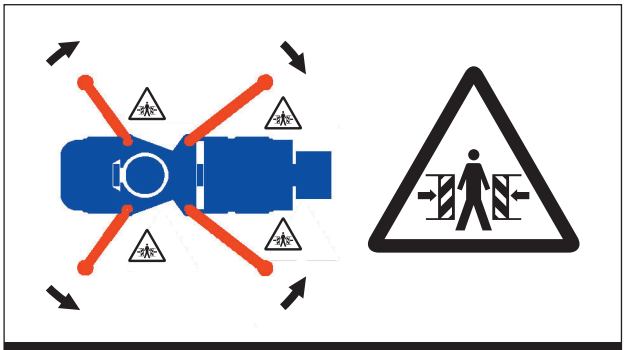


Fig. 2.2 Crush hazard in the slewing area of the support feet

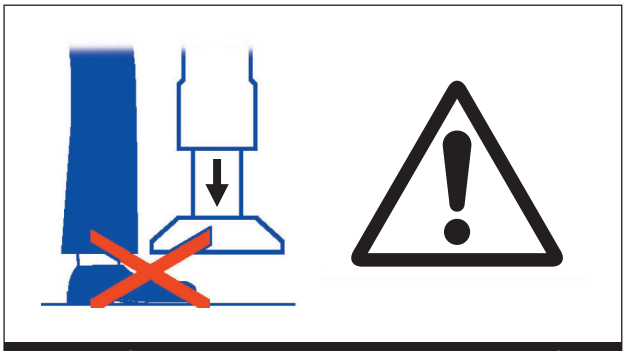


Fig. 2.3 Crush hazard when extending the support feet

2.7.3 Setting up

2.7.3.1 General

- Set up the truck-mounted concrete pump so that stability is assured.
- It must be at a sufficient distance from embankments, pits, excavations and other holes so that the pressure of the outriggers on the ground does not cause it to break into the hole.

2.7.3.2 Safety distances to the edges of excavation pits

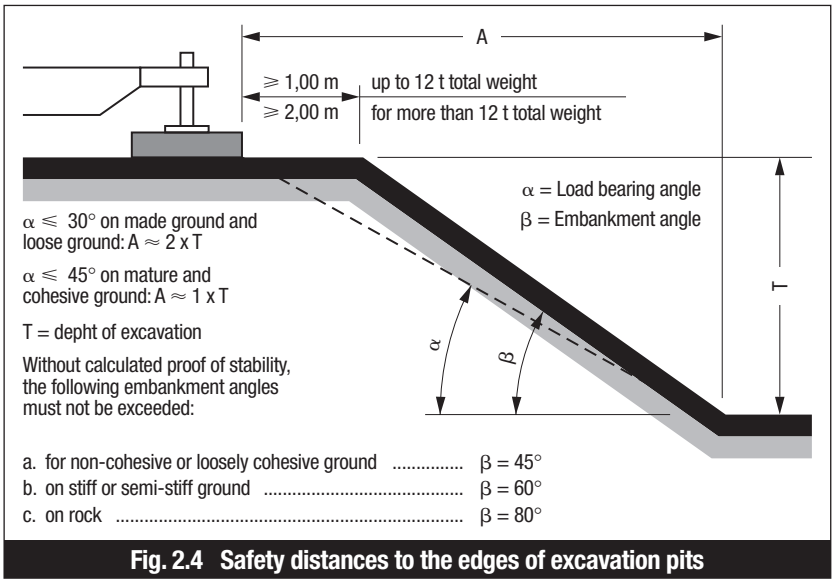


Fig. 2.4 Safety distances to the edges of excavation pits

2.7.3.3 Underground

The ground must be flat, horizontal and without voids.

On sloping ground the outriggers can slip from timber baulks.

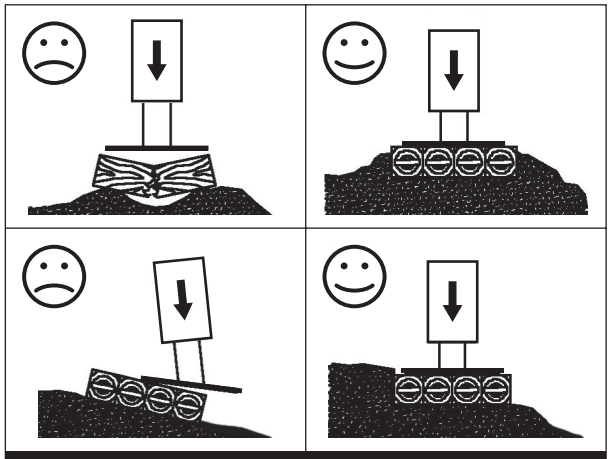


Fig. 2.5 Ground

2.7.3.4 Quality of ground

The ground must be of a quality sufficient to ensure the stability of the machine and the distributor boom. The outriggers exert a surface pressure up to 260 N/cm^2 (26 kg/cm^2). If the ground quality is insufficient to accept this the bearing area should be enlarged with two crossed layers of support plates. See DIN 1054 for recommended values.

Types of ground	Premissible ground pressure N/cm^2 (kg/m^2)
A. Backfilled ground, not artificially consolidated	0-10 (0-1)
B. Mature, obviously undisturbed ground:	
1. Silt, marsh, topsoil	0
2. Non-cohesive, sufficiently firm ground:	
fine to medium sand	15 (1,5)
Coarse sand to gravel	20 (2,0)
3. Cohesive ground:	
Mushy	0
Soft	4 (0,4)
Stiff	10 (1,0)
Semi-hard	20 (2,0)
Hard	30 (3,0)
4. Rock, unweathered with little fissuring and in a good position	150-300 (15-30)

Fig. 2.6 Premissible ground pressures for various types of ground

2.8 Safety instructions for remote control

☞ The remote control is active when the connecting cable is plugged into the machine.

☞ When remote control is in operation, the pendant must not be put down unless the Emergency Stop button has been pressed. To restart the machine (also after rectifying a fault), the Emergency Stop button must be released (twist it in the direction of the arrow, or pull it outwards).

☞ Before starting up the remote control, press the Emergency Stop button, so that all control and regulation devices for remote control are set to “0”.

☞ During interruptions, pauses whilst pumping takes place, also during maintenance and repair work, secure the remote control against unauthorised use e.g. by locking it in the cab or in a tool box etc.

2.9 Safety instructions for the working area

☞ During operation of the truck-mounted concrete pump, the machine operator is responsible for the entire working area. The working area must be fully within his field of view, otherwise an assistant is necessary. When leaving the machine, secure it against unauthorised use and self-acting movement.

☞ Barrier off the working area to other traffic in accordance with instructions.

☞ Personal protective clothing (hard hat, safety glasses, face mask, safety gloves, etc.) must be worn within the entire working area, in particular when working with cement or with chemical mortar additives.

☞ Unauthorised access to the hazard area of the machine is prohibited. If anyone is in the hazard area, first warn them, then if they still do not leave the hazard area, shut down the machine.

☞ Never, irrespective of whether the machine is running or not, reach with the hand into the transfer mechanism, pre-compression system, water tank, transfer tube or other moving part of the machine.
Always first switch the engine off and depressurise the system.

☞ When climbing on to and off the machine, use the handrails and the steps.
Keep steps, platforms, controls and regulation devices etc. free of dirt, oil, snow and ice.

☞ Whilst the machine is running never remove any guards (e.g. water tank cover), nor disable or bypass any safety devices (e.g. limit switches or mechanical catches for the grill interlocks).

☞ Whilst the pump is running, keep off the machine. All operation should be by remote control only.

DANGER

DANGER:

- ☞ **Under the slewing area of the distributor boom there is a risk of injury due to falling parts.**
- ☞ **At the discharge hose there is a there is a risk of injury due to falling concrete.**
- ☞ **Unauthorised persons must leave the hazard area immediately. If necessary, stop the machine immediately.**

2.9.1 Distributor boom

☞ The operator must ensure that no unauthorised person is in the hazard area.

☞ The distributor boom should not be moved before the outriggers have been fully extended and all support cylinders correctly set. The truck-mounted concrete pump must not be driven with the distributor boom deployed.

☞ Do not use the distributor boom as a crane jib or as a lever to push aside obstacles (such as trees).

☞ The distributor boom should be not be deployed beyond the lengths stated in the user manual.

☞ Add extensions to the conveying pipe to the distributor boom only if they do not place any additional load on the boom.

☞ When the wind reaches the critical speed, retract the distributor boom and secure it. Retract the boom and secure it also at the end of the day's work.

☞ If hazard areas are out of the operator's field of view, employ an assistant. Such hazard areas can be those within the slewing area of the distributor boom or the discharge hose.

☞ When the wind reaches the critical speed, retract the distributor boom and secure it. Retract the boom and secure it also at the end of the day's work. The machine operator must ensure that when moving the distributor boom the clearances to overhead electric cables are maintained as set out in the table.

2.9.2 Conveying pipes

☞ The machine operator must securely fasten the conveying pipes, particularly riser pipes, that are not incorporated in the distributor boom and ensure that the forces arising in the components and other parts of the design are appropriately taken up. The conveying pipes must be aligned so as to avoid kinks, sharp bends and damage in operation.

☞ If worn or defective components (high pressure hoses etc.) are not immediately replaced, **WAITZINGER** will not accept product liability. Conveying pipes are not under stress when the distributor boom is stowed, and can thus be replaced without problems at that time. If conveying pipes are replaced when the distributor boom is deployed, stresses may be introduced during assembly.

☞ To ensure a long working life for the conveying pipes, after delivering approx. 6,000 m^3, rotate all conveying pipes 120° clockwise, and rotate the elbows 180°. Check the minimum wall thicknesses and operating pressure.

WARNING

WARNING:

If you use compressed air for cleaning the conveying pipes, this is at your own risk! WAITZINGER accepts no liability for the risks involved. If nevertheless you do use compressed air for cleaning, information can be found in an additional sheet which can be requested from WAITZINGER as required.

2.9.2.1 Locking the conveying pipe connections

- All conveyor pipe couplings must be secured with spring clips (arrowed) against bursting open.

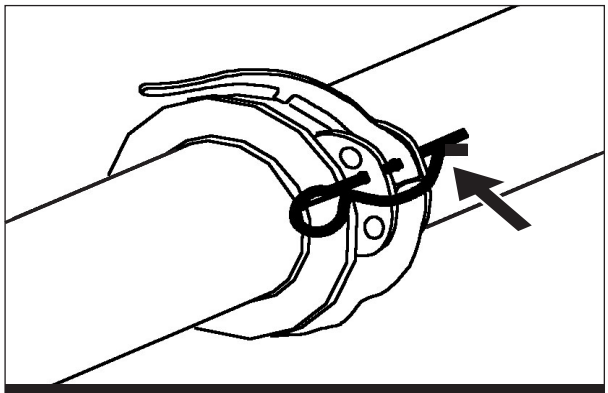


Fig. 2.7 Conveyor pipe coupling locking

2.9.2.2 Opening the conveying pipe connections

- Conveying pipe connections must be knocked apart and opened only in the depressurised state.
- Always pump backwards 1-2 piston strokes.

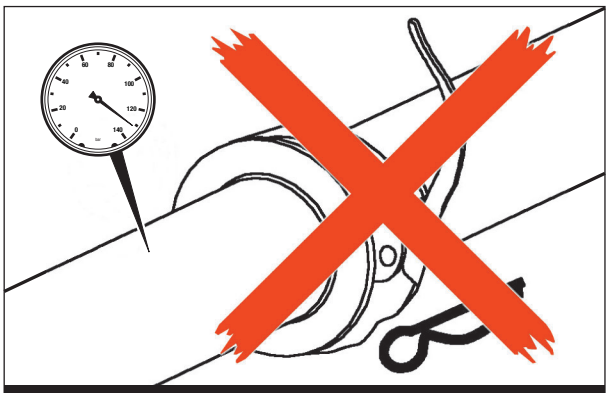


Fig. 2.8 Conveyor pipe coupling opening

2.9.3 Discharge hose

DANGER:
When pumping, after interruptions, after undoing a plug or when cleaning the conveying pipes, the discharge hose can swing out.

- ☞ The hazard area around the discharge hose has a diameter twice the length of the discharge hose.
- ☞ If anyone is within this hazard area, stop the machine immediately and press the Emergency Stop button.
- ☞ If the discharge hose becomes snagged, never use the distributor boom to pull it free. This might put the stability of the machine at risk or overload the steel structure!
- ☞ The freely suspended discharge hose must not be extended with additional couplings, discharge pieces or other hazardous discharge arrangements.
- ☞ The discharge hose must not be extended beyond the length supplied by the manufacturer.
- ☞ If the machine operator connects another discharge piece in place of the discharge hose, this must not be guided manually.
- ☞ The machine operator must use only the end hose approved by the manufacturer for delivering concrete into high places.

2.9.3.1 Hazard area for the discharge hose

- ☞ When the pump is started or a blockage occurs, the end hose must hang freely.
- ☞ There is an injury risk of being struck by the discharge hose or by stones shooting out of it.

Hazard area = 2 x discharge hose length

Fig. 2.9 Hazard area for the discharge hose

2.9.3.2 Kinks in the discharge hose

- Never kink the discharge hose whilst the pump is running. Blockages increase the risk of accidents.

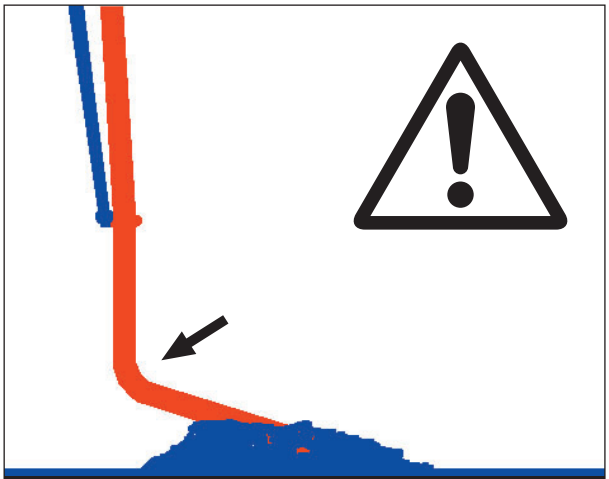


Fig. 2.10 Kink in the discharge hose

2.9.3.3 Use the guide rod to hold the discharge hose

- Do not hold the discharge hose by hand; if necessary to guide it use the guide rod as shown here.

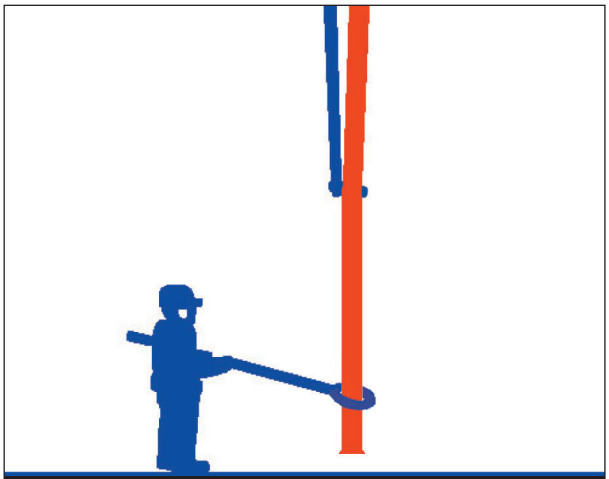


Fig. 2.11 Use the guide rod to hold the discharge hose

2.9.3.4 Securing the discharge hose with the catch

- Always secure the discharge hose with the catch

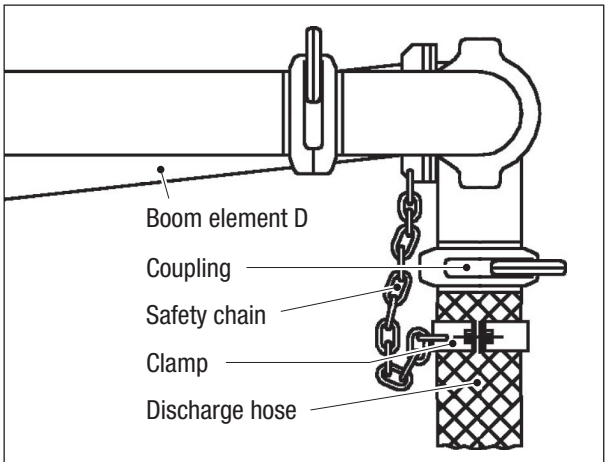


Fig. 2.12 Securing the discharge hose with the catch

2.9.4 Agitator

☞ To avoid air being sucked into the system, leading to spurting concrete, the hopper must be kept filled with concrete up to the level of the agitator shaft.

☞ Keep the safety grill closed in order to avoid injuries due to reaching into the agitator hopper, or falling into it. Do not place anything on the safety grill. Do not step on the safety grill.

☞ Never operate the machine unless the safety grill is closed and bolted into place or otherwise secured.

2.10 Safety instructions at concrete pressures in excess of 85 bar

If concrete is to be pumped at pressures in excess of 85 bar, the discharge must only be through the side outlet, not through the distributor boom. The machine operator must take the following safety precautions and perform the following tests:

a. Use only pipework supplied by the concrete pump manufacturer. At concrete pressures between 85 bar and 130 bar, high-pressure pipework is necessary.

b. Perform a water pressure test on pipes and couplings no later than after pumping 2000 m^3, at a pressure 30 % greater than the anticipated operating pressure.

c. All couplings, seals and pipe elbows that are less than 3 m from operating personnel should be regularly replaced. (e.g. after pumping each 1,000 m^3 of concrete)

2.11 Safety instructions for maintenance and repair

WARNING

WARNING:

Rectifying faults, repairs and maintenance work may be performed only when the main drive engine is switched off, hydraulic units are depressurised and conveying pipework is also depressurised. Take out the ignition key.

☞ Factory-set chokes and pressure limiting devices may not be adjusted except by trained technical staff.

☞ Removing the seals from safety valves is prohibited.

WARNING

WARNING:

Before performing any electric arc welding, always unplug the cables from the control cabinet and disconnect the battery.
To disconnect the battery, undo the positive and negative terminal connections or switch off the Nato switch at the battery if this is fitted.

☞ Disconnect machines with electrical equipment such as radio remote control (receiver), controls etc. before performing electric arc welding.

☞ Modifications, welding and repair work on the distributor boom and all assemblies associated with it, load-bearing elements, securing points, outriggers, on the mounting frame and any part of the pump or pressure-bearing components may only be performed by persons appointed by the manufacturer. Special care must be taken in respect of boom mountings and outriggers used as hydraulic or diesel tanks.

☞ When replacing electrical, pneumatic or hydraulic components (valves, pumps etc.), the required data (pressure, voltage etc.) should be checked from the machine data sheet, test sheet or circuit diagram and adjusted as necessary.

☞ Maintenance and repair work may be carried out only after fluids have been depressurised. No changes of any sort to the hydraulics are permissible. We emphatically warn against improper repairs to hydraulics. Test certificates supplied with hydraulic components should be carefully filed away for reference.

☞ If any component is removed, carefully note how it was fitted and replace it correctly referring to the spare parts data sheet / service information.

2.12 High-tension overhead electric cables

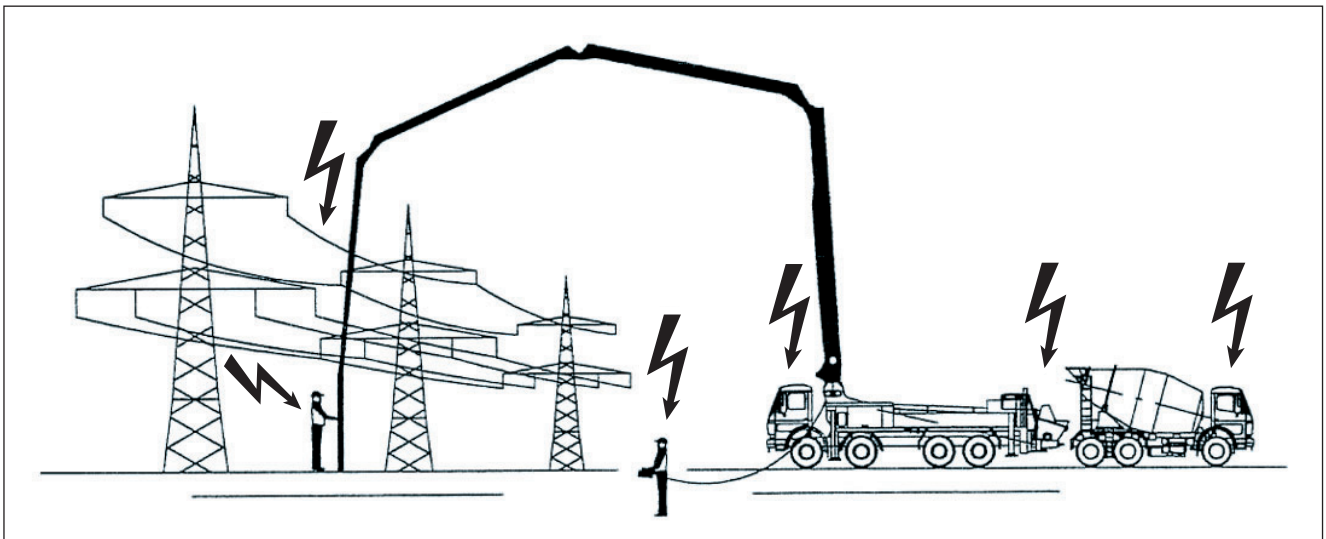


Fig. 2.13 Safety distances to high-tension overhead electric cables

DANGER:

☞ **Direct contact with high-tension cables can cause fatalities.**

☞ **Even coming close to high-tension overhead electric cables can cause the machine and the surrounding ground to become live due to a flashover.**

☞ **Always maintain the stated safety distance.**

2.12.1 Safety distance

☞ The machine operator must ensure that when moving the distributor boom the clearances to overhead electric cables are maintained as set out in the table. The following minimum safety distances are those specified for the German Federal Republic in VDE 0105:

Nominal voltage	Minimum safety distance
up to 1.000 Volt	1,0 metre
over 1 kV bis 110 kV	3,0 metre
over 110 kV bis 220 kV	4,0 metre
over 220 kV bis 380 kV	5,0 metre
if the voltage is not known	5,0 metre

Fig. 2.14 Minimum safety distance from overhead electric cables

☞ If the minimum safety distance from overhead electric cables shown in the table cannot be maintained, the machine operator must ensure that they are

- switched off for the duration of the work, or
- they are shrouded or insulated in the vicinity of the concrete pump and distribution boom.

☞ The same minimum safe distances apply to driving underneath overhead electric cables. Make allowance for the swing of the cables and the distributor boom in the wind.
High ambient humidities require safety distances greater than those listed.
Refer to the regulations for the country where the machine is in use.

☞ If the minimum distance cannot be maintained for all possible working positions, it is essential to contact the electricity supply company.
It may be necessary to forgo the use of the distributor boom altogether and use a separate conveyor pipe.

2.12.2 High-tension contacts

☞ High-tension contacts bring the risk of fatal injury for all persons who are on the machine and in its vicinity or are in any way connected to it (remote control, discharge hose etc.).

☞ High-tension contacts form a “Voltage funnel” underneath the equipment and in a circle around it. The voltage decreases as the radius increases.

☞ Every step within the voltage funnel is hazardous.
A step can span two different potentials (step voltage), so that the current flows through the body in proportion to the potential difference.

☞ If a high-tension contact occurs, keep calm, stand still (step voltage), and don’t touch anything.

☞ No-one else should enter the hazard area. Immediately have the high-tension cable switched off.

☞ After the high-tension cable has been switched off, move the machine away, help the injured and perform first aid.

☞ Using remote control protects the machine operator only if he is standing outside the voltage funnel.
In all other cases all personnel risk fatal injury.

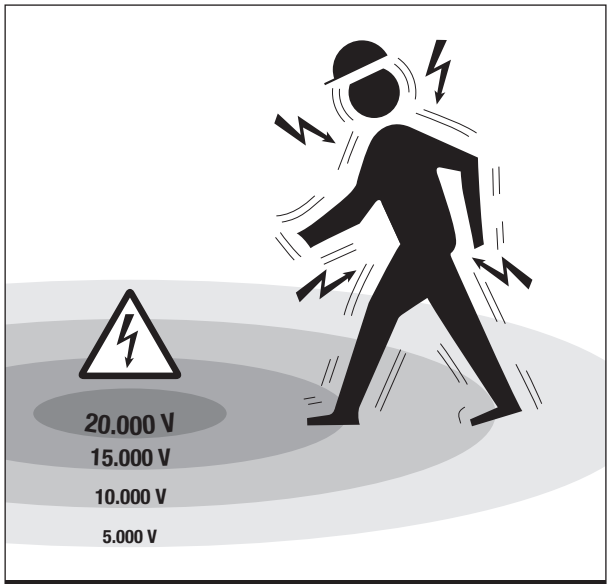


Fig. 2.15 Step voltage

☞ When working close to high-tension overhead cables, have these switched off by competent electricians.

2.12.2.1 Automatic reconnection

☞ Electrical supply systems are equipped with automatic reconnection.

☞ After the switchgear has tripped, the short-circuited cable is automatically reconnected after a brief interval.

☞ It is therefore necessary to arrange permanent disconnection.

2.12.3 Static discharge

☞ At close range to transmitting stations there can arise interference to radio and TV transmissions and hazardous static electrical discharges from the machine.

☞ Persons touching a statically charged machine will receive an electric shock.

☞ Machines close to transmitting stations should be earthed. Connect the earthing cable to a clean unpainted metal part of the machine, and anchor it in the ground with a conductive metal rod.

2.12.4 Immediate measures

☞ If an accident involving electric power occurs, immediately institute first aid measures.

☞ If despite all precautions a high-tension cable contact occurs, keep calm, stand still (step voltage), and don't touch anything.

☞ Tell those around to keep their distance (step voltage) and have the high-tension cable switched off.

☞ Only then can the machine be moved and the injured be assisted.

2.12.4.1 Actions after contacting a high-tension overhead cable

☞ Stay in the machine

☞ Drive the machine out of the hazard area

☞ Warn those standing around to keep away and not to touch the machine

☞ Have the high-tension cable switched off

☞ Do not leave the machine until the high-tension cable that was contacted / damaged has been switched off

2.13 Operation in winter

When operating in winter, take care:

☞ Increased danger of slipping, especial when cleaning

☞ Keep steps and platforms free of snow and ice

☞ Risk of blockages due to ice in the conveying pipe

2.14 Storms and thunderstorms

☞ From wind force 7 (wind speed 50 km/h), stop work and move the distributor boom to the transport position.

☞ During thunderstorms there is a risk of lightning strikes.

2.15 Noise emission measurement

The noise emission measurement to EN/ISO 3744 and EN/ISO 4871 have yielded a value of L_{Aeq} = 81.4 dB(A).

2.16 Environmental protection

☞ Use should be found around the building site for surplus concrete, or it should be disposed of as building waste according to the statutory requirements.

☞ Consumables such as lubricants, cleaning materials during maintenance, repair and oil change should be collected in suitable containers and disposed of in accordance with regulations (to EC directive 75/439/EWG and statutory instruments under §§ 5a, 5b AbfG and Altöl).

2.17 First aid

☞ Information should be sought for treatment of injuries that may arise when working with the truck-mounted concrete pump.

☞ Injuries must be reported to the supervisor.

2.18 Responsible persons

2.18.1 Personnel

The user must ensure that only personnel who have been properly trained and instructed work on or with the machine. The persons responsible for operation and maintenance must be clearly established. Furthermore he must ensure that only authorised persons use the machine.

2.18.2 Requirements

The following requirements apply to all personnel concerned with operation and maintenance of the machine:

☞ They must be at least 18 years of age

☞ They must have appropriate physical and mental capabilities

☞ They must be in good health (calm and not under the influence of alcohol, drugs or medicines)

☞ They must have been trained in the operation and maintenance of the machine

☞ They must have proved their capability to the user

☞ They must be expected to fulfil their duties reliably

Personnel must not wear any loose clothing or jewellery, including rings.
Free long hair must be secured using a hair net. This is an injury hazard since it may get caught or pulled in.

2.18.3 Skills

Personnel who are being trained, taught, instructed or educated on the machine may use it only under continuous supervision of an experienced operator.

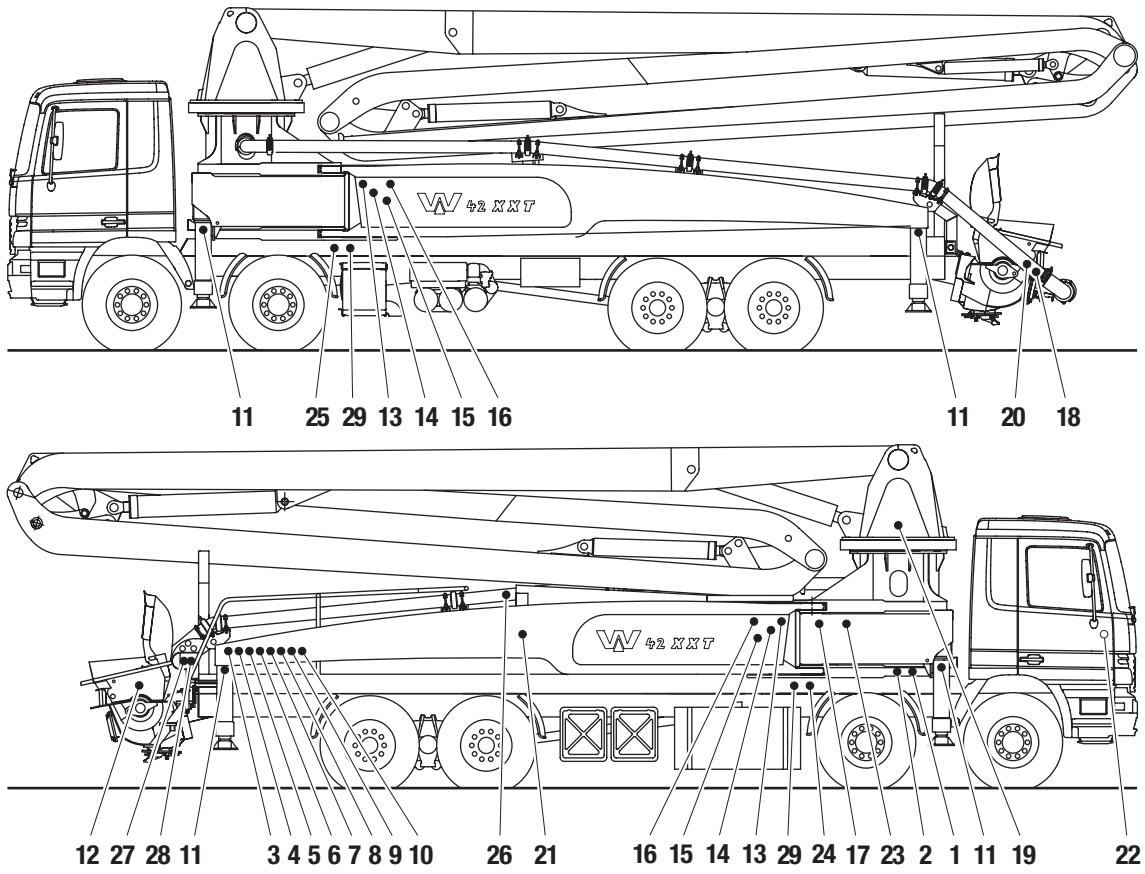
If no skilled personnel or workshop equipment etc. are available, apply to **WAITZINGER** Customer Service for maintenance of your machine.

2.18.4 Machine operator's responsibilities

The user must make clear the machine operator's responsibilities (including national regulations for driving on public roads) and enable him to refuse instructions from third parties to commit unsafe actions. The machine operator must be permitted to refuse to work at a location when there are technical safety problems.

2.19 Safety and warning notices

Safety and warning notices are attached to the truck-mounted concrete pump as listed below.
All safety and warning notices are depicted below in more detail.



1	WAI106179	Serial plate
2	WAI106032	Matching pipe lenghts / Conveying pipes
3	WAI105932	General instructions (GB)
	WAI105933	General instructions (D)
4	WAI105944	Safety equipment
5	WAI105934	High-tension overhead electric cables
6	WAI105974	Keep away
7	WAI105938	Remotely controlled machine
8	WAI105937	Boom is not a crane
9	WAI105975	Total weight of discharge hose
10	WAI105940	Slewing range of boom
11	WAI105941	Extending the support feet
12	WAI105939	Do not reach into the hopper
13	WAI106369	Grease point
14	WAI106370	Fully extend the outrigger
15	WAI106366	max. inclination 3°
16	WAI106367	Crush hazard
17	WAI105976	Distributor boom range
18	WAI105942	Spring plug
19	WAI106769	Distributor boom serial plate
20	WAI105935	Coupling pipe wall thickness
21	WAI105936	Keep hands out of water box
22	WAI105943	Desengage the clutch
23	WAI106478	Safety instructions (GB)
	WAI106477	Safety instructions (D)
24	WAI106348	Operating panel right hand outrigger
25	WAI106349	Operating panel left hand outrigger
26	WAI106519	Operating panel dustributor boom
27	WAI106030	Operating panel agitator
28	WAI106031	Operating panel water pump
29	WAI104770	supports

Fig. 2.16 Overview of safety and warning notices

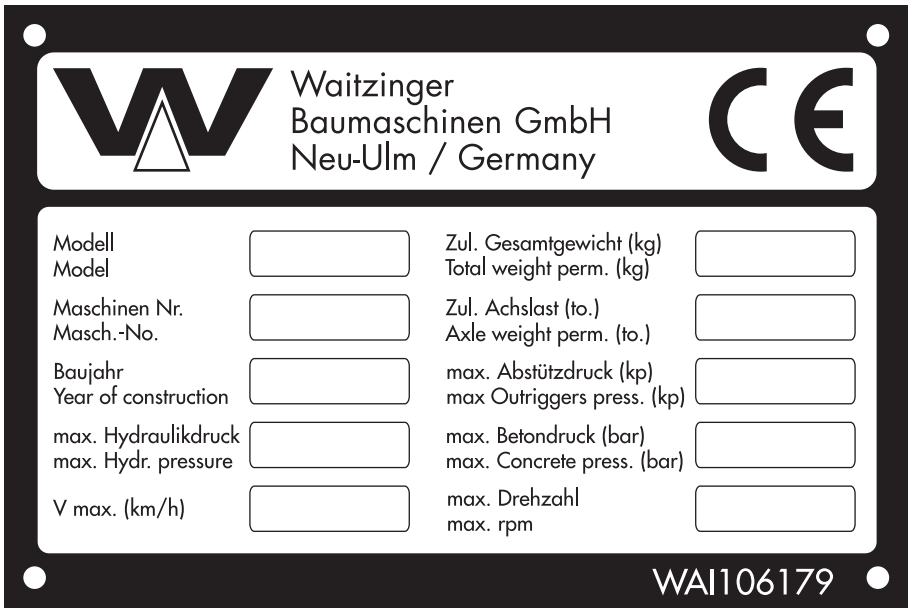


Fig. 2.17 Item 1 - WAI106179 - Serial plate

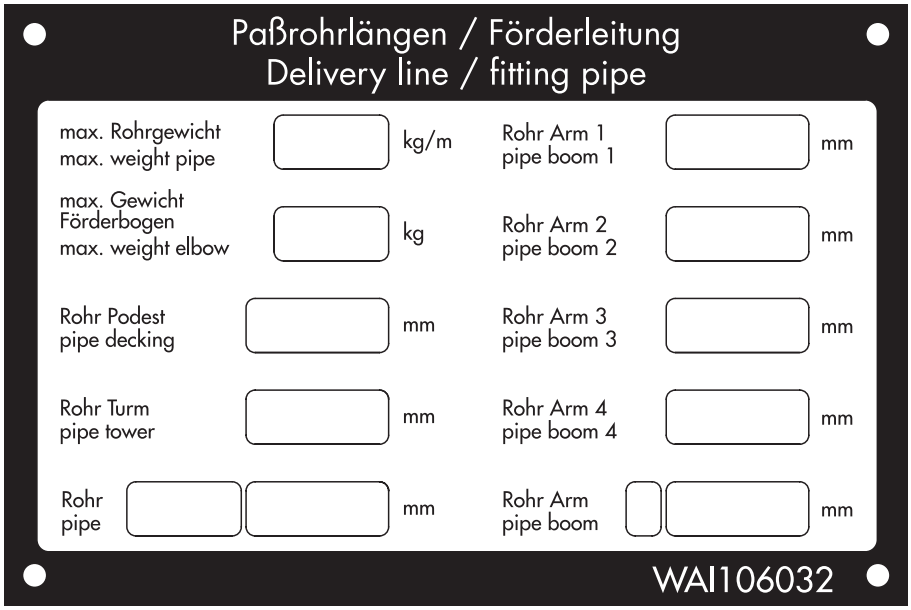
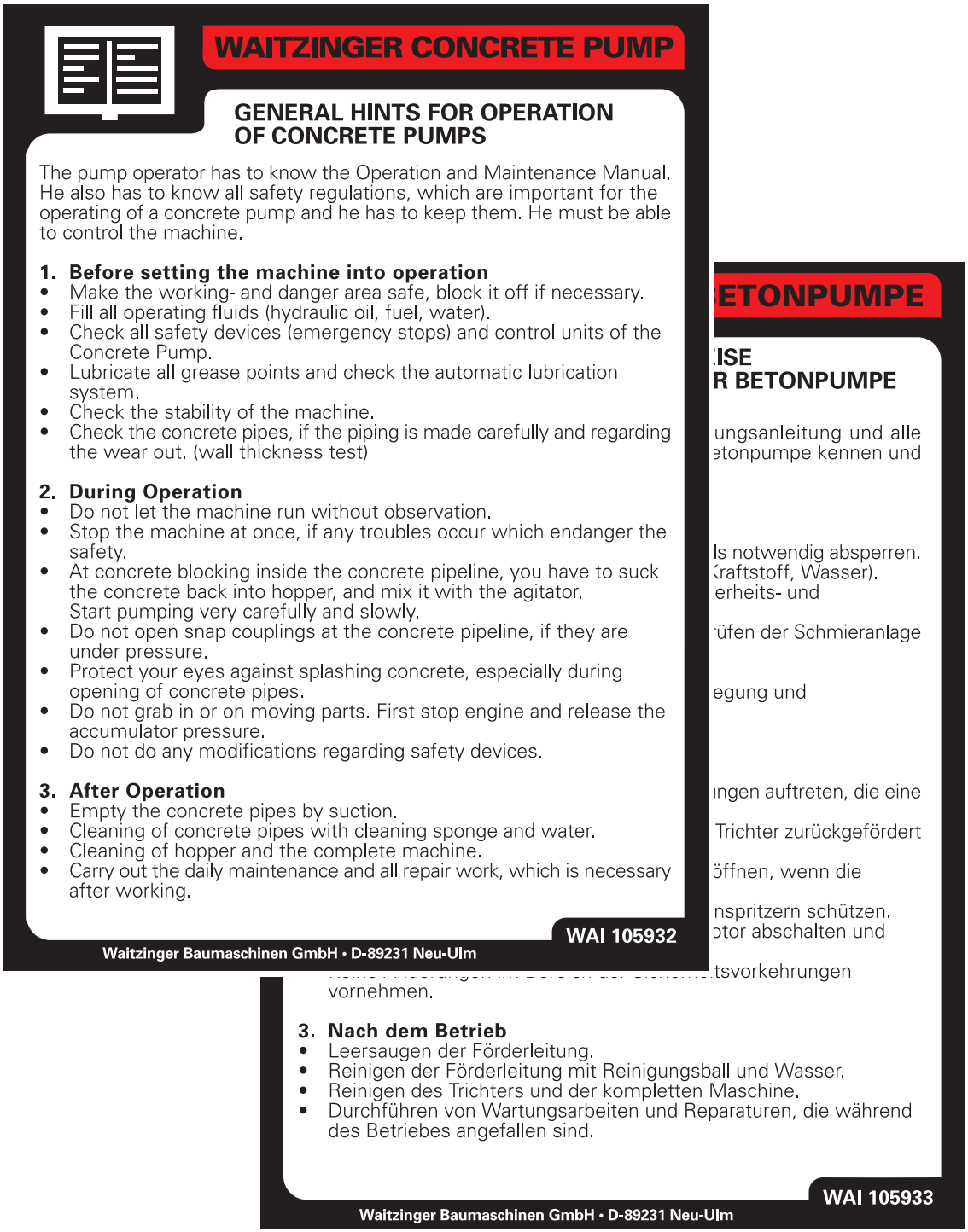


Fig. 2.18 Item 2 - WAI106032 - Matching pipe lenghts / Conveying pipes



WAITZINGER CONCRETE PUMP

GENERAL HINTS FOR OPERATION OF CONCRETE PUMPS

The pump operator has to know the Operation and Maintenance Manual. He also has to know all safety regulations, which are important for the operating of a concrete pump and he has to keep them. He must be able to control the machine.

1. Before setting the machine into operation
- Make the working- and danger area safe, block it off if necessary.
- Fill all operating fluids (hydraulic oil, fuel, water).
- Check all safety devices (emergency stops) and control units of the Concrete Pump.
- Lubricate all grease points and check the automatic lubrication system.
- Check the stability of the machine.
- Check the concrete pipes, if the piping is made carefully and regarding the wear out. (wall thickness test)

2. During Operation
- Do not let the machine run without observation.
- Stop the machine at once, if any troubles occur which endanger the safety.
- At concrete blocking inside the concrete pipeline, you have to suck the concrete back into hopper, and mix it with the agitator. Start pumping very carefully and slowly.
- Do not open snap couplings at the concrete pipeline, if they are under pressure.
- Protect your eyes against splashing concrete, especially during opening of concrete pipes.
- Do not grab in or on moving parts. First stop engine and release the accumulator pressure.
- Do not do any modifications regarding safety devices.

3. After Operation
- Empty the concrete pipes by suction.
- Cleaning of concrete pipes with cleaning sponge and water.
- Cleaning of hopper and the complete machine.
- Carry out the daily maintenance and all repair work, which is necessary after working.

WAI 105932

Waitzinger Baumaschinen GmbH • D-89231 Neu-Ulm

ETONPUMPE

ISE
R BETONPUMPE

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otor abschalten und

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vornehmen.

3. Nach dem Betrieb
- Leersaugen der Förderleitung.
- Reinigen der Förderleitung mit Reinigungsball und Wasser.
- Reinigen des Trichters und der kompletten Maschine.
- Durchführen von Wartungsarbeiten und Reparaturen, die während des Betriebes angefallen sind.

WAI 105933

Waitzinger Baumaschinen GmbH • D-89231 Neu-Ulm

Fig. 2.19 Item 3 - WAI105933/WAI105932 - General instructions (GB/D)

Fig. 2.20 Item 4 - WAI105944 - Safety equipment

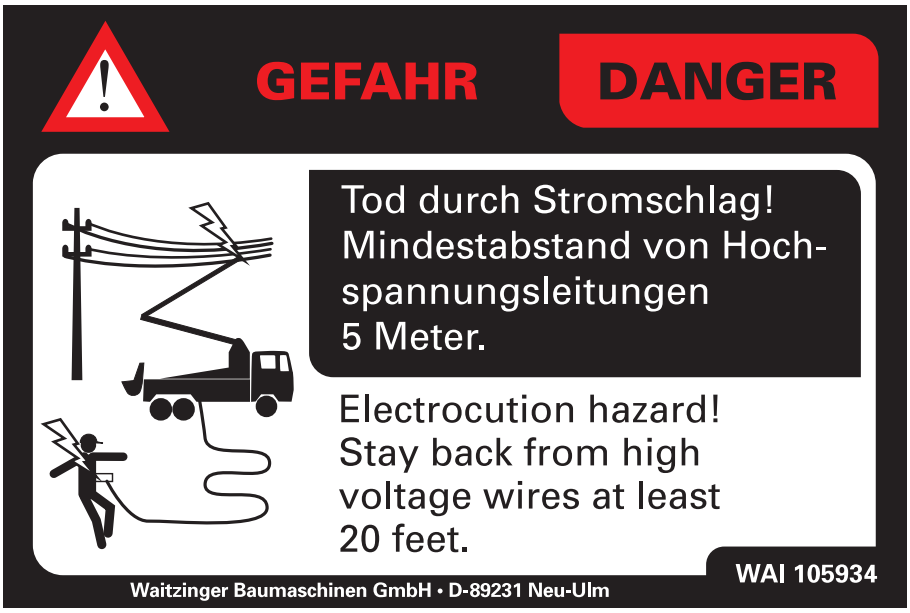


Fig. 2.21 Item 5 - WAI105934 - High-tension overhead electric cables

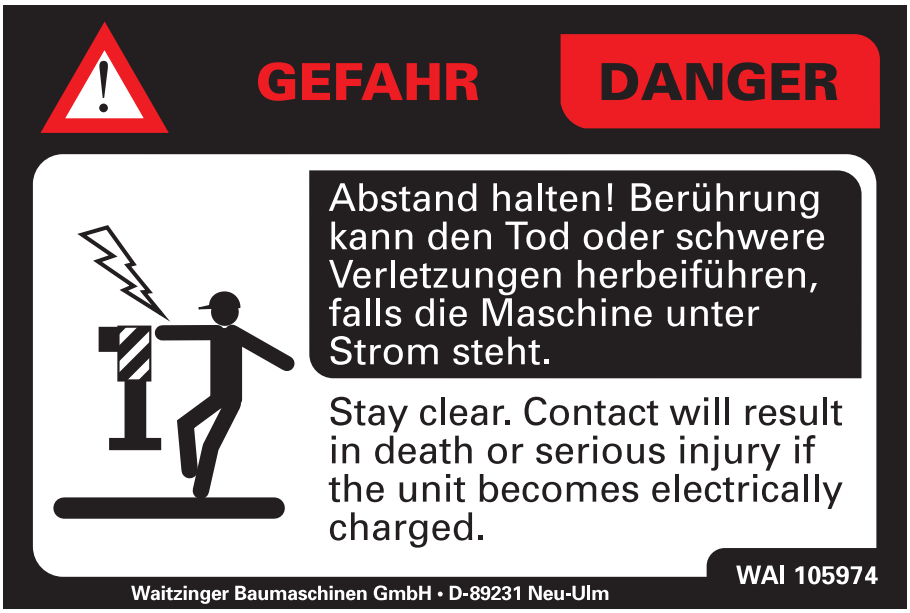


Fig. 2.22 Item 6 - WAI105974 - Keep away

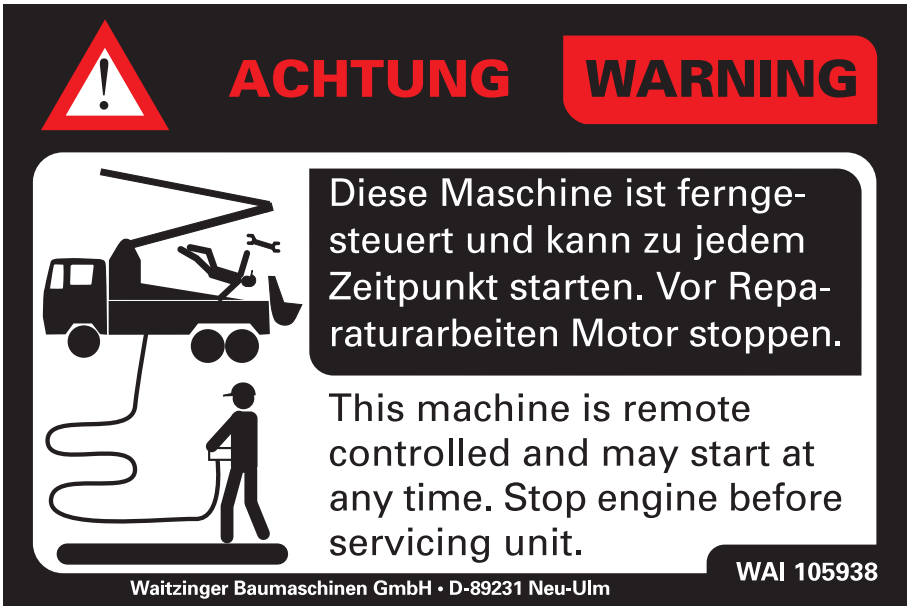


Abb. 2.23 Item 7 - WAI105938 - Remotely controlled machine

Fig. 2.24 Item 8 - WAI105937 - Boom is not a crane

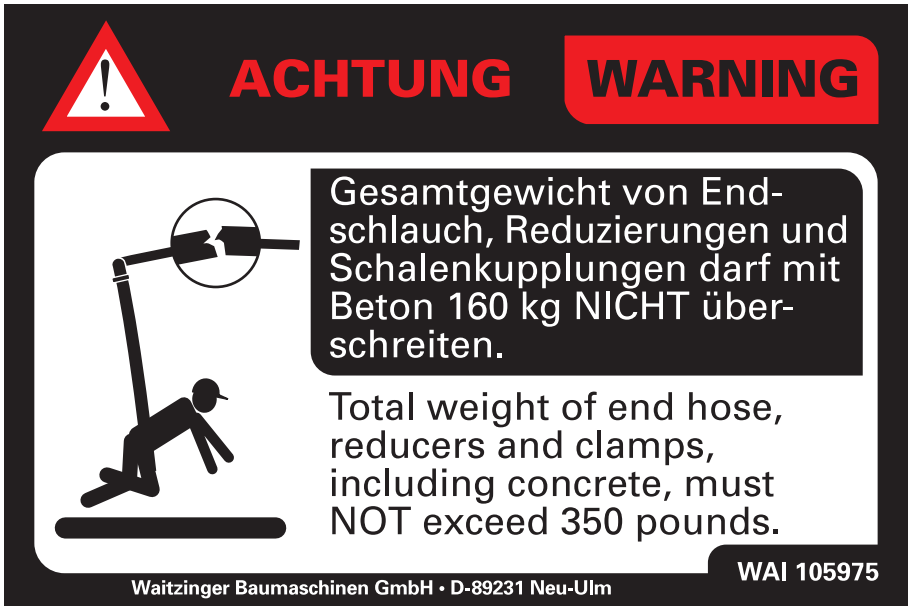


Fig. 2.25 Item 9 - WAI105975 - Total weight of discharge hose

Fig. 2.26 Item 10 - WAI105940 - Slewing range of boom

Fig. 2.27 Item 11 - WAI105941 - Extending the support feet

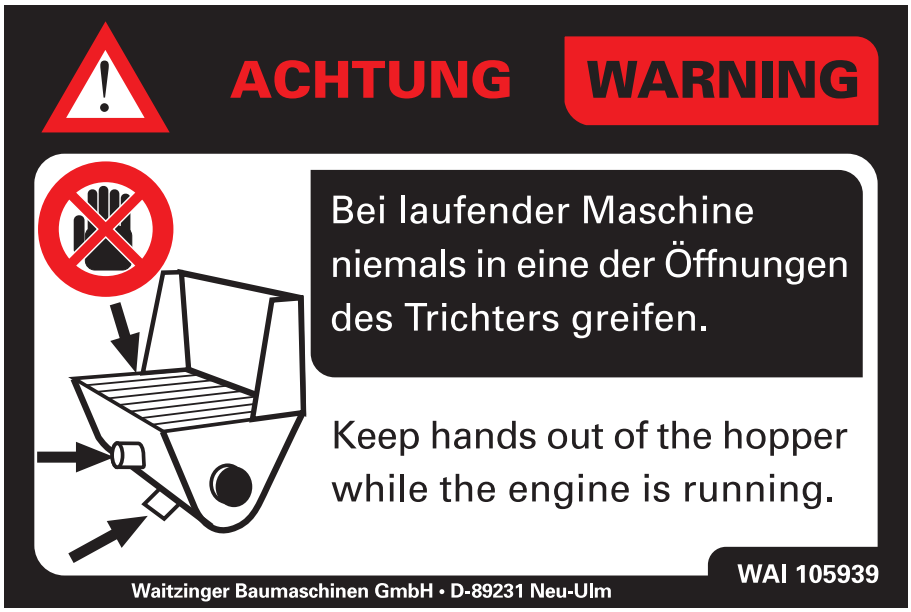


Fig. 2.28 Item 12 - WAI105939 - Do not reach into the hopper

Fig. 2.29 Item 13 - WAI106369 - Grease point

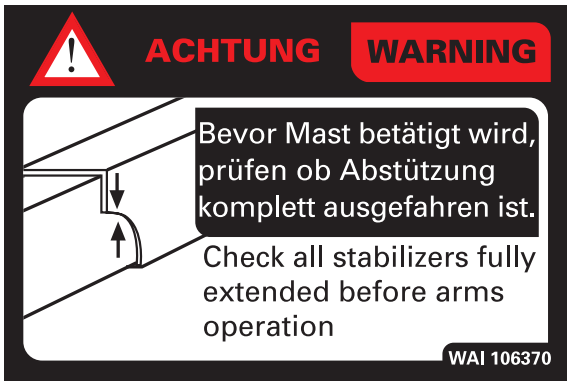


Fig. 2.30 Item 14 - WAI106370 - Fully extend the outrigger

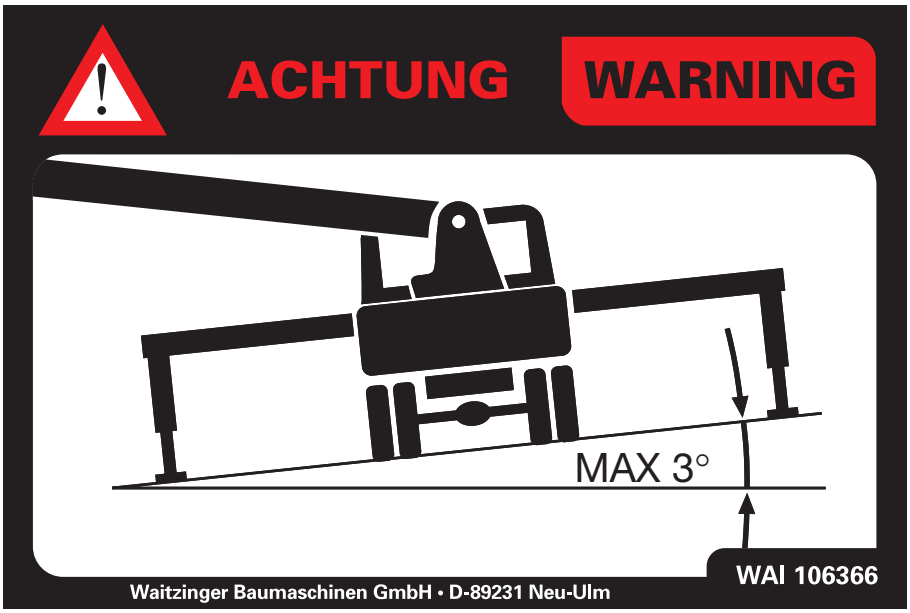


Fig. 2.31 Item 15 - WAI106366 - Max. inclination 3°

Fig. 2.32 Item 16 - WAI106367 - Crush hazard

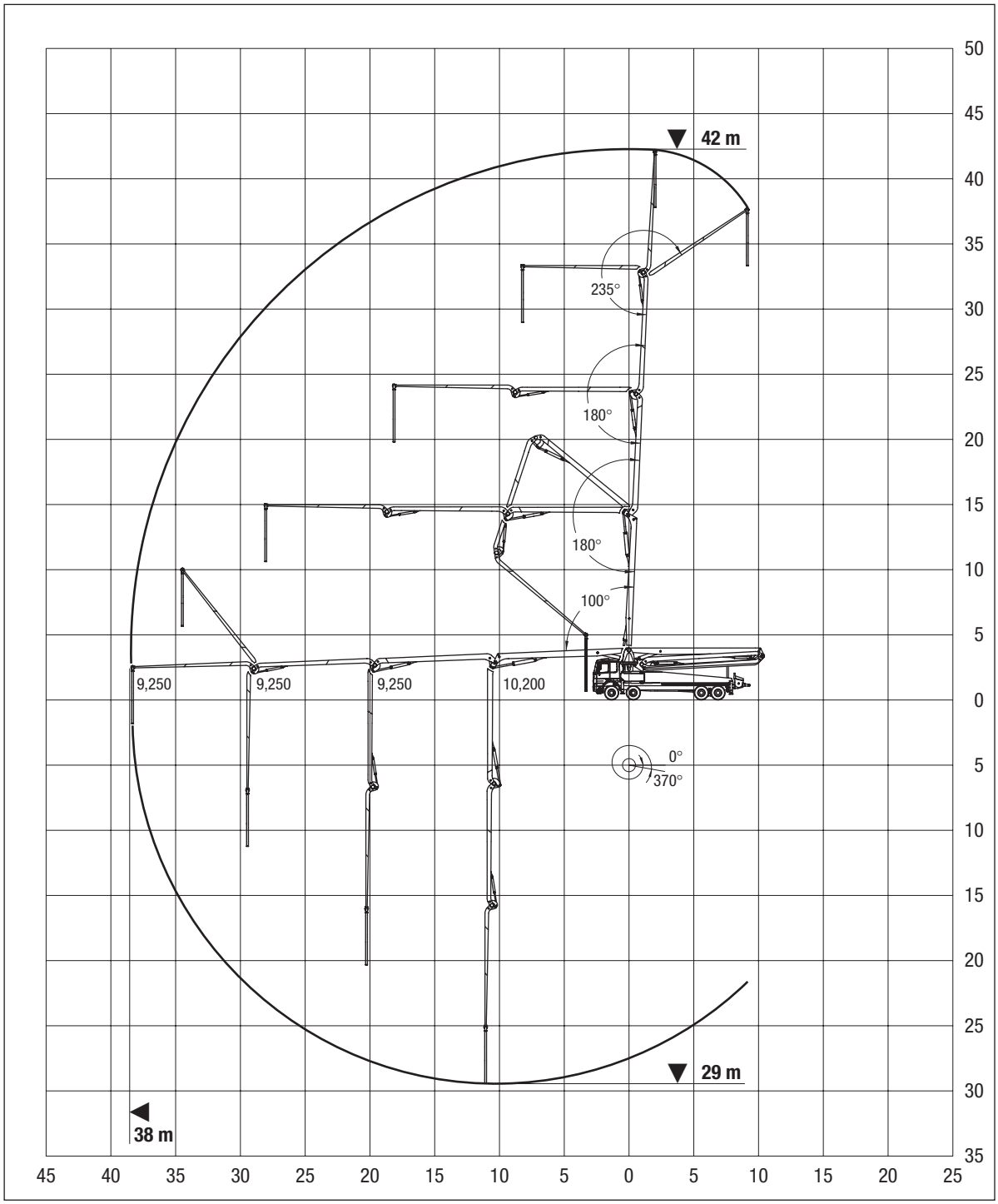


Fig. 2.33 Item 17 - WAI105976 - Distributor boom range

Fig. 2.34 Item 18 - WAI105942 - Spring plug

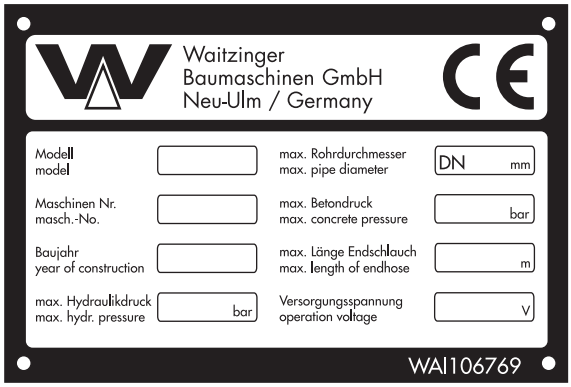


Fig. 2.35 Item 19 - WAI106769 - Distributor boom serial plate

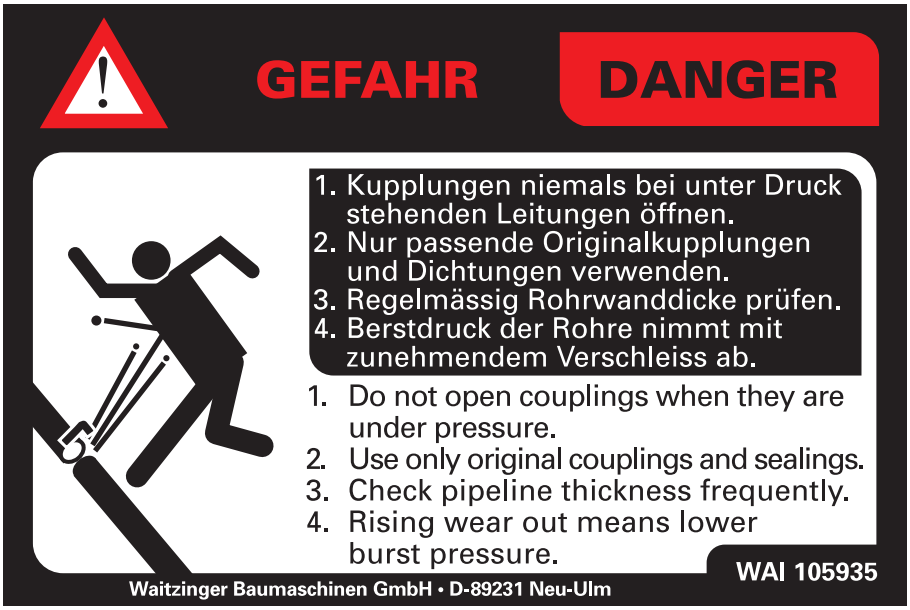
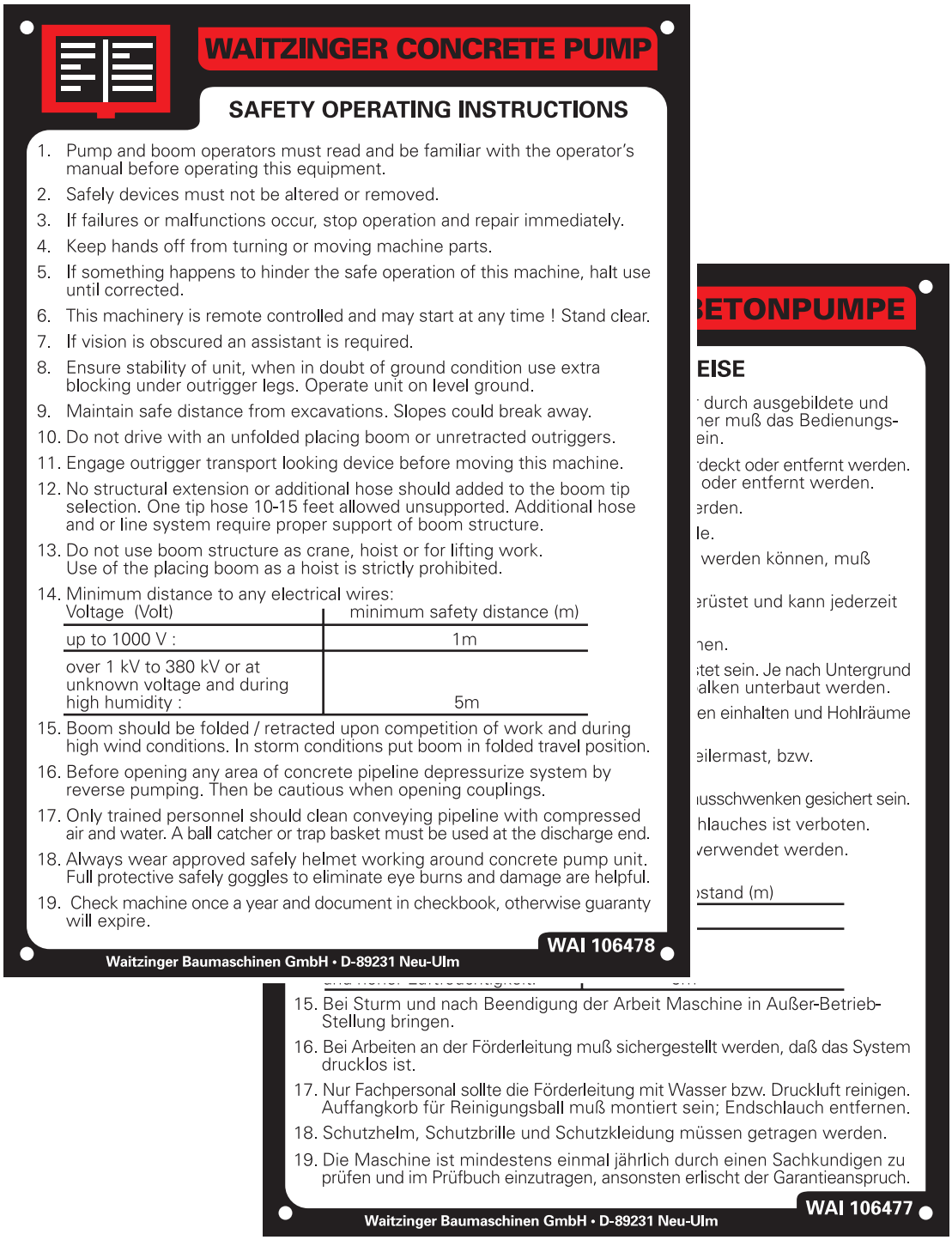


Fig. 2.36 Item 20 - WAI105935 - Coupling pipe wall thickness

Fig. 2.37 Item 21 - WAI105936 - Keep hands out of water box

Fig. 2.38 Item 22 - WAI105943 - Disengage the clutch



WAITZINGER CONCRETE PUMP

SAFETY OPERATING INSTRUCTIONS

1. Pump and boom operators must read and be familiar with the operator's manual before operating this equipment.
2. Safely devices must not be altered or removed.
3. If failures or malfunctions occur, stop operation and repair immediately.
4. Keep hands off from turning or moving machine parts.
5. If something happens to hinder the safe operation of this machine, halt use until corrected.
6. This machinery is remote controlled and may start at any time ! Stand clear.
7. If vision is obscured an assistant is required.
8. Ensure stability of unit, when in doubt of ground condition use extra blocking under outrigger legs. Operate unit on level ground.
9. Maintain safe distance from excavations. Slopes could break away.
10. Do not drive with an unfolded placing boom or unretracted outriggers.
11. Engage outrigger transport looking device before moving this machine.
12. No structural extension or additional hose should added to the boom tip selection. One tip hose 10-15 feet allowed unsupported. Additional hose and or line system require proper support of boom structure.
13. Do not use boom structure as crane, hoist or for lifting work. Use of the placing boom as a hoist is strictly prohibited.
14. Minimum distance to any electrical wires:

Voltage (Volt)	minimum safety distance (m)
up to 1000 V :	1m
over 1 kV to 380 kV or at unknown voltage and during high humidity :	5m

15. Boom should be folded / retracted upon competition of work and during high wind conditions. In storm conditions put boom in folded travel position.
16. Before opening any area of concrete pipeline depressurize system by reverse pumping. Then be cautious when opening couplings.
17. Only trained personnel should clean conveying pipeline with compressed air and water. A ball catcher or trap basket must be used at the discharge end.
18. Always wear approved safely helmet working around concrete pump unit. Full protective safely goggles to eliminate eye burns and damage are helpful.
19. Check machine once a year and document in checkbook, otherwise guaranty will expire.

WAI 106478

Waitzinger Baumaschinen GmbH • D-89231 Neu-Ulm

ETONPUMPE

EISE

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oder entfernt werden.
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usschwenken gesichert sein.
hlauches ist verboten.
verwendet werden.
stand (m)

15. Bei Sturm und nach Beendigung der Arbeit Maschine in Außer-Betrieb-Stellung bringen.
16. Bei Arbeiten an der Förderleitung muß sichergestellt werden, daß das System drucklos ist.
17. Nur Fachpersonal sollte die Förderleitung mit Wasser bzw. Druckluft reinigen. Auffangkorb für Reinigungsball muß montiert sein; Endschlauch entfernen.
18. Schutzhelm, Schutzbrille und Schutzkleidung müssen getragen werden.
19. Die Maschine ist mindestens einmal jährlich durch einen Sachkundigen zu prüfen und im Prüfbuch einzutragen, ansonsten erlischt der Garantieanspruch.

WAI 106477

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Fig. 2.39 Item 23 - WAI106477/WAI106478 - Safety instructions (GB/D)

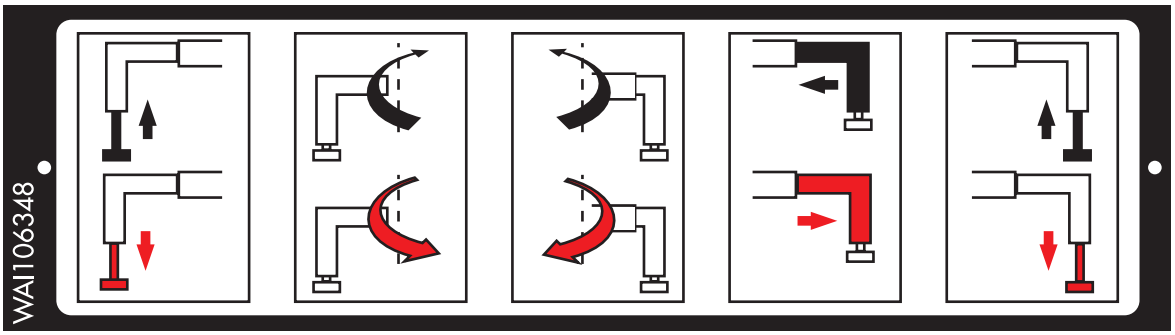


Fig. 2.40 Item 24 - WAI106348 - Operating panel right hand outrigger

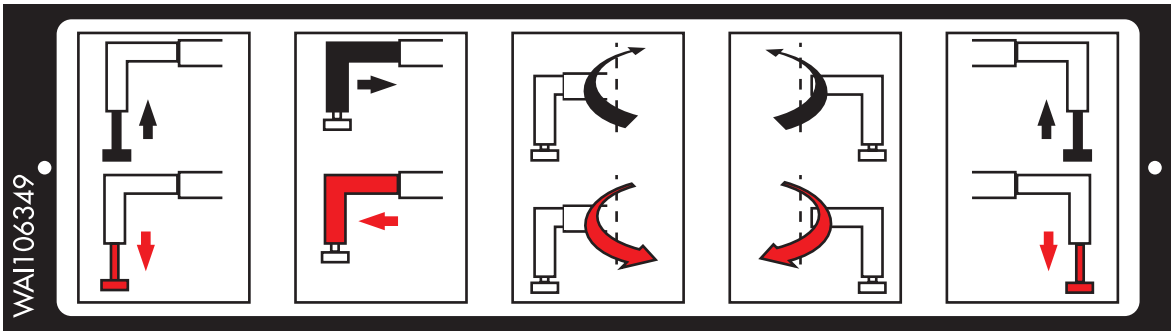


Fig. 2.41 Item 25 - WAI106349 - Operating panel left hand outrigger

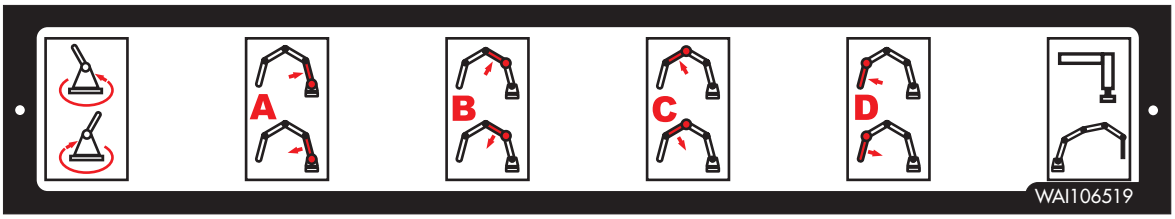


Fig. 2.42 Item 26 - WAI106519 - Operating panel distributor boom

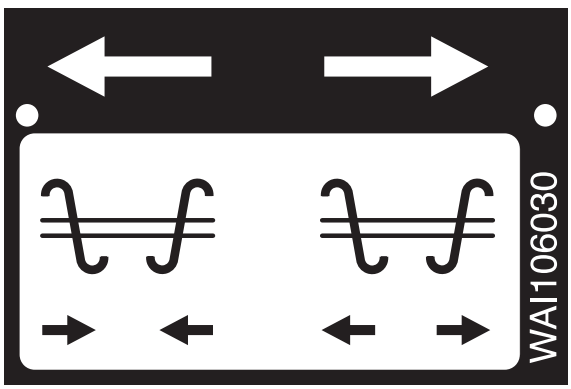


Fig. 2.43 Item 27 - WAI106030 - Operating panel agitator

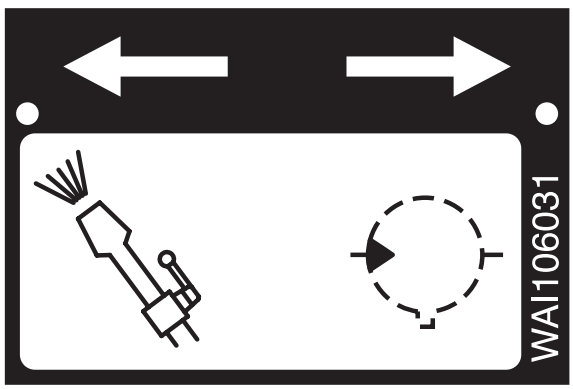


Fig. 2.44 Item 28 - WAI106031 - Operating panel water pump

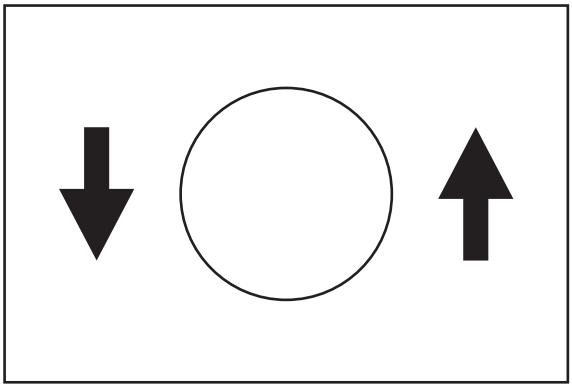


Fig. 2.45 Item 29 - WAI104770 - Operating panel supports

3. Technical data

3.1 Leading dimensions of the truck-mounted concrete pump,

Vehicle dimensions (Length x Width x Height)	approx. 13,070 mm x 2,500 mm x 3,980 mm
Weight (in full working order)	approx. 31,900 kg

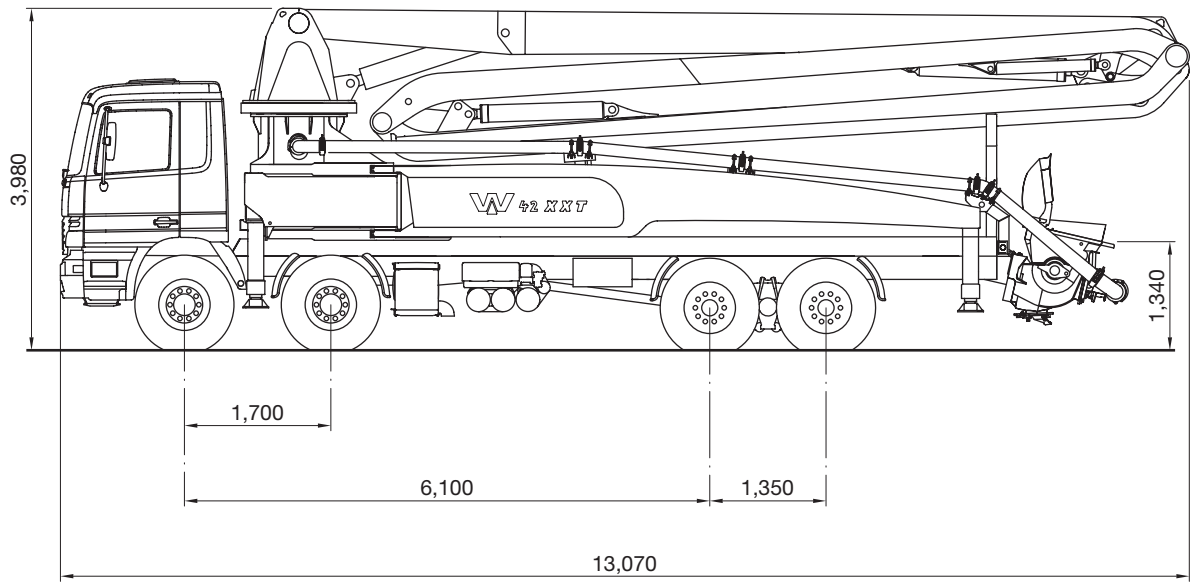


Fig. 3.1 Leading dimensions of the truck-mounted concrete pump

3.2 Truck

Information regarding the truck can be found in the separate user manual supplied by the truck manufacturer.

3.3 Distributor boom 42 R 4 XXT

Horizontal reach	[mm]	38,000
Vertical reach	[mm]	42,000
Slewing range	[degrees °]	370
1 / A element rotation	[degrees °]	100
2 / B element rotation	[degrees °]	180
3 / C element rotation	[degrees °]	180
4 / D element rotation	[degrees °]	235
Concrete pipeline diameter	[mm]	125
Front outrigger setup	[mm]	8,500
Rear outrigger setup	[mm]	8,000
Length of discharge hose	[mm]	4,000
Voltage	[V]	12/24
Max. slope of ground	[degrees °]	3
Front outrigger pressure	[kN]	220
Rear outrigger pressure	[kN]	220
Max. concrete pressure	[bar]	85
Max. weight of pipework	[kg/m]	12
Max. weight of elbow	[kg]	13
Max. density of concrete	[kg/m^3]	2,4
Hydraulic pressure for distributor boom	[bar]	330
Hydraulic pressure for outriggers	[bar]	200
Secondary settings		
Element 1 up	[bar]	300
Element 2 up	[bar]	320
Element 3 up	[bar]	280
Element 4 up	[bar]	280
Rotate	[bar]	160
Telescopic extension	[bar]	100/100
Slew out front outrigger	[bar]	50
Slew in front outrigger	[bar]	80
Time element 1 up/down 100 °	[sec]	90
Time element 2 up/down 180 °	[sec]	115
Time element 3 up/down 180 °	[sec]	76
Time element 4 up/down 235 °	[sec]	51
Rotate left/right 370 °	[sec]	160

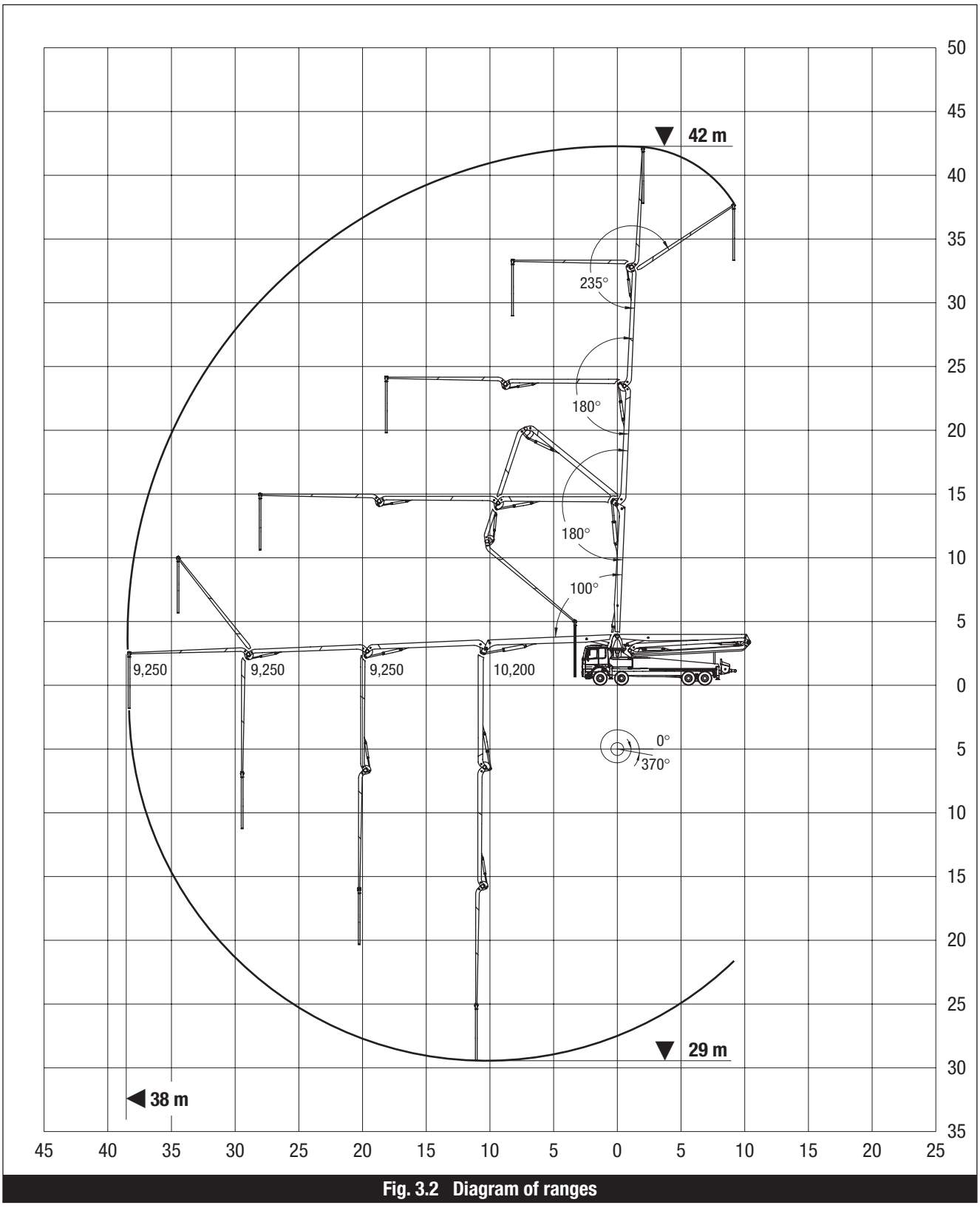


Fig. 3.2 Diagram of ranges

3.4 Concrete pump

		94/42 R 4 XXT	125/42 R 4 XXT	140 H/42 R 4 XXT
Max. concrete output, rod side	[m^3/h]	94	125	140
Max. concrete output, piston side	[m^3/h]	57	75	96
Max. concrete pressure, rod side	[bar]	75	55	80
Max. concrete pressure, piston side	[bar]	125	95	119
Pump cycles/min, rod side		25	25	28
Pump cycles/min, piston side		15	15	19
Conveying cylinder, D_{inner} x stroke	[mm]	200 x 2,000	230 x 2,000	230 x 2,000
Stroke volume / double stroke	[litre]	125	166	166
Hydraulic drive cylinder, D_{piston} /D_{rod} x stroke	[mm]	125/80 x 2,000	125/80 x 2,000	140/80 x 2,000
Oil tank volume	[litre]	600	600	600
Water tank volume	[litre]	600	600	600
Hopper capacity	[litre]	600	600	600
Water pump pressure	[bar]	20	20	20
Max. hydraulic pressure, concrete pump	[bar]	320	320	320
Max. hydraulic pressure, agitator	[bar]	250	250	250
Max. hydraulic pressure, water pump	[bar]	250	250	250
Max. speed of cardan shaft	[rpm]	1.650	1.650	1.650

WARNING:
Note transmission ratio from vehicle gearbox!

4. Description

4.1 Proper use

The truck-mounted concrete pump is a working machine and is exclusively intended for conveying concrete up a density in the pipe of 2,400 kg/m^3.

The machine is not to be used for transport of goods other than transporting accessories such as pipes and hoses etc.
The maximum permissible total weight must not be exceeded.

Any use that is not covered by proper use is deemed to be improper use or misuse.
WAITZINGER accepts no liability for damage that arises under such circumstances.

The truck-mounted concrete pump as delivered is in accordance with current technology and complies with recognised safety standards for construction and use.

The truck-mounted concrete pump should be operated only when it is in good technical condition and for its proper purpose.

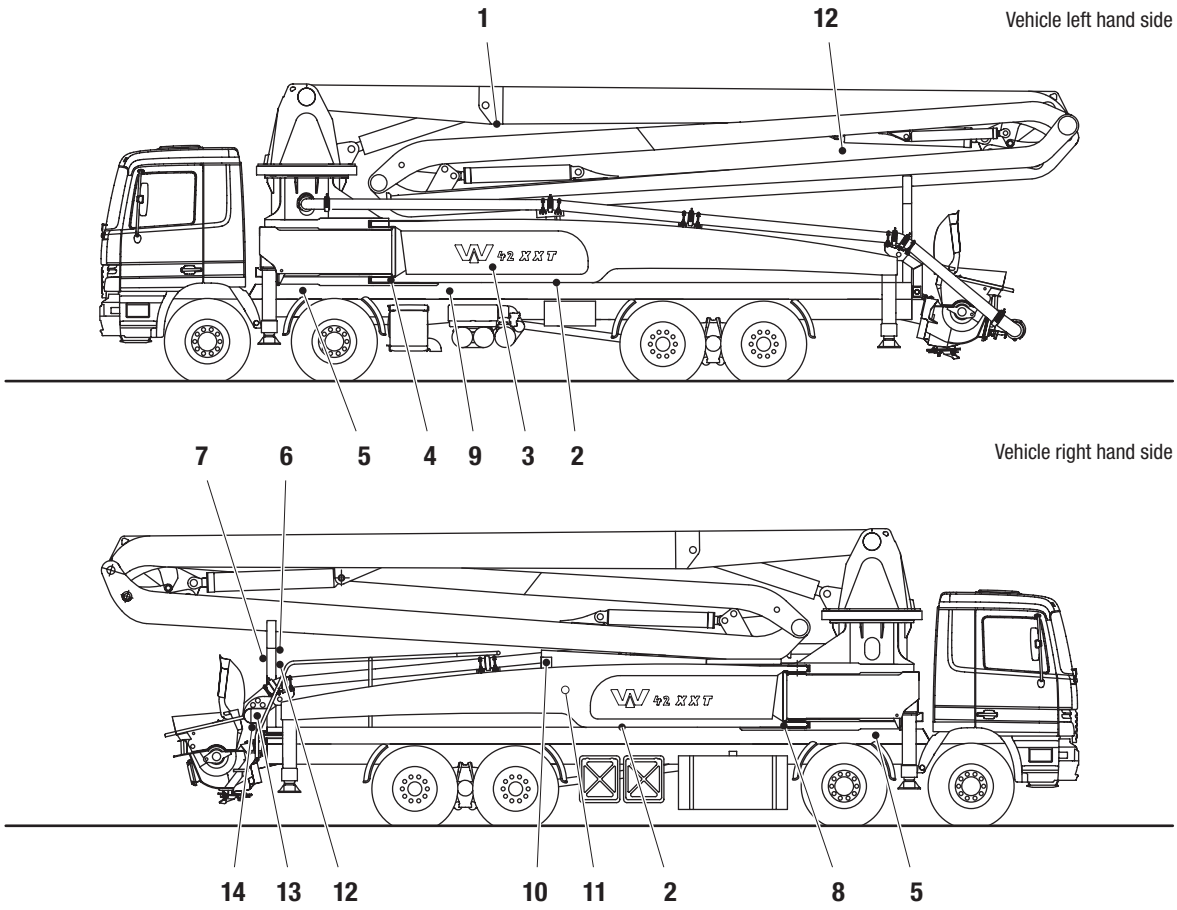
The mandatory regulations for accident prevention applicable in the country and location of operation, and the recognised technical safety rules for safe and proper working practices, together with the instructions for operation and maintenance, must all be complied with.

4.2 Structure and function of the truck-mounted concrete pump

4.2.1 Structure of the truck-mounted concrete pump

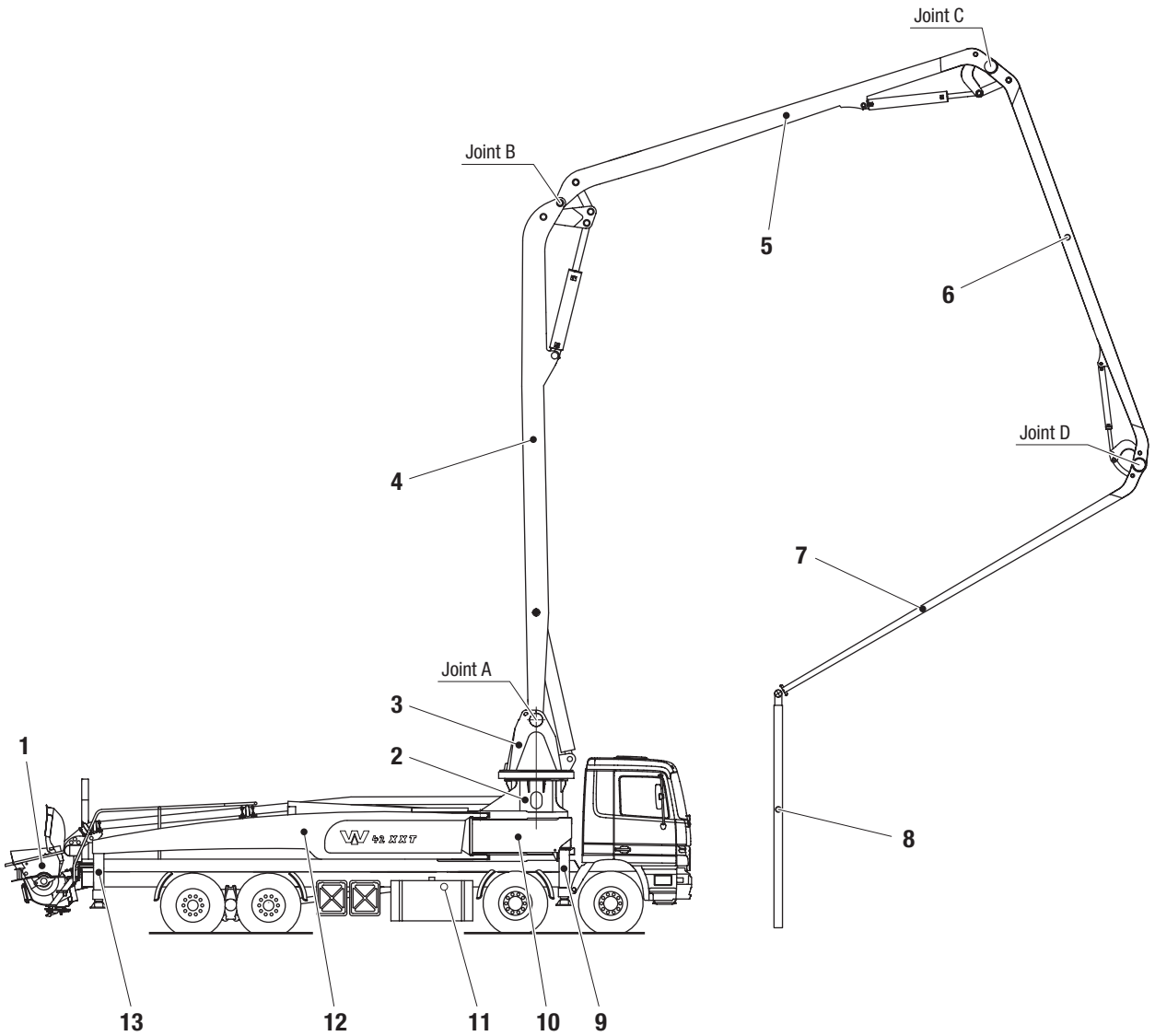
The truck-mounted concrete pump comprises a concrete pump conveying unit mounted on a truck chassis.

The concrete pump conveying unit comprises the following major subassemblies:



1 Catch hook
2 Rear outrigger catches in transport position
3 Water tank, filling and drain cock
4 Outrigger control block, left
5 Telescope limit of travel catch, front
6 Control
7 Lubrication system
8 Outrigger control block, right
9 Gearbox changeover valve
10 Boom control block
11 Concrete pump control block
12 Horn
13 Control panel
14 Control panel water pump / agitator

Fig. 4.1 Main components of the truck-mounted concrete pump - sheet 1



1	Pump group	**8**	Discharge hose
2	Boom block	**9**	Front outrigger cylinder
3	Slewing head	**10**	Front telescopic section
4	Boom element A	**11**	Transfer shift gearbox
5	Boom element B	**12**	Rear outrigge
6	Boom element C	**13**	Rear outrigger cylinder
7	Boom element D		

Fig. 4.2 Main components of the truck-mounted concrete pump - sheet 2

4.2.2 Function of the truck-mounted concrete pump

The concrete is delivered into the hopper and is pumped by the concrete pump through the S-valve and the conveying pipework to the discharge hose.

4.2.2.1 Distributor boom

All distributor boom functions are hydraulically actuated.
The conveying and riser pipes comprise pipes and pipe elbows.
Snap couplings allow the pipes to be joined together and the joints to be rotated.

4.2.2.2 Outriggers

The rear outriggers are swung out hydraulically. The telescopic front outriggers are hydraulically swung out and extended. The hydraulic support cylinders ensure the necessary stability of the truck-mounted concrete pump. The rear outriggers contain the water tanks with a capacity of 400 litres each.

4.2.2.3 Control

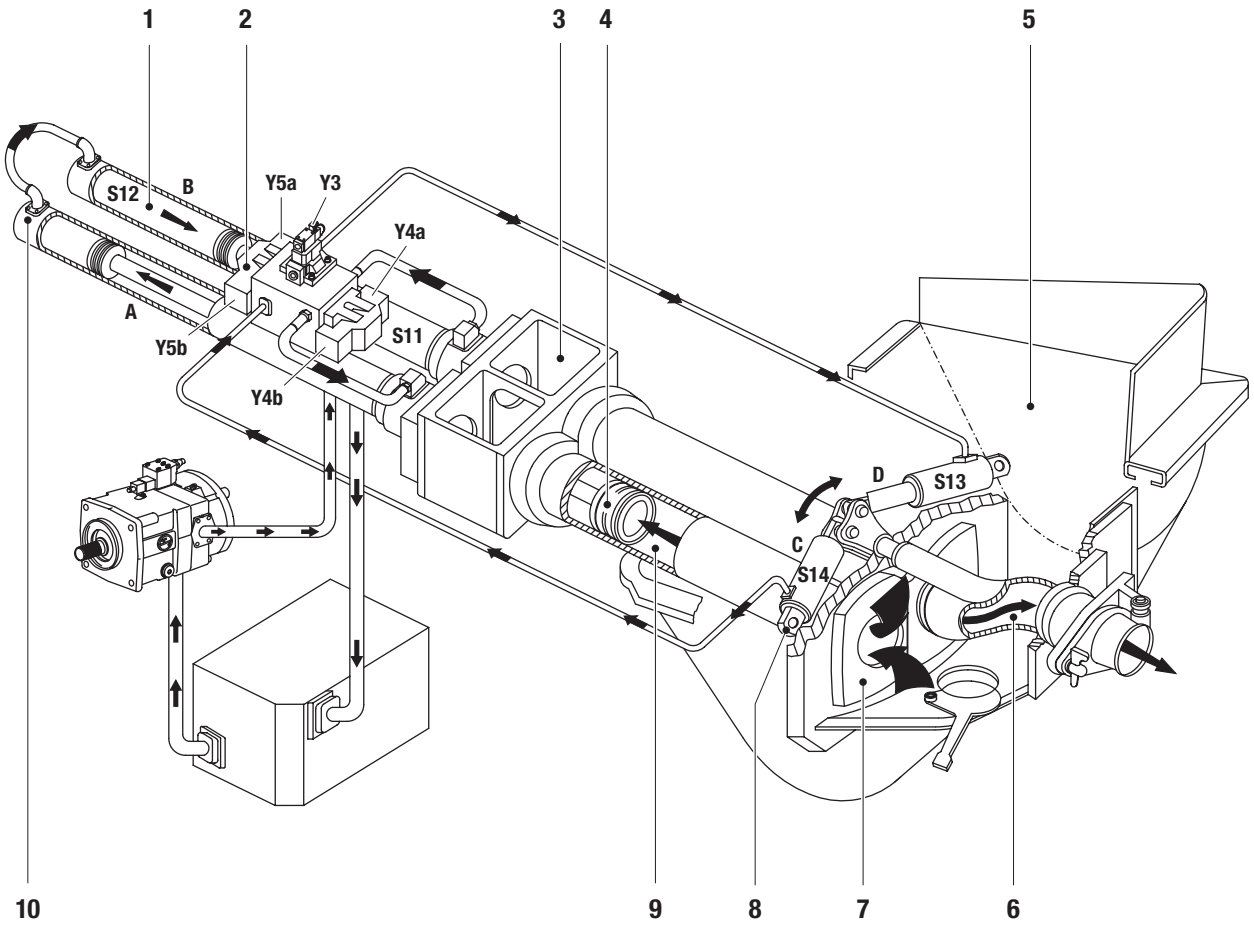
The controls actuate the hydraulic systems for the concrete pump and distributor boom. The operator can use the controls either at the control panel or at the remote control pendant.

4.2.2.4 Central lubrication

The central lubrication system is operated by compressed air from the pressure accumulator on the vehicle chassis. It supplies all lubrication points on the truck-mounted concrete pump (apart from the conveying piston). An optional central lubrication system is available for the conveying piston and/or distributor boom.

4.2.2.5 Function of the concrete pump

The concrete pump is hydraulically driven by the vehicle engine through a transfer shift gearbox and hydraulic pump.
The controls are electric and fully automatic. In addition a back-up function can be engaged by a selection switch; this allows the concrete pump to continue to be run at a reduced speed should the control system or the sensors fail. The stroke rate can be varied between minimum and maximum.
The drive cylinders (**1**) are fitted with an automatic leakage compensation. The S-valve automatically compensates for wear at the wear plate and wear ring.



1 Right drive cylinder
2 Control block
3 Wash-out tank
4 Conveying piston
5 Slide housing with agitator
6 S-valve
7 Wear plate
8 Slewing drive
9 Conveying cylinder II
10 Left drive cylinder

Fig. 4.3 Operation of the concrete pump

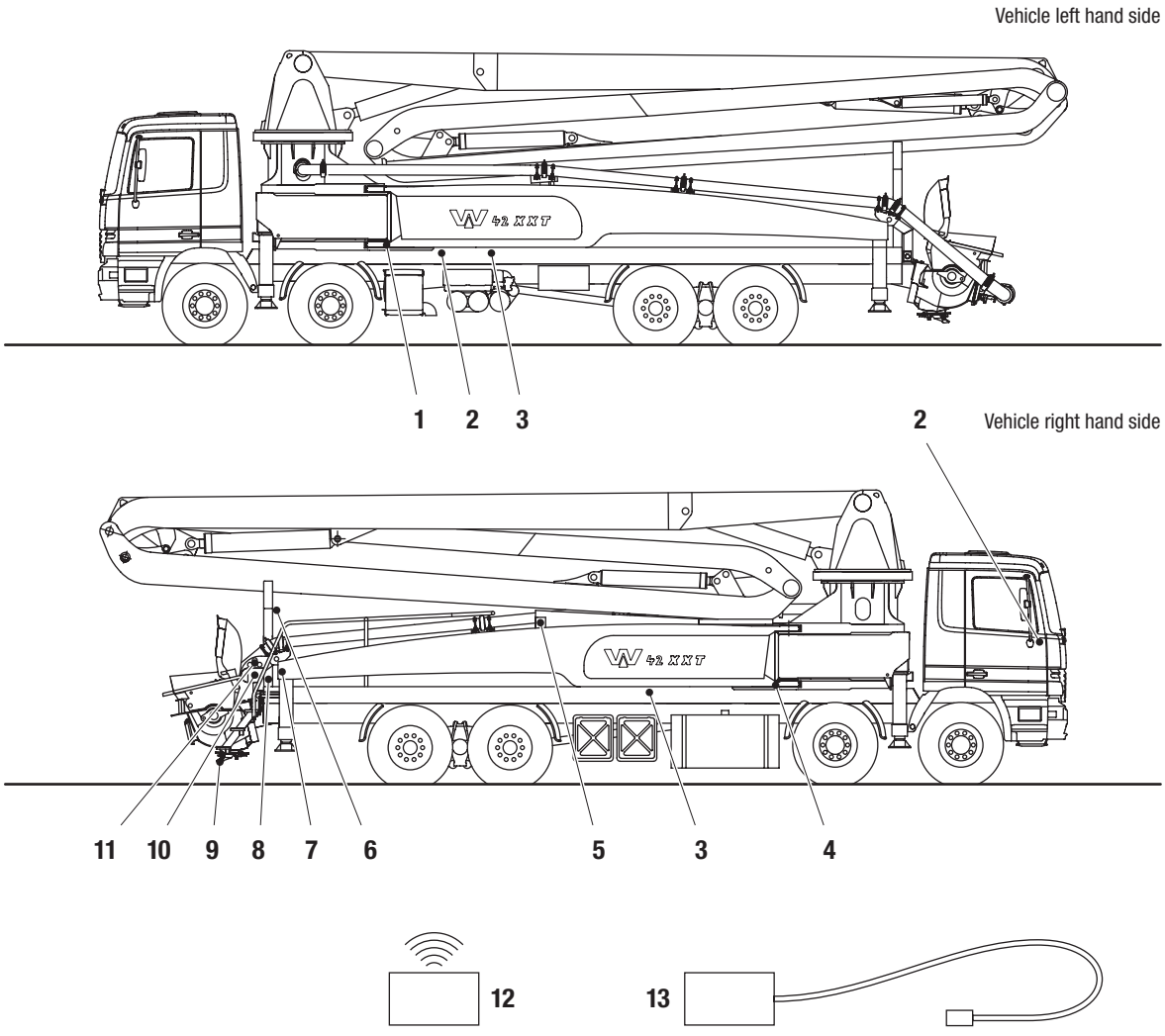
4.2.2.6 Method of operation of the concrete pump

The concrete pump operates as follows:

The oscillation cylinders are in position S13. On pumping the pressure relief valve Y3 is electrically actuated and closes, and Y4b is started. The drive cylinders move in direction “A”. The concrete in the left hand conveying cylinder is pushed into the S-valve into the conveying pipe.
Concrete is sucked into the right hand conveying cylinder through the free opening in the hopper. As soon as sensor S12 trips, valves Y4b and Y5b are started. The drive cylinders remain stationary and the oscillation cylinders start to move in direction “C”. The S-valve is now in line with the right hand conveying cylinder. Sensor S14 starts Y4a (and Y5b stops), and the drive cylinders move in direction “B”. The right hand conveying piston now pushes concrete through the S-valve and the left cylinder sucks concrete in from the slide housing. Sensor S11 stops Y4a and Y5a swings the S-valve back in direction “D”. A full cycle is now complete.

5. Controls and displays

5.1 Controls and displays for the truck-mounted concrete pump



1 Outrigger control block, left
2 Changeover to transfer shift gearbox
3 Water tank, drain cock
4 Outrigger control block, right
5 Boom control block
6 Control elements on the control cabinet
7 Control panel desk
8 Control panel agitator / water pump
9 Surplus concrete discharge opening
10 Manometer agitator / water pump
11 Manometer concrete pump
12 Radio remote control
13 Cable remote control

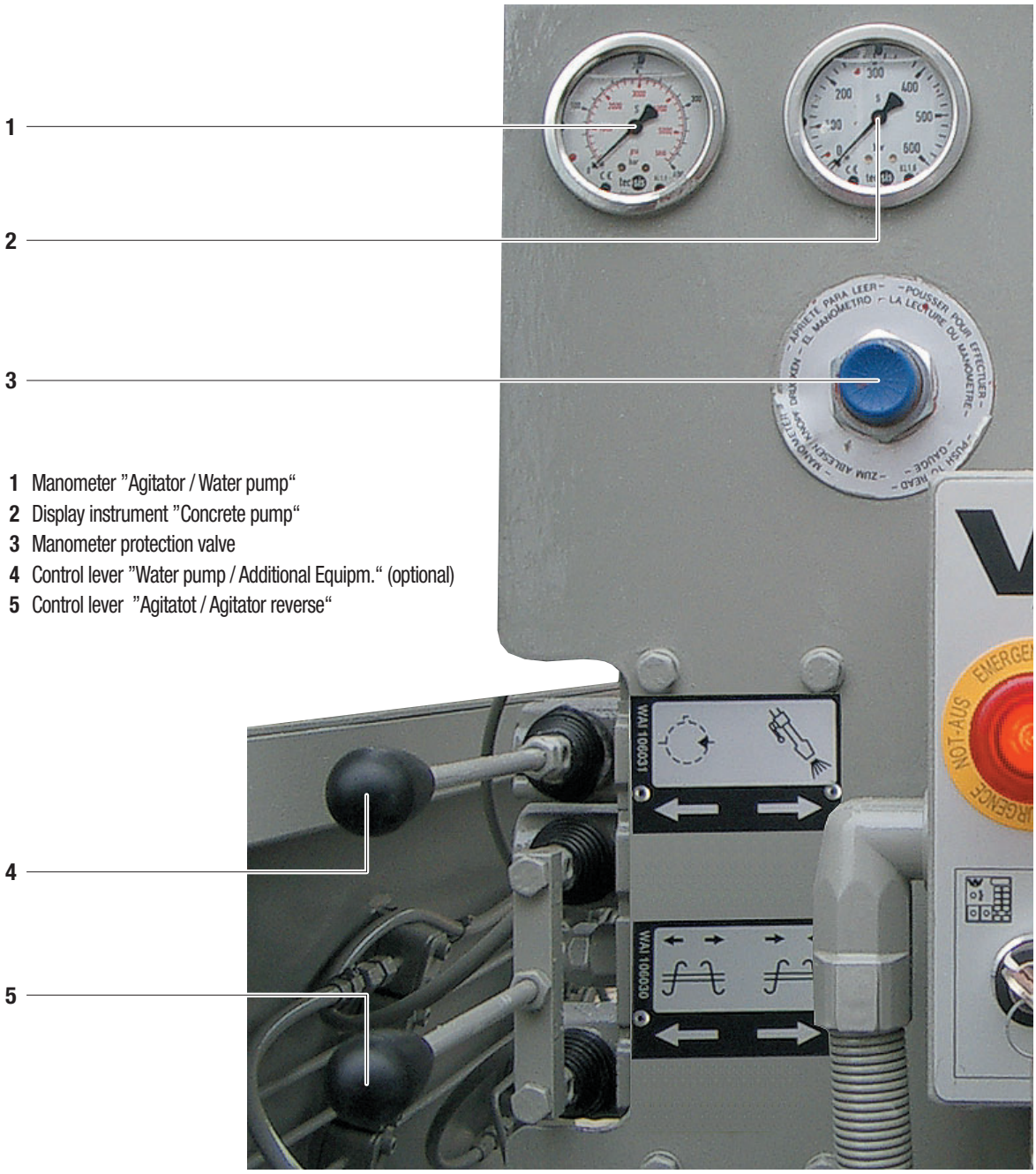
Fig. 5.1 Controls and displays for the truck-mounted concrete pump

5.2 Control panel desk

1 Emergency Stop button
2 Indicator lamp "Emergency Stop"
3 Indicator lamp "Controls on"
4 Indicator lamp "Hydraulic oil temperature"
5 Control panel lighting
6 Rocker switch "Horn-Reset/Lubrication"
7 Rocker switch "Light"
8 Rocker switch "Vibrator Auto/Manual"
9 Rocker switch "Engine speed +/–"
10 Indicator lamp "Pumps"
11 Rocker switch "Pump/Suck"
12 Indicator lamp "Suck"
13 Stroke rate potentiometer
14 Key switch "Desk/Remote control"

Fig. 5.2 Control panel desk

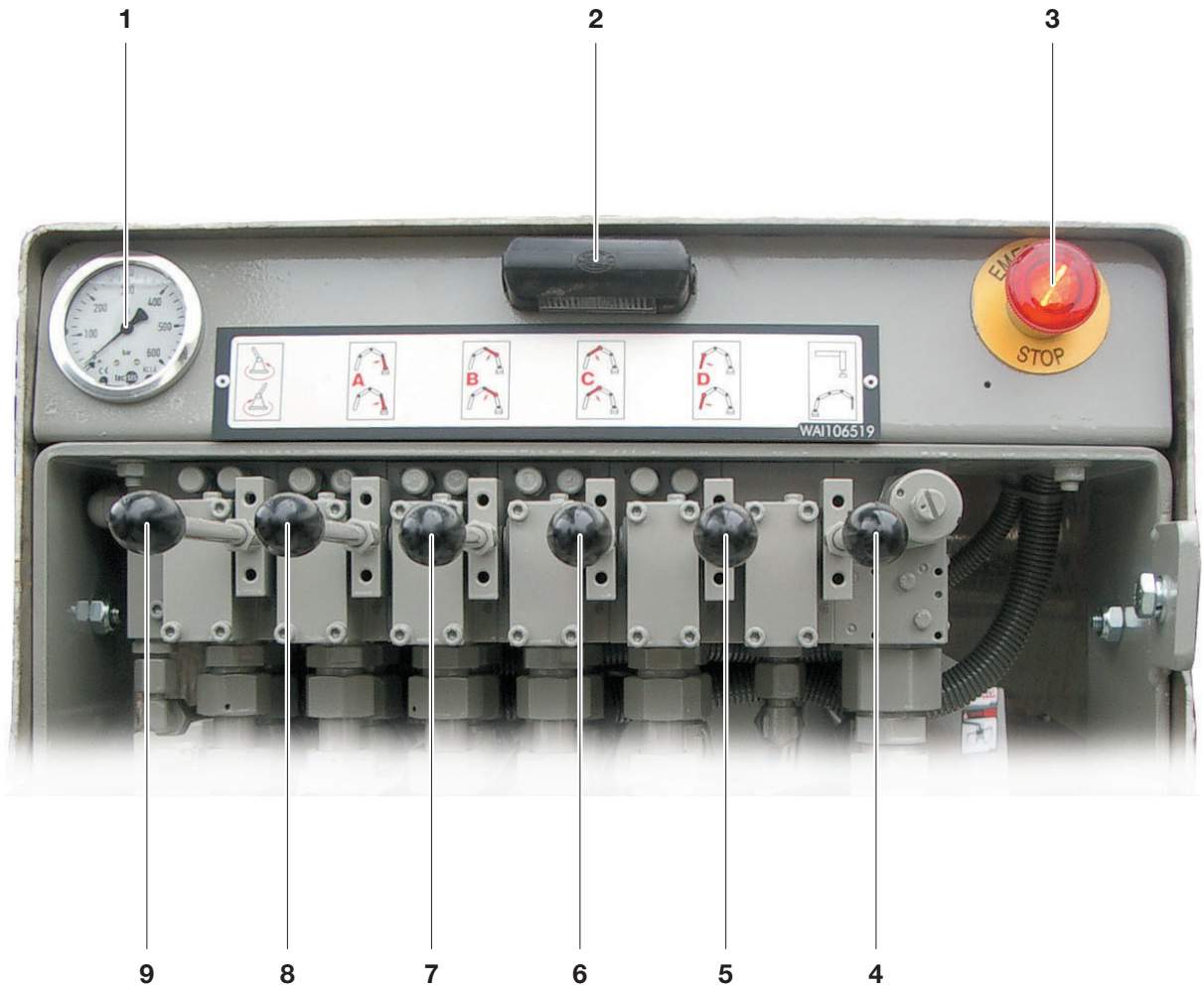
5.3 Control panel agitator / water pump



1 Manometer "Agitator / Water pump"
2 Display instrument "Concrete pump"
3 Manometer protection valve
4 Control lever "Water pump / Additional Equipm." (optional)
5 Control lever "Agitatot / Agitator reverse"

Fig. 5.3 Control panel Agitator / Water pump

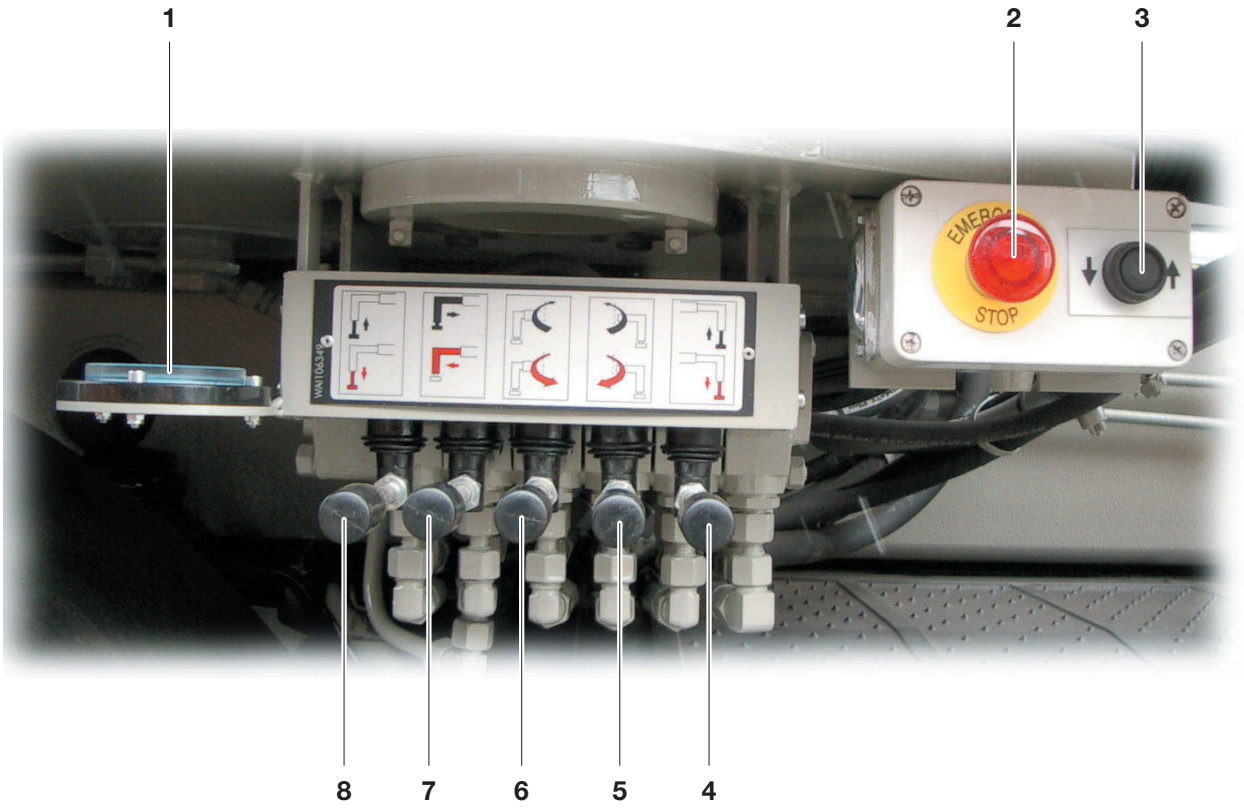
5.4 Boom control block



1 Manometer "Boom and outrigger"
2 Lighting for control panel
3 Emergency Stop button
4 Control lever "Outrigger / Boom"
5 Control lever "Deploy and retract boom element D"
6 Control lever "Deploy and retract boom element C"
7 Control lever "Deploy and retract boom element B"
8 Control lever "Deploy and retract boom element A"
9 Control lever "Boom slew left / right"

Fig. 5.4 Boom control panel

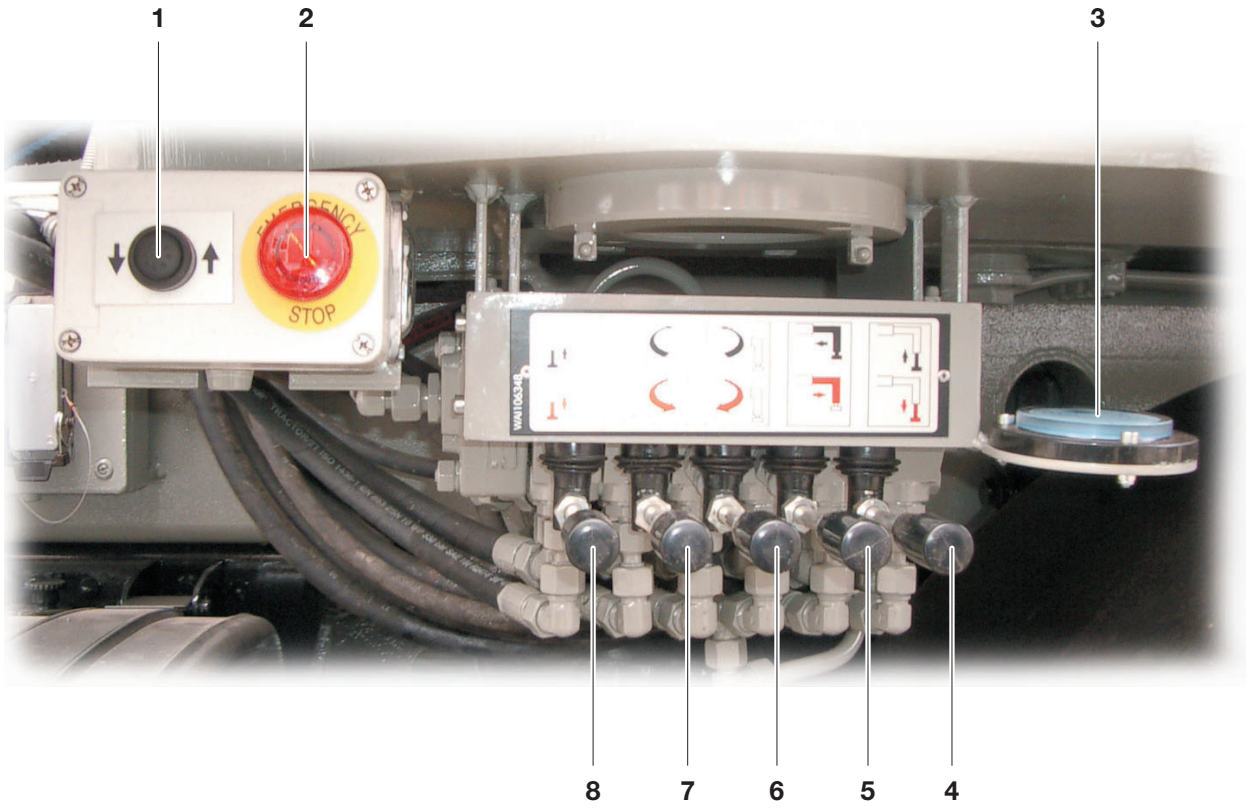
5.5 Outrigger control block, left



1 Circular level
2 Emergency Stop button
3 Outrigger safety button
4 Control lever "Extending / retracting the rear outrigger cylinder"
5 Control lever "Slewing the rear outrigger out / in"
6 Control lever "Slewing the front outrigger out / in"
7 Control lever "Extending / retracting the front outrigger telescope"
8 Control lever "Extending / retracting the front outrigger cylinder"

Fig. 5.5 Left outrigger control panel

5.6 Outrigger control block, right



1 Outrigger safety button
2 Emergency Stop button
3 Circular level
4 Control lever "Extending / retracting the front outrigger cylinder"
5 Control lever "Extending / retracting the front outrigger telescope"
6 Control lever "Slewing the front outrigger out / in"
7 Control lever "Slewing the rear outrigger out / in"
8 Control lever "Extending / retracting the rear outrigger cylinder"

Fig. 5.6 Right outrigger control panel

5.7 Control cabinet

1 Display instrument "Operating hours"
2 Rotary switch "Back-up function A-0-B"
3 Indicator lamp "Fault"
4 Indicator lamp "Lubrication system"

Fig. 5.7 Control cabinet control panel

5.8 Changeover to transfer shift gearbox (in the cab)

1 Indicator lamp “Transfer shift gearbox on”

2 Key switch “Transfer shift gearbox on/off”

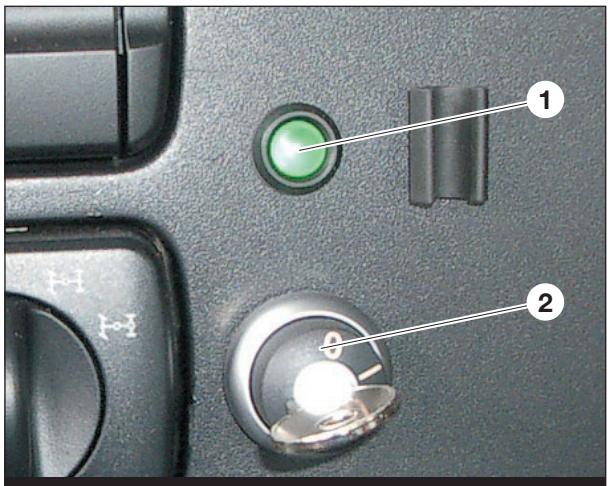


Fig. 5.8 Changing over the transfer shift gearbox

5.9 Surplus concrete discharge opening

1 Lever “Surplus concrete discharge opening”

2 Adjusting screws

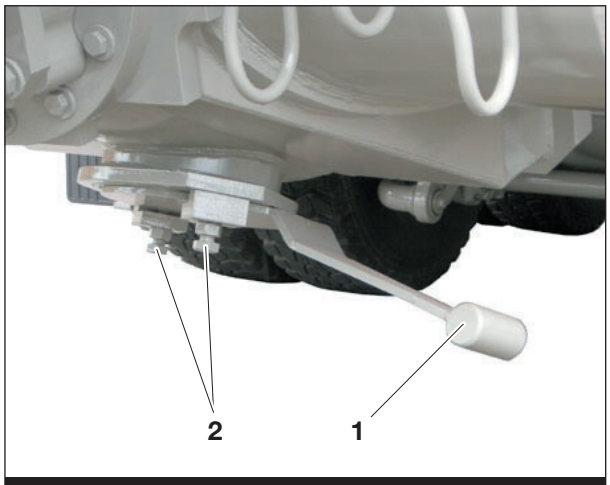


Fig. 5.9 Surplus concrete discharge opening

5.10 Water tank shut-off valve

1 Ball valve “Water tank filling / emptying”

2 Filling and emptying connection

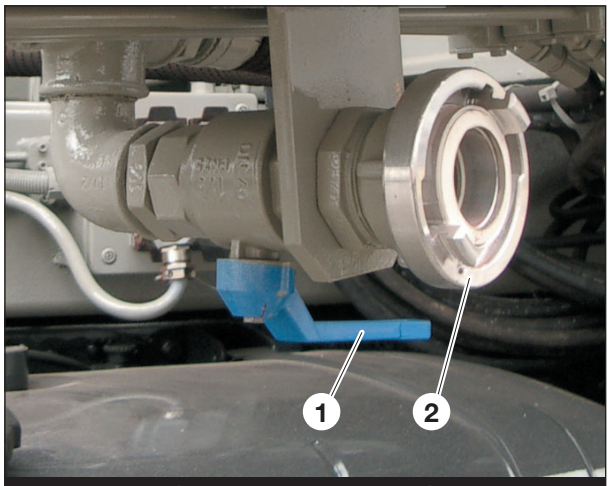


Fig. 5.10 Water tank drain

5.11 Water connection, rear

1 Geka connection for water hose

2 Ball valve for retaining or draining the water up to the water pump

3 Ball valve fro filling wash-out tank (optional)

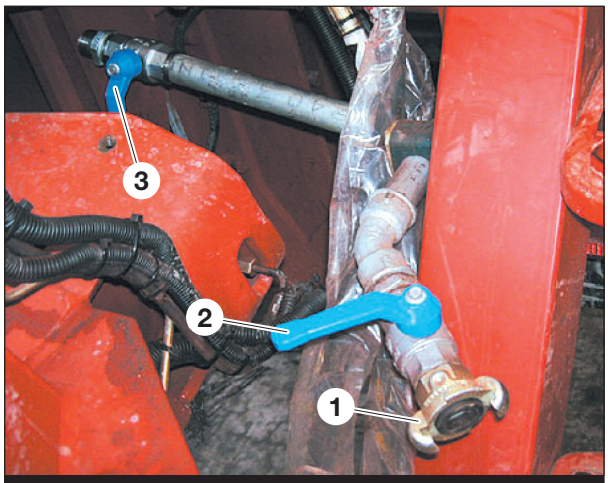
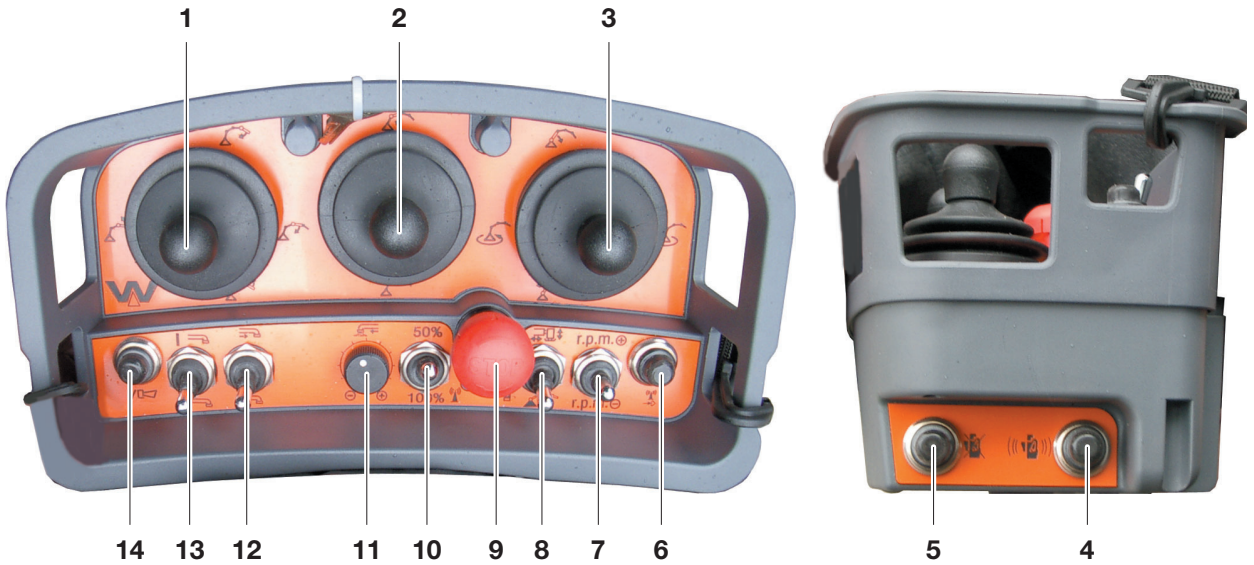


Fig. 5.11 Water connection, rear

5.12 Radio remote control / cable remote control



1 Joystick "Deploy and retract boom elements C and D"
2 Joystick "Deploy and retract boom element B"
3 Joystick "Deploy, retract and slew boom element A"
4 Push button "Start engine"
5 Push button "Stop engine"
6 Push button "Frequency changeover"
7 Rocker switch "Engine speed +/–"
8 Rocker switch "Outrigger / Boom"
9 Emergency Stop button – selector switch "Outrigger / Boom"
10 Rocker switch "Boom speed 50/100%"
11 Rotary switch "Stroke rate potentiometer"
12 Rocker switch " Pump / Suck"
13 Rocker switch "Pump On/Off"
14 Push button "Horn+Reset"

Fig. 5.12 Radio remote control / Cable remote control

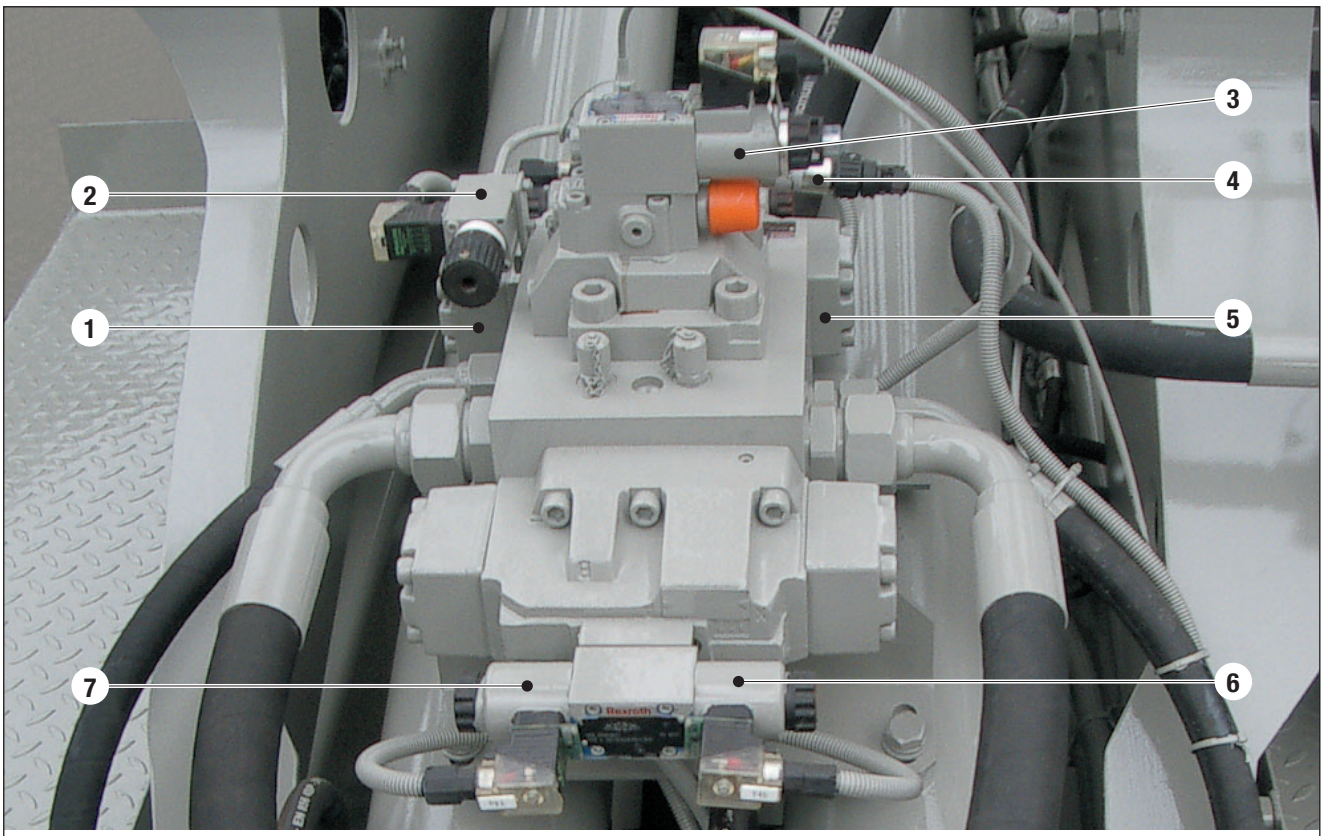
5.13 Emergency Stop button

Fig. 5.13 Emergency Stop button

Emergency Stop buttons are fitted to the truck-mounted concrete pump at the following places:

- ☞ Control panel desk
- ☞ Boom control block
- ☞ Outrigger control block, left
- ☞ Outrigger control block, right
- ☞ Radio remote control
- ☞ Cable remote control

5.14 Control elements on the hydraulic block



1 Valve Y5b
2 Push button
3 Valve Y3
4 Pressure sensor
5 Valve Y5a
6 Valve Y4a
7 Valve Y4b

Fig. 5.14 Hydraulic block

6. Driving, towing, loading

6.1 Driving

DANGER:
The centre of gravity of the truck-mounted concrete pump is very high, due to the nature of the design. Take extreme care when negotiating curves!

The truck-mounted concrete pump may be driven on public roads only in accordance with the applicable legislation and regulations of the country concerned. The driver must have a valid driving licence for this truck-mounted concrete pump.

6.1.1 Before a journey

The following actions must be taken before a journey:

- take all actions as described in the vehicle manufacturer's user manual
- check all components and transport restraints on the truck-mounted concrete pump to ensure they are in good condition
- check the outrigger catches to ensure they are properly engaged
- check that all components are secured against free movement
- check that the boom is in the transport position (height)

6.1.2 During the journey

Always drive the truck-mounted concrete pump having regard to the dimensions of the vehicle and its weight. Further information on driving can be found in the separate vehicle manufacturer's user manual.

6.2 Towing

The truck-mounted concrete pump should be towed only in accordance with the instructions of the vehicle manufacturer, and only using the attachment points provided for the purpose. For towing the truck-mounted concrete pump, the front towing ring should be used; for towing other vehicles by the truck-mounted concrete pump, the rear towing plate.
Further information on towing can be found in the separate vehicle manufacturer's user manual.

6.3 Loading

CAUTION:
Not all the identified lifting points are suitable for lifting the complete machine. Always check before lifting!

The attachment points for lifting the truck-mounted concrete pump are specifically identified.
A transport company should be entrusted with loading and transporting by crane if necessary.

7. Starting up and operating

This chapter contains all the important information for the operator to safety start up and operate the truck-mounted concrete pump.

WARNING:

Before first starting up the truck-mounted concrete pump, the operator must carefully read through this Chapter 7 “Starting up and operating” and perform all checks in accordance with the information set out in this chapter. Only when the operating safety has been assured in this way may the truck-mounted concrete pump be started up.

NOTE:

During start-up and operation, comply with the safety instructions set out in Chapter 2!

a. Personal safety equipment

In the entire working area of the truck-mounted concrete pump, suitable safety equipment should be worn, particularly when handling mortar additives.

The symbols for the necessary safety equipment are shown in the graphics panel alongside.

The symbols shown are as follows:

1. Hard hat
2. Safety boots
3. Ear defenders
4. Safety gloves
5. Safety glasses
6. Face mask
7. Protective clothing
8. Safety harness

Fig. 7.1 Symbols for personal safety equipment

b. General information for operating the truck-mounted concrete pump

The operator must be familiar with and comply with the user manual and all safety measures for operating the truck-mounted concrete pump. He must be able to control the machine.

b.1 Before starting up

☞ Secure the working- and hazard area and barrier it off if necessary
☞ Top up the fluids (hydraulic oil, fuel, water)
☞ Check the functioning of all safety devices - and controls
☞ Lubricate all grease points and check that the lubrication system is functioning
☞ Check the stability of the machine
☞ Check the conveying pipes for alignment and degree of wear (wall thickness measurement)

b.2 During operation

☞ Never allow the machine to operate unattended
☞ Stop the machine immediately if any fault occurs that might create a safety hazard
☞ In the event of blockages the material must be return to the hopper immediately. Start up again slowly!
☞ Open the snap couplings on the conveying pipes only when the conveying system has been depressurised
☞ When opening pipe joints, wear safety glasses to protect the eyes from spurting concrete
☞ Never reach into or on to moving parts, first switch the engine off or depressurise the accumulator
☞ Do not modify any safety device

b.3 At the end of operations

☞ Empty the conveying pipes
☞ Clean the conveying pipes using a cleaning ball and water
☞ Clean the hopper and the complete machine
☞ Perform routine maintenance, and repair any faults that have developed whilst the machine was running

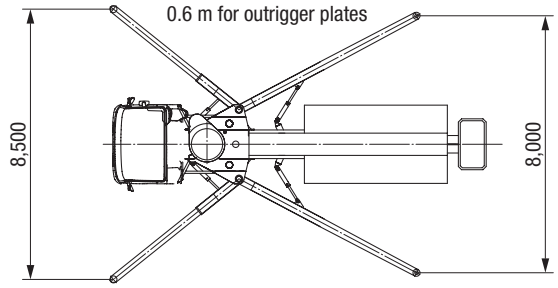
7.1 Setting up the truck-mounted concrete pump

Select the location having regard to the safety instructions in section 2.7, and drive the machine to the location.

NOTE:
Be sure to allow sufficient space for setting up truck-mounted concrete pump! Allow additional space for the mixer truck also!

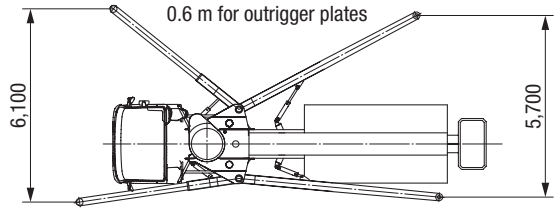
Fully deployed outriggers right:

Space requirement at the front: 8,5 m + 0, 6 m = 9,1 m
Space requirement at the rear: 8,0 m + 0, 6 m = 8,6 m
Slewing range: 0° - 360°



Narrow outriggers one side:

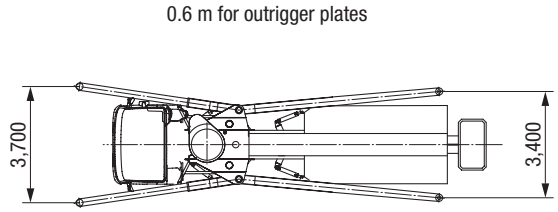
Space requirement at the front: 6,1 m + 0, 6 m = 6,7 m
Space requirement at the rear: 5,7 m + 0, 6 m = 6,3 m
Slewing range: 0° - 200° oder 360° - 160°



CAUTION: Narrow outriggers may only be used when XXA controls are installed and in use!

Narrow outriggers on both sides:

Space requirement at the front: 3,7 m + 0, 6 m = 4,3 m
Space requirement at the rear: 3,4 m + 0, 6 m = 4,0 m
Slewing range: 160° - 200°



CAUTION: Narrow outriggers may only be used when XXA controls are installed and in use!

Fig. 7.2 Space requirement for outriggers for the truck-mounted concrete pump

On sloping ground put chocks behind the wheels, release the brakes and allow the truck-mounted concrete pump to roll back on to the chocks. Then apply the handbrake and extend the outriggers.

The ground must be checked for its load-bearing capability.

7.2 Adjustments and actions before starting up

7.2.1 Changing over the transfer shift gearbox

Use the key switch (**2**) in the cab to change over the transfer shift gearbox in the drive train from travel drive "**O**" to pump drive "**I**".

For the changeover the ignition switch must be in the "ON" position (vehicle engine can run, but need not be running), the pneumatic pressure must be more than 5 bar and the clutch fully disengaged.

The indicator lamp (**1**) lights up when the gearbox is switched to pump drive.

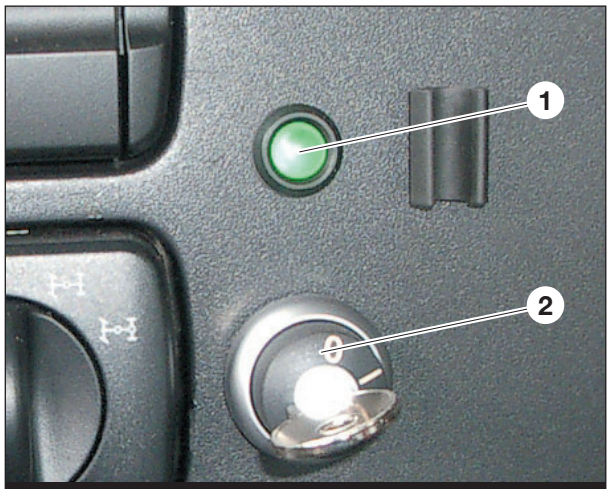


Fig. 7.3 Changing over the transfer shift gearbox

To drive the hydraulics a definite gear must be selected as shown in the information plate.

Example: 8 high

Fig. 7.4 Selecting a gear

WARNING

WARNING:

- ☞ **Selecting the wrong gear can lead to overspeeding and damage to the hydraulic pumps!**
- ☞ **Engine braking must be disengaged!**
- ☞ **The handbrake must be applied!**

The “Controls ON” indicator lamp (**3**) remains on as long as the ignition is on and the gearbox is set for pump drive. This function is independent of any Emergency Stop indication.

The vehicle engine must be running.

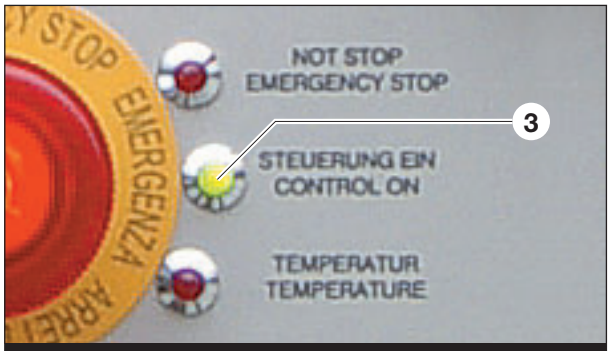


Fig. 7.5 Indicator lamp "Controls On"

7.2.2 Emergency Stop

The machine is fitted with 4 illuminated Emergency Stop buttons, plus an Emergency Stop button on each remote control pendant.

Each Emergency Stop button immediately switches off all functions and movements (optionally the engine can be switched off by an Emergency Stop).

The Emergency Stop buttons are located as follows:

- Control panel desk (Item 1, Fig. 5.2)
- Boom control block (Item 3, Fig. 5.4)
- Left hand outrigger controls (Item 2, Fig. 5.5)
- Right hand outrigger controls (Item 2, Fig. 5.6)
- Radio remote control (Item 9, Fig. 5.12)
- Cable remote control (Item 9, Fig. 5.12)

The activated Emergency Stop button is indicated n the control panel by the flashing Emergency Stop indicator lamp (Item 12, Fig. 5.2) and at the activated Emergency Stop button itself (except for remote control).

After the reason the activating the Emergency Stop button has been rectified, the activated Emergency Stop button can be released by pulling or twisting.

NOTE:

The controls must be reset after an Emergency Stop by pressing the “Horn/Reset” rocker switch (Item 6, Fig. 5.2) on the control panel desk.

All functions that were in operation when the Emergency Stop button was pressed must be restarted.

When the Emergency Stop button is pressed, the following conditions are set on the truck-mounted concrete pump:

- **Truck**
  Engine is switched to idling (or optionally switched off)
- **Truck-mounted concrete pump**
  Pumping / sucking is immediately switched off
- **Distributor boom**
  The distributor boom is halted at its current position

7.2.3 Selecting the operating mode

The control panel is at the right rear of the vehicle.

The functions on the control panel desk “Pump/Suck (**11**)” and “Stroke rate (**13**)” are disabled if the remote control is activated.

The key switch (**14**) allows switching between “Control Desk” and “Remote control”.

If the cable for remote control is plugged in, remote control is activated automatically.

In the setting “Remote control” the respective remote control pendant must be switched on, otherwise the controls are switched off in an Emergency Stop.

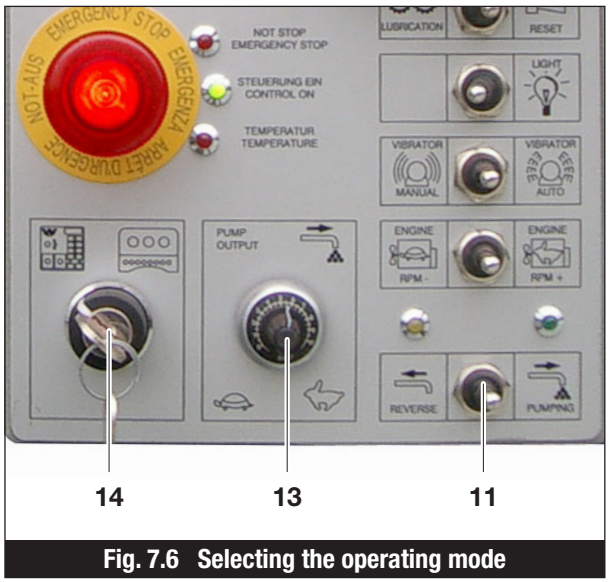


Fig. 7.6 Selecting the operating mode

NOTE:
The key should be withdrawn when the machine is in operation, so that no unauthorised person can tamper with the outriggers.

7.3 Operating the outriggers

DANGER:
When the outriggers are being slewed in/out or extended there is high crush risk hazard.

☞ The operator must continuously monitor the hazard area.

☞ The outrigger slew in/out and extension areas must be kept clear of all persons and objects.

☞ All instructions set out in Chapter 2 “Safety instructions” must be strictly complied with.

7.3.1 Stability checking

If the option “Stability checking” is installed, refer to the separate user manual.

7.3.2 Extending / retracting the outriggers

DANGER

DANGER:

☞ For safety reasons the operator must always face towards the outrigger that is being extended / retracted and have an unimpeded view of the entire hazard area!

☞ When activating the functions with the respective operating lever, for safety reasons the other hand should always be keeping the safety button (Item 3, Fig. 5.5 / Item 1, Fig. 5.6) pressed!

- Moving the operating lever on the outrigger control block **downwards**, means for all functions “**Extend**“.
- Moving the operating lever on the outrigger control block **upwards**, means for all functions “**Retract**“.
- The functions “Slew out” and “Telescopic extension” can be performed concurrently for the front outriggers. This causes the front outriggers to extend automatically to their full extent.
- The outriggers are secured in the stowed position for vehicle travel by hydraulically locked catches.

WARNING

WARNING:

Before moving the vehicle and before starting work make absolutely sure that the hydraulically locked catches are engaged!

NOTE:
If the operating mode selector switch (Item 14, Fig. 5.2) is in the remote control position, the remote control must be switched from the Boom control mode to the Outrigger control mode, using rocker switch (Item 8, Fig. 5.12).

7.3.2.1 Back-up operation

If the control system fails, the outriggers can be operated manually from the master control block. To do this a send person must stand at the “Outrigger/Boom” control panel and hold the control lever (Item 4, Fig. 7.11) in the UP position.

7.3.3 Functions at outrigger control block, left

Move the operating lever as shown to perform the respective functions on the outrigger.

1 Circular level
2 Emergency Stop button
3 Outrigger safety button
4 Extending / retracting the rear outrigger cylinder
5 Slewing the rear outrigger cylinder out / in
6 Slewing the front outrigger cylinder out / in
7 Extending / retracting the front telescopic outrigger
8 Extending / retracting the front outrigger cylinder

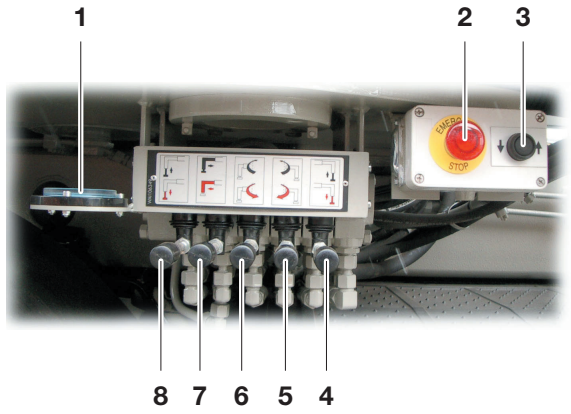


Fig. 7.7 Outrigger control block, left

7.3.4 Functions at outrigger control block, right

Move the operating lever as shown to perform the respective functions on the outrigger.

1 Outrigger safety button
2 Emergency Stop button
3 Circular level
4 Extending / retracting the front outrigger cylinder
5 Extending / retracting the front telescopic outrigger
6 Slewing the front outrigger cylinder out / in
7 Slewing the rear outrigger cylinder out / in
8 Extending / retracting the rear outrigger cylinder

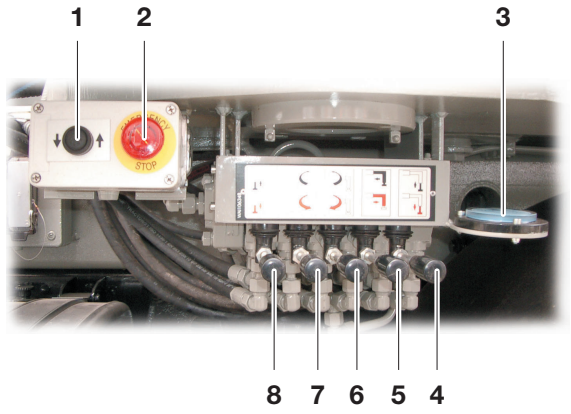


Fig. 7.8 Outrigger control block, right

7.3.5 Building up the outrigger

- Fully extend the outrigger and fully extend the telescopic sections.
- Extend the front telescopic outriggers until it clicks into a second registration point at the working setting (see detail, left).
- Check that the arrows match (see detail, right), indicating the that the outrigger is fully extended.
- Extend the front outrigger cylinder so far that the front wheels are lifted clear of the ground.
- The rear wheels must remain gently touching the ground (braking and stability).

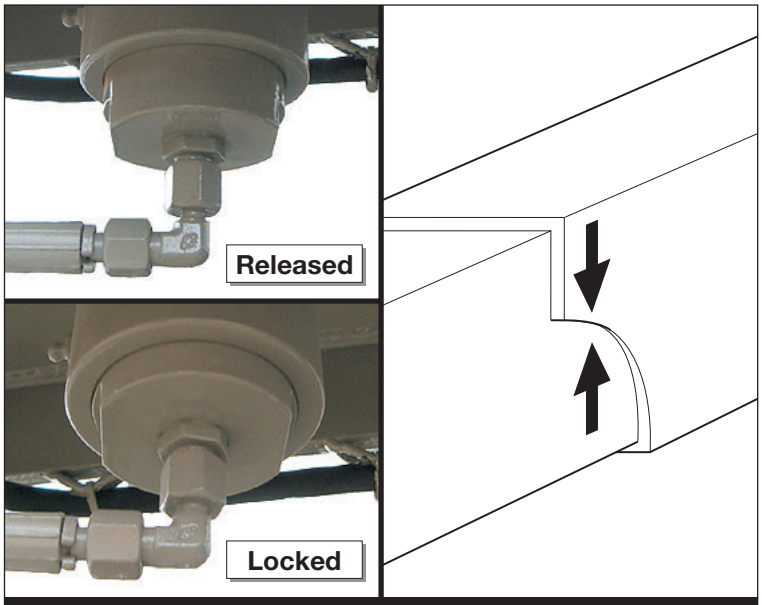


Fig. 7.9 Telescopic outrigger extended and locked

- The truck-mounted concrete pump may not stand more than 3° from level. Check the circular levels

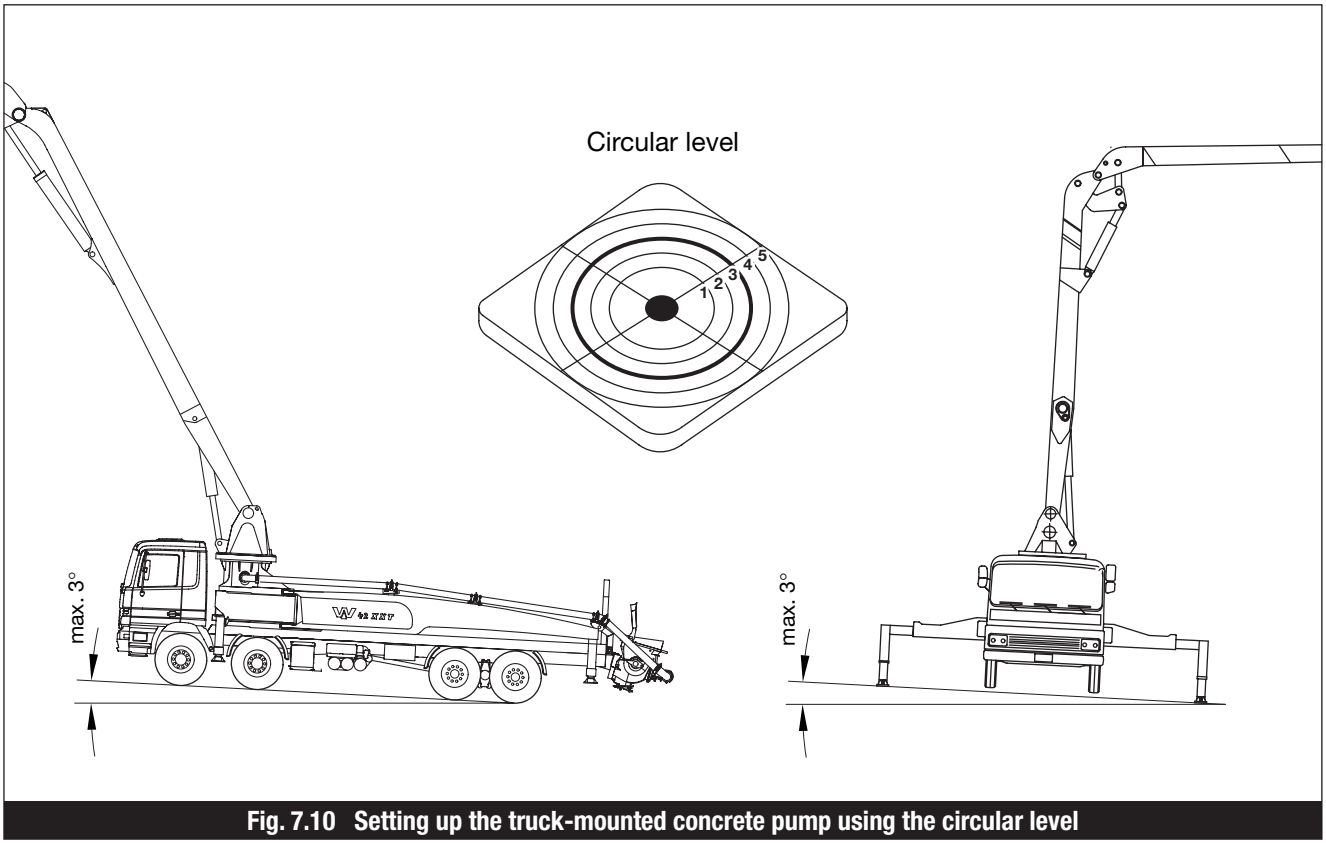


Fig. 7.10 Setting up the truck-mounted concrete pump using the circular level

7.4 Distributor boom operation

WARNING:

☞ **Do not deploy the distributor boom until the truck-mounted concrete pump outriggers are fully extended!**

☞ **Never drive the truck when the distributor boom is deployed!**

☞ **When deploying and stowing the distributor boom there are many points against which the boom can foul and cause damage. Therefore be sure to follow the correct sequence of operations for deploying the boom!**

NOTE:

Normally the distributor boom is controlled using the radio/cable remote control pendant. All boom functions are performed proportionally.

7.4.1 Distributor boom operation using the master control block

NOTE:

Distributor boom operation using the master control block should only be used as back-up. Whenever possible control the boom using the radio/cable remote control pendant.

- Set the operating mode selection switch (Item 14, Fig. 7.6) to “Control panel desk”.
- Control each boom element individually by moving the respective control levers Element A (**8**), Element B (**7**) , Element C (**6**) and Element D (**5**) in desired direction.

  Moving a control lever downwards moves the element inwards, moving a control lever downwards moves the element outwards.
- The boom rotation lever (**9**) controls the rotation of the boom.
  Pressing the control lever downwards rotates the boom clockwise, pressing the control lever upwards rotates the boom anticlockwise.

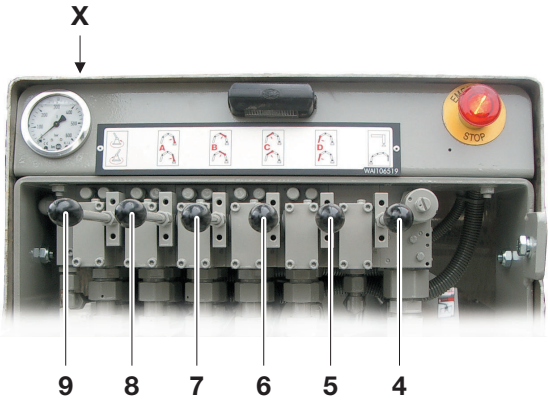


Fig. 7.11 Controll. the distrib. boom from the boom control block

- Press control lever boom A (Item 8, Fig. 7.11) and deploy the boom package until the catch hook releases.

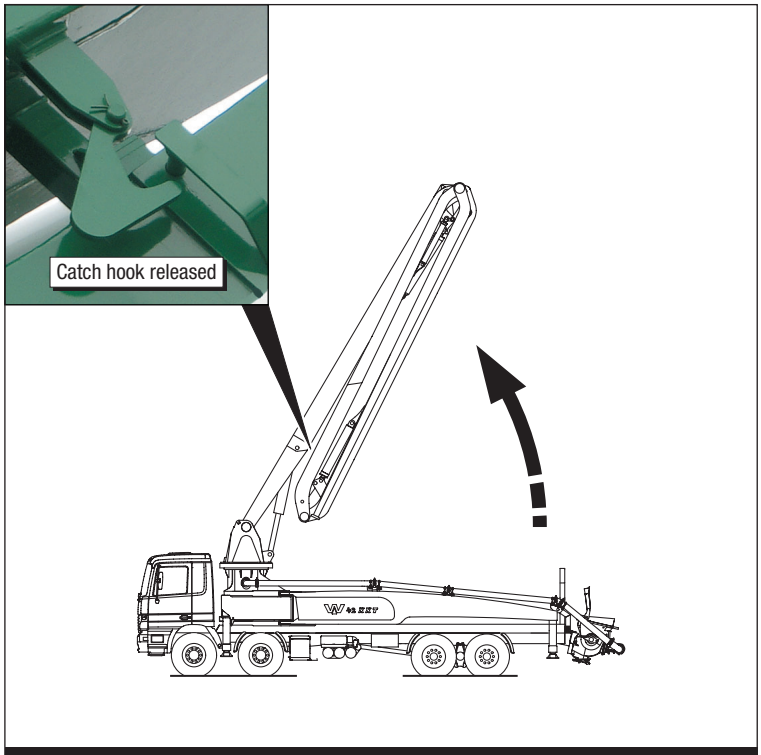


Fig. 7.12 Deploy the boom package, the catch hook releases

- Press the boom rotation control lever (Item 9, Fig. 7.11) to rotate the boom package into the working position.

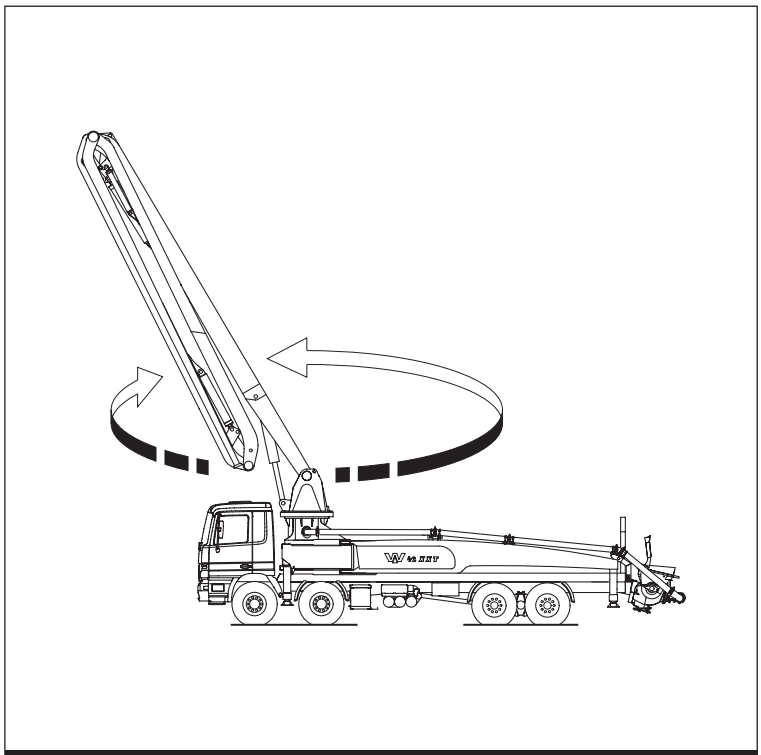


Fig. 7.13 Slew the boom package into the working position

- Press control lever B (Item 7, Fig. 7.11) and deploy boom element B at 120° to boom element A.

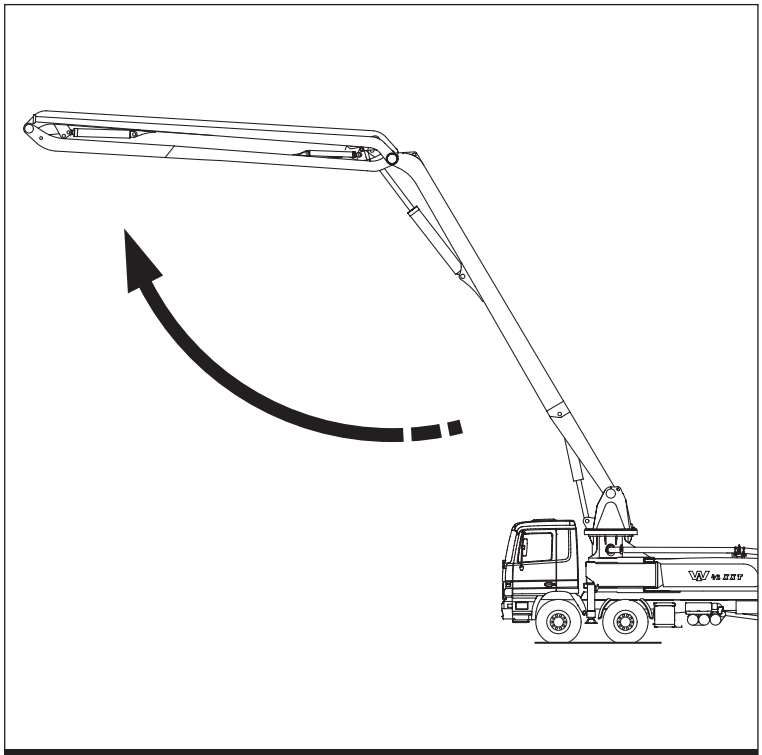


Fig. 7.14 Deploy boom element B

- Press control lever C (Item 6, Fig. 7.11) and deploy boom element C at 90° to boom element B.

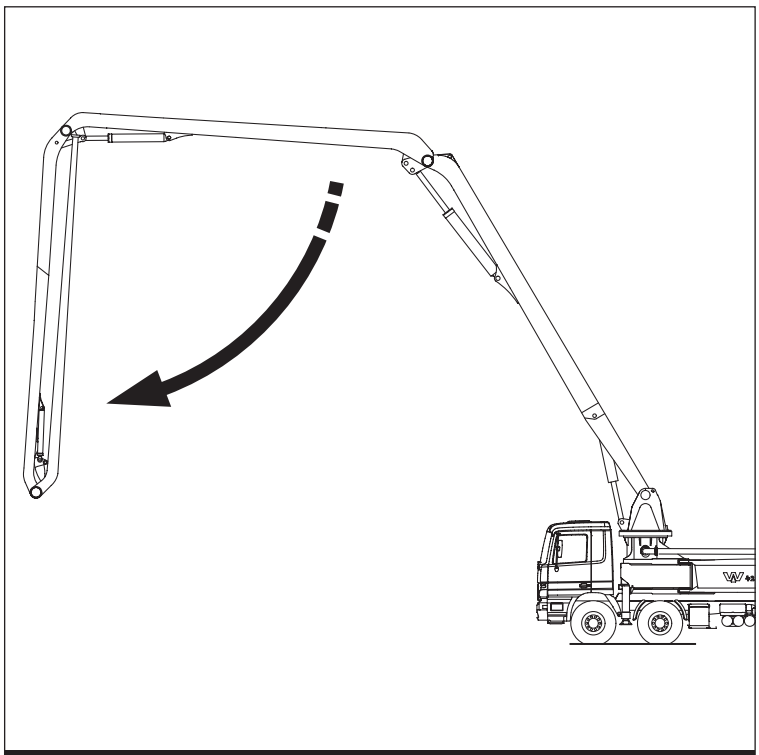


Fig. 7.15 Deploy boom element C

- Press control lever D (Item 5, Fig. 7.11) and deploy boom element D at 90° to boom element B.
- Position boom element D horizontally approx. 1 m above the ground.

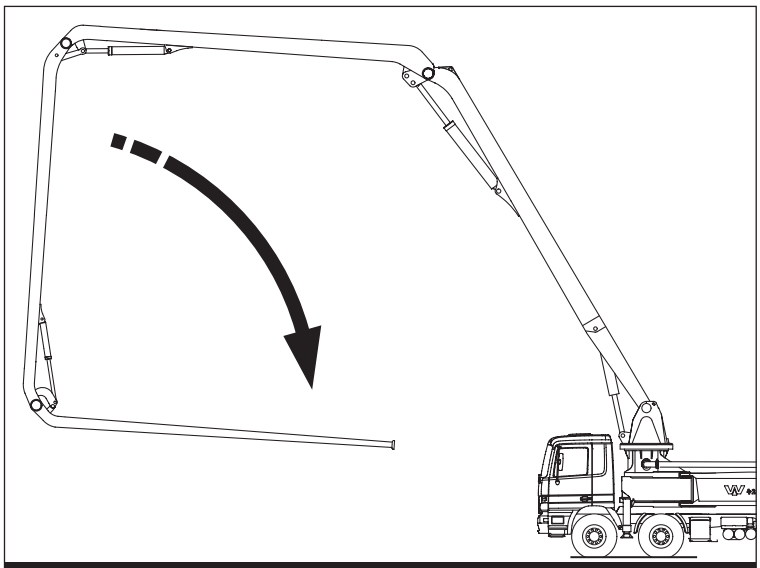


Fig. 7.16 Deploy boom element D

- Open the discharge hose retainer (arrowed) and release the discharge hose.
- Use the control levers (Items 5 to 9, Fig. 7.11) on the boom control block to move the distributor boom into the desired working position.

Fig. 7.17 Release the discharge hose

WARNING:

When using manual control at the boom control block all safety circuits including Emergency Stop are disabled.

7.4.1.1 Back-up slewing function

If the controls system fails, slewing the boom must be enabled by engaging the additional back-up controls (Item X, Fig. 7.11) by inserting a suitable screwdriver (4 mm) into the holes in the cover and pushing.

7.4.2 Controlling the distributor boom using the radio remote control pendant

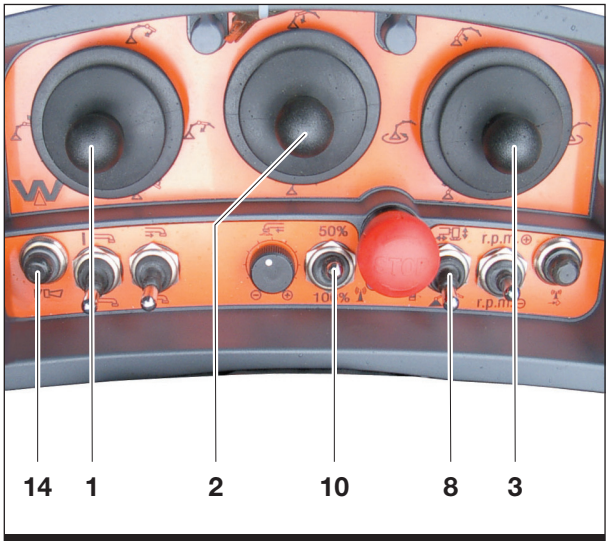


Fig. 7.18 Controll. the distrib. boom from the radio remote control pendant

- Set the operating mode selection switch (Item 14, Fig. 7.6) to “Remote control”.
- Activate the remote control pendant. See information in the separate user manual supplied by the manufacturer.
- Release the Emergency Stop by pressing the Horn/ Reset (**14**). The horn will sound.
- Switch the selector switch “Outrigger/Boom” (**8**) to “Boom” and uncap the Emergency Stop button.
- The 50%/100% switch (**10**) controls the boom speed, 50% when pumping, 100% when deploying / stowing.
- Press the master switch “Deploy boom element A / Slew boom” (**3**) and deploy boom element A until the catch hook releases and the boom element B can be deployed (see Fig. 7.12).
- Press the master switch “Deploy boom element A / Slew boom” (**3**) to move the distributor boom into the position where the discharge hose retainer can be opened.
- Press the master switch “Deploy boom element B” (**2**) and deploy boom element B until it is approx. 120° to boom element A (see Fig. 7.14).
- Use the joystick “Deploy boom element C and D” (**1**) to deploy boom element C to 90° to boom element B (see Fig. 7.15).
- Use the joystick “Deploy boom element C and D” (**1**) to deploy boom element D to 90° to boom element C (see Fig. 7.15).
- Position boom element D horizontally approx. 1 m above the ground.
- Open the catch and release the discharge hose (see Fig. 7.17).
- Use the joystick s(**1** to **3**) on the radio remote control to move the distributor boom to the desired working position.

7.4.3 Controlling the distributor boom using the cable remote control pendant

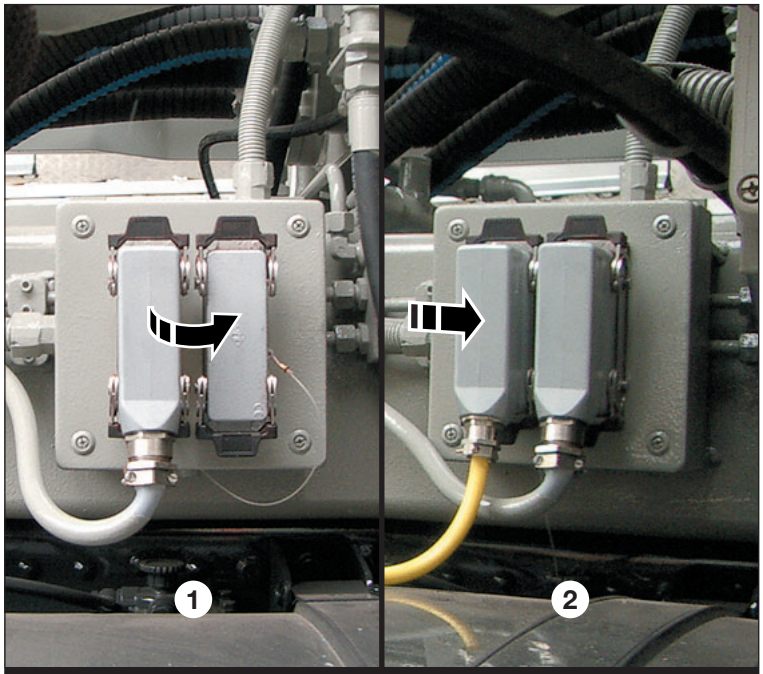


Fig. 7.19 Plug the extension cable for the cable remote control

- Remove the right hand protective cap.
- Unplug the “Radio” plug from the left hand socket and plug it into the free right hand socket ❶. Lock the plug in place.
- Plug the extension cable for the cable remote control into the left hand socket ❷. Lock the plug in place. Radio remote control is now deactivated.
- Set the operating mode selection switch (Item 14, Fig. 7.6) to “Remote control”.
- Release the Emergency Stop by pressing the Horn/Reset (Item 14, Fig. 7.18). The horn will sound.
- Switch the selector switch “Outrigger/ Boom” (Item 8, Fig. 7.18) to “Boom” and uncap the Emergency Stop button.
- The 50%/100% switch (Item 10, Fig. 7.18) controls the boom speed, 50% when pumping, 100% when deploying / stowing.
- Press the master switch “Deploy boom element A / Slew boom” (Item 3, Fig. 7.18) and deploy boom element A until the catch hook releases and the boom element B can be deployed (see Fig. 7.12).
- Press the master switch “Deploy boom element A / Slew boom” (Item 3, Fig. 7.18) to move the distributor boom into the position where the discharge hose retainer can be opened.
- Press the master switch “Deploy boom element B” (Item 2, Fig. 7.18) and deploy boom element B until it is approx. 120° to boom element A (see Fig. 7.14).
- Use the joystick “Deploy boom element C and D” (Item 1, Fig. 7.18) to deploy boom element C to 90° to boom element B (see Fig. 7.15).
- Use the joystick “Deploy boom element C and D” (Item 1, Fig. 7.18) to deploy boom element D to 90° to boom element C (see Fig. 7.16).
- Position boom element D horizontally approx. 1 m above the ground.
- Open the catch and release the discharge hose (see Fig. 7.17).
- Use the joystick s(**1** to **3**) on the radio remote control to move the distributor boom to the desired working position.

7.5 Pump operation

7.5.1 Motor Start/Stop, Speed control

The vehicle engine can be started from the remote control pendant using the push button (Item 4, Fig. 7.20). This can only be done if the key switch (Item 14, Fig. 7.6) on the control panel desk is set to “Remote Control”.
Pressing the push button (Item 5, Fig. 7.20) stops the vehicle engine, and inhibits its restart for approx. 10 sec.
Pressing the rocker switch (Item 7, Fig. 7.20 or Item 9, Fig. 7.21) brings the vehicle engine from idling to full speed within 10 sec.

Fig. 7.20 Operation "Motor Start/Stop"

7.5.2 “Pump/Suck” control at the control panel desk

The operating mode selection switch (Item 14, Fig. 7.21) must be set to “Desk”. The rocker switch (Item 11, Fig. 7.21) selects “Pump” or “Suck”. For confirmation one of the two indicator lamps (Item 10 or 12, Fig. 7.21) will light.

The stroke rate depends on the setting of the stroke rate potentiometer (Item 13, Fig. 7.21) and the engine speed.

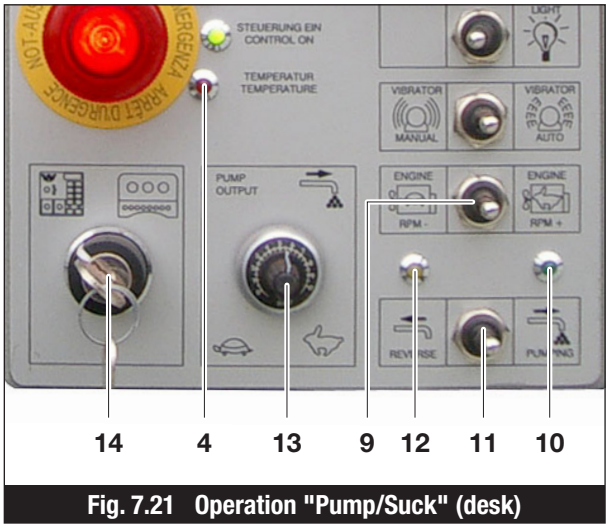


Fig. 7.21 Operation "Pump/Suck" (desk)

NOTE:
Opening the safety grill or pressing an Emergency Stop button (whilst the “Pump/Suck” switch is activated), will deactivate the “Pump/Suck” function.

NOTE:
If the hydraulic oil temperature exceeds 80 °C, the pump function is stopped and the indicator lamp (Item 4, Fig. 7.21) on the control panel desk will light. Sucking the concrete back remains available. The hydraulic system must be cooled down as quickly as possible by appropriate means (see section 7.6.4).

7.5.3 "Pump/Suck" control by radio remote control / cable remote control

The operating mode selection switch (Item 14, Fig. 7.6) must be set to "Radio remote control".

The rocker switch (Item 12, Fig. 7.21) on the remote control pendant is pre-set to "Pump" or "Suck". Select "Pump" or "Suck" using the rocker switch (Item 13, Fig. 7.21).

The stroke rate depends on the setting of the stroke rate potentiometer (Item 11, Fig. 7.22) and the engine speed.

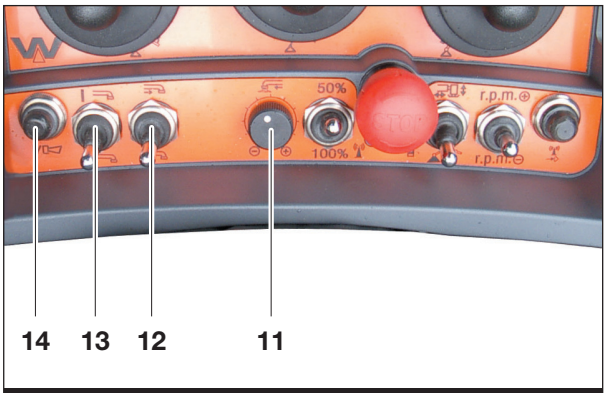


Fig. 7.22 Operation "Pump/Suck" (radio remote control)

NOTE:
Opening the safety grill or pressing an Emergency Stop button (whilst the "Pump/Suck" switch is activated), will deactivate the "Pump/Suck" function, which must then be restarted by switching the rocker switch (Item 13, Fig. 7.22) off and on again.

7.5.4 Back-up function for "Pump/Suck"

NOTE:
This function should only be switched on if the normal "Pump/Suck" controls are not operational!

7.5.4.1 Pumping with the control panel desk or via radio remote control/cable remote control

- Set the Back-up Pump control selector switch (Item 2, Fig. 5.7) to position "A or B"
  If the pump does not start (see trouble-shooting), back-up operation may be necessary in two possible fault situations:

Fault possibility 1: Defective sensors in the drive cylinder or oscillation cylinder

- Set the Back-up Pump control selector switch (Item 2, Fig. 5.7) to position “B”
- Set the pressure switch (Item 2, Fig. 7.23) to the anticipated pumping pressure (min. 60 bar, max. 280 bar)
- Set the key switch (Item 14, Fig. 7.21) to position “Desk” or “Remote Control”
- Switch on the “Pump/Suck” function using rocker switch (Item 11, Fig. 7.6) or rocker switch (Item 13, Fig. 7.22)

NOTE:

☞ **If the pressure at the pressure switch is set too low, the stroke will be short and the S-valve may not swing over fully.**

☞ **If the pressure at the pressure switch is set too high, the pump can stop at the end of its travel.**

Fault possibility 2: Controller failure

- Set the Back-up Pump control selector switch (Item 2, Fig. 5.7) to position “B”
- Set the key switch (Item 14, Fig. 7.21) to position “Desk” or “Remote control”
- Switch on the “Pump/Suck” function using rocker switch (Item 11, Fig. 7.21) or rocker switch (Item 13, Fig. 7.22)

NOTE:

☞ **The stroke rate, the power control and switching speed do not function in setting “A”.**

☞ **The concrete delivery can only be changed via engine speed.**

☞ **A lower gear should generally be engaged on the vehicle gearbox.**

7.5.4.2 Pump control at the hydraulic control block

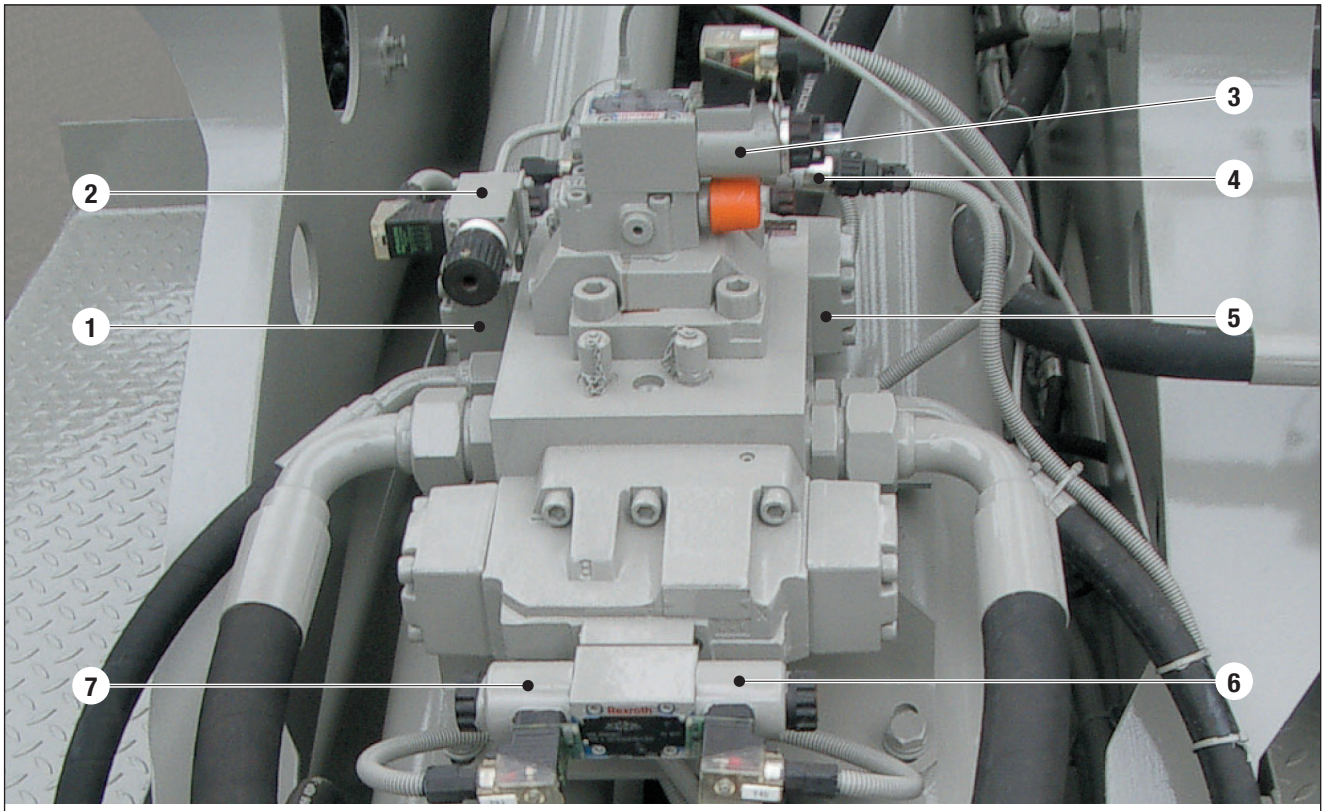
When controlling the valves manually, never run the engine at full speed.

WARNUNG

WARNING:
Valves and solenoids can be up to 100 °C temperature, risk of burns!

- Moving the drive cylinder
  Actuate Y4 a or b using a screwdriver (4 mm) or similar tool. Then press Y3 manually and move the drive cylinder to the desired position. Simultaneously releasing Y3 and Y4 will bring the cylinder to a halt.

- Moving the oscillation cylinder
  Actuate Y5 a or b using a screwdriver (4 mm) or similar tool. Then press Y3 manually and move the drive cylinder to the desired position. Simultaneously releasing Y3 and Y4 will bring the cylinder to a halt.



1 Valve Y5b
2 Push button
3 Valve Y3
4 Pressure sensor
5 Valve Y5a
6 Valve Y4a
7 Valve Y4b

Fig. 7.23 Pump hydraulic control block

7.5.5 Agitator

DANGER:

☞ **During cleaning work the control lever (Item 5, Fig. 7.24) must always be in the 0 position and must on no account be moved during the cleaning work!**

☞ **When working in the hopper, keep the vehicle engine switched off at all times!**

The control lever “Agitator” (Item 5, Fig. 7.24) switches the agitator on (even when the Emergency Stop button has been pressed).
The agitator should always be set to move the concrete inwards to the centre – push the control lever to the right. Setting the agitator to move the concrete outwards (control lever to the left) should be done only for brief periods to relieve a blockage or the remix the concrete.

Opening the safety grill automatically stops the agitator.

The manometer Item 1, Fig. 7.24) shows the actual pressure at the agitator / water pump (optionally: high pressure water pump and compressor). The maximum pressure that can be set is 210 bar.

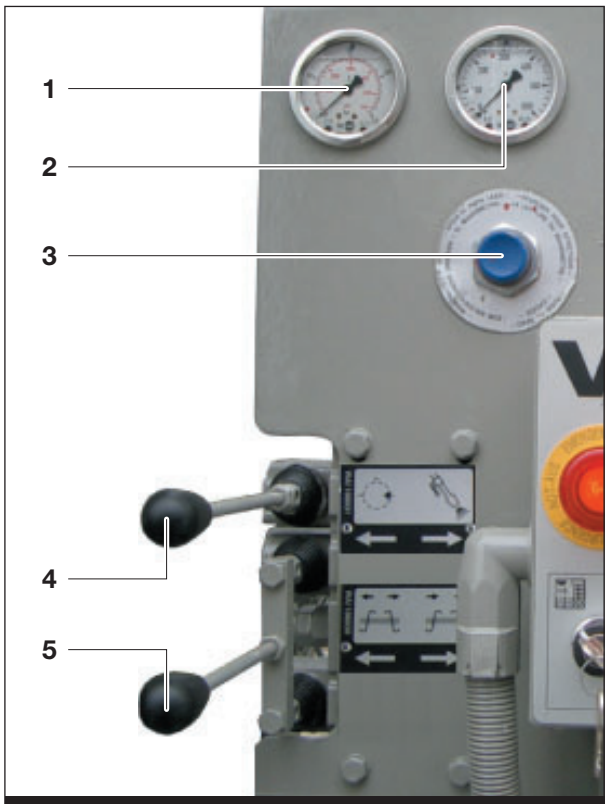


Fig. 7.24 Control panel Agitator / Water pump

7.5.6 Water pump

The control lever “Water pump” (Item 4, Fig. 7.24) switches the water pump on.

The manometer Item 1, Fig. 7.24) shows the actual pressure at the agitator / water pump (optionally: high pressure water pump and compressor). The maximum pressure that can be set is 210 bar.

NOTE:
When the agitator is switched on, the power of the water pump is reduced.

Option:
High pressure water pump or compressor, available as an option, are controlled by the same control lever (Item 4, Fig. 7.24).

7.5.7 Vibrator

The control lever “Vibrator” (Item 8, Fig. 7.24) switches the vibrator on.

Two operating modes are available:

MANUAL	=	Continuous operation
AUTO	=	The vibrator runs only when the pump is switched on.

Fig. 7.25 Control panel desk

7.5.8 Horn/Reset

Irrespective of the operating mode setting “Desk” or “Remote control” the horn can be sounded from any control panel using the rocker switch “Horn/Reset/Lubrication” (Item 6, Fig. 7.25).

If the Emergency Stop button has been pressed, provided all Emergency Stop buttons has been released, the controls will be switched on again (reset).

NOTE:
If the operating mode selector switch (Item 14, Fig. 7.25) is set to “Remote control”, the Emergency Stop button on the Remotecontrol pendant(radio or cable)must be released.

7.5.9 Light

The light switch (Item 7, Fig. 7.25) switches all operating lights on, including the outrigger feet lighting (optional) and working area floodlights.
The lighting around the outrigger feet is permanently switched on. It needs only be plugged into the appropriate socket on the outrigger foot.

7.5.10 Concrete pump manometer

By-passing or blocking the manometer protection valve (Item 3, Fig. 7.24) the actual pump pressure is shown at the manometer (Item 2, Fig. 7.24). At 320 bar the hydraulic pump has switched to “0”. The probable cause is a blockage in the conveying pipe.

7.5.10.1 Distributor boom manometer

The manometer (Item 1, Fig. 7.26) shows the actual pressure at the distributor boom.

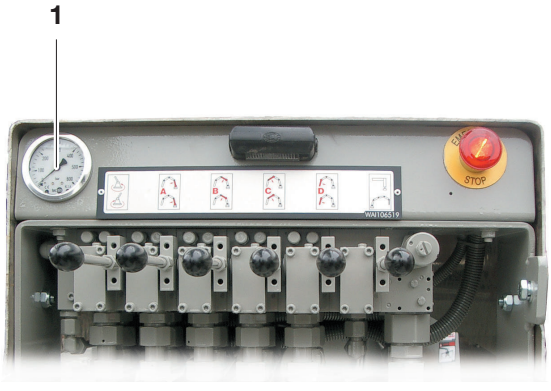


Fig. 7.26 Boom control block

7.5.10.2 Filter clogging display

The display instrument (Item 1, Fig. 7.27) shows the degree of clogging of the return flow filter. If when the hydraulic oil is at operating temperature the needle is in the red zone, the filter element must be changed immediately.

The display instrument (Item 2, Fig. 7.27) shows the degree of clogging of the in-line filter. If the needle indicates 3 bar, the filter cartridge must be changed.

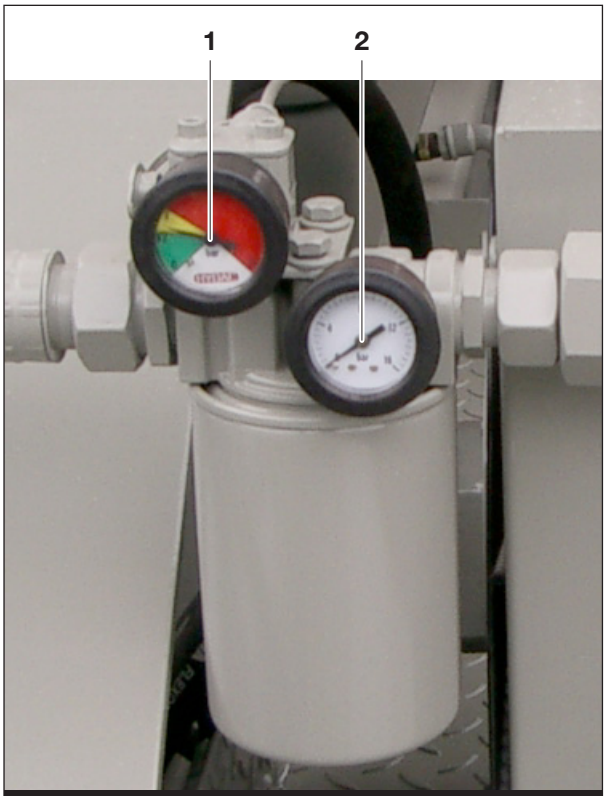


Fig. 7.27 Filter clogging indicator

7.5.10.3 Manometer for transfer shift gearbox

VORSICHT

CAUTION:

- ☞ **If the pressure is set too low, the transfer shift gearbox cannot change gear.**
- ☞ **If the pressure is set too low, the gearbox will be damaged.**

Maximum pressure 5 bar, see manometer (Item 1, Fig. 7.28).

Pull and twist the rotary controller (Item 2, Fig. 7.28) to adjust the pressure.

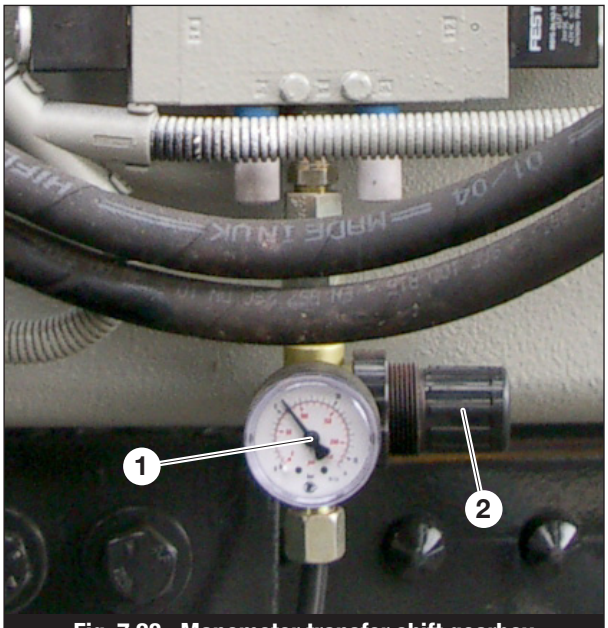


Fig. 7.28 Manometer transfer shift gearbox

7.6 Instructions for pump operation

NOTE:
The maximum conveying pressure must not exceed the pressure listed on the serial plate or in the test book.

- Mix the concrete in the mixer truck at full power and the highest speed, and check that the concrete is evenly mixed. After addition of concrete additives (accelerant, retardant) continue to mix for a further 4 minutes on site.

7.6.1 Instructions for pumping

- Immediately before starting pumping, with the agitator running, fill the hopper with several buckets of thin watery concrete, and send through two sponge balls in advance. Pump slowly, until a full stream of concrete emerges from the discharge hose.
- If the conveying pipework is short and clean, immediately before starting pumping, with the agitator running, fill the hopper with several buckets of laitance (cement-water mixture), and send through two sponge balls in advance, so that the laitance wets the whole periphery of the pipework. Pump slowly, until a full stream of concrete emerges from the discharge hose.
- For newer and longer conveying pipework the frictional resistance is greater, so make sure you pump sufficient laitance through.
- Fill the hopper with concrete from the silo or the mixer truck and keep pumping with the concrete pump.

NOTE:
If the pipework is rusted on the inside (high conveying resistance), do not increase the conveying quantity until you have pumped several m^3 continuously.

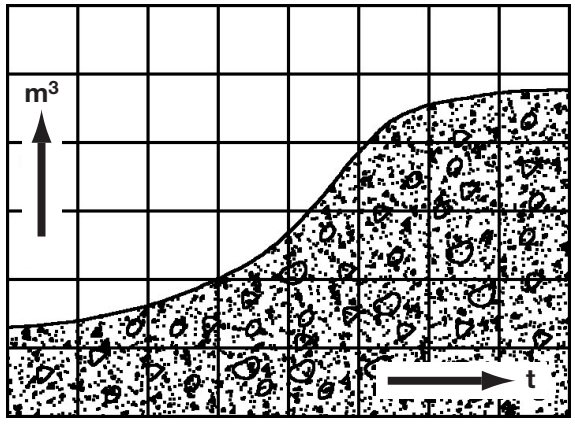


Fig. 7.29 Conveying quantity diagram

- If a blockage occurs, immediately pump the concrete back into the hopper and mix it. Only switch over to forward conveying when the conveying cylinder and transfer tube are correctly switching over automatically. Carefully start pumping through again.

7.6.1.1 Causes of blockages

- Laitance too thin or with insufficient cement
- Insufficient laitance used
- S-valve leaking (wear plate worn and ring too large: replace the parts)
- Leaking pipework (concrete bleeds out)
- Set concrete residues in the transfer tube or conveying pipes
- Unsuitable concrete composition

7.6.2 General instructions for pumping

- Whilst pumping, be sure not to draw any air in, since compressed air can emerge violently at the discharge hose, causing concrete to spray out. Therefore keep the hopper filled at least up to the level of the agitator shaft.
- When pumping, keep the agitator running.
- Avoid long pauses during which no concrete is pumped.

During pauses in pumping the concrete, observe the following points:

- Do not leave the conveying pipework under pressure
- Depressurise the conveying pipework by briefly reversing the pump
- Keep the concrete moving by briefly pumping through and back
- If there is a long pause in pumping, pump the concrete back into the hopper and mix it again before pumping it through the conveying pipework.

If the distributor boom whips around, determine the cause of this.

The following causes may lead to this:

- The outriggers may have moved – repeat the outrigger set-up procedure, see section 7.3.4

WARNING: Before restarting, determine the reason why the outriggers had moved.

- The pump speed is too high, reduce the pump speed
- The distribution boom is badly positioned, move the distribution boom to a better position
  Example of a badly positioned distribution boom: Boom fully extended, element 4 vertical

7.6.3 Instructions for pumping (depending on the material to be pumped)

NOTE:
☞ **Only ever use pumpable concrete!**
☞ **If you are unsure, contact the concrete manufacturer.**

- If pumping concrete that is hard to pump, the agitator shaft should be visible at all times!
  Difficult concrete (extremely stiff, low-sand mixtures, light-weight concrete etc.) will pump better when the hopper is filled only to the lower edge of the agitator shaft. This procedure means that air will be drawn by the concrete pump into the conveying cylinder and the concrete will be conveyed in air plug mode. Caution, blockages may occur!
- The pressure should be relieved in the conveying pipework by brief reversal of the pump (2-3 strokes) during pauses in conveying. Frequently pump back and forwards. Never allow the conveying pipework to stand under pressure.
- If the concrete is very fluid, with a high proportion of large gravel, and tends to bleed from the conveying pipework, always pump out into the hopper during pauses in pumping.
- During longer pauses pump the concrete back into the hopper, mix it and pump it through again.
- During longer pauses in pumping, switch off the drive engine, so that its vibrations do not cause the concrete to separate out. At intervals of 10-15 minutes, pump the concrete back and forth.
- Never force concrete that has separated out, or concrete that is lumpy because it is beginning to set, through the conveying pipework.
- Especially with concrete that has a low capacity for retaining water (tendency to bleed) avoid pauses when working at high throughputs, and when restarting conveying be sure to let the pump run long enough for the transfer tubes on both sides to be filled. Only then switch over to forwards conveying again.
- Air inclusions in the conveying pipework can be hazardous, since compressed air can emerge violently at the discharge hose, causing concrete to spray out explosively.
  Air inclusions occur particular when pumping through by sucking in air when the hopper is insufficiently filled with concrete and when the conveying pipework has been extended.
- The characteristics of the concrete must not be changed in any way.

7.6.4 Instructions for pumping (depending on the machine)

- The max. running speed of the diesel engine must under no circumstances be exceeded, since otherwise the hydraulic pump will overspeed. The permissible speeds can be found on the machine data sheet.

- Pay attention if the piston strokes are shortened and if necessary take action to counteract this (see Chapter 8 “Trouble-shooting”).

- If during continuous operation under heavy loading the oil temperature exceeds 80 °C, the indicator lamp will light (Item 4, Fig. 5.2). Immediately top up the water tank with cold water.

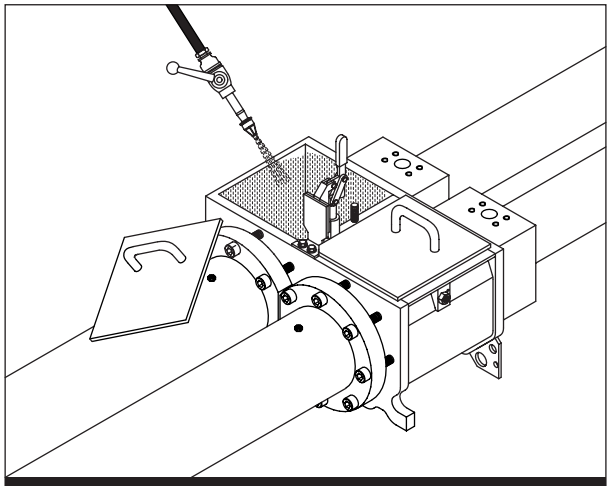


Fig. 7.30 Water in the wash-out tank

- After periods of heavy loading of the engine, never just switch it off, allow it to idle and cool down, at a diesel engine speed of approx. 1,000 rpm. This is particularly important for turbo diesel engines.

- Set the engine speed to more than the minimum speed (500-700 rpm).

- Damage due to operator error is not covered by the **WAITZINGER** warranty.

- If the temperature continues to rise, change the water continuously. Discover the cause of the overheating and rectify it. If the oil temperature rises above 40 °C the thermostatically controlled fan under the master control block will cut in.

- Under no circumstances spray the oil tank with water. This usually leads to a build-up of condensate water and damage to the hydraulic pump.
  If the cooling measures are insufficient, direct a water jet on to the drive cylinder (hydraulic cylinder) as shown here.

All pumps have a thermo-electric cut-out. If the oil temperature exceeds 80 °C the pump will be switched off automatically and the red indicator lamp on the control cabinet or control desk (Item 4, Fig. 5.2) will light up.

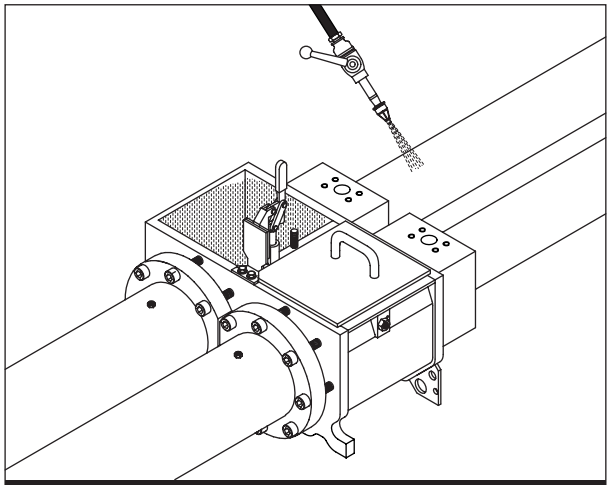


Fig. 7.31 Water on the drive cylinder

7.6.4.1 Measures to reduce the oil temperature

- Switch the pump to the “OFF” (**11**) position. The indicator lamp “Control System ON” (**3**) on the control panel will go out.
- Do not switch the engine off, the oil cooler must remain in operation.
- Renew the water in the water tank.
- When the red indicator lamp “Temperature” (**4**) has gone out, switch the pump on again. Continue to pump but at a lower power.
- When pumping is complete, establish the cause for the oil overheating and rectify it.
- The temperature sensor for the thermo-electric cutout is located in the hydraulic oil tank.

Fig. 7.32 Control panel desk

7.7 Cleaning the conveying pipework

7.7.1 General

- Do not use any aggressive cleaning additives for cleaning the conveying pipework
- Put the remote control pendants in a dry place.
- Follow the directions of the vehicle manufacturer
- Dispose of the cleaning materials according to regulations

7.7.2 Suction cleaning

- Pump out the agitator hopper down to the upper edge of the agitator shaft, then switch the pump off.
- Push a wetted cleaning sponge (cube) into the outlet of the discharge hose.
- Pull the cleaning sponge back through the boom by operating the pump in “reverse feed”; strike the conveying pipework with light hammer blows until the cleaning sponge has passed that point (the hollow ring is recognisable).

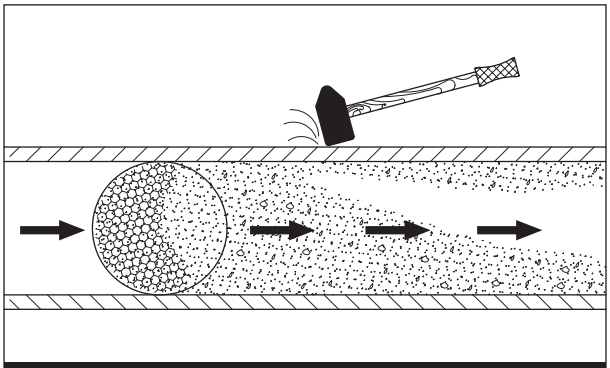


Fig. 7.33 cleaning sponge in suction cleaning

- Switch off the pump.
- Open the hinged base and retrieve the sponge.
- On long conveying pipework runs, repeat the cleaning process. One back suction run is not enough!
- If the protective grill has a safety cut-out, agitator and S-valve come to a halt as soon as the protective grill is opened. When cleaning, briefly shut the protective grill, let the pump run through one cycle, open the protective grill again. A protective grill that is bolted in position remains in position throughout cleaning.
- Remove any remaining material by opening the cleaning valve. Carefully spray the S-valve, hopper, conveying cylinder and water tank until they are clean. Clean the rest of the machine and spray it with formwork release oil.
- If there is a risk of frost, drain the wash-out tank, water tank and water pump. The wash-out tank should also be drained at normal temperatures during long pauses in pumping, overnight and at weekends.

7.7.3 Cleaning with pressurised water.

Cleaning the machine with pressurised water is a method well proven in practice.

- Empty the hopper as far as possible.
- Switch the pump to “Suck” mode using rocker switch (Item 11, Fig. 7.32) and pump 1 or 2 strokes to depressurise the conveying pipework.
- Switch off the pump.
- Drain out the remaining material by opening the cleaning valve, see section 7.7.4. When conveying upwards, close the blocking slide and open the cleaning port in the rising pipe.
- Switch the pump on again, in “Suck” mode, and carefully wash down the conveying pipe with the spray jet, working through the cleaning port. Take care that the hose is not cut through when the S-valve operates. Keep spraying the conveyor pipework until clear water emerges from the conveying cylinders.
- Switch off the pump.
- Clean the hopper and all the parts that come in contact with the material with the spray hose also.
- Push 2 or 3 cleaning sponges soaked with water into the cleaning port and the seal the cleaning port tightly.

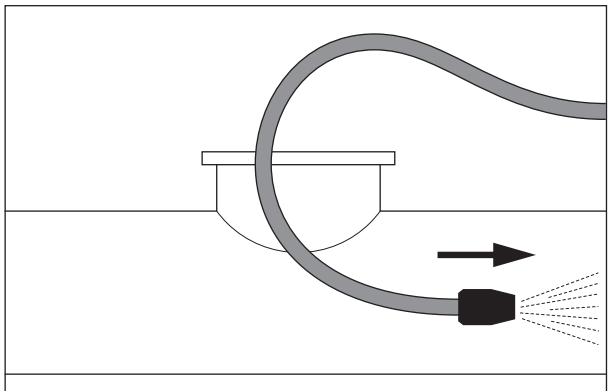


Fig. 7.34 Cleaning with water hose

- Close the cleaning valve and fill the hopper with water.
- Switch the pump on again, in “Suck” mode. Push the material in the conveying pipework forwards to the discharge.
  If a single filling of the hopper is insufficient for a long pipe run, switch the pump off before air is drawn in, and fill the hopper again with water. Then continue with the discharge of the material until the cleaning sponges emerge from the discharge hose.
- Take care that the water flowing from the discharge hose does not flow into the formwork.
- Suck the water back into the hopper by reversing the pump.

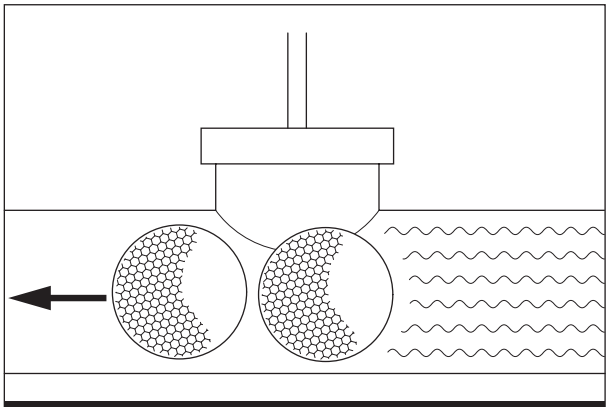


Fig. 7.35 Cleaning with sponges

- If the protective grill has a safety cut-out, agitator and S-valve come to a halt as soon as the protective grill is opened. When cleaning, briefly shut the protective grill, let the pump run through one cycle, open the protective grill again. A protective grill that is bolted in position remains in position throughout cleaning.
- Remove the remaining water by opening the cleaning valve. Carefully spray the S-valve, hopper, conveying cylinder and wash-out tank until they are clean.
- Clean the rest of the machine also, and spray it with formwork release oil.

See further information in the separate documentation supplied by the manufacturer.

NOTE:

If there is a risk of frost, drain the wash-out tank, water tank and water pump. The wash-out tank should also be drained at normal temperatures during long pauses in pumping, overnight and at weekends.

7.7.4 Draining the remaining concrete

The remaining concrete can be drained through the drain valve under the hopper.

- Strike the cover (Item 1, Fig. 7.36) of the drain valve lightly with a hammer to open it. If the cover is too slack or too stiff, adjust the clamping screws (Item 2, Fig. 7.36).
- Collect the remaining concrete in a suitable container or on plastic sheeting, for reprocessing or disposal.
- Observe the safety instructions set out the Chapter 2 “Safety instructions”.

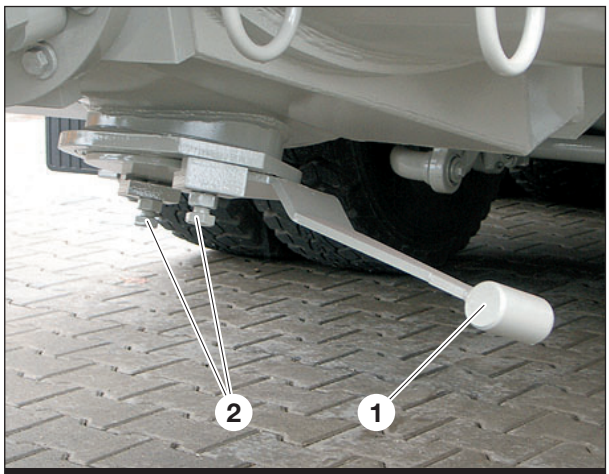


Fig. 7.36 Surplus concrete discharge opening

7.8 Water tank

7.8.1 Filling up / topping up with water by removing the cover

- Close all ball valves.
- Unscrew the cover (**1**) on the rear outrigger.
- Fill with water of a suitable quality (clean water without foreign bodies such as sand).
- Watch the water level indicator (**2**).
- Screw the cover back in place.

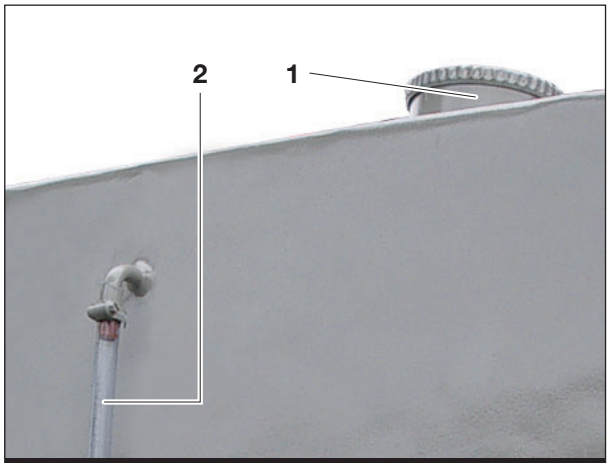


Fig. 7.37 Fill up with water by removing the cover

7.8.2 Filling with water using the C-coupling

- Connect the water hose to the C-coupling (Item 1, Fig. 7.38).
- Open the ball valve (Item 2, Fig. 7.38)
- Start filling with water; watch the water sight hose (Item 2, Fig. 7.37).
- Keep filling with water until water emerges from the filler opening.

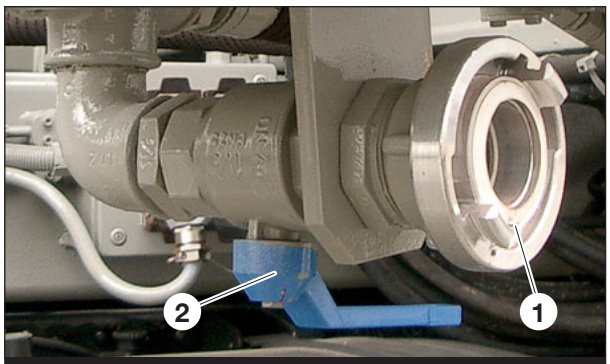


Fig. 7.38 Fill with water using the C-coupling

7.8.3 Filling with water from the mixer truck

- Connect the water hose to the Geka-coupling (Item 1, Fig. 7.39).
- Open the ball valve (Item 2, Fig. 7.39)
- Start filling with water; watch the water sight hose (Item 2, Fig. 7.37).
- Keep filling with water until water emerges from the filler opening.

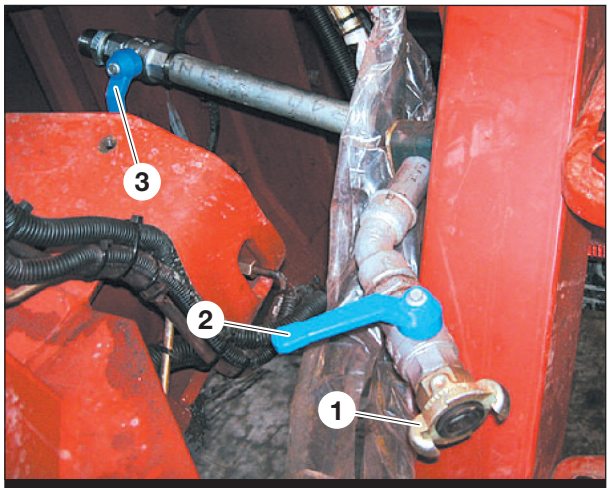


Fig. 7.39 Fill with water from the mixer truck

7.8.4 Operation in winter

- The machine must be standing level; level the machine using the circular levels (Item 1, Fig. 5.5 and Item 3, Fig. 5.6).
- Completely drain all water by opening all ball valves (Item 2, Fig. 7.38 and Item 2, Fig. 7.39).
- Drain the wash-out tank

8. Trouble-shooting

8.1 General information

The actions described in this chapter for trouble-shooting should be employed if during operation deviations from normal performance are found.
Trouble-shooting should be performed based on the following table.
Only skilled technical staff should investigate the causes of faults and implement measures to rectify the fault.

If the fault cannot be rectified, contact **WAITZINGER** customer service.

8.2 Tracing faults

Fault	Cause	Remedy
Gearbox does not shift to “Pump position”.	Vehicle ignition not switched on.	Switch on the ignition.
	Clutch was not disengaged.	Disengage the clutch and engage the required gear.
	Pressure in vehicle compressed air system too low.	Allow the engine to run until It has built up sufficient pressure.
	Pneumatic valve iced up.	De-ice the muffler on the pneumatic valve.
	Solenoid on pneumatic valve defective.	Check solenoids and wiring. The valve can also be actuated with a screwdriver.
	Fuse in vehicle blown.	Establish cause and rectify it. Replace fuse.
No indicator lamps lit on the controls (green LED on desk, and Emergency Stop not illuminated).	Vehicle ignition not switched on.	Switch on the ignition.
	Gearbox in driving position.	Change the gearbox over.
	Gearbox limit switch defective.	Replace gearbox limit switch. (Short-term remedy: Bridge the two contacts on the plug).
	Main fuse (battery) or fuse F1/F2 blown.	Establish cause and rectify it. Replace fuses.

Fault	Cause	Remedy
Emergency Stop indicator lamp flashing.	Emergency Stop button has been pressed.	Establish why the Emergency Stop button was pressed and remedy the cause. Release the Emergency Stop and restart the controls with the horn, see section 7.2.2.
	Selector switch set to remote control.	Release remote control Emergency Stop, or change over the selector switch on the desk, and start the controls with the horn.
	Broken cable or defective Emergency Stop switch.	Have fault rectified by **WAITZINGER** customer service.
Pumping or sucking does not start, no pressure available.	Selector switch in position “Desk”.	Move selector switch to position “Remote control”, operate horn.
	Grill open.	Close grill. Check limit switch.
	“Pump ON” was selected when the controls were switched on using the horn.	Switch the pump off and restart it.
	Engine not running.	Start the engine.
	Vehicle gearbox in neutral.	Select a gear, see section 7.2.1.
	Stroke rate potentiometer at “0”.	Set a higher value, see section 7.2.1.
	Emergency Stop button has been pressed.	Establish why the Emergency Stop button was pressed and remedy the cause. Release the Emergency Stop and restart the controls with the horn, see section 7.2.2.
	Hydraulic oil too hot.	Let the hydraulic system cool down, see section 7.6.4.
	Spool valve defective.	Check valve and solenoid, and have part replaced if necessary by **WAITZINGER** customer service.

Fault	Cause	Remedy
	Pressure relief valve defective.	Check valve and solenoid, and have part replaced if necessary by **WAITZINGER** customer service.
	Controls defective.	Check fuses F9 to F12. and replace if necessary. Set back-up function to position “A”.
		Immediately on finishing work have the fault rectified by **WAITZINGER** customer service.
Pumping or sucking does not at maximum pressure.	Blockage in the conveying pipework.	Suck back and establish the cause of the blockage, see section 7.6.1.1.
	Defective sensor on drive cylinder.	Set back-up function to position “B”. Replace the defective sensor at the earliest opportunity.
	Spool valve defective.	Check valve and solenoid, and have fault rectified if necessary by **WAITZINGER** customer service.
Concrete delivery from the pump is too little or is irregular.	Incorrect gear or stage engaged in the vehicle gearbox.	Engage the correct gear.
	Vehicle engine speed too low.	Increase the speed. Check the settings.
	Concrete pump sucking in air.	Inform the mixer truck driver that the hopper must always be filled to the agitator shaft at least, see section 7.6.2. Check the conveying piston for wear.
	Concrete mixture unsuitable for pumping.	Use only “pumping concrete”, see section 7.6.3.

Fault	Cause	Remedy
	Incorrect settings in the controls.	Have the settings checked by **WAITZINGER** customer service.
	S-valve stiff.	Check S-valve settings, check wear plate and ring for heavy wear or fracture, and check the S-valve bearings.
Concrete pump short strokes.	Back-up function B switched on.	Switch offrotary switch (Item 2, Fig. 5.7). Switch on the pressure switch, see section 7.5.4.
	Piston rings in drive cylinder worn.	Have piston rings replaced by **WAITZINGER** customer service.
Outrigger does not extend.	Incorrect switch setting.	Set selector switch (Item 14, Fig. 5.2) to position “Desk” or set remote control (Item 8, Fig. 5.12) to position “Outriggers”.
	Safety switch on the outrigger has not been pressed.	Set safety switch (Item 3, Fig. 5.5) or Item 1, Fig. 5.6).
	Engine not running.	Start the engine.
	Vehicle gearbox in neutral.	Select a gear, see section 7.2.1.
	Pre-selector valve not actuated.	Check solenoid and wiring. Actuate the pre-selector valve “Outrigger” manually. Seek advice from **WAITZINGER** customer service on this point.
	Pressure setting too low at the outrigger valve.	Check pressure setting shown on the data sheet, adjust it if necessary. Clean the pressure relief valve. Seek advice from **WAITZINGER** customer service on this point.
	Outrigger catch does not open.	Lubricate the outrigger catch, if necessary disassemble it and clean it, replace the seals and d burr the edges. Seek advice from **WAITZINGER** customer service on this point.

Fault	Cause	Remedy
The outrigger moves of its own accord.	Releasable non-return valve dirty.	Have valve cleaned or replaced by **WAITZINGER** customer service.
	Cylinder seal worn.	Have seal replaced by **WAITZINGER** customer service.
	Cylinder distorted by over-pressure.	Check valves for operation. Replace the cylinder. Seek advice from **WAITZINGER** customer service on this point.
The boom will not move.	Incorrect switch setting.	Set selector switch (Item 14, Fig. 5.2) to position “Remote control” or set remote control (Item 8, Fig. 5.12) to position “Boom”.
	Engine not running.	Start the engine.
	Vehicle gearbox in neutral.	Select a gear, see section 7.2.1.
	Emergency Stop button has been pressed.	Establish why the Emergency Stop button was pressed and remedy the cause. Release the Emergency Stop and restart the controls with the horn, see section 7.2.2.
	Radio remote control not operational.	Check transmitter battery charge. Restart the radio remote control (horn). Change the frequency. Use cable remote control instead.
	Pre-selector valve not actuated.	Check solenoid and wiring. Operate pre-selector valve manually. Seek advice from **WAITZINGER** customer service on this point.
	Insufficient hydraulic oil.	Stop engine immediately and top up with hydraulic oil.
		WARNING: The boom cylinder must be bled. Seek advice from **WAITZINGER** customer services on this point.

Fault	Cause	Remedy
	Dirt in the hydraulic system.	Change the filter and have **WAITZINGER** customer service clean out the entire system.
	Nozzle in “Load sensing pipe” closed (from 42 m boom).	Have nozzle cleaned by **WAITZINGER** customer service.
The boom will moves only slowly.	The “50/100%” switch is in the “50%” position.	Set the switch (Item 10, Fig. 5.12) to the “100%” position.
	Incorrect valves settings.	Have the settings checked by **WAITZINGER** customer service.
	Incorrect gear or stage engaged in the vehicle gearbox.	Engage the correct gear, see section 7.2.1.
	Check pressure setting at the boom block is too low.	Check pressure setting shown on the data sheet, adjust as necessary. Clean the pressure relief valve. Seek advice **WAITZINGER** customer service on this point.
	Hydraulic pump defective.	Have pump replaced by **WAITZINGER** customer service.
Individual boom movements do not operate.	Solenoids in the boom control block defective.	Have solenoids and wiring checked or replaced by **WAITZINGER** customer service.
Element A does not rise.	Sensor on the boom mount is activated.	Have sensor replaced by WAITZINGER customer service.
Slewing not operational.	Boom is at the limit of travel.	Slew it in the opposite direction.
	Boom “Slew” limit switch or solenoid at the boom control block defective (from 42 m boom).	Have the limit switch or solenoid replaced by **WAITZINGER** customer service.
The boom moves although no no element is activated.	Dirt in the load retention valve.	Clean the load retention valve at the boom cylinder. Set the pressures to the data sheet values. If necessary, replace the valves. Seek advice from **WAITZINGER** customer service on this point.

Fault	Cause	Remedy
	Seal in boom cylinder worn.	Have seal replaced by **WAITZINGER** customer service.
	Book cylinder distorted by excessive pressure.	Rectify the cause and replace the cylinder. Seek advice from **WAITZINGER** customer service on this point.
”Slew” operation too slow, or or does not move.	Pressure setting too low.	Check pressure setting to data sheet, and adjust. Clean the pressure relief valve. Seek advice from **WAITZINGER** customer service on this point.
	Machine inclination too great.	Reduce the inclination, see section 7.3.4.
	Ball bearing slewing rim insufficiently lubricated.	Lubricate the ball bearing slewing rim.
	Slewing motor worn.	Have motor replaced by **WAITZINGER** customer service.
The boom slews although “Slew” not activated.	Brake in slewing drive worn.	Have the brake linings replaced by **WAITZINGER** customer service.
Agitator does not operate.	Grill open.	Close grill.
	Water pump also running.	Switch off the water pump.
	Concrete too stiff, or setting in the hopper.	Empty the hopper and clean it.
	Pressure setting at the agitator control block is too low.	Check pressure setting to data sheet, adjust as necessary. Clean the pressure relief valve. Seek advice from **WAITZINGER** customer service on this point.
Water pump does not operate.	Water tank empty.	Fill up with water.
	Agitator switched on.	Switch the agitator off using the control lever (Item 5, Fig. 5.3).

Fault	Cause	Remedy
	Pressure setting at the agitator control block is too low.	Check pressure setting to data sheet, adjust as necessary. Clean the pressure relief valve. Seek advice from **WAITZINGER** customer service on this point.
	Dirt in the water pump.	Disassemble the water pump and clean it. See separate user manual from the manufacturer.
	Axial play in the pump shaft incorrect.	Undo the coupling and adjust to the mid value.
Lubrication system does not operate.	Fuse blown.	Replace fuse.
	Pump switched off.	Switch the pump on.
	Grease too stiff.	Replace grease with suitable grease, see Figure 9.5.
	Lubrication point blocked.	Clear the blockage at the lubrication point.
	Lubrication distributor blocked.	Replace the grease up to the lubrication distributor and replace the lubrication distributor.
	Pump impeller defective.	replace pump impeller.

9. Maintenance & Inspection

9.1 General information

The truck-mounted concrete pump must be thoroughly cleaned, maintained and inspected at regular intervals. All parts of the machine should be checked that they are in good condition and safe working order. The maintenance actions are listed in the Maintenance Schedule, section 9.4.

WARNING:

☞ **Maintenance and inspection work must always be carried out when the truck-mounted concrete pump is stopped and switched off.**

☞ **The adjacent notice must be placed in a suitable place where it is easily visible.**

DANGER:

Work on the hydraulics, pneumatics, electrics and electronics must only be performed by suitably trained skilled staff.

Further information on the truck part of the vehicle can be found in the separate vehicle manufacturer's user manual.

9.2 Safety instructions for maintenance and inspection

☞ Maintenance and inspection of the truck-mounted concrete pump must only be carried out by authorised staff.

☞ Repair work must only be carried out by authorised skilled staff of the manufacturer.

☞ Maintenance and inspection work must be carried out precisely in accordance with the specifications and instructions in this maintenance section.

☞ Make sure that the user manual for the truck-mounted concrete pump, the maintenance and special tools and fixtures for it, the oilcans and grease guns for lubrication and the cleaning and lubrication media are always kept in the places provided for them.

☞ Used cleaning materials must be removed from the truck-mounted concrete pump and placed in a specially designated container (fire hazard!). The use of highly flammable materials (e.g. petrol) is prohibited - VBG 1 § 43 and 44!

NOTE:

Consumables such as gearbox oil used during maintenance, repair and oil change should be collected in suitable containers and disposed of in accordance with regulations (to EC directive 75/439/EWG and statutory instruments under §§ 5a, 5b AbfG and AltölV).

☞ Electrical control equipment, resistors and contactors should be kept clean and cleaned as required.

☞ Check electrical cables for damage to the insulation.

☞ Check mechanical components for wear, deformation, crushing, cracks, breakage, corrosion and secure mounting.

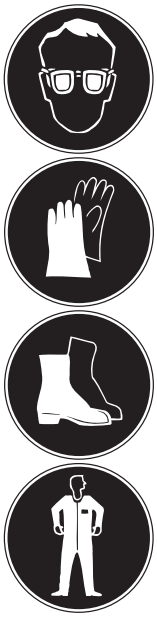
☞ Regularly check all pipes, hoses and screwed connections for leaktightness and for externally evident damage.

☞ Fluids which emerge at high pressure can be hazardous.

9.2.1 Lubricants and solvents

WARNING:

- ☞ **As far as possible, avoid allowing lubricants and solvents to contact the skin.**
- ☞ **Store fluids, especially hydraulic oils and also engine oils, lubricants and liquefied or compressed gaseous products, only in the containers legally prescribed for them.**
- ☞ **These should carry appropriate warning notices identifying their contents.**
- ☞ **Comply with all warning notices.**
- ☞ **When handling these materials wear protective clothing at all times (skin, eyes, hand and foot protection).**
- ☞ **Used protective clothing must be placed in sealed plastic sacks after wearing.**



9.2.2 Sealing rings (containing fluorine)

WARNING:

- ☞ Always wear protective clothing when removing the remains of sealing rings.
- ☞ Fluorine is contained in Viton sealing rings, O-rings and flat gaskets.
- ☞ Under normal conditions of use, Viton seals and O-rings are safe to use. However at temperatures in excess of 400 °C they decompose, e.g. if equipment catches fire.
- ☞ The remains of such seals are then extremely aggressive and generally cannot be removed from the skin.

9.2.3 Oils and greases

WARNING:

- ☞ Allergic reactions can arise when handling oils and greases.
- ☞ Use barrier creams and avoid all contact with the skin.
- ☞ Never wash your hands in oil.
- ☞ Hydraulic oil emerging at high pressure can penetrate the skin and cause severe injuries.
- ☞ To avoid severe infections, call a doctor immediately.
- ☞ Dispose of oils and filters in accordance with statutory regulations.
- ☞ Never pour lubricating oil down the public drains.

9.2.4 Paints, varnishes and thinners

☞ These materials are highly inflammable when applied as sprays and mists.

☞ Thinners vapours are heavier than air and create an extremely high explosion hazard.

WARNING:

☞ Materials soaked in paint, varnish or thinners can ignite spontaneously if they are carelessly thrown into a rubbish bin.
☞ Do not breathe in paint or thinners mists.
☞ When painting, ensure good ventilation and never smoke.
☞ When spraying paint always wear a close-fitting face mask.
☞ Never allow petrol or paraffin to come into contact with rubber components. Contamination of rubber components with these materials causes them to swell and soften, leading to failure.
☞ When working with paraffin or petrol, naked flames and smoking are prohibited.

9.2.5 Glues, adhesives and solvents

☞ Some vapours from these materials are flammable and/or poisonous if breathed in.

☞ Even gases which are not themselves flammable can decompose at high temperatures and release poisonous gases, e.g. when drawn through the glowing tip of a cigarette.

☞ Thus the same safety instructions apply as for paraffin and petrol.

9.2.6 Battery acid

WARNING:

- ☞ **Battery fluid contains aggressive sulphuric acid. Always wear protective clothing and protective gloves. Handle batteries with care.**
- ☞ **If any battery acid splashes on to the skin, wash it off immediately with clean water.**
- ☞ **If any battery acid splashes on to the eye, wash it out immediately with clean water. Then immediately summon a doctor.**
- ☞ **Because of the risk of an explosion, keep sparks and naked flames away from batteries. Battery acid can catch fire.**

9.2.7 Safety precautions when charging batteries

WARNING:

- ☞ Around batteries there is an explosion hazard due to short circuits, sparks or naked flames.
- ☞ Batteries on charge release explosive gas.
- ☞ Switch off the charging power before disconnecting the charging lead plug.
- ☞ When charging in enclosed spaces, ensure good ventilation.
- ☞ Continue to ventilate the room up until an hour after completing the charge.
- ☞ No smoking!
- ☞ Do not place tools on the battery.
- ☞ Disconnect the battery terminals before working on the electrical system.
- ☞ Electric arcs can be life- threatening and cause fires!
- ☞ Do not place anything metallic on the battery.
- ☞ Sulphuric acid is corrosive.
- ☞ When working on the battery always wear safety glasses and protective gloves!
- ☞ Battery fluid contains sulphuric acid.
- ☞ Remove splashes from the skin immediately with soap and water.
- ☞ Immediately summon a doctor is acid splashes the eyes or mucous membranes.

9.2.8 Safety instructions for welding work

CAUTION:

- ☞ Whenever carrying out welding work on the truck-mounted concrete pump, disconnect the battery and unplug all electrical control equipment!
- ☞ Attach the earth connection immediately adjacent to the welding location!

In addition, observe all safety instructions set out in Chapter 2 Safety Instructions!

9.3 Tightening torques for screw connections

The following values apply to tightening torques for machine screws to DIN 912, 931 and 934 based on a friction factor of μ = 1.25 (lightly oiled).

Thread Ø	Tightening torque M_D [Nm] 8.8	Tightening torque M_D [Nm] 10.9
M8	23	32
M10	46	64
M12	80	110
M14	125	180
M16	195	275
M18	270	390
M20	385	540
M22	510	720
M24	660	930
M27	980	1.400

Fig. 9.1 Tightening torque for screw connections

9.4 Maintenance schedule

Certain maintenance work must be carried out on the machine at specified intervals. These intervals are expressed either as numbers of operating hours or as periods of time such as **semi-annually** or **annually**, whichever interval **is reached** earlier.

Before performing the work for any maintenance interval, the maintenance work for all previous maintenance intervals must have been completed.

Maintenance work	Maintenance intervals				
	Daily	After the first 50 operating hours	Weekly	Every 500 operating hours	Every 1,000 operating hours or annually
Check all components for wear, deformation, corrosion and secure mounting.	X				
Check oil, fuel, grease and water levels, top up as necessary. The machine must be standing on level ground at this time.	X				
Check all filter clogging indicators.	X				
Check components that come in contact with concrete, replace worn parts.	X				
Check the wear condition of the conveying pipework by knocking it or by using a wall thickness gauge (see section 9.8) and replace worn parts. The minimum wall thicknesses can be found in the diagram in section 9.8.2.	X				
Check lubrication system for operation.	X				
Lubricate the conveying piston with grease (unless the automatic piston lubrication option is fitted).	X				
Visually check all hydraulic lines and screwed joints for leak-tightness.	X				

Maintenance work	Maintenance intervals				
	Daily	After the first 50 operating hours	Weekly	Every 500 operating hours	Every 1,000 operating hours or annually
Check the attachment of the discharge hose and the security of all snap couplings.	X				
Perform all necessary maintenance work on the truck in accordance with the separate user manual supplied by the manufacturer.		X			
Clean all filters and replace as necessary, see section 9.6.		X			
Check all screw connections against the tightening torque table in section 9.3.		X			
Check the screw connections on the cardan shaft joints.		X			
Change the oil in the boom slewing gearbox and transfer shift gearbox, see sections 9.7.1 and 9.7.2.		X			
Lubricate all grease points on the boom, boom mounting, pump and ball bearing slewing rim, see section 9.5.			X		
Check the oil level in the slewing gearbox.			X		
Make a thorough visual check for damage of all seals on the S-valve and agitator.			X		
Check the adjustment of the S-valve and adjust it as necessary.			X		
After at least 24 hours settling time check the condensation water in the hydraulic oil tank; drain it through the ball valve until hydraulic oil comes out.			X		

Maintenance work	Maintenance intervals				
	Daily	After the first 50 operating hours	Weekly	Every 500 operating hours	Every 1,000 operating hours or annually
Check the operation of all safety equipment such as Emergency Stop, grill and guards.			X		
Check the structural steelwork of the boom, boom mounting and outriggers for cracks.			X		
Completely drain the hydraulic oil, flush out the hydraulic oil tank and fill with the necessary quantity of hydraulic oil, see section 9.7.3.				X	
Replace the filter cartridges in the hydraulic oil tanks for the boom and concrete pump. Clean the magnetic rod.				X	
Check the oil level in the transfer shift gearbox.				X	
Perform a wear check on the S-valve, verify 8 mm wall thickness.				X	
Perform a wear check on the conveying cylinders.				X	
Clean the diesel pre-filter on the vehicle.				X	
Check the pressure setting of the pump and distributor boom against the data sheet, see sections 3.3 and 3.4.				X	
Check engine speed and operation of the pump together with stroke rate against the data sheet, see sections 3.3 and 3.4.				X	
Check that the conveying piston fastenings are tight.				X	

Maintenance work	Maintenance intervals				
	Daily	After the first 50 operating hours	Weekly	Every 500 operating hours	Every 1,000 operating hours or annually
Check all screw connections on the ball bearing slewing rim against the tightening torque table in section 9.3.				X	
Check that the conveying pipework fastenings on the distributor boom are tight.				X	
Clean the air filter casing.				X	
Change the breather filter on the hydraulic oil tank.				X	
Have all mechanical and hydraulic components examined by an expert.					X
Check all safety equipment that is fitted for good condition.					X
Check distributor boom play between the pinion and the ball bearing slewing rim, see section 9.8.5.					X
Check play within the ball bearing slewing rim, see section 9.8.6.					X
Change the oil in the slewing gearbox, see section 9.7.1.					X
Change the oil in the transfer shift gearbox, see section 9.7.2.					X

9.5 Lubrication

9.5.1 Central lubrication system

Use only greases of NLGL classes 0 to 2. See documentation for the central lubrication system.

9.5.1.1 Checking the central lubrication system

The operation of the central lubrication system must be checked daily. To do this, all grease points should be lubricated once manually.

1. Starting the lubrication system manually

The ignition must be switched on and all Emergency Stop switches released. Set the concrete pump to the setting “Pump”. Actuate the lubrication system for approx. 2 sec.

CAUTION

CAUTION:

- ☞ **Check whether the rotor vane on the lubrication pump rotates and sufficient grease is fed in.**
- ☞ **If grease emerges from the safety valve, no grease points are being lubricated. This fault must be rectified immediately!**

2. Checking the grease points on the hopper (Fig. 9.2)

At the bearings of the S-valve no. 2 and no. 3 and agitator no. 4 and no. 5 grease must emerge into the hopper; at S-valve no. 1 grease must emerge into the conveying pipe (the flap elbow must be open).

3. Checking the operation of the lubrication distributor

After waiting no more than 4 minutes the control pin in the lubrication distributor must be seen to move in and out.

4. Checking the lubrication pipes

CAUTION

CAUTION:

Immediately replace any defective lubrication pipes!

Check the lubrication pipes for damage and leak-tightness. All lubrication pipes must be securely connected.

5. Checking the grease nipples for manual lubrication

No grease must be leaking from the grease nipples. Either replace the defective grease nipple and non-return valve immediately (or close it off).

6. Lubricating "manually"

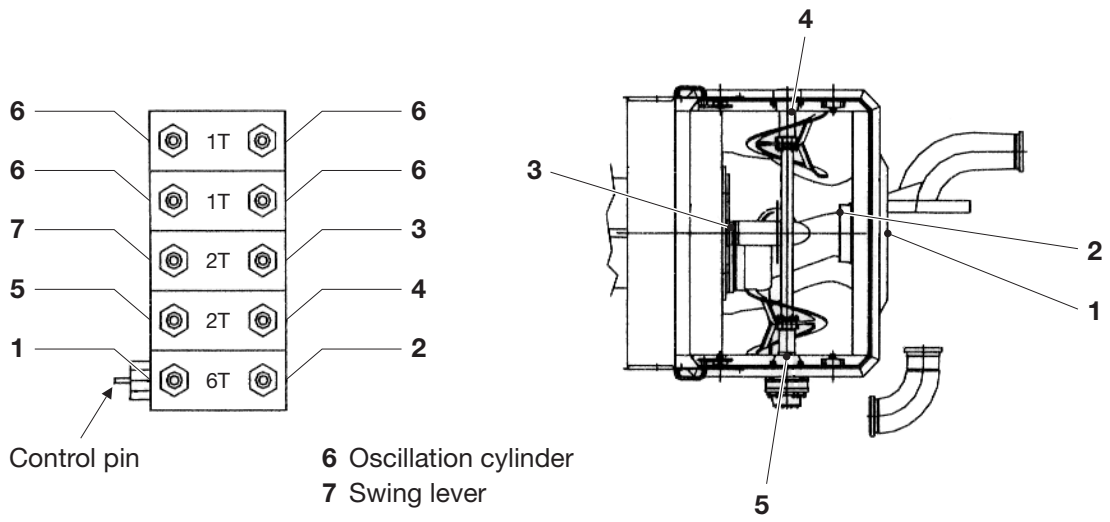
CAUTION

CAUTION:
Before starting work, check that grease is issuing at all grease points, see point 2.

If the central lubrication system is defective, all grease points can be lubricated manually, using a grease gun. This should be performed no less frequently than every 2 hours of operation.

7. Blocked grease points

If no grease can be injected into a lubrication point, this problem must be rectified as soon as possible by a **WAITZINGER** customer service fitter.



6 Oscillation cylinder
7 Swing lever

Fig. 9.2 Lubrication system

9.5.2 Manual lubrication

An acid-free multi-purpose grease should be used for manual lubrication, see Figure 9.5.

9.5.3 Sliding surfaces

Use graphite grease for sliding surfaces, see Figure 9.5.

9.5.4 Overview of grease points

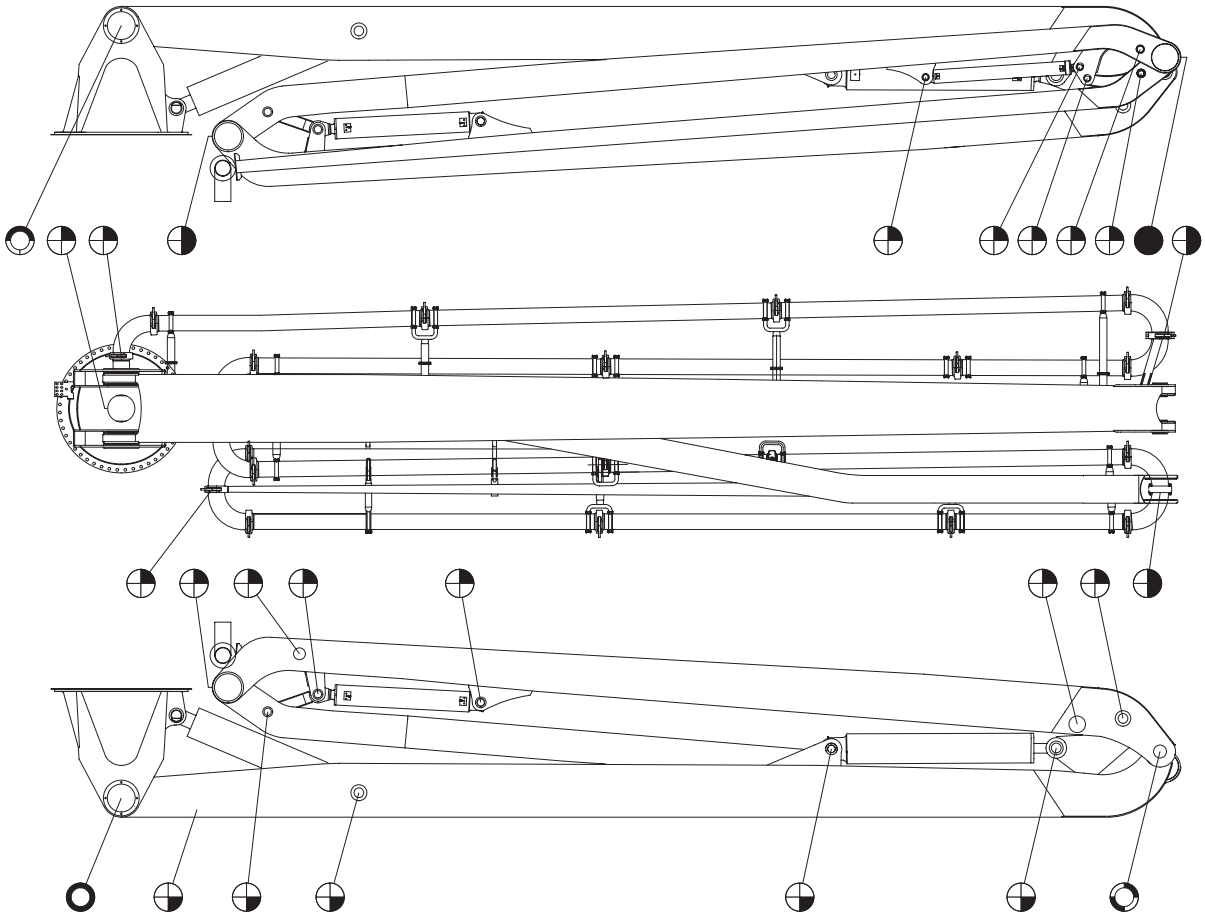
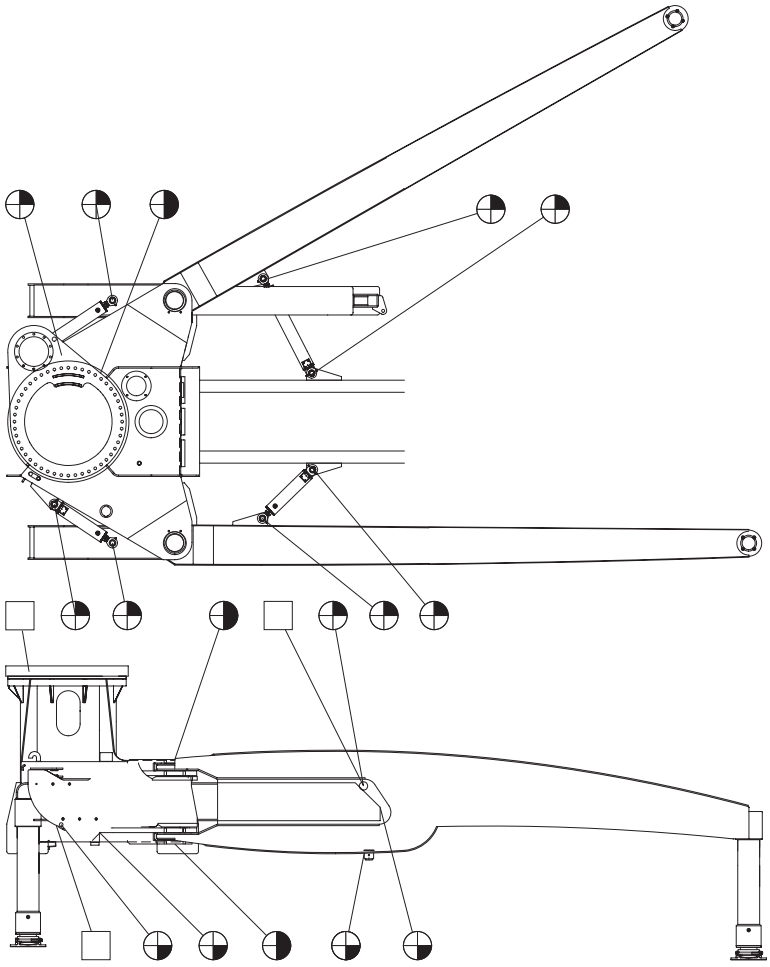


Fig. 9.3 Grease points overview



= 1 Schmiernippel

= 2 Schmiernippel

= 2 Schmiernippel, gegenüberliegend

= 2+2 Schmiernippel, gegenüberliegend

= 2 Schmiernippel auf der Innenseite

= 2 Schmiernippel auf der Innenseite, gegenüberliegend

= 2+2 Schmiernippel auf der Innenseite, gegenüberliegend

= Flächenschmierung

Fig. 9.3 Grease points overview Boom control block

9.5.5 Reference tables for hydraulic oils, greases and gear oils

Lubricants suitable for the truck-mounted concrete pump are listed in table below. **WAITZINGER** Takes no responsibility for the quality of the lubricants that are listed, nor for variations in their quality.

CAUTION

CAUTION:

☞ **Hydraulic oils with different characteristics – biologically degradable / mineral-based hydraulic oils – must on no account be mixed!**

☞ **Engine oil data can be found in the separate user manual issued by the vehicle manufacturer.**

Manufacturer	Standard » HLP 46 «	Tropic » HLP 100 «
AGIP	Arnica 46 L-HV/46	Blasia S 220
ARAL	Vitam CF 46	Vitam CF 100
BP	Energol HLP 46	Energol HL P10
ELF	Olna 46	Olna 100
ESSO	Nuto H 46	Nuto H 100
FANAL	Salvo MWS 46	Salvo MWS 100
FUCHS	Renolin B 15	Renolin B 30
MOBIL	DTE 25	DTE 27
SHELL	Tellus Öl 46	Tellus Öl 100

Fig. 9.4 Hydraulic oils reference table

The automatic lubrication system can convey greases only up to NLGI class 2 or mineral oils which have at least 40 mm^2/s (cST) at 40 °C.
IMPORTANT: When handling greases be scrupulous about cleanliness. Contaminants remain in suspension in the grease, they do not settle out. They can lead to blockages in the delivery pipes, causing damage to bearings.

	Manufacturer	Designation	Type of saponification	Min. conveying temperature
Conventional greases	AGIP	F1 Grease 24	Ca	–
	ARAL	Mehrzweckfett ZS 1/2	Ca/Li	-20 °C
	AUTOL	Top 2000	Ca	-10 °C
		Top 8000 W	Ca	-20 °C
	BP	Abschmierfett	Ca	–
		C1 Abschmierfett	Ca	-20 °C
	CASTROL	CLS - Grease	Ca/Li	–
	ESSO	Cazar K2	Ca	–
		High pressure grease	Ca	–
	FIAT LUBRIFICANTI	Comar 2	Li	-25 °C
	FINA	Ceran LT	Ca	-20 °C
		Ceran WR2	Ca	–
	FUCHS	FN 745	Ca	-25 °C
		Renocal FN3	Ca	-20 °C
		Renolit HLT 2	Li	-25 °C
	KLÜBER	Centoplex 2 EP	Li	–
	MOBIL	Mobilgrease	Li	-30 °C
	MOLYKOTE	TTF 52	inorg. thinner	-30 °C
	OPTIMOL	Longtime PD 2	Li	-20 °C
		OLIT CLS	Li/Ca	-15 °C
	SHELL	Retinax C	Ca	–
	WESTFALEN	Gresalit ZSA 2	Li	-15 °C
	ZELLER & GMELIN	ZG 450	Li	–
		ZG 736	Li	–
Biologically degradable greases	ARAL	BAB EP 2	Li/Ca	–
	AUTOL	Top 2000 Bio	Ca	-25 °C
	AVIA	Biogrease 1	Li	bis 0 °C
	DEA	Dolon E 2	Li	-15 °C
	FUCHS	Plantogel S2	Li/Ca	–
	KLÜBER	Klüberbio M32 - 82	Ca	-20 °C

Fig. 9.5 Greases reference table

As-sembly	Transfer gearbox / Slewing gearbox														Lubrication system											
Type of lubricanr	Mineral									Synthetic					Low-viscosity grease			Roller bearing							
	ÖI – CLP DIN 51517									ÖI – PGLP DIN 51502					Low-viscosity grease			Grease							
Kinematic viscosity in cSt at 40 °C	460			320			220 (standard)		100	460			220		100	–		–	(standard)			–			–	
Ambient temperature in °C	+5	–	+46	0	–	+40	-5	–	+35	-15	–	+25	-15	–	+100	-25	–	+80	-35	–	+60	-20	–	+50	-30	–	+60
ARAL	Degol BG 460			Degol BG 320			Degol BG 220			Degol BG 100			–			Degol GS 460			Degol GS 220			–			Aralub FDP 00			–			Multi-purpose grease Aralub I IL 2		
BP	Energol GR-XP 460			Energol GR-XP 320			Energol GR-XP 220			Energol GR-XP 100			Bartran HV 15			Energol SG-XP 460			Energol SG-XP 220			–			Energrease HT 00-EP			Energrease FG 00-EP			Energrease GSF			Multi-purpose grease L 2			Energrease LS 2			–		
CALYPSOL	UK-Ecubsol Öl 8140			UK-Ecubsol Öl 8060			UK-Ecubsol Öl 8050			UK-Ecubsol Öl 8030			–			UK-Ecubsynth Öl PG 460			UK-Ecubsynth Öl PG 220			–			Calypsol D 6024			Calypsol D 8024			–			Calypsol H 441			Multi-purpose grease Calypsol 20			Calypsol H 729		
CASTROL	Alpha SP 460			Alpha SP 320			Alpha SP 220			Alpha SP 100			Alphasyn T 15			Alphasyn T 460			Alphasyn T 220			–			CLS-Grease			–			CLS-Grease			Spheeröl AP 2			–			LZV-EP		
CHEVRON	NL-Gear Compound 460			NL-Gear Compound 320			NL-Gear Compound 220			NL-Gear Compound 100			Mechanism LPS 15			–			–			–			Dura-Lith. EP Grase 00			–			–			Dura-Lith. EP Grase 2			–			–		
DEA	Falcon CLP 460			Falcon CLP 320			Falcon CLP 220			Falcon CLP 150			Astron Z HLP 15			Polydea CLP 460			Polydea CLP 220			–			Glissando 283 EP 00			Orona DR 00			–			Glissando R EP 2			Glissando 20			–		
ESSO	Spartan EP 460			Spartan EP 320			Spartan EP 220			Spartan EP 100			Univis N 15			–			Circulation oil S 220			Circulation oil EZL 502			Fibrax EP 370			Fibrax 370			Low-viscosity grease S 420			Beacon 2			Unirex N 2			–		
KLÜBER	Klüberoil GEM 1-460			Klüberoil GEM 1-320			Klüberoil GEM 1-220			Klüberoil GEM 1-100			Isoflex MT 30 ROT			Klübersynth GH 6-460			Klübersynth GH 6-220			Klübersynth GH 6-100			Microlube GB 00			–			Klübersynth GE 46-1200			Centoplex 2 EP			Centoplex			Isoflex Topas NCA 52		
MOBIL	Mobilgear 634			Mobilgear 632			Mobilgear 630			Mobilgear 627			Mobil DTE 11			Mobil Glygoyle 80			Mobil Glygoyle 30			Mobil Glygoyle 11			Gargoyle Fett 1200 W			–			–			Mobilgrease MP			Mobilux 2			Mobiltemp SHC 100		
SHELL	Shell Omala Öl 460			Shell Omala Öl 320			Shell Omala Öl 220			Shell Omala Öl 100			Shell Tellus Öl T 15			Shell Tivela Oil SD			Shell Tivela Oil WB			Shell Tivela Oil WA			Shell Spezial Gear box grease H			Shell Tivela Compound A			Shell Tivela Compound A			Shell Alvania Fett G 2			Shell Alvania Fett R 2			Aeroshell Grease 7		

Fig. 9.6 Gearbox oils reference table

9.6 Changing filters

9.6.1 General

DANGER:

☞ **Filters may be changed only when the engine is switched off and the hydraulic system is depressurised (accumulator pressure or hydraulic pressure generated by static pressure in the conveying pipework).**

☞ **The distributor boom must be stowed for transport or propped.**

- Changing a filer always involves some loss of hydraulic oil. Therefore be sure always to have a container or oil barrel to hand.
- Filters should be changed in a short a time as possible, so that there is the least opportunity for contamination to enter the hydraulic system. Therefore before starting work have the replacement filter element, O-rings, lint-free wipe cloths and petrol for washing down ready to hand.
- After changing the filter, always check the oil level and top up with oil as necessary.

NOTE:

Do not let hydraulic oil drain into the ground, always use a sufficiently large bowl or container and dispose of it in accordance with the applicable regulations.

9.6.2 High-pressure filters for the boom and hydraulic pumps

If the red ring in the clogging indicator (Item 1, Fig. 9.7) is visible, the filter element must be changed:

1. Unscrew the filter casing (**2**) anti-clockwise.
2. Pull the filter element (**3**) downwards from the casing (**4**).
3. Clean the filter casing, replace the O-ring, and grease the thread and O-ring.
4. Fill the filter casing with clean oil.
5. Plug in the filter element.
6. Fit the filter casing and tighten it to approx. 150 Nm.

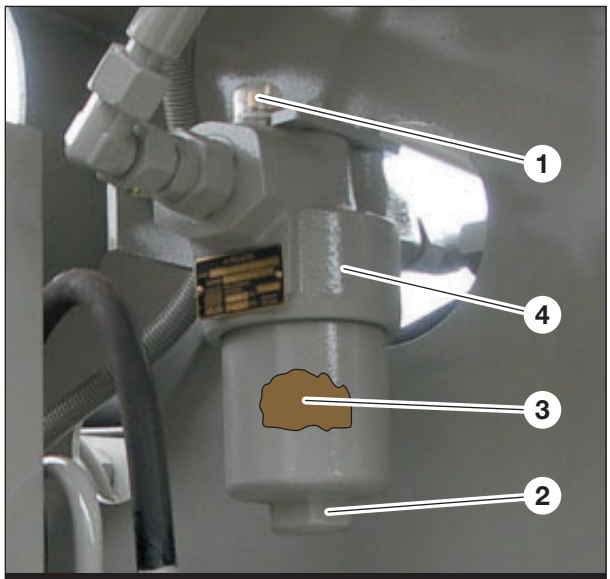


Fig. 9.7 Changing the high pressure filter

9.6.3 Return flow filter

If the clogging indicator (Item 1, Fig. 9.8) is in the red zone when the oil is at operating temperature, the filter element must be changed:

1. Have a suitable container ready for the oil filter element, and clean the outside of the filter casing.
2. Undo the 4 screws (**3**) and place the cover (**2**) on a clean surface.
3. Take out the filter element (**4**) with spring and dirt sleeve (**5**).
4. Twist the dirt sleeve anti-clockwise and pull it off, then thoroughly clean it and fit it to the new filter element.
5. Fit the new filter element into the return flow filter.
6. Fit the spring and cover, secure with 4 screws.
7. Check filter for leak-tightness.

NOTE: When changing the return-flow filter, always change the air filter (6) also!

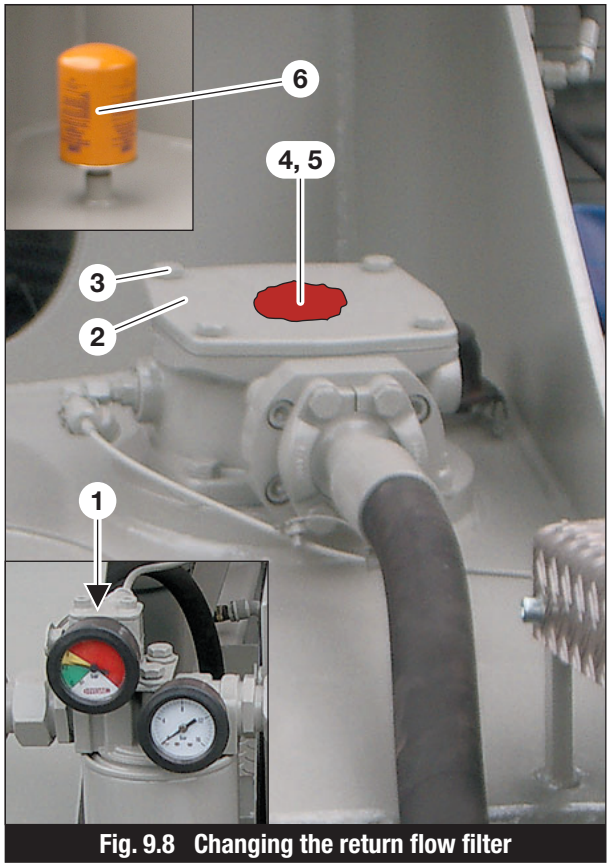


Fig. 9.8 Changing the return flow filter

9.6.4 In-line filter cartridge

If the manometer (Item 1, Fig. 9.9) shows a value in excess of 3 bar when the oil is at operating temperature, the filter element must be changed:

1. Turn the filter cartridge (**2**) anti-clockwise by hand to undo it, and dispose of it correctly.
2. Wet the sealing ring of the new filter cartridge with oil and screw it in clockwise by hand.
3. Check the in-line filter for leak-tightness.

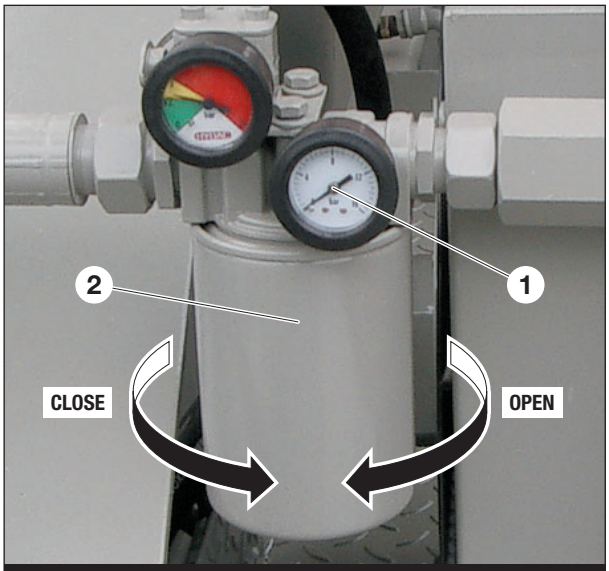


Fig. 9.9 Changing the in-line filter

9.7 Changing the oil

9.7.1 Changing the oil in the slewing gearbox

NOTE:
☞ **The slewing gearbox has only one oil circuit (oil circuit A).**
☞ **Use only gear oil as shown in the gear oil reference table Fig. 9.6.**

Use oil grades / alternative grades as shown in the gear oil reference table Fig. 9.6. Oil capacity 10 litres.

To change the oil in the slewing gearbox, proceed as follows:

1. Remove the breather screw (**1**) and fully remove the drain plug (**2**).
2. If the oil was very dirty, it is essential to fill the gearbox completely with flushing oil, and slew the distributor boom for several rotations. This ensures that any deposits of dirt in the gearbox are fully mixed into the oil; after this, repeat point 1.
3. Reinsert the drain plug.
4. Open the air bleed screw (**3**). Use a funnel to fill the gearbox with oil through the breather screw opening until the oil reaches level **A**.
5. Screw in the air bleed screw and the breather screw.

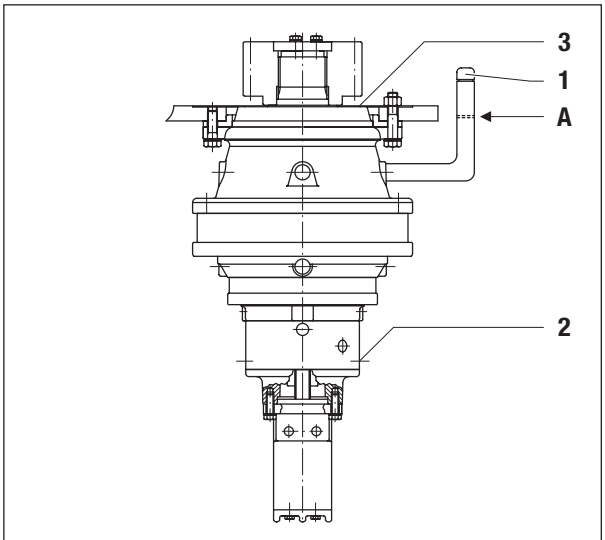


Fig. 9.10 Slewing gearbox

9.7.2 Changing the oil in the transfer shift gearbox

Use oil grades / alternative grades as shown in the gear oil reference table Fig. 9.6. Oil capacity 7.3 litres.

To change the oil in the transfer shift gearbox , proceed as follows:

1. Remove the oil level screw (**1**) and drain plug (**2**) and let the oil drain into a tray.
2. If the oil was very dirty, it is essential to fill the gearbox completely with flushing oil, and run the hydraulic system for a short period. This ensures that any deposits of dirt in the gearbox are fully mixed into the oil; after this, repeat point 1.
3. Reinsert the drain plug.
4. Use a funnel to fill the gearbox slowly with oil through the breather screw opening (**3**) until the oil comes out of the oil level screw hole.
5. Screw in the oil level screw.

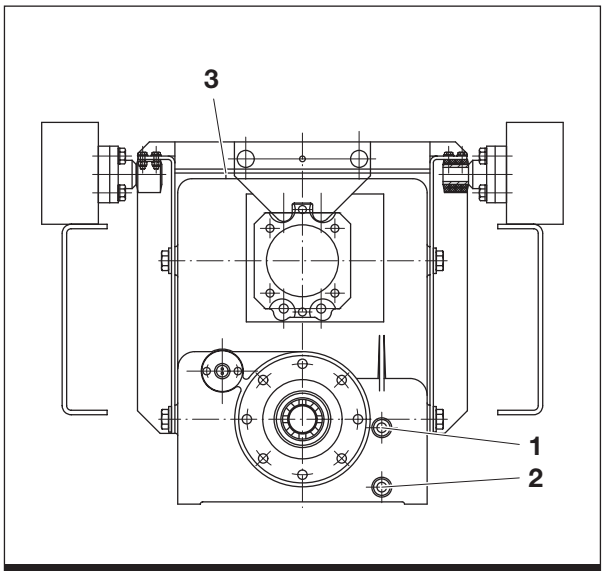


Fig. 9.11 Transfer shift gearbox

9.7.3 Changing the oil in the hydraulic system

Use oil grades / alternative grades as shown in the hydraulic oil reference table Fig. 9.4. Oil capacity 600 litres.

CAUTION

CAUTION:

Always refill with the same grade as was used previously. Before changing over to a biologically degradable oil the entire hydraulic system must be rendered totally oil-free. This procedure can only be performed by an authorised specialist company.

1. Remove the drain plug from the drain cock (Item 1, Fig. 9.12).
2. Connect a ∫" hose from the drain cock to the container.

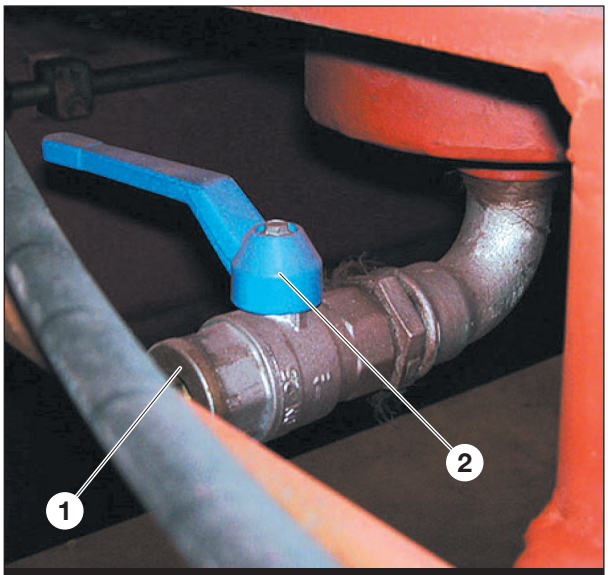


Fig. 9.12 Oil drain pipe

3. Open the filler neck cap (Item 3, Fig. 9.13).

4. Open the ball valve (Item. 2, Fig. 9.12) and allow oil to drain into the container.

5. If the old oil is very dirty or has significant water content, flush the oil tank with suitable flushing oil.

6. Close the ball valve (Item 2, Fig. 9.12) and watch the oil emerging from the drain hole.

7. Pour hydraulic oil into the hydraulic tank through the return flow filter element, or pump it in using a pump with a fine filter.

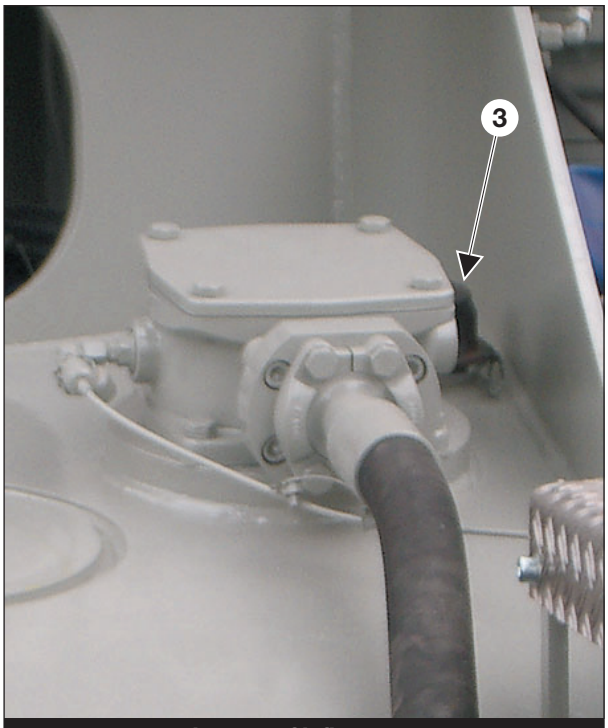


Fig. 9.13 Oil filter neck

CAUTION

CAUTION:
Never pour hydraulic oil into the tank directly from the barrel without filtration!

8. Keep feeding hydraulic oil until the maximum oil level of 2 cm below the upper edge of the sight glass.

9. Close the filler neck cap (Item 3, Fig. 9.13) or the return flow filter.

10. Perform a trial run to check for leak-tightness.

NOTE:
Before operating the hydraulics, first run the system at idling for 15 minutes.

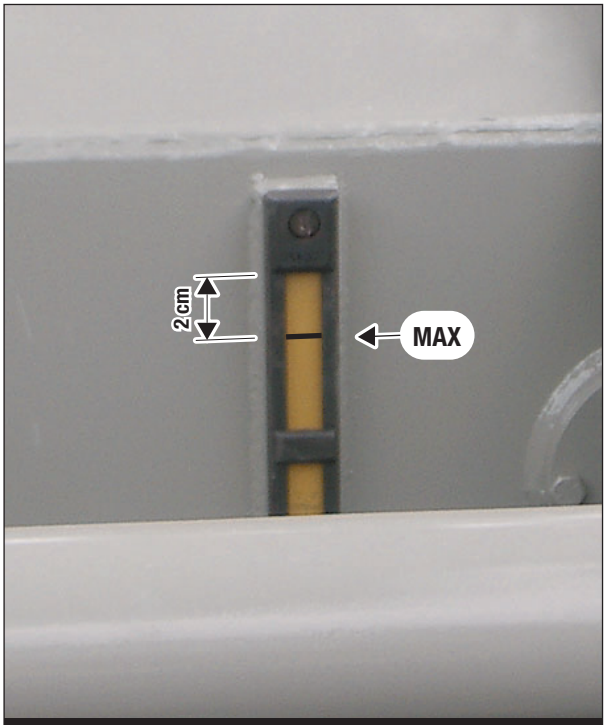


Fig. 9.14 Hydraulic oil tank sight glass

9.8 Performing tests

9.8.1 Measuring the wall thickness of the conveying pipework

DANGER

DANGER:

☞ **Only knock the conveying pipes apart and open them when they have been depressurised.**

☞ **Always pump backwards 1-2 piston strokes.**

- Check the wear condition of the conveying pipework by knocking it, or better by using a wall thickness gauge. Replace worn parts.
- The wall thickness can also be measured using a special wall thickness gauge.

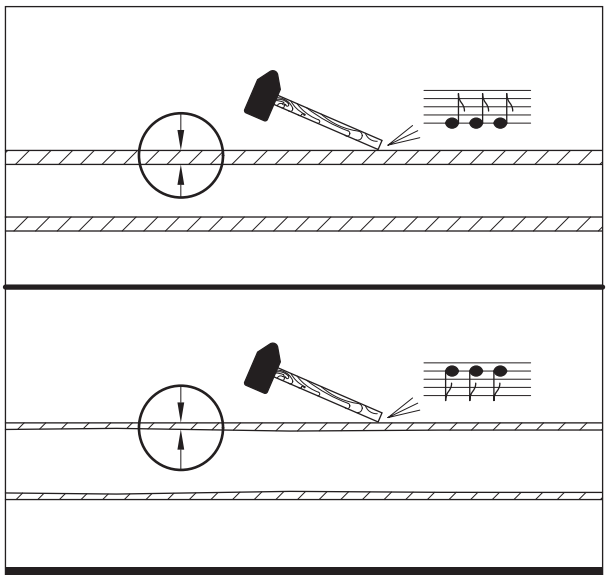


Fig. 9.15 Measuring the wall thickness of the conveying pipework

9.8.2 Minimum wall thicknesses and conveying pipework operating pressures

Always comply with the maximum pipe weight of the conveying pipework.
Unless stated otherwise on the serial plate:
Pipe 12.8 kg/m
Elbows
Y = Concrete pressure in bar
X = Minimum wall thickness in mm to DIN 2413 part 3
DN = Nominal diameter
Conveying pipework designation: Standard size
Maximum pressure
Code

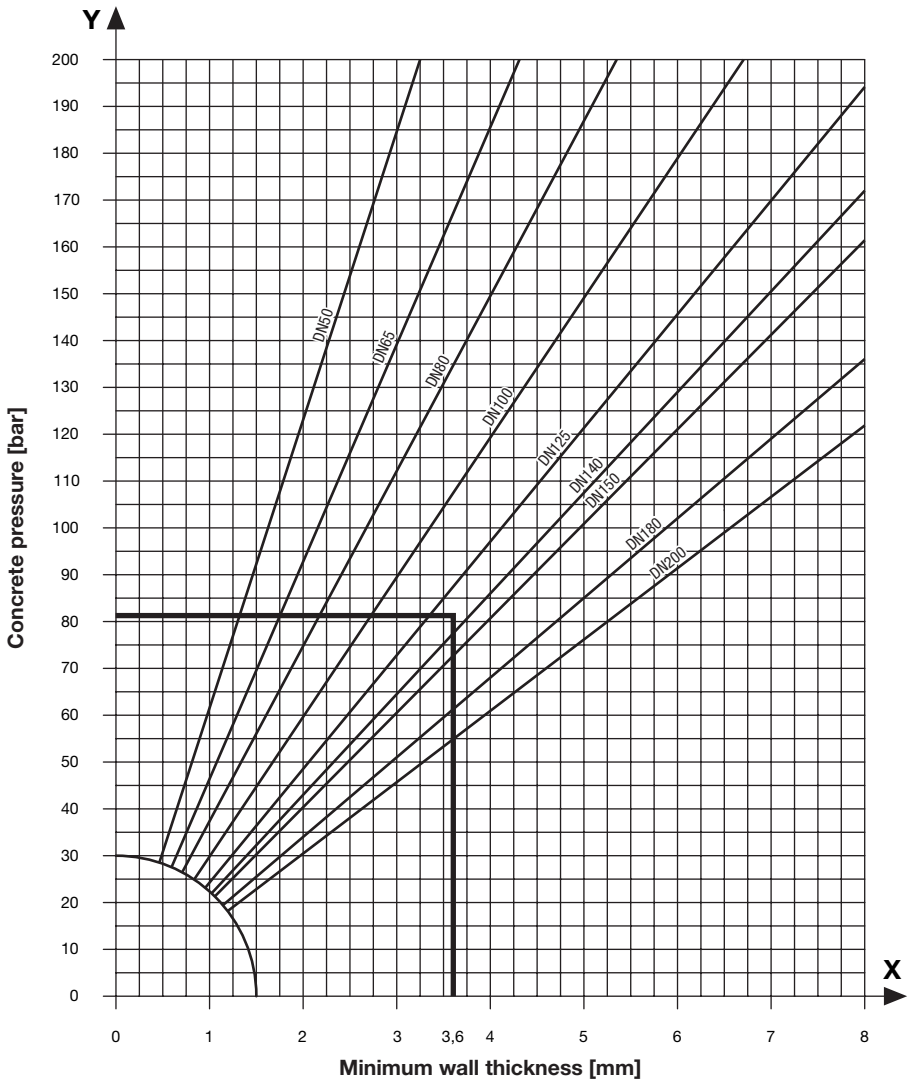


Fig. 9.16 Minimum wall thickness diagram

9.8.3 Adjusting the S-valve

Perform the following steps to adjust the S-valve:

1. Remove the locking plate (**1**) from the swing lever.
2. Tighten the screw (**2**) to approx. 100 Nm, then back off by 30%.
3. Refit the locking plate.
4. Perform a trial run of the concrete pump.

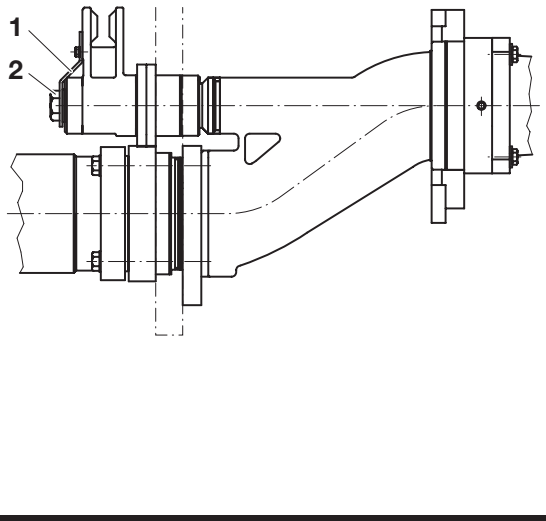


Fig. 9.17 Adjusting the S-valve

9.8.4 Checking the chain tension on the outrigger feet

When the chain tension is correctly set, the chin should sag no more than 30 mm. If the chain tension reduces, it must be tightened.

To do this, proceed as follows:

- Use the adjustment nut (**1**) to tighten the chain until the correct sag of 30 mm is achieved.

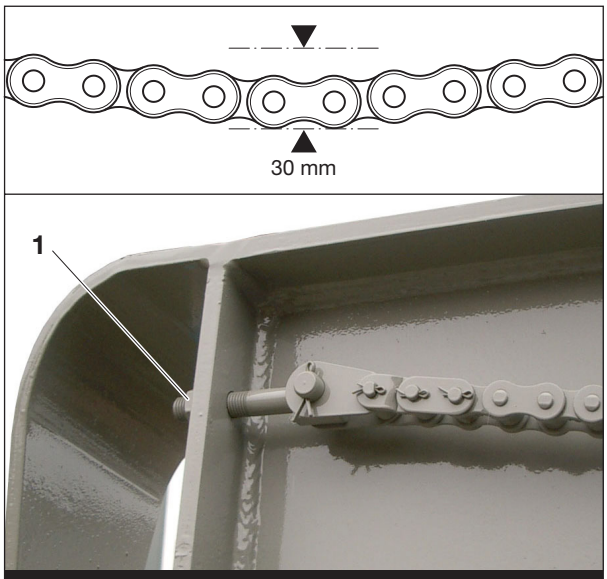


Fig. 9.18 Checking the chain tension

9.8.5 Checking the backlash in the slewing gearbox

The backlash is checked as follows:

1. Remove the pinion gear cover.
2. With the boom in the horizontal position, slew it slightly until a tooth is engaged without play.
3. Insert a feeler gauge to measure the engagement clearance as shown in the adjoining diagram.
4. If the backlash is excessive, the gearbox and the ball bearing slewing rim must be adjusted by a skilled fitter.

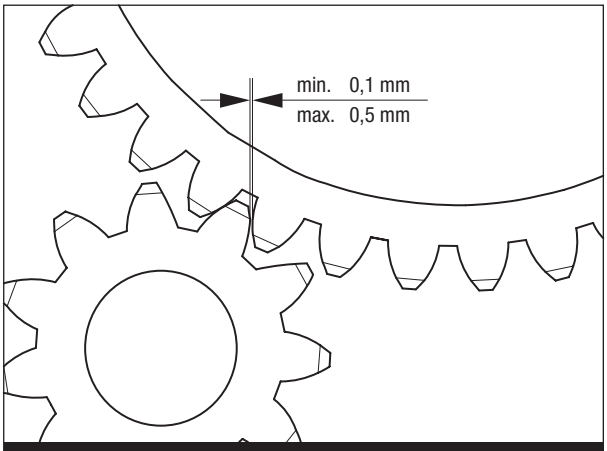


Fig. 9.19 Checking the backlash in the slewing gearbox

9.8.6 Checking the boom backlash (ball bearing slewing rim in the slewing gearbox)

Boom backlash means the increased play between outer ring and inner ring of the ball bearing slewing rim in the slewing gearbox.

- The calculation of boom backlash may only be performed by a specialist authorised workshop.

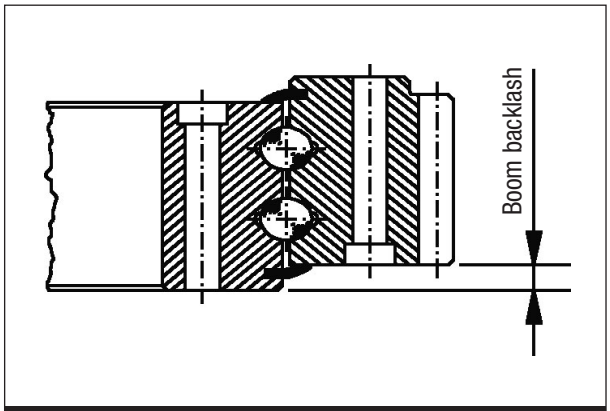


Fig. 9.20 Checking the boom backlash

- The measurement must be performed at 2 points (loaded side and unloaded side) as shown in the diagram alongside.

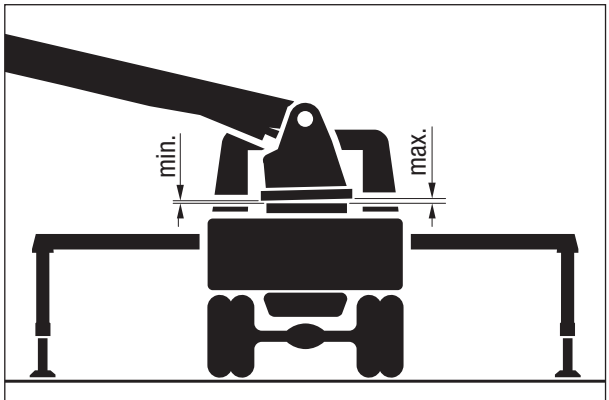


Fig. 9.21 Measurement points for checking the boom backlash

- The difference between the two values is the exact value for the measured backlash. This value must be entered in the boom test book every time the boom is tested. The maximum permissible value shown in the adjoining table must not be exceeded.

Rolling diameter [mm]	Ball diameter [mm]				
	20	22	25	30	40
1.000	1,8	1,9	1,9	2,0	2,5
1.250	1,9	2,0	2,0	2,1	2,6
1.500	2,0	2,1	2,1	2,2	2,7
1.750		2,2	2,2	2,3	2,8
2.000			2,3	2,4	2,9
2.250				2,5	3,0
2.500					3,1

Fig. 9.22 Maximum values for the boom backlash

9.8.7 Checking the operation of the sensors

The operation of the sensors is checked as follows:

There are two ways of checking the condition of the sensors.

1. Directly in the sensor or in its plug there are one or two LEDs.

One LED	Green =	Switch activated
Two LEDs	Green =	Power on
	Yellow =	Switch activated

2. On the 4-fold distributor there are

Two green LEDs	Power for the sensors
Each with a yellow LED	Switch activated

   Drive cylinder sensors: Move the drive cylinder (**1**) to the end of its travel to check the operation of the sensor (**2**).

   Oscillation cylinder sensors: Move the oscillation cylinder (**3**) to the end of its travel to check the operation of the sensor (**4**).

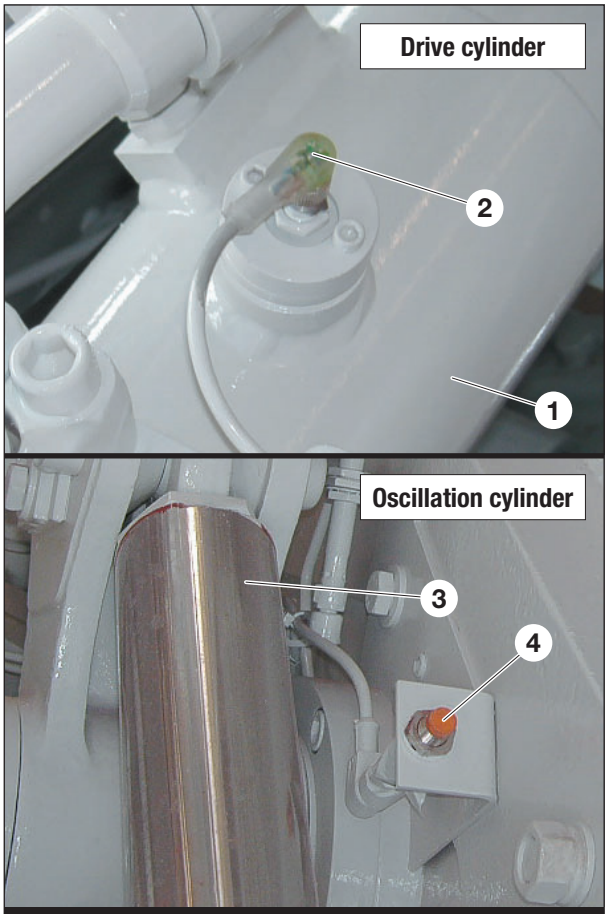


Fig. 9.23 Checking the operation of the sensors

9.9 Replacing worn parts

9.9.1 Exchanging the wear plate and wear ring

DANGER:
When working in the hopper and in the area of the oscillation cylinder, always switch the engine off and remove the ignition key.

1. Remove the locking plate (**1**) from the swing lever. Undo the screws (**2** and **3**) to relieve the load on the S-valve by 15 mm.
2. Exchange the free wear plate (**4**) by removing the first 2 screws (**6**) and tighten the screws.
3. Swing the S-valve over to the other side.
4. Remove the second wear plate by removing the other two screws (**6**).
5. Swing the S-valve back to the other side and exchange the wear ring (**5**).
6. Swing the S-valve on to the wear plate already fitted and fit the second wear plate.
7. Restore the S-valve pre-load by tightening the 4 screws (**3**).
8. Tighten the screw (**2**) by hand until the gap is closed. Back off the screw by at least 1/6 of a turn and refit the locking plate.

NOTE:
Tighten the screws (3 and 4) to the torque set out in the table in section 9.3.

9. Perform a trial run.

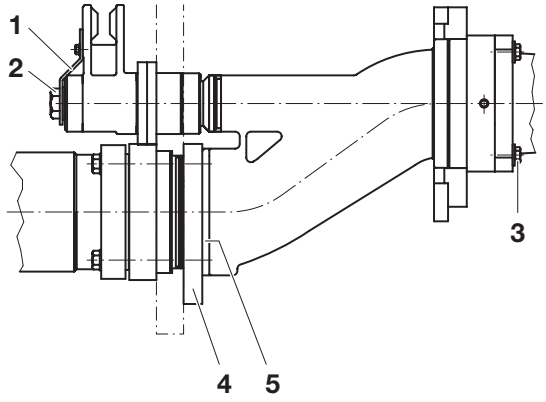


Fig. 9.24 Changing the wear plate and wear ring 1

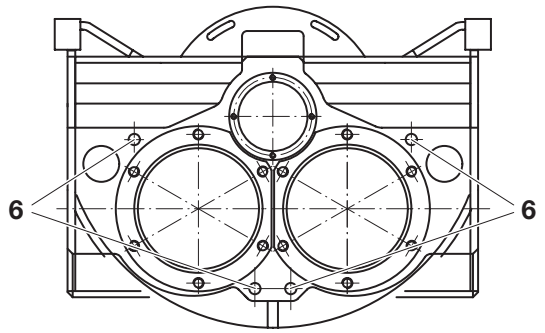


Fig. 9.25 Changing the wear plate and wear ring 2

9.9.2 Changing the conveying piston

- Turn a hardened conveying piston by 180° after 2 mm wear (4 mm on the diameter); turn a chromium plated conveying piston by 180° when the chromium plate layer is 30 µm.

DANGER

DANGER:

☞ **When working in the wash-out tank always switch off the engine and take out the ignition key.**

☞ **Never reach your hands into the wash-out tank when the engine is running.**

☞ **Always actuate the hydraulic cylinder by actually actuating the valves (see section 7.5.4.3) at a low engine speed and reduced stroke rate.**

1. Drain the water tank and remove the protective grill.
2. Actuate valves Y3 and Y4 to move one drive cylinder to the end of its travel.
3. Remove hose clip (**2**) and snap coupling (**4**).

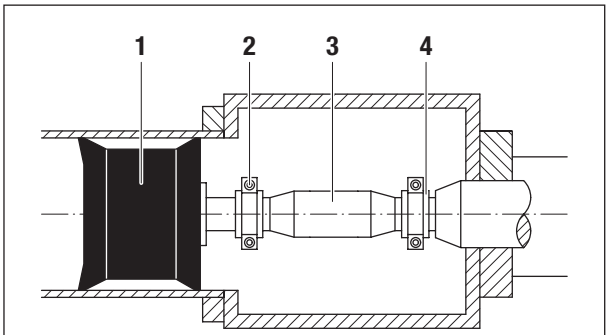


Fig. 9.26 Changing the conveying piston 1

4. Push the conveying piston (**1**) about 5 mm towards the conveying cylinder by levering with a pry bar, and remove the spacer (**3**).

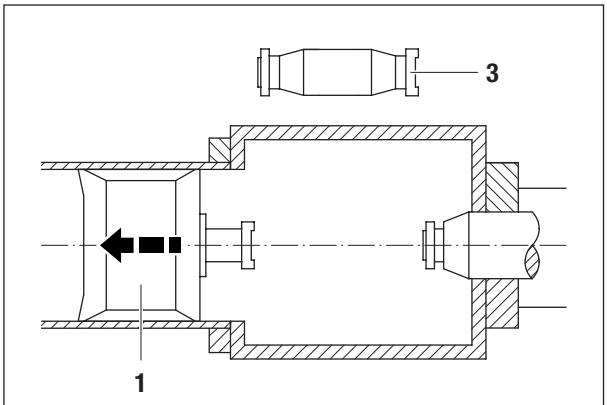


Fig. 9.27 Changing the conveying piston 2

5. Carefully move the drive cylinder out until it touches the flange. Fit a snap coupling (**4**).

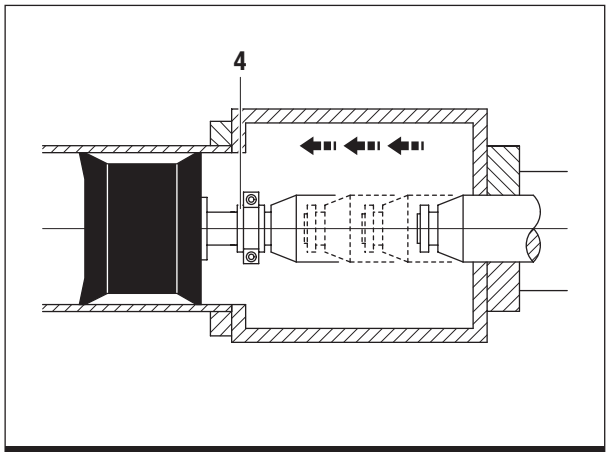


Fig. 9.28 Changing the conveying piston 3

6. Move the drive cylinder back in, and remove the snap coupling (**4**) and the conveying piston (**1**).

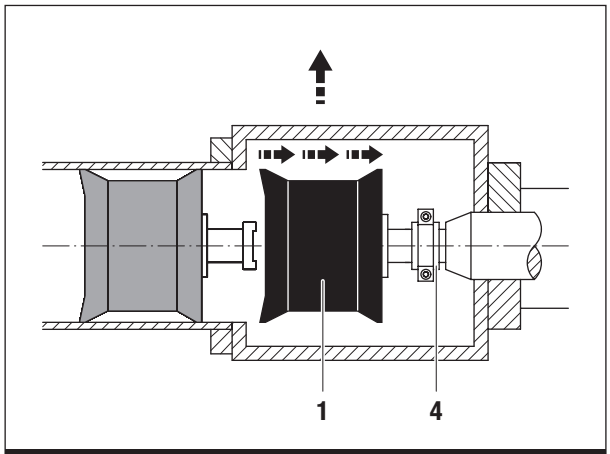


Fig. 9.29 Changing the conveying piston 4

7. Liberally lubricate the new conveying piston (**1**), attach a shell coupling (**4**) and fit it.

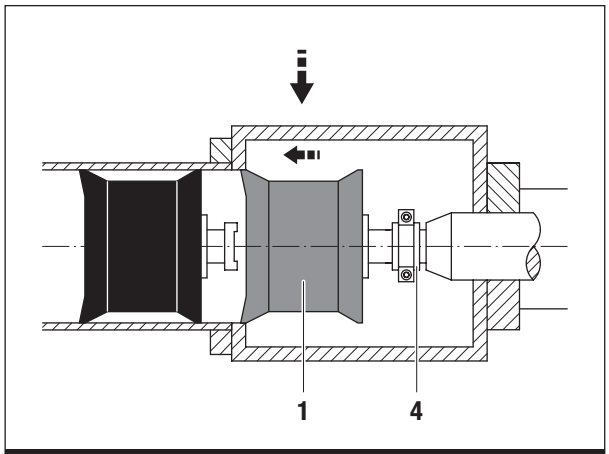


Fig. 9.30 Changing the conveying piston 5

8. Use the drive cylinder to move the conveying piston far enough for there to be room to fit the spacer (**3**).

9. Remove the snap coupling (**4**) and back off the drive cylinder to the end of its travel.

10. Fit the spacer (**3**) to the drive cylinder with the snap coupling (**4**).

11. Push the conveying piston (**1**) on to the spacer (**3**) by levering with a pry bar and fit the snap coupling (**4**).

12. Fit the hose clip (**2**).

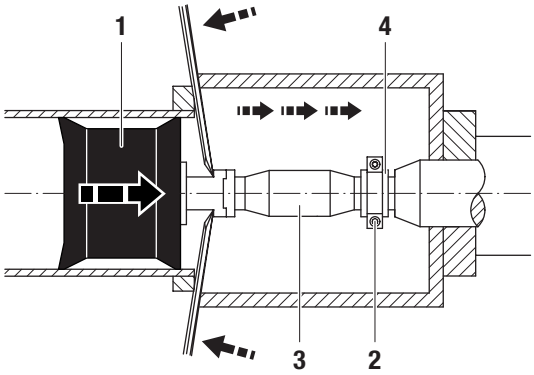


Fig. 9.31 Changing the conveying piston 6

9.9.3 Changing / turning the conveying cylinder

1. Remove the conveying cylinder as described in section 9.9.2.

2. Move both drive cylinders to the limit of their travel: Disconnect the oscillation pipe from a retracted drive cylinder and hang it over a container. Slowly move the drive cylinder to limit of its travel by actuating valves Y5 + Y6 manually.

3. Disconnect the shaft, support the wash-out tank.

4. Remove the 26 screws (**1**) and support the conveying cylinder, e.g. with a fork lift truck.

5. Lift the slide housing with a crane.

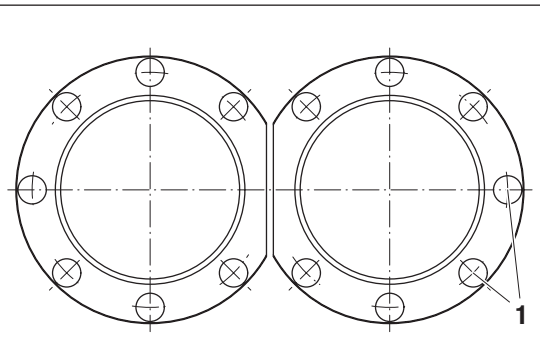


Fig. 9.32 Changing / turning the conveying cylinder

NOTE:
When lifting, take care that no hoses or cables are trapped!

6. Remove or turn the conveying cylinder.

NOTE:

To increase the working life of the conveying cylinders, these can be turned by 180°. Be sure to turn the conveying cylinders at the right tim.
If the wear has already passed the point of no return, the conveying cylinders must be replaced.

7. Refit the conveying cylinders in the reverse sequence to removal.
8. Fit the conveying pistons and oscillation pipe as described in section 9.9.2.
9. Manually activate valves Y3 and Y4 or the rocker switch (Item 11, Fig. 5.2) to slowly extend the right hand drive cylinder.
10. Bleed air from the drive cylinder.
11. Perform a trial run.

9.9.4 Changing the agitator blades

1. Remove the screws (**2**).
2. Change the agitator blades (**1**). Check that the seating faces are clean. The right hand agitator blades must be 90° out of phase with the left hand blades.
3. Fit the screws (**2**) and tighten them to the torque set out in the table in section 9.3. Always replace these screws.

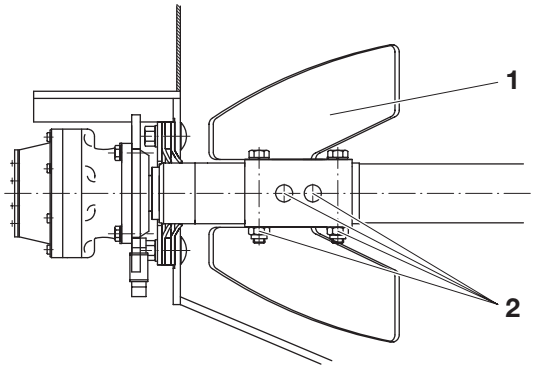


Fig. 9.33 Changing the agitator blades

9.9.5 Changing the agitator seals

1. Remove the agitator blades.
2. Pull the right hand motor (**4**) out approx. 10 mm and put the agitator shaft (**3**) to one side.
3. Remove the retaining ring (**5**), pull the left and right hand motors (**4**) out and put them to one side. Take care not to kink the hydraulic hoses.
4. Remove the screws (**6**) and take out the spacer plates with the seals (**7**).
5. Exchange the seals (**7**) and refit them. The gap between the seals must be completely filled with grease.
6. Reassemble the motors (**4**) and shafts (**3**) together with the agitator blades in the reverse sequence to removal (see Fig. 9.24).

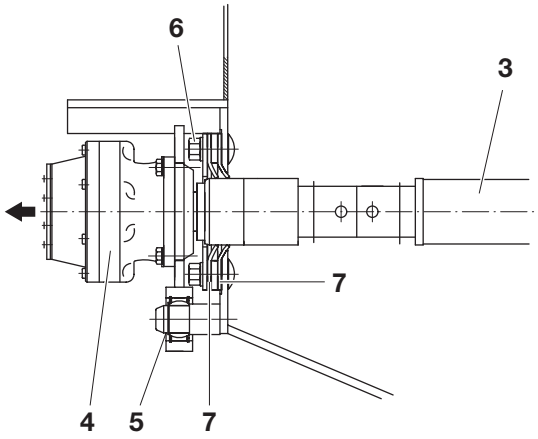


Fig. 9.34 Changing the agitator seals

9.9.6 Changing the agitator wear sleeves

1. Remove the motors (Item 4, Fig. 9.34) and put them in a safe place.
2. Knock the securing pin (**8**) fully inwards, remove the washer (**9**) and unscrew the nut (**10**).
3. Lever out the shaft (**11**) using pry bars.
4. Split the wear sleeves (**12**) off the shaft (**11**) and remove them.
5. Clean the shaft and evenly spread it with Loctite. Warm the new wear sleeves up to 200 °C and quickly slide them into place.
6. Refit the agitators in the reverse sequence to removal. A new hole must be drilled for the securing pin (**8**).

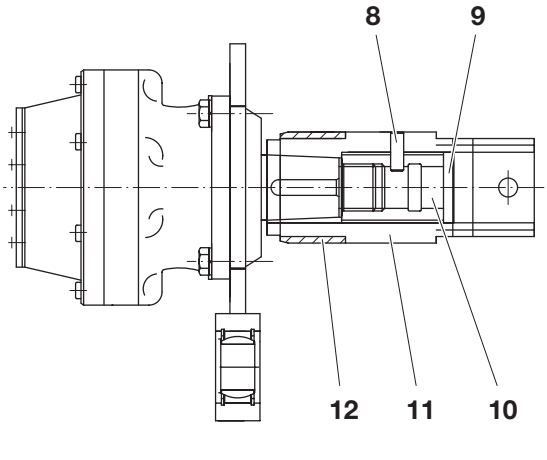


Fig. 9.35 Changing the agitator wear sleeves

9.10 Changing the conveying pipework

CAUTION

CAUTION:

The maximum weight of the conveying pipework and the conveying elbows on the boom, and the maximum pressure of 85 bar in the conveying pipework must be observed!

When the distributor boom is in the stowed position for transport it is not under stress; elements can thus easily be exchanged when it is in this configuration. If conveying pipes are replaced when the distributor boom is deployed, stresses may be introduced during assembly.

CAUTION

CAUTION:

A distance of 3 mm must be maintained between the flanges!

- Arrange the “Matching pipe lengths / Conveying pipes” as shown in the safety notice in Figure 2.16.

9.11 Crack-checking on the steelwork

CAUTION

CAUTION:

☞ **Cracks on the distributor boom, on the boom mounting and the outriggers must be rectified immediately they are noticed! To do this, request the WAITZINGER repair guide without delay!**

☞ **Repairs must only be performed by an authorised specialist company!**

- For crack checking the machine must be clean. Excess grease on the joints must be removed.
- Patches of rust and cracks in the paintwork can indicate underlying structural cracks.
- If there is doubt, have the steelwork checked by an authorised skilled operator using the “Dye penetrant crack detection method”.

9.12 Checking the hoses

DANGER:
If a hose splits suddenly under pressure, personnel can be seriously injured!
WAITZINGER takes no responsibility for damages that result from the use of worn or defective components.

Regular checking of hoses is part of the technical safety checks to be performed on the machine.

Do not repair damaged hydraulic or conveying pipes; instead replace them immediately. Damaged or weeping hydraulic hoses must also be replaced immediately.

All hydraulic hoses must be renewed after a life of 6 years (including a shelf life of 2 years), even if they exhibit no evident damage. The period of time can be calculated from the identification mark on the connection fitting (date of manufacture of the hose).

9.13 Cleaning the machine

- If the truck-mounted concrete pump is to be moved to another location for cleaning, move all parts of the machine to their transport positions.
- The truck-mounted concrete pump must not be driven with the distributor boom deployed or the outriggers extended, even for short distances.

DANGER:
☞ **No highly flammable materials (e.g. petrol) may be used for cleaning!**
☞ **Never direct a water jet or steam jet towards electrical components, this can occasion a flashover with fatal consequences!**

- Protect electrical components by covering them or sealing them shut to prevent ingress of water. After completion of cleaning, remove the covers and seals, leaving no residues.
- Never use seawater or other saline water for cleaning.
- Never use compressed air for cleaning.

- After completion of cleaning, check all pipework for leaktightness and loose connections, and check the machine for chafing points.
- Check all components for any sort of damage. If faults are found, rectify them immediately.
- If there is a risk of frost, completely drain the conveyor pipework, water tank and water pump. Leave all water drain points open.

9.14 Disposal of the machine

NOTE:
Observe national and regional legislative regulations and guidelines when disposing of the machine.

10. Repair work

WARNING:

- ☞ **Repair work must only be performed by trained personnel or service personnel who have been authorised by WAITZINGER!**
- ☞ **The user is not permitted to carry out repair work on his own account. Any work on the machine in breach of this provision will render the warranty void and relieve the manufacturer of all liability!**

WARNING:

- ☞ **Only skilled specialists or trained personnel may perform repair work on electrical systems!**
- ☞ **Before carrying out electrical repair work the system must be electrically de-energised and this state must be secured for the duration of the work!**
  The VDE regulations and the VBG 4 regulations must be complied with!
- ☞ **When fitting fuses, fit only fuses of the same type and rating as were originally fitted!**
- ☞ **It is absolutely prohibited to repair fuses!**

11. List of operators of the equipment

- Each operator of the equipment confirms here by his signature that he has received, read and understood this user manual.
- He agrees to comply with all instructions conscientiously.
- If he does not do so, the manufacturer's warranty will become void.

Operator name	Accepted on	Operator signature

Make further copies if required

Operator name	Accepted on	Operator signature

12. Maintenance and modifications list

- Each operator should enter here in a clear manner all maintenance and modification work performed and present the list to the supervisor for confirmatory signature.
- This maintenance and modifications list should be made available on request to the “Employers’ Liability Insurance Association” or the “TÜV” properly filled in and signed.

Maintenance on	Modification on	Date	Operator signature	Confirmed by person responsible

Make further copies if required

Maintenance on	Modification on	Date	Operator signature	Confirmed by person responsible

Make further copies if required

Maintenance on	Modification on	Date	Operator signature	Confirmed by person responsible

NOTES

NOTES

Concept + Layout: G & S - DOKUMENTATION • 85521 Ottobrunn

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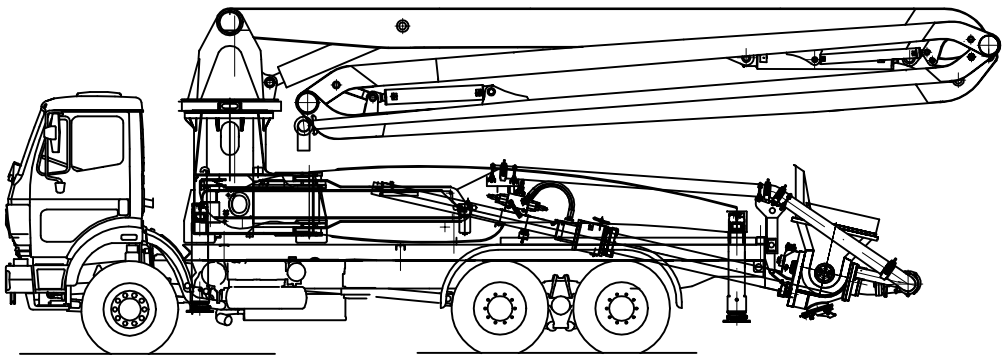
Baumaschinen GmbH

Ersatzteilliste
spare part list



42 R 4 XXT
Masch.-Nr. 205245

25.10.2005

Übersicht B 00 - B 09

over view B 00 - B 09

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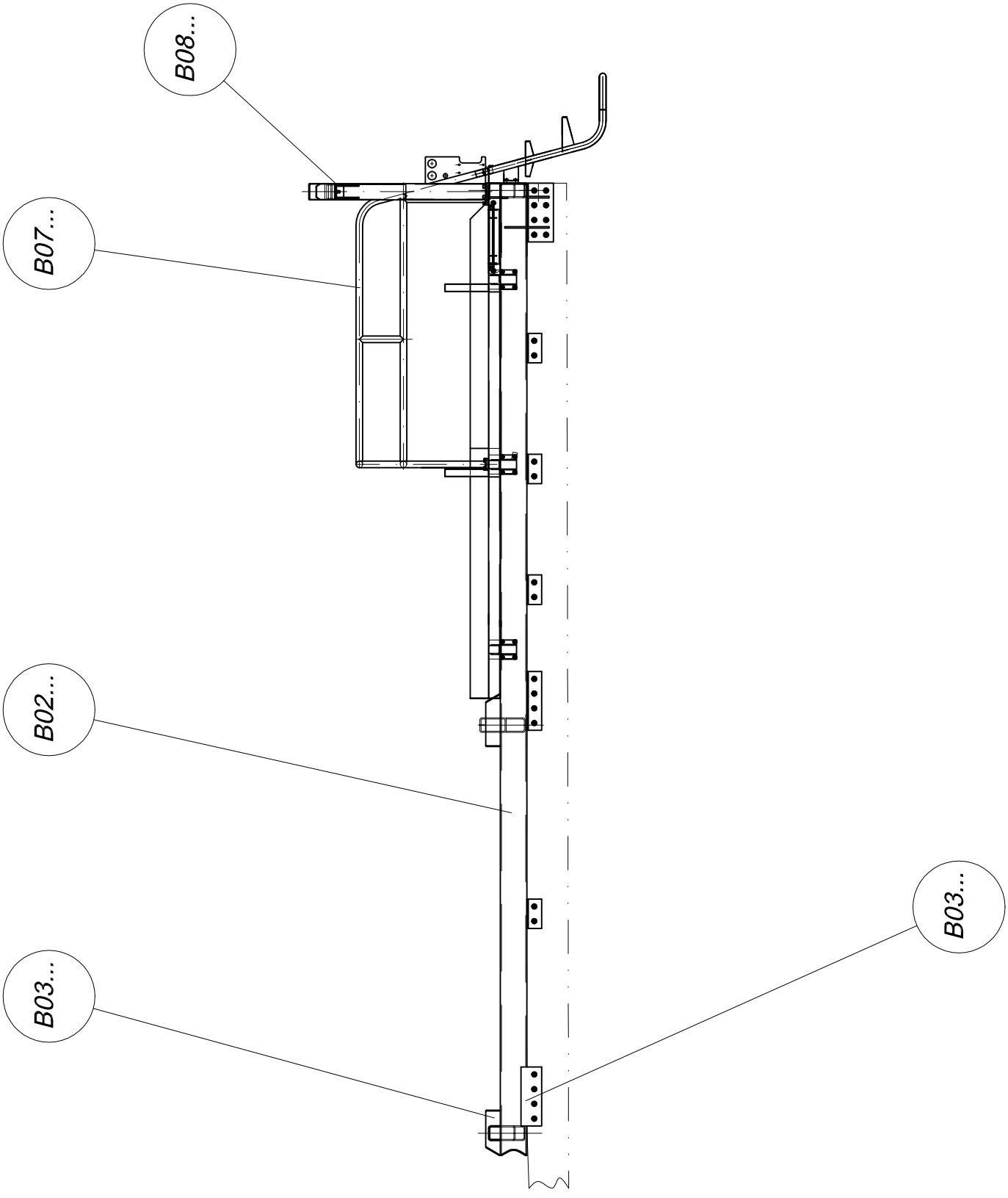

22.07.2002

Mastbockverbindung kpl.

boom base connection cpl.

B 03 2 056a

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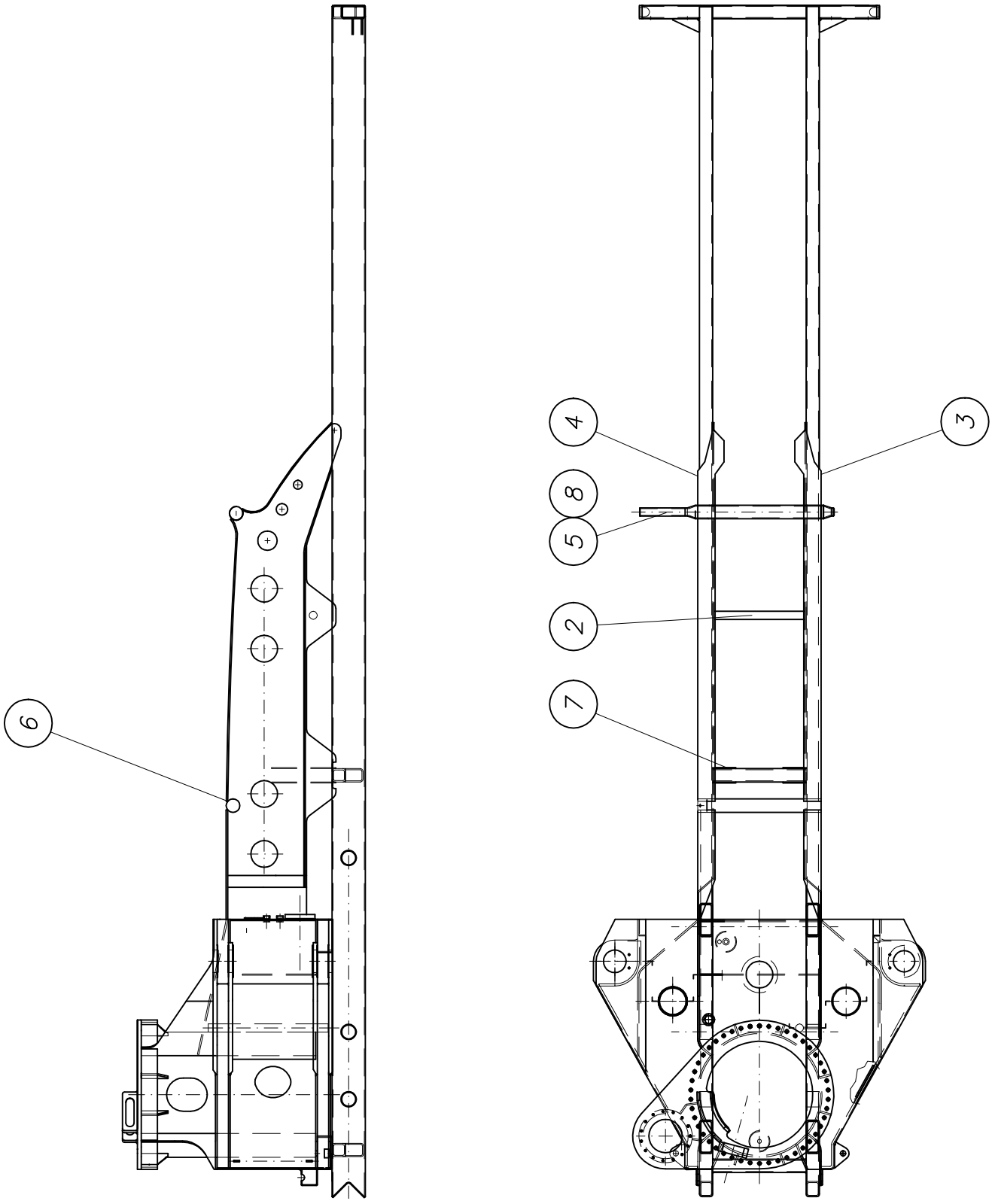

PARTS LIST

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B032056	boom connection cpl. 42R4XXT	03.08.04 HF	a	07.07.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
2	pipe	B032031 4xd60,3x683	2448 S355J2G3		3,80	1,00 Stk
3	connection for boom own parts list	B032035			174,00	1,00 Stk
4	connection for boom own parts list	B032040			174,00	1,00 Stk
5	pipe (welding group) own parts list	B033161			20,00	1,00 Stk
6	pipe	B039009 Rohr 101.6x5.6x	2448 S355J2G3	b 02.08.04	12,20	1,00 Stk
7	rib	B039036 Bl 10x172x435	1543 S355J2G3		3,08	4,00 Stk
8	pipe	B039042 Rohr 60.3x4x336	2448 S355J2G3		2,00	0,00 Stk

Übersicht B 10 - B 29

over view B 10 - B 29

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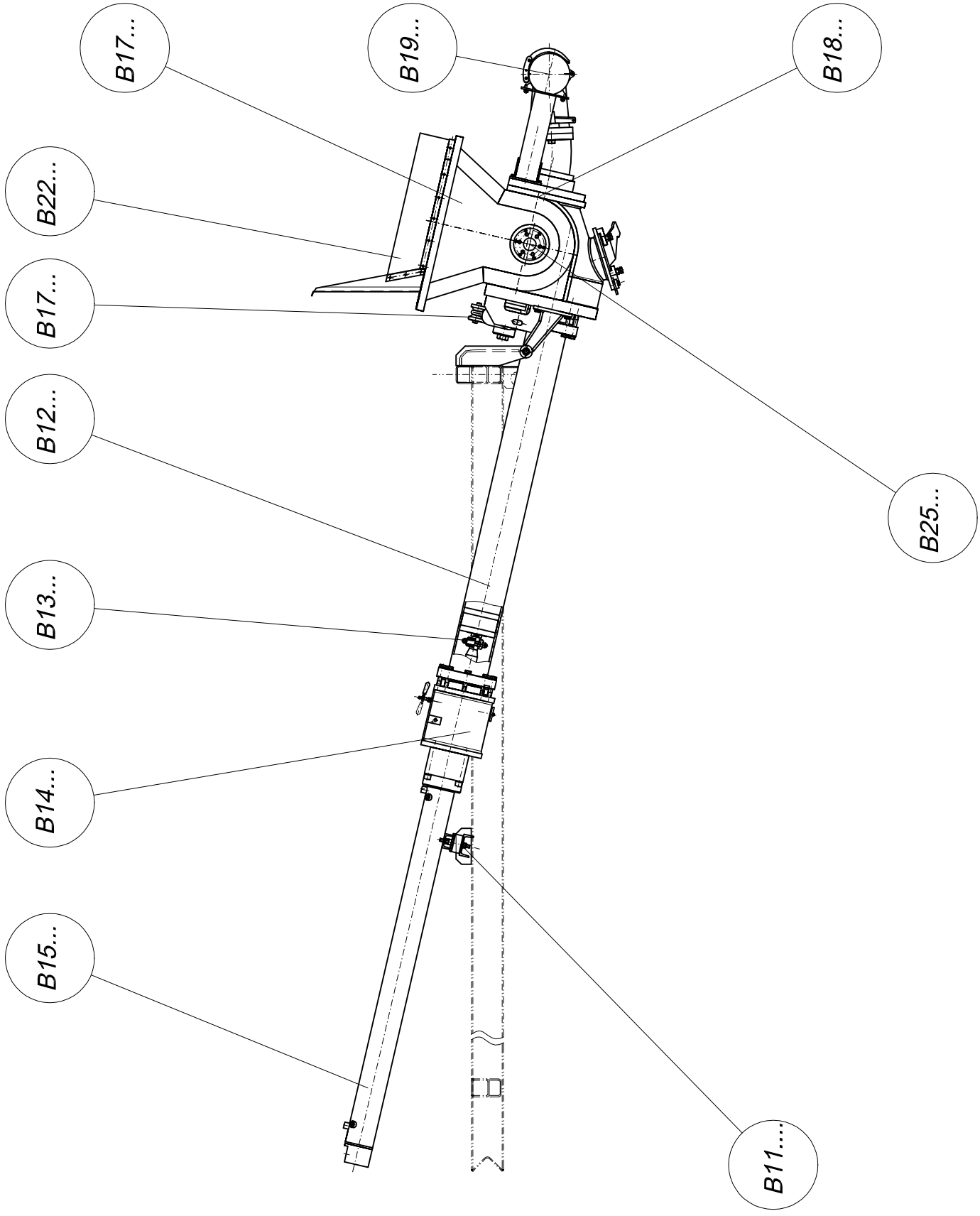
Baumaschinen GmbH



22.07.2002

Pumpenlagerung kpl.

pump support cpl.

B 11 5 005

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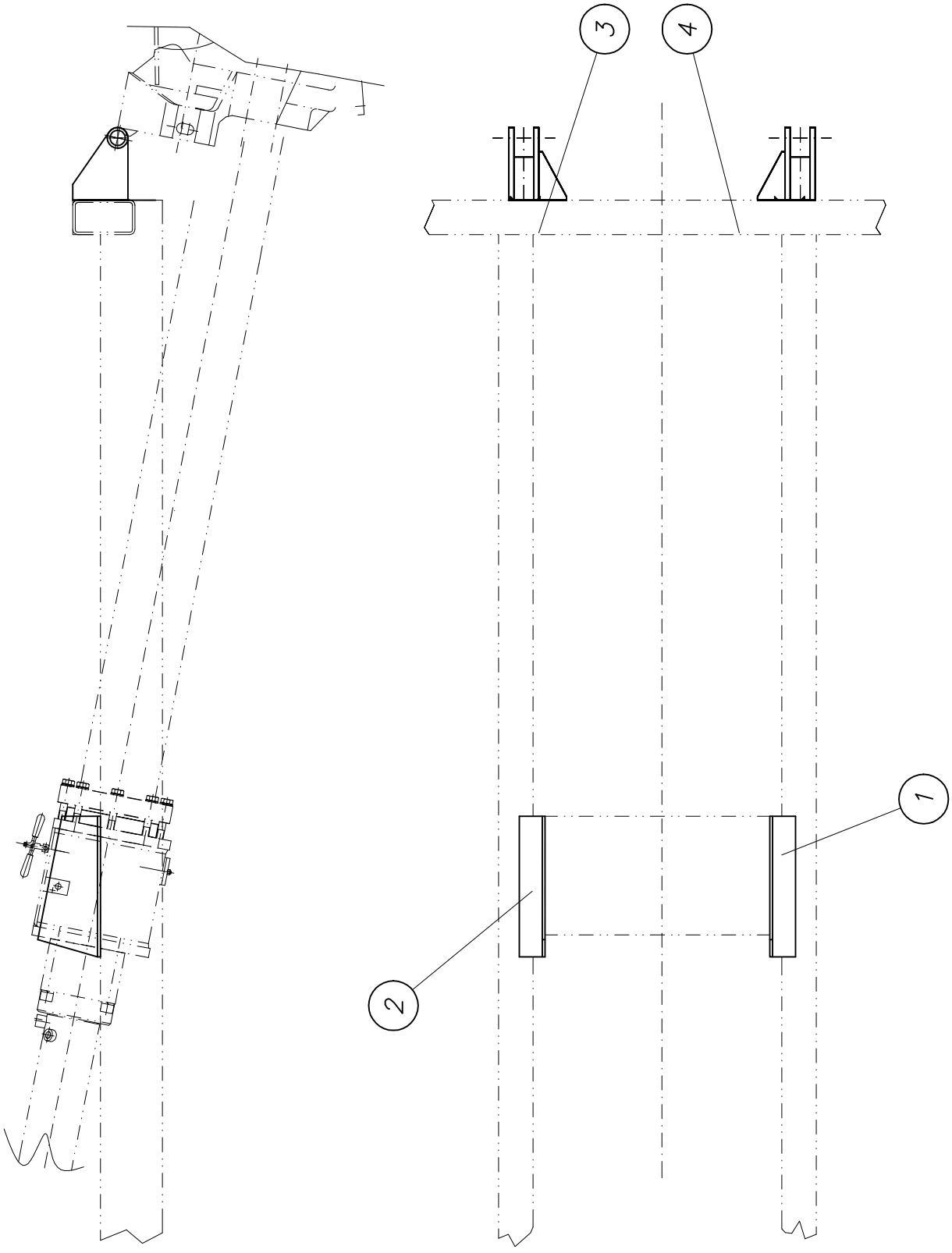
Baumaschinen GmbH



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B115005	pump support funnel	22.01.04 HF			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	holder for water box left	B114166 Bl 8x237x407	1543/EN10029 St37-2		5,00	1,00 Stk
2	holder for water box right	B114167 Bl 8x237x407	1543/EN10029 St37-2		5,00	1,00 Stk
3	bracket right cpl. -N own parts list	B113024		a 20.02.04	6,60	1,00 Stk
4	bracket left cpl. -N own parts list	B113025		a 20.02.04	6,60	1,00 Stk

Förderzylinder kpl.

conveying cylinder cpl.

B 12 5 010

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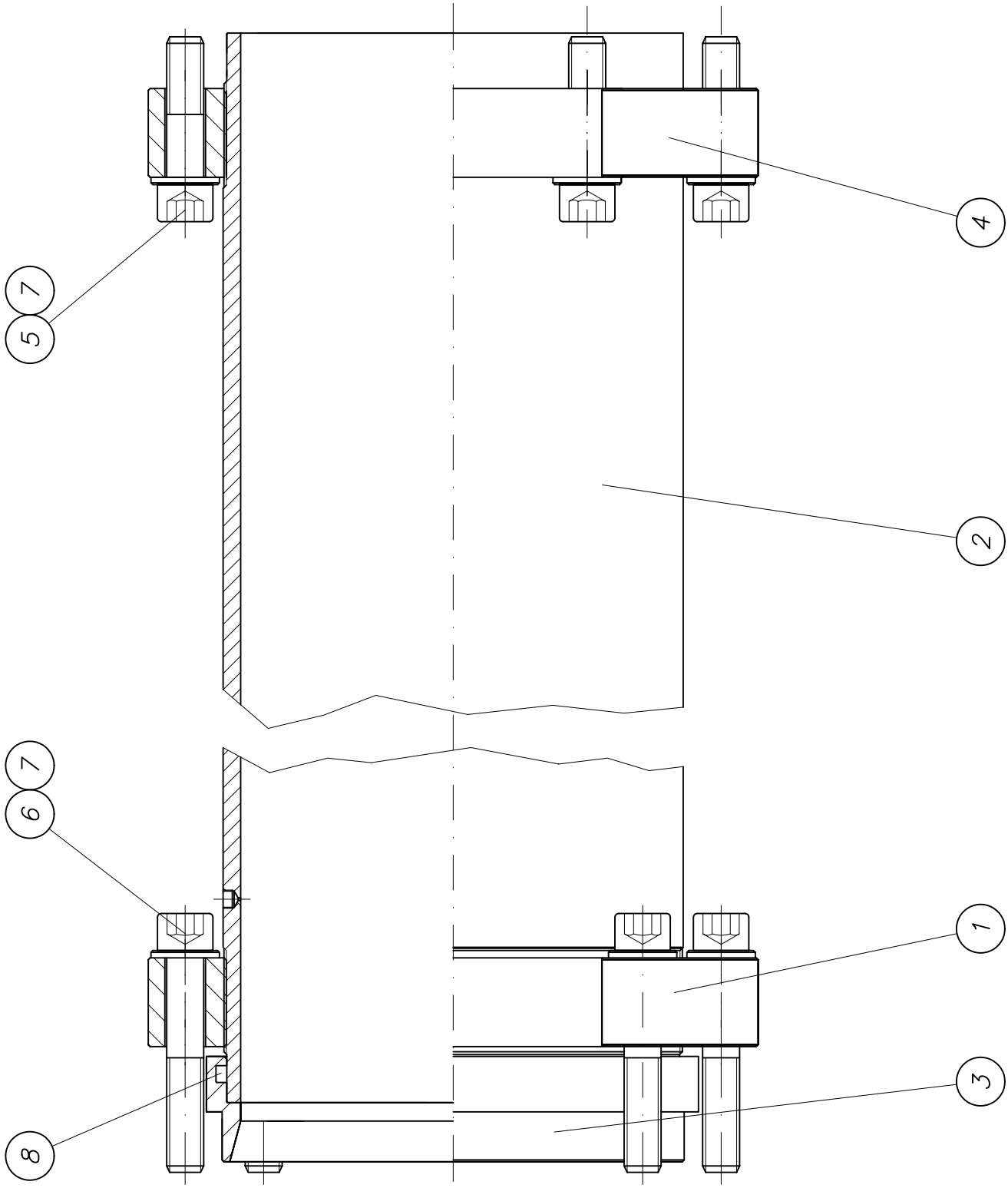

PARTS LIST

27.06.05 08:45:52

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B125010	conveyor cylinder cpl. DN230/215x2000 w.	15.03.01 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	flange ring DN 230 threaded	B124021 Bl 55xd330	1543/EN10029 St52-3		12,20	2,00 Stk
2	conveyor cylinder DN230x2000 chromized	B124019 Rohr 250x12.5x2	2448 St52.0		150,00	2,00 Stk
3	fitting ring DN 230 water box	B123012 Rohr 267x36x65	2448 St52.0		6,00	2,00 Stk
4	flange ring DN 230 threaded	B125014 Bl 55xd330	1543/EN10029 St52-3		12,20	2,00 Stk
5	cheese head screw M20 x 80	WAI106754				12,00 Stk
6	cheese head screw M20 x 120	WAI103970				14,00 Stk
7	washer HV	WAI100691			0,01	26,00 Stk
8	O-ring 244 x 7, NBR70	WAI102868				4,00 Stk

Förderkolben kpl.

conveying piston cpl.

B 13 3 020

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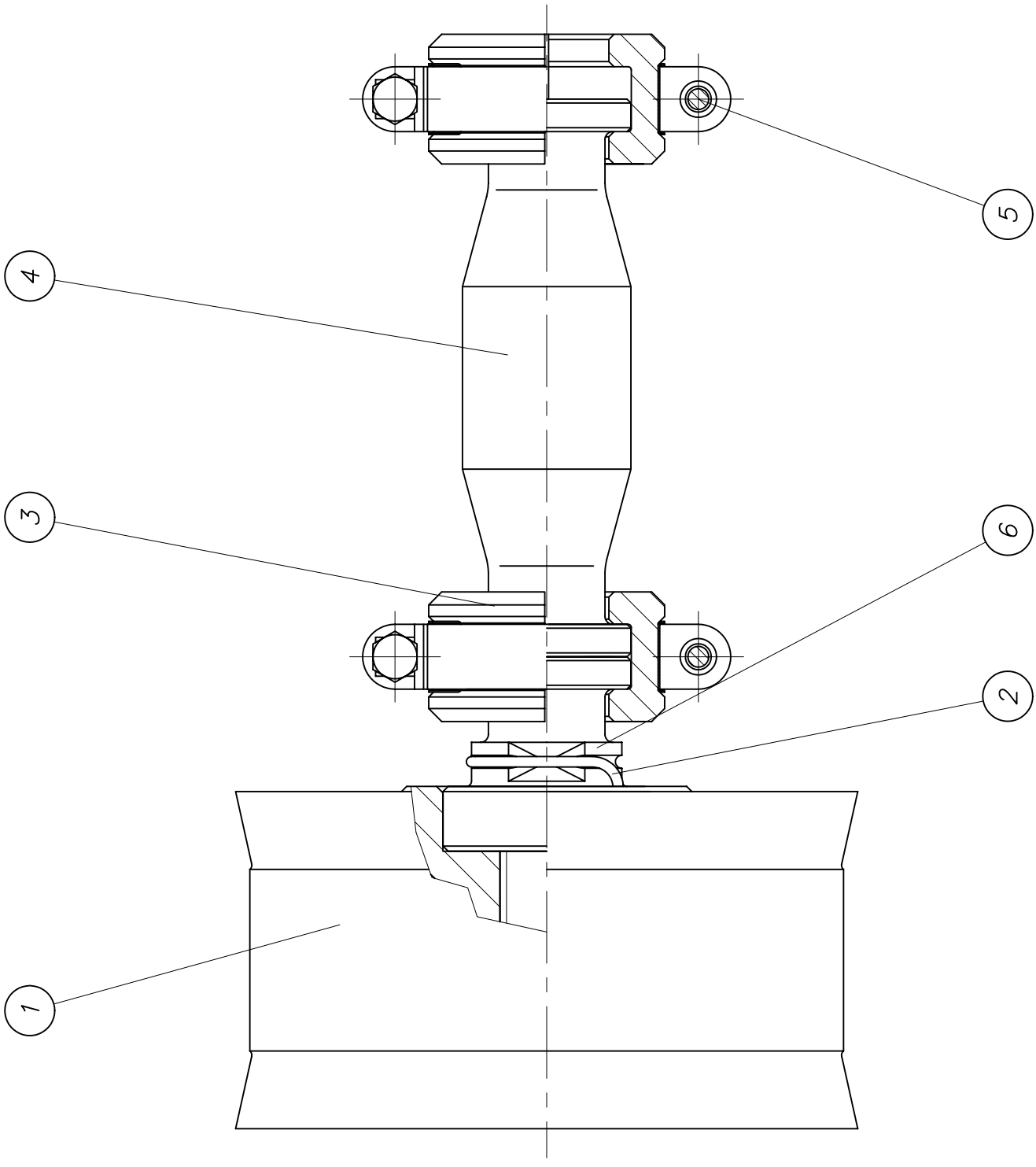

15.03.2001

PARTS LIST

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B133020	piston ram cpl. DN 230	08.07.98 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	piston ram DN 230	WAI100175			19,90	2,00 Stk
2	protection ring	B133019 Federst. 4	17223			2,00 Stk
3	clamp coupling	B131004 Rd 95x50	1013 42CrMo4V			4,00 Stk
4	distance piece	B133003 Rd 70x225	1013 42CrMo4V			2,00 Stk
5	hose clamp S86/25	WAI101381			0,22	4,00 Stk
6	coupling bolt	B133018 Rd 82x120	1013 42CrMo4V		2,20	2,00 Stk

Spülkasten kpl.

water box cpl.

B 14 3 000

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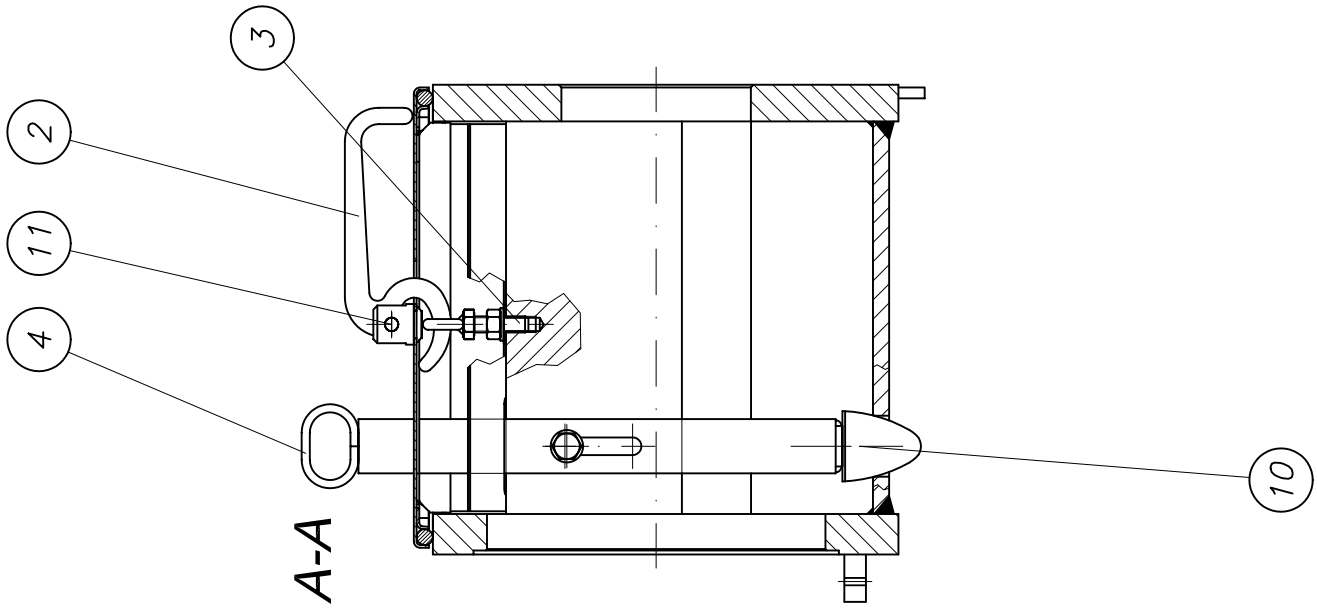

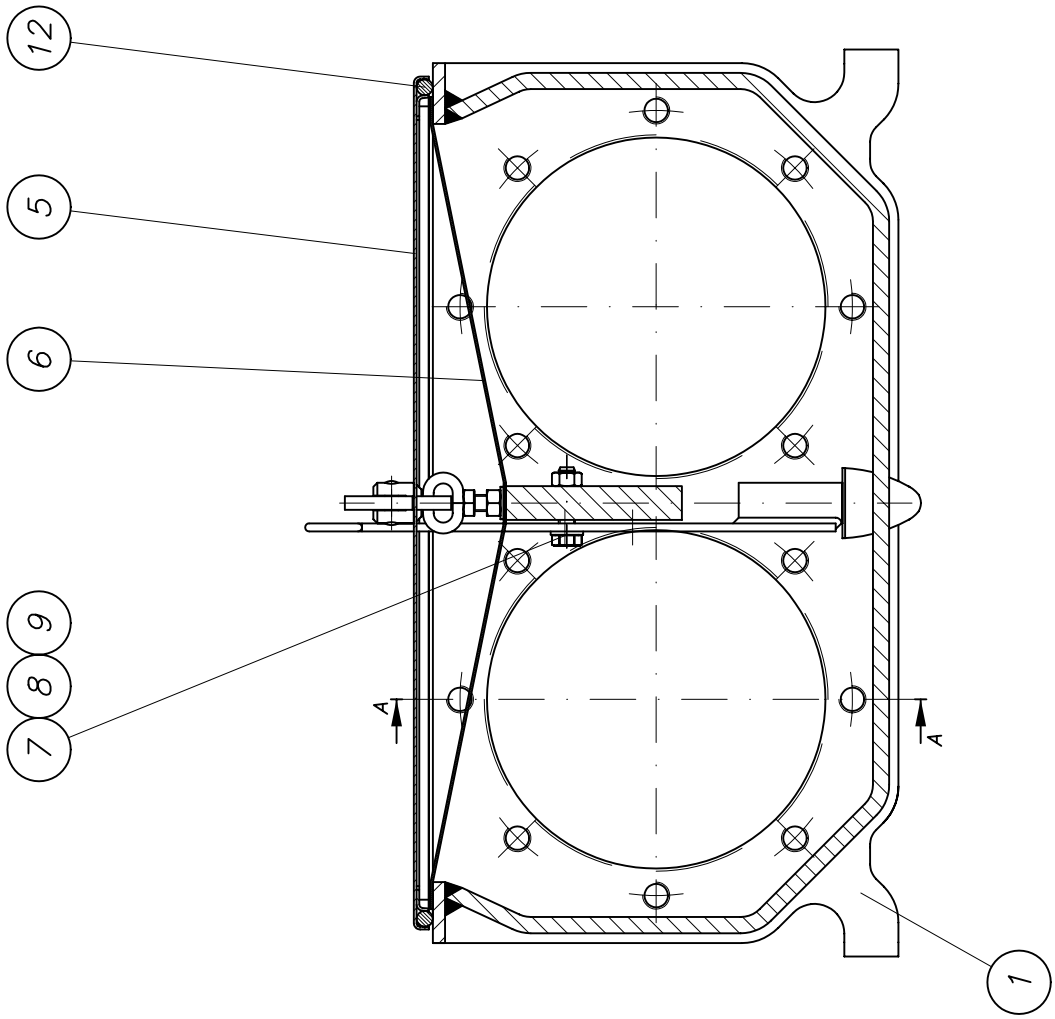

PARTS LIST

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B143000	waterbox cpl. DN 200/230 plug	19.06.97 HG			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	waterbox cpl. DN 200/230 (processing) own parts list	B143001		b 02.05.00		1,00 Stk
2	lever	B143007 Bl 10x195x78.5	1543/EN10029 St52-3			1,00 Stk
3	loop bolt cpl. own parts list	B143009			0,09	1,00 Stk
4	drain pin own parts list	B143011			1,14	1,00 Stk
5	cover for waterbox cpl. own parts list	B143015			4,55	1,00 Stk
6	savety lattice	B143020 Lochbl. 1.5x610	Rostfrei	a 28.05.03		1,00 Stk
7	hex. screw M12	WAI103688				1,00 Stk
8	nut M12 DIN 934	WAI101557			0,02	2,00 Stk
9	washer	WAI100504				2,00 Stk
10	rubber buffer 50 x 58	WAI102712				1,00 Stk
11	pin	WAI103387				1,00 Stk
12	O-ring cord 12mm	WAI101831				1,95 Mtr

Antriebszylinder kpl.

drive cylinder cpl.

B 15 4 031

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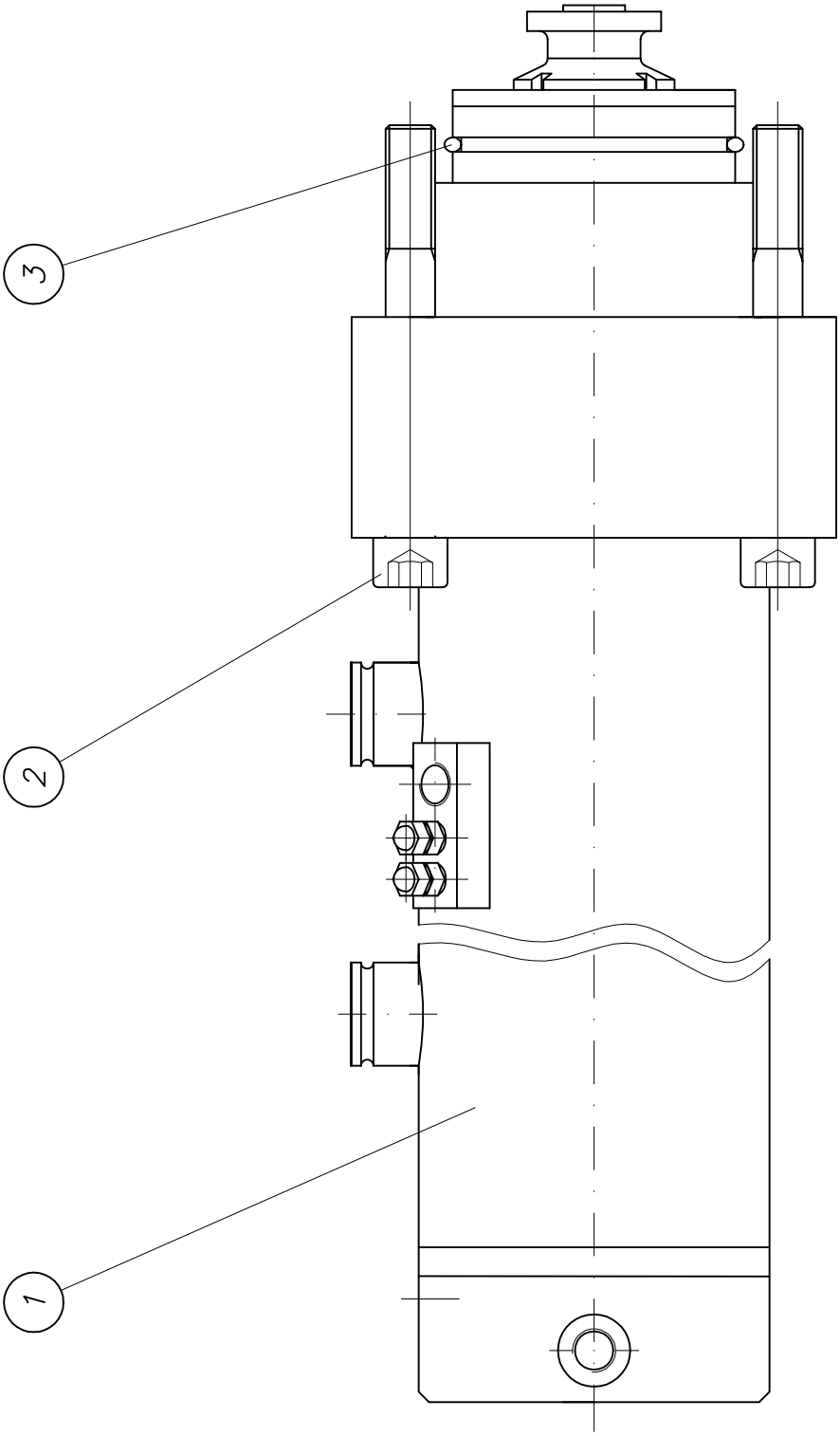

PARTS LIST

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B154031	drive cylinder cpl. 140/80-2000	20.09.00 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	drive cylinder 140/80-2000 REED own parts list	WAI106154		a 30.10.03	295,00	2,00 Stk
2	cylinder head screw M 24 x 200	WAI103828				8,00 Stk
3	O-ring 129,2 x 5,7	WAI101441				2,00 Stk

Antriebszylinder

drive cylinder

WAI 106154a

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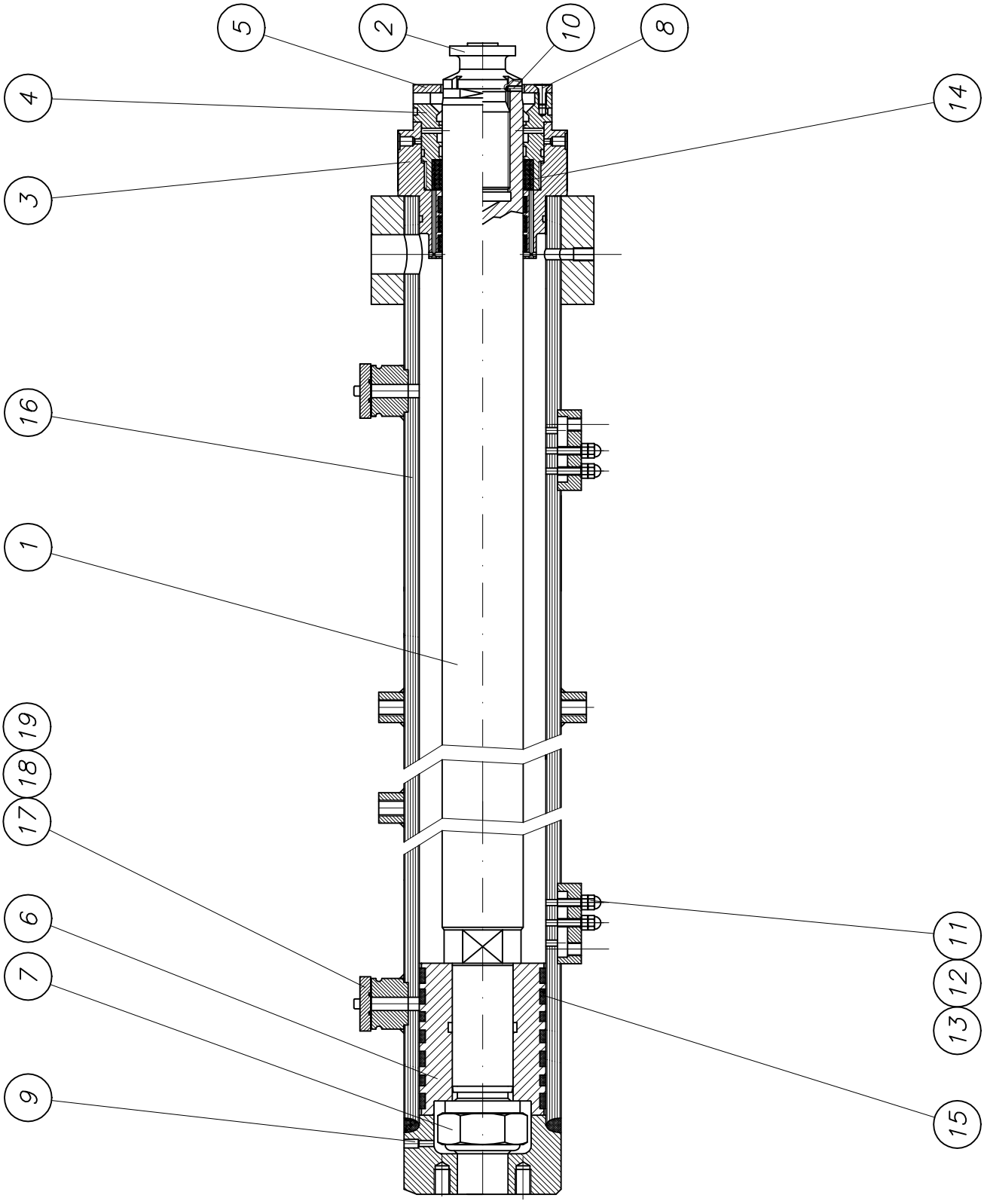

01.12.2003

PARTS LIST

27.06.05 08:28:07

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WAI106154	drive cylinder 140/80-2000 REED	15.05.00 Mi	a	30.10.03	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	piston rod for drive cylinder	WAI105724 Rd 90x2173	1013 Ck45			1,00 Stk
2	piston joint	WAI104146 Rd 80x131	1013 42CrMo4V		1,87	1,00 Stk
3	guide piece for drive cylinder 140	WAI105725 Rd 180x142	1013 St52	a 30.07.03		1,00 Stk
4	sealing carrier for drive cylinder	WAI104890	GGG 40	a 29.07.03		1,00 Stk
5	aperture for drive cylinder	WAI105726 8x d137	Polyamid			1,00 Stk
6	piston 140 REED	WAI106305		b 30.07.03		1,00 Stk
7	piston nut for drive cylinder	WAI105728				1,00 Stk
8	sunk screw M 8 x 20	WAI103397				3,00 Stk
9	locking screw G 1/8	WAI100528				3,00 Stk
10	set screw	WAI105739				1,00 Stk
11	hex. nut M8 DIN 934 8. VERZ.	WAI102880				4,00 Stk
12	cap nut M8	WAI104933				4,00 Stk
13	set screw	WAI105740				4,00 Stk
14	sealing set for drive cylinder 125/80 own parts list	WAI104690				1,00 Stk
15	sealing set for drive cylinder 140/80 own parts list	WAI106156				1,00 Stk
16	cylinder pipe cpl. 140 REED	WAI106153		a 30.07.03		1,00 Stk
17	cover for sensor connection	B154017 Rd 11x55	1013 S235J2G3		0,20	2,00 Stk
18	o-ring	WAI108533				2,00 Stk
19	alien bolt M 6x25	WAI103673				4,00 Stk

Stangendichtsatz
rod sealing set

WAI 104690

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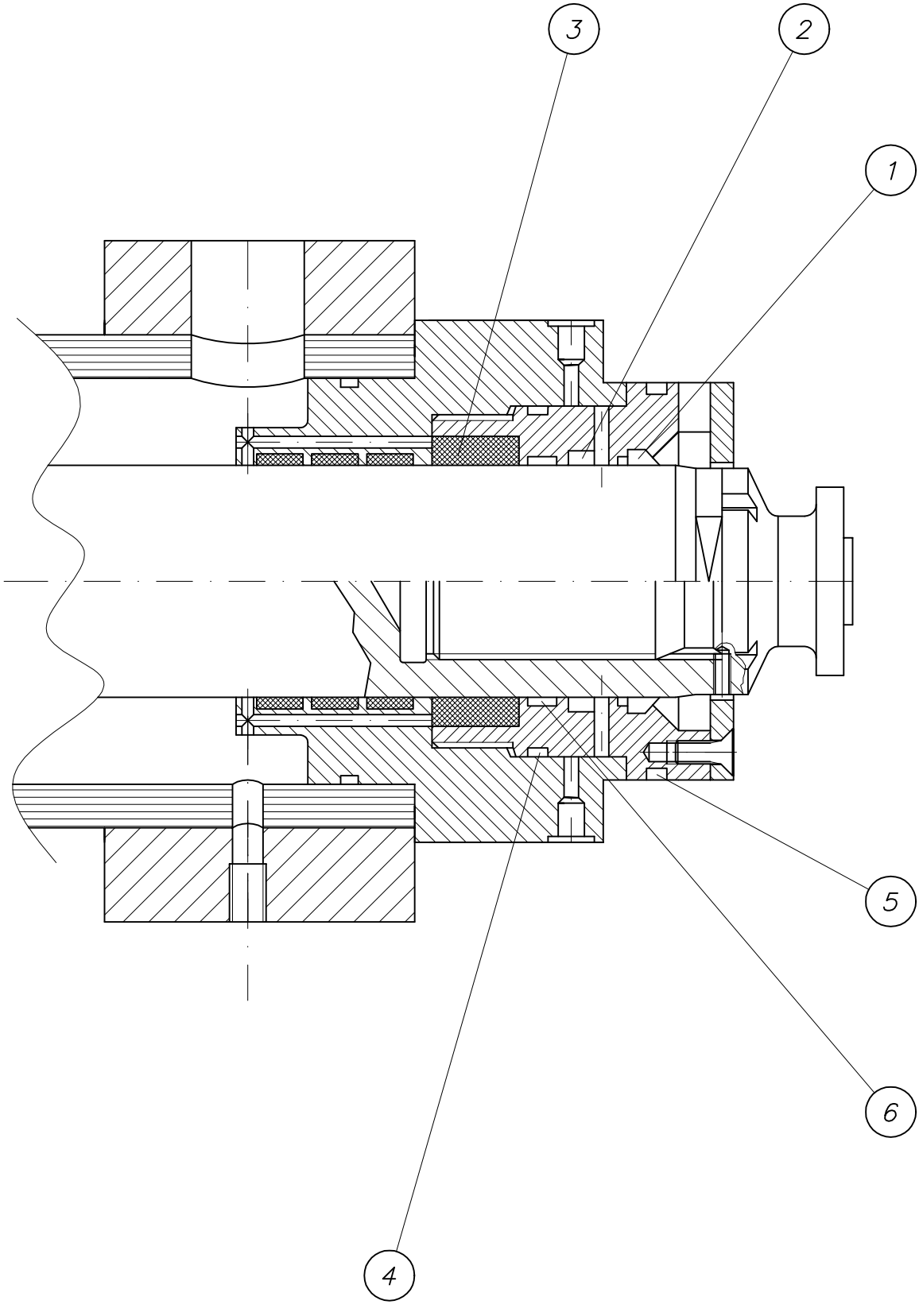

15.03.2001

PARTS LIST

27.06.05 08:29:29

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WAI104690	sealing set for drive cylinder 125/80	30.08.99 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	wiper	WAI100259			0,00	1,00 Stk
2	wiper	WAI105729				1,00 Stk
3	v-packing 80 x 100 x 30	WAI102584				1,00 Stk
4	sealing for drive cylinder	WAI105732				1,00 Stk
5	o-ring	WAI105731				1,00 Stk
6	rod support for drive cylinder	WAI105738				1,00 Stk

Dichtsatz für Antriebszylinder
sealing set for drive cylinder

WAI 106156

Waitzinger
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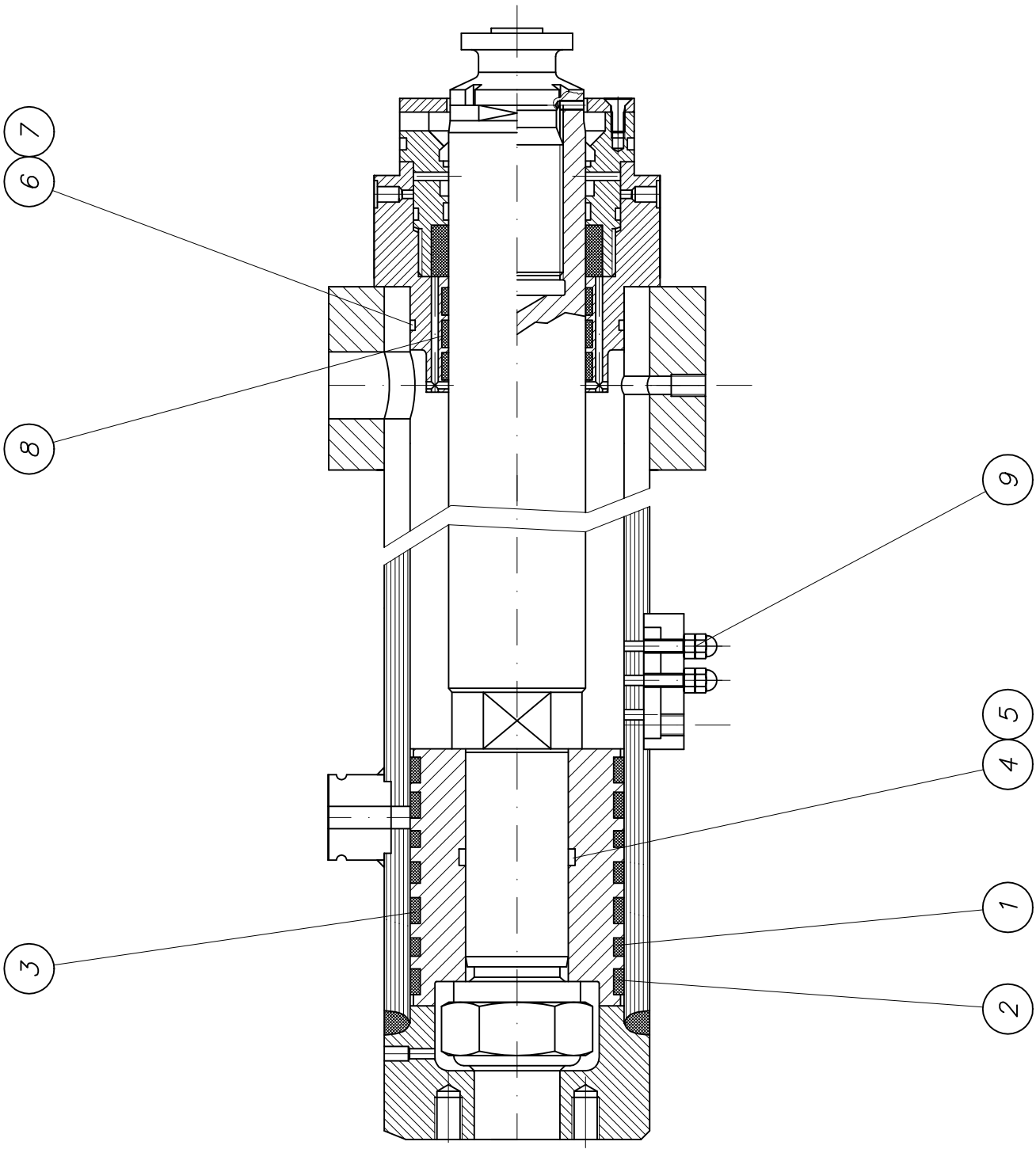

12.11.2002

PARTS LIST

27.06.05 08:31:02

part list	description	created	index	valid from	valid to
WAI106156	sealing set for drive cylinder 140/80	03.08.00 hbk			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	piston guide	WAI105735				3,00 Stk
2	piston ring permasel DN140	WAI105049			0,05	2,00 Stk
3	piston ring DN 140	WAI106313				2,00 Stk
4	back-up ring	WAI105736				2,00 Stk
5	o-ring	WAI105734				1,00 Stk
6	O-ring 134 x 4	WAI106314				1,00 Stk
7	back-up ring	WAI106315				1,00 Stk
8	piston guide	WAI106316			5,00	3,00 Stk
9	usit-ring 8.7-14-1	WAI101269				8,00 Stk

Schiebersystem kpl.

s-valve system cpl.

B 17 5 200R1

Waitzinger
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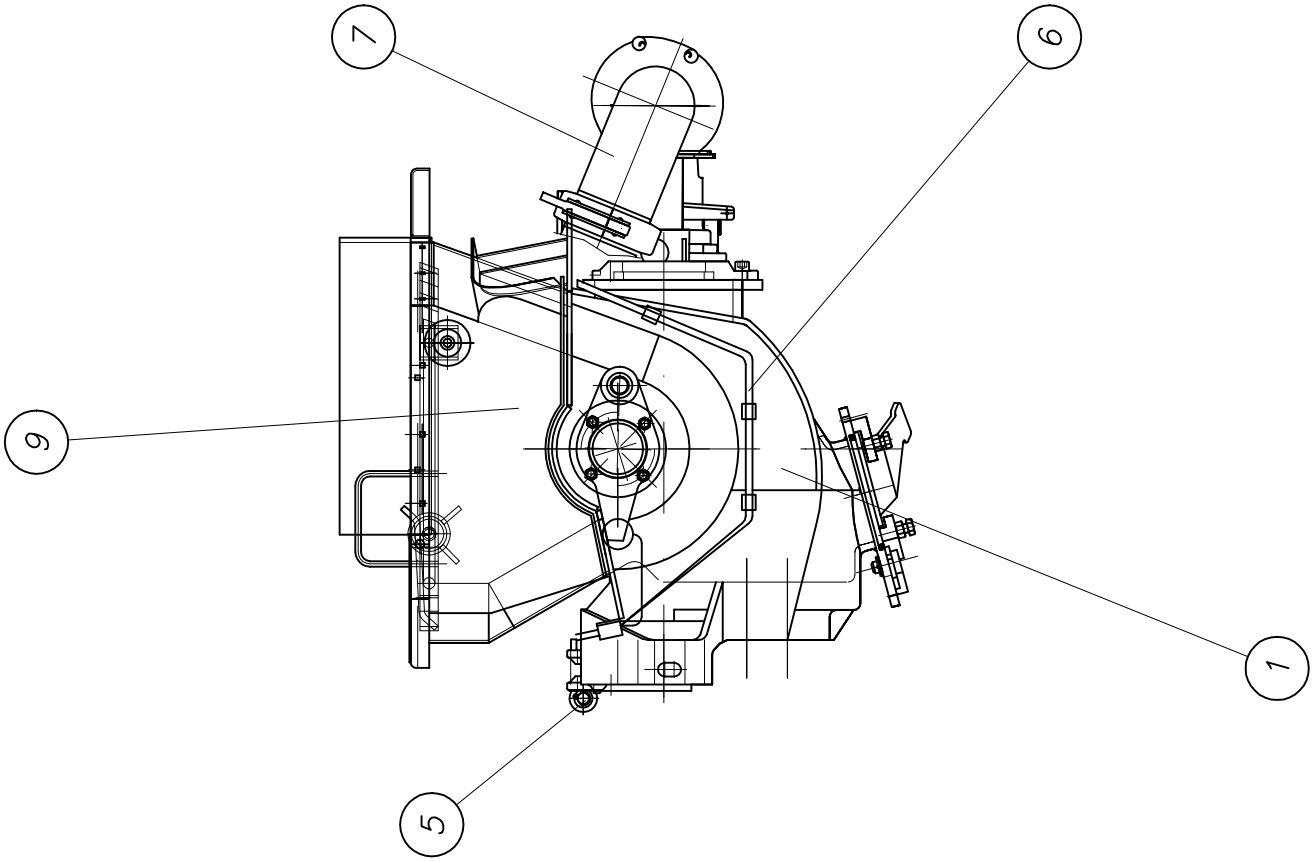

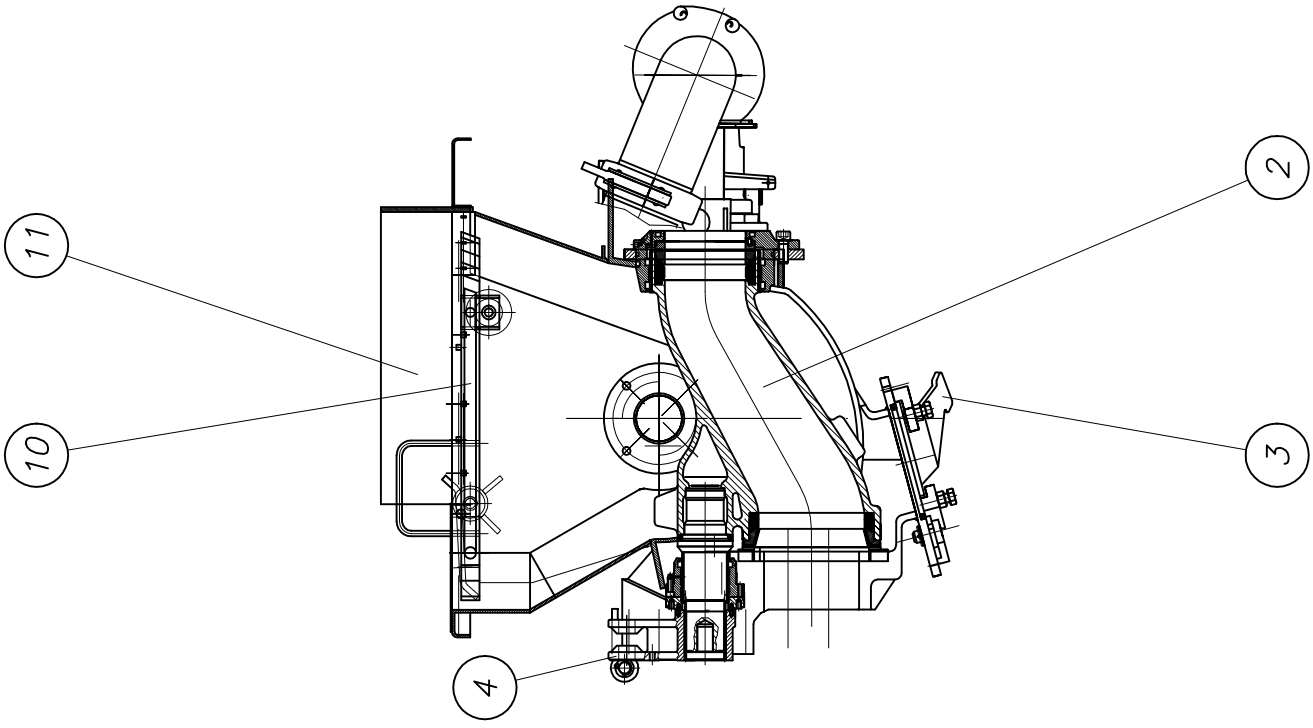

28.09.2005

PARTS LIST

28.09.05 09:41:32

part list	description	created	index	valid from	valid to
B175200R1	s-valve system w/o	20.07.05 TECHNIK			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	s-valve housing cpl. (processing) DN 230 own parts list	B175025		e 25.05.05	572,00	1,00 Stk
2	s-valve system complete own parts list	B175006		b 25.02.05		1,00 Stk
3	cleaning hole assembly own parts list	B175050		a 21.03.03		1,00 Stk
4	shift drive system cpl. own parts list	B175020		b 02.08.05		1,00 Stk
5	pump support funnel own parts list	B115001				1,00 Stk
6	lubrication system complete own parts list	B185003		a 29.07.04		1,00 Stk
7	conveying pipe line 6" own parts list	B195065R1				1,00 Stk
9	hopper upper part own parts list	B225055				1,00 Stk
10	grid cpl. own parts list	B225040		b 29.11.04		1,00 Stk
11	rubber apron cpl own parts list	B225045		a 04.04.03		1,00 Stk

Schiebersystem kpl.

s-valve system cpl.

B 17 5 006b

Waitzinger
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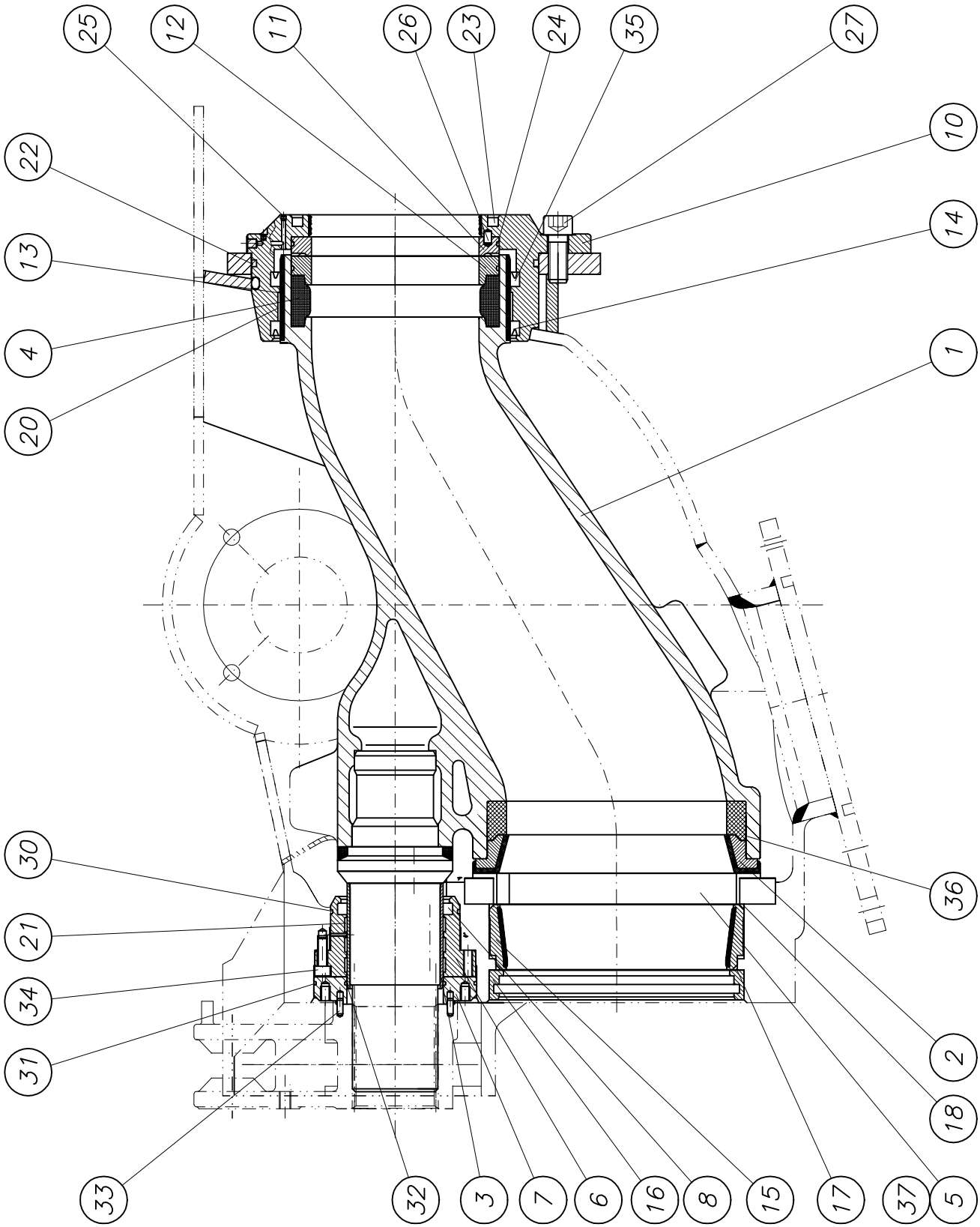

04.03.2005

PARTS LIST

22.06.05 10:11:14

part list	description	created	index	valid from	valid to
B175006	s-valve system complete	21.01.04 ek	b	25.02.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	s-valve cpl. own parts list	B175080			98,00	1,00 Stk
2	wear ring DN230	B175210 Bl 40xD300	1543/EN10029 S355J2G3		4,00	1,00 Stk
3	wear bushing small	B175175 Rohr 108x10x115	2448 StE690		1,70	1,00 Stk
4	tension ring DN217x64 / 70 shore	B175202 217x64	70 Shore			1,00 Stk
5	wear plate DN 250	B175177 Bl 30x400x644	1543/EN10029 St52-3	a 02.12.03	23,00	1,00 Stk
6	bearing housing small	B175178 Rd 180x90	1013 St52-3	b 24.07.03		1,00 Stk
7	axial bearing washer	B175179 Rd 180x35	1013 CuSn8P (2.18	a 01.08.03		1,00 Stk
8	groove ring 100x120x12 own parts list	B175181			0,04	1,00 Stk
10	bearing housing big (processing) megahop own parts list	B175009		b 23.05.05		1,00 Stk
11	slide ring DN 217 x 20	B173013 d217x20				1,00 Stk
12	slide ring DN 217 x 30	B173014				1,00 Stk
13	wear bushing big	B173073 Rohr 244.5x12.5	2458 StE690	a 01.08.03	2,00	1,00 Stk
14	groove ring 240x260x15 own parts list	B173078			0,04	1,00 Stk
15	fitting ring with hardened surface own parts list	B175071			7,60	2,00 Stk
16	fitting ring	B175072 Bl 40xd275	DIN EN 10029 S235J2G3	a 01.07.04	2,90	2,00 Stk
17	O-Ring 243 x 4	WAI108633				2,00 Stk
18	O-Ring 258 x 4	WAI108634				2,00 Stk
20	rod wear-ring 240 x 245 x 15 mm	WAI102487			0,03	2,00 Stk
21	rod wear-ring 105 x100 x 15 mm	WAI106096			0,01	3,00 Stk
22	O-ring 290 x 5	WAI102539			0,02	1,00 Stk
23	O-ring 193 x 10	WAI103563			0,05	1,00 Stk
24	O-ring	WAI101808				2,00 Stk

PARTS LIST

22.06.05 10:11:14

part list	description	created	index	valid from	valid to
B175006	s-valve system complete	21.01.04 ek	b	25.02.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
25	set screw M 8 x 8	WAI106824				4,00 Stk
26	straight pin	WAI103717				2,00 Stk
27	cheese head screw M20 x 50	WAI102854				4,00 Stk
30	O-ring 129,5 x 3 SH90	WAI102448				1,00 Stk
31	sealing ring 165 x 3	WAI103580				1,00 Stk
32	O-ring	WAI105771				1,00 Stk
33	straight pin	WAI103061				2,00 Stk
34	cheese head screw M 10 x 25	WAI109528				4,00 Stk
35	groove ring 240x260x15	WAI100479				1,00 Stk
36	tension ring	B175201 270x45	50 Shore		0,60	1,00 Stk
37	cheese head screw M20 x 130	WAI104885				4,00 Stk

Reinigungsklappe kpl.

cleaning cover cpl.

B 17 5 050a

Waitzinger
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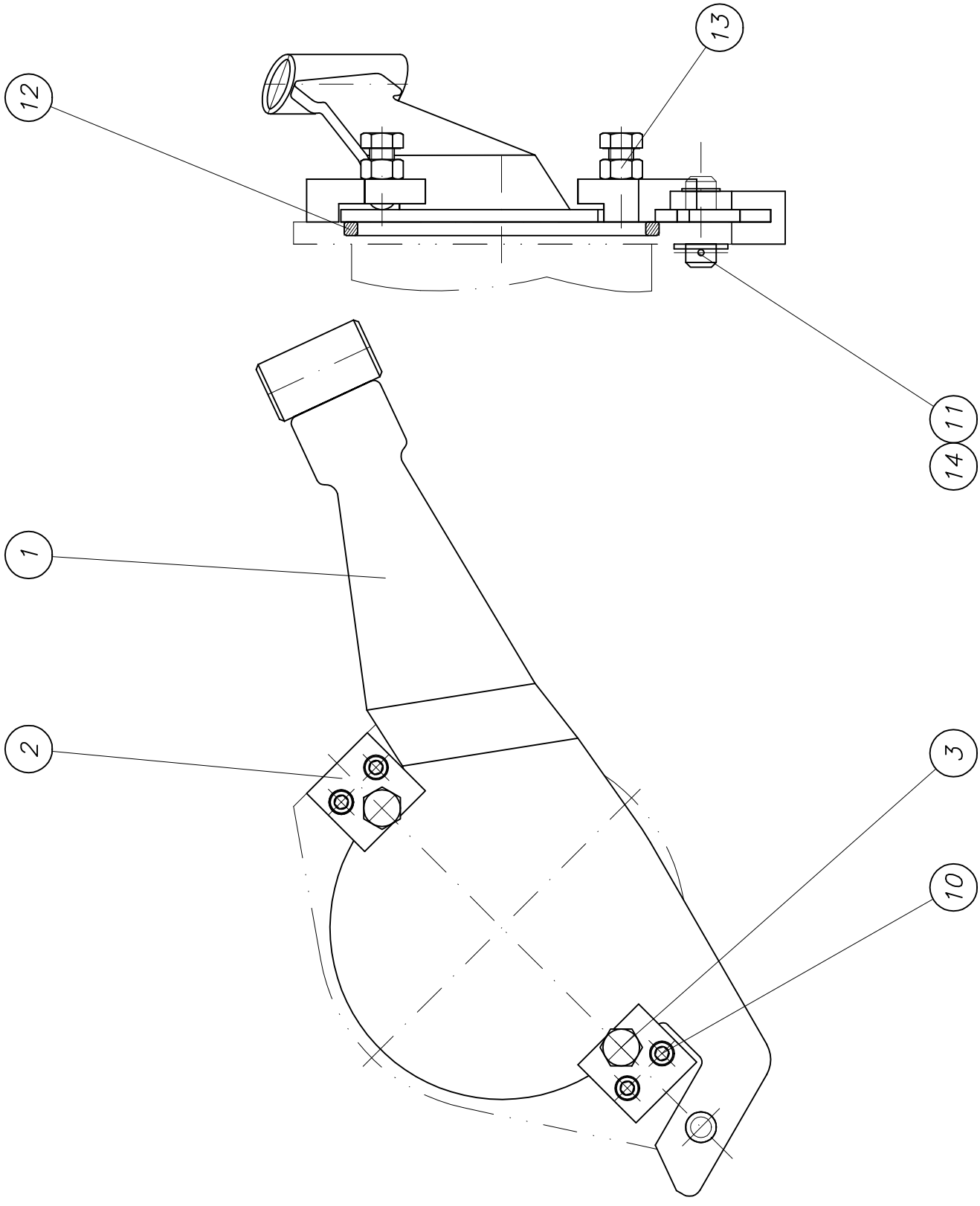


PARTS LIST

22.06.05 10:11:47

part list	description	created	index	valid from	valid to
B175050	cleaning hole assembly	03.03.00 Mi	a	21.03.03	

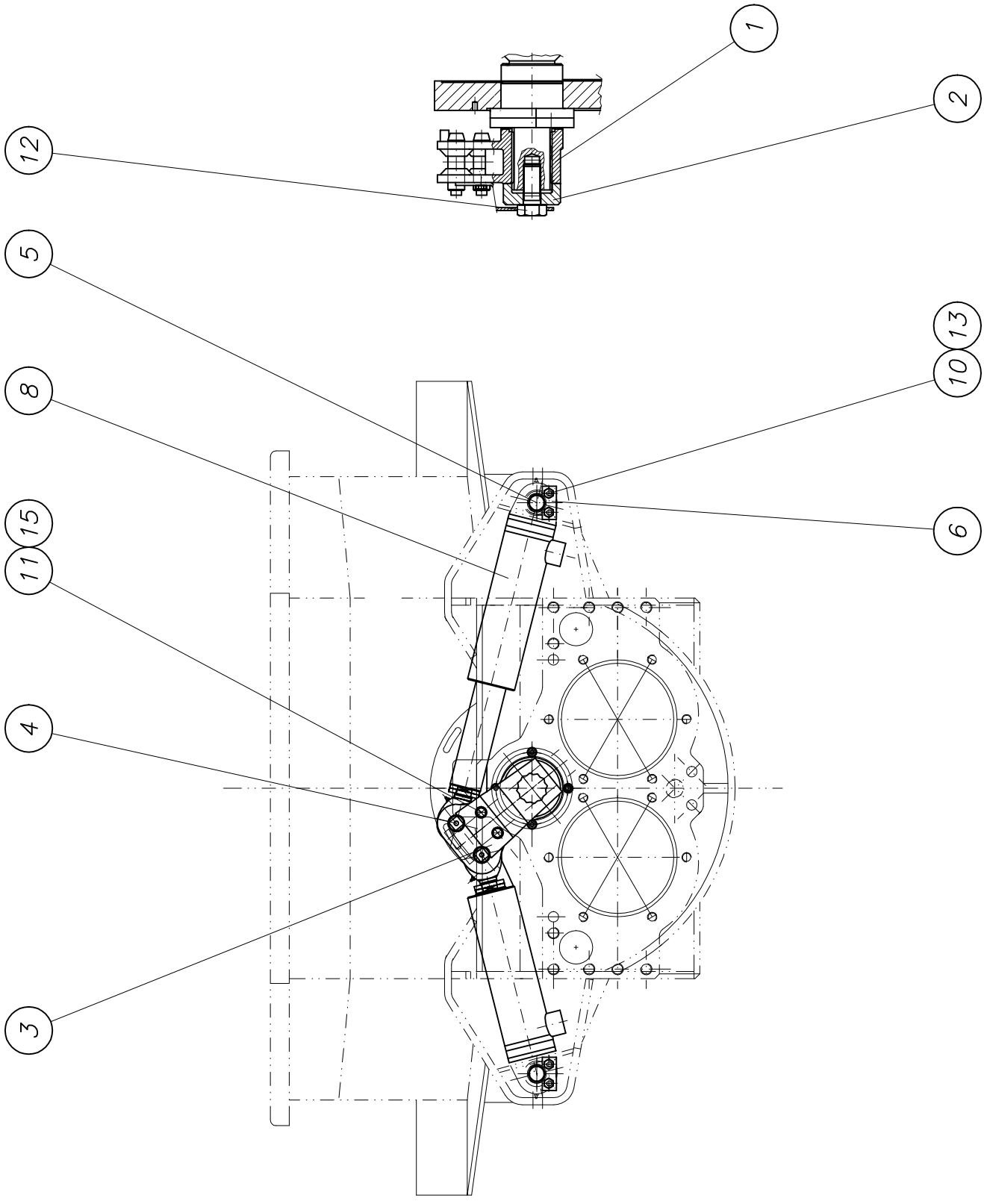
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	cover cpl. for cleaning cover own parts list	B175051		b 15.06.04	9,00	1,00 Stk
2	plate	B172126 Bl 40x67x70	1543/EN10029 St52-3		0,89	2,00 Stk
3	screw M 20 (processing) own parts list	B172128 6-Kt.Schraube M	933-8.8		0,18	2,00 Stk
10	cheese head screw M 12 x 40	WAI102855				4,00 Stk
11	washer 25, DIN 125	WAI103298				1,00 Stk
12	O-ring cord 12mm	WAI102908				0,78 Mtr
13	nut M20 DIN 934	WAI102891				2,00 Stk
14	split pin	WAI105194				1,00 Stk

Schwenkantrieb kpl.

tilting device cpl.

B 17 5 020b

Waitzinger
Baumaschinen GmbH



PARTS LIST

25.08.05 09:50:12

part list	description	created	index	valid from	valid to
B175020	shift drive system cpl.	11.07.01 Mi	b	02.08.05	

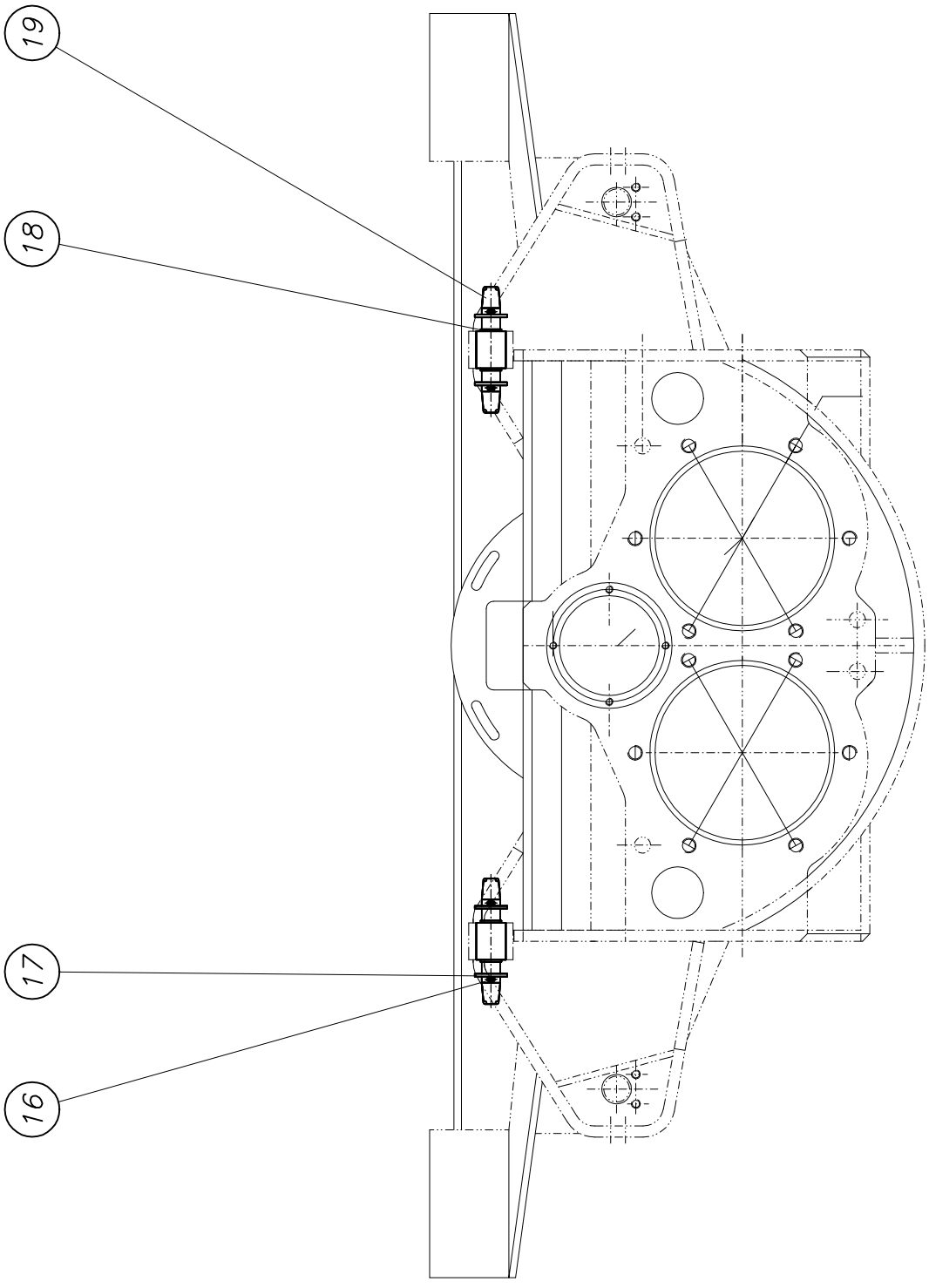
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	tilting lever (processing) own parts list	B175180			13,00	1,00 Stk
2	pressure disc	B174103 Rd125x50	1013 42CrMo4V		2,70	1,00 Stk
3	locking plate	B174104 Bl 6x220x120	1543/EN10029 St52-3		1,00	1,00 Stk
4	bolt	B173019 Rd 40x125	1013 42CrMo4V		0,83	2,00 Stk
5	bolt	B173066 Rd 40x115	1013 42CrMo4V	a 06.04.00	0,80	2,00 Stk
6	axle retainer	B173067 Fl 30x6x70	1017 St52-3		0,13	2,00 Stk
8	tilting cylinder D 65x220	WAI109491			23,00	2,00 Stk
10	hex. bolt M12 x 25 DIN 933 8.8	WAI101001			0,04	4,00 Stk
11	hex. bolt M12x30 DIN 933 8.8	WAI102107			0,04	2,00 Stk
12	hex.screw M 36 x 3 x 85	WAI103327		a 01.08.05		1,00 Stk
13	conical spring washer 12 mm	WAI102877				4,00 Stk
15	spring washer A12 DIN 127 VERZ.	WAI102896				2,00 Stk

Pumpenlagerung Trichter kpl.

pump support hopper cpl.

B 11 5 001

Waitzinger
Baumaschinen GmbH



PARTS LIST

22.06.05 10:12:42

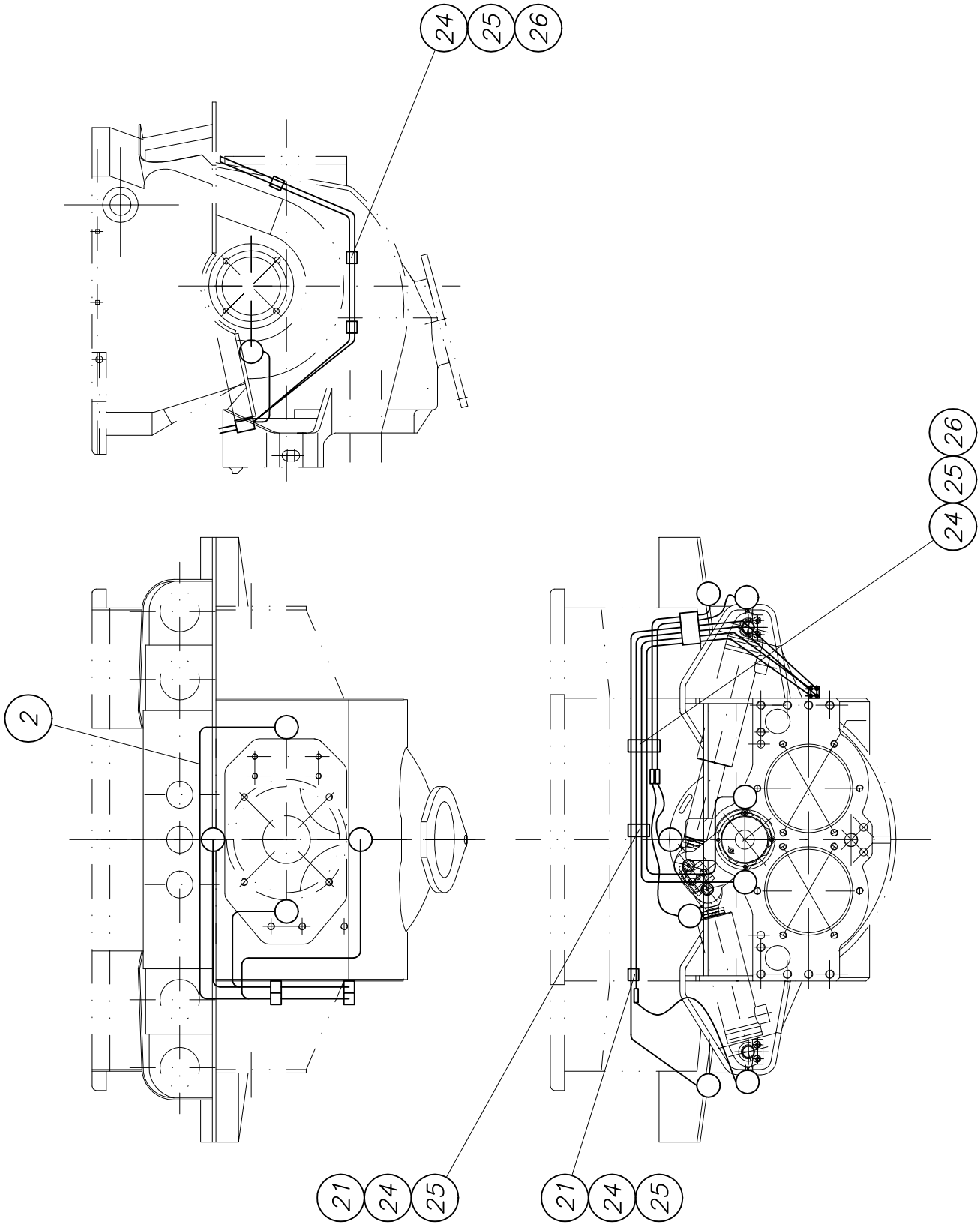
part list	description	created	index	valid from	valid to
B115001	pump support funnel	13.10.03 ute			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
16	pin	WAI100940				4,00 Stk
17	washer 26, DIN 126	WAI103411				4,00 Stk
18	rubber buffer 40 x 25 x 50	WAI102489			0,21	2,00 Stk
19	bolt	B113021 Rd 30x175	1013 42CrMo4V	a 13.02.02	0,65	2,00 Stk

Schmieranlage kpl.
lubrication system cpl.

B 18 5 003a **1**

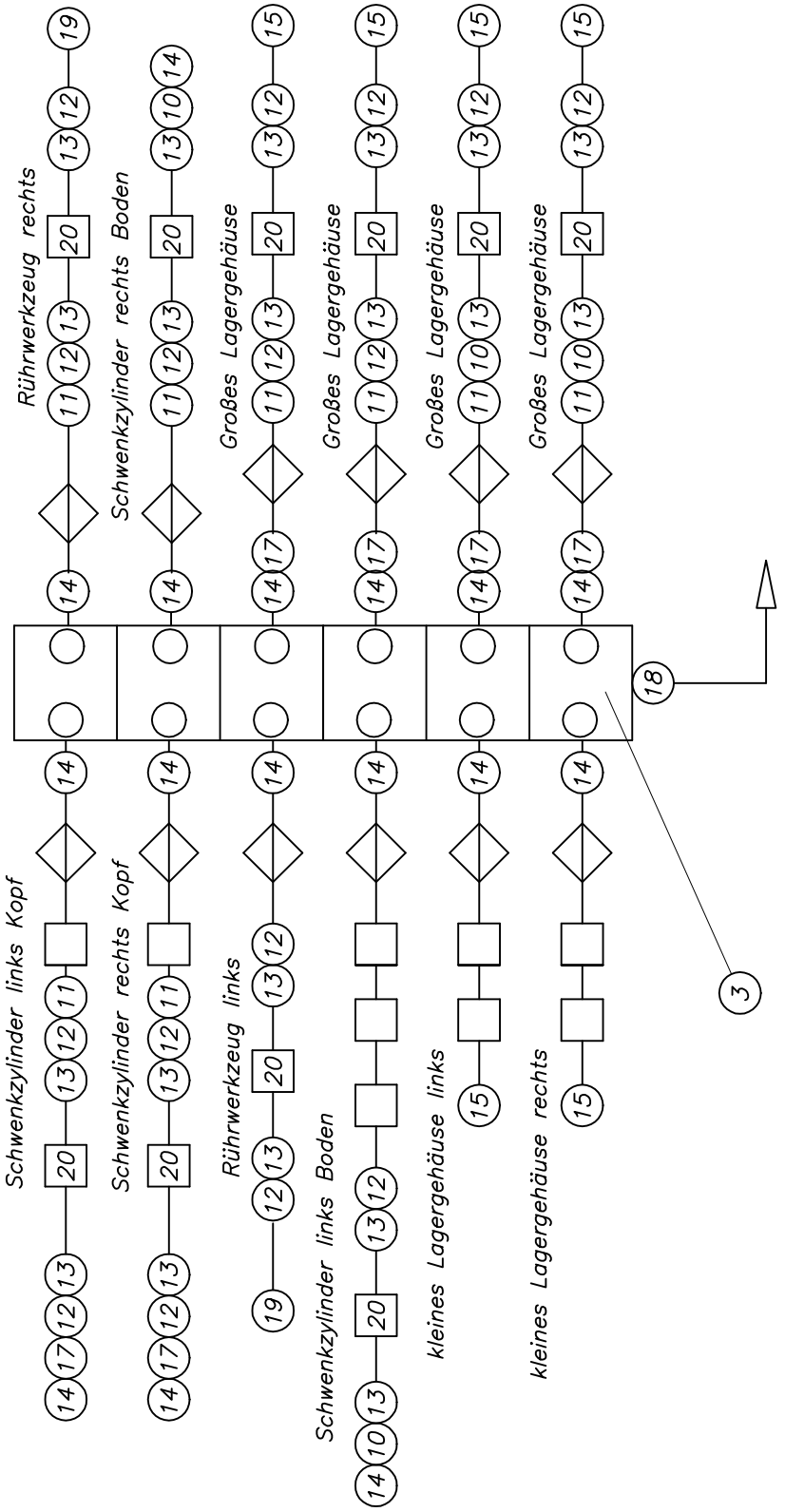
Waitzinger
Baumaschinen GmbH



Schmieranlage kpl.
lubrication system cpl.

B 18 5 003a **2**

Waitzinger
Baumaschinen GmbH



PARTS LIST

22.06.05 10:13:14

part list	description	created	index	valid from	valid to
B185003	lubrication system complete	15.10.03 ek	a	29.07.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
2	set of pipes for greasing system	WAI106760				1,00 Stk
3	lubrication distributor complete (12) own parts list	WAI105657			0,01	1,00 Stk
10	threaded sleeve, 90 degrees	WAI102643			0,02	4,00 Stk
11	straight couplings L6	WAI105282				8,00 Stk
12	hose connecting piece, DN6, short	WAI100253			0,01	16,00 Stk
13	threaded sleeve	WAI100254			0,01	20,00 Stk
14	straight male stud couplings L6M	WAI100546			0,03	16,00 Stk
15	throttlefree banjo elbows L6M	WAI102284				6,00 Stk
17	adjustable elbow bodies L6	WAI102664			0,02	8,00 Stk
18	straight male stud couplings L6M14 x 1,5	WAI102665			0,04	1,00 Stk
19	male stud LL6M 6 x 1	WAI102603				2,00 Stk
20	plastic pipe 8.4 x 2.1	WAI100255			0,05	6,00 Mtr
21	hexagon screw	WAI102109			0,01	2,00 Stk
24	pipe clip 6 mm (double)	WAI105281				8,00 Stk
25	welding plate for pipe clip	WAI105422			0,03	2,00 Stk
26	hexagon screw M 6 x 60 DIN 931 8.8	WAI104065				3,00 Stk
27	cable tie 200x3.6, black	WAI103137				10,00 Stk

PARTS LIST

28.09.05 09:49:46

part list	description	created	index	valid from	valid to
b195065R1	conveying pipe line 6"	20.07.05 TECHNIK			

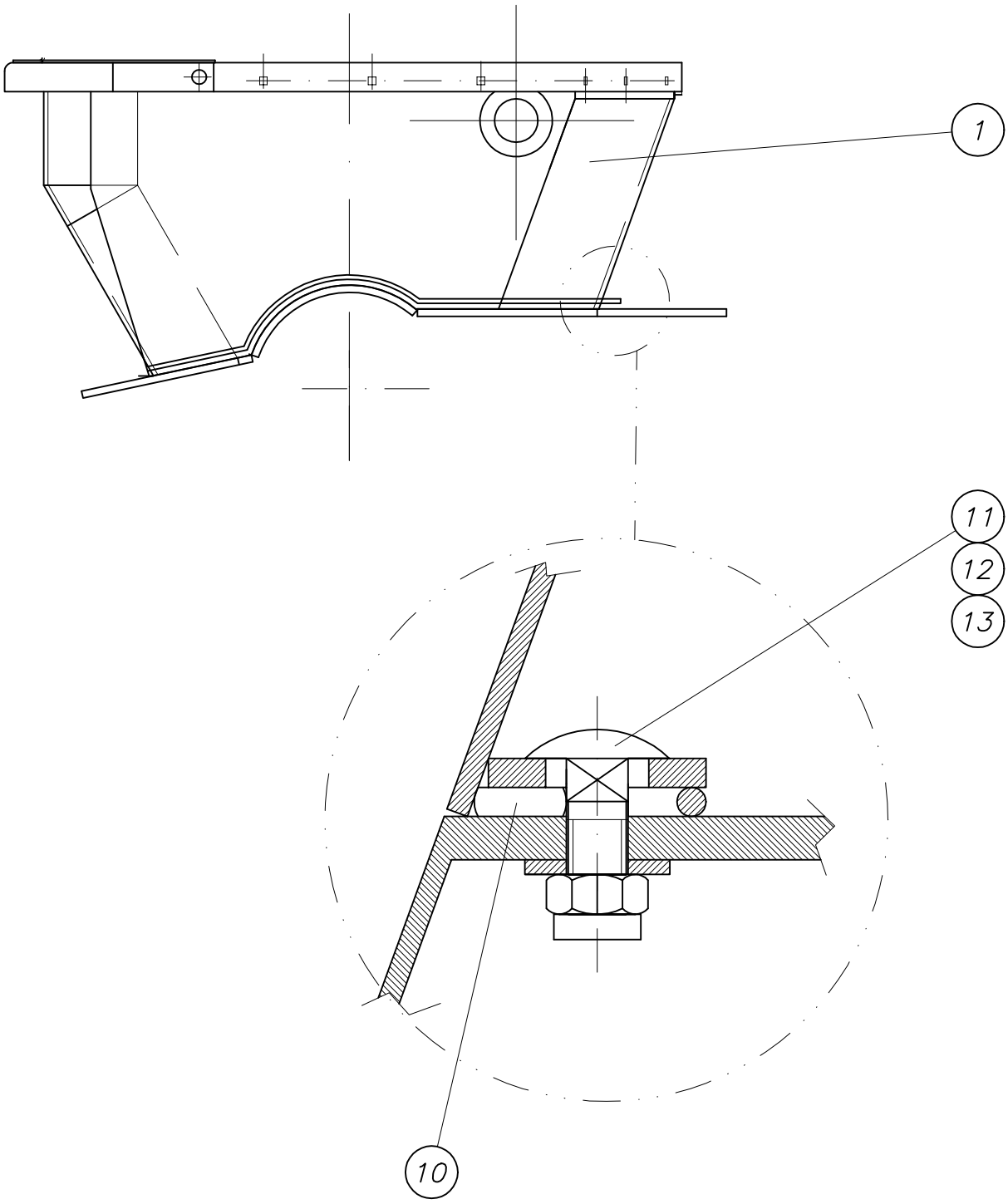
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	hinge own parts list	B190004			6,00	1,00 Stk
2	pin	B190008 Rd 40x315	1543 669		3,00	1,00 Stk
3	locking pin complete own parts list	B193008		a	3,00	1,00 Stk
4	locking wedge complete own parts list	B194046			1,85	1,00 Stk
10	cheese head screw M 16 x 40	WAI102859				4,00 Stk
11	spring washer A16	WAI103489			0,01	4,00 Stk
12	O-ring 193 x 10	WAI103563			0,05	1,00 Stk
13	cheese head screw M20 x 50	WAI102854				2,00 Stk
22	locking ring	WAI102865				2,00 Stk
23	key ring	WAI104636				2,00 Stk
24	chain 4mm	WAI103732				1,00 mtr

Trichteroberteil kpl.

hopper upper part cpl.

B 22 5 055

Waitzinger
Baumaschinen GmbH



PARTS LIST

22.06.05 10:14:34

part list	description	created	index	valid from	valid to
B225055	hopper upper part	11.11.02 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	kopper upper part own parts list	B175011		a 30.05.05	86,00	1,00 Stk
10	expanded rubber	WAI103309				4,00 Mtr
11	cup square neck bolt M 16 x 50	WAI105131				4,00 Stk
12	nut M16 DIN 985	WAI102330				4,00 Stk
13	washer DIN 6916 17	WAI101558			0,02	4,00 Stk

Gitterrost kpl.

grid cpl.

B 22 5 040b

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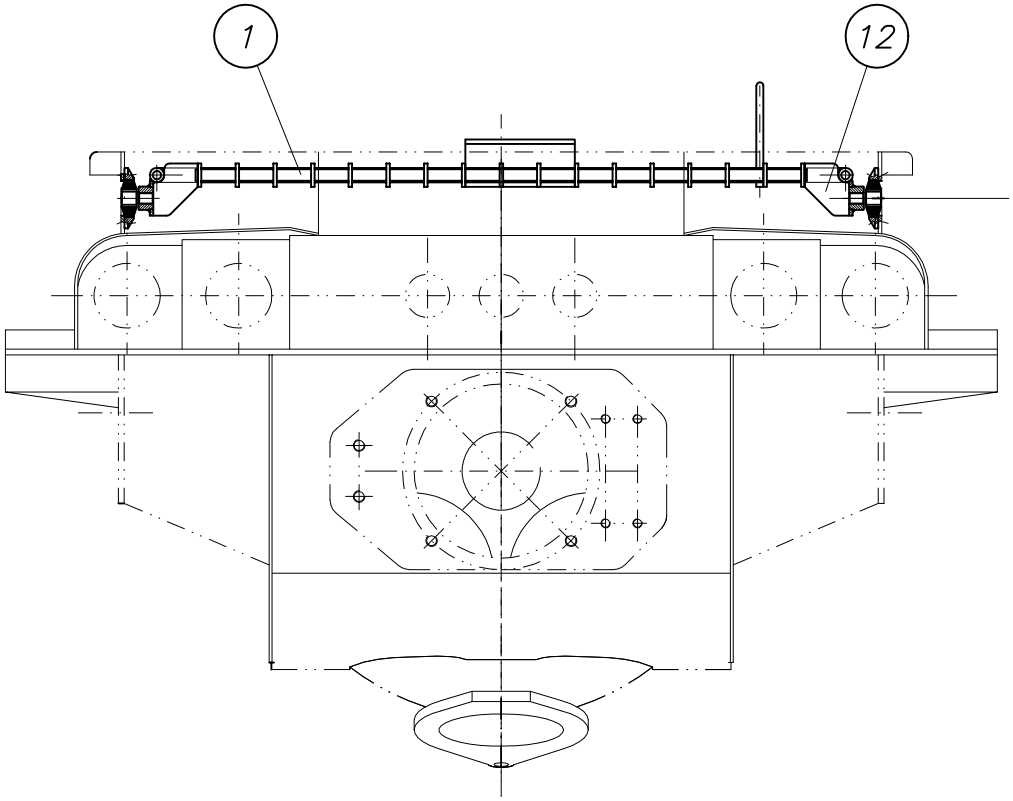
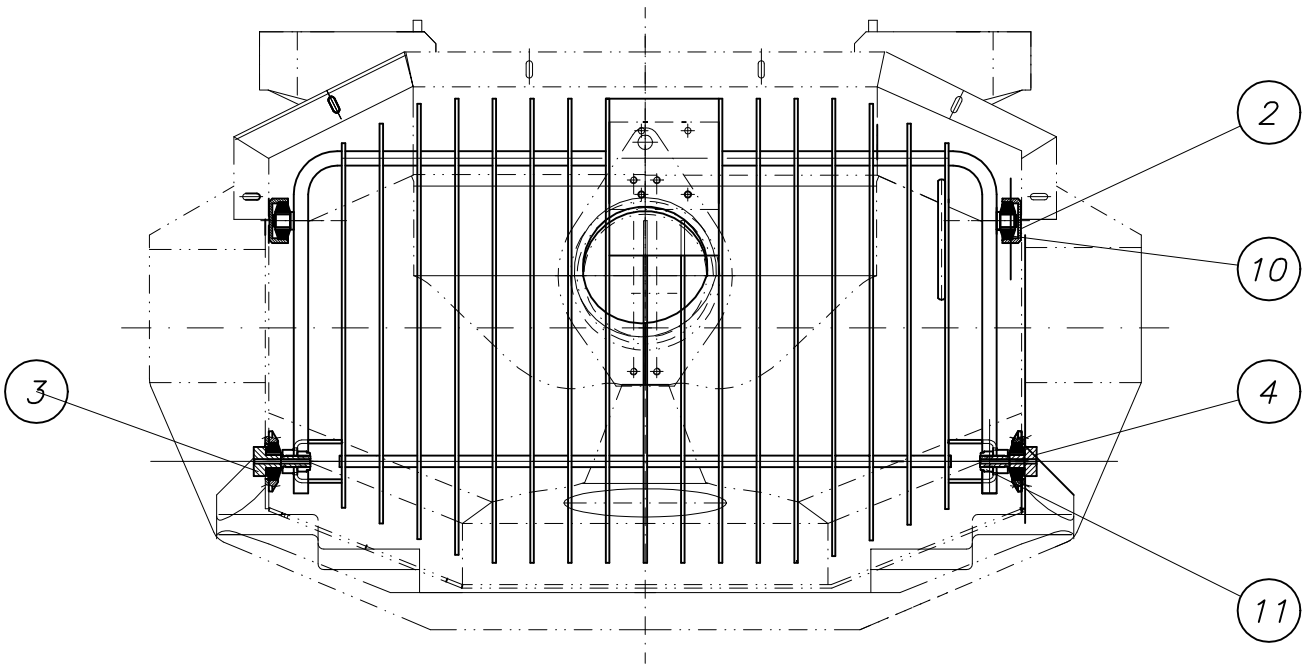




PARTS LIST

22.06.05 10:15:05

part list	description	created	index	valid from	valid to
B225040	grid cpl.	29.01.01 Mi	b	29.11.04	

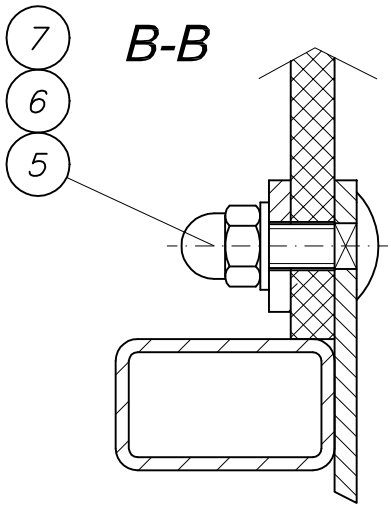
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	grate own parts list	B225010		b 09.09.04	33,42	1,00 Stk
2	housing for grating	B223061 Rd 80x20	1013 S355J2G3		0,50	2,00 Stk
3	bolt	B225041 Rd 50x104	1013 St52-3	b 05.04.05	0,20	1,00 Stk
4	bolt	B225085 Rd 50x109	1013 St52-3	a 05.04.05	0,20	1,00 Stk
10	rubber buffer 65 x 22,5 x 26	WAI102490			0,17	4,00 Stk
11	nut M20 DIN 985	WAI106610				2,00 Stk
12	fixing sheet	B223057 Bl 10x32x50	1543/EN10029 St37-2		0,10	2,00 Stk

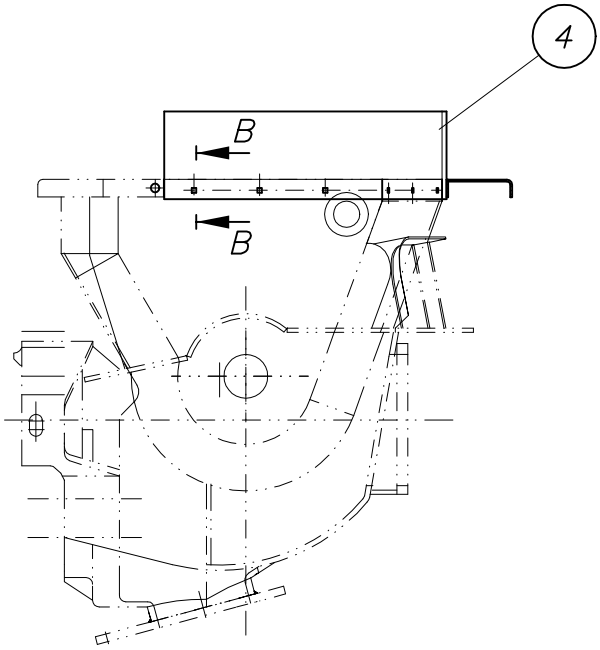
Gummischürze kpl.

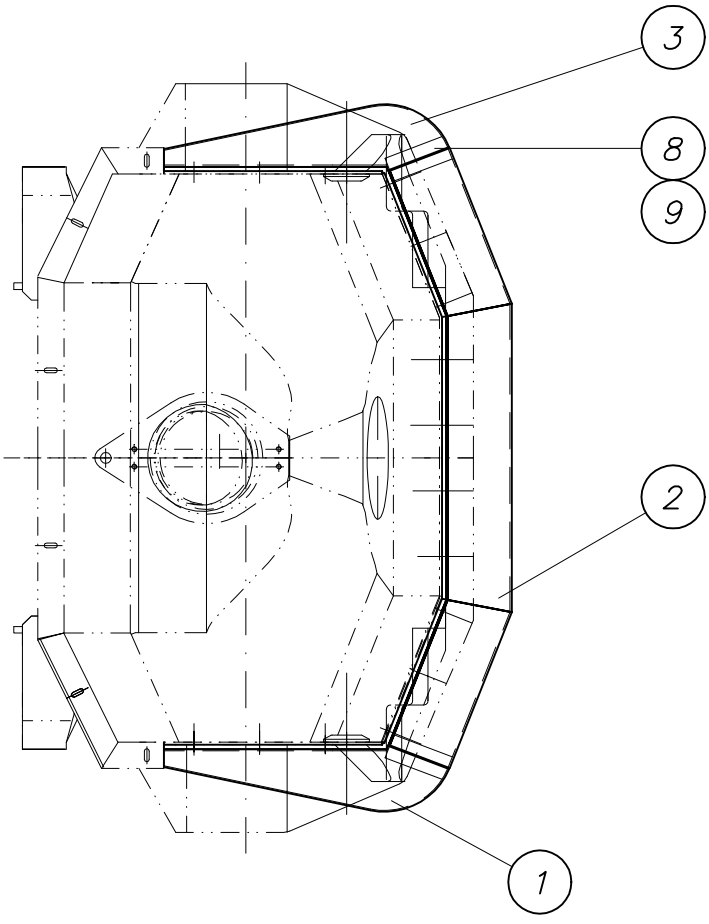
rubber apron cpl.

B 22 5 045a

Waitzinger
Baumaschinen GmbH







PARTS LIST

22.06.05 10:15:29

part list	description	created	index	valid from	valid to
B225045	rubber apron cpl	07.03.01 Mi	a	04.04.03	

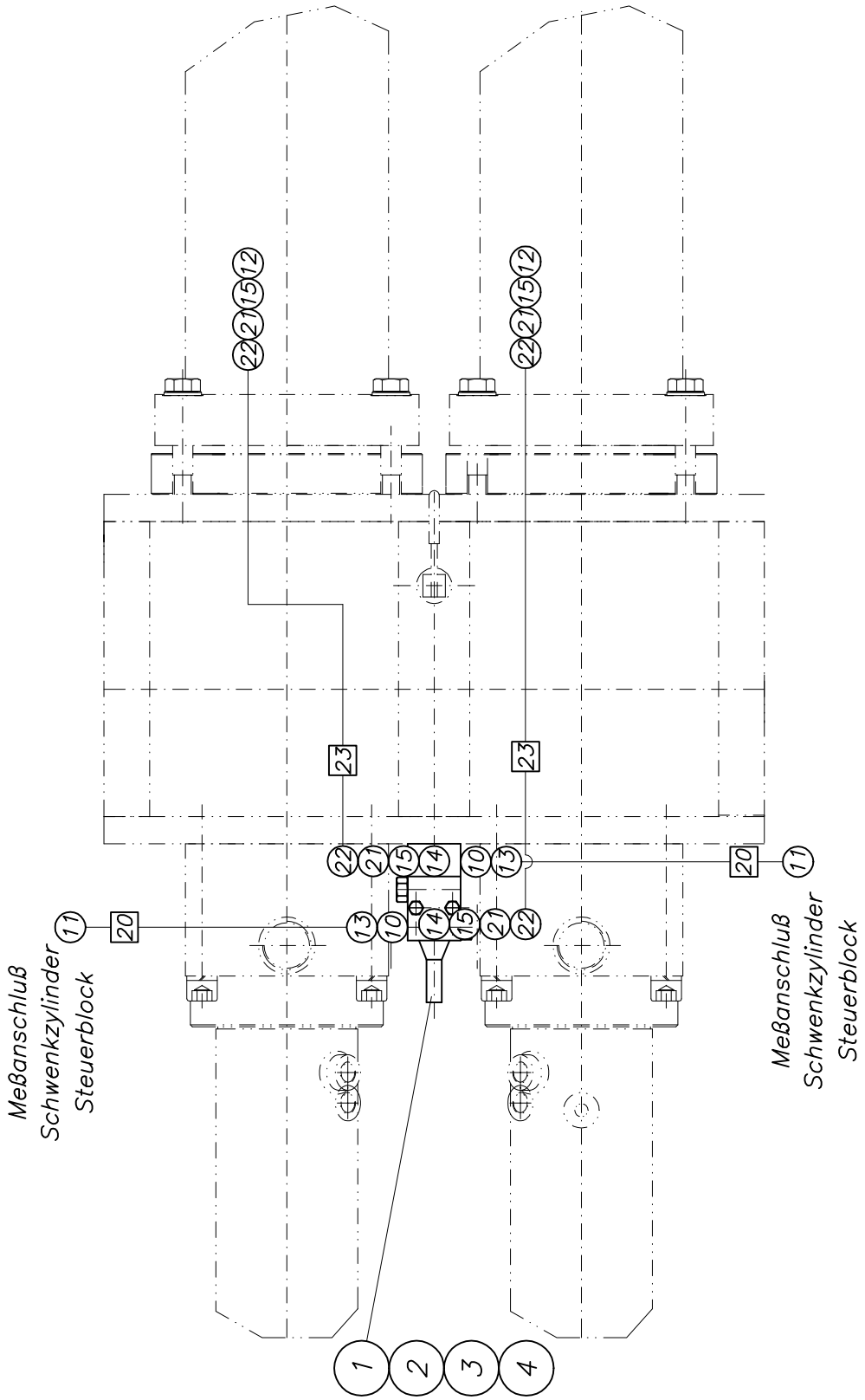
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	strip	B225042 Bl 4x220x701	1543/EN10029 St37-2	a 04.04.03	2,60	1,00 Stk
2	strip cpl. own parts list	B225053		b 02.03.04	10,00	1,00 Stk
3	strip	B225054 Bl 4x220x701	1543/EN10029 St37-2	b 30.11.04	2,60	1,00 Stk
4	rubber apron	B224013 Gummi 10x200x31		a 25.02.00		1,00 Stk
5	cup square neck bolt M 10 x 30	WAI103972				12,00 Stk
6	washer 10.5	WAI101559			0,00	12,00 Stk
7	cap nut M10	WAI101847				12,00 Stk
8	countersunk screw	WAI103176				4,00 Stk
9	hex. nut M6	WAI102998				4,00 Stk

Förderkolbenschmierung kpl.

conveying cyl. lubrication cpl.

B 18 3 006b

Waitzinger
Baumaschinen GmbH



PARTS LIST

27.06.05 08:51:45

part list	description	created	index	valid from	valid to
B183006	conveyor cyl. autom. cpl.	15.01.99 Mi	b	01.03.05	

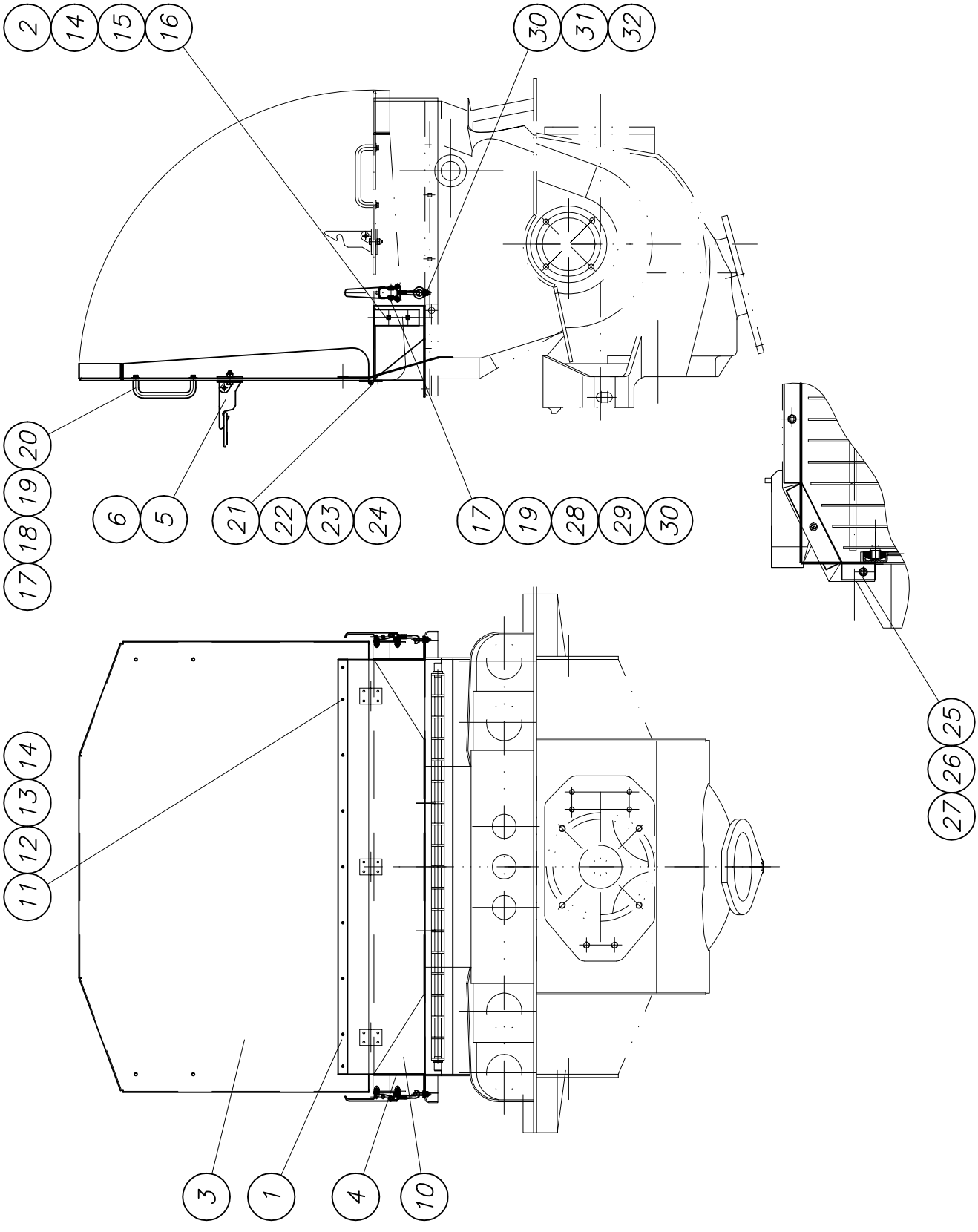
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	holder for distributor	B183008 Bl 8x52x95	1543/EN10029 St37-2		0,30	1,00 Stk
2	distributor VSKH 2-D	WAI104402				1,00 Stk
3	hexagon bolt M 8 x 70	WAI105277				2,00 Stk
4	spring washer A8 DIN 127 VERZ.	WAI102205			0,00	2,00 Stk
10	straight male stud couplings L8R 1/4"	WAI105202				2,00 Stk
11	swivel barrel tee L8	WAI100556			0,08	2,00 Stk
12	straight male stud couplings L6M	WAI103737				2,00 Stk
13	adjustable elbow bodies L8	WAI100589				2,00 Stk
14	male stud couplings L6 R 1/4" WD	WAI105434				2,00 Stk
15	adjustable elbow bodies L6	WAI102664			0,02	4,00 Stk
20	hydraulic hose DN 6 x 1000	WAI103234				2,00 Stk
21	hose connecting piece, DN6, short	WAI100253			0,01	2,00 Stk
22	threaded sleeve	WAI100254			0,01	2,00 Stk
23	plastic pipe 8.4 x 2.1	WAI100255			0,05	3,00 Mtr

Trichterabdeckung kpl.

cover for hopper cpl.

B 22 5 090a

Waitzinger
Baumaschinen GmbH



PARTS LIST

04.11.05 08:41:55

part list	description	created	index	valid from	valid to
B225090	cover for hopper cpl.	18.05.05 hbk	a	26.10.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	plate	B255063 Bl4x30x1280	10029 S235J2G3	a 19.07.05	1,20	1,00 Stk
2	plate	B255064 Bl5x50x140	10029 S235J2G3		0,27	2,00 Stk
3	splash board own parts list	B255065	 Alu	c 27.07.05	12,00	1,00 Stk
4	splash board own parts list	B255075			15,00	1,00 Stk
5	hook cpl. own parts list	B224025		a 06.09.05	0,90	1,00 Stk
6	holder	B224021 Rd 10x1060	1013 S355J2G3	a 23.05.05	0,65	1,00 Stk
10	rubber apron	WAI107190				1,00 Stk
11	countersunk head screw M6x20	WAI103153				9,00 Stk
12	washer 6 mm	WAI106432				9,00 Stk
13	spring washer A6	WAI103000				9,00 Stk
14	cup square neck bolt M 10 x 30	WAI103972				4,00 Stk
15	washer 10.5	WAI101559			0,20	4,00 Stk
16	cap nut M10	WAI101847				4,00 Stk
17	hexagon bolt M 8 x 20	WAI101837				10,00 Stk
18	washer 8.4 DIN9021	WAI102882				4,00 Stk
19	spring washer A8 DIN 127 VERZ.	WAI102205			0,00	10,00 Stk
20	bow grip	WAI104441				2,00 Stk
21	hinge	WAI103237			0,10	3,00 Stk
22	countersunk screw	WAI103176				12,00 Stk
23	washer	WAI103572				12,00 Stk

PARTS LIST

part list	description	created	index	valid from	valid to
B225090	cover for hopper cpl.	18.05.05 hbk	a	26.10.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
24	hex. nut M6	WAI101624				12,00 Stk
25	cup square neck bolt M 10 x 25	WAI103971				6,00 Stk
26	hex. nut M10 DIN985 8.	WAI102125			0,01	6,00 Stk
27	washer 10.5	WAI101559			0,20	6,00 Stk
28	excentric lever, TUB043050	WAI109856				2,00 Stk
29	cap nut M8	WAI104933				6,00 Stk
30	washer 8.4	WAI101625				8,00 Stk
31	ring screw M 08	WAI109871			0,10	2,00 Stk
32	stop nut M8 DIN985 8. VERZ.	WAI102111			0,05	2,00 Stk

Haken kpl.

hook cpl.

B 22 4 025a

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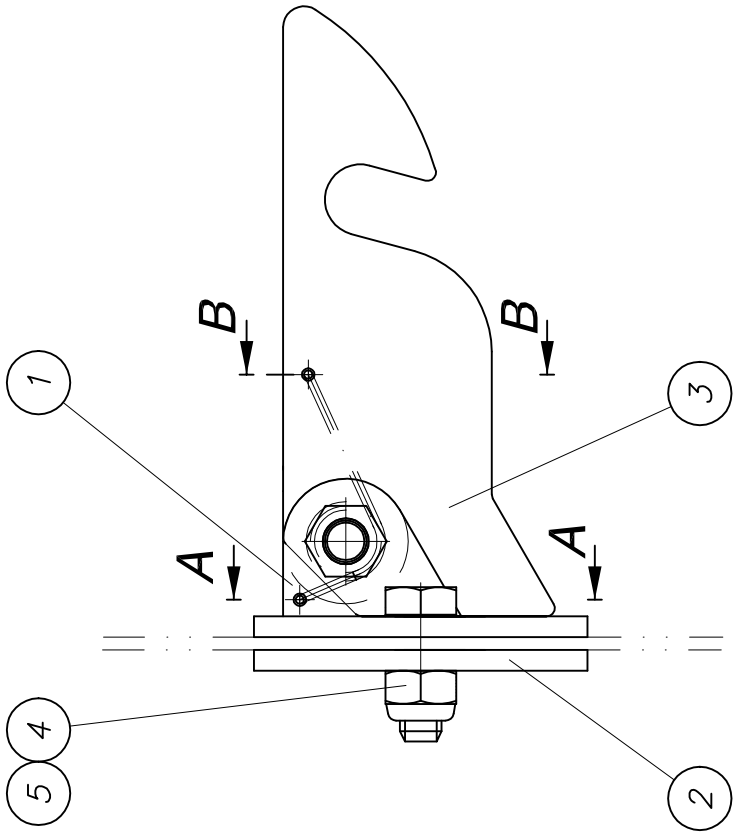

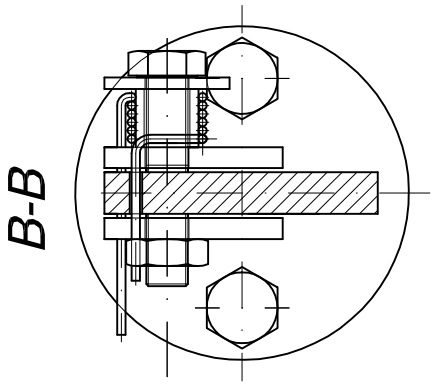

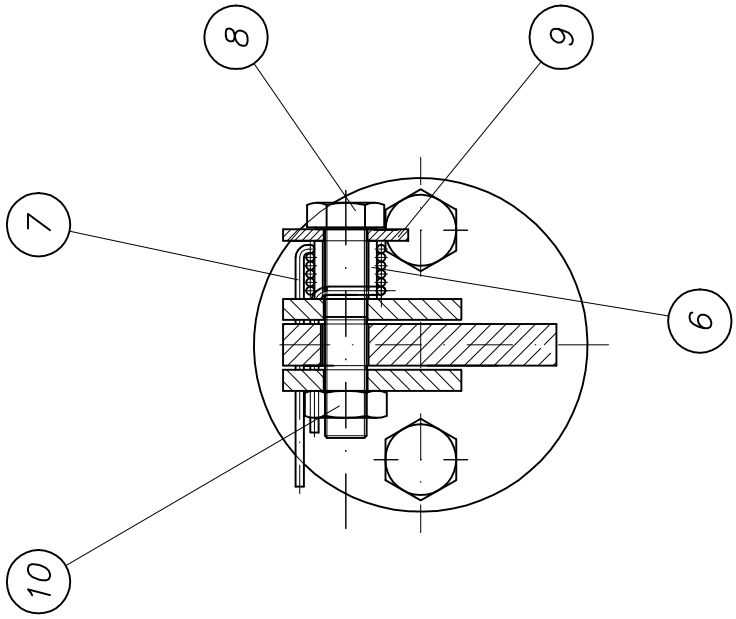

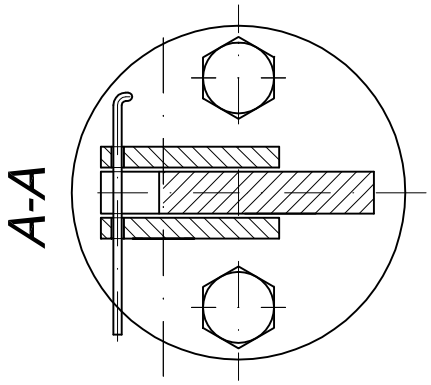

PARTS LIST

21.09.05 08:48:25

part list	description	created	index	valid from	valid to
B224025	hook cpl.	14.01.98 RH	a	06.09.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	basic plate own parts list	B224026		a 07.09.05	0,27	1,00 Stk
2	plate	B224027 5xDurchm.80	1543/EN10029 St37-2		0,19	1,00 Stk
3	hook	B224030 Bl 10x66.6x160.	1543/EN10029 St37-2	b 05.09.05	0,42	1,00 Stk
4	nut M10 DIN 934	WAI101556			0,01	2,00 Stk
5	hexagon bolt M 10 x 30	WAI101553			0,03	2,00 Stk
6	hydr. pipe 15x2x12	B224031 Hydr.Ro15x2x14			0,01	1,00 Stk
7	spring	WAI109678				1,00 Stk
8	hex. bolt M10x50	WAI102124			0,04	1,00 Stk
9	washer 10.5	WAI103288			0,00	1,00 Stk
10	hex. nut M10 DIN985 8.	WAI102125			0,01	1,00 Stk

Rührwerk mit Antrieb kpl.

agitator with drive cpl.

B 25 5 080

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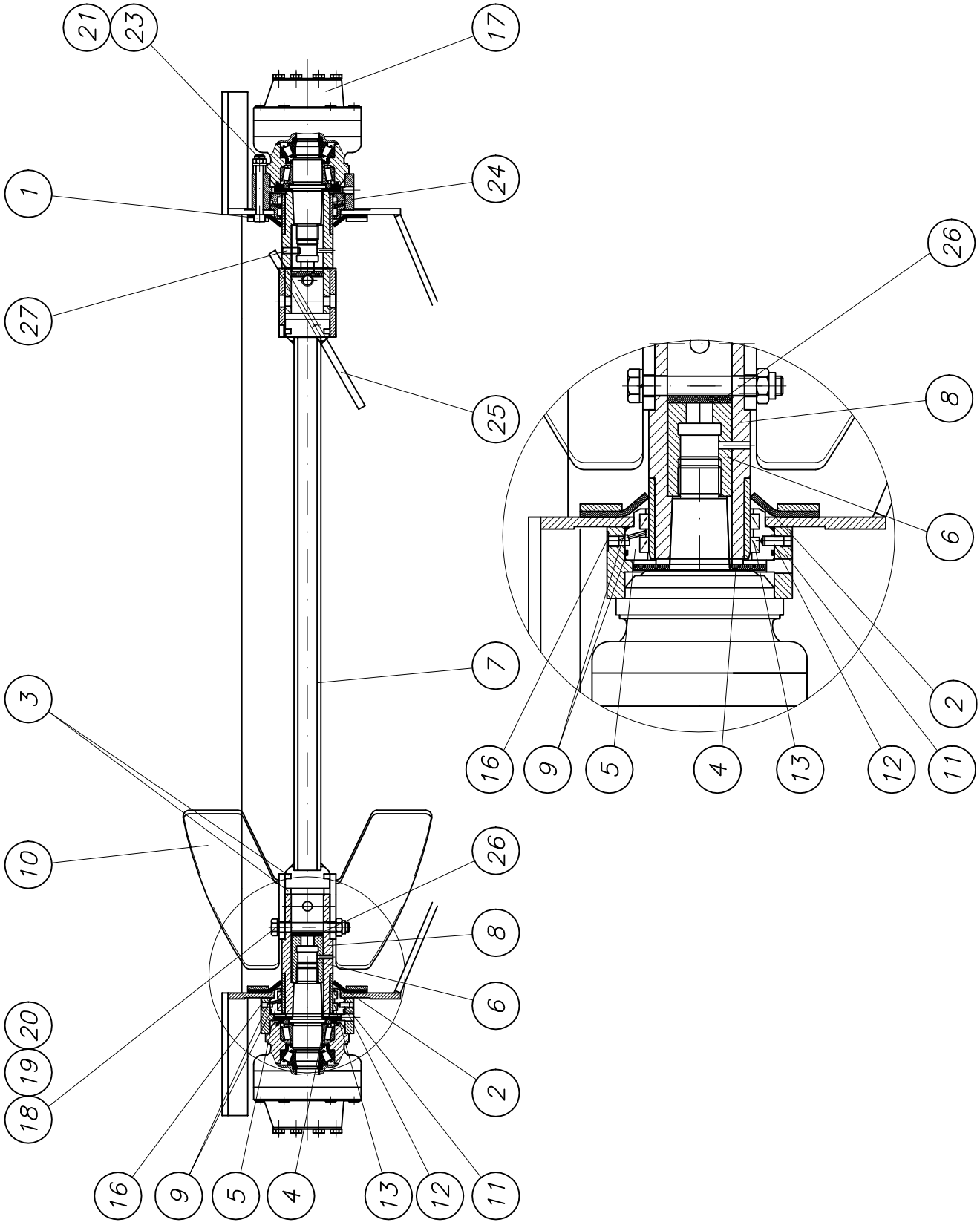
Baumaschinen GmbH



06.07.2005

PARTS LIST

28.09.05 09:53:53

part list	description	created	index	valid from	valid to
B255080	agitator with drive	13.06.05 TECHNIK			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	washer cpl. own parts list	B255092			1,00	2,00 Stk
2	seal disc	B255044 5xd 240	Gummi 70 Shore	a 31.03.04		2,00 Stk
3	sealing	B255083 Gummi 8x 76x 76	Gummi 60Shore			4,00 Stk
4	seal disc	B254109 5xDurchm.110	Gummi 60 Sho			2,00 Stk
5	sealing carrier	B255078 Rd 140x 50	DIN 1013 S355J2G3		0,31	2,00 Stk
6	shell	B255025 Rd 50x84	1013 S355J2G3	a 17.09.03	0,70	2,00 Stk
7	agitat shaft complete own parts list	B255079				1,00 Stk
8	shaft	B255028 Rd 85x208	1013 S355J2G3	c 01.07.05	5,00	2,00 Stk
9	O-ring 120 x 3	WAI108298				4,00 Stk
10	agitator cpl. left own parts list	B255085			4,50	1,00 Stk
11	motor support	B255076 Bl. 70x 155x 15	DIN EN10029 S235J2G3		4,80	2,00 Stk
12	set screw M 10x1x 20	WAI109709				2,00 Stk
13	groove ring 85-100-11.5	WAI102544			0,02	4,00 Stk
16	male stud LL6M 6 x 1	WAI102603				2,00 Stk
17	hydraulic motor MCR 3D 280 own parts list	WAI101240			28,00	2,00 Stk
18	washer DIN 6916 17	WAI101558			0,02	4,00 Stk
19	nut M16 DIN 985	WAI102330				4,00 Stk
20	hexagon bolt	WAI107513			0,21	4,00 Stk
21	hex. nut M12 DIN 985 8. VERZ.	WAI101626				2,00 Stk
23	washer	WAI102962			0,01	8,00 Stk

PARTS LIST

28.09.05 09:53:53

part list	description	created	index	valid from	valid to
B255080	agitator with drive	13.06.05 TECHNIK			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
24	wear sleeve	B253020 Rohr 101.6x13.5	2448 StE690	b 30.03.99	0,34	2,00 Stk
25	agitator cpl. right own parts list	B255088		a 28.07.05	4,50	1,00 Stk
26	seal disc	B255057 8xD53	Gummi 70 Shore			2,00 Stk
27	straight pin 10 H 6 x 30	WAI103065				2,00 Stk

Übersicht B 30 - B 39

over view B 30 - B 39

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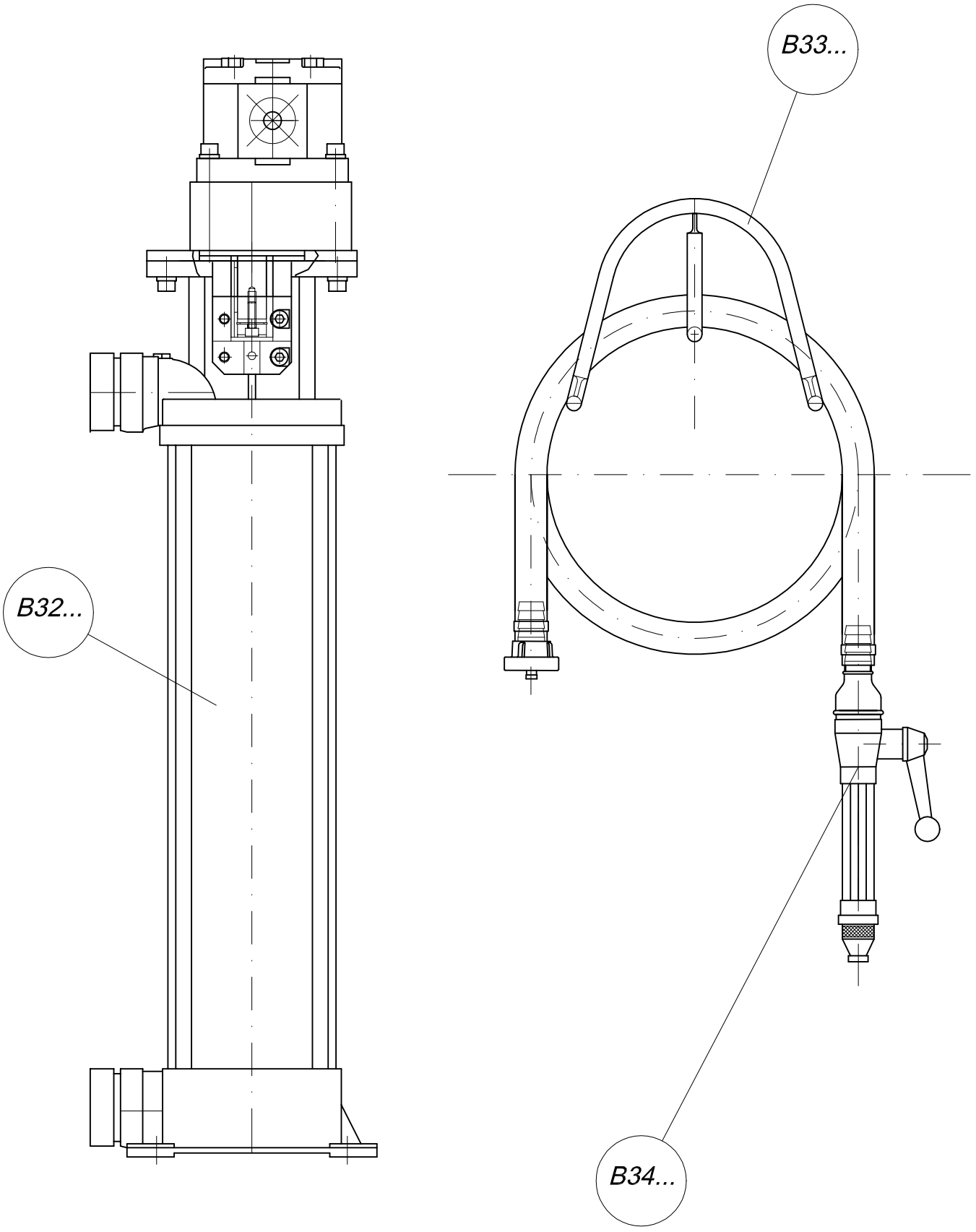

22.07.2002

Wasserpumpe kpl.

water pump cpl.

B 32 3 070

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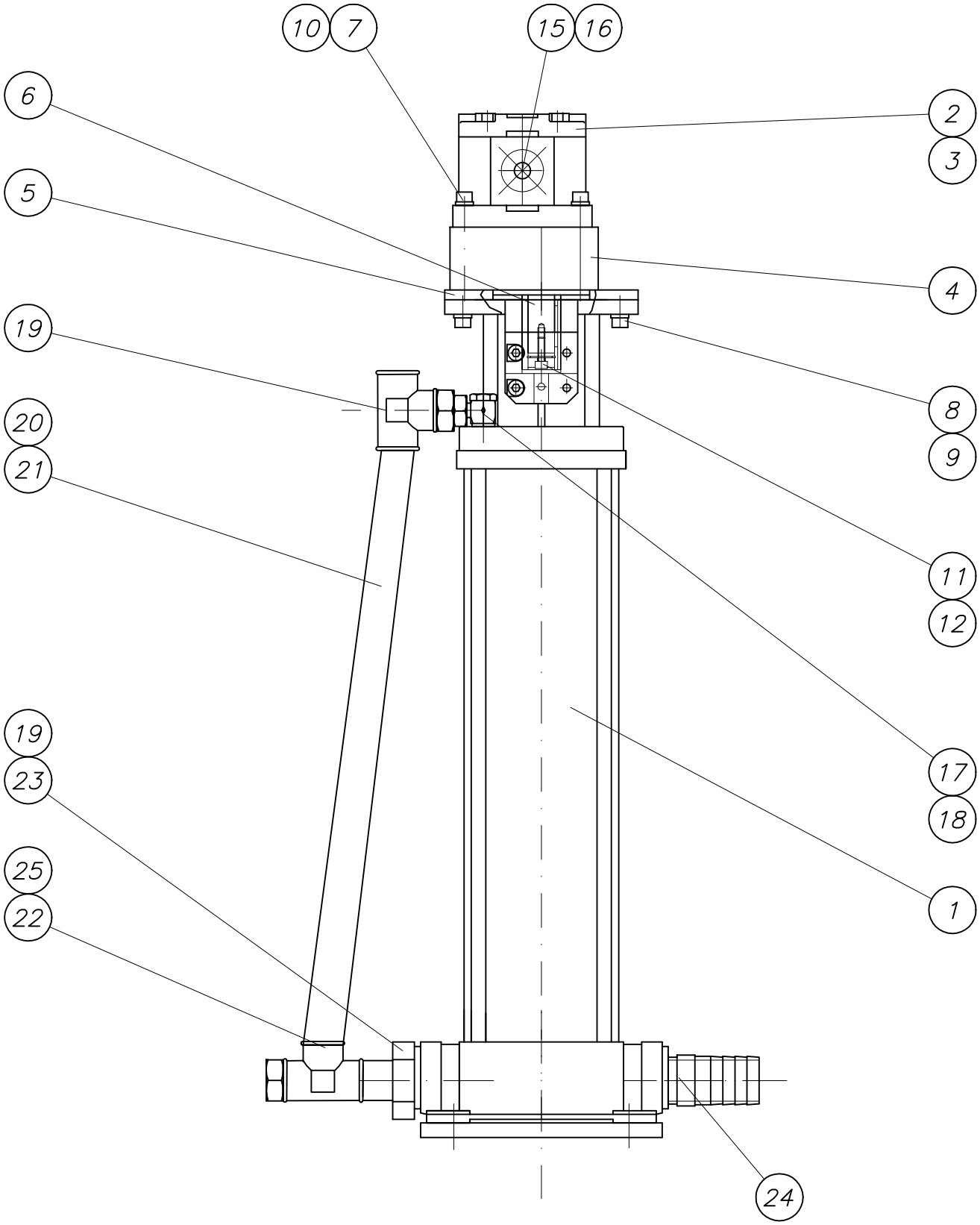

PARTS LIST

27.06.05 10:56:48

part list	description	created	index	valid from	valid to
B323070	water pump with drive	02.04.03 rhbk			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	water pump INV	WAI108082				1,00 Stk
2	gear motor own parts list	WAI105922				1,00 Stk
3	splined coupling	WAI102916				1,00 Stk
4	belt pulley support	WAI102915				1,00 Stk
5	flange	B323061 Rd 170 x12	1013 S235J2G3		1,35	1,00 Stk
6	coupling piece	B323019 Rd 38x58	670 ST50-k			1,00 Stk
7	alien bolt M 8x70	WAI105929				4,00 Stk
8	alien bolt M 8x25	WAI105930				5,00 Stk
10	spring washer	WAI100235			0,00	8,00 Stk
11	locking ring	WAI105931				1,00 Stk
12	washer	B323023 Rd 22x6	670 St50-2k		0,05	1,00 Stk
15	elbow flange coupling L15-40	WAI102678			0,23	1,00 Stk
16	elbow flange coupling L12-35	WAI105921			0,23	1,00 Stk
17	bow	WAI104163				1,00 Stk
18	thread red.adaptors"3/4-3/8"	WAI100347			0,09	1,00 Stk
19	t-piece	WAI103590				2,00 Stk
20	hose	WAI102117				0,50 Mtr
21	hose clamp 25-28 mm	WAI108309				4,00 Stk
22	hose socket	WAI105993				1,00 Stk
23	double nipple 3/4"	WAI103566				1,00 Stk
24	nipple	B323059 Rohr 42.4x4.5x9	2448 S235J2G3		0,30	1,00 Stk
25	connecting piece waterpump	B323062 Rohr 42,2x4.5x6	2448 S235J2G3		0,30	1,00 Stk

Halter für Wasserschlauch kpl.

holder for water pipe cpl.

B 33 0 020

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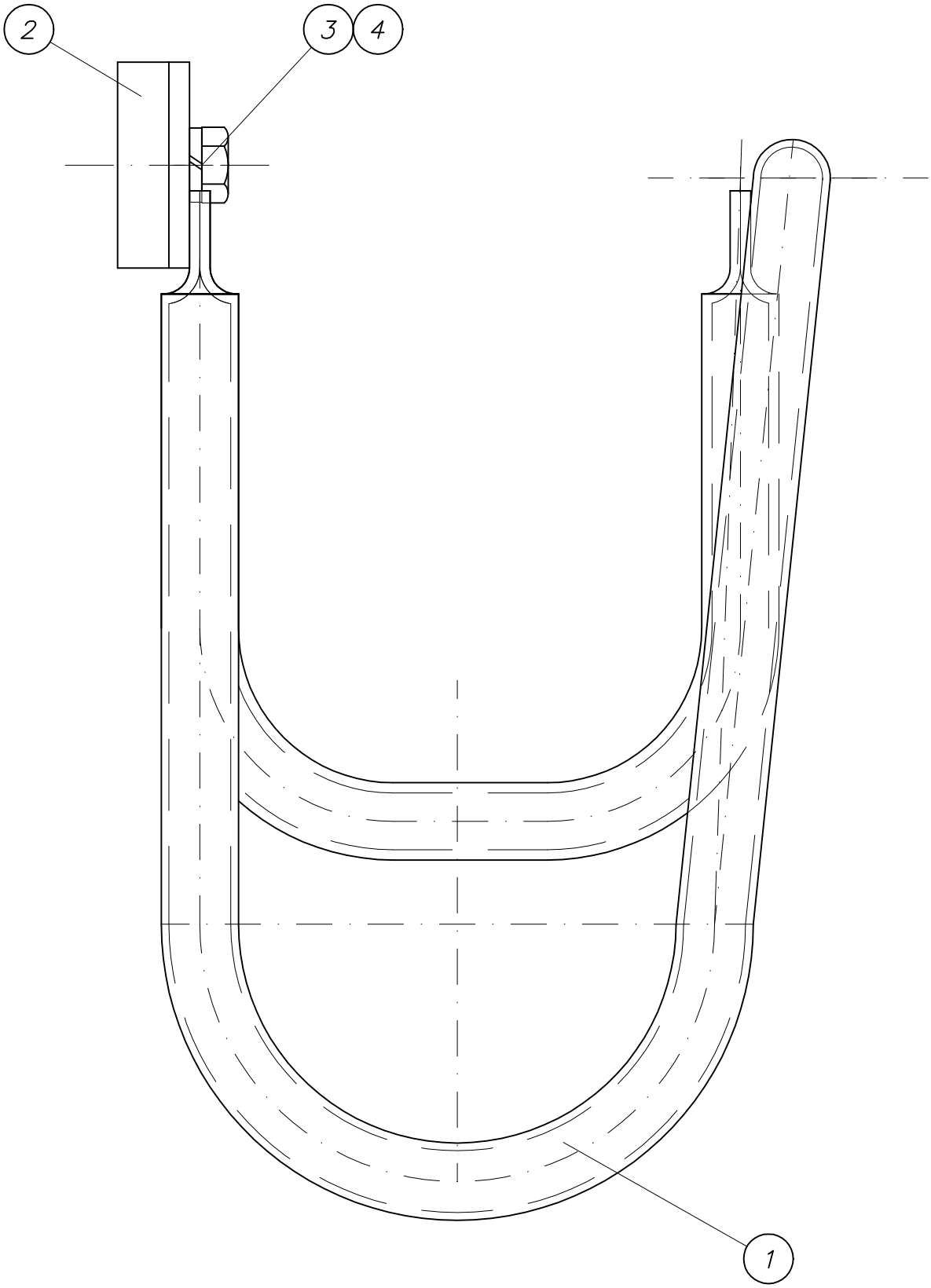

29.07.2002

PARTS LIST

27.06.05 10:58:29

part list	description	created	index	valid from	valid to
B330020	holder for water hose	06.06.02 ek			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	holder for water hose own parts list	B330015			1,00	1,00 Stk
2	flat bar	B330018 Bl 10x40x260	1543 St 37-2	a 27.09.02	0,30	1,00 Stk
3	hexagon bolt M 8 x 12 DIN 933 8.8	WAI103274				2,00 Stk
4	spring washer A8 DIN 127 VERZ.	WAI102205			0,00	2,00 Stk

Übersicht B 40 - B 49

over view B 40 - B 49

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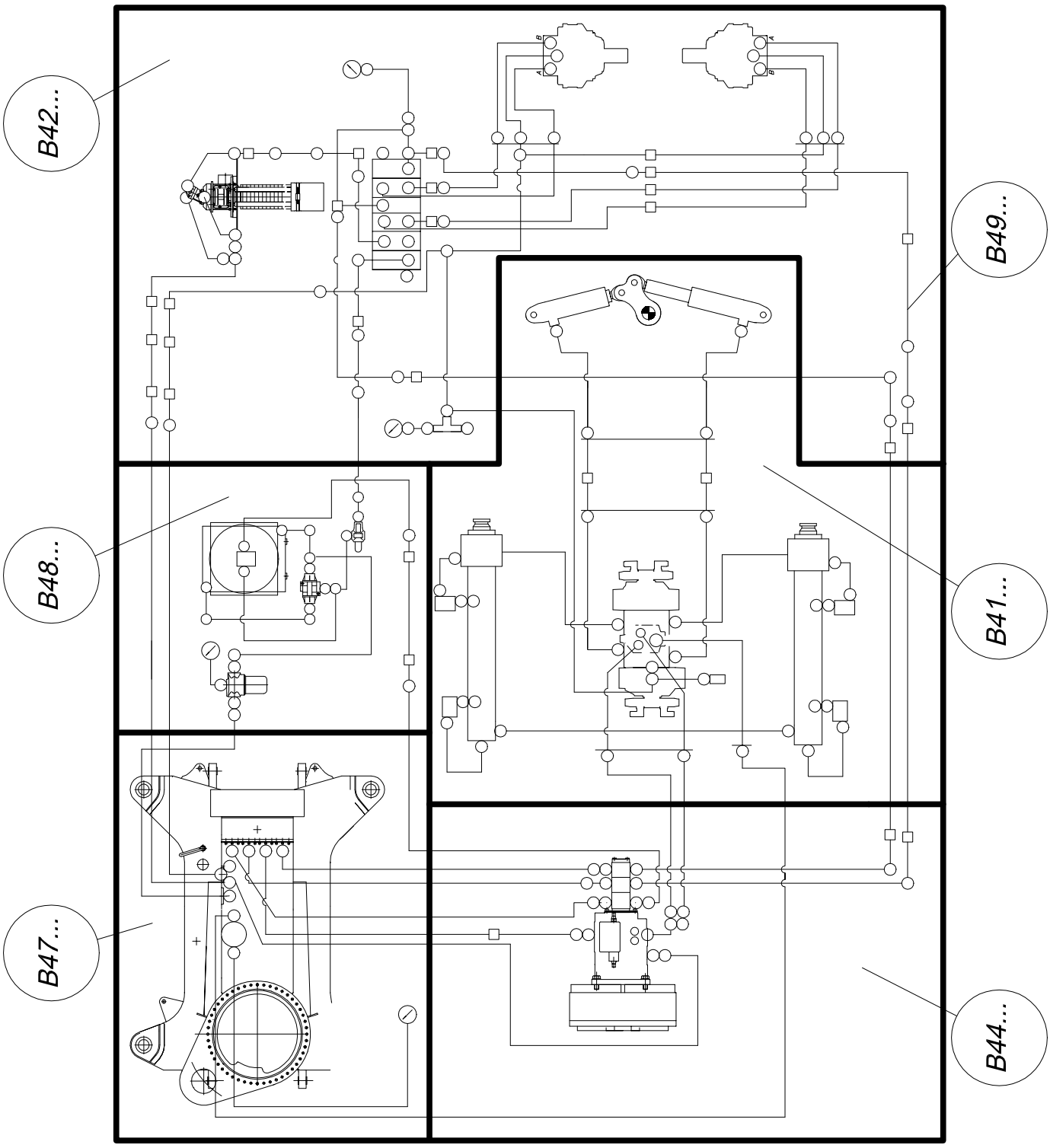
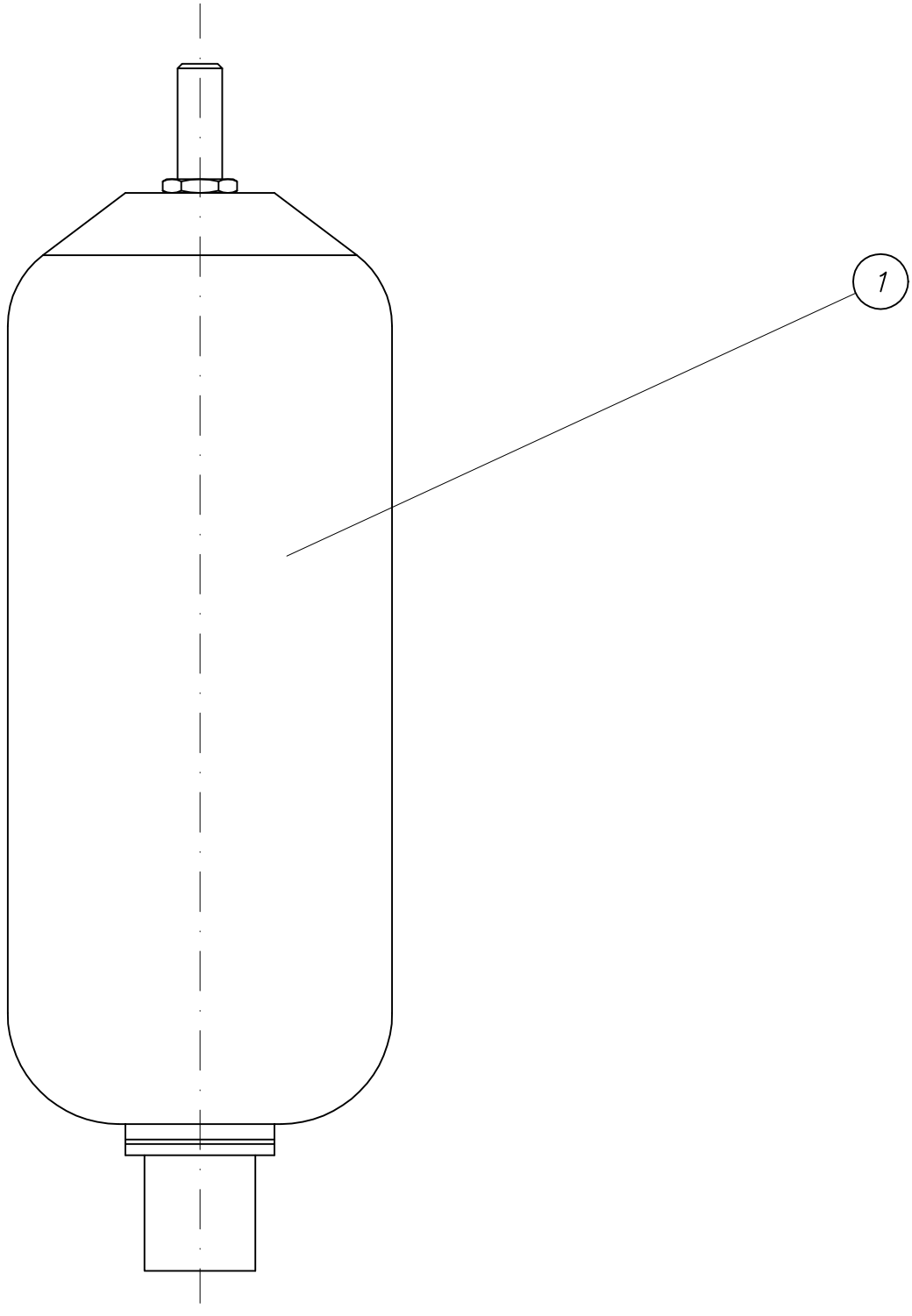


Blasenspeicher
hydraulic accumulator

WAI 103616

Waitzinger
Baumaschinen GmbH



PARTS LIST

28.09.05 11:17:13

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WAI103616	hydraulic accumulator 6 liter	01.09.99 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	spare bubble for hydraulic accumulator	WAI105555				1,00 Stk

Übersicht B 50 - B 59

over view B 50 - 59

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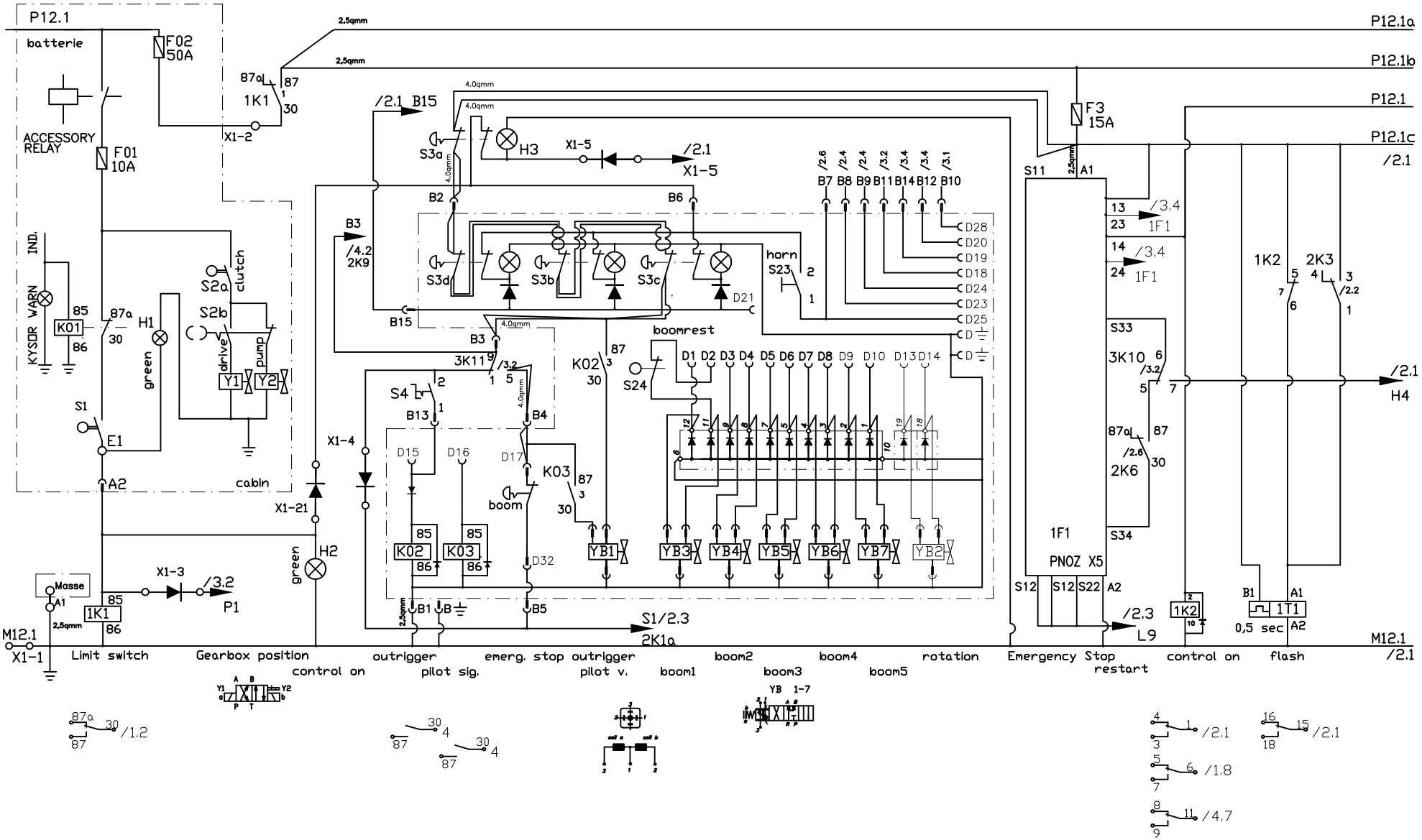

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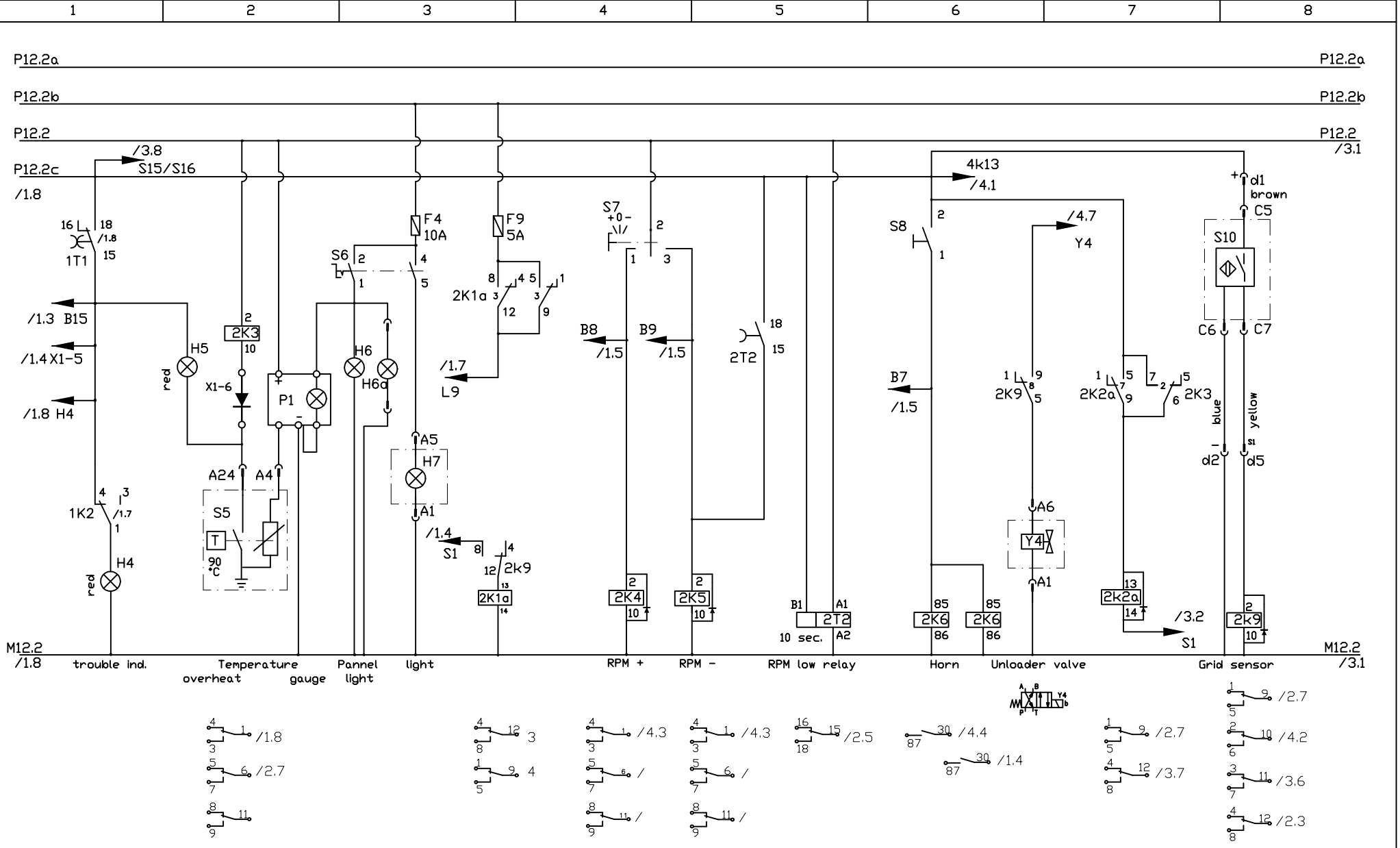
				DRAWN	2000/03/27	Fetzer	control panel V4 Page 1	
				CHKD.				
				APPD.				
d	siehe B_513017.doc	19.07.05	Körner					
c	siehe B_513017.doc	24.02.05	Körner					
b	siehe B_513017.doc	02.02.04	Körner	CHANGE ONLY WITH CAD			B 51 3 017	SHEET
a	siehe B_513017.doc	15.01.04	Körner					OF
ISSUE	MODIFICATION	DATE	NAME	ORIGINAL			REPLACEMENT FOR	REPLACEMENT BY



Waitzinger Baumaschinen Vertrieb und Service GmbH				FREE DIMENSION TOLERANCE DIN 7168 MEDIUM			SCALE / WEIGHT
					DATE	NAME	M 42.5 XXT
				DRAWN	2000/03/27	Fetzer	control panel V4 Page 2
				CHKD.			
				APPD.			
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c	siehe B_513017.doc	24.02.05	Körner	CHANGE ONLY WITH CAD			B 51 3 017
b	siehe B_513017.doc	02.02.04	Körner				SHEET / OF
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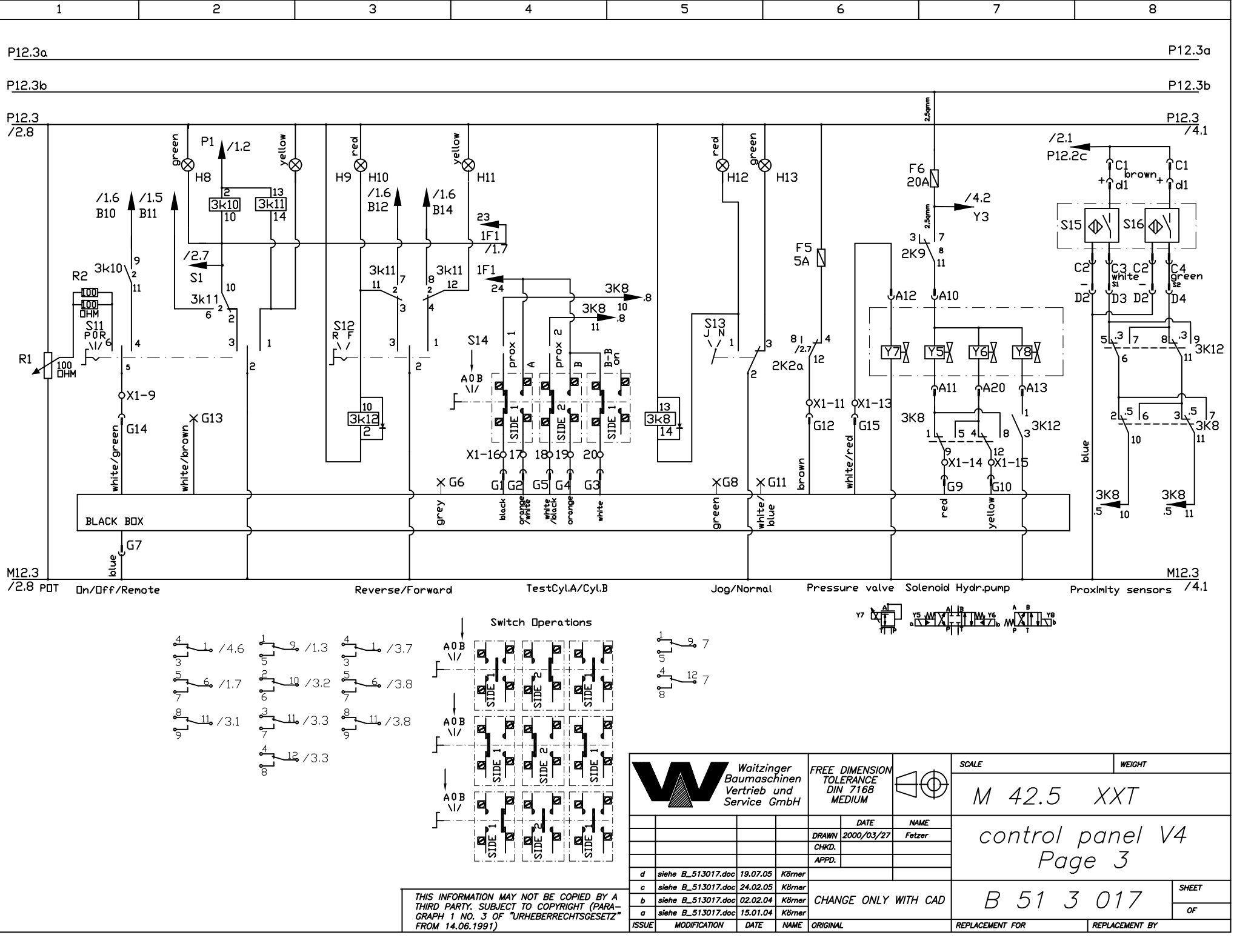

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Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

	DATE	NAME
DRAWN	2000/03/27	Fetzer
CHKD.		
APPD.		

ISSUE	MODIFICATION	DATE	NAME
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c	siehe B_513017.doc	24.02.05	Körner
b	siehe B_513017.doc	02.02.04	Körner
a	siehe B_513017.doc	15.01.04	Körner
ORIGINAL			

CHANGE ONLY WITH CAD

SCALE

WEIGHT

M 42.5 XXT

control panel V4
Page 3

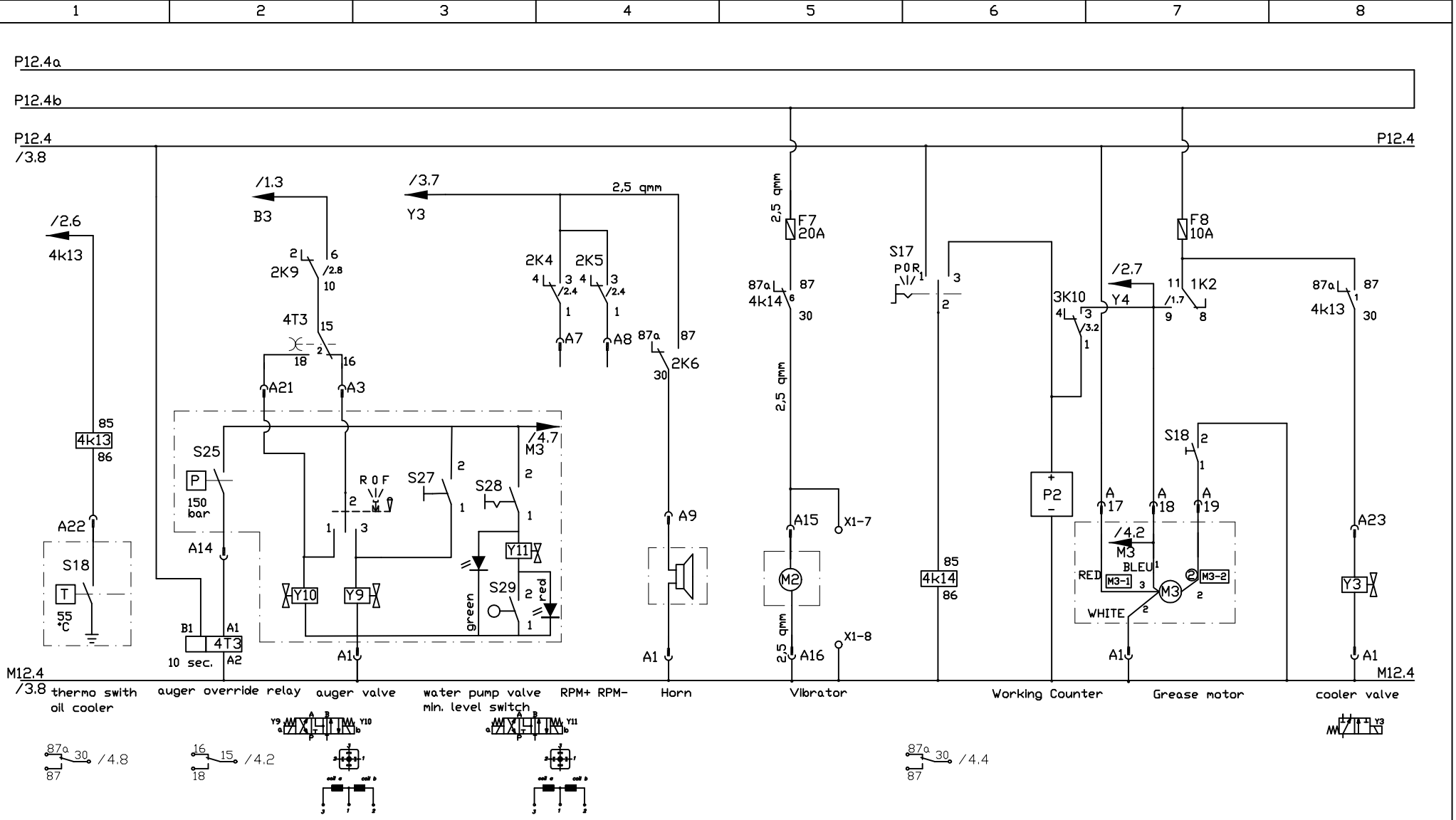
B 51 3 017

SHEET

OF

REPLACEMENT FOR

REPLACEMENT BY



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					DATE	NAME	M 42.5 XXT
				DRAWN	2000/03/27	Fetzer	control panel V4 Page 4
				CHKD.			
				APPD.			
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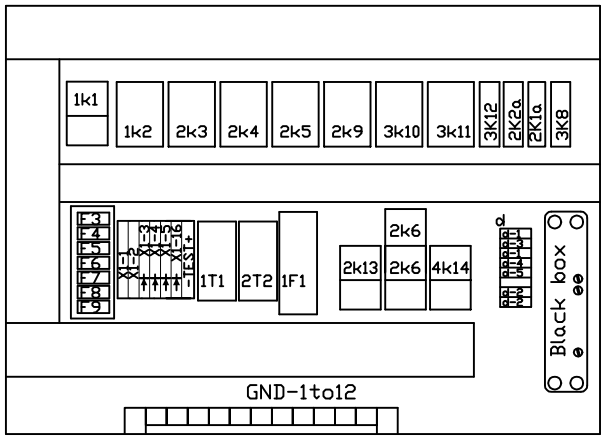

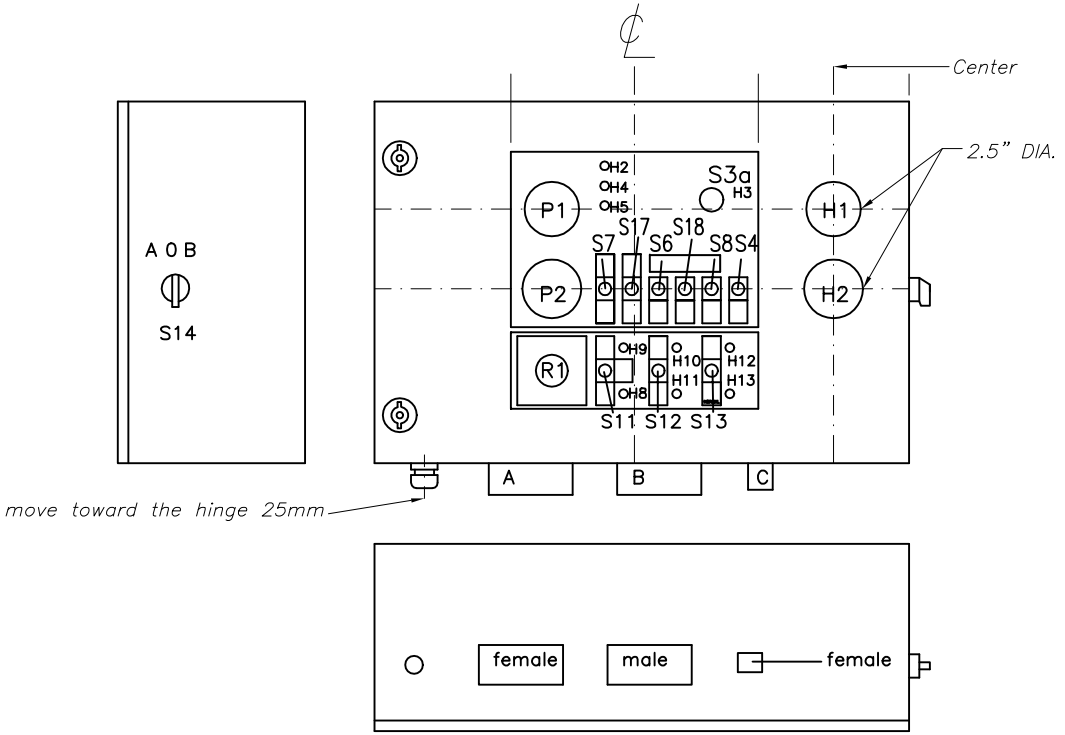

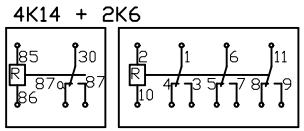

ISSUE	MODIFICATION	DATE	NAME
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b	siehe B_513017.doc	02.02.04	Körner
a	siehe B_513017.doc	15.01.04	Körner

Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

CHANGE ONLY WITH CAD

ORIGINAL

	DATE	NAME
DRAWN	2000/03/27	Fetzer
CHKD.		
APPD.		

SCALE

WEIGHT

M 42.5 XXT

control panel V4
Page 5

B 51 3 017

SHEET

OF

REPLACEMENT FOR

REPLACEMENT BY

STÜCKLISTEN-DRUCK

Stückliste	Benennung	Anlage	Änderungsindex	gültig ab	gültig bis
B513017	SCHALTPULT WAI 106059 VERSION 4	07.02.01 Mi	c	24.02.05	

Pos	Bezeichnung Rohmaterial	Sach-Nr. Abmessung	DIN Werkstoff	Index	Gewicht Kg	Anzahl Einheit
1	Not-Stop Schalter	WAI105094				1,00 Stk
2	Kontaktblock m. Lampenfassung	WAI105095				1,00 Stk
3	Schild "emergency - stop" ZB2-BY9330	WAI102278				1,00 Stk
4	Lampe 12V-2W BA 9S	WAI104083			0,10	1,00 Stk
5	LED-Signalleuchte 12 VDC 14 mm, rot	WAI105811				4,00 Stk
6	LED-Signalleuchte 12 VDC 14 mm, gelb	WAI105812				2,00 Stk
7	LED-Signalleuchte 12 VDC 14 mm, grün	WAI105813				3,00 Stk
8	Hebelschalter - abged. MOM-OFF-MOM 2	WAI103976				1,00 Stk
9	Hebelschalter - abgedichtet ON-OFF-ON	WAI104090				2,00 Stk
10	Hebelschalter - abgedichtet MON-ON	WAI104091				2,00 Stk
11	Hebelschalter - abgedichtet ON-OFF	WAI104089				2,00 Stk
12	Hebelschalter - abgedichtet ON-ON	WAI104092			0,10	2,00 Stk
13	Relais - Industrie 3W, 12VDC	WAI104093				7,00 Stk
14	Relaissockel 11-pol. ohne Diode	WAI104859				2,00 Stk
15	Relaissockel 10A, 380V, 11 Pins	WAI100178				5,00 Stk
16	Haltebügel f. Industrierelais	WAI104094				7,00 Stk
17	Sicherungskasten	WAI101577				1,00 Stk
18	Stecksicherung 5 A	WAI101922				1,00 Stk
19	Stecksicherung 10 A	WAI101921				3,00 Stk
20	Stecksicherung 20 A	WAI104096				2,00 Stk

STÜCKLISTEN-DRUCK

Stückliste	Benennung	Anlage	Änderungsindex	gültig ab	gültig bis
B513017	SCHALTPULT WAI 106059 VERSION 4	07.02.01 Mi	c	24.02.05	

Pos	Bezeichnung Rohmaterial	Sach-Nr. Abmessung	DIN Werkstoff	Index	Gewicht Kg	Anzahl Einheit
21	Betriebsstundenzähler	WAI100900				1,00 Stk
22	Anbaugehäuse CNI 16	WAI104097				1,00 Stk
23	Steckereinsatz 1-16 pol.	WAI104022				1,00 Stk
24	Anbaugehäuse 24-pol. Gr. 8	WAI101533				1,00 Stk
25	Steckdoseneinsatz 24-pol.	WAI100710				1,00 Stk
26	Erdungsschiene für Steuerpult WAI100251	WAI102577				1,00 Stk
27	Schaltplantasche	WAI104099				1,00 Stk
28	Gummipuffer 25 x 20 2 Bolzen	WAI104100				4,00 Stk
29	Verteilersystem 4-fach MVP 12	WAI105998				1,00 Stk
30	Lampe 12V-5W	WAI104101			0,10	3,00 Stk
31	Potentiometer 100 Ohm	WAI104103				1,00 Stk
32	Potentiometer - Antrieb schwarz	WAI104104				1,00 Stk
33	Kabelverschraubung PG21	WAI104109				1,00 Stk
34	Kabelverschraubung PG11	WAI104110				1,00 Stk
35	Gegenmutter PG21	WAI104114				1,00 Stk
36	Stecker für UK 4-TG leer ST-BE	WAI106395				1,00 Stk
37	Relais 12 VDC, 1W	WAI104117				4,00 Stk
38	Relaissockel für Bosch Relais	WAI100986				4,00 Stk
39	Gegenmutter PG11	WAI104112				1,00 Stk
40	Relais - Hochl. 12VDC, 70A, 1S	WAI104122				1,00 Stk

STÜCKLISTEN-DRUCK

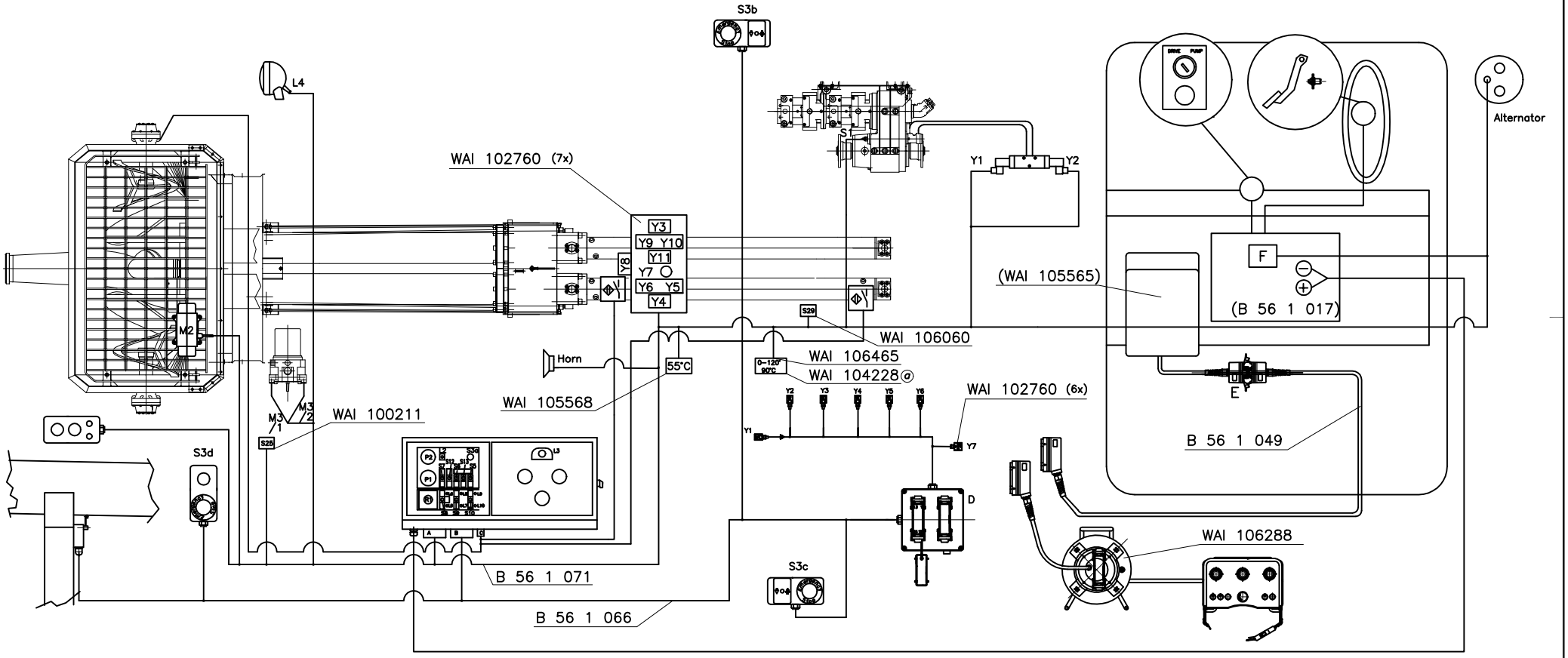
Stückliste	Benennung	Anlage	Änderungsindex	gültig ab	gültig bis
B513017	SCHALTPULT WAI 106059 VERSION 4	07.02.01 Mi	c	24.02.05	

Pos	Bezeichnung Rohmaterial	Sach-Nr. Abmessung	DIN Werkstoff	Index	Gewicht Kg	Anzahl Einheit
41	Relaissockel	WAI105619				1,00 Stk
42	Kabelverschraubung PG16 vernickelt	WAI102933				1,00 Stk
43	Widerstand 100 Ohm, 4,5W	WAI104118				2,00 Stk
47	Durchgangsklemme grau 2-Leiter 6qmm	WAI105817				2,00 Stk
48	Abschluß- und Zwischenplatte orange	WAI105818				1,00 Stk
49	Knebel	WAI100968				1,00 Stk
50	Halter	WAI100287				1,00 Stk
51	Schaltelement	WAI100969				3,00 Stk
52	Schalter - Brücke 3SB1S12OAN	WAI103735				2,00 Stk
53	Relais - Miniatur DC 12V 4 Wechsler	WAI105046				4,00 Stk
54	Kondensatablauf	WAI104669				1,00 Stk
55	Klemme UK 4-TG	WAI104186				7,00 Stk
56	Stecker m. Diode, ST-1N4007	WAI104185				6,00 Stk
57	Crimpkontakt - Stift 0,75 - 1 qmm	WAI103695				2,00 Stk
59	Relais - Zeit blinkend RZ12Ti-01	WAI105331				1,00 Stk
60	Relais - Ausschalt-Wisch EZ12RV-001	WAI105815				1,00 Stk
61	Not-Aus-Schaltgerät PNOZ X5	WAI105814				1,00 Stk
62	Alu-Klebeschild m. Bohr. für WAI105542	WAI105819				1,00 Stk
63	Klemme UK 5 N f. Hutschiene	WAI104671				2,00 Stk
64	Fassung 14-pol. m. Freilaufdiode	WAI103974			0,02	4,00 Stk

STÜCKLISTEN-DRUCK

Stückliste	Benennung	Anlage	Änderungsindex	gültig ab	gültig bis
B513017	SCHALTPULT WAI 106059 VERSION 4	07.02.01 Mi	c	24.02.05	

Pos	Bezeichnung Rohmaterial	Sach-Nr. Abmessung	DIN Werkstoff	Index	Gewicht Kg	Anzahl Einheit
65	Haltebügel f. Miniaturrelais	WAI104860			0,02	4,00 Stk
66	Fernthermometer 12 Volt	WAI105823				1,00 Stk
67	Black box	WAI104442				1,00 Stk
68	Gegenmutter CE16 PA 6	WAI104519				1,00 Stk
69	Leuchte innen 2JA 001 330-001	WAI106402				1,00 Stk
71	Relais - Zeit 12V, Multifunktion	WAI106393				1,00 Stk
72	Kennzeichenleuchte klein 2KA 001 389-10	WAI106182				1,00 Stk



PLUG A

1	Y3+L4+M3/1+ Y4+Y7+FAN	brn
2	S1>F1	blk/whi
3	Y3−1	red/yel
4	temp. switch	yel/whi
5	L4	grn/whi
6	Y4−1	blu/whi
7	F3	blu
8	F2	blk
9	Horn	blk
10	Y5−1/hopper Y6/Y8/Y9	blk/grn
11	Y5− 2	blk/red
12	Y7	gry/red
13	Y8	whi/brn
14	Y9	vio
15	M2	blk
16	M2	blu
17	M3/1 −1	gry
18	M3/1−3	grn
19	M3/2 −2	yel
20	Y6	whi
21	temp switch	whi
22	temp switch	whi
23	Y10	grn
24	free	free
	F5	red
	F6	gry/blk

PLUG B

1	D10	brn	ground
2	S3b	gry	emergency stop
3	S3c	blk	emergency stop
4	D13	blu	emergency stop
5	D 22	gry/red	emergency stop
6	S3b−d	white	emergency stop
7	D 20	whi/grn	horn
8	D 15	grn	RPM +
9	D 16	blk/whi	RPM −
10	D 24	vio	Pot
11	D 17	blk/grn	pumping on
12	D 19	gry/blk	reverse
13	free	free	free
14	D 18	blu/whi	pumping
15	D 21	blk/red	flashing light
16	free	free	free

PLUG C

pin No.	wire No.	function
1	brown	+
2	blue	−
3	black	Sensor 1
4	black	Sensor 2
5		
6		
7		
8		

PLUG D

⏚	A 1	brn	ground
1	Y3/3	brn/whi	boom 1 up
2	Y3/2	blu	boom 1 down
3	Y4/3	grn/whi	boom 2 up
4	Y4/2	blk/grn	boom 2 down
5	Y5/3	gry/blk	boom 3 up
6	Y5/2	blk/whi	boom 3 down
7	Y6/3	blk/red	boom 4 up
8	Y6/2	gry/red	boom 4 down
9	free	free	free
10	⊣⊢	brn	ground
11	Y2/2	vio	turn clockwise
12	Y2/3	blu/whi	turn anticlockw.
13	B4	red	plus
14	Y1/2/3 Y7	gry	pilot valve
15	B 8	grn	RPM +
16	B 9	blk/whi	RPM −
17	B 11	blk/grn	pumping on
18	B 14	blu/whi	pumping
19	B 12	gry/blk	reverse
20	B 7	whi/grn	horn
21	B 15	blk/red	free
22	B 5	gry/red	emergency stop
23	Y7	brn/whi	free
24	B 10	vio	POT

PLUG E

pin No.	wire No.	function	pin No.	wire No.	function
1	1	power supply 12V	17	34	boom 4 up
2	3	emergency stop	18	31	boom 3 down
3	4	12 V+	19	32	boom 3 up
4	5	RPM−	20	29	turn clockwise
5	6	free	21	30	turn anticlockw.
6	8	horn	22	28	boom 1 down
7	11	RPM+	23	27	boom 1 up
8	13	pump on	24	39	boom 2 down
9	9	GND	25	40	boom 2 up
10	14	reverse	26	–	free
11	25	pilot valve	27	–	free
12	–	free	28	35	pump speed pot
13	–	free	29	–	free
14	–	free	30	–	free
15	–	free	31	–	free
16	33	boom 4 down	32	–	free

TERMINAL F

blk/whi	A2
whi	S1
grn	Y1
gry/whi	Y2
blu	A7
blk	A8
vio	Lima D
brn	⊖
red	reserve
gry/blk	reserve

Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

	DATE	NAME
DRAWN	2000/03/28	MI
CHKD.		
APPD.		

CHANGE ONLY WITH CAD

a siehe B_561070.doc 29.08.05 Kilmer

MODIFICATION | DATE | NAME

ORIGINAL

SCALE without | WEIGHT

own parts list

Cable harness / accessories REED V4

B 56 1 070

SHEET | OF

REPLACEMENT FOR | REPLACEMENT BY

PARTS LIST

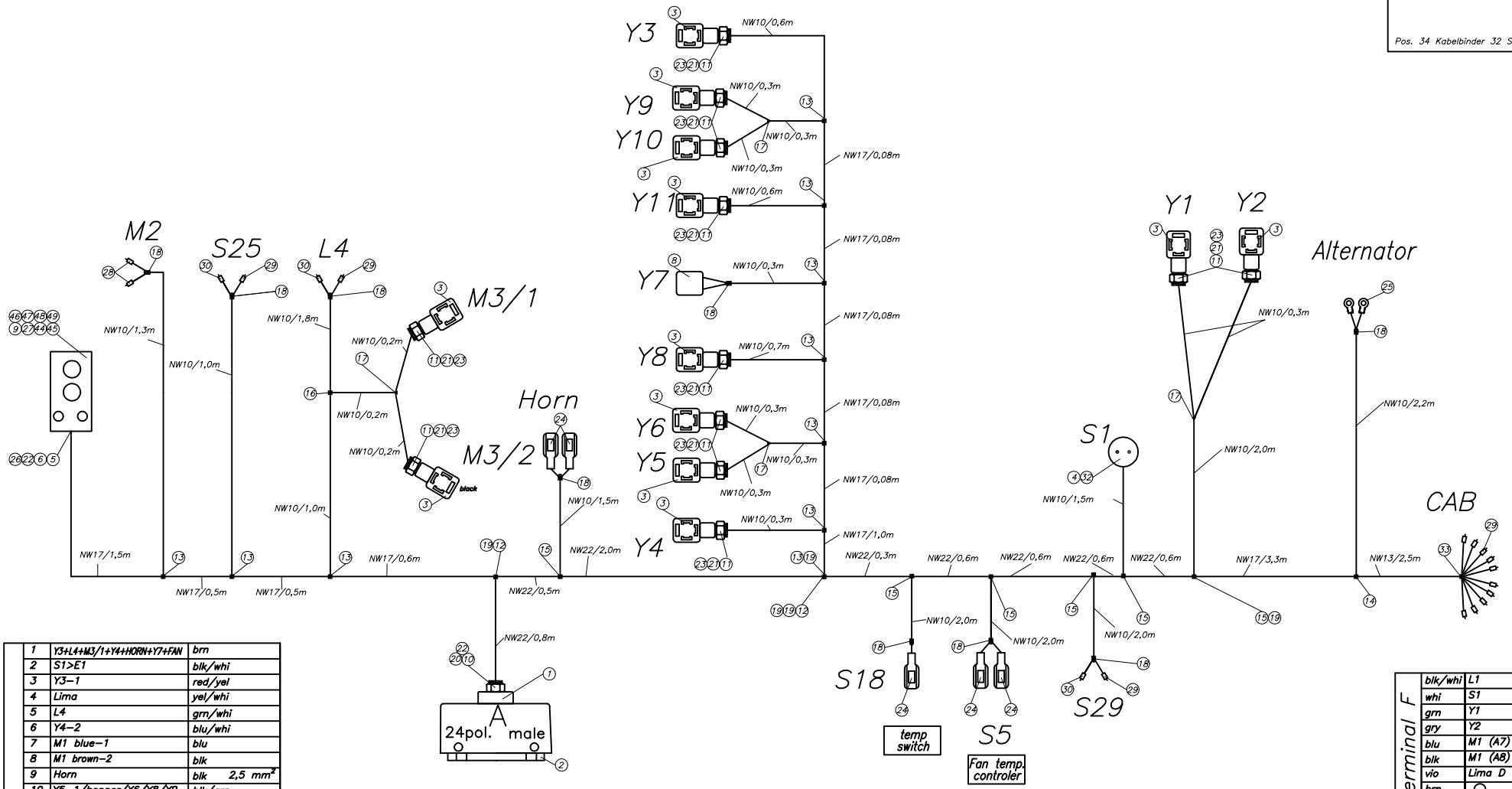
28.09.05 10:34:39

part list	description	created	index	valid from	valid to
B561070	cable harness closed loop version IV	28.03.00 Mi	a	29.08.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	cable harness boom REED V III own parts list	B561066		c 26.08.04	9,00	1,00 Stk
2	cable harness pump REED CL 32/36 V IV own parts list	B561071				1,00 Stk
3	cable cpl. for cable control own parts list	B561049				1,00 Stk
4	cable drum + 35m cable (34 x 0,5) own parts list	WAI106288				1,00 Stk
5	anti-interference device	WAI102760				14,00 Stk
6	thermo sensor	WAI104228				1,00 Stk
7	thermo sensor 55 degrees C	WAI105568			0,10	1,00 Stk
8	pressure switch	WAI100211			0,87	1,00 Stk
9	switch swimmer	WAI106060				1,00 Stk
10	sealing ring 14x18x2	WAI106465				1,00 Stk

Lose Teile:

Pos. 34 Kabelbinder 32 Stück



PLUG A			
	1	Y3+L4+M3/1+Y4+HORN+Y7+FAN	brn
	2	S1>E1	blk/whi
	3	Y3–1	red/yel
	4	Lima	yel/whi
	5	L4	grn/whi
	6	Y4–2	blu/whi
	7	M1 blue–1	blu
	8	M1 brown–2	blk
	9	Horn	blk 2,5 mm²
	10	Y5–1/hopper/Y6/Y8/Y9	blk/grn
	11	Y5–2	blk/red
	12	Y7	gry/red
	13	Y8	whi/brn
	14	Y9	vio
	15	M2	blk 2,5 mm²
	16	M2	blu 2,5 mm²
	17	M3/1 –1	gry
	18	M3/1–3	grn
	19	M3/2 –2	yel
	20	Y6	whi
	21		
	22		
	23	Fan	grn
	24	S5	yel/whi
		Res. F	red
		Res. F	gry/blk

Terminal F	
blk/whi	L1
whi	S1
grn	Y1
gry	Y2
blu	M1 (A7)
blk	M1 (A8)
vio	Lima D
brn	⊖
red	reserve
gry/blk	reserve

Waitzinger Baumaschinen Vertrieb und Service GmbH

free dimension tolerance DIN 7168 medium

issue	MODIFICATION	date	name

	date	name
drawn	1998/07/13	Mi
chkd.		
appd.		

change only with CAD

original

scale 1:1 weight 00 N

semi–finished product
Material

cable loop pump
REED cl 37m

B 56 1 071

sheet 1 of 2

replacement for

replacement by

PARTS LIST

28.09.05 10:35:01

part list	description	created	index	valid from	valid to
B561071	cable harness pump REED CL 32/36 V IV	28.03.00 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	housing upper part, 24-pol	WAI101542				1,00 Stk
2	plug insertion 24-pol.	WAI100714				1,00 Stk
3	plug	WAI104691				10,00 Stk
4	coupling	WAI104523				1,00 Stk
5	fitting PG16	WAI104510				1,00 Stk
6	sealing for cable fitting PG16	WAI104696				1,00 Stk
7	plate	WAI104735				12,00 Stk
8	plug 2-poles, AMP junior timer	WAI106058				1,00 Stk
9	housing agitator own parts list	B561072				1,00 Stk
10	fitting PG21	WAI104507				1,00 Stk
11	fitting PG9	WAI104506				12,00 Stk
12	t - piece 22-22-22	WAI104515				2,00 Stk
13	t - piece 17-10-17	WAI104332				8,00 Stk
14	t - piece	WAI104511				2,00 Stk
15	t - piece 22-10-22	WAI105263				6,00 Stk
16	t - piece 10-10-10	WAI104514				4,00 Stk
17	reducer	WAI104512				1,00 Stk
18	cap	WAI104513				8,00 Stk
19	reducer 22/17	WAI104509				5,00 Stk
20	sealing for cable fitting PG21	WAI104697				1,00 Stk

PARTS LIST

part list	description	created	index	valid from	valid to
B561071	cable harness pump REED CL 32/36 V IV	28.03.00 Mi			

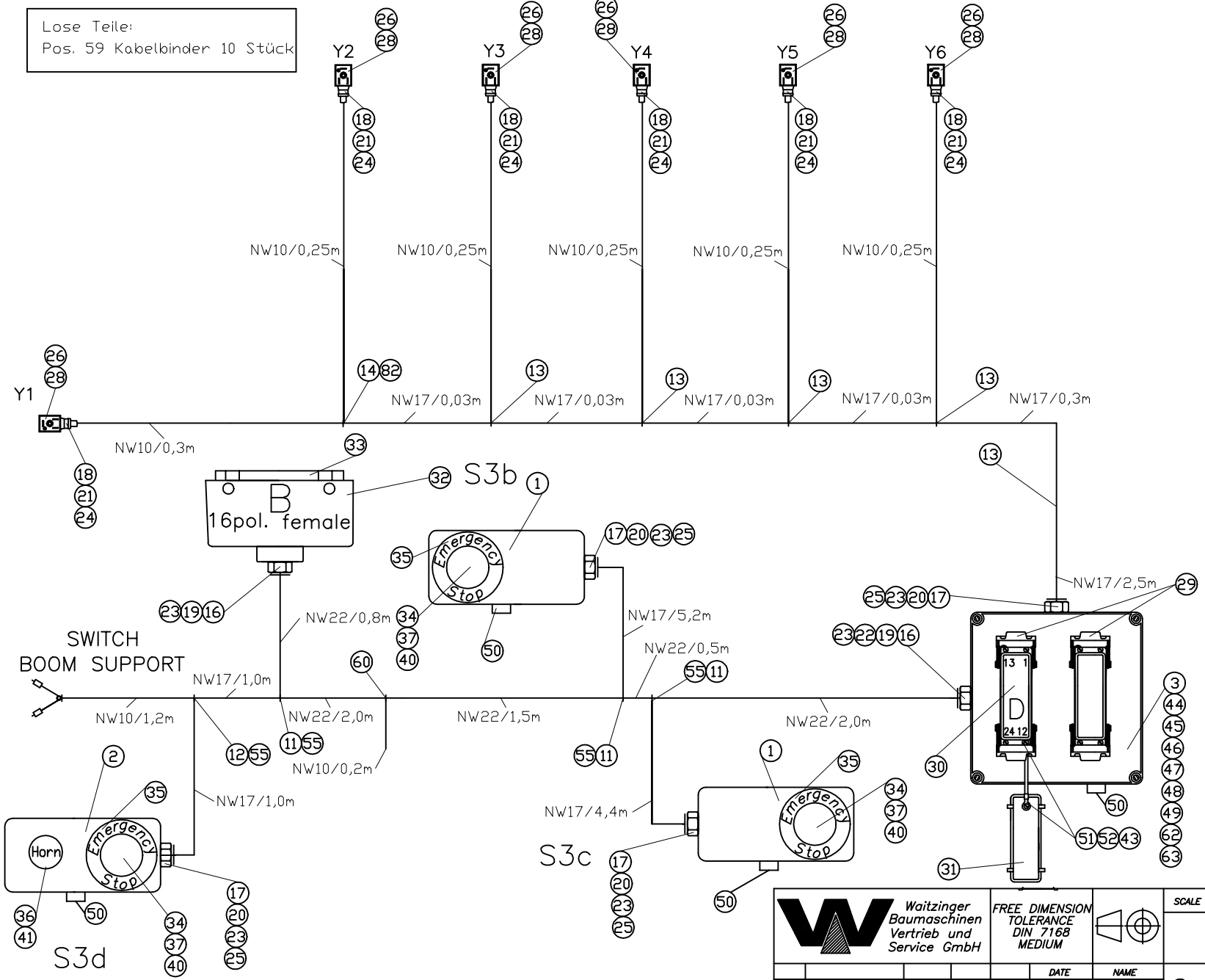
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
21	sealing for cable fitting PG9	WAI104695				12,00 Stk
22	O-ring 15 x 1,5	WAI104701				2,00 Stk
23	O-ring 8.9 x 1.25	WAI104700				12,00 Stk
24	flat plug sleeve 2,5mm	WAI104785				15,00 Stk
25	thimble 2,5 qmm M6	WAI104693			0,02	5,00 Stk
26	nut CE 16	WAI104519				2,00 Stk
27	push button	WAI100569				1,00 Stk
28	cove end sleeve 2.5mm	WAI101997				4,00 Stk
29	cove end sleeve 1.5mm	WAI101996				36,00 Stk
30	cove end sleeve 1.5mm	WAI104692				6,00 Stk
31	shrink hose	WAI104677				0,10 Mtr
32	shrink hose	WAI104505				0,05 Mtr
33	cable tie 200x3.6, black	WAI103137				32,00 Stk
34	plug	WAI104530				2,00 Stk
40	cable pipe	WAI104520				6,00 Mtr
41	cable pipe	WAI104216				7,80 Mtr
42	cable pipe	WAI104215				2,50 Mtr
43	cable pipe	WAI104213				23,80 Mtr
44	sign AL agitator	WAI106030				1,00 Stk
45	sign AL water pump	WAI106031				1,00 Stk

PARTS LIST

part list	description	created	index	valid from	valid to
B561071	cable harness pump REED CL 32/36 V IV	28.03.00 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
46	lever switch ON-OFF-ON	WAI104090				2,00 Stk
48	led-signal lamp, red	WAI105811				1,00 Stk
49	led-signal lamp, green	WAI105813				1,00 Stk
50	cable	WAI108059				270,00 Mtr

Lose Teile:
Pos. 59 Kabelbinder 10 Stück



PLUG B

1	D10 ⊣⊪	brn	ground
2	S3d	gry/brn	emergency stop
3	S3c	blk	emergency stop
4	D13	blu	emergency stop
5	D 22	gry/red	emergency stop
6	S3d	whi	emergency stop
7	D 20	whi/grn	horn
8	D 15	grn	RPM +
9	D 16	blk/whi	RPM –
10	D 24	vio	Pot
11	D 17	blk/grn	pumping on
12	D 19	whi/gry	reverse
13	D 23	brn/whi	outrigger
14	D 18	blu/whi	pumping
15	D 21	blk/red	free
16			free

PLUG D

⏚	B 1	brn	ground
1	Y3/3	brn/whi	boom 1 up
2	Y3/2	blu	boom 1 down
3	Y4/3	grn/whi	boom 2 up
4	Y4/2	blk/grn	boom 2 down
5	Y5/3	gry/blk	boom 3 up
6	Y5/2	blk/whi	boom 3 down
7	Y6/3	blk/red	boom 4 up
8	Y6/2	gry/red	boom 4 down
9	free	free	free
10	⊣⊪	brn	ground
11	Y2/2	vio	turn clockwise
12	Y2/3	blu/whi	turn anticlockw.
13	B4	red	plus
14	Y1/3 Y1/2 Y7	gry	pilot valve
15	B 8	grn	RPM +
16	B 9	blk/whi	RPM –
17	B 11	blk/grn	pumping on
18	B 14	blu/whi	pumping
19	B 12	gry/blk	reverse
20	B 7	whi/grn	horn
21	B 15	blk/red	free
22	A 5	gry/red	emergency stop
23	B13	brn/whi	free
24	B 10	vio	POT

ISSUE	MODIFICATION	DATE	NAME
d	siehe B 561066.doc	02.06.05	Körner
c	siehe B 561066.doc	26.08.04	Körner
b	siehe B 561066.doc	03/09/19	Hoh.
a	siehe B 561066.oen	08/03/20	Mi

Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

	DATE	NAME
DRAWN	1998/10/05	Fetzer
CHKD.		
APPD.		

CHANGE ONLY WITH CAD

ORIGINAL

SCALE | WEIGHT

Cable harness boom
REED 37m

B 56 1 066

SHEET 1 OF 3

REPLACEMENT FOR | REPLACEMENT BY

PARTS LIST

28.09.05 10:35:23

part list	description	created	index	valid from	valid to
B561066	cable harness boom REED V III	18.05.99 Mi	c	26.08.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	housing emergency stop own parts list	B561091				1,00 Stk
2	housing left own parts list	B561043		a 25.02.02		2,00 Stk
3	Clamp box for boom own parts list	B561029		a 15.01.02		1,00 Stk
11	t - piece 22-22-22	WAI104515				3,00 Stk
12	t - piece	WAI104508				1,00 Stk
13	t - piece 17-10-17	WAI104332				4,00 Stk
14	t - piece	WAI104511				1,00 Stk
16	fitting PG21	WAI104507				2,00 Stk
17	fitting PG16	WAI104510				4,00 Stk
18	fitting PG9	WAI104506				7,00 Stk
19	sealing for cable fitting PG21	WAI104697				2,00 Stk
20	sealing for cable fitting PG16	WAI104696				4,00 Stk
21	sealing for cable fitting PG9	WAI104695				7,00 Stk
22	lock nut PG21	WAI104114				1,00 Stk
23	O-ring 15 x 1,5	WAI104701				6,00 Stk
24	O-ring 8.9 x 1.25	WAI104700				7,00 Stk
25	nut CE 16	WAI104519				4,00 Stk
26	plate	WAI104735				7,00 Stk
28	plug	WAI104691				6,00 Stk
29	housing-body, lower part 24-pol	WAI101533				2,00 Stk

PARTS LIST

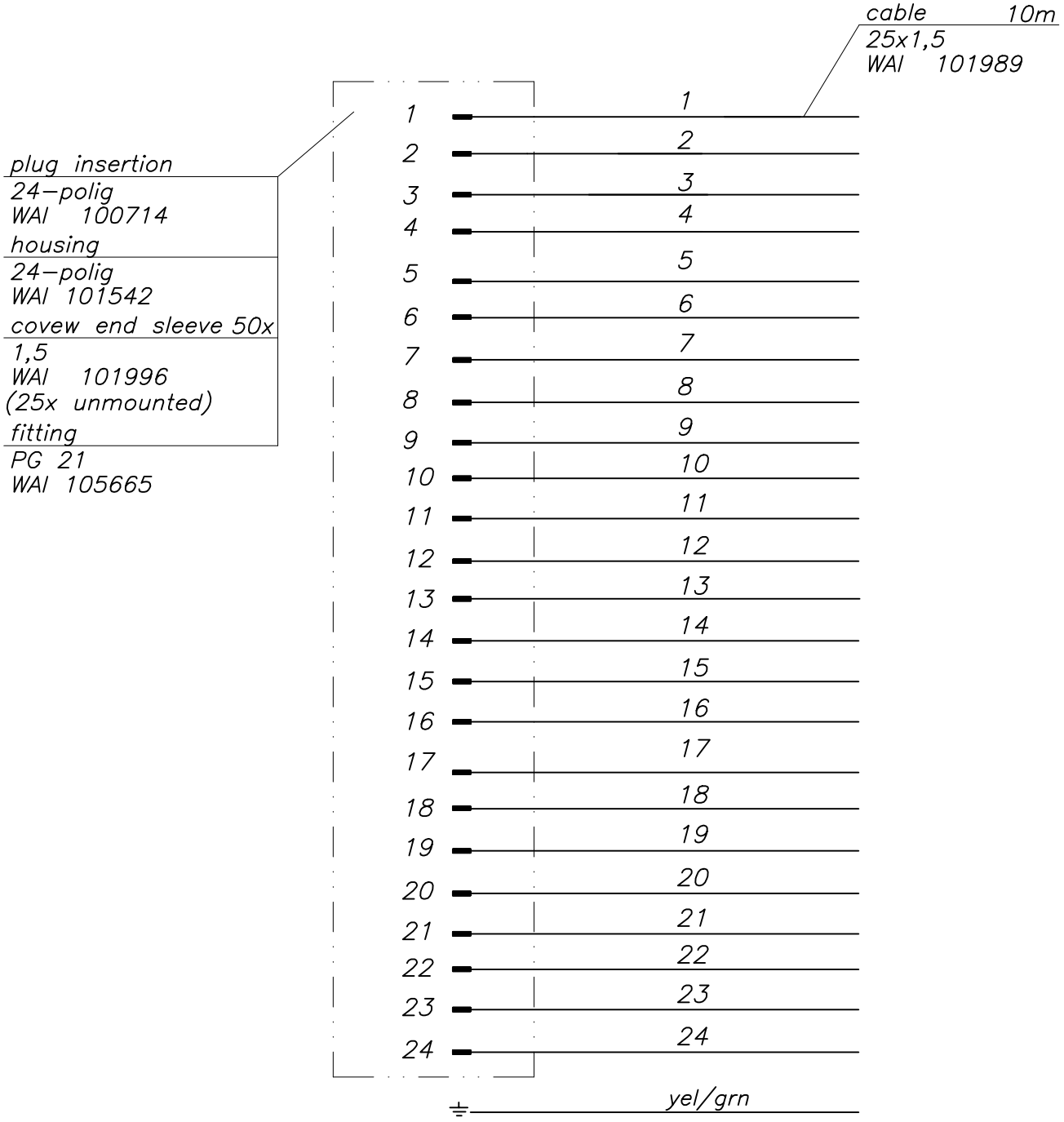
part list	description	created	index	valid from	valid to
B561066	cable harness boom REED V III	18.05.99 Mi	c	26.08.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
30	socket insertion 24-pol.	WAI100710				1,00 Stk
31	protective cap	WAI101305				1,00 Stk
32	housing upper part 16-pol.	WAI104023				1,00 Stk
33	plugbox insert 1-16 pol.	WAI104121				1,00 Stk
34	emergency stop switch	WAI105094				3,00 Stk
35	label ZB2-BY9330	WAI102278				3,00 Stk
36	push button	WAI100569				1,00 Stk
37	contact block	WAI105095				3,00 Stk
40	lamp 12V	WAI104083			0,10	3,00 Stk
41	plate "horn"	WAI105415				1,00 Stk
42	diode, 1A	WAI105337				3,00 Stk
43	washer 4	WAI104633				9,00 Stk
44	rail	WAI104772				0,20 Mtr
45	diode, MKS-D10	WAI104541				1,00 Stk
46	clamp	WAI104186				2,00 Stk
47	plug with diode	WAI104185				2,00 Stk
48	end plate	WAI104833				1,00 Stk
49	clamp	WAI104672				2,00 Stk
50	condenser	WAI104669				4,00 Stk
51	hexagon bolt M 4 x 12	WAI104632				9,00 Stk

PARTS LIST

part list	description	created	index	valid from	valid to
B561066	cable harness boom REED V III	18.05.99 Mi	c	26.08.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
52	hex. nut M4	WAI104634				9,00 Stk
53	cove end sleeve 1.5mm	WAI101996				60,00 Stk
54	cove end sleeve 1.5mm	WAI104692				35,00 Stk
55	reducer 22/17	WAI104509				4,00 Stk
56	cable pipe	WAI104520				7,00 Mtr
57	cable pipe	WAI104216				12,50 Mtr
58	cable pipe	WAI104213				3,40 Mtr
59	cable tie 200x3.6, black	WAI103137				28,00 Stk
60	t - piece 22-10-22	WAI105263				1,00 Stk
62	relay socket	WAI100986				2,00 Stk
63	relay DC 12V, 30 A	WAI104845				2,00 Stk
81	flat plug sleeve 2,5mm	WAI104785				14,00 Stk
82	reducer	WAI104512				1,00 Stk
83	cable	WAI108059				300,00 Mtr
90	thimble 1,5 - 2,5 qmm	WAI102458				3,00 Stk
91	cove end sleeve 2.5mm	WAI101997				20,00 Stk
92	cove end sleeve 1.0mm	WAI101995				20,00 Stk
93	plate	WAI106435				3,00 Stk



Waitzinger Baumaschinen Vertrieb und Service GmbH

free dimension tolerance DIN 7168 medium

	date	name
drawn	1999/07/20	Mi
chekd.		
appd.		

scale | weight

own parts list

cable cpl. for cable control

change only with CAD

B 56 1 049

sheet

of

issue	modification	date	name

original | replacement for | replacement by

PARTS LIST

28.09.05 10:35:45

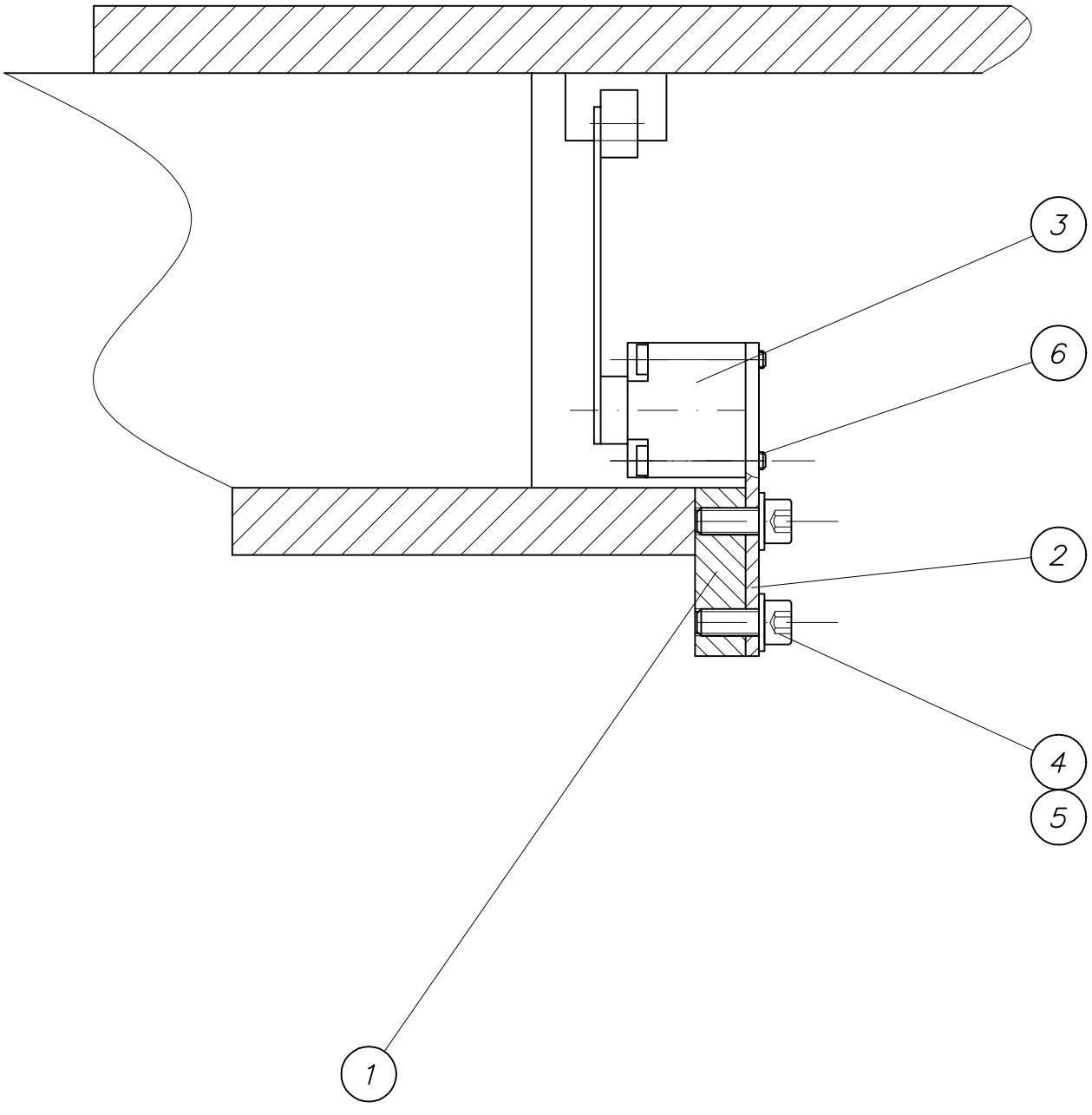
part list	description	created	index	valid from	valid to
B561049	cable cpl. for cable control	20.07.99 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	cable 25 x 1.5	WAI101989				10,00 Mtr
2	plug insertion 24-pol.	WAI100714				1,00 Stk
3	housing upper part, 24-pol	WAI101542				1,00 Stk
4	fitting PG21	WAI105665				1,00 Stk
5	cove end sleeve 1.5mm	WAI101996				50,00 Stk
6	sealing for cable fitting PG21	WAI104697				1,00 Stk

Drehwerksabschaltung
switch limit advice

B 57 0 015a

Waitzinger
Baumaschinen GmbH

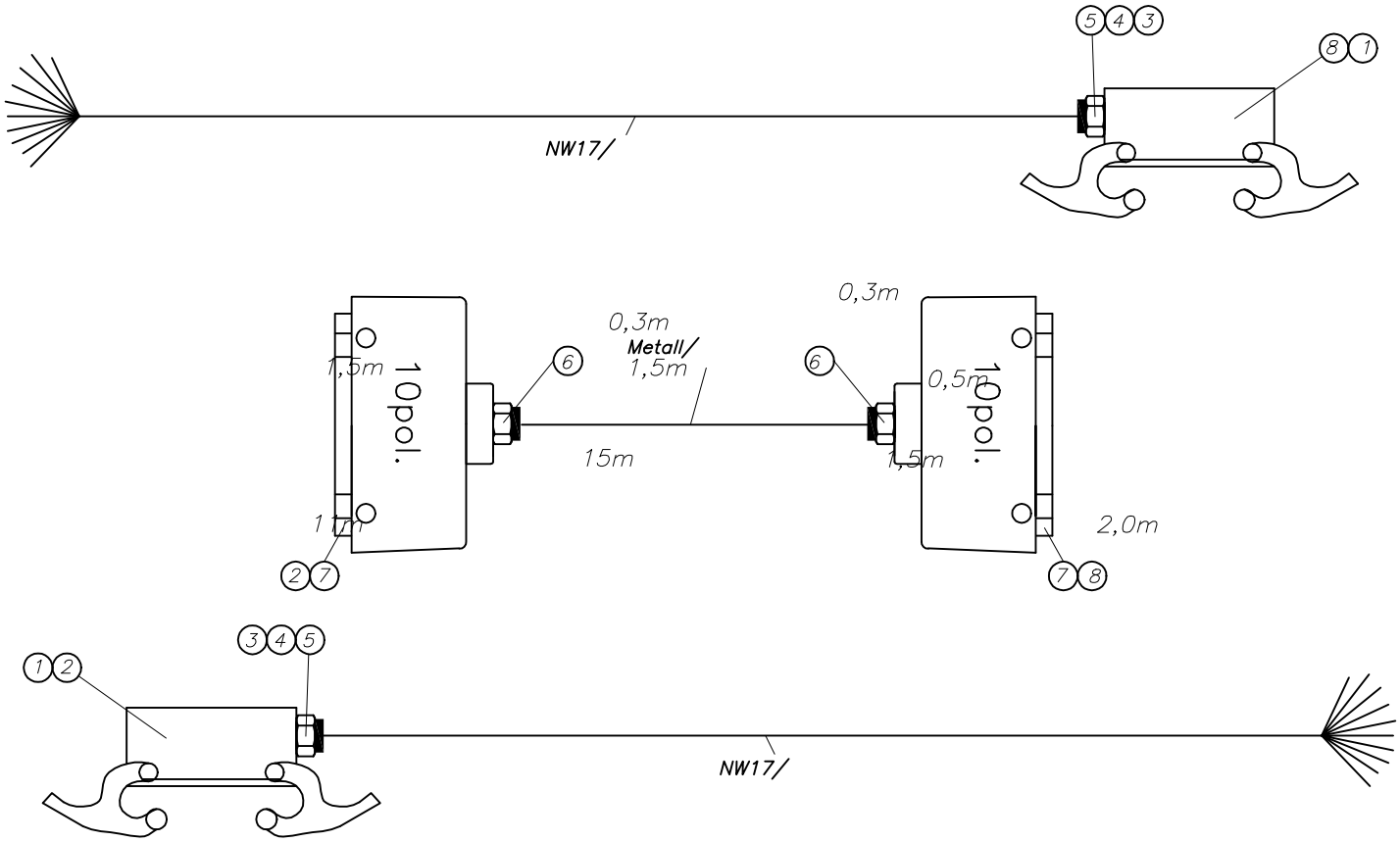


PARTS LIST

11.07.05 09:46:15

part list	description	created	index	valid from	valid to
B570015	turning stop unit	04.03.03 Mi	a	16.02.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	plate	B570016 Bl 15x50x60	1543/EN10029 S235J2G3		0,30	1,00 Stk
2	plate	B570017 Bl 4x75x93	1543/EN10029 S235J2G3		0,20	1,00 Stk
3	position switch own parts list	WAI107186				1,00 Stk
4	cheese head screw M 8 x 20	WAI103273				4,00 Stk
5	washer 8.4	WAI101625				4,00 Stk
6	cheese head screw M5x35	WAI109456				4,00 Stk



Waitzinger Baumaschinen Vertrieb und Service GmbH				Freimaßtoleranz DIN 7168 mittel		Maßstab	Gewicht
						eigene Stückliste	
					Datum / Name		
				Bearb.	06.09.2004 Körner	Kabelbaum Mast 37m REED	
				Gepr.			
				Norm			
				Änderung nur auf CAD		B 56 2 066	Blatt 2 von 2 Bl.
Zust.	Änderung	Datum	Name	Urspr.		Ers. für	Ers. durch

PARTS LIST

28.09.05 10:36:06

part list	description	created	index	valid from	valid to
b562066	cable loop boom REED	06.10.04 ALEXAND			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	housing 10 poles	WAI106688				2,00 Stk
2	plug insert 1-10 pin	WAI106687				2,00 Stk
3	fitting PG16	WAI104510				2,00 Stk
4	sealing for cable fitting PG16	WAI104696				2,00 Stk
5	O-ring 15 x 1,5	WAI104701				2,00 Stk
6	reduc. ring PG16 - 13,5	WAI107524				2,00 Stk
7	coupling housing 10-pole	WAI106689				2,00 Stk
8	plugbox insert 1-10 pol.	WAI106686				2,00 Stk
21	cable pipe	WAI104216				25,50 Mtr
22	cable	WAI108059				280,00 Mtr

Funkfernsteuerung kpl.

radio control cpl.

WAI 105982

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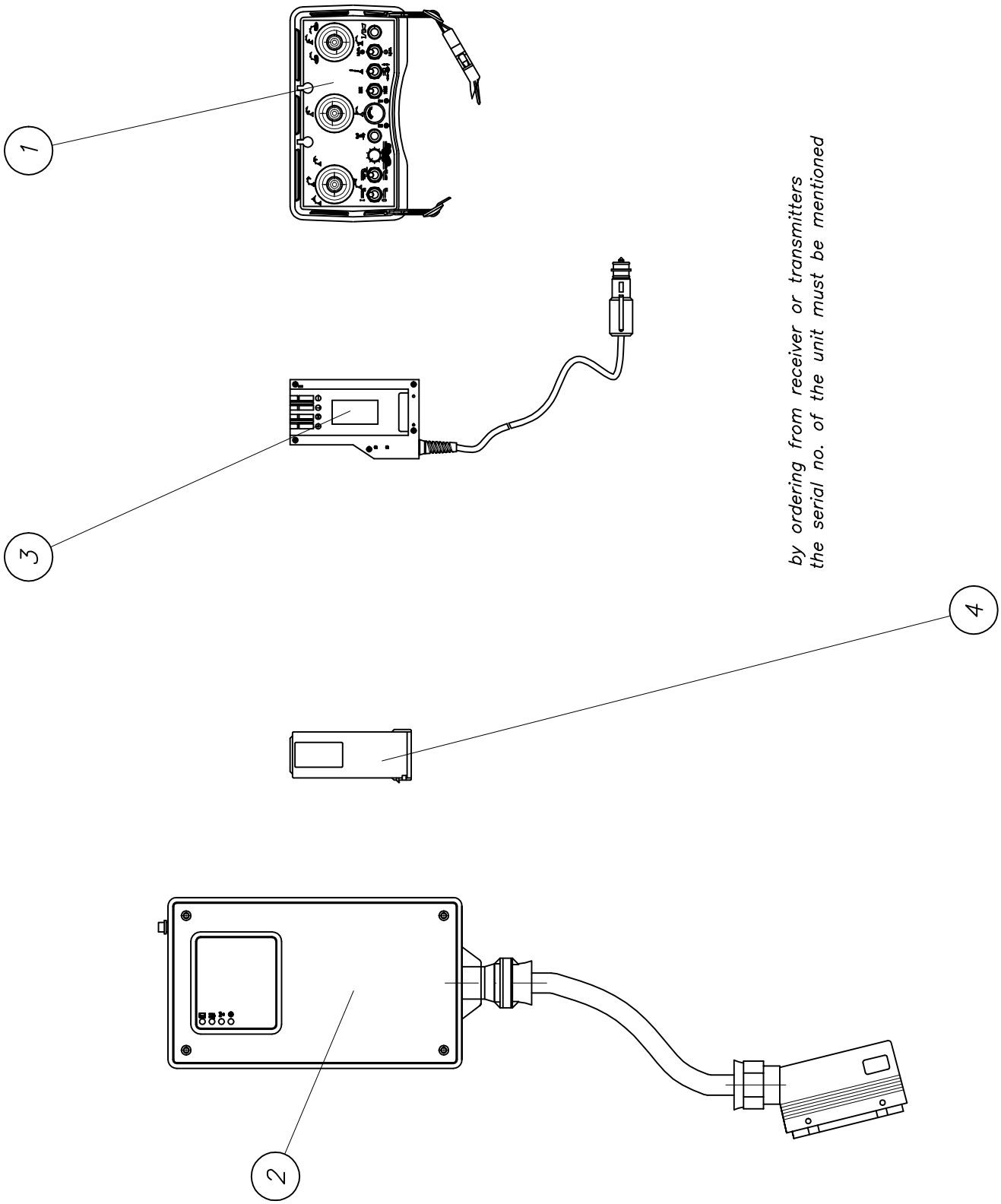

by ordering from receiver or transmitters the serial no. of the unit must be mentioned

PARTS LIST

28.09.05 10:42:58

part list	description	created	index	valid from	valid to
WAI105982	radio control	16.03.00 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	transmitter for remote control Reed 6	WAI106051				1,00 Stk
2	receiver for remote control REED 6	WAI106052				1,00 Stk
3	battery charger PNN-System	WAI104743				1,00 Stk
4	accumulator for remote control	WAI104745				1,00 Stk

Übersicht B 60 - B 69

over view B 60 - B 69

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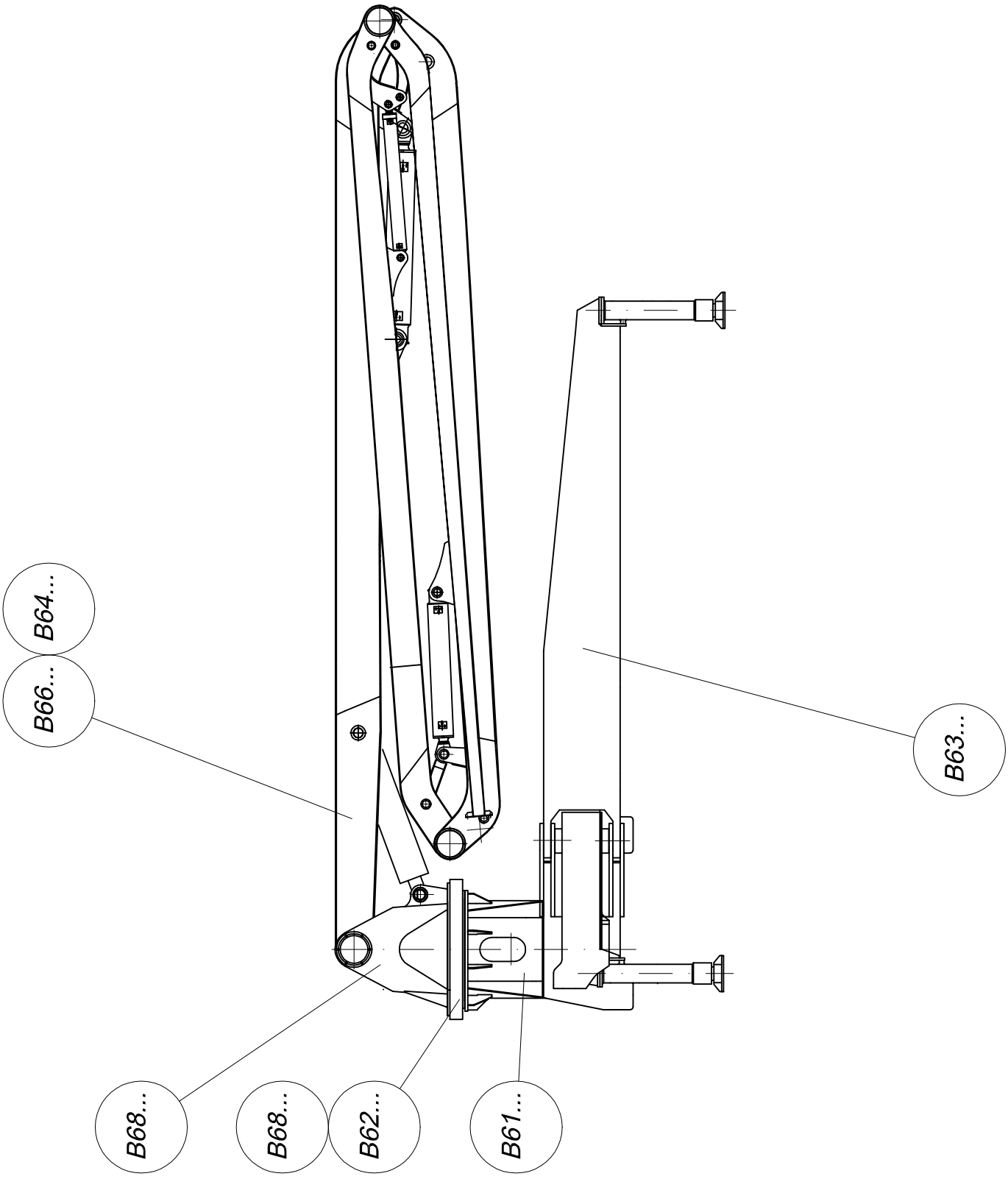

23.07.2002

Mastbock kpl.

boom base cpl.

B 61 2 205d

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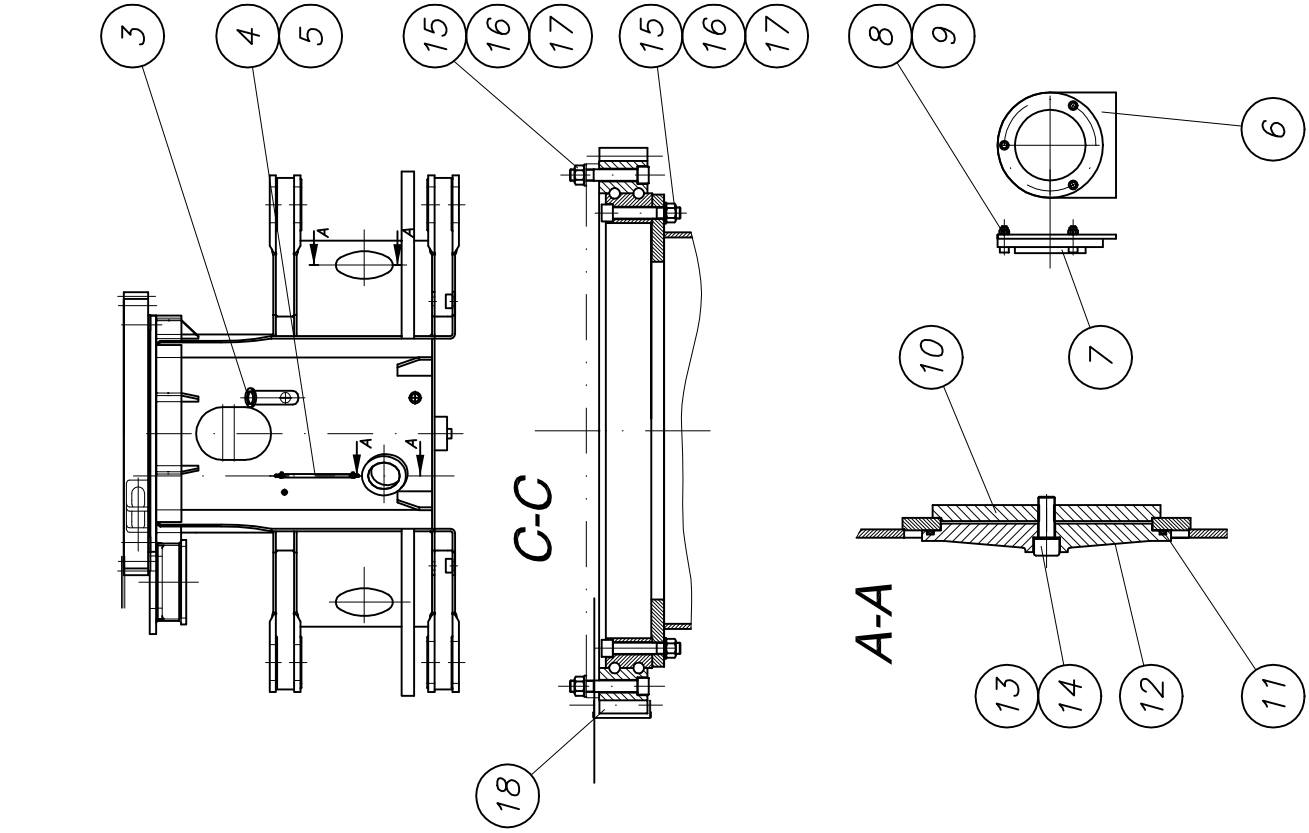

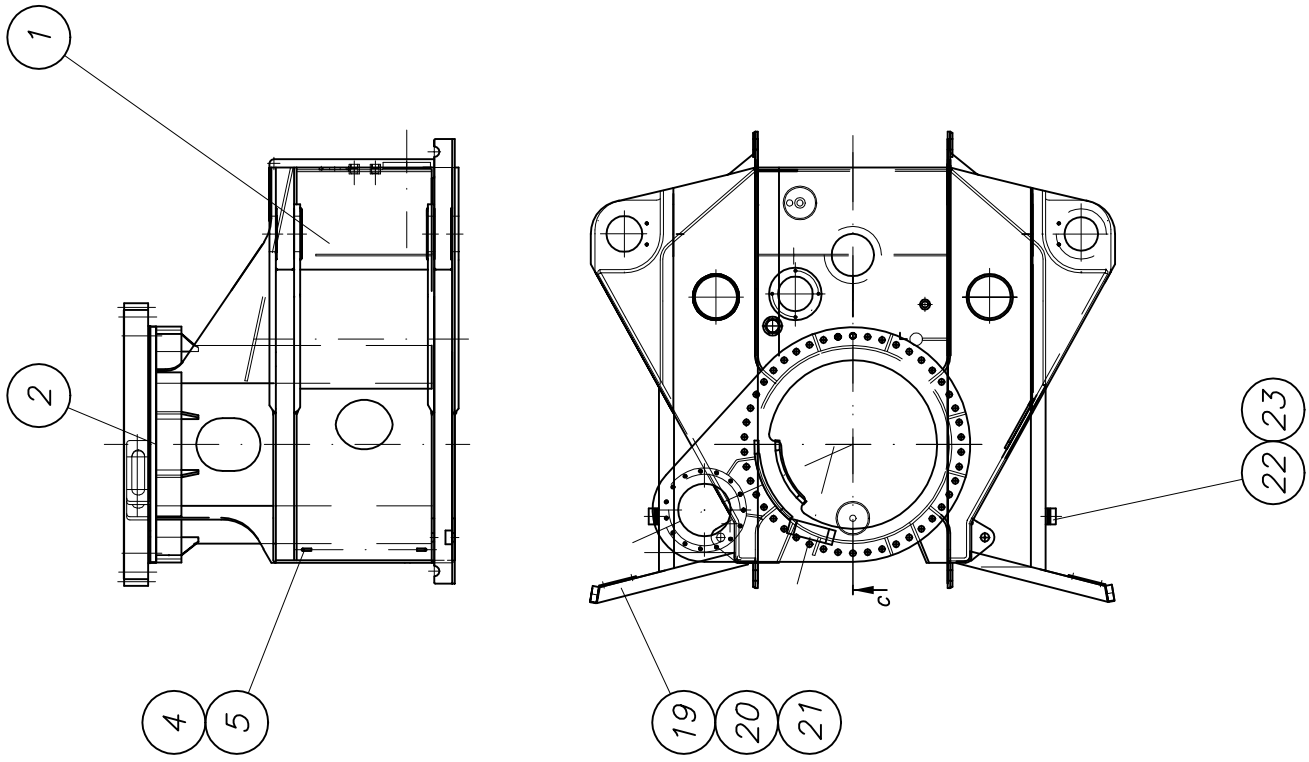

PARTS LIST

22.06.05 11:37:45

part list	description	created	index	valid from	valid to
B612205	pedestal 42 m xxt SHORT	05.12.03 HBK	d	27.10.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom base 42XXT cpl. short own parts list	B612200				1,00 Stk
2	lubrication kit for rotation bearing cpl own parts list	WAI108646			3,00	1,00 Stk
3	filling and air filter	WAI106163				2,00 Stk
4	fuel hose DN 12	WAI103104				1,00 Mtr
5	hose clamp 15mm	WAI103103				4,00 Stk
6	holder for can drag and fly	B619093 Bl 5x100x112.5	1543/EN10029 S235J2G3	a 13.02.03	0,22	2,00 Stk
7	box level d80	WAI106237				2,00 Stk
8	cheese head screw M5x20 DIN 912 8.8	WAI103389				6,00 Stk
9	locking nut DIN 980	WAI102068				6,00 Stk
10	star for oilcover FL 15X 220X 220	B610034 Fl 220x220x15	1017 S235JR	a 12.02.03	2,00	5,00 Stk
11	O-ring 217x5, No. A0120.371	WAI106011				5,00 Stk
12	cover for oiltank D236 X 27 36XT	B610033 RD 240x30	1747 Al99		1,80	5,00 Stk
13	cheese head screw M 16 x 55	WAI104550				5,00 Stk
14	u-seal 16,7 x 24 x 1,5T	WAI101572				5,00 Stk
15	cheese head screw M27 x 160	WAI107371				92,00 Stk
16	nut M27 DIN 934	WAI107372				92,00 Stk
17	washer 28	WAI107373				92,00 Stk
18	rotation bearing	WAI107158			440,00	1,00 Stk
19	bracket own parts list	B612110				2,00 Stk
20	stop	B619111 30x60x75	Polyamid			2,00 Stk
21	cylinder head screw M 10 x 25	WAI106654				2,00 Stk
22	washer	B612115 Bl 8xd75	1543/EN10029 S235J2G3		0,27	6,00 Stk

PARTS LIST

22.06.05 11:37:45

part list	description	created	index	valid from	valid to
B612205	pedestal 42 m xxt SHORT	05.12.03 HBK	d	27.10.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
23	rubber cushion	WAI107199			0,50	2,00 Stk

Schmieranlage kpl.

lubrication system cpl.

WAI 108646

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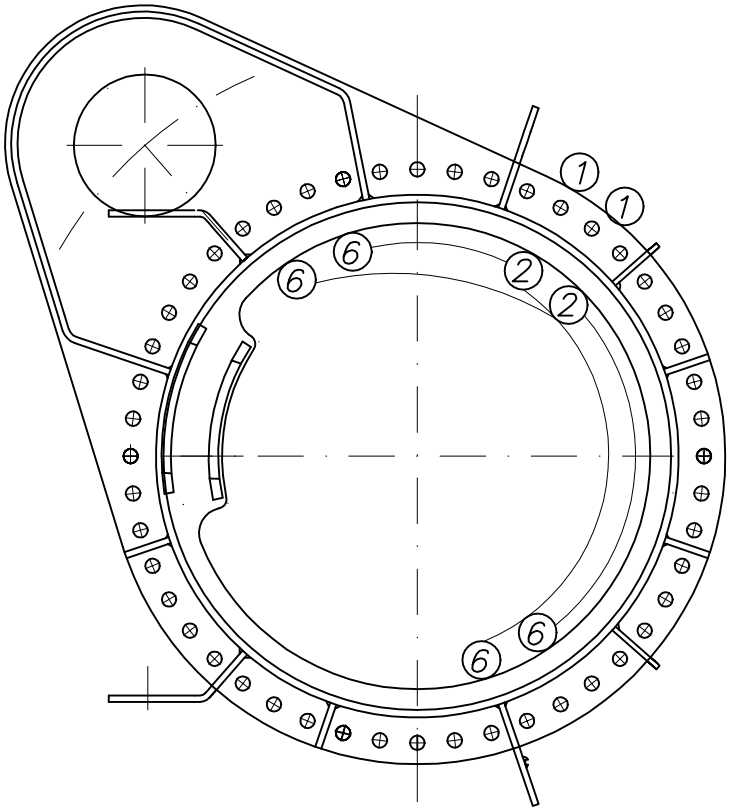

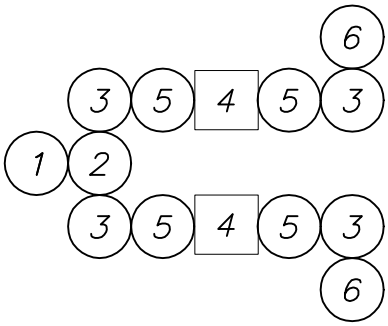

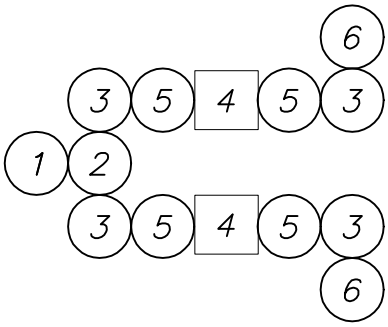

27.02.2004

S T Ü C K L I S T E N - D R U C K

22.06.05 11:39:27

Stückliste	Benennung	Anlage	Änderungsindex	gültig ab	gültig bis
WAI108646	SCHMIERANLAGE FÜR DREHKRANZ KP	29.01.04 a			

Pos	Bezeichnung Rohmaterial	Sach-Nr. Abmessung	DIN Werkstoff	Index	Gewicht Kg	Anzahl Einheit
1	Kegelschmiernippel	WAI100805			0,01	2,00 Stk
2	T-Einschraubverschraubung LL6	WAI106534				2,00 Stk
3	Schlauchstutzen, 90 Grd., lang	WAI102643			0,02	8,00 Stk
4	Kunststoffrohr 8.4x2.1	WAI100255			0,05	5,00 Mtr
5	Schraubhülse für Schlauchstutzen	WAI100254			0,01	8,00 Stk
6	Gerade Einschraubverschraubung LL6 M8x	WAI108723				4,00 Stk

Drehwerkseinheit kpl.

turning unit cpl.

B 62 2 010f

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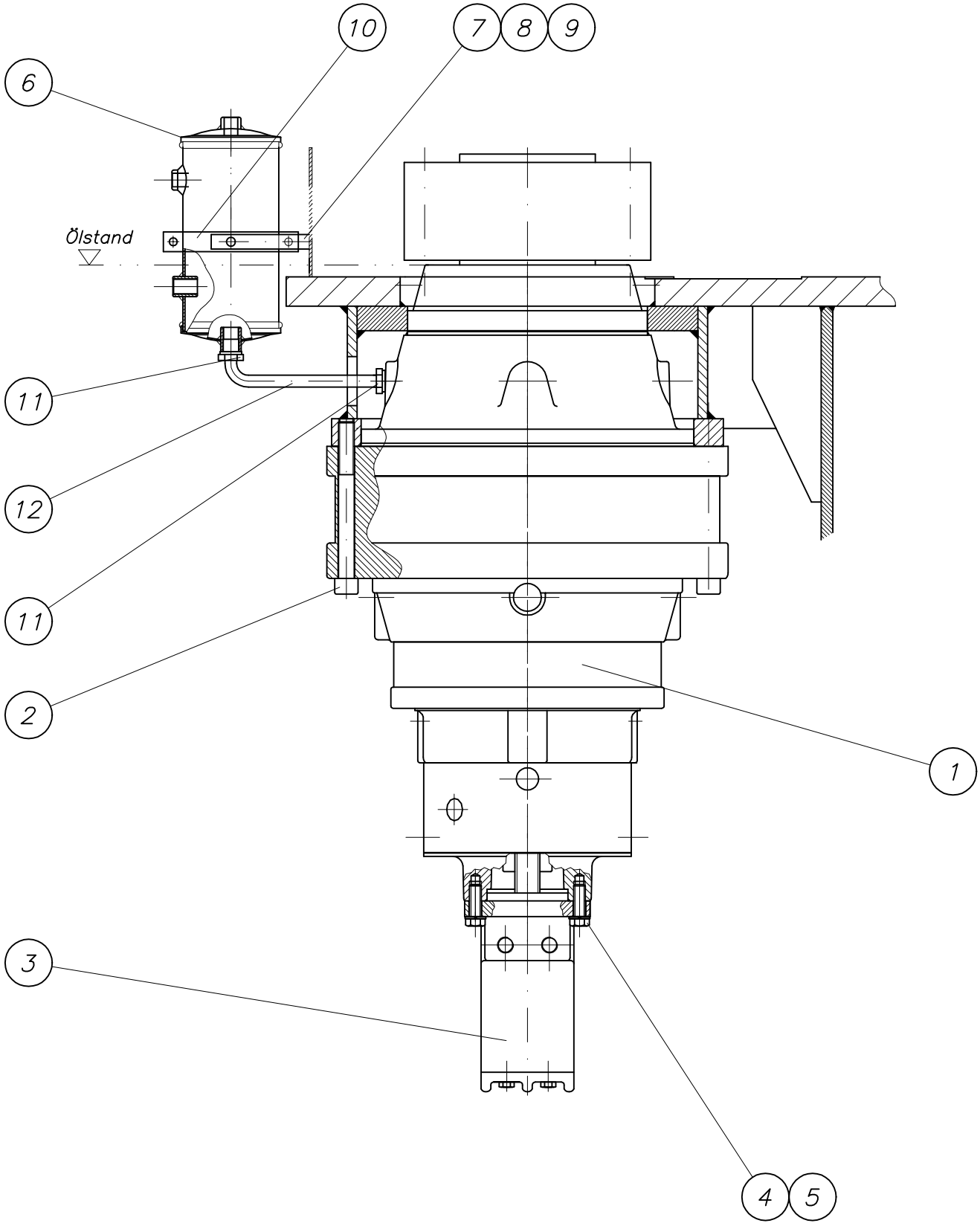


PARTS LIST

22.06.05 11:43:16

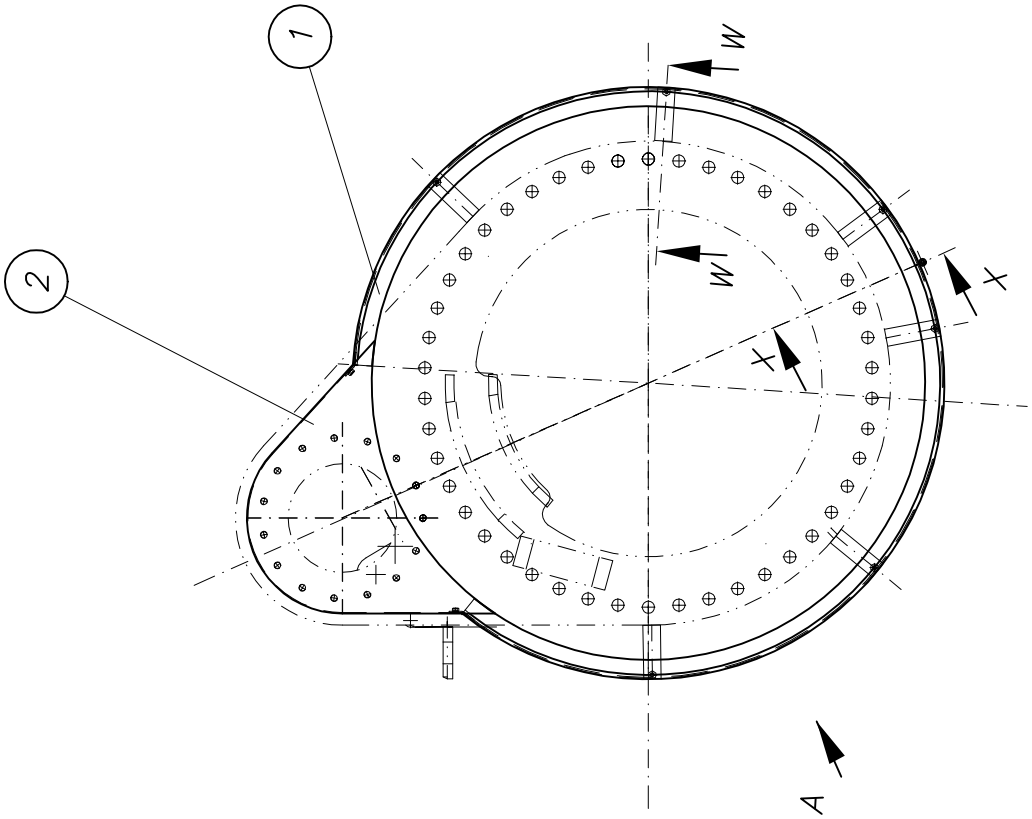
part list	description	created	index	valid from	valid to
B622010	turning unit 42 XXT	24.05.02 Mi	f	02.06.05	

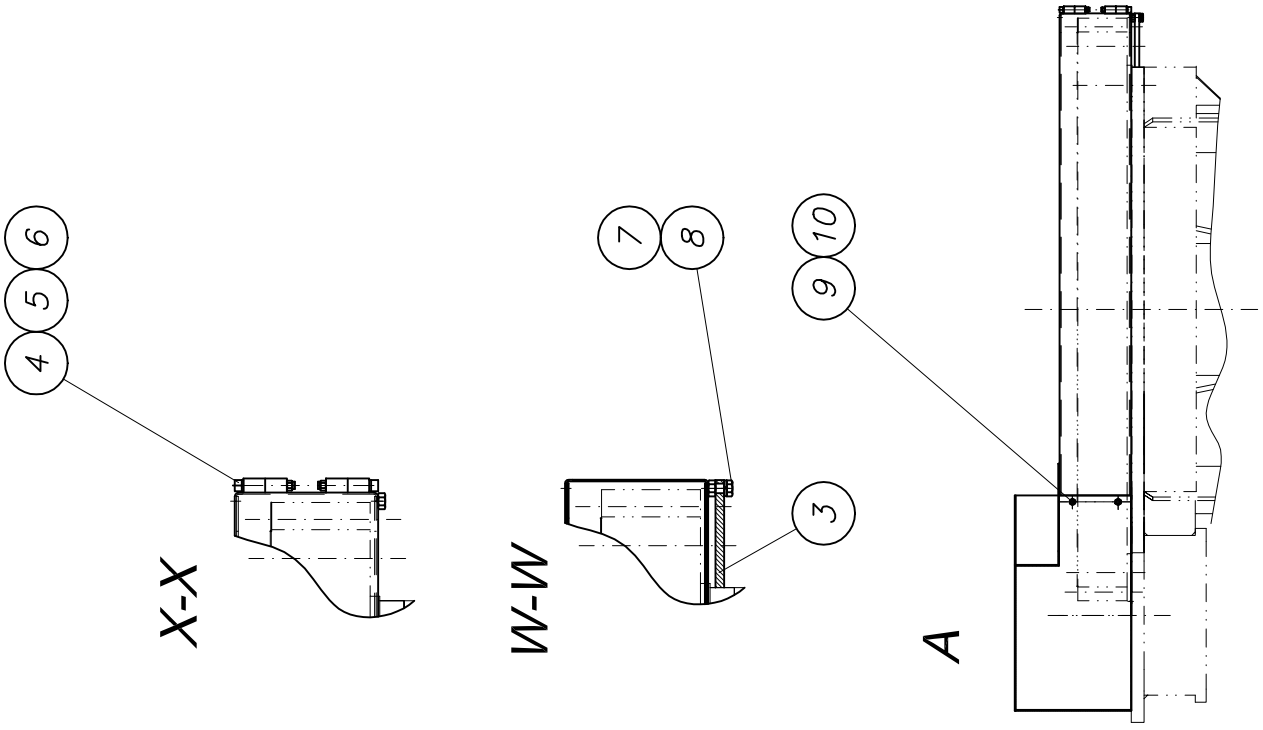
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	gearbox PG2503-Pr r 106.2 own parts list	WAI107335			252,00	1,00 Stk
2	cheese head screw M16x160	WAI101255				15,00 Stk
3	hydraulic motor Char Lynn	WAI107338				1,00 Stk
4	hexagon bolt M12 x 35	WAI102122			0,04	2,00 Stk
5	spring washer A12 DIN 127 VERZ.	WAI102896				2,00 Stk
6	expansion tank	WAI109422			2,20	1,00 Stk
7	plate	B622013 Bl 5x15x100	1543/EN 10029 S235J2G3		0,06	1,00 Stk
8	hexagon bolt M 8 x 20	WAI101837				1,00 Stk
9	spring washer A8 DIN 127 VERZ.	WAI102205			0,00	1,00 Stk
10	pipe clamp 100 mm	WAI109545				1,00 Stk
11	straight male stud couplings L12D	WAI100548				2,00 Stk
12	hydr. pipe 12 x 2	WAI102022			0,49	0,40 Mtr

Drehwerksschutzeinrichtung
turning protection cpl.

B 62 2 025

Waitzinger
Baumaschinen GmbH





09.09.2004

PARTS LIST

23.06.05 09:07:07

part list	description	created	index	valid from	valid to
B622025	turning unit protection parts 42 XXT	26.06.02 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	cover cpl. own parts list	B622015			15,00	1,00 Stk
2	cover cpl. own parts list	B622020			5,50	1,00 Stk
3	holder	B622023 FL 40x10x114	1017 S235J2G3		0,40	6,00 Stk
4	alien bolt M 8x70	WAI105929				2,00 Stk
5	spring washer	WAI100235			0,00	2,00 Stk
6	stop nut M8 DIN985 8. VERZ.	WAI102111			5,00	2,00 Stk
7	hexagon bolt	WAI102244				6,00 Stk
8	spring washer A10	WAI102070			0,00	6,00 Stk
9	hexagon bolt M 8 x 20	WAI101837				4,00 Stk
10	spring washer A8 DIN 127 VERZ.	WAI102205			0,00	4,00 Stk

Abstützung kpl.

outrigger cpl.

B 63 2 340a **1**

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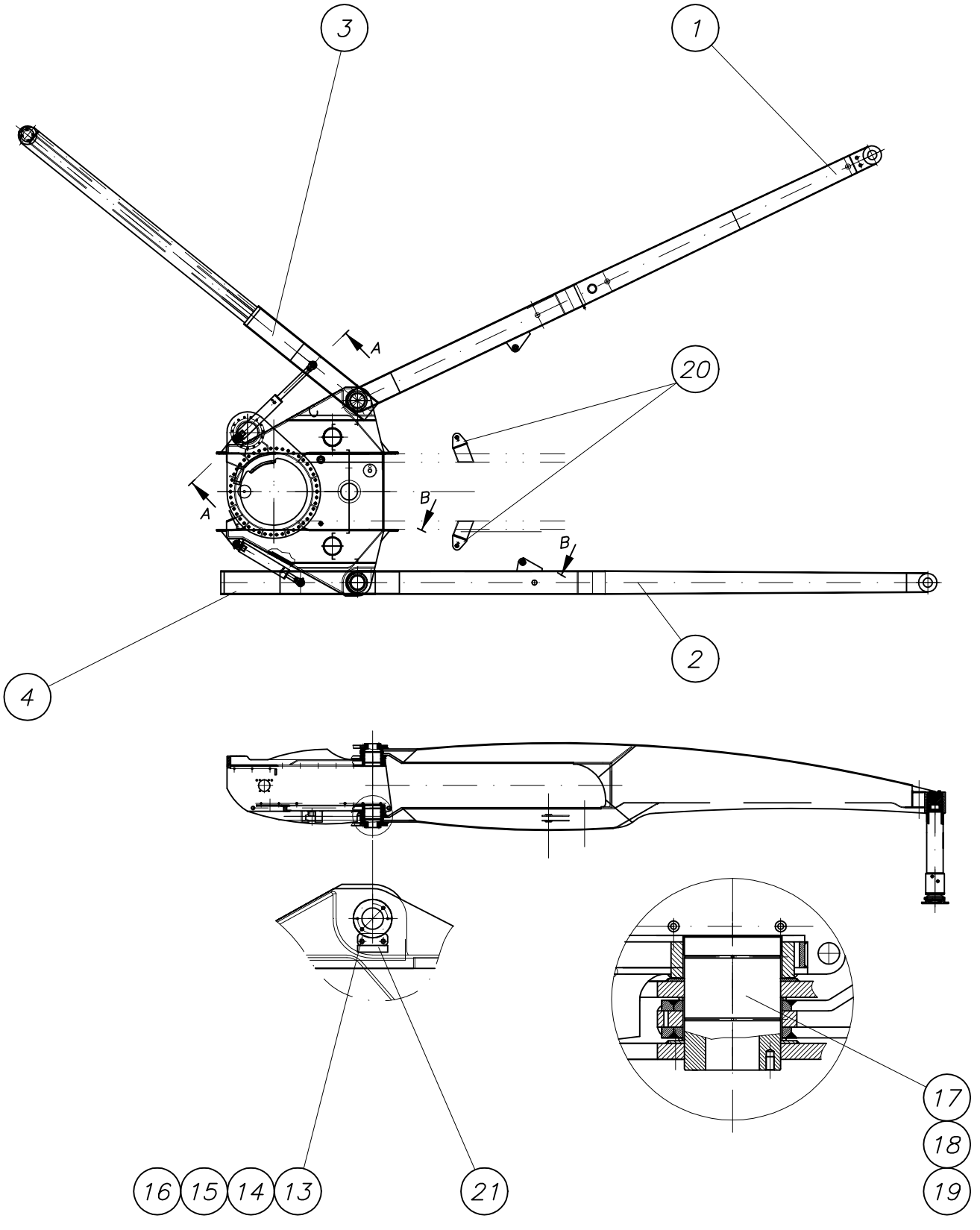

Abstützung kpl.

outrigger cpl.

B 63 2 340a 2

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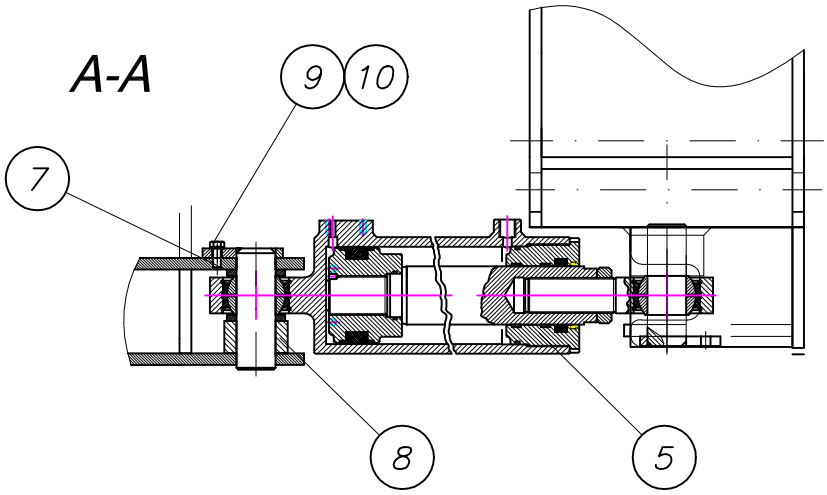
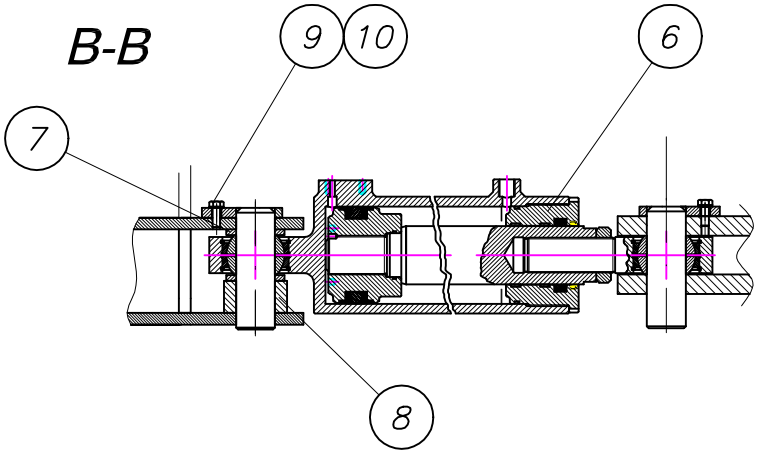
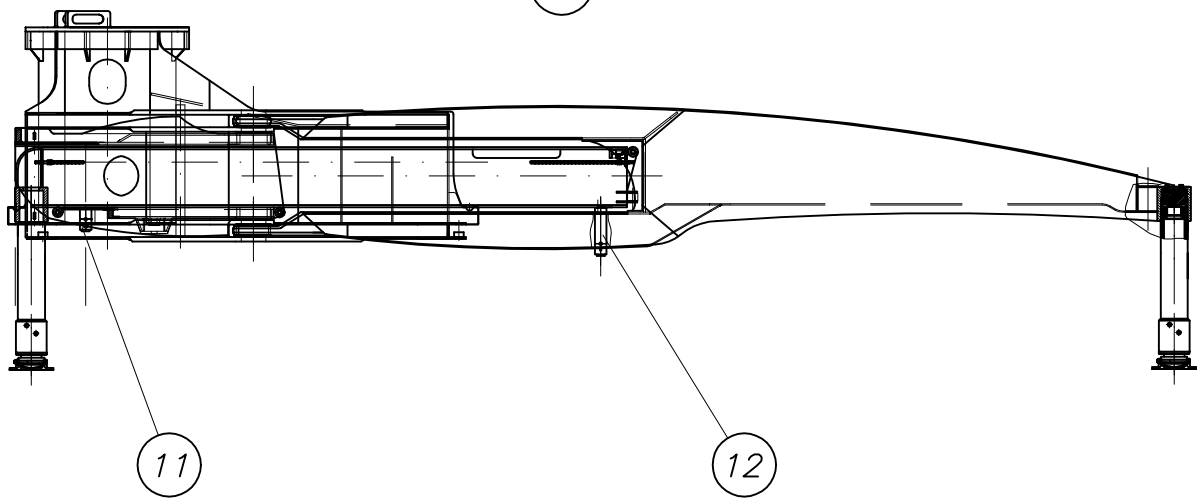
A-A



B-B





PARTS LIST

14.07.05 07:23:35

part list	description	created	index	valid from	valid to
B632340	outrigger 42 xxt cpl	27.02.04 ek	a	13.07.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	rear right stabilizer 42XXT cpl. own parts list	B632330		a 03.06.05	1021,00	1,00 Stk
2	rear left stabilizer 42XXT cpl. own parts list	B632325		a 03.06.05	1021,00	1,00 Stk
3	front outrigger 42 meter own parts list	B632050		f 12.07.05		1,00 Stk
4	front left stabilizer 42XXT cpl. own parts list	B632051		f 12.07.05		1,00 Stk
5	swing cylinder cpl. own parts list	B632036		a 02.06.05		2,00 Stk
6	swing cylinder cpl. own parts list	B632037		a 02.06.05		2,00 Stk
7	washer	B632038 Bl 6x d60	1543/EN10029 S355J2G3		0,07	4,00 Stk
8	pin cpl. own parts list	B632047		b 18.10.04	1,06	8,00 Stk
9	alien bolt M 8x25	WAI105930				8,00 Stk
10	spring washer A8 DIN 127 VERZ.	WAI102205			0,00	8,00 Stk
11	transport savety device own parts list	B639197		b 14.10.03		2,00 Stk
12	transport savety device own parts list	B639207		b 20.10.04		2,00 Stk
13	pin holder	B632054 Bl 12x55x140	1543/EN10029 S235J2G3		0,70	4,00 Stk
14	hex. bolt M12x30 DIN 933 8.8	WAI102107			0,04	8,00 Stk
15	spring washer A12 DIN 127 VERZ.	WAI102896				8,00 Stk
16	hexagon bolt M16 x 25	WAI103401				8,00 Stk
17	pin 180 x 251	B632064 Rd 190x225	1013 42 CrMo4V		30,00	4,00 Stk
18	grease nipple H1 M10 X 1 DIN 71412	WAI100805			0,01	8,00 Stk
19	sleeve DU 180x185x80	WAI107324				8,00 Stk
20	bracket for cylinder 42 XXT own parts list	B632175			3,00	2,00 stk
21	flat bar	B630013 Fl 30x10x140	1017 S235J2G3		0,30	4,00 Stk

Abstützung hinten rechts kpl.
outrigger right stabilizer cpl.

B 63 2 330a

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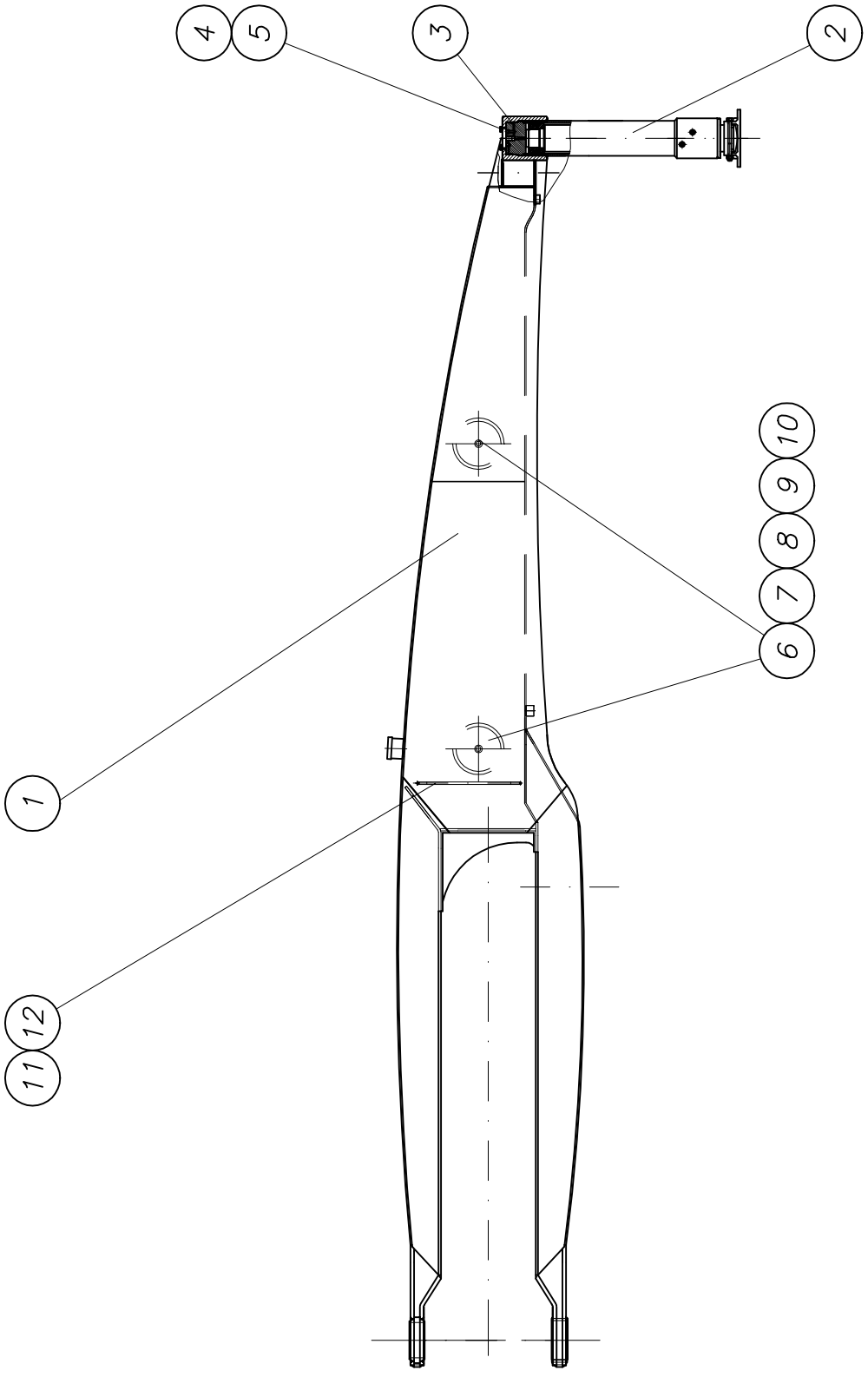

PARTS LIST

23.06.05 09:40:50

part list	description	created	index	valid from	valid to
B632330	rear right stabilizer 42XXT cpl.	27.02.04 ek	a	03.06.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	rear outrigger XXT 42 right process own parts list	B632315				1,00 Stk
2	jack cylinder own parts list	WAI109673				1,00 Stk
3	O-ring 129,2 x 5,7	WAI101441				1,00 Stk
4	hexagon bolt M16 x 50	WAI106269			0,17	4,00 Stk
5	spring washer A16	WAI102072			0,01	4,00 Stk
6	cover for oiltank D236 X 27 36XT	B610033 RD 240x30	1747 Al99		1,80	2,00 Stk
7	star for oilcover FL 15X 220X 220	B610034 Fl 220x220x15	1017 S235JR	a 12.02.03	2,00	2,00 Stk
8	O-ring 217x5, No. A0120.371	WAI106011				2,00 Stk
9	cheese head screw M 16 x 65	WAI103388				2,00 Stk
10	u-seal 16,7 x 24 x 1,5T	WAI101572				2,00 Stk
11	fuel hose DN 12	WAI103104				1,00 Mtr
12	hose clamp 15mm	WAI103103				2,00 Stk

Abstützzylinder

jack cylinder

WAI 109673

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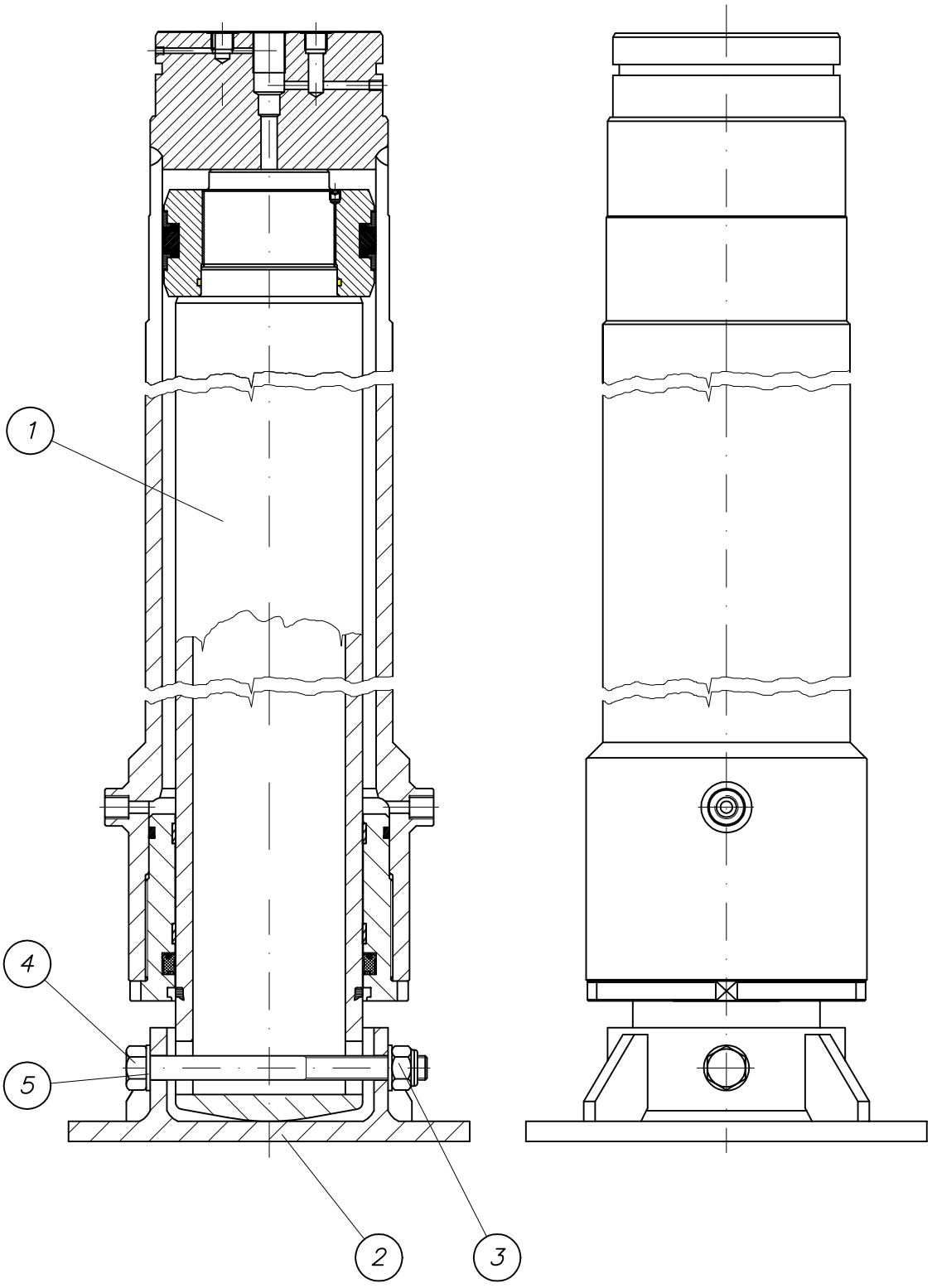
Baumaschinen GmbH



06.06.2005

PARTS LIST

22.06.05 11:51:01

part list	description	created	index	valid from	valid to
WAI109673	jack cylinder	31.05.05 RAINER			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	jack cylinder own parts list	wai109669				1,00 Stk
2	foot	wai106778				1,00 Stk
3	hex. nut M18 DIN 985 8. VERZ.	wai109671				1,00 Stk
4	washer 19	wai109672				1,00 Stk
5	hexagon screw M 18 x 220	wai109670				1,00 Stk

Abstützzylinder

jack cylinder

WAI 109669

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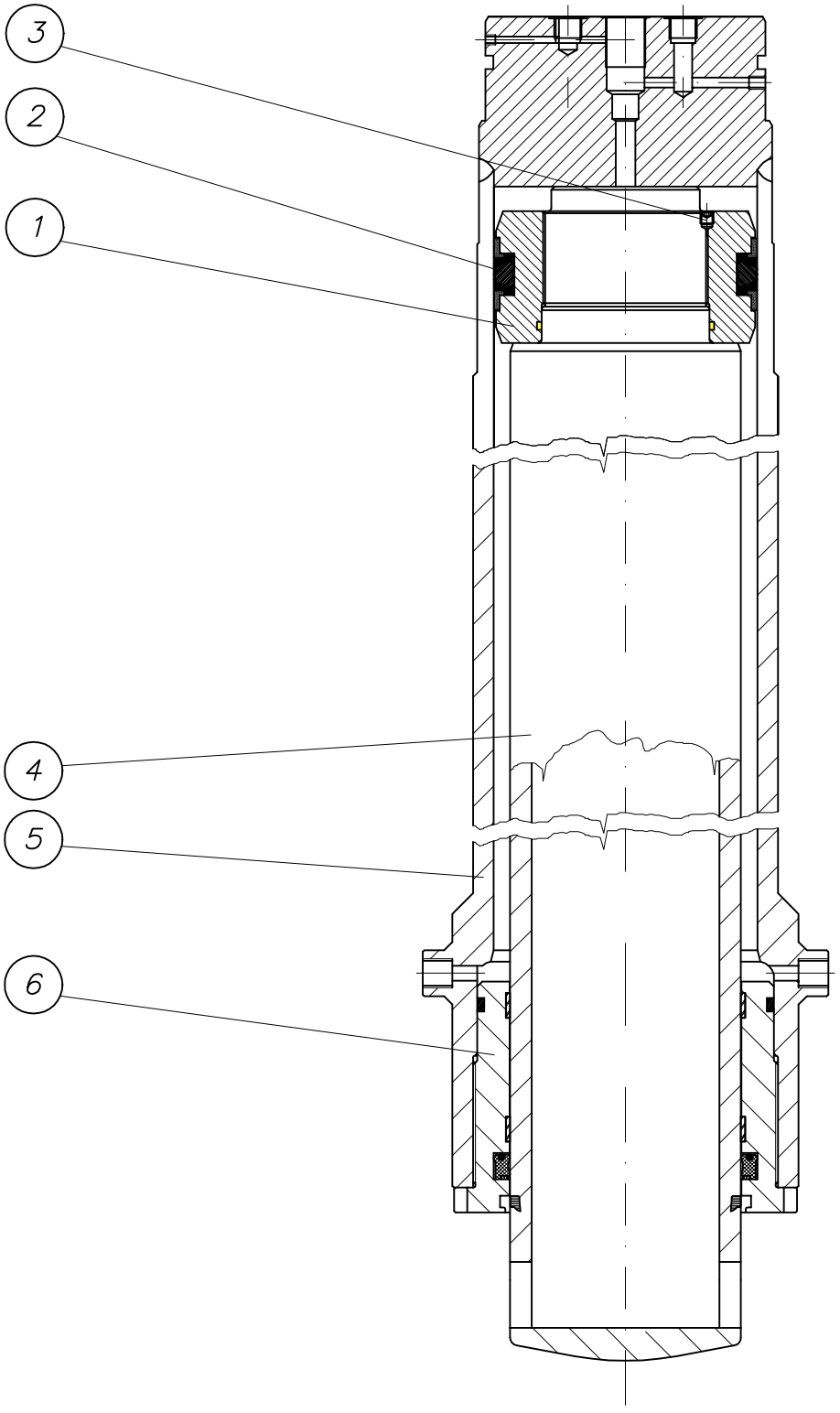

PARTS LIST

22.06.05 11:52:18

part list	description	created	index	valid from	valid to
wai109669	jack cylinder	31.05.05 RAINER			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	piston	WAI106770				1,00 Stk
2	sealing kit for front and rear	WAI104040				1,00 Stk
3	set screw	WAI106771				1,00 Stk
4	piston rod	WAI106772				1,00 Stk
5	cylinder	WAI106773				1,00 Stk
6	piston nut	WAI106774				1,00 Stk

Abstützung hinten links kpl.

outrigger left stabilizer cpl.

B 63 2 325a

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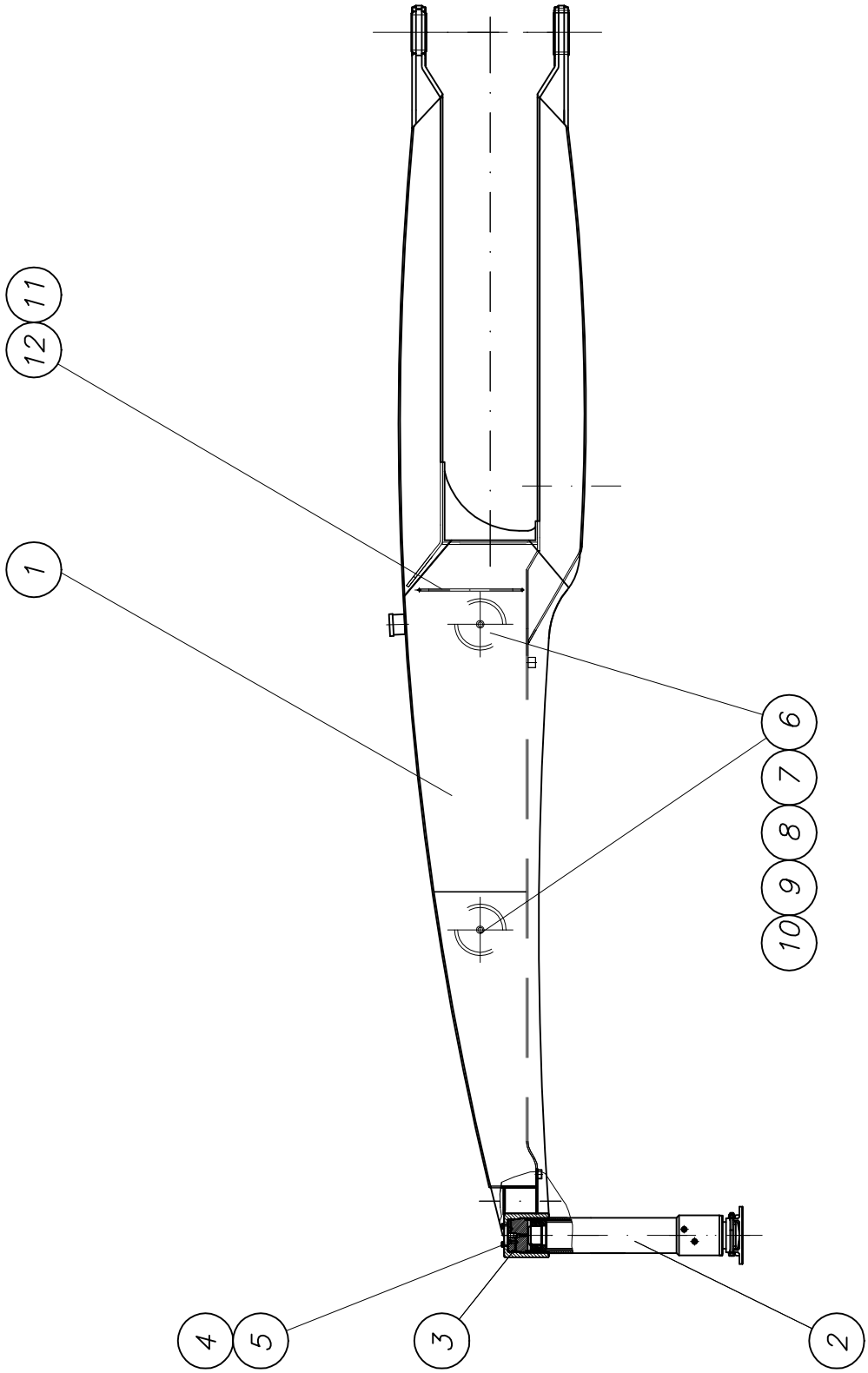
Baumaschinen GmbH



06.06.2005

PARTS LIST

23.06.05 09:42:13

part list	description	created	index	valid from	valid to
B632325	rear left stabilizer 42XXT cpl.	27.02.04 ek	a	03.06.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	rear outrigger XXT 42 left process own parts list	B632320				1,00 Stk
2	jack cylinder own parts list	WAI109673				1,00 Stk
3	O-ring 129,2 x 5,7	WAI101441				1,00 Stk
4	hexagon bolt M16 x 50	WAI106269			0,17	4,00 Stk
5	spring washer A16	WAI102072			0,01	4,00 Stk
6	cover for oiltank D236 X 27 36XT	B610033 RD 240x30	1747 Al99		1,80	2,00 Stk
7	star for oilcover FL 15X 220X 220	B610034 Fl 220x220x15	1017 S235JR	a 12.02.03	2,00	2,00 Stk
8	O-ring 217x5, No. A0120.371	WAI106011				2,00 Stk
9	cheese head screw M 16 x 65	WAI103388				2,00 Stk
10	u-seal 16,7 x 24 x 1,5T	WAI101572				2,00 Stk
11	fuel hose DN 12	WAI103104				1,00 Mtr
12	hose clamp 15mm	WAI103103				2,00 Stk

Abstützung vorne rechts kpl.
outrigger front right cpl.

B 63 2 050f **1**

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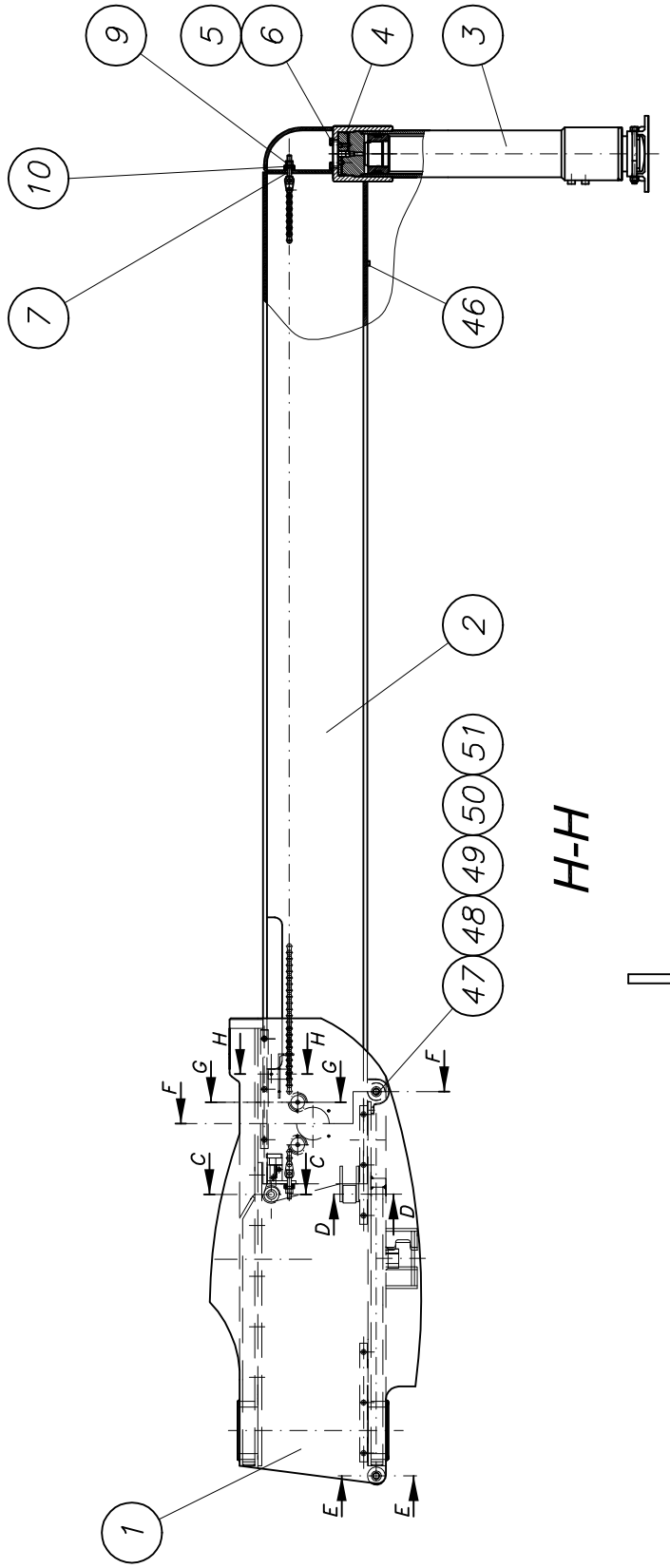
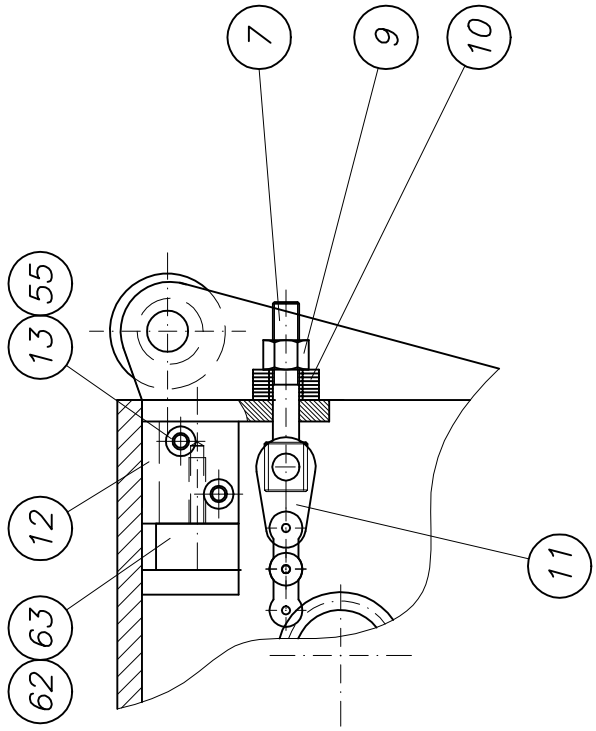
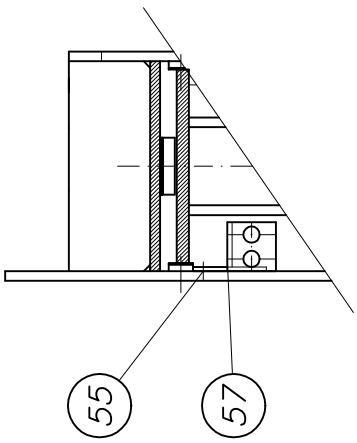
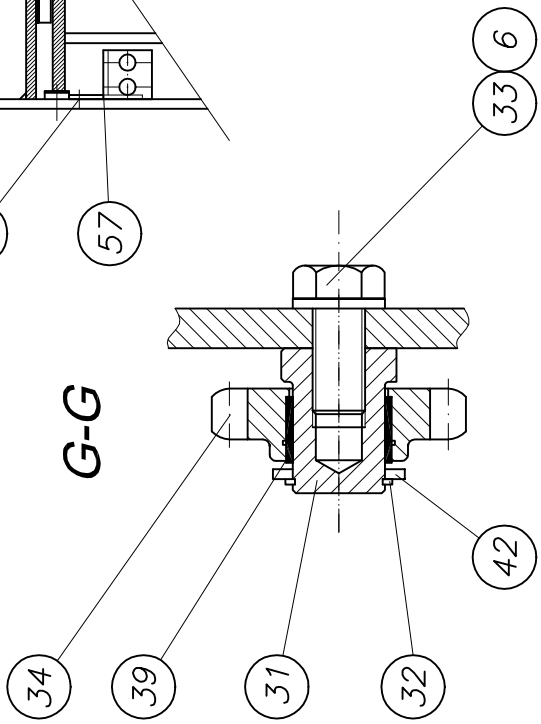




H-H



G-G



Abstützung vorne rechts kpl.
outrigger front right cpl.

B 63 2 050f 2

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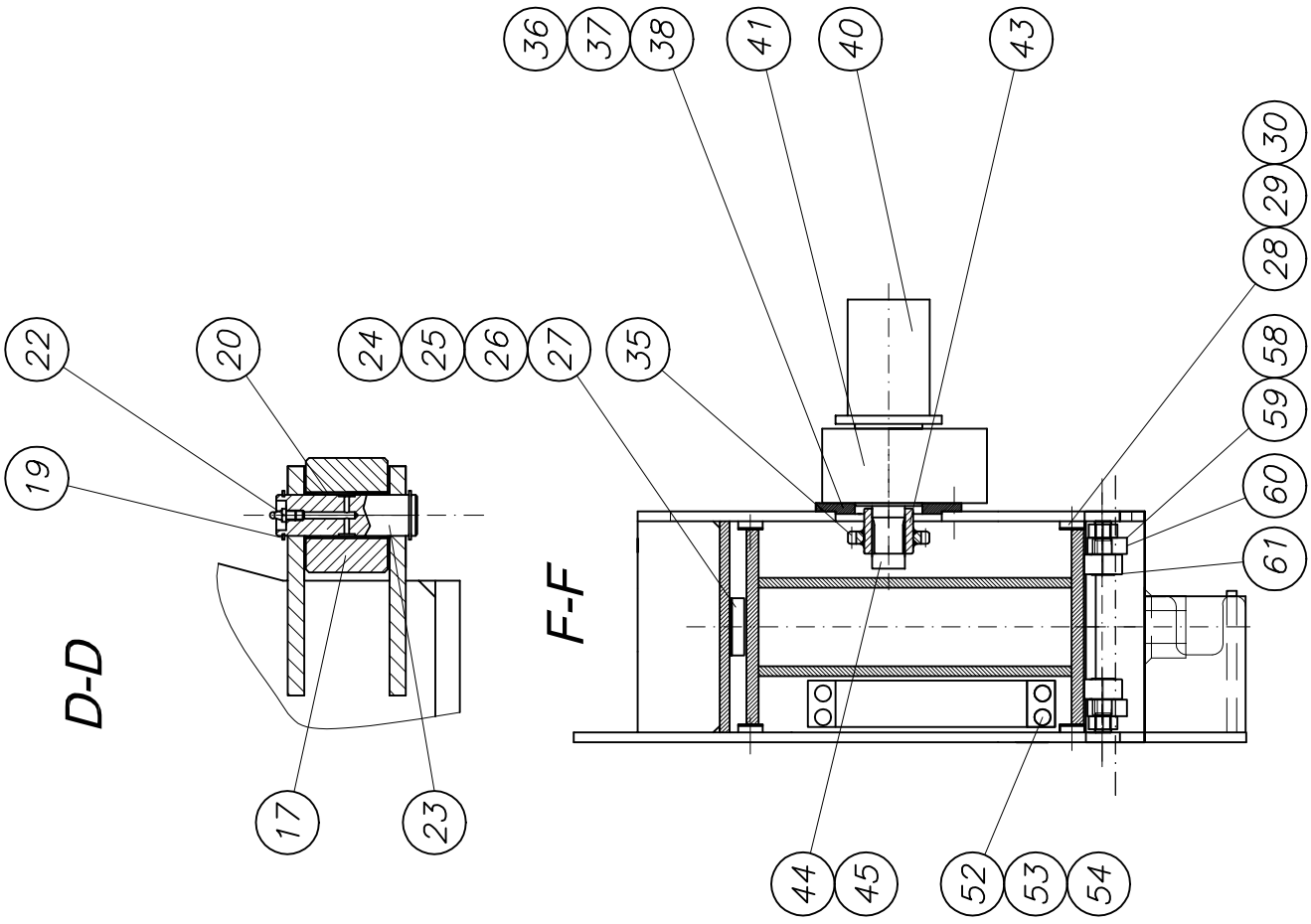

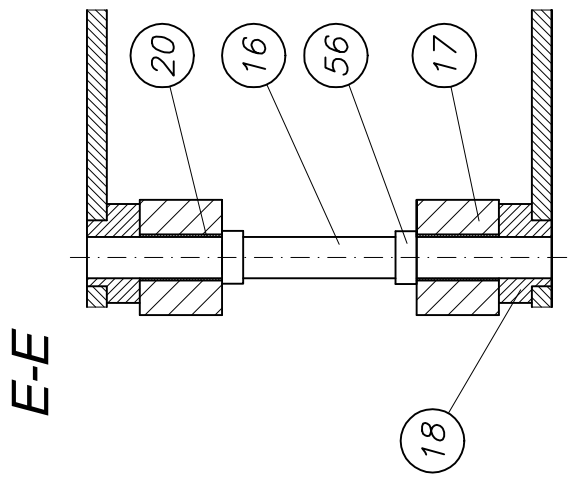

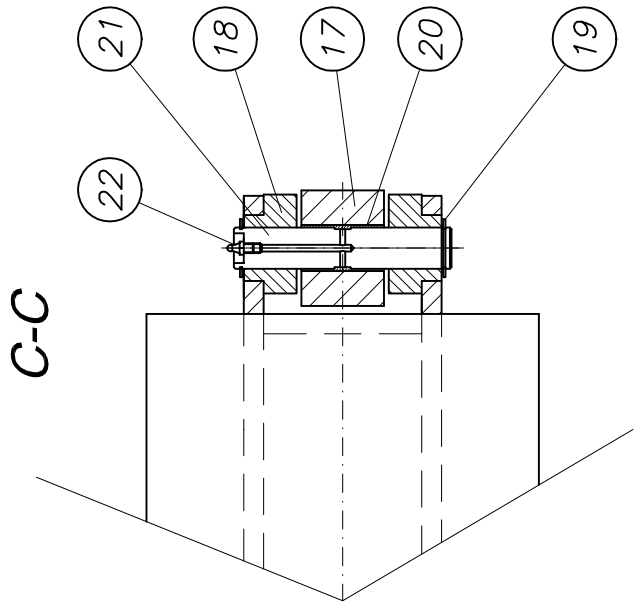

PARTS LIST

14.07.05 07:13:13

part list	description	created	index	valid from	valid to
B632050	front outrigger 42 meter	21.05.02 Mi	f	12.07.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	outrigger 42XXT front right processed own parts list	B632230			345,00	1,00 Stk
2	telecopic 42 XXT tooling own parts list	B632200		a 02.07.04	625,00	1,00 Stk
3	jack cylinder own parts list	WAI109673				1,00 Stk
4	O-ring 129,2 x 5,7	WAI101441				1,00 Stk
5	cheese head screw M 16 x 50	WAI102856				4,00 Stk
6	spring washer A16	WAI102072			0,01	6,00 Stk
7	bolt	B632053 Rd 36x115	1013 S355J2G3		0,20	2,00 Stk
9	nut M16 DIN 934	WAI101555				2,00 Stk
10	conical spring washer	WAI100506				16,00 Stk
11	chain own parts list	WAI107322				1,00 Stk
12	holder for chain cpl. right own parts list	B632068			2,20	1,00 Stk
13	alien bolt M 10 x 55	WAI105285			0,01	2,00 Stk
16	shaft	B639233 Rd 25x 290	669 S235J2G3	c 26.04.05	1,00	1,00 Stk
17	bolt	B632061 Rd 70x50	Lamigamid 320		1,00	4,00 Stk
18	eccenter	B632063 Rd 45x40	1013 S235J2G3		0,20	4,00 Stk
19	locking ring A 25 X 1.2 DIN 471	WAI103006				4,00 Stk
20	bushing DU 25 X 28 X 50	WAI106236				4,00 Stk
21	pin 25 x 136, 3P206	B610023 Rd 25 x 140	669 St50-2K		0,50	1,00 Stk
22	grease nipple M6 DIN 71412	WAI103355				2,00 Stk
23	pin 25 x 085 4P201	B610026 Rd 25 x 90	669 St50-2K		0,32	1,00 Stk
24	strip	B632093 Fl 70x15x1200	1017 S355J2G3		9,50	1,00 Stk

PARTS LIST

part list	description	created	index	valid from	valid to
B632050	front outrigger 42 meter	21.05.02 Mi	f	12.07.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
25	PLATE	B632094 Bl 1X15X1200	1623/EN10131 ST02Z	a 15.02.05	0,10	3,00 Stk
26	cylinder head screw M 12 x 25	WAI103698				1,00 Stk
27	sunk screw M 12 x 25	WAI107333				4,00 Stk
28	guide profil	B632059 30x8x470	PEUHMW 1000		0,12	4,00 Stk
29	PLATE	B632096 Bl 1x30x470	1623/EN10131 ST02Z	a 15.02.05	0,10	8,00 Stk
30	sunk screw M 10 x 20	WAI104689				12,00 Stk
31	bolt	B632043 Rd 35x47	1013 S355J2G3			2,00 Stk
32	locking ring	WAI107339				2,00 Stk
33	hexagon bolt M12 x 35	WAI102122			0,04	2,00 Stk
34	free pinion 9K115	WAI106040				2,00 Stk
35	gear 9K116	WAI106041				1,00 Stk
36	flange	B632044 Bl 15xd180	1543/EN10029 S235J2G3		2,00	1,00 Stk
37	zylinder head screw M10 x 30	WAI103826				8,00 Stk
38	spring washer A10	WAI102070			0,00	8,00 Stk
39	bushing 28x32x20	WAI107340				2,00 Stk
40	hydraulic motor 250ccm	WAI107377			7,25	1,00 Stk
41	gearbox ODR 70	WAI107378				1,00 Stk
42	washer	B632042 Bl 3xd40	1543/EN10029 S355J2G3			2,00 Stk
43	conection piece	B632067 Rd 60x55	668 S355J2G3	a 23.02.04	1,50	1,00 Stk
44	cover f. telescop motor	WAI108739			0,20	1,00 Stk
45	countersunk screw	WAI103176				3,00 Stk

PARTS LIST

14.07.05 07:13:13

part list	description	created	index	valid from	valid to
B632050	front outrigger 42 meter	21.05.02 Mi	f	12.07.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
46	fixing sheet	B632104 FL 10x20x60	174 S355J2G3		0,10	1,00 Stk
47	housing	B951044 Bl 3x250x232	 Alu	b 11.07.05	0,50	1,00 Stk
48	strip	B632108 Fl 12x25x150	174 S355J2G3	b 11.07.05	0,29	1,00 Stk
49	cheese head screw M 8 x 10	WAI108302				2,00 Stk
50	washer 8.4	WAI101625				2,00 Stk
51	spring washer A8 DIN 127 VERZ.	WAI102205			0,00	2,00 Stk
52	energie chain	WAI108645			0,01	1,00 Stk
53	cheese head screw M 6x16	WAI101658				4,00 Stk
54	spring washer A6	WAI103000				4,00 Stk
55	sunk screw M 10 x 20	WAI104689				4,00 Stk
56	fixing ring	WAI108884 Di25 Da40 B16	DIN 705		0,05	2,00 Stk
57	bolt right own parts list	B632117		b 30.03.05		1,00 Stk
58	bracket	B632179 Bl 20x48x133	1543/EN10029 S355J2G3	a 11.07.05	0,70	2,00 Stk
59	spacer plate	B632181 Bl 1x75x20	1623/EN10131 S235J2G3		0,01	4,00 Stk
60	hexagon bolt M 8 x 50 DIN 931 8.8	wai108743				4,00 Stk
61	roller	wai109571 Rd 60 x 30	 Polyamid		0,02	2,00 Stk
62	stop	B632182 50x28	 Polyamid		0,10	1,00 Stk
63	cheese head screw	wai101567			0,01	1,00 Stk

Abstützung vorne links kpl.

outrigger front left cpl.

B 63 2 051f 1

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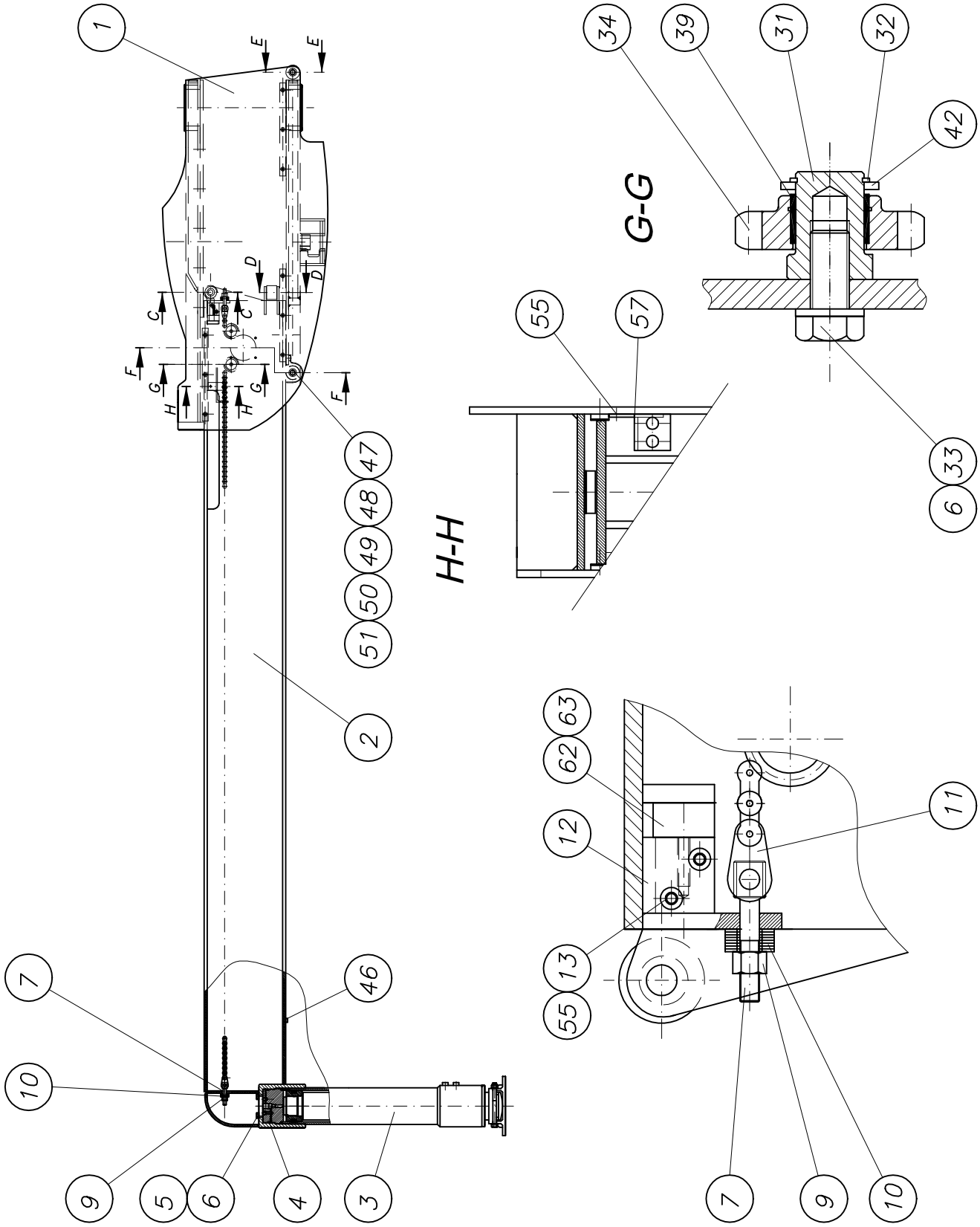

13.07.2005

Abstützung vorne links kpl.
outrigger front left cpl.

B 63 2 051f **2**

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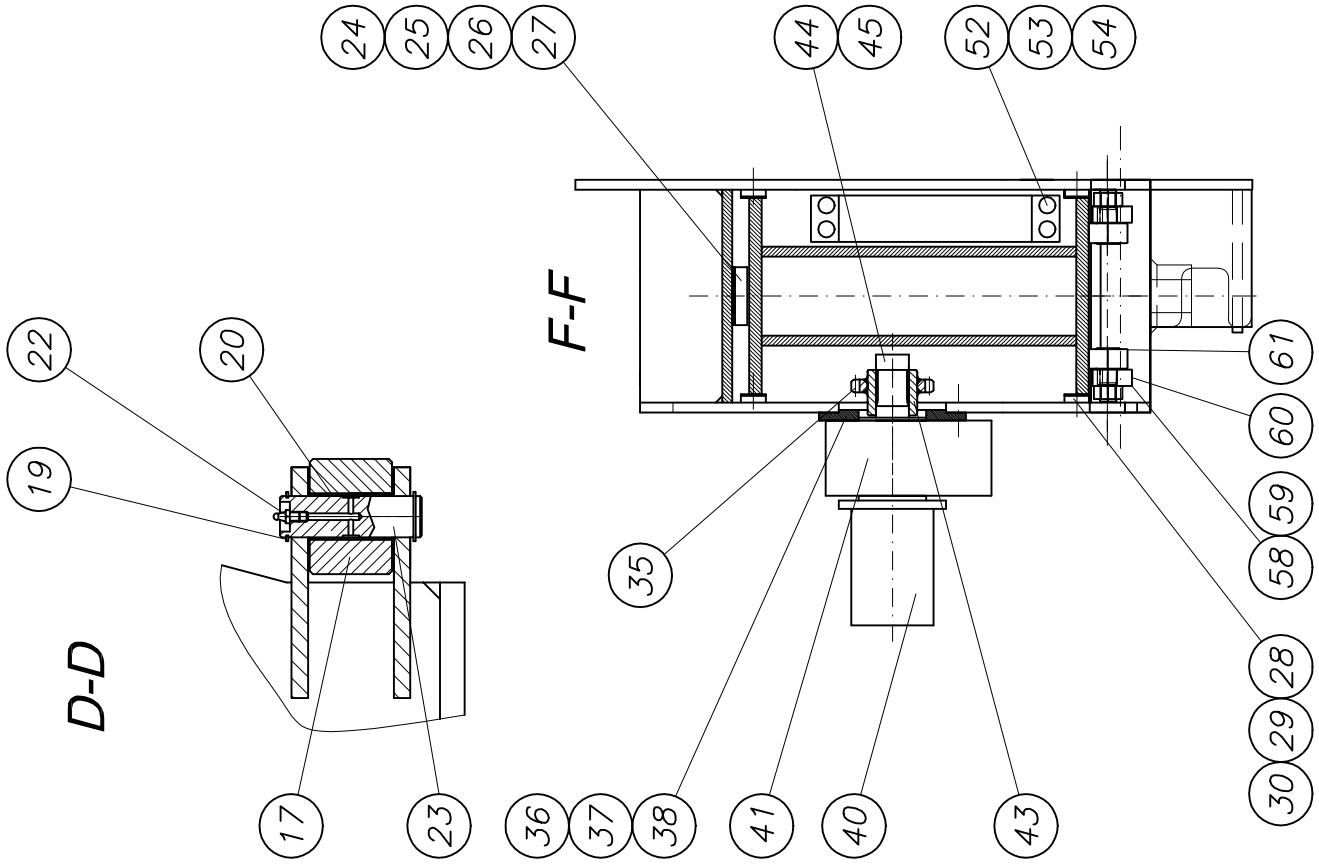

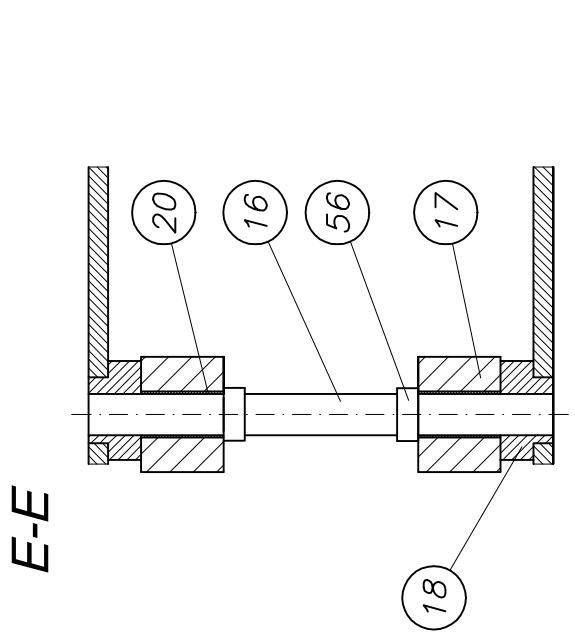

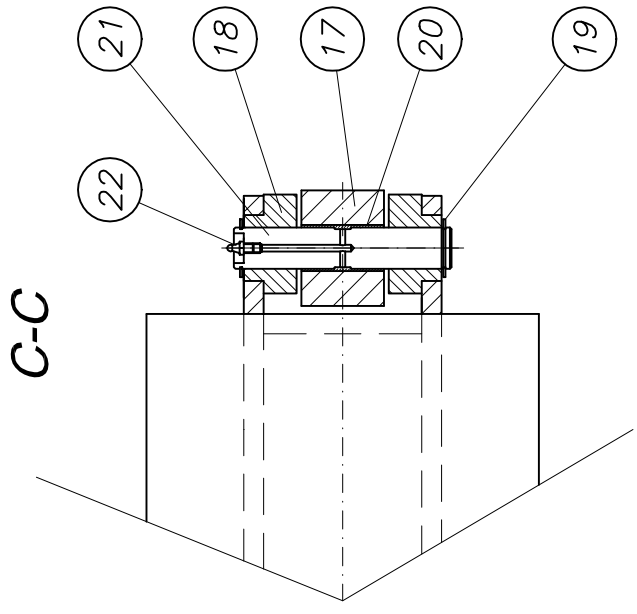

PARTS LIST

14.07.05 07:13:55

part list	description	created	index	valid from	valid to
B632051	front left stabilizer 42XXT cpl.	22.05.02 Mi	f	12.07.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	outrigger 42XXT front left processed own parts list	B632235			345,00	1,00 Stk
2	telecopic 42 XXT tooling own parts list	B632202		a 02.07.04	625,00	1,00 Stk
3	jack cylinder own parts list	WAI109673				1,00 Stk
4	O-ring 129,2 x 5,7	WAI101441				1,00 Stk
5	cheese head screw M 16 x 50	WAI102856				4,00 Stk
6	spring washer A16	WAI102072			0,01	6,00 Stk
7	bolt	B632053 Rd 36x115	1013 S355J2G3		0,20	2,00 Stk
9	nut M16 DIN 934	WAI101555				2,00 Stk
10	conical spring washer	WAI100506				16,00 Stk
11	chain own parts list	WAI107322				1,00 Stk
12	holder for chain cpl. left own parts list	B632048		a 02.07.04	2,20	1,00 Stk
13	alien bolt M 10 x 55	WAI105285			0,01	2,00 Stk
16	shaft	B639233 Rd 25x 290	669 S235J2G3	c 26.04.05	1,00	1,00 Stk
17	bolt	B632061 Rd 70x50	Lamigamid 320		1,00	4,00 Stk
18	eccenter	B632063 Rd 45x40	1013 S235J2G3		0,20	4,00 Stk
19	locking ring A 25 X 1.2 DIN 471	WAI103006				4,00 Stk
20	bushing DU 25 X 28 X 50	WAI106236				4,00 Stk
21	pin 25 x 136, 3P206	B610023 Rd 25 x 140	669 St50-2K		0,50	1,00 Stk
22	grease nipple M6 DIN 71412	WAI103355				2,00 Stk
23	pin 25 x 085 4P201	B610026 Rd 25 x 90	669 St50-2K		0,32	1,00 Stk
24	strip	B632093 Fl 70x15x1200	1017 S355J2G3		9,50	1,00 Stk

PARTS LIST

14.07.05 07:13:55

part list	description	created	index	valid from	valid to
B632051	front left stabilizer 42XXT cpl.	22.05.02 Mi	f	12.07.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
25	PLATE	B632094 Bl 1X15X1200	1623/EN10131 ST02Z	a 15.02.05	0,10	3,00 Stk
26	cylinder head screw M 12 x 25	WAI103698				1,00 Stk
27	sunk screw M 12 x 25	WAI107333				4,00 Stk
28	guide profil	B632059 30x8x470	PEUHMW 1000		0,12	4,00 Stk
29	PLATE	B632096 Bl 1x30x470	1623/EN10131 ST02Z	a 15.02.05	0,10	8,00 Stk
30	sunk screw M 10 x 20	WAI104689				12,00 Stk
31	bolt	B632043 Rd 35x47	1013 S355J2G3			2,00 Stk
32	locking ring	WAI107339				2,00 Stk
33	hexagon bolt M12 x 35	WAI102122			0,04	2,00 Stk
34	free pinion 9K115	WAI106040				2,00 Stk
35	gear 9K116	WAI106041				1,00 Stk
36	flange	B632044 Bl 15xd180	1543/EN10029 S235J2G3		2,00	1,00 Stk
37	zylinder head screw M10 x 30	WAI103826				8,00 Stk
38	spring washer A10	WAI102070			0,00	8,00 Stk
39	bushing 28x32x20	WAI107340				2,00 Stk
40	hydraulic motor 250ccm	WAI107377			7,25	1,00 Stk
41	gearbox ODR 70	WAI107378				1,00 Stk
42	washer	B632042 Bl 3xd40	1543/EN10029 S355J2G3			2,00 Stk
43	conection piece	B632067 Rd 60x55	668 S355J2G3	a 23.02.04	1,50	1,00 Stk
44	cover f. telescop motor	WAI108739			0,20	1,00 Stk
45	countersunk screw	WAI103176				3,00 Stk

PARTS LIST

14.07.05 07:13:55

part list	description	created	index	valid from	valid to
B632051	front left stabilizer 42XXT cpl.	22.05.02 Mi	f	12.07.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
46	fixing sheet	B632104 FL 10x20x60	174 S355J2G3		0,10	1,00 Stk
47	housing	B951044 Bl 3x250x232	 Alu	b 11.07.05	0,50	1,00 Stk
48	strip	B632108 Fl 12x25x150	174 S355J2G3	b 11.07.05	0,29	1,00 Stk
49	cheese head screw M 8 x 10	WAI108302				2,00 Stk
50	washer 8.4	WAI101625				2,00 Stk
51	spring washer A8 DIN 127 VERZ.	WAI102205			0,00	2,00 Stk
52	energie chain	WAI108645			0,01	1,00 Stk
53	cheese head screw M 6x16	WAI101658				4,00 Stk
54	spring washer A6	WAI103000				4,00 Stk
55	sunk screw M 10 x 20	WAI104689				4,00 Stk
56	fixing ring	WAI108884 Di25 Da40 B16	DIN 705		0,05	2,00 Stk
57	bolt left own parts list	B632114		b 30.03.05		1,00 Stk
58	bracket	B632179 Bl 20x48x133	1543/EN10029 S355J2G3	a 11.07.05	0,70	2,00 Stk
59	spacer plate	B632181 Bl 1x75x20	1623/EN10131 S235J2G3		0,01	4,00 Stk
60	hexagon bolt M 8 x 50 DIN 931 8.8	wai108743				4,00 Stk
61	roller	WAI109571 Rd 60 x 30	 Polyamid		0,02	2,00 Stk
62	stop	B632182 50x28	 Polyamid		0,10	1,00 Stk
63	cheese head screw	WAI101567			0,01	1,00 Stk

Ausschwenkzylinder vorne kpl.

swing cylinder front cpl.

B 63 2 036a

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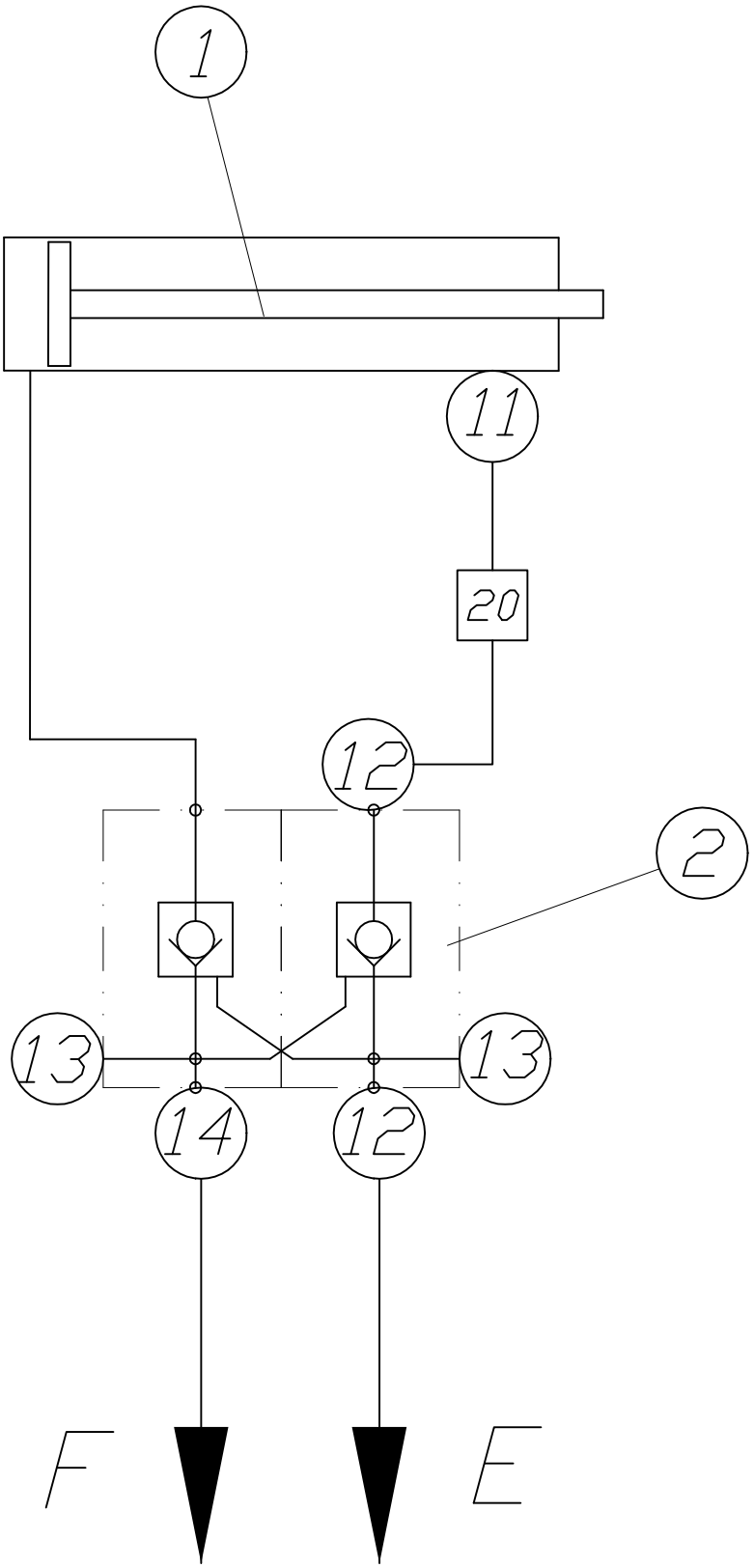

PARTS LIST

23.06.05 08:14:50

part list	description	created	index	valid from	valid to
B632036	swing cylinder cpl.	11.11.03 Mi	a	02.06.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	swing cylinder 100x 60 x 475 42XXT own parts list	WAI107364				1,00 Stk
2	pilot operated twin check valve	WAI106410				1,00 Stk
11	banjo coupling L12 RD	WAI103684				1,00 Stk
12	straight male stud couplings L12D	WAI100548				2,00 Stk
13	locking screw G 3/8	WAI100521				2,00 Stk
14	straight male stud couplings L12R 1.5 own parts list	WAI106427			0,13	1,00 Stk
20	hydr. pipe 12 x 2	WAI102022			0,49	0,30 Mtr

Ausschwenkzylinder kpl.

swing cylinder cpl.

WAI 107364

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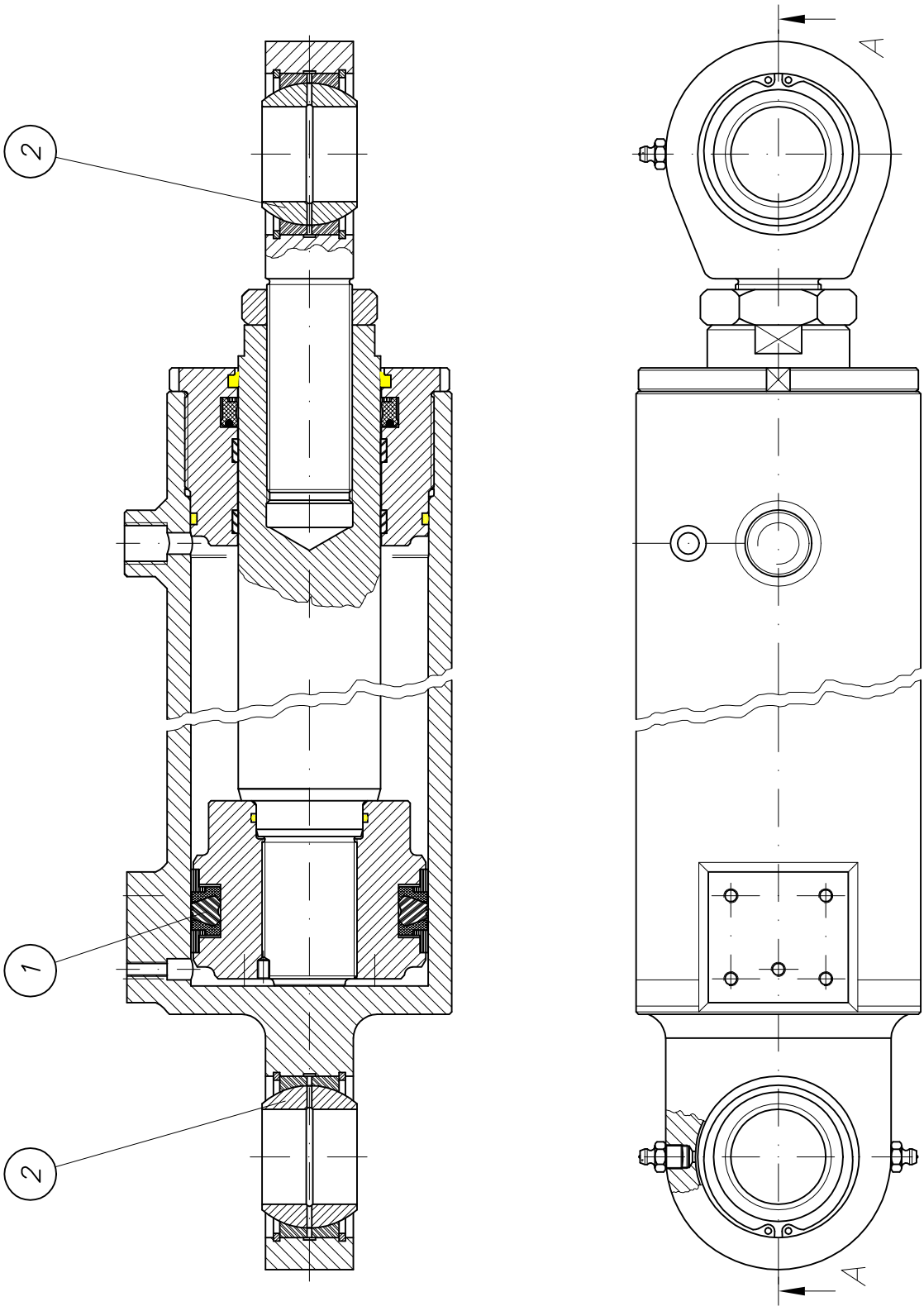


27.11.2003

PARTS LIST

23.06.05 08:18:04

part list	description	created	index	valid from	valid to
WAI107364	swing cylinder 100x 60 x 475 42XXT	24.10.03 HG			

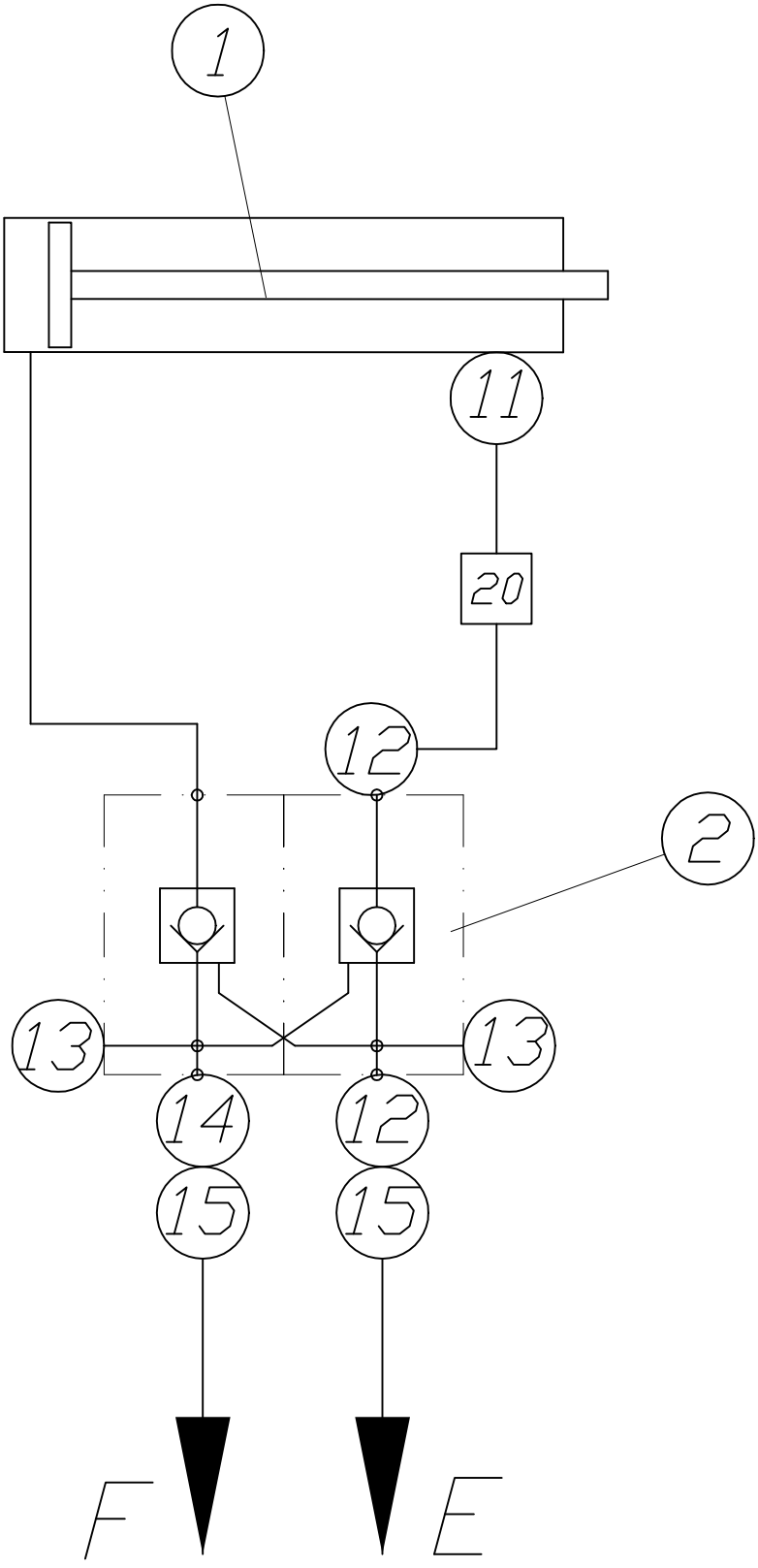
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	sealing kit for swing cylinder 42XXT	WAI108535				1,00 Stk
2	joint bearing	WAI100233			0,60	2,00 Stk

Ausschwenkzylinder hinten kpl.

swing cylinder cpl.

B 63 2 037a

Waitzinger
Baumaschinen GmbH



PARTS LIST

23.06.05 08:16:14

part list	description	created	index	valid from	valid to
B632037	swing cylinder cpl.	11.11.03 Mi	a	02.06.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	swing cylinder 100x 60 x 475 42XXT own parts list	WAI107364				1,00 Stk
2	pilot operated twin check valve	WAI106410				1,00 Stk
11	banjo coupling L12 RD	wai103684				1,00 Stk
12	straight male stud couplings L12D	WAI100548				2,00 Stk
13	locking screw G 3/8	WAI100521				2,00 Stk
14	straight male stud couplings L12R 1.2 own parts list	WAI107456			0,13	1,00 Stk
15	swivel elbow L12	WAI103794				2,00 Stk
20	hydr. pipe 12 x 2	WAI102022			0,49	0,30 Mtr

Transportsicherung vorne
transport safety device front

B 63 9 197b

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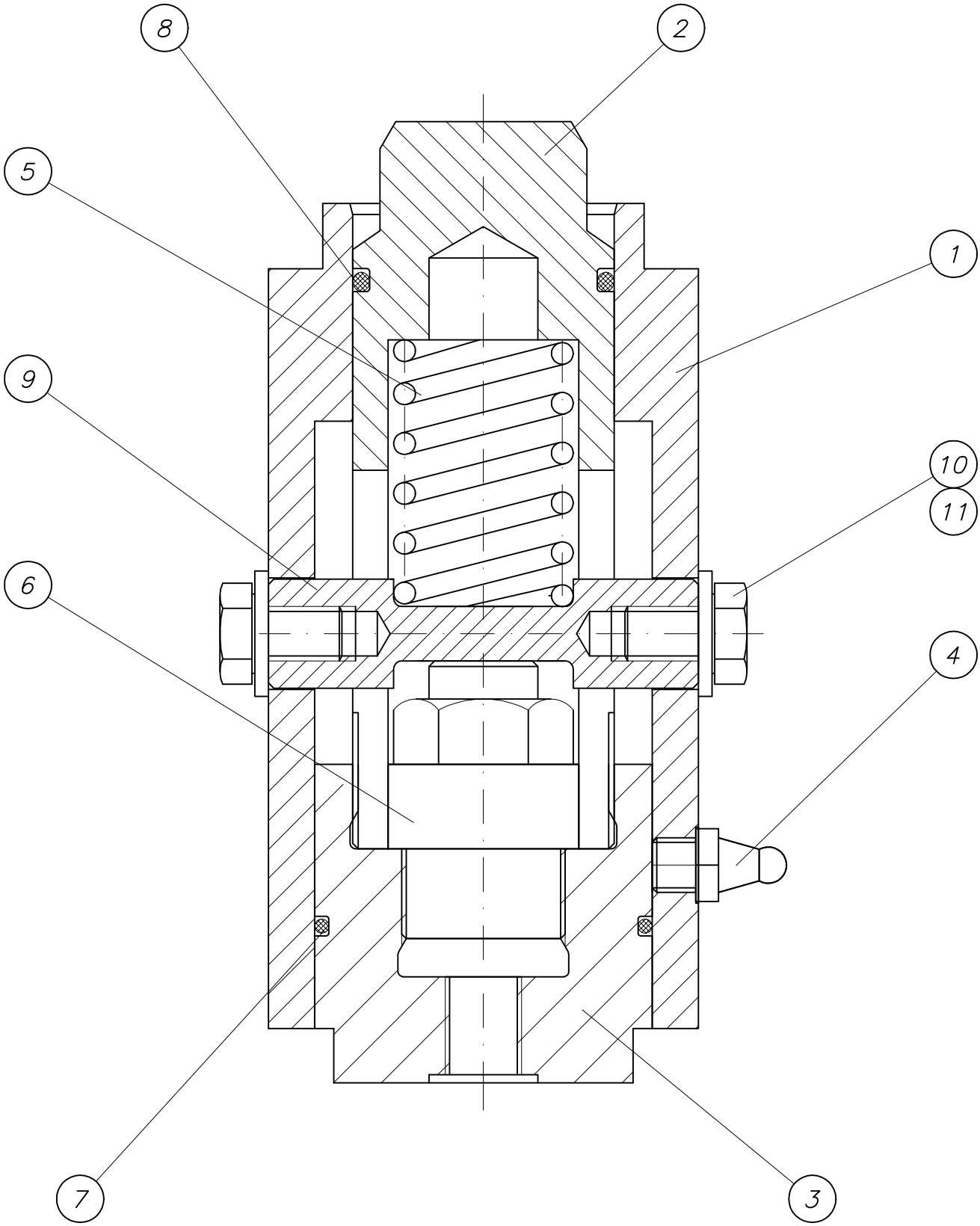

17.10.2003

PARTS LIST

23.06.05 08:21:11

part list	description	created	index	valid from	valid to
B639197	transport savety device	04.12.00 ek	b	14.10.03	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	pipe	B639198 Ro D82.5x20x155	2448 St52-3	c 16.02.04		1,00 Stk
2	bolt	B639199 Rd 50x135	1013 St52-3	a 17.09.03		1,00 Stk
3	nut	B639201 Rd 70	1013 St52-3	a 17.12.02		1,00 Stk
4	grease nipple H1 M10 X 1 DIN 71412	WAI100805			0,01	1,00 Stk
5	pressure spring	WAI106537				1,00 Stk
6	cylinder	WAI106536				1,00 Stk
7	O-ring 56.74x3	WAI106538				1,00 Stk
8	O-ring	WAI101260				1,00 Stk
9	bolt	B639215 Rd 20x80	1013 S355J2G3		0,15	1,00 Stk
10	hexagon bolt M10 x 16	WAI102886				2,00 Stk
11	washer 10.5	WAI101559			0,00	2,00 Stk

Transportsicherung hinten
transport safety device rear

B 63 9 207b

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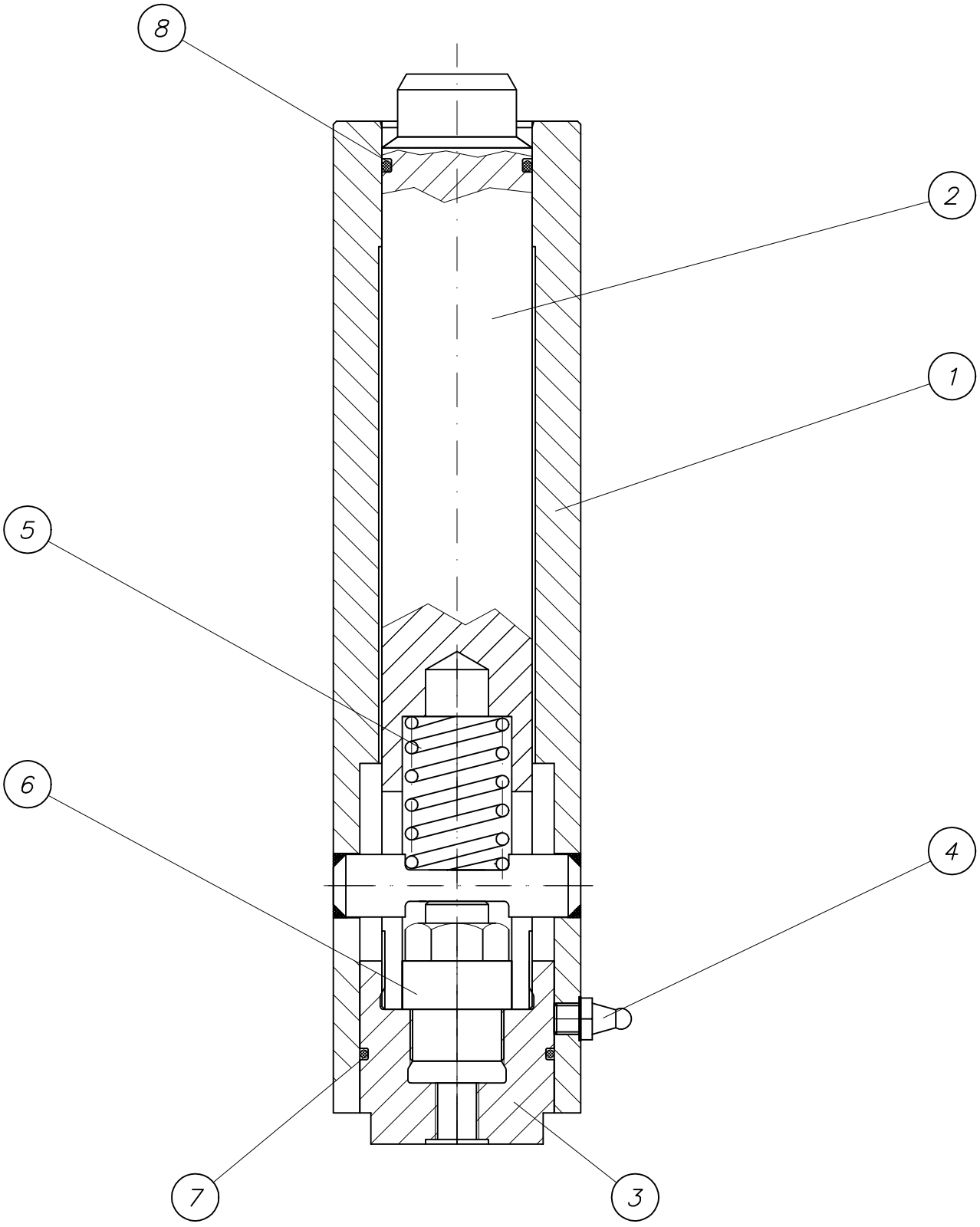
Baumaschinen GmbH



25.10.2004

PARTS LIST

23.06.05 08:20:46

part list	description	created	index	valid from	valid to
B639207	transport savety device	04.12.00 ek	b	20.10.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	pipe cpl. own parts list	B639218				1,00 Stk
2	bolt	B639209 Rd 50x320	1013 St52-3	b 20.10.04		1,00 Stk
3	nut	B639201 Rd 70	1013 St52-3	a 17.12.02		1,00 Stk
4	grease nipple H1 M10 X 1 DIN 71412	WAI100805			0,01	1,00 Stk
5	pressure spring	WAI106537				1,00 Stk
6	cylinder	WAI106536				1,00 Stk
7	O-ring 56.74x3	WAI106538				1,00 Stk
8	O-ring	WAI101260				1,00 Stk

Armpaket W42-4 kpl.

boom W42-4 cpl.

B 66 2 100

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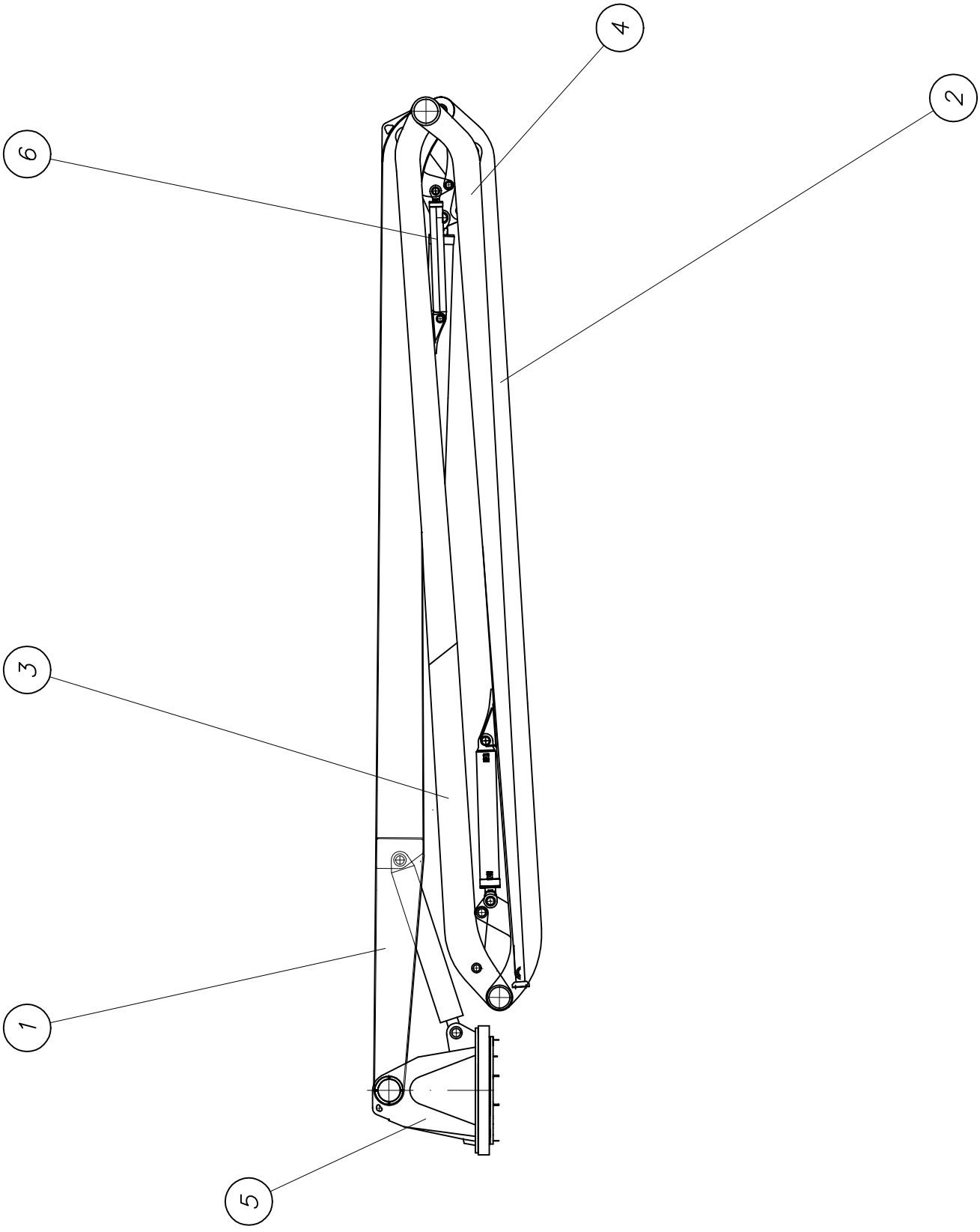

PARTS LIST

12.10.05 08:43:59

part list	description	created	index	valid from	valid to
B662100	distribution boom 42.4 type plan	19.04.04 a			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom arm 1 cpl. own parts list	B662110		a 10.02.05		1,00 Stk
2	boom arm 2 cpl. own parts list	B662120		c 23.09.05		1,00 Stk
3	boom arm 3 cpl. own parts list	B662130		b 10.02.05		1,00 Stk
4	boom arm 4 cpl. own parts list	B662140				1,00 Stk
5	rotating head unit 42 m own parts list	B682100			790,00	1,00 Stk
6	piping plan 42R4 boom own parts list	B712020		a 28.09.04		1,00 Stk

Mastarm 1 kpl.

element 1 cpl.

B 66 2 110a

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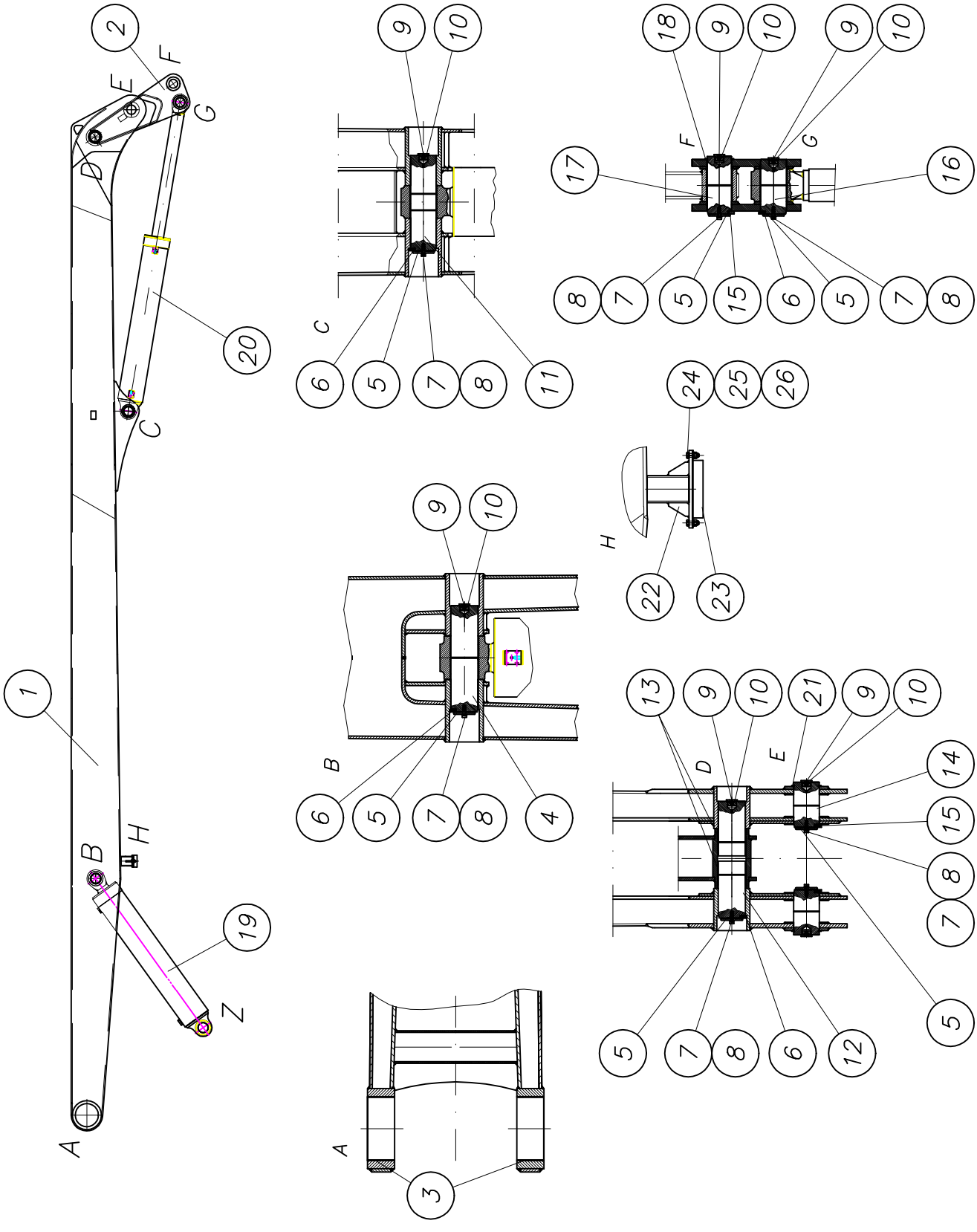

PARTS LIST

part list	description	created	index	valid from	valid to
B662110	boom arm 1 cpl.	23.02.04 aaa	a	10.02.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom arm 1 cpl. own parts list	B672100		a 24.08.04		1,00 Stk
2	beam "B" cpl. processing drawing own parts list	B672610		c 20.05.05	130,00	1,00 Stk
3	bushing	WAI108736				2,00 Stk
4	pin 100x 390	B662153 Rd 105x395	1013 42CrMo4V		24,00	1,00 Stk
5	washer d 90x06	B660054 Rd 95x10	1013 St37-2		0,20	7,00 Stk
6	pin holder	B660088 Bl 10x22x70	1543/EN10029 S235J2G3		0,10	3,00 Stk
7	cylinder head screw M 10 x 25	WAI106654				7,00 Stk
8	spring washer A10	WAI102070			0,00	7,00 Stk
9	grease nipple H1 M10 X 1 DIN 71412	WAI100805			0,01	7,00 Stk
10	locking screw M33x2 own parts list	B660085			0,10	7,00 Stk
11	pin 95 x 350	B660113 Rd 100x355	1013 42CrMo4V	a 31.07.02	19,00	1,00 Stk
12	pin 100x 430	B662154 Rd 105x435	1013 42CrMo4V		26,50	1,00 Stk
13	bushing	WAI108734				2,00 Stk
14	pin 95x 166	B662155 Rd 100x170	1013 42CrMo4V		9,20	2,00 Stk
15	pin holder	B660086 Fl 25x10x80	1017 S235J2G3		0,15	4,00 Stk
16	pin 95x 200	B662156 Rd 95x205	1013 42CrMo4V		11,00	1,00 Stk
17	pin 90x 216	B662157 Rd 95x220	1013 42CrMo4V	a 16.07.04	10,80	1,00 Stk
18	retaining ring A 85x4 DIN471	WAI106975			0,02	1,00 Stk
19	boom cylinder A cpl. with pipes own parts list	B660140		b 15.04.05		1,00 Stk
20	boom cylinder B cpl. with pipes own parts list	B660141		b 15.04.05		1,00 Stk
21	retaining ring A 90x4 DIN471	WAI108740			0,02	2,00 Stk

PARTS LIST

04.07.05 08:30:21

part list	description	created	index	valid from	valid to
B662110	boom arm 1 cpl.	23.02.04 aaa	a	10.02.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
22	holder for rubber buffer arm 1 cpl. own parts list	B662025		a 02.11.04	4,90	1,00 Stk
23	rubber cushion	WAI106715				1,00 Stk
24	hexagon bolt M 10 x 30	WAI101553			0,03	2,00 Stk
25	spring washer A10	WAI102070			0,00	2,00 Stk
26	hex. nut M10 DIN985 8.	WAI102125			0,01	2,00 Stk

Mastarm 1 kpl.

element 1 cpl.

B 67 2 100a

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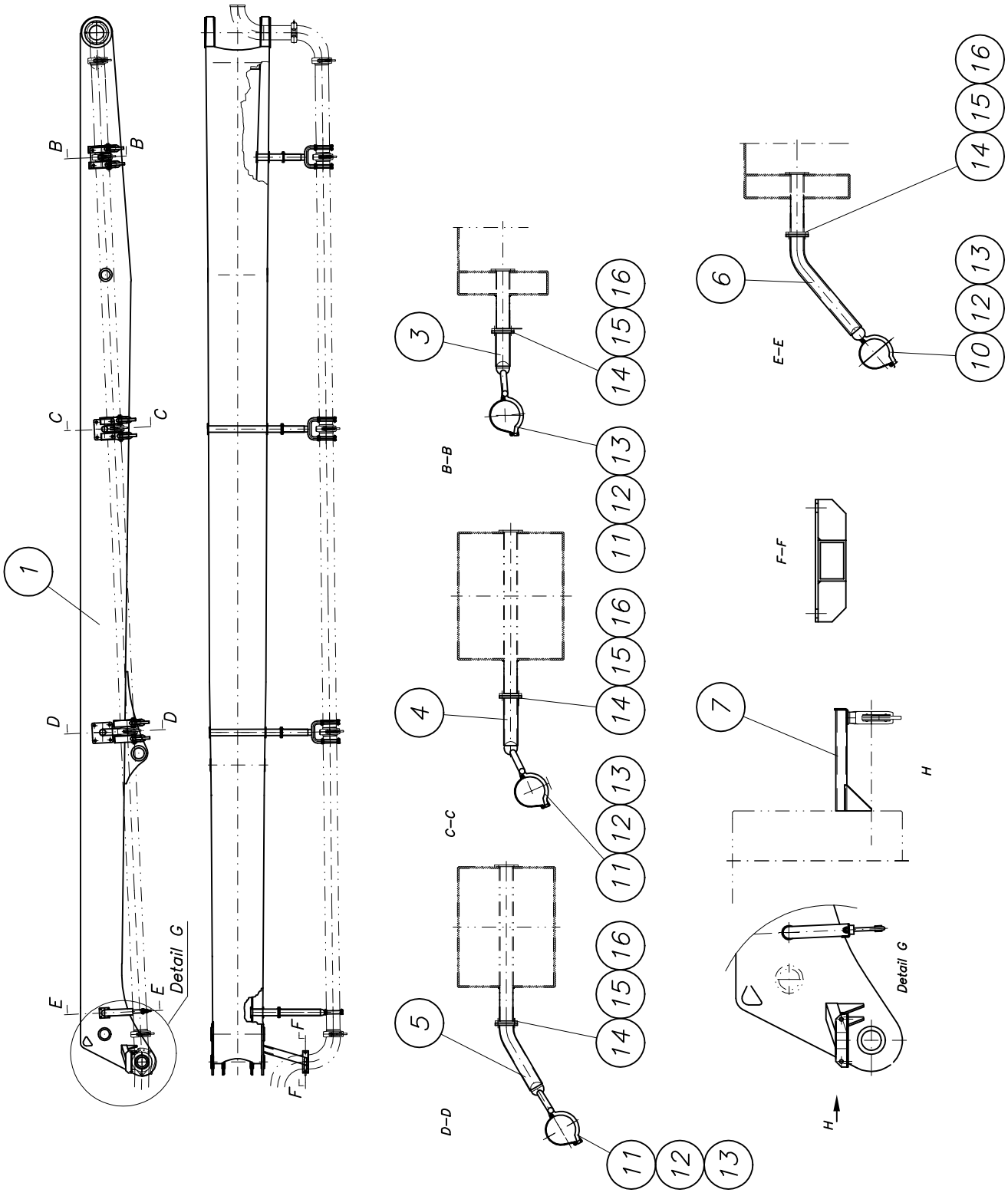

PARTS LIST

04.07.05 08:32:05

part list	description	created	index	valid from	valid to
B672100	boom arm 1 cpl.	19.02.04 Mi	a	24.08.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom arm 1 processing cpl. 42.4 own parts list	B672101		a 23.05.05	2140,00	1,00 Stk
3	holder 2 cpl., element 1 own parts list	B642012		a 24.08.04	1,70	1,00 Stk
4	holder 3 cpl., element 1 own parts list	B642014		a 24.08.04	2,30	1,00 Stk
5	holder 4 cpl., element 1 own parts list	B642016		a 24.08.04	3,00	1,00 Stk
6	holder 5 cpl., element 1 own parts list	B642018		a 24.08.04	4,00	1,00 Stk
7	holder 5 cpl., element 1 own parts list	B641039		a 22.04.05	5,70	1,00 Stk
10	pipe holder cpl. own parts list	WAI107108				1,00 Stk
11	pipe holder cpl. own parts list	WAI107109				3,00 Stk
12	conical spring washer 12 mm	WAI102877				7,00 Stk
13	hex. nut M12 DIN 985 8. VERZ.	WAI101626				7,00 Stk
14	hexagon bolt M 10 x 35	WAI101705			0,03	16,00 Stk
15	washer 10.5	WAI101559			0,00	16,00 Stk
16	nut M10 DIN 934	WAI101556			0,01	16,00 Stk

Mastzylinder A kpl.

boom cylinder A cpl.

B 66 0 140b

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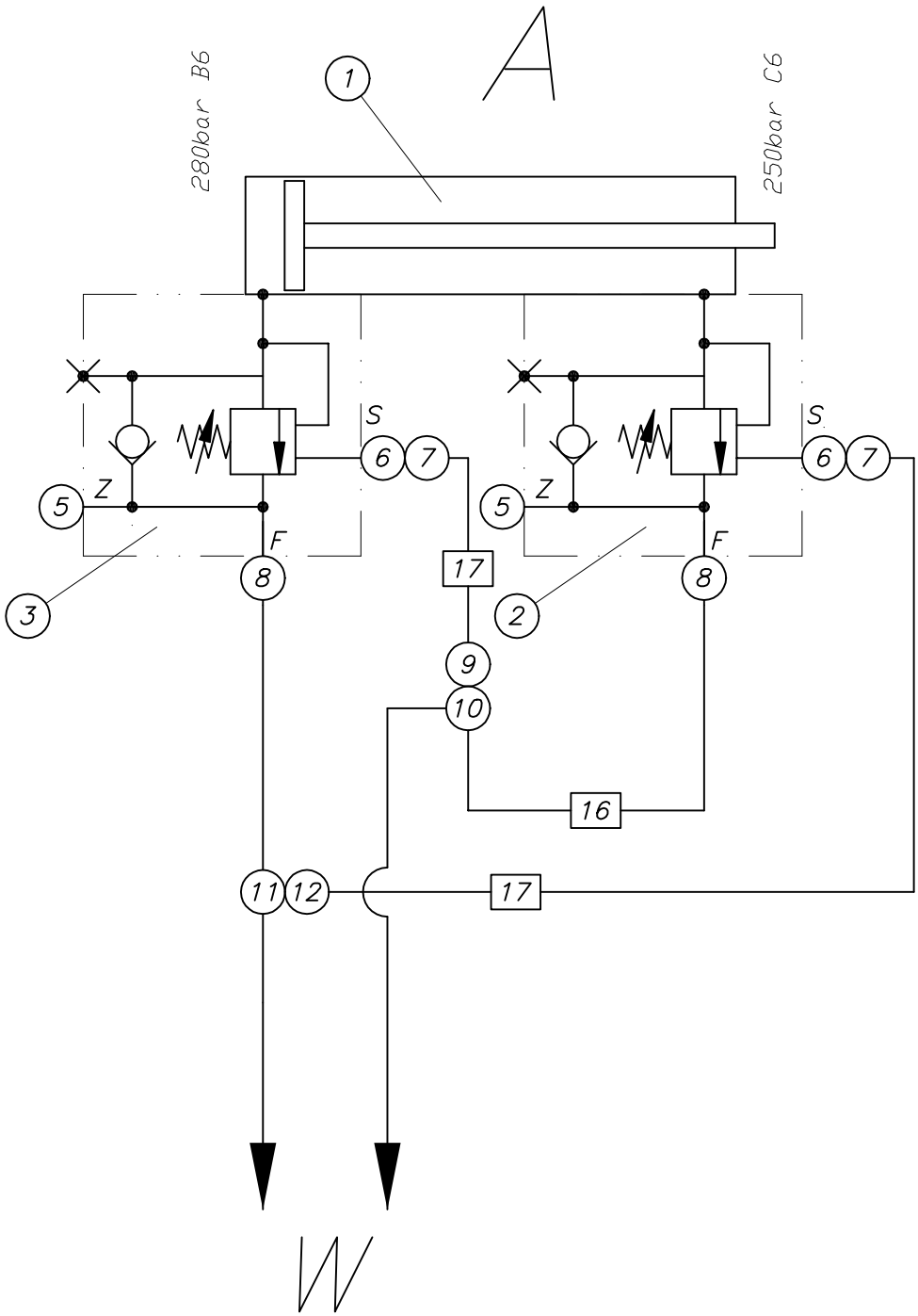

PARTS LIST

04.07.05 08:34:01

part list	description	created	index	valid from	valid to
B660140	boom cylinder A cpl. with pipes	19.04.04 a	b	15.04.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom cylinder for 42-mtr., section A	WAI109328				1,00 Stk
2	locking valve 250 bar	WAI106260				1,00 Stk
3	locking valve 280 bar	WAI108959				1,00 Stk
5	locking screw G 1/4	WAI100520				2,00 Stk
6	male stud couplings S12RB 1/4	WAI104042				2,00 Stk
7	adjustable male stud elbows	WAI100366			0,19	2,00 Stk
8	straight male stud couplings S16	WAI100543				2,00 Stk
9	straight reducing couplings S16-12	WAI101160				1,00 Stk
10	tee coupling S16	WAI100594				1,00 Stk
11	swivel barrel tee S16	wai100602				1,00 Stk
12	standpipe reducers S16-12V	WAI100355			0,18	1,00 Stk
16	hydr. pipe 16 x 2.5	WAI109029			0,83	2,00 Mtr
17	hydr. pipe 12 x 2	WAI102022			0,49	2,00 Mtr

Mastzylinder B kpl.

boom cylinder B cpl.

B 66 0 141b

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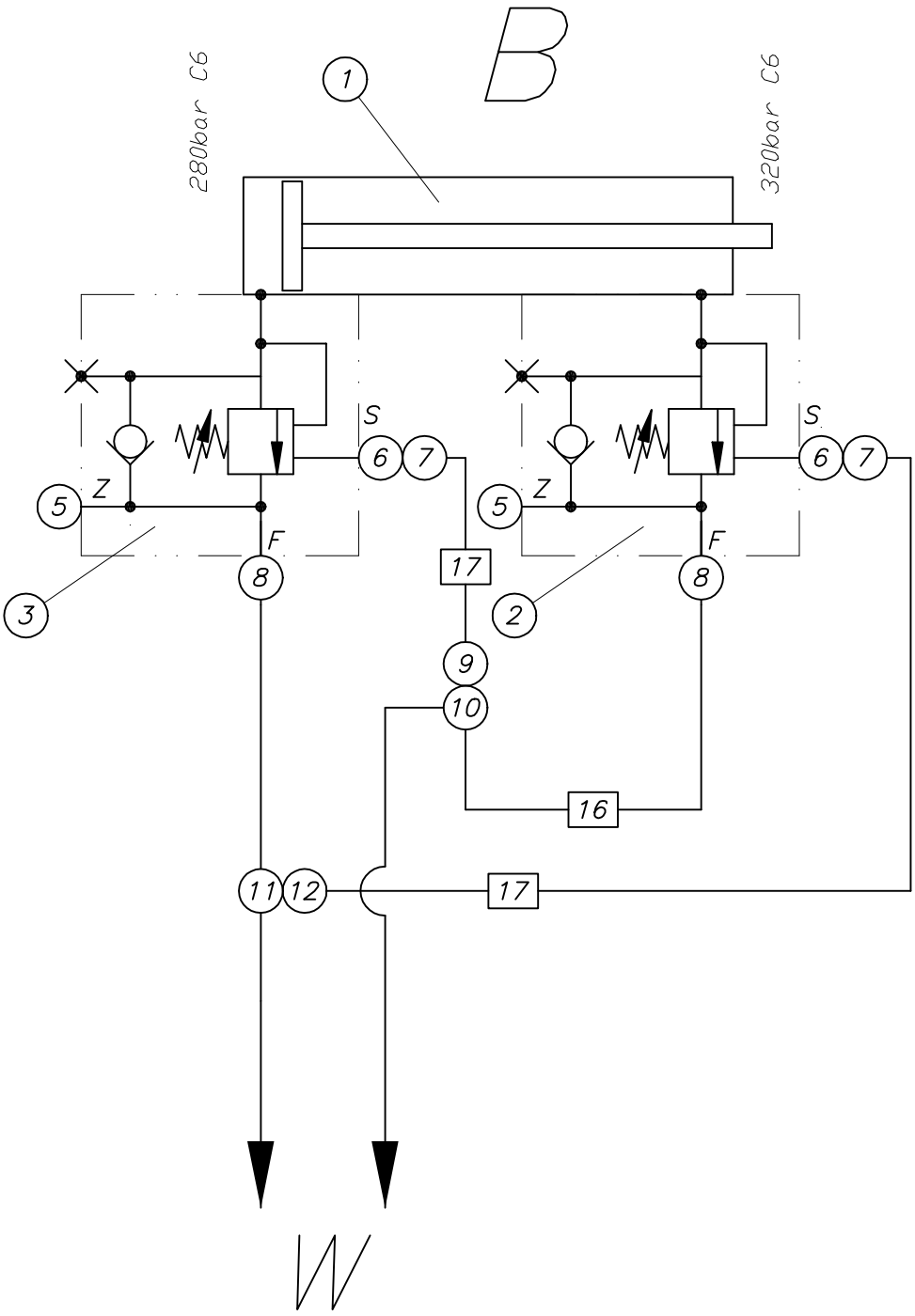

PARTS LIST

04.07.05 08:35:14

part list	description	created		index	valid from	valid to
B660141	boom cylinder B cpl. with pipes	19.04.04 a	b	15.04.05		

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom cylinder for 42-mtr., section B	WAI109329				1,00 Stk
2	locking valve 320 bar	WAI106258				1,00 Stk
3	locking valve 280 bar	WAI106935				1,00 Stk
5	locking screw G 1/4	WAI100520				2,00 Stk
6	male stud couplings S12RB 1/4	WAI104042				2,00 Stk
7	adjustable male stud elbows	WAI100366			0,19	2,00 Stk
8	straight male stud couplings S16	WAI100543				2,00 Stk
9	straight reducing couplings S16-12	WAI101160				1,00 Stk
10	tee coupling S16	WAI100594				1,00 Stk
11	standpipe reducers S16-12V	WAI100355			0,18	1,00 Stk
12	swivel barrel tee S16	WAI100602				1,00 Stk
16	hydr. pipe 16 x 2.5	WAI109029			0,83	2,00 Mtr
17	hydr. pipe 12 x 2	WAI102022			0,49	2,00 Mtr

Mastarm 2 kpl.

element 2 cpl.

B 66 2 120c

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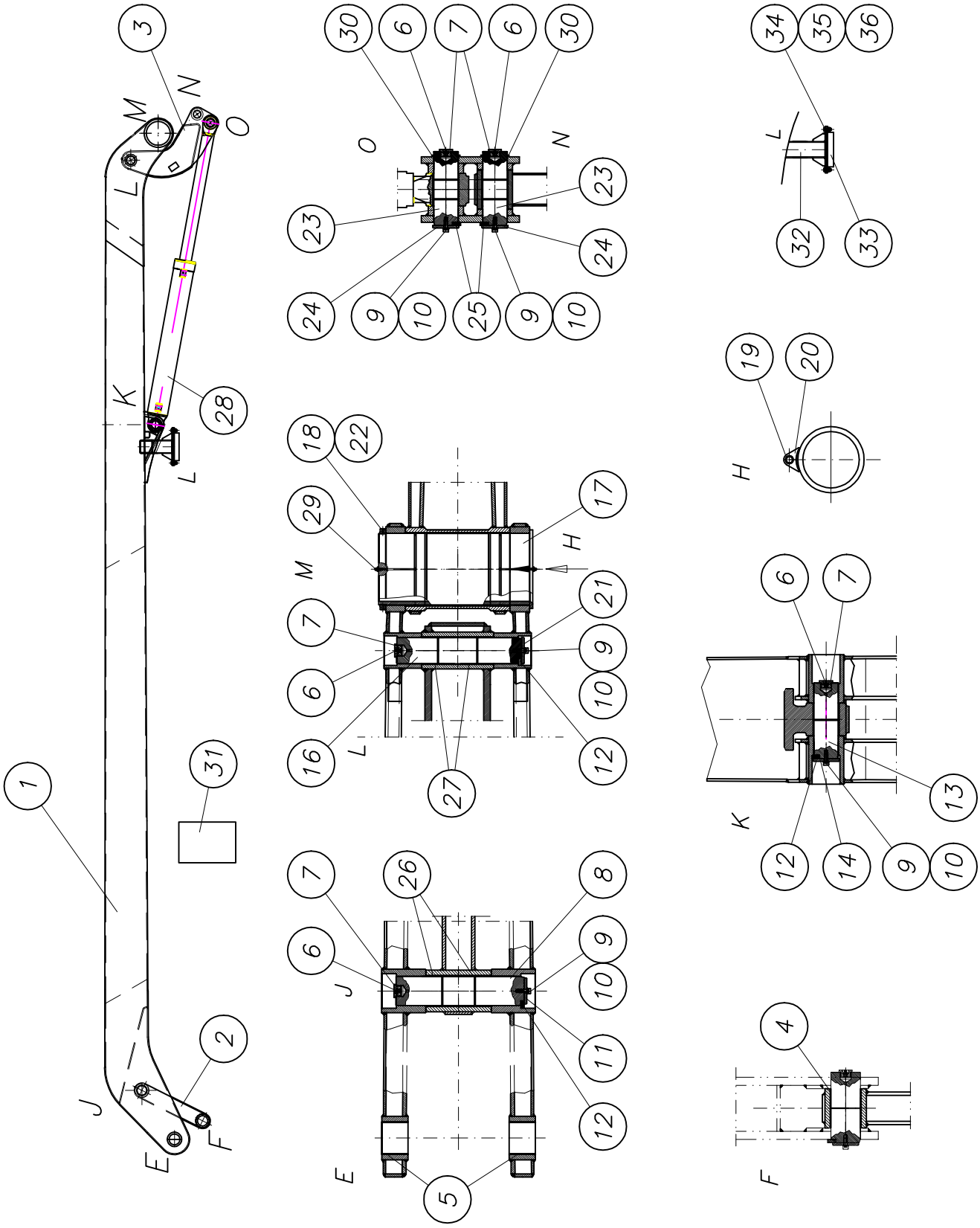

PARTS LIST

12.10.05 08:40:25

part list	description	created	index	valid from	valid to
B662120	boom arm 2 cpl.	23.02.04 aaa	c	23.09.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom arm 2 cpl. own parts list	B672200				1,00 Stk
2	forcing rod B cpl. own parts list	B672710		a 09.05.05	40,00	1,00 Stk
3	Lever C cpl. own parts list	B672620			120,00	1,00 Stk
4	bushing	WAI108732				1,00 Stk
5	bushing	WAI108733				2,00 Stk
6	grease nipple H1 M10 X 1 DIN 71412	WAI100805			0,01	5,00 Stk
7	locking screw M33x2 own parts list	B660085			0,10	5,00 Stk
8	pin 90x 390	B662158 Rd 95x395	1013 42CrMo4V		19,50	1,00 Stk
9	cylinder head screw M 10 x 25	WAI106654				5,00 Stk
10	spring washer A10	WAI102070			0,00	5,00 Stk
11	washer d 90x06	B660054 Rd 95x10	1013 St37-2		0,20	1,00 Stk
12	pin holder	B660088 Bl 10x22x70	1543/EN10029 S235J2G3		0,10	3,00 Stk
13	pin 75x 229	B662160 Rd 80x235	1013 42CrMo4V		8,00	1,00 Stk
14	washer d 70x05	B660065 Rd 75x10	1013 St37-2		0,10	1,00 Stk
16	pin 80x 380	B662159 Rd 85x385	1013 42CrMo4V		15,00	1,00 Stk
17	pin 220x 472	B662163			28,00	1,00 Stk
18	threaded ring	WAI105378				1,00 Stk
19	pipe	B660124 Rohr 51x6.3x30	2448 S355J2G3		0,20	1,00 Stk
20	pin protection	B660123 Bl 10x100x148	1543/EN10029 S355J2G3		0,45	1,00 Stk
21	washer d 80x06	B660058 Rd 85x10	1013 St37-2		0,20	1,00 Stk

PARTS LIST

12.10.05 08:40:25

part list	description	created	index	valid from	valid to
B662120	boom arm 2 cpl.	23.02.04 aaa	c	23.09.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
22	set screw M 6 x 8	WAI109320				2,00 Stk
23	pin 75x 209	B662162 Rd 80x215	1013 42CrMo4V		7,20	2,00 Stk
24	washer	B660089 Bl 8xd62	1543/EN10029 S235J2G3		0,20	2,00 Stk
25	pin holder	B660086 Fl 25x10x80	1017 S235J2G3		0,15	2,00 Stk
26	bushing	WAI108753				2,00 Stk
27	bushing	WAI108752				2,00 Stk
28	boom cylinder C cpl. with pipes own parts list	B660142		a 29.11.04		1,00 Stk
29	grease nipple	WAI102885				4,00 Stk
30	locking ring	WAI109034				2,00 Stk
31	reinforcement	B662101 Bl 8x250x430	1543/EN10029 S235J2G3		6,80	1,00 Stk
32	holder for rubber buffer arm 2 cpl. own parts list	B661120			4,50	1,00 Stk
33	rubber cushion	WAI106715				1,00 Stk
34	hexagon bolt M 10 x 30	WAI101553			0,03	2,00 Stk
35	spring washer A10	WAI102070			0,00	2,00 Stk
36	hex. nut M10 DIN985 8.	WAI102125			0,01	2,00 Stk

Mastarm 2 kpl.

element 2 cpl.

B 67 2 200

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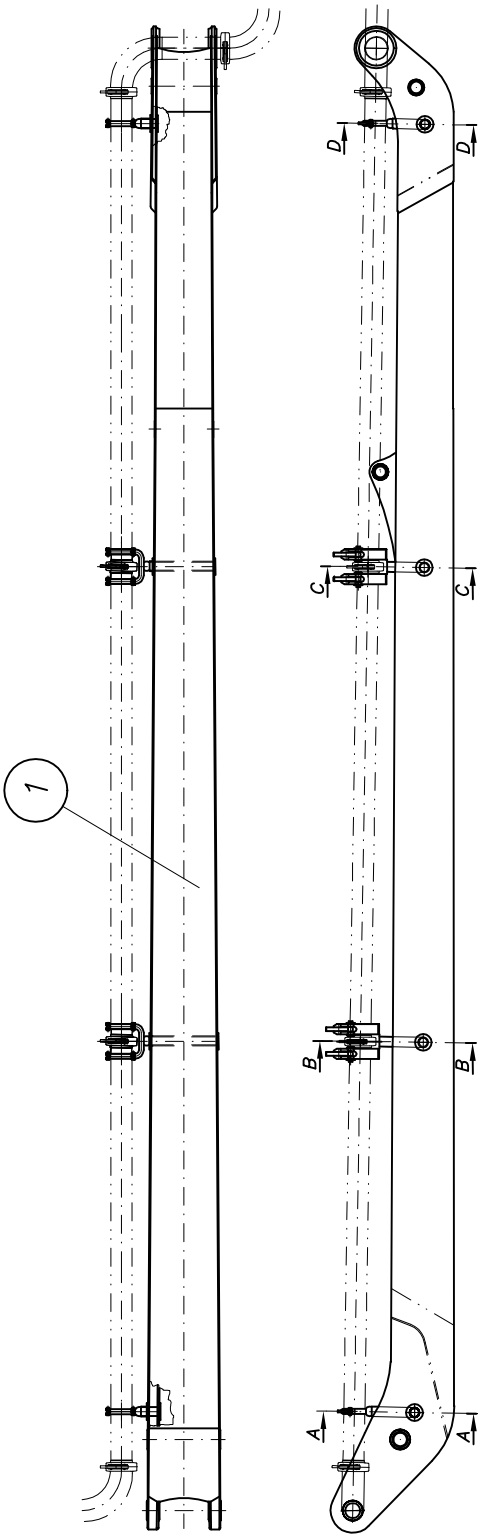
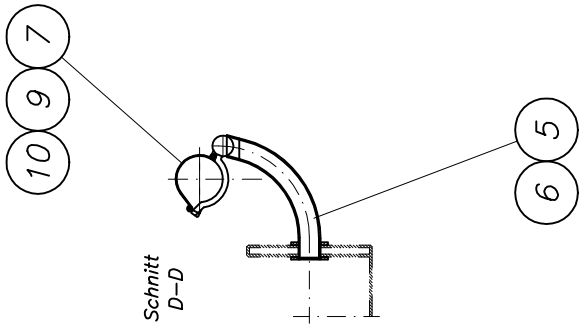
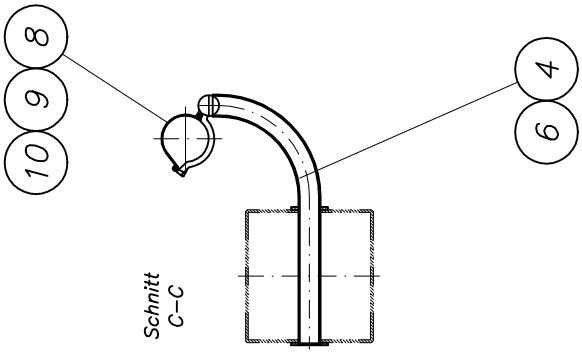
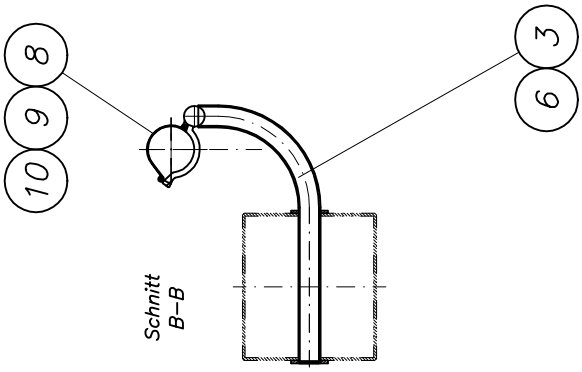
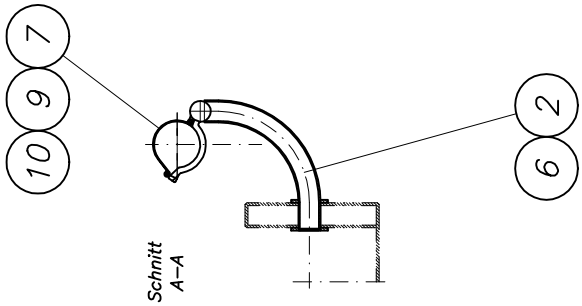










PARTS LIST

04.07.05 08:43:45

part list	description	created	index	valid from	valid to
B672200	boom arm 2 cpl.	20.02.04 Mi			

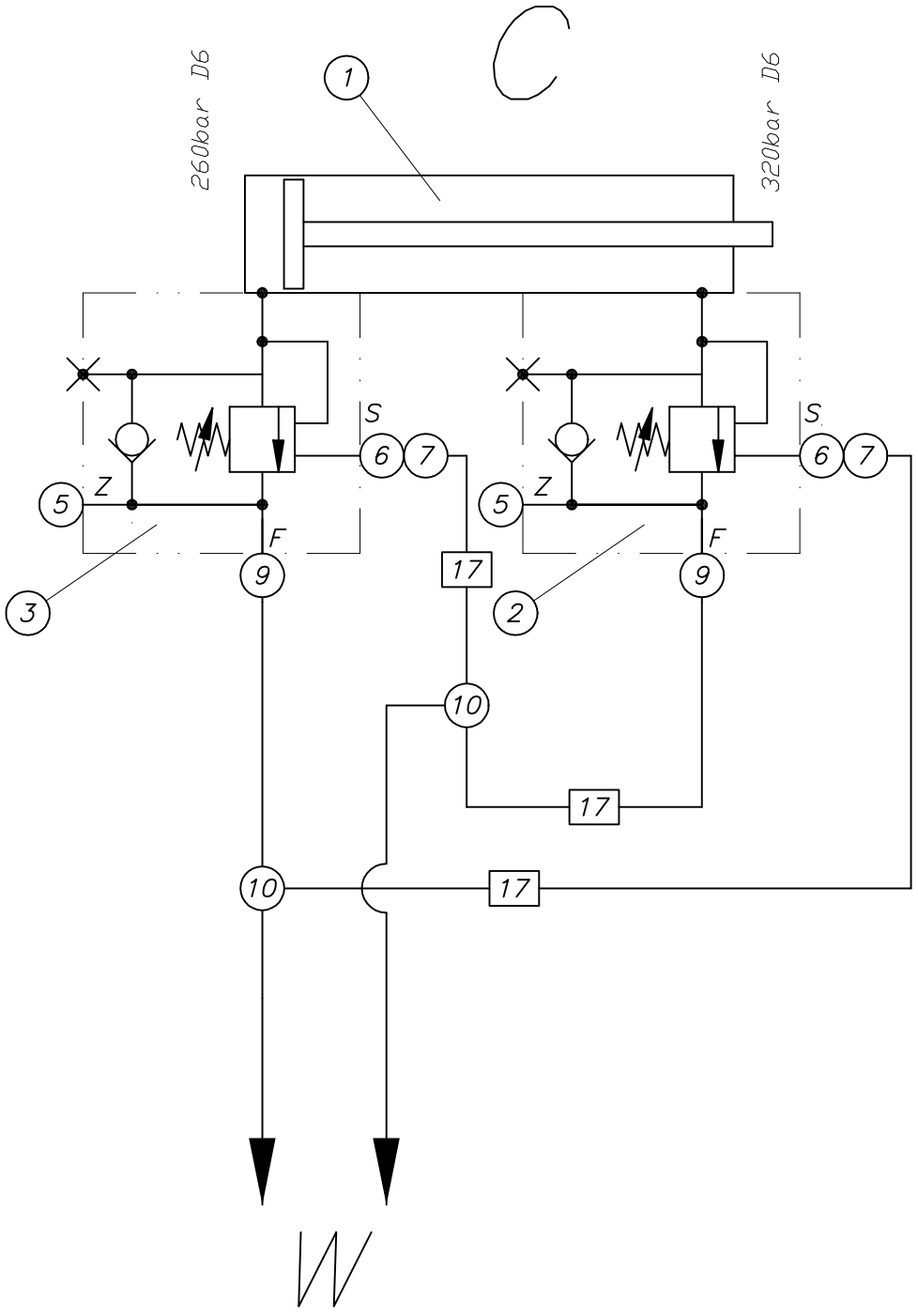
pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom arm 2 processing cpl. 42.4 own parts list	B672201		b 17.05.05	1250,00	1,00 Stk
2	pipe 1, Element 2	B642020 Rohr 63.5x4x552	2448 S355J2G3		3,20	1,00 Stk
3	pipe 2, Element 2	B642021 Rohr 63.5x4x929	2448 S355J2G3		5,40	1,00 Stk
4	pipe 3, Element 2	B642022 Rohr 63.5x4x869	2448 S355J2G3		5,10	1,00 Stk
5	pipe 4, Element 2	B642023 Rohr 63.5x4x465	2448 S355J2G3		2,70	1,00 Stk
6	washer	B672152 Bl 4xd 52	1543/EN10029 S355J2G3		0,10	4,00 Stk
7	pipe holder cpl. own parts list	WAI107108				2,00 Stk
8	pipe holder cpl. own parts list	WAI107109				2,00 Stk
9	conical spring washer 12 mm	WAI102877				6,00 Stk
10	hex. nut M12 DIN 985 8. VERZ.	WAI101626				6,00 Stk

Mastzylinder C kpl.

boom cylinder C cpl.

B 66 0 142a

Waitzinger
Baumaschinen GmbH



PARTS LIST

04.07.05 08:36:29

part list	description	created		index	valid from	valid to
B660142	boom cylinder C cpl. with pipes	19.04.04	a	a	29.11.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom cylinder for 42-mtr., section C	WAI109330				1,00 Stk
2	locking valve 320 bar	WAI106258				1,00 Stk
3	locking valve 260 bar	WAI106938				1,00 Stk
5	locking screw G 1/4	WAI100520				2,00 Stk
6	male stud couplings S12RB 1/4	WAI104042				2,00 Stk
7	adjustable male stud elbows	WAI100366			0,19	2,00 Stk
9	straight reducing couplings S16-12	WAI101160				2,00 Stk
10	tee coupling S12	WAI100593			0,28	2,00 Stk
17	hydr. pipe 12 x 2	WAI102022			0,49	2,00 Mtr

Mastarm 3 kpl.

element 3 cpl.

B 66 2 130b

Waitzinger
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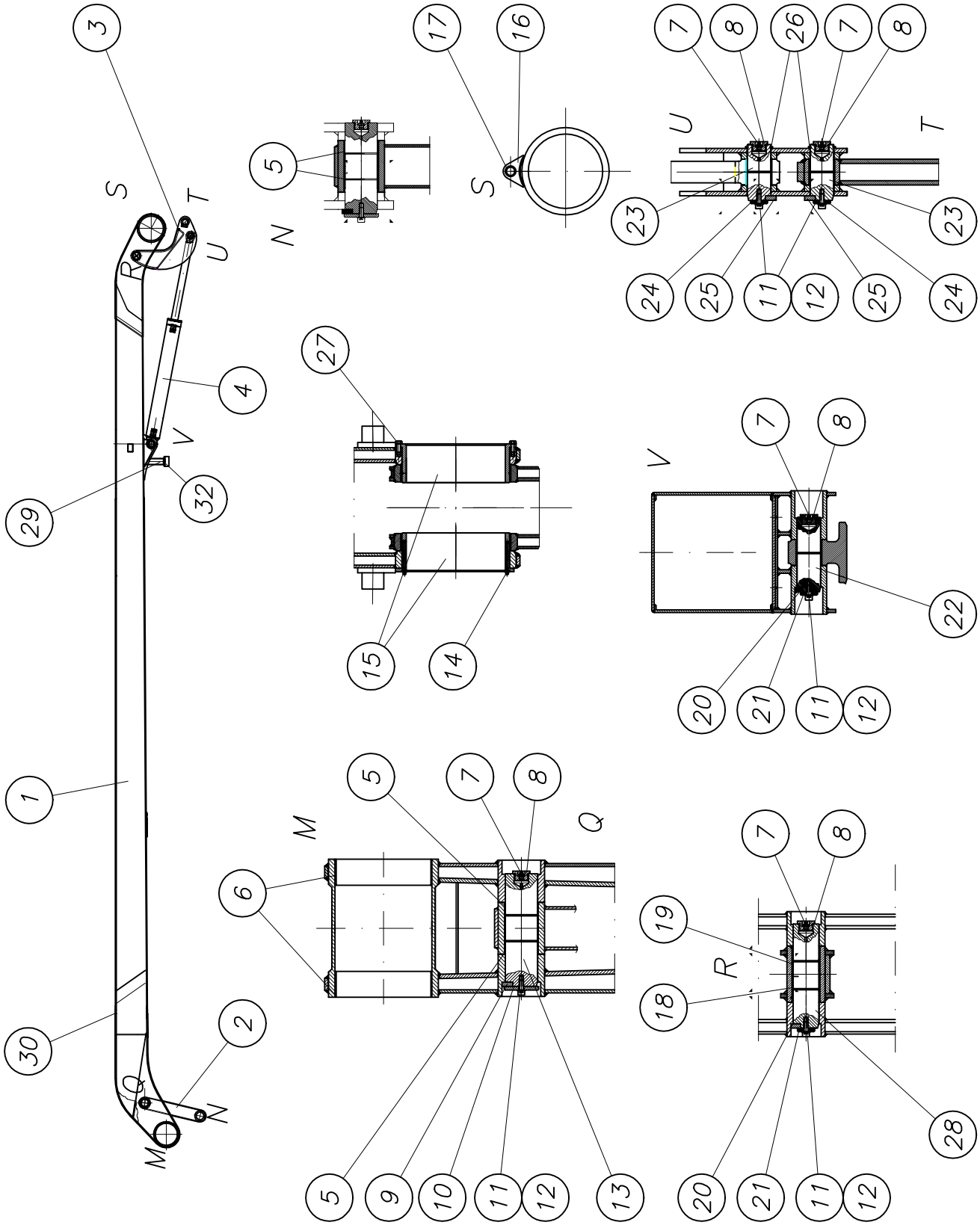

11.02.2005

PARTS LIST

part list	description	created	index	valid from	valid to
B662130	boom arm 3 cpl.	23.02.04 aaa	b	10.02.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom arm 3 cpl. own parts list	B672300				1,00 Stk
2	forcing rod C cpl. own parts list	B672720		a 09.05.05	27,50	1,00 Stk
3	lever D cpl. own parts list	B672630		a 23.05.05	38,00	1,00 Stk
4	boom cylinder D cpl. with pipes own parts list	B660143		a 29.11.04		1,00 Stk
5	bushing 75 x 80 x 60	WAI106016				4,00 Stk
6	bushing	WAI108735				2,00 Stk
7	grease nipple H1 M10 X 1 DIN 71412	WAI100805			0,01	5,00 Stk
8	locking screw M33x2 own parts list	B660085			0,10	5,00 Stk
9	pin holder	B660088 Bl 10x22x70	1543/EN10029 S235J2G3		0,10	1,00 Stk
10	washer	B660087 Bl 8xd80	1543/EN10029 S235J2G3		0,20	1,00 Stk
11	cylinder head screw M 10 x 25	WAI106654				5,00 Stk
12	spring washer A10	WAI102070			0,00	5,00 Stk
13	pin 75x 258	B662164 Rd 80x260	1013 42CrMo4V		9,00	1,00 Stk
14	grease nipple	WAI102885				4,00 Stk
15	pin 250x 91.25	B662168 Ro 323.9x50x100	2448 S355J2G3	a 31.08.04	6,20	2,00 Stk
16	pin protection	B660123 Bl 10x100x148	1543/EN10029 S355J2G3		0,45	2,00 Stk
17	pipe	B660124 Rohr 51x6.3x30	2448 S355J2G3		0,20	2,00 Stk
18	bushing	WAI108730				1,00 Stk
19	bushing	WAI108729				1,00 Stk
20	pin holder	B660090 Bl 10x14x45	1543/EN10029 S235J2G3		0,10	2,00 Stk
21	washer d 55x05	B660077 Rd 60x10	1013 St37-2		0,10	2,00 Stk

PARTS LIST

04.07.05 08:40:56

part list	description	created	index	valid from	valid to
B662130	boom arm 3 cpl.	23.02.04 aaa	b	10.02.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
22	pin 55x 172	B662166 Rd 60x180	1013 42CrMo4V		3,10	1,00 Stk
23	pin 55x 129	B662167 Rd 60x140	1013 42CrMo4V		2,50	2,00 Stk
24	washer	B660091 Bl 8xd42	1543/EN10029 S235J2G3		0,10	2,00 Stk
25	pin holder	B660086 Fl 25x10x80	1017 S235J2G3		0,15	2,00 Stk
26	ring	WAI109028				2,00 Stk
27	hexagon bolt M 8 x 20 DIN 931 10.9	WAI109085				8,00 Stk
28	pin 60x 238	B662165 Rd 65x240	1013 42CrMo4V		5,20	1,00 Stk
29	holder for rubber buffer arm 3 cpl. own parts list	B662010		a 02.11.04	1,90	1,00 Stk
30	reinforcement sheet	B662024 Bl 8x200x310	1543/EN 10029 S235J2G3		3,90	1,00 Stk
32	rubber buffer 100 x 50	WAI103478				1,00 Stk

Mastarm 3 kpl.

element 3 cpl.

B 67 2 300

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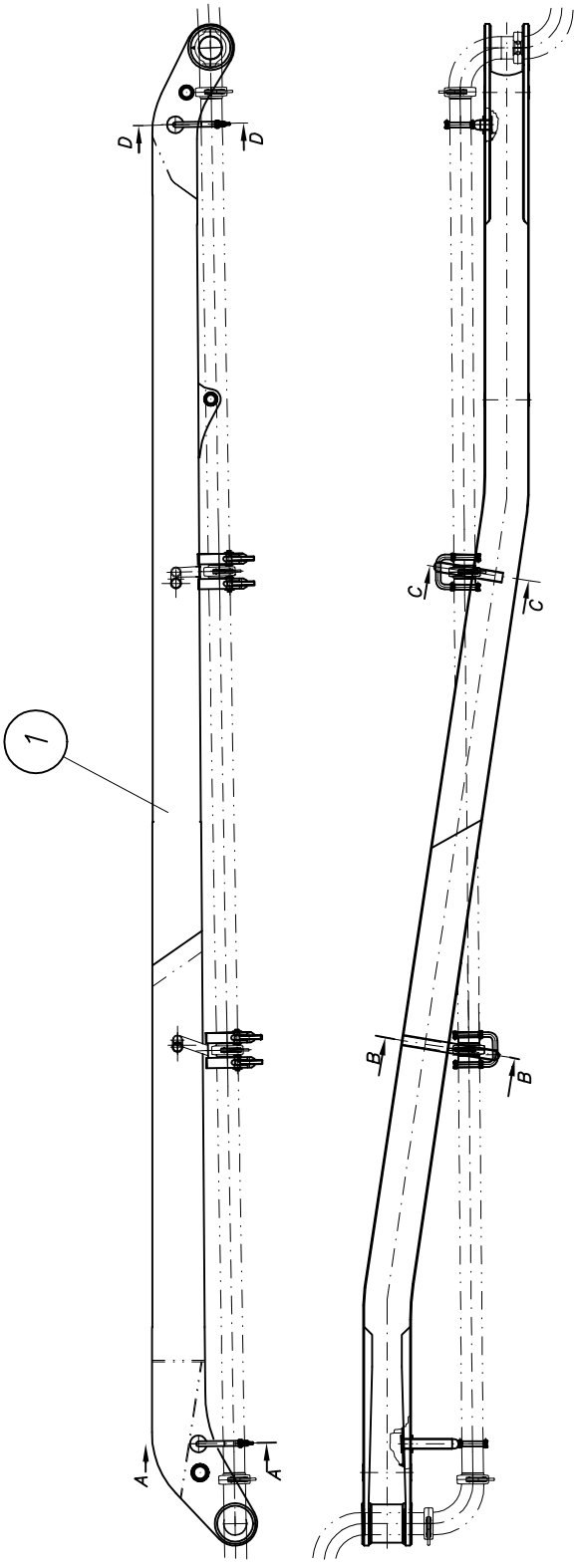

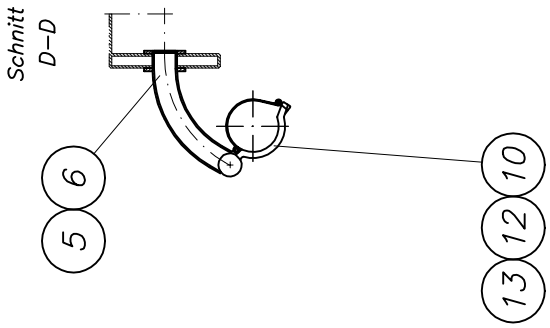

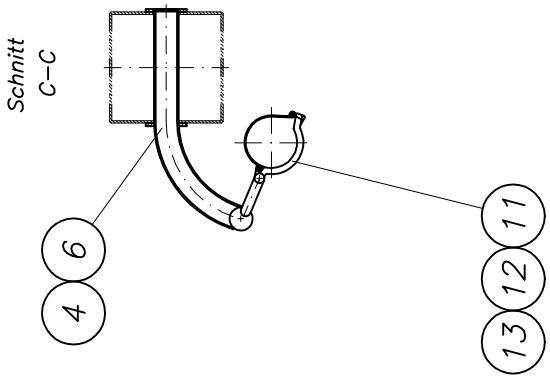

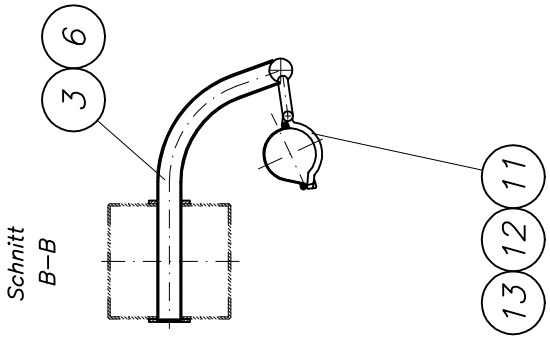

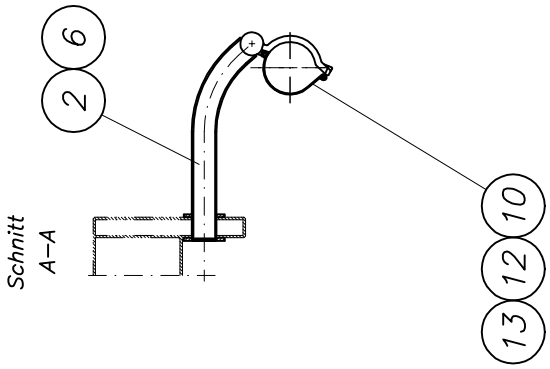

21.06.2004

PARTS LIST

04.07.05 08:44:55

part list	description	created	index	valid from	valid to
B672300	boom arm 3 cpl.	23.02.04 Mi			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom arm 3 processing cpl. 42.4 own parts list	B672301		c 11.05.05	735,00	1,00 Stk
2	pipe 1, Element 3	B642024 Rohr 63.5x4x569	2448 S355J2G3		3,40	1,00 Stk
3	pipe 2, Element 3	B642025 Rohr 63.5x4x812	2448 S355J2G3		4,70	1,00 Stk
4	pipe 3, Element 3	B642026 Rohr 63.5x4xx63	2448 S355J2G3		3,70	1,00 Stk
5	pipe 4, Element 3	B642027 Rohr 63.5x4x370	2448 S355J2G3		2,10	1,00 Stk
6	washer	B672152 Bl 4xd 52	1543/EN10029 S355J2G3		0,10	4,00 Stk
10	pipe holder cpl. own parts list	WAI107108				2,00 Stk
11	pipe holder cpl. own parts list	WAI107109				2,00 Stk
12	conical spring washer 12 mm	WAI102877				6,00 Stk
13	hex. nut M12 DIN 985 8. VERZ.	WAI101626				6,00 Stk

Mastzylinder D kpl.

boom cylinder D cpl.

B 66 0 143a

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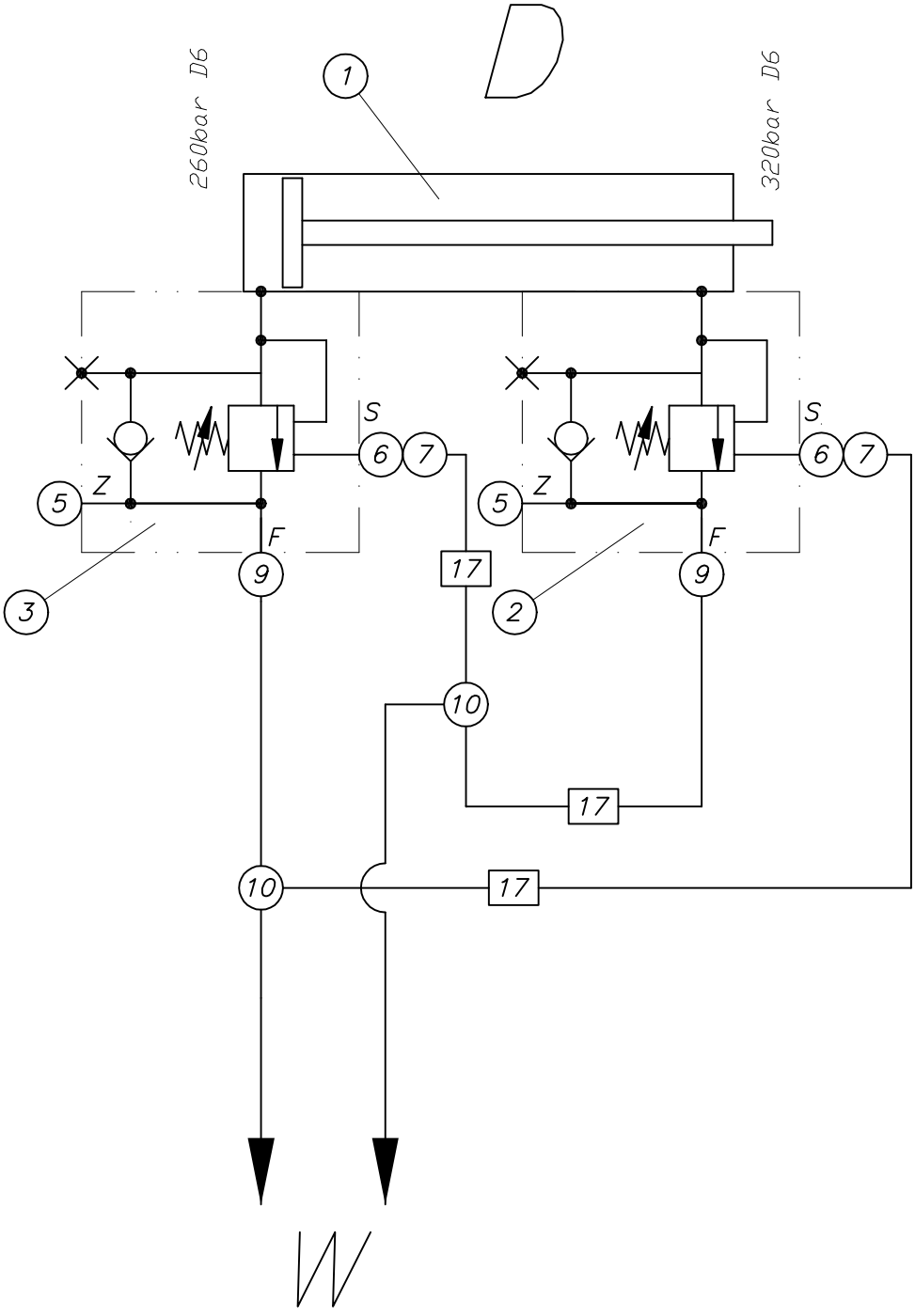

PARTS LIST

04.07.05 08:38:15

part list	description	created	index	valid from	valid to
B660143	boom cylinder D cpl. with pipes	19.04.04 a	a	29.11.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom cylinder for 42-mtr., section D	WAI109331				1,00 Stk
2	locking valve 320 bar	WAI106258				1,00 Stk
3	locking valve 260 bar	WAI106938				1,00 Stk
5	locking screw G 1/4	WAI100520				2,00 Stk
6	male stud couplings S12RB 1/4	WAI104042				2,00 Stk
7	adjustable male stud elbows	WAI100366			0,19	2,00 Stk
9	straight reducing couplings S16-12	WAI101160				2,00 Stk
10	tee coupling S12	WAI100593			0,28	2,00 Stk
17	hydr. pipe 12 x 2	WAI102022			0,49	2,00 Mtr

Mastarm 4 kpl.

element 4 cpl.

B 66 2 140

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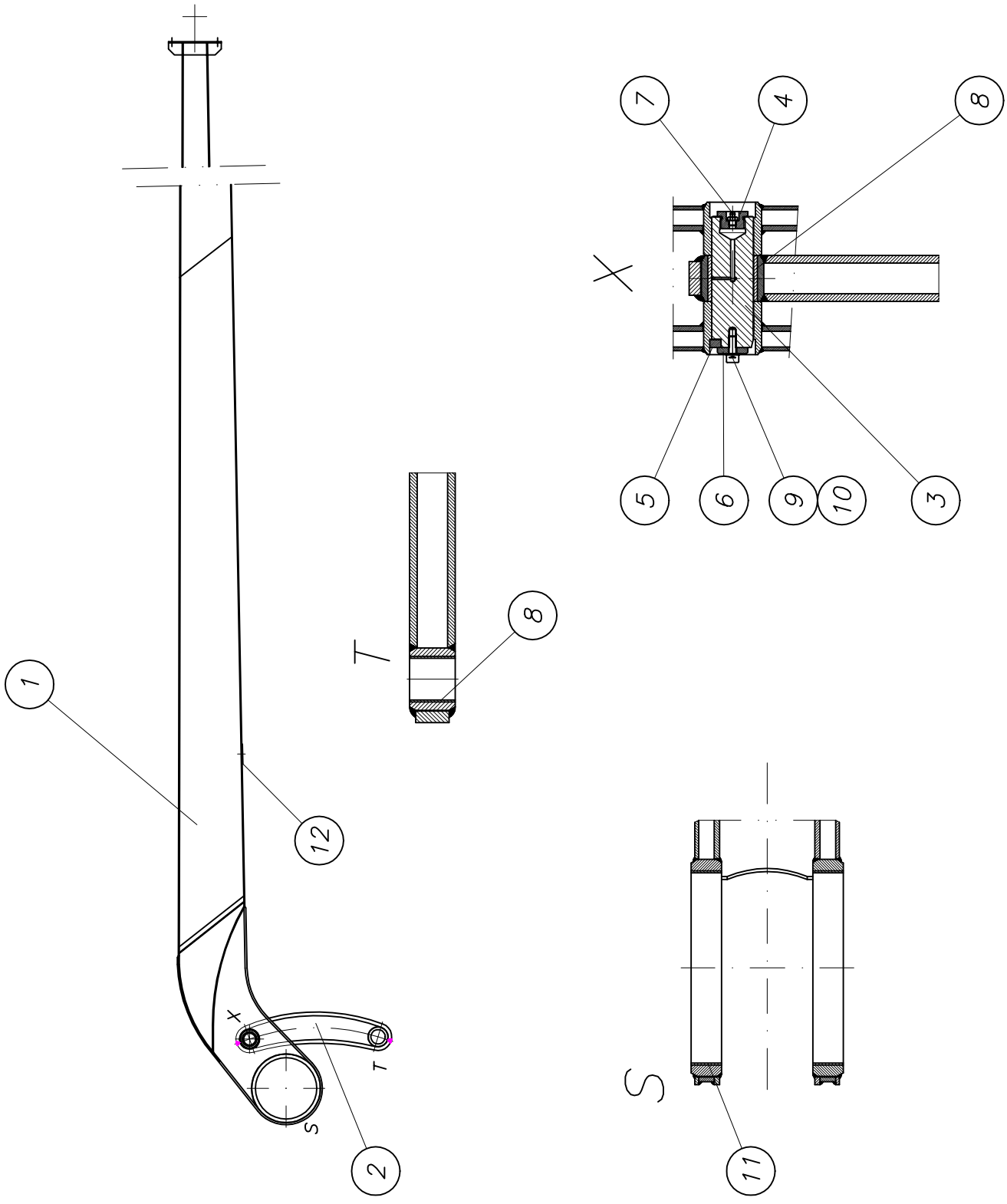

PARTS LIST

24.08.05 10:27:12

part list	description	created	index	valid from	valid to
B662140	boom arm 4 cpl.	23.02.04 aaa			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	boom arm 4 cpl. own parts list	B672400		a 19.07.05		1,00 Stk
2	forcing rod D cpl. own parts list	B672730			20,00	1,00 Stk
3	pin 55x 172	B662166 Rd 60x180	1013 42CrMo4V		3,10	1,00 Stk
4	locking screw M33x2 own parts list	B660085			0,10	1,00 Stk
5	pin holder	B660090 Bl 10x14x45	1543/EN10029 S235J2G3		0,10	1,00 Stk
6	washer d 50x05	B660076 Rd 55x10	1013 St37-2		0,10	1,00 Stk
7	grease nipple H1 M10 X 1 DIN 71412	WAI100805			0,01	1,00 Stk
8	bushing 55 x 60 x 60	WAI106013				2,00 Stk
9	cylinder head screw M 10 x 25	WAI106654				1,00 Stk
10	spring washer A10	WAI102070			0,00	1,00 Stk
11	bushing	WAI108737				2,00 Stk
12	plate	B661089 Bl 5x130x175	1543/EN10029 St37-2		0,80	1,00 Stk

Mastarm 4 kpl.

element 4 cpl.

B 67 2 400a

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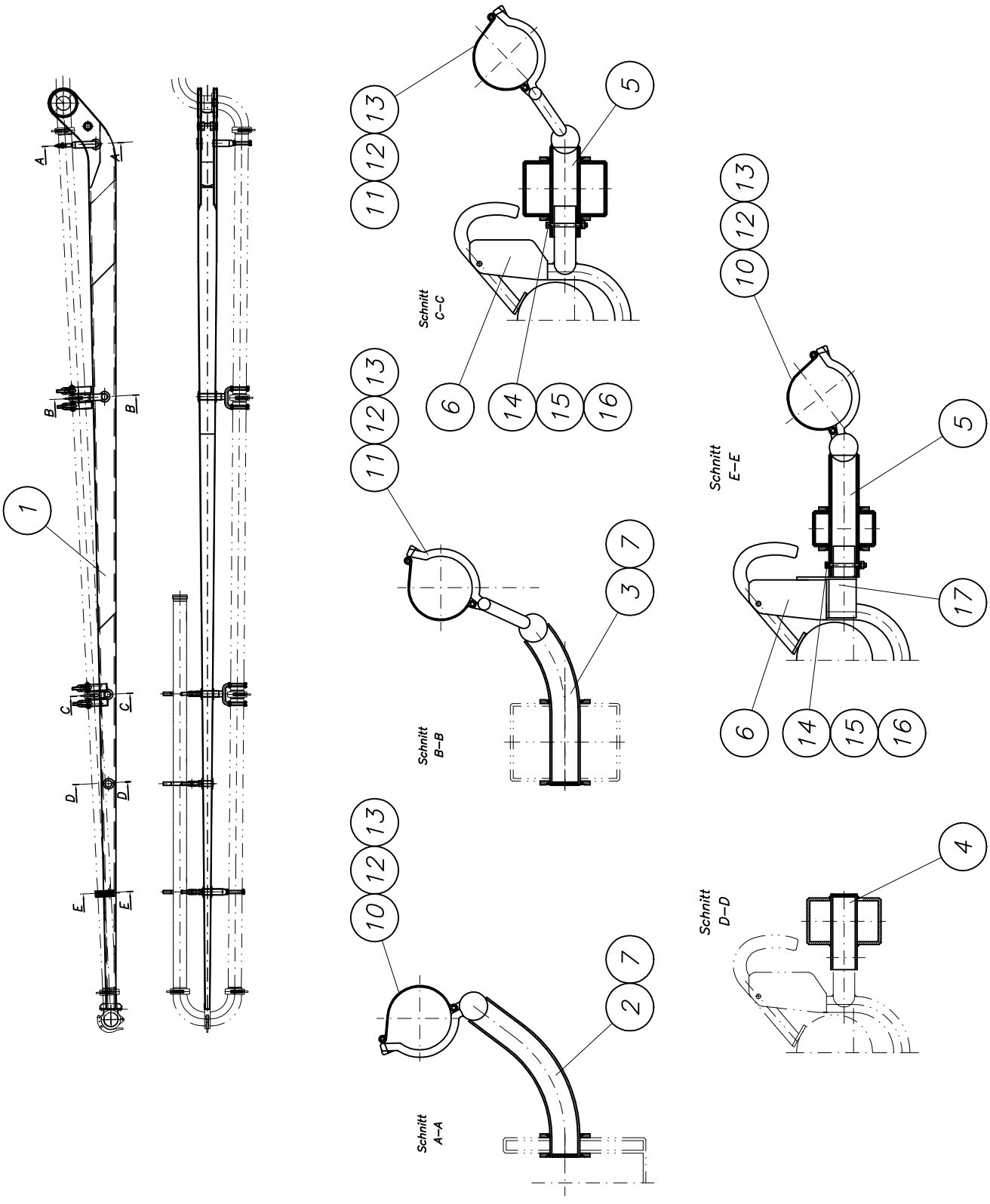

PARTS LIST

24.08.05 10:24:25

part list	description	created	index	valid from	valid to
B672400	boom arm 4 cpl.	24.02.04 Mi	a	19.07.05	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	arm own parts list	B672401		a 29.06.05	290,00	1,00 Stk
2	pipe 1, Element 4	B642028 Rohr 63.5x4x395	2448 S355J2G3		2,20	1,00 Stk
3	pipe 2, Element 4	B642029 Rohr 63.5x4x349	2448 S355J2G3		2,00	1,00 Stk
4	pipe 4, Element 4	B641059 Rohr 63.5x5x180	2448 S355J2G3	a 12.01.04	1,10	1,00 Stk
5	pipe 5, Element 4	B641060 Rohr 63.5x5x280	2448 S355J2G3		2,00	2,00 Stk
6	flexible hose support	WAI106989				1,00 Stk
7	washer	B672152 Bl 4xd 52	1543/EN10029 S355J2G3		0,10	2,00 Stk
10	pipe holder cpl. own parts list	WAI107108				2,00 Stk
11	pipe holder cpl. own parts list	WAI107109				2,00 Stk
12	conical spring washer 12 mm	WAI102877				6,00 Stk
13	hex. nut M12 DIN 985 8. VERZ.	WAI101626				6,00 Stk
14	alien bolt M 8x75 DIN 912 8.8	WAI107115				2,00 Stk
15	spring washer A8 DIN 127 VERZ.	WAI102205			0,00	2,00 Stk
16	hex. nut M8 DIN 934 8. VERZ.	WAI102880				2,00 Stk
17	holder own parts list	B642030			1,50	1,00 Stk

Drehkopf kpl.

rotating head cpl.

B 68 2 100

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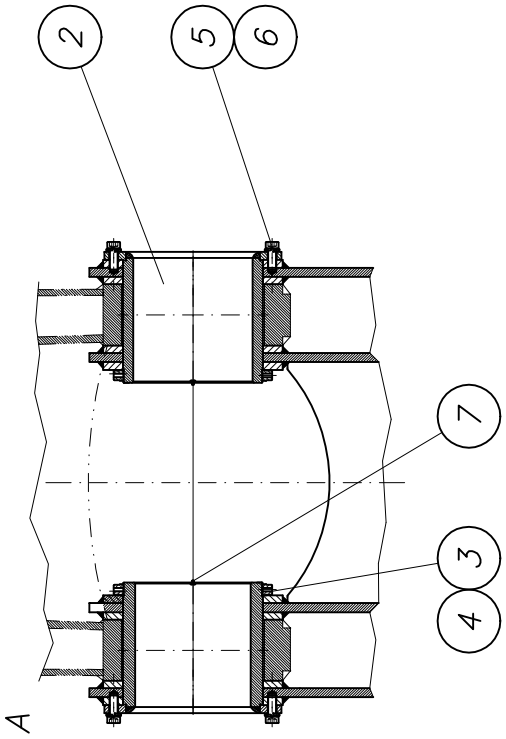

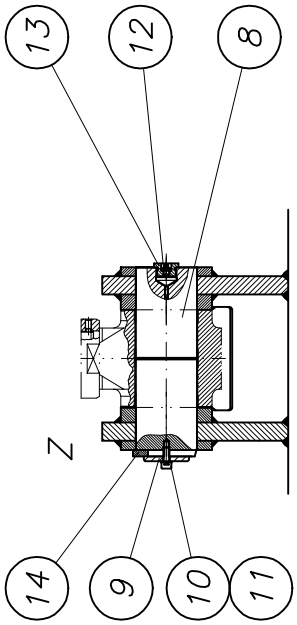

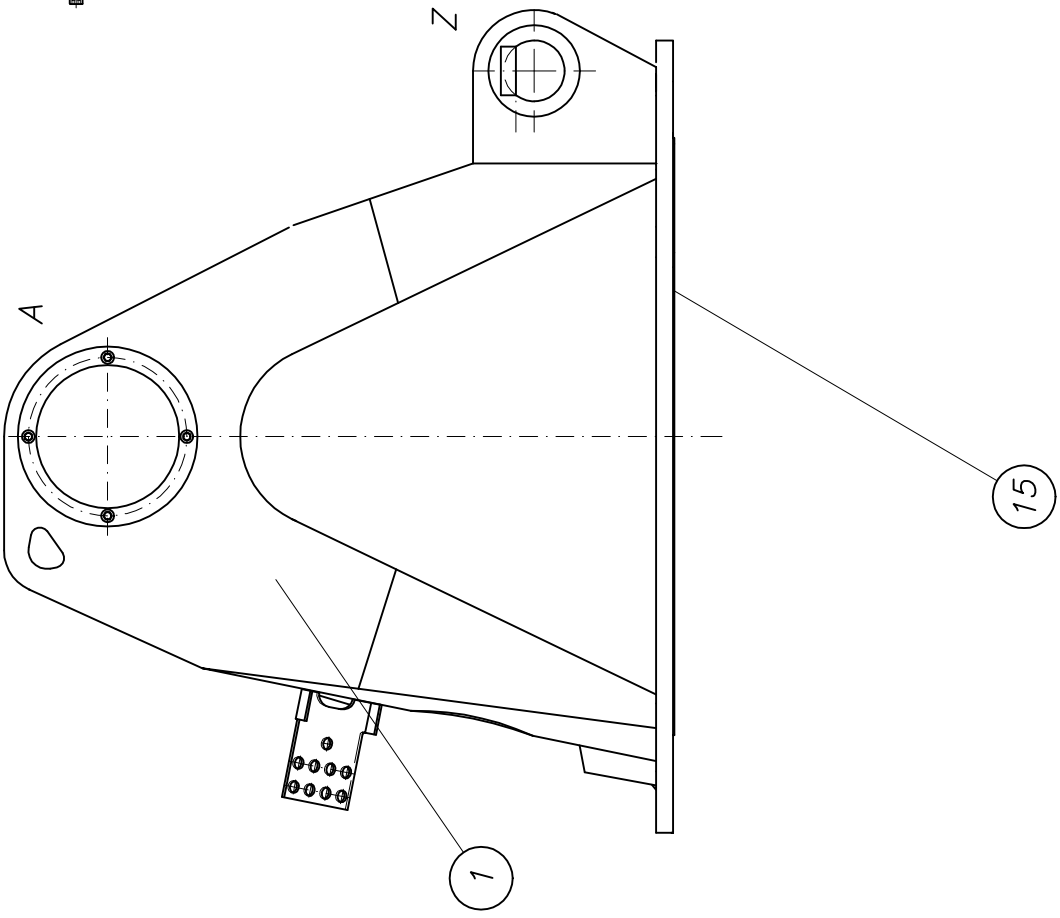

PARTS LIST

04.07.05 08:47:42

part list	description	created	index	valid from	valid to
B682100	rotating head unit 42 m	23.02.04 aaa			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	rotating head unit 42 m own parts list	B682010			720,00	1,00 Stk
2	pin 230x 215 own parts list	B662151			19,00	2,00 Stk
3	threaded ring	WAI106624				2,00 Stk
4	set screw M 6 x 8	WAI103646				2,00 Stk
5	cheese head screw	WAI106664				8,00 Stk
6	spring washer	WAI101976			0,00	8,00 Stk
7	grease nipple	WAI102885				4,00 Stk
8	pin 100x 310	B662152 Rd 105x315	1013 42CrMo4V		19,00	1,00 Stk
9	washer	B660087 Bl 8xd80	1543/EN10029 S235J2G3		0,20	1,00 Stk
10	cylinder head screw M 10 x 25	WAI106654				1,00 Stk
11	spring washer A10	WAI102070			0,00	1,00 Stk
12	grease nipple H1 M10 X 1 DIN 71412	WAI100805			0,01	1,00 Stk
13	locking screw M33x2 own parts list	B660085			0,10	1,00 Stk
14	pin holder	B660086 Fl 25x10x80	1017 S235J2G3		0,15	1,00 Stk
15	rotation bearing protection own parts list	B682070				1,00 Stk

Verrohrungsplan Armpaket kpl.

piping diagram boom cpl.

B 71 2 020a

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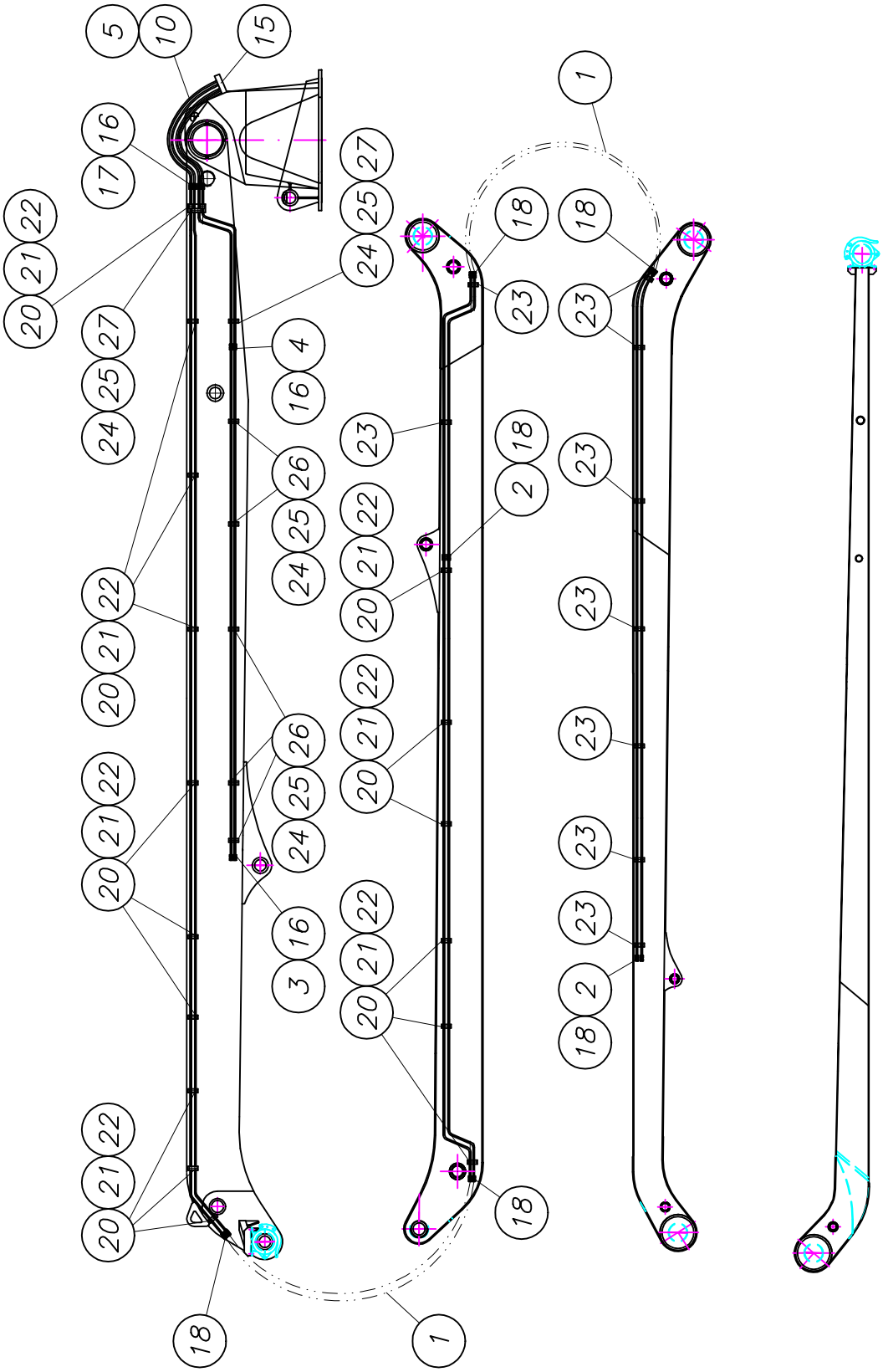

PARTS LIST

04.07.05 08:49:34

part list	description	created	index	valid from	valid to
B712020	piping plan 42R4 boom	23.07.04 hbk	a	28.09.04	

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	hydraulic hose DN 10 x 1250	WAI109038				6,00 Stk
2	hydraulic hose DN 10 x 700	WAI109039				4,00 Stk
3	hydraulic hose DN 12 x 700	WAI108472				2,00 Stk
4	hydraulic hose DN 12 x 900	WAI109062				2,00 Stk
5	hydraulic hose DN 12 x 1250	WAI109037				8,00 Stk
10	Pvc Hose 100mm, blue	WAI106517				1,00 Mtr
11	Pvc Hose 52mm, blue	WAI106516				1,00 Mtr
12	Pvc Hose 38mm, blue	WAI106827				1,00 Mtr
15	bulkhead straight couplings S16	WAI107043				9,00 Stk
16	straight couplings S16	WAI100536				12,00 Stk
17	straight reducing couplings S16-12	WAI101160				4,00 Stk
18	straight fitting S12	WAI100535				16,00 Stk
20	hexagon screw M 6 x 55	WAI103512				64,00 Stk
21	pipe clip 12mm	WAI108642				64,00 Stk
22	cover plate DP-1A	WAI108643				32,00 Stk
23	pipe clip 12 mm, own parts list	WAI105146			0,07	9,00 Stk
24	cover plate DP-2	WAI108943				14,00 Stk
25	pipe clip 16mm	WAI108942				18,00 Stk
26	hexagon screw	WAI102109			0,01	20,00 Stk
27	hexagon screw M 6 x 70	WAI104347				8,00 Stk
28	hydr. pipe 16 x 2.5	WAI109029			0,83	20,00 Mtr

PARTS LIST

04.07.05 08:49:34

part list	description	created		index	valid from	valid to
B712020	piping plan 42R4 boom	23.07.04 hbk	a	28.09.04		

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
29	hydr. pipe 12 x 2	WAI102022			0,49	90,00 Mtr

Übersicht B 70 - B 79

over view B 70 - B 79

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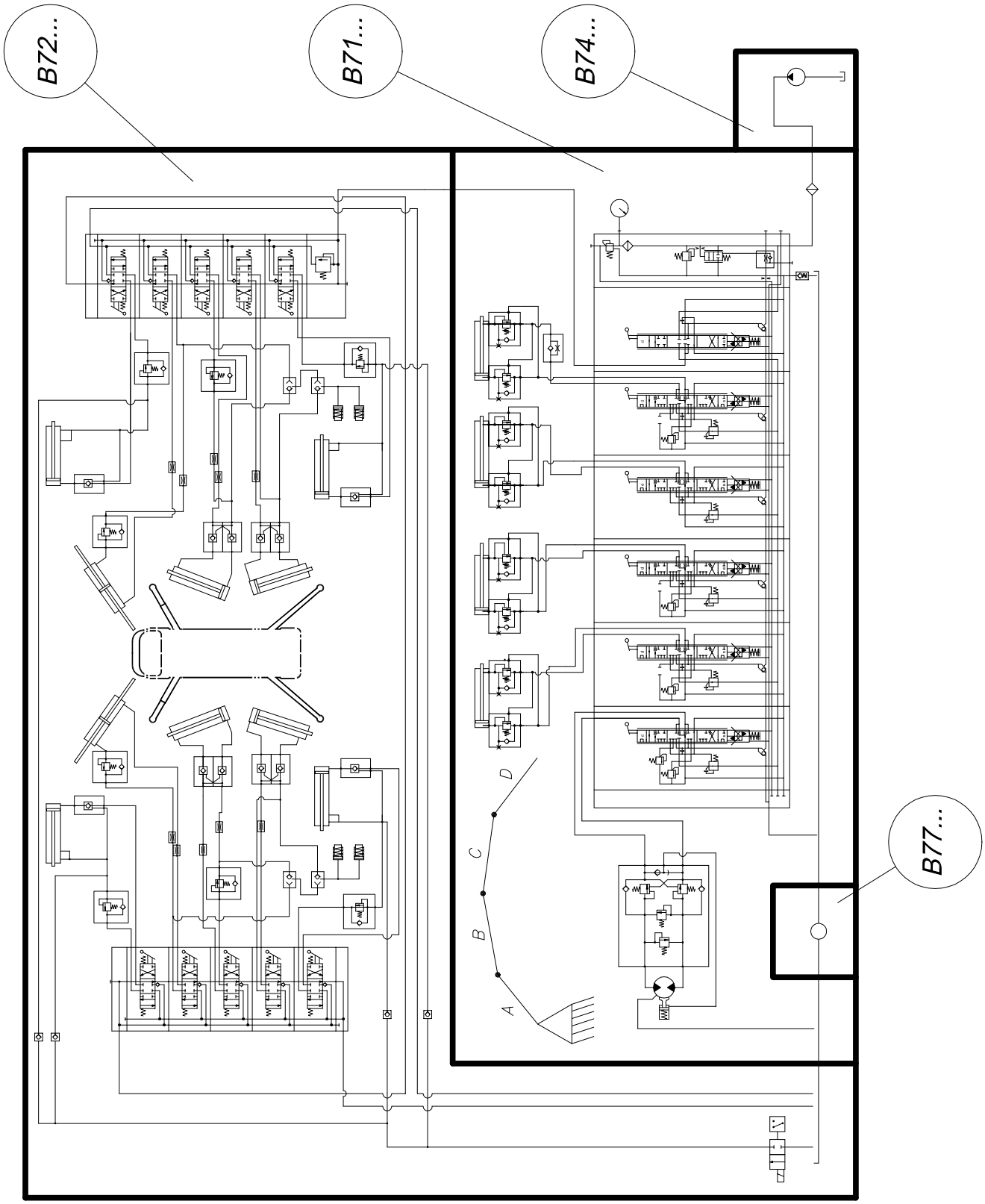

Verrohrungsplan Abstützung
piping diagram outrigger

B 72 2 010 1

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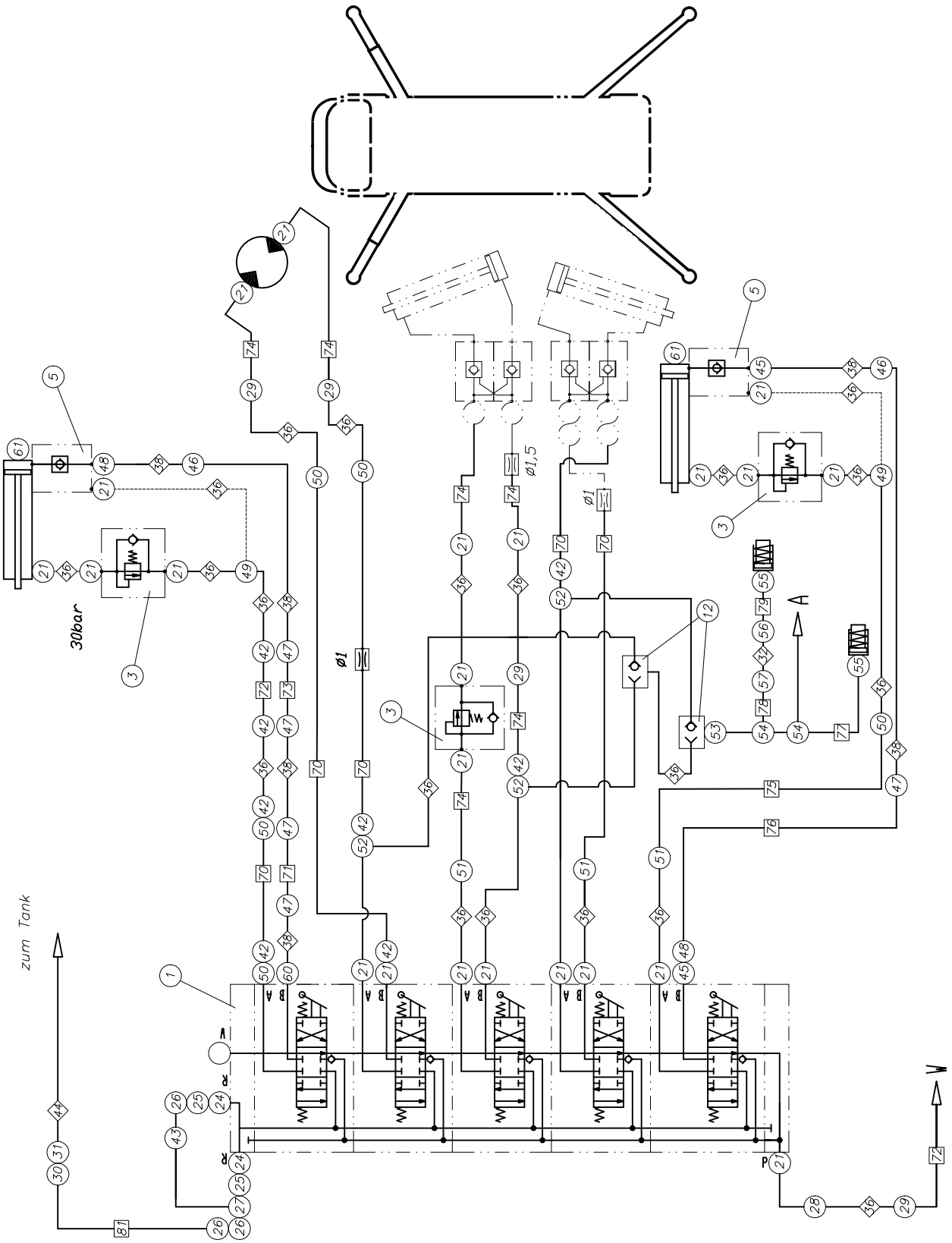

27.11.2003

Verrohrungsplan Abstützung
piping diagram outrigger

B 72 2 010 2

Waitzinger
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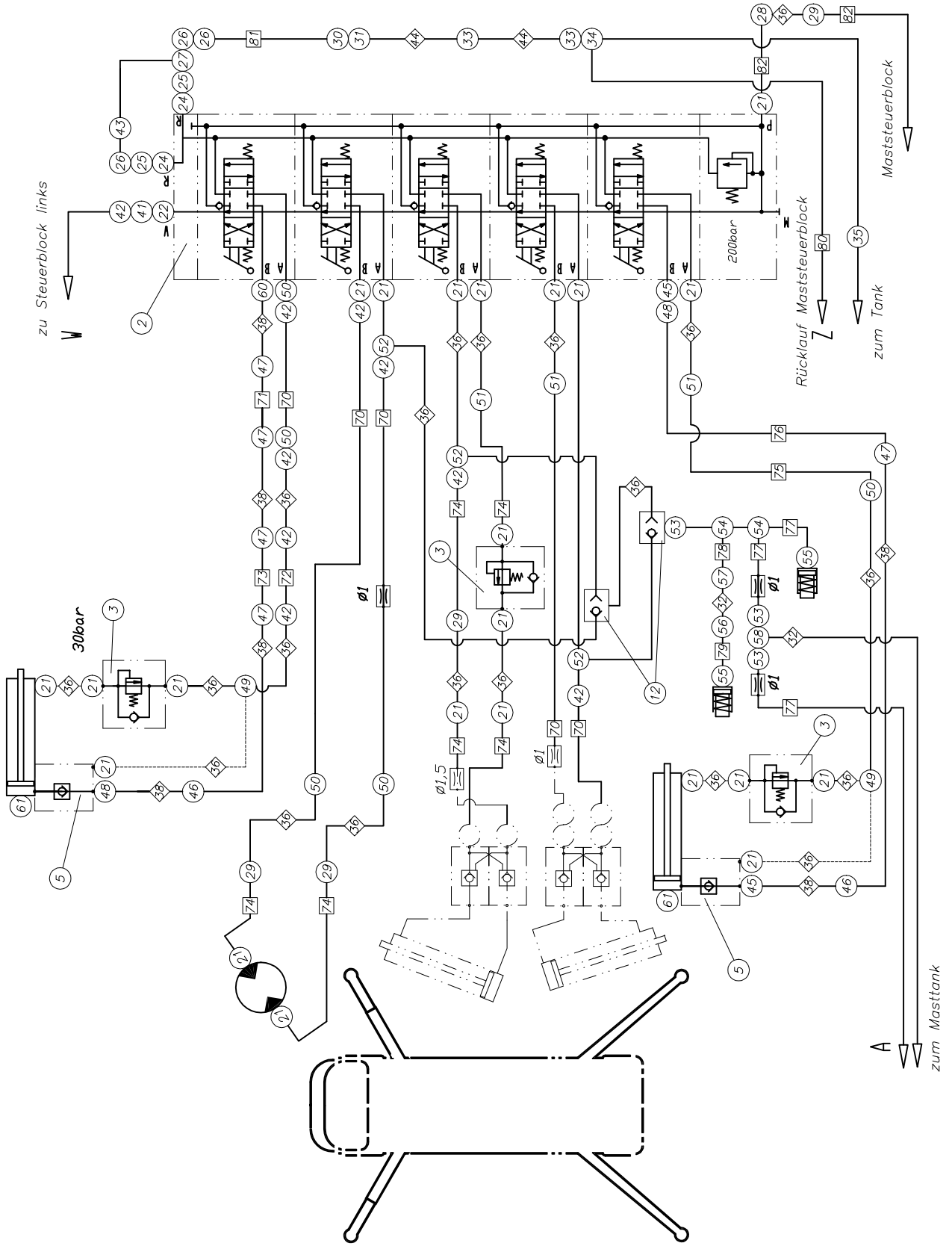

Verrohrungsplan Abstützung
piping diagram outrigger

B 72 2 010 3

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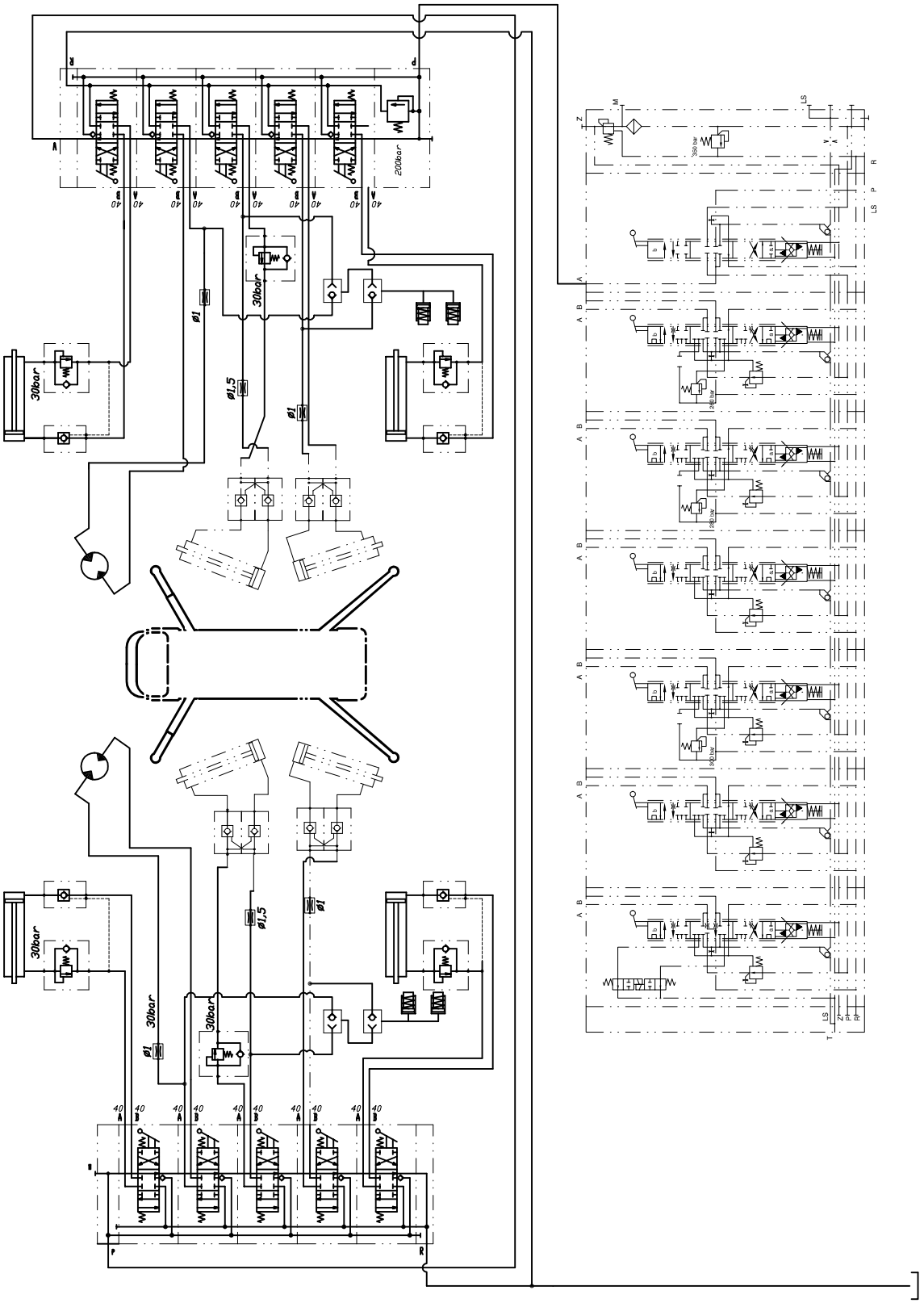
Baumaschinen GmbH



27.11.2003

PARTS LIST

25.10.05 11:21:04

part list	description	created	index	valid from	valid to
B722010R2	piping diagram 42XXT boom	02.08.04 HF			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
3	valve SVC 46 F-30	WAI106335				8,00 Stk
5	valve RHC 31	WAI106698				4,00 Stk
12	valve WV 8-S	WAI105212				4,00 Stk
21	straight male stud couplings L12 3/8"	WAI103741				50,00 Stk
24	thread red.adaptors"3/4-3/8"	WAI100347			0,09	4,00 Stk
25	straight male stud couplings L22-G 3/4"	WAI101407				4,00 Stk
26	standpipe elbows L22V	WAI101207			0,42	6,00 Stk
27	swivel barrel tee L22	WAI107499				2,00 Stk
28	bulkhead elbows L12	WAI103782				1,00 Stk
29	straight couplings L12	WAI100603				7,00 Stk
30	straigt reducing coupling L28-22	WAI101205				2,00 Stk
31	standpipe elbows L 28 D	WAI104435				2,00 Stk
32	hydr. pipe 8 x 1.5	WAI102309			0,24	4,00 Mtr
33	elbow couplings L28	WAI101396				2,00 Stk
34	swivel barrel tee L28D	WAI104391				1,00 Stk
35	male stud couplings L28MD	WAI102417				1,00 Stk
36	hydr. pipe 12 x 2	WAI102022			0,49	20,00 Mtr
37	hydr. pipe 22 x 2.0	WAI105383			1,00	3,00 mtr
38	hydr. pipe 15 x 2	WAI101717			0,65	18,00 Mtr
41	throttlefree banjo elbows L15 M 16 x 1,5	WAI105116				1,00 Stk

PARTS LIST

part list	description	created	index	valid from	valid to
B722010R2	piping diagram 42XXT boom	02.08.04 HF			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
42	swivel elbow L12	WAI100590				17,00 Stk
43	elbow couplings L22	WAI102185				2,00 Stk
44	hydr. pipe 28 x 2.0	WAI103562			1,30	2,00 Mtr
45	straight male stud couplings L15-G 3/8"	WAI103704				5,00 Stk
46	elbow couplings L15	WAI100829				4,00 Stk
47	bulkhead couplings L15	WAI101336			0,21	11,00 Stk
48	swivel elbow L15	WAI101333				4,00 Stk
49	swivel branch tee L12	WAI101774				4,00 Stk
50	bulkhead coupling L12	WAI101384				10,00 Stk
51	elbow couplings L12	WAI100604				6,00 Stk
52	swivel barrel tee L12	WAI101325				6,00 Stk
53	standpipe reducers L12-8	WAI101727				4,00 Stk
54	swivel barrel tee L8	WAI103787				4,00 Stk
55	banjo coupling L8R	WAI101196				4,00 Stk
56	straight couplings L8	WAI100538				2,00 Stk
57	bulkhead coupling L8	WAI101379				2,00 Stk
58	tee coupling L12	WAI100598				1,00 Stk
59	orifice	WAI106077				2,00 Stk
60	bulkhead elbows L15	WAI101390				3,00 Stk
61	socket head port plugs M24x1.5	WAI106699			0,04	4,00 Stk

PARTS LIST

part list	description	created	index	valid from	valid to
B722010R2	piping diagram 42XXT boom	02.08.04 HF			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
70	hydrauli hose DN10x1700	WAI106917				10,00 Stk
71	hydraulic hose DN12x1700	WAI106918				2,00 Stk
72	hose DN10x2600	WAI108616				3,00 Stk
73	hose DN12x2600	WAI108617				2,00 Stk
74	hydraulic hose DN10 x 500	WAI108571				12,00 Stk
75	hydraulic hose DN10 x 1250	WAI106508				2,00 Stk
76	hydraulic hose DN12 x 1250	WAI107921				2,00 Stk
77	hydraulic hose DN06 x 1700	WAI106505				4,00 Stk
78	hydraulic hose DN06 x 900	WAI106506				2,00 Stk
79	hydraulic hose DN06 x 600	WAI107235				2,00 Stk
80	hydraulic hose DN25 x 900	WAI105381				1,00 Stk
81	hydraulic hose DN20 x 1250	WAI106500				2,00 Stk
82	hydraulic hose DN10 x 700	WAI101605				2,00 Stk

PARTS LIST

25.10.05 11:23:01

part list	description	created	index	valid from	valid to
B741031	hydraulic pump A11VO40/4496	04.04.02 ek			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	pump A11VO40DRS/10L-NSC12N00 own parts list	WAI104346			31,60	1,00 Stk
2	O-ring	WAI104873				1,00 Stk
3	cheese head screw M 12 x 35	WAI102895				2,00 Stk
4	spring washer A12	WAI103113				2,00 Stk

Übersicht B 80 - B 99

over view B 80 - B 99

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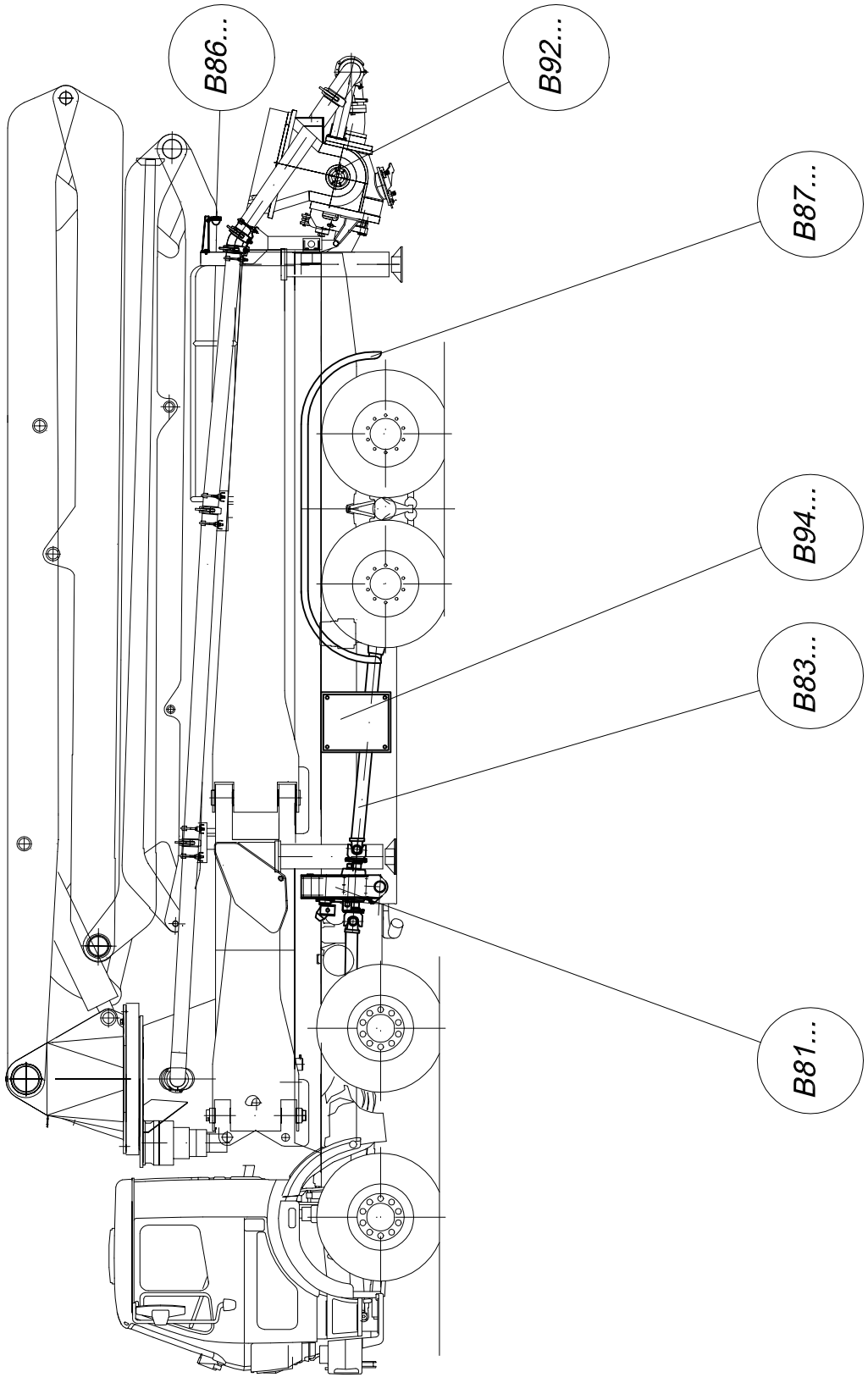

PARTS LIST

25.10.05 11:25:21

part list	description	created	index	valid from	valid to
B814088R1	distributor gear box 4496.xx	09.06.04 HF			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	PTO gearbox 4400. own parts list	WAI107195				1,00 Stk
2	buffer	WAI103414				4,00 Stk
3	hexagon bolt M 20 x 50	WAI102860				14,00 Stk
6	sealing ring 165 x 5	WAI102903				1,00 Stk
7	O-ring	WAI105771				1,00 Stk
10	conical spring washer	WAI102110			0,05	11,00 Stk
11	hexagon bolt M8 x 25 DIN 933 8.8	WAI101621				16,00 Stk
12	stop nut M8 DIN985 8. VERZ.	WAI102111			5,00	16,00 Stk
13	washer 8.4	WAI101625				16,00 Stk

Schildersatz Betonpumpe

sticker set concrete pump

B 92 1 004

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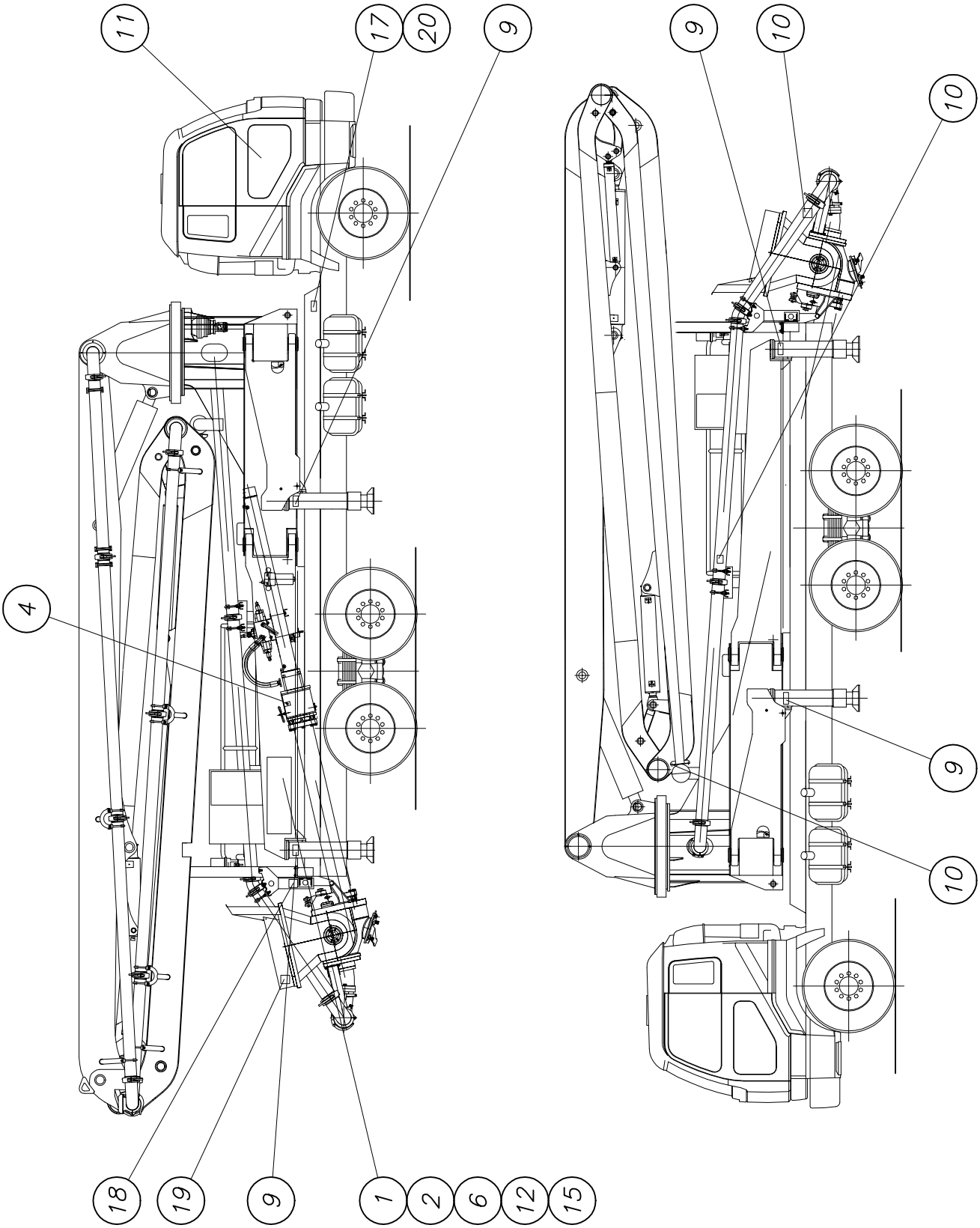


PARTS LIST

28.06.05 13:48:18

part list	description	created	index	valid from	valid to
B921004	sticker set CP english without boom	21.09.00 hbk			

pos	description stock	ident-no dimensions	DIN material	index	weigth Kg	quantity unit
1	sticker operation eng.	WAI105932				1,00 Stk
2	sticker electrocution hazard d/e	WAI105934				1,00 Stk
4	sticker danger of bruise d/e	WAI105936				1,00 Stk
6	sticker remote control d/e	WAI105938				1,00 Stk
7	sticker hopper d/e	WAI105939				1,00 Stk
9	sticker outrigger d/e	WAI105941				4,00 Stk
10	sticker coupling d/e	WAI105942				3,00 Stk
11	sticker gearbox switch system d/e	WAI105943				1,00 Stk
12	sticker person protection d/e	WAI105944				1,00 Stk
15	sticker electrocution hazard 2 d/e	WAI105974				1,00 Stk
17	identification badge	WAI106179				1,00 Stk
18	sign AL agitator	WAI106030				1,00 Stk
19	sign AL water pump	WAI106031				1,00 Stk
20	sign AL delivery line	WAI106032				1,00 Stk

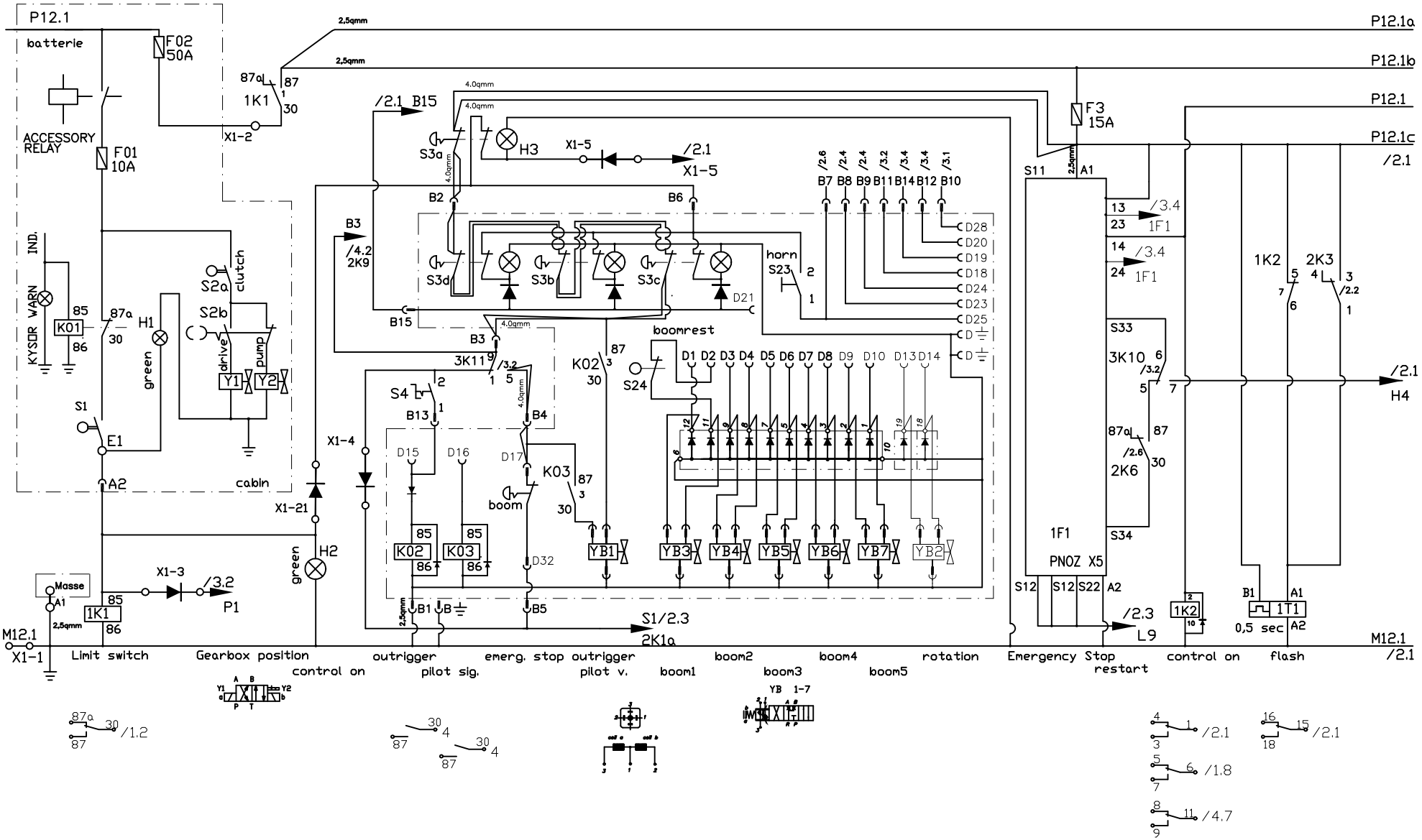
REED SCHEMATIC LIST-MODEL XXT42.4R

CONCRETE BOOM PUMP

CUSTOMER INFO:

BULL CONCRETE
MODEL: XXT42.4R CONCRETE BOOM PUMP
REED-SN 08-251-XXT42.4R
BOOM-SN:

DRAWING No.
B 51 3 017
B 56 1 049
B 56 1 066
B 56 1 070
B 56 1 071
B 72 2 010



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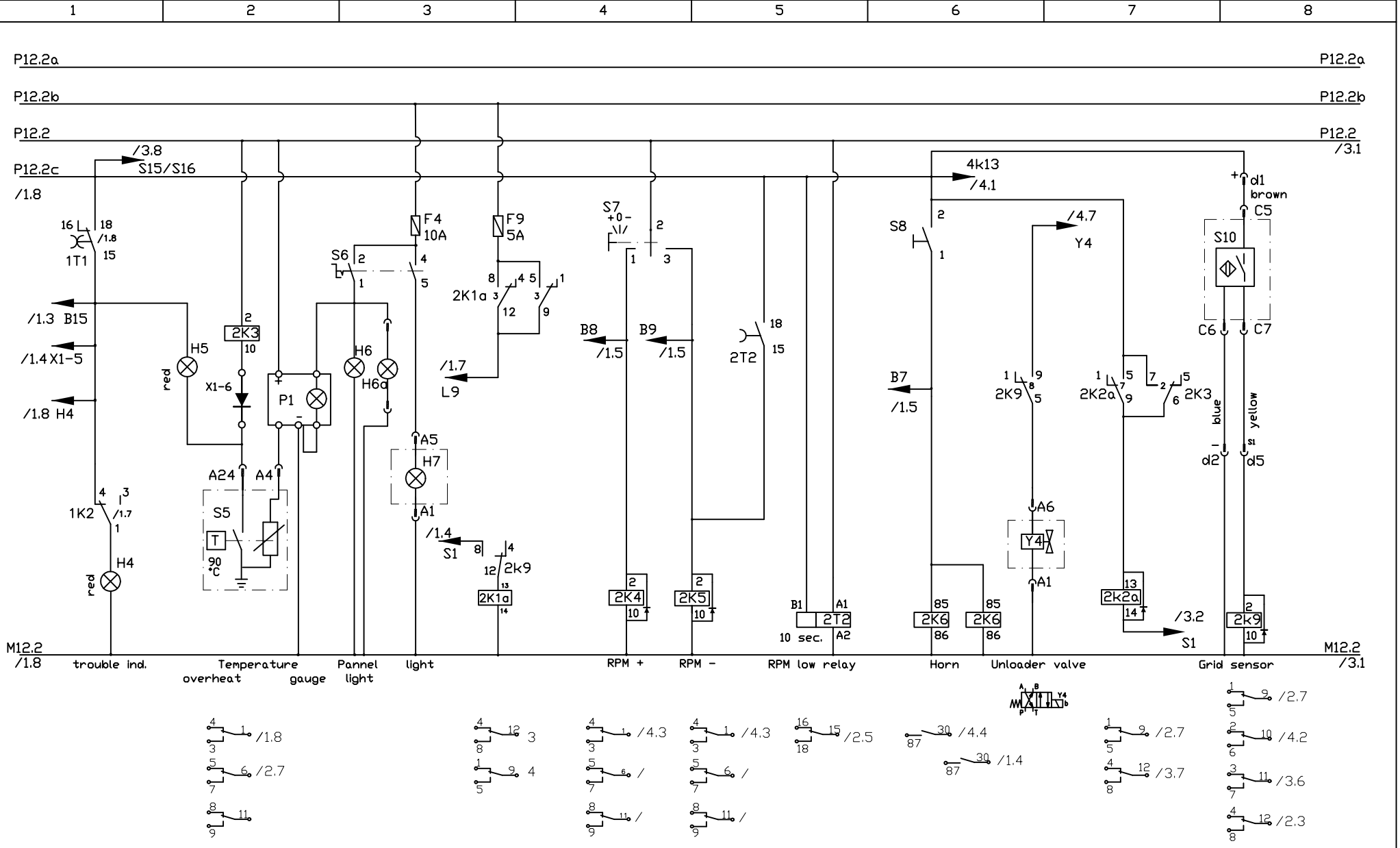
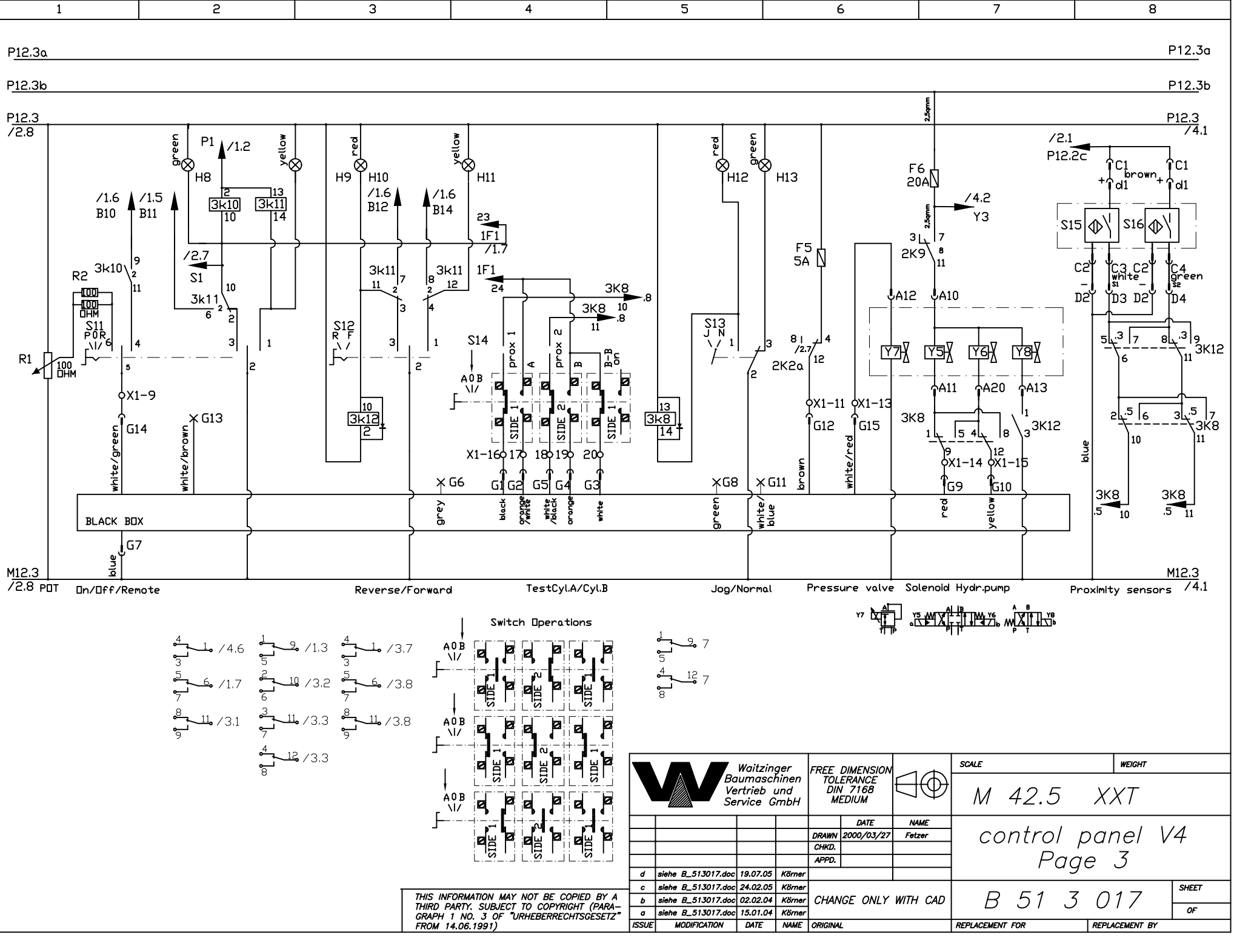
				DRAWN	2000/03/27	Fetzer	control panel V4 Page 1	
				CHKD.				
				APPD.				
d	siehe B_513017.doc	19.07.05	Körner					
c	siehe B_513017.doc	24.02.05	Körner					
b	siehe B_513017.doc	02.02.04	Körner	CHANGE ONLY WITH CAD			B 51 3 017	SHEET
a	siehe B_513017.doc	15.01.04	Körner					OF
ISSUE	MODIFICATION	DATE	NAME	ORIGINAL			REPLACEMENT FOR	REPLACEMENT BY



Waitzinger Baumaschinen Vertrieb und Service GmbH				FREE DIMENSION TOLERANCE DIN 7168 MEDIUM			SCALE / WEIGHT
					DATE	NAME	M 42.5 XXT
				DRAWN	2000/03/27	Fetzer	control panel V4 Page 2
				CHKD.			
				APPD.			
d	siehe B_513017.doc	19.07.05	Körner				
c	siehe B_513017.doc	24.02.05	Körner	CHANGE ONLY WITH CAD			B 51 3 017
b	siehe B_513017.doc	02.02.04	Körner				SHEET / OF
a	siehe B_513017.doc	15.01.04	Körner				
ISSUE	MODIFICATION	DATE	NAME	ORIGINAL			REPLACEMENT FOR / REPLACEMENT BY



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Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

	DATE	NAME
DRAWN	2000/03/27	Fetzer
CHKD.		
APPD.		

ISSUE	MODIFICATION	DATE	NAME
d	siehe B_513017.doc	19.07.05	Körner
c	siehe B_513017.doc	24.02.05	Körner
b	siehe B_513017.doc	02.02.04	Körner
a	siehe B_513017.doc	15.01.04	Körner
ORIGINAL			

CHANGE ONLY WITH CAD

SCALE

WEIGHT

M 42.5 XXT

control panel V4
Page 3

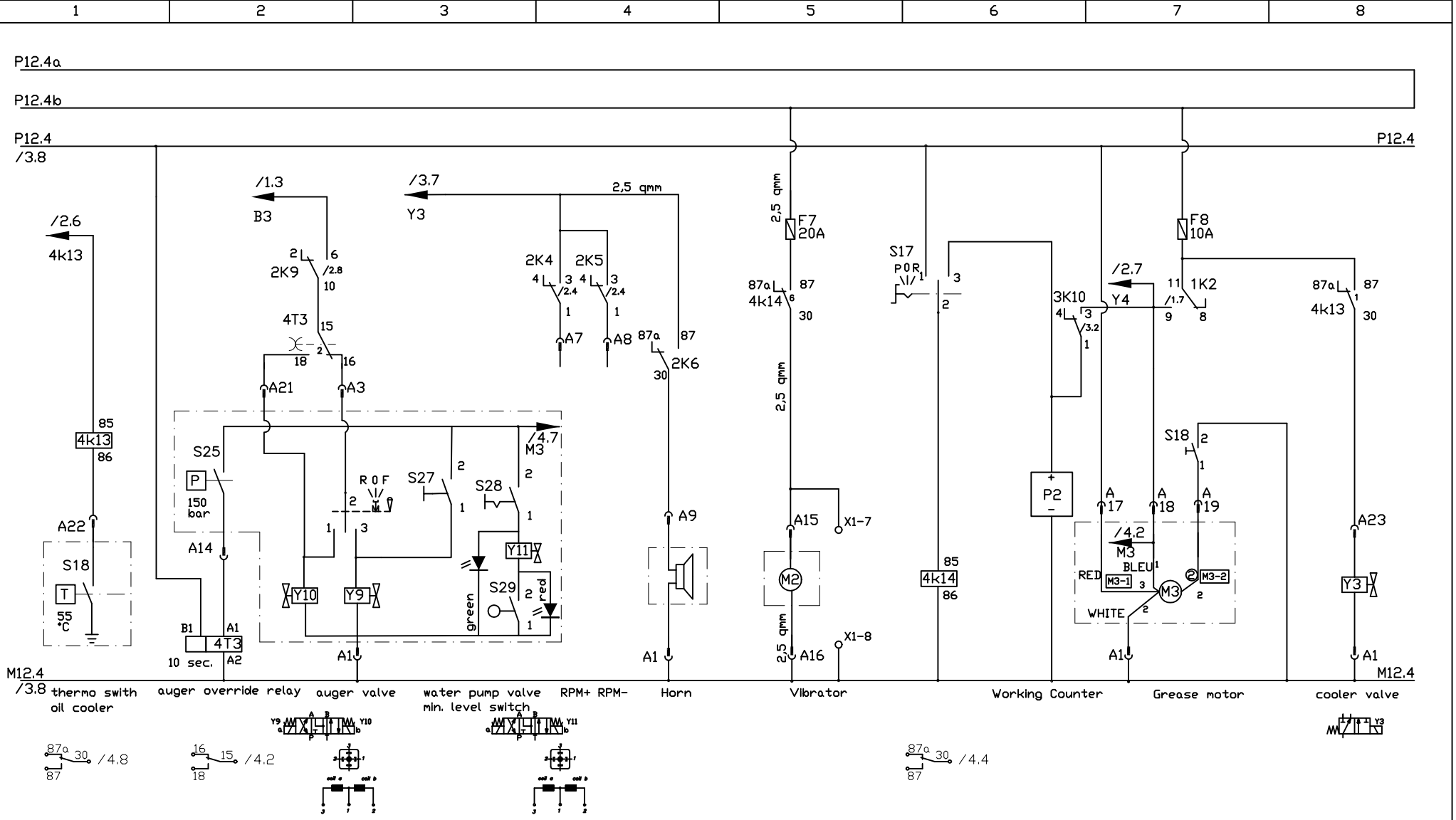
B 51 3 017

SHEET

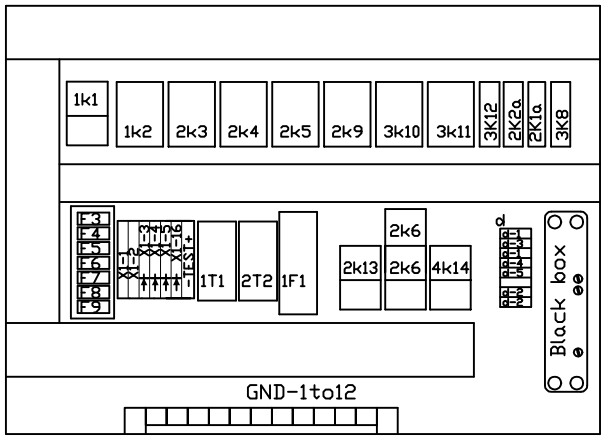
OF

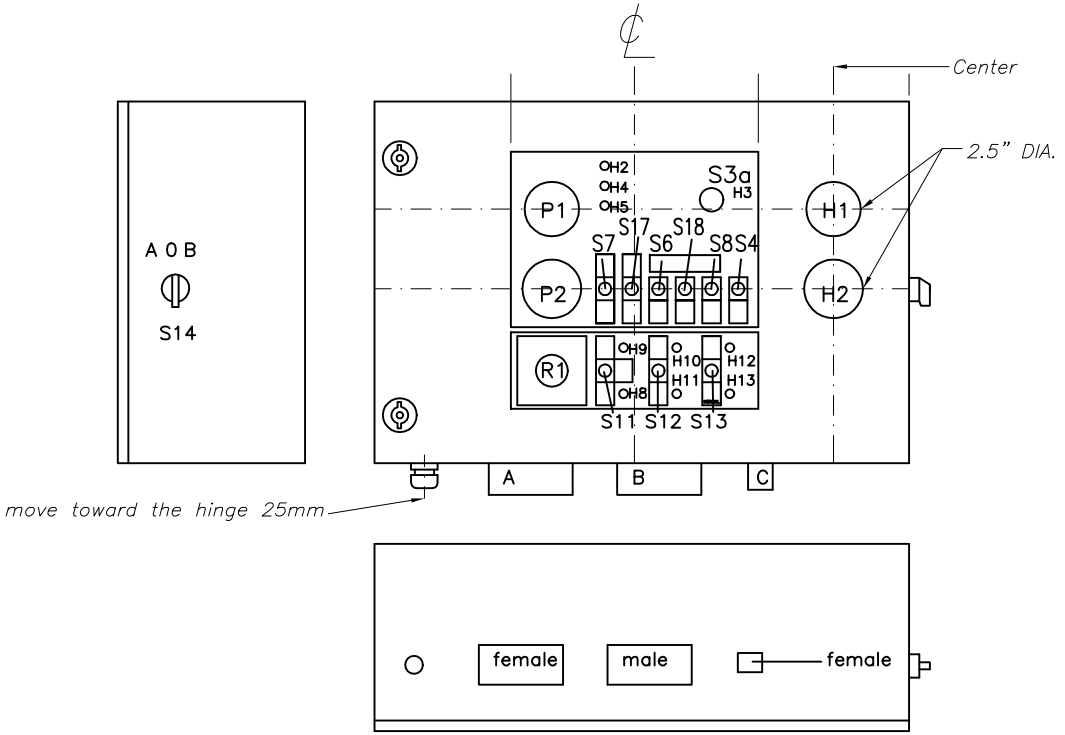
REPLACEMENT FOR

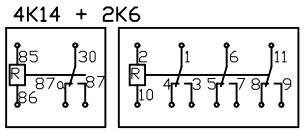
REPLACEMENT BY



Waitzinger Baumaschinen Vertrieb und Service GmbH				FREE DIMENSION TOLERANCE DIN 7168 MEDIUM			SCALE / WEIGHT
					DATE	NAME	M 42.5 XXT
				DRAWN	2000/03/27	Fetzer	control panel V4 Page 4
				CHKD.			
				APPD.			
d	siehe B_513017.doc	19.07.05	Körner				
c	siehe B_513017.doc	24.02.05	Körner	CHANGE ONLY WITH CAD			B 51 3 017
b	siehe B_513017.doc	02.02.04	Körner				SHEET / OF
a	siehe B_513017.doc	15.01.04	Körner				
ISSUE	MODIFICATION	DATE	NAME	ORIGINAL			REPLACEMENT FOR / REPLACEMENT BY







ISSUE	MODIFICATION	DATE	NAME
d	siehe B_513017.doc	19.07.05	Körner
c	siehe B_513017.doc	24.02.05	Körner
b	siehe B_513017.doc	02.02.04	Körner
a	siehe B_513017.doc	15.01.04	Körner

Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

CHANGE ONLY WITH CAD

ORIGINAL

	DATE	NAME
DRAWN	2000/03/27	Fetzer
CHKD.		
APPD.		

SCALE

WEIGHT

M 42.5 XXT

control panel V4
Page 5

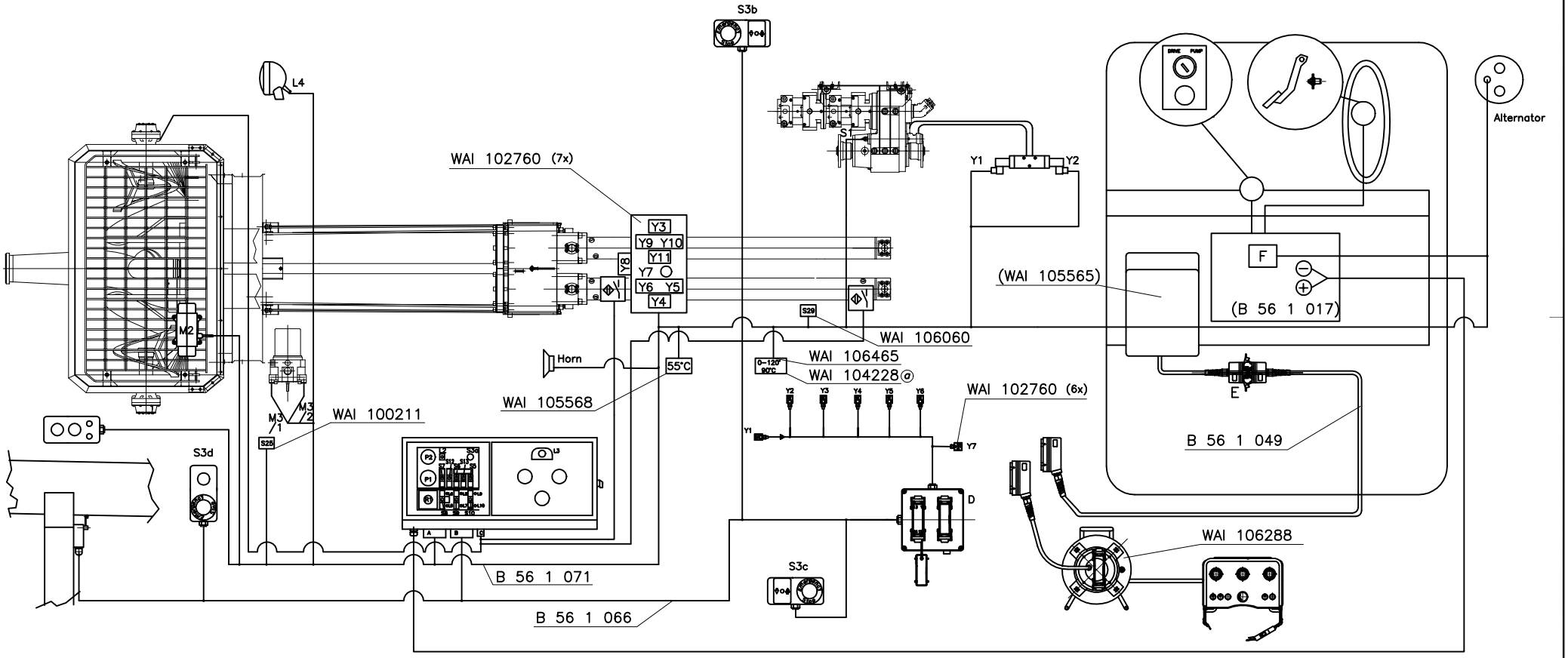
B 51 3 017

SHEET

OF

REPLACEMENT FOR

REPLACEMENT BY



PLUG A

1	Y3+L4+M3/1+ Y4+Y7+FAN	brn
2	S1>F1	blk/whi
3	Y3−1	red/yel
4	temp. switch	yel/whi
5	L4	grn/whi
6	Y4−1	blu/whi
7	F3	blu
8	F2	blk
9	Horn	blk
10	Y5−1/hopper Y6/Y8/Y9	blk/grn
11	Y5− 2	blk/red
12	Y7	gry/red
13	Y8	whi/brn
14	Y9	vio
15	M2	blk
16	M2	blu
17	M3/1 −1	gry
18	M3/1−3	grn
19	M3/2 −2	yel
20	Y6	whi
21	temp switch	whi
22	temp switch	whi
23	Y10	grn
24	free	free
	F5	red
	F6	gry/blk

PLUG B

1	D10	brn	ground
2	S3b	gry	emergency stop
3	S3c	blk	emergency stop
4	D13	blu	emergency stop
5	D 22	gry/red	emergency stop
6	S3b−d	white	emergency stop
7	D 20	whi/grn	horn
8	D 15	grn	RPM +
9	D 16	blk/whi	RPM −
10	D 24	vio	Pot
11	D 17	blk/grn	pumping on
12	D 19	gry/blk	reverse
13	free	free	free
14	D 18	blu/whi	pumping
15	D 21	blk/red	flashing light
16	free	free	free

PLUG C

pin No.	wire No.	function
1	brown	+
2	blue	−
3	black	Sensor 1
4	black	Sensor 2
5		
6		
7		
8		

PLUG D

⏚	A 1	brn	ground
1	Y3/3	brn/whi	boom 1 up
2	Y3/2	blu	boom 1 down
3	Y4/3	grn/whi	boom 2 up
4	Y4/2	blk/grn	boom 2 down
5	Y5/3	gry/blk	boom 3 up
6	Y5/2	blk/whi	boom 3 down
7	Y6/3	blk/red	boom 4 up
8	Y6/2	gry/red	boom 4 down
9	free	free	free
10	⊣⊢	brn	ground
11	Y2/2	vio	turn clockwise
12	Y2/3	blu/whi	turn anticlockw.
13	B4	red	plus
14	Y1/2/3 Y7	gry	pilot valve
15	B 8	grn	RPM +
16	B 9	blk/whi	RPM −
17	B 11	blk/grn	pumping on
18	B 14	blu/whi	pumping
19	B 12	gry/blk	reverse
20	B 7	whi/grn	horn
21	B 15	blk/red	free
22	B 5	gry/red	emergency stop
23	Y7	brn/whi	free
24	B 10	vio	POT

PLUG E

pin No.	wire No.	function	pin No.	wire No.	function
1	1	power supply 12V	17	34	boom 4 up
2	3	emergency stop	18	31	boom 3 down
3	4	12 V+	19	32	boom 3 up
4	5	RPM−	20	29	turn clockwise
5	6	free	21	30	turn anticlockw.
6	8	horn	22	28	boom 1 down
7	11	RPM+	23	27	boom 1 up
8	13	pump on	24	39	boom 2 down
9	9	GND	25	40	boom 2 up
10	14	reverse	26	–	free
11	25	pilot valve	27	–	free
12	–	free	28	35	pump speed pot
13	–	free	29	–	free
14	–	free	30	–	free
15	–	free	31	–	free
16	33	boom 4 down	32	–	free

TERMINAL F

blk/whi	A2
whi	S1
grn	Y1
gry/whi	Y2
blu	A7
blk	A8
vio	Lima D
brn	⊖
red	reserve
gry/blk	reserve

Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

	DATE	NAME
DRAWN	2000/03/28	MI
CHKD.		
APPD.		

CHANGE ONLY WITH CAD

a siehe B_561070.doc 29.08.05 Kilmer

MODIFICATION | DATE | NAME

ORIGINAL

SCALE without | WEIGHT

own parts list

Cable harness / accessories REED V4

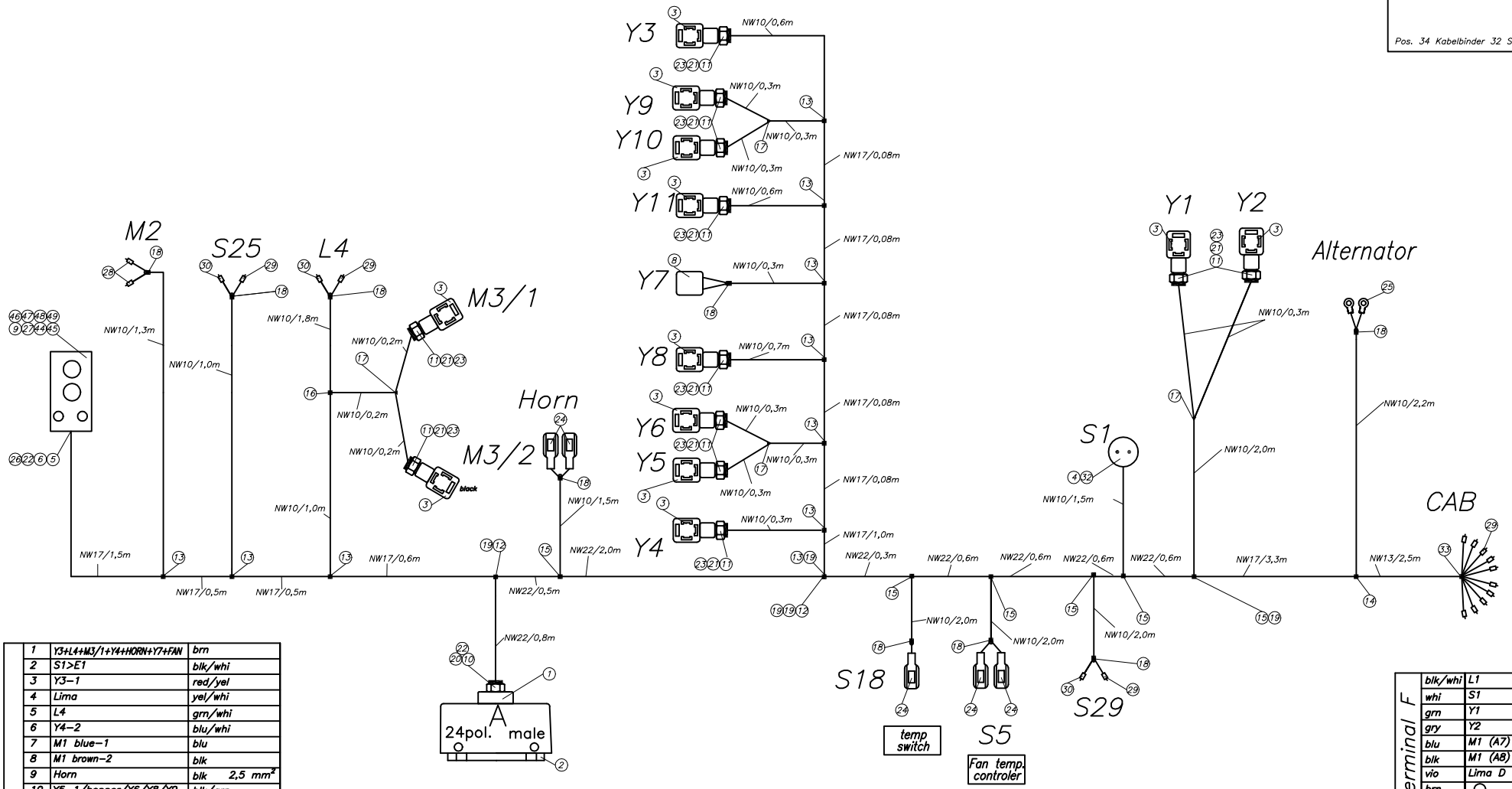
B 56 1 070

SHEET | OF

REPLACEMENT FOR | REPLACEMENT BY

Lose Teile:

Pos. 34 Kabelbinder 32 Stück



PLUG A			
	1	Y3+L4+M3/1+Y4+HORN+Y7+FAN	brn
	2	S1>E1	blk/whi
	3	Y3–1	red/yel
	4	Lima	yel/whi
	5	L4	grn/whi
	6	Y4–2	blu/whi
	7	M1 blue–1	blu
	8	M1 brown–2	blk
	9	Horn	blk 2,5 mm²
	10	Y5–1/hopper/Y6/Y8/Y9	blk/grn
	11	Y5–2	blk/red
	12	Y7	gry/red
	13	Y8	whi/brn
	14	Y9	vio
	15	M2	blk 2,5 mm²
	16	M2	blu 2,5 mm²
	17	M3/1 –1	gry
	18	M3/1–3	grn
	19	M3/2 –2	yel
	20	Y6	whi
	21		
	22		
	23	Fan	grn
	24	S5	yel/whi
		Res. F	red
		Res. F	gry/blk

Terminal F	
blk/whi	L1
whi	S1
grn	Y1
gry	Y2
blu	M1 (A7)
blk	M1 (A8)
vio	Lima D
brn	⊖
red	reserve
gry/blk	reserve

Waitzinger Baumaschinen Vertrieb und Service GmbH

free dimension tolerance DIN 7168 medium

issue	MODIFICATION	date	name

	date	name
drawn	1998/07/13	Mi
chkd.		
appd.		

change only with CAD

original

scale 1:1 weight 00 N

semi–finished product
Material

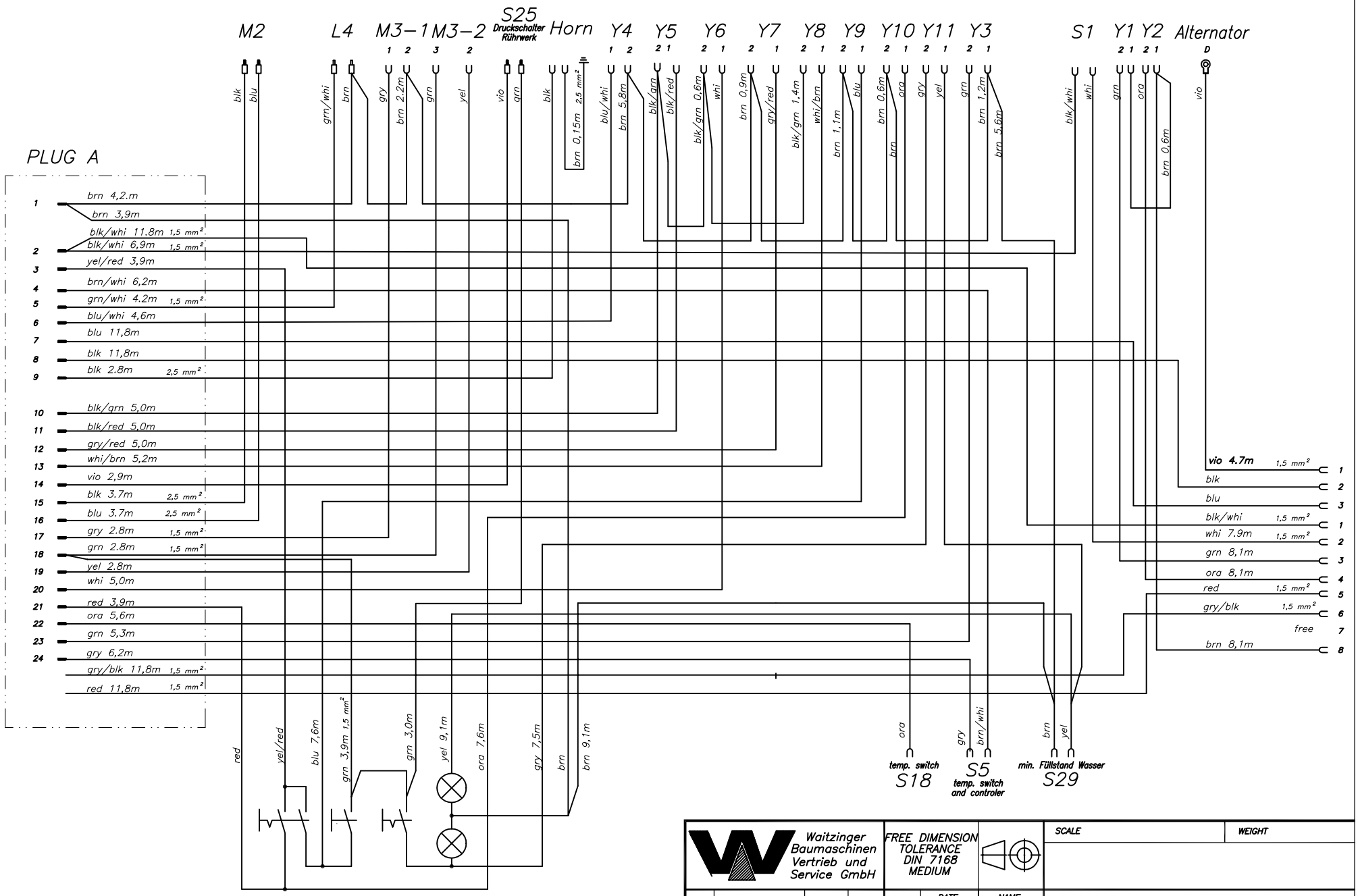
cable loop pump
REED cl 37m

B 56 1 071

sheet 1 of 2

replacement for

replacement by



Alle nicht bezeichneten Kabel sind 1mm²
Kabel um 10% länger als angegeben zuschneiden

ISSUE	MODIFICATION	DATE	NAME

Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

	DATE	NAME
DRAWN	1999/03/24	Fetzer
CHKD.		
APPD.		

CHANGE ONLY WITH CAD

ORIGINAL

SCALE | WEIGHT

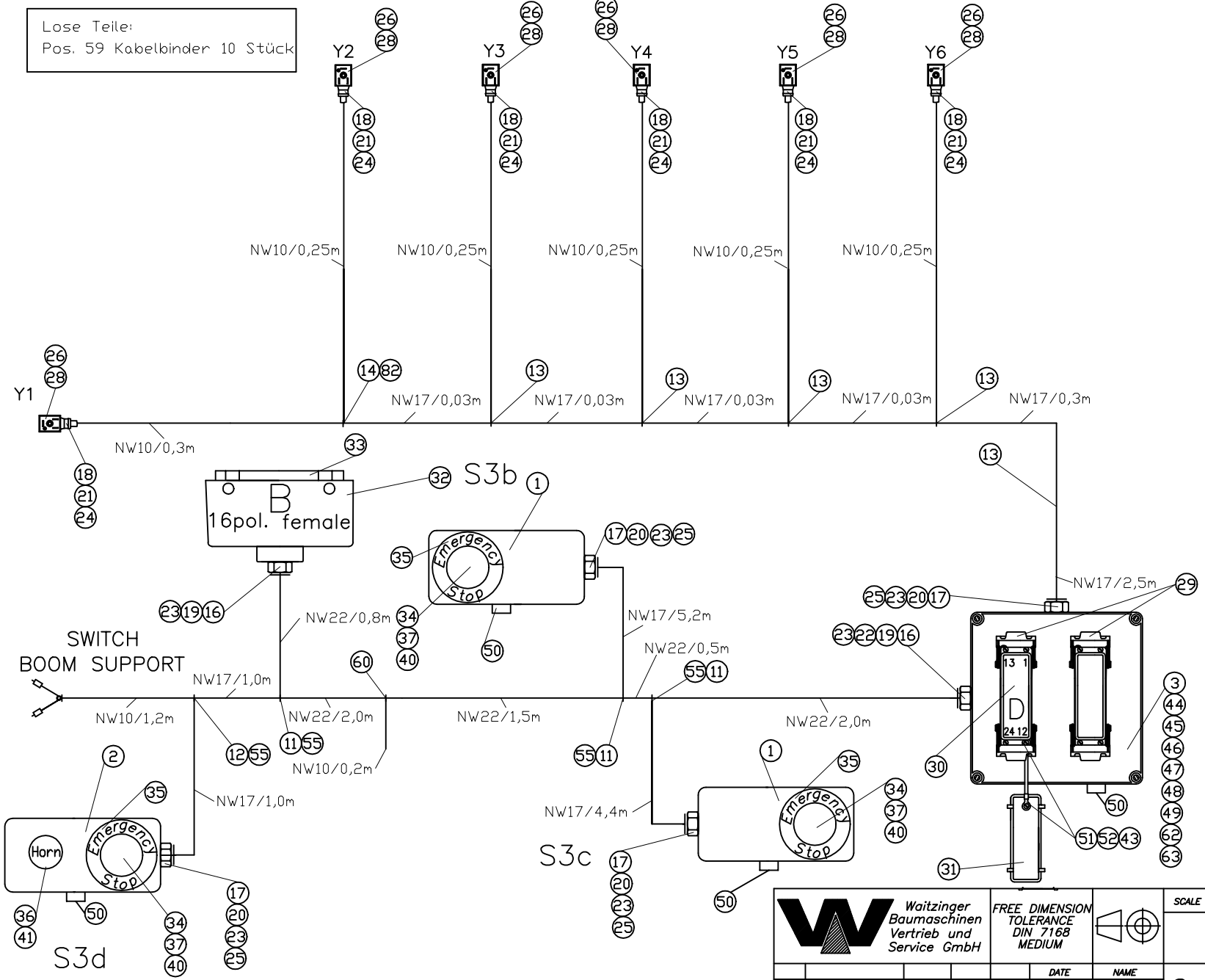
cable loop pump REED cl 37m

B 56 1 071

SHEET 2 OF 2

REPLACEMENT FOR | REPLACEMENT BY

Lose Teile:
Pos. 59 Kabelbinder 10 Stück



PLUG B

1	D10 ⊣⊪	brn	ground
2	S3d	gry/brn	emergency stop
3	S3c	blk	emergency stop
4	D13	blu	emergency stop
5	D 22	gry/red	emergency stop
6	S3d	whi	emergency stop
7	D 20	whi/grn	horn
8	D 15	grn	RPM +
9	D 16	blk/whi	RPM –
10	D 24	vio	Pot
11	D 17	blk/grn	pumping on
12	D 19	whi/gry	reverse
13	D 23	brn/whi	outrigger
14	D 18	blu/whi	pumping
15	D 21	blk/red	free
16			free

PLUG D

⏚	B 1	brn	ground
1	Y3/3	brn/whi	boom 1 up
2	Y3/2	blu	boom 1 down
3	Y4/3	grn/whi	boom 2 up
4	Y4/2	blk/grn	boom 2 down
5	Y5/3	gry/blk	boom 3 up
6	Y5/2	blk/whi	boom 3 down
7	Y6/3	blk/red	boom 4 up
8	Y6/2	gry/red	boom 4 down
9	free	free	free
10	⊣⊪	brn	ground
11	Y2/2	vio	turn clockwise
12	Y2/3	blu/whi	turn anticlockw.
13	B4	red	plus
14	Y1/3 Y1/2 Y7	gry	pilot valve
15	B 8	grn	RPM +
16	B 9	blk/whi	RPM –
17	B 11	blk/grn	pumping on
18	B 14	blu/whi	pumping
19	B 12	gry/blk	reverse
20	B 7	whi/grn	horn
21	B 15	blk/red	free
22	A 5	gry/red	emergency stop
23	B13	brn/whi	free
24	B 10	vio	POT

ISSUE	MODIFICATION	DATE	NAME
d	siehe B 561066.doc	02.06.05	Körner
c	siehe B 561066.doc	26.08.04	Körner
b	siehe B 561066.doc	03/09/19	Hoh.
a	siehe B 561066.oen	08/03/20	Mi

Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

	DATE	NAME
DRAWN	1998/10/05	Fetzer
CHKD.		
APPD.		

CHANGE ONLY WITH CAD

ORIGINAL

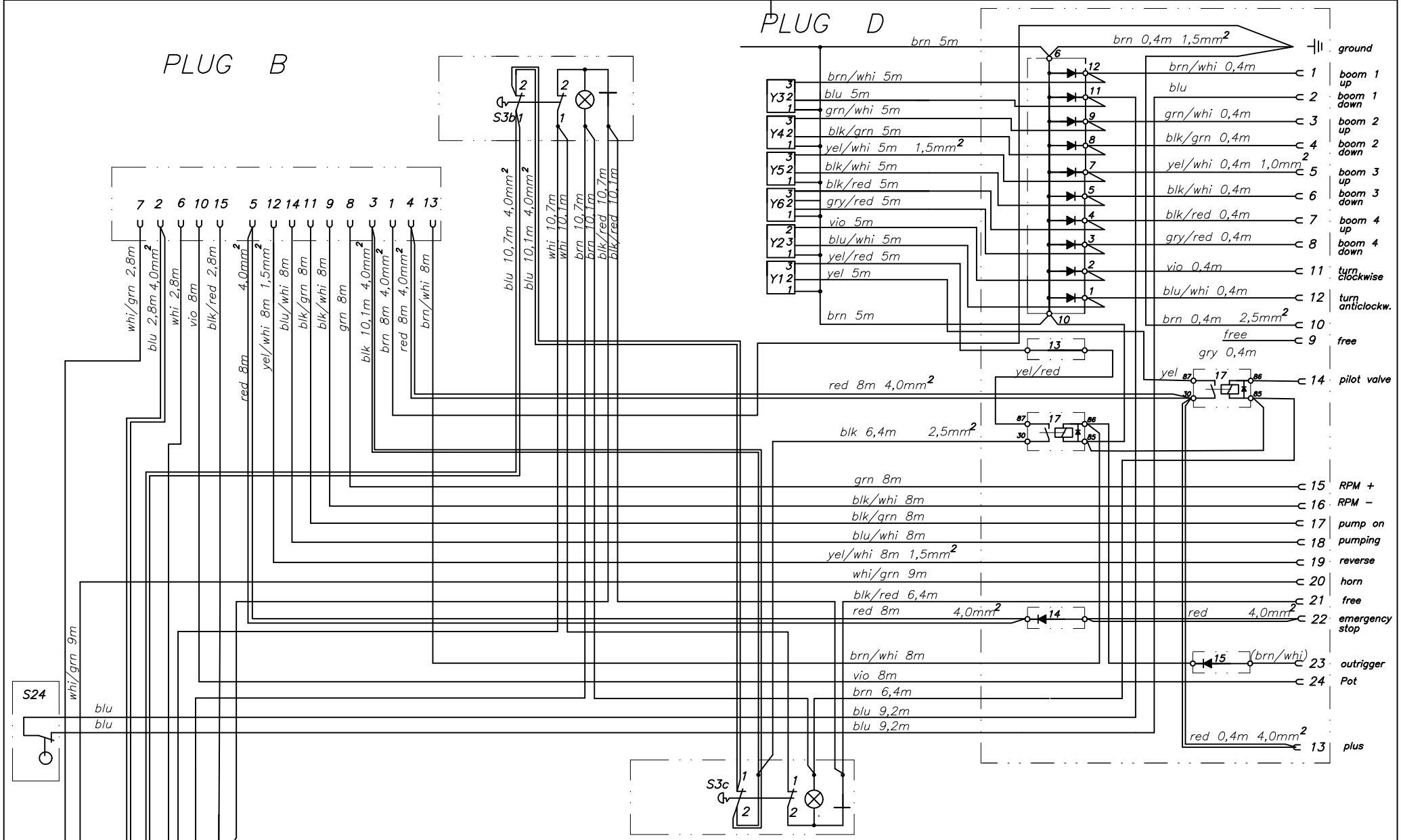
SCALE | WEIGHT

Cable harness boom
REED 37m

B 56 1 066

SHEET 1 OF 3

REPLACEMENT FOR | REPLACEMENT BY



all cables which are not dimensioned are 1 mm²

Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

	DATE	NAME
DRAWN	1998/10/05	Fetzer
CHKD.		
APPD.		

ISSUE	MODIFICATION	DATE	NAME
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c	siehe B 561066.aen	26.08.04	Körner
b	siehe B 561066.aen	03/09/19	Hoh.
a	siehe B 561066.aen	[illegible]	Mi

ORIGINAL

CHANGE ONLY WITH CAD

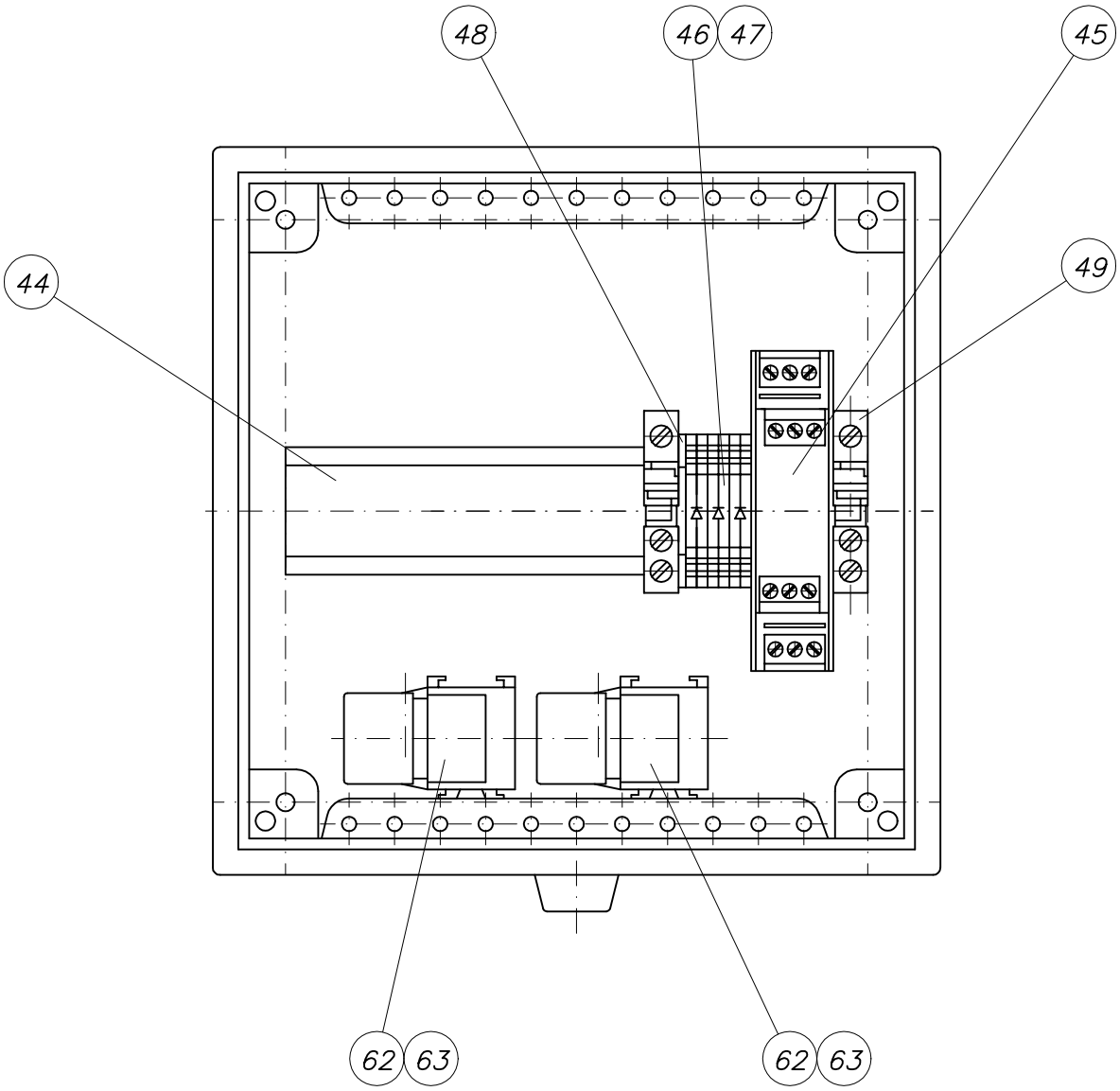
SCALE | WEIGHT

Cable harness boom REED 37m

B 56 1 066

SHEET 2 OF 3

REPLACEMENT FOR | REPLACEMENT BY



Waitzinger Baumaschinen Vertrieb und Service GmbH

FREE DIMENSION TOLERANCE DIN 7168 MEDIUM

	DATE	NAME
DRAWN	1998/10/05	Fetzer
CHKD.		
APPD.		

SCALE

WEIGHT

Cable harness boom REED V3

B 56 1 066

SHEET 3 OF 3

CHANGE ONLY WITH CAD

ISSUE	MODIFICATION	DATE	NAME
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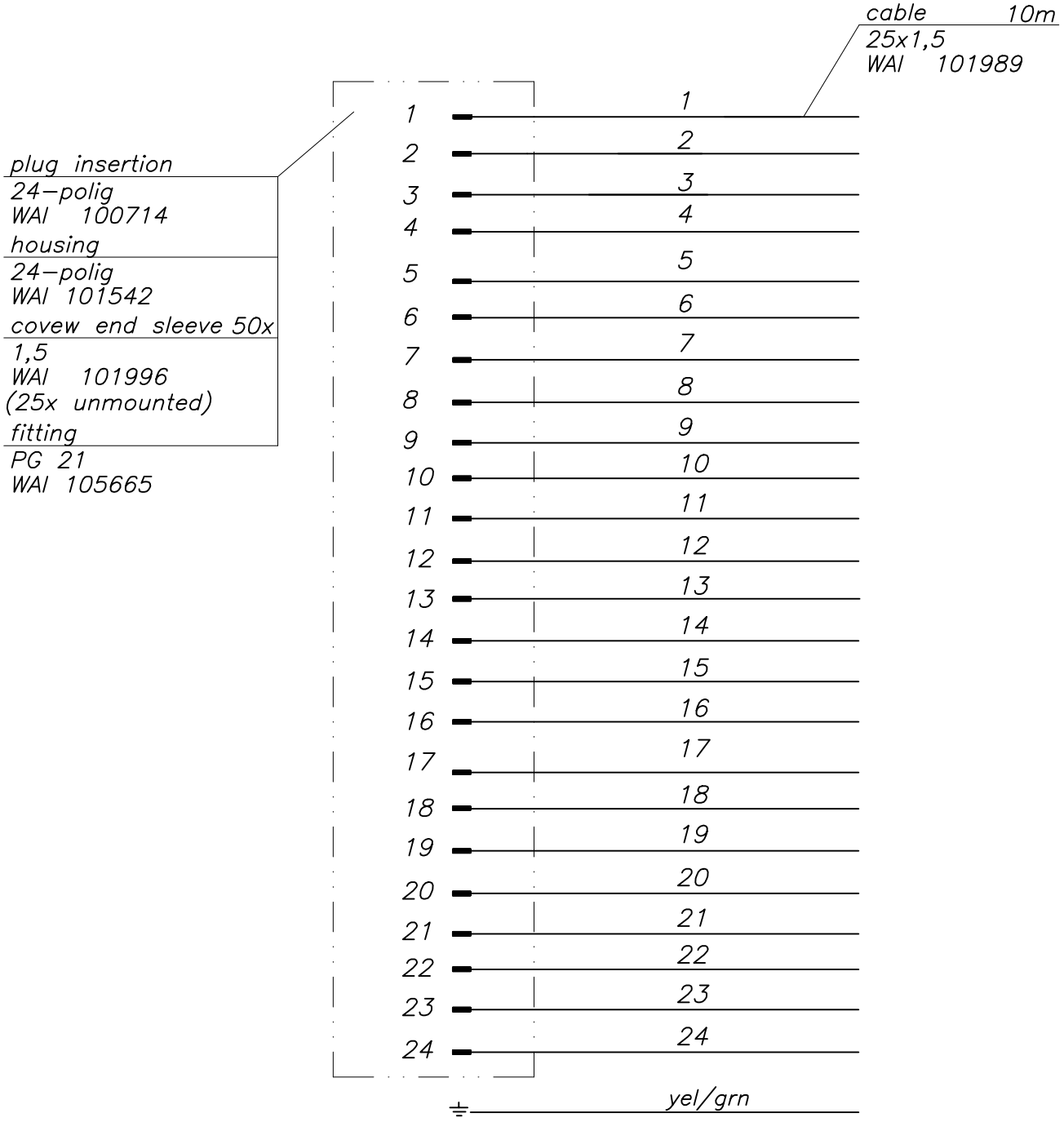
c	siehe B 561066.aen	04/08/26	Körner
b	siehe B 561066.aen	03/09/19	Hoh.
a	siehe B 561066.aen	02/03/28	Mi

ORIGINAL

REPLACEMENT FOR

REPLACEMENT BY



Waitzinger Baumaschinen Vertrieb und Service GmbH

free dimension tolerance DIN 7168 medium

	date	name
drawn	1999/07/20	Mi
chekd.		
appd.		

scale | weight

own parts list

cable cpl. for cable control

change only with CAD

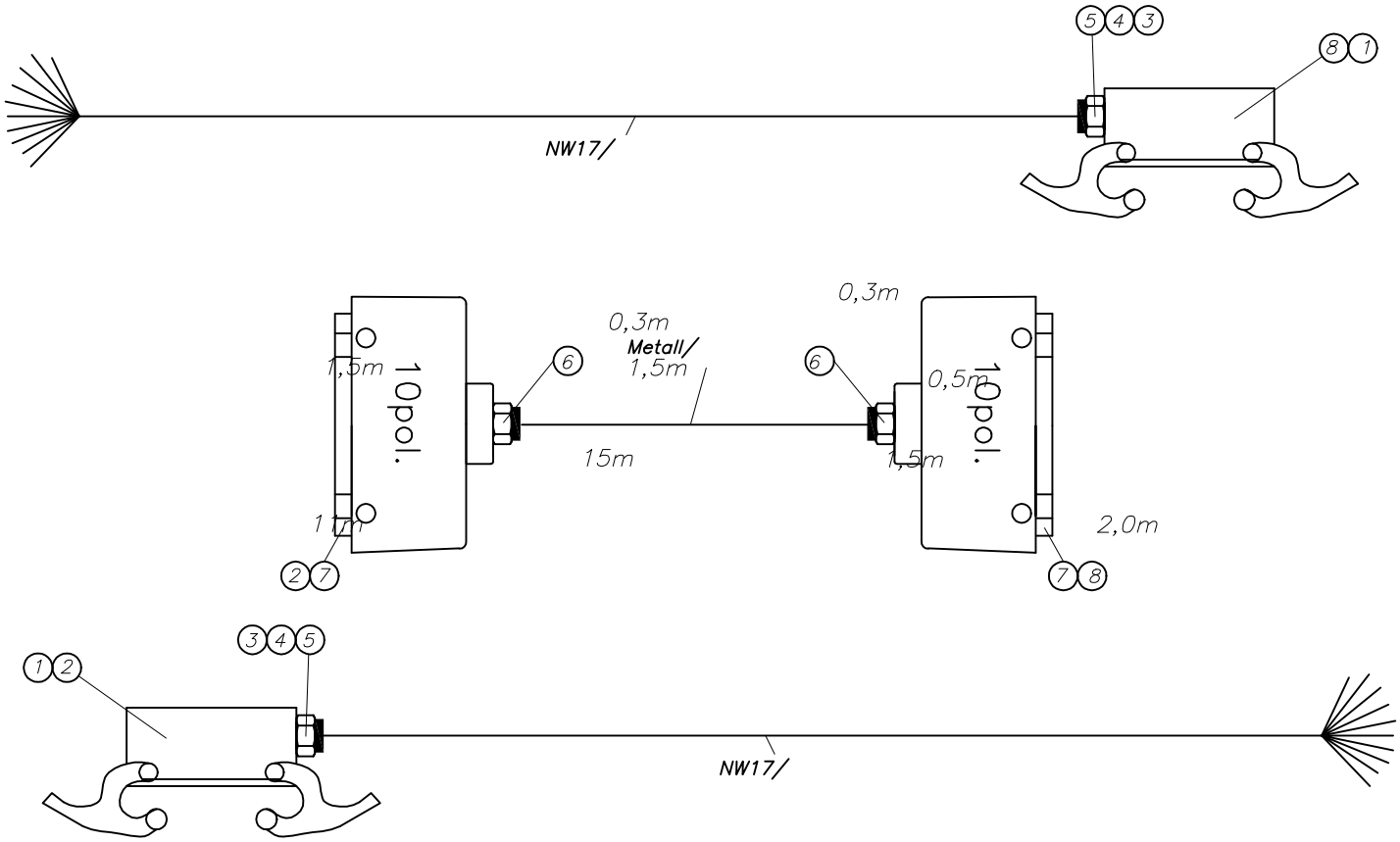
B 56 1 049

sheet

of

issue	modification	date	name

original | replacement for | replacement by



Waitzinger Baumaschinen Vertrieb und Service GmbH				Freimaßtoleranz DIN 7168 mittel		Maßstab	Gewicht
						eigene Stückliste	
					Datum / Name		
				Bearb.	06.09.2004 Körner	Kabelbaum Mast 37m REED	
				Gepr.			
				Norm			
				Änderung nur auf CAD		B 56 2 066	Blatt 2 von 2 Bl.
Zust.	Änderung	Datum	Name	Urspr.		Ers. für	Ers. durch

Drehkopf

Zust.	Änderung	Datum	Name

Waitzinger Baumaschinen Vertrieb und Service GmbH

Freimaßtoleranz DIN 7168 mittel

	Datum	Name
Bearb.	06.09.2004	Körner
Gepr.		
Norm		

Änderung nur auf CAD

Ursprung

Maßstab

Gewicht

eigene Stückliste

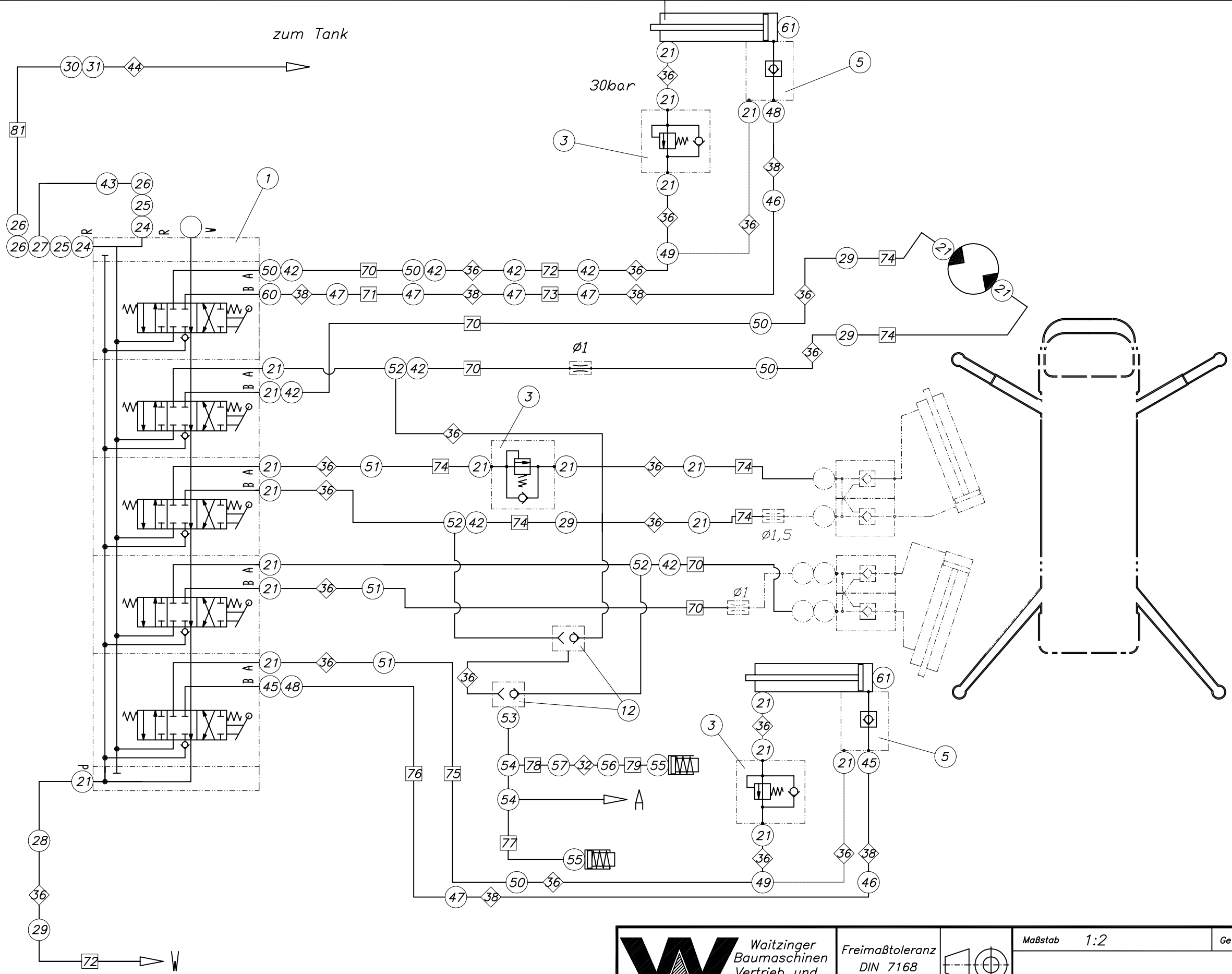
Kabelbaum Mast 37m REED

B 56 2 066

Blatt 1 von 2 Bl.

Ers. für

Ers. durch



Waitzinger Baumaschinen Vertrieb und Service GmbH

Freimaßtoleranz DIN 7168 mittel

Maßstab 1:2

Gewicht

eigene Stückliste

	Datum	Name
Bearb.	14.11.2003	Mi
Gepr.		
Norm		

Verrohrungsplan 42 XXT Mastbock

Änderung nur auf CAD

B 72 2 010

Blatt 1

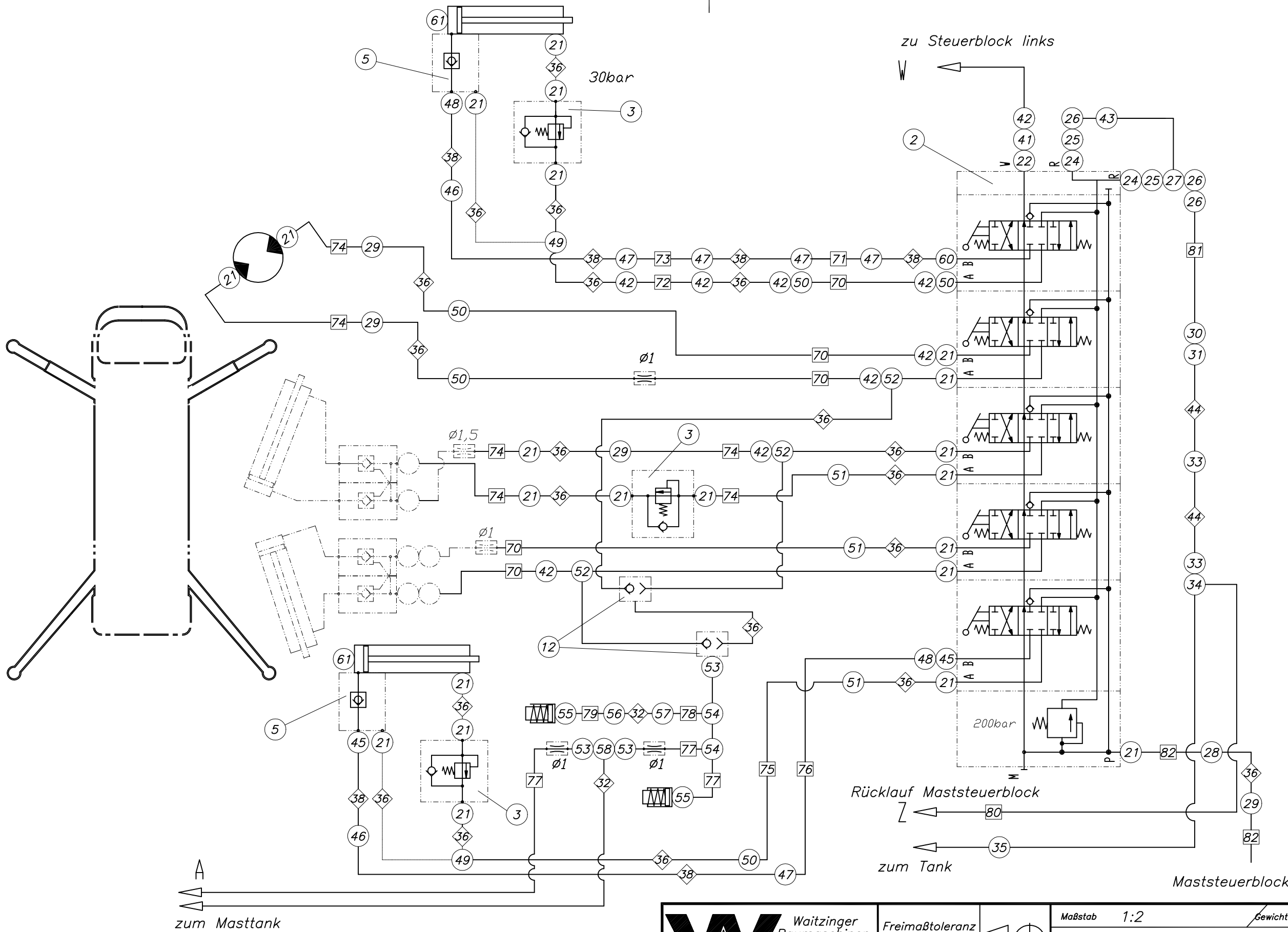
3 Bl.

Zust.	Änderung	Datum	Name

Ursprung

Ers. für

Ers. durch



Zust.	Änderung	Datum	Name				
					Datum	Name	
				Bearb.	14.11.2003	Mi	
				Gepr.			
				Norm			

Waitzinger Baumaschinen Vertrieb und Service GmbH

Freimaßtoleranz DIN 7168 mittel

Maßstab 1:2 Gewicht

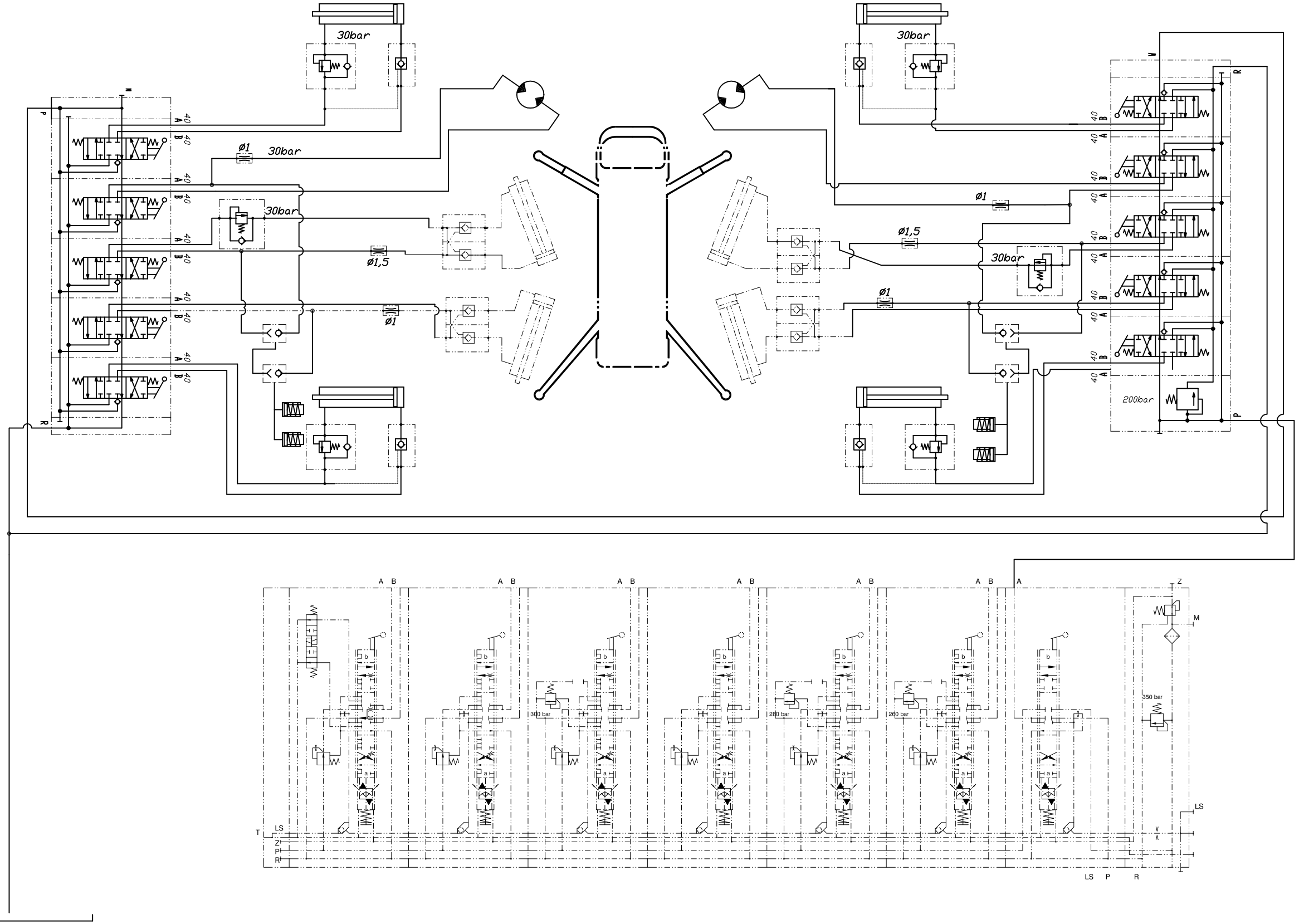
eigene Stückliste

Verrohrungsplan 42 XXT Mastbock

B 72 2 010

Blatt 2 / 3 Bl.

Ursprung | Änderung nur auf CAD | Ers. für | Ers. durch



Zust.	Änderung	Datum	Name

Waitzinger Baumaschinen Vertrieb und Service GmbH

Freimaßtoleranz DIN 7168 mittel

	Datum	Name
Bearb.	14.11.2003	R.HBK
Gepr.		
Norm		

Änderung nur auf CAD

Ursprung

Maßstab 1:2

Gewicht

eigene Stückliste

Verrohrungsplan 42 XXT Mastbock

B 72 2 010

Blatt 3

3 Bl.

Ers. für

Ers. durch

REED

Waitzinger
Baumaschinen GmbH

Check book for Waitzinger Concrete pump

Concrete pump:

Type:	**Serial No.**
THP 150	**VL-8829**

Placing boom:

Type:	**Serial No.**
42R4XXT	**08-251**

Truck:

Manufacturer

Type:	**Serial No.**

BOOM TRUCK

VENDOR INFORMATION

MACK TRUCK
BOSTROM SEATING
REXROTH A2F HYDRAULIC PUMP MOTOR
NBB NANO RADIO REMOTE CONTROL
REXROTH A4VG 71-180 HYDRAULIC PUMP
STIEBEL PTO GEAR BOX
CRK WASH WATER PUMP
PNN SYSTEM CABLE REMOTE CONTROL

REED TRUCK MOUNTED CONCRETE BOOM PUMP MODEL ***XXT42R***

VENDOR SECTION CONTAINS THE FOLLOWING FIGURES:


REED
CONCRETE PLACING EQUIPMENT
MR SERIES MACK TRUCK
VENDR
FIGURE 01
PAGE 01
REED
CONCRETE PLACING EQUIPMENT
REXROTH A2F HYDRAULIC PUMP MOT
A2F
REED
CONCRETE PLACING EQUIPMENT
BOSTROM AIR SUSPENSION SEAT
TALLADEGA SERIES
VENDR
FIGURE 02
PAGE 01
Bostrom
SEATING
TALLADEGA
905L/905/910
AIR SUSPENSION SEATS

REVISION:

THE CUSTOMER SERVICE DEPARTMENT PHONE NUMBER IS (610) 709-3961.

When contacting our regional service offices or Customer Service Department, it is imperative that you provide them with the following information:

- ❑ VEHICLE IDENTIFICATION NUMBER (VIN) — This 17-digit number is
- ❑ MODEL and YEAR of vehicle
- ❑ DATE vehicle was PURCHASED and put into service
- ❑ DATE of REPAIR and REPAIR MILEAGE
- ❑ BRANCH or DISTRIBUTOR who sold and/or serviced the vehicle
- ❑ DESCRIPTION of unresolved service complaint or inquiry
- ❑ SUMMARY of ACTION TAKEN to date by the branch or distributor and our regional service office
- ❑ NAMES of INDIVIDUALS (if known) contacted at the branch or distributor and the Mack Trucks, Inc. regional service office

TABLE OF CONTENTS

THE VEHICLE

Basic Configuration

The MR has a low-entry, cab-forward-style operator's compartment. The low profile and excellent visibility are features that make this model popular throughout the refuse-hauling, construction and fire-fighting industries.

Vehicle Management and Control System (V-MAC)

The Vehicle Management and Control System, referred to as V-MAC, is an electronic engine control system with the ability to control and manage certain functions of the vehicle as well as monitor and store information.

Your vehicle may or may not be equipped with V-MAC. Vehicles equipped with V-MAC may have switches or controls located in slightly different locations than vehicles without V-MAC.

A complete description of the system components, their functions and locations on the vehicle is contained in the V-MAC Operator's Guide, TS725 (V-MAC) or TS780 (V-MAC II). If your vehicle has V-MAC, refer to TS725/TS780 for specific V-MAC information not found in this handbook.

⚠ WARNING

Never cut into the V-MAC system harness to power additional equipment.

INTRODUCTION

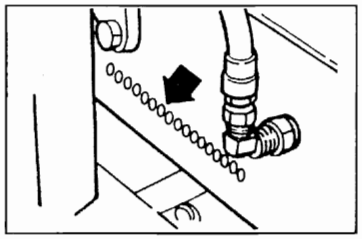
UNIT IDENTIFICATION

Locate the following serial numbers and write them in the boxes provided next to each illustration.

VIN Locations

The Vehicle Identification Number (VIN) in the two locations shown here must be the same.

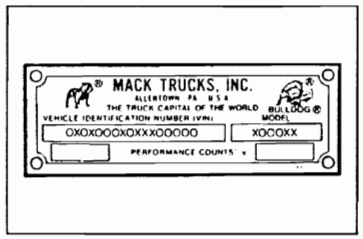
The **VIN frame stamping** is located on the right front frame rail.



Vehicle Identification Number

000038a

The **VIN plate** is located on the driver side, mounted on the seat riser.



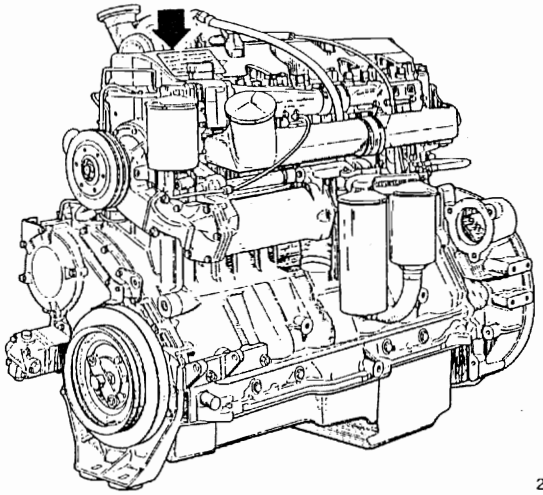
Vehicle Identification Number

000037a

Engine Information Plate

In compliance with the emissions standards requirements, an engine exhaust emissions control plate is affixed to one of the engine cylinder head covers for all MACK E7 and E9 (if equipped) diesel engines. This plate gives basic engine identification information and specifications for injection pump-to-engine timing and valve clearances.

The MACK E7 engine is shown for example purposes, where the information plate is found on the forward cylinder head cover.



200042a

INTRODUCTION

WARRANTY

Injection Pump and Governor Settings

⚠ CAUTION

Any unauthorized adjustments of the injection pump and governor settings, other than as specified, can cause serious damage to the engine.

Please be aware of the hazards of attempting to increase the power of the diesel engine in your chassis by adjusting injection pump and governor settings. Standard specifications for injection pump and governor settings permit the maximum allowable engine output. Adjustments of the injection pump and governor settings, other than as specified, can cause serious damage to the engine. In some engines, improper adjustments generally produce visual evidence of over-fueling, excessive fuel consumption and smoke. The turbocharged diesel engine usually does not produce visual evidence. The possibility of damage from improper adjustments is greater in the turbocharged diesel engine because the usual warning signs may not be present.

In the event that damage results from such unauthorized adjustments, as evidenced by improper settings in the injection pump and governor assembly or broken fastener seals of the same, the cost of repairing such damage will NOT be covered under the MACK Standard Vehicle Warranty.

Air Brake System

The MACK Standard Vehicle Warranty applies to the air brake system, as set forth in the Warranty, but only if the air brake system has not been subjected to unauthorized additions, deletions or modifications. If any such unauthorized additions, deletions or modifications are performed to the air brake system, Mack Trucks, Inc. disclaims any and all liability for any loss or damage arising out of a malfunction of the air brake system.

The air brake system was designed and built to conform to all applicable federal motor vehicle safety standards in effect at the time of manufacture. Tractor air systems are designed for operation as a tractor only, and truck air systems are designed to be operated as a truck only. If a tractor is going to be converted for operation as a truck, the air brake system must be reconfigured to that of a truck. Conversely, if a truck is going to be converted for operation as a tractor, the air system must be reconfigured to that of a tractor. Consult your MACK trucks distributor for additional information.

If any unauthorized additions, deletions or modifications are made to any portion of the air brake system which is required by Federal Motor Vehicle Safety Standards, Mack Trucks, Inc. makes no representation as to conformity with the Standards.

For complete warranty information, refer to Pedigreed Protection Plan (TS468) or Standard Vehicle Warranty (Form F034) furnished with your truck.

INTRODUCTION

CUSTOMER SERVICE

Questions and Complaints

Your satisfaction with the vehicle or service parts you purchase, and the service you receive at a Mack Trucks, Inc. subsidiary, distributor or service dealer, are our most important concerns.

If questions or complaints arise, we suggest that you first discuss the matter with the service manager at the MACK facility involved. If you are not satisfied with the service manager's response, contact the branch manager, principal or general manager of the distributorship, explain the situation and request assistance. Those requiring assistance at a service dealer should speak with the owner of the establishment.

If, for any reason, you need further assistance after dealing with the personnel at a MACK subsidiary or distributor, contact the nearest MACK regional service office and address your problem or request to our regional service manager. The regional service manager has the responsibility and the authority to recommend action in most cases and (with the aid of relevant district service personnel) will make every effort to conduct a fair review of your situation.

Addresses

The addresses and telephone and fax numbers of the Mack Trucks, Inc. regional offices are:

United States

Northeast Region — 2166 S. 12th St., P.O. Box M, Allentown, PA 18105-5000, TEL: (610) 709-3419, FAX: (610) 709-2220

Southeast Region — 6768 Southlake Parkway, Morrow, GA 30260, TEL: (770) 960-0511, FAX: (770) 960-0593

Central Region — 900 S. Frontage Rd., Suite 100, Woodridge, IL 60517, TEL: (708) 910-3330, FAX: (708) 910-3331

Southwest Region — 5605 N. MacArthur Blvd., #550, P.O. Box 165408, Irving, TX 75016-5408, TEL: (214) 518-1614, FAX: (214) 550-0389

Western Region — 20201 Mack St., P.O. Box 56658, Hayward, CA 94545-6658, TEL: (510) 732-0680, FAX: (510) 785-3803

SAFETY STATEMENT

Mack Trucks, Inc. cannot anticipate every possible occurrence which may involve a potential hazard. An accident can be avoided by recognizing potentially hazardous situations before an accident occurs. Correctly performed service procedures are critical for technician safety and safe, reliable operation of the vehicle.

⚠ DANGER

Driver attitude is the most important part of any effective vehicle safety system. Mack Trucks, Inc. strongly encourages all drivers and passengers to use their seat belts, drive defensively, remain alert and respect the speed limits. Many accidents can also be avoided through regular vehicle maintenance.

Certain everyday procedures like washing your truck and cleaning the windshield can also be hazardous because of the vehicle's height. Mack Trucks, Inc. does NOT recommend climbing up on your truck to perform these operations! Instead, stand on the ground and use brushes and squeegees mounted on extension poles. When better access is necessary (for instance, when washing the cab roof), use sturdy ladders held in place by someone on the ground.

SAFETY INFORMATION

CERTIFICATION LABELS

Safety Certification Label

National Highway Traffic Safety Administration (NHTSA) regulations require affixing a certification label to all vehicles.

NHTSA regulations also require that the certification label be affixed to either the hinge pillar, door latch post or the door edge that meets the door latch post next to the driver seat. If none of these locations are practical, it may be attached to the left side of the instrument panel or to an inward facing surface of the driver-side door.

In compliance with NHTSA regulations, your MR has a safety certification label affixed in one of the NHTSA locations listed above. This label may be either an Incomplete Vehicle and/or Completed Vehicle label. Both labels are described below.

Incomplete Vehicles

CHASSIS-CAB MANUFACTURED BY MACK TRUCKS,INC. DATE: 03/1996

THIS CHASSIS-CAB CONFORMS TO FEDERAL MOTOR VEHICLE SAFETY STANDARDS NOS. 101, 102, 103, 104, 106, 107, 111, 113, 115, 116, 124, 205, 206, 207, 208, 209, 210, AND 302.
THIS VEHICLE WILL CONFORM TO STANDARD NOS. 108, 120, AND 121 IF IT IS COMPLETED IN ACCORDANCE WITH THE INSTRUCTIONS CONTAINED IN THE INCOMPLETE VEHICLE DOCUMENT FURNISHED PURSUANT TO 49CFR PART 568. CONFORMITY TO THE OTHER SAFETY STANDARDS APPLICABLE TO THIS VEHICLE WHEN COMPLETED IS NOT SUBSTANTIALLY AFFECTED BY THE DESIGN OF THE CHASSIS-CAB.

VEHICLE IDENTIFICATION NUMBER (VIN): 1M2AA10YXTW008682 4MR3256

000249a

A chassis-cab is an incomplete vehicle with a completed occupant compartment that requires the addition of cargo-carrying, work-performing or load-bearing components to perform its intended functions.

The chassis-cab manufacturer must affix a label to the incomplete vehicle in one of the NHTSA locations listed above. This label provides the chassis-cab date of manufacture, VIN and vehicle certification information.

Completed Vehicles

In addition to the label supplied by Mack Trucks, Inc. as the chassis-cab manufacturer, a Completed Vehicle certification label, supplied by the body manufacturer, is affixed in the same general location. This label provides information pertaining to Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating (GAWR), tire and rim information, etc.

On **MACK-completed vehicles**, this label contains the date of manufacture, VIN, GVWR, GAWR, and tire and rim data. It is found in one of the NHTSA locations listed above.

MANUFACTURED BY MACK TRUCKS, INC IN 03/1996 GVWR 22680 KG (50000 LB)
THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE VEHICLE IDENTIFICATION NUMBER 1M1AA13Y0TW069202

	GAWR			TIRES			RIMS					
FRONT:	5443	KG (	12000LB) WITH	11R24.5	G	,	24.5 X 8.25	, AT	724 KPA (	105 PSI) COLD	SINGLE
1ST INT:	8618	KG (	19000LB) WITH	11R24.5	G	,	24.5 X 8.25	, AT	724 KPA (	105 PSI) COLD	DUAL
2ND INT:		KG (	LB) WITH			,		, AT	KPA (	PSI) COLD	
REARMOST:	8618	KG (	19000LB) WITH	11R24.5	G	,	24.5 X 8.25	, AT	724 KPA (	105 PSI) COLD	DUAL

VEHICLE TYPE: TRUCK-TRACTOR 4MR3306

U.S. VEHICLES

THIS VEHICLE CONFORMS TO ALL APPLICABLE STANDARDS PRESCRIBED UNDER THE CANADIAN MOTOR VEHICLE SAFETY REGULATIONS IN EFFECT ON THE DATE OF MANUFACTURE/CE VÉHICULE EST CONFORME À TOUTES LES NORMES QUI LUI SONT APPLICABLES EN VERTU DU RÈGLEMENT SUR LA SÉCURITÉ DES VÉHICULES AUTOMOBILES DU CANADA EN VIGUEUR À LA DATE DE SA FABRICATION.
MANUFACTURED IN 03/1996 BY MACK TRUCKS, INC VEHICLE IDENTIFICATON NUMBER 1M1AA18Y8TW062524
GVWR/PNBV 23070 KG VEHICLE TYPE: TRUCK-TRACTOR/CAMION TRACTEUR

GAWR/PNBE-FRONT:	5033	KG WITH	11R24.5	G	TIRES, 24.5 X 8.25	RIMS, AT	690 KPA	COLD	SINGLE
GAWR/PNBE-1ST INT.:	8618	KG WITH	11R24.5	G	TIRES, 24.5 X 8.25	RIMS, AT	690 KPA	COLD	DUAL
GAWR/PNBE-2ND INT.:		KG WITH			TIRES,	RIMS, AT	KPA	COLD	
GAWR/PNBE-REARMOST:	8618	KG WITH	11R24.5	G	TIRES, 24.5 X 8.25	RIMS, AT	690 KPA	COLD	DUAL

4MR3311

CANADIAN VEHICLES

000250a

ADVISORY LABELS

Throughout this book you will find paragraphs labeled *Service Hint*, *Note*, *Caution*, *Warning* and *Danger*. *Caution* and *Warning* labels are also found in various locations on the vehicle to alert drivers, operators and service technicians to situations which can cause personal injury or equipment damage. The labels shown are applicable to the MR model chassis at the time of publication and they are representative of what can be typically found on an MR. (Your vehicle may not contain all of the labels illustrated in this handbook.) These labels are for your benefit. Please look through this section and make a mental note of the labels, their locations and what they explain. Be sure to replace any label that is damaged.

Advisory Label Location (In Handbook)

Cautionary *signal words* (Danger-Warning-Caution) may appear in various locations throughout this manual. Information accented by one of these signal words must be observed to minimize the risk of personal injury to service personnel, or the possibility of improper service methods which may damage the vehicle or render it unsafe. Additional Notes and Service Hints are utilized to emphasize areas of procedural importance and provide suggestions for ease of repair. The following definitions indicate the use of these advisory labels as they appear throughout the manual:

⚠ CAUTION

Directs attention to unsafe practices which could result in damage to equipment and possible subsequent personal injury or death if proper precautions are not taken.

⚠ WARNING

Directs attention to unsafe practices which could result in personal injury or death if proper precautions are not taken.

⚠ DANGER

Directs attention to unsafe practices and/or existing hazards which will result in personal injury or death if proper precautions are not taken.

NOTE

An operating procedure, practice, condition, etc., which is essential to emphasize.

SERVICE HINT

A helpful suggestion which will make it quicker and/or easier to perform a certain procedure, while possibly reducing overhaul cost.

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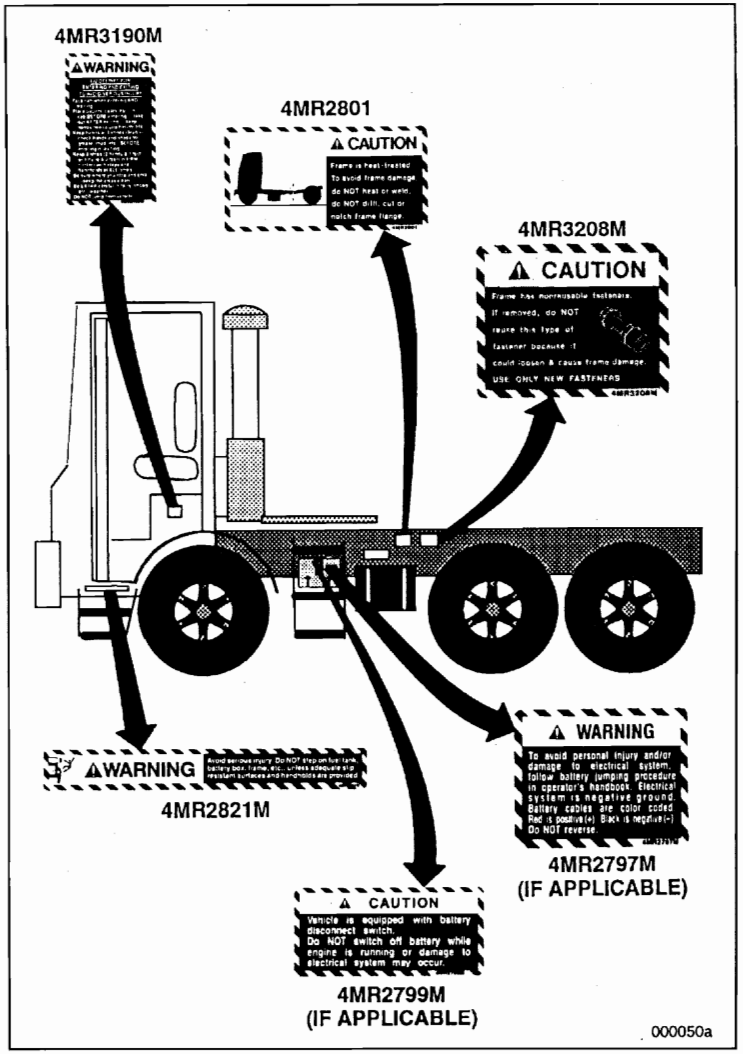
SAFETY INFORMATION

Advisory Label Location (On Truck)

Labels Found on Chassis



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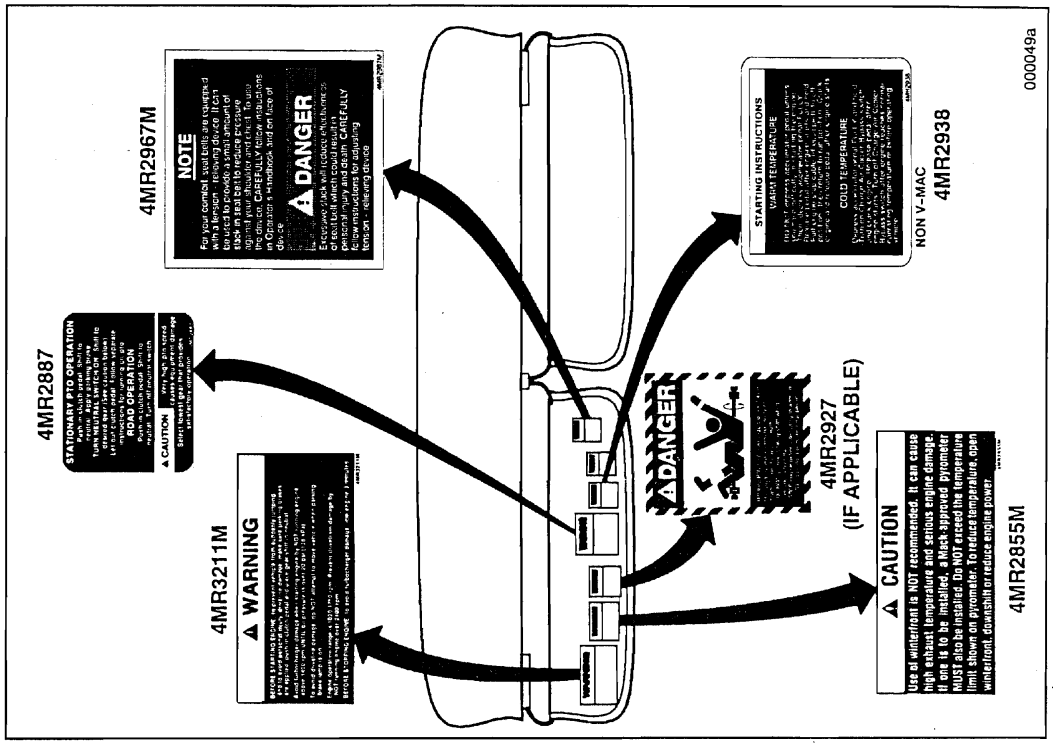
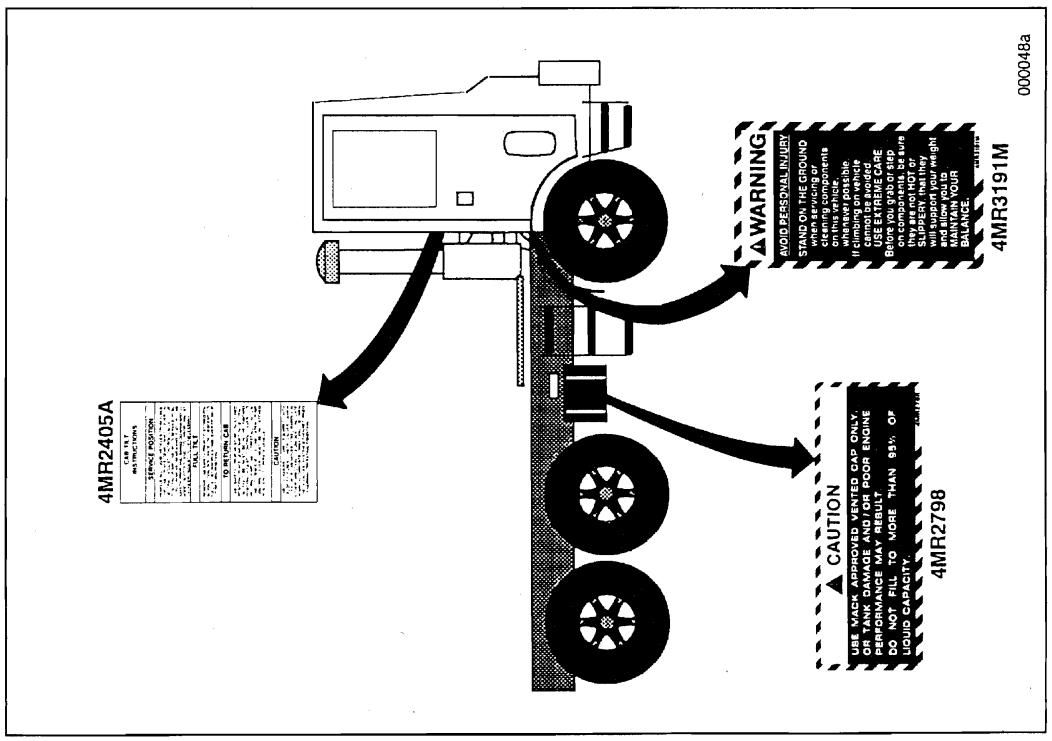
SAFETY INFORMATION

Labels Found on Driver-Side Sun Visor



SAFETY INFORMATION



REVISION:

Labels Found on Windshield

⚠ CAUTION

This tractor has an air brake system designed for TRACTOR OPERATION ONLY. If this tractor is converted for operation as a TRUCK, the air brake system MUST be changed to provide SAFE OPERATION as a TRUCK. Contact your MACK Dealer for instructions.

DO NOT remove until delivered to the ultimate consumer. 4MR21027

⚠ CAUTION

This truck has an air brake system designed for TRUCK OPERATION ONLY. If this truck is converted for operation as a TRACTOR the air brake system MUST be changed to provide SAFE OPERATION as a TRACTOR. Contact your MACK Dealer for instructions.

DO NOT remove until delivered to the ultimate consumer. 4MR21031

000247a

NOTE

Label to be removed upon delivery to the end user.
Refer to page 11 for additional information.

SAFETY INFORMATION

CAB ENTRY/EXIT

Three-Limb Contact

When entering or exiting a cab, the driver and/or passenger must have at least three limbs in contact with the vehicle or ground at all times. This means that a minimum of two hands and one foot, or one hand and two feet must be in FIRM contact with the vehicle or ground to avoid accidents due to carelessness.

⚠ WARNING

When entering or exiting the cab, be aware of the condition of steps and handrails, especially in cold weather. During cold weather operations, ice and snow may accumulate and should be cleaned off to prevent slipping.

During cold, wet conditions when ice, slush, or snow may accumulate on the cab doorstep and other external surfaces, extra caution must be observed when entering or exiting the cab.

⚠ WARNING

To avoid injury, use the following guidelines when entering and exiting the cab:

— Face the cab when entering and exiting.

— Keep hands free to grip handholds. Place papers, coats, etc., in the cab before entering, and remove after exiting.

— Keep hands and shoes clean. Check hands and shoes for grease, mud, etc., before entering and exiting to avoid slipping.

— Do NOT jump from the vehicle.

— Do NOT step on the fuel tank, battery box, frame, etc., unless adequate slip-resistant surfaces and handholds are provided.

— Be aware of the condition of steps and handholds, especially in rainy or snowy weather. Clean grease, oil, mud, snow, ice, etc., from steps and handholds before entering and exiting to avoid slipping.

SAFETY INFORMATION

NOTE

The illustrations on the following pages are typical for purposes of emphasizing a safe method for hand/foot placement and movement during cab entry/exit. Your truck may not look exactly like the one pictured.

NOTE

The arrows in the illustrations are intended to show movement. Notice that three-limb contact is maintained even when one foot, or one hand, is moving.

Left Side

The following cab entry and exit procedures, along with the safety guidelines outlined in Three-Limb Contact earlier in this section, can be used with your MACK truck.

Entry

These entry procedures are illustrated on the following page:

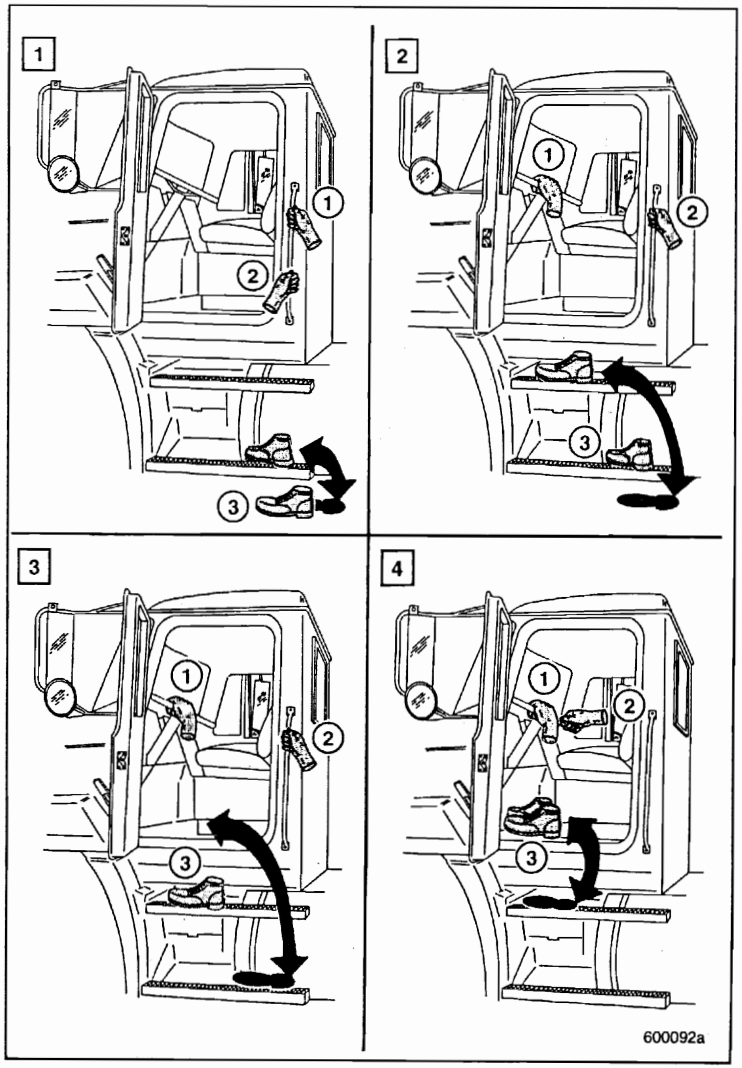
1. With both feet firmly on the ground, grab the outside handhold with both hands or grab the outside handhold with one hand and grab the steering wheel or inside handhold (if equipped) with the other hand. Then raise one foot to the bottom step. (See figure 1.)
2. Maintain a firm grip on the handholds and/or steering wheel and raise your other foot to the top step. If the truck has only one step, go on to step 3. (See figure 2.)
3. While still gripping the handholds and/or steering wheel, raise one foot to the cab floor. (See figure 3.)
4. Move one hand at a time to the steering wheel, inside handhold (if equipped) or cab interior. Bring the other foot inside the cab and sit down. (See figure 4.)

Exit

To exit, follow the illustrations in reverse order:

1. With both hands gripping the steering wheel, inside handhold (if equipped) or cab interior, stand up and face the inside of the cab. Move one foot to the top step. (See figure 4.)
2. Move one hand to the outside handhold and grip the steering wheel, inside handhold (if equipped), or cab interior with the other hand. With one foot firmly on the top step, lower the other foot to the bottom step. If the truck has only one step, lower the other foot to the ground and go on to step 4. (See figure 3.)
3. Maintain a firm grip on the handholds and/or steering wheel, and keep one foot firmly on the bottom step. Then lower the other foot to the ground. (See figure 2.)
4. With both hands firmly gripping the handholds and/or steering wheel, lower the other foot to the ground. (See figure 1.)

SAFETY INFORMATION



Right Side

The following cab entry and exit procedures, along with the safety guidelines outlined in the Three-Limb Contact section, can be used with any MACK truck. If any of the following entry/exit procedures seem unclear, or if you have any questions, please contact your MACK distributor for assistance.

Entry

These entry procedures are illustrated on the following page:

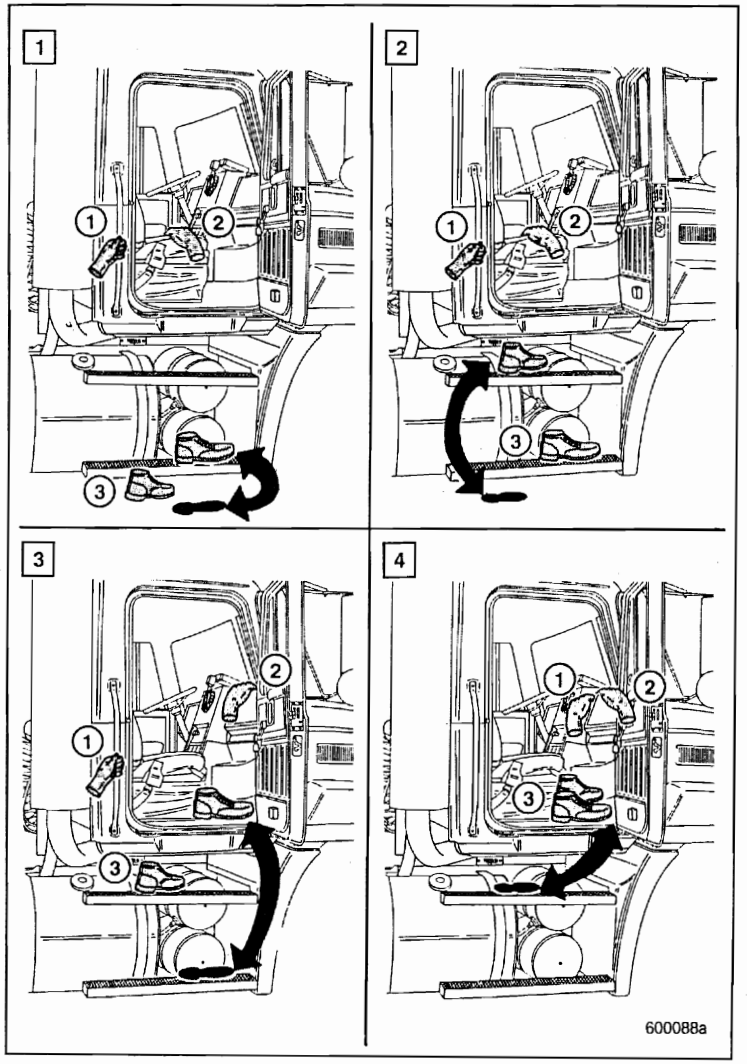
1. With both feet firmly on the ground, grab the outside handhold with both hands, or grab the outside handhold with one hand and grab the inside handhold (if equipped) or cab interior with the other hand. Then raise one foot to the bottom step. (See figure 1.)
2. Maintain a firm grip on the handholds and/or cab interior and raise your other foot to the top step. If the truck has only one step, go on to step 3. (See figure 2.)
3. While still gripping the handholds and/or cab interior, raise one foot to the cab floor. (See figure 3.)
4. Move one hand at a time to the cab interior for support, bring the other foot inside the cab and sit down. (See figure 4.)

Exit

To exit, follow the illustrations in reverse order:

1. With both hands gripping the cab interior or inside handhold (if equipped), stand up and face the inside of the cab. Move one foot to the top step. (See figure 4.)
2. Move one hand to the outside handhold and grip the inside handhold (if equipped) or cab interior with the other hand. With one foot firmly on the top step, lower the other foot to the bottom step. If the truck has only one step, lower the other foot to the ground and go on to step 4. (See figure 3.)
3. Maintain a firm grip on the handholds and/or cab interior, and keep one foot firmly on the bottom step. Then lower the other foot to the ground. (See figure 2.)
4. With both hands firmly gripping the handholds and/or cab interior, lower the other foot to the ground. (See figure 1.)

SAFETY INFORMATION



Cab Door Seals and Key Locks

Hollow-core rubber weather seals around some cab doors may lose their resilience in extremely cold temperatures (i.e., −40°F/ −40°C and below). Under these conditions, it may be necessary to drill holes to penetrate the hollow core. This allows entrapped air to escape, thereby easing the opening/closing of cab door(s).

Be sure to keep the key locks clean and dry to prevent occasional winter freeze-up. Use of antifreeze lubricants is neither required nor recommended.

Deck Plate Access

There may be a time when you will need to climb up behind the cab. If your vehicle is equipped with a deck access package, steps and a handhold are provided so you can get to this area safely. Review the rules in the Three-Limb Contact section before climbing behind the cab.

Climbing Up

These procedures are illustrated on the following page:

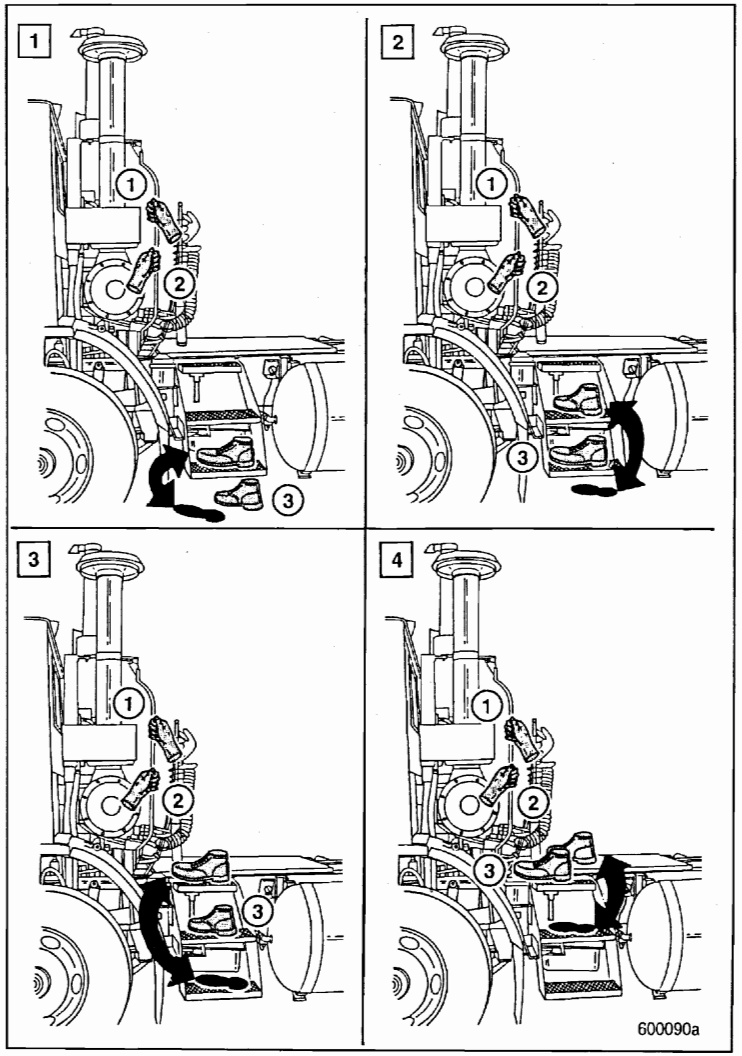
1. Grab the handhold with both hands. Then move one foot to the bottom step. (See figure 1.)
2. While still gripping the handhold, and with one foot planted firmly on the bottom step, move your other foot to the middle step. (See figure 2.)
3. Then with one foot planted firmly on the middle step, move your left foot to the top step. (See figure 3.)
4. Finally, move your other foot from the middle step onto the deck plate. (See figure 4.)

Climbing Down

To climb down from behind the cab, follow the illustrations in reverse order:

1. Grab the handhold with both hands and move one foot to the top step. (See figure 4.)
2. While firmly gripping the handhold, and with one foot on the top step, move your other foot to the middle step. (See figure 4.)
3. Then with one foot planted firmly on the middle step, place the other foot on the bottom step. (See figure 3.)
4. With both hands still gripping the handhold, move your other foot from the middle step to the ground. (See figure 2.)
5. Finally, move foot from bottom step to the ground. (See figure 1.)

SAFETY INFORMATION



SEAT BELTS

⚠ DANGER

The use of seat belts is required in some states and is strongly recommended at all times, especially during adverse road conditions associated with winter weather. Failure to use seat belts can result in SEVERE bodily injury.

Operation

MACK vehicles manufactured on or after September 1, 1990 must have locking retractable seat belts. For all seating positions on your MACK vehicle, this type of seat belt is a combination lap and shoulder belt.

This type of belt is designed to lock (that is, prevent belt travel out of the retractor) only during sudden stops or impacts. This feature allows the operator to move freely under normal conditions. The seat belts cannot be locked by jerking on the belt, except during sudden stops or harsh bumps.

Fastening

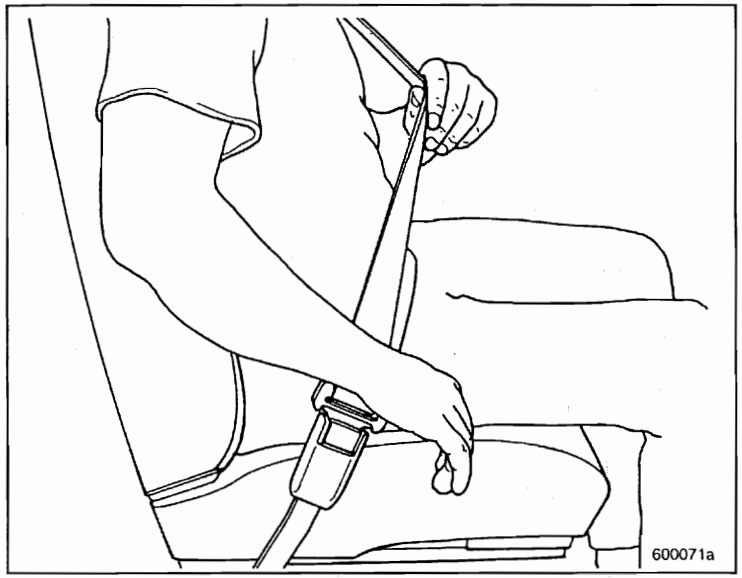
1. Pull clip so the belt crosses your shoulder and lap and insert it into the buckle until an audible snap is heard.

⚠ WARNING

Use the shoulder belt only on the shoulder that is closest to the vehicle door. Never wear the shoulder portion of the belt under your arm or behind your back. Improper use will increase your chances of injury during a collision.

2. Make sure the clip is securely fastened into the buckle.

SAFETY INFORMATION



3. To tighten the lap portion of the combination belt, pull upward on the shoulder portion until the lap portion fits you snugly. The belt should rest as low on your hips as possible.

Unfastening

Push down on the button to release the belt.

⚠ WARNING

Do NOT wear seat belt loosely. Do NOT use one belt for more than one person. Do NOT wear retractor belt with webbing wound on retractor drum. Do NOT bleach or dye belt, as this may cause severe loss of strength. Do NOT install belt in a truck with weakened floor until the floor has been replaced or reinforced.

Maintenance

- Keep belt clean and dry.
- Clean with mild soap solution and lukewarm water.
- Periodically inspect belt, retractor, and mounting points for damage or corrosion that could materially lessen effectiveness of belt installation. Replace all inadequate parts.

NOTE

Seat belt assemblies must be replaced after an accident if they have been subjected to loading by occupants (even if no damage is obvious), or if they have been damaged by an accident (bent retractor, torn webbing, etc.). If there is any question regarding belt or retractor condition, replace the appropriate part.

The Komfort® Latch System

Track III Three-Point Seat Belt Assembly

The Track III three-point seat belts installed in this chassis are designed to provide the highest degree of operator safety, comfort and convenience. Additional comfort is provided by the Komfort Latch mechanism which is incorporated into the seat belt assembly, and may be used to relieve any discomfort caused by the constant pressure of engaged seat belts.

Seat Belt Operation

To buckle the seat belt, grasp the latch portion of the buckle, bring it across your lap (from outboard to inboard) and insert it into the fixed buckle which is mounted to the floor or seat (depending on seat type). With the belt properly latched, the pelvic and upper torso restraints will be in place and automatically adjusted to provide a snug fit.

SAFETY INFORMATION

Komfort Latch Feature

If the constant tension of the buckled seat belt causes any discomfort, engage the Komfort Latch as follows:

⚠ WARNING

Do NOT attempt to engage the Komfort Latch feature while the truck is in motion.

Engagement — Pull the webbing of the shoulder belt away from the upper torso, pulling only as much slack as needed while still allowing the belt to exert slight pressure against your chest and shoulder. (Maximum amount of slack should not exceed one inch when measured from the chest to the belt.) While holding the slack, lift the lever located on top of the Komfort Latch mechanism upward to clamp the webbing in place.

Normal Release — To unfasten the seat belt, simply release the buckle and give the shoulder belt a quick tug to release the Komfort Latch mechanism. Allow the belt to retract into the retractor.

Emergency Release — In the event of an emergency, release the seat belt buckle. It is not necessary to release the Komfort Latch in an emergency situation.

NOTE

If forward movement is required while the Komfort Latch mechanism is latched, the latch automatically releases when you lean against the shoulder portion of the belt. Repeat the above steps to reset the Komfort Latch, if desired, after forward movement is no longer required.

⚠ DANGER

Excessive slack will reduce effectiveness of the seat belt, which could result in personal injury and death. CAREFULLY follow the instructions for adjusting the tension-relieving device.

SAFETY INFORMATION

SAFETY TIPS FOR COLD WEATHER OPERATION

Driver Visibility

Poor driver visibility is not only annoying, but extremely unsafe under any circumstances. Without proper maintenance of visibility-related components, adverse weather conditions such as rain, snow and frost can seriously reduce visibility. Take time before winter arrives to check the following:

- Windshield Wipers
  - — Check windshield wiper operation and speeds.
  - — Inspect condition and travel of blades. Install new refills for any blades that are cracked, brittle, torn, or coated with road oil along their wiping edge.
- Windshield Washers
  - — Check operation of windshield washer.
  - — Inspect system hoses and replace if brittle or worn.
  - — Inspect washer reservoir. Drain and flush if dirt particles are evident in washer solution.
  - — Fill reservoir with commercially available non-freezing type washer fluid.

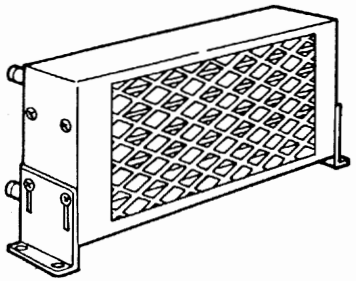
⚠ CAUTION

Do NOT fill reservoir with water only. Even though non-freezing type washer fluid is recommended, do not attempt to clear the windshield of ice by activating the windshield washer and wipers. Ice accumulations should be removed manually by using a scraper.

- Heater/Defroster
  - — Check operation and blowers for speed control, noise and temperature.
  - — Inspect heater core for signs of corrosion and/or leakage.
  - — Check that the defroster blend door is operating correctly and that all ducting is connected properly.
  - — Be sure that vents are not obstructed by debris or other objects.

Auxiliary Cab Heater

Ensure maximum in-cab comfort even under severe cold weather conditions. See your nearest MACK subsidiary or distributor for a wide range of auxiliary in-cab heaters to fit your chassis (see figure below).



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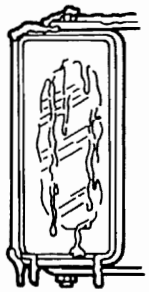
SAFETY INFORMATION

Outside Mirror Heater

In areas of frequent snowfall and ice, it may be beneficial to install heated mirrors which will defrost and de-ice cab mirrors. Heated mirrors eliminate the need to pull off the highway and stand on the roadside to scrape ice and snow from the mirrors during winter driving conditions.



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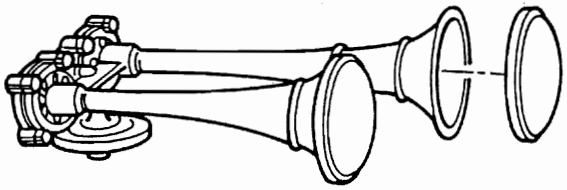
Air Horn Snow Shield

To prevent snow from clogging the air horn bell, thereby maintaining maximum sound output in snowy conditions, installation of an air horn snow shield is recommended.



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INSTRUMENT PANEL

Tell-Tales

A tell-tale, by definition, is a display that indicates, by means of a light-emitting signal, the actuation of a device, a correct or defective functioning or condition, or a failure to function.

The operator should become familiar with these symbols to recognize and react, if necessary, to the indicated condition.

Colors

To promote visual recognition internationally, specific colors for tell-tales have been established. Unless governmental regulations in the area where the vehicle is to be used, or engineering directives specify otherwise, the standard colors are:

- **Blue** — high-beam headlights
- **Flashing Green** — turn signals
- **Flashing Red** — hazard condition involving the safety of personnel
- **Steady Green** — system in operation
- **Steady Red** — warning, immediate action required
- **Amber** — early warning, such as low fuel or anti-lock malfunction

Tell-tale symbols are shown in the instrument panel illustrations on the following pages.

INSTRUMENTS AND CONTROLS

Panel Arrangement

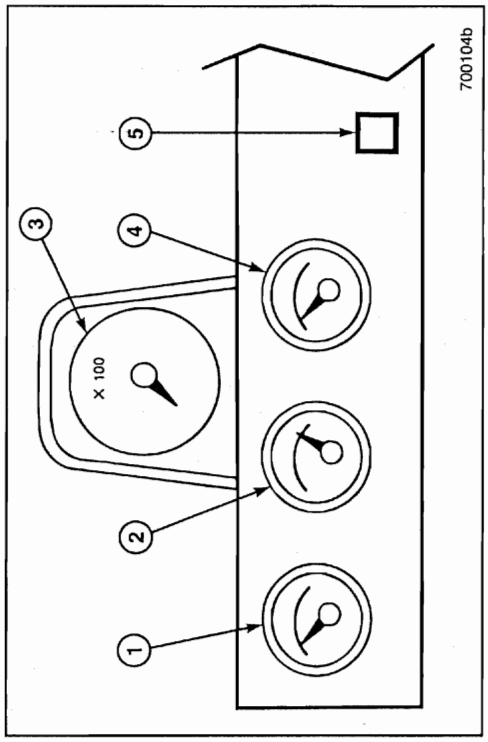
Your view from the driver seat should look something like the illustrations shown. The layout has been designed to provide the operator with a good view of the gauges and controls (which are placed so they are within easy reach). The instrument panel, as shown in the following drawing, is broken down into four or five main sections. For easy identification we will refer to them, from left to right, as Panels A, B, C, D and E (where necessary).

NOTE

This section is intended to show all the possible instruments and controls available for your truck. However, depending on the options you chose, your truck may not have all of the instruments and controls shown here, and they may not be in exactly the same position.

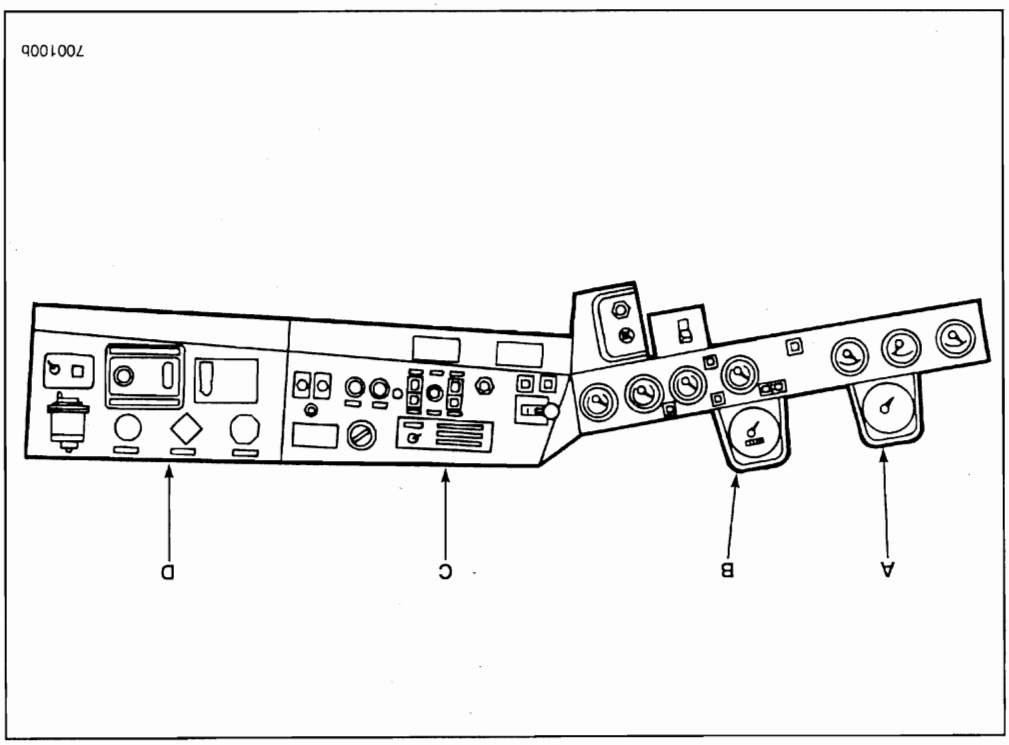
INSTRUMENTS AND CONTROLS

Panel A

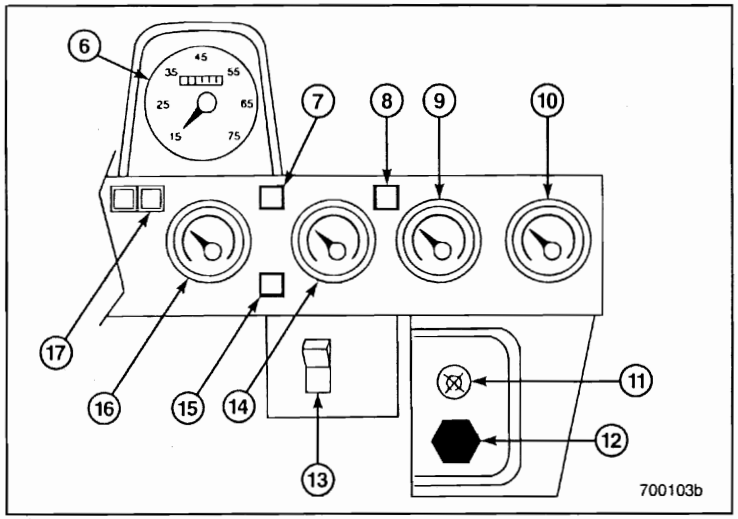


1. Voltmeter
2. Coolant Temperature Gauge
3. Tachometer
4. Oil Pressure Gauge
5. Engine Shutdown Indicator (Red)

INSTRUMENTS AND CONTROLS



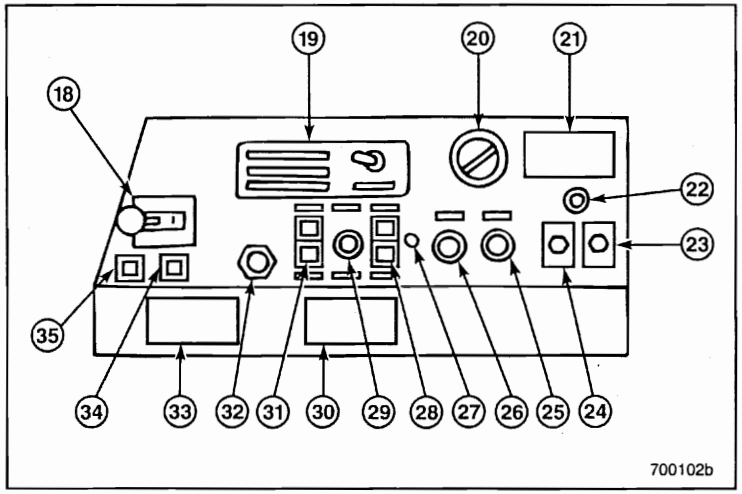
Panel B



6. Speedometer/Odometer	12. Throttle (If Equipped)
7. Parking Brake Indicator (Red)	13. Power Take-Off Switch
8. High Beam Indicator (Blue)	14. Fuel Gauge
9. Hour Meter	15. Low Air Pressure Warning Indicator (Red)
10. Engine Oil Temperature Gauge	16. Air Pressure Gauge
11. Engine Stop Control	17. Turn Signal Indicators

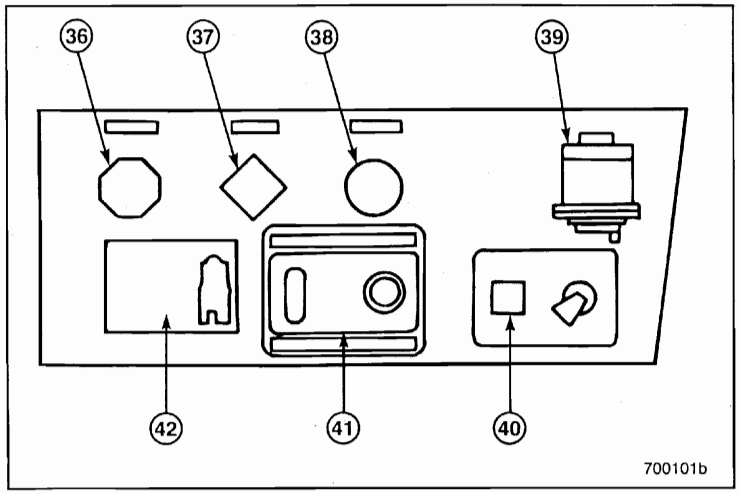
INSTRUMENTS AND CONTROLS

Panel C



18. Trailer Brake Lever	27. Cigar Lighter
19. Climate Control Panel	28. Light Switch
20. Air Vent	29. Panel Lights Rheostat
21. Battery Disconnect Switch Caution Label 4MR2799	30. Transmission Shifter Neutral Inhibitor Label 4MR2860
22. Engine Shutdown Override	31. Clearance Light Switch
23. Mirror Defroster Switch	32. Combination Starter and Electrical Switch
24. Mirror Adjustment Switch	33. PTO Overspeed Label 4MR2856
25. Right Windshield Wiper/ Washer Control	34. Power Take-Off Overspeed Warning Indicator (Amber)
26. Left Windshield Wiper/ Washer Control	35. Engine Brake Switch

Panel D



36. Trailer Air Supply Valve	40. Charge Air Cooler Bypass Switch (If Equipped)
37. Parking Brake Valve	41. Power Divider Switch
38. Tractor Parking Brake	42. Power Take-Off Switch
39. Air Filter Restriction Indicator	

INSTRUMENTS AND CONTROLS

① **Voltmeter** — This gauge indicates the surface charge of the battery with the ignition switch ON and the engine NOT running. With engine running, gauge indicates condition of charging system.

The voltmeter will provide useful information. When the reading is observed during cranking, the reading normally should not drop below 10 volts. Lower readings indicate corroded connections at the cranking motor or at the battery terminals of defective or discharged batteries.

② **Coolant Temperature Gauge** — The normal operating range of a MACK engine, as indicated by the coolant, is between 170°F and 225°F (77°C and 107°C).

Consult the appropriate vendor engine manual if your vehicle is not equipped with a MACK engine.

⚠ CAUTION

Coolant temperature must NOT exceed 225° F (107° C).

③ **Tachometer** — Engine speed is indicated in revolutions per minute (RPM). The tachometer readings should be used as a guide for shifting and to prevent engine damage due to overspeed.

④ **Oil Pressure Gauge** — Under normal operating conditions, the engine oil pressure will be between 30 and 84 psi (207 and 579 kPa) at governed speed on a MACK six-cylinder engine, depending on engine type speed and oil viscosity. Oil pressure should be between 10 and 35 psi (69 and 241 kPa) on E7 engines at idling speed.

E9 engines (if equipped) should be between 25 and 46 psi (172 and 317 kPa) at 600 RPM. At governed speed, a hot oil reading should be between 50 and 100 psi (345 and 690 kPa).

Should pressure at operating speeds drop suddenly from normal reading, stop engine immediately and determine cause. Other manufacturers' engines may have different requirements and specs. Consult the appropriate manufacturers' engine manuals for their respective pressures.

⑤ **Engine Shutdown Indicator (Red)** — If low water level, low oil pressure or high water temperature occurs, the light will go on. If the vehicle is equipped with the shutdown feature, the driver has about 15 seconds to pull to the side of the road before the engine shuts off.

⑥ **Speedometer/Odometer** — Indicates road speed in miles and/or kilometers per hour and total distance vehicle has traveled.

⑦ **Parking Brake Indicator** (Red)

⑧ **High Beam Indicator** (Blue)

⑨ **Hour Meter** — Indicates hours of engine operation. Hours of operation should be used as a guide for certain engine or PTO maintenance operations.

⑩ **Engine Oil Temperature Gauge** — Indicates the temperature of the engine oil.

⚠ CAUTION

Maximum safe oil temperature is 235° F (113° C). Continued operation with oil above this temperature will cause rapid deterioration of the oil's lubricating properties and is NOT recommended.

⑪ **Engine Stop Control** — Pull out to stop the engine (not used on electronically controlled engines, or chassis having a key switch shut-off feature).

⑫ **Throttle (If Equipped)** — Pull out to increase idling speed. Turn clockwise to lock in position.

⚠ WARNING

The throttle was designed to allow the operator to increase the idle speed of the engine. Uses other than what the throttle was designed for are strictly prohibited. Misuse may cause damage to equipment or even fatal injuries.

INSTRUMENTS AND CONTROLS

⑬ **Power Take-Off Switch** — Push top in to turn on; push bottom in to turn off.

⑭ **Fuel Gauge** — Registers fuel level in supply tank(s).

⑮ **Low Air Pressure Warning Indicator** (Red)

⑯ **Air Pressure Gauge** — Normal operating air pressure is between 105 psi (724 kPa) and 135 psi (931 kPa) in both air brake systems. If pressure drops below 75 psi (± 5 psi) in either system, the warning buzzer and warning light will go on. Determine the cause of failure before proceeding. Primary air pressure is supplied to the rear brakes and is indicated by the green pointer on the gauge. Secondary air pressure is supplied to the steering axle brakes and indicated by the orange pointer.

⑰ **Turn Signal Indicators** — Flash green when the turn signals are activated.

⑱ **Trailer Brake Lever** — Pull down to activate the trailer brakes.

⚠ WARNING

The trailer braking system must NOT be used for parking.

⑲ **Climate Control Panel** — See the CLIMATE CONTROL section for more information.

⑳ **Air Vent** — Rotate knob to open or close the air vent.

㉑ **Battery Disconnect Switch Caution Label 4MR2799** — This label states that "Vehicle is equipped with battery disconnect switch. Do NOT switch off battery while engine is running or damage to electrical system may occur."

㉒ **Engine Shutdown Override** — Allows the operator to temporarily override the engine shutdown system for the purpose of moving the vehicle to safety.

㉓ **Mirror Defroster Switch** — This is a two-position rocker switch. Push the top to activate outside rearview mirror defrosters. Push the bottom in to turn the mirror defrosters off.

㉔ **Mirror Adjustment Switch** — This two-position switch allows the operator to adjust the passenger-side rearview mirror.

㉕ and ㉖ **Windshield Wiper/Washer Control** — Push knob in to activate the washers. The 12 o'clock position is OFF. The area between OFF and LOW is intermittent wiper control. Four o'clock position is LOW speed. Five o'clock position is HIGH speed.

㉗ **Cigar Lighter**

㉘ **Light Switch** — This is a three-position switch allowing the operator to choose between parking lights (push bottom in), headlights (push top in), or OFF (middle position).

㉙ **Panel Lights Rheostat** — Clockwise rotation decreases dash light intensity.

NOTE

Panel lights will not go on unless Light Switch is ON.

㉚ **Transmission Shifter Neutral Inhibitor Label 4MR2860** — This label states, "This vehicle is equipped with a transmission shifter neutral inhibitor system. Neutral to Drive range shifts are automatically prevented at high engine speeds. After completing neutral PTO operation, reduce engine speed to below 900 RPM to allow neutral to range shift."

㉛ **Clearance Light Switch** — This is a two-position switch. Push the top to activate the clearance lights on the tractor and the trailer. Push the bottom to turn the switch OFF.

㉜ **Combination Starter and Electrical Switch** — When key is straight up and down, the switch is OFF. Turn counterclockwise to activate accessories. To start the engine, turn key clockwise. As soon as the engine starts, release the key (which will automatically return to running position). When switch is turned to ON in either direction, a warning buzzer will sound if air pressure is below 65 ± 5 psi (448 ± 34 kPa). Buzzer shuts off as soon as sufficient air pressure is restored.

V-MAC — For information on the engine protection/shutdown system as it relates to V-MAC, consult TS725 (V-MAC I) or TS780 (V-MAC II).

INSTRUMENTS AND CONTROLS

㉝ **PTO Overspeed Label 4MR2856** — This label states, "Yellow light indicates PTO overspeed. PTO system is automatically disengaged. To reset, reduce engine speed to idle." This label applies to chassis equipped with a Power-Pro system only.

㉞ **Power Take-Off Overspeed Warning Indicator (Amber)** — Indicates PTO has automatically disengaged. To reset, reduce engine speed.

㉟ **Engine Brake Switch** — E7 engines use the Jacobs compression release engine brake, or the Jacobs Stealth Retarding System™. With either system, the best braking performance is achieved in the 1800 to 2100 RPM range. For optimum retarding power, keep engine RPM as close to 2100 RPM as possible. For additional information, refer to the Jacobs driver's manual supplied with the vehicle.

⚠ CAUTION

Do NOT activate the engine brake until the engine has reached normal operating temperatures.

㊱ **Trailer Air Supply Valve** — This valve is NOT to be used for parking. Pull to apply trailer emergency brakes. Push to pressurize trailer air reservoir, releasing the trailer emergency brakes.

㊲ **Parking Brake Valve** — Pull to apply. Push to release. Applies tractor parking brakes and trailer brakes, if attached.

㊳ **Tractor Parking Brake** — Pull to apply. Push to release.

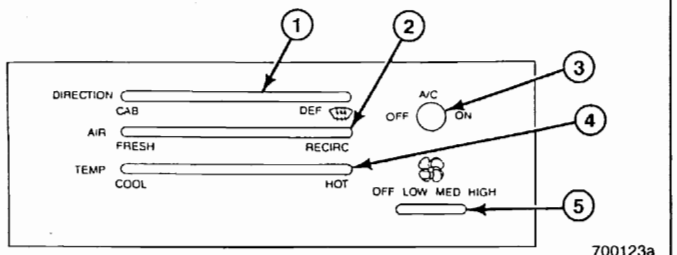
㊴ **Air Filter Restriction Indicator** — Indicator shows when the element needs servicing or replacement. When the red flag locks into position, service as soon as possible to prevent engine damage. Then reset the indicator after the filter change. Check the air filter indicator daily.

㊵ **Charge Air Cooler Bypass Switch (If Equipped)**

㊶ **Power Divider Switch** — See Inter-Axle Power Divider in the OPERATION section.

㊷ **Power Take-Off Switch** — Push top in to turn on; push bottom in to turn off.

CLIMATE CONTROL



1. Mode Selection Lever	4. Temperature Control Lever
2. Air Selection Lever	5. Fan Control Switch
3. A/C On-Off Switch	

① **Mode Selection Lever** — This lever lets you choose the air direction. The CAB position delivers air to the floor outlets, while the DEF position delivers air to the defrost louvers. Sliding the lever in between positions provides a blend of the two.

② **Air Selection Lever** — This lever lets operator choose between fresh air (from the outside) and recirculated air (within the cab).

③ **A/C On-Off Switch** — This switch turns the air conditioner on or off.

④ **Temperature Control Lever** — This sliding lever controls the temperature of air from COOL (far left) to WARM (far right).

⑤ **Fan Control Switch** — This is a four-position switch to control the amount of air delivered through the vents. Down is OFF and up is HIGH speed. The middle positions are LOW and MEDIUM speeds.

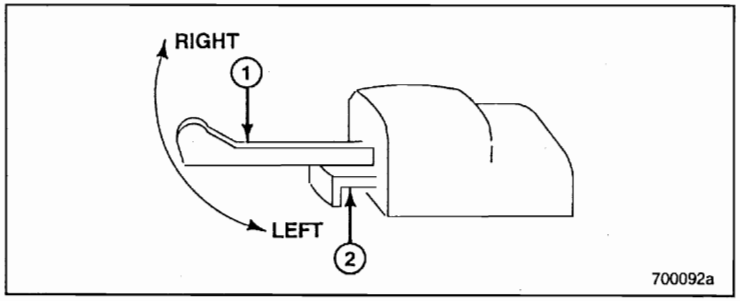
INSTRUMENTS AND CONTROLS

STEERING COLUMN

Turn Signal Lever

NOTE

The turn signals are not self-cancelling and must be returned to the middle position manually.



The turn signal lever is located on the steering column. It incorporates a hazard switch.

① **Turn Signal Lever** — Push lever clockwise to activate right turn signal and counterclockwise to activate left turn signal.

② **Hazard Switch** — Pull out to activate the four-way flasher when required. Flip-turn signal lever forward or back to release.

BEFORE OPERATING YOUR VEHICLE

Daily Walk-Around Inspection

With the proper care, your MR will work hard and give you years of efficiency and performance — and it is the operator's job to provide the proper care. Good operating habits formed early will make you and your truck a great team.

The driver for each shift should inspect safety equipment, oil and fluid levels and conditions of the following:

⚠ WARNING

To avoid serious injury, do NOT step on fuel tank, battery box, frame, etc., unless adequate slip-resistant surfaces and handholds are provided.

Check/Add Fluid

- ❑ Engine oil
- ❑ Engine coolant
- ❑ Fuel

Check for Leaks

- ❑ Air, coolant, oil, fuel

Wheels and Tires

- ❑ Tire air pressure
- ❑ Tire/wheel condition
- ❑ Wheel stud nuts
- ❑ Front wheel bearings (oil)

OPERATION

Check Fasteners

- ❑ Steering linkage
- ❑ Seat belts
- ❑ Doors and windows
- ❑ Battery box covers
- ❑ Fuel tank straps
- ❑ Hood or engine compartment covers

Air Reservoir

- ❑ Drain to remove moisture

Lights/Reflectors

- ❑ Replace bulbs that aren't working
- ❑ Replace broken lenses and reflectors

Gauges and Instruments

- ❑ Air pressure gauge
- ❑ Oil pressure gauge
- ❑ Temperature gauge
- ❑ Voltmeter

Check Operation

- ❑ Brakes (service and parking)
- ❑ Horn
- ❑ Heater and defroster
- ❑ Signaling devices
- ❑ Windshield wipers/washers
- ❑ Foot pedals
- ❑ Back-up alarms (if equipped)

Check Adjustment

- ❑ Rearview mirrors
- ❑ Seats

New Vehicle Break-In

Your new MR has been quality built, inspected, lubricated and final adjustments performed at the Mack Trucks Assembly Plant. A proper break-in, along with the following suggestions, can help ensure the long life of your truck.

- As moving parts "wear in," or as gaskets "take a set," an occasional oil, air or coolant leak may develop. Quick action to adjust and correct these minor mechanical items will prevent major repair later, saving you inconvenience and unnecessary expense. So, please stop at your nearest MACK service center as soon as any abnormal condition becomes evident.

NOTE

It is important to fill components with lubricants meeting the specifications listed in the Lubricants and Capacities section of the MAINTENANCE AND LUBRICATION manual, TS494.

NOTE

All checks and adjustments referred to in this vehicle break-in section can be found in the MAINTENANCE AND LUBRICATION manual, TS494.

During the First 3000 Miles (5000 Kilometers)

- After the first 125 miles (200 km), retorque the wheel nuts using an accurately calibrated torque wrench. Recheck this torque again after 500 miles (800 km).
- Check the oil and coolant levels frequently.
- Check brake and clutch adjustments per recommended maintenance schedule, and adjust as needed.
- Observe the instruments often, and shut down at the first sign of any abnormal readings.

OPERATION

- Report all leaks, loose fasteners, unusual noises, etc., to the service representative at your nearest branch or distributor, so they can be checked and corrected.
- Check spring clip torque (U-bolts). (On Reyco suspensions, also check equalizer nut torque.)
- Check the U-bolt torque on the MACK air suspension at the end of the first 1000 miles (1600 km).

After the First 3000 Miles (5000 Kilometers) or Before 4000 Miles (6400 Kilometers) or Before 3 to 4 Months

- Retorque spring clip (U-bolts). (On Reyco suspensions, also retorque equalizer nut.)

NOTE

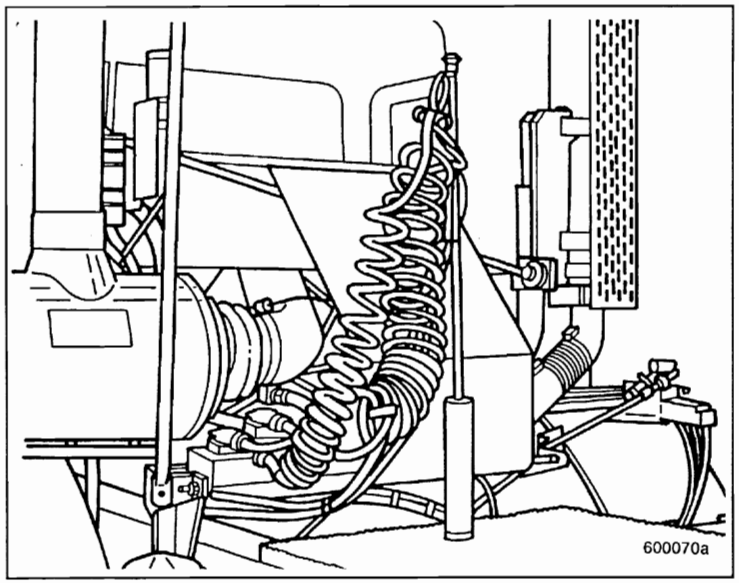
Lubricate the chassis and change the following lubricants and filters according to the Mack preventive maintenance schedules outlined in the MAINTENANCE AND LUBRICATION MANUAL, TS494:

- Gear oils — transmission, rear axle carrier(s), front drive axle carrier, transfer case, flywheel PTO.
- Engine oil, oil filters, fuel filters and coolant conditioner.

At the First A Inspection Interval

- Check front and rear axle alignment and adjust if out of specifications.

Hose Tenders



⚠ CAUTION

AVOID LOOSE HOSES. Air lines and tractor-to-trailer electrical connections must be secured to the tractor hose tenders (hose hanger, towel bar, pogo stick, etc.) to prevent them from tangling in the driveline.

OPERATION

Cab Tilt

⚠ DANGER

Before attempting to tilt the cab, be certain to take the following steps:

- Park on a level surface.
- Shut off engine.
- Secure all loose items within the cab.
- Apply parking brake.
- Place gearshift lever in NEUTRAL position.
- Close cab doors.

The MR cab is mounted on the chassis frame by two front hinges and two rear cab locks. This arrangement allows the cab to tilt forward to a maximum of 60 degrees, exposing the engine compartment for easy accessibility.

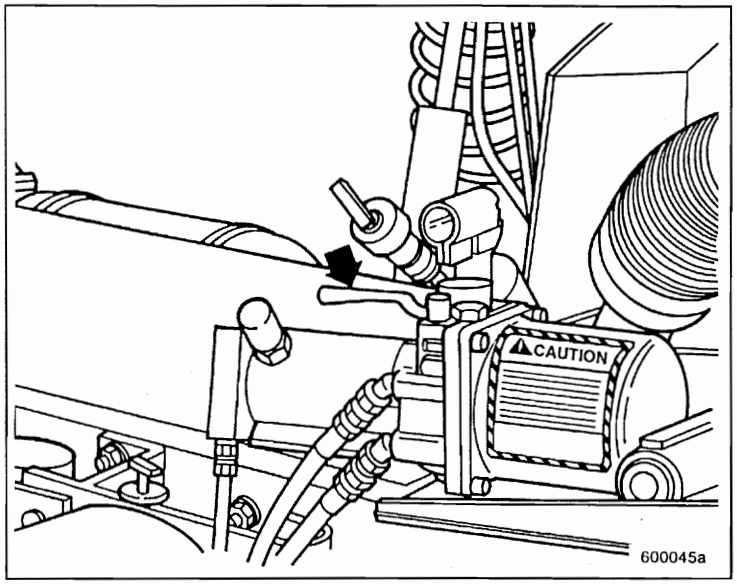
The cab tilt system uses one hydraulic cylinder. It incorporates internal safety valves which lock up automatically if the cab moves too rapidly in either direction.

The hydraulic fluid pressure imbalance forces the check valves to seat, holding the cab in a hydraulically locked position. If this situation occurs, operate the pump in the opposite direction to open the check valves. The system will then be returned to normal operation.

Tilting Cab

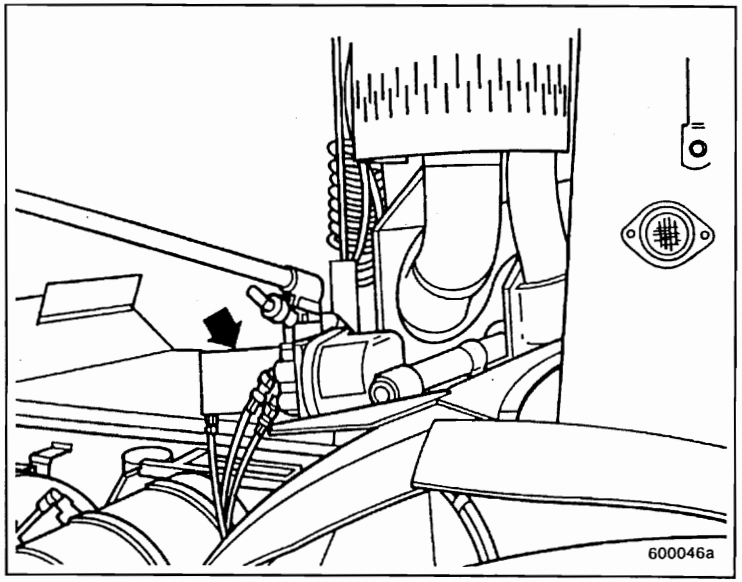
Use the following instructions to tilt the cab:

1. Be sure the engine is shut off, and secure all loose items in the cab.
2. Take the cab tilt pump handle from its stored position.

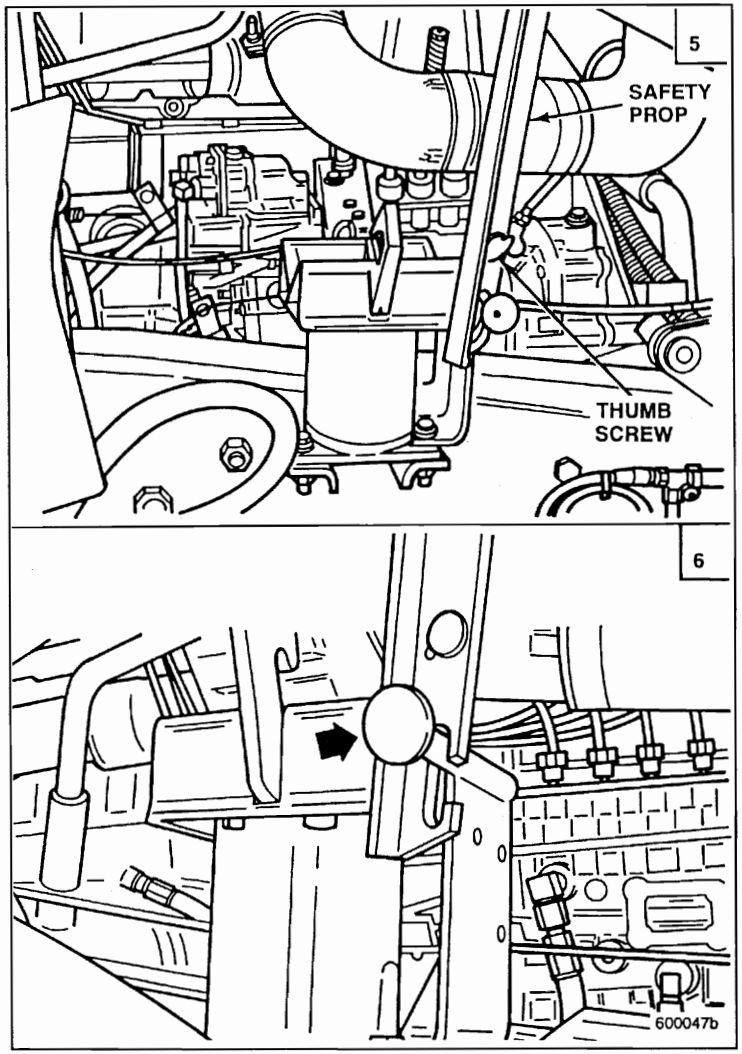


3. Insert the pump handle into the pump and move the pump control lever to the RAISE position.

OPERATION



4. To raise to the service position, pump cab up to SERVICE HEIGHT.



OPERATION

5. In the service position, the cab must be secured with the safety prop. Loosen the thumbscrew and swing the safety prop down onto the safety prop stud so the slot in the safety prop settles securely around the stud.

⚠ WARNING

Be certain that there are no people, tools or unsecured vehicle parts in the path of the descending cab before shifting pump control lever.

6. You may have to manipulate the control lever to get the cab to descend so the safety prop settles on the stud (see arrow).
7. To raise the cab to the full tilt position, pump the cab up past the balance point. The cab will descend by itself. The rate of descent may be controlled by manipulating the pump control lever from the RAISE to LOWER position.

Lowering Cab

NOTE

The cab safety prop must be in stored position and the transmission in NEUTRAL.

1. Move the pump control lever to the LOWER position.
2. Pump until the cab is past the balance point and allow the cab to descend and latch.
3. Leave the pump control lever in the LOWER position to operate the vehicle.

System Bleed Procedure

NOTE

The cab must be in the lowered position.

NOTE

All steps must be performed in the following order ONLY.

1. Connect all hydraulic lines.
2. Tighten all connections (except two) at the tilt cylinder and one at each latch cylinder.
3. Fill pump reservoir to top with specified oil. Close and tighten fill plug.

⚠ CAUTION

Do not refill the reservoir with the cab in the RAISE position.

4. Shift pump control lever to LOWER position. Pump until LOWER lines are bled. Tighten corresponding connections.

OPERATION

5. Shift pump control lever to RAISE position. Repeat the procedure in step 4 for the RAISE lines. Bleed latch cylinders first and tighten connections. Repeat for push port of the tilt cylinder.
6. After the entire system is bled, shift pump control lever to LOWER position. Check and refill reservoir, if necessary.

SERVICE HINT

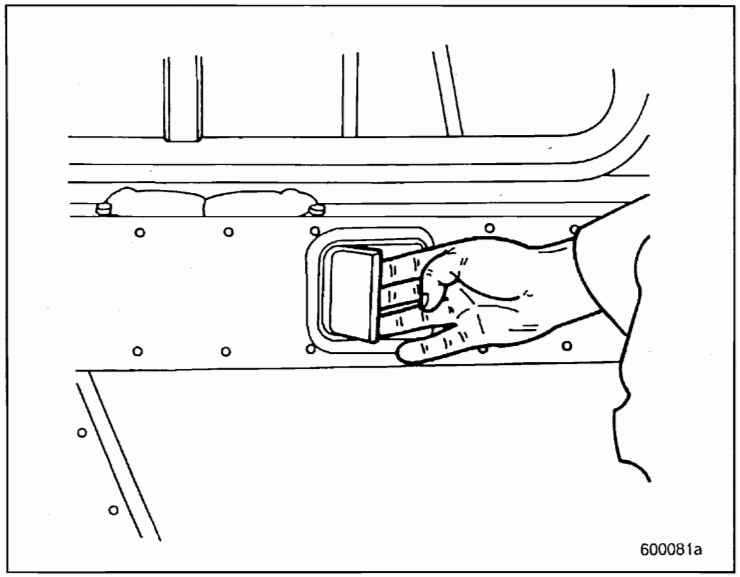
The recommended type of fluid for the cab tilt system is CF-A (MIL-H-5606B), capacity 3 pints (1.4 liters).

⚠ WARNING

The pump control lever must be in the LOWER position before operating the vehicle.

Doors

Opening



The inside door handles are of flush-mounted, paddle-type design. To open, put your fingers behind the handle and pull out while exerting some force on the door to open it.

Locking

To lock (with door open), press the door handle inward and shut the door.

OPERATION

Power Take-Off

If the vehicle you are operating is equipped with a Power Take-Off (PTO) unit, be sure you read and understand the following section.

⚠ DANGER

Power Take-Off (PTO) units and their related equipment can be very dangerous. Any PTO installation, repair or replacement should include a warning indicator light which indicates PTO engagement. The light must be located close to the PTO control and clearly visible to the operator.

⚠ DANGER

PTO units are driven by the engine or drivetrain components (flywheel, crankshaft, transmission). Do not attempt any work or service on the PTO and related units unless the engine is shut down.

⚠ DANGER

Always keep body parts and loose-fitting clothing out of the range of drivetrain components or personal injury may result.

⚠ DANGER

Be sure you are aware of the PTO's engagement or non-engagement status and the position of the truck's body (dump body controlled by PTO, etc.). Be sure PTO is disengaged when not in use.

OPERATION

MACK transmission rear-mounted PTO units fall into one of two categories (depending on how they operate).

Intermittent Service — The PTO unit is operated, under load, for less than seven minutes and then allowed to cool before it is operated again.

Continuous Service — The PTO unit is operated, under load, for seven minutes or more. Also, units operated for less than seven minutes and not allowed to cool down before operating again, should be considered in continuous service.

Rear-mounted PTO units operating under the continuous service guideline must not be run at more than 70% of the PTO output-rated torque/horsepower.

V-MAC — PTO operations controlled through V-MAC differ from vehicles not equipped with V-MAC. See TS725 (V-MAC) or TS780 (V-MAC II) for information regarding the programming of PTO.

OPERATION

PTO Operating Procedures

The following procedures apply to transmissions with a neutral switch and a transmission rear-case-mounted PTO only.

When engaging PTO:

1. Select LO-split using the splitter switch and select LO range using the range selector. The transmission MUST be in LO range and LO-split at all times during PTO operation.
2. Depress the clutch pedal to disengage the clutch.
3. Set parking brakes.
4. Move the main box gearshift lever to the NEUTRAL position.
5. Move the dash-mounted compound neutral control valve to the ON position, which moves the synchro clutch to a neutral position.
6. Engage the PTO.
7. Move the main box gearshift lever to the desired ratio.
8. Release the clutch pedal to engage the clutch.
9. Operate the PTO-driven load.

When disengaging the PTO:

1. Depress the clutch pedal to disengage the clutch.
2. Move the main box gearshift lever to NEUTRAL.
3. Disengage the PTO.
4. Move the dash-mounted compound neutral control valve to the OFF position, which moves the synchro clutch back to LO range.
5. Move the gearshift lever to the desired main gear box ratio.
6. Release the parking brakes.
7. Release the clutch pedal to engage the clutch.

Engine

⚠ CAUTION

Use a Mack-approved winterfront designed for the specific chassis only. The use of winterfronts or shutters for normal operating conditions above freezing requires caution to avoid high intake/exhaust temperatures. The restriction in air flow can cause higher exhaust temperature, power loss, excessive fan usage and a reduction in fuel economy.

⚠ CAUTION

A Mack-approved exhaust pyrometer must be installed and closely monitored while the engine is in operation when a winterfront is used. DO NOT exceed the maximum temperature listed on the decal. To reduce exhaust temperature, downshift or reduce engine power and open the winterfront.

⚠ CAUTION

Do not permit load to drive engine above governed speed. Operate in a gear low enough to allow engine to accelerate to (or maintain) governed RPM when applying throttle.

OPERATION

⚠ WARNING

Misuse or modification of a turbocharger can result in serious injury and property damage. In addition, extreme care must be taken to avoid foreign material induction, excessive exhaust temperatures and lack of lubrication.

Model Designation

The MACK engine unit symbol designation system is designed to provide total unit description identification through a combination of prefix letters, numbers, digits and suffix letters, as applicable.

Prefix Letters and Numbers:

- E = MACK turbocharged diesel engine
- M = Maxidyne engine (high torque rise)
- 7 = 728 cubic inch displacement
- 9 = 998 cubic inch displacement
- Digits: peak gross horsepower (BHP)

NOTE

E7 engines use the Jacobs compression release brake, or the Jacobs Stealth Retarding System™. With either system, the best braking performance is achieved in the 1800 to 2100 RPM range. For optimum retarding power, keep engine RPM as close to 2100 RPM as possible. For additional information, refer to the Jacobs driver's manual supplied with your chassis.

Brakes

Air Brake System

This truck has been built to meet or exceed all applicable federal standards and regulations.

Brake Operation — The air brake system consists of three main elements:

- The compressor, governor and reservoirs supply and store the air pressure.
- The brake application valve controls the brake application pressures.
- The brake chambers perform the work on the brake mechanism.

MACK vehicle design has incorporated into this chassis a dual braking system. It has two complete air circuits: a primary circuit for rear brakes and a secondary circuit for front brakes. Each circuit receives air from separate reservoirs. Although there are two air circuits, they operate as one brake system through the dual-circuit treadle valve. This provides the driver with easy, graduated control when applying and releasing the brakes.

The air pressure in the two air brake circuits is monitored by air pressure gauges on the instrument panel. (See the INSTRUMENT PANEL section for more information.) When air pressure drops below 65 ± 5 psi (448 ± 34 kPa) in either the primary or secondary air system at any time other than vehicle startup, pull to the side of the road and determine problem. If air pressure continues to drop below 40 ± 5 psi in BOTH systems, spring brakes will automatically apply. The Low Air Pressure warning indicator or buzzer will be activated if low air pressure occurs in either circuit.

⚠ CAUTION

Avoid sudden stops. Constant, sudden stops may negatively affect the performance of braking and driving parts.

OPERATION

When slowing for a stop, leave clutch engaged as long as possible to use the braking effect of the engine. When forward speed has dropped to a little above idling speed, push clutch pedal in and brake to a complete stop.

Parking Brake

Spring-type parking brakes are standard on rear axles and bogies. The basic unit of a spring brake system is an air cylinder with heavy springs integrated with the service brake chamber. The spring brake chamber operates so that when there is no pressure in the spring brake section of the air chamber, the spring expands, causing a brake application. When air pressure is applied to the spring section of the air chamber, the heavy spring is compressed, releasing the brakes.

The spring brakes can be applied and released from the cab by using the hand-operated control valve. In the event of an air loss in both the primary and secondary air systems, pressure is automatically exhausted from the spring brake chambers, applying the brakes. The spring brakes will remain applied until enough pressure is available in the system to compress the heavy application springs.

⚠ CAUTION

NEVER use the trailer parking brake system alone. Use the tractor-trailer parking brake system only.

Anti-Lock Brakes (If Equipped)

Installation of Electrical Equipment on Vehicles Equipped with Anti-Lock Brake System (ABS)

Connecting electrically powered or electrically controlled equipment to the vehicle may cause interference with the proper operation of other vehicle components. This interference may depend on the operating frequency and the degree to which transient signals are coupled into the vehicle system.

Every user and installer of electrical equipment has the obligation to ensure the proper operation of all electrical systems on the vehicle with respect to conducted or radiated signals by his installation.

Specific attention is directed to the anti-lock brake control system. A vehicle checkout procedure should include operating any added circuitry under the following test conditions:

- Engine running and brake air system pressure in operating range
- Vehicle stationary
- Depress and hold brake pedal in full application pressure mode
- Operate added equipment in all starting, running and shutdown conditions. Listen for any air exhausting from anti-wheel-lock controllers. This indicates an interference condition which must be corrected before the vehicle is released for highway use.

Operating an ABS-Equipped Vehicle

- Apply the brakes as normal. If the anti-lock brake system begins to function, maintain brake pressure. DO NOT release the brakes.
- Avoid rapidly pumping the brakes. The anti-lock brake system automatically applies and releases the brakes up to five times per second.
- When towing a trailer(s), especially if only the tractor is equipped with anti-lock brakes, watch the trailer(s) through the mirrors. Adjust brake application pressure as necessary to keep the combination in a straight line. Make sure the trailer(s) follows the tractor properly.

OPERATION

Good Driving Habits

Gross Vehicle Weight (GVW) Rating

Do not overload your chassis. The gross vehicle weight ratings for a given model truck vary with operating conditions, tire size, wheel base, type of wheels, axles, suspension, frame length and overhang. For economy and safety, it is important to observe the GVW rating for your particular truck, which can be found on the Safety Certification Label.

Observe Instruments

Glance at instruments frequently. When problems develop, take prompt steps to correct them.

Stopping the Engine

After a hard run, allow engine to idle three minutes before shutdown in order to stabilize the temperature of all engine parts. Quick shutdowns can cause engine damage and prevent the turbocharger from being properly lubricated.

Parking

Use only the parking brake for parking. Do NOT use the hand control for rear service brakes or trailer brakes (if equipped) for parking. Check brake adjustment frequently to be sure the brakes will lock and hold vehicle when parked. Do NOT use the parking brake for braking vehicle when in motion, except in an emergency. When parking on a grade, use wheel chocks under the rear wheels or turn front wheels to the curb. Do NOT leave diesel engine vehicles in gear; if vehicle should move, the engine may start by heat of compression.

General Observation

Make it a habit at stops to walk around your truck looking for fuel, oil and coolant leaks. Also check condition of tires, wheel nuts, springs and lights. Stop trouble before it stops you!

STARTING YOUR VEHICLE

General Information

Before you put the key in the ignition switch, set the parking (spring) brake, disengage the clutch (if equipped) and put the transmission in NEUTRAL. Push the Engine Stop Control all the way in (if equipped).

⚠ CAUTION

Do not engage the starting motor too soon after an incomplete start of the engine, or the starter may be damaged. Wait at least five seconds before attempting to restart the engine.

⚠ CAUTION

Do not rev the engine at start-up. Turbocharger damage may result. Lubricants need time to establish a film between moving parts.

⚠ CAUTION

If the engine does not start immediately, limit cranking periods to 30 seconds to avoid overheating and damaging the starter.

OPERATION

Cold Weather Starting Tips

NOTE

Before attempting to start the engine during cold weather, actuate the Engine Stop Control (if so equipped) several times to ensure that the injection pump control rack is free. Condensation in the fuel could cause the control rack to freeze up after extended shutdown in cold weather.

- Save your batteries. Do not overtax batteries and starting motor by cranking for more than 30 seconds without interruption. Allow about two minutes between attempts at starting the truck. This permits starter to cool and batteries to re-energize.
- Use the correct grade of oil in your crankcase for the prevailing winter temperature.
- Water/moisture can accumulate in the fuel system. Water accumulation can freeze in fuel tank, fuel lines and filter. This can be avoided by regularly draining the tanks and filters.

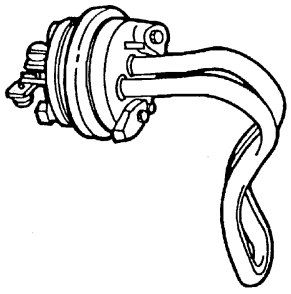
⚠ WARNING

Under NO circumstances should gasoline, alcohol, used oil or additives with metallic particles be added to the fuel.

- Diesel fuel has some bad habits in cold weather. It can gel and clog filters and small passages. When gelling occurs, mix a small percentage of No. 1D fuel (kerosene) with No. 2D (diesel) fuel. Adding kerosene is NOT recommended for general use since there will be a sacrifice in both performance and fuel economy. Refer to the MAINTENANCE AND LUBRICATION manual, TS494, for additional cold weather operating information.

Engine Block Heater

An engine block heater works by heating the coolant surrounding the combustion chambers. Engine heaters are recommended to help combat the extreme demands of cold weather operating conditions. The engine heater can be plugged in overnight when the temperature drops. Location of the engine heater power receptacle varies according to vehicle design.



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Engine Heater Benefits

- Eliminates cold weather starting problems.
- Increases engine life significantly by keeping the engine warm and avoiding costly, excessive idling.
- Prevents external water leaks caused by excessive cold.
- Allows the cab to heat more quickly.
- Reduces the temperature at which ether is required.
- Engine heaters may be activated as soon as the engine is stopped.

OPERATION

Air Starter or Push Button (If Equipped)

NOTE

Build up air pressure to a maximum (120 lbs/827 kPa) before shutting down and parking for the night.

⚠ CAUTION

Idling engine unnecessarily for long periods of time wastes fuel and fouls injection nozzles. Unburned fuel causes carbon formation and oil dilution. NEVER race an engine during warm-up.

Put the key in the ignition switch. Turn the key clockwise to the first "click" (about two o'clock position) to activate the instruments. Push starter button in and release as soon as engine starts. Keep clutch (if equipped) disengaged until engine runs smoothly. When oil pressure and air pressure approach normal operating ranges, you may put the vehicle into operation.

E7 Non V-MAC Engines

If your chassis is equipped with a mechanically governed E7 (non V-MAC) engine, use the following procedure:

Normal Temperatures

1. Do NOT depress the accelerator.
2. Crank the engine.
3. After the engine has started, set the hand throttle to maintain an engine speed of 1200 RPM.
4. Allow the engine to idle at 1200 RPM and reach normal operating temperature BEFORE moving the vehicle.

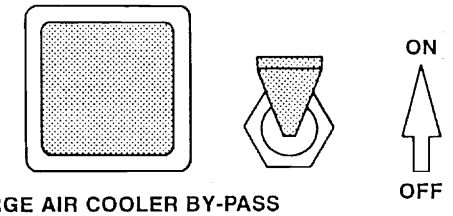
If the engine is difficult to start, use the following procedure:

1. With the key switch in the OFF position, fully depress and hold the accelerator pedal to the floor.
2. If equipped with an Engine Stop Control, pull to the OFF position, then return to the run position.
3. Crank the engine.
4. Release the accelerator pedal as soon as the engine starts.

Cold Temperatures

1. Fully depress and hold the accelerator pedal to the floor.
2. Push the Charge Air Cooler Bypass switch (if equipped) to the ON position. A dash light will illuminate when the bypass is activated.

OPERATION



CHARGE AIR COOLER BY-PASS

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3. Crank the engine.
4. Release the accelerator pedal as soon as the engine starts.
5. Set the hand throttle to maintain an engine speed of 1200 RPM.
6. Allow the engine to idle at 1200 RPM and reach normal operating temperature BEFORE moving the vehicle.
7. Move the Charge Air Cooler Bypass switch (if equipped) to the OFF position when the coolant temperature has reached 125°F (52°C).

⚠ CAUTION

Operating the chassis with the Charge Air Cooler Bypass switch (if equipped) in the ON position may cause severe engine damage.

⚠ CAUTION

Do NOT use the Charge Air Cooler Bypass switch (if equipped) during warm temperatures or if the engine is already warm.

E7 V-MAC Engines

If your chassis is equipped with an electronically governed E7 (V-MAC) engine, use the following procedure:

Normal Temperatures

1. Do NOT depress the accelerator. The pedal must be left in the idle position.
2. Crank the engine.
3. After the engine has started, set the hand throttle to maintain an engine speed of 1200 RPM.
4. Allow the engine to idle at 1200 RPM and reach normal operating temperature BEFORE moving the vehicle.

Cold Temperatures

1. Fully depress and hold the accelerator pedal to the floor.
2. Crank the engine.
3. Release the accelerator pedal as soon as the engine starts.
4. Set the Variable Speed Control (VSC) (if equipped) to maintain an engine speed of 1200 RPM.
5. Allow the engine to idle at 1200 RPM and reach normal operating temperature BEFORE moving the vehicle.

OPERATION

Engine Warm-Up

Engine damage can occur if the engine is not warmed up to a minimum operating temperature of 170°F (77°C) before putting the chassis into full operation.

Heavy-duty diesel engines are designed to operate at optimum efficiency when they are running loaded at (or very near) normal operating temperature where efficient combustion takes place. When the engine is operated unloaded, lightly loaded (stop and go operations, PTO operations, or periods of extended engine idling) or in cold weather conditions, normal operating temperature may not be achieved or maintained. As a result, carbon and/or varnish build-up will occur and lubricating oil will become contaminated with combustion byproducts.

Cold weather operations place added demands on a diesel engine. When operating in cold climates, particularly in stop-and-go operations, PTO operations or periods of extended engine idling, minimum operating temperature must be maintained to prevent engine damage resulting from valve varnishing and carbon build-up. Many accessories, from winterfronts to belly tarps, are available to best equip your truck for cold weather operations. Refer to the MAINTENANCE AND LUBRICATION manual, TS494, supplied with your truck for additional information concerning cold weather accessories.

Engine Idling

Idling the engine unnecessarily for long periods of time wastes fuel, fouls injector nozzles and can lead to valve carbon and varnish deposits. Unburned fuel causes carbon formation and oil dilution. Shut engine down when prolonged loading or unloading of cargo is required.

When starting a cold engine, or if the vehicle has been parked and the engine coolant has fallen well below normal operating temperature, a fast idle speed of approximately 1200 RPM should be maintained to help the engine warm up more quickly.

Engine Shutdown

After a hard run, allow the engine to idle approximately three minutes before shutdown. This provides the temperature stabilization of all engine parts and allows the turbocharger RPM to slow gradually. Quick shutdowns can result in mechanical problems for the engine and/or turbocharger.

⚠ CAUTION

Operating the engine below normal operating temperature for extended periods of time will allow varnish/carbon deposits to build on the valve stems and guides. Varnish deposits will cause the valves to stick in the guides after the engine has been shut down, and could result in push rod damage when the engine is restarted. If the engine has been operated below normal operating temperature for an extended period of time, and the odor of raw diesel fuel can be detected or unburned fuel can be seen at the exhaust stack, it is recommended that the engine be operated under load until normal operating temperature is achieved before shutting down.

On chassis equipped with an air starter, make sure that the air pressure gauge reads a maximum of 120 psi before shutting down and parking for the night. This will ensure sufficient air pressure for restarting the engine.

OPERATION

Engine Shutdown System (If Equipped)

The engine may be protected by a shutdown system that prevents engine failure when a condition such as loss of oil pressure, loss of coolant or engine overheating occurs. If the system detects a condition that will initiate engine shutdown, a warning indicator light will illuminate to alert the driver before the engine actually shuts down. Should shutdown occur, the system can be overridden so the vehicle can be moved to a location where it will not pose a hazard.

Check Engine Warning Indicator — During normal operating conditions, the Check Engine warning indicator should illuminate as soon as the key switch is turned on. After the engine is started, it will remain illuminated until engine oil pressure reaches normal idling range. During shutdown, if the system detects a condition that could lead to engine failure, the Check Engine warning indicator illuminates 30 to 45 seconds prior to engine shutdown.

Lengard Shutdown System

Shutdown Override Button (If Equipped) — During normal operation, to ensure adequate fuel delivery when starting the engine (whether starting a hot or a cold engine), the following starting procedures are recommended (Lengard system only):

1. Depress and hold the Shutdown Override button.
2. Crank the engine.
3. Continue depressing the Shutdown Override button after the engine is started and the Check Engine warning indicator is still illuminated.
4. Release the Shutdown Override button when the Check Engine warning indicator deactivates.

Refer to the STARTING YOUR VEHICLE section for complete engine starting procedures.

During Shutdown — If the shutdown system activates, use the following procedures to move the vehicle to a location where it can be parked safely:

1. Push and hold the Shutdown Override button (if equipped).
2. Start the engine.
3. Continue depressing the Shutdown Override button while moving the vehicle to the nearest area where the vehicle can be parked safely.

Kysor Shutdown Systems

There are no special starting instructions for the Kysor shutdown system. To override the engine shutdown system so the vehicle can be moved to safety, simply restart the engine in the normal manner. The engine will run for 30 seconds and then shut down again.

⚠ CAUTION

Continuously overriding the shutdown system for an extended period will cause severe engine damage.

OPERATION

MOVING YOUR VEHICLE

General Information

Braking

Avoid sudden stops. Constantly making such stops may have a negative effect on the performance of braking and driving parts. When slowing, leave clutch (if equipped) engaged as long as possible to use the braking effect of the engine.

⚠ CAUTION

When using the braking effect of the engine, final gear selection is critical. If gear selection is too high the vehicle will buck, which could cause loss of control.

E7 engines use the Jacobs compression release engine brake, or the Jacobs Stealth Retarding System™. With either system, the best braking performance is achieved in the 1800 to 2100 RPM range. For optimum retarding power, keep engine RPM as close to 2100 RPM as possible. For additional information, refer to the Jacobs driver's manual supplied with your chassis.

Shifting

Operate in a gear low enough to allow engine to accelerate to, or maintain, governed RPM when applying full throttle. Allowing the engine to lug causes excessive strain on engine which could damage pistons, rings, cylinder walls, or bearings. However, you should not overspeed the engine either.

⚠ CAUTION

Do not permit a load to drive the engine above governed speed. Use lower gears when descending steep grades, and watch the tachometer. Over-speeding will cause severe drivetrain damage and eventually destroy the engine.

⚠ DANGER

Select the proper gear ratio BEFORE descending a grade to avoid a runaway vehicle and to stay within safe and legal speed limits. Do NOT coast down hills. Gear ratios should be selected to allow engine operation between peak torque and rated speed.

⚠ CAUTION

Running the engine at an RPM that is too low for the load or grade of the road can cause damage to the drivetrain.

Shifting at the proper time will save both fuel and unnecessary repair bills, but remember that once your engine falls below the peak torque, both the torque and horsepower drop off very rapidly. Before this happens, downshift to the next lower gear.

On vehicles with transmissions having extreme reduction gearing coupled with high rear-axle loads, a torque-limiting device will be used. This device limits the amount of fuel that can be delivered to the engine by the injection pump and prevents overloading of the drivetrain components while in extreme reduction gears.

Use the same gear going downhill as you would going uphill. This will save your brakes and prevent damage to the engine from over-speeding.

Engine Temperature

Before entering high-speed traffic conditions, allow the engine to reach normal operating temperature. Normal operating range may be between 170°F and 225°F (77°C and 107°C) depending on weather and road conditions.

OPERATION

Clutch (If Equipped)

To avoid shock damage, release the clutch pedal smoothly without shock-loading the driveline, especially on grades while carrying heavy loads. Do not ride the clutch pedal. Premature wear of clutch facing and release bearing may result.

⚠ CAUTION

Always use the lowest drive gear combination to start vehicle moving to avoid premature clutch failure.

General Instructions

1. To move the vehicle, begin by starting the engine and waiting until it reaches its operating range.
2. Disengage the clutch (if equipped) by pushing the pedal to the floor.
3. Shift transmission into first or LO gear (see Transmission Shifting Instructions for how to shift your particular transmission and in what gear to start).
4. Release the parking brake.

⚠ CAUTION

If the Spring Brake Warning indicator is on, do NOT attempt to move the vehicle because driveline damage may result.

5. Engage clutch (if equipped) smoothly by releasing the clutch pedal. At the same time, apply the accelerator enough for the engine to move the load.

⚠ CAUTION

Never allow your foot to ride the clutch pedal when clutch is engaged. This will cause premature failure and short clutch facing life.

6. As vehicle gains speed, continue shifting until transmission is in the highest gear possible with engine in operating range.

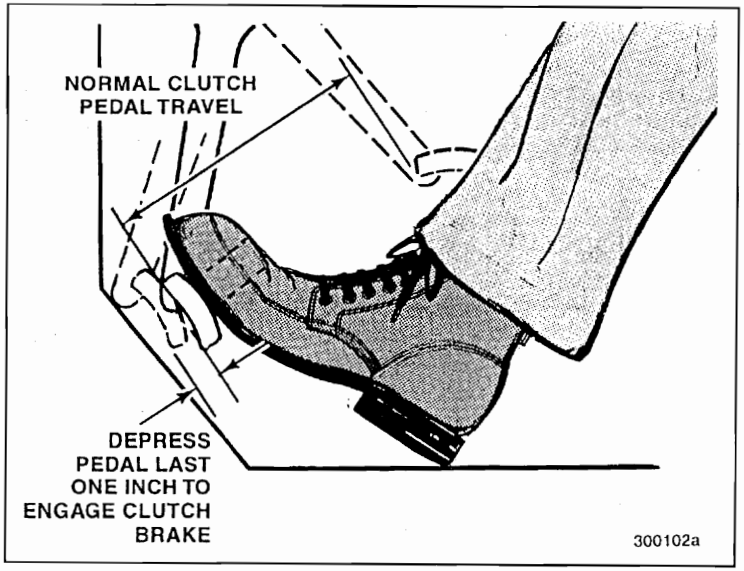
NOTE

Engine must be warmed up to operating temperature before attempting to move in either REVERSE or LO-LO range when the vehicle is equipped with a torque-limiting device.

OPERATION

Clutch Brake Operation (If Equipped)

The clutch brake is designed to stop the rotation of the transmission input shaft while the truck is standing still, to make shifting into first or reverse gears easier.



With the vehicle standing still, push in the clutch pedal. Apply the clutch brake by pushing the clutch pedal all the way to the floor (the clutch brake is applied when the clutch pedal is fully depressed, the last one inch of travel past normal pedal travel).

NOTE

When the clutch is engaged, a slight but definite resistance to clutch pedal downward travel will be felt in the last one inch.

Shift the transmission into first or reverse gear, engage the clutch and accelerate. The clutch brake is only to be used when the vehicle is stopped and being shifted into first or reverse gears. It is not designed to be used as an upshifting aid.

⚠ CAUTION

Clutch brake damage may result if used while the vehicle is in motion. The clutch brake must NOT be used when making a downshift or an upshift.

Double-Clutching

As with all nonsynchronized transmissions, double-clutching is necessary on downshifts as well as upshifts. It is advisable to use the torque-limiting clutch brake to engage first and REVERSE gears and to double-clutch for gear ratio changes.

Double-clutching is a way to bring the speed of transmission gears into synchronization so that the shift can be made without clash. The engine is used to speed up the countershaft for a downshift and to slow it down for an upshift.

1. Depress clutch pedal and shift to NEUTRAL.
2. Let up clutch pedal and accelerate engine (when making downshift) or allow engine to slow down (upshift) until engine speed approximately corresponds to road speed of gear to be selected.
3. Depress clutch pedal and complete shift to desired gear. Release the clutch pedal.

OPERATION

Transmission Shifting Instructions

⚠ CAUTION

Maximum safe oil temperature is 235°F (113°C) for manual transmissions. Continued operation with oil above this temperature will cause rapid deterioration of the oil's lubricating properties and is NOT recommended.

⚠ CAUTION

The vehicle must be completely stopped before attempting to shift from REVERSE to any forward speed, or vice versa, to avoid transmission damage.

T2070-T2070C-T2070F TRANSMISSION RATIOS

Gear (Main Box)	Ratios	
	LO	HI
1	14.16	5.24
2	8.25	3.05
3	(4.67)	1.73
4	(2.70)	1.00
5	(1.62)	0.60
5 (T2070C)	(1.81)	0.67
Reverse	14.53	5.38

( ) The ratios in parentheses are not practical to use.

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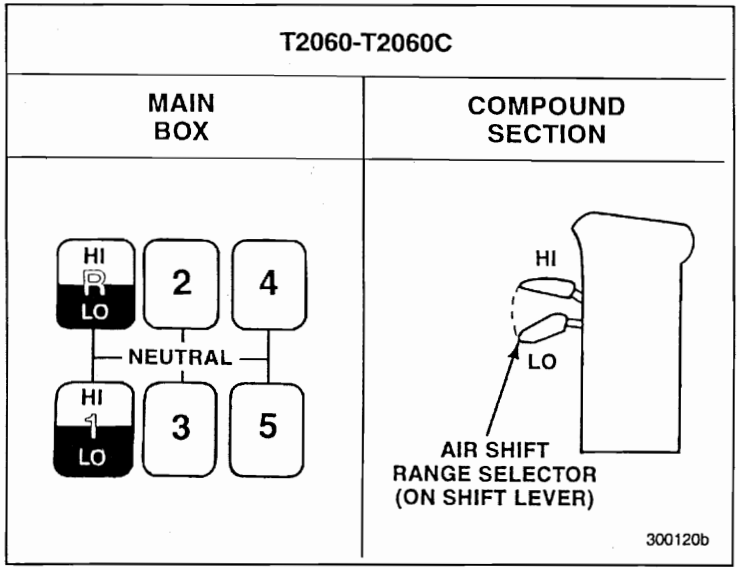

T2060-T2060C TRANSMISSION RATIOS

Gear (Main Box)	Ratios	
	LO	HI
1	9.02	5.24
2	(5.25)	3.05
3	(2.98)	1.73
4	(1.72)	1.00
5 (T2060)	(1.03)	0.60
5 (T2060C)	(1.16)	0.67
Reverse	9.25	5.38

( ) The ratios in parentheses are not practical to use.

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OPERATION

MACK T2070-T2070C-T2070F

The T2070-T2070C-T2070F are nonsynchronized transmissions. These transmissions feature a LO and HI auxiliary compound section controlled by an air-shift range selector located on the shift lever. The LO range provides two low ratios. In HI range there are five forward gears that can be shifted in the standard manner, but remember to double-clutch whether moving up or down through the gears. For normal highway usage, start in HI range, first gear and shift through second, third, fourth, and fifth. The two gears in LO range are designed for off-highway use and in slow-moving applications (curb pouring, material spreading, heavy load/steep grade operation). REVERSE can be used in LO or HI range.

Upshift — Begin in first gear, LO range (commonly called LO-LO as shown on the shift pattern diagram). Double-clutch and upshift to second gear, LO range (called LO) in the normal manner. When ready to upshift again, depress the clutch pedal and release the accelerator pedal. Move the shift lever to NEUTRAL, then flip the air-shift range selector to HI range, double-clutch and move the shift lever back to first gear. This is first gear HI range, which provides the next higher ratio. Release the clutch pedal and apply the accelerator to reach the top of the operating range. Shift through second, third, fourth, and fifth (HI range), being sure to double-clutch from one gear to the next.

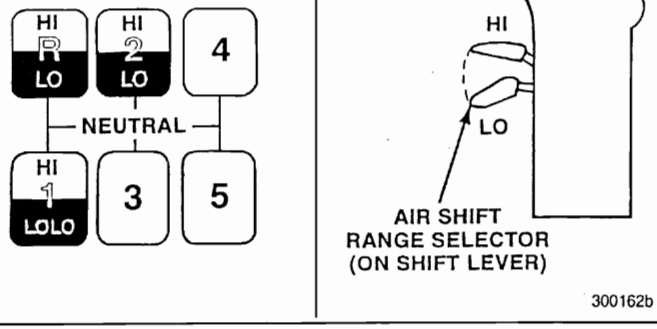
Downshift — Downshift in reverse order from fifth through first gear (HI range), double-clutching through each gear. The next downshift will be to second gear, LO range (called LO). Proceed to depress the clutch pedal and release the accelerator pedal. Move the shift lever to NEUTRAL, then flip the air-shift range selector to LO range, double-clutch and move the shift lever to second gear. This is second gear, LO range, which provides the next lower ratio. When ready for the lowest ratio available (called LO-LO), double-clutch and downshift to first gear, LO range.

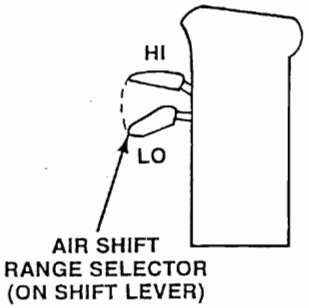
⚠ CAUTION

Do not overspeed the engine when downshifting the transmission. Damage to the drivetrain components can result. Do NOT preselect the air-shift range selector. Shift the auxiliary compound section only with the clutch pedal depressed and/or the shift lever in NEUTRAL. To avoid transmission damage, do NOT change range while moving in reverse gear.

T2070-T2070C-T2070F

MAIN BOX	COMPOUND SECTION





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Axles

Rear Axle

Mack Trucks, Inc. provides axle housings in three capacity classifications. They are medium duty, heavy duty and extra-heavy duty. To deliver the appropriate amount of torque to the driving wheels, Mack Trucks, Inc. offers single-reduction and dual-reduction carriers in a large variety of ratios for single axle applications. When required, a large variety of four-wheel-drive, two-axle bogies are also available with top-mounted, dual-reduction carriers for straight line through drive. The bogie carriers are also available in a large number of ratios.

All four-wheel-drive bogie tandem carriers are available with the MACK inter-axle power divider third differential, with or without a driver-controlled lockout.

MACK rear axles are designed so the entire load is carried by the axle housing through the wheel bearings mounted on the housing spindle. The rear axle shafts can be either free-splined, both ends, or integral flange type. Both types of axle shafts may be removed without removing or disturbing the rear wheels.

To avoid excessive tire wear, good maintenance must be practiced in the matching of tires on bogies without a compensating inter-axle power divider.

⚠ CAUTION

Maximum safe oil temperature is 235° F (113° C). Continued operation with oil above this temperature will cause rapid deterioration of the oil's lubricating properties and is NOT recommended.

Two-Speed Rear Axle

The dual-reduction rear axle carrier employs selective fast and slow gear reductions. Electric shift (button on the transmission shifter lever) provides either fast or slow ratio by selecting these gearsets. The transmission is shifted in the usual manner and the two-speed axle is shifted in the usual manner. The two-speed axle is shifted as follows:

Split Shifting — To shift to higher transmission gear and LO axle speed at the same time:

1. Shift transmission to higher gear in the usual way.
2. Push the axle shifter button down just before re-engaging the clutch.
3. Re-engage clutch and depress the accelerator to maintain road speed.

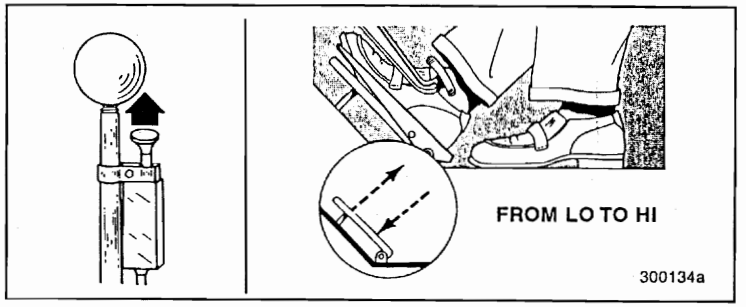
To shift to lower transmission gear and HI axle speed at the same time:

1. Hold accelerator down and pull axle shifter up.
2. Shift transmission to lower gear in the usual way, then depress accelerator to maintain road speed.

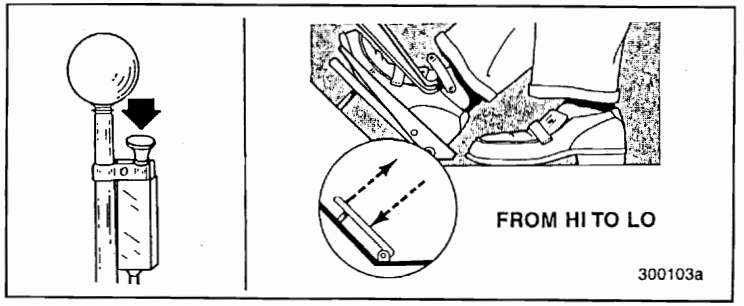
⚠ CAUTION

Always keep accelerator down when shifter button is moved, except when split shifting to LO axle speed. Vehicle must be brought to a full stop before shifting from forward to REVERSE, and vice versa.

OPERATION



To shift from LO to HI speed — Hold accelerator down and pull axle shifter button up. Ride with accelerator down until you want to complete shift. Release accelerator, pause until shift is completed, then depress accelerator to maintain road speed.



To shift from HI to LO speed — Push axle shifter button down and hold accelerator down until you want to shift. Disengage and re-engage clutch as quickly as possible while holding accelerator down, or release and depress accelerator as quickly as possible without declutching.

Inter-Axle Power Divider (If Equipped)

A driver-controlled, air-shifted lockout is available so the MACK power divider can be rendered inoperative for short periods of poor traction, and then unlocked when normal traction returns. When the MACK sliding clutch lockout is engaged with mating teeth of the outer cam, both axles are locked together in positive through-drive for maximum traction with no differential action taking place between axles.

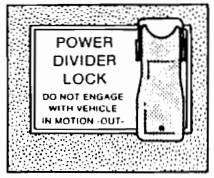
Normally, the driver-controlled, inter-axle power divider lockout control switch is in the OUT or unlocked position. On rare occasions, it is necessary to provide positive through-drive to both bogie axles for poor traction situations.

⚠ CAUTION

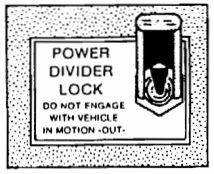
Stop the vehicle before actuating the air-shift range selector.

NOTE

The lockout should NOT be used on dry, hard surfaces.



LOCKOUT DISENGAGED



LOCKOUT ENGAGED

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OPERATION

Declutch the engine (if equipped with an automatic transmission, shift to NEUTRAL) and move the lockout switch to the engaged position. Re-engage clutch and drive through the slippery area.

NOTE

An electric buzzer in the cab sounds continuously as long as the lockout is engaged. This is to remind the driver to release the lock as soon as normal traction is regained.

When driving conditions permit returning to normal, unlock power-divider drive, move the lockout switch back to the OUT (disengaged) position, and let up momentarily on the accelerator pedal to powershift out of locked position. Then drive as usual.

⚠ CAUTION

To avoid clash at the lockout sliding clutch and outer cam, under NO circumstances should the air-shift mechanism be activated while the drive wheels are actually slipping or spinning.

MAINTENANCE INTRODUCTION

Preventive maintenance is vital to the life of your new MR. This section of the Operator's Handbook covers items of importance concerning the proper care of your new truck. A well-run maintenance and lubrication program is the best way of ensuring a long and productive life for your truck, as well as increased profitability and reduced maintenance costs for your business.

The operator plays an important role in the proper care of this equipment. By performing daily checks and observing the equipment while it is in operation, minor defects can be caught and corrected before they become major problems. Make sure any problems are corrected before putting the equipment into operation.

The service manager at your Mack Sales, Parts and Service Center knows your truck the best. Your satisfaction is his main concern. If you have any questions concerning the proper care, maintenance and lubrication of your MR, or if you need help in developing a preventive maintenance program, he will be glad to help.

NOTE

This handbook contains some maintenance information. Refer to TS494 for complete maintenance and lubrication procedures.

MAINTENANCE AND LUBRICATION

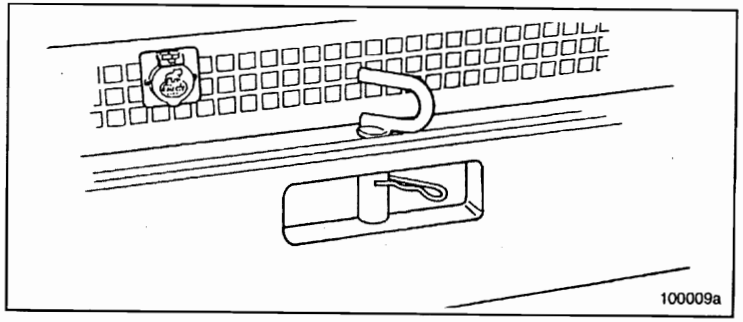
TOWING

There is one center-mounted tow pin located in the front bumper. The device meets the requirements set forth by The Maintenance Council (TMC) of the American Trucking Association. The tow pin may be used for towing a disabled vehicle from the immediate location.

If it is necessary to remove the tow pin, remove the retainer clip first. Once the retainer clip is pulled, the tow pin can be lifted out of the bumper hole.

⚠ CAUTION

Do NOT lift and tow vehicle by tow pins, hooks, eyes, etc. If mired in heavy mud, snow, etc., use a suitable sling-type towing arrangement to move the truck.



NOTE

Use of tow pins, hooks, eyes, etc., is NOT intended for long-term wrecker pull of disabled vehicles.

⚠ CAUTION

Failure to disconnect the driveline before towing or pushing the vehicle can cause serious transmission damage.

Before towing or pushing the vehicle, the driveline should be disconnected or the drive wheels should be lifted off the ground.

MAINTENANCE AND LUBRICATION

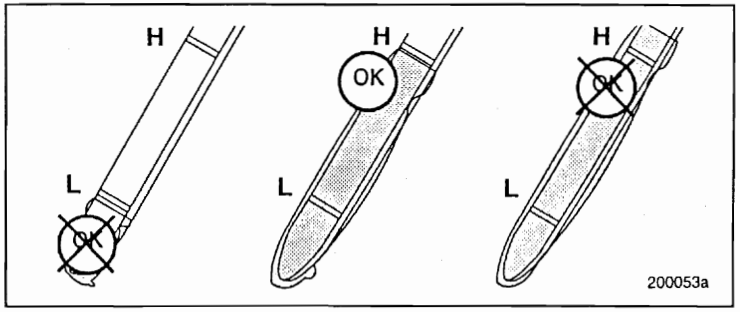
ENGINE

Oil Level Check

As the operator of this vehicle, it is important for you to perform the daily inspections necessary to keep your truck in good shape. Maintaining the proper oil level in your engine crankcase cannot be overemphasized.

Before checking the oil, remember these important points:

- Measurement of the oil level must be taken on level ground.
- If the engine has been running, allow about 15 minutes after shutdown for oil to drain down to the oil pan.
- The level must be close to the FULL line (at least between the ADD and FULL lines) on the dipstick, but must NOT exceed the FULL line (refer to illustration below).



COOLING SYSTEM

The cooling system is a pressurized system. The coolant is circulated by a centrifugal pump. It is a typical system in most respects, but there are a few things to keep in mind when checking or working on the cooling system.

⚠ WARNING

Avoid injury when checking coolant in a hot engine. Wait for the engine to cool prior to checking the level, whenever possible.

Winterfronts

A MACK-approved winterfront, although not recommended for normal operation, may be used during cold weather to aid the engine in reaching and maintaining engine coolant temperatures within the normal operating range.

⚠ CAUTION

Use only a MACK-approved winterfront designed for the specific chassis. Restricted air flow through the charge air cooler can cause higher exhaust temperatures, power loss, excessive fan usage, reduced fuel economy and possible engine damage. The use of any other type of device, such as a radiator cover, cardboard or similar material, is not approved by Mack Trucks, Inc.

NOTE

The minimum operating temperature is 170°F (77°C).

MAINTENANCE AND LUBRICATION

When a winterfront is installed, a MACK-approved exhaust pyrometer must also be installed and closely monitored while the engine is in operation.

⚠ CAUTION

DO NOT exceed the maximum exhaust temperature listed on the pyrometer decal. To reduce exhaust temperature, open the winterfront, downshift or reduce engine power.

Maximum Ambient Air Temperature			
	Above 60°F (15.5° C)	60°F (15.5°C)	40°F (4.40°C)
MACK-Approved Winterfront	Not Recommended	Available*	Recommended
MACK-Approved Belly Tarp	Not Recommended	Not Recommended	Available*

* Make sure that engine oil, coolant, transmission and pyrometer temperatures remain in normal operating range.

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⚠ CAUTION

Winter treatments are NOT RECOMMENDED for vehicles which only operate intermittently in cold climates.

⚠ CAUTION

Never operate a viscous fan with a closed or partially closed winterfront.

ON/OFF FAN CLUTCH

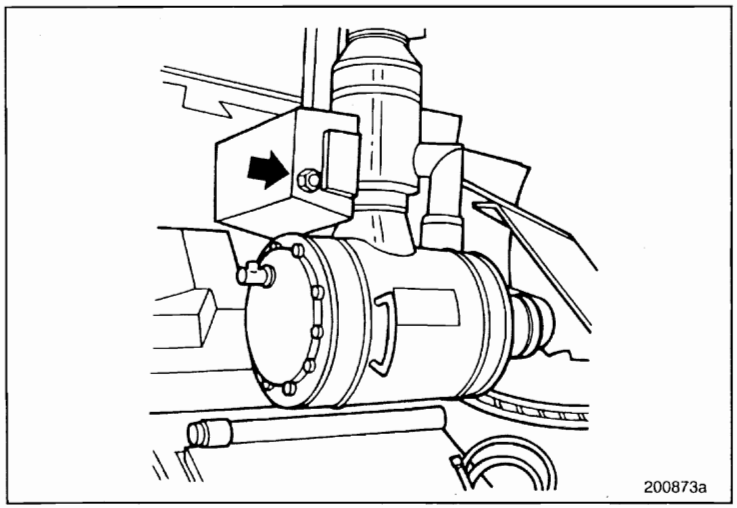
An ON/OFF fan clutch can help prevent excessive cooling during extremely cold weather operations. Whereas viscous fans often rotate continuously during cold weather, an ON/OFF fan clutch keeps the fan in the OFF position, thus reducing unnecessary air movement and helping to maintain adequate engine operating temperatures.

COOLANT LEVEL CHECK

⚠ WARNING

Turn the radiator cap counterclockwise to the first stop but do NOT depress. After the pressure has completely dissipated, press the cap downward and continue turning to remove.

The MR model chassis has an expansion tank located on the left-hand side of the chassis, mounted on the air cleaner assembly support bracket. Coolant should be visible in the sight glass located on the side of the tank.



MAINTENANCE AND LUBRICATION

Draining

Whenever repairs are to be made which would require disconnection of coolant hoses, etc., the cooling system should be completely drained. Carefully remove the filler cap and open all coolant drain cocks.

Protecting Coolant System

⚠ CAUTION

The concentration of ethylene glycol or propylene glycol in the cooling system must be checked with a refractometer prior to traveling or operating in areas where subfreezing temperatures may be encountered. When adding antifreeze to the system, run the engine for 20 minutes before checking with a hydrometer.

NOTE

Your chassis is currently supplied from the factory with engine coolant protection to −10°F (−23°C). Optional coolant protection to −40°F (−40°C) is also available.

Ethylene glycol or propylene glycol-based antifreezes are both approved for all MACK engines. All ethylene glycol and propylene glycol coolants must be low-silicate antifreezes which meet ASTM4985 test (GM6038M SPEC) criteria. These antifreezes are sometimes referred to as heavy-duty diesel coolants. Passenger car coolants do NOT meet this specification.

Be sure to maintain the required level of antifreeze protection for anticipated winter temperatures in your area of operation. A 40% to 60% concentration of antifreeze is required for E7 and E9 engines, regardless of application, geographic location or ambient air temperature.

⚠ CAUTION

Do NOT exceed a 60% concentration of antifreeze to water. A higher percentage of antifreeze will not increase protection. Concentrations over 60% adversely affect freeze protection and heat transfer rates.

NOTE

Propylene glycol should be checked with a refractometer.

NOTE

ALWAYS mix the water/antifreeze solution before pouring it into the cooling system.

NOTE

Piping arrangement may cause capacity variation depending on the type of cooling system and optional external cooling devices which may be attached. Therefore, it is difficult to tell exactly how much coolant it will take to fill any one particular system. As a general rule, fill to one inch below the bottom of the radiator filler neck.

MAINTENANCE AND LUBRICATION

⚠ CAUTION

Do NOT use coolant solutions which contain anti-leak additives in trucks equipped with coolant filters or conditioners.

⚠ CAUTION

Do NOT use soluble oil-type coolants in any MACK cooling system.

Refilling

Close all drain cocks and fill with the proper coolant mixture. Run engine with the radiator cap off until operating temperature is reached and the thermostat opens. Recheck level and add coolant, if required. Run the engine long enough to be sure the system is free of air and has the correct amount of coolant.

Cooling System Maintenance

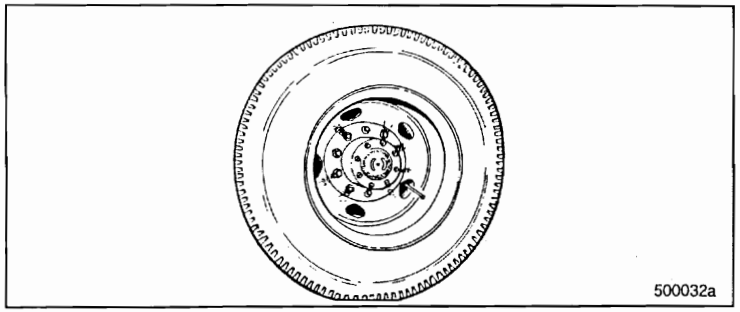
The cooling system must be maintained by performing regularly scheduled maintenance as outlined in the MAINTENANCE AND LUBRICATION manual, TS494. Cold weather operations, however, place added demands on the cooling system. Prevent potential cold weather problems by performing a quick check of the cooling system as outlined below:

- Make a general check for cooling system leaks.
- Inspect hoses and clamps for leaks and condition. Tighten hose clamps to specifications (as required).
- Check coolant level. Add fresh coolant (in specified concentration) as necessary.
- Check and record degree of antifreeze concentration. Add antifreeze as necessary to obtain required protection level.

WHEELS

Wheel Inspection

Look at wheels and cap nuts. Inspect them for evidence of cap nut looseness. Rust streaks from the cap nut ball seat are an indication of looseness.



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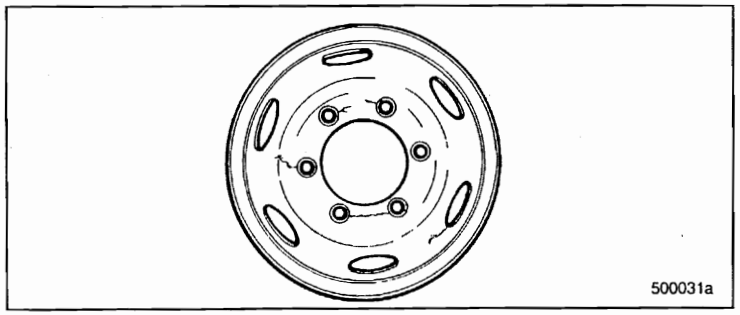
Look for cracks around the hand hole, stud hole and wheel. Look for broken studs, wheel damage or improperly seated lock rings.



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MAINTENANCE AND LUBRICATION

Tires

⚠ DANGER

Tires used on multipiece rims must be assembled and inflated only by experienced, qualified personnel. Tires must be inflated in a safety cage whenever possible. If, however, a safety cage is not available, use a portable lock-ring guard. The tire must be deflated prior to removal of the tire-and-rim assembly from the vehicle. Remove the valve core to ensure complete deflation.

⚠ DANGER

NEVER position your body in front of the rim during inflation.

Inflation Pressure

In order to ensure maximum mileage and overall performance from your tires, it is essential that they operate at the correct inflation pressure for the load carried. Inflation pressure should be checked daily while the tires are cold. Always use an accurate tire pressure gauge. NEVER bleed air from a hot tire, as it will then be underinflated. Refer to the MAINTENANCE AND LUBRICATION manual, TS494 for a complete listing of tire inflation pressures, and for additional information concerning tire care.

⚠ WARNING

UNDER NO CIRCUMSTANCES should you drive on underinflated or overloaded tires. A tire in this condition builds up excessive heat which can result in sudden tire destruction, property damage and personal injury.

⚠ CAUTION

Never bleed air from your tires in an attempt to gain traction for a vehicle stuck in snow, ice or mud. This practice provides no additional traction and typically results in underinflated tires. Never bleed air from a hot tire since that tire will then be underinflated.

To adjust for pressure fluctuations induced by temperature changes associated with winter weather, it is recommended that tire inflation pressure be checked daily when the tires are cold (i.e., before the vehicle is driven). Always use an accurate tire pressure gauge.

Inspection

Inspect your tires daily. Look for bulges, cracks, cuts, penetrations and/or oil contamination. If any such damage is found, the tire must be thoroughly inspected by a qualified tire inspector and repaired or discarded immediately, at his discretion. Also, check for uneven wear. If found, a thorough inspection of front end parts and alignment should be made by a qualified mechanic.

Tire Manufacturer's Data Book

Specific and more detailed information can be obtained by referring to the technical data books provided by each tire manufacturer.

Subjects of interest are:

- High-speed or low-speed operation
- Repair, retreading and regrooving
- Use of tire chains
- Mixing radial and bias tires on the same vehicle
- Use of dynamometers
- Tire mounting/dismounting

MAINTENANCE AND LUBRICATION

Oil Contamination of Tires

Lubricating oils, fuel oil, gasoline and other petroleum derivatives, if allowed to contact tires, will soften the rubber and destroy the tire. Preventive maintenance is necessary to ensure that oil leakage does not occur. The following areas should be inspected on a regular basis:

- Axle end seals
- Engine seals
- Transmission seals
- Drive axle seals
- Oil filters
- Oil and hydraulic lines (if equipped)

BATTERY

Jump-Starting Engine

If you encounter a situation in which it is necessary to jump-start an engine, use the following procedures.

⚠ WARNING

Batteries which are to be linked together must be of the same voltage (12 to 12, 24 to 24). Batteries produce explosive gasses. Keep sparks, flames, cigarettes, etc., away from batteries at all times. Protect your eyes by wearing safety goggles. Be sure vehicles are NOT touching each other.

1. Connect positive (+) cable to positive (+) post of discharged battery.
2. Connect the other end of the same cable to the positive (+) post of the booster battery.
3. Connect the second cable, negative (−) side, to the other post of the booster battery.
4. Make the final connection on the engine block of the stalled vehicle AWAY FROM THE BATTERY, and stand back.
5. Start the vehicle with the booster batteries and then start the stalled vehicle. Shut down the vehicle with the booster batteries and remove the cables in the reverse order of connection.

⚠ WARNING

Do NOT connect the final negative (−) connection to the frame of the stalled vehicle. This would cause all current to flow through the master ground circuit breaker resulting in overload.

MAINTENANCE AND LUBRICATION

ELECTRICAL

Circuit Protection

The circuit protection panel is located to the left of the passenger seat (on the engine tunnel). Remove the fasteners and the circuit board will be exposed.

Fuses are standard equipment for all circuits except the headlamps and windshield wipers. Circuit breakers are available as optional equipment.

⚠ CAUTION

For proper installation of electrical accessories, all wiring should meet SAE requirements and be routed through the circuit protection panel with proper amperage fuses or Type II circuit breakers. (Headlights and wipers will be on Type I, cycling-type circuit breakers.)

Some vehicles may be equipped with daytime running lights. For the daytime running lights to be operational, a DRL module must be installed in the relay socket marked either "DRL MOD" or "Running Lamps" on the electrical equipment panel. Do NOT install a standard relay into the daytime running light relay socket (marked either "DRL MOD" or "Running Lamps") or a short circuit in the headlight high beam circuit will result.

The headlight circuits are protected by SAE Type I (automatic reset-cycling) circuit breakers that automatically interrupt then restore the flow of current through the circuit in the event of an overload. This cycling will continue until the cause of the overload is repaired.

SAE Type II (automatic reset, non-cycling) circuit breakers (if equipped) provide a complete circuit disconnect until the overload is corrected. The power to the affected circuit breaker must be shut off before the circuit breaker will reset itself.

The circuit protection panel also provides access to battery, ignition and ground terminals for non-factory installed electronic equipment. (On V-MAC chassis, there are two serial link terminals for easy local connection of a trip recording device.)

MAINTENANCE AND LUBRICATION

Bulb Chart

Light (Some lights may not be available on certain models)	Quantity (Varies with model)	CP/Watt	Trade No.
ABC Gauge Panel Cluster Lights	26	1.0CP	#161
Gauge Panel D	2	1.0CP	#161
Dome and Door Courtesy Light	2/3	12.0CP	#561
Map Light	1	3.0CP	#1816
Heater and Air Conditioner	1	1.0CP	#184
Clearance & Cab ID Marker (Standard)	5/7	3.0CP	#168
Clearance & Cab ID Marker (Premium)	5	4.0CP	#904
Side Turn Indicator	2	32.0CP	#570
Hook-Up Light	1	35W/600CP	#4406
Fog Light	2	55W	#H3
Headlight, Incandescent (Round)	2	60W/50W	#6015
Headlight, Halogen (Round)	2	65W/35W	#H6024
Headlight, Halogen (Rectangular)	2	65W/45W	#9004
Rear Tail Light Backup	2	32.0CP	#1156
Rear Stop, Tail and Turn Light	2	32.0/3.0CP	#1157
Front Turn Light	2	32.0/3.0CP	#3057

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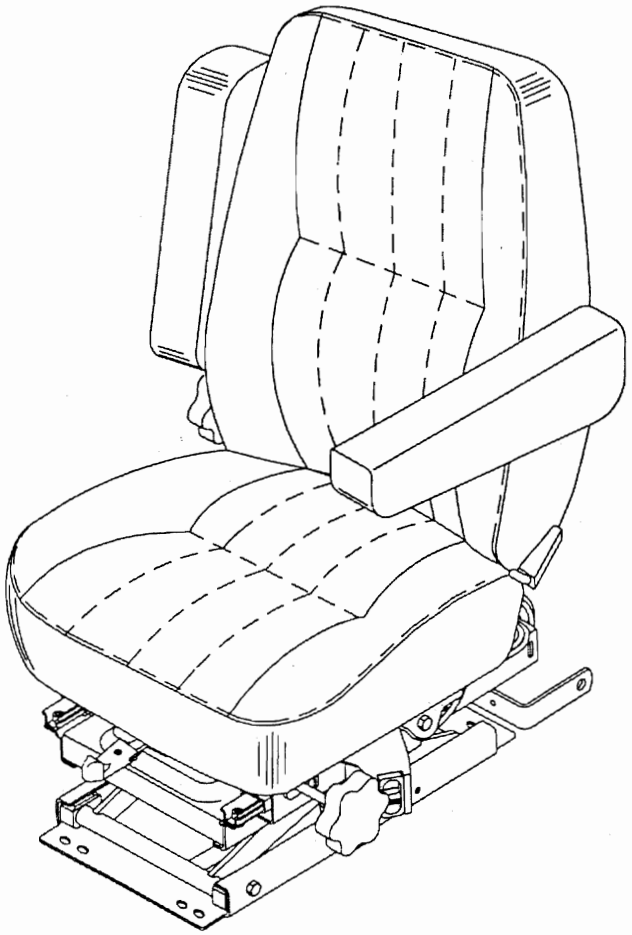
To prevent corrosion of the lamp socket terminals, particularly with the clearance and marker lamps, apply a coating of electrical sealing grease, such as Lubriplate DS-EX, to the socket and terminal assemblies.

⚠ CAUTION

Do not use electrical grease on any V-MAC connectors.

Bostrom®
SEATING



TALLADEGA™ SERIES

905L/905/910

AIR SUSPENSION SEATS

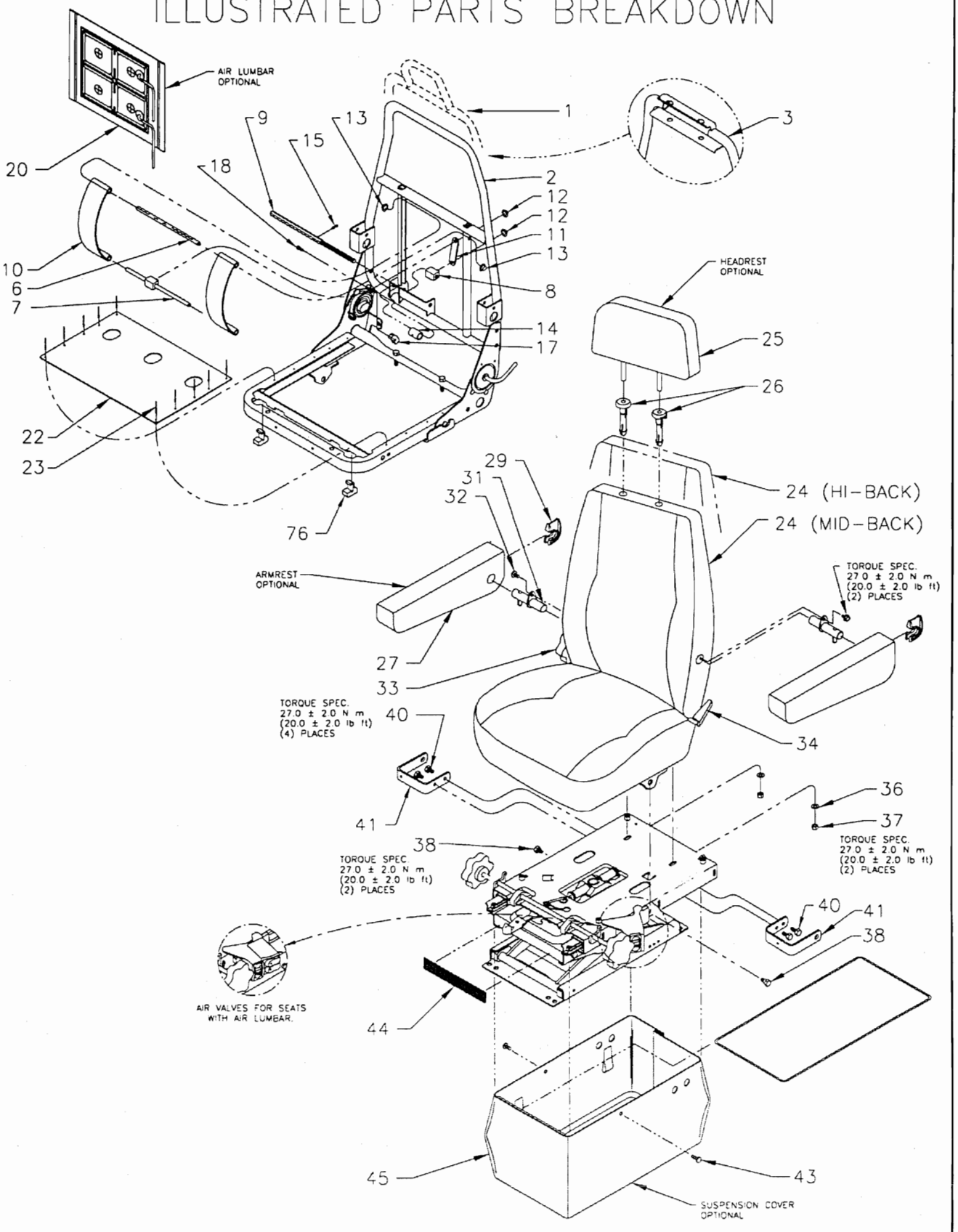
REED
CONCRETE PLACING EQUIPMENT

BOSTROM AIR SUSPENSION SEAT
TALLADEGA SERIES

VENDR

FIGURE 02
PAGE 02

ILLUSTRATED PARTS BREAKDOWN



REVISION:

PARTS REPLACEMENT LIST
LOW PROFILE SUSPENSION SEAT

ORDERING INSTRUCTIONS: Order by Part Number, NOT Reference Number.

HOW TO USE: Find the corresponding part that you wish to replace on the exploded view illustration and note its reference number. Refer to list below and record part number, quantity required and description. Order cover pad kits or armrests by color and material.

ORDER FROM: Your truck dealer or Bostrom Authorized Distributor for your area.

REF NO	PART NO	DESCRIPTION	QTY
1	6200906-001	Frame Assy. - High Back	
2	6200908-001	Frame Assy. - Mid Back	
3	6201118-001	Frame w/Headrest	
4	6201316-001	Frame w/Air Lumbar	
5	6222137-001	Lumbar Kit	
6	*	Lumbar Support Shaft	1
7	*	Lumbar Slide Shaft	1
8	*	Lumbar Adj. Block	1
9	*	Lumbar Adj. Shaft	1
10	*	Lumbar Spring	2
11	*	Lumbar Linkage	1
12	*	Push Nut 5/16"	2
13	*	Push Nut 3/8"	2
14	*	Spacer	1
15	*	Roll Pin	1
16	6107030-001	Back Restriction Kit	
17	*	Stop Block	1
18	*	Screw 10-32	1
19	6222141-001	Lumbar Kit (Air)	
20	*	Lumbar Bladder	1
21	6222157-001	Pan - Support Kit	
22	*	Pan	1
23	*	Rivets	10
24	**	Upper or Cover Pad Kit	
25	**	Headrest	
26	6201133-001	Grommet	2
27	**	Armrest Assy.	
28	6222159-001	Kit Armrest Insert	
29	*	Insert	1
30	6222160-001	Kit Armrest Bracket	
31	*	Screw 5/16 x 1/2 Hex Tap	1
32	*	Armrest Shaft	1
33	6200413-002	Lumbar Knob	1
34	6103653-003	Recliner Handle	1
35	6222007-001	Kit Fastener Mounting	
36	*	Washer Flat	2
37	*	Nut M8 x 1.25	2
38	*	Shoulder Bolt M8	2
39	6222005-001	ICP Bracket Kit	
40	*	Bolts	4
41	*	ICP Bracket	2
42	**	Suspension Cover Kit	
43	*	Fastener	2
44	*	Velcro	1
45	*	Suspension Cover	1
46	6222155-001	Air Valve Kit	
47	*	Valve Mounting Pod	1
48	*	Air Valve	1
49	*	Wire Tie 3"	3
50	*	Wire Tie 6"	1
51	*	Air Line	
52	6222133-001	Isolator Spring Kit	
53	*	Rubber Bumper	2
54	*	Isolator Spring	2
55	*	Shoulder Bolt M10 x 1.50	1
56	*	Pivot Block Assy.	1
57	*	Latch Spring	2
58	*	Split Poly Loom	2
59	*	Spacer	1
60	*	Latch Bar	1
61	6222134-001	Control Handle Kit	
62	*	Control Handle Assy.	1
63	*	Detent Pin Assy.	1
64	*	Spring Lockout	1
65	*	Hex Head - Shoulder	1
66	*	Washer	1
67	*	Isolator Knob	1
68	*	Pop Rivet	1

REVISION:

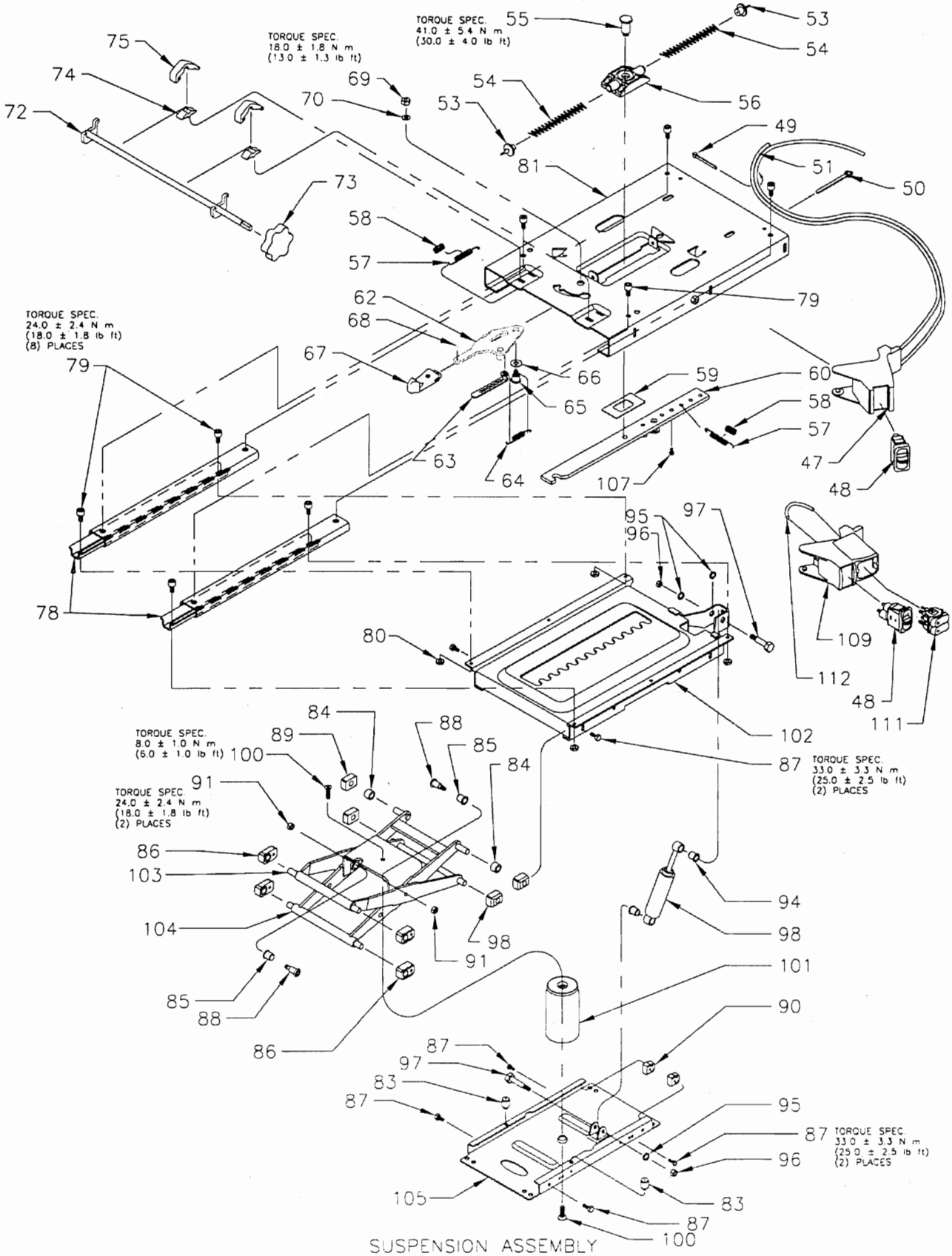
REED
CONCRETE PLACING EQUIPMENT

BOSTROM AIR SUSPENSION SEAT
TALLADEGA SERIES

VENDR

FIGURE 02
PAGE 04

ILLUSTRATED PARTS BREAKDOWN



REVISION:

PARTS REPLACEMENT LIST
LOW PROFILE SUSPENSION SEAT
CONTINUED

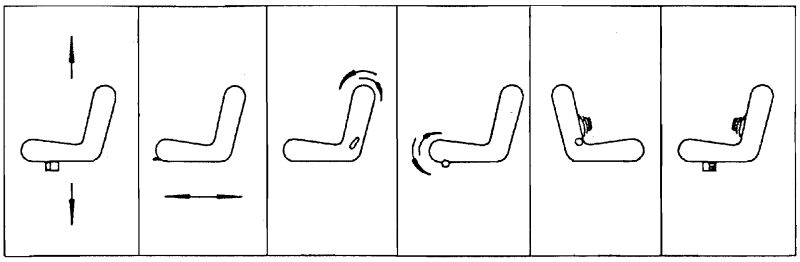
REF NO	PART NO	DESCRIPTION	QTY
69	*	Hex Nut M8 x 1.25 LK	1
70	*	Washer	1
71	**6222135-001**	**Seat Tilt Replacement**	
72	*	Tilt Rod Weldment	1
73	*	Tilt Knob	1
74	*	Bracket Tilt Rod	2
75	*	Bracket Tilt Rod	2
76	*	Slide Block Seat Tilt	2
77	**6222165-001**	**Slide Rail Kit**	
78	*	Slide Rail	2
79	*	Screws	8
80	*	Nuts	4
81	**6200641-004**	**Isolator Assy.**	
82	**6222076-001**	**Susp. Hardware Kit**	
83	*	Rubber Bumper	2
84	*	Spacer Roller	2
85	*	Bearing Multilube	2
86	*	Bearing Block	4
87	*	Screw Cap M8 x 20mm	6
88	*	Bolt Shoulder M8 x 1.25	2
89	*	Block Slide	4
90	*	Stop Block Assy.	2
91	*	Nut Hex M8 x 1.25 LK	2
92	**6222078-001**	**Low Profile Damper Kit**	
93	**6222079-001**	**Heavy Duty Damper Kit**	
94	*	Bearing Multilube	2
95	*	Washer Flat	2
96	*	Hex Nut	2
97	*	Bolt	2
98	*	Standard Damper	1
99	**6222084-001**	**Air Spring Kit**	
100	*	Screw	2
101	*	Air Spring Assy.	1
102	**6201571-001**	**Upper Plate Weldment**	1
103	**6065662-002**	**Outer Lever Assy.**	1
104	**6106528-002**	**Inner Lever Assy.**	1
105	**6111111-001**	**Base Assy.**	1
106	**6222138-001**	**Fore/Aft Restriction**	
107	*	Restrictor Screw	1
108	**6222163-001**	**Air Valve Kit Assy.**	
109	*	Pod	1
110	*	Air Lumbar Valve	1
111	*	Air Valve	1
112	*	Jumper Loop	1

* EXCEPT AS NOTED, KITS CONTAIN ALL ITEMS DENOTED BY ASTERISK LISTED BELOW EACH KIT PART NUMBER.

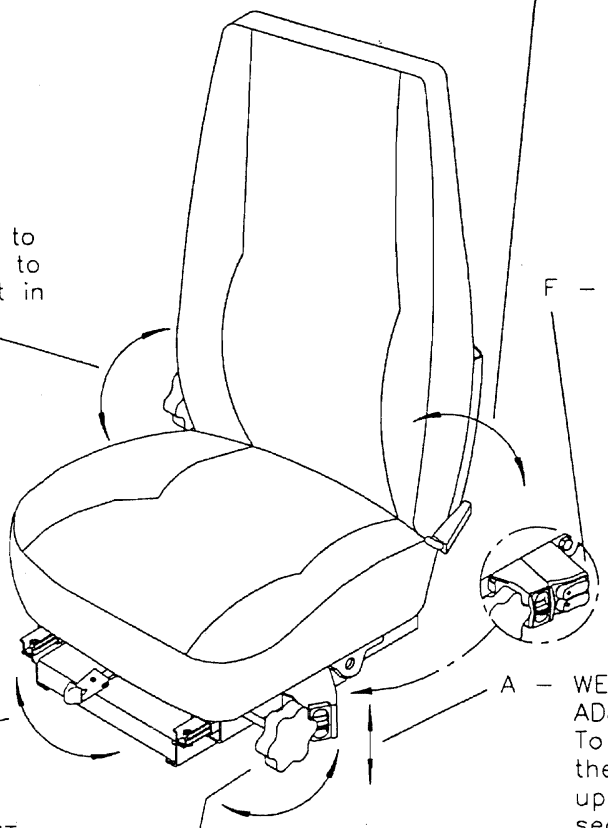
** SEE YOUR DEALER OR BOSTROM AUTHORIZED DISTRIBUTOR FOR UPPER, ARMREST, SUSPENSION COVER OR COVER PAD KIT PART NUMBERS APPROPRIATE FOR YOUR SEAT.

COMFORT ADJUSTMENTS

After installation the following comfort adjustments can be made to ensure the best performance.



A B C D E F



C – BACK ANGLE ADJUSTMENT
Lean forward slightly to remove pressure from seat back, hold handle rearward to adjust to any position within range.

E – LUMBAR ADJUSTMENT
Rotate knob forward to increase or rearward to decrease the support in the lumbar area.

F – OPTIONAL AIR LUMBAR ADJUSTMENT (UPPER AND LOWER)
To increase lumbar support press control valve forward.
To decrease lumbar support press control valve rearward.

A – WEIGHT AND HEIGHT ADJUSTMENT
To raise seat, push the air valve lever upwards. To lower seat, push the air valve lever downwards. When adjusted properly and under normal driving conditions. The seat should not top nor bottom against the end limits of the vertical travel. Adjusted height position should aide drivers visibility and vehicle control.

B – FORE AND AFT SEAT POSITION ADJUSTMENT
FORE AND AFT ISOLATION
Hold lever to left to adjust seat position forward or backward. Isolation is provided when lever is in center (straight forward) position. To lock out move lever to right.

D – SEAT CUSHION TILT ADJUSTMENT
Rotate seat tilt knob to decrease or increase seat tilt.

REMOVAL / REASSEMBLY

Air Spring Assembly (101) Removal/Reassembly

Remove complete seat assembly from vehicle.

1. Fill air spring assembly (101) so that seat is at maximum height (see comfort adjustments).
2. Block suspension up with a spacer placed between the base riser (105) and the upper frame (102).
3. Release air pressure from air spring so that seat is supported by spacer (see comfort adjustments).
4. Disconnect air line (51) from air spring assembly (101) by loosening air fitting and pulling air line out of fitting.
5. Remove top and bottom screw from air spring (101) and remove air spring assembly from suspension assembly.
6. Position air spring so that fitting at bottom of air spring (101) is toward the front of the seat. Install screw (100) into bottom of air spring (101).
7. Torque screw (100) at bottom of air spring assembly (101) to 10.0 +/- 1.0 ft.-lbs.
8. Install screw (100) at top of air spring assembly (101) and torque to 6.0 +/- 1.0 ft.-lbs.
9. Reconnect air line (51) to fitting in air spring assembly (101) by pushing air line into fitting and tightening fitting.
10. Fill air spring assembly (101) (see comfort adjustment) and remove spacer block.

Damper Replacement (98)

Seat need not be removed from truck.

1. Be sure suspension is at maximum height. Add air if needed (see comfort adjustment).
2. Move channel assembly (81) to full frontward position to gain working room.
3. Remove shoulder bolts (97) and hex nuts (96).
4. Remove damper assembly.
5. Install new damper with flanges of bearings to the outside of the suspension. Add thrust washers (95) and install shoulder bolts (97) and hex nuts (96).

Slide Rail (77) Replacement

1. Remove seat/back assembly (24). NOTE: See Seat/Back Assembly Removal/Reassembly procedure.
2. Once seat/back is removed, slide channel assembly (81) to the rear. Remove front screws (79) and nuts (80). Carefully, move channel assembly (81) to the front. Remove screws (79) and nuts (80).
3. Remove top screws (79).
4. Remove and install one slide rail (78) at a time.
5. Install new screws (79) and nuts (80).
6. Reassemble seat/back assembly (24).

REMOVAL / REASSEMBLY

Suspension Rebuild Bearing/Slide Block Replacement

1. Bleed all air from supply line. Disconnect air supply line to seat. Using air valve, exhaust all air from air spring. Remove complete seat assembly from vehicle.

2. Remove seat/back assembly (24) from suspension per procedures shown.

3. If seat assembly has a suspension cover (45), remove along with fasteners (43), after removing ICP bracket (41) and cap screws (40).

4. Block suspension up with a spacer placed between the base riser (105) and the upper frame (102).

5. Disconnect air line (51) from air spring assembly (101) by loosening air fitting and pulling air line (51) out of fitting.

6. Remove top and bottom screw from air spring (101) and remove air spring assembly from suspension assembly.

7. Remove damper assembly (98) by removing shoulder bolts (97) nuts (96) and washers (95) (see procedure for damper replacement).

8. Remove cap screws (87) from upper front bearing blocks (86) and lower rear stop block assemblies (90).

9. Remove upper plate weldment (102) by lifting and sliding it forward until bearing blocks (86) can be removed from cutouts in channels on upper frame (102). Then slide channel rearward until slide blocks (89) can be removed. Be careful not to pinch fingers in lever assembly.

10. Remove cap screws (87) from lower front bearing blocks (86) and slide lever assemblies (103 and 104) forward until bearing blocks (87) are removed from channel on base (105). Then slide lever assemblies rearward until slide blocks (89) are removed from channel. Be careful not to pinch fingers in lever assemblies.

11. Remove shoulder bolts (88) and nuts (91) from pivots of lever assemblies (103 and 104) and inspect. Replace if worn.

12. Replace bearings (85) at pivots on lever assembly (104) by pushing the old out and pressing in new. Flange of bearings (85) should be on outside of lever assembly (104).

13. Reassemble reverse order. Torque pivot shoulder bolts (88) to 20.0 +/- 2 ft.-lbs.

14. Put new bearing blocks (86) and slide blocks (89) on levers with beveled surfaces outward and slide levers with blocks into channel on base riser (105). Torque screws (87) to 30.0 +/- 3.0 ft.-lbs.

15. After putting bearing blocks (86), spacers (85) and slide blocks (89) on levers, slide upper frame assembly (102) over blocks. Line up screws (88) with bearing blocks (86) and torque screws (87) to 30.0 +/- 3.0 ft.-lbs.

16. Manually move suspension up and down to make sure there are no clearance problems. Be careful not to pinch fingers in linkage.

17. Block up suspension and reinstall air spring assembly (101). Torque upper screw (100) to 6.0 +/- 1.0 ft.-lbs. and lower screw (100) to 10.0 +/- 1.0 ft.-lbs. (see procedure shown for air spring reassembly).

18. Reinstall damper assembly (98) with washer (95) and nuts (96) (see procedure for damper replacement).

19. Reinstall suspension cover (45) and ICP brackets (41) if removed (see step #3).

20. Install assembly (24).

Seat/Back Assembly (24) Removal/Reassembly

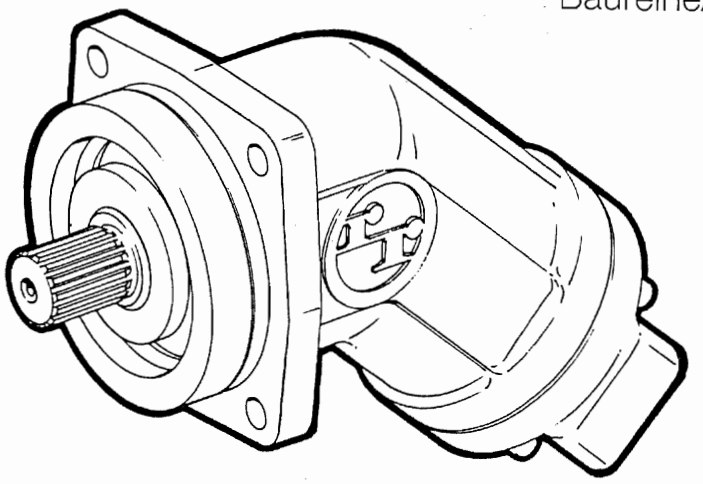
1. Adjust the seat upper to most rearward position and remove two nuts (37) and flat washers (36) from underside of channel assembly (81).

2. Remove two shoulder bolts (38) from channel assembly (81).

3. Reverse procedure to reassemble.

A2F

Baureihe/Series 6.1



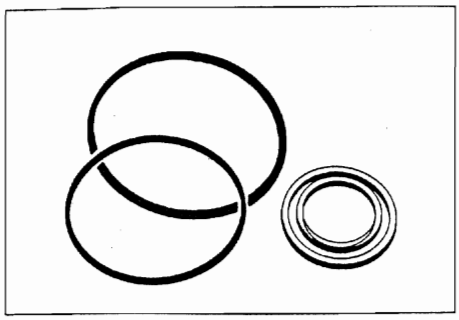
NOTE

Pretested and preassembled Original-Hydromatik-subassemblies make quick and successful repairs possible.
Should it be necessary to carry out repairs with individual components, our experience shows that only Original-Hydromatik-seals, retaining rings, and bearings should be used. Basically, these should be changed when ever a unit is stripped down, as useful life still remaining cannot be visvally determined.
In addition, it would be dissapointing to spoil a well done repair by including marginally cheaper components.
Giving us the unit type and fabrication number when ordering components will mean that you receive them quickly.
Repairs are simple, but we recommend you take advantage of our training in order to acquire the necessary special knowledge. This applies also to specialists whom we ale always pleased to meed again to explain the repair of newly developed products.

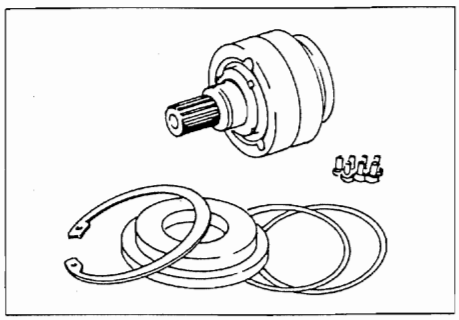
MANNESMANN REXROTH

Hydromatik GmbH

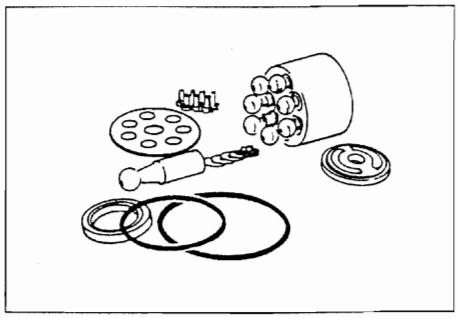
R



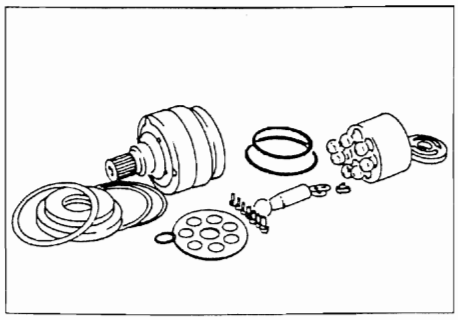
External seals



Rotary group, mechanical part; with sealkit, completely adjusted.



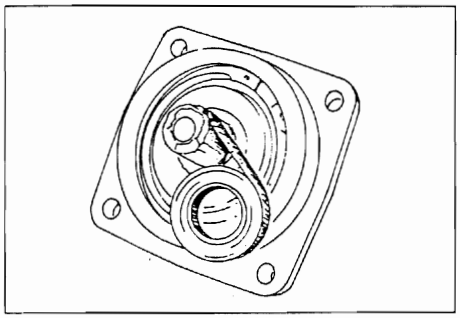
Rotary group, hydraulic part; with sealkit, completely adjusted.



Rotary group, complete; with sealkit, completely adjusted.

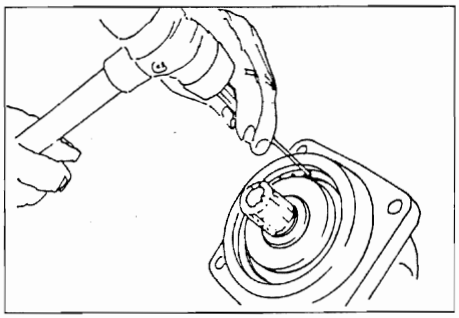
C O N T E N T S

Shaft seals



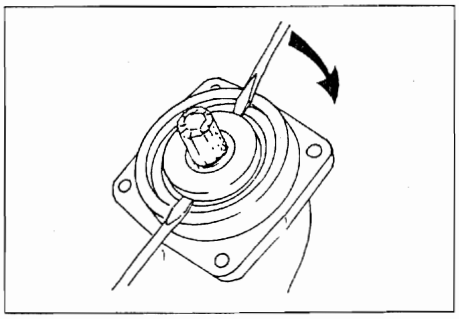
1

Remove protective cover. If keyed shaft,remove key.



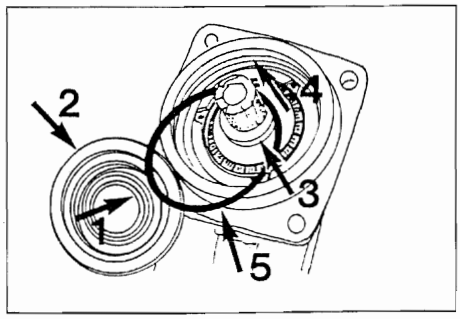
2

Free circlip and remove.



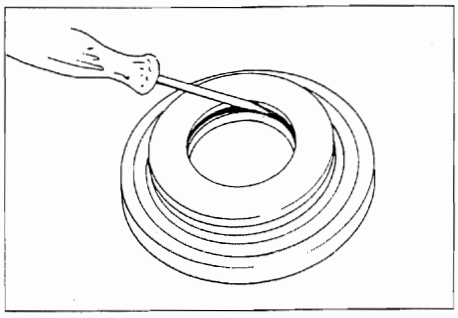
3

Prise off front cover.



4

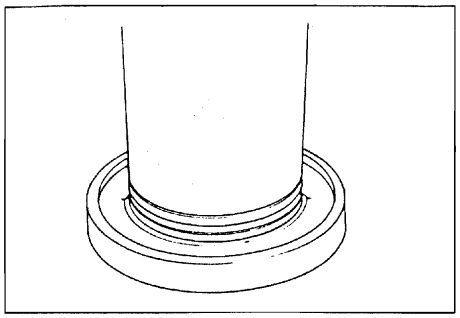
Visual check
Shaft seal (1), Cover (2), drive shaft (3), housing (4), O-ring (5).



5

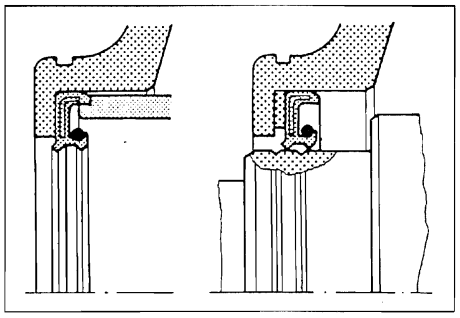
Remove old shaft seal.

Shaft seals



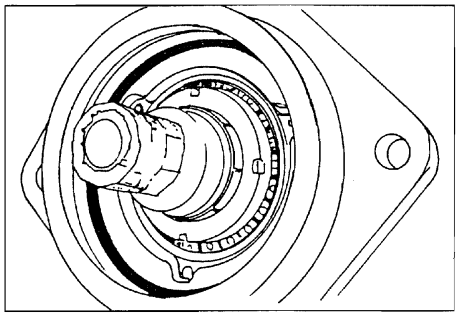
6

Press in the shaft seal ring to the correct position with a suitable sleeve.



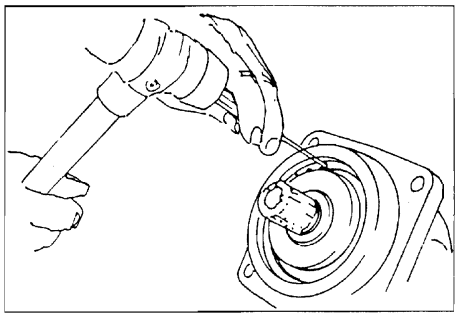
7

If the shaft is deeply grooved, insert shim behind seal.



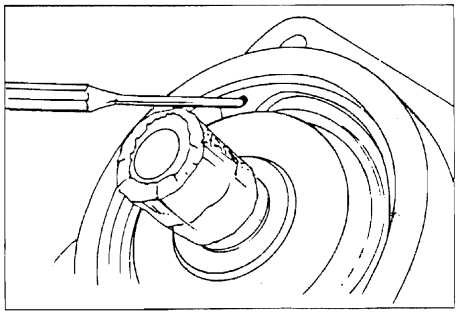
8

Fit new O-ring, ensure it is a snug fit. Grease O-ring and lips of shaft seal.



9

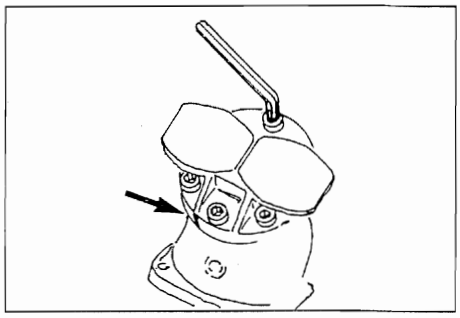
Fit circlip using a punch.



10

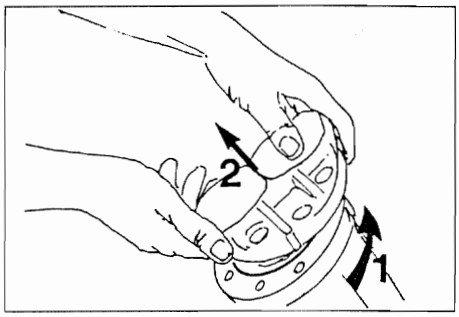
Check that circlip is well seated.

Cover plate/seals



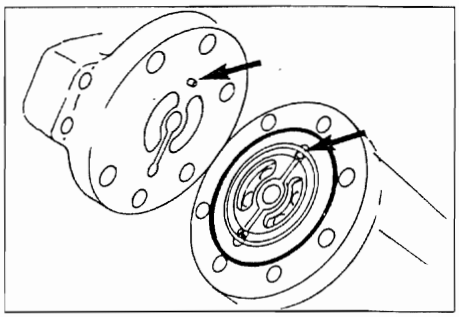
11

Mark position of cover plate (arrowed). Remove screws.



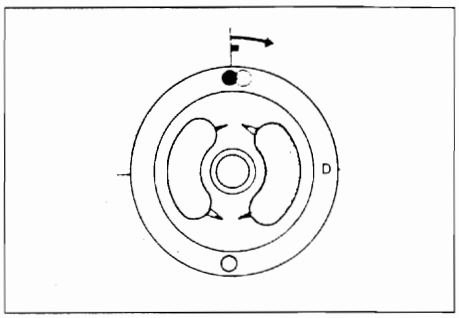
12

Swivel port plate on locating pin and lift off.



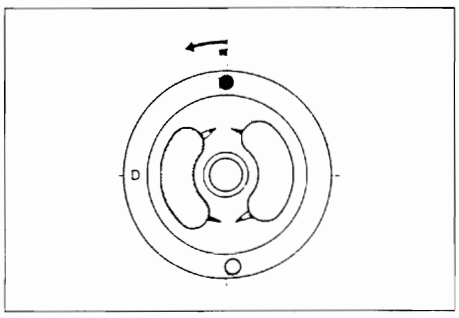
13

Note position of locating pin. (arrow).



14

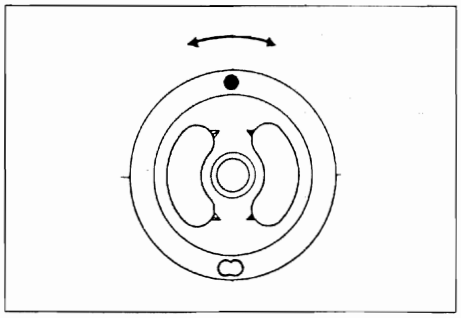
Pump, clockwise rotation. (Viewed on spherical surface.)



15

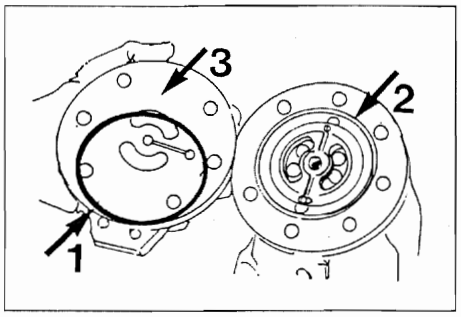
Pump, anti-clockwise rotation. (Viewed on spherical surface.

Cover plate/seals



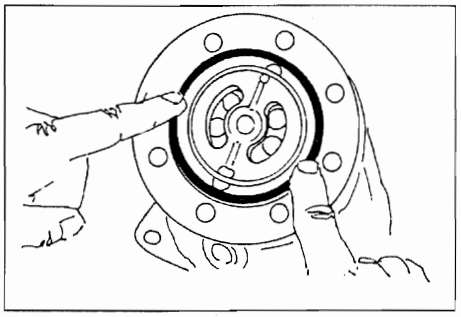
16

Motor, bi-directional. (Viewed on spherical surface.)



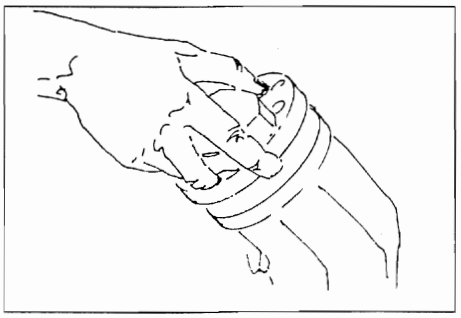
17

Visual check
O-ring (1), Groove (2), Plate (3).



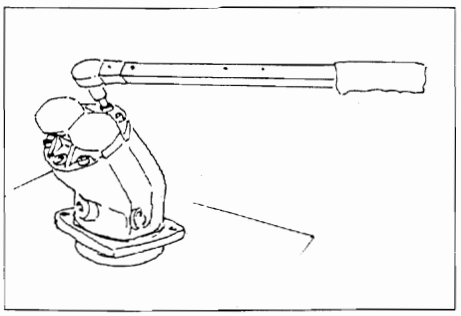
18

Lightly grease and fit O-ring.



19

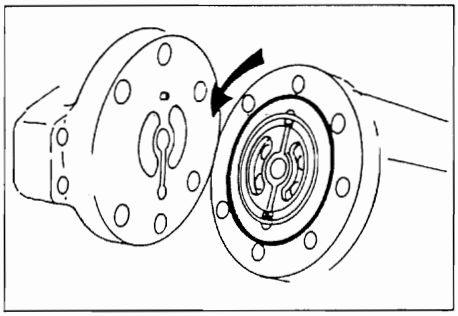
Assemble port plate to original mark (11),noting position of port plate (14-16). See notes fitting control plate.



20

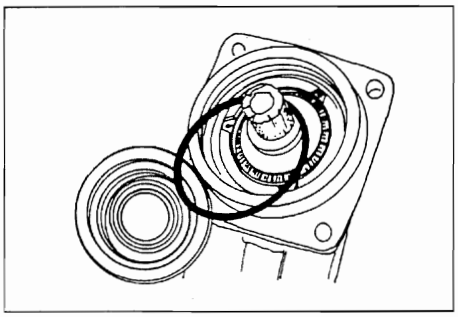
Tighten screws using torque wrench. See p. 14 for setting.

Removal of rotary group



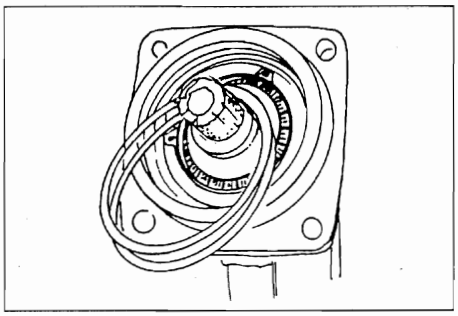
21

Remove cover plate (page 6). Rotate control plate to remove.



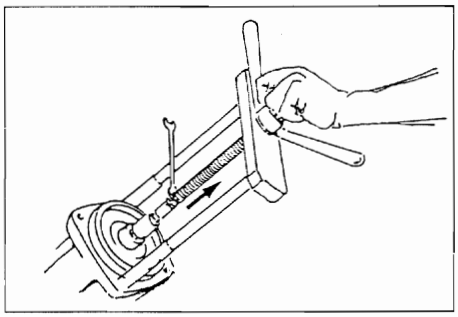
22

Remove front cover (page 4).



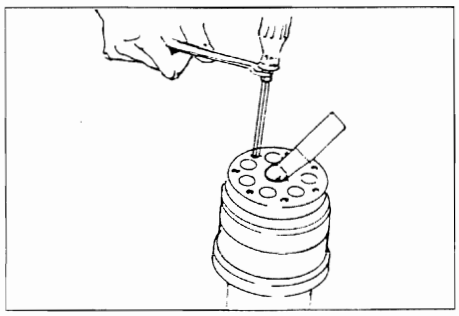
23

Remove shim(s).



24

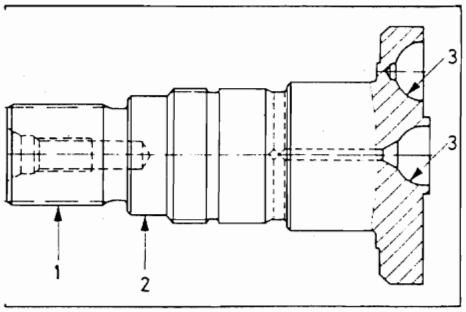
Remove rotary group with extractor. (See fig. 50).



25

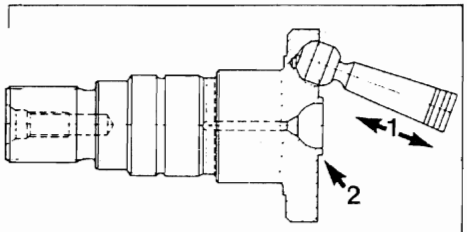
Remove retaining plate. The screws are held by loctite.

Examination notes



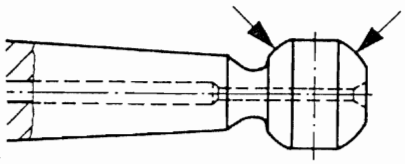
26

Drive shaft
1.) Free of corrosion or erosion, no damage to splines or keyway.
2.) No trace of wear, free of scratches (p. 7).
3.) Cups free of scratches and no pitting.



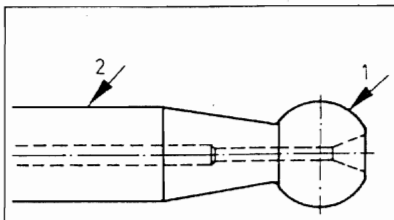
27

1.) Axial play of piston.
2.) Spigot.



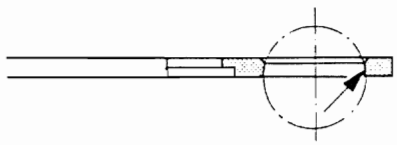
28

Piston
Free of scratches, no pitting (do not dismantle - tilt).



29

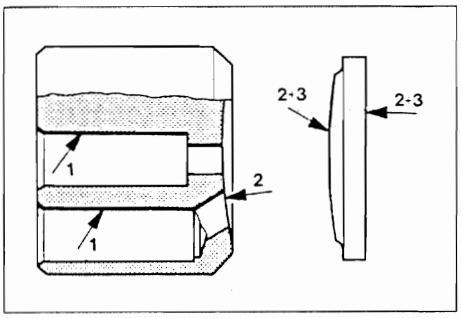
Centre pin
1.) Free of scratches, no pitting (do not dismantle - tilt).
2.) Free of scratches.



30

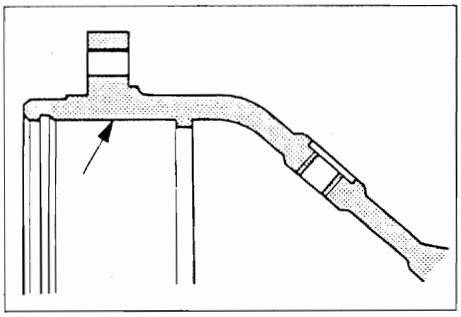
Retaining plate
Free of scratches, no wear.

Examination notes



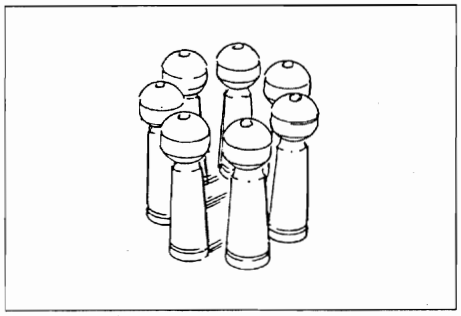
31

Cylinder block/Control plate
1.) Bores unscratched, and not worn.
2.) Faces, smooth and even, no cracks or scratches.
3.) Min. hardness 700 HV 10.



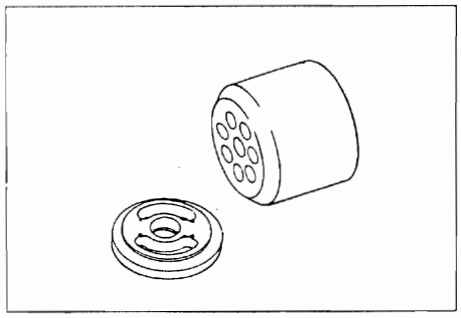
32

Housing
No damage or wear where bearings fit.



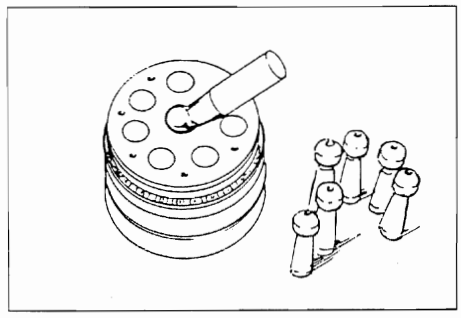
33

Only exchange piston as a complete set. When changing other components, re-calibration is required.



34

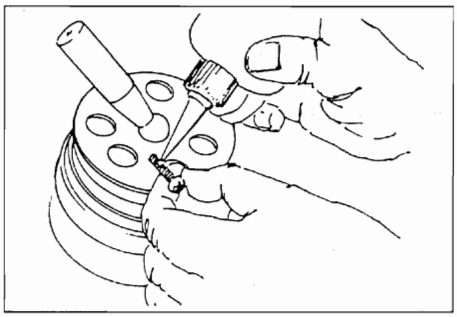
Exchange cylinder block and control plate as a pair.



35

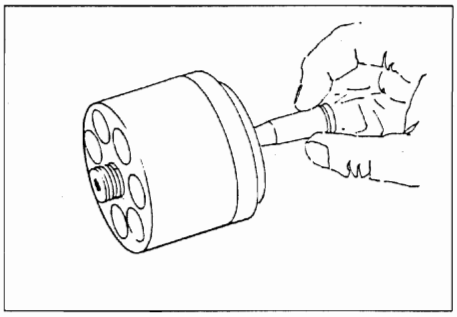
Insert centre pin with retaining ring.
Correctly fit retaining plate.

Installing rotary group



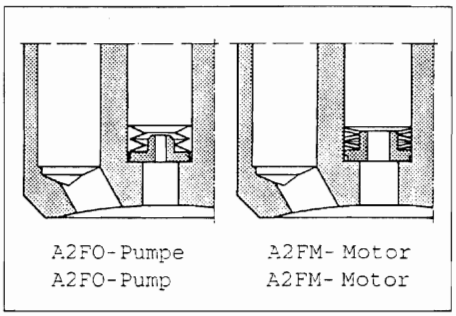
36

Apply loctite sparingly to screws only.



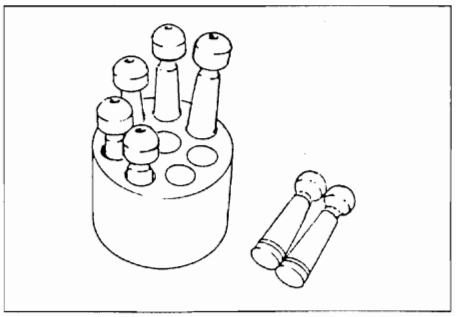
37

Heavily grease and fit spring pad and Belleville washers (using screwdriver).



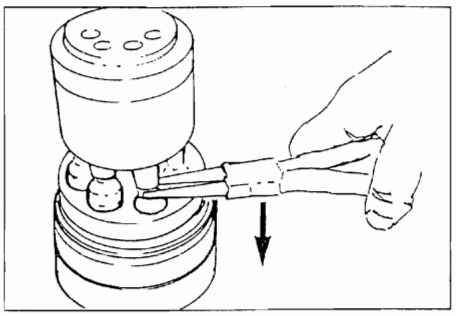
38

Make sure all parts are fitted in correctly!
Note:
A2FO - Pump- 4 Belleville washers/ Spring pad
A2FM - Motor- 6 Belleville washers/ Spring pad



39

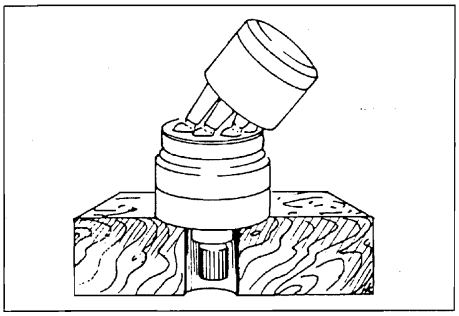
Fit pistons in bores.



40

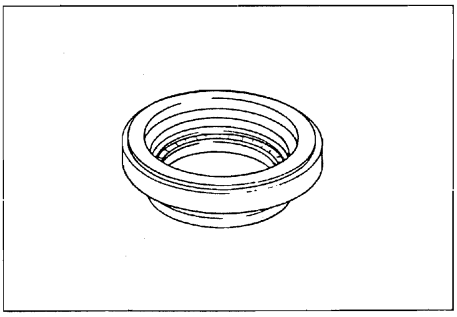
Press pistons firmly into cups with cylinder block held in central position.

Installing rotary group



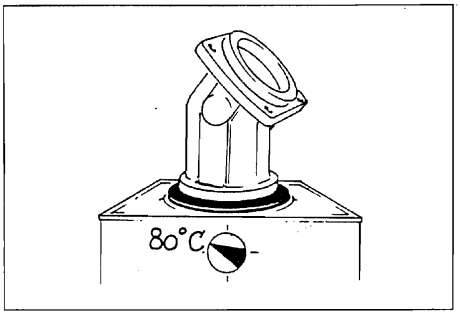
41

Swivel cylinder block to max. It fouling occurs fig. 40.



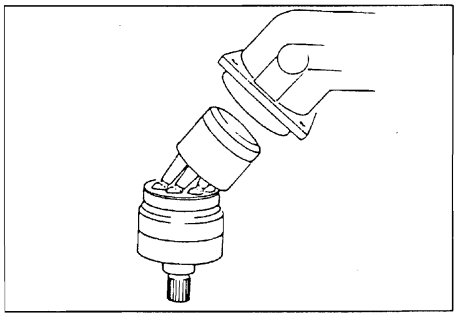
42

Is new shaft seal fitted? (comparisons fig 7).



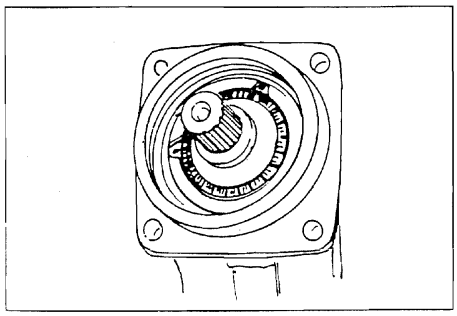
43

Heat the housing to 80°C.



44

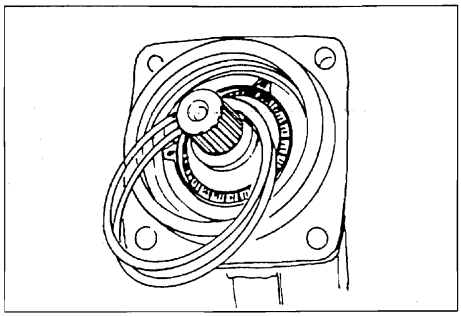
Fit pre-heated housing up to stop.



45

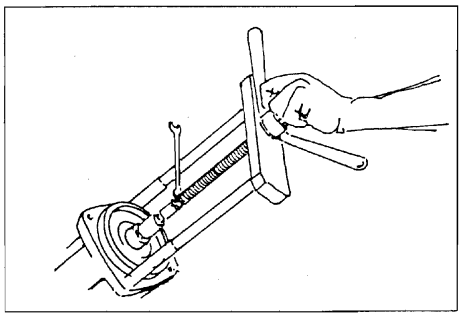
Re-position.

Installing rotary group



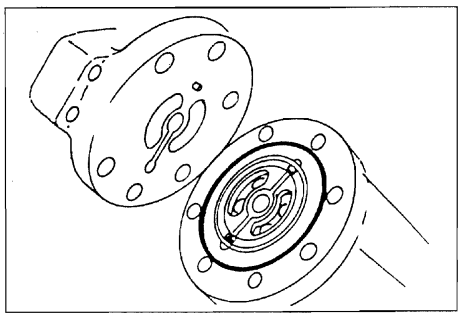
46

Insert shims and assemble to figs. 7 - 10.



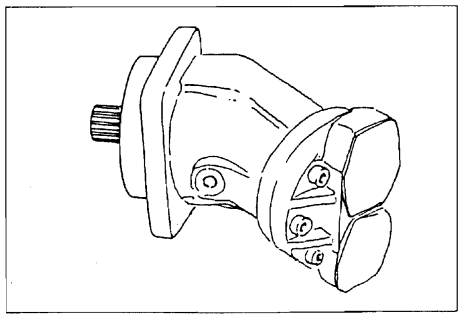
47

Pull the rotary group against the cover plate.
Check that the cover plate cannot move!



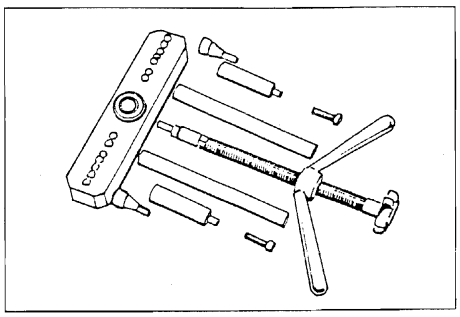
48

Completely assemble to figs. 18 - 20.



49

Seal connections to protect against dust.
Corrosion proctection (internal/external).
Assembly complete.



50

Extractor for rotary group (fig. 24).

Tightening torques

Anziehdrehmomente für Schaftschrauben (Metrisches ISO-Regelgewinde)

Die nebenstehenden Werte für Anziehdrehmomente gelten nur für Schaftschrauben mit metrischem ISO-Regelgewinde und Kopfauflagemaßen nach DIN 912, DIN 931 und DIN 933. Außerdem gelten diese Werte nur für leicht oder nicht geölte, unbehandelte Oberflächen, sowie nur bei Verwendung von Drehmoment- und Kraftbegrenzungsschlüsseln.

Gewinde größe	Festigkeitsklassen 8.8	10.9	12.9
	Anziehdrehmoment (Nm)		
M 3	1.1	1.6	1.9
M 4	2.9	4.1	4.9
M 5	6	8.5	10
M 6	10	14	17
M 8	25	36	41
M 10	49	69	83
M 12	86	120	145
M 14	135	190	230
M 16	210	295	355
M 18	290	405	485
M 20	410	580	690
M 22	550	780	930
M 24	710	1000	1200
M 27	1050	1500	1800
M 30	1450	2000	2400

Tightening torques for shaft bolts (Metric ISO Standard Thread)

The values for tightening torques shown in the table are valid only for shaft bolts with metric ISO- standard threads and head support surface dimensions in accordance with DIN 912, DIN 931 and DIN 933. These values are also valid only for light or unoiled, untreated surface as well as for use only with torque-indicating wrenches and force limiting tools.

Thread Size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft)		
M 3	0.8	1.2	1.4
M 4	2.1	3.0	3.6
M 5	4.4	6.3	7.4
M 6	7.4	10.3	12.5
M 8	18.4	25.8	30.2
M 10	36.1	50.9	61.2
M 12	63.4	88.4	106.9
M 14	99.5	140.0	169.5
M 16	154.8	217.4	261.6
M 18	213.7	298.5	357.4
M 20	302.2	427.5	508.5
M 22	405.4	574.9	685.4
M 24	523.5	737.0	884.4
M 27	773.9	1105.5	1326.6
M 30	1068.7	1474.0	1768.8

Anziehdrehmomente für Verschlußschrauben VSTI (Metrisches Feingewinde)

Gewindegröße	Bezeichnung		Anziehdrehmoment (Nm)
M 8 x 1	VSTI 8 x 1	-ED/SA	≈ 5
M 10 x 1	VSTI 10 x 1	-ED	≈ 10
M 12 x 1,5	VSTI 12 x 1,5	-ED	≈ 20
M 14 x 1,5	VSTI 14 x 1,5	-ED	≈ 30
M 16 x 1,5	VSTI 16 x 1,5	-ED/SA	≈ 30
M 18 x 1,5	VSTI 18 x 1,5	-ED/SA	≈ 40
M 20 x 1,5	VSTI 20 x 1,5	-ED/SA	≈ 50
M 22 x 1,5	VSTI 22 x 1,5	-ED	≈ 60
M 26 x 1,5	VSTI 16 x 1,5	-ED/SA	≈ 70
M 27 x 2	VSTI 27 x 2	-ED	≈ 90
M 30 x 1,5	VSTI 30 x 1,5	-ED/SA	≈ 100
M 33 x 2	VSTI 33 x 2	-ED/SA	≈ 120
M 42 x 2	VSTI 42 x 2	-ED/SA	≈ 200
M 48 x 2	VSTI 48 x 2	-ED	≈ 300

Tightening torques for locking screws VSTI (Metric ISO fine thread)

Thread Size	Designation		Tightening Torque (lb.ft)
M 8 x 1	VSTI 8 x 1	-ED/SA	≈ 4
M 10 x 1	VSTI 10 x 1	-ED	≈ 7
M 12 x 1,5	VSTI 12 x 1,5	-ED	≈ 15
M 14 x 1,5	VSTI 14 x 1,5	-ED	≈ 22
M 16 x 1,5	VSTI 16 x 1,5	-ED/SA	≈ 22
M 18 x 1,5	VSTI 18 x 1,5	-ED/SA	≈ 29
M 20 x 1,5	VSTI 20 x 1,5	-ED/SA	≈ 37
M 22 x 1,5	VSTI 22 x 1,5	-ED	≈ 44
M 26 x 1,5	VSTI 16 x 1,5	-ED/SA	≈ 51
M 27 x 2	VSTI 27 x 2	-ED	≈ 66
M 30 x 1,5	VSTI 30 x 1,5	-ED/SA	≈ 74
M 33 x 2	VSTI 33 x 2	-ED/SA	≈ 88
M 42 x 2	VSTI 42 x 2	-ED/SA	≈ 147
M 48 x 2	VSTI 48 x 2	-ED	≈ 220

Anziehdrehmomente für Seal-Lock Bundmuttern (Metrisches ISO-Regelgewinde)

Die nebenstehenden Werte für Anziehdrehmomente gelten nur für Seal-Lock Bundmuttern der Festigkeitsklasse 8.8 mit metrischem ISO-Regelgewinde.

Gewinde größe	Festigkeitsklassen 8.8	10.9	12.9
	Anziehdrehmoment (Nm)		
M 6	10		
M 8	22		
M 10	40		
M 12	69		
M 14	110		
M 16	170		

Tightening torques for seal-lock nuts (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for seal-lock-nuts of the strength class 8.8 and with metric ISO- standard thread.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft)		
M 6	7.4		
M 8	16.2		
M 10	29.5		
M 12	50.9		
M 14	81.1		
M 16	125.3		

Anziehdrehmomente für Linsenschrauben mit Kreuzschlitz DIN 7985 (Metrisches ISO-Regelgewinde)

Die nebenstehenden Werte für Anziehdrehmomente gelten nur für Linsenschrauben mit Kreuzschlitz DIN 7985 der Festigkeitsklasse 8.8 mit metrischem ISO-Regelgewinde.

Gewinde größe	Festigkeitsklassen 8.8	10.9	12.9
	Anziehdrehmoment (Nm)		
M 3	1.1		
M 4	2.9		
M 5	6		
M 6	10		
M 8	25		
M 10	49		

Tightening torques for cross-slotted lens head screws DIN 7985 (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for cross-slotted lens head screws DIN 7985 of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft))		
M 3	0.8		
M 4	2.1		
M 5	4.4		
M 6	7.4		
M 8	18.4		
M 10	36.1		

General advice
- Make yourself familiar with the equipment of the machine.
- Only operate the machine if your are completely familiar with the operating and control elements as well as the functioning of the machine.
- Use your safety equipment like helmet, safety shoes and hearing protection.
- Make yourself familiar with your working field.
- Only operate the machine for its intended purpose.

Please observe the guidelines of the Professional Association and the machine manufacturer.

Before starting
- Observe the operating instructions before starting.
- Check the machine for remarkable faults.
- Do not operate the machine with defective instruments, warning lights or control elements.
- All safety devices must be in a secure position.
- Do not carry with you movable objects or secure them to the machine.
- Keep oily and inflammable material away from the machine.
- Before entering the driver's cabin, check if persons or obstacles are beside or beneath the machine.
- Be careful when entering the driver's cabin, use stairs and handles.
- Adjust your seat before starting.

Start
- When starting all operating levers must be in "neutral position".
- Only start the machine from the driver's seat.
- Check the indicating instruments after start to assure that all functions are in order.
- Do not leave the machine unobserved when the motor is running.
- When starting with battery connection cables connect plus with plus and minus with minus. Always connect mass cable (minus) at last and cut off at first.

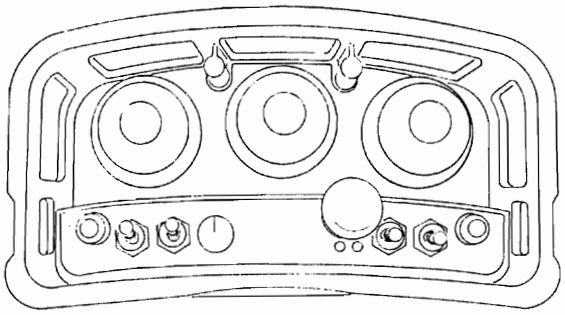
Attention
- Exhaust gas is dangerous. Assure sufficient fresh air when starting in closed rooms!

Hydraulic equipment
1. Hydraulic equipment is standing under high pressure.
   ⚠ High pressure fluids (fuel, hydraulic oil) which escape under high pressure can penetrate the skin and cause heavy injuries.
   Therefore immediately consult a doctor as otherwise heavy infections can be caused.
2. When searching leakages use appropriate auxiliary devices because of the danger of accidents.
3. Before working at the hydraulic equipment, lower pressure to zero and lower working arms of the machine.
4. When working at the hydraulic equipment, absolutely stop motor and secure tractor against rolling away (parking brake, shim)!
5. When connecting hydraulic cylinders and motor pay attention to correct connection of hydraulic flexible hoses.
6. In case of exchanging the ports, the functions are vice versa (f. ex. lift-up/lower) - danger of accidents!
7. Check hydraulic flexible hoses regularly and replace them in case of dammage or wear! The new hose pipes must comply with the technical requirements of the machine manufacturer!

⚠ Orderly disposal or recycling of oil, fuel and filters!

NBB NANO-S-A2-HC
RADIO REMOTE CONTROL

NBB
NACHRICHTEN
TECHNIK



S/N :

1. STANDARD SPECIFICATION

- Portable transmitter with two replaceable 7,2 volt NiCd batteries, halter and waist straps
- Receiver with NBB adapter plate for fastening purposes (Only PNN-BUS-3)
- Receiver with 4 fastening angles (PNN-BUS-5)
- Multi-pole connecting cable for the receiver, to your specifications
- Automatic battery charger with charging adapter (rapid charging in three hours)

The actual delivery specification is as detailed on the confirmation of order or the delivery note accompanying the goods!

2. SAFETY PRECAUTIONS

Even if you are accustomed to working with radio control systems, read these operating instructions without fail before using this equipment. Only this document contains the latest information relating to your NBB radio control system.

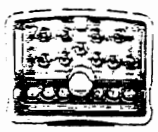
Please refer to the accompanying registration documents for the explanatory notes on obtained an operating permit. Observe all applicable work-safety and accident prevention regulations without fail. Only fully trained, authorized personnel may use the NBB radio control equipment. Components, etc. built into the NBB equipment for safety purposes must be regularly inspected. (See point 6 of this instruction)

If the NBB radio control unit develops a fault, it must be shut down immediately. The transmitter should be switched off with the EMERGENCY-OFF switch. The connecting cable must be disconnected from the crane connecting socket (terminal) on the receiver. The repair of the equipment must not be carried out other than by NBB or an NBB authorized technician.

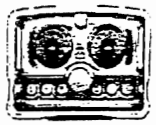
Failure to observe these recommendations will put both you yourself and others at risk. Under these circumstances, NBB rescinds the guarantee and any other form of liability. This radio control unit is designed exclusively for the control of construction machines and industrial plants. Only under these conditions are the safety systems (EMERGENCY-OFF, zero setting) fully effective. No other form of use is permitted. Any non-observance of this condition will relieve NBB of all liability.

Nano, Nano-S-A2-HC

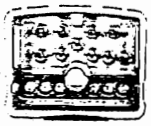
Nano-Vario



Nano, Nano-S-A2-HC

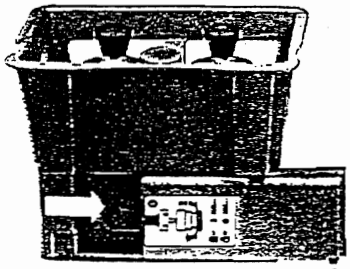


Nano-Vario

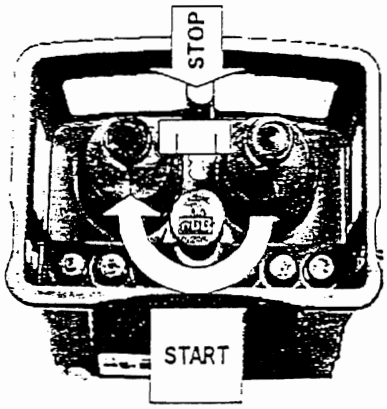


3. TRANSMITTER

To make the unit ready for use, insert the battery into the battery compartment. To remove the battery, depress the pin and push out the battery. The power supply to the transmitter is activated with the EMERGENCY-OFF switch (when depressed, the EMERGENCY-OFF switch can also be secured by removing the key cap). The green LED on the transmitter control panel must flash regularly. Commands can now be input by means of the controls. The operating period with a charged battery is approximately 8 hours with the transmitter in continuous use. When the red 'Battery' indicator lamp lights up, the battery is nearing exhaustion.
The transmitter can be operated for approximately 15 minutes more in this condition. During this time, bring the crane to a safe position and install a new battery.
Removal of the battery inerrupts the radio link. As a result, the master switch for the crane must be switched on again.
Charge the discharged battery with the charger supplied.

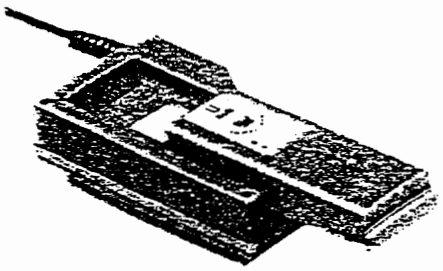


Depress the pin and push out the battery



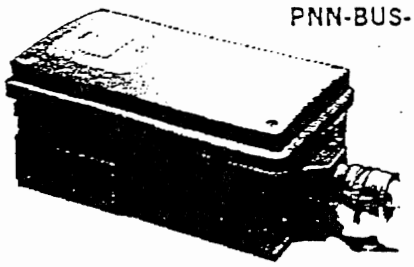
4. BATTERY CHARGER

The red indicator lamp indicates that the battery charger is ready for use. Place the battery in the charging well; it will now be charged. When the red LED goes out, the charging process is concluded. No harm will come to the battery if it is left in the charger beyond the required charging time.
Do not use the charger other than in dry rooms having a min-max temperature range of 0-40°C. A charged battery is a concentrated energy source. Never store a charged battery in a toolbox or similar where it could be short-circuited by metal components (even a key in your trouser pocket can cause a short circuit).



5. RECEIVER (PNN-BUS-3 and PNN-BUS-5)

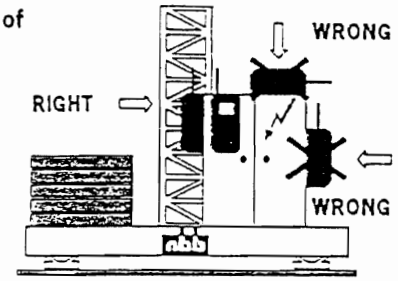
PNN-BUS-3

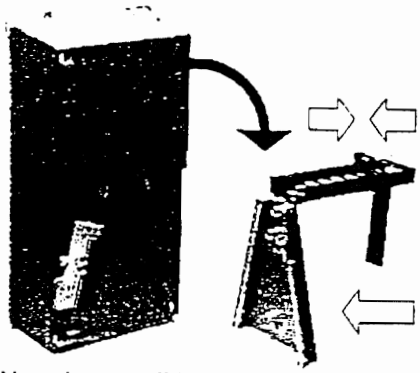


The receiver is connected to the crane with the multi-pole connecting cable supplied. Please observe the instructions issued by the crane manufacturer. The power supply to the receiver is generally effected by way of the connecting cable.

- **In general, an earth lead is required in the case of cranes which have not previously been operated under radio control. Failing this, the receiver electronic circuit will not receive any power supply.**
  Take care to ensure that the operating voltage of the receiver complies with the electrical specifications of the crane.
  The applicable operating voltage is specified in the supplement.

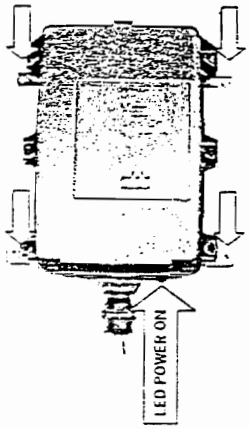
- **Never expose the receiver to a high pressure cleaning jet. This also applies to the transmitter.**
- **The receiver should always be fixed vertical at the outside panel of the switching cabinet. The antenna should reach over the top of the panel.**



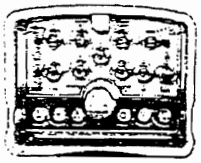


Mounting-possibilities of the PNN-BUS-3 or of the PNN-BUS-5.

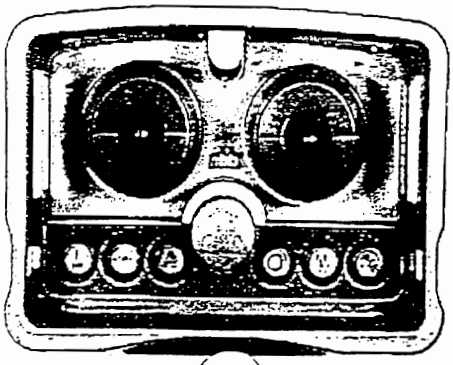
PNN-BUS-5

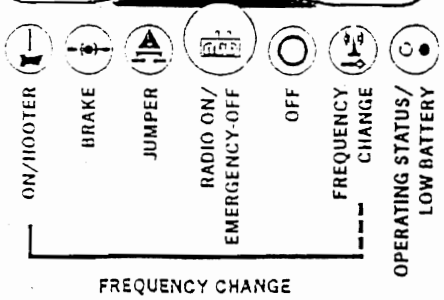


Nano-Vario



Nano / Nano-S-A2-HC





6. OPERATING THE SYSTEM

Safety equipment in the NBB radio control system:

In the transmitter:

- EMERGENCY-OFF switch with automatic disconnection from the power supply
- Automatic zeroing

In the receiver:

- Duplicated 2-channel evaluation of the EMERGENCY-OFF signal
- Automatic zeroing when switched on again after radio signal interruption
- Inhibition of radio control commands at the relay level if EMERGENCY-OFF circuit defective.

To ensure troublefree operation, observe the following operating instructions precisely. Subject to the transmitter being in operating condition, the crane's master switch can only be switched on provided no command transmitter is actuated. The necessary command for this purpose is initiated by the 'ON/HOOTER' button. This activates a warning signal on the crane. After the crane has been switched on, this button serves for the subsequent activation of the hooter as required by safety at work regulations.

If the NBB radio control unit remains unused for a prolonged period, we strongly recommend that the battery be charged from time to time (approximately every four weeks). This will prevent it from becoming discharged and will prolong its working life. If an extended period of disuse is intended, we recommend that the battery be removed from the transmitter.

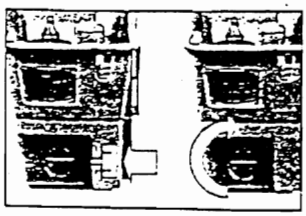
Changing the frequency:

To change the frequency, hold down the 'ON/HOOTER' button while simultaneously operating the 'FREQUENCY CHANGE' button until the hooter sounds. (Please observe the accompanying registration conditions, see page 5, point 9).

TEACH-IN: Individual Setting of Analog Channels (Basic Setting) at Nano Transmitter*.
The output signals of the analog channels can be individually programmed from the transmitter.

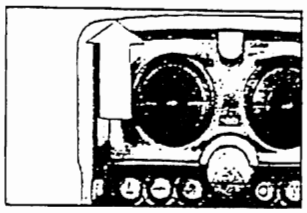
Activate programming mode

Mounting the key cap on the rotary switch opposite the battery compartment and then turning this switch activates the programming mode.



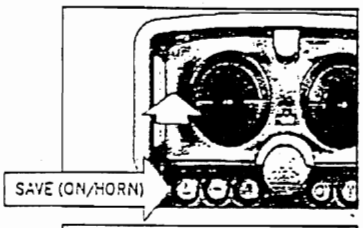
Select analog function

To determine which analog function is to be programmed, it is sufficient to briefly turn the appropriate master switch fully in the direction of this function.



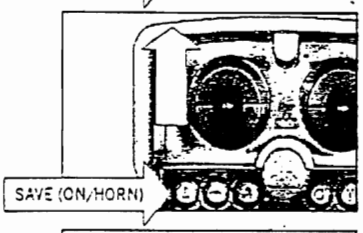
Save "contact point"

The master switch is now turned until the required "contact point" (less than 50% of the master switch turning range) is reached. To save this value, the "SAVE" ("ON/HORN") key must be pressed at this position.



Save maximum speed

The upper initial value is saved by turning the master switch (further than 50% of the master switch turning range) until the maximum speed of the function is reached, and then pressing again the "SAVE" ("ON/HORN") key.

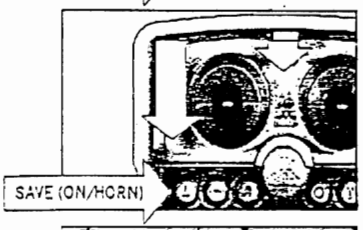


Program opposite direction ?

No

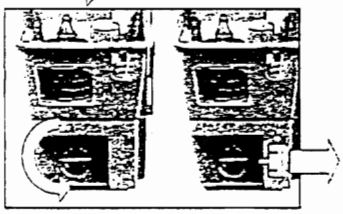
Yes

The opposite direction of this function can then be programmed the same way immediately afterwards.



End programming mode

If the rotary switch is reset, the programming mode is left and working with this function can commence.
Removing the key cap secures the transmitter against inadvertant teaching.



Programming of next function ?

No

Yes

When programming several analog channels consecutively, the programming function must be left after saving a function, in order to release the next channel for programming, after turning the programming switch back on by briefly turning the master switch to the full.

The control is ready to operate.

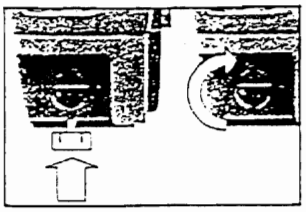
Please note:
No frequency change is possible in the programming mode!

***Please refer to the scope of supply of your facility.**

TEACH-IN: Individual Setting of Analog Channels (Basic Setting) at Nano Transmitter with Potentiometer Control*.
The output signals of the analog channels can be individually programmed from the transmitter.

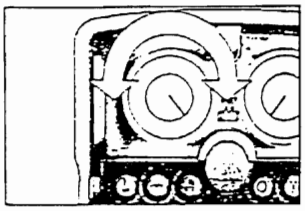
Activate programming mode

Mounting the key cap on the rotary switch opposite the battery compartment and then turning this switch activates the programming mode.



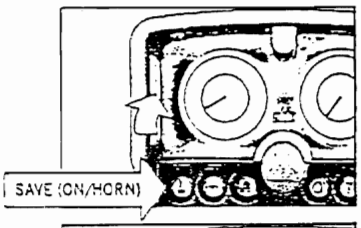
Select analog function

To determine which analog function is to be programmed, it is sufficient to briefly turn the appropriate potentiometer fully in the direction of this function and then back again.



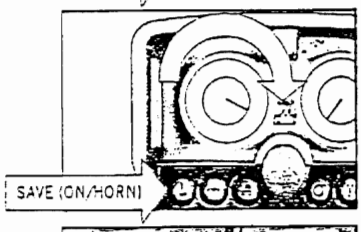
Save "contact point"

The potentiometer is now turned until the required "contact point" (less than 50% of the potentiometer turning range) is reached. To save this value, the "SAVE" ("ON/HORN") key must be pressed at this position.



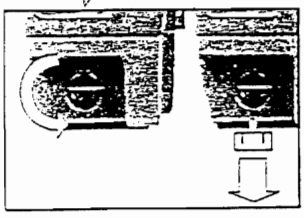
Save maximum speed

The upper initial value is saved by turning the potentiometer (more than 50% of the potentiometer turning range) until the maximum speed of the function is reached, and then pressing again the "SAVE" ("ON/HORN") key.



End programming mode

If the rotary switch is reset, the programming mode is left and working with this function can commence.
Removing the key cap secures the transmitter against inadvertant teaching.



Programming next function ?

No

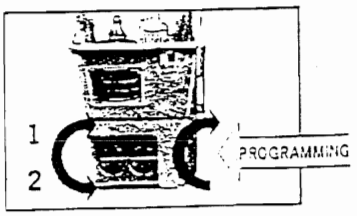
Yes

When programming several analog channels consecutively, the programming function must be left after saving a function, in order to release the next channel for programming, after turning the programming switch back on by briefly turning the master switch to the full.

The control is ready to operate.

Please note:
No frequency change is possible in the programming mode!

Saving two different basis settings (optional)*
If required, the unit can be supplied with two saving options for the basic setting.
These can be selected using an additional key switch or rotary switch once saved.
For both settings, the individual analog functions must be programmed separately.



***Please refer to the scope of supply of your facility.**

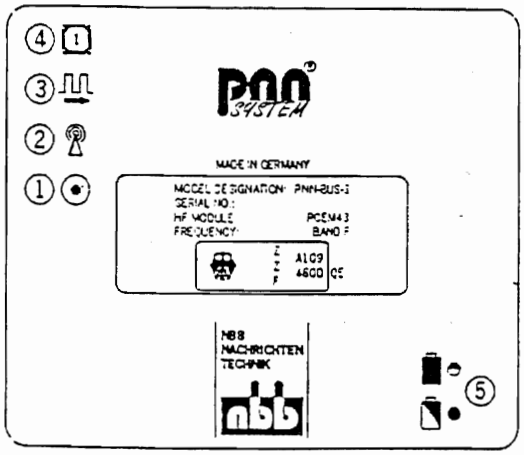
7. FUNCTION CHECKS

Regular function checks of the NB8 radio control unit are essential to ensure that operating safety is maintained. In the case of a single-shift daily operation, we recommend that the checks be carried out once a week. They can be performed with the aid of the indicator lamps on the receiver. For this purpose, the transmitter must be in operating condition.

- First, connect only the receiver - the transmitter remains switched off.
- Switch on the transmitter by releasing the EMERGENCY-OFF button.
- Now test the command functions (always starting at the lowest stage) and check that the crane responds correctly. In particular, make sure that the danger area is clear of all personnel. **Failure to do so may result in an ACCIDENT.**
- **EMERGENCY-OFF check.** Press the EMERGENCY-OFF button on the transmitter until it locks. The crane's master contactor must drop out after a maximum of 1/2 second.

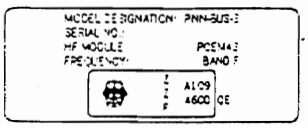
Checking the LEDs of the receiver

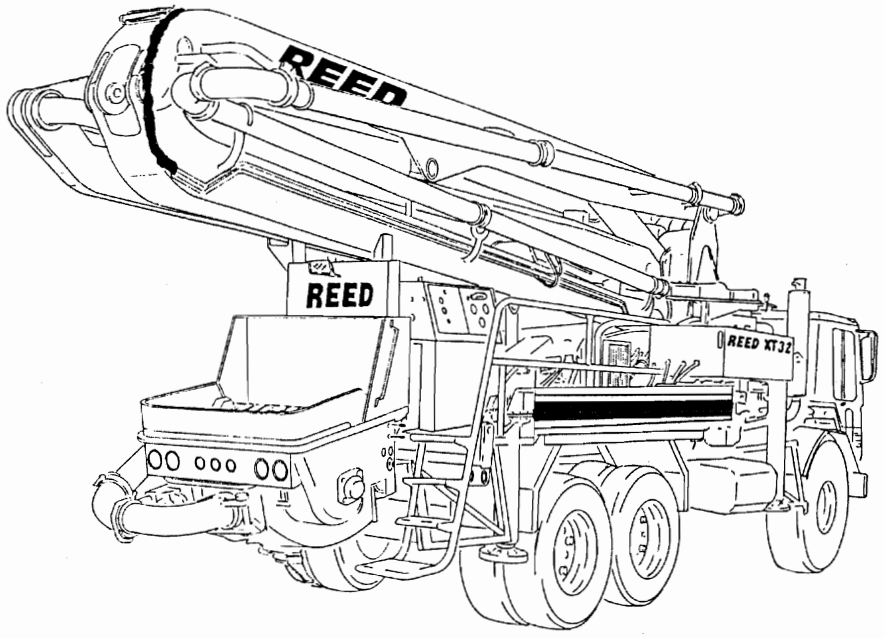
- **LED1:** POWER ON. If the LED does not light up, check the power supply. If the power supply lead is in satisfactory condition, notify your service centre.
- **LED2:** HF AVAILABLE. Remains lit continuously when the transmitter is switched on.
  (not significant in the case of scanner operation).
- **LED3:** Flashes at regular intervals during fault-free operation. Irregular flashing means that the HF channel is probably disrupted. In this case, select an alternative channel.
- **LED4:** If this LED flashes, the HF channel is disrupted.
- **LED5** (Battery operation): state of charge of the battery.



8. RATING PLATES

Rating plates contain the serial number, model designation, type of HF module and frequency. In the event of a query, please give the serial number without fail.





9. REGISTRATION

Explanatory notes on obtaining an operating permit for your NBB radio control system will be found in the accompanying registration documents.

10. MAINTENANCE

The NBB radio control unit is largely maintenance-free. Nevertheless, please observe the following points:

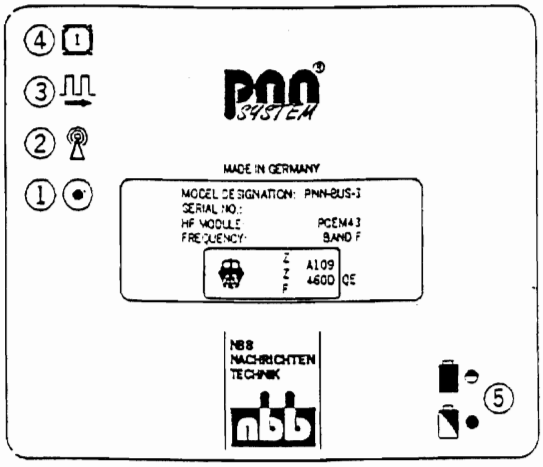
- The EMERGENCY-OFF button must operate freely.
- Keep the unit clean of any contamination from building materials.
- If any electrical welding is carried out on the crane, disconnect the control cable from the receiver, otherwise the receiver electronics may be damaged.

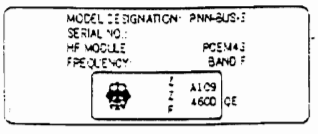
11. GUARANTEE

All NBB radio control units (transmitter, receiver, battery charger) are guaranteed to operate satisfactorily for a period of six months from the date of sale. The terms of the guarantee include parts and labour. Transport costs are the buyer's responsibility. The following are excluded from the guarantee: wearing parts, relays and batteries. The guarantee does not cover damage, accidental damage, negligence, improper use, non-adherence to operating conditions, the non-observance of operating, testing and servicing instructions, or repairs or modifications to the unit not authorized by NBB.
NBB will not be liable for consequential damage. It reserves the right to effect repairs or replacements at its own discretion.

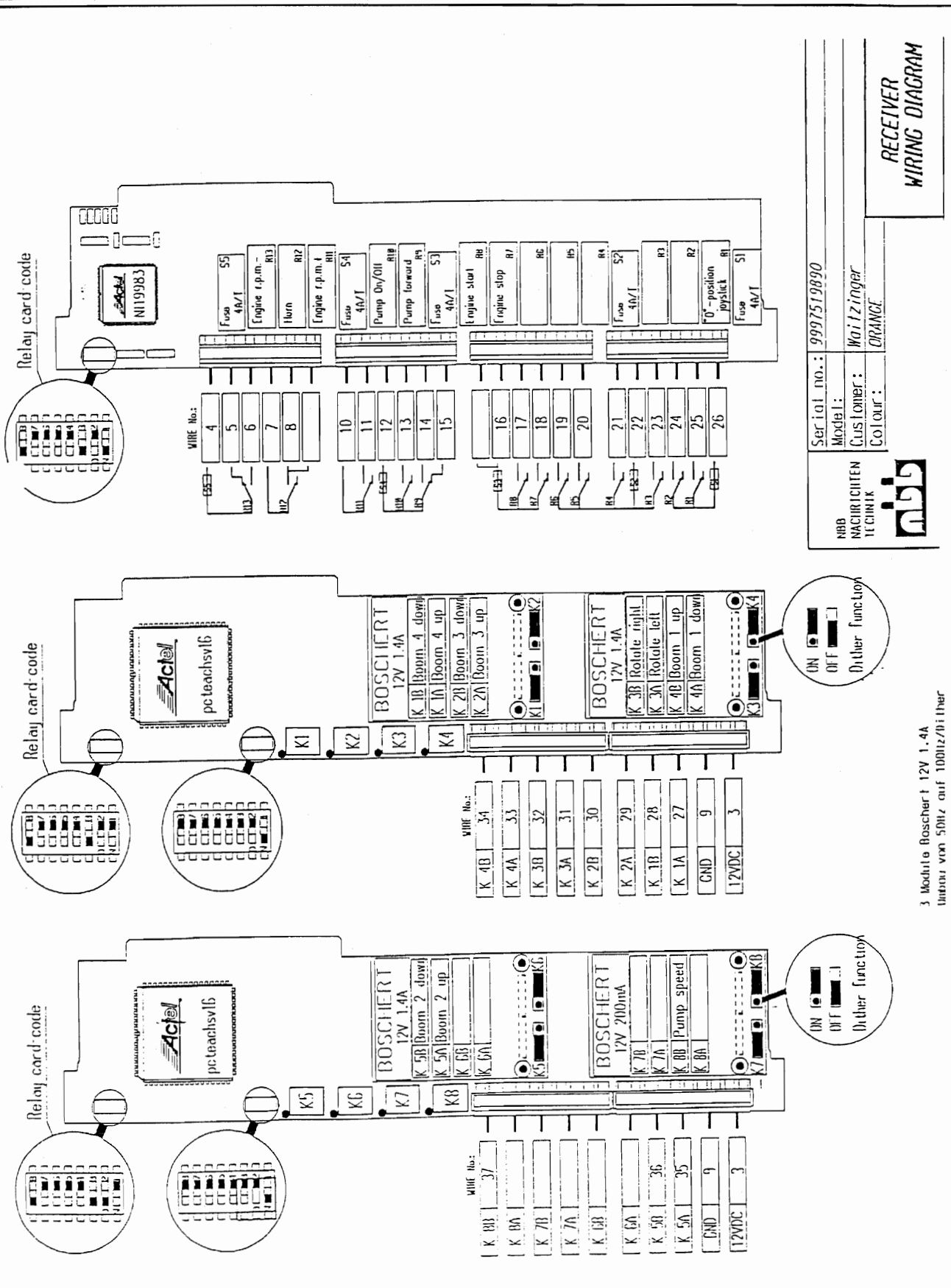
12. ACTION IN THE EVENT OF A FAULT

Do not continue to work with a defective NBB radio control unit. Even a minor defect in the first instance may eventually lead to a major fault!
Do not try to repair the NBB radio control unit yourself. In the event of a fault, please notify your dealer or contact us!



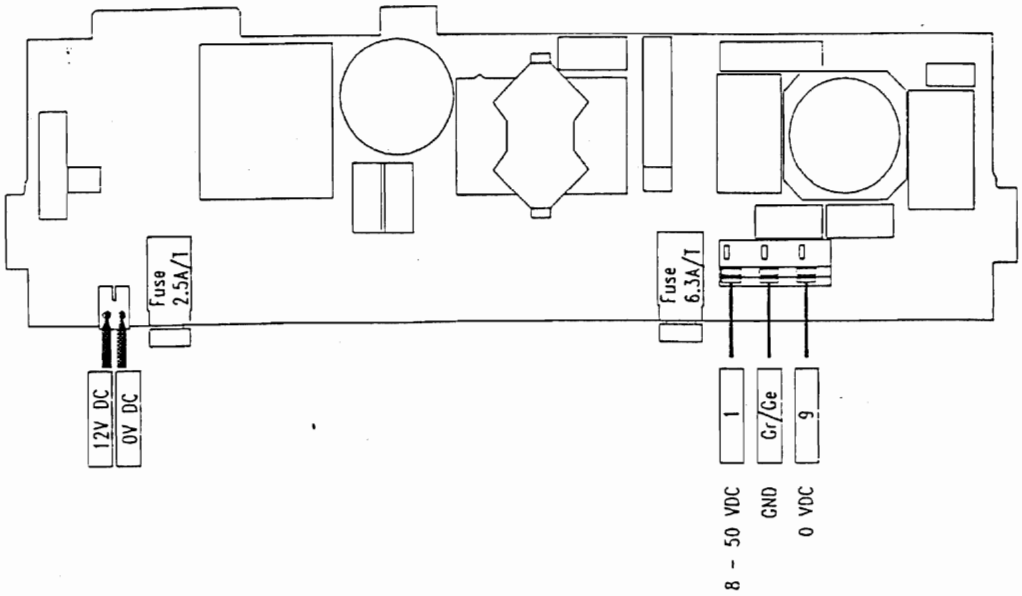


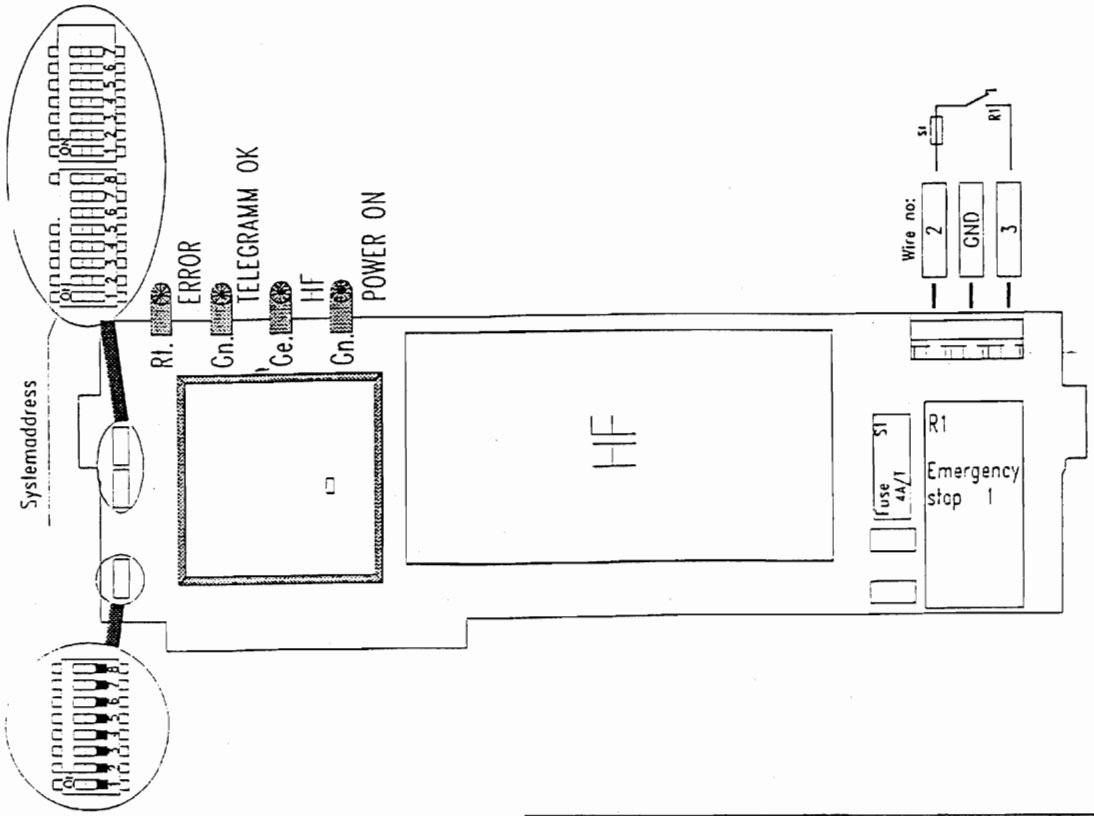
NBB NANO-S-A2-HC
RADIO REMOTE CONTROL



REVISION:

NBB NANO-S-A2-HC
RADIO REMOTE CONTROL





NBB NACHRICHTEN TECHNIK	Serial no.:	9997519890
	Model:	Concrete-Pump
	Customer:	Waitzinger
	Colour:	
	Date:	/05/1997
	Name:	
	Scale:	

RECEIVER WIRING DIAGRAM

REVISION:

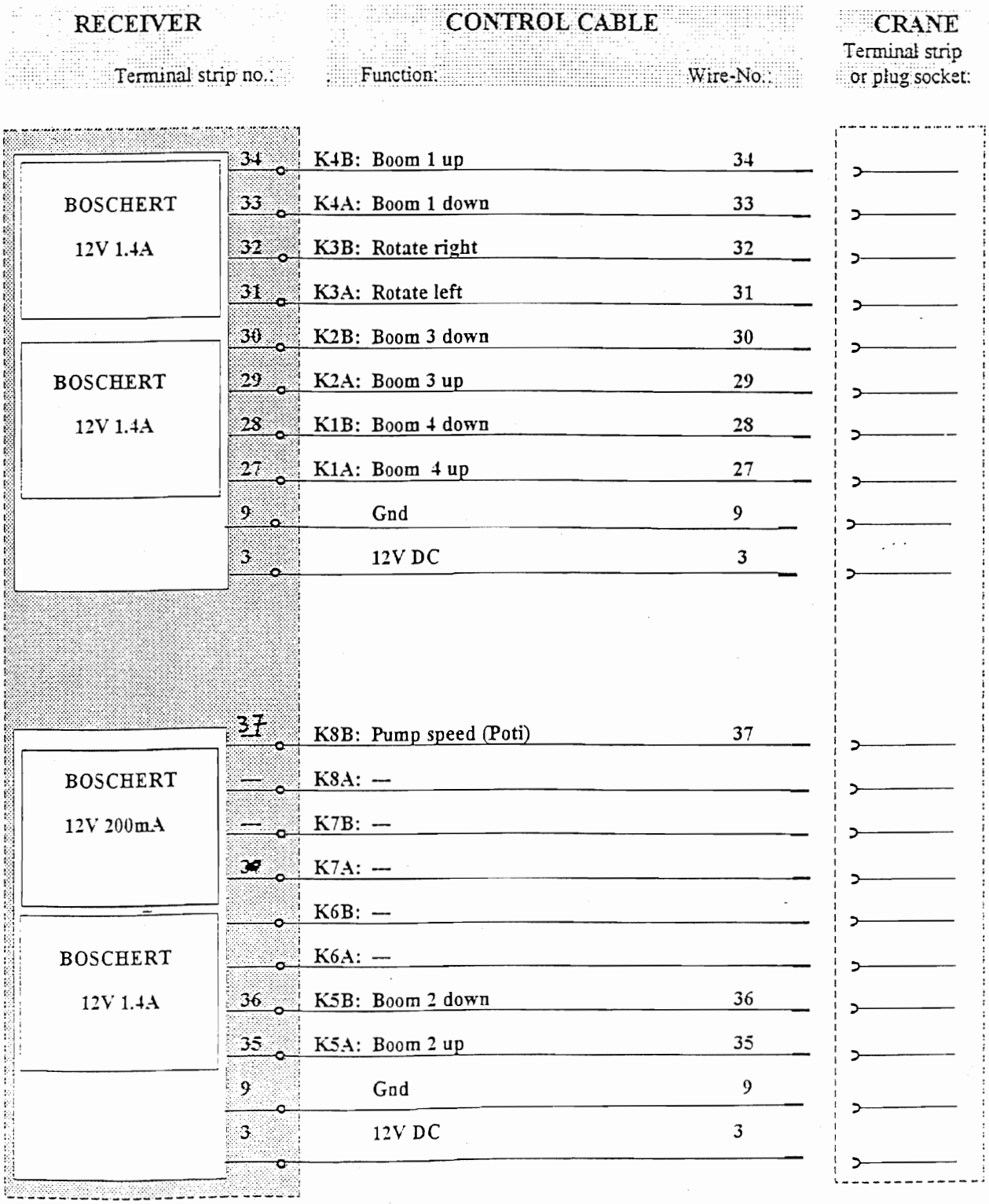
CONTROL CABLE CONNECTING PLAN

Serial no.: 9997519890
Relay board code: 1. 3. 8

RECEIVER		CONTROL CABLE		CRANE
Terminal strip no .:		Function:	Wire-No.:	Terminal strip or plug socket:
8-50VDC / 12VDC	1	Power supply 12VDC	1	
	9	Power supply 0VDC GND	9	
	2	Common	2	
	3	Emergency stop	3	
	4	Common	4	
R 13	5	Engine r.p.m. „-„	5	
R 13	6	Engine r.p.m. „-„	6	
	7	Common	7	
R 12	8	Horn	8	
	10	Common	10	
R 11	11	Engine r.p.m. +	11	
	12	Common	12	
R 10	13	Pump on/off	13	
R 9	14	Pump for.	14	
R 9	15	Pump rev.	15	
	16	Common	16	
R 8	17	Engine start	17	
R 7	18	Engine stop	18	
R 6	19		19	
R 5	20		20	
R 4	21		21	
	22	Common	22	
R 3	23		23	
R 2	24		24	
R 1	25	„0"-position joystick	25	
	26	Common	26	

NBB NANO-S-A2-HC
RADIO REMOTE CONTROL

Serial no.: 9997519890
Crane model:
Relay board code: 3, 8

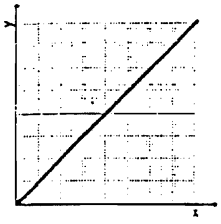


REVISION:

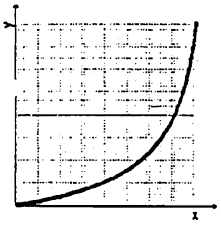
TECHNICAL SUPPLEMENT

NANO: Board E-AN04A2V1/1 TEACH-IN*

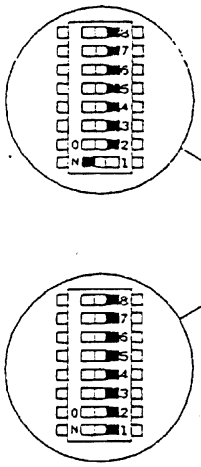
DIL switch (SW2) for setting various transmission characteristics:

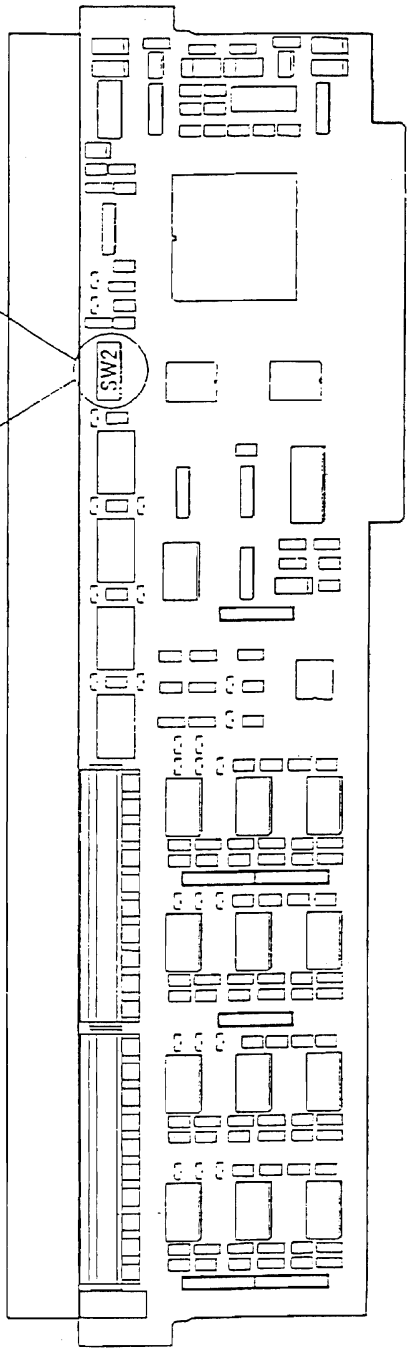


Setting for linear characteristic

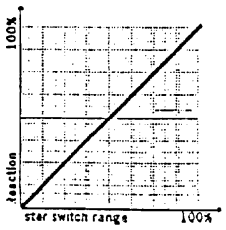


Setting for non-linear characteristic

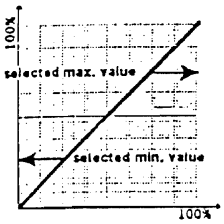




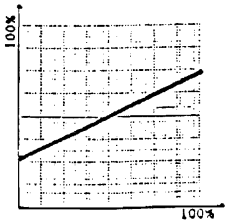
Characteristics linear or non-linear

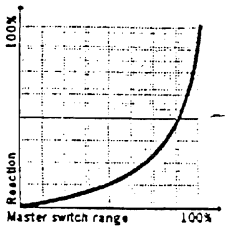


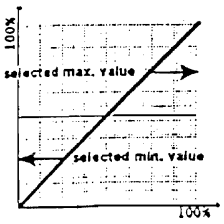
Characteristics in Teach-In mode

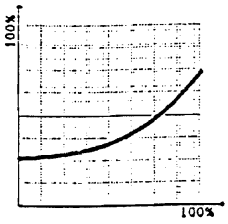


Characteristics after Teach-In mode









*Please refer to the scope of supply of your facility.

Teaching of the function "PUMP SPEED":

In case of teaching the function "PUMP SPEED" the rotary switch has to be set from minimum to maximum and back in order to release this function for programming.
This function is to be programmed at last.

Teaching of the additional functions:

Before the programming-mode is activated the rotary switch for the function "PUMP SPEED" has to be set to less than 50% (best minimum or left-hand position).

Apart from that the programming is according to the advice in the operating instructions.

TECHNICAL DATA

Operating ambient temperature	-20 to +65 °C
Insulation class - Protection	IP 65

TRANSMITTER

Nano, Nano-Vario, Nano-S-A2-HC

Transmission frequency range	400 - 477 MHz, 25 mW FM

The use of synthesizer technology permits frequencies to be selected in accordance with the appropriate waveband for the country of use.

Low frequency modulation	FSK signal to CCITT V.23
Data repetition rate	about 60 ms
Baud rate	1200 baud (bits per sec.)
Range	300 up to 1000 m
Power input	about 60 mA
RF ouput	25 mW

	Weight (without battery)	Size (L x W x H)
Pocket	0,4 kg	8,7 x 3,5 x 18,2 cm
Nano	0,8 kg	17,5 x 12,6 x 12,2 cm
MOL	1,5 kg	28,3 x 14,4 x 16,7 cm

TECHNICAL DATA

RECEIVER

PNN-BUS-3 PNN-BUS-5

Reception frequency range	400 - 477 MHz

Data security:
Generates a CRC code with a Hamming distance = 4. Generates a neutral position Addressing of each transmitter with its own, unique combination (32768 possible combinations). Parity - Bit parameters with addressing.

Data reception security:

2 diversitary evaluators (1 hardware evaluator, 1 software - controlled evaluator). CRC. EMERGENCY OFF and neutral position bits. Restart inhibitor if EMERGENCY OFF relay defective.

Contact loading for EMERGENCY OFF and commands.

max. switching voltage	250 V
max. switching current	6 A
max. switching power	1000 VA

	Weight	Size (L x W x H)
PNN-BUS-3	3,0 kg	30,6 x 18,1 x 13 cm
PNN-BUS-5	4,7 kg	36,4 x 28,3 x 15,2 cm

BATTERY

Pocket / Nano	7,2V / 0,6 Ah
MOL	9,6V / 0,6 Ah

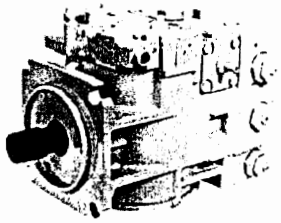
CHARGING UNIT

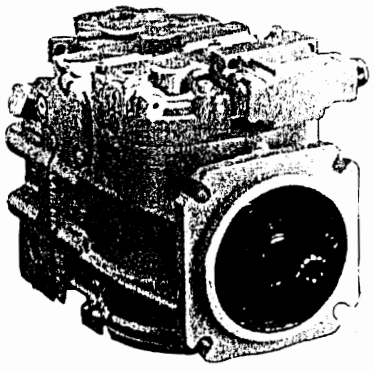
Operating voltage	80V - 270V AC
	8V - 50V DC

SAUER SUNDSTRAND

Series 90

Contents





SAUER SUNDSTRAND

1. Introduction

1.1 Use of This Manual

This manual includes information for the normal operation, maintenance, and servicing of the Series 90 family of hydrostatic pumps and motors. The manual includes the description of the units and their individual components, troubleshooting information, adjustment instructions, and minor repair procedures. Unit warranty obligations should not be affected if maintenance, adjustment, and minor repairs are performed according to the procedures described in this manual.

Many service and adjustment activities can be performed without removing the unit from the vehicle or machine. However, adequate access to the unit must be available, and the unit must be thoroughly cleaned before beginning maintenance, adjustment, or repair activities. Since dirt and contamination are the greatest enemies of any type of hydraulic equipment, cleanliness requirements must be strictly adhered to. This is especially important when changing the system filter and during adjustment and repair activities.

A worldwide network of Sauer-Sundstrand Authorized Service Centers is available should repairs be needed. Contact any Sauer-Sundstrand Authorized Service Center for details. A list of all Service Centers can be found in bulletin BLN-2-40527, or in brochure SAW (Ident. No. 698266).

1.2 Safety Precautions

Observe the following safety precautions when using and servicing hydrostatic products.

Loss of Hydrostatic Braking Ability

WARNING
When Series 90 units are used in vehicular hydrostatic drive systems, the loss of hydrostatic drive line power in any mode of operation (e.g. acceleration, deceleration or "neutral" mode) may cause a loss of hydrostatic braking capacity. A braking system which is independent of the hydrostatic transmission must, therefore, be provided which is adequate to stop and hold the system should the condition develop.

Disable Work Function

WARNING
Certain service procedures may require the vehicle/machine to be disabled (wheels raised off the ground, work function disconnected, etc.) while performing them in order to prevent injury to the technician and bystanders.

Fluid Under High Pressure

WARNING
Use caution when dealing with hydraulic fluid under pressure. Escaping hydraulic fluid under pressure can have sufficient force to penetrate your skin causing serious injury. This fluid may also be hot enough to burn. Serious infection or reactions can develop if proper medical treatment is not administered immediately.

Flammable Cleaning Solvents

WARNING
Some cleaning solvents are flammable. To avoid possible fire, do not use cleaning solvents in an area where a source of ignition may be present.

SAUER SUNDSTRAND

2. Functional Description

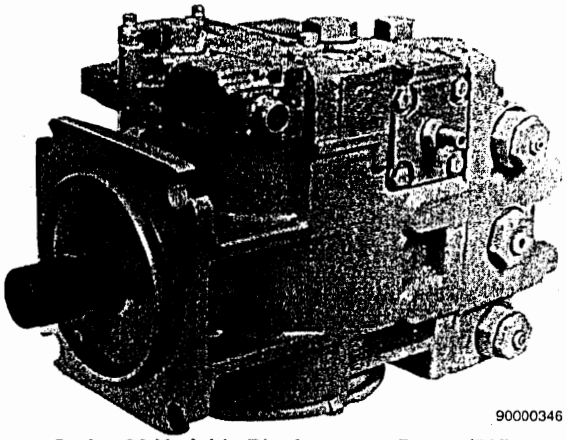
This section describes the operation of pumps, motors, and their various serviceable features. It is a useful reference for readers unfamiliar with the functioning of a specific system.

2.1 General Description and Cross Sectional Views

2.1.1 Variable Displacement Pumps

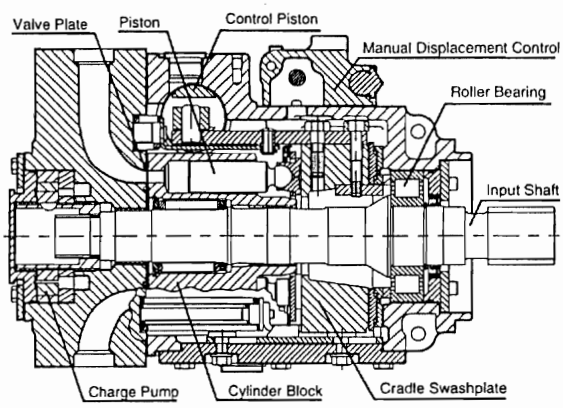
The Variable Displacement Pump (PV) is designed to convert an input torque into hydraulic power. The input shaft turns the pump cylinder which contains a ring of pistons. The pistons run against a tilted plate, called the swashplate. This causes the pistons to compress the hydraulic fluid which imparts the input energy into the hydraulic fluid. The high pressure fluid is then ported out to provide power to a remote function.

The swashplate angle can be varied by the control piston. Altering the swashplate angle varies the displacement of fluid in a given revolution of the input shaft. A larger angle causes greater displacement which yields greater output torque for a given input. A smaller angle reduces the displacement per revolution and yields greater speed for a given input.



90000346

Series 90 Variable Displacement Pump (PV)

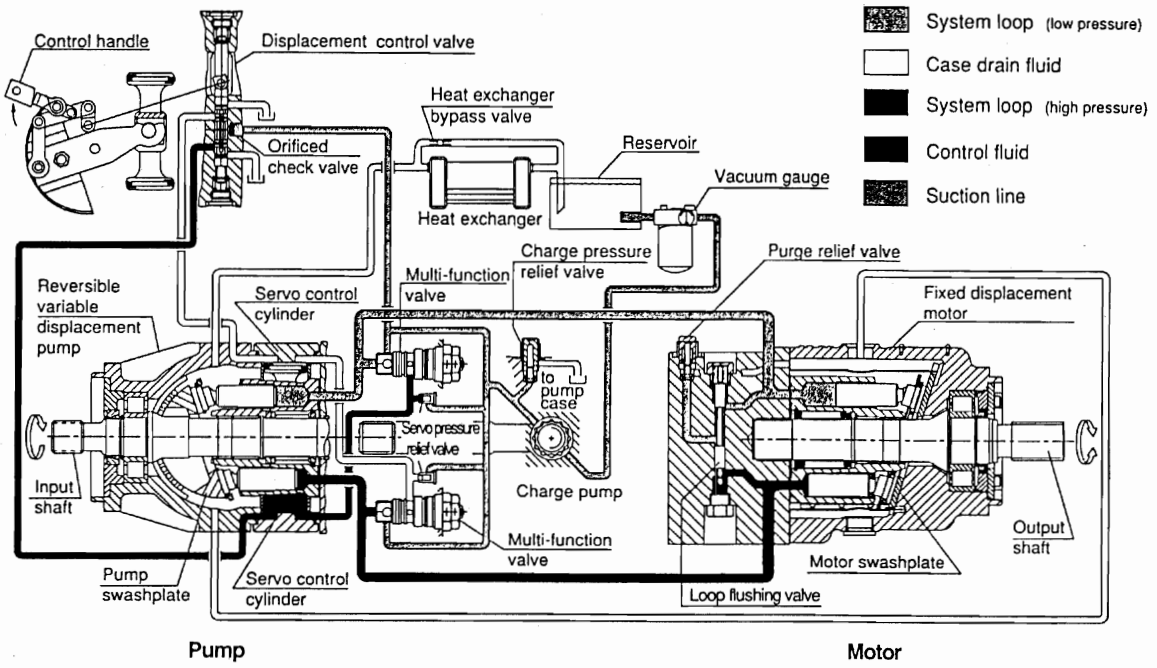


90000189

Series 90 PV Cross Section

SAUER SUNDSTRAND

2.2 The System Circuit



90000800

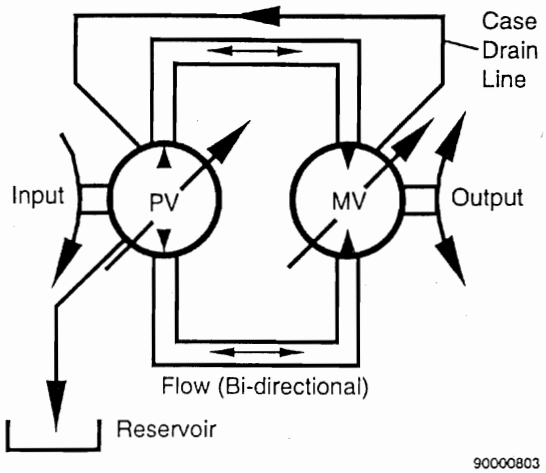
Circuit Diagram for Series 90 PV and Series 90 MF

The Basic Closed Circuit

The main ports of the pump are connected by hydraulic lines to the main ports of the motor. Fluid flows, in either direction, from the pump to the motor then back to the pump in this closed circuit. Either of the hydraulic lines can be under high pressure. The position of the pump swashplate determines which line is high pressure as well as the direction of fluid flow.

Case Drain and Heat Exchanger

The pump and motor require case drain lines to remove hot fluid from the system. The motor should be drained from its topmost drain port to ensure the case remains full of fluid. The motor case drain can then be connected to the lower drain port on the pump housing and out the top most port. A heat exchanger, with a bypass valve, is required to cool the case drain fluid before it returns to the reservoir.



90000803

Basic Closed Circuit

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Series 90 Functional Description 2

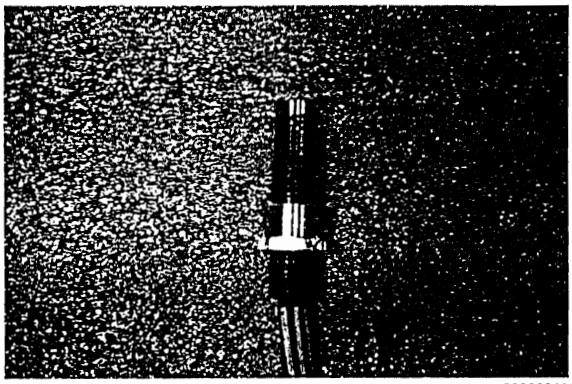
2.3 Common Features of Pumps and Motors

2.3.1 End Caps and Shafts

Series 90 pumps and motors can be supplied with a variety of end caps and shafts to allow for almost any configuration. For pumps, end caps are available with system ports on either side ("side ports") or both ports on one side ("twin ports"). Motors have end caps with ports on the face of the end cap ("axial ports") or both ports on one side ("twin ports"). See the Series 90 Technical Information manuals (BLN-10029 and BLN-10030) or the Series 90 Price Book (BLN-2-40588) for information on available options. **Removing the end cap will void the warranty on a Series 90 pump or motor.**

2.3.2 Speed Sensors

An optional speed sensor can be installed on Series 90 pumps and motors to provide unit speed information. The sensor reads a magnetic ring wrapped about the unit's cylinder. See Sec. 4 to locate the speed sensor port. See Sec. 8.4 and 9.6 to adjust and install the sensor.



90000810

Speed Sensor

SAUER SUNDSTRAND

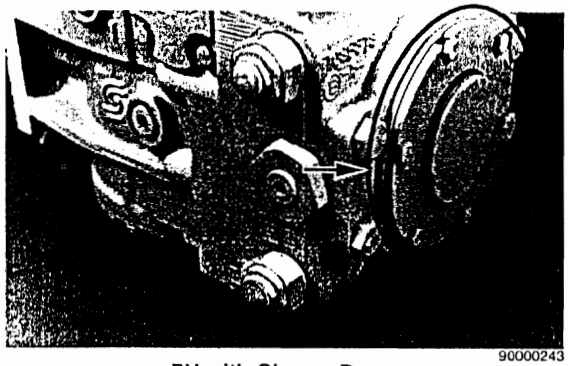
2.4 Pump Features

2.4.1 Charge Pump

The charge pump is necessary to supply cool fluid to the system, to maintain positive pressure in the main system loop, to provide pressure to operate the control system, and to make up for internal leakage. Charge pressure must be at its specified pressure under all conditions of driving and braking to prevent damage to the transmission.

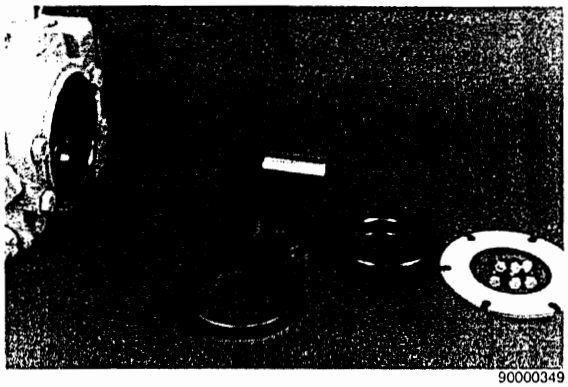
The charge pump is a fixed-displacement, gerotor type pump installed in the variable displacement pump and driven off the main pump shaft. Charge pressure is limited by a relief valve (Sec. 2.4.2).

The standard charge pump will be satisfactory for most applications. However, if the charge pump sizes available for the given main pump size are not adequate, a gear pump may be mounted to the auxiliary mounting pad (Sec. 2.4.8) and supply the required additional charge flow. For repairs to the charge pump see Sec. 9.2.4.



90000243

PV with Charge Pump



90000349

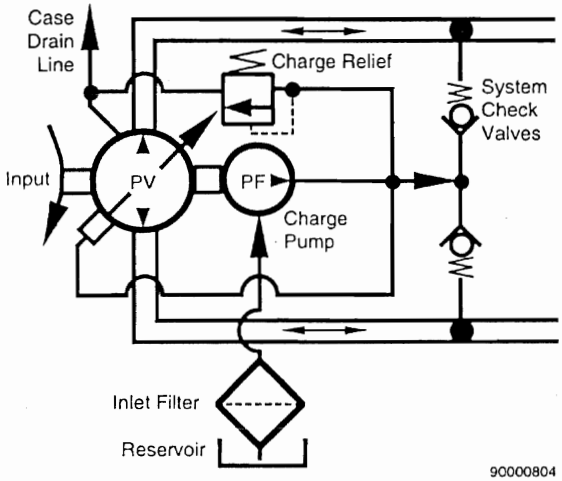
Charge Pump Components

2.4.2 Charge Relief Valve

The charge relief valve on the pump serves to maintain charge pressure at a designated level. A direct-acting poppet valve relieves charge pressure whenever it surpasses a certain level. This level is nominally set referencing case pressure at 1775 rpm. This nominal setting assumes the pump is in neutral (zero flow); in forward or reverse charge pressure will be lower. The charge relief valve setting is specified on the model code of the pump (Sec. 8.1.1). For repairs to the pump charge relief valve see Sec. 9.2.3.

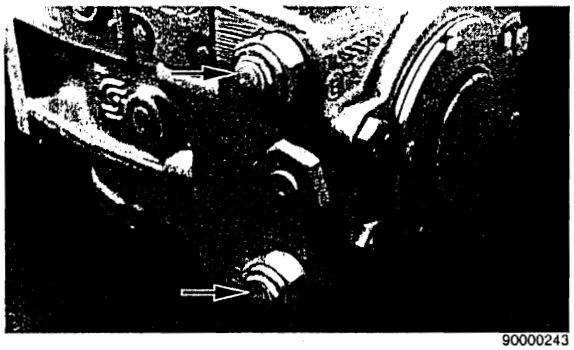
2.4.3 System Check Valves

The system check valves allow pressurized flow from the charge pump to enter the low pressure side of the loop whenever system pressure dips below a certain level. This is needed as the pump will generally lose system pressure due to leakage and other factors. Since the pump can operate in either direction, two system check valves are used to direct the charge supply into the low pressure lines. The system check valves are poppet valves located in the multi-function valve assembly (next section).



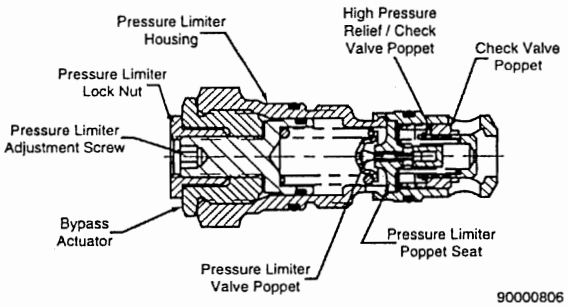
Pump Charge System

SAUER SUNDSTRAND



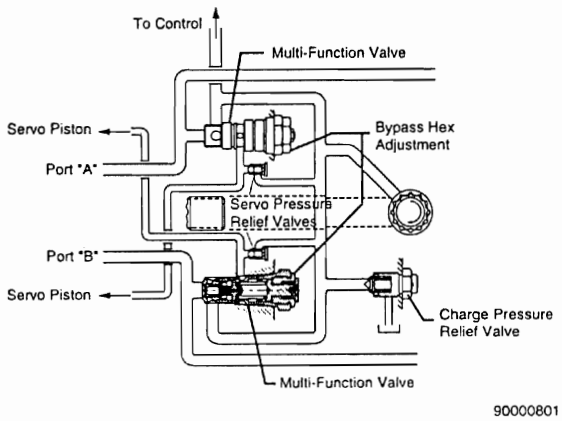
90000243

PV showing location of Multi-Function Valves



90000806

Cross Section of Multi-Function Valve



90000801

Circuit Diagram Showing Pressure Control Mechanisms

2.4.4 Multi-Function Valves

All Series 90 pumps include two multi-function valves. The multi-function valve incorporates the system check valve, the pressure limiter valve, the high pressure relief valve, and the bypass valve in a replaceable cartridge. These functions are described separately. There are two multi-function valve cartridges in each Series 90 pump to handle functions in either direction. See Secs. 8.1.2 and 9.2.1 for adjustments and repairs.

NOTE: Some multi-function valves do not include a pressure limiter valve.

2.4.5 Pressure Limiter and High Pressure Relief Valves

Series 90 pumps are designed with a sequenced pressure limiting system and high pressure relief valves. When the preset pressure is reached, the pressure limiter system acts to rapidly destroke the pump so as to limit the system pressure. For unusually rapid load application, the high pressure relief valve acts to immediately limit system pressure by cross-porting system flow to the low pressure side of the loop. The pressure limiter valve acts as the pilot for the high pressure relief valve spool. The high pressure relief valve is sequenced to operate at approximately 35 bar (500 psi) above the level that initiates the pressure limiter valve.

Both the pressure limiter sensing valves and relief valves are built into the multi-function valves (see above).

NOTE: For some applications, such as dual path vehicles, the pressure limiter function may be defeated so that only the high pressure relief valve function remains.

2.4.6 Bypass Valves

The bypass valves ("tow") can be operated when it is desired to move the vehicle or mechanical function when the pump is not running. The valve is opened by manually resetting the valve position (Sec. 8.1.3).

The bypass valves are built into the multi-function valves (see above).

SAUER SUNDSTRAND

Series 90 Functional Description 2

2.4.7 Displacement Limiters

Series 90 pumps sizes 042 - 250 are designed for optional mechanical displacement (stroke) limiters. The maximum displacement of the pump can be limited in either direction.

The setting can be set as low as 0° in either direction.

For instructions on adjustment see Sec. 8.1.5.

90000244

PV with Displacement Limiters

2.4.8 Auxiliary Mounting Pads

Auxiliary mounting pads are available on all Series 90 pumps. SAE A through E and H mounts are available (availability varies by pump size). This pad is used for mounting auxiliary hydraulic pumps and for mounting additional Series 90 pumps to make tandem pumps. The pads allow for full through-torque capability.

90000242

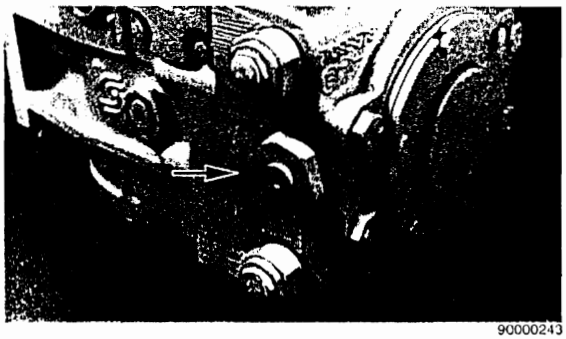
PV with Auxiliary Mounting Pad

2.4.9 Filtration Options

All Series 90 pumps are available with provisions for either suction or charge pressure filtration (integral or remote mounted) to filter the fluid entering the charge circuit. (See Sec. 6 for more information.)

Suction Filtration

The suction filter is placed in the circuit between the reservoir and the inlet to the charge pump. When suction filtration is used, a reducer fitting is placed in the charge pressure gauge port (M3). Filtration devices of this type are provided by the user.



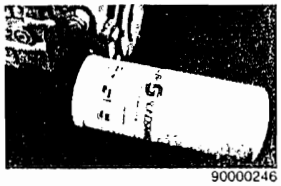
90000243

PV with Suction Filtration
(No filtration device attached)

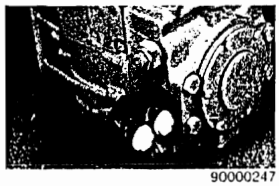
Charge Pressure Filtration

The pressure filter may be integrally mounted directly on the pump or a filter may be remotely mounted for ease of servicing.

A 200 mesh screen, located in the reservoir or the charge inlet line, is recommended when using this filtration option. A non-bypass filter is preferred on all types of filtration.



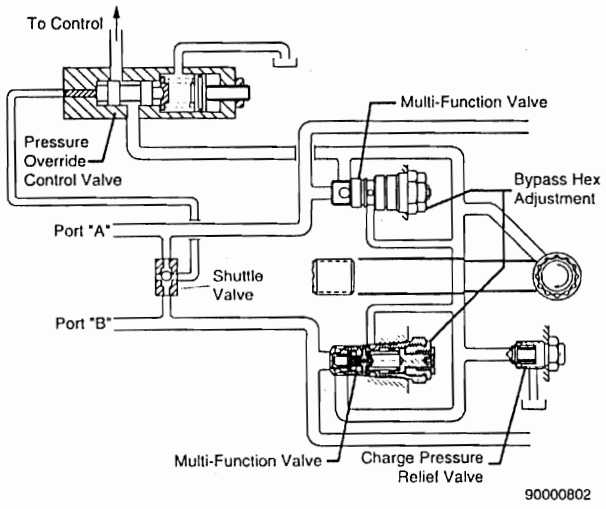
90000246



90000247

PV with Integral Charge Pressure Filtration (left)
PV with Remote Charge Pressure Filtration (right, filter attached remotely)

SAUER SUNDSTRAND



Pressure Override - 180 Frame Size Only

2.4.10 Pressure Override (POR) - 180 Frame Size Only

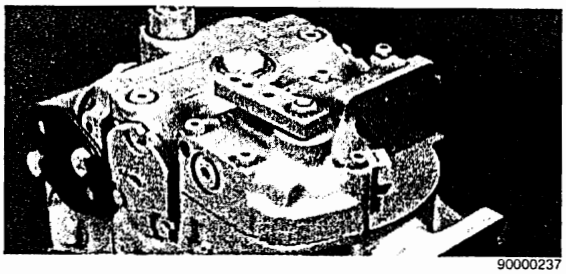
The pressure override valve (POR) modulates the control pressure to the displacement control to maintain a pump displacement which will produce a system pressure level less than or equal to the POR setting. For unusually rapid load application, the high pressure relief valve function of the multifunction valves is available to also limit the pressure level.

The pressure override consists of a three-way normally open valve which operates in series with the pump displacement control. Control supply pressure is normally ported through the pressure override valve to the displacement control valve for controlling the pump's displacement. If the system demands a pressure above the override setting, the POR valve will override the control by reducing the control pressure supplied to the displacement control. As the control pressure reduces, the internal forces tending to rotate the swashplate overcome the force of the servo pistons and allow the pump's displacement to decrease.

2.5 Pump Control Options

2.5.1 Manual Displacement Control (MDC)

The manual displacement control converts a mechanical input signal to a hydraulic signal using a spring-centered four-way servo valve. This valve ports hydraulic pressure to either side of a dual-acting servo piston. The servo piston rotates the cradle swashplate through an angular rotation of ±17°, thus varying the pump's displacement from full displacement in one direction to full displacement in the opposite direction. The MDC is designed so the angular position of the pump swashplate is proportional to the rotation of the control input shaft. For adjustments see 8.2.1; for repairs see 9.3.2, 9.3.8.

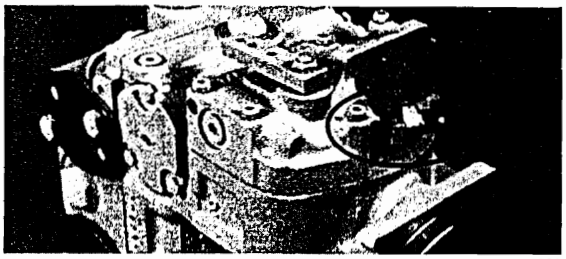


90000237

PV with Manual Displacement Control

Non-Linear MDC

The non-linear manual displacement control (photo in Sec. 8.2.2) operates in the same manner as the regular MDC except that it is designed so the change in the angular position of the pump swashplate *progressively* increases as the control input shaft is rotated toward its maximum displacement position. For adjustments see Sec. 8.2.2; for repairs see 9.3.2.



90000239

PV with Manual Displacement Control and Neutral Start Switch

Solenoid Override Valve

A solenoid override valve option (not shown here) is available for MDC. This safety feature will return the swashplate to zero displacement position when activated. The valve may be set in either a normally open or normally closed mode. For repairs see 9.3.3, 9.3.4.

Neutral Start Switch (NSS)

The neutral start switch is an optional feature available with MDC. When connected properly with the vehicle's electrical system, the neutral start switch ensures that the prime mover can be started only when the control is in a neutral position. For adjustments see Sec. 8.2.3.

2.5.2 Hydraulic Displacement Control (HDC)

The hydraulic displacement control uses a hydraulic input signal to operate a spring-centered four-way servo valve. This valve ports hydraulic pressure to either side of a dual-acting servo piston. The servo piston rotates the cradle swashplate through an angular rotation of ±17°, thus varying the pump's displacement from full displacement in one direction to full displacement in the opposite direction. The HDC is designed so the angular position of the pump swashplate is proportional to input pressure. For adjustments see 8.2.4; for repairs see 9.3.5, 9.3.8.

90000240

PV with Hydraulic Displacement Control

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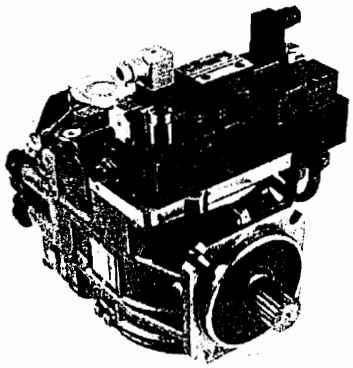
Series 90 Functional Description 2

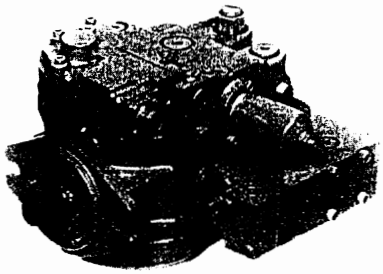
90000241

PV with Electric Displacement Control



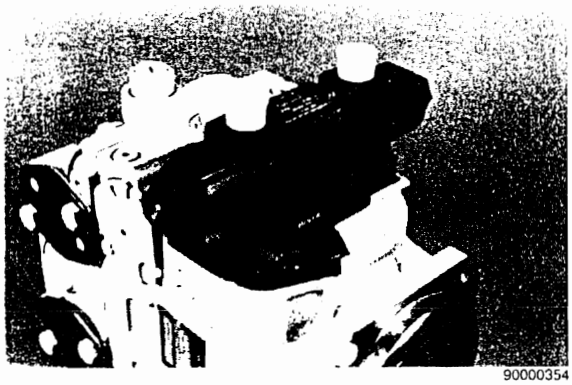
90000353

PV with Automotive Control (AC)



F000645

PV with Automotive Control Type II (AC II)



90000354

PV with 3-Position (FNR) Electric Control

2.5.3 Electric Displacement Control (EDC)

The electric displacement control is similar to the hydraulic displacement control with the input signal pressure controlled by a pressure control pilot (PCP) valve. The PCP valve converts a DC electrical input signal to a hydraulic signal which operates a spring-centered four-way servo valve. This valve ports hydraulic pressure to either side of a dual-acting servo piston. The servo piston rotates the cradle swashplate through an angular rotation of ±17°, thus varying the pump's displacement from full displacement in one direction to full displacement in the opposite direction. The control is designed so the angular position of the swashplate is proportional to the EDC input. For neutral adjustment see Sec. 8.2.4; for repairs see Sec. 9.3.5, 9.3.6, and 9.3.8.

2.5.4 Automotive Control (AC and AC II)

Automotive Control (AC) allows a vehicle to be driven in a manner similar to an automobile with an automatic transmission.

The AC control includes a three-position electric control to provide direction control.

The AC II control can be combined with a manual, hydraulic, or electric displacement control to provide both direction control and control over maximum vehicle speed. It may also be combined with a 3-position electric control to provide direction control.

2.5.5 3-Position (FNR) Electric Control

This control utilizes a 12 or 24 VDC electrically operated spool valve to port pressure to either side of the pump displacement control piston. Energizing one of the solenoids will cause the pump to go to its maximum displacement in the corresponding direction.

All functions of the three-position (FNR) electric control are preset at the factory. For repairs, see Sec. 9.3.7.

SAUER SUNDSTRAND

Series 90 Functional Description 2

2.6 Motor Features

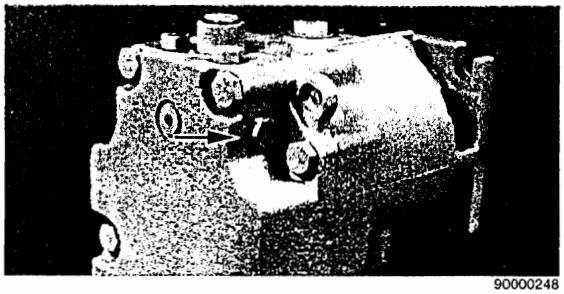
2.6.1 Motor Loop Flushing Valve and Charge Relief Valve

All Series 90 motors are designed to accommodate a loop flushing valve. The loop flushing valve is used in installations which require additional fluid to be removed from the main hydraulic circuit because of transmission cooling requirements, or unusual circuits requiring additional loop flushing to remove excessive contamination in the high pressure circuit.

A shuttle valve and charge relief valve are installed in the motor end cap to provide the loop flushing function. The shuttle valve provides a circuit between the low pressure side of the closed loop and the charge relief valve in the motor end cap.

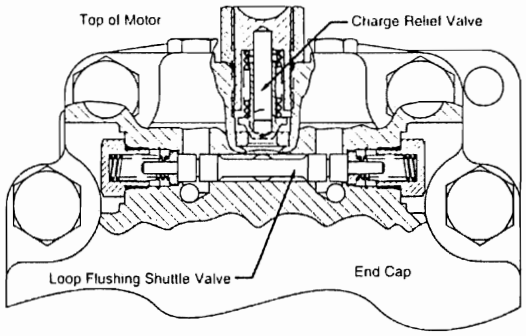
The motor charge relief valve regulates the charge pressure level only when there is a pressure differential in the main loop. The shuttle valve is spring centered to the closed position so that no high pressure fluid is lost from the circuit when reversing pressures.

For charge relief valve adjustment see Sec. 8.3.1, for repairs see Sec. 9.4.1.



90000248

MF showing location of Loop Flushing Valve



90000238

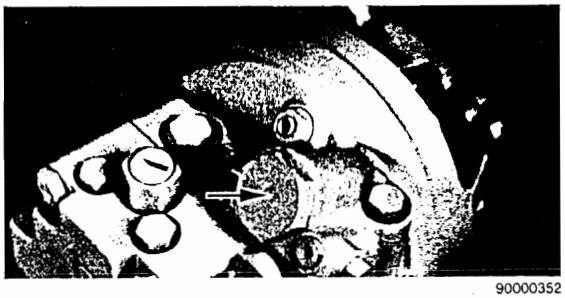
Motor Charge Relief Valve and Loop Flushing Shuttle Valve

2.6.2 Variable Motor Displacement Limiters

All Series 90 variable motors include mechanical displacement (stroke) limiters. Both the maximum and minimum displacement of the motor can be limited.

The range of the settings is as follows:

	055 MV Frame	075 MV Frame
Minimum Displacement	19 - 40 cm^3 1.2 - 2.4 in^3	26 - 54 cm^3 1.6 - 3.3 in^3
Maximum Displacement	65 - 100%	65 - 100%



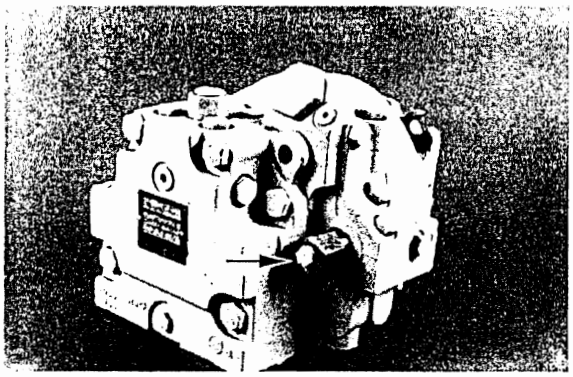
90000352

MV Maximum Displacement Limiter
(Minimum Displacement Limiters on Opposite Side)

SAUER SUNDSTRAND

Series 90 Functional Description 2

2.7 Variable Motor Controls



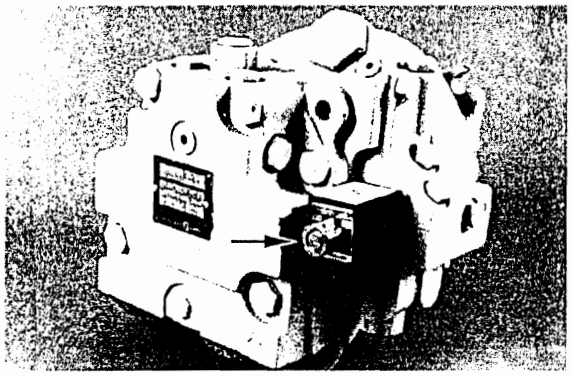
90000350

MV with Hydraulic 2-Position Control

2.7.1 Hydraulic 2-Position Control

This control utilizes a hydraulically operated three-way hydraulic valve to port system pressure to either of the motor displacement control pistons. The motor is normally held at its maximum displacement. Supplying pilot hydraulic pressure to the valve will cause the motor to go to its minimum displacement.

All functions of the hydraulic two-position control are preset at the factory. For repairs see Sec. 9.5.2 and 9.5.4.



90000351

MV with Electric 2-Position Control

2.7.2 Electric 2-Position Control

This control utilizes an electric solenoid operated three-way hydraulic valve to port system pressure to either of the motor displacement control pistons. The motor is normally held at its maximum displacement. Energizing the solenoid will cause the motor to go to its minimum displacement.

All functions of the electric two-position control are preset at the factory. For repairs see Sec. 9.5.1 and 9.5.4.

3. Technical Specifications

3.1 General Specifications

Design
Variable Pumps and Motors: Axial piston pump of variable displacement, cradle swashplate design.

Fixed Motors: Axial piston motor with fixed displacement, fixed swashplate design.

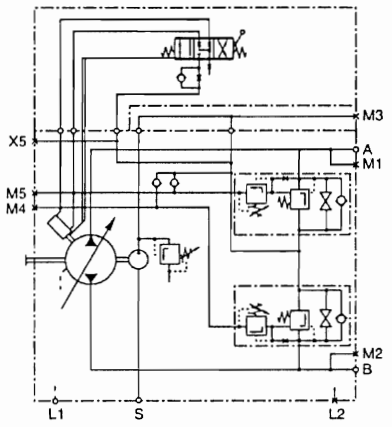
Type of Mounting (per SAE J744)
SAE flange, Size "B" mounting pad, 2 bolts
SAE flange, Size "C" mounting pad, 4 bolts
Cartridge flange, 2 bolts (for motor only)

Port Connections (See Sec. 4.2 for exact specs.)
Main pressure ports: SAE flange, Code 62
Remaining ports: SAE straight thread O-ring boss

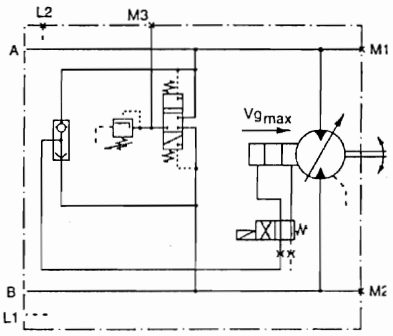
Direction of Rotation
Clockwise or counterclockwise (motors are bidirectional)

Installation Position
Installation position is discretionary. The housing must always be filled with hydraulic fluid, so note position of drain ports.

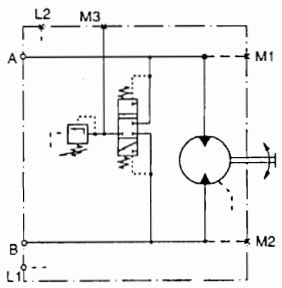
3.2 Circuit Diagrams



PV with charge pump and manual displacement control



MV with electrohydraulic two-position control



MF

SAUER SUNDSTRAND

Series 90 Technical Specifications 3

3.3 Hydraulic Parameters

System Pressure Range

Maximum Pressure	480 bar	[6960 psi]
Rated Pressure	420 bar	[6000 psi]

Charge Pump Inlet Vacuum (on pumps only)

Maximum Vacuum, Continuous	0.7 bar abs	[10 in Hg]
Maximum Vacuum, Cold Start	0.2 bar abs	[25 in Hg]

Case Pressure

Maximum, Continuous	3 bar	[44 psi]
Maximum, Intermittent or Cold Start	5 bar	[73 psi]

Hydraulic Fluid

Refer to SAS publication BLN 9887 or Publication SDF (Id. No. 697581). Also refer to publication ATI-E 9101 for information relating to biodegradable fluids

Temperature Range[1]

Minimum, Intermittent or Cold Start	-40°C	[-40°F]
Maximum, Continuous	104°C	[220°F]
Maximum, Intermittent	115°C	[240°F]

Fluid Viscosity Limits

Minimum, Intermittent	5 mm^2/s	[42 SUS]
Minimum, Continuous	6.4 mm^2/s	[47 SUS]
Minimum, Optimum	13 mm^2/s	[70 SUS]
Maximum, Continuous	110 mm^2/s	[510 SUS]
Maximum, Intermittent or Cold Start	1600 mm^2/s	[7400 SUS]

Filtration

Required cleanliness level: ISO 4406 Class 18/13 or better. Refer to SAS publications BLN 9887 or Publication SDF (Id. No. 697581) and ATI-E 9201.

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3.4 Technical Data

Table 1 - Variable Displacement Pumps

	Dimension	030 PV	042 PV	055 PV	075 PV	100 PV	130 PV	180 PV	250 PV
Displacement (maximum)	cm^3 in^3	30.0 1.83	42.0 2.56	55.0 3.35	75.0 4.57	100.0 6.10	130.0 7.93	180.0 10.98	250.0 15.25
Minimum speed	min^{-1} (rpm)	500	500	500	500	500	500	500	500
Rated speed*	min^{-1} (rpm)	4200	4200	3900	3600	3300	3100	2600	2300
Maximum speed*	min^{-1} (rpm)	4600	4600	4250	3950	3650	3400	2850	2500
Max. attainable speed* at max. disp.	min^{-1} (rpm)	5000	5000	4700	4300	4000	3700	3150	2750
Theoretical torque at max. disp.	Nm / bar lbf•in/1000 psi	0.48 290	0.67 380	0.88 530	1.19 730	1.59 970	2.07 1260	2.87 1750	3.97 2433
Weight (Base Unit)	kg lb	28 62	34 75	40 88	49 108	68 150	88 195	136 300	154 340

Table 2 - Fixed and Variable Displacement Motors

		Dimension	030 MF	042 MF	055 MF	075 MF	100 MF	130 MF	055 MV	075 MV
Displacement (maximum)		cm^3 in^3	30.0 1.83	42.0 2.56	55.0 3.35	75.0 4.57	100.0 6.10	130.0 7.93	55.0 3.35	75.0 4.57
Displacement (minimum)		cm^3 in^3	—	—	—	—	—	—	19.0 1.16	26.0 1.59
Rated speed*	at max. disp.	min^{-1} (rpm)	4200	4200	3900	3600	3300	3100	3900	3600
	at min. disp.	min^{-1} (rpm)	—	—	—	—	—	—	4600	4250
Maximum speed*	at max. disp.	min^{-1} (rpm)	4600	4600	4250	3950	3650	3400	4250	3950
	at min. disp.	min^{-1} (rpm)	—	—	—	—	—	—	5100	4700
Max. attainable speed* at max. disp.		min^{-1} (rpm)	5000	5000	4700	4300	4000	3700	4700	4300
Theoretical torque at max. disp.		Nm / bar lbf•in/1000 psi	0.48 290	0.67 380	0.88 530	1.19 730	1.59 970	2.07 1260	0.88 530	1.19 730
Maximum flow at max. disp.		l / min gal / min	138 36.5	193 51	234 62	296 78	365 96	442 117	234 62	296 78
Max. corner power		kW hp	111 149	155 208	187 251	237 318	292 392	354 475	224 300	282 378
Weight (SAE Flange)		kg lb	11 24	15 34	20 45	26 57	34 74	45 99	39 86	44 98
Weight (Cartridge Motor)		kg lb	—	17 37	26 57	33 72	—	—	40 88	46 101

* = Refer to Series 90 Technical Information manual for definitions

4. Pressure Measurement

4.1 Required Tools

The service procedures described in this manual for Series 90 pumps and motors can be performed using common mechanic's tools. Special tools, if required are shown.

Pressure gauges should be calibrated frequently to ensure accuracy. Snubbers are recommended to protect pressure gauges.

4.2 Port Locations and Pressure Gauge Installation

The following sections list the ports for each type of hydraulic unit. The recommended pressure gauge and fitting are also specified.

Outline drawings showing port locations follow the tables.

4.2.1 Variable Pump

Port	Function	Recommended Gauge Size and Fitting
M1	System Pressure Port "A"	1000 bar or 10 000 psi Gauge 9/16—18 O-Ring Fitting
M2	System Pressure Port "B"	1000 bar or 10 000 psi Gauge 9/16—18 O-Ring Fitting
M3 (M6)	Charge Pressure	50 bar or 1000 psi Gauge 9/16—18 O-Ring Fitting
M4 M5	Servo Pressure	50 bar or 500 psi Gauge 9/16—18 O-Ring Fitting

Port	Function	Recommended Gauge Size and Fitting	
L1 L2	Case Pressure	10 bar or 100 psi Gauge	
		SAE O-Ring Fitting:	
		030, 042	7/8—14
		055, 075, 100	1-1/16—12
		130	1-5/16—12
		180, 250	1-5/8—12
X1 X2	HDC / EDC Pressure	50 bar or 1000 psi Gauge 7/16 — 20 O-Ring Fitting or 9/16 — 18 O-Ring Fitting	
X3	Ext. Control Pressure	50 bar or 1000 psi Gauge 9/16 — 18 O-Ring Fitting	
S	Charge Pump Inlet	Vacuum Gauge, Tee into Inlet Line	
		SAE O-Ring Fitting:	
		030, 042	1-1/16 — 12
		055, 075	1-5/16 — 12
		100, 130, 180	1-5/8 — 12
		250	1-1/2 SAE Split Flange

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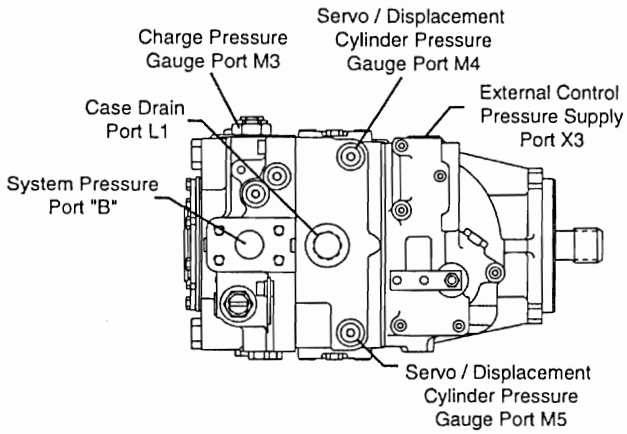
Series 90 Pressure Measurement 4



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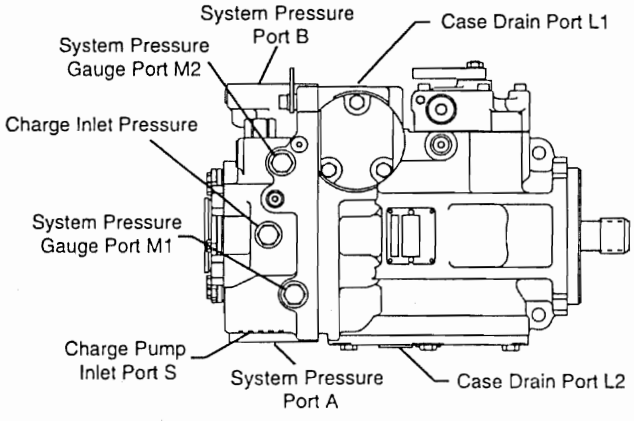
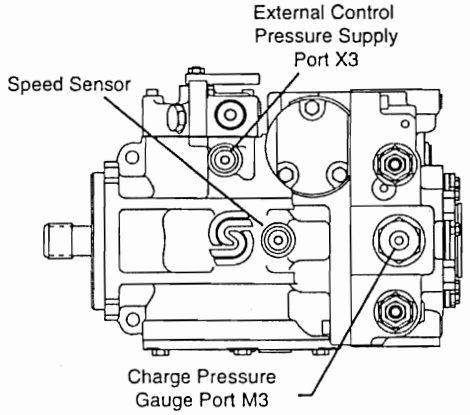
Top View



Left Side View



Right Side View

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90000816

PV with Side Port End Cap and Manual Displacement Control

5. Initial Start-Up Procedure

The following start-up procedure should always be followed when starting-up a new Series 90 installation or when restarting an installation in which either the pump or motor had been removed.

WARNING
The following procedure may require the vehicle/machine to be disabled (wheels raised off the ground, work function disconnected, etc.) while performing the procedure in order to prevent injury to the technician and bystanders. Take necessary safety precautions before moving the vehicle/machine.

Prior to installing the pump and/or motor, inspect the units for damage incurred during shipping and handling. Make certain all system components (reservoir, hoses, valves, fittings, heat exchanger, etc.) are clean prior to filling with fluid.

Fill the reservoir with recommended hydraulic fluid. This fluid should be passed through a 10 micron (nominal, no bypass) filter prior to entering the reservoir. The use of contaminated fluid will cause damage to the components, which may result in unexpected vehicle/machine movement. See the publications BLN-9887 and SDF 697581 for further related information.

The inlet line leading from the reservoir to the pump must be filled prior to start-up. Check inlet line for properly tightened fittings and make sure it is free of restrictions and air leaks.

Be certain to fill the pump and/or motor housing with clean hydraulic fluid prior to start up. Fill the housing by pouring filtered oil into the upper case drain port.

Install a 50 bar (or 1000 psi) pressure gauge in the charge pressure gauge port (see Sec. 4.2 for location) to monitor the charge pressure during start-up.

It is recommended that the external control input signal (linkage for MDC, hydraulic lines for HDC, or electrical connections for EDC) be disconnected at the pump control until after initial start-up. This will ensure that the pump remains in its neutral position.

WARNING
Do not start prime mover unless pump is in neutral position (0° swashplate angle). Take precautions to prevent machine movement in case pump is actuated during initial start up.

"Jog" or slowly rotate prime mover until charge pressure starts to rise. Start the prime mover and run at the lowest possible RPM until charge pressure has been established. Excess air may be bled from the high pressure lines through the high pressure system gauge port.

Once charge pressure has been established, increase speed to normal operating RPM. Charge pressure should be as indicated in the pump model code (see Sec. 8.1.1). If charge pressure is inadequate, shut down and determine cause for improper pressure. Refer to Troubleshooting Sec. 7.

WARNING
Inadequate charge pressure will affect the operator's ability to control the machine.

Shut down the prime mover and connect the external control input signal. Also reconnect the machine function if disconnected earlier. Start the prime mover, checking to be certain the pump remains in neutral. With the prime mover at normal operating speed, slowly check for forward and reverse machine operation.

Charge pressure may slightly decrease during forward or reverse operation. Continue to cycle slowly between forward and reverse for at least five minutes.

Shut down prime mover, remove gauges, and plug ports. Check reservoir level and add filtered fluid if needed.

The transmission is now ready for operation.

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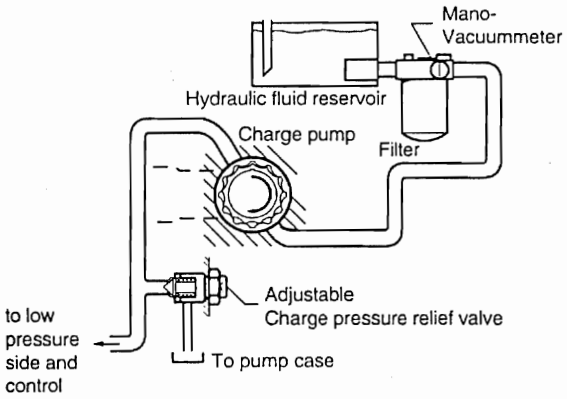
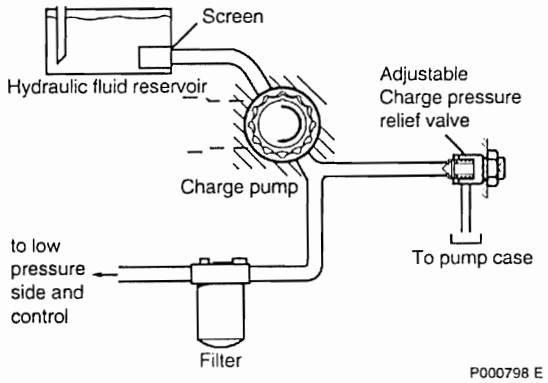
6. Fluid and Filter Maintenance



Suction Filtration Schematic



Charge Pressure Filtration Schematic
(Partial Flow)

To ensure optimum service life of Series 90 products, regular maintenance of the fluid and filter must be performed. Contaminated fluid is the main cause of unit failure. Care should be taken to maintain fluid cleanliness while performing any service procedure.

Check the reservoir daily for proper fluid level, the presence of water (noted by a cloudy to milky appearance, or free water in bottom of reservoir), and rancid fluid odor (indicating excessive heat). If either of these conditions occur, change the fluid and filter immediately.

It is recommended that the fluid and filter be changed per the vehicle/machine manufacturer's recommendations or at the following intervals:

System with a sealed-type reservoir	2000 hours
System with a breathing-type reservoir	500 hours

It may be necessary to change the fluid more frequently than the above intervals if the fluid becomes contaminated with foreign matter (dirt, water, grease, etc.) or if the fluid has been subjected to temperature levels greater than the recommended maximum. Never reuse fluid.

The filter should be changed whenever the fluid is changed or whenever the filter indicator shows that it is necessary to change the filter.

Filters can be in either pressure filtration or suction filtration configurations. For suction filtration, filters should have a Beta-ratio of $\beta_{10}>2$. For charge pressure filtration, filters should have a Beta-ratio of $\beta_{10}>10$. See Sauer-Sundstrand publication BLN-9887 or 697581 and ATI-E 9201 for more information on filtration.

7. Troubleshooting

This section provides general steps to follow if certain undesirable system conditions are observed. Follow the steps in a section until the problem is solved. Some of the items will be system specific. For areas covered in this manual, a section is referenced. **Always observe the safety precautions listed in Sec. 1.2 and related to your specific equipment.**

7.1 "Neutral" Difficult or Impossible to Find

Item	Description	Action
1. Check input to pump control.	Input to control module is operating improperly.	Check control input and repair or replace as necessary.
2. Check pump displacement control.	Control linkages are not secure, control orifices are blocked, etc.	Adjust, repair, or replace control module as necessary (8.2 and 9.3).
3. Repair or replace pump.		Consult a Sauer-Sundstrand Authorized Service Center.

7.2 System Operating Hot

Item	Description	Action
1. Check oil level in reservoir.	Insufficient hydraulic fluid will not meet cooling demands of system.	Fill reservoir to proper level.
2. Inspect heat exchanger.	Heat exchanger not sufficiently cooling the system.	Check air flow and input air temperature for heat exchanger. Clean, repair or replace heat exchanger.
3. Check charge pressure.	Low charge pressure will overwork system.	Measure charge pressure (4.2). Inspect and adjust or replace charge relief valve (8.1.1 and 9.2.3). Or repair leaky charge pump (9.2.4).
4. Check charge pump inlet vacuum.	High inlet vacuum will overwork system. A dirty filter will increase the inlet vacuum. Inadequate line size will restrict flow.	Check charge inlet vacuum (4.2). If high, inspect inlet filter and replace as necessary. Check for adequate line size, length or other restrictions.
5. Check system relief pressure settings.	If the system relief settings are too low, the relief valves will be overworked.	Verify settings of pressure limiters and high pressure relief valves and adjust or replace multi-function valves as necessary (8.1.2, 9.2.1)
6. Check for internal leakage in motor.	Leakage will reduce low side system pressure and overwork the system.	Monitor motor case flow without loop flushing in the circuit (use defeat spool 9.4.1.3). If flow is excessive, replace motor.
7. Check system pressure.	High system pressure will overheat system.	Measure system pressure (4.2). If pressure is high reduce loads.
8. Replace transmission.		Replace pump and motor.

SAUER SUNDSTRAND

Series 90 Troubleshooting 7

7.3 Transmission Operates Normally in One Direction Only

Item	Description	Action
1. Check input to pump control.	Input to control module is operating improperly.	Check control input and repair or replace as necessary.
2. Check pump displacement control.	Control linkages are not secure, control orifices are blocked, etc.	Repair or replace control module as necessary (8.2 and 9.3).
3. Interchange system pressure limiters, high pressure relief valves, and system check valves.	Interchanging the multi-function valves will show if the problem is related to the valve functions contained in the multi-function valves.	Interchange multi-function valves. If the problem changes direction, repair or replace the valve on the side that does not operate (8.1.2 and 9.2.1).
4. Check charge pressure.	If charge pressure decays in one direction the loop flushing valve may be "sticking" in one direction.	Measure charge pressure in forward and reverse (4.2). If pressure decays in one direction, inspect and repair the motor loop flushing valve (9.4.1.1).

7.4 System Will Not Operate in Either Direction

Item	Description	Action
1. Check oil level in reservoir.	Insufficient hydraulic fluid to supply system loop.	Fill reservoir to proper level.
2. Check input to pump control.	Input to control module is operating improperly.	Check control input and repair or replace as necessary.
3. Check pump displacement control.	Control linkages are not secure, control orifices are blocked, etc.	Repair or replace control module as necessary (8.2 and 9.3).
4. Ensure bypass valve(s) are closed.	If bypass valve(s) is open, the system loop will be depressurized.	Close bypass valves (8.1.3). Replace multi-function valve if defective (9.2.1).
5. Check charge pressure with pump in neutral.	Low charge pressure insufficient to recharge system loop.	Measure charge pressure with the pump in neutral (4.2). If pressure is low, go to step 6; otherwise continue with step 5.
6. Check charge pressure with pump in stroke.	Low charge pressure with the pump in stroke indicates a motor charge relief valve or system pressure relief valve may be improperly set.	Measure charge pressure with pump in stroke (4.2). If pressure is low, adjust or replace motor charge relief valve (8.3.1 and 9.4.1.2), otherwise go to step 9.
7. Inspect pump charge relief valve.	A pump charge relief valve that is leaky or set too low will depressurize the system.	Adjust or replace pump charge relief valve as necessary (8.1.1, 9.2.3)
8. Check charge pump inlet filter.	A clogged filter will undersupply system loop.	Inspect filter and replace if necessary.

9. Check charge pump.	A malfunctioning charge pump will provide insufficient charge flow.	Repair or replace the charge pump (9.2.4). If OK go to last step.
10. Check pump displacement control.	Control linkages are not secure, control orifices are blocked, etc.	Repair or replace control module as necessary (8.2 and 9.3).
11. Check system pressure.	Low system pressure will not provide power necessary to move load.	Measure system pressure (4.2). Continue with next step.
12. Check system multi-function valves.	Defective multi-function valves will cause system pressure to be low.	Repair or replace multi-function valve(s) (9.2.1).
13. Replace transmission.		Replace pump and motor.

7.5 Low Motor Output Torque

Item	Description	Action
1. Check system pressure at motor.	Low system pressure at the motor will reduce torque.	Measure system pressure at motor (4.2). If pressure limiter setting is low, increase setting.
2. Variable motor stuck at minimum displacement.	Minimum motor displacement yields low output torque.	Check control supply pressure (4.2.3) or repair displacement control (9.5). Check motor control orifices (9.5.4).
3. Check for internal leakage.	Internal leakage will reduce system pressure.	Check for leakage in O-rings, gaskets, and other fittings (9.1.1 and others). Repair unit as required, or replace leaky unit.
4. Replace transmission.		Replace pump and motor.

7.6 Improper Motor Output Speed

Item	Description	Action
1. Check oil level in reservoir.	Insufficient hydraulic fluid will reduce motor speed.	Fill oil to proper level.
2. Check charge pressure.	Incorrect charge pressure can result in a low speed motor.	Measure charge pressure (8.1.1), adjust charge system as necessary (9.2.3 and 9.2.4).
3. Check pump output flow.	Incorrect outflow will affect output speed. Incorrect output flow indicates the swashplate is out of position.	Measure pump output flow by teeing into outflow hose. Check for proper pump speed and see that the pump is in full stroke.
4. Check variable motor displacement control.	If variable motor displacement control is not functioning correctly, variable motor swashplate may be in wrong position.	See if variable motor displacement control is responding. If not, repair or replace control (9.5).

SAUER SUNDSTRAND

Series 90 Troubleshooting 7

7.7 Excessive Noise and/or Vibration

Item	Description	Action
1. Check oil in reservoir.	Insufficient hydraulic fluid will lead to cavitation.	Fill reservoir to proper level.
2. Air in system.	Air bubbles will lead to cavitation.	Look for foam in reservoir. Check for leaks on inlet side of system loop. Afterwards, let reservoir settle until bubbles are gone. Run system at low speed to move system fluid to reservoir. Repeat.
3. Check pump inlet vacuum.	High inlet vacuum will create noise. A dirty filter will increase the inlet vacuum.	Inspect and replace filter as necessary. Check for proper suction line size.
4. Inspect shaft couplings.	A loose shaft coupling will cause excessive noise.	Replace loose shaft coupling in charge pump (Sec. 9.2.4) or replace pump or motor.
5. Inspect shaft alignment.	Unaligned shafts will create excessive frictional noise.	Align shafts.

7.8 System Response is Sluggish

Item	Description	Action
1. Check oil level in reservoir.	Insufficient hydraulic fluid will reduce output pressure.	Fill reservoir to proper level.
2. Check multi-function valves' pressure settings.	Incorrect pressure settings will affect system reaction time.	Adjust or replace multi-function valves (8.1.2 and 9.2.1).
3. Check pump inlet vacuum.	High pump inlet vacuum will reduce system pressure.	Measure charge inlet vacuum (4.2). If high replace inlet filter.
4. Check prime mover speed.	Low engine speed will reduce system performance.	Adjust engine speed.
5. Check charge and control pressures.	Incorrect charge or control pressures will affect system performance.	Measure charge and control pressures and correct if necessary (4.2 and others).
6. Check system internal leakage.	Internal leakage will reduce system pressure.	Check for leakage in O-rings, gaskets, and other fittings (9.1.1 and others).
7. Replace transmission.		Replace pump and motor.

engineering
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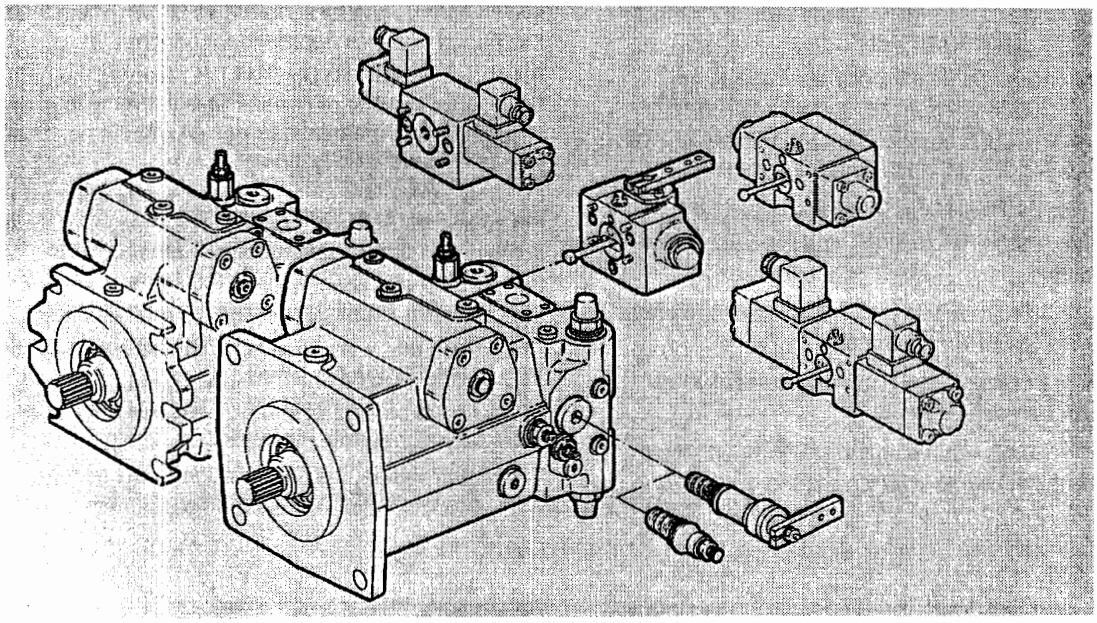
Rexroth



NOTICE

Specifications, descriptions and illustrative material shown herein were as accurate as known at the time this publication was approved for printing.

BRUENINGHAUS HYDROMATIK reserves the right to discontinue models or options at any time or to change speci-fications, materials, or design without notice and with-out incurring obligation.

Optional equipment and accessories may add cost to the basic unit, and some options are available only in combination with certain models or other options.

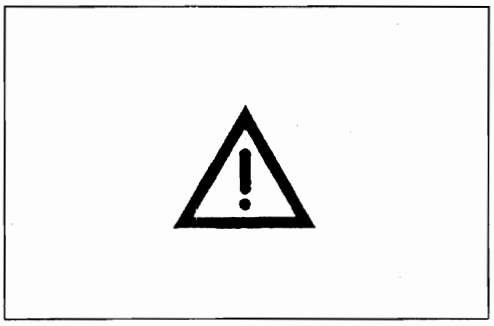
For the available combinations refer to the relevant data sheet for the basic unit and the desired option.

Adjustment and tests have to be carried out on the test bench under operating temperatures.

Protection of personnel and property has to be guar-anteed by appropriate measures.

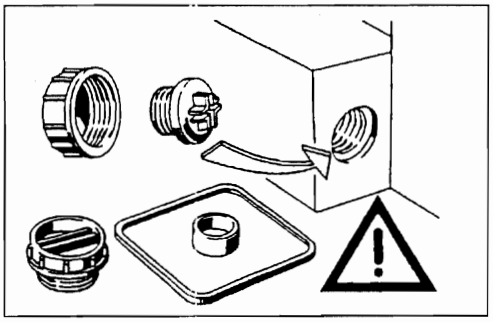
Expert knowledge, the precondition of any service work, can be obtained in our training courses.

CONTENTS



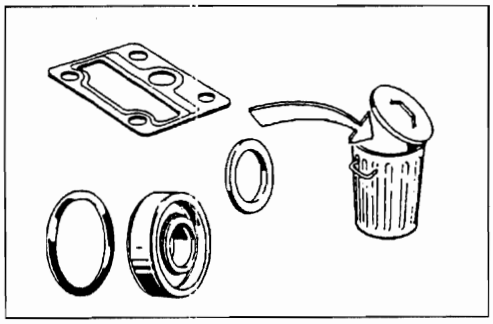
Achtung!
Nachfolgend Hinweise bei allen Reparaturarbeiten an Hydraulikaggregaten beachten!

Attention!
Observe the following notices when carrying out repair work at hydraulic aggregates!



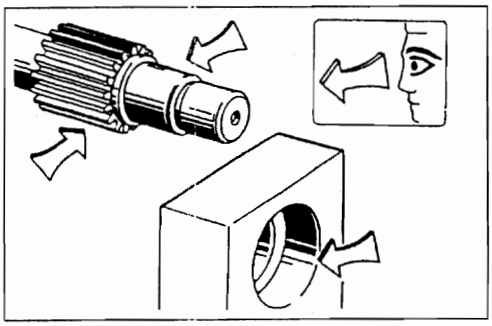
Alle Öffnungen der Hydraulikaggregate verschließen.

Close all ports of the hydraulic aggregates.



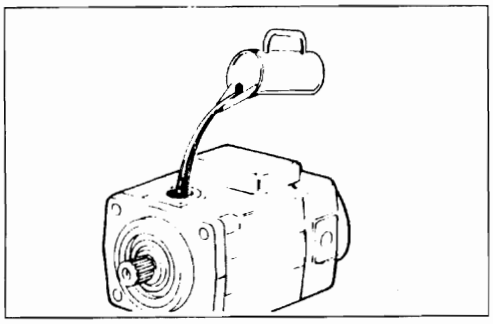
Alle Dichtungen erneuern.
Nur original HYDROMATIK-Ersatzteile verwenden.

Replace all seals.
Use only original HYDROMATIK spare parts.



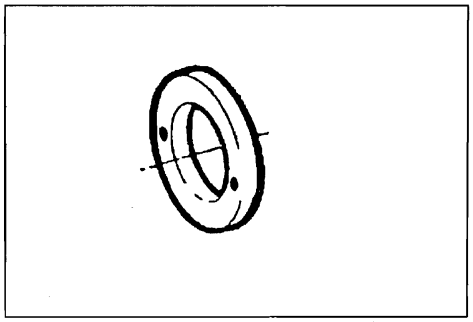
Alle Dicht- und Gleitflächen auf Verschleiß prüfen.
Achtung: Nacharbeiten an Dichtflächen z.B. durch Schleifpapier kann die Oberfläche beschädigen.

Check all seal and sliding surfaces for wear.
Attention: Rework of sealing area f. ex. with abrasive paper can damage surface.



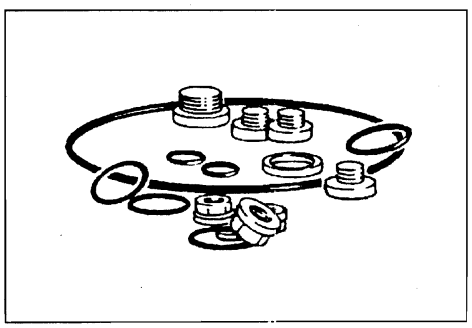
Hydraulikaggregate vor Inbetriebnahme mit Betriebsmedium befüllen.

Fill up hydraulic aggregates with medium before start- up.



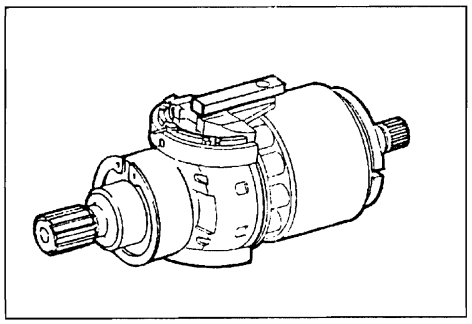
1 Dichtsatz für Triebwelle.

Seal kit for drive shaft.



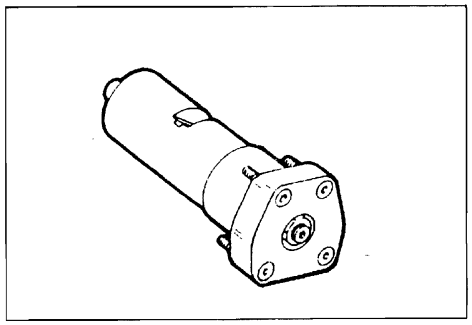
2 Äußerer Dichtsatz.

External seal kit.



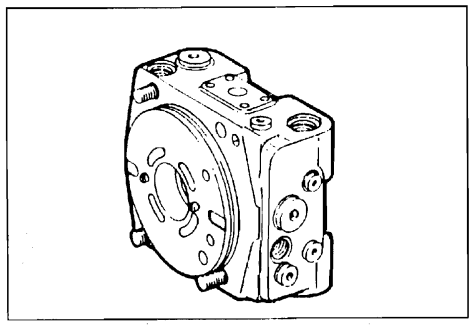
3 Triebwerk komplett.

Complete rotary group.



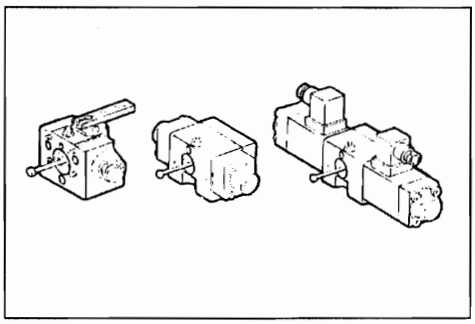
4 Stellkolben

Positioning piston



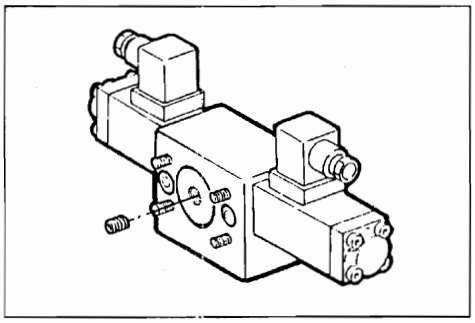
5 Anschlußplatte

Valve plate



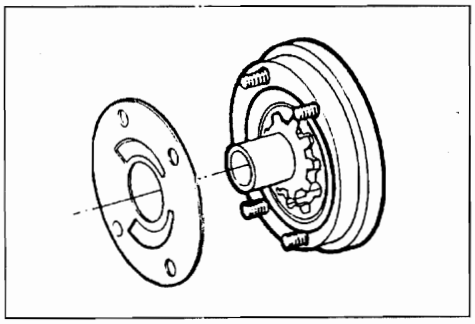
6 Ansteuergeräte **HW, HD, EP**
Hinweis:
NG 71 wie NG 40 - 56 mit Flachdichtung.

Control device **HW, HD, EP**
Note:
Size 71 control device as size 40 - 56 with flat seal.



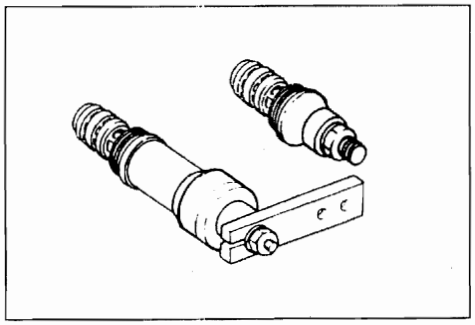
7 Ansteuergerät **DA**
Hinweis:
NG 71 wie NG 40 - 56 mit Flachdichtung.

Control device **DA**
Note:
Size 71 control device as size 40 - 56 with flat seal.



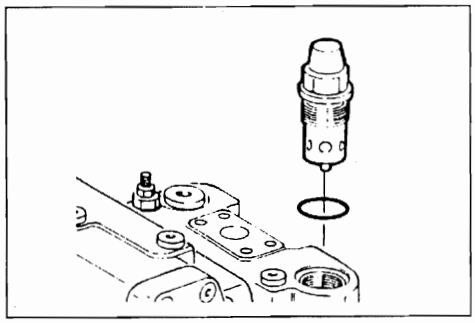
8 Hilfspumpe

Boost pump



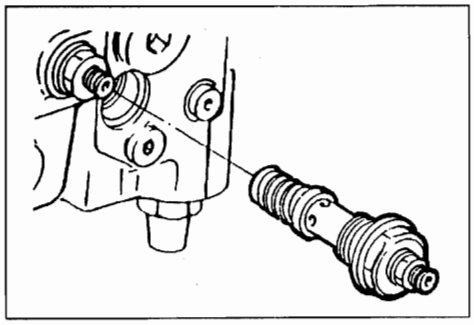
9 Regelventil

Control valve



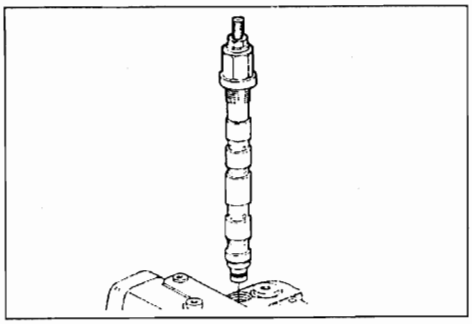
10 HD - Ventil

High pressure valve



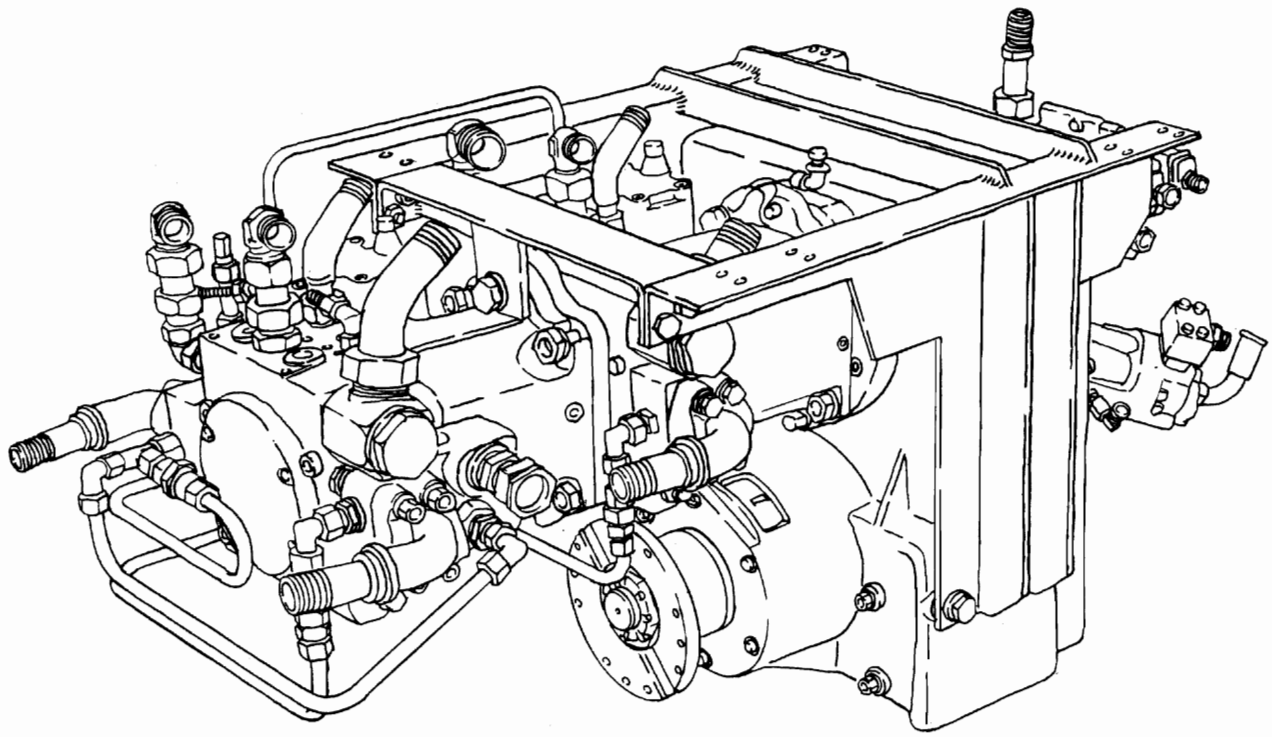
11 ND - Ventil

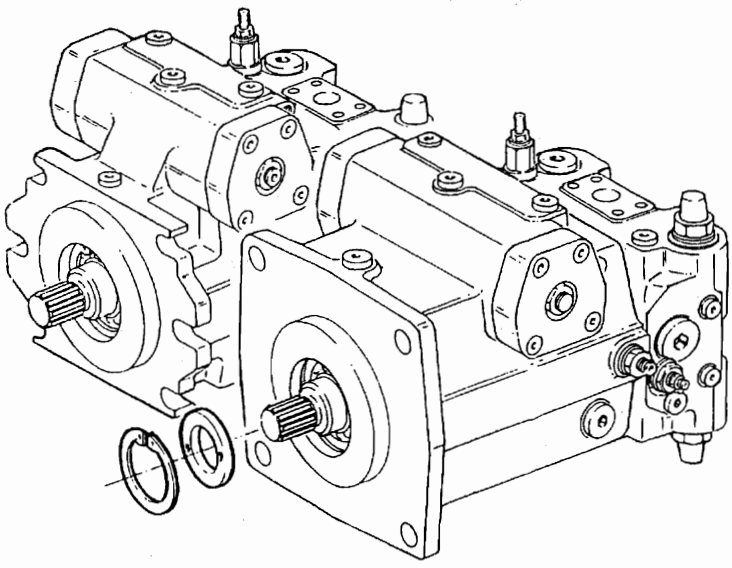
Low pressure valve



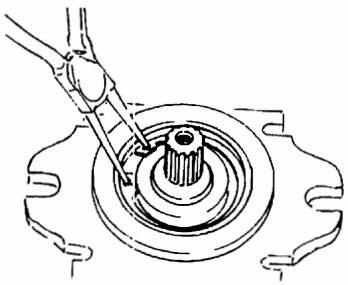
12 Druckabschneidung

Pressure cut-off



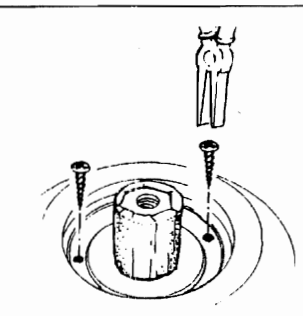


13



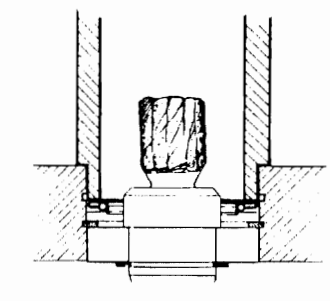
14 Triebwelle abkleben.
Sicherungsring ausbauen.

Protecting the drive shaft.
Remove retaining ring.



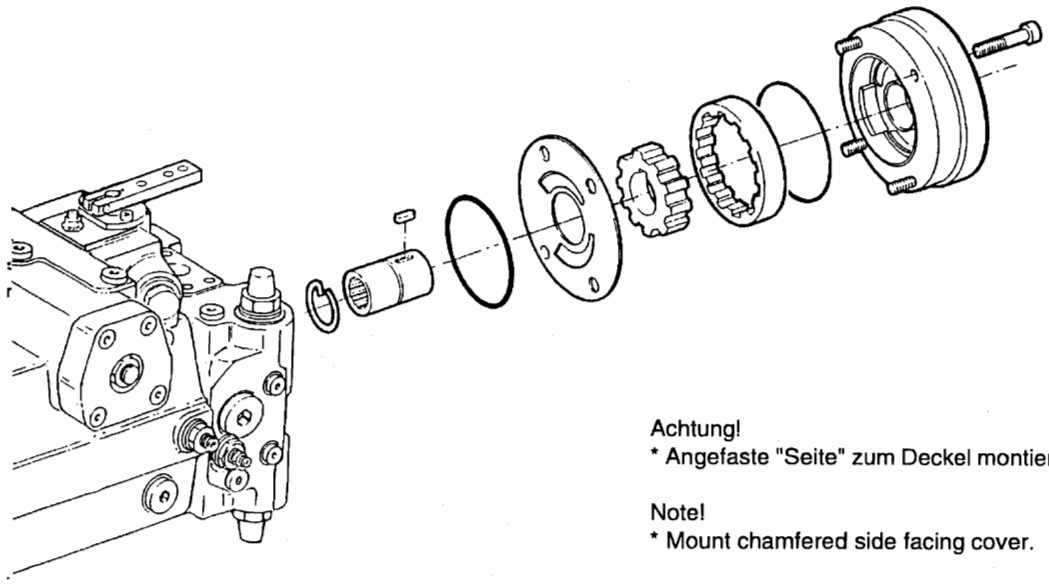
15 Blechschraube in die mit Gummi gefüllten Löcher eindrehen.
Mit Zange WDR herausziehen.

Screw in sheet metal screw into the holes fitted with rubber.
Pull out shaft seal with pliers.



16 Wellendichtring mit Buchse auf Anschlag einpressen.
Sicherungsring einbauen.

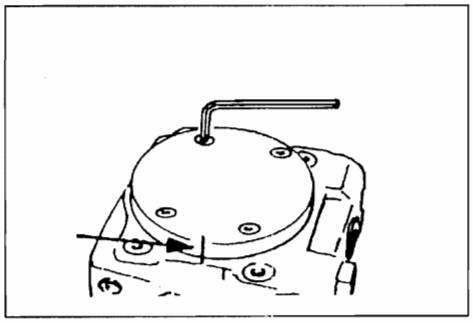
Press-in shaft seal with bush to stop.
Assemble retaining ring.



Achtung!
* Angefaste "Seite" zum Deckel montieren.

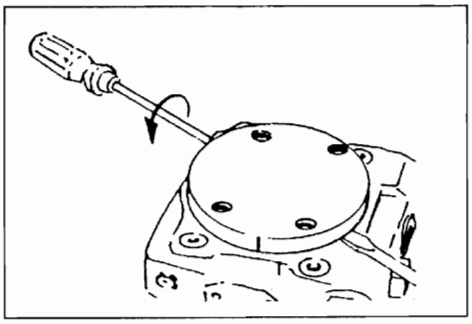
Note!
* Mount chamfered side facing cover.

17



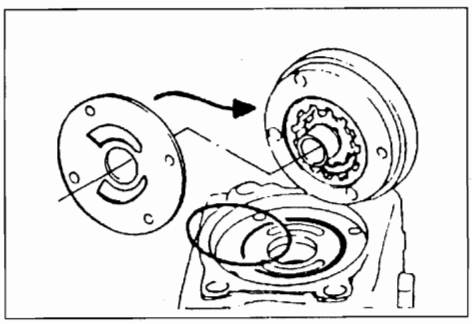
18 Lage kennzeichnen,
Befestigungsschrauben ausbauen.

Mark position,
remove fixing screws.



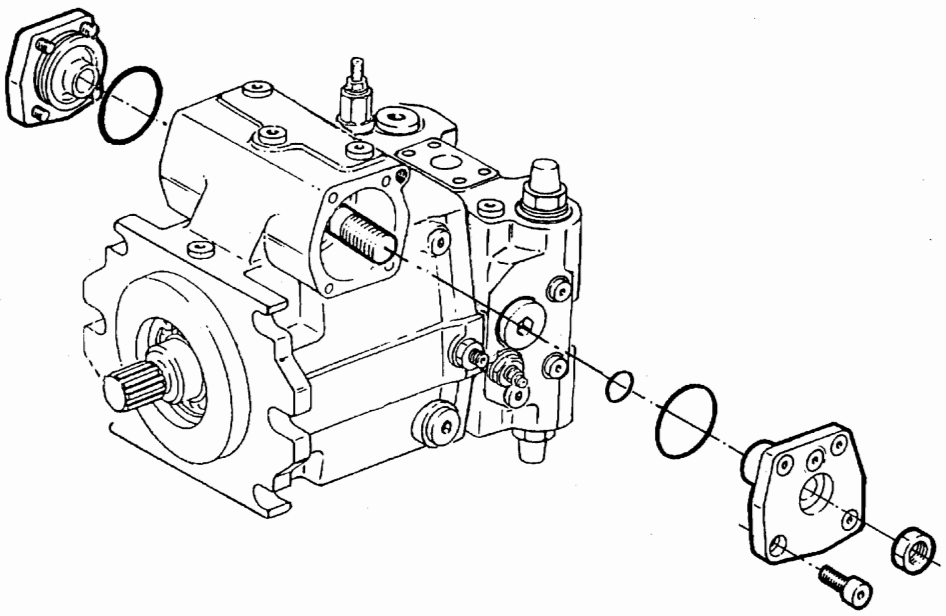
19 Deckel abdrücken.

Pry-off cover.



20 Kontrolle:
O-Ring, Nut,
Lauffläche, Anschlußplatte.

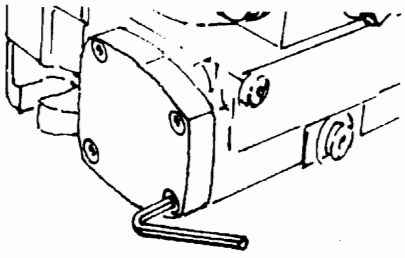
Check:
O-ring, groove,
gliding surface, connection plate.



Achtung!
Korrekt mechanische 0-Lageneinstellung überprüfen

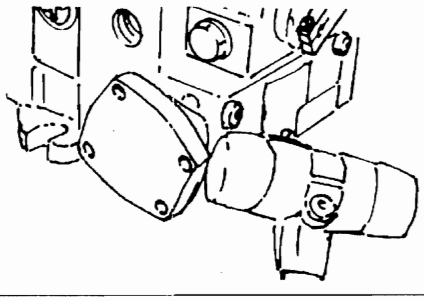
Attention!
Check correct mechanical 0-position.

21



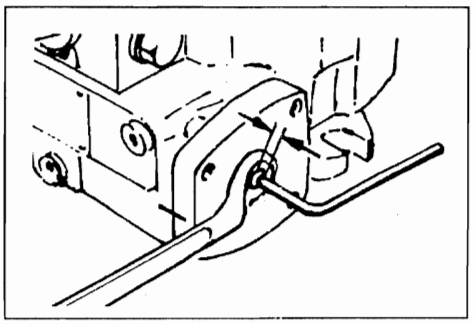
22 Lage kennzeichnen.

Mark position.



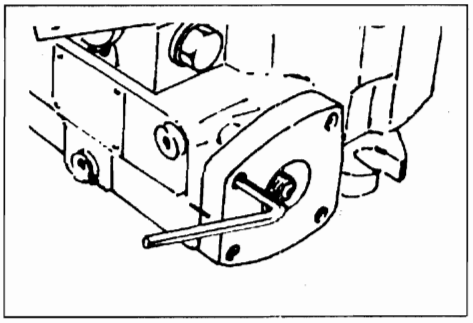
23 Deckel verdrehen und mit leichten Hammerschlägen lösen.

Rotate cover and release by tapping gently with hammer.



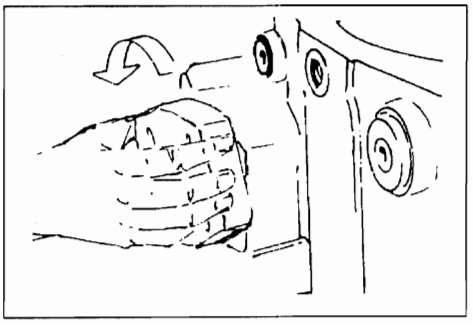
24 Deckel kennzeichnen. Maß festhalten, Kontermutter lösen, Stellschraube gegenhalten.

Mark cover. Must be fixed, loosen counter nut, hold adjustment screw.



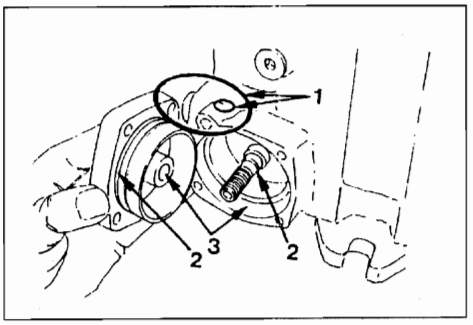
25 Deckel demontieren.

Remove cover.



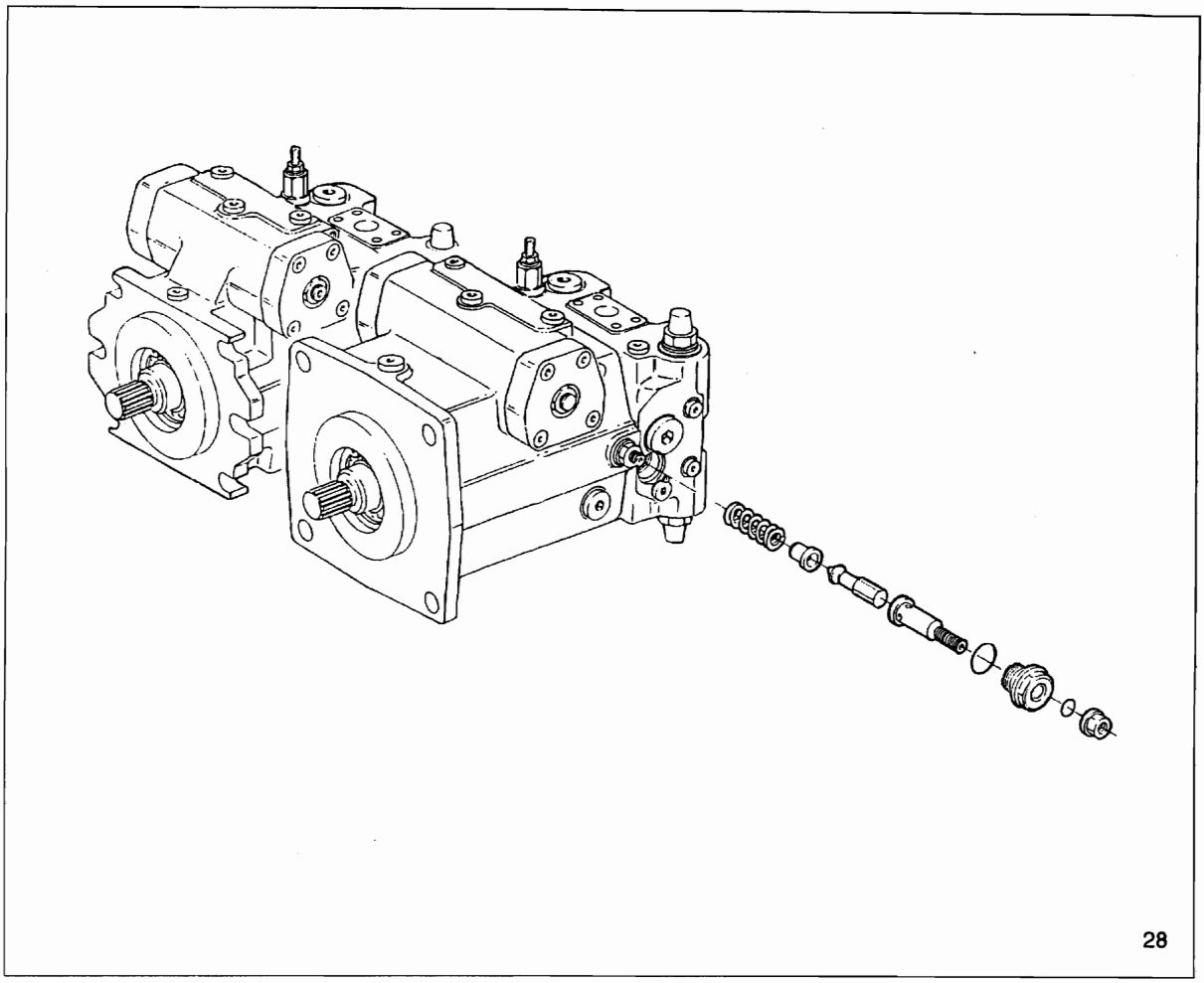
26 Deckel von Stellschraube "abschrauben".

Lift off by turning the setting screw.

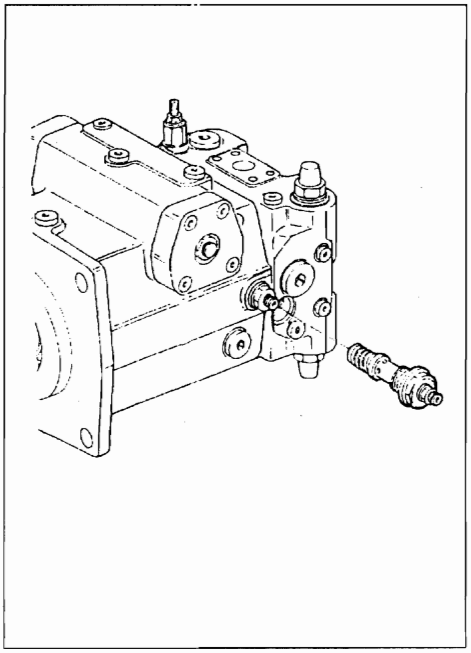


27 Kontrolle!
O-Ring (1), Nut (2), Gehäuse (3).

Check!
O-ring (1), groove (2), housing (3).



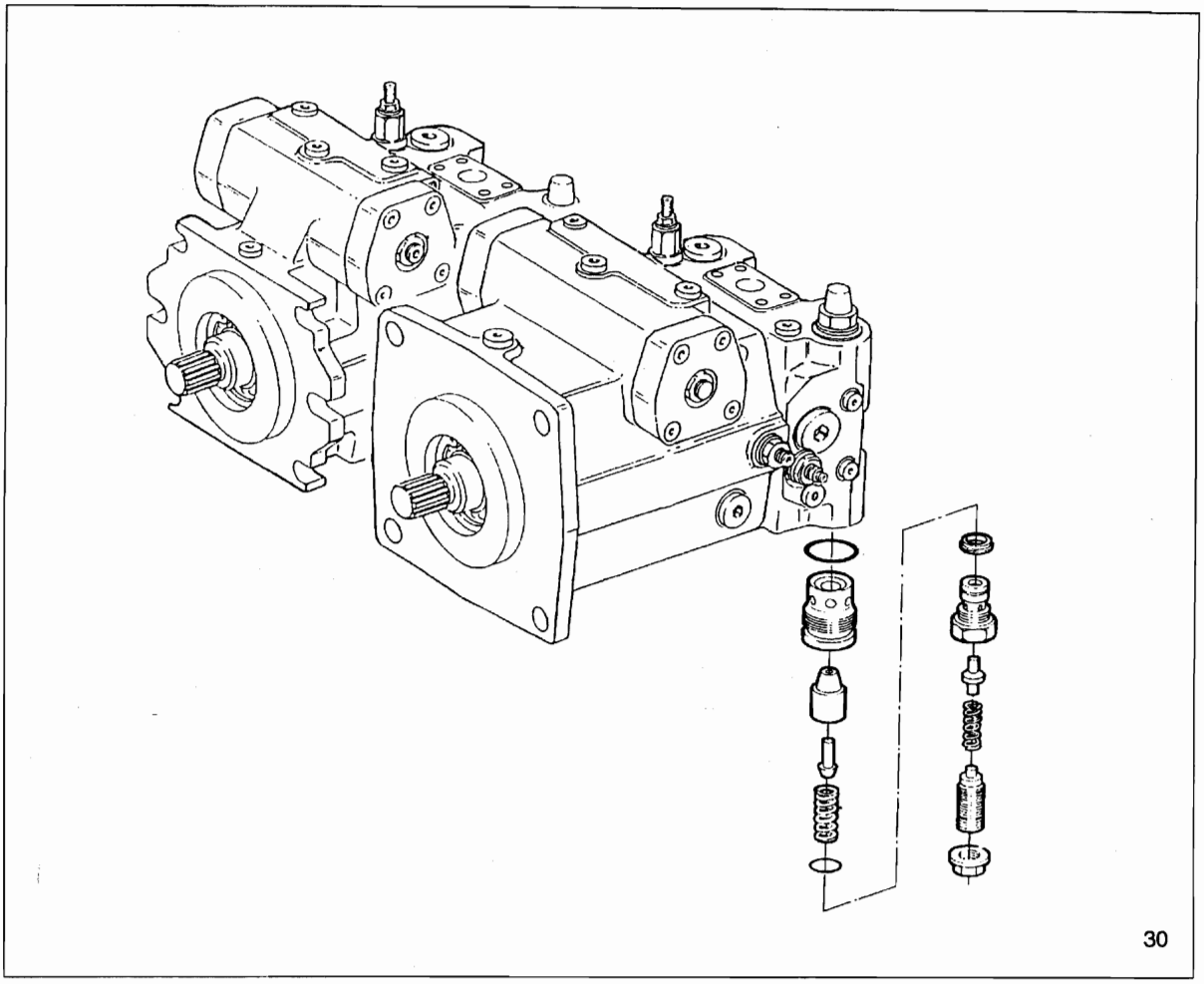
28



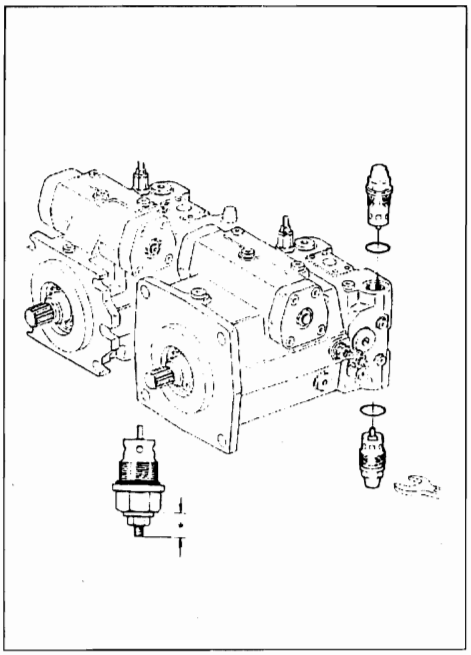
29

Ventil komplett ausbauen.
Hinweis:
Einstellschraube nicht verändern.
Achtung!
Nach Einbau Ventileinstellung überprüfen!

Remove valve completely:
Note:
Do not change adjustment screw.
Attention!
Check valve setting after installation.

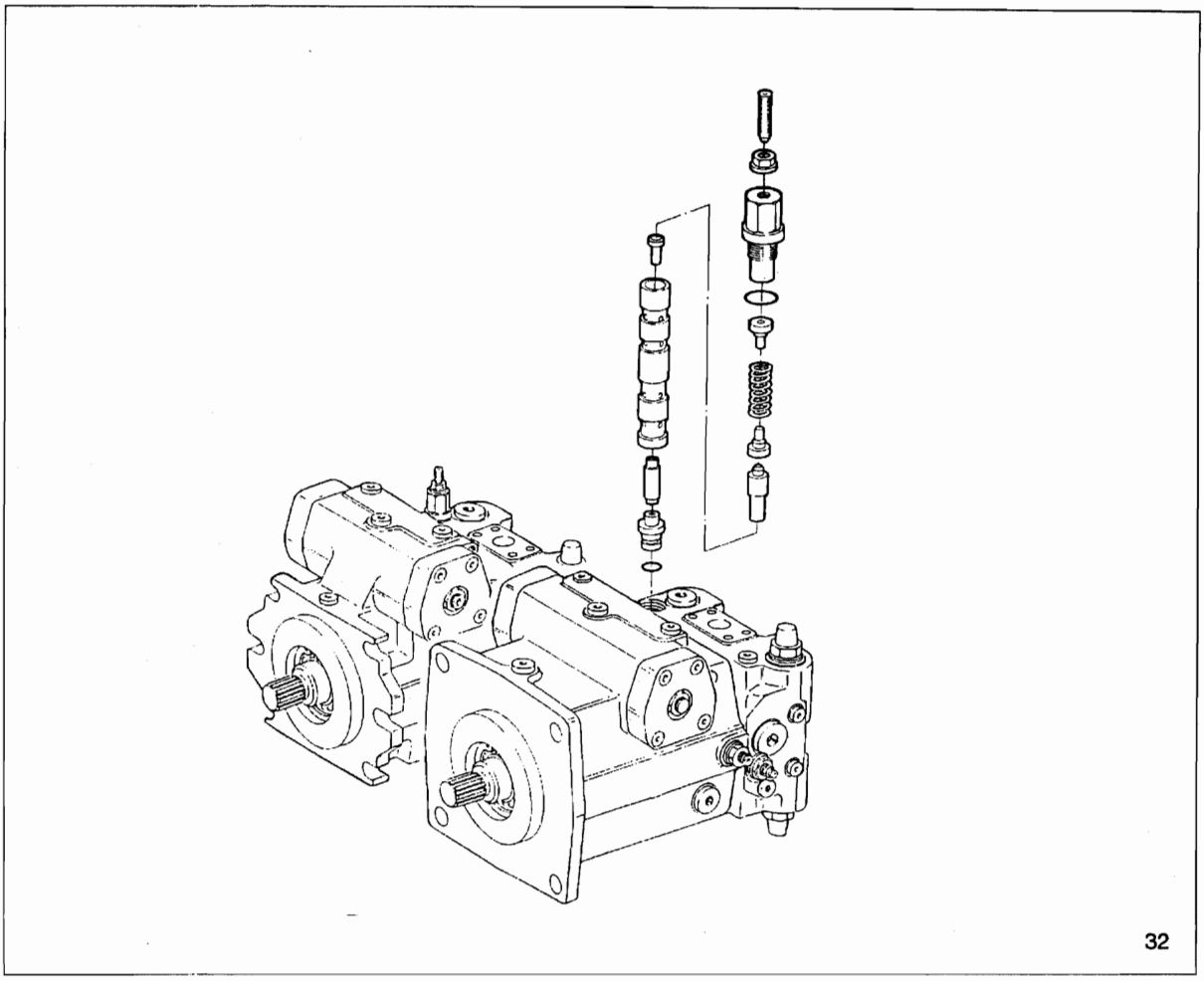


30

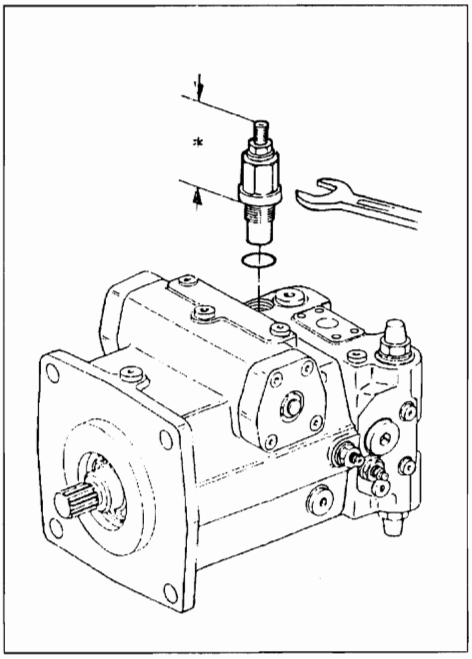


31 Ventil komplett ausbauen.
Kontrolle: O-Ring, Gehäuse.
Wechsel der Dichtmutter - Einstellmaß (*) festhalten.
Achtung!
Nach Einbau "Ventileinstellung" überprüfen.

Remove valve completely.
Control: O-ring, housing.
Replacement of the tightening nut, record measure (*).
Attention!
After assembly check "valve setting".



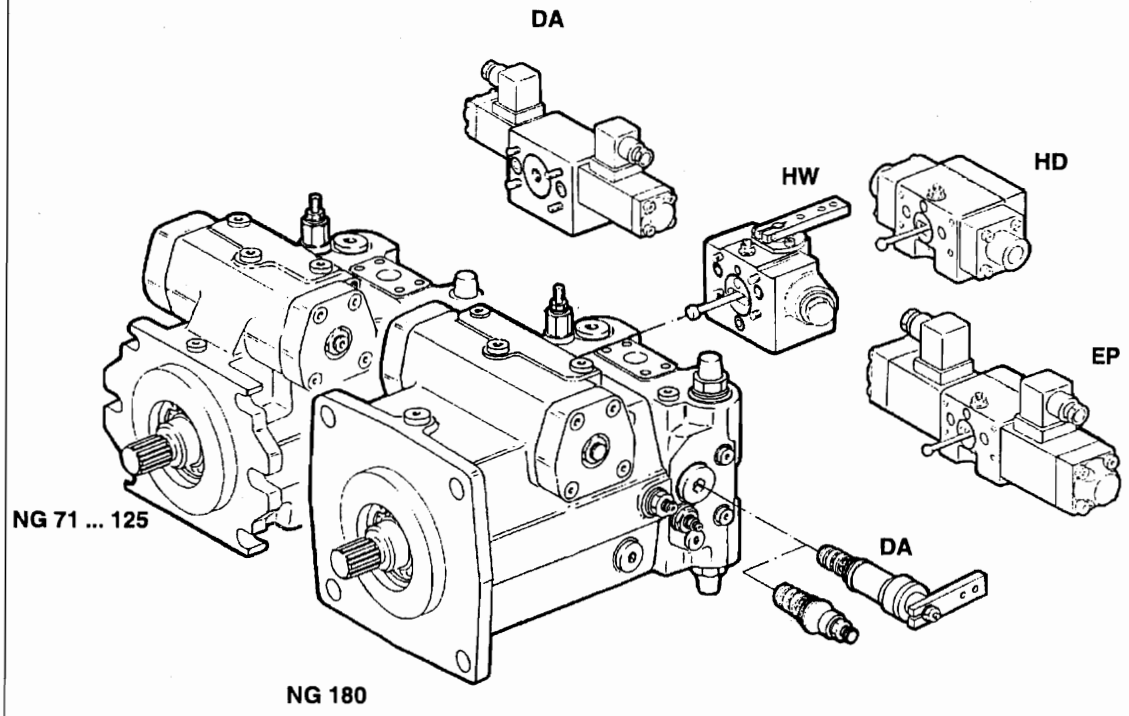
32



33

Einstellteil komplett ausschrauben.
Kontrolle: O-Ring, Gehäuse.
Wechsel der Dichtmutter - Einstellmaß (*) festhalten.
Achtung!
Nach Einbau "Ventileinstellung" überprüfen.

Unscrew setting cartridge completely.
Control: O-ring, housing.
Replacement of the tightening nut, record measure (*).
Attention!
After assembly check "valve setting".

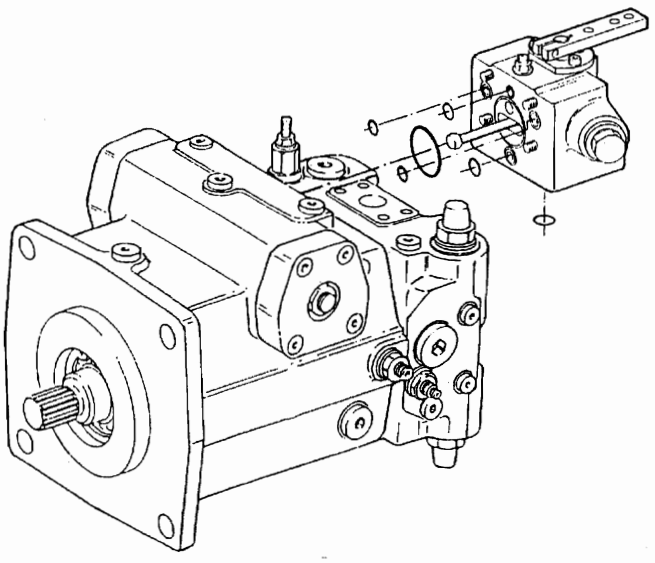


Ansteuergerät abbauen.

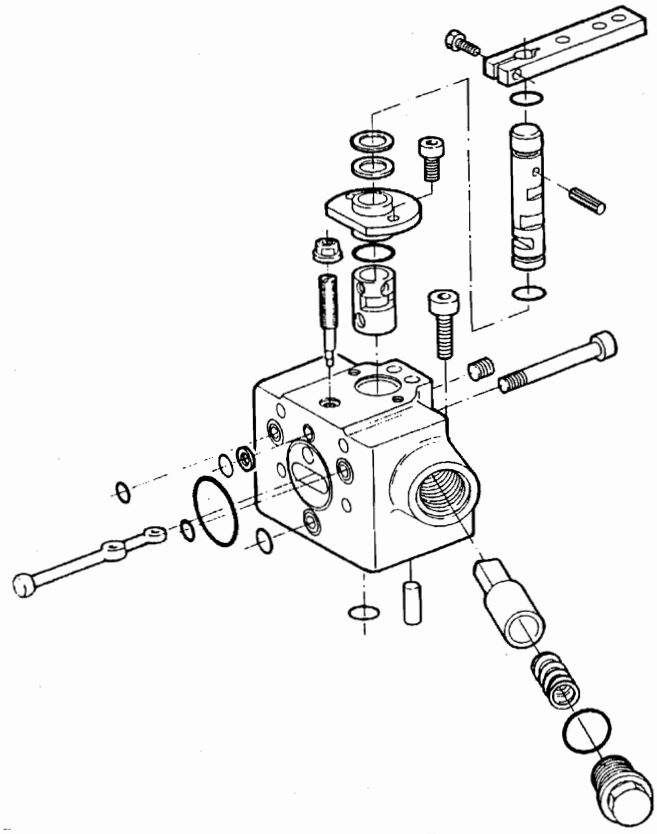
Remove control device.

Hinweis:
NG 71: Abdichtung der Ansteuergeräte wie NG 40 - 56 mit Flachdichtung.
Achtung!
Korrekte hydraulische Nullageneinstellung überprüfen.

Note:
Size 71: Sealing of control device as size 40 - 56 with flat seal.
Attention!
Check correct hydraulic 0-position.



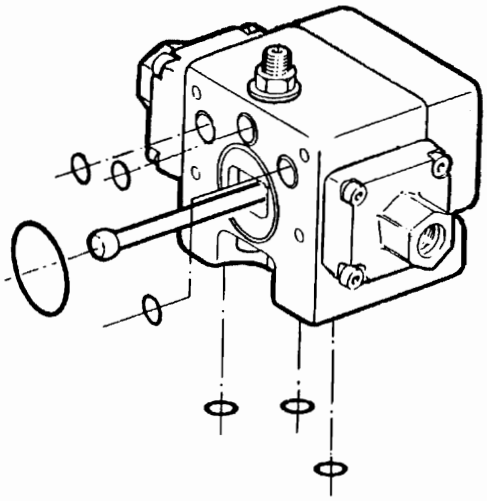
35



Kontrolle:
O-Ringe und Dichtung.

Check:
O-rings, gasket.

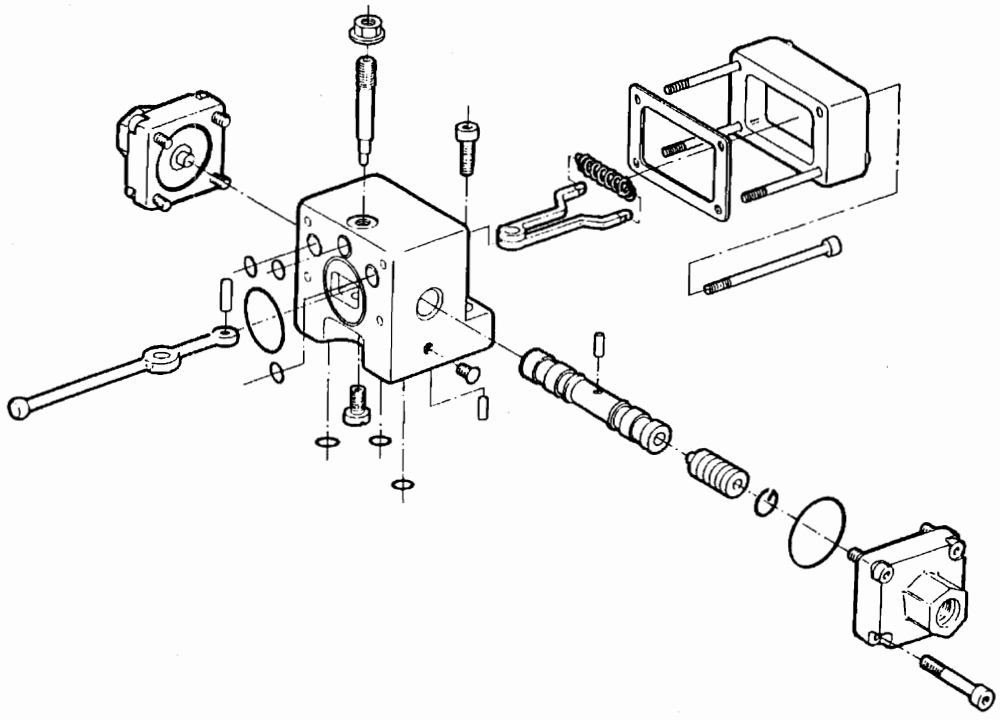
36



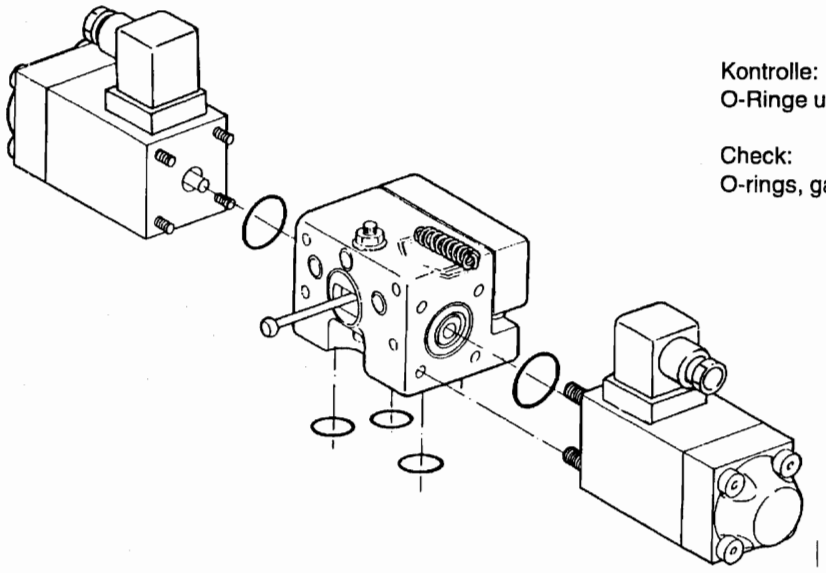
Kontrolle:
O-Ringe

Check:
O-rings

37



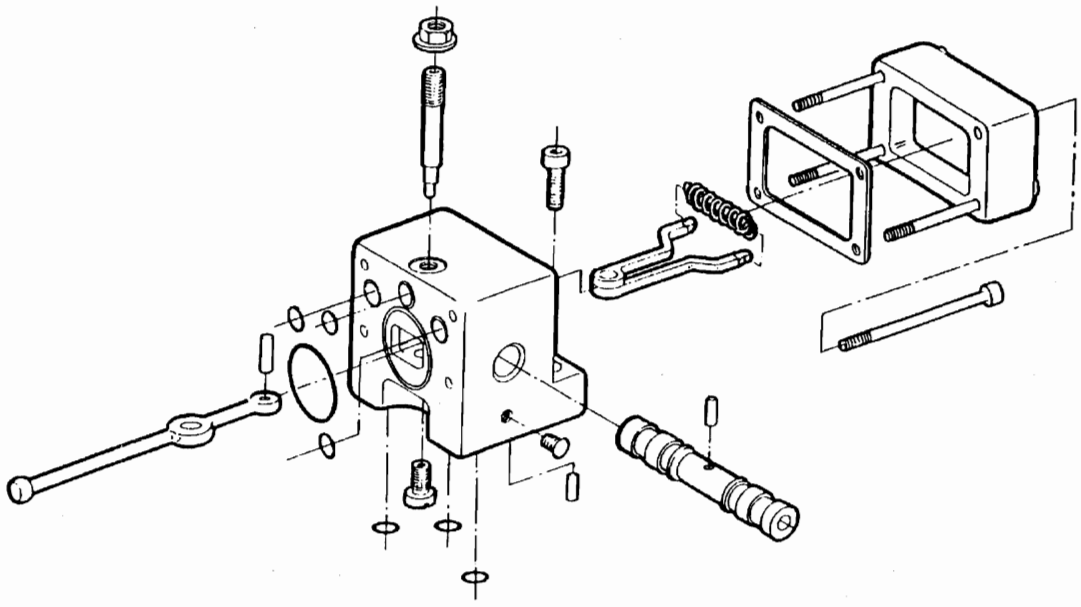
38



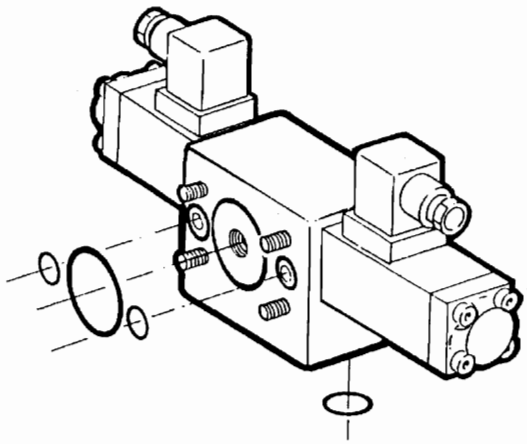
Kontrolle:
O-Ringe und Dichtung.

Check:
O-rings, gasket.

39



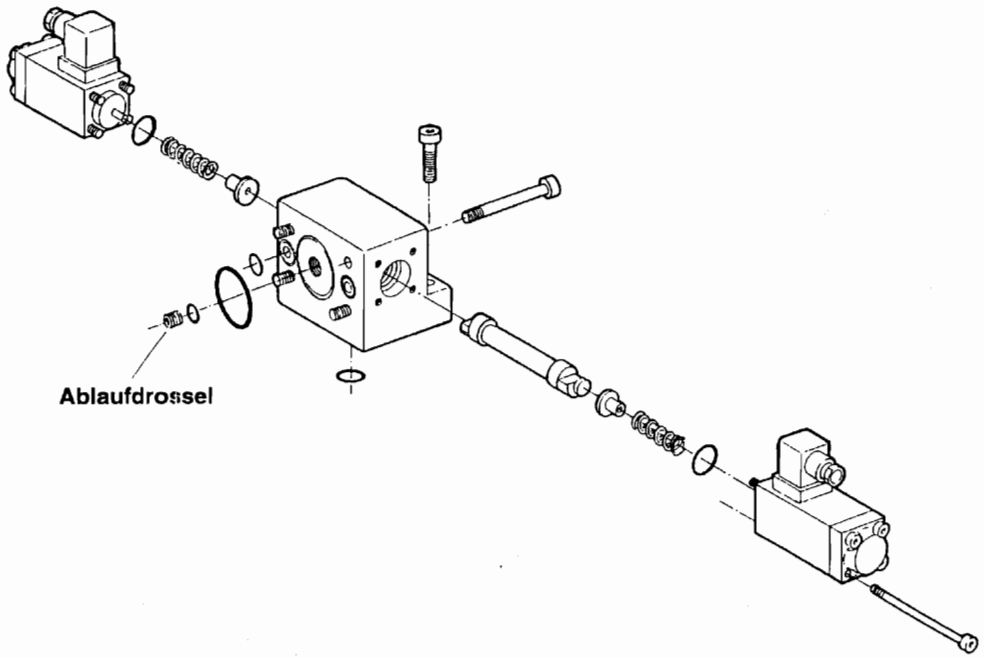
40



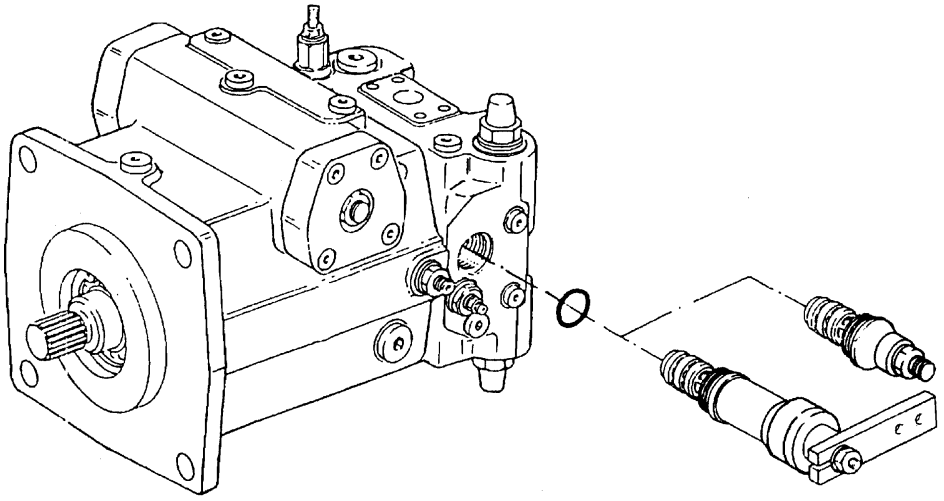
Kontrolle:
O-Ringe

Check:
O-rings

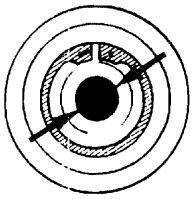
41



42

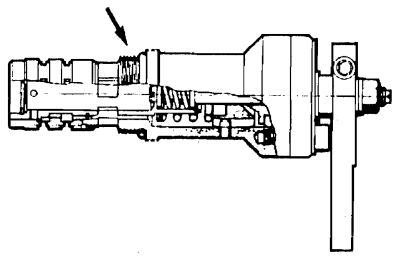


43



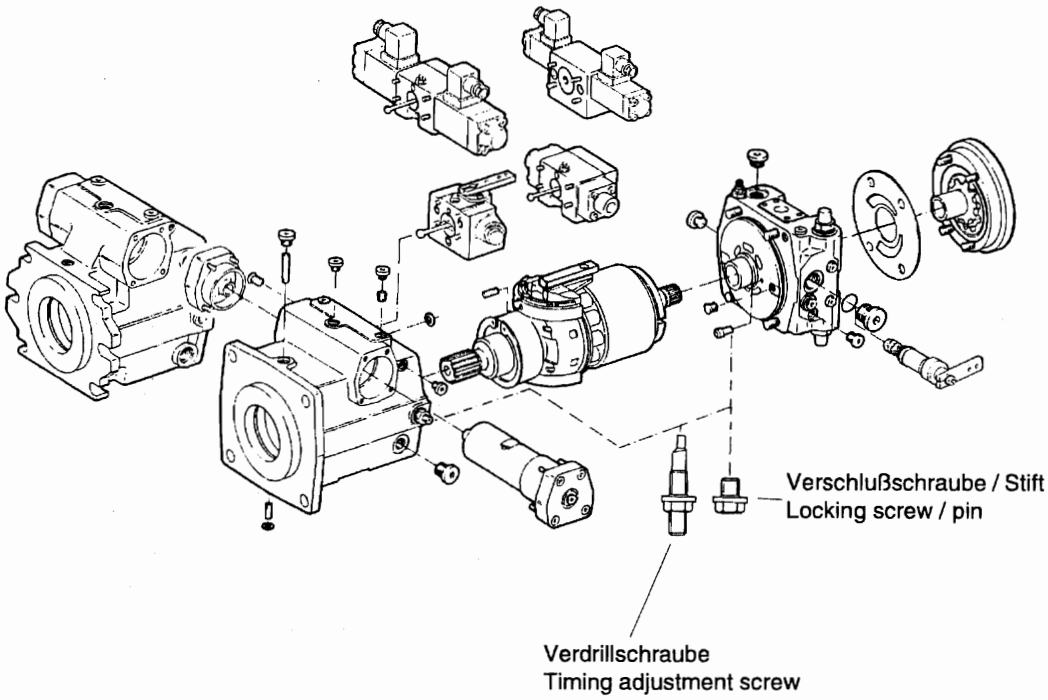
44 Blende überprüfen.
Keine Beschädigung.

Inspect orifice.
No damage.

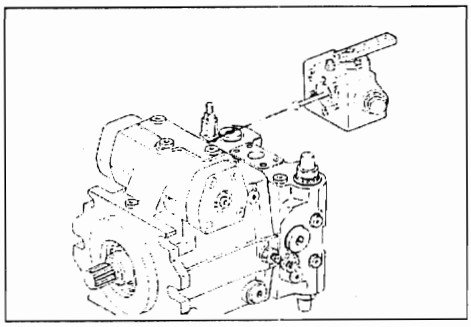


45 Gewinde abkleben.
O-Ring einsetzen.

Cover threads.
Insert O-ring.

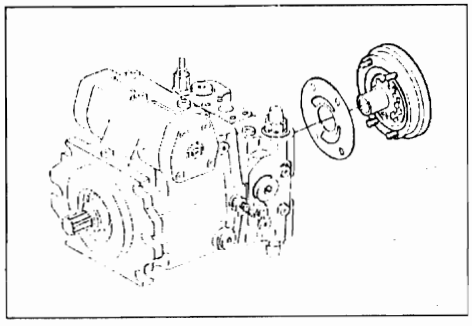


46



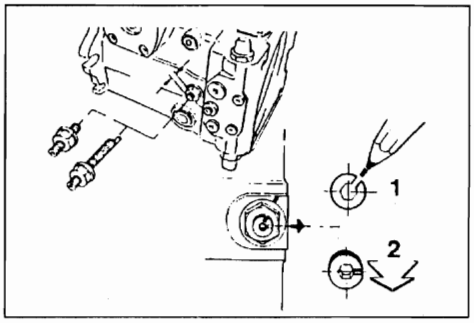
47 Ansteuergerät abbauen.

Remove control device.



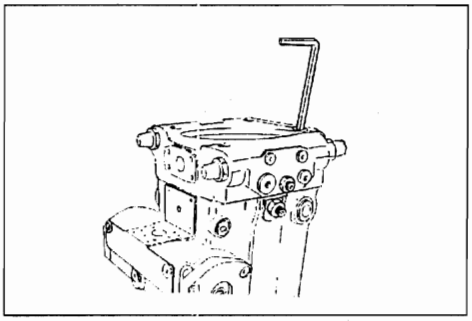
48 Hilfspumpe ausbauen.
Hinweis:
Einbaulage kennzeichnen.

Remove auxiliary pump.
Note:
Mark assembly position previously.



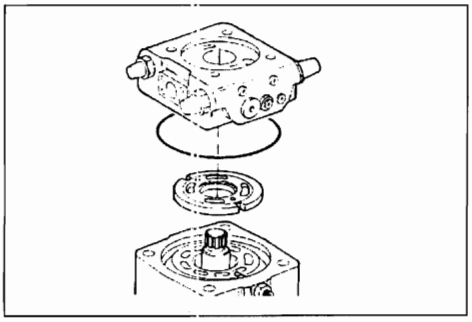
49 Lage der Verdrillschraube markieren (1).
Einstellmaß festhalten.
Verdrillschraube auf Demontageposition stellen (2).

Mark the position of the indexing screw (1).
Record setting measure.
Set the indexing screw to disassembly position (2).



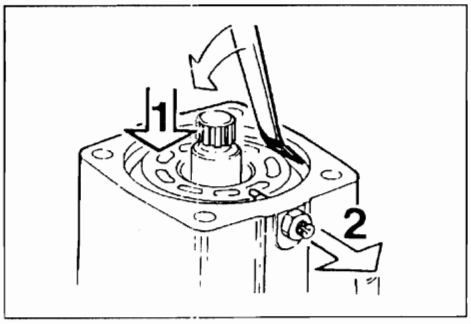
50 Lage der Hilfspumpe und Anschlußplatte markieren.
Anschlußplattenbefestigung lösen.

Mark position of the connection plate.
Loosen connection plate fixation.



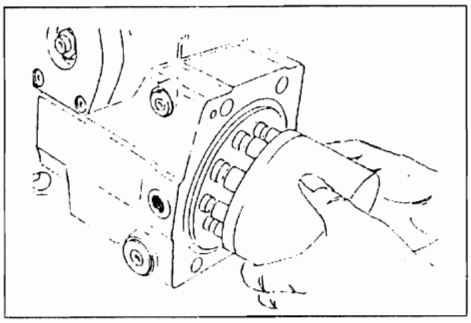
51 Anschlußplatte und Steuerplatte abheben.

Lift off port plate and control plate.



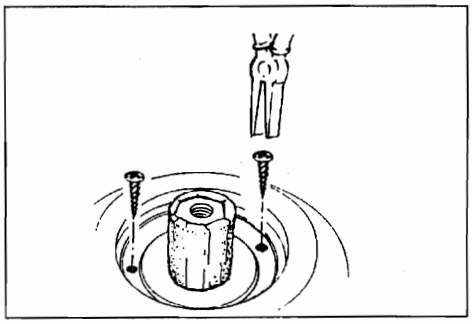
52 1. Zylinder nach unten drücken.
2. Verdrillschraube herausdrehen.

1. Press the cylinder to the bottom.
2. Remove fixing indexing screw.



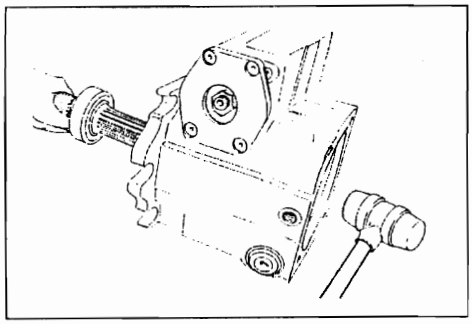
53 Zylinder komplett mit Kolben und
Rückzugeinrichtung ausbauen.

Push off hydraulic section of rotary group.



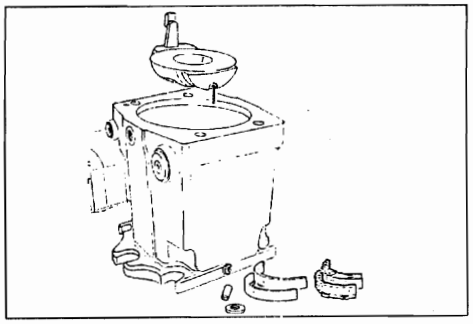
54 Seegerring / WDR ausbauen.

Remove retaining ring and radial seal ring.



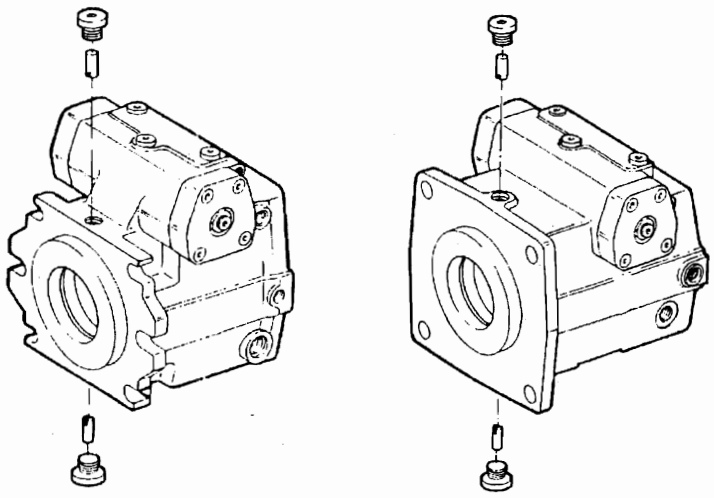
55 Triebwelle mit leichten Hammerschlägen austreiben.

Remove drive shaft with slide hammer strokes.



56 Schwenkwiege / Lager komplett ausbauen.

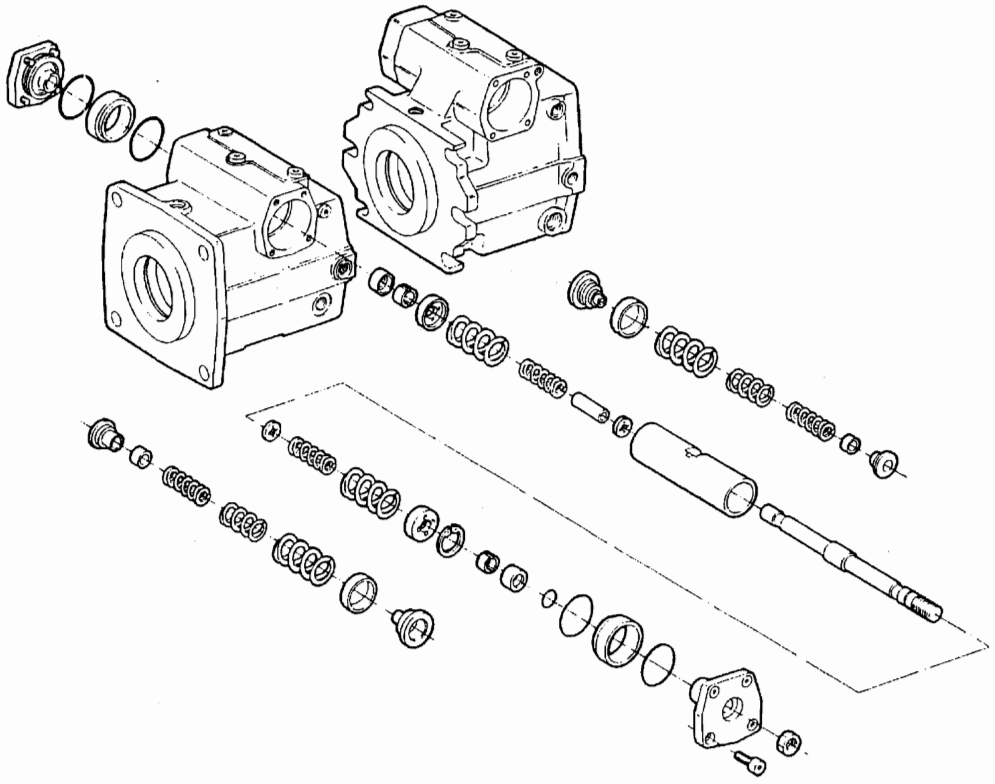
Remove swash plate / bearing cups.



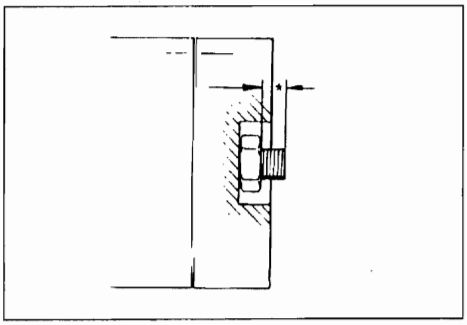
Gelenkstift ausbauen.

Remove joint pin.

57

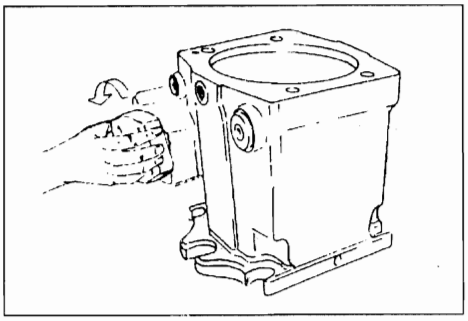


58



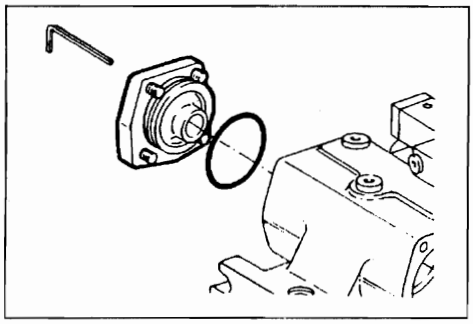
59 Lage vom Deckel markieren, Maß "Nullage" festhalten, Mutter lösen.

Mark position of the cover, note measure of "zero position". Loosen nut.



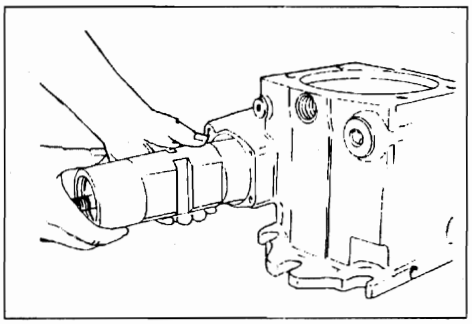
60 Deckel abdrehen.

Remove cover.



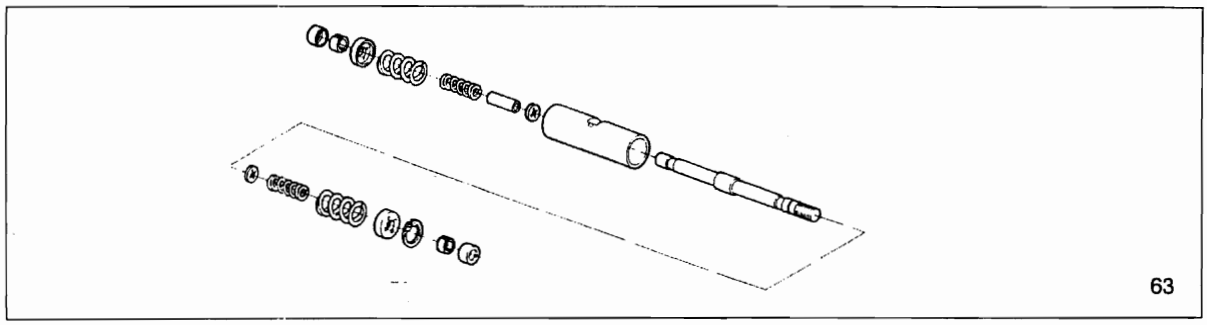
61 Lage des Deckels markieren.
Befestigungsschrauben lösen, abbauen.

Mark position of the cover.
Loosen locking screw, remove cover.

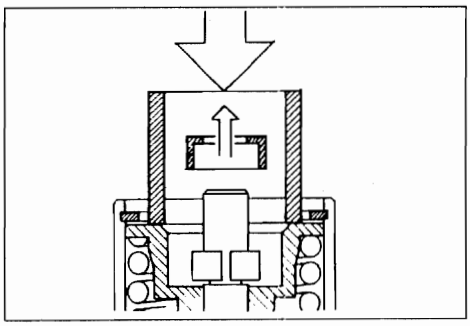


62 Stellzylinder ausbauen.

Remove positioning ring.

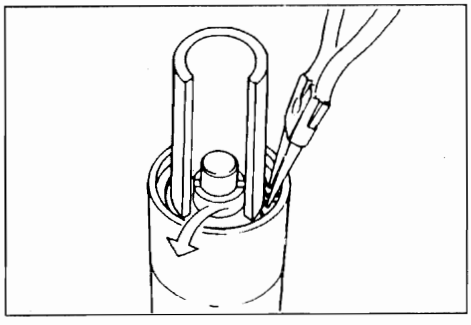


63



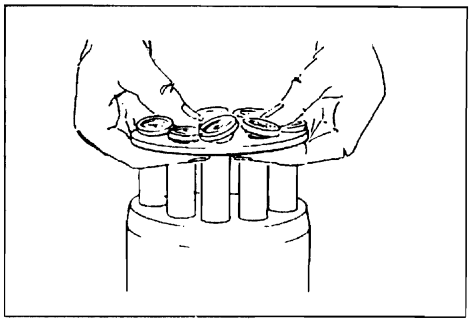
64 Vorrichtung aufsetzen und Feder vorspannen.
Aufnahmering ausbauen.

Fit tool device and preload spring.
Remove take-off ring.



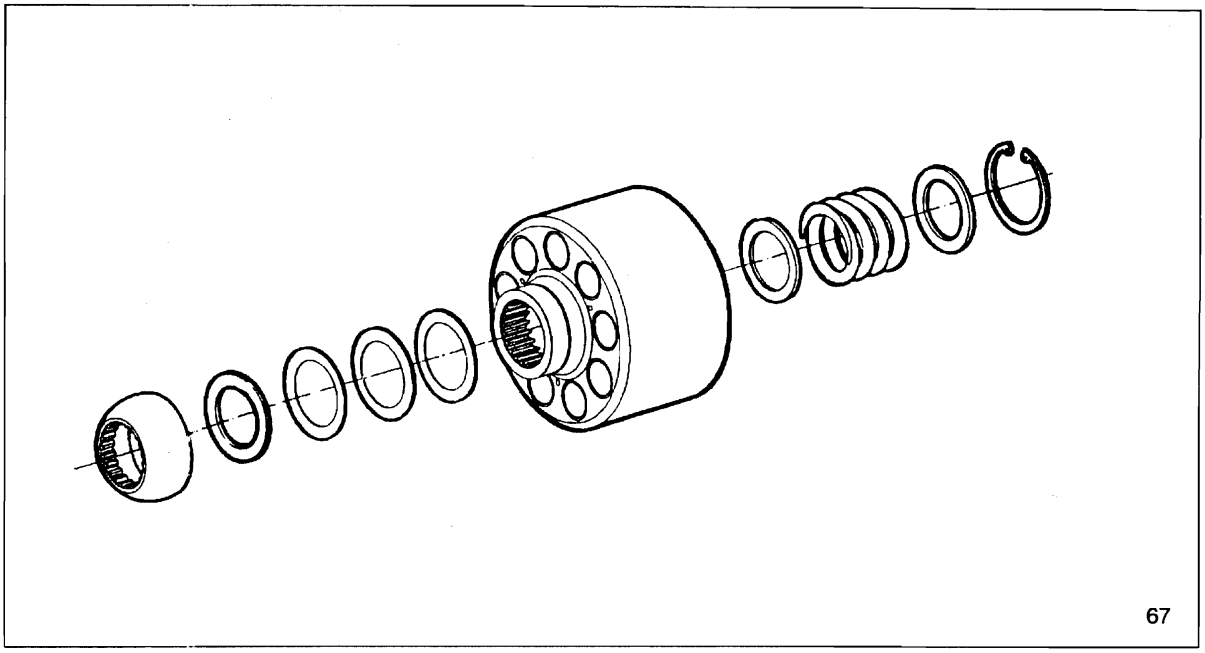
65 Ringe ausbauen.
Sicherungsring ausbauen.
Achtung: Teile stehen unter Federvorspannung.

Remove rings.
Remove safety ring.
Attention: Parts are under spring load.

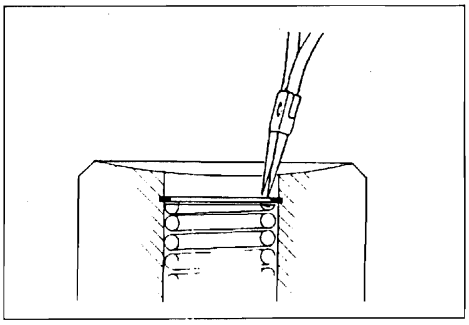


66 Kolben mit Rückzugeinrichtung ausbauen.
Tragkugel mit Tellerfedersäule abheben.

Remove piston with retaining plate.
Remove retaining ball with spring cup assembly.

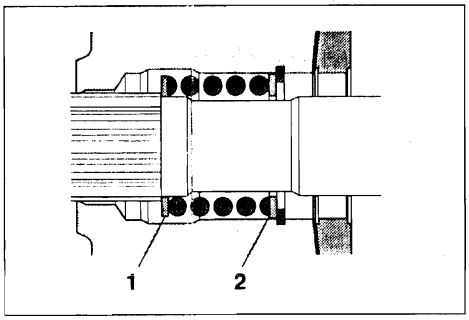


67



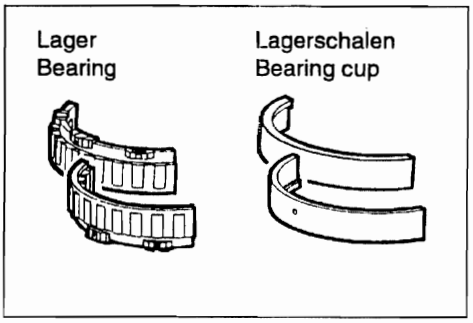
68 Sicherungsring ausbauen.

Remove safety ring.



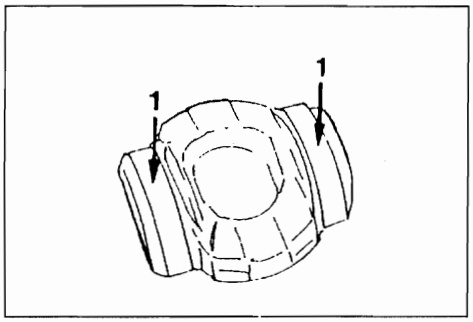
69 Scheibe 1, 2

Disc 1, 2



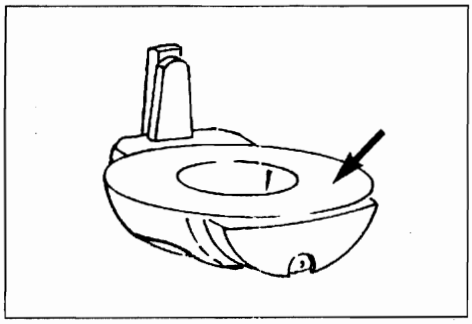
70 Kontrolle!
Käfig-Paar (1),
Lagerschalenpaar (2).

Check!
Cage set (1),
Bearing cup set (2).



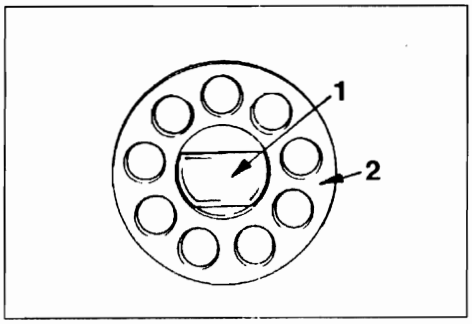
71 Kontrolle!
Lagerbahnen (1)

Check!
Bearing surfaces (1)



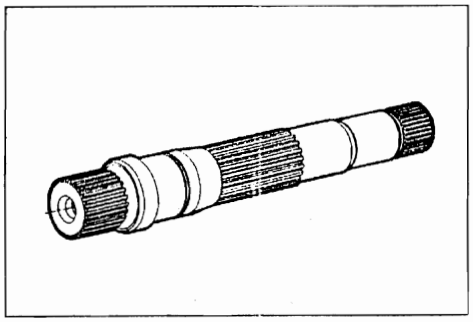
72 Kontrolle!
Gleitfläche riefenfrei.

Check!
Sliding surface free from scoring.



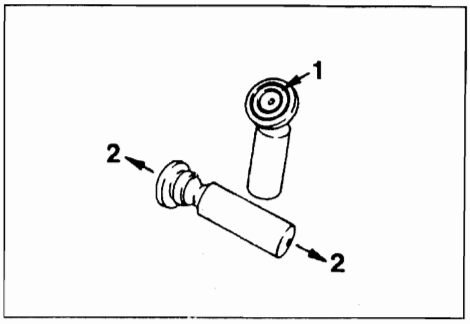
73 Kontrolle!
Rückzugeinrichtung riefenfrei.

Check!
Check that return device is free of scoring.



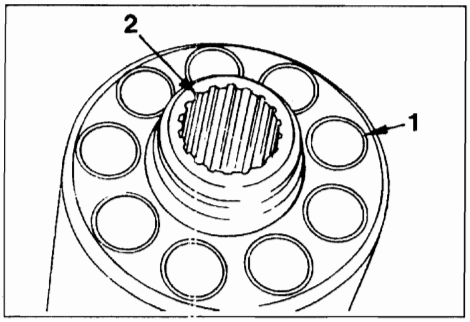
74 Kontrolle!
1. Verzahnung "ausgeschlagen", Passungsrost.
2. Laufflächen.
3. Lauffläche - Wellendichtring.

Check!
1. Splines for damage or fretting.
2. Running surfaces.
3. Groove cut by shaft seal.



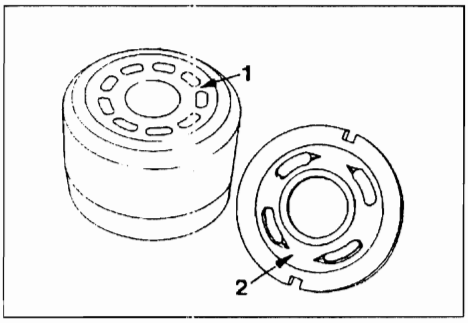
75 Kontrolle!
Lauffläche (1) keine Kratzer, keine Metalleinlagerungen, kein Axialspiel (2), (Kolben nur satzweise tauschen).

Check!
Check that there are no scratches or metal deposits on sliding surface (1), and there is no axial play (2), (otherwise: pistons must be replaced in sets).



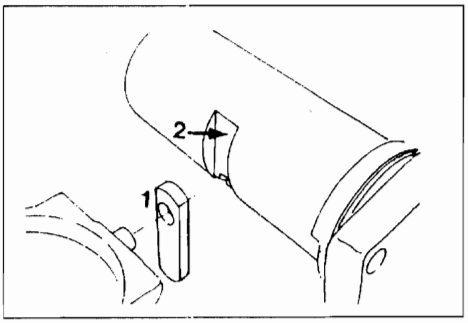
76 Kontrolle!
Zylinderbohrungen (1), Verzahnungen (2).

Check!
Cylinder bores (1), splines (2).



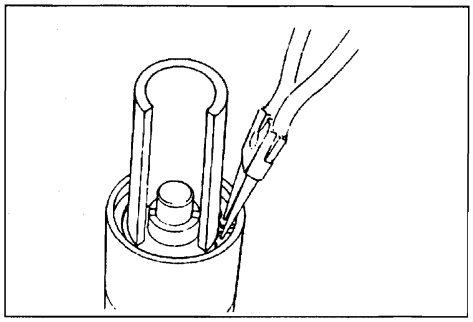
77 Kontrolle!
Zylindergleitfläche (1) riefenfrei.
Steuerplatte (2) nicht riefig.

Check!
Cylinder surface (1) free of scoring.
Control plate (2) without scoring.



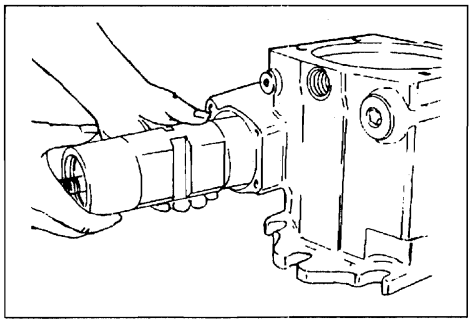
78 Kontrolle!
Stellkolben - Schwenkwiegenverbindung
Gleitstein (1), Nut im Stellkolben (2), Stellkolben.

Check!
Positioning piston - cradle linkage
Gliding stone (1), groove at the positioning piston (2).
Positioning piston.



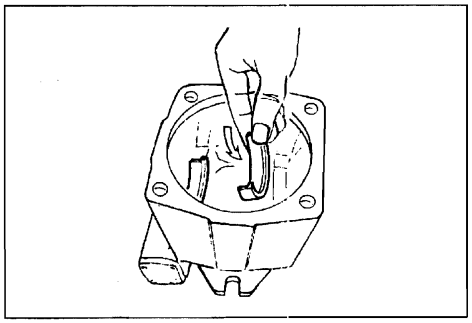
79 Stellkolben montieren.
Hinweis:
Auf korrekten Sitz der geteilten Ringe "achten".

Assemble positioning piston.
Instruction:
Observe correct fit of the divided rings.



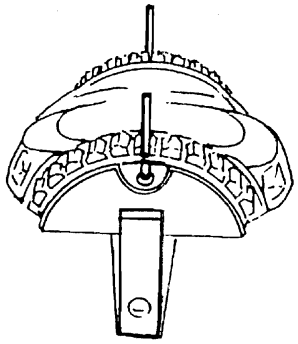
80 Stellkolben ins Gehäuse einsetzen.
Hinweis:
Stellkolben vor Einbau einölen.

Insert positioning piston into the housing.
Instruction:
Oil positioning piston before assembly.



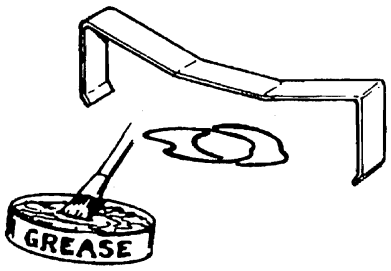
81 Lagerschalenpaar einsetzen.

Insert bearing cup set.

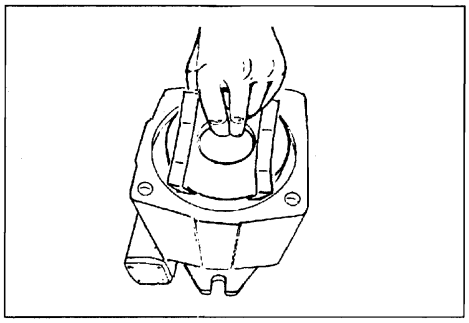


Lager, Draht, Gleitstein und Gelenkstift
montieren.
Montagehilfe: z.B. - Klammer / Gummiringe / Fett

Assemble bearing, wire, gliding stone
and articulating pin.
Assistance: Devices e.g. - Clamp / rubber rings / grease



82

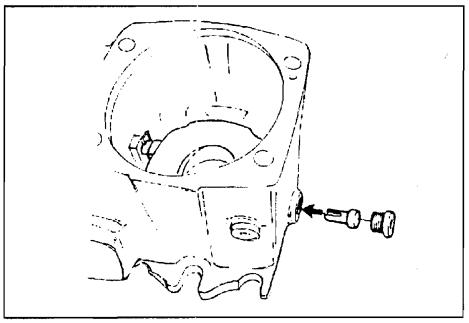


83 Schwenkwiege komplett ins Gehäuse einsetzen.
Auf korrekten Sitz der Schwenklager im Gehäuse "achten".

⚠ Montagehilfe ausbauen.

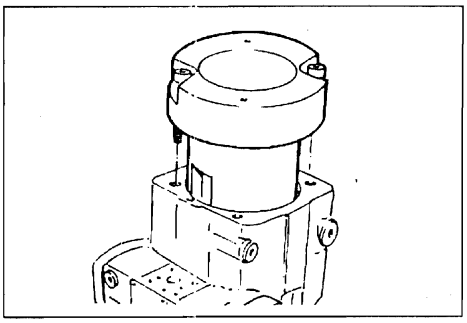
Insert completely swivel cradle into the housing.
Pay attention for correct seat of the swivel cradle in the housing.

⚠ Remove auxiliary device.



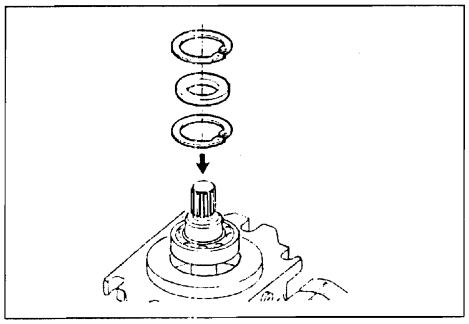
84 Gelenkstifte montieren.

Assemble articulating pins.



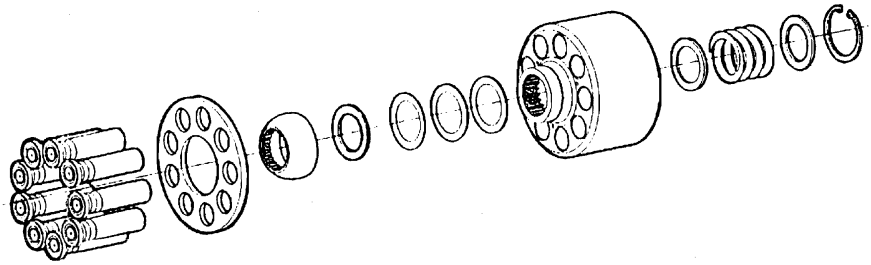
85 Vorrichtung zum Fixieren der Schwenkwiege montieren.

Assemble device for fixation of the swivel cradle.

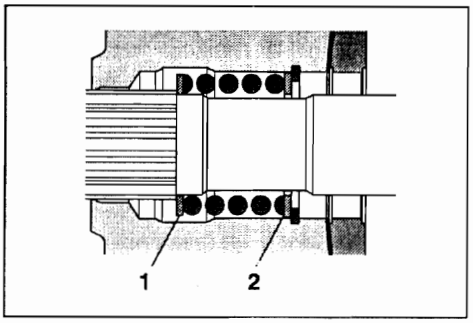


86 Neue Montageposition!
Triebwelle mit Lager und Wellendichtring einbauen.

Assemble drive shaft with bearings and radial seal rings.

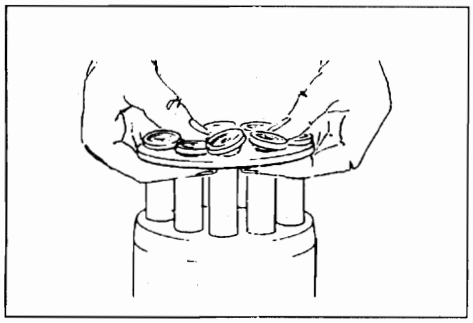


87



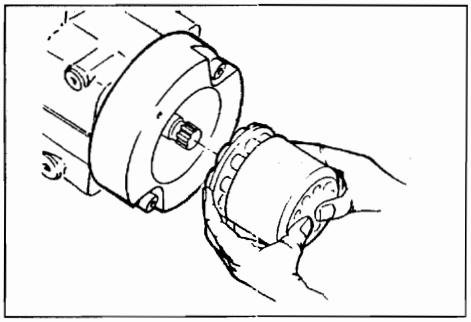
88 Scheibe 1, 2

Disc 1, 2



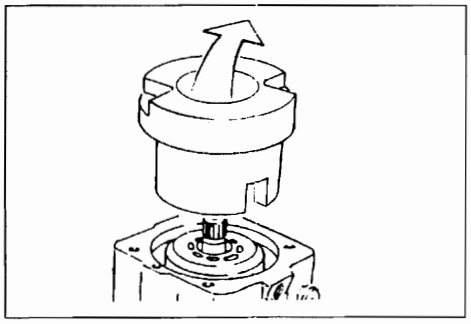
89 Kolben mit Rückzugeinrichtung montieren.
Hinweis:
Kolben, Gleitschuhe einölen.

Assemble piston with retaining plate.
Note:
Oil piston and piston pad.



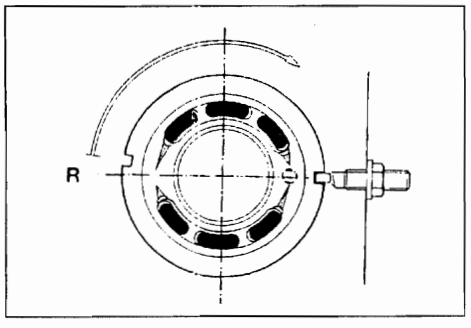
90 Zylinder komplett einbauen.

Assemble cylinder completely.



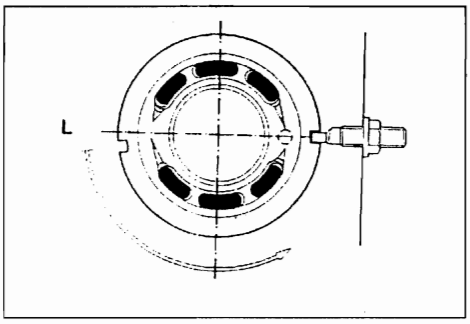
91 Vorrichtung ausbauen.

Remove assembly device.



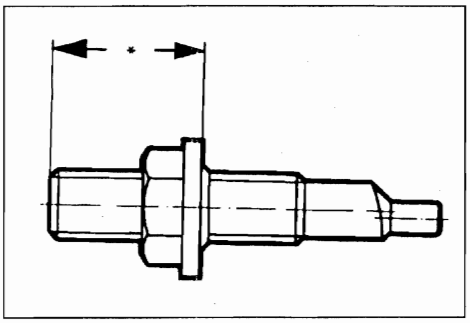
92 Steuerplatte Rechtslauf - in Drehrichtung verdreht.
Achtung!
Geräuschkerben sind drehrichtungsbezogen eingeschliffen.

Control plate clockwise rotation - indexed in the direction of rotation.
Note!
Noise grooves are machined - in based on direction of rotation.



93 Steuerplatte Linkslauf - in Drehrichtung verdreht.
Achtung!
Geräuschkerben sind drehrichtungsbezogen eingeschliffen.

Control plate counter clockwise rotation - indexed in the direction of rotation.
Note!
Noise grooves are machined - in based on direction of rotation.

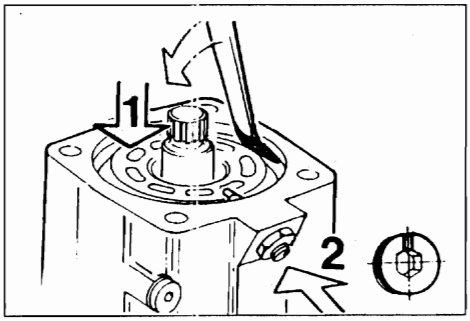


94 Grundeinstellung - Verdrillschraube

A4VG...71 * = 28 ± 0,75 mm	A4VG...90 * = 29 ± 0,75 mm
A4VG...125 * = 20 ± 0,75 mm	A4VG...180 * = 22 ± 0,75 mm.

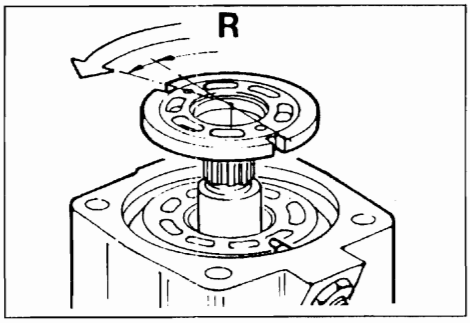
Basic setting - indexing screw

A4VG...71 * = 28 ± 0,75 mm	A4VG...90 * = 29 ± 0,75 mm
A4VG...125 * = 20 ± 0,75 mm	A4VG...180 * = 22 ± 0,75 mm.



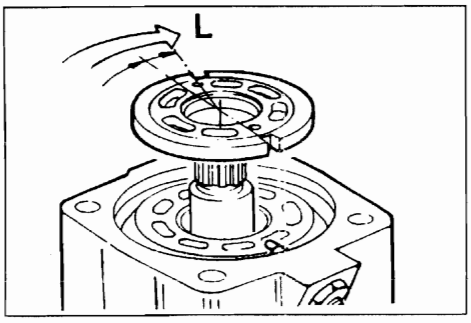
95 Steuerplatte einsetzen - Rechtslauf.

Insert the control plate - clockwise rotation.



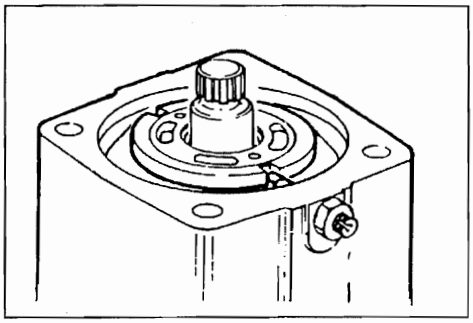
96 Zylinder nach unten drücken (1).
Verdrillschraube einbauen (2).
Kerbe in Montageposition.

Press the cylinder to the bottom (1).
Screw in the indexing screw (2).
Groove in mounting position.

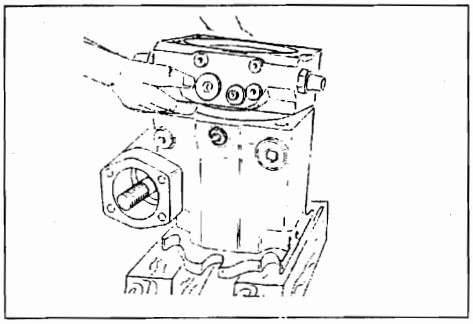


97 Steuerplatte einsetzen - Linkslauf.

Insert the control plate - Counter- clockwise rotation.



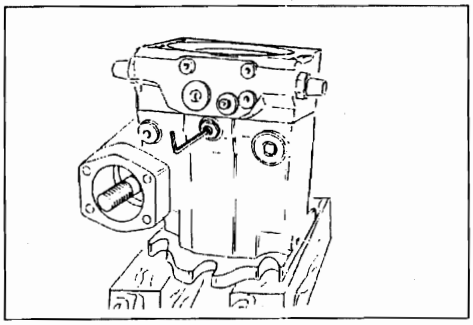
98



99

Anschlußplatte aufbauen.
Achtung! Federvorspannung!
Mit zwei Befestigungsschrauben überkreuz Anschlußplatte in Gehäuseführung einsetzen - Fertigmontage!

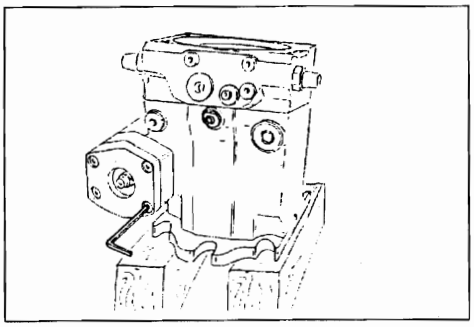
Assemble connection plate.
Attention! Spring preloaded!
Insert control plate into housing, guidance with two locking screws crossing over -Finish assembly!



100

Verdrillschraube - Nach Markierung ausrichten.

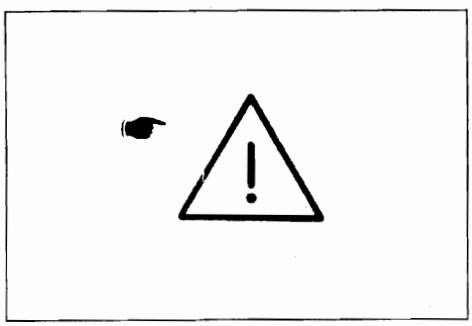
Locking screw - Observe adjusting measure.



101

1. Deckel montieren.
2. Nullage nach Maß einstellen.

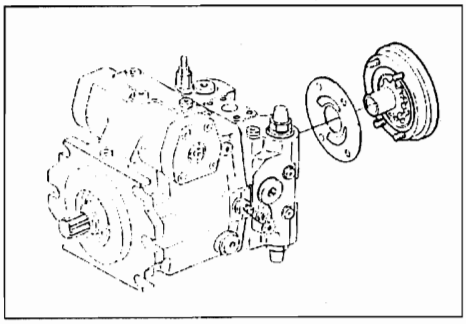
1. Assemble cover
2. Adjust zero position according to measure.



102

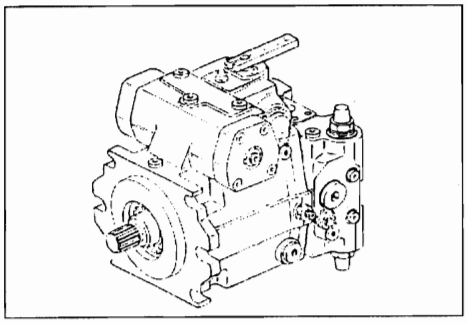
Achtung!
Korrekte mechanische Nullageneinstellung muß nach Einbau im Gerät bzw. Prüfstand erfolgen.

Attention!
Adjustments of the correct zero position to be carried out after installation into the machine or on the bench test.



103 Hilfspumpe montieren.
Hinweis: Drehrichtung beachten.

Assemble auxiliary pump.
Note: Take care of direction of rotation.



104 Ansteuergerät montieren.

Assemble control device.

Tightening torques for shaft bolts (Metric ISO Standard Thread)

The values for tightening torques shown in the table are valid only for shaft bolts with metric ISO- standard threads and head support surface dimensions in accordance with DIN 912, DIN 931 and DIN 933. These values are also valid only for light or unoiled, untreated surface as well as for use only with torque-indicating wrenches and force limiting tools.

Thread size	Strength Classes 8.8	10.9	12.9
	Tightening Torque (lb.ft)		
M 3	0,8	1,2	1,4
M 4	2,1	3,0	3,6
M 5	4,4	6,3	7,4
M 6	7,4	10,3	12,5
M 8	18,4	25,8	30,2
M10	36,1	50,9	61,2
M12	63,4	88,4	106,9
M14	99,5	140,0	169,5
M16	154,8	217,4	261,6
M18	213,7	298,5	357,4
M 20	302,2	427,5	508,5
M 22	405,4	574,9	685,4
M 24	523,5	737,0	884,4
M 27	773,9	1105,5	1326,6
M 30	1068,7	1474,0	1768,8

Tightening torques for cross-slotted lens head screws DIN 7985 (Metric ISO- Standard Thread)

The values for tightening torques shown in the table are valid only for cross-slotted lens head screws DIN 7985 of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength classes 8.8	10.9	12.9
	Tightening torques (lb.ft)		
M 3	0,8		
M 4	2,1		
M 5	4,4		
M 6	7,4		
M 8	18,4		
M10	36,1		

Tightening torques for locking screws VSTI (Metric ISO fine thread)

Thread size	Designation		Tightening torques (lb.ft)
M 8 x 1	VSTI 8 x 1	-ED/SA	= 4
M 10 x 1	VSTI 10 x1	-ED	= 7
M 12 x 1,5	VSTI 12 x 1,5	-ED	= 15
M 14 x 1,5	VSTI 14 x 1,5	-ED	= 22
M 16 x 1,5	VSTI 16 x 1,5	-ED/SA	= 22
M 18 x 1,5	VSTI 18 x 1,5	-ED/SA	= 29
M 20 x 1,5	VSTI 20 x 1,5	-ED/SA	= 37
M 22 x 1,5	VSTI 22 x 1,5	-ED	= 44
M 26 x 1,5	VSTI 16 x 1,5	-ED/SA	= 51
M 27 x 2	VSTI 27 x 2	-ED	= 66
M 30 x 1 ,5	VSTI 30 x 1,5	-ED/SA	= 74
M 33 x 2	VSTI 33 x 2	-ED/SA	= 88
M 42 x 2	VSTI 42 x 2	-ED/SA	= 147
M 48 x 2	VSTI 48 x 2	-ED	= 220

Tightening torques for seal-lock nuts (Metric ISO-Standard Thread)

The values for tightening torques shown in the table are valid only for seal-lock nuts of the strength class 8.8 and with metric ISO-standard thread.

Thread size	Strength classes 8.8	10.9	12.9
	Tightening torque (lb.ft)		
M 6	7,4		
M 8	16,2		
M 10	29,5		
M 12	50,9		
M 14	81,1		
M 16	125,3		

General advice

- Make yourself familiar with the equipment of the machine.
- Only operate the machine if your are completely familiar with the operating and control elements as well as the functioning of the machine.
- Use your safety equipment like helmet, safety shoes and hearing protection.
- Make yourself familiar with your working field.
- Only operate the machine for its intended purpose.

Please observe the guidelines of the Professional Association and the machine manufacturer.

Before starting

- Observe the operating instructions before starting.
- Check the machine for obvious faults.
- Do not operate the machine with defective instruments, warning lights or control elements.
- All safety devices must be in a secure position.
- Do not carry with you movable objects or secure them to the machine.
- Keep oily and inflammable material away from the machine.
- Before entering thc driver's cabin, check if persons or obstacles are beside or beneath the machine.
- Be careful when entering the driver's cabin, use stairs and handles.
- Adjust your seat before starting.

Start

- When starting all operating levers must be in "neutral position".
- Only start the machine from the driver's seat
- Check the indicating instruments after start to assure that all functions are in order.
- Do not leave the machine unobserved when the motor is running.
- When starting with battery connection cables connect plus with plus and minus with minus. Always connect negative (-) cable last and disconnect negative cable first.

Attention

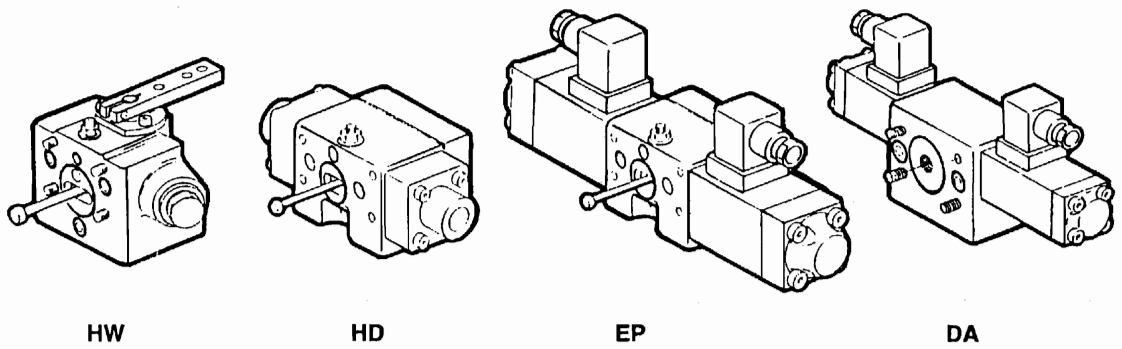
- Exhaust gas is dangerous. Assure sufficient fresh air when starting in closed rooms!

Hydraulic equipment

1. Hydraulic equipment is standing under high pressure.

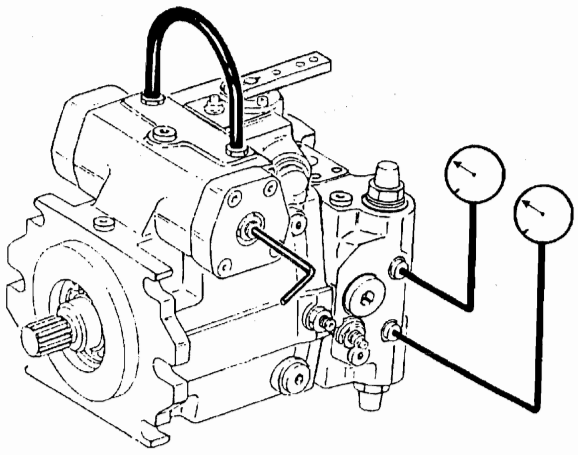
   ⚠ High pressure fluids (fuel, hydraulic oil) which escape under high pressure can penetrate the skin and cause heavy injuries.
   Therefore immediately consult a doctor as otherwise heavy infections can be caused.
2. When searching leakages use appropriate auxiliary devices because of the danger of accidents.
3. Before working at the hydraulic equipment, lower pressure to zero and lower working arms of the rnachine.
4. When working at the hydraulic equipment, absolutely stop motor and secure machine against rolling away (parking brake, shim)!
5. When connecting hydraulic cylinders and motor pay attention to correct connection of hydraulic flexible hoses.
6. In case of exchanging the ports, the tunctions are vice versa (f. ex. lift-up/lower) - danger of accidents!
7. Check hydraulic flexible hoses regularly and replace them in case of dammage or wear! The new hose pipes must comply with the technical requirements of the machine manufacturer!

⚠ Orderly disposal or recycling of oil, fuel and filters!



HW HD EP DA

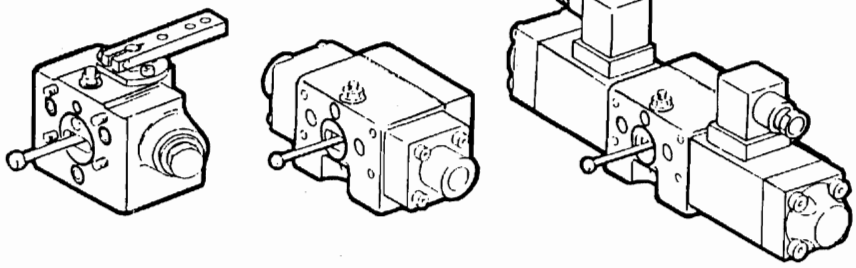
105



Achtung!
Sicherheitsbestimmungen beachten!
Mit Schlauch NW6 beide Stellkammern verbinden. Vermeidung von Restsignal aus hydraulischer Nullage.
Manometer an M_A und M_B anschließen.
Nullage so einstellen, daß bei blockiertem Antrieb beide Manometer auf gleichem Druckwert stehen.
Hinweis:
Totband der Nullage - vermitteln.

Attention!
Observe safety regulations!
Connect both control chambers with hose NW6. Avoidance of rest signal from hydraulic zero position.
Connect manometer to M_A and M_B. Adjust zero position so that at blocked drive both manometer indicate the same pressure valve.
Note:
Adjust death line of zero position.

106

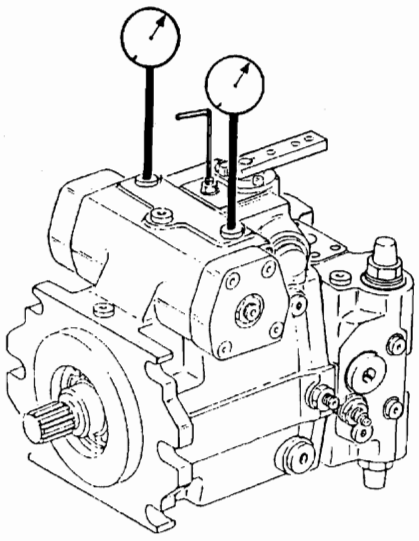


HW HD EP

Achtung!
Sicherheitsbestimmungen beachten!

Attention!
Observe safety regulations!

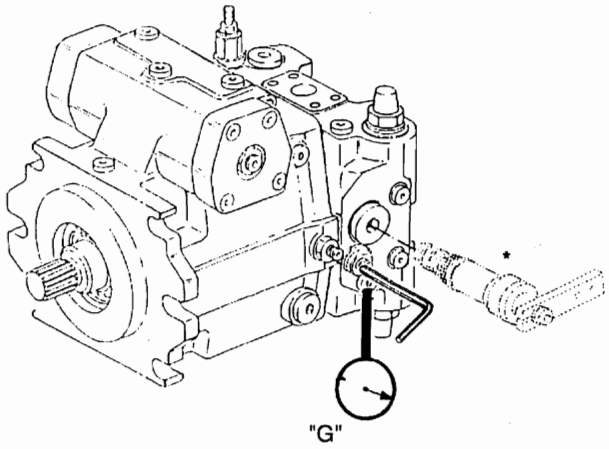
107



Manometer an X_1 und X_2 anschließen.
Nullage so einstellen, daß bei blockiertem Antrieb beide Manometer auf gleichem Druckwert stehen.
Hinweis:
Excenterjustierung
- nicht über ±90° verdrehen.

Connect manometer to X_1 and X_2.
Adjust zero position so that at blocked drive both manometer indicate the same pressure value.
Note:
Eccentric adjusting
- Do not turn over ±90°.

108



Achtung!
Sicherheitsbestimmungen beachten!

Hinweis:
Nachjustierung nur bei Betriebstemperatur.

Manometer an "G" anschließen.

Achtung!
* Speisedruckeinstellung!
Nenndruck p_H - 18 bar
Höchstdruck p_H - 40 bar
Bei Max.-Drehzahl.

Hinweis:
Einstelldaten nach Werksauftrag.

* bei DA-Ausführung

Attention!
Observe safety regulations!

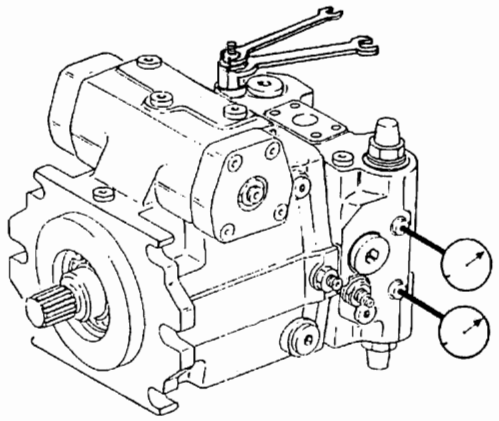
Note:
Readjusting only at operating temperature.

Connect manometer to "G".

Attention!
* Boost pressure setting!
Nominal pressure p_H - 18 bar
Peak pressure p_H - 40 bar
at max. speed.

Note:
Adjusting data according to order.

Druckabschneidung
Pressure cut-off



110

Achtung!
Sicherheitsbestimmungen beachten!

HD-Ventil ohne Bypass

1 . HD- Ventile sind immer 10% höher eingestellt als die Druckabschneidung.
Bei Veränderung eines Einsteilwertes immer beide kontrollieren.
2. Nachjustierung nur bei Betriebstemperatur

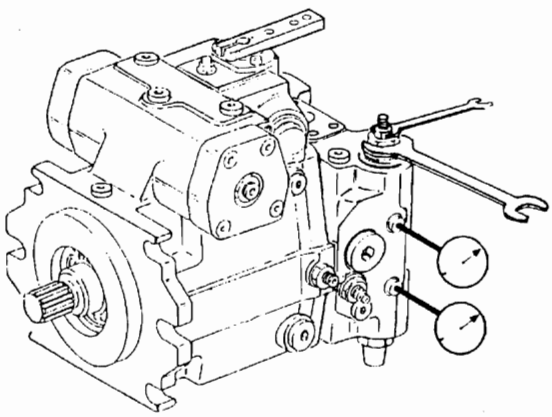
Manometer an M_A und M_B anschließen.
Druckabschneidung: Maß X Einstellschrauben notieren! Einstellschraube auf Block drehen.

HD- Ventile: Mit geringer Pumpenmenge über Ventile fahren. Einstellwert kontrollieren.
(Nur kurzzeitig "Temperatur".)

Drucklos "Einstellwert" verändern - Kontrolle

Druckabschneidung:
Einstellschraube auf Maß (*) zurückdrehen.
Druckwert kontrollieren bzw. nachjustieren.
Achtung! Differenz von 10% HD- Ventile und Druckabschneidung beachten!
Hinweis: Einstelldaten nach Werksauftrag.

HD- Ventile
HP- valves



111

Attention!
Observe safety regulations.

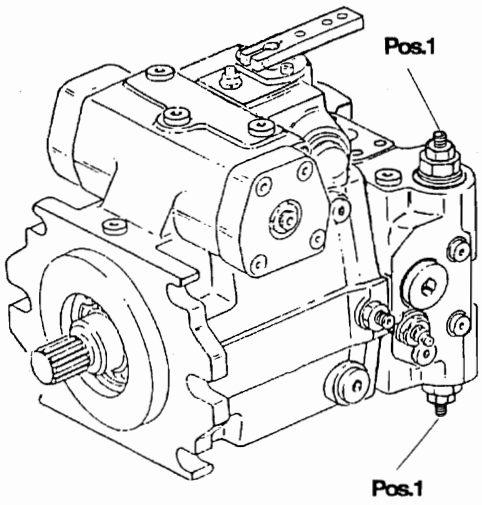
HP valve without bypass-function

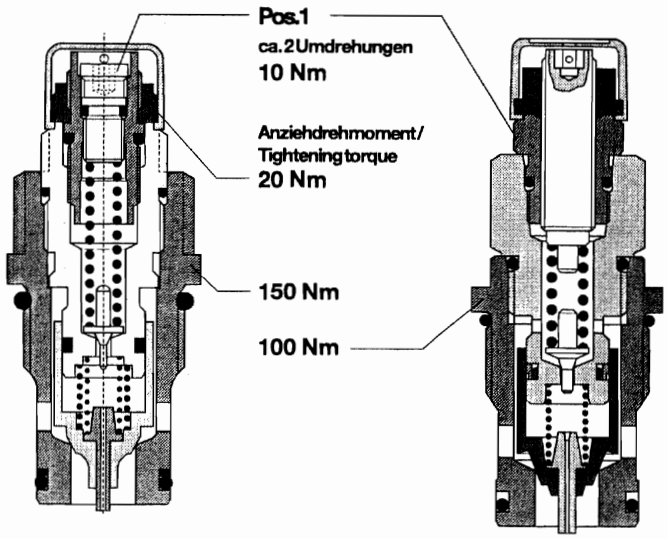
1 . HP valves are always adjusted 10% higher than the pressure cut-off.
If one setting value is changed, always check both values.
2. Readjusting only at operating temperature.

Connect manometer M_A and M_B.
Pressure cut-off: Note measure X setting screw! Turn setting screw on block.
HP valves: Operate valves with small pump flow volume.
Check setting value. ("temperature" only for a short time).
Change "setting value" - check.

Pressure cut-off:
Turn back setting screw to measure (*).
Check pressure value and readjust.
Attention! Observe 10% pressure difference HP valves and pressure cut-off!

A4VG 71 - 90





Fahrzeuge mit rein-hydrostatischem Fahrantrieb bzw. mit hydrostatischem Fahrantrieb und Schaltgetriebe ohne Leerlaufstellung (Freilauf).

Hydrostatischer Antrieb / Bypaß-Schaltung

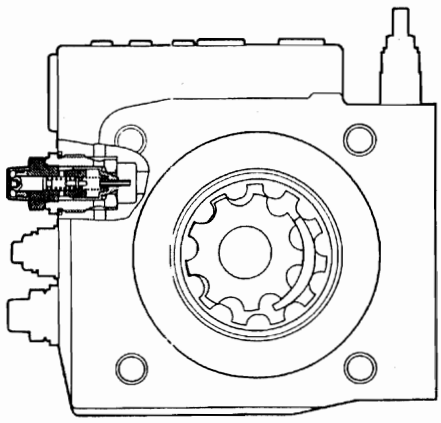
In diesem Fall wird der Fahrantrieb auf freien Umlauf geschaltet. Zu diesem Zweck haben die in der Verstellpumpe integrierten Hochdruckbegrenzungsventile eine sogenannte Bypaß-Funktion. D.h. durch Drehen der entsprechenden Schraube (Pos.1) wird der Ventil-Einsatz so entspannt, daß ein freier Öl-Umlauf möglich ist.

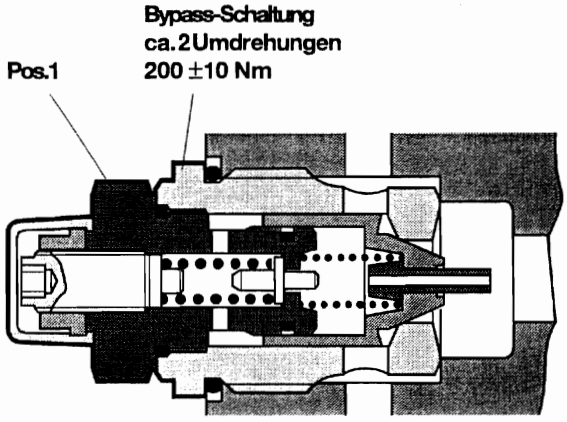
Vehicle with hydrostatic transmission and gear shift without idling setting position (free wheeling).

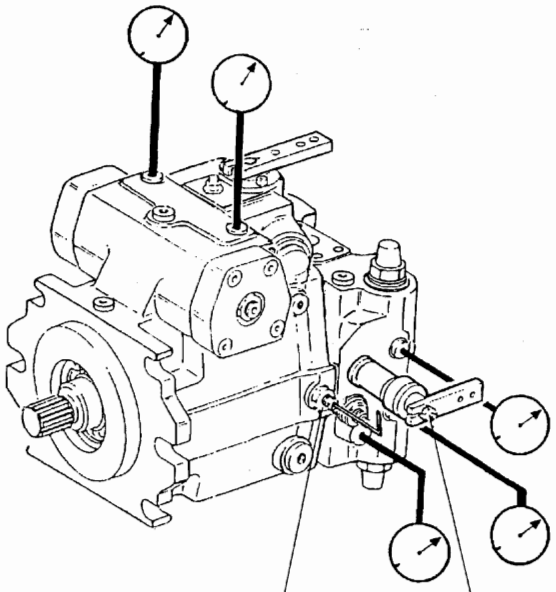
Hydrostatic transmission / Bypass-switching

In this case the travel transmission is switched on to free wheeling. For this purpose the variable displacement pump has incorporated high pressure relief valves with bypass function.
The screw (item 1) is unscrewed to such an extent, that the valve cartridge is released and free oil circulation is possible.

A4VG 125 - 250







113

Achtung!
Sicherheitsbestimmungen beachten!

Überprüfung der Einstelldaten
Betriebstemperatur soll während des Überprüfungsvorgangs weitgehend konstant gehalten werden.
Antriebsmotor starten, Leerlaufdrehzahl

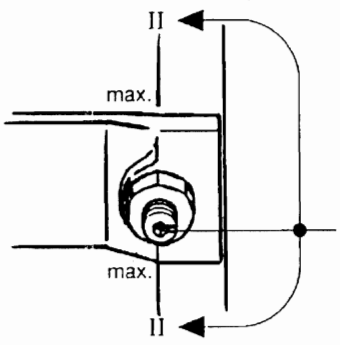
Blockzustand
Fahrtrichtungsschalter **"0"**
Motordrehzahl langsam steigern bis zur max. Motordrehzahl, dabei Meßgeräte beobachten.
Speisedruck:
Leerlaufdrehzahl
Psp = ca. 15-20 bar
max. Motordrehzahl
Psp = ... bar*

Blockzustand
Fahrtrichtungsschalter - vorwärts
(Straßengang und Festgebremst)

Einstelldaten Pumpe A4V/DA überprüfen
Regelbeginn
HD 40 - 50 bar
Motordrehzahl . min.^{1} * Psp . . . . . bar*
HD . . . . . bar
Nachjustierung - Regelbeginnschraube

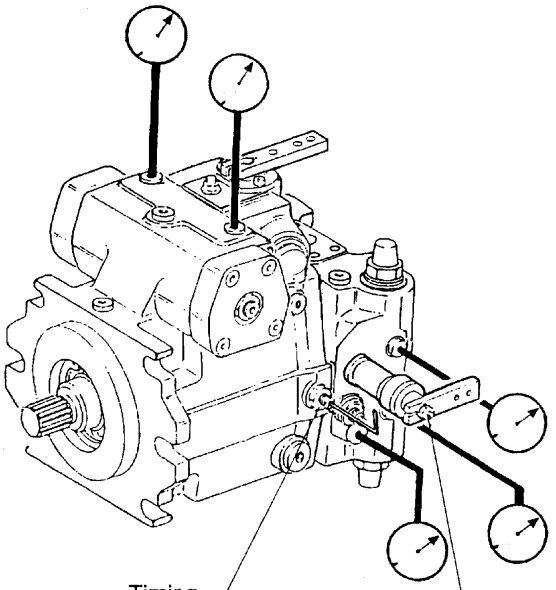
Regelende
HD . . . . . bar*
Motordrehzahl . . . . . min.^{1} * Psp . . . . . bar*
Nachjustierung - Verdrillschraube

Hinweis:
Excenterjustierung - Drehrichtung beachten

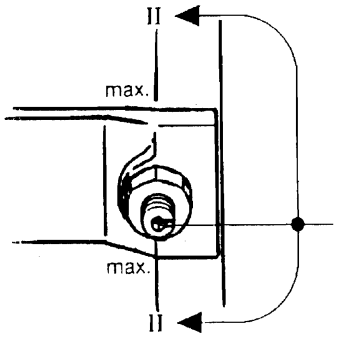


114

Hinweis: * Einstelldaten nach Werksauftrag!



113



114

Attention!
Observe safety regulations!

Check setting data.
Operating temperature should be kept largely constant during the check procedure.
Start prime mover, idle speed.

Block position
Drive direction switch - **"0"**.
Slowly increase motor speed up to the max. motor speed and thereby observe measuring instruments.

Boost pressure:
Idle speed of prime mover
Psp = approx. 15 - 20 bar
max. motor speed
Psp = ... bar*

Block position
Drive direction switch - **forward**
(Road gear and fully applied brake)

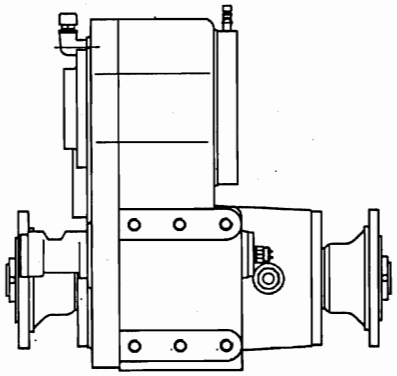
Check setting data pump A4VIDA
Begin of control:
HD 40 - 50 bar
Motor speed . . . . . rpm* Psp . . . . . bar*
HD . . . . . bar*
Readjusting - control start screw

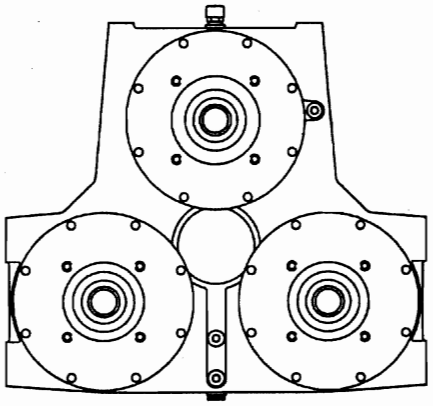
End of control
HD . . . . . bar
Motor speed . . . . . rpm* Psp . . . . . bar*
Readjusting timing adjustment screw

Note:
Eccentric adjusting - observe direction of rotation

* Setting data according to order!

STIEBEL GETRIEBE





Contents

1. Technical Data

STIEBEL D51545 WALDBROEL

Typ 4400.02.09904.97-
Nr. 459005
kW n_1 min^{-1}
T_2 Nm i= 1:1,6289
Bj. 1997 kg
GETRIEBEOEL 8.50L
CLP220 DIN51517

2. Foreword

These operating instructions contain important advice on the safe, correct and economic operation of the gear and plant.

Following this advice helps to prevent hazards and damage, reduce repair costs and breakdown times and to increase the reliability and service life of the gear.

Important: Always read information marked with this ⚠ symbol. Such information warns of danger. Non-observance can lead to personal injury and damage to property.

3. Prescribed Use

The above-mentioned product is intended for installation in a machine. It may not be commissioned until it has been ascertained that the machine in which the above-mentioned product is to be installed complies with the conditions of the EC guideline on machinery.

The product may only be used for the technically designed purpose agreed. The product may not be operated with outputs, torques or external loads which exceed the structural design (see technical data and catalogue).

Installation and commissioning may only be carried out by properly qualified personnel.

Any applicable national, local and plant-specific conditions and requirements concerning the prevention of accidents must be observed.

Qualified personnel are those persons who, on the basis of their training, experience and instruction, along with their knowledge of relevant standards, conditions, regulations for the prevention of accidents and operating conditions, have been authorized by the person responsible for the safety of the plant to carry out the necessary activities and in so doing are able to detect and prevent possible hazards.

4. Transport and Storage

Transport

⚠ For risk-free handling, the hoisting lugs and pegs or threaded bore-holes provided must be used. Hoisting lugs and similar aids attached to the gears are designed only for the weight of the gear and may not be used for raising extension components such as motors, drum shafts or similar. Only use suitable and technically faultless lifting equipment and load suspension devices (e.g. ropes, eye bolts etc.) with sufficient load-bearing capacity. See indication of weight in the technical data or on the type plate. The indications of weight must be regarded as approximate as weights can vary slightly, e.g. by different oil levels.
Do not remain or work under suspended loads.

Storage

Storage from delivery to commissioning should be in dry, dust-free and vibration-free. Enquiries should be addressed to the manufacturer in the case of differing storage conditions.

Protection against Corrosion

The standard preservation of the shafts, hollow shafts etc. is effective for one year maximum under the above-mentioned conditions. It is not suitable for outside storage.

5. Set-up and putting into operation

Assembly and commissioning may only be carried out by suitably qualified personnel.

⚠ Before commissioning and the test run it must be ensured that the moving and rotating components (e.g. shafts, couplings etc.) do not represent a hazard. This means that the necessary contact protection must be provided or measures taken to ensure a safe distance from the machine is maintained. During the test run without attached machinery, the keys in the shaft ends are to be secured against being spun out.

⚠ Before work on the gear unit or attached equipment is performed, the power supply must be disconnected. Action must be taken to prevent the power being inadvertently switched on again. Where necessary, mechanical devices (special equipment, supports etc.) must ensure that the machine cannot move or rotate.

⚠ It must be ensured before commissioning that the specified amount of lubricant has been poured into the machine. For the oil quantity and oil grade, see nameplate or operating manual. Check the oil level by undoing the overflow screw or by using the oil dipstick or oil sight glass if these devices are fitted.

⚠ Never operate without a breather filter otherwise the excess pressure resulting from the gear unit heating up will cause an oil leak.

⚠ After prolonged operation the lubricant and gear unit surface may reach temperatures which could cause skin burns.

⚠ Oil mist is produced in the gear units. It is therefore dangerous to work with a naked flame near the gear unit openings. There is a risk of fire or explosion.

⚠ High-speed machines into which these gear units are installed may generate loud noises which can damage your hearing if they persist. In this case the operating staff should be provided with ear protection. In order to reduce the noise, all technical possibilities should be used to observe the statutory regulations.

⚠ It must be ensured that the gear units are not continuously subjected to severe vibrations, e.g. from low-speed diesel engines.

Technical information

Housings: Torsionally rigid housings made of aluminium or grey cast iron

Gearing: casehardened, tooth flanks ground

Lubrication: Splash lubrication, pressurised circulation lubrication

Assembly of the gear units

Before assembly, check the surfaces, edges of the shaft end, keys and external shaft splines for damage, and remedy any damage discovered.

In the case of key and splined shaft connections apply lubricating paste (e.g. Optimol White T) to the shaft end. The paste facilitates assembly of the units and prevents corrosion which would make subsequent dismantling much more difficult. It must be ensured that the shaft seals are not dirty, damaged or coated with paint. When the units are being painted, cover the seals and running surfaces of the shafts or protect with grease. This is the only way to prevent damage and thus oil losses.

Oil baffle plates which may be installed on the pump mounting flanges must not be damaged or dismantled.

Assembly of input and output elements

Couplings, belt pulleys or similar elements should be mounted with the appropriate jigs (threaded spindle which is screwed into the centring bore of the shaft). Severe hammering must be avoided as antifriction bearings, retaining rings and other internals would be damaged!

Hydraulic pumps must be connected with the mounting flanges so that they are oil-tight and must not exert any axial pressure on the gear unit shafts! The coupling elements and the splines must be adequately lubricated before assembly; we recommend Optimol White T or Staburags NBU 30 PTM. Exception: Splined hollow shafts which have their own oil filling from the gear unit lubrication system; the relevant mounting flange is then provided with screw plugs for the oil level and oil drain as well as a breather. In these cases the oil level as well as the oil quantity required to fill the gear unit flange is entered in the assembly drawing.

Lubricants

The gear units are as a rule supplied without oil; they are then provided with a label "Caution! Not filled with oil!". Normally gear oil CLP220 to DIN 51517 (mineral oil) or PGLP 220 to DIN 51502 (synthetic oil) is used. These grades are suitable for normal operating conditions at an ambient temperature of -5° to +35°C or -25° to +80°C with synthetic oil. Consult the manufacturer in the event of special operating and application conditions.

Commissioning

Before commissioning, the gear units and, if necessary, the mounting flanges must be properly filled with oil; for the oil grade and oil level, refer to the technical data or the nameplate and assembly drawing. During commissioning the plant must not be operated immediately at full capacity. Only after 3-4 hours is the load to be slowly increased so that the plant can then be run under full load. Oil and gear unit temperatures up to 80°C, or up to 100°C with synthetic oil, are not unusual and do not have any negative impact on the functioning of the gear units. The oil level is to be checked after about 15 min. running time as oil collects in the mounting flanges or is dammed there to lubricate the splined hollow shafts. If necessary, replenish oil up to the specified oil level mark. We recommend you to repeat this procedure until the oil level no longer changes. This is especially important if oil pumps, oil coolers and the like also have to be filled with oil.

Installation positions

Stiebel power take-off, pump power take-off and variable-speed gear units can be operated in several installation positions depending on the type. The manufacturer must always be consulted in the event of installation positions which deviate from the position ordered or shown in the assembly drawing.

Power take-off variable-speed gear units

⚠ The gear units must not be switched under load; this operation may only be performed at standstill. Any contravention of this will result in damage to the geared coupling and no claims under the guarantee will be accepted.

- Pneumatic gear-shifting: The pneumatics must be designed so that the side subjected to pressure is continuously under a pressure of 6 bar. A mist oiler must be installed in the pneumatic system to ensure proper lubrication of the operating piston and to protect it against any corrosion.

- Mechanical gear-shifting: A spring element (gear-shifting aid) must be installed in the shift linkage so that, if the geared coupling in the gear unit is in an unfavourable position (tooth on tooth), the shift linkage can be locked. When the motor starts up, the coupling then engages. The tensile and compressive forces of the shift linkage in the engaged condition must not exceed 500 N.

6. Conversions and modifications

Do not make any changes, provide attachments or perform conversion work on the gear unit or components which could reduce safety without the manufacturer's permission! In particular any protective facilities provided (e.g. covers, overload protection) must not be removed or changed.

7. Notes on maintenance

Change oil regularly in accordance with the operating manual. Refer to lubrication chart, pump power take-off gear units. If the mounting flanges have their own oil filling, it is designed as long-life lubrication and no oil change is necessary. For the oil quantity and oil grade, see nameplate or operating manual; the oil quantities are to be regarded as approximations. The oil level indicated in the assembly drawing is always decisive. Check the oil level by undoing the overflow screw or by using the oil dipstick provided these devices are part of the fittings. At each oil change check all the seals and screw fittings for any leaks and, if necessary, retighten the screws. If possible, a visual leak check should be made every day. A rise in the oil level in the gear unit or mounting flanges with their own oil filling is a sign of defective seals in the hydraulic units.

Premature gear unit failure may occur as a result of running dry caused by oil loss, the ingress of water into the gear unit housing or the presence of foreign matter in the lubricant.

⚠ When changing, replenishing or draining the oil or when taking oil samples, it must be guaranteed that no oil can escape onto the ground, penetrate the ground or surface water or enter the sewage system.

⚠ Prolonged contact with lubricants can cause injury to your skin. Use a protective skin ointment.

⚠ After prolonged operation the lubricant and surface of the gear unit may reach temperatures which can cause skin burns. When working on hot components, wear protective clothing, e.g. protective gloves.

The lubricant is best drained while still warm from operation so that a complete change of the old lubricant is ensured. If the oil is highly contaminated, the gear unit should be rinsed with the same lubricant.

⚠ Under no circumstances may different types of lubricant, such as mineral oil, synthetic oil or grease, be mixed with each other.

⚠ The applicable national, local and plant-specific regulations and requirements concerning accident prevention and environmental protection are to be observed.

⚠ To prevent faults, it is necessary to carry out the regular maintenance and inspection work prescribed. Any changes compared with normal operation (higher power input, temperatures or vibrations, unusual noises or smells, response of monitoring devices etc.) are an indication that the unit is not functioning properly. To avoid faults which could result in injury to people or damage to property, the maintenance staff responsible must be notified immediately. In case of doubt switch off the relevant item of equipment and ensure it cannot be switched on again.

⚠ To prevent damage from overheating, dirt and dust deposits should be regularly removed from the gear unit surface.

8. Spare parts and repairs

Spare parts must satisfy the technical requirements specified by the manufacturer. This is always guaranteed with original spare parts. When ordering spare parts, the type number and serial number (to be found on the nameplate or in the technical data) in addition to the spare part number must be indicated. Spare parts drawings and spare parts lists can be requested from the manufacturer.

Repairs and overhauls are carried out by the manufacturer at short notice. When carrying out your own repairs, make sure that the expendables and auxiliary materials and parts which have been replaced are disposed of safely and without polluting the environment.

⚠ The applicable national, local and plant-specific regulations and requirements concerning accident prevention and environmental protection are to be observed. The manufacturer does not assume any liability for damage caused by improper repair work or the use of non-original spare parts.

⚠ Prolonged contact with lubricants can cause skin damage. Use a protective skin ointment. After prolonged operation the lubricant and the surface of the gear unit may reach temperatures which can cause skin burns. Before starting repairs, let the gear unit cool down.

Schmierstoffe — Lubricants — Lubrifiants

DEA	Shell	Mobil / KLÜBER LUBRICATION	Esso	Deutsche	Castrol	Calypsol	BP	ARAL	Umgebungstemp. in °C Ambient temperature in °C Température ambiante en °C	Kinem. Viskosität in cSt bei 40° C Kinem. viscosity in cSt at 40° C Viscosité kiném. en cSt à 40° C	Schmierstoffart siehe Typenschild Lubricant type see name plate Type de graisse voir plaque de type	Schmierstoffe für Lubricants for Graisses pour
											mineralisch mineral minérale	STIEBEL-Getriebe STIEBEL-Gears STIEBEL-Réducteurs
											Öl Oil CLP DIN 51517 Huile	
Falcon CLP 460	Shell Omala Öl 460	Mobilgear 634	Klüberoil GEM 1-460	Spartan EP 460	NL-Gear Compound 460	Alpha SP 460	UK-ECUBSOL Öl 8140	Energol GR-XP 460	Degol BG 460	+ 5··· + 45	460	
Falcon CLP 320	Shell Omala Öl 320	Mobilgear 632	Klüberoil GEM 1-320	Spartan EP 320	NL-Gear Compound 320	Alpha SP 320	UK-ECUBSOL Öl 8060	Energol GR-XP 320	Degol BG 320	0··· + 40	320	
Falcon CLP 220	Shell Omala Öl 220	Mobilgear 630	Klüberoil GEM 1-220	Spartan EP 220	NL-Gear Compound 220	Alpha SP 220	UK-ECUBSOL Öl 8050	Energol GR-XP 220	Degol BG 220	− 5··· + 35	220 (standard)	
Falcon CLP 150	Shell Omala Öl 100	Mobilgear 627	Klüberoil GEM 1-100	Spartan EP 100	NL-Gear Compound 100	Alpha SP 100	UK-ECUBSOL Öl 8030	Energol GR-XP 100	Degol BG 100	− 15··· + 25	100	
Astron Z HLP 15	Shell Tellus Öl T 15	Mobil DTE 11	ISOFLEX MT 30 ROT	Univis N 15	Mechanism LPS 15	Alphasyn T 15	—	Bartran HV 15	—	− 50··· 10	15	
											Fließfett Fluid grease Graisse fluide	
Glissando 283 EP 00	Shell Spezial Getriebefett H	Gargoyle Fett 1200 W	MICROLUBE GB 00	Fibrax EP 370	Dura-Lith. EP Grease 00	CLS-Grease	Calypsol D 6024	Energrease HT 00–EP	Aralub FDP 00	− 20··· + 50	—	
Orona DR 00	Shell Tivela Compound A			Fibrax 370			Calypsol D 8024	Energrease FG 00–EP				
											synthetisch synthetic synthétique	
											Öl Oil PGLP DIN 51502 Huile	
Polydea CLP 460	Shell Tivela Oil SD	Mobil Glygoyle 80	Klübersynth GH 6-460	—	—	Alphasyn T 460	UK-ECUSYNTH Öl PG 460	Energol SG-XP 460	Degol GS 460	− 15··· + 100	460	
Polydea CLP 220	Shell Tivela Oil WB	Mobil Glygoyle 30	Klübersynth GH 6-220	Umlauföl S 220 Umlauföl EZL 502	—	Alphasyn T 220	UK-ECUSYNTH Öl PG 220	Energol SG-XP 220	Degol GS 220	− 25··· + 80	220	
—	Shell Tivela Oil WA	Mobil Glygoyle 11	Klübersynth GH 6-100	—	—	—	—	—	—	− 35··· + 60	100	
											Fließfett Fluid grease Graisse fluide	
—	Shell Tivela Compound A	—	Klübersynth GE 46-1200	Fließfett S 420	—	CLS-Grease	—	Energrease GSF	—	− 35··· + 60	—	
											Fett Grease Graisse	Wälzlager Roller bearings Paliers à roulement
Glissando R EP 2	Shell Alvania Fett G 2	Mobilgrease MP	CENTOPLEX 2 EP	Beacon 2	Dura-Lith. EP Grease 2	Spheerol AP 2	Calypsol H 441	Mehrzweckfett L 2	Mehrzweckfett Aralub HL 2	− 30··· + 60	— (standard)	
Glissando 20	Shell Alvania Fett R 2	Mobilux 2	CENTOPLEX 2	Unirex N 2			Mehrzweckfett Calypsol 20	Energrease LS 2				
—	Aeroshell Grease 7	Mobiltemp SHC 100	ISOFLEX TOPAS NCA 52	—		LZV-EP	Calypsol H 729	—	—	− 50··· + 110	—	

Schmierstoffwechselintervalle für

STIEBEL-Standardgetriebe

Erster Ölwechsel nach ca. 500 Betriebsstunden; danach alle 4.000 h. jedoch maximal nach 18 Monaten.

STIEBEL-Standard gears

First oil change after approx. 500 operating hours; further every 4,000 h. or at least after 18 months.

Intervals of lubricant changing for

Termes de changement de lubrifiant pour

STIEBEL-Réducteur standard

Changement premier d'huile après environ 500 heures de service; toutes les 4.000 h. de plus ou au plus tard après 18 mois.

STIEBEL-Pumpenverteilergetriebe, STIEBEL-Getriebe mit besonderer Schmieranweisung

Erster Ölwechsel nach ca. 200 Betriebsstunden; danach alle 2.000 h. jedoch maximal nach 12 Monaten.

STIEBEL-Pump distributor gears, STIEBEL-Gears with special lubrication instruction

First oil change after approx. 200 operating hours; further every 2,000 h. or at least after 12 months.

STIEBEL-Réducteur à sorties multiples pour pompes STIEBEL-Réducteur avec des préseptes spéciaux de graissage

Changement premier d'huile après environ 200 heures de service; toutes les 2.000 h. de plus ou au plus tard après 18 mois.

Wälzlager

Neubefüllung alle 10.000 Betriebsstunden. Füllmenge: 1/3 Lagerinnenraum.

Roller bearing

New filling every 10,000 operating hours. Quantity: 1/3 inner space of roller bearing.

Palier à roulement

Remplissage nouveau après 10.000 heures de service. Quantité: 1/3 de l'intérieur du palier à roulement.

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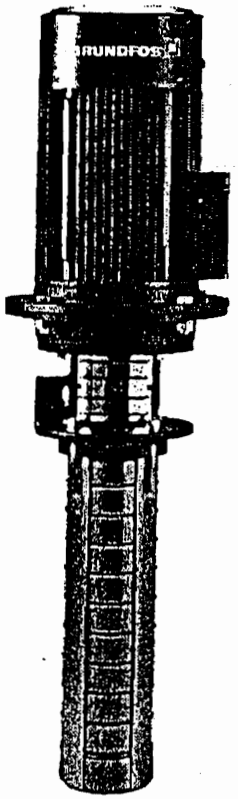
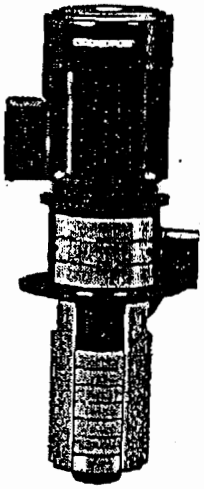




(GB) Installation and Operating Instructions
(D) Montage- und Betriebsanleitung
(F) Notice d'installation et d'entretien
(DK) Monterings- og driftsinstruktion

CRK

CONTENTS

1. Applications

The GRUNDFOS CRK pumps are multistage centrifugal pumps designed for the pumping of cooling and cutting liquids for machine tools, condensate transfer, liquid transfer in industrial washing machines and similar applications.

GB

CRK pumps are designed for the pumping of liquids with a density and viscosity corresponding to those of water. The pumped liquid must not contain abrasive particles or fibres.

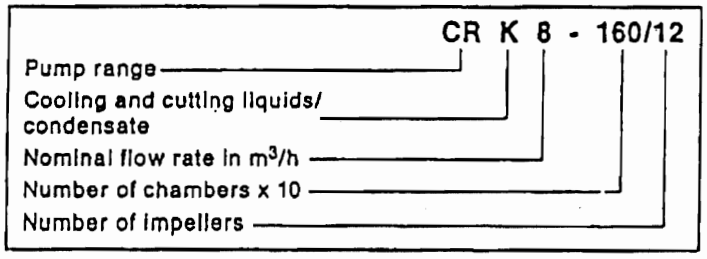
When pumping liquids with a density or viscosity higher than that of water, motors with correspondingly higher outputs must be used, if required.

2. Type Designation

The standard range of CRK pumps encompasses complete impeller in chamber combinations. On request, other lengths, against duty combinations, can be supplied by fitting empty intermediate chambers instead of standard chambers with impellers.

The pump key on the pump nameplate indicates the number of chambers and impellers fitted to the pump.

Example:



3. Operating Conditions

Liquid Temperature:	−15°C to +90°C.
Ambient Temperature:	−30°C to +40°C.
Enclosure Class:	IP 55.
Relative Air Humidity:	Maximum 90%.
Operating Pressure:	Maximum 25 bar.

4. Installation

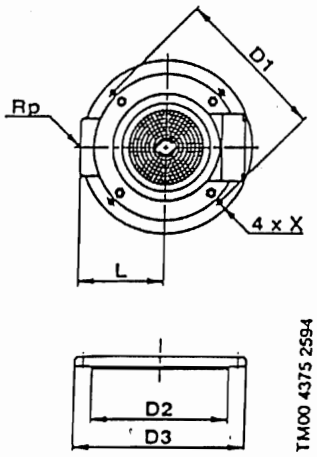
4.1 Pump Location

GB

The pump is designed for tank mounting in a vertical position. The pump is positioned in a hole cut into the cover of the tank (upper side) and is secured to the tank by four set screws through the holes in the mounting flange. It is recommended to fit a sealing gasket between the pump flange and tank.

Fig. 1
Pump Mounting Flange Dimensions

	CRK 2 and 4	CRK 8 and 16
D1	160	225
D2	140	200
D3	180	250
L	100	125
Rp	1¼	2
X	ø7	ø9



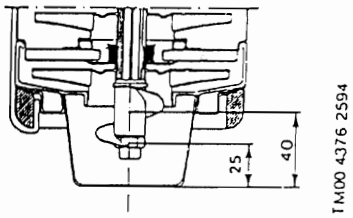
4.2 Suction Conditions

The CRK pumps are designed to provide full performance down to a liquid level of 40 mm (CRK 2/4) or 50 mm (CRK 8/16) above the bottom of the pump strainer.

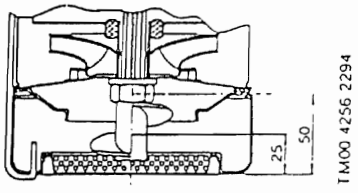
At a liquid level between 25 and 40/50 mm above the bottom of the strainer, the built-in priming screw will protect the pump against dry-running, see fig. 2.

Fig. 2

CRK 2 and CRK 4



CRK 8 and CRK 16



5. Electrical Connections

The electrical connections should be carried out in accordance with local regulations.

The operating voltage and frequency are marked on the pump nameplate. Please make sure that the motor is suitable for the electricity supply on which it will be used.

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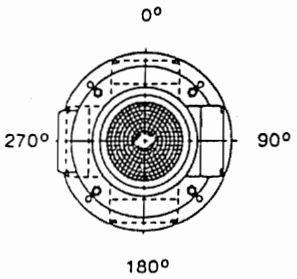
Single-phase GRUNDFOS motors incorporate a thermal switch and require no additional motor protection.

Three-phase motors must be connected to a motor starter.

To ensure easy access to the electrical connections, the terminal box can be turned to the positions shown in fig. 3.

Fig. 3



Remove the coupling guards which are kept in position by spring tension.

To change the position of the terminal box, remove the four screws securing the motor to the motor stool. Turn the motor to the required position, replace and tighten the four screws.

Replace the coupling guards.

Do not start the pump until it has been submerged in the pumped liquid.

The electrical connection should be carried out as shown in the diagram inside the terminal box cover.

In the case of **frequency converter** operation, the motor should not be loaded by more than 90% of the power stated on the motor nameplate, unless otherwise stated by the frequency converter manufacturer.

6. Start-Up

The pump can be started against an open or a closed discharge side.

- If the discharge side is open and the pump body is partly filled with liquid when the pump is started, the air will escape through the discharge pipe.
- If the discharge side is closed and the pump body is partly filled with liquid when the pump is started, the air will be pressed down through the pump body and out into the tank, and the pump will very quickly reach its maximum operating pressure.

Before starting the pump, make sure:

1. that the direction of rotation of the pump is correct.
   When seen from the top, the pump should rotate counter-clockwise.
   (Start the pump for a short period and check the direction of rotation at the motor cooling fan).
2. that all pipe connections are tight.
3. that the pump body is partly filled with liquid (partly submerged).
4. that the strainer is not blocked by impurities.

7. Operation and Maintenance

7.1 Lubrication and Maintenance

Pumps installed in accordance with these instructions require very little maintenance.

The mechanical shaft seal is self-adjusting and has wear-resistant seal rings which are lubricated and cooled by the pumped liquid.

The pump bearings are also lubricated by the pumped liquid. Motor bearings are grease packed and sealed for life. No further lubrication is necessary.

7.2 Filters

Chip trays, filters, etc. should be cleaned at regular intervals to ensure a correct flow of liquid.

7.3 Periodic Checks

At regular intervals, depending on the conditions and time of operation, the following checks should be made:

- Check the quantity of liquid and operating pressure.
- Check that there are no leaks.
- Check that the motor is not overheating.
- Check the tripping of the motor starter.
- Check that all controls are operating satisfactorily.

If the above checks do not reveal any abnormal operating details, no further checks are necessary. Should any faults be found, check the symptoms with section 8. "Fault Finding Chart".

8. Fault Finding Chart

Before removing the terminal box cover and before any removal/dismantling of the pump, make sure that the electricity supply has been switched off.

Fault	Cause
1. Motor does not run when started.	a) Supply failure. b) Fuses blown. c) Motor starter overload has tripped out. d) Main contacts in starter are not making contact or the coil is faulty. e) Control circuit fuses are defective.
2. Motor starter overload trips out immediately when supply is switched on.	a) One fuse is blown. b) Contacts in motor starter overload are faulty. c) Cable connection is loose or faulty. d) Motor winding is defective. e) Pump mechanically blocked.
3. Motor starter overload trips out occasionally.	a) Overload setting too low. b) Periodic supply failure. c) Low voltage at peak times.
4. Motor starter has not tripped out but the pump does not run.	a) Check 1 a), b), d) and e).
5. Pump capacity not constant.	a) Pump strainer partly blocked by impurities. b) Liquid level in tank too low. See 4.2 "Suction Conditions".
6. Pump runs but gives no liquid.	a) Pump strainer blocked by impurities. b) Liquid level in tank too low. See 4.2 "Suction Conditions". c) Pump rotates in the wrong direction.

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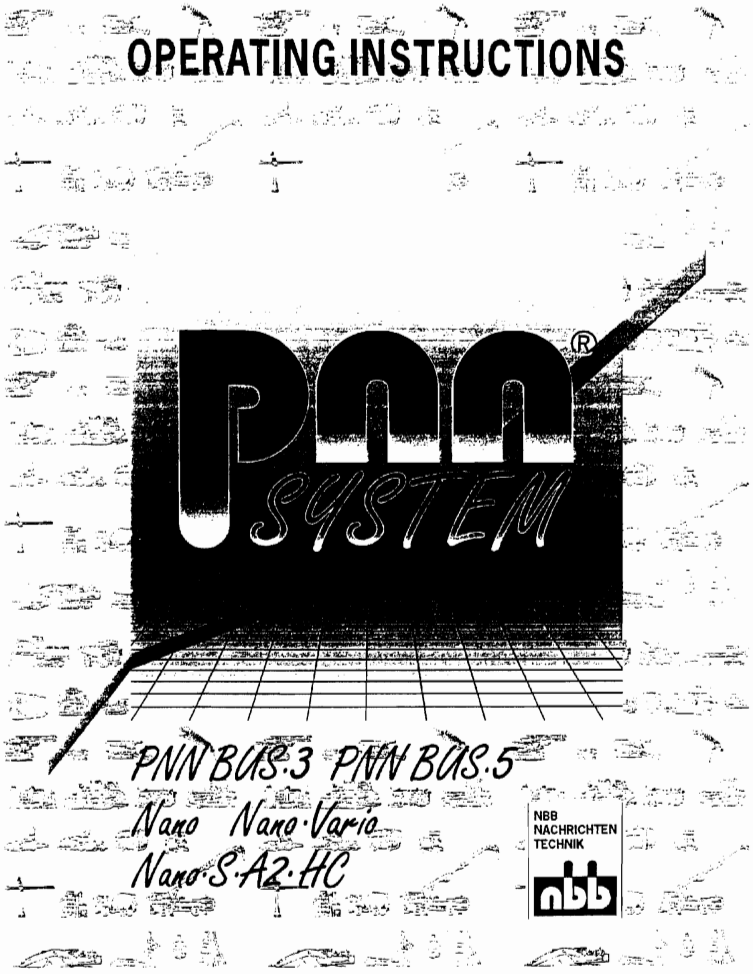


1. STANDARD SPECIFICATION

- Portable transmitter with two replaceable 7,2 volt NiCd batteries, halter and waist straps
- Receiver with NBB adapter plate for fastening purposes (Only PNN-BUS-3)
- Receiver with 4 fastening angles (PNN-BUS-5)
- Multi-pole connecting cable for the receiver, to your specifications
- Automatic battery charger with charging adapter (rapid charging in three hours)

The actual delivery specification is as detailed on the confirmation of order or the delivery note accompanying the goods!

2. SAFETY PRECAUTIONS

Even if you are accustomed to working with radio control systems, read these operating instructions without fail before using this equipment. Only this document contains the latest information relating to your NBB radio control system.

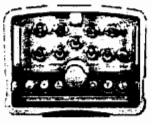
Please refer to the accompanying registration documents for the explanatory notes on obtained an operating permit. Observe all applicable work-safety and accident prevention regulations without fail. Only fully trained, authorized personnel may use the NBB radio control equipment. Components, etc. built into the NBB equipment for safety purposes must be regularly inspected. (See point 6 of this instruction)

If the NBB radio control unit develops a fault, it must be shut down immediately. The transmitter should be switched off with the EMERGENCY-OFF switch. The connecting cable must be disconnected from the crane connecting socket (terminal) on the receiver. The repair of the equipment must not be carried out other than by NBB or an NBB authorized technician.

Failure to observe these recommendations will put both you yourself and others at risk. Under these circumstances, NBB rescinds the guarantee and any other form of liability. This radio control unit is designed exclusively for the control of construction machines and industrial plants. Only under these conditions are the safety systems (EMERGENCY-OFF, zero setting) fully effective. No other form of use is permitted. Any non-observance of this condition will relieve NBB of all liability.

Nano, Nano-S-A2-HC

Nano-Vario



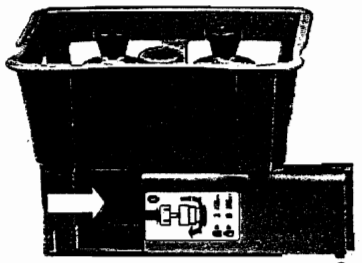
3. TRANSMITTER

To make the unit ready for use, insert the battery into the battery compartment. To remove the battery, depress the pin and push out the battery. The power supply to the transmitter is activated with the EMERGENCY-OFF switch (when depressed, the EMERGENCY-OFF switch can also be secured by removing the key cap). The green LED on the transmitter control panel must flash regularly. Commands can now be input by means of the controls. The operating period with a charged battery is approximately 8 hours with the transmitter in continuous use. When the red "Battery" indicator lamp lights up, the battery is nearing exhaustion.

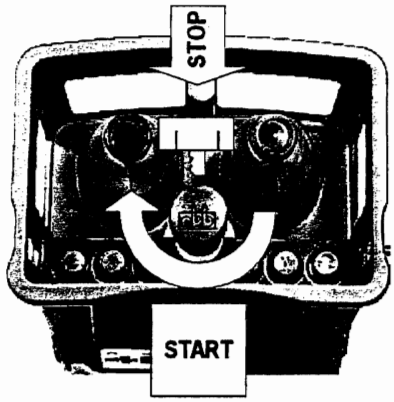
The transmitter can be operated for approximately 15 minutes more in this condition. During this time, bring the crane to a safe position and install a new battery.

Removal of the battery inerrupts the radio link. As a result, the master switch for the crane must be switched on again.

Charge the discharged battery with the charger supplied.



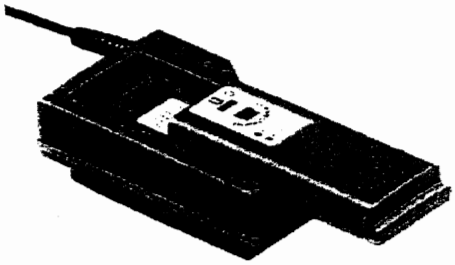
Depress the pin and push out the battery



4. BATTERY CHARGER

The red indicator lamp indicates that the battery charger is ready for use. Place the battery in the charging well; it will now be charged. When the red LED goes out, the charging process is concluded. No harm will come to the battery if it is left in the charger beyond the required charging time.

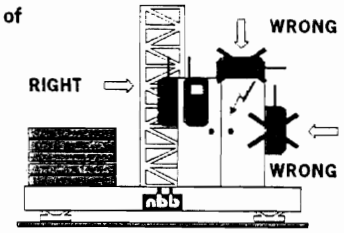
Do not use the charger other than in dry rooms having a min-max temperature range of 0-40°C. A charged battery is a concentrated energy source. Never store a charged battery in a toolbox or similar where it could be short-circuited by metal components (even a key in your trouser pocket can cause a short circuit).



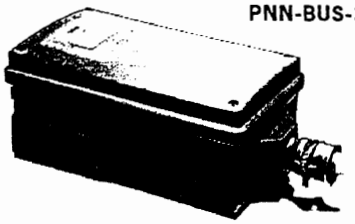
5. RECEIVER (PNN-BUS-3 and PNN-BUS-5)

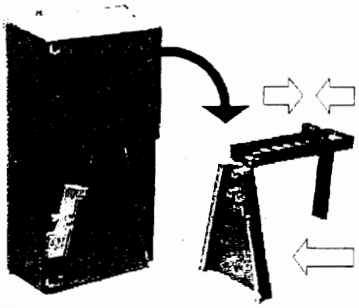
The receiver is connected to the crane with the multi-pole connecting cable supplied. Please observe the instructions issued by the crane manufacturer. The power supply to the receiver is generally effected by way of the connecting cable.

- **In general, an earth lead is required in the case of cranes which have not previously been operated under radio control. Failing this, the receiver electronic circuit will not receive any power supply.**
  Take care to ensure that the operating voltage of the receiver complies with the electrical specifications of the crane.
  The applicable operating voltage is specified in the supplement.
- **Never expose the receiver to a high pressure cleaning jet.**
  This also applies to the transmitter.
- **The receiver should always be fixed vertical at the outside panel of the switching cabinet.**
  The antenna should reach over the top of the panel.



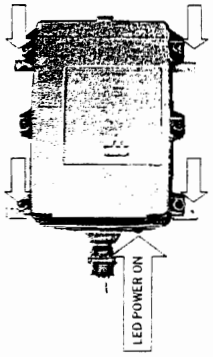
PNN-BUS-3



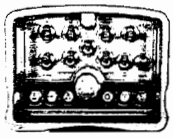


Mounting-possibilities of the PNN-BUS-3 or of the PNN-BUS-5.

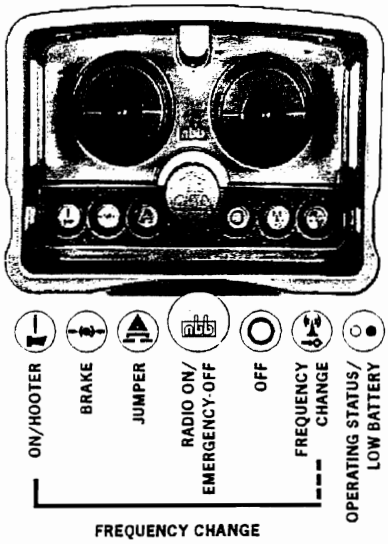
PNN-BUS-5



Nano-Vario



Nano / Nano-S-A2-HC



6. OPERATING THE SYSTEM

Safety equipment in the NBB radio control system:

In the transmitter:
- EMERGENCY-OFF switch with automatic disconnection from the power supply
- Automatic zeroing

In the receiver:
- Duplicated 2-channel evaluation of the EMERGENCY-OFF signal
- Automatic zeroing when switched on again after radio signal interruption
- Inhibition of radio control commands at the relay level if EMERGENCY-OFF circuit defective.

To ensure troublefree operation, observe the following operating instructions precisely. Subject to the transmitter being in operating condition, the crane's master switch can only be switched on provided no command transmitter is actuated. The necessary command for this purpose is initiated by the "ON/HOOTER" button. This activates a warning signal on the crane. After the crane has been switched on, this button serves for the subsequent activation of the hooter as required by safety at work regulations.

If the NBB radio control unit remains unused for a prolonged period, we strongly recommend that the battery be charged from time to time (approximately every four weeks). This will prevent it from becoming discharged and will prolong its working life. If an extended period of disuse is intended, we recommend that the battery be removed from the transmitter.

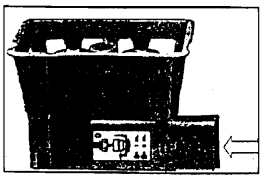
Changing the frequency:

To change the frequency, hold down the "ON/HOOTER" button while simultaneously operating the "FREQUENCY CHANGE" button until the hooter sounds. (Please observe the accompanying registration conditions, see page 5, point 9).

TEACH-IN: Individual Setting of Analog Channels (Basic Setting) at Nano Transmitter*.
The output signals of the analog channels can be individually programmed by the transmitter.

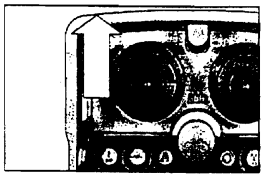
Activate programming mode

1 Set all analog channels to zero position. (potentiometer without automatic release) Insert the TEACH-battery into the battery compartment, release the EMERGENCY-OFF switch and press the "ON/HORN" key. Now the programming mode is activated.



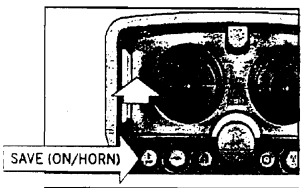
Select analog function

2 To determine which analog function is to be programmed, it is sufficient to turn briefly the appropriate master switch fully in the direction of this function.



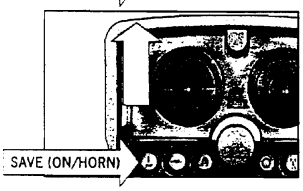
Save "contact point"

3 Now the "50%/100%" switch has to be turned into the "50%" position. The master switch is now turned until the required "contact point" is reached. To save this value, the "SAVE" ("ON/HORN") key must be pressed at this position.



Save maximum speed

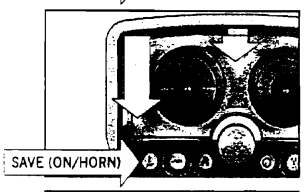
4 The "50%/100%" switch has to be turned into the "100%" position. The upper initial value is saved by turning the master switch until the maximum speed of the function is reached then pressing again the "SAVE" ("ON/ HORN") key.



Program opposite direction ?

No / Yes

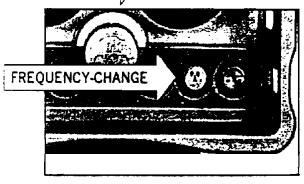
5 The opposite direction of this function can then be programmed the same way immediately afterwards. See point **3** and **4** .



Programming of next function ?

No / Yes

6 When programming several analog channels consecutively, the "FREQUENCY-CHANGE" key must be pressed once after saving a function. Continue point **2** .



Check the programmed values

7 By pressing and holding the "FREQUENCY-CHANGE" key it is possible to change to the working mode to check the programmed values. As soon as the key is released, the programming mode can be commenced, as described above. (Point **2** to **5** .)

Close the programming mode

8 Press the EMERGENCY-OFF switch, push out the TEACH battery of the battery compartment , insert the normal working battery, release the EMERGENCY-OFF switch again and prepare the control to operate by pressing the "ON/HORN" key.

The control is ready to operate.

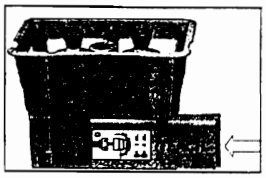
Please note:
In the programming mode all functions are locked, except "ON/HORN" and each selected function.

*** Please refer to the scope of supply of your facility.**

TEACH-IN: Individual Setting of Analog Channels (Basic Setting) at Nano Transmitter with Potentiometer Control*.
The output signals of the analog channels can be individually programmed by the transmitter.

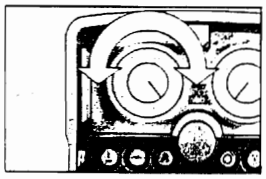
Activate programming mode

1 Set all analog channels to zero position. (potentiometer without automatic release) Insert the TEACH-battery into the battery compartment, release the EMERGENCY-OFF switch and press the "ON/HORN" key. Now the programming mode is activated.



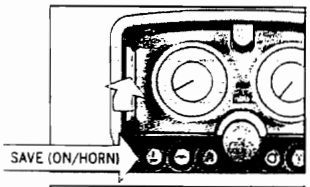
Select analog function

2 To determine which analog function is to be programmed, it is sufficient to turn briefly the appropriate potentiometer fully in the direction of this function.



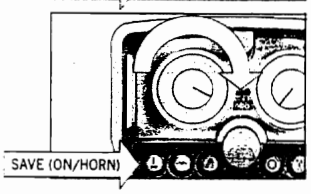
Save "contact point"

3 Now the "50%/100%" switch has to be turned into the "50%" position. The potentiometer is now turned until the required "contact point" is reached. To save this value, the "SAVE" ("ON/HORN") key must be pressed at this position.



Save maximum speed

4 The "50%/100%" switch has to be turned into the "100%" position. The upper initial value is saved by turning the potentiometer until the maximum speed of the function is reached then pressing again the "SAVE" ("ON/ HORN") key.



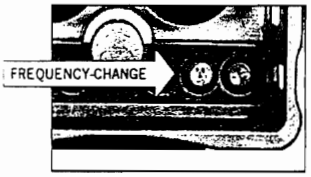
5 No opposite direction.

Programming of next function ?

No

Yes

6 When programming several analog channels consecutively, the "FREQUENCY-CHANGE" key must be pressed once after saving a function. Continue point **2** .



Check the programmed values

7 By pressing and holding the "FREQUENCY-CHANGE" key it is possible to change to the working mode to check the programmed values. As soon as the key is released, the programming mode can be commenced, as described above. (Point **2** to **5** .)

Close the programming mode

8 Press the EMERGENCY-OFF switch, push out the TEACH battery of the battery compartment , insert the normal working battery, release the EMERGENCY-OFF switch again and prepare the control to operate by pressing the "ON/HORN" key.

The control is ready to operate.

Please note:
In the programming mode all functions are locked, except "ON/HORN" and each selected function.

*** Please refer to the scope of supply of your facility.**

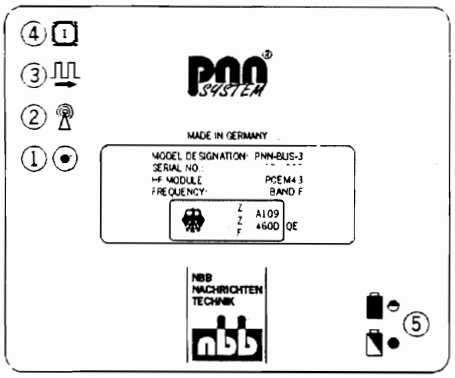
7. FUNCTION CHECKS

Regular function checks of the NBB radio control unit are essential to ensure that operating safety is maintained. In the case of a single-shift daily operation, we recommend that the checks be carried out once a week. They can be performed with the aid of the indicator lamps on the receiver. For this purpose, the transmitter must be in operating condition.

- First, connect only the receiver - the transmitter remains switched off.
- Switch on the transmitter by releasing the EMERGENCY-OFF button.
- Now test the command functions (always starting at the lowest stage) and check that the crane responds correctly. In particular, make sure that the danger area is clear of all personnel. **Failure to do so may result in an ACCIDENT.**
- **EMERGENCY-OFF check.** Press the EMERGENCY-OFF button on the transmitter until it locks. The crane's master contactor must drop out after a maximum of 1/2 second.

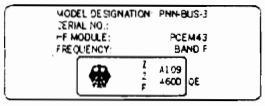
Checking the LEDs of the receiver

- **LED1:** POWER ON. If the LED does not light up, check the power supply. If the power supply lead is in satisfactory condition, notify your service centre.
- **LED2:** HF AVAILABLE. Remains lit continuously when the transmitter is switched on. (not significant in the case of scanner operation).
- **LED3:** Flashes at regular intervals during fault-free operation. Irregular flashing means that the HF channel is probably disrupted. In this case, select an alternative channel.
- **LED4:** If this LED flashes, the HF channel is disrupted.
- **LED5** (Battery operation): state of charge of the battery.



8. RATING PLATES

Rating plates contain the serial number, model designation, type of HF module and frequency. In the event of a query, please give the serial number without fail.



9. REGISTRATION

Explanatory notes on obtaining an operating permit for your NBB radio control system will be found in the accompanying registration documents.

10. MAINTENANCE

The NBB radio control unit is largely maintenance-free. Nevertheless, please observe the following points:

- The EMERGENCY-OFF button must operate freely.
- Keep the unit clean of any contamination from building materials.
- If any electrical welding is carried out on the crane, disconnect the control cable from the receiver, otherwise the receiver electronics may be damaged.

11. GUARANTEE

All NBB radio control units (transmitter, receiver, battery charger) are guaranteed to operate satisfactorily for a period of six months from the date of sale. The terms of the guarantee include parts and labour. Transport costs are the buyer's responsibility. The following are excluded from the guarantee: wearing parts, relays and batteries. The guarantee does not cover damage, accidental damage, negligence, improper use, non-adherence to operating conditions, the non-observance of operating, testing and servicing instructions, or repairs or modifications to the unit not authorized by NBB.
NBB will not be liable for consequential damage. It reserves the right to effect repairs or replacements at its own discretion.

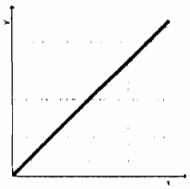
12. ACTION IN THE EVENT OF A FAULT

Do not continue to work with a defective NBB radio control unit. Even a minor defect in the first instance may eventually lead to a major fault!
Do not try to repair the NBB radio control unit yourself. In the event of a fault, please notify your dealer or contact us!

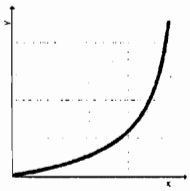
TECHNICAL SUPPLEMENT

NANO: Board E-AN04A2V1/1 TEACH-IN*

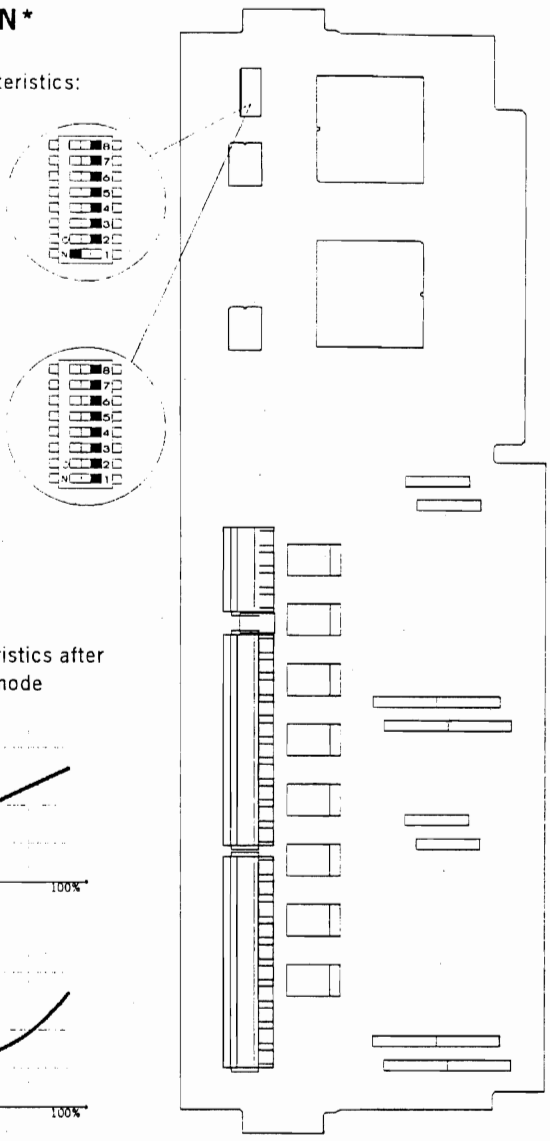
DIL switch (SW2) for setting various transmission characteristics:

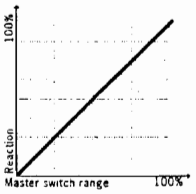
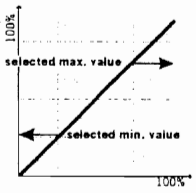
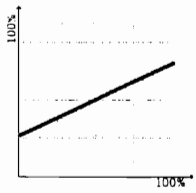
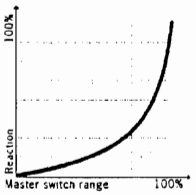
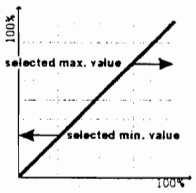
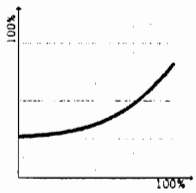


Setting for linear characteristic



Setting for non-linear characteristic



Characteristics linear or non-linear	Characteristics in Teach-In mode	Characteristics after Teach-In mode
		
		

DIL switch no. 8 : OFF: 50% switching variable
ON : 50% switching fixed

***Please refer to the scope of supply of your facility.**

TECHNICAL DATA

PNN SYSTEM

Operating ambient temperature	-20 to +65 °C
Insulation class - Protection	IP 65

TRANSMITTER

Pocket-S Nano Nano-L Nano-M

Transmission frequency range	400 - 477 MHz, 25 mW FM

The use of synthesizer technology permits frequencies to be selected in accordance with the appropriate waveband for the country of use.

Low frequency modulation	FSK signal to CCITT V.23
Data repetition rate	about 60 ms
Baud rate	1200 baud (bits per sec.)
Range	300 up to 1000 m
Power input	about 60 mA
RF ouput	10 mW

	Weight (without battery)	Size (L x W x H)
Pocket	0,2 kg	8,7 x 3,5 x 14 cm
Nano	0,7 kg	17,5 x 12,6 x 12,2 cm
Nano-L	1,0 kg	24,7 x 13,9 x 11,7 cm
Nano-M	1,5 kg	28,3 x 14,4 x 16,7 cm

RECEIVER

PNN-BUS-3, PNN-BUS-5

Reception frequency range	400 - 477 MHz

Data security:
Generates a CRC code with a Hamming distance = 4. Generates a neutral position Addressing of each transmitter with its own, unique combination (32768 possible combinations). Parity - Bit parameters with addressing.

Data reception security:
2 diversitary evaluators (1 hardware evaluator, 1 software - controlled evaluator). CRC. EMERGENCY OFF and neutral position bits. Restart inhibitor if EMERGENCY OFF relay defective.

Contact loading for EMERGENCY OFF and commands.

max. switching voltage	250 V
max. switching current	6 A
max. switching power	1000 VA

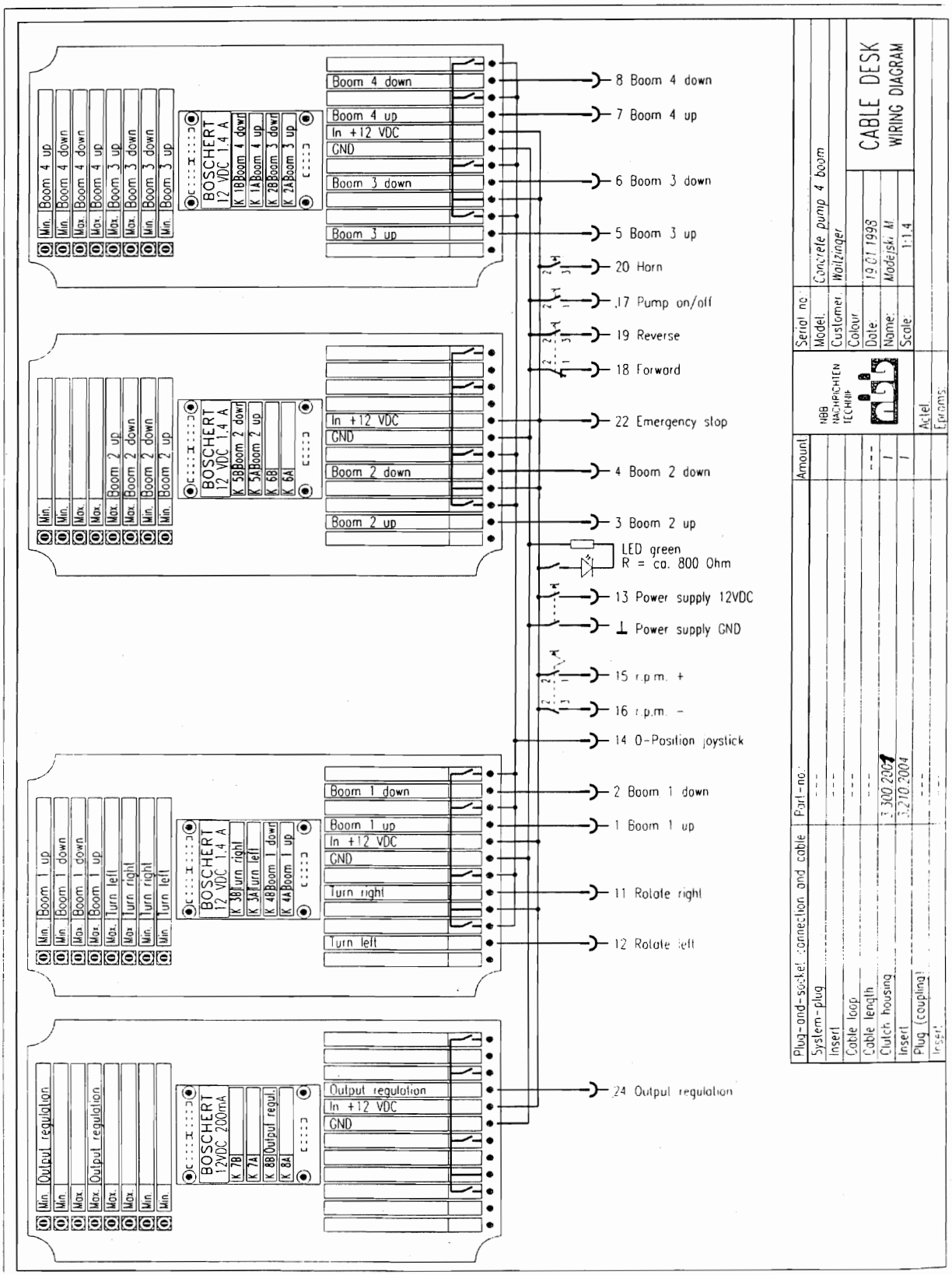
	Weight	Size (L x W x H)
PNN-BUS-3	3,0 kg	30,6 x 18,1 x 13 cm
PNN-BUS-5	4,7 kg	36,4 x 28,3 x 15,2 cm

BATTERY

7,2V / 0,6 Ah

CHARGING UNIT

Operating voltage external charging unit	12V/24V DC
	110V/230V AC
Operating voltage /PNN-BUS-3/PNN-BUS-5	90V - 270V AC
	40V - 270V AC
	40V - 130V AC
	8V - 50V DC
	24V DC


Boom 4 up
Boom 4 down
Boom 3 up
Boom 3 down
BOSCHERT
12 VDC 1.4 A
K 1B Boom 4 down
K 1A Boom 4 up
K 2B Boom 3 down
K 2A Boom 3 up
Boom 4 down
Boom 4 up
In +12 VDC
GND
Boom 3 down
Boom 3 up
8 Boom 4 down
7 Boom 4 up
6 Boom 3 down
5 Boom 3 up
20 Horn
17 Pump on/off
19 Reverse
18 Forword
Boom 2 up
Boom 2 down
K 5B Boom 2 down
K 5A Boom 2 up
K 6B
K 6A
In +12 VDC
GND
Boom 2 down
Boom 2 up
22 Emergency stop
4 Boom 2 down
3 Boom 2 up
LED green
R = ca. 800 Ohm
13 Power supply 12VDC
⊥ Power supply GND
15 r.p.m. +
16 r.p.m. -
14 0-Position joystick
Boom 1 up
Boom 1 down
Turn left
Turn right
K 3B Turn right
K 3A Turn left
K 4B Boom 1 down
K 4A Boom 1 up
Boom 1 down
Boom 1 up
In +12 VDC
GND
Turn right
Turn left
2 Boom 1 down
1 Boom 1 up
11 Rotate right
12 Rotate left
Output regulation
12VDC 200mA
K 7B
K 7A
K 8B Output regul.
K 8A
Output regulation
In +12 VDC
GND
24 Output regulation
Serial no.
Model: Concrete pump 4 boom
Customer: Wallzinger
Colour
Date: 19.01.1998
Name: Modejski M
Scale: 1:1.4
CABLE DESK
WIRING DIAGRAM
ABB
NACHRICHTEN
TECHNIK
Amount
Part-no.
Plug-and-socket connection and cable
System-plug
Insert
Cable loop
Cable length
Clutch housing
Insert
Plug (coupling)
Insert
3 300 2001
3 210 2004
Actel
Eprom

REVISION:

REVISION:

BUNDESAMT FÜR ZULASSUNGEN IN DER TELEKOMMUNIKATION

ZULASSUNGSURKUNDE

Zulassungsnummer: G120913F

Zus. Kennzeichen: LED-D

Objektbezeichnung: E-EM43 AO

Zulassungsinhaber: NBB
Nachrichtentechnik GmbH
Otto-Hahn-Str. 3
D-75248 Ölbronn-Dyrrn

Zulassungsart: Allgemeinzulassung

Objektart: Funkanlagen für gewerbliche und industrielle Fernsteuerungs- und Fernmeßzwecke

Das Zulassungsobjekt erfüllt die Zulassungsvorschrift BAPT 222 ZV 125, Ausgabe Dezember 1994 auf der Grundlage der angewandten technischen Vorschrift I-ETS 300 220, Ausgabe August 1993

Saarbrücken, den 05.10.1995

Im Auftrag

Hans-Werner Dies

1 Anlage

Bundesamt für Zulassungen in der Telekommunikation, Talstraße 34-42, D-66119 Saarbrücken, Tel.: (06 81) 9 66-0, Fax: (06 81) 5 84-18 00

SYSTEMBESCHREIBUNG

Objektbestandteil: Empfangsmodul: E-EM43 AO

Objektmerkmale:

Frequenzbereich:	433,05 MHz bis 434,79 MHz
Betriebsfrequenzbereich:	433,100 MHz bis 434,750 MHz
Sendeart:	F 1 D
Betriebsart:	Simplex
Spannungsversorgung des Empfängers:	12V, DC
Antenne des Empfängers:	Antennenbuchse
Anzahl der schaltbaren HF-Kanäle:	67

REED CONCRETE PLACING EQUIPMENT

PNN SYSTEM
CABLE REMOTE CONTROL

VENDR
FIGURE 08
PAGE 09

AS WE MAKE IMPROVEMENTS TO THE ***REED***
TRUCK MOUNTED CONCRETE BOOM PUMP MODEL ***XXT42***,
WE LIKE TO SUPPLY YOU, THE CUSTOMER, WITH
UPDATED INFORMATION WHICH APPLIES TO YOUR PUMP.

THIS SECTION IS PROVIDED AS A PLACE TO STORE
SERVICE BULLETINS AS YOU RECEIVE THEM
FROM ***REED*** **LLC.**

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BULLETIN NO: SB 001

DATE: JUNE 10, 2004

TO: ALL ***REED*** DEALERS

SUBJECT: ***REED* WARRANTY PROGRAM**

Each ***REED*** Concrete Placing Trailer Pump, Truck Mounted Boom Pump and Dry-mix Spraying Gun, undergoes before delivery a thorough Quality Assurance inspection, a performance check and final testing. However, even with these precautions the possibility exists that after delivery, for some reason, a component may fail.

This is the reason for warranty. If this should happen to one of your machines during the first 12 months or 1000 pumping hours after delivery, there is a good chance the failed component could be replaced under warranty.

REED has updated and formalized its **WARRANTY PROGRAM** and this bulletin is issued to make all dealers aware of the program.

Enclosed is a supply of our new **WARRANTY CLAIM** forms. From this point on, all warranty claims must be submitted on these forms. Also, please find a description of the program, coverage and how to make a claim and its submission. We suggest you give this some careful attention. Briefly some noteworthy items are:

- Do not return any failed part unless requested by ***REED***.
- Purchase the replacement part through normal channels from ***REED***. Submit your claim noting the invoice number of the replacement part. Upon approval of the claim, a credit will be issued.
- Every effort will be made to process claim within 2 weeks from receipt except for those occasions where the part is to be returned.

Should questions arise during your review, please do not hesitate to contact us.

We appreciate the opportunity to be of service.

Sincerely,

Mike Wickstrom
Service Manage

WARRANTY PROGRAM POLICY

REED Concrete Placing Equipment MODEL ***XXT42*** is designed and engineered to perform as stated on published specifications. Only quality materials and workmanship are used in the manufacture of these products. As a back up for the product manufactured by ***REED***, a guarantee against defects in design and workmanship of components is provided for each machine.

The ***REED*** guarantee/warranty states, in general, that ***REED*** will replace free of charge any components found to be defective within the time frame of the warranty period. There are exceptions to some components which are not the responsibility of ***REED***. These are noted elsewhere.

A formal printed policy is available and depicts in more detail the warranty and description. However, for your ready reference the following is offered:

A. WARRANTY PERIOD

- ALL CONCRETE PLACING MACHINES

  The warranty period is for twelve (12) months from date of delivery to initial user or 1000 pumping hours whichever comes first.

- NEW PARTS WARRANTY

  For parts sold through the ***REED*** Parts Department the warranty is ninety (90) days from invoice ship date.

- REPLACEMENT WARRANTY PARTS

  Replacement parts provided under the terms of the machine warranty are for the warranty period applicable to the unit in which they were installed as if such parts were original components of the machine.

B. WARRANTY COVERAGE

- DEFECTIVE PARTS

  Unless otherwise authorized the replacement part **MUST** be **PURCHASED** from ***REED***. Once warranty claim is received and approved, ***REED*** will provide credit to the dealer/user for their cost of the replacement part as invoiced by ***REED***.

- LABOR

  No labor time and related compensation will be provided by ***REED*** to dealers/users or others to perform work under this warranty policy.

- TRAVEL TIME

  No travel time, mileage or other expenses will be compensated by ***REED*** to dealers/users or others to perform work under this warranty policy.

- FREIGHT, IMPORT DOCUMENTATION, CUSTOM DUTY

  Any expense incurred for freight, import duty and documentation will not be reimbursed by ***REED*** in association with this warranty policy.

C. EXCLUSIONS

- CHASSIS AND RELATED COMPONENTS (TRUCK MOUNTED UNITS)

  The warranty for the chassis is handled by the chassis manufacturer and their dealer network. Prior to putting the truck in service it is suggested you contact the nearest manufacturer dealership.

- ENGINE - TRAILER UNITS

  The engine warranty is handled by the engine manufacturer and their dealer network. The terms and conditions of their warranty will apply. Contact the local engine dealer for specifics on warranty of the engine.

- NORMAL WEAR

  This pertains to items that have failed as a result of normal wear and tear to the product including but not limited to material cylinder and hydraulic cylinder piston components, delivery systems, pins, chains, bushings, seals, concrete pump wear parts, brakes, filter elements, fluids and tires.

- DAMAGES

  Caused by transport of equipment or parts, improper set-up or installation, operator error, improper operation or storage, environmental conditions, accidents, improper mechanical techniques employed by anyone or any other cause other than a structural defect in materials or workmanship.

- MAINTENANCE

  Caused by failure to perform any scheduled maintenance or routine maintenance as specified in technical manual on any structural or mechanical component.

- MODIFICATIONS

  Any non-authorized changes or modifications of any kind to the product. Any modification must be authorized and approved in writing by ***REED*** Engineering Department.

- ABUSE

  Any accidental or intentional abuse of product including but not limited to neglect, loading beyond capacity or any operation of the equipment beyond the limits set forth by ***REED*** documentation and as depicted in the appropriate technical manual.

D. SUBMISSION OF CLAIM BY DEALER/USER

Should a component failure be encountered during the warranty period and should it fall within the guidelines of the ***REED*** **WARRANTY POLICY** the following procedure is to be followed to claim warranty:

1. REPLACEMENT PART

   - Obtain the replacement part by ordering it from the **REED PARTS DEPT.** through normal channels. You will be **INVOICED** for the part.

   - If the part has been previously ordered from ***REED*** and is in your replacement stock inventory you may choose to use that part.

2. COMPLETE THE CLAIM FORM

   REED has supplied you with a pre-numbered Warranty Claim Form which consists of four (4) parts. This and only this form is **ACCEPTABLE**. **DUPLICATE** copies of the form are **NOT ACCEPTABLE**. If you do not have the proper form, contact the ***REED*** Service Department. They will send you a supply.

REED
CONCRETE PLACING EQUIPMENT

WARRANTY CLAIM

13822 OAKS AVENUE
CHINO, CA. 91710 909-364-2100

NO.

Date: (1)

Distributor Account Number:
Distributor: (2)
Address:
City:
State: Zip Code:
Phone: ( )

End User Account Number:
End User: (3)
Address:
City:
State: Zip Code:
Phone: ( )

MACHINE PUMP DATA

Model (4) Serial No. (5) In Service Date (6)
Hours of Operation (7) Failure Date (8) Repair Date (9)

NOTE - Hold deficient part(s) until requested by **REED** or until claim is approved. All parts requested to be returned must have a return authroization number provided by **REED**, shipped freight prepaid.Parts must ship within 30 days from **REED** request.

RETURN AUTHORIZATION NO. (10) SHIP DATE (11)

PART NUMBER	DESCRIPTION (12)	QTY.	NET PRICE	TOTAL PRICE	REED REPLACEMENT PART INVOICE NO. (13)

Describe Failure and How it Occurred (14)

REED comments

Claim Approved for

$

REED Use - Claim Approved ☐ Denied ☐

Signed Date

Dealer Signature (15)

Date

REVISION:

The following instructions are offered for completing the **WARRANTY CLAIM FORM**. Refer to sample of form. Circled numbers on form correspond to items below. **FILL IN**:

1. Date your claim is written

2. Distributor name and address

3. End user name and address

4. Model number of unit affected

5. Serial number of unit affected

6. Date unit was first placed in service

7. Hours (from hour-meter) of operation at time of failure

8. Date when failure occurred

9. Date when unit was repaired

10. Return Authorization number as received from ***REED*** Service Department. This will only apply when failed component is requested to be returned by ***REED***.

11. Date when failed part is shipped back to ***REED***

12. List ***REED*** part number, description of part, quantity and price of part.

13. List ***REED*** invoice number sent you when replacement part was purchased

14. Briefly describe failure and how it occurred

15. Dealers signature and date

The claim form **MUST BE COMPLETELY FILLED OUT**. Claims lacking specific, accurate information will be returned **UNPROCESSED**. If additional room is needed to describe the failure or to list the parts used, attach a separate sheet and identify those sheets with the **SAME WARRANTY CLAIM NUMBER**.

3. SUBMITTING TO ***REED***

When all appropriate data has been entered on the claim and signed, proceed as follows:

- Remove copies of form marked **"DEALER"** (yellow) and **"RETURN AUTHORIZATION"** (green). The Dealer copy is for your records and the Return Authorization copy is to be retained in the event ***REED*** requests the return of the part.

- Mail the ***"REED"*** copy (white) and **"ACCOUNTING"** copy (pink) along with any back-up data such as a copy of the replacement part **INVOICE** to ***REED***. **DO NOT FAX COMPLETED FORM** and send only **FORM ORIGINALS**.

E. RETURN OF FAILED COMPONENT

Depending on the type of part and circumstance surrounding the component failure, the possibility exists that ***REED*** may request that the failed part be returned to them for investigation and evaluation purposes or to apply for warranty from the manufacturer of the part.

- Upon receipt of your warranty claim and before claim is approved, ***REED*** will inform you in writing if the part is to be returned. On this correspondence a **RETURN AUTHORIZATION** number will be given to you.

- This number is to be written in the appropriate area on the **RETURN AUTHORIZATION** copy (green) of the warranty form. Include this copy as part of your packing slip. Also write the number on a tag and attach to the part.

- Parts requested to be returned must be shipped back to ***REED*** within 30 days from issuing of the **RA** number. Failure to do so will cause warranty claim to be **DENIED**.

- Returned parts are to be properly packaged and shipped freight **PREPAID**.

- Any parts received by ***REED*** without the **PROPER RA** number will be shipped back at **DEALER/USER EXPENSE**.

- If claim is approved and no request to return parts from ***REED*** has been made, then parts can be discarded.

F. APPROVAL/DENIAL OF CLAIM

Every effort will be made to process the warranty claim within 2 weeks from receipt.

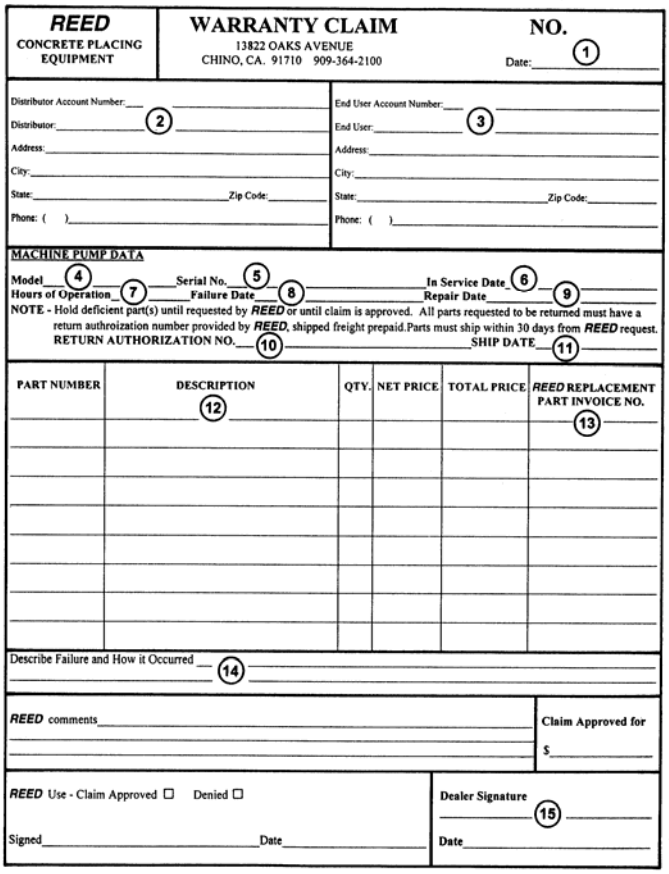
- APPROVAL

  Once your claim has been approved by ***REED***, the pink copy will be forwarded to our Accounting Dept. They in turn will issue a credit against the invoice for the replacement purchased part.

  In the meantime a fax or notification will be sent you indicating the claim and the amount approved.

- DENIAL

  If your warranty claim is denied for any reason, a fax or notification will be sent to you indicating reasons for denial. Should you have any dispute with the decision, you have the right to have the decision reconsidered. You must present your arguments in **WRITING** within 15 days of your receipt of the claim denial.



REED
CONCRETE PLACING EQUIPMENT

WARRANTY CLAIM NO. (1)
13822 OAKS AVENUE
CHINO, CA. 91710 909-364-2100
Date:

Distributor Account Number:
Distributor: (2)
Address:
City:
State: Zip Code:
Phone: ( )

End User Account Number:
End User: (3)
Address:
City:
State: Zip Code:
Phone: ( )

MACHINE PUMP DATA

Model (4) Serial No. (5) In Service Date (6)
Hours of Operation (7) Failure Date (8) Repair Date (9)
NOTE - Hold deficient part(s) until requested by REED or until claim is approved. All parts requested to be returned must have a return authroization number provided by REED, shipped freight prepaid.Parts must ship within 30 days from REED request.
RETURN AUTHORIZATION NO. (10) SHIP DATE (11)

PART NUMBER	DESCRIPTION (12)	QTY.	NET PRICE	TOTAL PRICE	REED REPLACEMENT PART INVOICE NO. (13)

Describe Failure and How it Occurred (14)

REED comments

Claim Approved for
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REED Use - Claim Approved ☐ Denied ☐

Signed Date

Dealer Signature (15)

Date