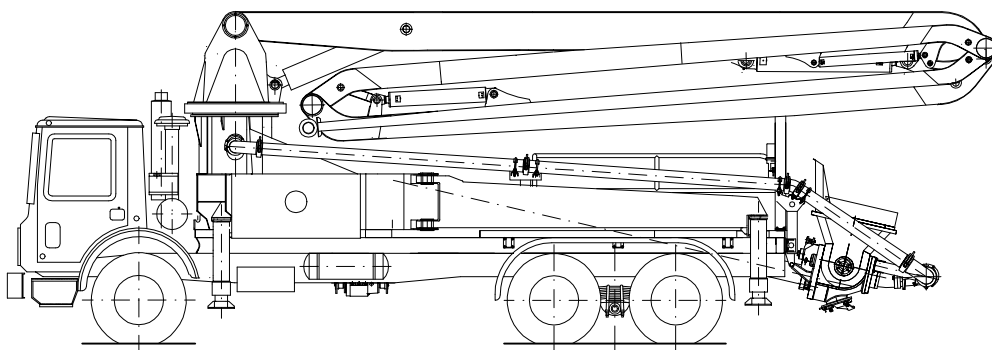


*Waitzinger
Baumaschinen GmbH*

Bedienungsanleitung operation manual



36 R 4 XT
Masch.-Nr. 206295

<u>1</u>	<u>Description</u>	4
1.1	<u>Description of main components</u>	4
1.2	<u>Description of pumping cycle</u>	5
<u>2</u>	<u>Safety regulations</u>	6
2.1.1	<u>Field of application</u>	6
2.2	<u>Qualifications and duties of the pump operator</u>	7
2.3	<u>Important safety regulations</u>	7
2.3.1	<u>In general</u>	7
2.3.2	<u>Maintenance and repair</u>	9
2.3.3	<u>Working area</u>	10
2.3.4	<u>Placing</u>	10
2.3.5	<u>Minimum wall thickness and operating pressure of conveyor pipes</u>	12
<u>3</u>	<u>Operation of the Concrete Pump</u>	13
3.1	<u>In general</u>	13
3.1.1	<u>Description of the operating elements</u>	13
3.1.2	<u>First starting / test run</u>	15
3.1.3	<u>Manual function of control block</u>	15
3.1.4	<u>First starting: drive cylinders</u>	15
3.1.5	<u>Spare function with fault of sensors or amplifier</u>	16
3.2	<u>Set up the concrete pump</u>	16
3.3	<u>Concrete pumping</u>	17
3.3.1	<u>Start pumping</u>	17
3.3.2	<u>Pumping hints (depending on concrete quality)</u>	17
3.3.3	<u>Pumping hints (depending on machine)</u>	18
3.4	<u>Cleaning</u>	19
3.4.1	<u>Cleaning by suction</u>	19
3.4.2	<u>Cleaning with pressure water</u>	20
3.5	<u>Conversion and replacement of wear parts</u>	21
3.5.1	<u>Replacement of wear plate and wear ring</u>	21
3.5.2	<u>Replacement of conveyor pistons</u>	22
3.5.3	<u>Replacement / turning of conveyor cylinders</u>	23
3.5.4	<u>Replacement of the agitator tool</u>	23

<u>4</u>	<u>Maintenance</u>	24
<u>4.1</u>	<u>General hints</u>	24
<u>4.2</u>	<u>Daily maintenance</u>	24
<u>4.3</u>	<u>After the first 50 operating hours</u>	24
<u>4.4</u>	<u>Weekly maintenance</u>	24
<u>4.5</u>	<u>Every 100 operating hours</u>	24
<u>4.6</u>	<u>Every 500 operating hours</u>	25
<u>4.7</u>	<u>Every 1000 operating hours</u>	25
<u>4.8</u>	<u>Tightening torque's for screws</u>	25
<u>4.9</u>	<u>Lubrication</u>	26
<u>4.10</u>	<u>Lubricants</u>	27
<u>5</u>	<u>Trouble Shooting</u>	29
<u>5.1</u>	<u>Truck engine does not start</u>	29
<u>5.2</u>	<u>Pump unit does not start (without hydraulic pressure)</u>	29
<u>5.3</u>	<u>Pump unit stops (at maximum pressure)</u>	29
<u>5.4</u>	<u>Pump unit works with too low performance</u>	29
<u>5.5</u>	<u>Agitator does not work</u>	30
<u>5.6</u>	<u>Hydraulic oil is getting too hot</u>	30
<u>5.7</u>	<u>Faulty operations</u>	31
<u>5.7.1</u>	<u>Drive cylinders work with shortened stroke</u>	31
<u>5.7.2</u>	<u>Faulty operation of tilting cylinders</u>	31
<u>5.7.3</u>	<u>Delayed switch over with pressure peaks</u>	31
<u>5.7.4</u>	<u>Changing of stroke number is too fast / too slow</u>	32
<u>5.8</u>	<u>Grease system does not work</u>	32
<u>5.8.1</u>	<u>Mixing wing does rotate</u>	32
<u>5.8.2</u>	<u>Mixing wing does not rotate</u>	32

PREFACE

Before operating this machine please read carefully the following instructions.

We have tried to keep this instruction manual as short as possible in order to help you in becoming quickly acquainted with our machines. We are, however, obliged by law to include complete details on the technical construction, maintenance and safety regulations, etc. So that we are unable to shorten this manual further. This is for your own safety, also for persons concerned with this machine.

The pump operator and all persons concerned with this machine are equally obliged to study this manual thoroughly, not only to operate it properly and economically, but also to avoid damage and accidents.

We must draw your attention to the fact that our warranty is void if your machine is not operated and maintained according to our instructions. If you have any queries or problems contact the technical advisers at our company. We would be pleased to help you and would enjoy hearing from you.

Spare parts and wear parts, or any other parts which are not supplied by the manufacturer or his authorised representative are excluded from the warranty. For foreign products no responsibility can be taken.

Claims cannot be made on the manufacturer as a result of any information contained in or omitted from this manual, especially with regard to the construction and/or the assembly of the machine.

Due to our continued efforts to improve our machines in every way, modifications are effected from time to time and it could be that some changes could not be included in this manual at the time of going to print.

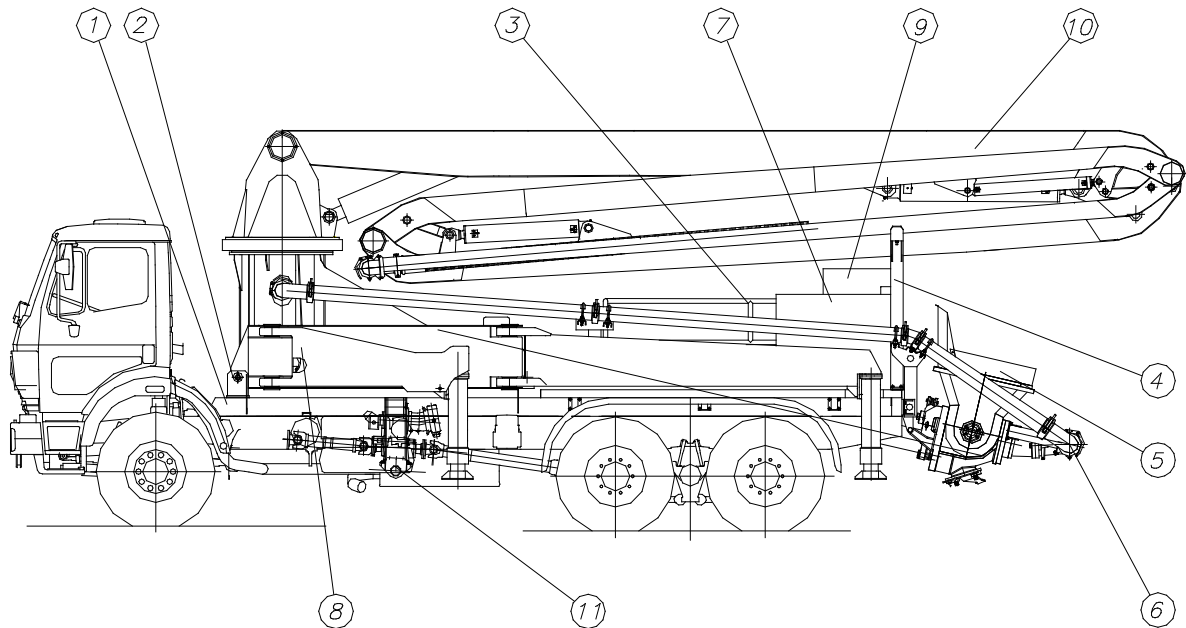
Please take into consideration that the present operation manual is valid for different versions of this pump model. Therefore it is possible that the pump version ordered by you may be different to the technical version described in this manual.

Accessories and all spare parts are listed in a special catalogue / spare part list according to the part numbers. For spare part orders please indicate the part number, the model and the machine number.

This manual should be regarded as an essential part of the THP-Trailer-Pump of the Waitzinger Baumaschinen GmbH company. It should be kept in a safe place as a reference book.

1 Description

1.1 Description of main components



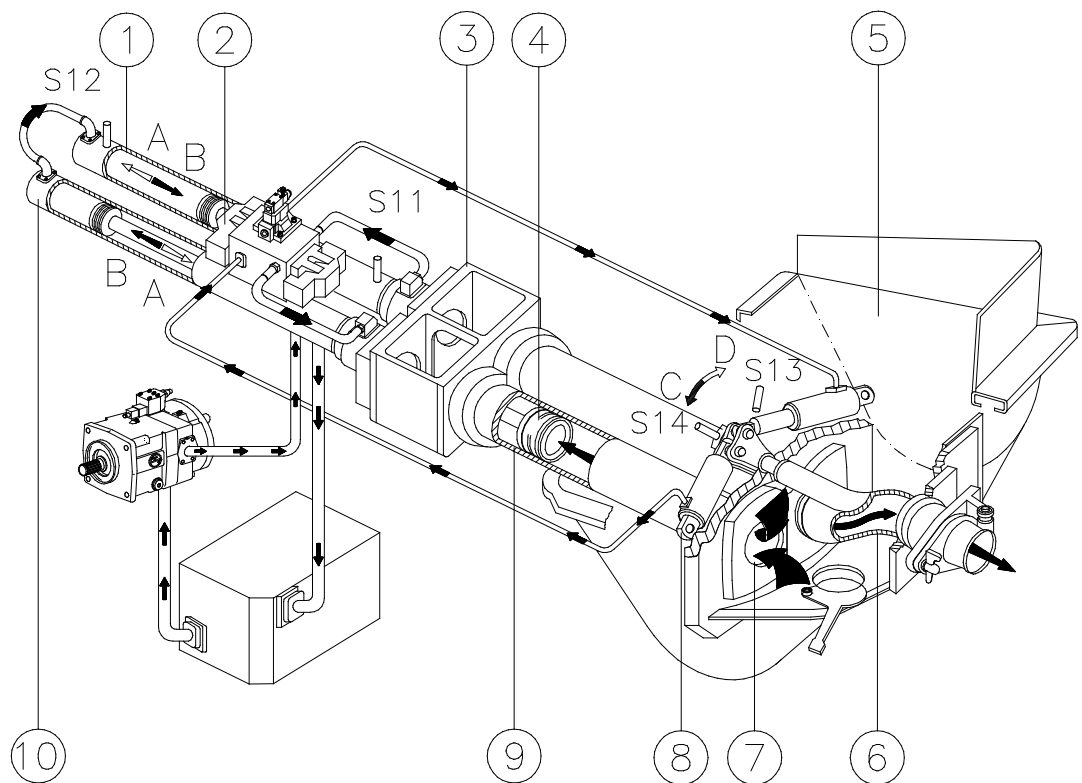
- | | |
|----|--|
| 1 | Subframe |
| 2 | Frame connection for boom base |
| 3 | Pedestal, railing and ladder |
| 4 | Boom support |
| 5 | Pump unit with main control block |
| 6 | Concrete delivery pipeline |
| 7 | Additional water tank with water pump |
| 8 | Boom base with outrigger |
| 9 | Control panel |
| 10 | Distributor boom |
| 11 | Distribution gear box with hydraulic pumps |

Description

1.2 Description of pumping cycle

1. electric motor. The control system is electric and fully automatic. When using the monitoring switch a spare function can be switched on additionally which enables a continuous working of the concrete pump at reduced engine speed upon breakdown of the control system or the sensors. The number of strokes can be adjusted from minimum to maximum. The drive cylinders (1) have an automatic leakage compensation. The S-tube valve compensates the wear on the wear plate and on the wear ring automatically.

1:	Drive cylinder, right	6:	S-valve
2:	Control block	7:	Wear plate
3:	Water box	8:	Tilting drive
4:	Conveyor piston	9:	Conveyor
5:	S-valve system with agitator	10:	Drive cylinder, left



The concrete pump works as follows: The tilting cylinders are in pos. S13. During the pumping the pressure relief valve Y3 is closed electrically while Y4b is being started. The drive cylinders run into direction "A". The concrete in the left conveyor cylinder is pressed through the S-tube valve into the conveying line. In the right conveyor cylinder concrete is sucked from the open bore hole in the hopper. As soon as sensor S12 is switched on, Y4b stops while Y5b is being started. The drive cylinders stop and the tilting cylinders move into position "C".

The S-valve is now at the front of the right conveyor cylinder. Sensor S14 starts Y4a (Y5b stops) and the drive cylinders move into position "B". The right conveyor piston pumps the concrete through the S-valve while the left one sucks the concrete out of the S-valve housing. Sensor S11 stops Y4a and Y5a shifts the S-valve back into position "D". Thus the cycle is being finished.

2 Safety regulations

2.1.1 Field of application

The use of this pump can be dangerous!!

1. The current operating instructions must be in the vehicle.
2. Operator must be trained and must sign confirming that he has "taken note" of the operating instructions.
3. The operator is obliged to behave in accordance with the operating instructions. The works Guarantee is cancelled if your machine is not operated and maintained in accordance with the operating instructions.
4. The following injuries can occur in improper use:
 5. Injury to the eyes due to sprayed concrete, water glass or other chemicals.
 6. Injury to eyes and other parts by hydraulic oil shooting out when joints are opened without first relieving the accumulator pressure.
 7. Injury due to the force of bursting couplings, bursting pipes or blockages shooting out.
 8. Danger from contact with live electrical wires.
 9. Electric shock (possibly resulting in death) due to touching machines with an electrical drive, if the electrical connection was not correctly made or the supply cable is damaged.
 10. Danger of tipping over due to the supports sinking.
 11. Injury due to swivel and telescopic support legs moving out quickly if not properly "bled".
 12. Injury due to parts of pipeline falling down due to screwed joints or couplings gradually coming undone.
 13. Injury of workers due to unintentional operation of the boom controls and therefore unintentional movement of the boom.
 14. Injuries to head and shoulders due to concrete dropping out of the end hose if the placing boom is moved above the site at a great height (also with the pump switched off).
 15. Injury due to boom arms falling down if valve blocks are opened without first ensuring that the corresponding boom arm has been secured.
 16. Injury of someone at the hose end from the end hose if it has caught in the reinforcement and suddenly moves out when the boom continues to move.
 17. The pump rolling away due to the brakes or the support legs coming off.
 18. Injury due to opening delivery pipes which are under pressure (after blockages).
 19. Injuries due to reaching into or falling into the agitator or the pressure devices.
 20. Injuries due to slipping on the oily or greasy machine.
 21. Injuries due to reaching into the waterbox with the piston moving.
 22. Injuries due to stumbling over cables, hoses, reinforcing material.
 23. Injuries due to being jammed in by the truck mixer or its parts (chute).
 24. Injuries due to slipping or falling from the unsecured delivery lines.

Safety regulations

2.2 Qualifications and duties of the pump operator

Pumps and/or placing booms may be operated and maintained only by persons (operator, machine driver) who

1. are aged 18 years and older,
2. are both physically and mentally capable
3. have been trained to operate and maintain the pump and/or the placing boom and have shown proof of these capabilities to the contractor
4. are not under influence of alcohol , drugs ,and medicine

Safety devices may not be altered resp. removed and are to be used in a correct manner.

Before setting the machine into operation, check the operational reliability . In the case of faults and defects, or even just a hint of same, steps must be taken immediately to remedy them and the person in charge informed, if necessary. Work should be discontinued at the smallest hint of danger.

If accidents are caused due to negligence or non-observance of safety regulations laid down by the respective unions and Factory Inspectors, the operating personnel will be made liable. If they cannot be made responsible, due to lack of training or knowledge, the person in charge of the operating personnel will be made liable. Please make sure, therefore, that great care is taken at all times.

2.3 Important safety regulations

2.3.1 In general

1. Work with pumps and placing booms is subject to the specific regulations of the country resp. the responsible employers

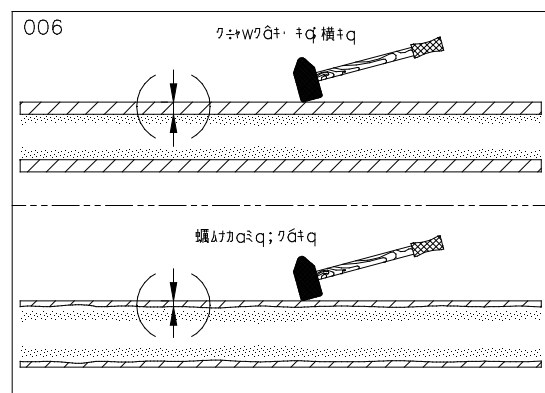
- liability association and the operating and maintenance regulations of the manufacturer.
2. The concrete pumps may only be used as intended by their manufacturer and as described in his instruction manual. Regulations call for the availability of such an instruction manual at the construction site.
3. All devices for safety and prevention of accidents such as informative and warning notices, cover grids, metal guards, must be available. They must not be removed or altered.

DANGER OF ACCIDENTS!

During operation of the machine, it is not allowed to remove any protective devices (e.g. water box covering) or to set any safety installations (e.g. limit switch or mechanical safety device for switching off the grid) out of operation.

4. The concrete pumps together with their delivery lines have to be inspected when necessary according to the operational conditions and working situations, but at least once a year, by a qualified person. The results of the testing have to be written down in the enclosed check book and have to be shown on request. This inspection is prescribed by law.

Check wear on the concrete delivery line daily by knocking, or better by using a wall thickness measuring device and replace worn out parts in time, resp. as a precaution. For min. wall thickness see under "min. wall thickness and operating pressure of conveyor lines".

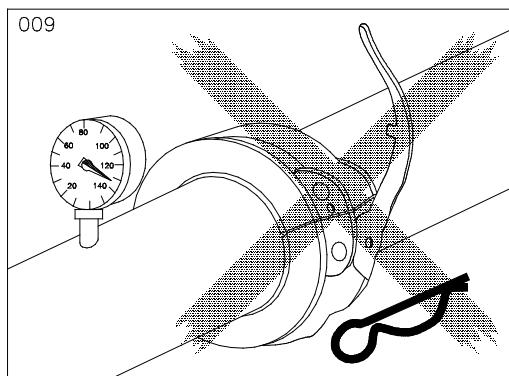


ATTENTION:

If worn out resp. defective parts (high pressure hoses) are not replaced immediately, the manufacturer will not take over any warranty.

DANGER OF ACCIDENTS!

Never knock or open the line under pressure.
Always pump 1 - 2 strokes in reverse first.



6. When concrete pressure above 85 bar (vertical and horizontal pumping) the following safety measures must be taken and checks made or supervised by the pump operator.
 - Use exclusively piping of the concrete pump manufacturer. With concrete pressures between 85 bar and 130 bar high pressure piping and more than 130 bar special piping is required.
 - Carry out water pressure test for pipes and couplings latest after pumping 2000 m³. Test pressure 30% higher than the expected maximum operating pressure.
 - Change couplings, seals and pipe elbows regularly (e.g. every 1000 m³) near to which operating personnel may approach at a distance of less than 3 m.

Do never grab inside the hopper, to the s-valve or inside the water box during the engine is running. First you have to stop the engine and release the system pressure. Take care of the sign of danger at the hopper. Secure the opened grid against unintentional closing.

ATTENTION DANGER OF LIFE!

It is not allowed to modify the hydraulic accumulator circuit. It is strictly forbidden to remove leads of safety valves or to modify the hydraulic pipe system.

7. If the cable control is connected with the socket i.e. if the connection cable from the remote control to the machine does not present any defect, the cable control can only be laid down if the 'emergency-shutdown button' has been actuated. For 're-setting into operation' (after having cleared fault) release the emergency-shutdown-button by turning in direction of arrow.
8. You have to disconnect the cable control during pumping breaks and repair work, in order to avoid unintentional operating.
9. Use ascents and handles if you step up to the machine.
10. Control and testing installations have to be kept free of dirt, oil, snow and ice.
11. In order to avoid concrete spraying by air being sucked in, the agitator hopper has always to be filled with concrete up to the mixer shaft.
12. Cleaning of the conveyor pipes by compressed air is not allowed. Waitzinger Baumaschinen Vertrieb und Service GmbH does not take any liability for accidents.
13. The maximum conveying pressure must not be higher than indicated at the data plate.
14. First aid
 - a) Keep all information available concerning the treatment of work specific accidents.
 - b) Any injuries must be reported to a supervisor or a responsible deputy supervisor.

Safety regulations

2.3.2 Maintenance and repair

Carry out maintenance work regularly.

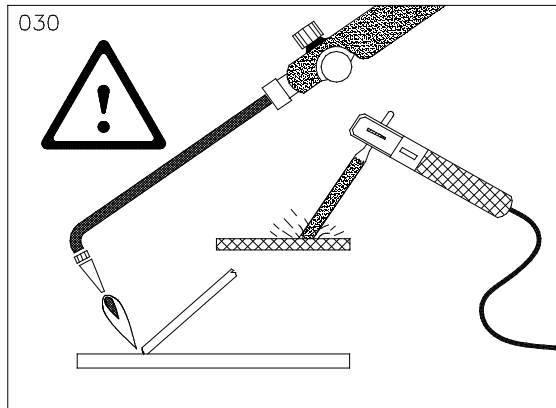
ATTENTION:

Throttles and pressure limiting valves, may only be modified by skilled staff. It is forbidden to remove seals of safety valves.

1. Modification-, welding- and repair on the placing boom and all assembly groups belonging to it, supporting members, fixture, support legs, mounting frame and each part of the pump or parts under pressure may only be performed by persons nominated by the manufacturer.

'DANGER OF EXPLOSION!'

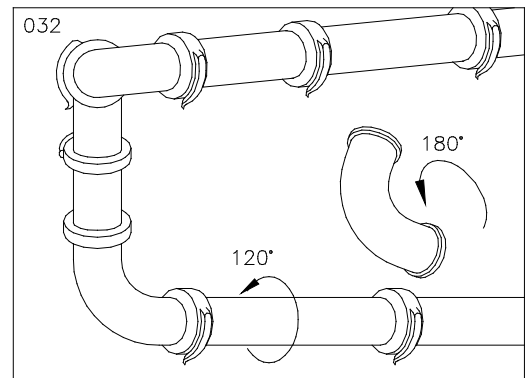
These works must be inspected by an expert with regard to their execution according to the specific regulations for concrete pumps and concrete placing booms ZF 1/573 issued by the Inspector of Factories, resp. the social insurance association for occupational accidents or the legislator of your country.



ATTENTION:

Before carrying out electric welding, plug out cable harness from the control box and disconnect battery. In order to disconnect the battery both plus and minus have to be detached.

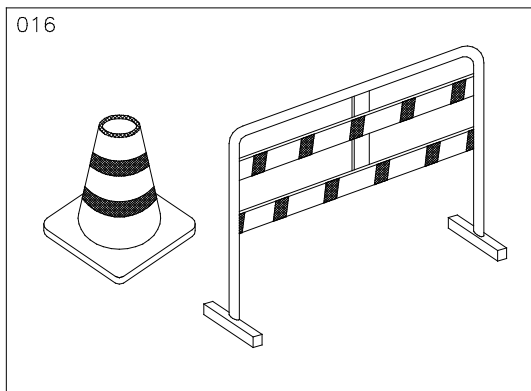
2. The drive engine must always be shut down and pressure let off the hydraulic units and lines before carrying out repairs or maintenance work. Release the pressure in the accumulator. Remove the key of the engine!
3. Works on machines equipped with hydraulic accumulators (repair, maintenance) may only be carried out after the pressure in the liquid has been released. It is not allowed to modify the hydraulic accumulator circuit. Never allow non-experts to perform a repair. Test certificates delivered with accumulators must be kept in a safe place.
4. If components of electric, pneumatics or hydraulics are replaced (valves, pumps etc.) they have to be checked according to the data (pressure, voltage etc.) of the machine card, data sheet or circuit diagram and adjusted accordingly.
5. In order to get a longer life time of conveyor pipes, you should turn straight pipes for 120° clockwise and conveyor bows for 180° anti clockwise after pumping about 6000m³. Take care of minimum wall thickness and operating pressure.



6. When dismantling parts take note of their fitting position. Make use of the spare parts service information to ensure correct assembly!

2.3.3 Working area

1. The operator is responsible for the complete working area when using the machine and must have a good view over the hole area. If the operator during pumping operation cannot see the concrete placing hose, a means of communication between the place where concrete is poured and the concrete pump must be established. When leaving the machine, always make sure that it is secured against unauthorised use.
2. Close the working area off from general traffic and public according to regulations in force.



3. A personal protective equipment (helmets, spectacles, mask, gloves etc.) has to be worn in the hole working area if cement or additives for mortar on a chemical base is used for working.

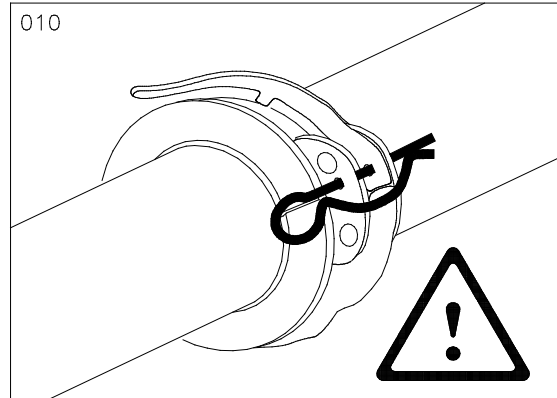
The unauthorised stay in the danger area of the machine is forbidden. Any persons staying there have to be warned; stop working if persons do not leave the danger area in spite of being warned.

2.3.4 Placing

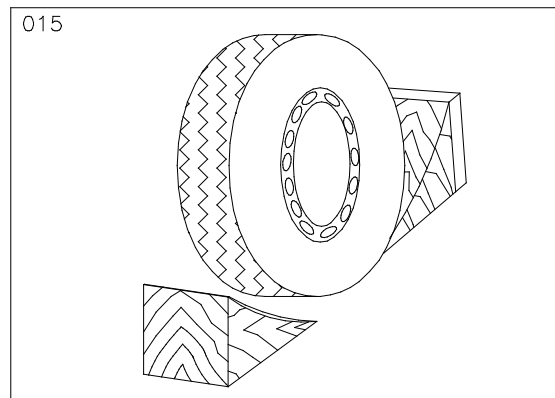
CAUTION!

It is not allowed to start PUMPING with the Trailer Pump before it is set up at the outriggers according the Operation Manual. Also take care of your countries safety regulations.

1. Secure couplings with pin to prevent opening by themselves.



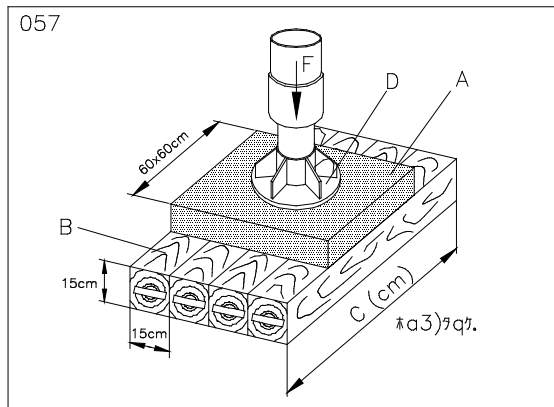
2. Check that the conveyor pipelines and connections are perfectly in order before commencing work.
3. Before start pumping procedure, check delivery lines, couplings and hoses for secure fixture.
4. When the machine stands on sloping ground, block wheels with wedges, let off brake and let vehicle run slowly towards wedges. Afterwards support machine.



5. You have to keep a safe distance to obstacles, cranes, buildings and other disturbing things.
6. The pump must be set up on firm ground to ensure its stable standing. Keep away from slopes, embankments, pits, trenches and ditches, as these may collapse under the pressure exerted by the support legs.

Safety regulations

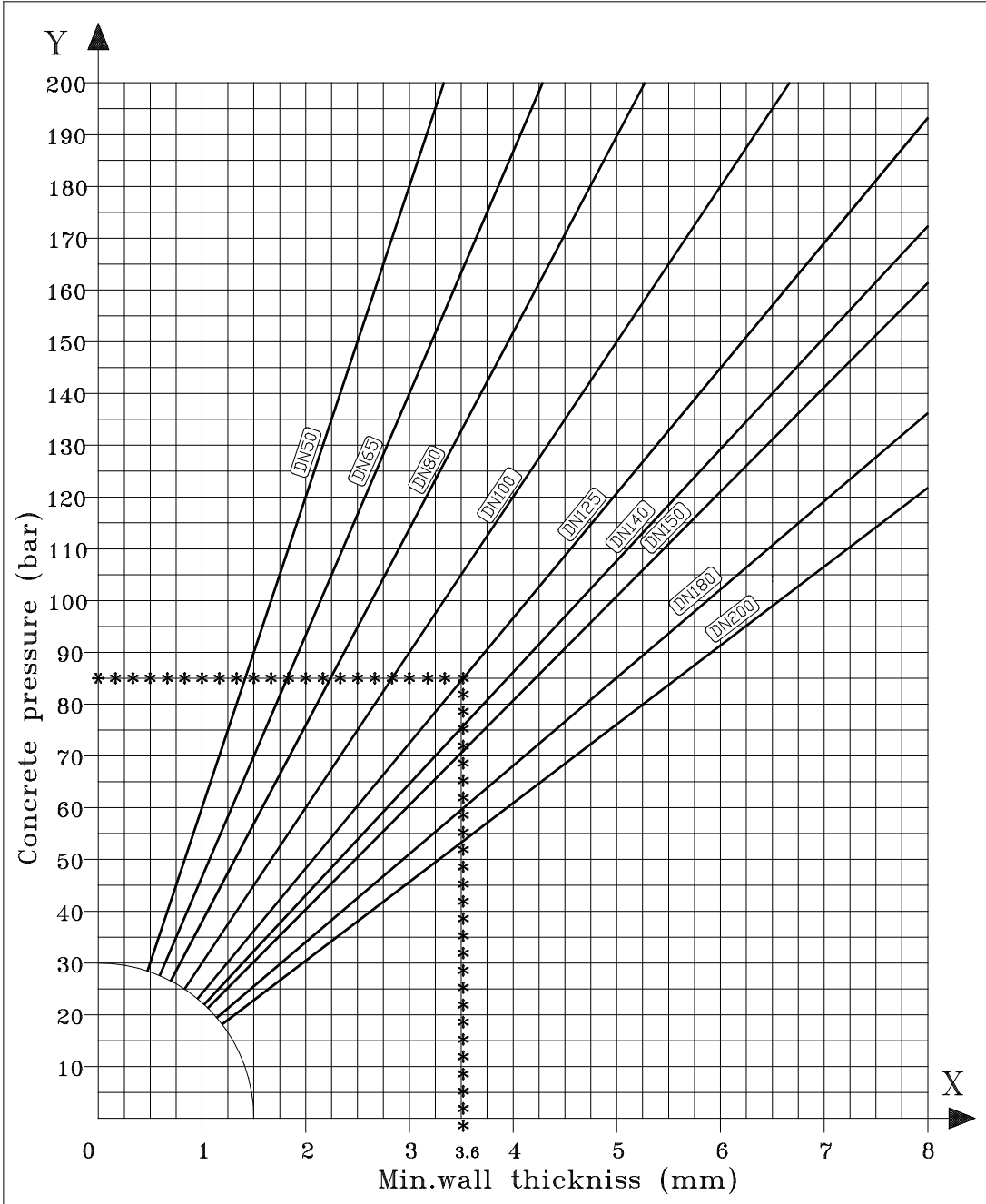
7. The ground must be checked to make sure that it may not negatively affect the stable standing of the machine. If the ground is not firm enough, the supporting area should be increased by using suitable materials laid crosswise in two layers. German standard see DIN 1054.



8. The support legs and feet must be locked mechanically or hydraulically in position.

2.3.5 Minimum wall thickness and operating pressure of conveyor pipes

Y = concrete pressure in bar
X = minimum wall thickness in mm according to DIN 2413 T3
DN = nominal diameter



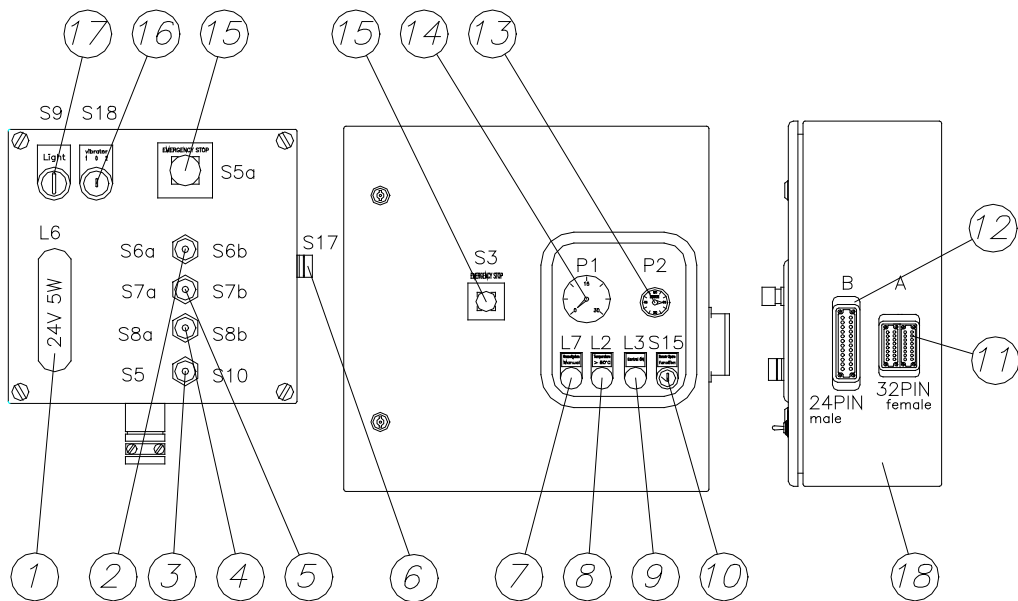
Operation of the Concrete Pump

3 Operation of the Concrete Pump

3.1 In general

1. Before the operation the operator has to read the operation manual in order to avoid accidents and damages.
2. The operator is responsible for the safety during any operation of the machine. Therefore he is obliged to take the necessary safety measures on the concrete pump and to inform every worker of the safety hints who is working in the danger zone of the machine. For the additional appliances which are not described in this manual the separate, enclosed operation an maintenance manuals are valid.

3.1.1 Description of the operating elements



Operation of the Concrete Pump

1. = Panel light
2. = Select switch - PUMPING / SUCTION this is a 2 position toggle switch used to control the cycle direction of the concrete pump. The „PUMPING“ position will start the pump . The „SUCTION“ position stop the pump and reverse the pump function as long as the switch is operated .
3. = Horn/ Grease pump manual switch .this is a 2 position toggle switch used to interrupt the preset timing cycle of the grease pump.The lubrication cycle is preset and will automatically start and stop as set . If the pumping function is „ON“ by moving the toggle to „GREASE“ position the grease pump will start .The position „HORN“is used to activate the chassis horn for signaling purposes . The horn is also controled by the oil pressure . If the pressure is higher as adjusted on the pressure switch beside the control block the horn is „ON“ to show you the pressure is to high. (concrete blockage , sensor failed)
4. = Switch for changing stroke + / -
After pushing in „+“ - position for more than 5 seconds the maximum stroke number is reached.
After pushing in „-“ - position for more than 5 seconds the minimum stroke number is reached.
5. = Switch for changing r.p.m. + / -
(function also without running engine).
Position „+“ increase the engine r.p.m.
Position „-“ decrease the engine r.p.m.
6. = Engine " START "(only if the truck is prepared for this function .17)
7. = Indication of grease pump.
8. = Indication for oil temperature higher than 80° C
As soon as the indication lights on "PUMPING" is interrupted. Only suction is possible.
9. Power indicating lamp
- 10.= Select switch for spare functions
Position 0 = without spare function
Position A = spare function if amplifier failed
Position B = spare function if sensor failed
- 11.= Socket for cable harness 24 pin
- 12.= Socket for cable harness 32 pin
- 13.= Counter for operating hours of the pump
- 14.= R.p.m. indication engine
- 15.= Emergency stop and engine stop button (engine stop only if the truck is prepared for this function)
- 16.= Vibrator Position 1 = manual Position 0 = off Position 2 = auto (only with option vibrator)
- 17.= Panel light switch.

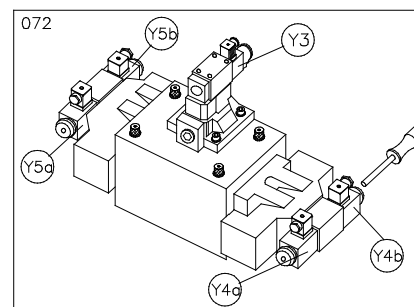
Operation of the Concrete Pump

3.1.2 First starting / test run

1. You have to test the complete machine each time before it is used at the jobsite.
2. Check filling levels (hydraulic oil - engine oil - diesel fuel - cooling water - battery acid - grease in grease pump)
3. Fill the water box with water. It is inadmissible to run the concrete pump without filled up waterbox.
4. Check wear out parts for the wear out limit. Close the grid at the hopper and lock it with the nuts.
5. Check, if the valve for agitator and the switch for PUMPING / SUCTION is in middle position. Unlock emergency stop. Drive the r.p.m. motor out for 1/3 of stroke. Start engine. (switch pos. 16).
6. Warm up the engine with about 1000 r.p.m. Take care of leakings at engine and hydraulic system.
7. Start PUMPING during medium r.p.m. and switch on the grease pump manual. Check agitator in all two directions. The hydraulic pressure for the agitator should be not higher than 40 bar (without load). Lubricate the conveying pistons in end position. Take care of leakings.
8. Check function PUMPING / SUCTION with maximum engine r.p.m. and different stroke numbers. (switch over function / endposition drive cylinder). Check maximum stroke number (see at the data sheet).
9. Check the indications for hydraulic filter element. The indication for the hydraulic filter must be inside the green area, if you run with maximum r.p.m. and maximum stroke number and the oil temperature is higher than 30° C. If the red indication lamp lights up during maximum r.p.m. you have to change the filter element.

3.1.3 Manual function of control block

For safety reasons you have to move the drive cylinders or the tilting cylinders manually, if you need a defined position of them. You can move the cylinders if you use an suitable tool for the way valves Y4 and Y5. The valve Y3 is activated by hand.



ATTENTION: If valve Y3 is activated single, the hydraulic pressure will increase to maximum. Therefore, you have to activate the corresponding valves Y4 or Y5 first. After this you can push and release Y3 for the stroke. Don't release Y3 before you released the way valves. If you work with manual function, you have to run the engine with low r.p.m.

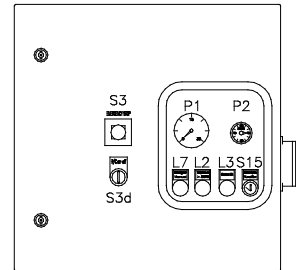
3.1.4 First starting: drive cylinders

At the first starting or after change of the drive cylinders:
(hydraulic connection: rod side)

1. Drive the right hand drive cylinder slowly out by activating valves Y4a and Y3 at the same time.

Operation of the Concrete Pump

2. Breathe off hydraulic swing space - open the highest plug of the right drive cylinder and activate valves Y4a + Y3 slowly, till the left drive cylinder reaches end position without being springy.
3. Breathe off seals - open the plug of the right drive cylinder and activate Y4b + Y3 as often as oil without air comes out. Repeat this procedure with left drive cylinder (Y4a + Y3).



3.1.5 Spare function with fault of sensors or amplifier

It is possible to work with the truck concrete pump by spare function, if there is a fault with the sensors or with the amplifier. You can use the spare function in order to finish a already started work. This operating is unfavourable for the hydraulic system. Therefore you should reduce the maximum r.p.m. for about 20%.

1. How to find the fault; during a fault of sensors the hydraulic system stops in end position. The horn signals the maximum pressure because of the assembled pressure switch.
2. Stop PUMPING at once.
3. Change the spare function switch S15 to position "B".
4. Start PUMPING and check if the same fault happens again, or not.
5. If the fault continues, switch spare function to position "A".

3.2 Set up the concrete pump

1. Please see the „ Installation manual“ of the concrete distributor boom - Section B .

Operation of the Concrete Pump

3.3 Concrete pumping

3.3.1 Start pumping

Directly before start of the pumping, you have to fill some buckets with lubrication mixture (cement, water, sand) into the hopper during running agitator. In order to lubricate the complete conveyor pipes with the mixture, you should pump two sponge balls through the pipeline. Pump slowly until full concrete jet comes out of the end pipe.

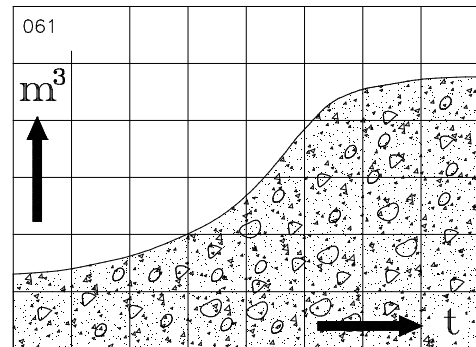
ATTENTION:

Maximum output pressure may not higher than it is indicated at the data plate respectively in the test book.

2. If you use new and long conveyor pipes the friction resistance is higher. Therefore you need enough lubrication mixture.
3. Pump several strokes and switch on the agitator system..
4. The concrete inside the Truck Mixer must be mixed with highest speed. Take care of constant prepared concrete mixture. It must be mixed at least for about 4 minutes, after addition of concrete additives (accelerator, retarder).
5. Fill the concrete out of the Truck Mixer or the tank inside the hopper and start Pumping.

ATTENTION:

If the conveyor pipes are rusty (high resistance) increase the concrete output steady after several m^3 .



6. At concrete blocking inside the pipeline, you have to suck the concrete back into the hopper and mix it with the agitator. Don't start PUMPING, before s-valve and drive cylinder switch automatically. Start PUMPING very carefully.
7. Reasons for concrete blocking:
 - a) Lubrication mixture contents too much water
 - b) Not enough lubrication mixture used
 - c) Leaky s-valve
 - d) Leaky pipelines
 - e) Old, hardened concrete inside s-valve and conveyor pipes
 - f) unfavourable concrete compound.

3.3.2 Pumping hints (depending on concrete quality)

1. During pumping of difficult concrete compounds, the agitator rod should be visible! It is easier to pump unfavourable concrete (extremely stiff and with low sand mixtures; light concrete) at half filled hopper. (under edge of agitator rod). In this case the concrete pump also sucks air inside the conveyor cylinder and PUMPING is easier possible. BUT: Take care of concrete blocking!!!

Operation of the Concrete Pump

2. During break times of PUMPING you should relieve the conveyor pipes from pressure by sucking 2 or 3 strokes . During the break time you should move the concrete inside the pipeline. Never let the pipeline under pressure.
3. Try to pump the hopper completely empty, during pumping breaks, if you use very liquid concrete with rough corn.
4. During long pumping breaks suck the concrete back to the hopper, mix it, and pump it again.
5. During very long pumping breaks switch off the engine, in order to avoid dismixing of the concrete because of vibrations. Move the concrete by pumping and suction, in time distances from 10 to 15 minutes.

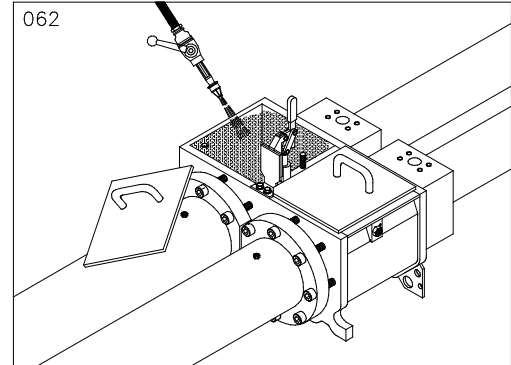
Never try to press already hardened or dismised concrete into the conveyor pipe by force.

6. Avoid breaks, especially for up pumping from concrete, which can't keep the water. Also suck as long as the s-valve tilts to endposition at both sides, before you start PUMPING again with this kind of concrete mixture.
7. It is very dangerous, if air comes inside the pipeline, because the compressed air comes out with a stroke at the end of the conveyor line and catapults the concrete away like explosion. This can happen if the hopper isn't filled enough with concrete or if you lengthen the pipelines.

3.3.3 Pumping hints (depending on machine)

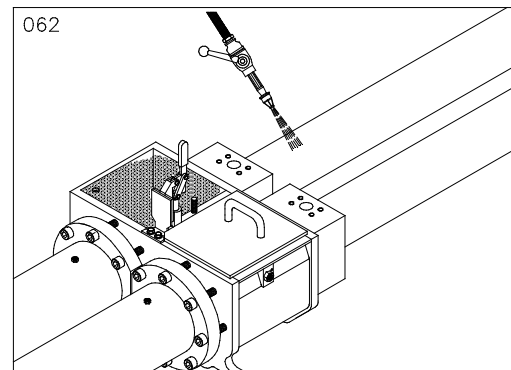
1. Do never break the maximum r.p.m. of the diesel engine, because this will damage the hydraulic pump. Admissible r.p.m see at the data sheet.
2. Watch stroke reduction (piston stroke) and compensate if possible.

3. Fill the water box with fresh water, if the oil temperature breaks 80°C during continuous operation with high load.



If the temperature increases further, exchange the water continuously. Search for the reason of overheat and eliminate. The thermo static oil cooler starts at temperatures higher than 55°C.

4. Don't sprinkle the hydraulic oil tank with water. This causes damage of hydraulic pump or develops condensing water. If there is no more other possibility, you can spray a jet of water directly to the drive cylinders..



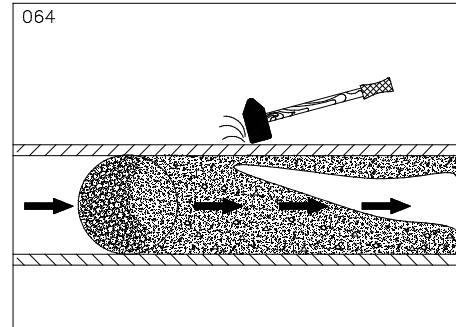
5. All pumps possess a thermo -electrical stop. At oil temperatures higher than 80°C pumping stops automatically and the red indication lamp at the control panel lights up.

Steps:

- a) Switch off the pump .

Operation of the Concrete Pump

- b) Don't stop the engine. Oil cooler must go on.
 - c) Renew the water inside the water box.
 - d) Start pumping again, after the indication lamp goes out. Pump only with reduced performance.
 - e) Search for the reason of oil overheating. Eliminate the mistake. - (Look at chapter 5, mistake search)
 - f) The temperature sensor for thermo - electrical switch off is assembled at the hydraulic tank..
6. Don't stop the engine after long running with big performance. Let the engine run with about 1000 r.p.m. in order to cool it. This is very important especially for turbo charged engines.
 7. Adjust the engine r.p.m. so that the engine is running uniform (higher than 700 U/min.).
 8. The producer does not take any liability for any damages happened because of operating mistakes.



4. Open the conveyor pipe and take out the cleaning sponge.
5. You have to repeat the suction of the sponge ball, if your pipeline is very long. For long distances is one time cleaning not enough..
6. S-valve and agitator will stop, if you open the hopper grid, in case of safety stop, assembled at the grid. Lock the grid during cleaning the pipeline. Don't open the bolts during cleaning, If the hopper grid is assembled with screws.
7. Take out the rest of concrete by opening the cleaning hole at the bottom of the hopper. Clean the s-valve, hopper, conveyor cylinders, water box with water. Clean the complete concrete pump and spray it with oil or diesel fuel.
8. You have to drain the water box, the water tank and the water pump, if they could freeze. The water box must be drained during long pumping breaks, over night time, on weekends, also at normal temperatures.

3.4 Cleaning

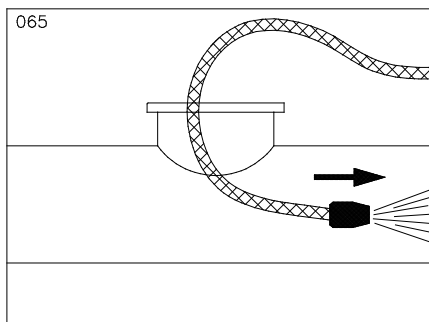
3.4.1 Cleaning by suction

1. Pump the hopper empty up to the upper edge of the conveyor cylinders.
2. Push a cleaning sponge (cube), which is filled with water, into the end hose of the pipeline.
3. Suck the cleaning sponge back to last conveyor pipe in front of the hopper. By knocking on the conveyor pipe with a hammer, you can check the position of the sponge (different sounds). Switch off the pump.

3.4.2 Cleaning with pressure water

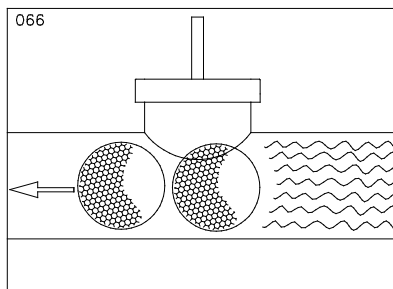
You need some experience to clean the machine with pressure water.

1. Pump the hopper empty as far as possible. Suck 2 or 3 strokes back - pressure relief for conveyor pipes. Switch off the pump.
2. Open the cleaning hole of the hopper and take out the rest of concrete.
3. Open the conveyor pipe in front of the hopper or the cleaning hole of the conveyor pipe (in this case you have to lock the rest of the concrete pipes). Spray water with the spray nozzle in direction to the hopper.



Start SUCTION. Be carefully that the s-valve doesn't cut the water hose during tilting. Spray with water as long as clean water comes out of the conveying cylinders. Stop SUCTION. Clean the complete hopper and s-valve.

4. Push 2 or 3 with water filled sponge balls inside the conveyor pipeline and connect it to the hopper again. (If you locked the rest of the pipes, you have to open it now). Lock the cleaning hole of the hopper and fill the hopper with water.



5. Pump the sponge balls through the conveyor pipes, until they come out at the end hose. If the water inside the hopper is not enough for the complete pipeline, you have to fill it, before the system sucks air. Be carefully that the cleaning water can not run inside the sheeting.
6. Suck the water back into the hopper.
7. S-valve and agitator will stop, if you open the hopper grid, in case of safety stop, assembled at the grid. Lock the grid during cleaning the pipeline. Don't open the bolts during cleaning, If the hopper grid is assembled with screws.
8. Take out the water by opening the cleaning hole at the bottom of the hopper. Clean the s-valve, hopper, conveyor cylinders, water box with water. Clean the complete concrete pump and spray it with oil or diesel fuel.
9. You have to drain the water box, the water tank and the water pump, if the water could freeze. The water box must be drained during long pumping breaks, over night time, on weekends, also at normal temperatures.

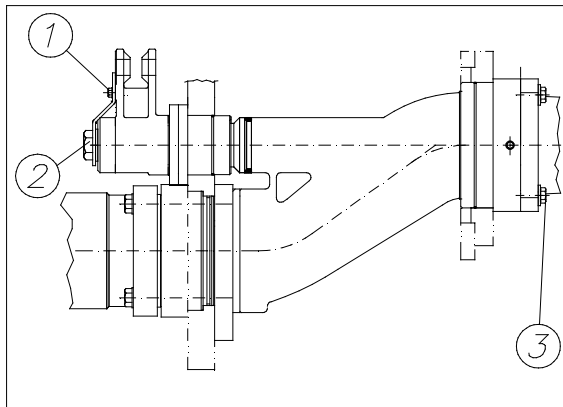
Operation of the concrete pump

3.5 Conversion and replacement of wear parts

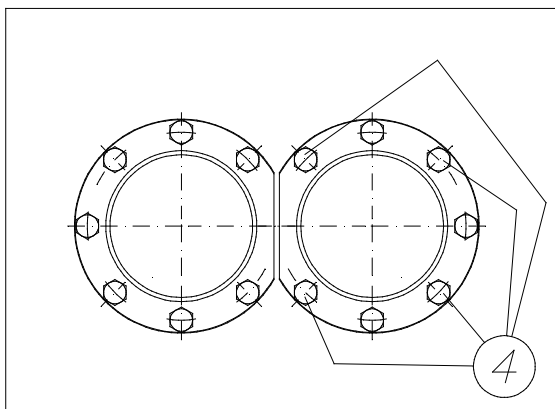
3.5.1 Replacement of wear plate and wear ring

ATTENTION: Always stop the engine and remove the ignition key if you work inside the hopper or in the surroundings of the tilting cylinders.

1. Remove safety plate (1) at the tilting lever. Release the s-valve by opening the screws (2) und (3) for about 15 mm.



2. Exchange the released wear plate by removing the 4 screws (4) and tighten the bolts again.



3. Swing the s-valve to the other side..

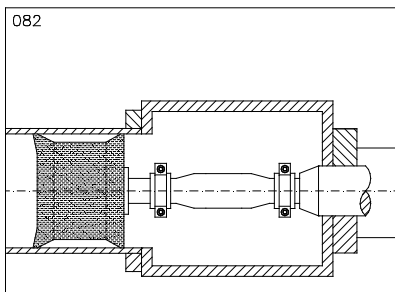
4. Take out the second wear plate by removing the 4 screws (4).
5. Swing the s-valve back and exchange the wear ring (5).
6. Swing the s-valve up to the mounted wear plate and assemble the second one.
7. Give tension to the s-valve by tighten the 4 screws (3).
8. Tighten the adjusting screw (2) by hand until there is no gap anymore. Release this screw for 1/6 at least and assemble the safety plate (1).
ATTENTION: Tighten the screws (3) and (4) with tightening torque. (See attached table for torque's).

9. Carry out a test run.

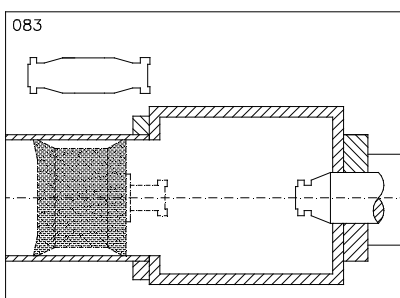
3.5.2 Replacement of conveyor pistons

ATTENTION: Always stop the engine and remove the ignition key if you work inside the water box. Do never grab inside the water box as long as the engine is running. Do the hydraulic cylinders drive always by using manual driving with the valves at the main control block. Use low r.p.m.

1. Drain the water box and remove the safety grid..
2. Move one drive cylinder by activating the valves Y3 and Y4 to end position.

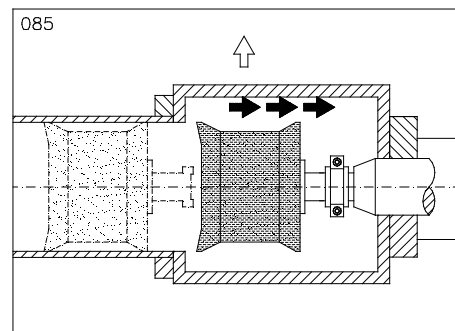


3. Open and remove the hose clamp and the clamp coupling.
4. Push the conveyor piston about 5mm in direction of conveyor cylinder and remove the spacer.

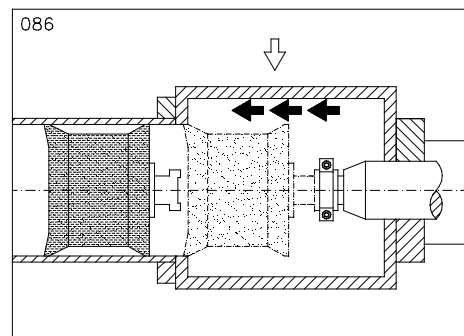


Drive the drive cylinder carefully out until the flanges touch each other and assemble a clamp coupling.

6. Bring the drive cylinder to end position and disassemble the clamp coupling and the piston.

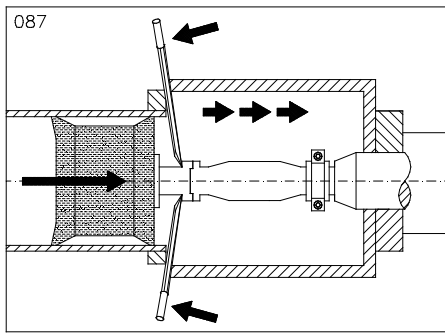


7. Lubricate the new conveyor piston well with grease and assemble it with one clamp coupling.



8. Drive the drive cylinder into the conveyor cylinder as long as there is enough space to assemble the spacer.
9. Remove the clamp coupling and drive the cylinder back to end position.
10. Assemble the spacer with the clamp coupling and the hose clamp onto the drive cylinder.

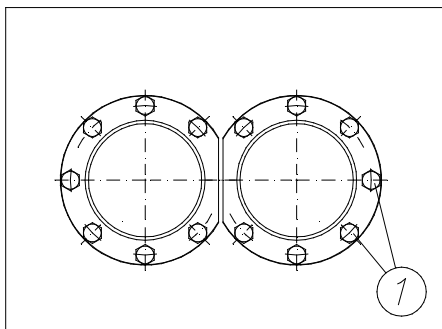
Operation of the concrete pump



11. Push the piston in direction to the spacer and mount the second clamp coupling and clamp.

3.5.3 Replacement / turning of conveyor cylinders

1. Disassemble conveyor piston (see 3.5.3)
2. Bring both drive cylinders hydraulically to end position:
Open the hydraulic swing hose at the driven in drive cylinder and fix a bucket at the hose.
3. Disassemble the axle and support the water box.
4. Remove the 28 screws (1) at the 4 flanges of the two conveyor cylinders and support the cylinders. (The easiest way would be with the fork lift)



Lift the hopper by crane.

ATTENTION: Take care that you don't squeeze hydraulic hoses or electrical cables during lifting.

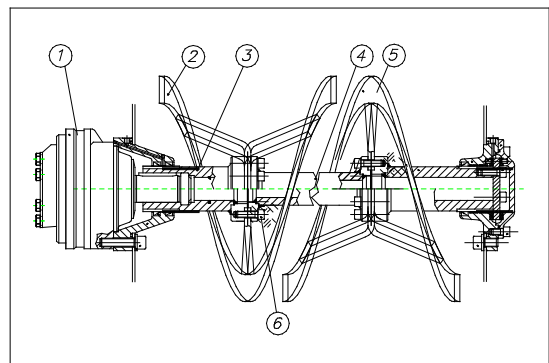
5. Disassemble or turn the conveyor cylinders.
Hint: In order to increase the life time of cylinders you can turn them for 180°. It is very important to turn the cylinders in time,

before the wear out is too big, because than you have to exchange them completely.

6. Assemble the conveyor cylinders in opposite order.
7. Assemble the pistons (see 3.5.3) and the hydraulic swing hose again.
8. Drive the right drive cylinder out by activating the valves Y4a and Y3. (look at 3.1.4)
9. Take out the air from the swing hose. (see 3.1.4)
10. Start a test run.

3.5.4 Replacement of the agitator tool

1. Remove the cylindrical screws (6).
2. Push the shaft (3) against the motor (1).
3. Exchange the agitator tools (2 and 5).
4. Assemble the screws (6) and tighten it.
5. Fill the inner hex gap of the cylindrical screws with silicon to protect against concrete .



4 Maintenance

4.1 General hints

1. Maintain all technical units (e.g. truck) as the producer suggest you.
2. Pay attention to the safety hints written in the chapter 2 and 3 of this Operation Manual.
3. All Concrete Pumps must be checked for Operation Safety at least once a year by an authorised staff. (see chapter 2)

4.2 Daily maintenance

1. Check the oil-, fuel-, grease- ,water levels and refill if necessary. Take care that the Pump is set up horizontal.
2. Check all parts which come in contact with concrete and exchange worn out parts..
3. Check the wear out of the conveyor pipes by knocking or with a wall thickness tester and exchange worn out pipes. For minimum wall thickness see the diagram at chapter 2.
4. Check the function of grease pump. Lubricate the bearings of tilting cylinders and the conveyor pistons.
5. Visual control of the hydraulic hoses and pipes and the fittings for leakings.

4.3 After the first 50 operating hours

1. Maintenance the truck according to the „Operation Manual“ from the truck producer.
2. Maintenance the concrete distributor boom according to the „Installation manual“ from the concrete distributor boom producer .
3. Clean all filter elements, respectively exchange them if necessary.

4. Check all screws for the tightening torque.(torque's see at chapter 3.6)

4.4 Weekly maintenance

1. Carry out the daily maintenance.
2. Lubricate all grease nipples and sliding surfaces.
3. Check the seals at s-valve and agitator by visual control.
4. Drain the condensation water at the ball gate of hydraulic tank.

4.5 Every 100 operating hours

1. Carry out the weekly maintenance.
2. Exchange the hydraulic filter element inside the hydraulic oil tank and clean the solenoid rod.

ATTENTION: Use only original parts.

Order numbers see in the Spare Part Book

3. Clean the diesel fuel prefilter.
4. Clean the air filter housing..
5. Check the pressure settings according to the data sheet.
6. Check the engine r.p.m. and the general function of hydraulic pump.
7. Check the clamping of the conveyor pistons.

Maintenance

with rest surface 30µm for 180°.

4.6 Every 500 operating hours

1. Carry out the 100 hours maintenance
2. Drain the hydraulic oil, clean the tank, refill it with new hydraulic oil according to lubrication list 4.9.
3. Exchange the oil filter element.
4. Check the wear out at the s-valve wall thickness.(minimum 4mm)
5. Wear out control at the conveyor cylinders. Turn hardened cylinders at 2mm wear out (4mm in diameter) and chromized cylinders

4.7 Every 1000 operating hours

1. Carry out the 500 hours maintenance.
2. An authorised expert has to check all mechanical and hydraulically parts.
3. Check all safety facilities for properly condition.
4. Check the pulling loop, support wheel, outriggers. Control the tightening torque's for all screws.

4.8 Tightening torque's for screws

Following values are valid for grub screws threaded part way (DIN 912, 931 and 934) and sliding factor $\mu = 1,25$ (light oiled).

thread size	tightening torque 8.8 Nm	tightening torque 10.9 Nm
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	1400
M30	1350	1850

4.9 Lubrication

The Waitzinger concrete pumps are equipped with several areas which require lubrication .

A.Lubrication of boom and outriggers

The lubricating instructions and the lube points of boom and outriggers are described in the „Installation manual“ of the boom - section C .

B.Lubrication of concrete pump

In order to insure a long life of the components it is necessary to lubricate carefully each lube point of the pump .

Use only lubricants NLGL - class 0-2 .

The critical lube points are connected to the central lubrication distribution block and fed by the automatic lube pump .The reservoir of the grease pump must be checked and refilled if necessary on a daily basis .

For areas not connected to the automatically lube system , use a manual lube pump and pump a sufficient number of strokes to ensure thorough lubrication of each point . Wipe off any excess lubricant .

C.Lubrication of conveying pistons .

The conveying cylinders are equipped with a grease fitting at the end of tubes next to the flush box. Lube the conveying pistons when the pistons are retracted to end position (Piston connection is visible in the flush box) . The conveying pistons must be lubricated daily .

Optional the conveying cylinders are equipped with a automatically lubrication . In this condition the lubricant for the conveying pistons is hydraulic oil .

D.Inspection of the central lubrication system .



The central lubrication system must be checked every day for :

- filling level of reservoir , so that no air can come to the pump inlet element . If the pump operates but the pump element does not deliver lubricant , the lubrication of lube points is defective . The used lubricant does not have the correct viscosity or air pockets are at the inlet of the pump element . Disconnect the main delivery line from the pump element outlet and operate the pump continuously until the lubricant is delivered without air pockets or change the lubricant if it would be necessary .

- blockage in the distribution system . If lubricant is discharged from the relief valve outlet of the pump or the indicator pin assembled at the grease distributor doesn't move (the control pin should move itself very slowly in and out during working grease pump) , the lubrication system is blocked . The blockage must be traced and cured .

Maintenance

4.10 Lubricants

	motor summer 	motor winter 	hydraulic oil standard	hydraulic oil tropical countries
type	HD SAE 30	HD SAE 10W	HLP 46	HLP 100
Aral	Aral Super Kowal Aral Turboal	Multi Turboal 15W40	Vitam CF 46	Vitam CF 100
BP	Vanellus- T Energol HD-S	Visco Static	Energol HLP 46	Energol HL P10
ELF	Performance 2B Performance 3C	Multiperformance 3C	Olna 46	Olna 100
Esso	Essolube HDX Essolube HDX plus	Essolube XD 3	Nuto H 46	Nuto H 100
Fuchs	Renolin HD Titan HD-Super	Titan Universal HD	Renolin B 15	Renolin B 30
Mobil	Delvac 1230	Delvac 1210	DTE 25	DTE 27
Schell	Retolla X Rimula X	Myrina 15W40	Tellus Öl 46	Tellus Öl 100
Fanal	Super HD Motoröl HD Motoröl	Indol C	Salvo MWS 46	Salvo MWS 100



pay attention to the regulations of the engine producer

lubrication points: use general purpose grease, acid free.

slip planes: use graphite lubricant

grease system: use only lubricants NLGL-class 0 - 2.
See documentation of grease system.

5 Trouble Shooting

5.1 Truck engine does not start

(see Operation Manual of truck)

5.2 Pump unit does not start (without hydraulic pressure)

possible reason		remedy
1. hydraulic oil is too hot	☞	cool down hydraulic oil (see 3.3.3) Attention: do never cool down the hydraulic tank with water!
2. burnt fuses	☞	search for the reason of short circuit exchange the burnt fuses
3. amplifier out of order	☞	turn switch of spare function to position A check the amplifier
4. switch for stroke number is in minimum position	☞	increase stroke number
5. wiring problem at the cable loop	☞	check the cable loop
6. solenoid Y3 is damaged	☞	exchange the solenoid
7. solenoid Y6 at the main pump is damaged	☞	exchange the solenoid

5.3 Pump unit stops (at maximum pressure)

possible reason		remedy
1. concrete blocking in the conveyor pipeline	☞	release the blocked concrete by suction
2. fuses burnt	☞	exchange fuses
3. drive cylinders do not reach end position	☞	drive cylinders manual to end position and take out the air
4. sensors damaged	☞	turn switch of spare function to position B exchange the damaged sensors
5. wiring problem at the cable loop	☞	check the cable loop
6. solenoids Y4a or Y4b or Y5a or Y5b damaged	☞	exchange damaged solenoids

5.4 Pump unit works with too low performance

possible reason		remedy
1. switch for stroke number is in minimum position	☞	increase stroke number
2. pressure reduce valve Y3 is dirty.	☞	push the valve Y3 several times by hand in order to take out the dirty parts.
3. parameter setting for amplifier N1 is false	☞ the	set parameter P3, P8, P9, P- according to description

Trouble shooting

5.5 Agitator does not work

possible reason		remedy
1. agitator tool is blocked	☞	move agitator several times in both direction in order to release the tool
2. pressure reduce valve of mobil control block is dirty	☞	block the agitator tool, in order to wash out the fouling

5.6 Hydraulic oil is getting too hot

possible reason		remedy
1. agitator tool is blocked for a longer time	☞	release the tool and cool down the hydraulic system
2. pressure reducing valve Y3 is fouled	☞	activate the pressure reducing valve several times by hand, in order to wash out the fouling cool down the hydraulic system

5.7 Faulty operations

5.7.1 Drive cylinders work with shortened stroke

possible reason		remedy
1. spare function is switched on	☞	switch off the spare function
2. parameter setting for amplifier N1 is false	☞	set parameter P6, P8, P9, P- according to the description
3. pressure switch is adjusted too low	☞	adjust the pressure switch to 290 bar
4. sensor S11 or S12 is always active	☞	exchange sensor, in order to work short time with spare function, you have to take off the plug from the damaged sensor

5.7.2 Faulty operation of tilting cylinders

possible reason		remedy
1. spare function is switched on	☞	switch off the spare function
2. parameter setting for amplifier N1 is false	☞	set parameter P7 according to the description
3. amplifier is out of order	☞	exchange the amplifier; it is possible to continue work with spare function "A" for a short time
4. sensor is out of order	☞	exchange sensors; it is possible to continue work with spare function "B" for a short time

5.7.3 Delayed switch over with pressure peaks

possible reason		remedy
1. parameter setting for amplifier N1 is false	☞	set parameter P6, P7, P8, P9, P- according to the description
2. sensor is out of order	☞	exchange damaged sensor

Trouble shooting

5.7.4 Changing of stroke number is too fast / too slow

possible reason		remedy
1. parameter setting for amplifier N1 is false	☞	set parameter P5 according to description

5.8 Grease system does not work

5.8.1 Mixing wing does rotate

possible reason		remedy
1. grease has to high consistency	☞	use a suitable lubricant
2. lubrication point blocks	☞	remove blocking
3. grease distributor blocks	☞	exchange distributor
4. pumping element is damaged	☞	exchange pumping element

5.8.2 Mixing wing does not rotate

possible reason		remedy
1. start conditions are not fulfilled	☞	control system "ON", PUMPING "ON", activate grease system
2. wiring problems with cable loop	☞	check the cable loop
3. printed circuit board is out of order	☞	exchange the printed circuit board
4. grease system motor is damaged	☞	exchange motor