

Forest Crane

FK-5300-1

FK-6700-1

FK-7000L

FK-7000S

FK-8000

English translation of the original operating instructions

Copyright by Binderberger GmbH



**Carefully read these operating instructions
before starting up the machine!**

These operating instructions are valid for:

Type	Article number
Forest Crane FK-5300-1	FK-M53-1
Forest Crane FK-6700-1	FK-M67-1
Forest Crane FK-7000L	FK-M70-1
Forest Crane FK-7000S	FK-M70-2
Forest Crane FK-8000	FK-M80-1

Version of this operating manual: FK 2.3

Release date: 2017-05

Table of Content

1	Declaration of EC Conformity	6
2	Safety instructions	7
2.1	Meaning of symbols and hints.....	7
2.2	Meaning of icons	8
2.3	General safety instructions.....	9
2.4	Proper use	9
2.5	Required operator qualification	10
2.6	Technical modifications to the machine	10
3	Description of the machine	11
3.1	Operating mode.....	11
3.2	Overview.....	12
3.3	Machine details	12
3.4	Technical data.....	13
3.5	Table of lifting capacities	14
4	Transporting the machine	15
4.1	Safety instructions concerning transport	15
4.2	Crane transport on private and public roads	15
4.3	Storage.....	16
5	Installing the machine	17
5.1	Safety instructions concerning machine installation	17
5.2	Duties before starting operation	18
5.3	Important startup information.....	18

5.4	Installing the forest crane.....	19
5.5	Installing the control valves block	19
5.6	Connection with the hydraulic system	20
5.7	Electric supply.....	21
6	Operation.....	22
6.1	Safety instructions concerning operation	22
6.2	Important instructions concerning operation	24
6.3	Control lever positions	25
6.4	Examination before test operation	29
6.5	Test operation	29
6.6	Rehearsing the use of the control levers.....	30
6.7	Working with the forest crane	31
6.8	Operation under special environmental conditions.....	32
6.9	Daily examination	33
7	Machine shutdown.....	34
7.1	Safety instructions concerning shutdown	34
7.2	Shutting down the machine drive	35
8	Repair.....	36
8.1	Safety instructions concerning repair.....	36
8.2	Important instructions concerning repair	37
8.3	Instructions for working on electric equipment.....	38
8.4	Instructions concerning work on hydraulic equipment ...	38
8.5	Duties before ending the repair work	39
9	Maintenance.....	40

9.1	Safety instructions concerning maintenance	40
9.2	Cleaning	41
9.3	Lubrication	42
9.4	Oil and filter exchange at the additional tank (in case of individual supply).....	44
9.5	Replacing the hydraulic hoses	44
9.6	Maintenance schedule	44
9.7	Maintenance and repair tasks	47
10	Help in case of breakdowns.....	49
10.1	Safety instructions	49
10.2	Troubleshooting	50
11	Guarantee, warranty	52
12	Recurrent inspection	53
13	Measures in case of accidents	58
13.1	Proper reaction in case of danger situations.....	58
14	Notes	59

1 Declaration of EC Conformity

We hereby declare that this machine, in all its available technical versions, complies with the regulations of Machine Directive 2006/42/EG and with all directly connected standards.

The safety instructions and operating instructions delivered here are valid for this machine.

This machine may not be changed technically. Any change that has not been coordinated with us will make this declaration invalid.

It is forbidden to operate the machine without the belonging protecting devices, because it will no longer comply with the EC directives and because it will lead to a higher risk of injury.

Name and address of the person authorized to compose the technical documentation:

St. Georgen am Fillmannsbach, 2015

Karl Binderberger

CEO / Geschäftsführer

Binderberger Maschinenbau GmbH


Fillmannsbach 9


AT-5144 St. Georgen am Fillmannsbach


2 Safety instructions


2.1 Meaning of symbols and hints

Please observe the meaning of the symbols and hints illustrated hereafter. They are classified according to danger levels and comply with ISO 3864-2.







DANGER	
	<p><i>Points to an immediately threatening danger.</i></p> <p><i>Disregarding this information may lead to death or to most severe injuries (invalidity).</i></p>

WARNING	
	<p><i>Points to a possible danger situation.</i></p> <p><i>Disregarding this information may lead to death or to most severe injuries (invalidity).</i></p>

ATTENTION	
	<p><i>Points to a possible danger situation.</i></p> <p><i>Disregarding this information may lead to death or to small / medium injuries.</i></p>

ADVICE	
	<p><i>Points to general information, useful operating instructions and handling recommendations, which however do not influence the safety and health of the personnel).</i></p>

2.2 Meaning of icons

	<i>Carefully read the operating instructions before starting up the machine!</i>
	<i>Always wear ear protection and eye protection during operation!</i>
	<i>Always wear steel-toed safety shoes during operation!</i>
	<i>The machine may be operated by a single person only!</i>
	<i>Trip hazard!</i>
	<i>Danger of injury from slipping!</i>
	<i>Beware of hot materials!</i>
	<i>Danger of unauthorized machine start!</i>
	<i>Lubrication spot</i>

2.3 General safety instructions

This machine may only be operated by persons who have been trained, instructed and authorized. These persons must be familiar with the operating instructions and must act accordingly. The competences of the operating personnel must be determined clearly.

Apprentice personnel may only start working with the machine while being supervised by an experienced person. The completion of successful instruction must be confirmed in writing.

2.4 Proper use

The forest cranes have been designed and built exclusively for forestry use: lifting and transporting logs and trunks. Any use beyond this purpose is not permitted. In case of any personal injuries and damages resulting from improper use, the responsibility lies with the operator of the machine, not with the producer!

Proper use also includes reading this operating manual and adhering to all information contained here, especially adhering to the safety instructions. Proper use also includes the execution of all inspection and maintenance tasks within the prescribed time intervals.

The forest cranes may be operated with various load handling devices (grapples). These types of grapples are permitted:

- Wood grapple
- Dung grapple
- Shell grapple
- Brushwood grapple
- Round bale grapple
- Energy wood gripper
- Splitting gripper

ATTENTION

Operating other load handling devices than wood grapples (see the directives on proper use), may require additional safety devices, like load control valves!

2.5 Required operator qualification

Operating this machine does not require special knowledge from the fields of machine engineering or electric engineering. The operator must however be at least **18 years** old. Before his first use of the machine, the owner of the machine must train and instruct him accordingly. For working with the machine, protecting shoes and tightly fitting clothes are required.

If the operator wants to execute maintenance and repair work, he must have the required technical knowledge.

2.6 Technical modifications to the machine

For safety reasons, the operator is not authorized to carry out technical modifications to the machine. This is also true for welding work on supporting parts. All planned technical changes must be authorized beforehand in writing by manufacturer Binderberger GmbH.

Only use original spare parts / original wear parts / original accessory parts – these parts have been designed especially for the machine. Using parts from other sources will not guarantee that they have been designed and manufactured according to the occurring stress and the required safety level.

Parts and optional equipment which have not been delivered by us also have no approval from our side for use with the machine.

3 Description of the machine

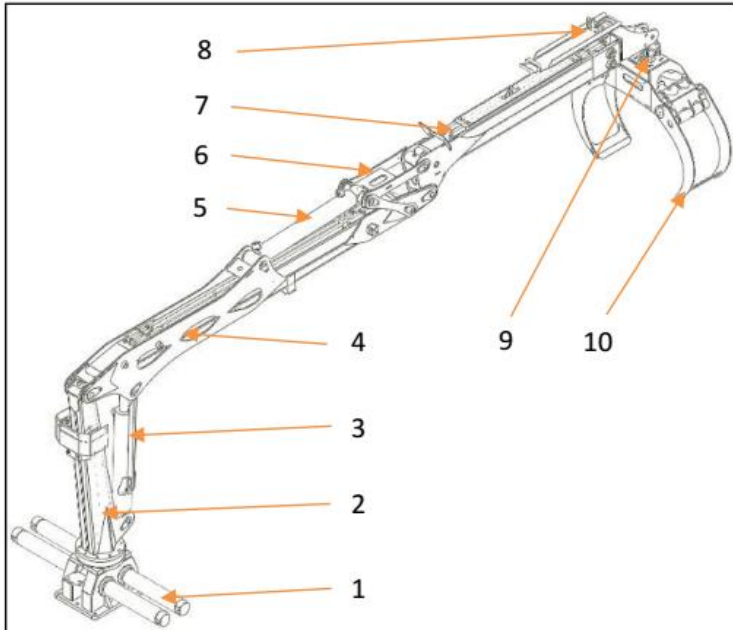
3.1 Operating mode

FK type forest cranes are machines for attachment to a tractor or to a timber trailer. This device is operated with hydraulic pressure. Hydraulic supply may come from the tractor or from an individual aggregate.

The control valves system offers the execution of various operating functions:

- Operating the rotating device
- Lifting / lowering the main lifting arm
- Lifting / lowering the articulated arm
- Extending / retracting the telescopic arm (depending on model)
- Turning the rotator
- Opening / closing the grapple
- Lowering / lifting the supporting legs (depending on model)

3.2 Overview



3.3 Machine details

Item	Description
1	Rotating device
2	Crane pillar
3	Main cylinder
4	Main arm
5	Articulated cylinder

Item	Description
6	Toggle lever
7	Articulated arm
8	Telescopic arm
9	Rotator
10	Grapple

3.4 Technical data

Characteristic	FK-5300-1	FK-6700-1
Max. outreach	5.30 m	6.70 m
Operating pressure	190 bar	175 bar
Crane rotating range	360°	360°
Telescopic extension	-	1.30 m
Rotating cylinders	4 pcs.	4 pcs.
Crane torque	10 kNm	12 kNm
Lifting capacity	5.30 m: 570 kg	6.70 m: 700 kg
Own weight	620 kg	750 kg
Supporting feet	hydraulic	hydraulic

Characteristic	FK-7000L	FK-7000S	FK-8000
Max. outreach	7.00 m	7.00 m	8.00 m
Operating pressure	190 bar	210 bar	210 bar
Crane rotating range	380°	380°	380°
Telescopic extension	1.40 m	1.40 m	2.00 m
Rotating cylinders	4 pcs.	4 pcs.	4 pcs.
Crane torque	22 kNm	22 kNm	22 kNm
Lifting capacity	7.00 m: 820 kg	7.00 m: 940 kg	8.00 m: 720 kg
Own weight	1,200 kg	1,200 kg	1,280 kg
Supporting feet	hydraulic	hydraulic	hydraulic

3.5 Table of lifting capacities


This table shows the lifting capacities of each crane type at the grapple attachment – without attached rotator and grapple!

Actual distance from pillar	FK-5300-1	FK-6700-1	
3 m	700 kg	1,050 kg	
4 m	590 kg	915 kg	
5 m	580 kg	850 kg	
5,30 m	570 kg		
6 m		750 kg	
6,70 m		700 kg	

Actual distance from pillar	FK-7000L	FK-7000S	FK-8000
3 m	1,950 kg	2,200 kg	1,950 kg
4 m	1,400 kg	1,500 kg	1,450 kg
5 m	1,150 kg	1,330 kg	1,150 kg
6 m	950 kg	1,000 kg	950 kg
7 m	820 kg	940 kg	820 kg
8 m			720 kg

4 Transporting the machine

4.1 Safety instructions concerning transport

WARNING	
	<p style="text-align: center;"><u>Danger of injury during transport!</u></p> <ul style="list-style-type: none">• Make sure that no persons stay within the danger zone and that a sufficient safety distance is kept at all times!• If the machine is transported in a slanting position, lubricants may escape! Direct skin contact will cause chemical burns!• Pending loads may fall down and thus cause danger to life – never stay underneath pending loads!• The machine may only be lifted using the designed suspension points!

4.2 Crane transport on private and public roads

When driving on public roads you must comply with all legal requirements!


- The complete lighting system and the reflectors of the carrier vehicle must be clean.
- During transport, the grapple may not hang freely, but must be supported firmly by the vehicle or by the load.
- Always select your driving speed according to the road conditions. It is essential to protect the forest crane from hard shocks and percussions, because they are likely to damage the linkage system.
- Pay attention to the reduced steering ability because of the high overall weight of the loaded vehicle.
- Before passing underneath bridges, verify the vehicle for proper overall height.

4.3 Storage


- Proper parking before longer periods of inactivity will support safe operation and the resale value of the crane.
- Retract all hydraulic cylinders, otherwise there is a danger of surface rust.
- Clean the forest crane thoroughly and remedy damaged spots of the paint layer.
- Regrease the forest crane at all lubrication points.
- Areas which cannot be covered with a paint layer or be regreased should be coated with a thin layer of lubricant.
- Clean and dry all hydraulic couplings and hoses.
- Reduce the pressure inside the cylinders.
- Store the forest crane in a cool and dry place.

5 Installing the machine


5.1 Safety instructions concerning machine installation

WARNING	
	<p style="text-align: center;"><u>Danger of injury from improper installation of the machine!</u></p> <ul style="list-style-type: none">• Always check the machine for transport damage before installing it!• Install the machine on levelled and stable ground only!• If the forest crane is equipped with supporting legs: Apply them!• Make sure that no persons can be endangered by installing the machine!• When installing machine connections, cables, hoses and pipes, make sure not to create any tripping points!• Operate the machine only while in immaculate condition!• Never couple or uncouple pipes and hoses which are under pressure!• Pipes and hoses which are under pressure may not be installed inside the operator's cab! If this cannot be avoided, you must take proper precautions to protect the operator from injury in case a hose or pipe will burst!

5.2 Duties before starting operation

A D V I C E	
	<p style="text-align: center;"><u>Execute these steps before starting operation:</u></p> <ul style="list-style-type: none">• Crane installation and all couplings must be performed according to the directives.• Before every new start of operation, you must check all hoses, couplings, bolts and screw connections for tight fit.• In case of ambient temperatures below 0° C / 32° F let the machine run for some 10 minutes in idle operation, without material.

5.3 Important startup information

	<p style="text-align: center;"><i>Carefully read these instructions before starting up the machine!</i></p>
---	--

- If the crane has no individual hydraulic oil supply, **make sure** that the return pipe is being connected to a **pressure-less return hose!**
- Always couple the return pipe first, and afterwards the pressure pipe! Coupling with a double-acting control valve can not be executed pressure-less, and may cause damage to the control valves block!
- Never execute any hydraulic function at the control valves block (including inadvertent operation), before the return pipe has been connected to the tractor. Disregard may cause severe damage to the control valves block!

5.4 Installing the forest crane

- If you want to attach the crane to the tractor's three-point linkage, you may first fasten the crane to a three-point stand.
- The crane may also be attached to the tractor's rear axle, using brand-specific attachment equipment. This work should be carried out by the tractor manufacturer or by an authorized workshop of the tractor manufacturer.
- The assembling technician must have sufficient experience in installing forest cranes.
- When operating the crane in forest areas, it is recommended to install the crane on a timber trailer, which will provide smooth and secure driving.

5.5 Installing the control valves block

- Install the control valves block in a way that only the control levers will be inside the driver's cab.
- The control valves block itself must be attached tightly to the tractor!
- The control valves block must be secured against loosening during operation or from shocks during driving on rough terrain.
- All control levers must be installed in vertical position.
- If sufficient space is available, install the levers in a way that keeps the driver's chair rotatable, so the operator can select the best working position.
- All levers must be situated and protected in a way that will prevent inadvertent actuation.
- You may bend all levers slightly, if this offers a better working position. Disassemble the levers from the valves block before bending them.
- To bend levers more than 45°, heat them up beforehand.

5.6 Connection with the hydraulic system

Before you connect the forest crane to the tractor's hydraulic system, make sure that the oil types of crane and tractor will match. New forest cranes have performed a test run with hydraulic oil type **HVLP 46**. This oil type is suitable for hydraulic systems operating under a wide range of temperatures. The crane is already filled with oil at delivery.

Coupling:

It is recommended to couple the crane's pressure hose to a **single-acting** coupling of the tractor's hydraulic system; the return hose will be directed to a filter unit and on to the hydraulic tank.

The crane may also be coupled to a **double-acting** hydraulic interface. In this case, the hoses will be connected to the corresponding couplings. In this situation, you must verify the proper direction of the double-acting valves. Pressure will be delivered to the pressure input of the crane's control valves block. Consult the operating instructions of the hydraulic aggregate and find out how the double-acting connections are operating. Make sure that all quick couplings have been connected properly and tightly.

ATTENTION



Make sure that no pressure exists at the return pipe of the control valves block! Otherwise the valves may be damaged and the crane can not be operated!

Make sure that the complete hydraulic system is kept clean at all times!

Carefully execute one hydraulic function, to see whether pressure is available at the proper hose.

ATTENTION: Do not lift any object or reach a limit position during this test!

Carry out all available movements and verify whether all hoses can move easily and are not exposed to strain!

Protecting the hoses:

All hoses must be installed in a protected position, secured against chafing, twisting and jamming. If hoses must run through the operator's cab, a special shielding must be installed, which will secure the operator against any injury from a bursting hose (lashing hose, escaping hydraulic oil).

Coupling to a closed system (like the John Deere constant pressure system):

Please contact the manufacturer to obtain proper installation instructions and a list of required components.

5.7 Electric supply


Only use the cables delivered together with the forest crane.


Connect the 3-pin plug / 7-pin plug to the tractor.

Work on electric devices is only permitted to persons with the required professional competence!

6 Operation

6.1 Safety instructions concerning operation

DANGER	
	<p style="text-align: center;"><u>Danger of injury from getting caught or dragged in by moving machine components!</u></p> <ul style="list-style-type: none">• Always keep a sufficient safety distance towards moving machine components!• Pending loads may fall down and thus cause danger to life – never stay underneath pending loads!

WARNING	
	<p style="text-align: center;"><u>Danger of injury during operation!</u></p> <ul style="list-style-type: none">• No other persons are allowed within the danger zone – a safety distance of at least 25 meters must be kept at all times!• Get familiar with the operating elements for the forest crane before using it!• The machine must be placed on even and solid ground!• The parking brake of the tractor must be active during crane operation!

ATTENTION



Stumbling / tripping on objects lying about!

- Remove all objects that are not part of the machine from its vicinity.

ATTENTION



Danger of injury from missing personal protecting equipment!

- Always wear protecting gloves and steel-toed safety shoes.

ATTENTION



Danger of injury during operation!

- The machine must be operated by a single person only!
- Make sure that no further persons stay within the machine area.
- Always keep the maximum permitted lifting loads.
- Never lift persons with the crane!

6.2 Important instructions concerning operation

ADVICE



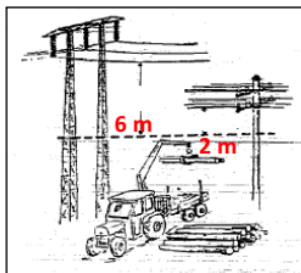
- The operator always has to take care that no unauthorized persons stay within the working area of the machine.
- Get information about the proper measures in case of malfunctions before you start up the machine.
- Execute all tasks listed in chapter “Duties before starting operation” before you start up the machine.
- After turning the machine off, always execute the tasks listed in the next chapter “Machine shutdown”.
- Before the operator leaves the machine unattended, he must turn it off and secure it against inadvertent restart.

Operation underneath power supply lines:

It is mandatory to keep the safety distances during work underneath power supply lines. No part of the machine may ever get closer to power lines than indicated below.

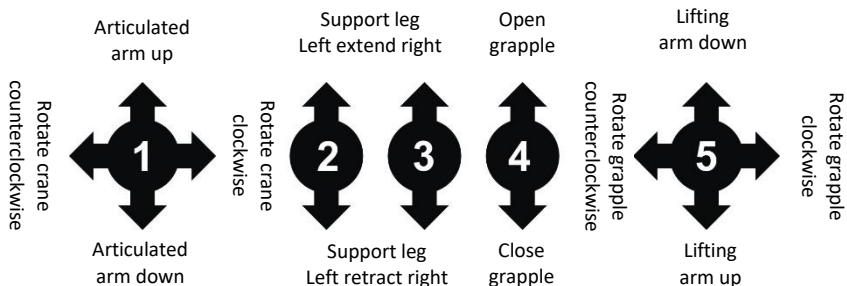
Underneath low voltage lines: at least 2 meters

Underneath high voltage lines: at least 6 meters



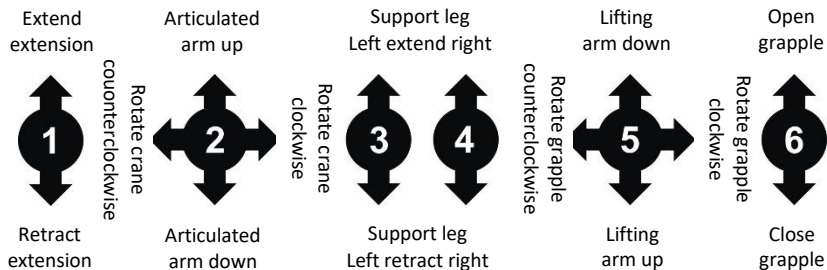
6.3 Control lever positions

Version without telescopic arm: Execute functions with levers 1 – 5



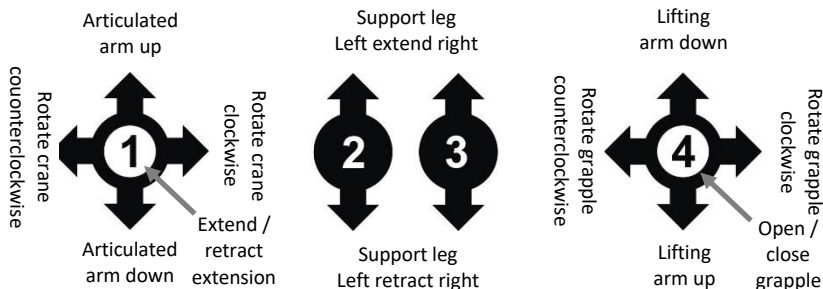
Lever	forward	back	left	right
1	Articulated arm up	Articulated arm down	Rotate crane clockwise	Rotate crane counterclockwise
2	Extend left support leg	Retract left support leg	-	-
3	Extend right support leg	Retract right support leg	-	-
4	Open grapple	Close grapple	-	-
5	Lifting arm up	Lifting arm down	Rotate grapple counterclockwise	Rotate grapple clockwise

Version with telescopic arm: Execute functions with levers 1 – 6



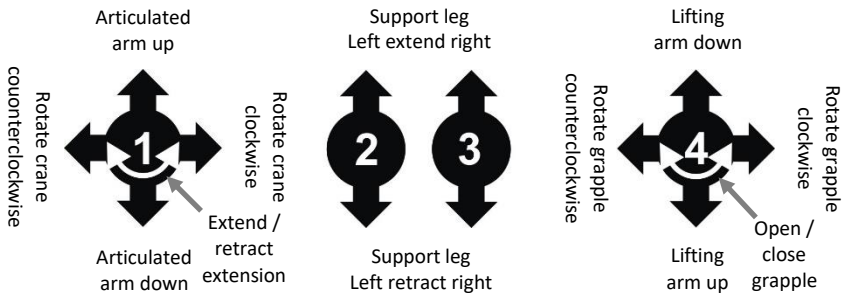
Lever	forward	back	left	right
1	Extend telescopic arm	Retract telescopic arm		
2	Articulated arm up	Articulated arm down	Rotate crane counterclockwise	Rotate crane clockwise
3	Extend left support leg	Retract left support leg	-	-
4	Extend right support leg	Retract right support leg	-	-
5	Lifting arm up	Lifting arm down	Rotate grapple counterclockwise	Rotate grapple clockwise
6	Open grapple	Close grapple	-	-

Version with pushbutton levers: Execute functions with levers 1 – 4



Levier	forward	back	left	right	rotary knob
1	Articulated arm up	Articulated arm down	Rotate crane counterclockwise	Rotate crane clockwise	Extend / retract telescopic arm
2	Extend left support leg	Retract left support leg	-	-	-
3	Extend right support leg	Retract right support leg	-	-	-
4	Lifting arm down	Lifting arm up	Rotate grapple counterclockwise	Rotate grapple clockwise	Open / close grapple

Version with rotary levers: Execute functions with levers 1 – 4



Lever	forward	back	left	right	push button
1	Articulated arm up	Articulated arm down	Rotate crane counter-clockwise	Rotate crane clockwise	Extend / retract telescopic arm
2	Extend left support leg	Retract left support leg	-	-	-
3	Extend right support leg	Retract right support leg	-	-	-
4	Lifting arm down	Lifting arm up	Rotate grapple counter-clockwise	Rotate grapple clockwise	Open / close grapple

6.4 Examination before test operation

- The person to execute test operation must have experience with forest cranes.
- The crane must be positioned on levelled ground. Loading operation is prohibited if the crane / vehicle stands on slanted ground.
- Check the hydraulic system for proper oil level.
- Make sure that all hydraulic hoses can move freely.
- No unauthorized persons are allowed within the operating range of 25 meters.
- Make sure that no obstacles (like cables, pillars ect.) remain within the operating range.
- Make sure that all control levers are in ZERO position.

6.5 Test operation

- Turn the hydraulic circuit ON. Let the oil circulate through the valves block for a couple of minutes.
- Start operating the crane at low performance speed, so all actions will be executed slowly.
- Try every function of the crane, but only execute one single function at a time. Move every cylinder from one end position to the other, in order to deaerate the cylinders. Repeat every movement until they all are performed smoothly.

Deaeration processes must be executed carefully. If a cylinder moves into an end position under full force, the air pressure inside the cylinders may damage the seals.

As long as air is inside a cylinder, the crane movements may be uneven or jogging. A movement may even continue after the control valve has been shut.

Proceed very carefully!

- At the end of test operation, examine all hoses, couplings and pipes.
- If necessary, fill up the hydraulic oil in the tank to the proper level.

6.6 Rehearsing the use of the control levers

Start your training with the tractor running at low level. Operate the crane rotation and the cylinder of the articulated arm with the left hand, and the grapple rotator and the main lifting arm with the right hand. Depending on the type of your control valves block, you also control the grapple functions and the telescopic arm. An experienced crane operator executes several functions simultaneously.

- Get acquainted with the control valves functions. First of all, execute all functions without load. Make sure to avoid any collision of the crane with the tractor's cab and with any other object.
- Get used to executing several functions at the same time. All movement steps should be performed smoothly, which will reduce the wear of the crane. Remember that the distribution of the oil flow to several cylinders at the same time will slow down all movements.
- Actuate the control levers smoothly, avoid fast or jogging switching. Avoiding abrupt movements will improve operational safety and will avoid unnecessary breakdowns and repairs.
- Operate the hydraulic pump at a reduced output level, which will also help avoiding abrupt movements.
- Once you have become familiar with the crane's functions and movements, you may select a suitable output level, enabling efficient operation. But take your time to get acquainted with the system's functions and potentials.

6.7 Working with the forest crane

Before you start regular crane operation, you must execute the same examination as before test operation – for details see chapter “Examination before test operation”.

- During loading operation, the tractor’s parking brake must be activated. It may be necessary to use wheel chocks for the tractor’s wheels.
- If the crane is equipped with support legs, they must be extended. Make sure that the ground is solid and will not sink down.

The load should only be lifted while the telescopic arm is in retracted position. Never lift a load when the arm is completely extended. For a longer service life of the crane and for safety considerations, keep this sequence of loading steps:

- First of all, pull the load closer to the crane by retracting the telescopic arm, then lift the load.

Never start rotating the crane before the load has been lifted completely off the ground. Be especially careful when lifting the load off the trailer platform and swivelling the crane.

- You can lift any load easier, when you start with retracting the telescopic arm, to bring the load closer to the rotation centre.
- Move the load to the unloading spot and release it.

While the telescopic arm is extended, be especially careful to avoid any collision with obstacles.

Avoid loading operation on steep ground. If you must work on slopes, proceed especially carefully – don’t operate the crane at maximum performance. Working on slopes with the crane at a level above the load, there may not be sufficient rotating torque available to keep the load in position. This may even lead to a failure of the pressure limiting valves, the load will be pulled by gravity and the crane might topple.

Never move any crane function fast into its end position!

Never exceed the permitted load values.

Proceed especially carefully if the load is close to the maximum permitted weight.

Consult the chart of “lifting forces” for the maximum permitted loads of every crane type.

Never move the crane rotating device into a limit position under high speed! The load will rock and damage the arm bearings.

Be especially careful when operating close to electric devices. Always keep the required safety distance!

6.8 Operation under special environmental conditions

Never operate the crane at an ambient temperature below -25°C / -13°F .

Remember that hydraulic seals will wear faster at low temperatures, and that the hoses will be prone to damage. At the same time there is an increasing danger of cracks at steel components due to brittleness caused by the cold temperatures.

- Before starting operation at low ambient temperature, let the hydraulic oil circulate for some 10 minutes.
- Execute every single function in both directions, to achieve smooth seals.
- Only afterwards you may speed up operation.

In case of extremely hot weather, make sure that the oil will not overheat. Excess oil temperature ($> 80^{\circ}\text{C}$ / 176°F) will reduce the service life of the hydraulic oil and will damage the seals.


6.9 Daily examination


Make a visual examination of the forest crane. Determine all faults and defects that might influence the safety of the machine.


- Make sure that the complete hydraulic system is leak-tight.
- Make sure that all hoses are in immaculate condition.
- Examine the bolts and nuts on the arm components, the grapple attachment, the crane attachment to the tractor / the timber trailer, and the cylinder bearings. Regrease the crane if necessary. Check every single crane function by moving once into every limit position.

7 Machine shutdown

7.1 Safety instructions concerning shutdown

D A N G E R	
	<p style="text-align: center;"><u>Danger of injury from getting caught or dragged in by moving machine components!</u></p> <ul style="list-style-type: none">• After turning the machine OFF wait until all moving components have come to a standstill• Always keep a sufficient safety distance towards moving machine components!

W A R N I N G	
	<p style="text-align: center;"><u>Danger of injury during shutdown!</u></p> <ul style="list-style-type: none">• The operator always has to take care that no unauthorized persons stay within the working area of the machine and that a sufficient safety distance from the moving machine components is kept!• Never stay underneath floating loads, as they might fall down!• Nobody is allowed to stay between machine and tractor!

W A R N I N G	
	<p style="text-align: center;"><u>Danger of injury from machine start by unauthorized persons!</u></p> <ul style="list-style-type: none">• After shutdown, secure the machine against unauthorized restart!

7.2 Shutting down the machine drive

Uncoupling from a tractor:


- Turn the tractor's engine / hydraulic drive off.
- Relieve the pressure from all hydraulic functions of the machine: Put all control levers into ZERO position.
- Now you can uncouple the hoses from the tractor's couplings.


Uncoupling from a timber trailer:


- Turn the tractor's PTO drive off and secure it against restart.
- Relieve the pressure from all hydraulic functions of the machine: Put all control levers into ZERO position.
- Now you can uncouple the PTO shaft from the tractor.


8 Repair

8.1 Safety instructions concerning repair

DANGER	
	<p style="text-align: center;"><u>Danger of severe injury</u> <u>by starting the drive during repair work!</u></p> <ul style="list-style-type: none">• Turn the machine OFF!• Secure the machine against restart!

ATTENTION	
	<p style="text-align: center;"><u>Danger of slipping because of oil residue during</u> <u>maintenance work (oil exchange)!</u></p> <ul style="list-style-type: none">• Use a suitable collecting bin.• Remove spilled oil immediately!

ATTENTION	
	<p style="text-align: center;"><u>Danger of injury: Scalding</u> <u>on hot machine components and media!</u></p> <ul style="list-style-type: none">• Before starting any repair work let the machine cool down to ambient temperature!

ATTENTION	
	<p style="text-align: center;"><u>Danger of chemical burns from contact with lubricants!</u></p> <ul style="list-style-type: none">• Avoid skin and eye contact!• Do not swallow or aspirate!• Use proper protecting equipment (protecting gloves, eye protection).

8.2 Important instructions concerning repair

ADVICE



- **Immediately replace all faulty machine parts.**
- **Use original spare parts only.**
- **Make sure that suitable collecting bins are available for any groundwater endangering media (oils, cooling agents).**
- **Use the specified operating media only.**
- **Self-securing bolts and nuts must always be replaced.**
- **All operating media which cannot be reused must be disposed according to the valid environmental regulations.**
- **Severe damage to the machine can result when installing wrong spare parts or wear parts.**
- **Welding work causes fire hazard. Always have a fire extinguisher at hand.**
- **Improperly installed cables may cause cable meltdown and cable fire.**
- **Never release the machine for operation without all safety installations provided by the manufacturer available.**
- **It is strictly forbidden to remove safety instructions and safety installations from the machine.**
- **If an information label on the machine is no longer legible you must replace it.**
- **Always observe the warning instructions attached to the machine. They help avoiding danger situations.**
- **Do not execute repair work if you do not possess the required qualification.**

8.3 Instructions for working on electric equipment

As a matter of principle, any work on electric equipment may only be carried out by skilled electricians.

- Review electric equipment on a regular basis.
- Fasten any loose connection.
- Replace damaged cables and wires immediately.
- Never clean electric equipment with water or other liquids!

8.4 Instructions concerning work on hydraulic equipment

Work on the hydraulic equipment of the machine may on principle be executed by skilled technicians for hydraulic systems only.

- Before starting any work on hydraulic systems, relieve the pressure from the hydraulic system and all its components.
- Make sure that suitable collecting bins are available for any groundwater endangering media (oils, cooling agents).


8.5 Duties before ending the repair work


After the repair steps have been executed and before machine restart, these tasks must be observed:


- Verify whether all bolt connections loosened before have been retightened properly.
- Verify whether all protecting devices, covers, container lids etc. have been installed properly again.
- Make sure that all used tools, materials and further equipment has been removed from the working area again.
- Clean the working area and remove / clean up any spilled liquids and similar materials.
- Verify the function of all safety devices. Never release the machine for operation as long as any safety device is not functioning properly.
- Execute a test operation run with a functional control of all repaired components.
- As long as you have not finished the repair work, you must secure the machine against inadvertent restart.
- The use of open flames and smoking is prohibited.

9 Maintenance

9.1 Safety instructions concerning maintenance

DANGER	
	<p style="text-align: center;"><u>Danger of severe injury</u> <u>by starting the drive during maintenance work!</u></p> <ul style="list-style-type: none">• Turn the machine OFF!• Secure the machine against restart!

ATTENTION	
	<p style="text-align: center;"><u>Danger of slipping because of oil residue</u> <u>during maintenance work (oil exchange)!</u></p> <ul style="list-style-type: none">• Use suitable collecting bins.• Remove spilled oil immediately!

ATTENTION	
	<p style="text-align: center;"><u>Danger of injury: Scalding</u> <u>on hot machine components and media!</u></p> <ul style="list-style-type: none">• Before starting any repair work let the machine cool down to ambient temperature!• Keep easily flammable materials away from hot surfaces!

ATTENTION



Danger of chemical burns from contact with lubricants!

- Avoid skin and eye contact!
- Do not swallow or aspirate!
- Use proper protecting equipment (protecting gloves, eye protection).

ATTENTION



Danger for the environment!

- Make sure that no oil can escape into the environment.
- Spilled oil will contaminate surface water and ground water!

9.2 Cleaning

Remove all dirt and residue from the machine after every operation run and before maintenance work!

After you cleaned the crane with water, you must regrease it!

9.3 Lubrication

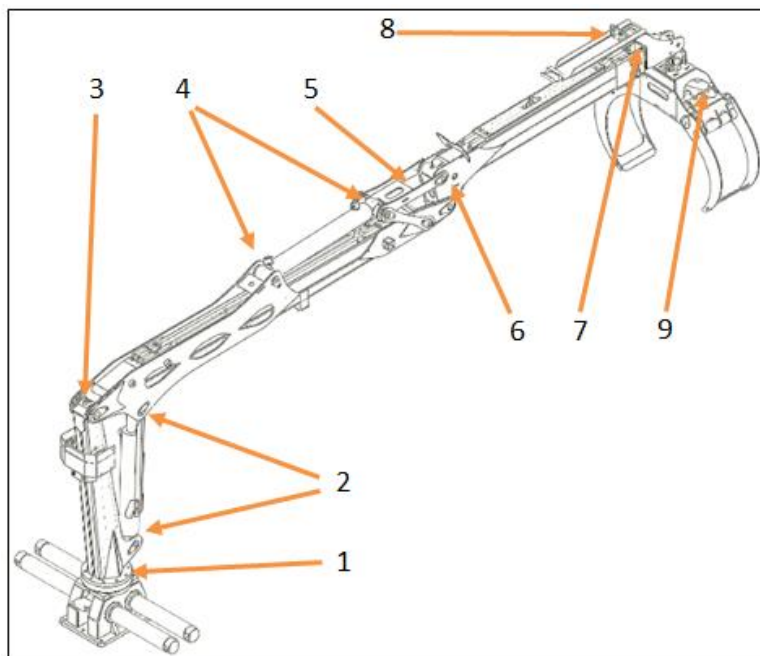
See the illustration and the chart below for complete lubrication. It is advisable to relubricate at short intervals instead of applying huge quantities of lubricant at longer intervals. Damaged grease nipples must be replaced.

Apply high-quality lubricants only. Never use grease types with solid additives, like molybdenum sulphide (MoS_2). They may speed up the wear of the bearings.

Do not apply vegetable oils – they will harm seals and valves quickly.

Synthetic oil (environmental-friendly) may be a good alternative.

Be aware: If the lubrication channel of an axle stud or of the housing of a bearing is clogged, and the lubricant can not pass, you must stop operation, and first clean the lubrication channel!



Pos	Lubrication spot	FK-5300-1	FK-6700-1	Interval
1	Crane rotator, upper bearing	2x	2x	8 h
2	Joint spots of the lifting cylinder	2x	2x	
3	Bearing between pillar and main arm	1x	1x	
4	Joint spots of the articulated arm's cylinder	2x	2x	
5	Joint spots of the articulated arm	5x	5x	
6	Telescopic arm cylinder			
7	Coat the extension arm periodically slightly with oil, using a brush		x	
8	Rotator joint spots	2x	2x	
9	Grapple	10x	10x	
	Check the oil level for the rotating device	x	x	50 h
	Oil exchange for the gearbox of the rotating device	Gear oil type SAE 80/90		250 h or at least 1x / year

Pos	Lubrication spot	FK-7000L FK-7000S	FK-8000	Interval
1	Crane rotator, upper bearing	2x	2x	8 h
2	Joint spots of the lifting cylinder	2x	2x	
3	Bearing between pillar and main arm	1x	1x	
4	Joint spots of the articulated arm's cylinder	2x	2x	
5	Joint spots of the articulated arm	4x	4x	
6	Telescopic arm cylinder			
7	Coat the extension arm periodically slightly with oil, using a brush	x	x	
8	Rotator joint spots	2x	2x	
9	Grapple	10x	10x	
	Check the oil level for the rotating device	x	x	50 h
	Oil exchange for the gearbox of the rotating device	Gear oil type SAE 80/90		250 h or at least 1x / year

9.4 Oil and filter exchange at the additional tank (in case of individual supply)

The first oil change is due after 50 operating hours.

Afterwards you must change the oil after every 250 operating hours, but at least once a year.

Use hydraulic oil of class HVI 46 or equal quality only.

Always replace the oil filter when changing the oil.

9.5 Replacing the hydraulic hoses

Replace all hydraulic hoses not later than after 5 years of use.

If a hydraulic hose shows evident damage, it must be replaced immediately, because otherwise it may cause severe injuries and grave damage!

9.6 Maintenance schedule

Regular maintenance is the best way to achieve efficient and economic operation of your forest crane. The crane has already been tested and adjusted carefully by the manufacturer.

Component	Task after interval in hours		
	10 h	50 h	250 h
General	All bolts and nuts must be tightened strongly Especially important with new cranes!		
	Examine whether joint bolts are without play		
	Examine whether joint bolts are tightened well		
	Examine safety equipment and guides		
	Examine cylinders, hoses and couplings for leaks. Replace damaged components!		
	Check steel components for cracks and defective devices!		
Rotating device	Retighten the fastening bolts	Examine the support bearings of the toothed racks	Examine the sliding bearings Lateral play evident?
Cylinders			Examine all control valves and bearings of the hydraulic cylinders
Telescopic arm			Examine the sliding bearings for play
Tools			Attachment of the grapple to the rotator
Support system			Examine all control valves and bearings of the hydraulic cylinders
Pendulum brake (optional)			Examine the friction lining

Checking the sink rate for the lifting arms system

Leaks within the hydraulic components can cause the lifting arm system to sink without actuation. The sink rate, measured at the far end of the lifting arm system, must not exceed 5% of the complete arm length within one minute.

To examine the sink rate, the crane must hold the maximum permitted load at maximum possible hydraulic extension (without manual arm extensions).

Checking the wear of the bearings

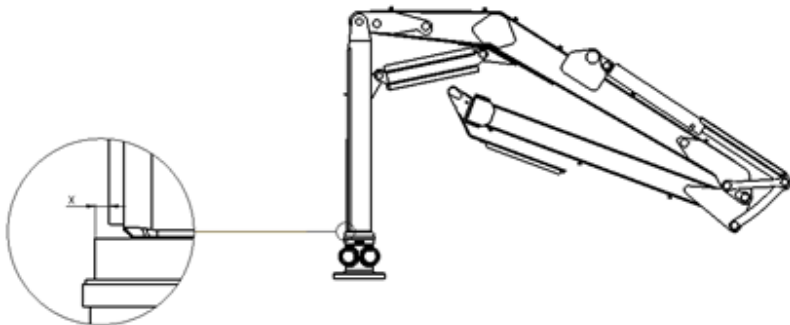
First of all, lift the crane arms with attachments off the ground.

Measure and write down distance "X" between the crane pillar and the surface of the housing of the crane's rotating device.

Then lower the crane arms with attachments onto the ground, then keep pressing the arm down with suitable force.

Measure and write down distance "X" between the crane pillar and the surface of the housing again.

Maximum permitted difference between both values is 2.6 mm / 0.1 inches.



9.7 Maintenance and repair tasks

Remember: Early detection of malfunctions will help avoiding accidents.

Keep utmost cleanness to avoid damage to the hydraulic system.

Purchase spare parts at your dealer or directly from manufacturer Binderberger GmbH.

How to adjust the play for the telescopic arm

- The first examination of the telescopic arm is due after 25 operating hours, afterwards at intervals of 250 operating hours.
- If a play between the articulated arm and the telescopic arm becomes evident, you must improve the position of the synthetic sliding blocks (2 on the left side, 2 on the right side) with their adjustment screws:
- Take the securing bolt out, then turn in the adjusting nuts in steps of quarter turns.
- Always adjust the left side and right side adjustment nuts in the same degree.
- Do not tension the sliding blocks too much, because the extension movement might become stiff.
- Install the securing nut again.
- Use a brush to apply a layer of grease to the sliding surfaces.

Instructions for welding work (repair or retrofitting)

- Use original spare parts only!
- Welding work must be carried out by an experienced welder only.
- If an experienced welder is not at hand, you must employ a suitable service workshop.

How to replace the bushes of sliding bearings

- Use original spare parts only!
- If an experienced technician is not at hand, you must employ a suitable service workshop.

How to replace the sealing kit of a hydraulic cylinder


- Use original spare parts only!
- If an experienced technician is not at hand, you must employ a suitable service workshop.


How to adjust the (optional) pendulum brake of the rotator joint


- The first examination of the pendulum brake is due after 25 operating hours, afterwards at intervals of 250 operating hours.
- Rotate the crane to one side, then stop the swivelling, to make the grapple swing intensely.
- If the grapple swings left and right more than 2 times before coming to a halt, the pendulum brake must be readjusted.
- Change the setting by turning the setting screw of the brake block.
- If the wear pad of the brake block has become thinner than 2 mm / 0.08", the brake pad must be replaced.
- Make sure that the pad surface is always free of grease.

10 Help in case of breakdowns

10.1 Safety instructions

DANGER	
	<p style="text-align: center;"><u>Danger to life by starting the drive after a breakdown occurred!</u></p> <ul style="list-style-type: none">• Turn the machine OFF!• Secure the machine against restart!

ATTENTION	
	<p style="text-align: center;"><u>Danger of injury: Scalding on hot machine components and media!</u></p> <ul style="list-style-type: none">• Before starting any repair work let the machine cool down to ambient temperature!• Keep easily flammable materials away from hot surfaces!

ATTENTION	
	<p style="text-align: center;"><u>Danger of chemical burns from contact with lubricants!</u></p> <ul style="list-style-type: none">• Avoid skin and eye contact!• Do not swallow or aspirate!• Use proper protecting equipment (protecting gloves, eye protection).

10.2 Troubleshooting

Fault	Possible causes	Recommended measures
All movements of the crane are executed too slow	Hydraulic pump runs too slow	Control / adjust the pump speed
	Not enough oil	Refill oil, deaerate system
	Pump is damaged	Repair or replace the pump
	Oil hoses are leaking or clogged / clamped	Examine all hoses and couplings
	Oil is too viscous	Use the correct oil type (with proper viscosity)
Movements in DOWN direction are too slow	Oil hoses are leaking or clogged / clamped	Examine all hoses, couplings and the protecting spirals around the hoses
	Oil is too viscous	Use the correct oil type (with proper viscosity)
	If installed: Fault at excess flow cut-off valve	Replace the excess flow cut-off valve
Crane movements are too fast	Pump is too powerful or runs too fast	Use a suitable pump, set the correct working speed
	Bad handling of control valves	Shift the levers more smoothly and carefully
The main lifting cylinder is sinking by itself	Fault at control valve	Repair or replace the control valve
	Fault at cylinder or at hoses	Examine the cylinder, replace hoses if necessary

Fault	Possible causes	Recommended measures
Crane movements appear powerless	Not enough oil	Refill oil, deaerate system
	Pump is damaged	Repair or replace the pump
	Pressure limiter valve or secondary overflow valve is damaged	Replace pressure limiter valve or secondary overflow valve
	Fault at control valve	Repair or replace the control valve
	Fault at cylinder or at seal rings	Examine the cylinder, replace seals if necessary
Crane performs jogging movements	Air inside the hydraulic system	Check the oil level, refill, deaerate the system
		Check the supply piping for clamped spots and leaks
	Pump is damaged	Repair or replace the pump
A control piston of the valve unit is jammed	Tightening screws of the valve are too tight	Examine the screws for proper torque = 50 Nm
	The valve does not rest on a levelled ground	Make sure that the valve support is levelled
	The tensioning rod of the valve is tightened too much	Examine the tensioning rod for proper torque: Ex 38 control: 40 Nm HCD control: 35 Nm

If a malfunction cannot be repaired with the measures above:

Please contact your dealer, he will organize further assistance!

11 Guarantee, warranty

For the forest crane, manufacturer Binderberger Maschinenbau GmbH grants a guarantee period of 12 months and a warranty period of 24 months from the date of the invoice (please file the original invoice!)

Warranty covers parts with defects which can be attributed to material or production faults.

Defective parts will be replaced free of charge – the exchange must be performed by an authorized specialist. If safety and instruction labels have been damaged, remember to order and to attach new ones.

Warranty claims are excluded in case of

- Damage that has resulted from improper treatment or operation.
- Transport damage – any transport damage must be reported to the forwarder immediately after receipt of the shipment.
- Retrofitting or changes to the machine, or the use of unauthorized or non-standard parts for servicing and maintenance.

12 Recurrent inspection

Legal basis: DGUV Directive 52 (formerly BGV D6); Translation by Binderberger

§ 25: Examination before first startup and after profound retrofitting

- (1) The owner / operator is obliged to organize the examination by an authorized expert before the initial startup of a power-driven crane, and before the first startup after profound retrofitting. This obligation is also true for hand-driven or partly power-driven cranes with a lifting capacity of more than 1.000 kgs, and for tower cranes.
- (2) Examination before initial startup according to paragraph (1) comprises proper erection, assembly and readiness for operation.
- (3) Concerning cranes according to § 3a, section 3, the examination comprises pre-examination, design examination and acceptance test.
- (4) Examination before initial startup according to paragraph (1) is not required for cranes which have been delivered in ready-for-operation condition, and which possess evidence of a type approval or a declaration of EU conformity.

§ 26: Recurrent inspections

- (1) The owner / operator is obliged to organize the examination by a technical expert of his crane/s according to their operational conditions and work conditions as required, but at least once a year. During this examination, the test instructions from the manufacturer's operating manual must be considered.
- (2) Concerning tower cranes, the owner / operator is obliged in addition to paragraph (1), to have the crane examined by a technical expert after every new erection and after every retrofitting.
- (3) The owner / operator is obliged to have the crane types listed hereafter examined every 4 years by an authorised expert. This examination substitutes the examination by a technical expert according to paragraph (1)
 - Power-driven tower cranes
 - Power driven vehicle cranes
 - Mobile power-driven derrick cranes
 - Truck-mounted cranes

- (4) In addition to paragraph (3), the owner / operator is obliged to have the crane types listed hereafter examined by an authorised expert. This examination substitutes the examination by a technical expert according to paragraph (1):
- Power-driven tower cranes after 14 and after 16 years of operation, afterwards every year;
 - Power driven vehicle cranes after 13 years of operation, afterwards every year.
- (5) Paragraph (3) is not valid for loading cranes mounted on trucks.

§ 27: Test book

- (1) The owner / operator is obliged to have the results of the examination according to § 25 and § 26 written down in a test book.
- (2) The owner / operator is obliged to confirm that he has taken notice of determined faults and of the need to remedy these faults. It is also his obligation to remedy these faults. If doubts remain about startup, restart or continued operation of the crane because of the kind and scope of the faults, it is his obligation to put the crane out of service. The crane may not be used again before the faults have been remedied and before eventually due examinations have been organized by him.
- (3) On request, the owner / operator must present the test book to the technical authorities. Concerning mobile cranes, he must keep a copy of the most recent test report of the technical expert and of the authorized expert with the crane.
- (4) The owner / operator must induce the authorized expert for the recurrent inspection of tower cranes according to § 26, sections (2) and (3), to pass the test report instantly to the liability insurance competent for this employer.

VSG 3.1 §18 (Accident Prevention Directive for Technical Work Equipment):

- (1) Cranes must be inspected, depending on their operational conditions and work conditions by a technical expert / a qualified person, as required, but at least once a year. Cranes for agriculture (and forestry) must be inspected at least every 2 years.

Implementing regulation for paragraph (1):

1. "Cranes" are defined here as lifting machines, which can lift loads and can additionally move them in one or several directions.
 2. "Agricultural cranes" are defined here for example as dung cranes and cranes inside barns.
- (2) Power-driven cranes must be examined by an authorized expert / a qualified person before the initial startup and before the first startup after profound retrofitting. This obligation is also true for cranes with a lifting capacity of more than 1.000 kgs. Examination before initial startup is not required for cranes which possess evidence of a type approval.

Scope of examination:

Design / construction:

- Welding seams
- Surfaces (rust, ...)
- Locking elements
- Hydraulic pipes and hoses
- Electric cables and connections
- Straightness of the crane arm
- Installation of the control unit
- Lubrication
- Oil level
- Fastening bolts of the rotating gear
- Warning labels (safety distance, ...)
- Operating instructions

Test run

- Pressure limiting system
- Range of movements and limit positions
- Function of the control valve
- Lifting test under permitted load
- Lifting test under excess load
- Control of stable position: Lift the maximum permitted load, then extend the crane arm until the arm system starts sinking. During this process, the supports / wheels must not lift off the ground.

Recurring crane inspection according to DGUV Directive 52 (formerly BGV D6) and according to VSG 3.2, § 16 and § 18

Crane serial number	Name of inspector	Date of inspection

		n / a	okay	Fault existing	Fault remedied	Date
1 Labels						
Crane type label	Completeness					
Crane test book	Durability					
Operating manual	Recognizability					
2 Structural parts						
Drawbar	Fastening status Distortion Cracks Status					
Chassis						
Axle carrier						
Axles						
Support legs						
Stakes & holders						
Crane foot						
Crane pillar						
Main lifting arm						
Articulated arm						
Telescopic extension						
Grapple						
3 Fastening devices						
Plug and bolt connections	Existence Tightness					
4 Drive devices						
Shafts	Fastening Bearing Status					
Joints						
Bearings						
Plugs and related bolt connections						

		n / a	okay	Fault existing	Fault remedied	Date
5	Hydraulic system					
	Hydr. motors, pumps	Function Leak tightness Status Fastening				
	Cylinders					
	Hose connections					
	Pipe connections					
	Filters					
	Valves					
	Sinking rate (max. 2%!)					
6	Control devices					
	Shifting elements	Status, function, smooth movements, auto return to ZERO, labelling				
	Control valves block					
	EHC control system					
7	Protecting devices					
	Protecting gratings	Fastening Status Effectiveness Settings				
	Covers					
	PTO shaft protection					
	Protecting coils for hoses					
8	Safety devices and labels					
	Excess flow cut-off valves	Fastening Status Effectiveness Settings				
	Trailer support legs					
	Min. 2 labels "Risk Zone"					
	Label with position stability diagram					
	Position stability					
	Access ladder					
	Complete crane rotation > 10 – 12 seconds					
8	Public traffic safety					
	Drawbar locking system	Completeness Function Effectiveness Status				
	Braking system					
	Trailer lighting					
	Reflectors					
	Label for permitted top speed					

Date:

Signature:

13 Measures in case of accidents

Take care of a periodic information update concerning the available facilities and means for First Aid.

In case of an accident including injured persons, damage to machines or to buildings / structures you must first provide initial treatment for the injured person, then inform the person in charge as soon as possible.

To alarm the proper ambulance emergency resources, you must pass information about the severity of personal injuries and of damage.

In case of a disaster (fire) leave the machine immediately.

13.1 Proper reaction in case of danger situations

- If the machine shows signs of toppling over, lower the load to the ground immediately.
- All cylinders are double-acting, so they will stop as soon as the grapple touches the ground - Do not open the grapple!
- Never jump out of the vehicle!
- If the arm system starts to sink down because of excess load, try to pull the load towards the crane – do not open the grapple!

Life-saving advices when a crane contacts an overhead power line:

- If you are apart from the vehicle / crane: Avoid any contact! Never try to enter the vehicle / crane!
- Prevent all other persons from contact with the vehicle / crane! Stay away from the vehicle / crane!
- If you are in / on the vehicle / crane: Jump off with both legs simultaneously. You MUST leave the vehicle if smoke starts to develop at the rubber tyres.
- You may also jump off with one leg lifted and only one leg touching the ground – The tension of the ground may cause a life-threatening voltage difference even between two legs.
- Get away from the vehicle crane at least 20 m / 22 yards before you start walking normally.
- Make an emergency call as soon as possible.

Dealer's stamp:

Type label:



Maschinenbau GmbH

Fillmannsbach 9

A-5144 St. Georgen am Fillmannsbach

Tel: +43 / 7748 / 8620

Fax: +43 / 7748 / 8620 – 20

office@binderberger.com