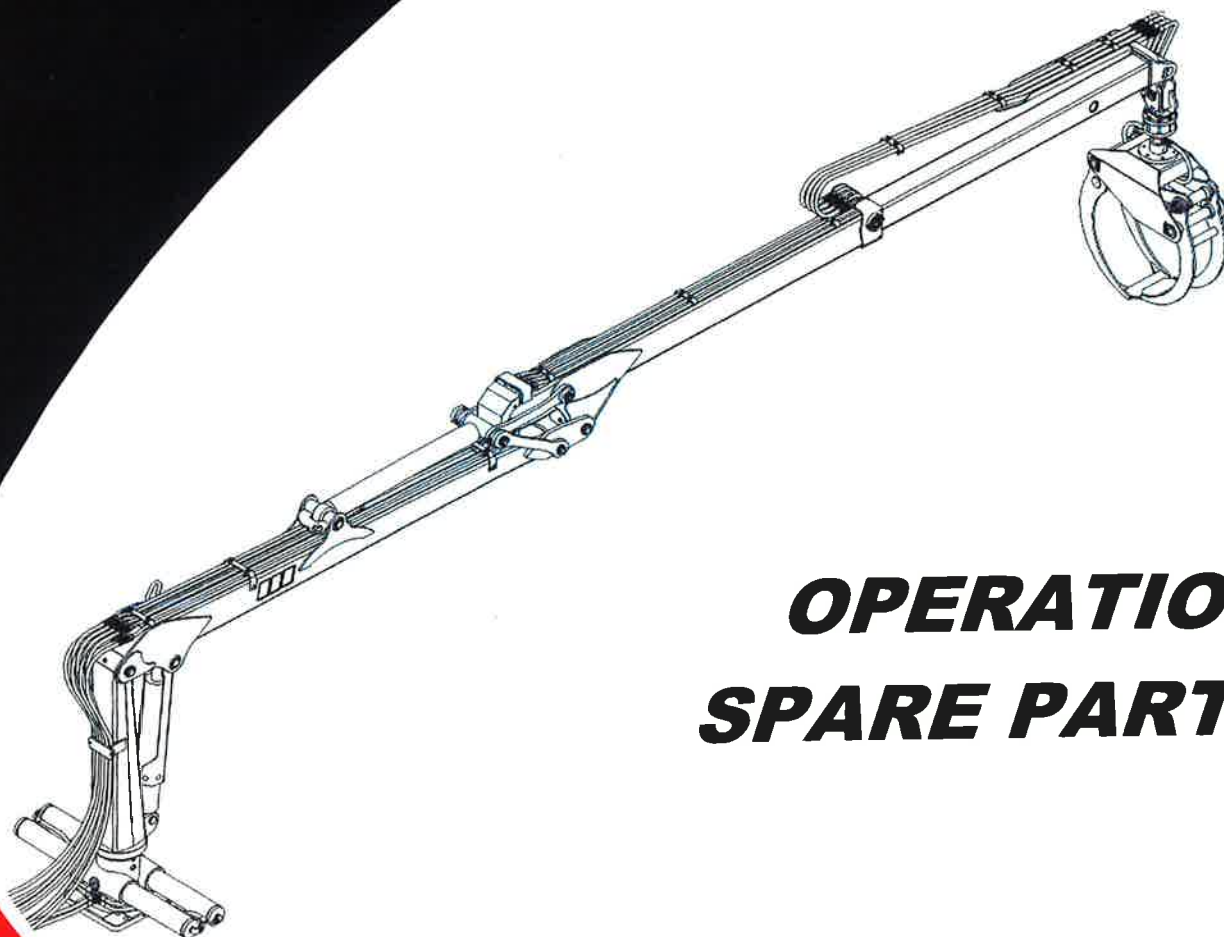




GRAPPLE LOADER



OPERATION SPARE PARTS

IGLAND 56-69S

IGLAND 56-85SS

IGLAND 65-69S

IGLAND 65-85SS

Owner's Manual – Betriebsanleitung

Manuel d'utilisation – Eierens instruksjonshefte

EC DECLARATION OF CONFORMITY FOR MACHINERY

Manufacturer: Kesla Oyj
Kuurnankatu 24, FI-80100 JOENSUU, FINLAND

Name and address of the person authorized to compile the technical file:

Riku Väyrynen
Kuurnankatu 24, FI-80100 JOENSUU, FINLAND

Herewith we declare that **IGLAND 56-69S**
IGLAND 56-85SS
Grapple loader **IGLAND 65-69S**
IGLAND 65-85SS

Serial number: _____

- is in conformity with the relevant provisions of the Machinery Directive (2006/42/EC)
- is in conformity with the provisions of the following other EC-Directives

2014/30/EC

And furthermore, we declare that

- the following (parts/clauses of) European harmonised standards have been used

SFS-EN ISO 12100

- the following (parts/clauses of) other technical standards and specifications have been used

ISO/TR 14121-2, SFS-EN-12999

Place, time: Joensuu 3/3/2017

(a translation from the original version)

Signature: 
Managing Director Simo Saastamoinen

Kesla Oyj
Kesälahti factory
Joensuu factory

Legal domicile:
Metsolantie 2
Kuurnankatu 24

Joensuu
59800 KESÄLAHTI
80100 JOENSUU

Business ID
tel. +358 207 862 841
tel. +358 207 862 841

0168715-8
fax. +358 13 6100 322
fax. +358 13 6100 523

CONTENTS

EC DECLARATION OF CONFORMITY FOR MACHINERY	1
1 INTRODUCTION	7
1.1 GENERAL	8
1.2 USING THE MANUAL	9
1.3 TYPE PLATE	9
1.4 INTENDED PURPOSE OF THE LOADER	9
1.5 OPERATING PRINCIPLE OF THE LOADER	10
1.6 RECOMMENDED OPERATING CONDITIONS	10
1.7 WARRANTY CONDITIONS	10
1.8 PROHIBITED OPERATING METHODS AND CONDITIONS OF THE DEVICE	12
1.9 INFORMATION AND WARNING SYMBOLS USED IN THE MANUAL	12
1.9.1 Warning symbols	13
1.10 CONTACT DETAILS	13
1.11 VERSION NUMBER OF THE MANUAL	13
2 SAFETY INSTRUCTIONS	14
2.1 GENERAL SAFETY INSTRUCTIONS	14
2.2 THE BIGGEST SAFETY RISKS DURING DEVICE OPERATION AND MAINTENANCE	15
2.3 SPECIFIC SAFETY INSTRUCTIONS	18
2.3.1 Hazard zones during work	18
2.3.2 Safety devices	18
2.3.3 Instructions for emergency stop	18
2.3.4 Traktor's 3-point hitch	19
2.3.5 Attachment parts for mounting on the tractor's rear axle	19
2.3.6 Centre of gravity and inclination angles	20
2.3.7 Centre of gravity and inclination angles	21
2.4 INSTRUCTION AND WARNING DECALS ON THE LOADER	22
2.5 HYDRAULIC SYSTEM	27
2.6 SAFETY INSTRUCTIONS FOR HANDLING CHEMICALS	28
2.7 WELDING THE DEVICE	29
2.8 SAFETY INSTRUCTIONS FOR DRIVING ON PUBLIC ROADS	29
2.9 INSTALLATION OF ACCESSORIES AND MODIFICATIONS IN DEVICE STRUCTURES	30
3 INTRODUCTION OF THE MACHINE	31
3.1 MAIN PARTS OF THE MACHINE	31
3.2 OPERATING PRINCIPLE OF THE LOADER	32
3.3 MOUNTING ALTERNATIVES OF THE LOADER	32
3.3.1 Rear axle mounting	32
3.3.2 Mounting with mounting plate	33
3.3.3 Mounting on 3-point hitch for transfers	33
3.3.4 Recommended installation	33
4 COMMISSIONING	34
4.1 START-UP	34
4.1.1 Safety instructions	34
4.1.2 Start-up preparations	34
4.2 CONNECTING THE LOADER TO THE TRACTOR	34
4.2.1 Safety instruction	35
4.3 CONNECTING THE LOADER TO TRACTOR'S REAR AXLE WITH A MOUNTING CONSOLE	35

CONTENTS

4.3.1	Mechanic for mounting work.....	35
4.3.2	Inspections prior to mounting.....	36
4.3.3	Mounting the front rack and safety bar	36
4.4	CONNECTING THE LOADER TO THE BEAM OF A KESLA TIMBER TRAILER	36
4.4.1	Safety instruction	36
4.5	MOUNTING THE LOADER ON A TRAILER TOWBAR.....	37
4.6	MOUNTING THE CONTROL VALVE.....	37
4.6.2	Emergency stop.....	38
4.6.3	Covering of hydraulic hoses	38
4.6.4	Covering of cylinders	38
4.7	COUPLING THE HYDRAULIC SYSTEM	38
4.7.1	General.....	38
4.7.3	Mounting.....	39
4.7.4	Connecting to a constant pressure hydraulic system (e.g. John Deere).....	39
4.8	DECALS	39
4.9	PLATES.....	39
5	INSPECTIONS.....	40
5.1	COMMISSIONING INSPECTION.....	40
5.2	REGULAR INSPECTION	40
5.3	THOROUGH REGULAR INSPECTION	40
5.4	INSPECTOR.....	40
5.5	STORAGE OF THE REPORT.....	41
5.6	PERFORMING THE INSPECTION	41
5.6.1	Safety instruction	41
5.6.2	Inspection	41
5.6.3	Controls	41
5.6.4	Plates and decals	42
5.6.5	Hydraulic hoses and pipes.....	42
5.6.6	Load-bearing steel structures and welding seams.....	42
5.6.7	Pin lockings on axles	42
5.6.8	Hydraulic system	42
5.7	TEST RUN	42
6	OPERATION.....	43
6.1	OPERATING THE LOADER.....	43
6.1.1	Safety instructions	43
6.2	GENERAL	44
6.2.1	Choosing the working site.....	44
6.2.2	Timber hauling from the wood	44
6.3	WAY OF WORKING.....	44
6.3.1	Special safety instruction	44
6.3.2	Working	45
7	MAINTENANCE.....	46
7.1	GENERAL MAINTENANCE MANUAL	46
7.2	SAFETY INSTRUCTIONS.....	47
7.3	DAILY INSPECTIONS.....	47
7.3.1	Hydraulic hoses and pipes.....	47
7.3.2	Load-bearing steel structures and welding seams.....	47
7.3.3	Shaft locks	47
7.3.4	The hydraulic system.....	48

CONTENTS

7.4	SLEW MECHANISM	48
7.4.1	Greasing the slew mechanism.....	48
7.4.2	Lubricating the control valve	48
7.4.3	Changing the slew mechanism oil	48
7.4.4	How to change oil (Slew mechanism).....	49
7.4.5	Tightening the mounting bolts of loader.....	49
7.5	DISMANTLING THE SLEW MECHANISM.....	50
7.6	THE BOOMS.....	52
7.6.1	Greasing the booms and cylinder links	52
7.6.2	Replacing bearings.....	52
7.6.3	Greasing the grapple	52
7.6.4	Tightening of joints.....	53
7.6.5	Greasing the boom extensions	53
7.6.6	Adjusting the chain tension (models with double extension).....	54
7.6.7	Adjusting the swing damper.....	55
7.6.8	Adjusting the boom extension.....	55
7.6.9	Adjusting the gaps in the transfer boom	55
7.6.10	Dismantling the transfer boom.....	57
7.7	THE HYDRAULIC SYSTEM.....	58
7.7.1	Checking the oil level.....	58
7.7.2	Changing the hydraulic system oil	58
7.7.3	Biodegradable hydraulic oils.....	58
7.7.4	How to change oil	59
7.9	PRESSURE MEASUREMENT.....	60
7.9.1	Measuring.....	60
7.10	LUBRICATION	62
7.10.1	Lubricating greases, general	62
7.10.2	Lubrication scheme.....	62
7.10.3	Oil recommendation (Slew mechanism)	63
7.10.4	Oil recommendation (hydraulics)	63
8	MAINTENANCE SCHEDULE	64
9	TROUBLESHOOTING	65
9.1.1	Safety instruction	65
10	FURTHER INSTRUCTIONS	66
10.1	STORAGE.....	66
10.2	TAKING INTO USE AFTER STORAGE	66
10.3	ACCESSORIES.....	67
10.4	DRIVING ON PUBLIC ROADS.....	68
10.4.1	Transport position	68
10.4.2	Check the functioning and steerability.	68
10.4.3	Driving and driving speeds	68
10.5	REPAIR WELDING	69
10.5.1	General welding instructions.....	69
10.6	DISPOSAL OF THE LOADER.....	69
11	APPENDIXES	70
11.1	TIGHTENING TORQUES FOR SCREWS AND NUTS	70
11.2	SPECIFICATIONS.....	71
11.3	DIMENSIONED DRAWING KESLA 304	72
11.4	DIMENSIONED DRAWING KESLA 304T	72
11.5	DIMENSIONED DRAWING KESLA 305	73

CONTENTS

11.6	DIMENSIONED DRAWING KESLA 305T	73
11.7	PERMITTED LOADING VALUES KESLA 304	74
11.8	PERMITTED LOADING VALUES KESLA 305	74
11.9	MOVEMENT SCHEME KESLA 304, 304T	75
11.10	MOVEMENT SCHEME KESLA 305, 305T	76
11.11	HYDRAULIC PRESSURE SETTINGS	77
11.12	CONNECTION POINTS OF THE HYDRAULICS	77
11.13	HYDRAULIC SCHEME NORDHYDYHRAULIC RS-218, 2-LEVER	78
11.14	HYDRAULIC SCHEME WALVOIL DPX100/8 CF-SYSTEM	79
11.15	HYDRAULIC SCHEME WALVOIL DPX100/8 LS-SYSTEM	80
11.16	HD-SCHEME WALVOIL SDS 100/8 ON-OFF	81
11.17	HD-SCHEME WALVOIL HYDRAULIC / ELECTROHYDR. REMOTE CONTROL	82
11.18	HD-SCHEME / ELECTROHYDR. REMOTE CONTROL / W. FLOAT POSITIONS	83
11.19	HD- SCHEME PARKER L90LS-06	84
11.20	HD- SCHEME RS214	85
11.21	HYDRAULIC SCHEME WALVOIL DPX100	86
11.22	DETERMINATION OF STABILITY	87
11.22.1	Determination of stability by test	87
12	WARRANTY CERTIFICATE	88
13	BILL OF DELIVERY	89
13.1	BILL OF DELIVERY / OWNERS / POSSESSORS ASSURANCE OF HAVING READ AND UNDERSTOOD THE MANUAL	89
14	CUSTOMER FEEDBACK	91

GENERAL

DEAR CUSTOMER

*We thank you for your trust in our **IGLAND** product and wish you every success in your work. Please learn this operating manual thoroughly, as the best operating safety and productivity of the machine from one day to another is ensured by good knowledge of the machine, accurate adjustments and careful maintenance. It is vital to understand each part of this manual and follow the operating instructions. In case of doubt please contact the seller of the machine. You may also give feedback to Kesla by using the feedback form provided at the end of this manual or at the address www.kesla.fi.*

1 INTRODUCTION

- 1. First read the instructions. Using the timber trailer requires good knowledge of the operating and safety instructions.*
- 2. Check that the hydraulics and stability of the base machine are appropriate.*
- 3. Follow the installation instructions and ask additional information from the seller or factory, if necessary.*
- 4. Perform the inspections that are required by law.*
- 5. Practice makes perfect.*
- 6. Always think through, what you are doing.*
- 7. Do not forget to "limber up" the hydraulic system in freezing conditions.
Let all the cylinders of the timber trailer slowly complete a full stroke cycle, to allow the seals become flexible.*
- 8. Grease preferably often and a little than rarely and a lot.*
- 9. Cleanness is essential for the hydraulic system.*
- 10. First filling oil: Shell Spirax S4 TXM.*
- 11. Repair even the smallest faults, before these escalate into serious damages.*

GENERAL

1.1 GENERAL

With this manual as your guidance you will be able to operate the device presented in the manual in the right and safe way. The tractor manual gives you the key data on the base machine's hydraulics, couplings and on the right working position in regard to safety.

For realization of an effective timber transport, the general instructions on harvesting will be of assistance when planning the timber felling site.

-) The asterisk notifies information on the issue at hand.
-) The dash indicates necessary / possible action related to the discussed issue.

Storage of the manual

This manual is part of the product and should be stored throughout the service life of the product. If there are any modifications made to the device, the relevant information should be appended to this manual. Keep the manual clean and within reach. If you sell the device, the manual should be handed over to the new owner.

Product data

The information in this manual corresponds to the model and appearance of the product at the moment of delivery.

Kesla Oy reserves the right to make changes in specifications and equipment without prior notice. All the information in this manual is valid as at the moment of publication.

Contents of the manual

The operating manual contains the following information:

- *General information about the purpose and contents of the operating manual, guidelines on how to read the instructions and a request to provide feedback and to notify about possible errors.*
- *Instructions related to safety*
- *Daily inspections*
- *Operating instructions of the device*

1.2 USING THE MANUAL

All the descriptions, instructions and specifications provided in this manual are based on the latest knowledge of the design of the machine at the moment of printing the manual. The product is subject to continuous development and therefore the manufacturer reserves the right to introduce changes to the product without prior notice.

In case of device malfunctioning, you can identify and eliminate the fault and its probable cause on the basis of the table. If you are unable to repair the machine by yourself, contact the seller of the machine or the authorised repair shop of the seller.


REMEMBER!

When you order spare parts or ask for repair instructions, give the information provided on the type plate of the machine to the seller or the repair mechanic. This way you can get help faster in situations of machine malfunction and you'll receive the correct spare part as fast as possible.

1.3 TYPE PLATE

NOTE!

Mark the data of your machine's type plate to the following type plate figure.

KESLA Oyj		Hydraulic crane		
Type	KESLA	Year	201	
Serial No				
tel.+358 207 862 841		<input type="checkbox"/> FIN-80100 Joensuu	<input type="checkbox"/> FIN-59800 Kesälahti	3281642
fax.+358 13 6100 523		Kuumankatu 24	Metsolantie 2	

1.4 INTENDED PURPOSE OF THE LOADER

IGLAND farmers' timber loaders are intended for farming and forestry applications in farms. The loaders are especially useful for loading and lifting round timber, forage, manure, sand, loose fertilizer, etc.

In forestry use the loaders are suitable for the farmer's own harvesting in thinning stands and also for lighter professional work.

1.5 OPERATING PRINCIPLE OF THE LOADER

IGLAND grapple loader is a hydraulically driven loader connected to a farm tractor or timber trailer and used for handling and loading timber, soil, Big Bags, etc.

The operator controls the loader movements with a control valve. The valve transfers the hydraulic pressure, generated by the tractor, to the hydraulic cylinders of the loader, thus bringing about the wanted functions: slewing of booms, lifting of main lifting boom, closing of grapple etc. The loader valve is fitted with relief valves to prevent overloading of the machine.

1.6 RECOMMENDED OPERATING CONDITIONS

The lowest recommended working temperature for the loader is - 25° C. Notice that the hydraulic seals wear sooner, hoses are more likely to sustain damage and steel structures are more exposed to brittle fracture at low temperatures. When working at temperatures below - 25° C it is recommended to lift smaller loads than normally, to avoid unnecessary damages.

1.7 WARRANTY CONDITIONS

Kesla Oyj guarantees that the products they sell are free of defects and provides the following warranty for any problems that might appear in workmanship or materials:

1. The warranty period is valid starting from the day the product is installed and covers only new products sold to their first owner.
 - For truck- and stationary installed loaders the warranty period is 2000 working hours or 12 months. The main components of the timber loader frame structure such as the boom, stabilizers and slew mechanism are warranted for 24 months from the date of delivery from factory.
 - For forest machine cranes and harvester heads the warranty period is 2000 working hours or 12 months.
 - For chippers the warranty period is 1000 working hours or 12 months.
 - For tractor-mounted timber trailers and loaders the warranty period is 12 months from the date of delivery to the customer. However, the warranty is valid max. 18 months from the date of delivery from the Kesla factory.
 - For spare parts the warranty period is 6 months from the date of purchase.
 - Kesla shall supply spare parts, produced by Kesla, for a period of ten (10) years, after the manufacturing of the Product has been stopped.
 - Warranty will be void when either working hours or calendar time of warranty period is filled.
2. Repair work under warranty is done during normal business hours only by Kesla Oyj factory authorized repair workshops or by Kesla Oyj authorized service repairman working according to their standard working schedule.
3. Kesla Oyj reserves the right to approve and authorize any part or work claimed under warranty.
4. The warranty stipulates that crane installation registration records to be properly filled out and returned to Kesla Oyj within 30 days of installation. The registration record contains the assurance that the new owner/user has been familiarized with the instruction manual.

GENERAL

In order for the warranty to be valid the bill of delivery for loaders/trailers and the initial registration documents for harvester heads must be returned to Kesla Oyj. Furthermore the warranty requires first service to be carried out on cranes within 30 days of initial active use.

- 5. Reimbursement applications for repair work must be filled out by the buyer or the authorized service repair workshop and returned to Kesla Oyj within 30 days from the date of damage. Damaged parts should be marked with both the customer's and machinery's information and may be requested to be returned to Kesla Oyj for inspection. Kesla Oyj will bear the cost of normal shipping charges for the returned parts if the matter has been agreed on in advance with Kesla's warranty handling personnel. The warranty period for the exchanged part is valid to the end of the original warranty of the machine.*
- 6. In case the warranty demand concerns a faulty part that has been taken apart from a Kesla product, it can be replaced with a similar functioning part free of charge by Kesla Oyj spare parts warehouse, at an authorized service workshop or by Kesla Oyj authorized service repairmen. The warranty covers defects arising in raw material, structure or manufacturing. The defected part will be replaced with a new or reconditioned part from Kesla Oyj.*
- 7. The warranty does not cover parts which normally wear out and need to be regularly replaced such as filters, oil, hoses, gaskets, belts, skid bearings and glide pads or any similar.*
- 8. The warranty does not cover faults resulting from:*
 - Non-compliance with proper use and/or safety issues as mentioned in the product manual*
 - Improper or non-sufficient installment or service*
 - Normal wear and tear*
 - Accidents*
 - Overloading*
 - Impurities in oil or in hydraulic system*
- 9. The customer bears financial responsibility for costs arising from fulfilling warranty requirements such as travel and accommodation costs for repair personnel, fees for transporting equipment or components, overtime or other similar costs.*
- 10. If machinery breaks down, Kesla Oyj bears no responsibility for damages caused by machinery to property or persons. Furthermore, Kesla Oyj bears no responsibility for financial loss occurring in down time (for example, losses arising from wages or transportation fees).*
- 11. Attachments or components supplied to Kesla Oyj by sub-contractors are guaranteed only according to the warranty terms given by the supplier.*
- 12. The warranty will be considered either partially or entirely invalidated if repair or maintenance carried out by the owner/user are done improperly, if unsuitable, non-compatible or foreign parts are installed, if modifications or changes to the product or hydraulic equipment are made without the a written permission of Kesla Oyj or if hydraulic system is adjusted exceeding allowed tolerances or reference values.*
- 13. In addition to the above mentioned terms there may be more detailed product-specific warranty terms which are written into the user manual of each product.*

1.8 PROHIBITED OPERATING METHODS AND CONDITIONS OF THE DEVICE

Operating the device is strictly prohibited:

- *for lifting people or piece goods*
- *under the influence of intoxicating substances*
- *while there are people in the danger zone*
- *if unfamiliar with the operating and safety instructions*
- *without checking the stability of the ground*
- *if faulty or in damaged condition*
- *if any part of the device or a device attached thereto is within the minimum distance to live conductors*
- *while the tractor or trailer is moving*

1.9 INFORMATION AND WARNING SYMBOLS USED IN THE MANUAL

Warnings in this manual are divided into the following three categories:



DANGER refers to a dangerous situation, which will cause death or a serious bodily injury, if not avoided



WARNING refers to a dangerous situation, which can cause death or a bodily injury, if not avoided.



ATTENTION refers to a situation, which can cause material damages, if not avoided.

1.9.1 Warning symbols

Warning symbols are used in the manual as a support in referring to a danger, forbidden activity or a compulsory activity (order).



Danger

A black symbol inside a yellow triangle describes the indicated danger.



Forbidden

A black symbol inside a red circle refers to a forbidden activity.



Symbol of compulsory activity

A white symbol on a blue background indicates the activity that must be carried out in order to avoid the danger.

1.10 CONTACT DETAILS

ORDERING OF SPARE PARTS

MAINTENANCE AND WARRANTY ISSUES

SPARE PARTS AND MAINTENANCE SERVICES

IGLAND AS
Roresanden 109
N-4885 GRIMSTAD
Norway

Phone +47 37 25 62 00
Fax +47 37 25 62 01
E-mail corporate@igland-as.com
www.igland-as.com

1.11 VERSION NUMBER OF THE MANUAL

2 SAFETY INSTRUCTIONS

2.1 GENERAL SAFETY INSTRUCTIONS



Read and understand the operating, maintenance and safety instructions before you use the machine or carry out any maintenance works. Operating, maintenance and adjustment procedures may only be carried out by a person, who has been trained in the operation and maintenance of the specific machine. Inadequate information about the functioning and properties of the machine may lead to serious injuries or death.



The operator should always use the safety equipment required by regulations, such as a safety helmet, overalls, safety footwear, ear protectors, safety glasses and other safety equipment necessary in the work.





If your machine is equipped with a main switch, disconnect it before leaving the machine.

- *Follow the warnings and instructions on your machine. This will help you avoid accidents when working with the loader.*
- *When the warning or instruction decals on the machine have become loose or torn, repair the decals immediately.*
- *Plan your work carefully in advance, to avoid possible damages and accidents. The operator should be well familiar with the functions of the device before taking it into use.*
- *When working with the device make sure that the ground under the device is sufficiently firm to avoid any danger of overturning.*
- *Never start any work you're not made familiar with and for which you're not authorized.*
- *Notify the operator of the device of any imminent maintenance and repair works.*
- *When working with the device, make sure there are no people in the danger zone.*
- *Before starting the power unit, make sure the hydraulic pressure is not connected to the device.*
- *When disconnecting hydraulic pipes and hoses make sure that no pressure had remained in the line after switching off the power source.*
- *Never leave a running power unit unattended.*



SAFETY INSTRUCTIONS



- **Before starting maintenance and repair works to the device, check that the machine is standing on a firm ground. Switch off the engine of the tractor, disconnect the hydraulic pressure from the device, engage the parking brake and remove the ignition key from the ignition lock.**
- **Mark the work site with signboards, if necessary.**
- **Do not make the device available to an outsider before you are sure that the person is familiar with the relevant safety and operating instructions.**
- **It is forbidden to operate the device, when under the influence of alcohol or any other intoxicating substances.**
- **Be extremely careful when connecting or disconnecting the device from the power unit or the trailer.**
- **Clean and wash the device on a regular basis and always before maintenance or repair works.**
- **Due to the acute risk of a sudden structural collapse, never use the device, when it is damaged.**



2.2 THE BIGGEST SAFETY RISKS DURING DEVICE OPERATION AND MAINTENANCE

 DANGER	
	<p>RISK OF CRUSHING</p> <ul style="list-style-type: none">• Hands and other parts of the body are in risk of getting jammed between the loader structures or staying under the load, resulting in death or serious injuries.• Be very cautious when working near the device. Always use relevant (CE-approved) safety equipment.• Never work in the hazard zone of the machine, unless it is switched off.


SAFETY INSTRUCTIONS



 DANGER	
	<p>DANGER OF A FALLING LOAD</p> <ul style="list-style-type: none">• Staying under the load may result in death or serious injuries.• Loitering under the load or loader or running the load above people is prohibited.• Prior to repair or maintenance lower the grapple or the boom end onto a firm ground so that no machine component will be supported by the hydraulic cylinders solely.

 DANGER	
	<p>DANGER OF ELECTRIC SHOCK!</p> <ul style="list-style-type: none">• Contact with high voltage cables results death or serious injuries.• Observe strictly the given safe approach distances to live electric conductors when operating the device.

 DANGER	
	<p>DANGER OF OVERTURNING!</p> <ul style="list-style-type: none">• Instability of the device can cause it to move unexpectedly, which can result in death or serious injury.• Never park or use the machine on slopes that exceed the maximum permitted inclination.• Ensure that the ground is stable enough before lifting.

 DANGER	
	<p>RISK OF BREAKING FIXING SCREWS!</p> <ul style="list-style-type: none"> • Breaking of fixing screws can result in death or serious injuries. • Use the screws and other fasteners specified in the manual. • Use the tightening torques provided in the manual and check the tightness of bolt according to the manual.

 WARNING	
	<p>DANGER OF HIGH-PRESSURE OIL JETS!</p> <ul style="list-style-type: none"> • Damaged hydraulic hoses may release high-pressure oil jets, which can cause serious injuries on skin. • Check the condition of the hoses on a regular basis and replace any worn parts. • In case of an accident seek medical attention immediately.

 WARNING	
	<p>RISK OF FALLING!</p> <ul style="list-style-type: none"> • Falling while climbing to the control seat can cause serious injuries. • Keep the steps and handrail surfaces clean and dry.



- Noise emission exposure made by the machines can cause weaker hearing or even worse hearing loss.
- The noise level at the work site depends on the sound proofing of a tractor or any other machinery's sound proofing, as well as the from the position of the control valves.
- The manufacturer recommends when needed the use of appropriate and effective personal hearing protection.

2.3 SPECIFIC SAFETY INSTRUCTIONS

2.3.1 Hazard zones during work



2.3.2 Safety devices

- The cover which is mounted to the control valve and protects against oil jets should be kept in its position and in good order.

2.3.3 Instructions for emergency stop

Risk of tipping over

- Instantly lower the lifting boom by pushing its control lever to the lowering position.
- Keep the lever pushed until the load has reached the ground. Do not interrupt the lowering, as the risk of tipping over will only increase, if the load suddenly stops.
- If in risk of tipping over, do not use the outer boom for load lowering, because the load then might get into the cab.
- Should the tractor tip over, follow the instructions displayed in the tractor cab. Do not jump out from the cab, because you will then be in risk of getting under the falling load or the tipping over tractor or loader.
- Do not mount any extra components to the cab by drilling or welding.
- To avoid fire, switch off the battery voltage of a tipped over tractor.

Emergency stop in case of hose burst

- In case some of the hydraulic hoses or pipes running from the control valve to the loader burst, stop the tractor engine and lower the load to the ground. Disengage the hydraulic oil flow. Repair the damaged spot. Remove any spilled oil from the ground as thoroughly as possible and deliver to a relevant plant to be duly treated.
- If the burst occurs in the main supply hose, which runs from the tractor to the control valve, stop the oil flow by disengaging the control lever for the tractor hydraulic output or by shutting off the tractor engine with the stop button. Repair the damaged spot. Remove any spilled oil from the ground and deliver to a waste oil treatment plant to be duly treated.



Stopping in case of spontaneous functioning of loader

- If the loader starts to function by itself e.g. due to electrical short cut or a return hose having detached from the quick coupling, shut off the tractor engine with the stop button. Repair the damage before restarting the loader.

SAFETY INSTRUCTIONS

2.3.4 Traktor's 3-point hitch



- Follow the safety instructions given below when connecting the loader to the tractor's 3-point hitch.
- Check that the carrying capacity of all tractor hitches is sufficient.
- Check for any deformations or breaks in hitch components and make sure that the side stabilizers are in order. Replace defective parts.
- Use only a top link that is in good condition and sufficiently robust.
- Make sure that the draft control of the three point hitch is absolutely locked when the loader is mounted on the hitch.

 WARNING	
	RISK OF CRUSHING <ul style="list-style-type: none">• Hands and other parts of the body are in risk of getting jammed between the loader structures, resulting in injuries .• Always use relevant (CE-approved) safety equipment.• Observe extra caution

2.3.5 Attachment parts for mounting on the tractor's rear axle

Follow the safety instructions given below when connecting the loader on the attachment parts mounted on the tractor's rear axle.

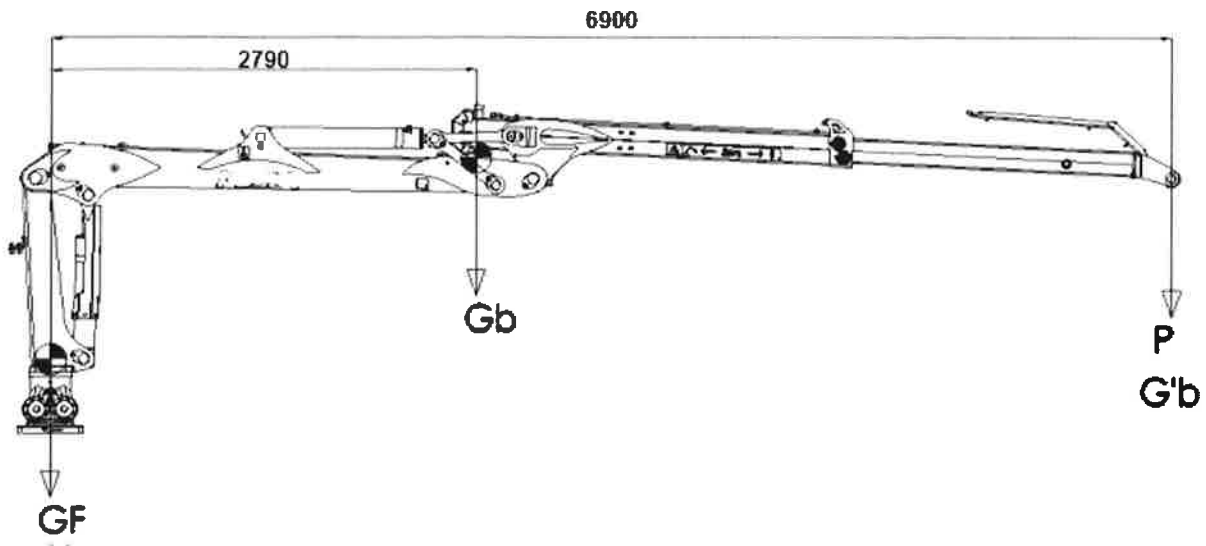
- Check the carrying capacity of the tractor before mounting the loader to its rear axle.
- Check the stability of the machine unit before starting to use the loader. Use, if necessary, extra weights for achieving appropriate stability. (instructions for stability calculation)

 WARNING	
	RISK OF BREAKDOWN <ul style="list-style-type: none">• Loosening of bolts may cause breakdown of the tractor or the attachment parts and result in injuries or death of the operator.• Check the torque of the mounting bolts of the attachment parts according to maintenance instructions.

SAFETY INSTRUCTIONS

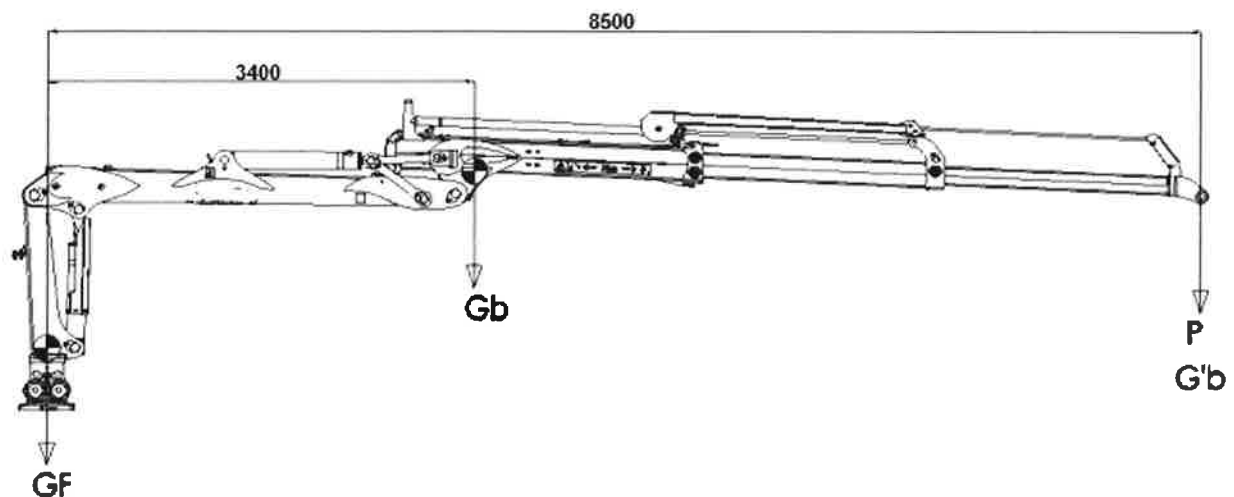
2.3.6 Centre of gravity and inclination angles

304



$GF = 315 \text{ kg}$, $G_b = 455 \text{ kg}$, $P = 620 \text{ kg}$, $G'b = 184 \text{ kg}$

304T



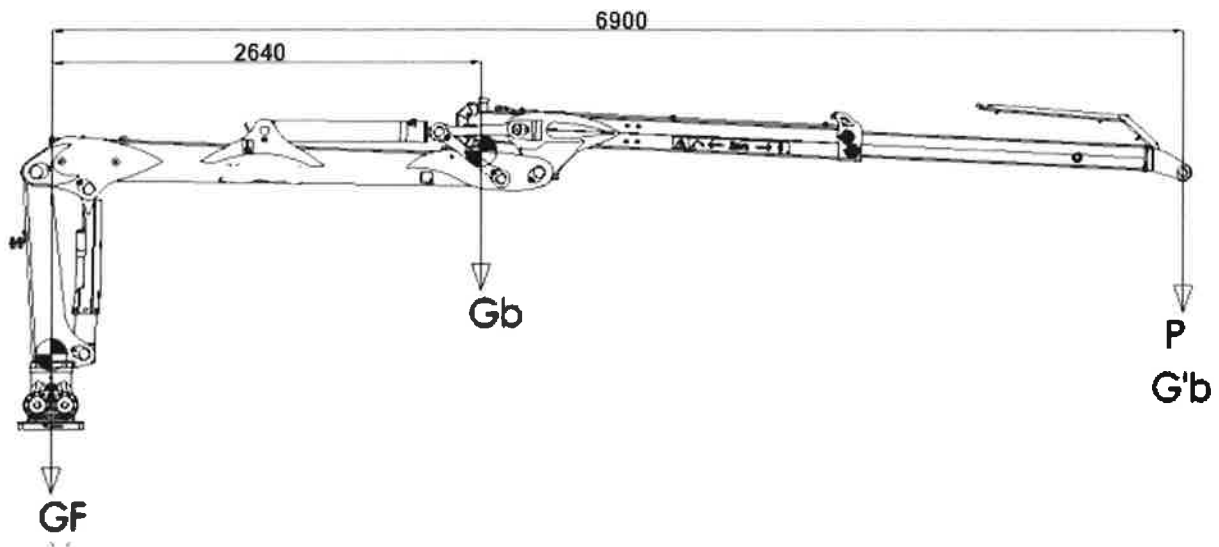
$GF = 315 \text{ kg}$, $G_b = 559 \text{ kg}$, $P = 430 \text{ kg}$, $G'b = 224 \text{ kg}$

- P is the mass of load
- G_b is the mass of booms at the centre of gravity
- GF is the mass of pillar, lifting cylinder and the slew mechanism at its centre of gravity
- $G'b$ is a mass that causes the same torque as the mass G_b

NOTE! The loader should stand on a horizontal base while it is operated!

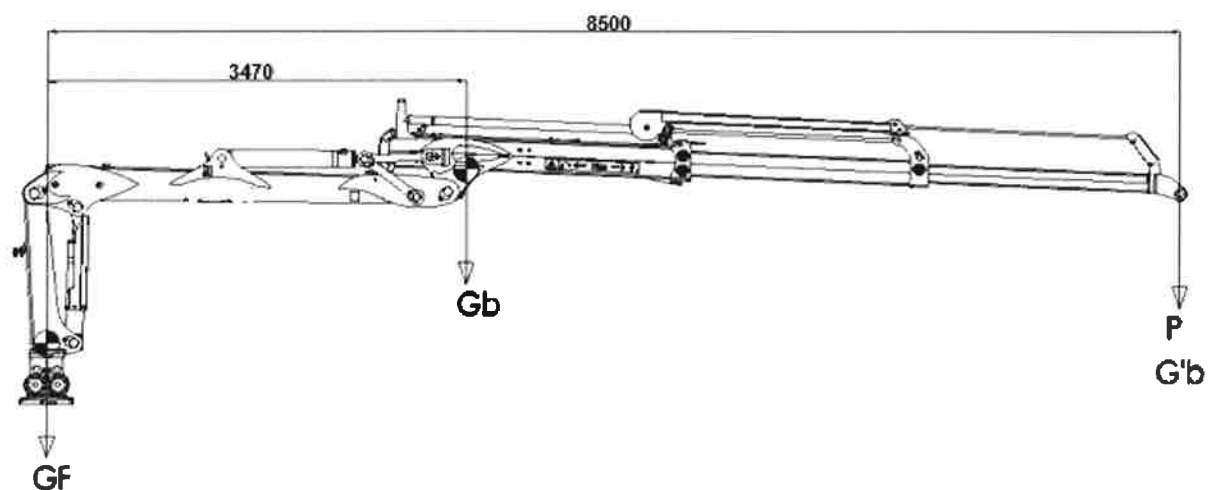
2.3.7 Centre of gravity and inclination angles

305



$GF = 454 \text{ kg}$, $G_b = 510 \text{ kg}$, $P = 720 \text{ kg}$, $G'b = 195 \text{ kg}$

305T



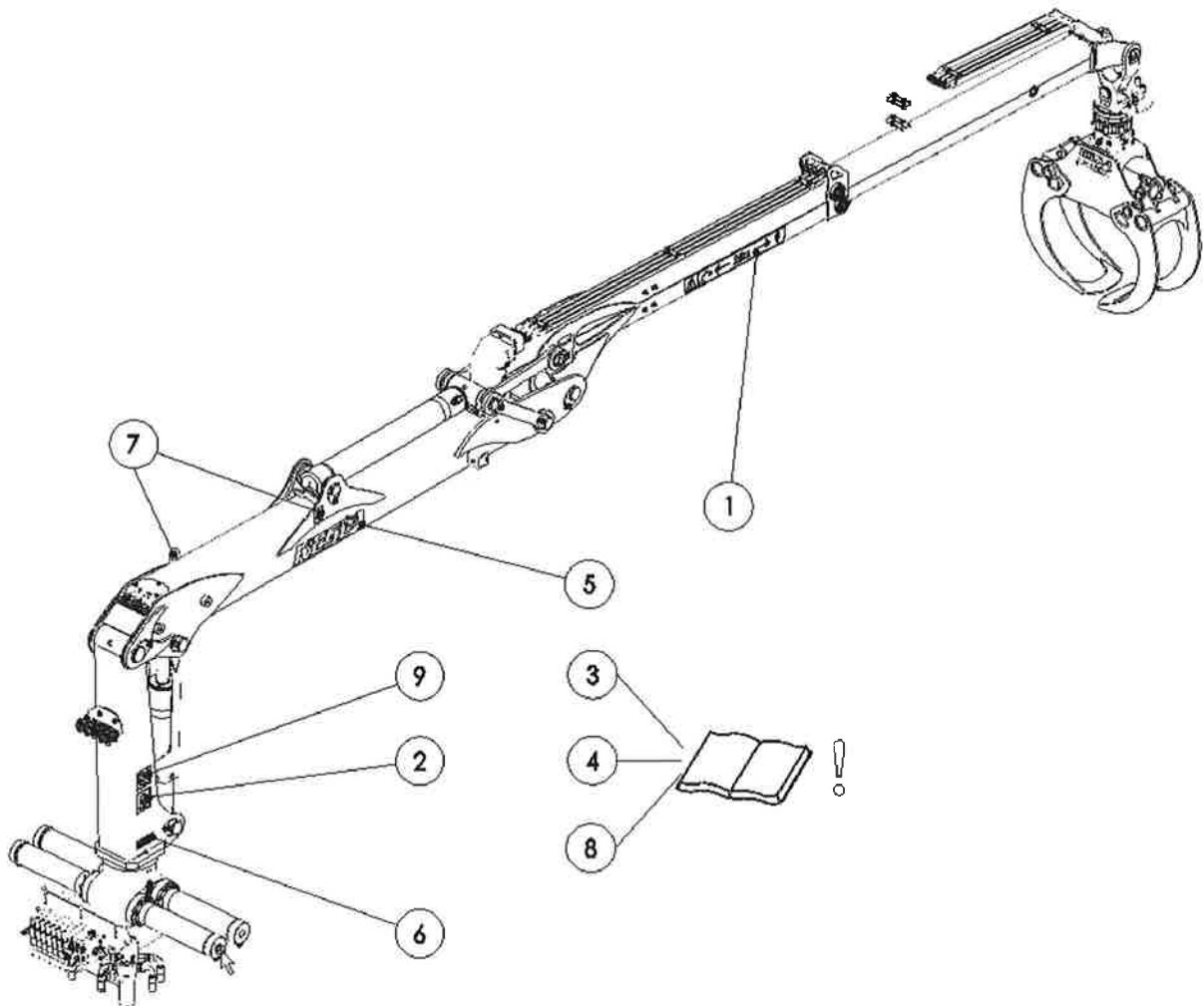
$GF = 454 \text{ kg}$, $G_b = 640 \text{ kg}$, $P = 490 \text{ kg}$, $G'b = 261 \text{ kg}$

- P is the mass of load
- G_b is the mass of booms at the centre of gravity
- GF is the mass of pillar, lifting cylinder and the slew mechanism at its centre of gravity
- $G'b$ is a mass that causes the same torque as the mass G_b

NOTE! The loader should stand on a horizontal base while it is operated!

2.4 INSTRUCTION AND WARNING DECALS ON THE LOADER

Warnings and instructions informing of hazards or operational directions are attached in relevant spots on the loader. Follow these to avoid accidents and malfunctions.



SAFETY INSTRUCTIONS

Decal No. 1

Risk zone decal



The decal states the risk zone radius measured from the slewing centre of the loader.

The risk zone must always be clear of people during lifting.

Decal No. 2

'Read the manual' decal

The decal reminds the operator to become familiar with the manual before start-up, mounting, maintaining or repairing the loader.

If the machine is operated by more than one person, the owner/holder should instruct the operators in how to operate, mount, maintain or repair the loader and also oblige them to become familiar with the manual.

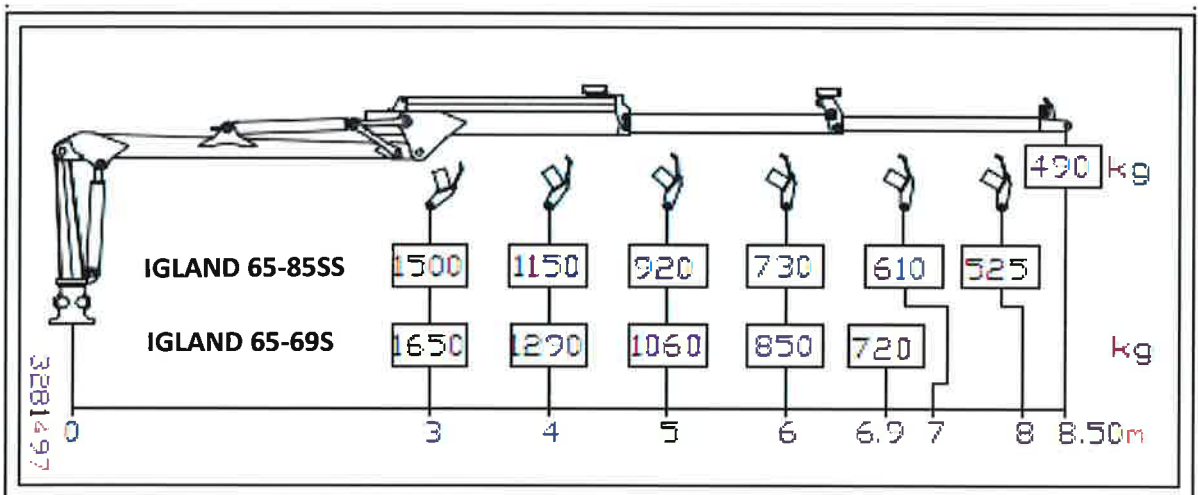
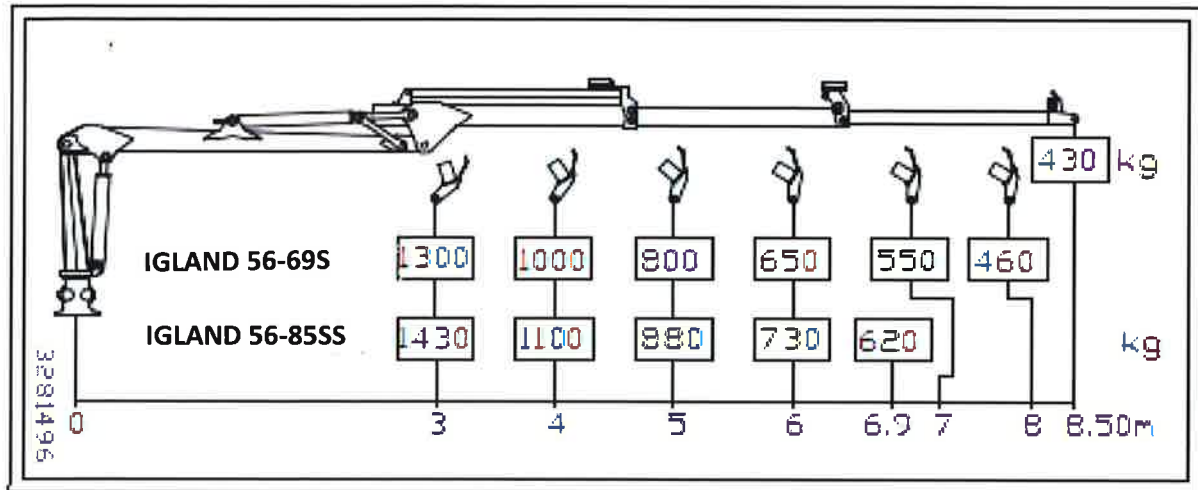


*The owner/holder should send the Bill of Delivery and the Assurance of having read and understood the manual, and send both of these documents to the manufacturer no later than in 14 days since the delivery of the loader from the seller to the customer (see the Terms of Warranty). Send the Bill of Delivery and the Assurance to the address:
Kesla Oyj, Metsolantie 2, 59800 Kesälahti.*

SAFETY INSTRUCTIONS

Decal No. 3

Lifting capacity decal



The decal states the maximum permitted load at the end of the outermost boom extension, excluding the timber grapple, grapple rotator and link at the given lifting radius, measured from the slewing centre.

The decal is delivered separately together with the manual.

The decal should be mounted to the loader, making sure that it is visible from all stationary control points.

For example, with a 4.0 m radius the permissible load = 1100 kg

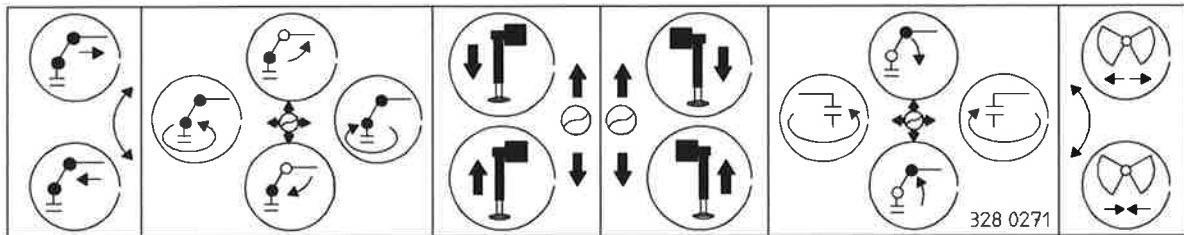
SAFETY INSTRUCTIONS

Decal No. 4

Scheme decal for controls

Located by the control valve

The decal shows the effect of different lever positions of the control valve. For example, when pulling the right side lever, the lifting boom will rise.



Decal No. 5

Product decal

IGLAND 65-85SS

The decal states the name and type of the machine.

Decal No. 6

Machine plate

CE: Pan-European conformity marking.

Type: Product name

KESLA Oyj		Hydraulic crane		CE
Type		Year	201	
Serial No				
tel. +358 207 882 841		<input type="checkbox"/> FIN-80100 Joensuu	<input type="checkbox"/> FIN-59800 Kestähti	3281642
fax. +358 13 6100 523		Kuumankatu 24	Metsolantie 2	

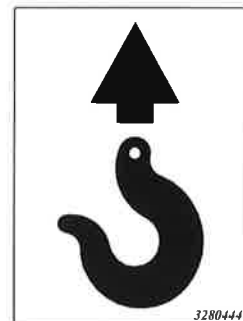
SAFETY INSTRUCTIONS

Decal No. 7

Lifting point decal

The decal shows the lifting points for a loader, which is not mounted or is in its transport package.

These lifting points may not be used for lifting the loader while it is mounted to a tractor, trailer or any other machine unit.



Decal No. 8

Warning decal

The decal states the minimum safe approach distances from the loader component or the load to uninsulated or insulated live electrical conductors with different conductor voltages.

For example, the min. approach distance to a power line with the voltage of 110 kV (110 000 V) is 5 m.

The minimum distance also applies to possible branches or other thin protruding parts, which might cause a voltage "jump" from the conductor.

VAROITUS VARNING
VARO JÄNNITTEISIÄ JOHTOJA!
AKTA DIG FÖR SPÄNNINGSFÖRÄNDE LEDNINGAR!

OLESKELU VAARA-ALUEELLA NOSTON AIKANA EHDOTTOMASTI KIELLETTY!
VISTELSE INOM RISKZONEN UNDER LYFTNINGEN ÄR FÖRBUDEN!

Nimellisjännite Nominellspänning U kv	Vähimmäis-etäisyys eristämättöm johdin. Minimialvstånd från oisolerad ledning m	Vähimmäis-etäisyys eristeinen johdin. Minimialvstånd från isolerad ledning m
U<1	2	0,5
1<U<45	3	1,5
U<110	5	

The decal is delivered separately, together with the manual.

The decal should be installed when starting to use the loader for the first time, fixing it at a visible place in the cab, with the text facing the operator.

If the warning decal becomes damaged or when the loader is mounted on another tractor, a new decal should be acquired from the loader seller.

Decal No. 9

Prohibiting decal

The decal prohibits using the loader for lifting piece goods.



2.5 HYDRAULIC SYSTEM



- Follow the safety instructions relating to the hydraulic system when attaching and using the hydraulics of the loader.
- The hydraulic system may be serviced and repaired and components related to the system be installed only by persons with the relevant training.
- Do not start the work if not entirely sure about your skills.



DANGER



RISK OF A FALLING LOAD!

- A device or component supported only with the hydraulics can fall down, causing death or serious injuries.
- Support parts of the device with suitable supportig blocks before starting with maintenance or repair.



WARNING



DANGER OF HIGH-PRESSURE OIL JETS!

- Damaged hydraulic hoses may release high-pressure oil jets, which can cause serious injuries on skin.
- Never look for leaks by feeling with hand.
- Use a piece of cardboard or similar when looking for leaks.

RISK OF ACCIDENT!



- Air may have entered into the hydraulic system during start-up, repair, maintenance or other works and can cause unexpected movements. The movements can cause death or serious injuries.
- Special caution should be taken when starting the device.
- Make sure that the hydraulic pressure is not engaged in the loader when starting the power unit.

SAFETY INSTRUCTIONS



- Use only original spare parts when repairing or servicing hydraulic components.
- Use only parts with sufficient pressure-proofness.



RISK OF ACCIDENT!

- Increasing the pressure in the hydraulic system above permitted values can cause serious injuries and material damages
- Changing the pressure values of the valves in the hydraulic system is strictly prohibited

2.6 SAFETY INSTRUCTIONS FOR HANDLING CHEMICALS

 WARNING	
 	RISK OF ACCIDENT! <ul style="list-style-type: none">• Oils and greases can contain additives, which may be detrimental to the environment or in repeated skin contact• Follow the instructions and regulations of the manufacturers and authorities when handling these substances.• Waste oil from maintenance or repair should be sent to be duly treated.



- Use appropriate protective clothes, skin lotions or appropriate gloves when handling oils and greases
- *Never use lubricating oils or greases to clean your hands with. Metal particles and additives of the lubricants might damage the skin.*
- *Never wear clothes soiled with oils and greases.*
- *Do not keep oily tools or other oily objects in your pockets.*
- *If oil or grease causes skin changes, immediately contact a physician.*

2.7 WELDING THE DEVICE



- Identify the material to be welded and suitable welding method and materials before welding. Contact Kesla, if needed.
- Follow the welding instructions and use appropriate welding methods
- Always use appropriate protective equipment.
- *If you need to repair structures by welding, you should contact the production factory, who will provide the necessary repair instructions and other aspects to consider. Repair welding should be performed by a competent and skilled person, as incompetent repair can cause sudden breakdown of the structure and result in accidents.*
- *Switch off the power unit and turn its ignition key to 0 position.*
- *Open the main switch.*
- *Shield sensitive components against welding spatter.*
- *Connect the ground conductor of the welding machine directly to the part to be welded. Connect the conductor as close to the welding point as possible, so that the welding current would not pass through bearings, hydraulic components or electric components.*

2.8 SAFETY INSTRUCTIONS FOR DRIVING ON PUBLIC ROADS



- Follow all the decrees and regulations provided in the Road Traffic Act when driving on public roads.
- *Before driving away, move the loader into transport position.*
- *Switch the loader valve to float position if the grapple is connected with the trailer and the loader is mounted to the hitch or rear axle of the tractor.*
- *Observe the given safe approach distances when near electric/telephone lines.*
- *Observe the machine unit height when driving under flyover junctions.*
- *Before driving away check that all the required equipment, such as lamps, reflectors and slow moving vehicle signs function properly and are in their positions.*
- *Check also tyre pressures.*

SAFETY INSTRUCTIONS

- *Never transport the loader while under the influence of alcohol or intoxicating substances.*
- *Never exceed the permitted tilting angles .*
- *Make sure during the driving that the machine unit is completely under your control in every situation. Remember also the longer braking distance.*

2.9 INSTALLATION OF ACCESSORIES AND MODIFICATIONS IN DEVICE STRUCTURES



Device modifications without the approval and reassessment of risks by Kesla can result in death, serious injuries and material damage.

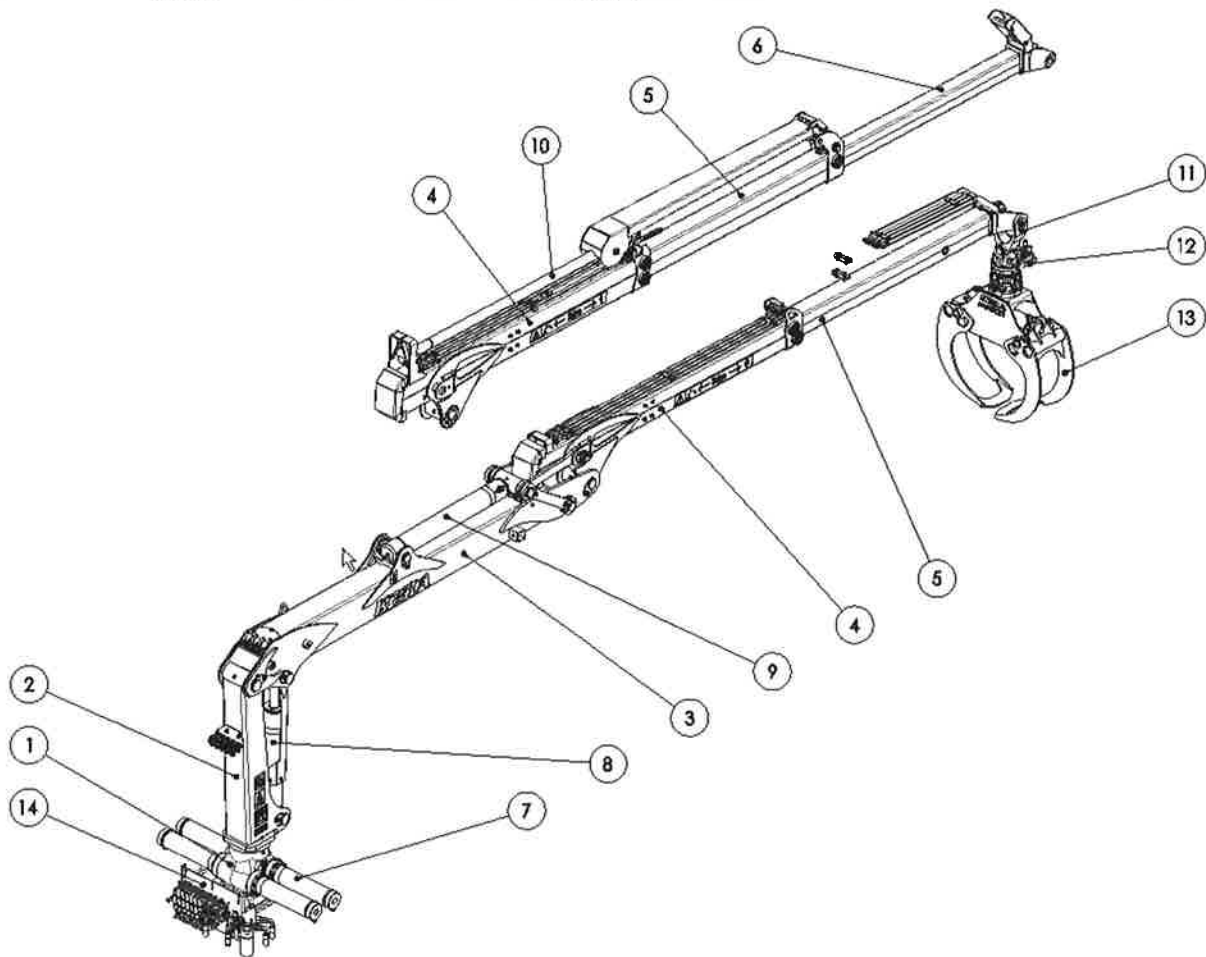


All modifications and repairs, which are not mentioned in the maintenance manual and which can have a negative impact on the functioning, safety and operability of the machine should receive prior approval of Kesla. Approval requires careful risk analysis during the designing stage, where all the remaining risks and possible new risks caused by the modifications are assessed.

- *The manufacturer shall not be liable for any accidents resulting in death, injuries or material damage as the consequence of modifications and repairs, which were performed without the permission of Kesla and had a negative impact on the functioning, safety and operability of the machine.*
- *Modifications without the permission of Kesla can lead to revoking of warranty.*
- *Always contact the manufacturer before making any modifications in the structures of the loader. Structural modifications can cause situations of overload and a risk of accident.*

3 INTRODUCTION OF THE MACHINE

3.1 MAIN PARTS OF THE MACHINE



- 1. Slew mechanism
- 2. Pillar
- 3. Lifting beam
- 4. Transfer beam
- 5. Extension 1
- 6. Extension 2
- 7. Turning cylinder
- 8. Lifting cylinder
- 9. Transfer cylinder
- 10. Extension cylinder
- 11. Shackle
- 12. Rotator
- 13. Grappler
- 14. Control valve

3.2 OPERATING PRINCIPLE OF THE LOADER

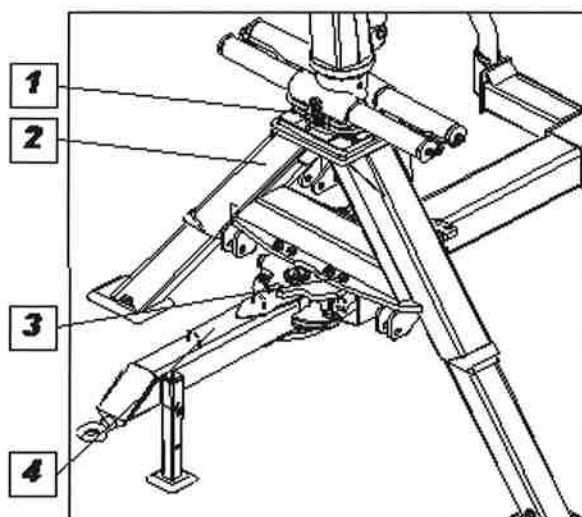
The operator controls the loader movements with a control valve. The control valve transfers the hydraulic pressure generated by the tractor to the hydraulic cylinders of the loader and thus actuating the desired operation: slewing the booms, elevating the lifting boom, closing the grapple, etc. The loader valve is fitted with overpressure valves that prevent overloading the machine.

3.3 MOUNTING ALTERNATIVES OF THE LOADER

Depending on the model, IGLAND grapple loaders can be mounted on the tractor's 3-point

3.3.1 Rear axle mounting

3.3.2 Mounting with mounting plate



1. Mounting bolts of loader
2. Base equipment
3. Mounting bolts
4. IGLAND timber trailer

3.3.3 Mounting on 3-point hitch for transfers

The base of the loader is also supplied with loops for the 3-point hitch of a tractor. The loops are intended only for loader transfers. Operating the loader while it is mounted on a hitch is strictly prohibited. There is the risk of damaging the hitch or base and tipping over of the loader.

3.3.4 Recommended installation

Mounting the loader on the hitch of a lower class trailer is prohibited,

4 COMMISSIONING

4.1 START-UP

This section of the manual focuses on the preparations and special safety instructions before starting the work.

4.1.1 Safety instructions

- *Learn how to quickly shut off the tractor engine, for example to prevent oil spill in the environment as a result of loader valve failure.*
- *Observe extreme caution when connecting the loader to the tractor or trailer.*
- *Make sure that the connected machine unit would be sufficiently stable in all situations.(Calculation instructions)*
- *Make sure that no unauthorised people are in the hazard zone of the tractor and loader during the connection and operation of the units.*
- *Become familiar with the movement scheme of the control valve and the functions of the control levers before you begin your work.*



4.1.2 Start-up preparations

- *Connecting the loader to the tractor*
- *Connecting the loader to a timber trailer*
- *Installation of the front rack and safety beam*
- *Dismounting and mounting of an extra loop*
- *Covering of hydraulic hoses*
- *Covering of cylinders*
- *Coupling of the hydraulic system*
- *Decals*
- *Plates*

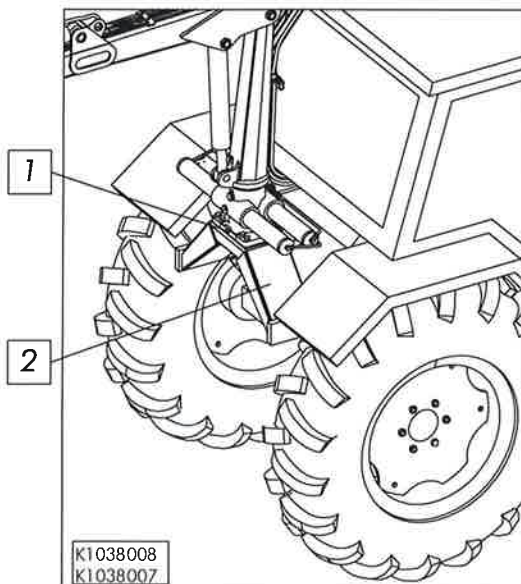
4.2 CONNECTING THE LOADER TO THE TRACTOR

The loader can be connected to the tractor by two methods: on the tractor's 3-point hitch or on the tractor's rear axle by means of a mounting console.

4.2.1 Safety instruction

 DANGER	
	<p>RISK OF CRUSHING</p> <ul style="list-style-type: none"> • Hands and other parts of the body are in risk of getting jammed between the loader structures or staying under the load, resulting in death or serious injuries. • Connecting the loader to a tractor involves working between the machines. Be extra cautious.

4.3 CONNECTING THE LOADER TO TRACTOR'S REAR AXLE WITH A MOUNTING CONSOLE



1. Mounting bolts of loader
2. Mounting console specific for tractor make

For connection to the rear axle you will need a separate mounting console specific to the tractor make.

Mounting instructions are delivered with the mounting console.

4.3.1 Mechanic for mounting work



- The mounting work may only be carried out by the manufacturer or a workshop authorised by the manufacturer.
- The mechanic should have sufficient experience in the mounting of loaders.

COMMISSIONING

4.3.2 Inspections prior to mounting

- Before fixing the loader to the frame check that the loader cannot swivel around the back.
- Clean the threads in the mounting frame and on screws and check that the mounting screws are of strength class 10.9 and size M20 (KESLA 305 M24). Tightening torque of mounting screws is 520 Nm (KESLA 305 900 Nm). Install M20 (KESLA 305 M24) Nord-Lock washers under the screws.

4.3.3 Mounting the front rack and safety bar

The tractor should be fitted with a rack, where the loader grapple could be easily secured for transportation. The rack and its fastening should be durable to stress caused by the loader while driving on uneven terrain. When producing the front rack, make sure that the rack and grapple would not cover headlights and the registration plate.



All loaders intended for mounting to tractors are supplied with spindles with so-called floating position for turning, lifting and transfer actions, making it possible to fix the grapple for short-distance travels also on top of the load in the trailer. Valves with pilot control are supplied with the floating position for turning and lifting motion.

When lifting from the front, the lifting boom descends so low that it can damage the cabin, wherefore it is recommended to protect the cabin with safety bars that prevent lowering the lifting beam onto the cabin. Safety bars may not be fixed to the cabin or block the escape route through the sunroof. Check from the tractor manufacturer/representative for any other possible restrictions.

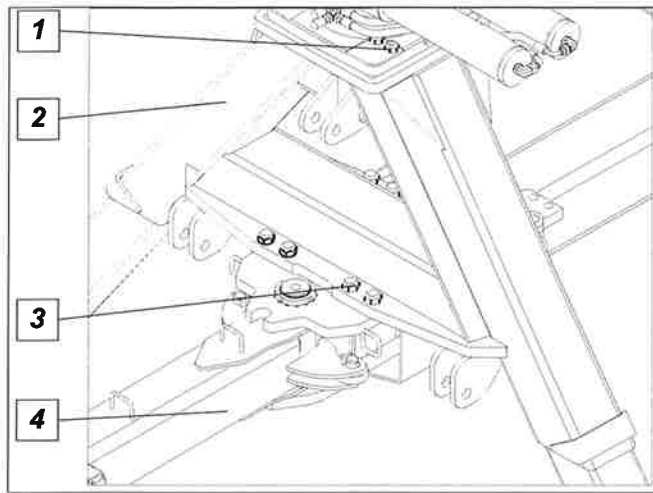
4.4 CONNECTING THE LOADER TO THE BEAM OF A TIMBER TRAILER

There are two ways of connecting the loader to the timber trailer beam. Directly to the trailer towbar by means of stabilizer feet and by means of a loader mounting column.

4.4.1 Safety instruction

 DANGER	
	<p>RISK OF CRUSHING</p> <ul style="list-style-type: none">• Hands and other parts of the body are in risk of getting jammed between the loader structures or staying under the load, resulting in death or serious injuries.• Connecting the loader to a tractor involves working between the machines. Be extra cautious.

4.5 MOUNTING THE LOADER ON A TRAILER TOWBAR



1. Mounting bolts of loader
2. Base equipment
3. Mounting bolts
4. IGLAND timber trailer

- Lift loader using a lifting device with a lifting capacity of at least 2tn..
- Use only approved lifting accessories.
- Mount the base equipment to the mounting plate with 4 pcs. 10.9 hex screws M24 (threaded hole) and 4 pcs 10.9.M24 (through hole). M24 NordLoc washers under the screws.
- Tightening torque 900 Nm


4.6 MOUNTING THE CONTROL VALVE

- Try to install the control valve of the loader so that the control levers would be positioned upright and at the height and distance, which would be convenient for the operator.
- Try to mount the valve housing outside the cab, if possible. This is to avoid the oil jet in case of possible hose burst.
- Fix the valve firmly, so that the valve would neither move when driving in terrain, nor sway during the work.

4.6.1 Emergency stop

There must be an emergency stop switch in the cab of the tractor (standardi EN 12999), to stop the oil flow to the loader. You can use the shutoff lever of the tractor as the switch, if it is within reach and clearly marked.

4.6.2 Covering of hydraulic hoses

 WARNING	
	<p>DANGER OF HIGH-PRESSURE OIL JETS!</p> <ul style="list-style-type: none"> • Damaged hydraulic hoses may release high-pressure oil jets, which can cause serious injuries on skin. • Use covered hydraulic hoses and/or special shields.

- Should it be necessary to lead into the cab hydraulic hoses, where the pressure of liquid exceeds 5 MPa and/or temperature is above 50°C, it is mandatory to cover the hoses at least at 1m distance from the driver, so that in case of hose burst the oil jet will not hit the operator.

- Hoses should be arranged and covered to prevent exposure to unnecessary friction or deformation and compression when using the hitch or some other accessory.

4.6.3 Covering of cylinders

ATTENTION	<p>The rods in the cylinders are covered in factory with storage grease Remove the grease before taking the loader into use. The thick grease with impurities can damage the seals.</p>
------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

4.7 COUPLING THE HYDRAULIC SYSTEM

4.7.1 General

Check the compatibility of oils before connecting the loader to the tractor. The loader has been test run at the factory with the oil Shell Spirax S4 TXM, which is also suitable for wet brakes. When the loader is delivered, it contains about 14 l of oil.

If the tractor and the loader run on separate hydraulic systems, you have more freedom in choosing the oil for the loader. You can find the recommended oils in the maintenance instructions.

Observe cleanness when coupling the hydraulic system - contaminants cause premature wear and malfunctions.

COMMISSIONING

4.7.2 Mounting

The pressure hose (R ¾") and return hose (R¾") of the control valve are fitted with a ½" quick coupling. Connect the pressure hose either to a single or double acting outlet. The quick coupling of the pressure hose is marked in red colour. It is recommended to connect the return hose directly underneath the tank oil level. It is recommended to fit the return hose with a return filter with a nominal flow of approx. 3 x the pump flow and a filter gauge of 10 µm (about 25 µm abs.) if the tractor does not already have a sufficiently effective filter.

In some control valves the pilot operation of spindle is hydraulic, and an additional return hose is required for control. The given hose should be connected to the tank directly without a quick coupling. An improper connection may cause damage to the control valve. Valves that require an additional hose include Walvoil ON/OFF and valves with hydraulic pilot operation.

The recommended max. continuous pressure for the return oil is 10 bar. (For pressure measuring refer to Maintenance instructions). Improperly connected pressure and return hoses can cause valve damage. Always check that no pressure will enter into the return hose before you engage the pressure.

If the loader is operated with more than 50 l/min oil flow, there is a risk that the return oil pressure rises above the recommended level. In that case the return hose should be connected to the tractor without a quick coupling, preferably directly to the hydraulic oil tank.

When installing and reconnecting, look out for blockages in the return line that may be caused by the position of the tractor valve or an improperly or inadequately connected quick coupling. A clogged return line can damage the loader valves or the hydraulic pump.

4.7.3 Connecting to a constant pressure hydraulic system (e.g. John Deere)

The installation set and instructions are available from the manufacturer.

4.8 DECALS

The loader delivery also includes a decal, which states the minimum safe approach distances to live electrical wires. The decal should be mounted to such a place, e.g. on the inside of tractor's rear window, where it could be easily read when operating the loader.

4.9 PLATES

The loader delivery also includes a load decal. The decal should be mounted to such a place, where it would be clearly legible from the operating point.

5 INSPECTIONS

This section of the manual explains the issues related to loader inspection. The subsections Commissioning inspection, Regular inspection, Thorough regular inspection, competence of the inspector and Storage of the report are based on the Finnish Council of State Resolution No. 403/2008.

5.1 COMMISSIONING INSPECTION

Before taking it into use for the first time and operation after repair and modifications significant from the aspect of safety, the loader should pass a commissioning inspection. This involves measures stated in the Commissioning Inspection Report (appended), including the inspection of parts and devices that are significant for safety, conducting of a pressure test according to standard EN 12999 or manufacturer's instructions, and inspection of standing stability according to standard EN 12999, if needed. The loader control system that is based on contact-free (electromagnetic) data transmission should be inspected also when installed to a loader that is in use.

5.2 REGULAR INSPECTION

A loader in active use should be inspected at least once a year and at shorter intervals if required for special reasons. A loader in active use should be subjected to regular inspection and related test run in every 12 months and the related test run at the maximum permitted load in every four years. Procedures provided in the Regular Inspection Report (appended) are carried out in the inspection, paying special attention to the fatigue, wear of materials caused by operation, to corrosion and other damages. Structural modifications significant from the safety aspect should also be inspected.

5.3 THOROUGH REGULAR INSPECTION

In addition to regular inspections the loader should also pass a thorough regular inspection not later than in 10 years after the first commissioning.

When determining the time of thorough regular inspections, the operating conditions of the loader, damages observed in regular inspections, completed repairs and possible type defects manifested in the loader should be taken into account.

The thorough inspection involves dismounting of such parts vital for safety, which cannot be checked for their functional reliability otherwise. The inspection should be conducted with non-destructive inspection methods.

5.4 INSPECTOR

The person conducting the commissioning and planned inspection should be sufficiently familiar with the design, operation and inspection of the loader. The performer of commissioning and regular inspections should be an expert association deemed competent by an appraisal body, or an independent expert approved by a certification body deemed competent by an appraisal body as provided in § 4 of the Act on Verification of Competence in Compliance Assessment Services (920/2005).

5.5 STORAGE OF THE REPORT

The loader delivery includes forms of the reports of commissioning and regular inspections. Such forms should be filled out in each inspection and then stored with the loader or kept available nearby throughout the service life of the loader.

5.6 PERFORMING THE INSPECTION

5.6.1 Safety instruction



- **For inspection the same safety instructions apply as to normal operation.**
- **Read the operating manual and especially its safety instructions before performing the inspection.**

- *Ensure that the loader is sufficiently stable during the inspection.*
- *Ensure that the tractor and loader risk zones are clear of people during the inspection.*
- *Do not loiter under the loader or load during the inspection. Be careful.*
- *Observe the given safe approach distances to live electricity conductors.*

5.6.2 Inspection

- *The machine has been test loaded at the factory according to EN 12999 and this is recorded in the report.*
- *Inspection date and the name of the inspector should be recorded for each inspection.*
- *The stability of the machine unit is determined only in connection with the mounting inspection, if no modifications affecting the stability are performed. You will find the instructions for determining the stability in the section 'Stability'.*

5.6.3 Controls

- *The control valve levers shall function without getting stuck and should return smoothly to their middle position.*
- *Check that the levers function as notified on the functioning decal for controls. If the lever succession has been altered at the request of the operator, so that it differs from the standard EN 12999, this must be stated in the inspection record.*

INSPECTIONS

5.6.4 Plates and decals

The following decals and plates should appear on the loader:

- *machine plate*
- *load plate visible from the cab*
- *an undetachable decal notifying the functions of controls*
- *a plate at a visible place (an undetachable decal inside the cab) with minimum safe approach distances to live electricity conductors*
- *a "Risk zone 25" decal on both sides of the booms of a loader for handling of round timber, which has no hose burst valves or load lowering valves installed*

5.6.5 Hydraulic hoses and pipes

- *Check for worn areas or deformations on the hydraulic hoses, which could lead to hose burst.*
- *Check for any deformation or damage on the hydraulic couplings and pipes, which could cause sudden failure.*
- *Check the hose covers and their movements in different loader positions.*

5.6.6 Load-bearing steel structures and welding seams

- *After a test run check for any tear, crack or other severe permanent deformation in steel structures and welding seams.*
- *Check for any improper modification or repair welding on structures.*

5.6.7 Pin lockings on axles

- *Check that the pin lockings on axles are tight and fastened.*

5.6.8 Hydraulic system

- *Check if any modifications have been made to the hydraulic system, which could set safety at risk, e.g. if hoses belong in the same pressure class as the original hoses.*

5.7 TEST RUN

Perform the test run with the maximum safe working load and the most unfavourable movement combinations. The maximum safe working load is stated on the load plate or decal. When determining the test load, observe the weight of the loading element and the weight of equipment attached to it, subtracting these from the maximum permitted load.

6 OPERATION

6.1 OPERATING THE LOADER

This section of the manual focuses on working procedures.

- General
- Operating principle of the loader
- Choosing the working site
- Way of working
- Training

6.1.1 Safety instructions



Read and understand the operating, maintenance and safety instructions before you use the machine or carry out any maintenance works. Operating, maintenance and adjustment procedures may only be carried out by a person, who has been trained in the operation and maintenance of the specific machine. Inadequate information about the functioning and properties of the machine may lead to serious injuries or death.



The operator should always use the safety equipment required by regulations, such as a safety helmet, overalls, safety footwear, ear protectors, safety glasses and other safety equipment necessary in the work.

- *Become thoroughly familiar with the operating and safety instructions before starting to use the loader, and observe the instructions during the work.*
- *Always engage the parking brake of the tractor and/or use wheel wedges during the loading work.*
- *Make sure you have unrestricted view over the whole working area.*
- *Before starting the work with the machine make sure that there are no unauthorized people, animals or items in the hazard zone of the loader.*
- *When you notice a person, an animal etc. approaching the loading site, lower the load, warn with a signal and continue with the work only after making sure that no-one is at the loading site.*
- *It is prohibited to use the loader for lifting people.*
- *Avoid abrupt movements with the loader and running the slew mechanism at high speed to its end position. Load swinging can cause the loader to tip over.*

6.2 GENERAL

Efficient and safe work requires good knowledge of the device and thorough practical experience. Every loader model has different paths and speeds of movement as well as characteristics and therefore even a very experienced operator should learn thoroughly the characteristics of a new loader before starting to work with it.

6.2.1 Choosing the working site

Already before acquiring or gathering the material to be loaded, observe the needs and restrictions of the loader.

6.2.2 Timber hauling from the wood

- *Choose such driving routes that the loading site will be as level and firm as possible.*
- *Plan the wood piles so that the timber could be loaded without damaging the remaining stand.*
- *Observe the space required for the machine unit when choosing the places where to turn in the woods.*
- *Make as straight skid roads as possible to avoid damaging the stand of forest as much as possible.*
- *Observe that the stability of the machine unit is poorer when loading on slanting or soft ground.*

6.3 WAY OF WORKING

6.3.1 Special safety instruction

- *Engage the hydraulic pressure to the loader only after all preparations and safety procedures are carried out.*
- *Stop working immediately, if there is any hazard.*
- *Ensure the machine unit's appropriate stability.*
- *Make sure the working light will be sufficient.*

OPERATION

6.3.2 Working

- *Start the tractor engine and connect the hydraulic pressure to the loader.*
- *Let the oil circulate in the control valve for a while before starting the work with the loader.*
- *Drive all the cylinders of the loader slowly back and forth to limber up the seals. This is especially important at low temperatures.*
- *The lowest recommended working temperature of the loader is - 25° C. Notice that the hydraulic seals wear sooner, hoses are more likely to sustain damage and steel structures are more exposed to brittle fracture at low temperatures. When working at temperatures below - 25° C it is recommended to lift smaller loads than normally, to avoid unnecessary damages.*
- *Operate the loader with smooth movements and avoid sudden changes of direction. This makes working safe and effective and you avoid uncalled-for repairs.*
- *Observe the paths and positions, where the loader can collide with the cab or other parts.*
- *Use the stabilizer legs to adjust the loader in as upright position as possible.*
- *Take a firm grip of the load and always as close to the centre of gravity as possible.*
- *If you are working on a yielding ground, pull in the load close to the ground level and lift at a shorter distance, if necessary. Should the machine unit begin to tip over, lower the load to the ground as fast as possible.*
- *In all loaders for tractor mounting the valve spools for slewing and lifting boom functions are fitted with a floating position, and therefore the grapple can be lowered onto the load for shorter transports. You can engage these floating position by pushing the lever beyond its normal range of use, thus making it lock itself.*

7 MAINTENANCE

This part of the manual deals with scheduled maintenance, necessary overhauls and adjustments.

- * Lubrication*
- * Oil change*
- * Adjustments*
- * Determination of bushing wear*
- * Repair welding*
- * Tension - torque*
- * Replacing the bushings*
- * Pressure measuring*
- * Measures for storage*

7.1 GENERAL MAINTENANCE MANUAL

- *Pre-conditions for the guarantee is correct maintenance performed in accordance with the manual*
- *Use approved protective equipment when performing maintenance and repairing the appliance*
- *Have ready the necessary tools and spare parts before starting work*
- *Lubrication increases the service life, in addition to further reduce friction, take caution and remove impurities and any water from the lubricated places.*
- *Oil gradually accumulates water and impurities, which may cause corrosion and wear. Regular oil changes and dehydration minimize these problems.*
- *By making adjustments and observing the wear of the parts, the loader's usability will be kept in good working order.*
- *By keeping surfaces of the loader clean, you will notice any damages faster and therefore decrease corrosion.*

When using a pressure washer for cleaning, avoid excessive pressure.

Particularly void water penetration into the spherical plain bearings and inside the rotating device from the connection point of the column and the rotating device.

7.2 SAFETY INSTRUCTIONS

** Lower the machine onto firm ground during maintenance, repairs, adjustments and cleaning. Shut off the tractor engine and remove the key from the ignition.*

** Do not leave any loader part with pressure on the hydraulic cylinders solely.*

** Be aware of any air possibly entering the hydraulic cylinders during maintenance, because it might lead to sudden and uncontrollable loader movements.*

7.3 DAILY INSPECTIONS

7.3.1 Hydraulic hoses and pipes

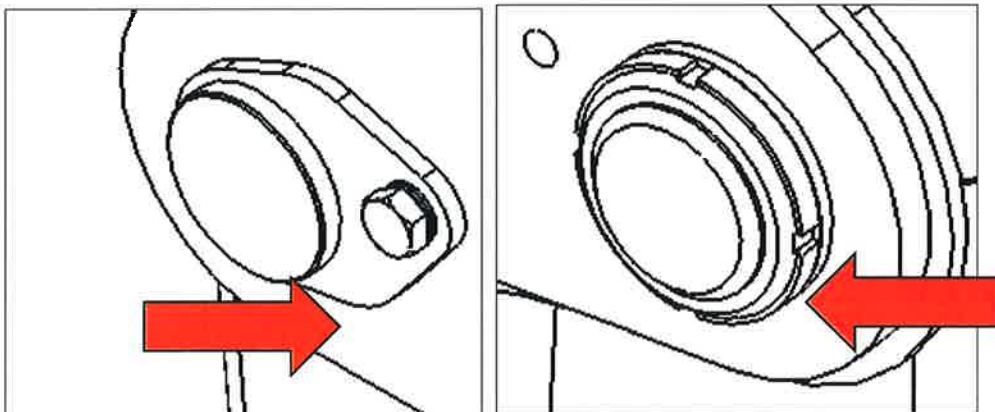
- Check that the hydraulic hoses do not have abrasions or bruises that may cause hose rupture.
- Check the hydraulic fittings and pipes for warps or cracks that can cause a sudden breakdown.
- Check the protections and movements of the hoses in their various positions on the loader.

7.3.2 Load-bearing steel structures and welding seams

- Check the steel structures and welding seams after a trial run, make certain that there are no tears, cracks, or other permanent dangerous deformations.
- Check that no inappropriate alteration or repair weldings have been made in or on the structures.

7.3.3 Shaft locks

- Check that the shaft locks are not loose or disconnected.



MAINTENANCE

7.3.4 The hydraulic system

- Check if changes endangering safety have been made in the hydraulic system, such as the hoses must be the original in their pressure class.

7.4 SLEW MECHANISM

7.4.1 Greasing the slew mechanism

- For the slew mechanism upper bushing to be equally greased, turn the pillar into different positions. Grease the slew mechanism every 10 hours. Observe that the upper bearing of an oil immersed slew mechanism is lubricated with grease.
- Lubrication schedule, item 1.

7.4.2 Lubricating the control valve

- Lubricate the control valve levers with lubricating oil every 50 hours.
- Lubrication schedule, item 5.

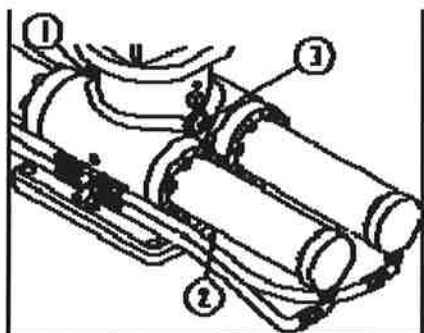
7.4.3 Changing the slew mechanism oil

- Check the oil quantity of the slew mechanism every 50 operating hour and change the oil every two (2) years. The first oil change shall be carried out after 50 operating hours.
- Remember to remove water from the slew mechanism twice a year. Open draining plug, number 2. Pour the water out until the oil starting to come out. Screw back the draining plug.
- Check the oil quantity by inclining the loader 5° - 10° in the direction of the oil filling plug.
- If you cannot observe the oil level from the oil gauge, add oil up to the lower edge of the filling hole.
- Filling quantity 2.6 l
- High quality transmission oils (80W/90) may be used in the slew mechanism. Avoid using hydraulic or gear oil.
- Lubrication schedule, item 6.

MAINTENANCE

7.4.4 How to change oil (Slew mechanism)

- Drain the oil from the slew mechanism into a waste oil vessel by unscrewing the oil drainage and filling/check plug. Drain all the oil.



1. Filling / check plug

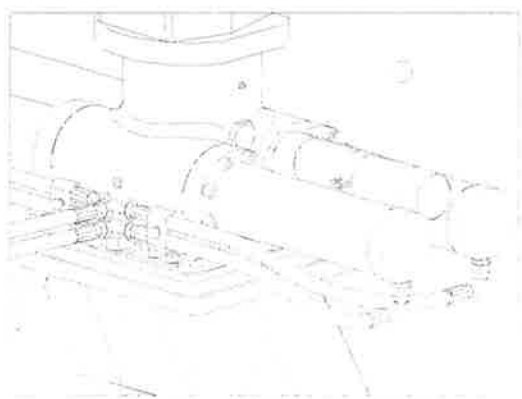
2. Draining plug

3. Check oil gauge

- Screw back the draining plug.
- Fill the slew mechanism to the lower edge of the filling hole with recommended oil quality.
- Screw back the filling/check plugs.
- Tidy up and send the waste oil to a waste oil treatment plant.

7.4.5 Tightening the mounting bolts of loader

- Check the tension of the loaders slewing equipment mounting bolts and tighten them, if required, after the first 20 hours of operation and then after every 250 hours of operation.
- Tensioning torque of the securing bolts (8 pcs., M24 10.9) is 900 Nm.



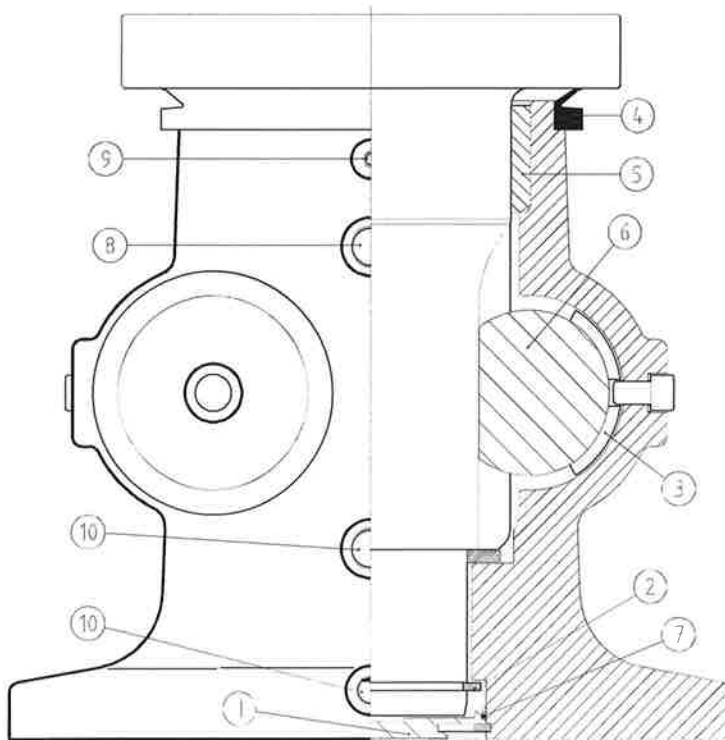
1. Mounting bolts

7.5 DISMANTLING THE SLEW MECHANISM

- The crane and auxiliary lifting equipment used for lifting the loader or its components shall be safe to operate and have sufficient lifting power (about 16000 N).
 - Use suitable supports to prevent the loader from tipping over when working. Never use a hydraulic jack for support.
 - Never loiter under the load when lifting or working.
 - Take protective measures for the harmful effects of the lubricant.
- Position the slew mechanism into its middle.
 - Lift the loader from its lifting brackets at its centre of gravity so that it will slightly jerk upwards.
 - Remove the mounting bolts of the loader.
 - Drain the lubricating oil of the slew mechanism into a waste oil vessel.

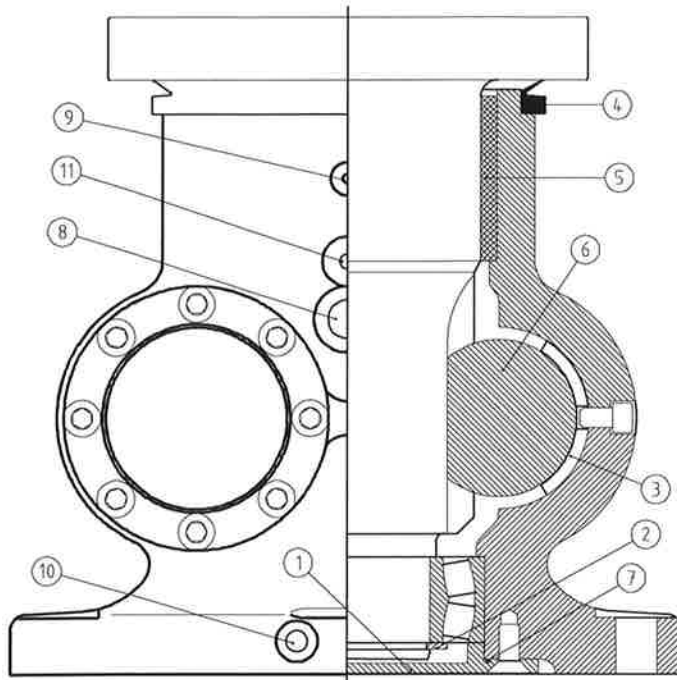
56-69S

56-85SS



1. Bottom plate
2. Lower locking
3. Thrust bearing
4. Seal
5. Radial bushing (upper)
6. Rack bar
7. Seal
8. Oil filling and checking
9. Grease fitting
10. Oil draining

MAINTENANCE



1. Bottom plate
2. Lower locking
3. Thrust bearing
4. Seal
5. Radial bushing (upper)
6. Rack bar
7. Seal
8. Oil filling and checking
9. Grease fitting
10. Oil draining
11. Breather

65-69S

65-85SS

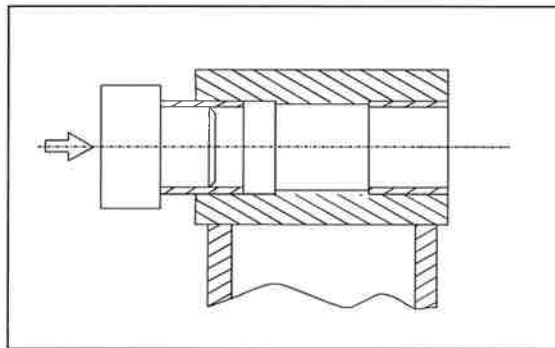
- Remove bottom plate 1 of the slew mechanism. (12)
- Support the slew housing on a firm ground and remove lower locking 2 of the gear shaft, thus keeping the slewing area correct during mounting.
- Lift the pillar (14) slowly and shake it when lifting.
- Lift the pillar aside and protect the bearing surfaces. (5), (13)
- Detach the hydraulic hoses and pipes of the slew mechanism cylinder barrels.
- Detach the slew mechanism cylinder barrels by unscrewing them from the cylinder pipe ends with e.g. a chain spanner.
- Drain the hydraulic oil from cylinders into a waste oil vessel.
- Detach thrust bearing (3) of the rack bar and pull out the rack bars (6). The rack bars are not in pairs, so remember to mark them off and to mount them on the same side you detached them from.
- Replace seal (4), (7) if needed.
- Assemble the slew mechanism in reverse order.
- When mounting, position the rack bars in their middle position so that the centre mark on the rack bar strikes the centreline of the slew housing. Lower the pillar into its place in the same position as when dismantling.

7.6 THE BOOMS

7.6.1 Greasing the booms and cylinder links

- Grease the booms and cylinder links every 20 hours.
- Use that much grease that you can see old grease oozing out from the links.
- Lubrication schedule, item 2.

7.6.2 Replacing bearings

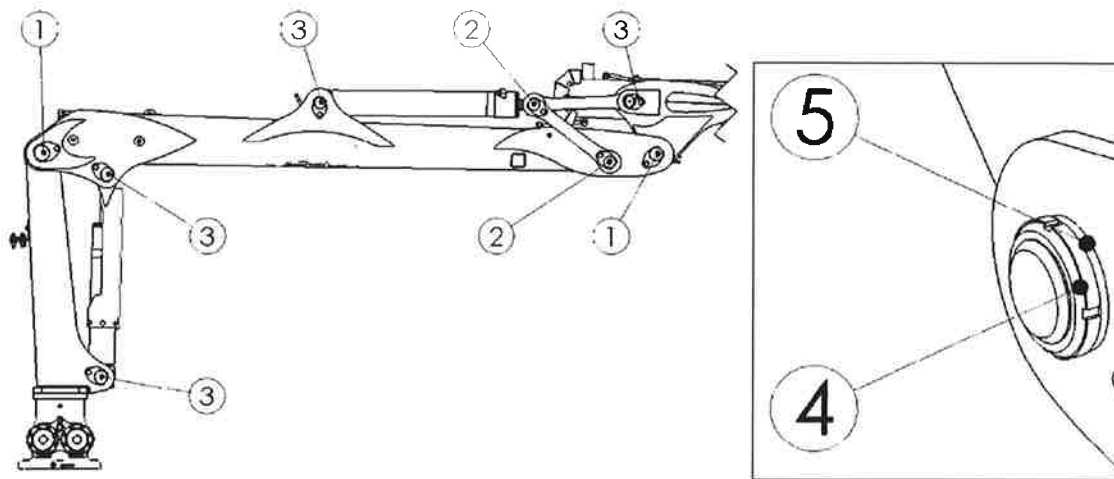


- When the bearing is worn so that the joint clearly shows a significant gap, pull the shaft and the former bearings, for example, by wedging it open at the seam.
- When installing the new bearings use a suitable mandrel to prevent breakage of the bearing.
- Ensure that any grease holes are aligned during the installation.
- Before installing the shaft, the small pockets of grease in the bearings must be carefully filled-in with the recommended grease.
- Check also the shaft. If its surface is worn or scratched, it has to be replaced.

7.6.3 Greasing the grapple

- Follow the grapple's own maintenance instructions.
- Lubrication schedule, item 4.

7.6.4 Tightening of joints



- Tighten the joints marked with number 1 by turning the nut 4 firmly until the slack is removed
- Tighten the joints marked with number 2 by turning the nut 4 firmly until the base plate 5 can be rotated by hand more snugly (washers should not be tightened so much that they cannot rotate)
- the joints marked with number 3 cannot be tightened
- finally, check the shaft flange fixing screws for tightness

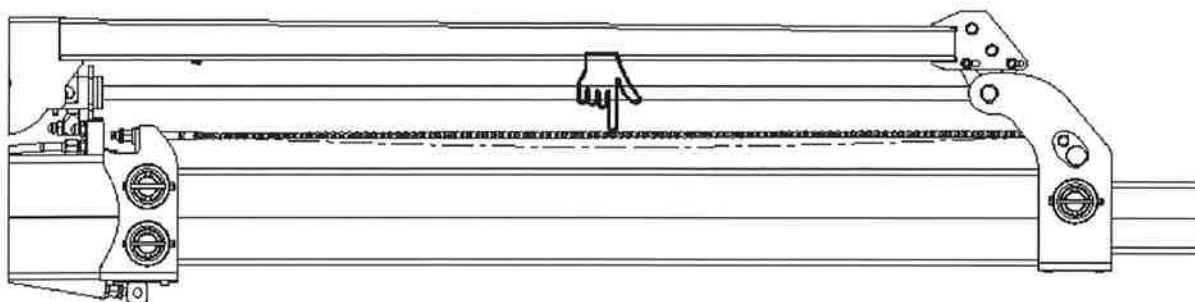
7.6.5 Greasing the boom extensions

- Move the boom extension back and forth to ensure equal greasing.
- Grease the boom extension every 50 hours.
- Lubrication schedule, item

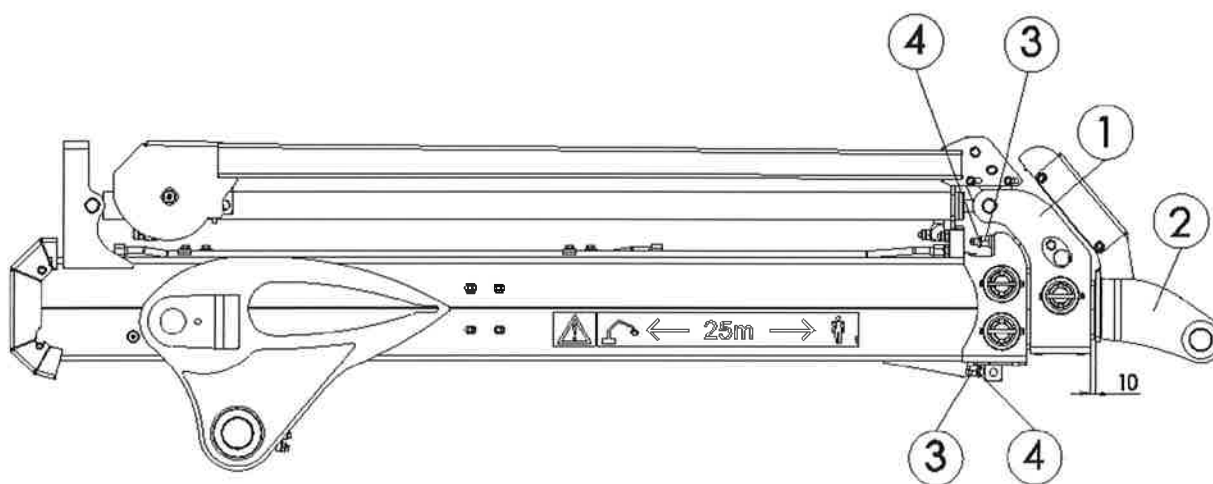
MAINTENANCE

7.6.6 Adjusting the chain tension (models with double extension)

- Check the adjustments of the booms after first 20 operating hours and from then on every 250 operating hours.



- Extend the extensions fully and then retract them some, so that the visible chain becomes slack.
- Tighten both chains equally. The tension is correct, when the chain will flex about 20-30 mm, when pushing downward at the centre of the chain by hand.



- The distance between the lugs of extension 1 (1) and extension 2 (2) with extensions retracted must be about 10 mm (refer to drawing).
- If needed, adjust the distance by slackening and tightening the extension and retract chains with nuts (3). Finally tighten the locking nuts (4).
- If tightened too much, the chains and chain gear bushings will wear.
- A too slack chain may break, when it gets to run on the edge of the chain gear.

MAINTENANCE

7.6.7 Adjusting the swing damper

- *Adjust the swing damper of the link for the first time after 20 operating hours and from then on, every 250 operating hour.*
- *Swing the loader boom sideways so that the grapple will swing its entire path sideways.*
- *If the grapple swings more than twice before stopping, the swing damper must be adjusted.*
- *Adjust by turning the adjusting screw of the brake pad.*
- *If the friction surface of the brake pad is < 2 mm, replace the brake pad.*
- *Make sure there is no grease on the friction surface.*

7.6.8 Adjusting the boom extension

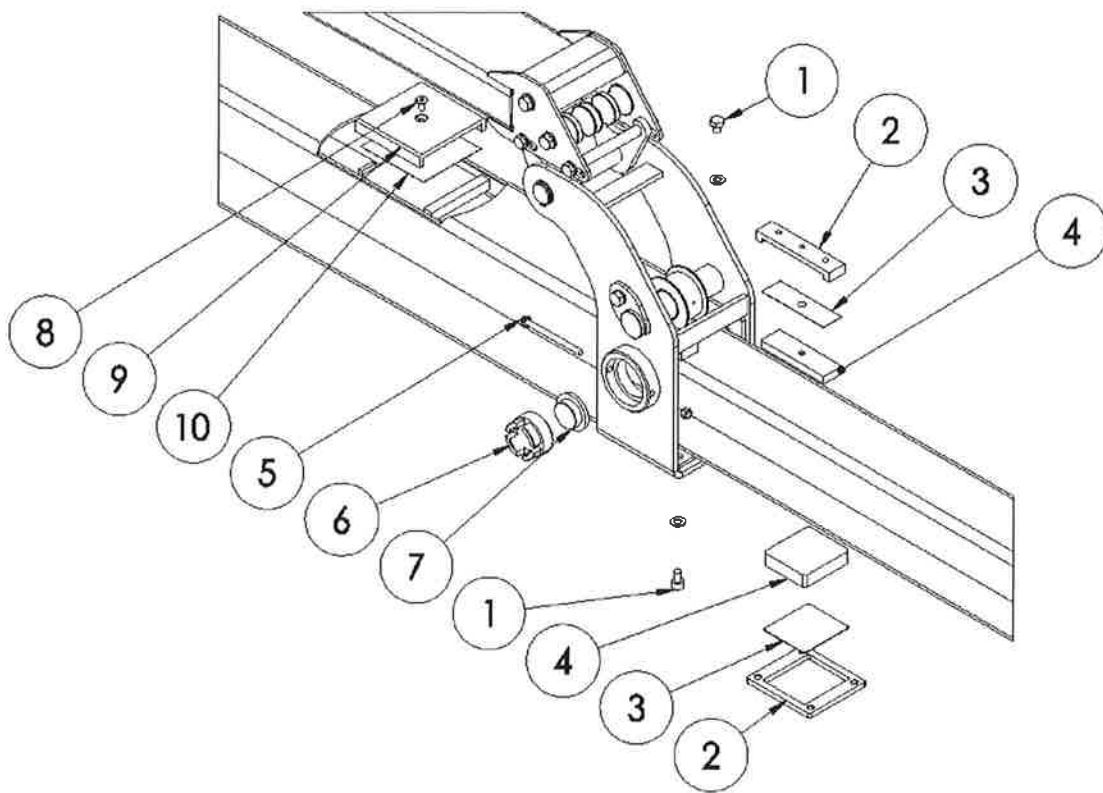
These instructions only apply to loaders having a hydraulic boom extension.

Check the adjustments of the booms after the first 20 operating hours and from then on every 250 operating hours.

7.6.9 Adjusting the gaps in the transfer boom

- *If you feel a gap when moving the end of the transfer boom, you must check the gaps of the slide pads.*
- *Use a feeler gauge to measure the gaps between the slide pads that are located at the mouth of the transfer boom. Adjust the gap if it exceeds 1.5 mm.*
- *The gap between the back slide pads of the transfer boom can only be measured accurately when the boom is dismantled. Adjust the gap if it exceeds 1.5 mm.*
- *Sliding blocks may not be adjusted to be clearance free because as their wear increases, the movement of the extensions can be blocked*

MAINTENANCE



Front sliding blocks, vertical clearance

- Open the fastening screws (1).
- pull the parts 2, 3, and 4 out
- The gap in the top/bottom direction is adjusted by placing the adjustment plates (3) under the sliding block (4)
- Sliding blocks (4) must be replaced when the height of the adjustment plates is greater than 3 mm
- Assemble the parts and tighten the screws

Front sliding blocks, horizontal clearance

- By opening the sliding block (7) brackets and (6) locking screws, (5) then tightening the fasteners on both sides of the boom until the clearance has been removed. Finally the locking screws are fastened (attachment slots in increments of 90°).
- If the gap is not eliminated by turning the bracket, the sliding block (7) has to be replaced.

MAINTENANCE

Rear sliding blocks, vertical clearance

- *When adjusting the rear sliding blocks the transfer boom must be dismantled*
- *The side direction cannot be adjusted*
- *Open the fastening screw (8).*
- *The gap in the top/bottom direction is adjusted by placing the adjustment plates (10) under the sliding block (9)*
- *Sliding blocks (9) must be replaced when the adjustment plates height is greater than 3 mm*
- *Assemble the parts and tighten the screws*
- *When the transfer boom has been dismantled for the clearance adjustment, check when re-assembling, make sure that all parts are in good condition and if necessary, correct any deficiencies.*
- *In the assembly, tighten all screws and nuts to the specified torque (see table)*
- *Use a locking agent for all screw connections (except when Nyloc nuts or connections using Nordlock washers as chain fastening nuts of the extension are used)*

7.6.10 Dismantling the transfer boom

- *Extend the extensions by approximately 50 cm.*
- *Detach the roller guide (model with two extensions), the extension cylinder and the hydraulic hoses from the transfer boom.*
- *Detach all slide pads from the mouth of the transfer boom and extension 1.*
- *Detach the pair of chains.*
- *Slide the chain fastener of the lower chain into the opening and pull it out through the mouth of the boom. At the same time, pull the entire extension assembly (extensions 1 and 2) out from the transfer boom.*
- *Remove the chain roller from the mouth of extension 1 in order to be able to pull the end of the upper chain out through the mouth of the boom. Then pull out extension 2.*
- *For a model with one extension, complete phases 1 to 3 (the extension cylinder is inside the boom; a fixed hose guide).*
- *Re-assemble the transfer boom in the reverse order.*

7.7 THE HYDRAULIC SYSTEM

When replacing the hydraulic system components such as hoses, couplings, gaskets, etc., it must be ensured that their characteristics meet the original parts. Trouble-free and safe operation is ensured the best by using original spare parts.

7.7.1 Checking the oil level

The hydraulic system oil level check is performed within ten (10) hours of operation.

7.7.2 Changing the hydraulic system oil

- Always change the oil after first 50 operating hours.
- Change the oil every 250 operating hour, if the tractor hydraulics are not fitted with separate return oil filter.
- Change the oil every 500 operating hour, if the tractor has a good hydraulic oil filtering.
- Change the oil every 1000 operating hour, if the separate hydraulic system is fitted with good filtering.
- Oil filling quantity 15 - 25 l depending on loader size, which means that a considerable quantity of oil remains unchanged when changing oil. Therefore you have to pay special attention to the quality of the new oil and its compatibility to the first filling oil.
- Hydraulic oils and high-class motor and multi-purpose-oils are well suited for hydraulic systems.
- First filling oil: Shelloil Harvella T10W/30. Foremost follow the recommendations of the tractor manufacturer or the supplier of the separate hydraulic system.

7.7.3 Biodegradable hydraulic oils

- Instead of normal hydraulic oils, oils that dissolve quicker in the environment have been developed to minimise the damage in case of oil leakage. Many forestry companies require the use of these oils in their machines.
- Normal oils cannot directly be replaced with any biodegradable oil without changing the hydraulic components (e.g., pump seals, hoses).
- Biodegradable oils are divided into three main classes:
 1. Synthetic hydraulic oils based on esters (HEE)
 2. Synthetic hydraulic oils based on polyglycols (HEPG)
 3. Hydraulic oils based on vegetable oils (HETG) e.g. rapeseed oils

MAINTENANCE

- **NOTE!** *The use of HETG oils is prohibited*

- **NOTE!** *Before using a biodegradable hydraulic oil, consult your oil dealer when choosing a suitable oil type and clarify its suitability for the pump seals and other hydraulic components.*

7.7.4 How to change oil

- *Drive the main lifting boom, outer boom, extension and grapple cylinders fully out.*

- *Detach the hoses on the piston-rod side from the cylinders and the return hose from the hydraulic system. If the return hose has quick coupling, detach it or connect a separate counter piece to the quick coupling to keep the return line open.*

- *Place the return hose end and the hose ends of the cylinder rod side into a waste oil vessel.*

- *Push in the cylinders.*

- *Drain the boom slewing and rotator by turning both by hand to their limits a few times.*



- *Detach the rest of the hoses from their cylinders. Pump fresh oil through every hose line until there is no dirty oil left.*

- *Connect the hoses and vent the cylinders by driving each movement in turns back and forth between limits a few times.*

- *Observe extreme caution, because air in the system might cause sudden loader movements.*

- *Perform the next oil change as after first filling.*

7.8 PRESSURE MEASUREMENT

 WARNING	
	<p>DANGER OF HIGH-PRESSURE LIQUID JETS!</p> <ul style="list-style-type: none">• From a defective hydraulic hose or carelessly made connections can fly a high-pressure oil jet that in contact with the skin can cause serious injury.• Check the condition of hoses and the connections before connecting the pressure. Use the appropriate and approved protective equipment.• In case of an accident seek medical attention immediately.

7.8.1 Measuring

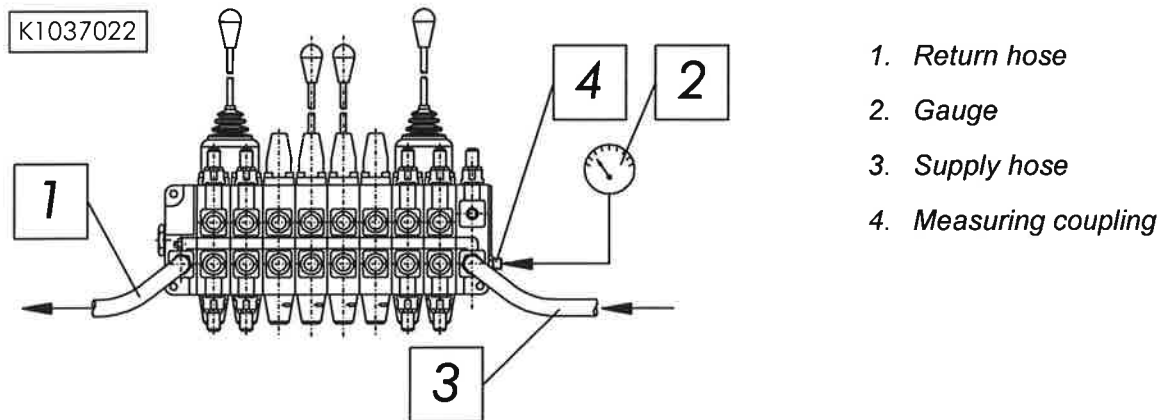
Measure the pressure of the hydraulic system as follows:

- *Warm the system to normal operating temperature.*
- *Adjust the rpm of the engine so that the flow of the hydraulic system is 30 l/min*
- *Close the grapple fully.*
- *Keep the flow engaged to the grapple cylinder, even if the cylinder already is at its max. length.*
- *Read the system pressure from the gauge connected to connector P2.*
- *Release the valve levers to their middle position and read the back pressure.*

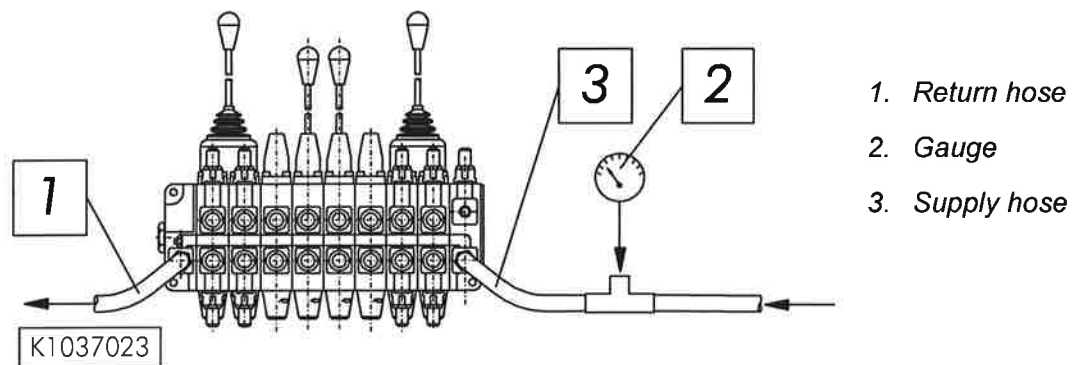
Pressure measuring spot P2 for control valve NordHydraulic.

Drawings 1 and 2. Measuring quick coupling EMA 3 DIN 2359

1. Measuring from pressure measuring coupling



2. Measuring from supply hose



7.9 LUBRICATION

The given lubricating intervals are valid provided the machine is operated with a normal load and under normal working conditions. Shorten the intervals, if the machine is heavily loaded or the working conditions unfavourable, i.e., dust, mud etc.

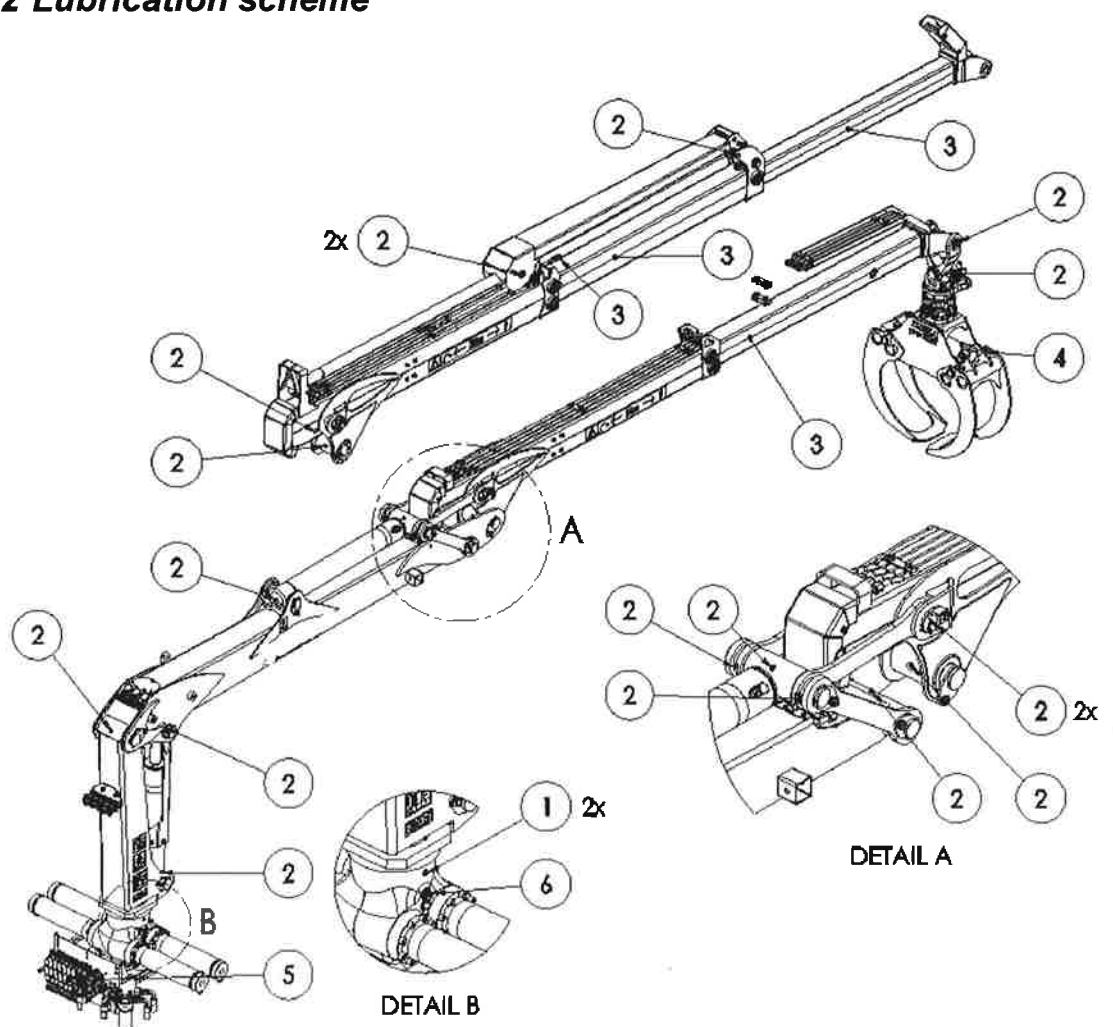
7.9.1 Lubricating greases, general

RECOMMENDED GREASES

BP	Energolene LS-EP (NLGI 2)
CASTROL	LMX GREASE (NLGI 2,5 MAN 284 Li-H2)
EXXON	Beacon EP 2 (NLGI 2)
MOBIL	Mobilux EP 2 (NLGI 2)
NESTE OIL	Superlix EP2 (NLGI 2)
SHELL	Retinax Grease EP2 (NLGI 2)
TEBOIL	Multi-Purpose Extra ((NLGI 2)
TECACO	Multifak T EP2 (Beka-Max, MAN 283-Li-P2, MB 267, Safematic, Vogel)

All grease containing additives, like molybdenum sulphide (Mo S2) and calcium based greases might cause a quicker than normal wear of bushings and even damage the bushing surface.

7.9.2 Lubrication scheme



MAINTENANCE

7.9.3 Oil recommendation (Slew mechanism)

- SAE 80W-90 API GL5

7.9.4 Oil recommendation (hydraulics)

OIL BRAND	TRACTOR HYDRAULICS AND TRANSMISSION	OIL BRAND	
		Summer	Winter **)
BP	Terrac Super Universal 10W/30	Energol SHF 46	Energol SHF 32,22
Castrol	MP 10W/30	Hyspin AWH 46	Hyspin AWH 32
Esso	Unifarm 10W/30	Univis HP46	Univis HP 32,22
Mobil	Mobi Agri extra 10W/40	DTE 16	DTE 15,13
Neste	Farm Universal 10W/30	Hydraulic 46	Hydraulic 22
Shell	Harvella T 10W-30	Tellus Oil T 46	Tellus Oil T 32,22
Teboil	Monitra Plus 10W/30	Hydraulic Oil 46	Hydraulic Oil 32,22
Texaco	Suto Extra 10W/30	Rando Oil HDZ 46 Rando Oil LT 46	Rando Oil HDZ 32 Rando Oil LT 32

*) Can be used as winter oil, if recommended for all year around use by the tractor manufacturer. Warm up the oil by circulating it through the valves for a few minutes in temperatures below -10°C and "limber up" the machine to prolong the lifetime of the seals.

**) If the oil temperature does not rise above 60° C in the summertime, it can be used all year around.

MAINTENANCE

8 MAINTENANCE SCHEDULE

	MEASURE	MAINTENANCE INTER-VAL/h (for the first time)	NOTE!
GENERAL	Check pins and lockings	10	
	Check for and repair oil leaks	50 (20)	
	Check/replace hose fittings and hoses	50 (20)	
	Check cylinder leaks and piston rods	50 (20)	
	Check condition of load-bearing structures	250	
	Tighten mounting bolts	250 (20)	
	Lubricate control valve links (lubricating can/spray)	50	Open levers
SLEW MECHANISM	Grease slew mechanism	10	
	Oil change	2 v (50)	Noin 2,6 l
BOOMS	Grease bushings	20	
	Check bushings	1000	
	Tighten joints	250	
	Grease extension	50	
	Check and adjust chain tension of extension and gaps of glide pads	250 (20)	
	Check/adjust swing damper of link	250 (20)	
HYDRAULIC SYSTEM	Check oil quantity	10	
	Replace oil filter		
	Hydr. system of tractor without separate return filter	250 (50)	
	Hydr. system of tractor with good filtering	500 (50)	
	Separate hydr. system with good filtering	1000 (50)	

9 TROUBLESHOOTING

The trouble shooting table lists the most common faults with causes and measures for eliminating the faults.

Read the guidelines in the maintenance instructions to carry out the measures.

9.1.1 Safety instruction

- Follow strictly all the instructions on the operation and safety of the loader when carrying out repairs and measures for eliminating the cause of a fault.

FAULT	POSSIBLE CAUSE	MEASURE
The loader does not move	Oil tank is empty Pressure hose coupling not properly connected Pump does not generate pressure Pressure and return hose connected the wrong way	Add oil Check the connection and compatibility of the quick coupling Measure the pressure from the quick coupling or the pressure line of the pump Connect the hoses correctly
The loader moves only a little or has no power	Return line blocked Main relief valve faulty Pump worn or the relief valve of tractor faulty or contaminated	Check the return hose connection and compatibility of the quick coupling. Measure the return pressure. Measure the working pressure from the loader. Replace the main relief valve, if needed. Measure the pressure from the tractor pressure line
One function without power	Relief valve at the particular spool is faulty Cylinder seal leaking Valve spool is worn	Measure the pressure. Replace the relief valve, if needed Lift a load, supporting it with the cylinder If the load comes down, replace the cylinder seals Lift a load, supporting it with the cylinder If the load comes down, replace the valve spool or block
Booms come down at normal load	The relief valve of the particular function is leaking Valve spool leaks	Replace with a new similar relief valve Replace the spool or block
Hydraulic system-overheats	Hydraulic pump worn out Output of the hydraulic pump too high for this particular valve Not enough oil in the hydraulic system	Measure max. pressure while the oil is hot. Replace the pump, if needed Adjust the flow to lower Add oil
Valve spoolt get stuck	Hydraulic oil overheated	see above
Oil leaking from slew housing	Too much oil added to the housing Loader inclined at too big angle during storage Seal of slew mechanism cylinder is leaking Bottom plug of slew mechanism is leaking	Drain excess oil Do not exceed permitted inclination angle $\pm 25^\circ$ Replace the seals Check the seal and mounting of the plug

10 FURTHER INSTRUCTIONS

10.1 STORAGE

- *Before lowering the loader to its storage platform make sure that the platform is stable throughout the storage period, e.g. during the thawing of ground, in rain, etc.*
- *Move the booms and grapple of the loader to their transport position.*
- *Support the loader to make sure it will not tip over during storage.*
- *Make sure that children cannot use the storage area as their playing ground.*
- *Do not exceed the permitted tilting angles during storage*

If storing the loader over a longer period, carry out the following measures:

- *Clean the loader thoroughly. If you are using a pressure washer, do not aim the jet directly at bearings, seals on cylinder rods and upper bearing of the slewing mechanism.*
- *Lubricate all the lubrication points immediately after washing. Fresh Vaseline expels water from the surfaces of bearings, preventing corrosion and wear.*
- *Check the oil of the slewing mechanism and add, if needed.*
- *Protect all cylinder rods with storage grease, e.g. Vaseline.*
- *Apply paint to all those spots, where the paint is worn or is splitting off.*
- *Eliminate all detected faults and make all necessary adjustments before storing the loader. With these procedures you ensure faultless functioning of the loader when taking it back into use.*
- *Store the machine in a shielded and secluded place, preferably under a roof. If storing the machine outdoors, use protective covers.*
- *Never place any parts of the loader directly on the ground.*
- *Store the loader in a vertical position, to prevent lubrication oil of the slewing mechanism from spilling out.*
- *Support the loader properly to avoid it from tipping over.*
- *Make sure that children cannot use the storage area as their playing ground.*

10.2 TAKING INTO USE AFTER STORAGE

- *Clean the loader thoroughly*
- *Lubricate the lubrication points and check the oil of slew mechanism*
- *Remove protection grease from cylinder rods*
- *Tighten all bolts and nuts*
- *Check all the adjustments and functioning of safety equipment*
- *Read this manual once more to recall everything.*

10.3

ACCESSORIES

10.4 DRIVING ON PUBLIC ROADS

This section explains the safety instructions for traffic on public roads while the loader is mounted to a tractor or trailer. Follow these safety instructions to avoid the risk of accident. The factory and reseller take no liability for damages resulting from non-observance of these instructions.

10.4.1 Transport position

- *When in transport position the loader should be as low as possible.*
- *Before driving to a public road, tie carefully all the accessories mounted to the loader. For example, a hanging rope of a winch, etc.*

10.4.2 Check the functioning and steerability.

- *Ensure the machine unit's appropriate stability. You should have full control over the machine unit in every situation.*
- *Check the lamps, reflectors, slow moving vehicle sign and other possible safety and protection devices as well as tyre pressures.*
- *Do not exceed the permitted axle and gross weight and transport dimensions.*
- *Before starting to move check that no-one is near the machine unit and that you have clear view.*
- *Switch the loader valve to float position if the grapple is connected with the trailer and the loader is mounted to the tractor.*

10.4.3 Driving and driving speeds

- *Follow traffic rules and regulations when driving on roads.*
- *Adjust your driving speed to the driving situation. Drive carefully on downhills and slopes and avoid abrupt turns.*
- *Remember the longer braking distance due to the transportation of the machine unit and pay attention to ice and bumps in the road.*
- *The load and all loose items should be properly tied.*

10.5 REPAIR WELDING

 WARNING	
	<p>RISK OF ACCIDENT!</p> <ul style="list-style-type: none">• If a change or repair work by welding is carried out incorrectly or incompetently, it can result in an abrupt structural breakdown, which again can cause serious injuries or material damages.• If you need to carry out repair or modification welding, first contact Kesla Oyj, where you will receive necessary instructions for the welding work.

10.5.1 General welding instructions

- a competent welder (preferably qualified)
- welding quality class WC
- remove the paint by grinding from the area to be welded
- clean oily surfaces
- connect the ground conductor close to the part to be welded (no joints in between)
- electrodes must be completely dry
- suitable electrode OK-48.39 or similar
- welding rod OK- Autrod 12,51 or similar in MIG/MAG welding

10.6 DISPOSAL OF THE LOADER

When the loader has reached the end of its service life, it should be disposed of appropriately. Follow these instructions, to avoid needless harm to the environment:

- deliver the loader to a scrapped goods treatment facility, where it will be scrapped under surveillance
- if unable to deliver the loader to a scrap yard,
 - drain the oil from the slew mechanism and the hydraulic system and deliver the waste oil to an authorised collection point
 - remove all hydraulic hoses and deliver to a collection point for waste rubber
 - deliver the metal parts to a scrap yard

11 APPENDIXES

11.1 TIGHTENING TORQUES FOR SCREWS AND NUTS

- The following tightening torques shall apply if no tightening torque is given in specific maintenance instructions.
- The values apply to dry, untreated carbon steel screw connections and dry, electro-galvanized carbon steel screw connections.

M 24 bolts and nuts	8.8 = 640 Nm	10.9 = 900 Nm
M 20 bolts and nuts	8.8 = 370 Nm	10.9 = 520 Nm
M 16 bolts and nuts	8.8 = 190 Nm	
M 14 bolts and nuts		12.9 = 210 Nm
M 12 bolts and nuts	8.8 = 80 Nm	
M 10 bolts and nuts	8.8 = 45 Nm	
M 8 bolts and nuts	8.8 = 23 Nm	

Note: 8.8 and 10.9 are the strength classes of bolts. For example, a 10.9 bolt may not be replaced with a bolt of strength class 8.8. Check the strength class from the spare parts list or the head of the old bolt when replacing a bolt.

ATTENTION

The strength classes and torques provided in these instructions should be strictly observed. Incorrect strength class or torque of a screw may cause loader breakdown.

11.2 SPECIFICATIONS

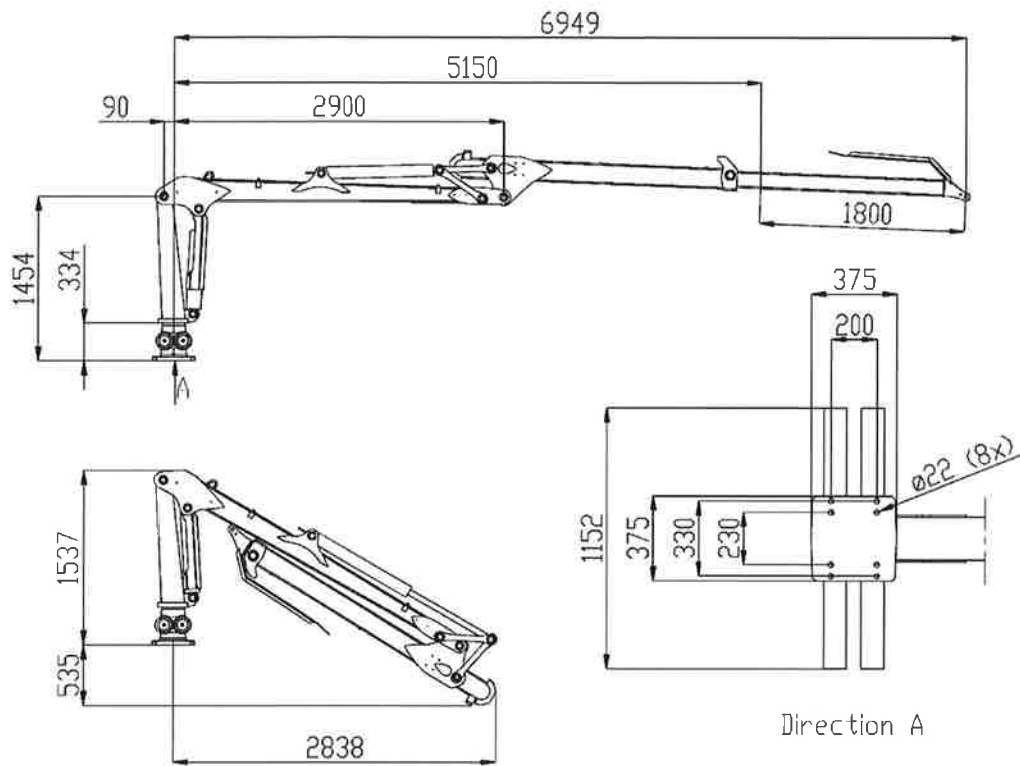
Specifications indicate the structural and functional dimensions of the loader, its lifting capacity and pressures.

SPECIFICATIONS	56-69S	56-85SS	65-69S	65-85SS
<i>Lifting torque</i> - net	43,0 kNm	39 kNm	52 kNm	45 kNm
<i>Horizontal reach</i> - basic reach	5100 mm	5100 mm	5100 mm	5100 mm
- max. reach	6900 mm	8500 mm	6900 mm	8500 mm
- hydraulic boom extension	1800 mm	3400 mm	1800 mm	3400 mm
<i>Lifting capacity without grapple and rotator</i> -with 4.0 m arm	1100 kg	1000 kg	1290 kg	1150 kg
- at max. reach	6,9 m /477kg	8,5 m/287 kg	6,9 m/577 kg	8,5 m/347 kg
<i>Boom</i> - torque	13,5 kNm	13,5 kNm	16,0 kNm	16,0 kNm
- slewing angle	380°	380°	380°	380°
Unladen weight *	975 kg	1070 kg	1260 kg	1370 kg
<i>Adjusted working pressure</i>	19.0 MPa	19.0 MPa	19.0 MPa	19.0 MPa
<i>Recommended pump output</i>	40 - 70 l / min	40 - 70 l / min	50 - 80 l / min	50 - 80 l / min

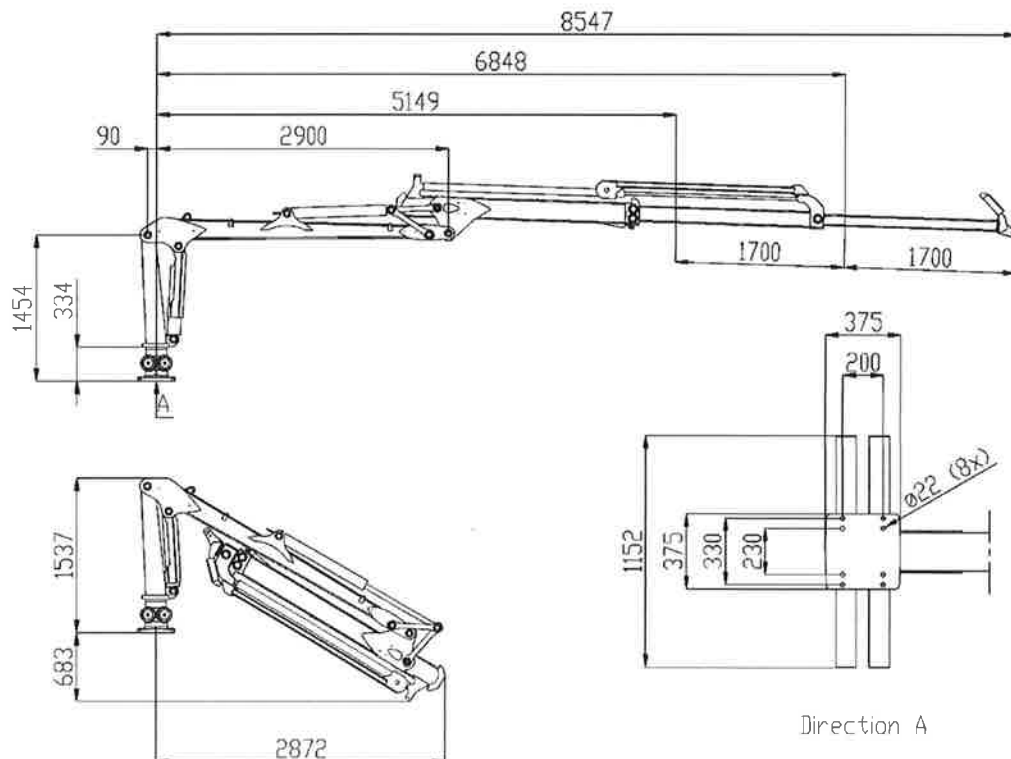
*** With rotator, grapple, link and mechanical valve**

APPENDIXES

11.3 DIMENSIONED DRAWING IGLAND 56-69S

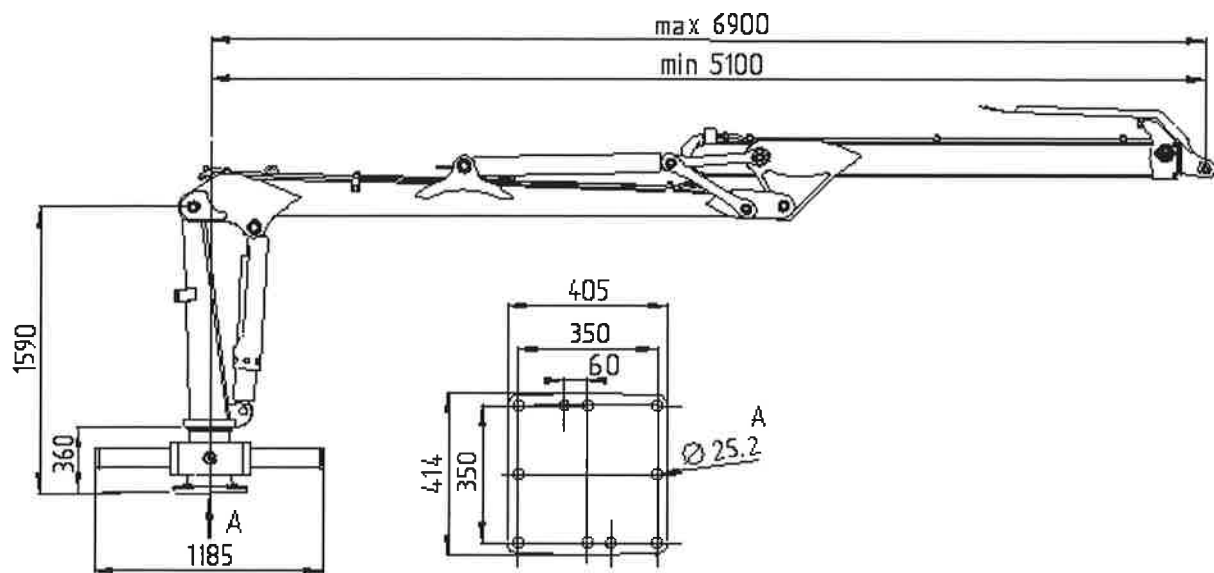


11.4 DIMENSIONED DRAWING IGLAND 56-85SS

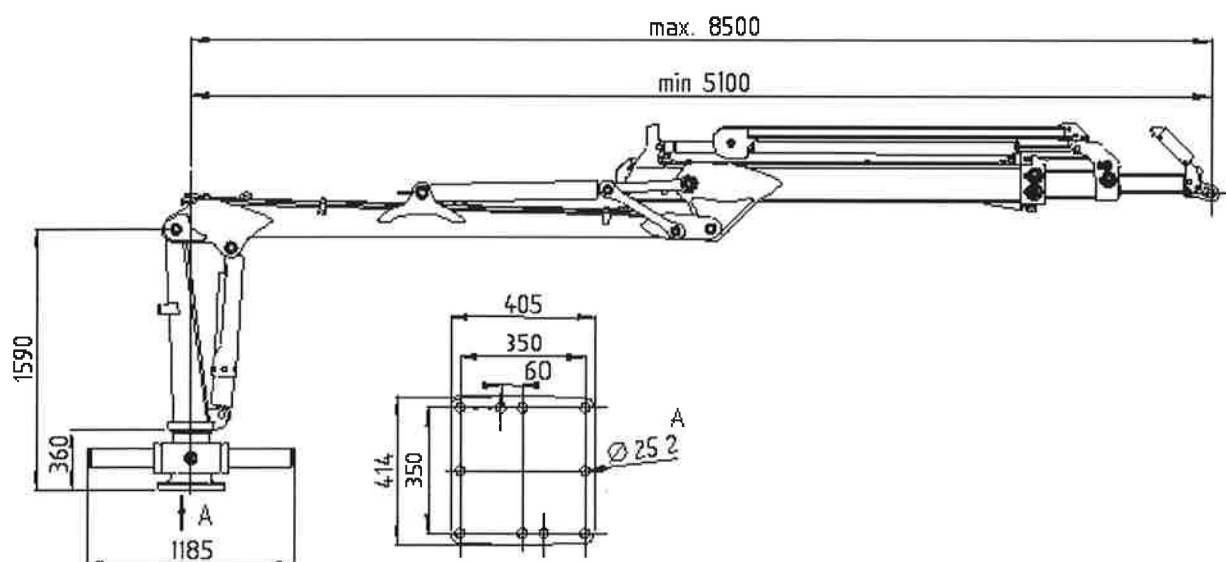


APPENDIXES

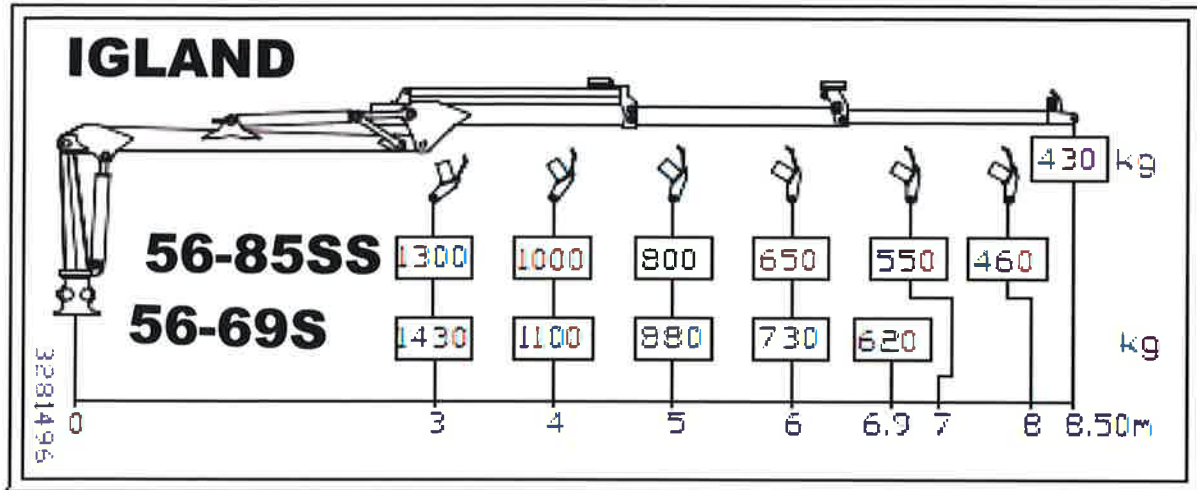
11.5 DIMENSIONED DRAWING IGLAND 65-69S



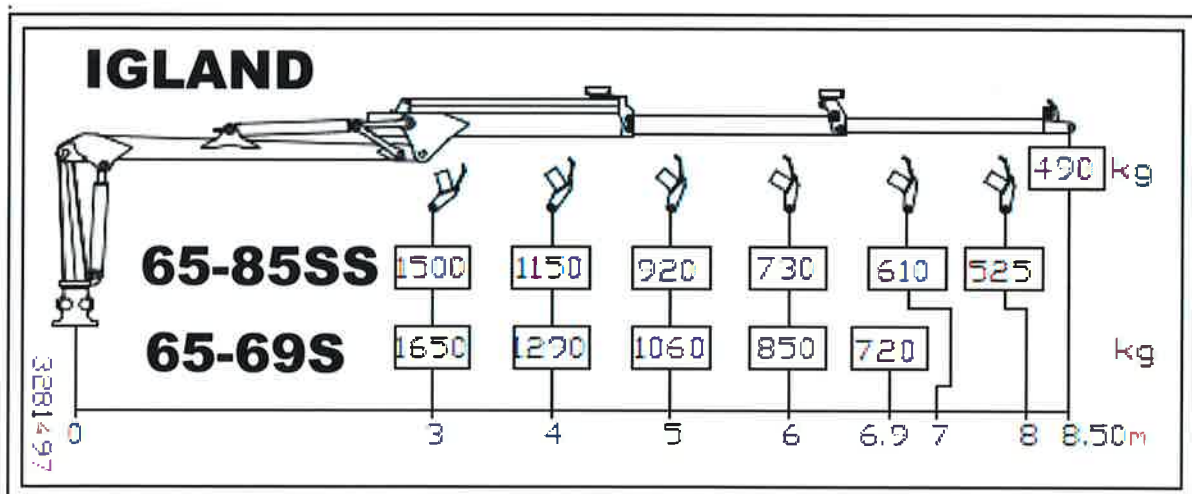
11.6 DIMENSIONED DRAWING IGLAND 65-85SS



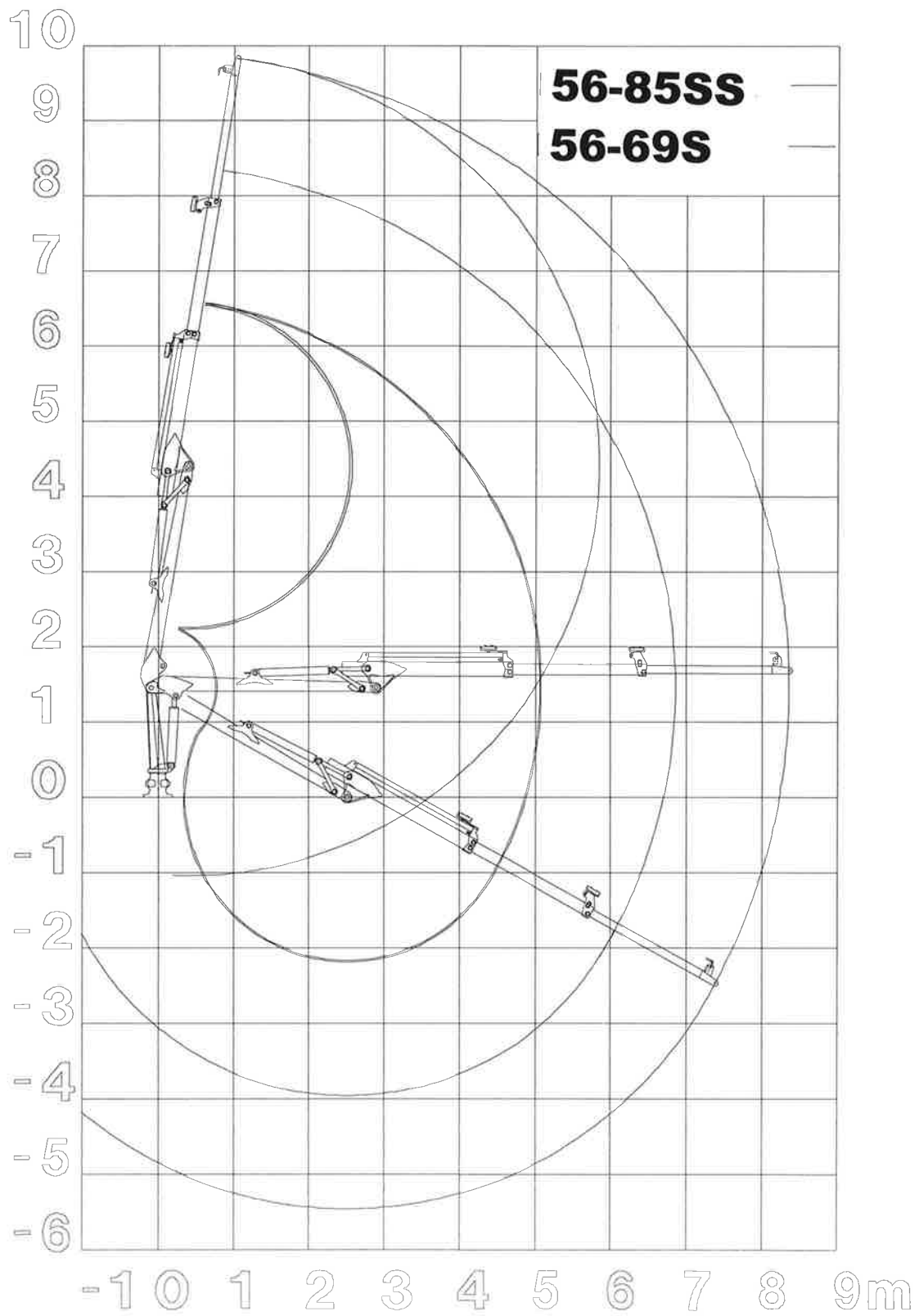
11.7 PERMITTED LOADING VALUES



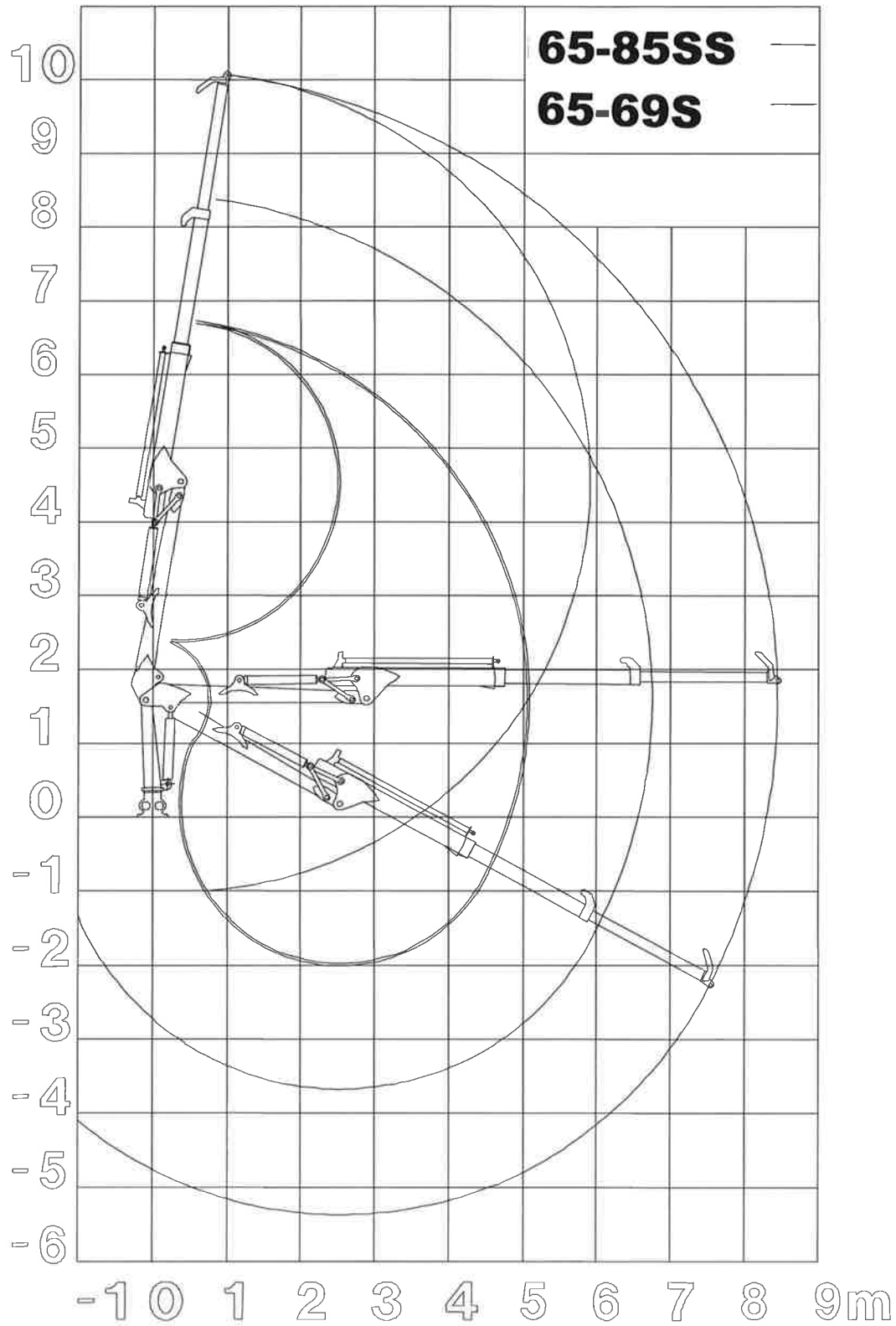
11.8 PERMITTED LOADING VALUES



11.9 MOVEMENT SCHEME **IGLAND**



11.10 MOVEMENT SCHEME IGLAND

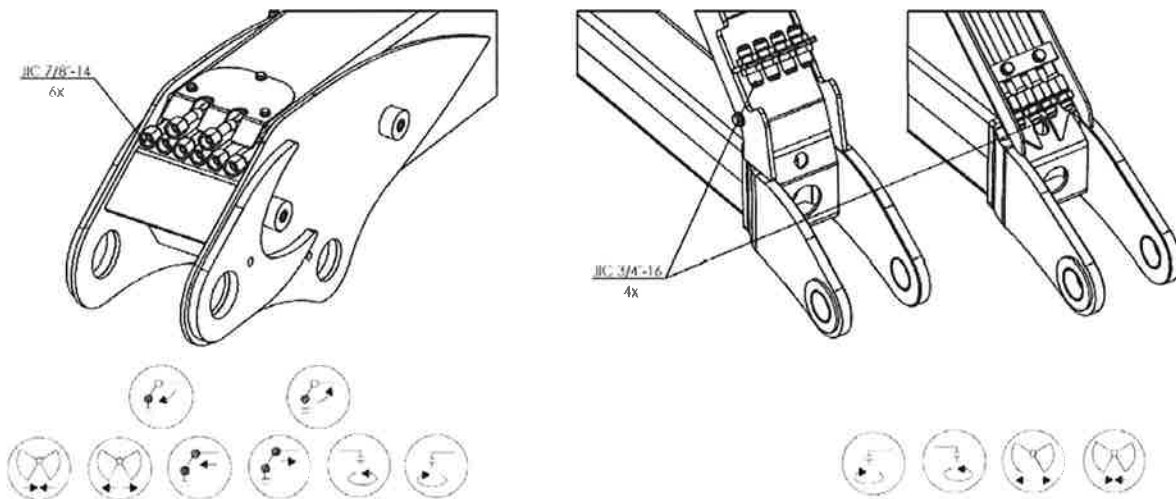


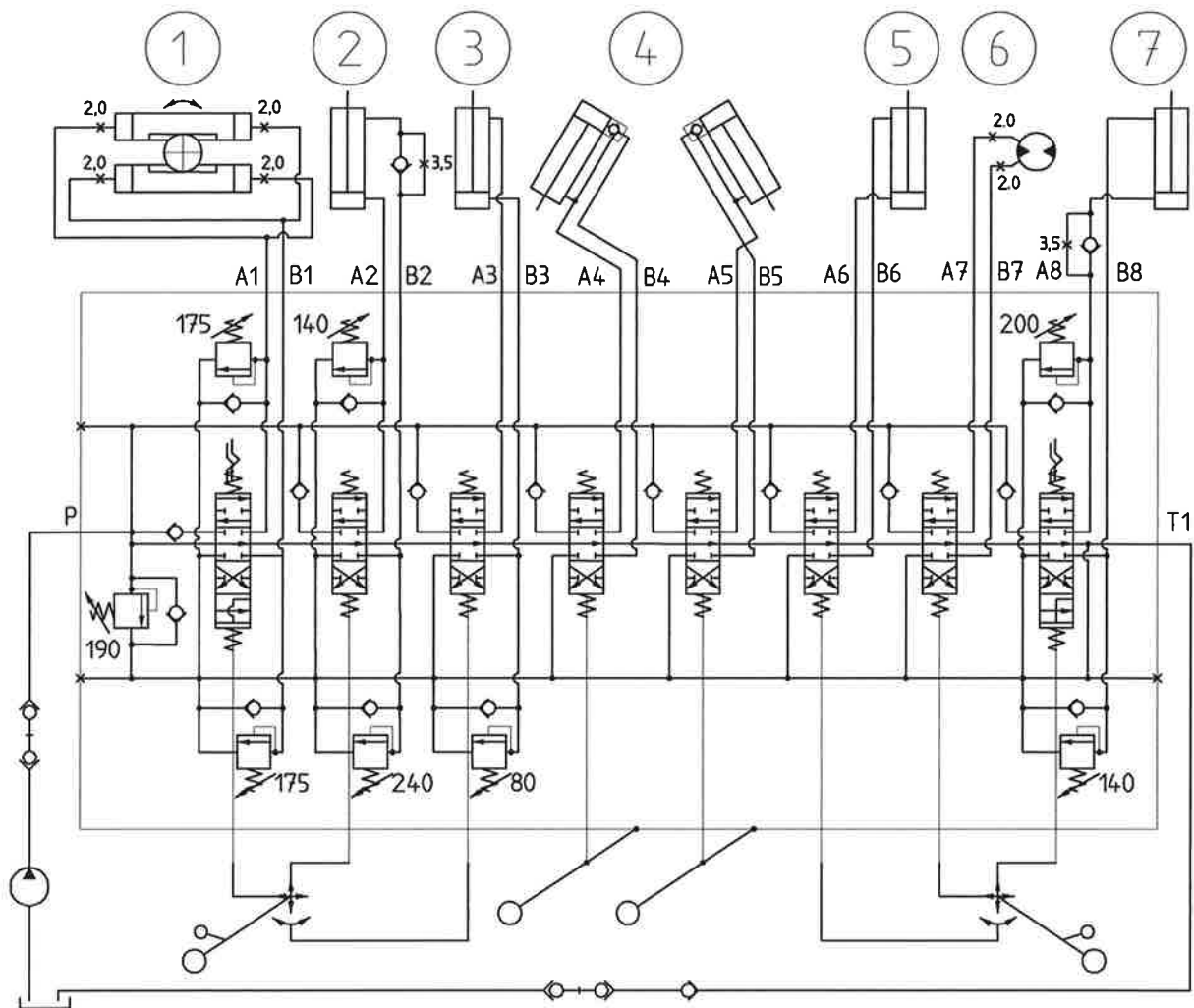
11.11 HYDRAULIC PRESSURE SETTINGS **IGLAND**

	56-69S	56-85SS	65-69S	65-85SS
- Main relief valve	19.0 MPa	19.0 MPa	19.0 MPa	19.0 MPa
- Pressure relief of slewing in both directions with restrictor	17.5 MPa Ø 2.0 mm	17.5 MPa Ø 2.0 mm	17.5 MPa -	17.5 MPa -
- Transfer arm pressure relief piston side of cylinder rod side of cylinder fixed restriction, rod side	14.0 MPa 24.0 MPa Ø 3.5 mm	14.0 MPa 24.0 MPa Ø 3.5 mm	14.0 MPa 24.0 MPa adjustable	14.0 MPa 24.0 MPa adjustable
- Lift boom pressure reliefs piston side of cylinder rod side of cylinder	20.0 MPa 14.0 MPa	20.0 MPa 14.0 MPa	20.0 MPa 14.0 MPa	20.0 MPa 14.0 MPa
- Boom extension pressure relief piston side of cylinder	8.0 MPa	8.0 MPa	8.0 MPa	8.0 MPa

Valves for lifting and slewing are fitted with so called floating positions.

11.12 CONNECTION POINTS OF THE HYDRAULICS

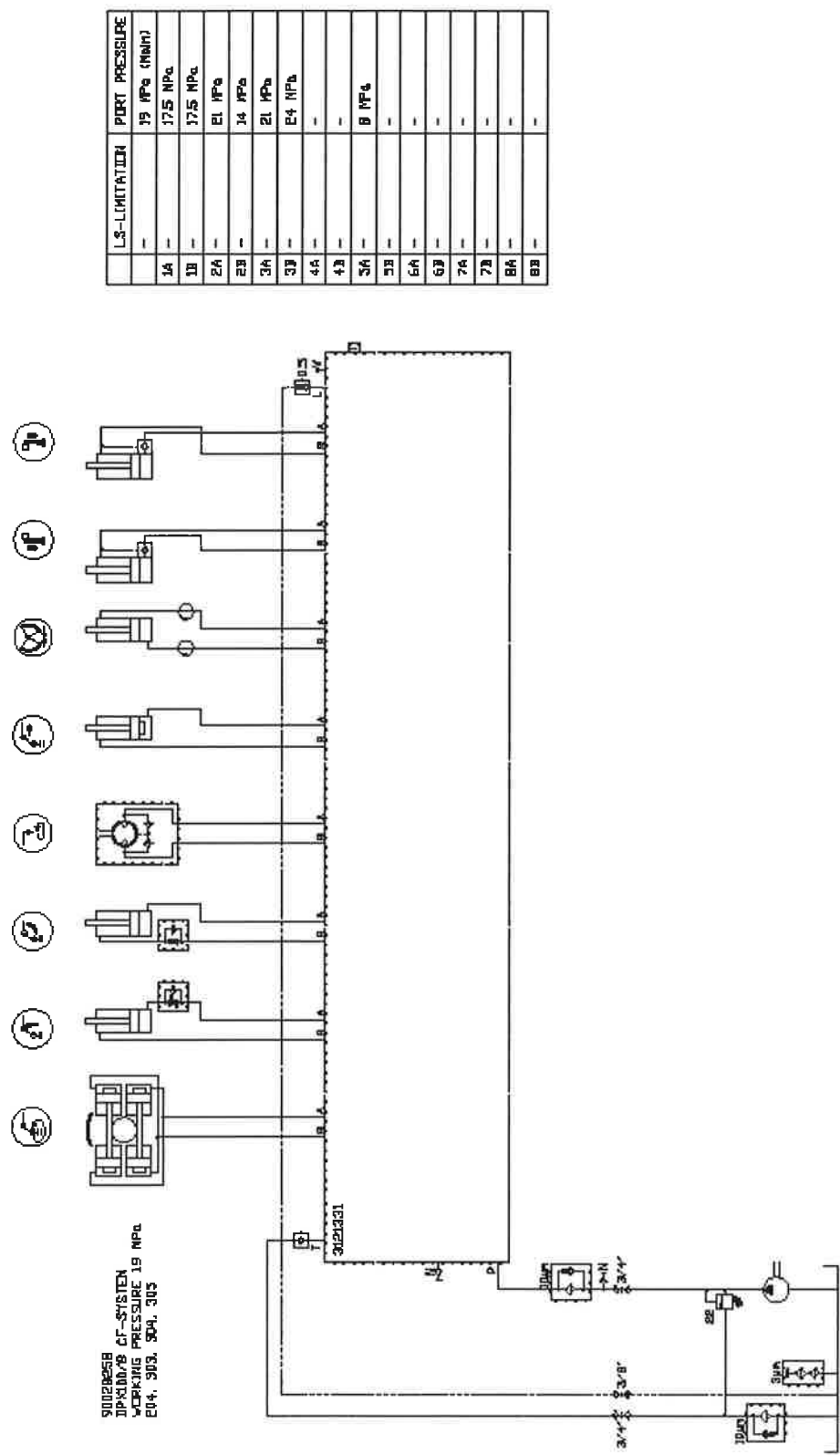


11.13 HYDRAULIC SCHEME NORDHYDYHRAULIC RS-218, 2-LEVER

Nordhydr.RS-218

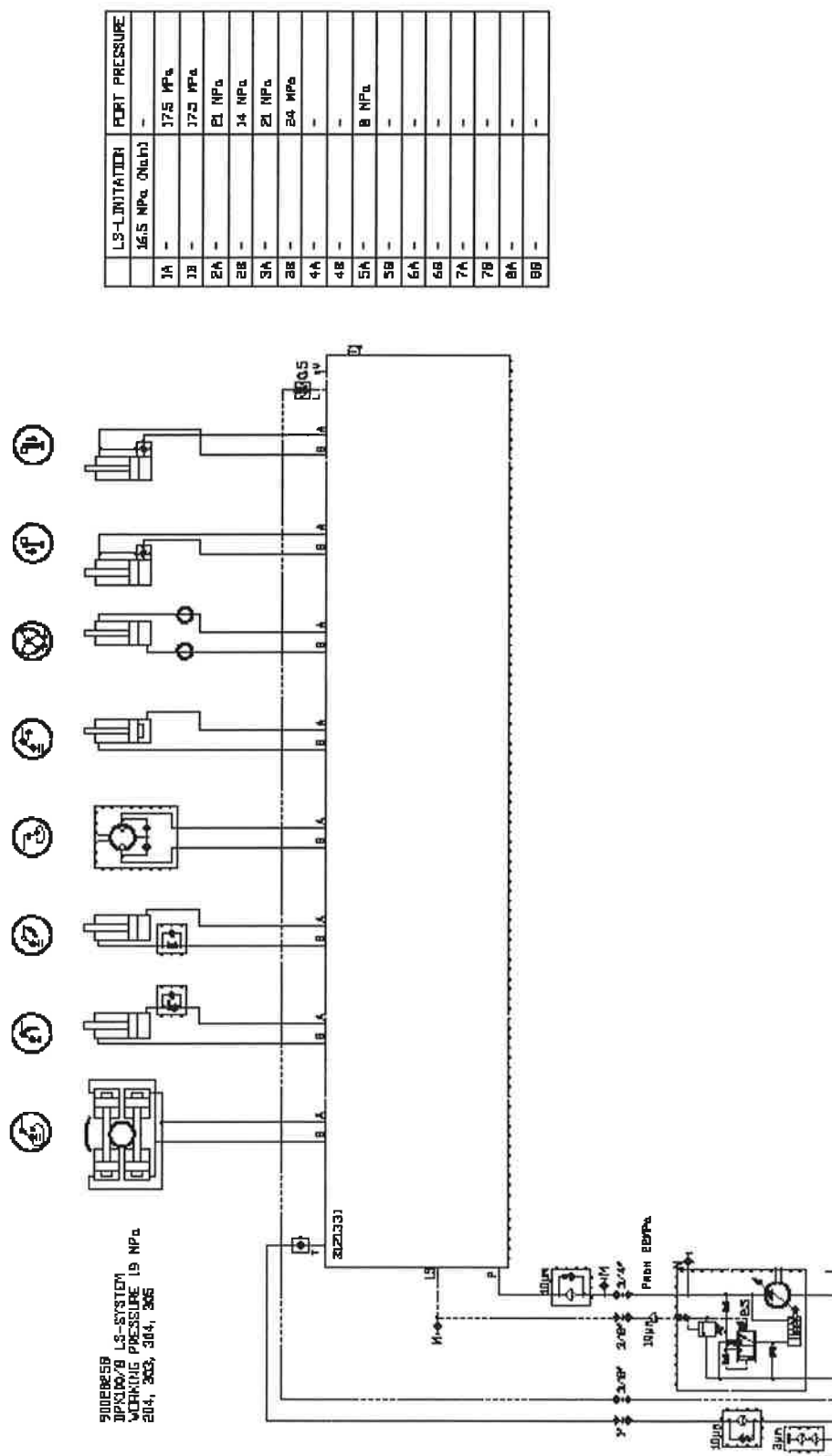
1.	Kääntö	Sväng	Slew	Schwenken	Rotation
2.	Siirto	Vipparm	Transfer arm	Knickarm	Transfert
3.	Jatkopuomi	Utskjut	Boom extension	Ausschub	Rallonge
4.	Tukijalat	Stödben	Stabilizer	Stützfüße	Stabilisateurs
5.	Koura	Grip	Grapple	Greifer	Grappin
6.	Rotaattori	Rotator	Rotator	Rotator	Rotator
7.	Nostopuomi	Lyftbom	Lift boom	Hubarm	Levage

11.14 **HYDRAULIC SCHEME WALVOIL DPX100/8 CF-SYSTEM**



	LS-LIMITATION	PORT PRESSURE
	-	19 MPa (NMIN)
1A	-	17.5 MPa
1B	-	17.5 MPa
2A	-	17.5 MPa
2B	-	17.5 MPa
3A	-	14 MPa
3B	-	14 MPa
4A	-	21 MPa
4B	-	21 MPa
5A	-	8 MPa
5B	-	8 MPa
6A	-	-
6B	-	-
7A	-	-
7B	-	-
8A	-	-
8B	-	-

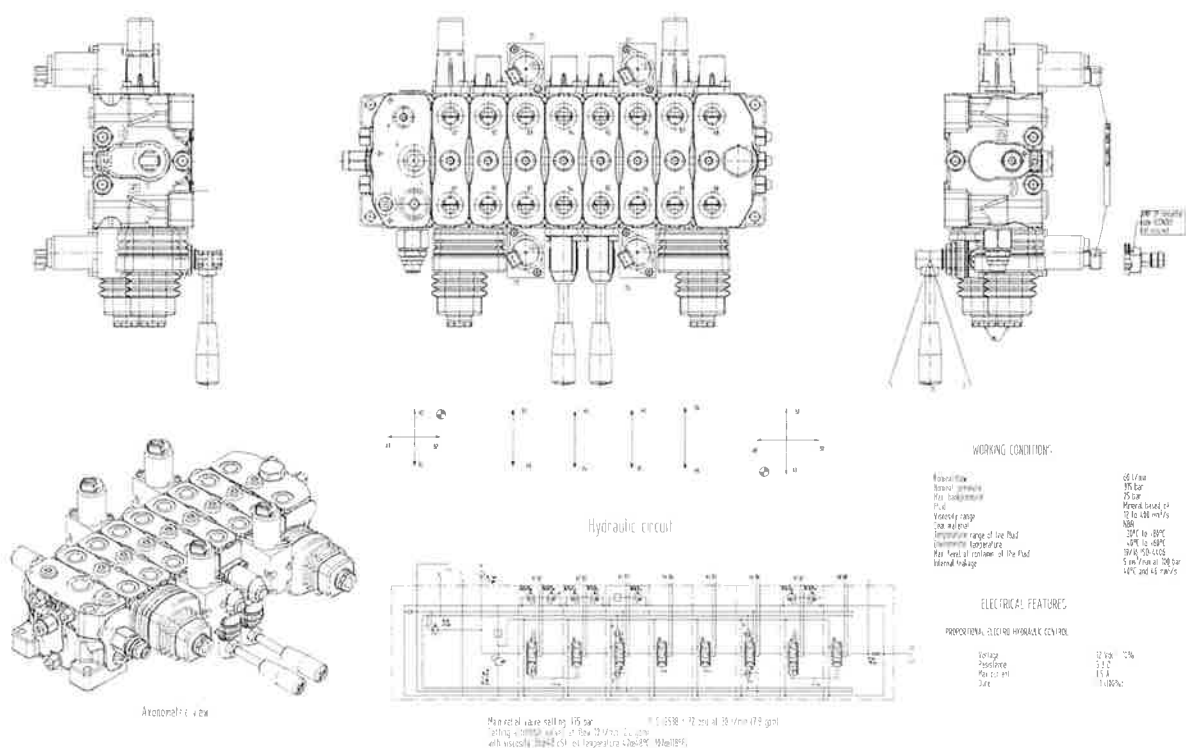
11.15 HYDRAULIC SCHEME WALVOIL DPX100/8 LS-SYSTEM



	LS LIMITATION	PORT PRESSURE
	16.5 MPa (240 in)	-
1A	-	17.5 MPa
1B	-	17.5 MPa
2A	-	21 MPa
2B	-	34 MPa
3A	-	21 MPa
3B	-	24 MPa
4A	-	-
4B	-	-
5A	-	8 MPa
5B	-	-
6A	-	-
6B	-	-
7A	-	-
7B	-	-
8A	-	-
8B	-	-

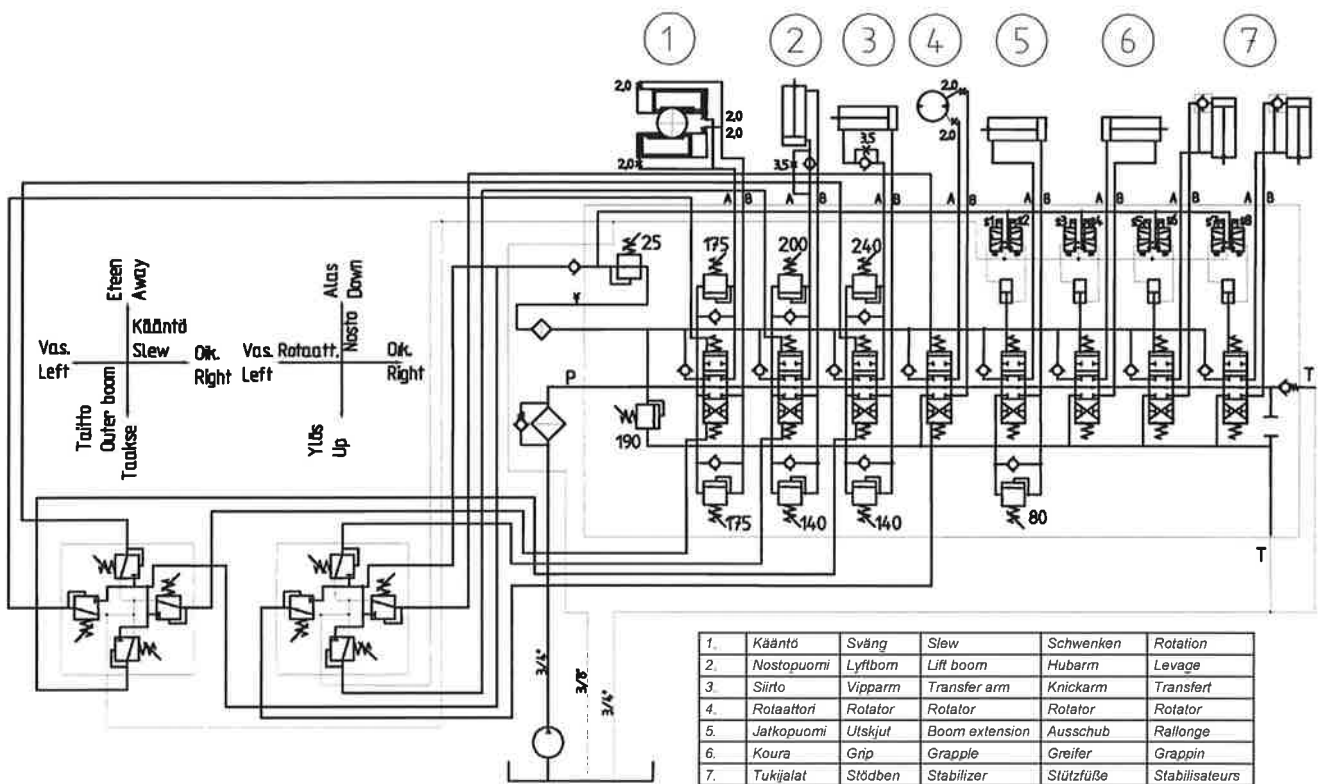
APPENDICES

11.16 HD-SCHEME WALVOIL SDS 100/8 ON-OFF



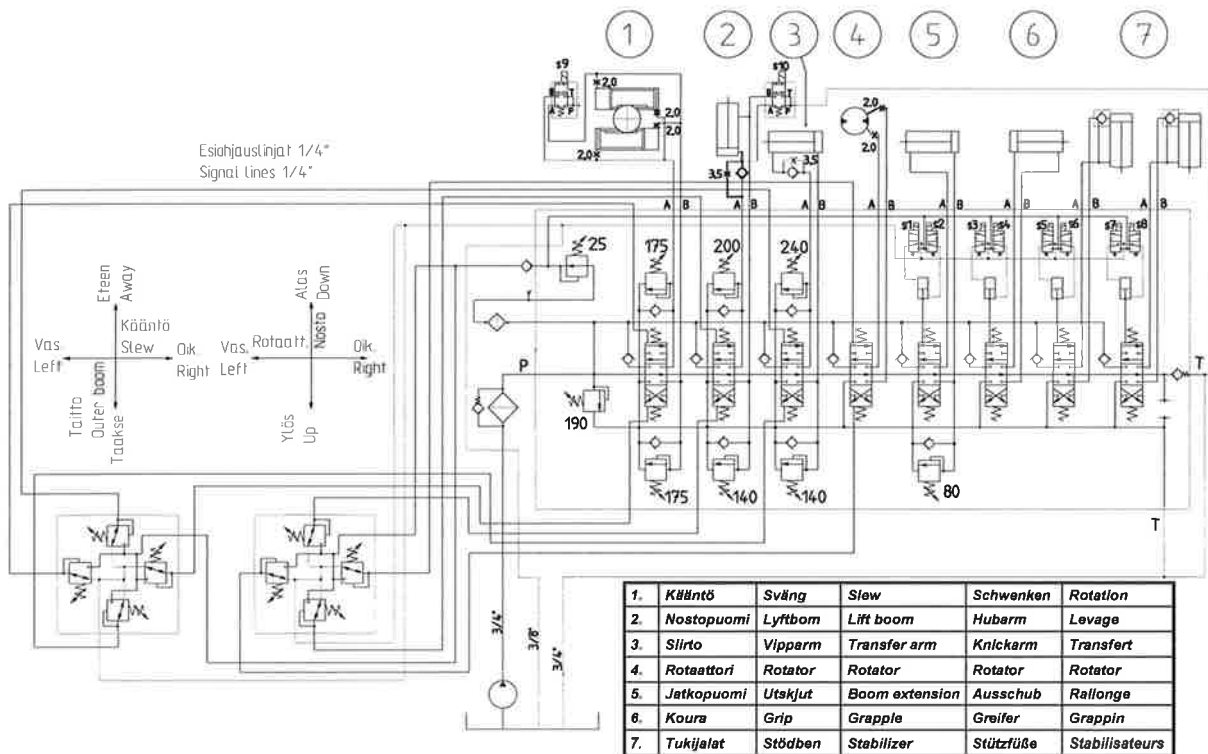
APPENDICES

11.17 HD-SCHEME WALVOIL HYDRAULIC / ELECTROHYDR. REMOTE CONTROL



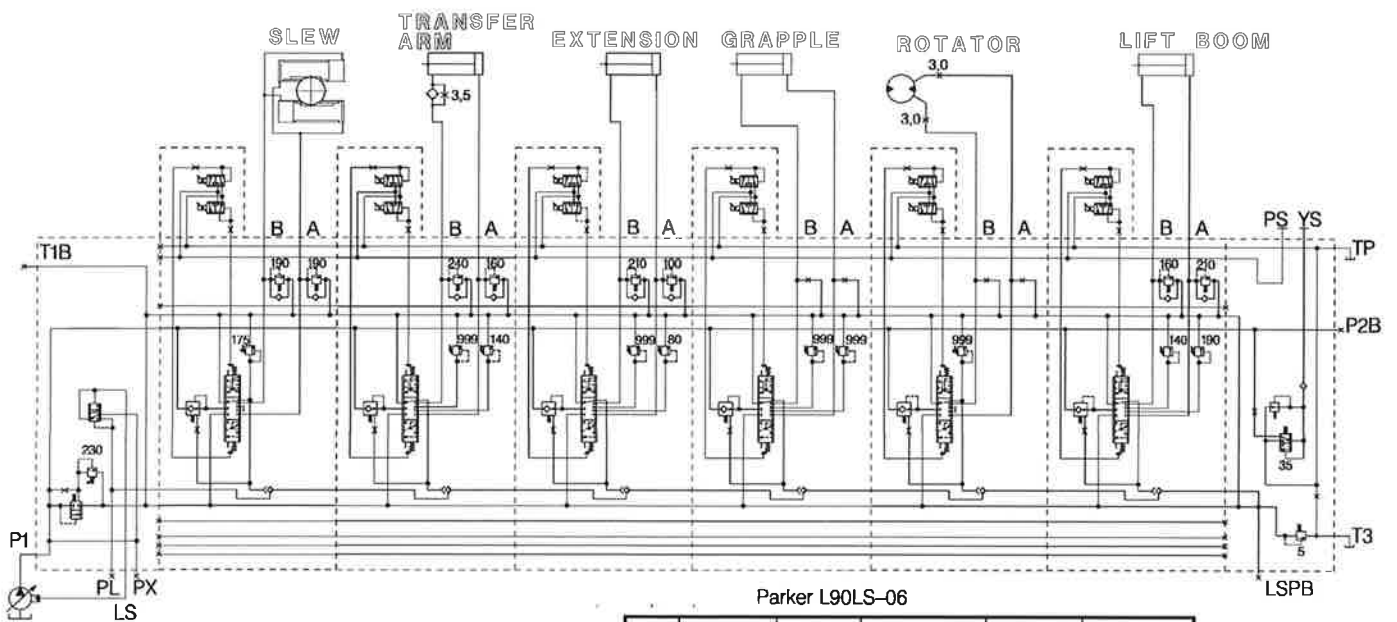
APPENDICES

11.18 HD-SCHEME / ELECTROHYDR. REMOTE CONTROL / W. FLOAT POSITIONS



APPENDIXES

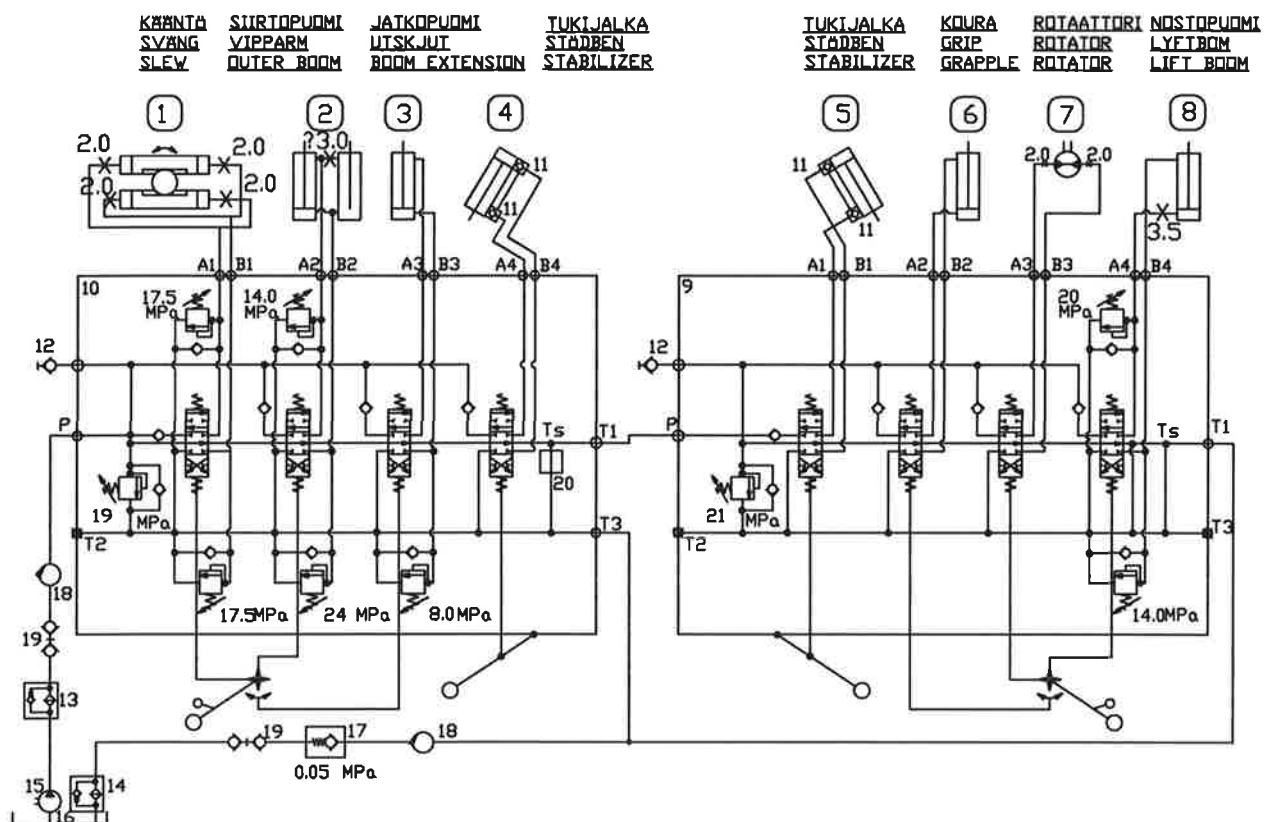
11.19 HD- SCHEME PARKER L90LS-06



1.	Kääntö	Sväng	Slew	Schwenken	Rotation
2.	Siirto	Vipparm	Transfer arm	Knickarm	Transfert
3.	Jatkopuomi	Utskjut	Boom extension	Ausschub	Rallonge
4.	Koura	Grip	Grapple	Greifer	Grappin
5.	Rotaattori	Rotator	Rotator	Rotator	Rotator
6.	Nostopuomi	Lyftbom	Lift boom	Hubarm	Levage

APPENDICES

11.20 HD- SCHEME RS214



11.21 HYDRAULIC SCHEME WALVOIL DPX100



Max. work port flow	: 90 l/min
Max. inlet flow	: 120 l/min
Max. pressure inlet port	: 300 bar
Max. pressure inlet ports A and B	: 300 bar
Max. backpressure	: 10 bar
Stand-by pressure	: 14 bar
Velocity range	: Mineral based oil 12 to 400 mm/s
Seal material	: NBR
Temperature range of the fluid	: -20°C to +60°C
Environment temperature	: -10°C to +60°C
Max. level of contamination of the fluid	: 18/16 ISO-4408
Internal leakage	: 6 cm ³ /min at 100 bar, 40°C and 48 mm/s
(M.54, M.54.05, AT 57, AT 80, B8)	: 10 cm ³ /min at 100 bar, 40°C and 48 mm/s
(M.1, A1, A2, B2, B3, B5)	: 40°C and 48 mm/s

PROPORTIONAL ELECTROHYDRAULIC CONTROL KIT (SEBJT)

Voltage	12 VDC
Resistance	4.72 Ohm \pm 3%
Max current	1.5 A
Duty	100%

11.22 DETERMINATION OF STABILITY

Stability should be verified in a test with a test load according to the standard EN 12999.

11.22.1 Determination of stability by test

Safety instruction

 DANGER	
	<p>DANGER OF OVERTURNING!</p> <ul style="list-style-type: none"> • Instability of the device can cause it to move unexpectedly, which can result in death or serious injury. • Do not exceed the maximum permitted inclination • Ensure that the ground is stable enough before lifting.

Test conditions

Stability test should be carried out with the loader on a firm ground at the most unfavourable conditions in regard to the tipping over verge. The incline of the loader should correspond to the maximum inclination specified by the manufacturer.

Performing the test

According to the standard EN 12999, test loads are determined with the formula

$$TL = K_s \times P + (K_s - 1) \times G'b$$

where

TL	is the test load
K _s	is stability coefficient; Timber loader calculated K _s = 1.125
P	is lifting capacity
G'b	is the mass at the end of the boom, causing the same torque in the slew centre, as Gb

The test should be carried out with unloaded vehicle without the driver.

The stability calculations should be verified by rotating test-loaded loader around its whole turning area.

Result evaluation

The test should be deemed as accepted, if the test load stays in its position. During the test loading one or more support feet or wheel may raise from the ground. In any case at least one wheel locked with a parking brake should maintain its contact with the ground.

12 WARRANTY CERTIFICATE

WARRANTY CERTIFICATE

____ / ____ 20 ____

PRODUCTION NUMBER _____

SELLER: _____

13 BILL OF DELIVERY

KESLA OYJ
FIN 59800 KESÄLAHTI

Seller's copy

____ / ____ 20 ____

Product _____

Owner/Possessor _____

Serial number _____

Building/Street _____

Accessories _____

Postcode and town _____

Phone _____

Seller _____

KESLA OYJ
Metsolantie 2
FIN 59800 KESÄLAHTI
FINLAND

To be sent back to the manufacturer

13.1 Bill of delivery / owners / possessors assurance of having read and understood the manual

____ / ____ 20 ____

Product _____

Owner / Possessor _____

Serial number _____

Building / Street _____

Accessories _____

Postcode and town _____

ASSURANCE

*I have read and understood the user's
intructions and safety instructions of the manual*

Phone _____

Seller _____

APPENDIXES

14 CUSTOMER FEEDBACK

Please send us your feedback about the KESLA product
or
our customer service with the form below, to enable us to improve our activities.

Client's name :

Street address :

Postal code / region :

Telephone :

E-mail :

Product :

Serial number :

Seller :

Purchase day :

	Excellent	Good	Satisfactory	Poor
Quality of our activities :	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Quality of our products :	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Competitiveness of our product prices :	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Customer service / doing business with us :	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Doing business with the reseller :	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Other feedback :

I would like to be contacted :

Yes	No
<input type="text"/>	<input type="text"/>

You can send the feedback by mail to the address:

Kesla Oyj / Customer feedback

Kuurnankatu 24

80100 Joensuu

or

FAX : +35813 6100523

or

append it to an e-mail and send it to the address : sales@kesla.com

You can provide feedback also with the contacting form available on our website www.kesla.fi or submit the form to your nearest reseller.

APPENDIXES

INSPECTIONS

KESLA OYJ
Metsolantie 2
FIN-59800 KESÄLAHTI

REPORT OF THE TEST RUN AND INSPECTION PROCEEDINGS - GRAPPLE LOADERS

(Record the proceedings thoroughly. The report shall be stored together with the machine for over the life of the loader.)

Inspected by the manufacturer

Mounting inspection

Maintenance inspection

CE marking: yes

--

___ / ___ 20 ___

Place of inspection: _____ Inspector: _____

Signature and signer: _____

Inspector's address: _____

Basic data on the machine

Place of manufacturing: _____ Make and model: _____

Country of delivery and language: _____ Serial no. / Model year: _____

Type of control valve: _____

A-frame: yes ☐ no ☐

Attachment kit: yes ☐ no ☐

Type of timber grapple: _____

Type of rotator: _____

Other equipment: _____

OBSERVED DEFECTS AND REMARKS

APPENDIXES

ISSUES TO INSPECT

(Refer to instructions on inspection later on in this manual)

YES = IN ORDER

NO = TO BE ATTENDED TO

1. STRUCTURE

YES NO

<input type="checkbox"/>	<input type="checkbox"/>	1. Welding seams
<input type="checkbox"/>	<input type="checkbox"/>	2. Surface treatment
<input type="checkbox"/>	<input type="checkbox"/>	3. Pin lockings
<input type="checkbox"/>	<input type="checkbox"/>	4. Hydraulic hoses and pipes
<input type="checkbox"/>	<input type="checkbox"/>	5. El. cables and connections
<input type="checkbox"/>	<input type="checkbox"/>	6. Straightness of the booms
<input type="checkbox"/>	<input type="checkbox"/>	7. Chain tension of outer boom extension
<input type="checkbox"/>	<input type="checkbox"/>	8. Fitting of controls
<input type="checkbox"/>	<input type="checkbox"/>	9. Greasing
<input type="checkbox"/>	<input type="checkbox"/>	10. Oil filling
<input type="checkbox"/>	<input type="checkbox"/>	11. Mounting bolts of slew mechanism
<input type="checkbox"/>	<input type="checkbox"/>	12. Plates and decals
<input type="checkbox"/>	<input type="checkbox"/>	13. Owner's manual
<input type="checkbox"/>	<input type="checkbox"/>	14. The theoretic stability of the unit

2. TEST RUN / LOADING

YES NO

<input type="checkbox"/>	<input type="checkbox"/>	1. Pressure settings
<input type="checkbox"/>	<input type="checkbox"/>	2. Sealing
<input type="checkbox"/>	<input type="checkbox"/>	3. Operating movements and limit positions
<input type="checkbox"/>	<input type="checkbox"/>	4. Control valve; function
<input type="checkbox"/>	<input type="checkbox"/>	5. Test loading with SWL
<input type="checkbox"/>	<input type="checkbox"/>	6. Test loading with overload

KESLA

Overload = SWL = _____ kg

<input type="checkbox"/>	<input type="checkbox"/>	7. Load run off _____ mm
<input type="checkbox"/>	<input type="checkbox"/>	8. The unit stability determined by test

3. REPAIRS CARRIED OUT AFTER PREVIOUS INSPECTION

YES NO

<input type="checkbox"/>	<input type="checkbox"/>	1. Welding
<input type="checkbox"/>	<input type="checkbox"/>	2. Other repairs
<input type="checkbox"/>	<input type="checkbox"/>	3. Test loading with overload

OBSERVED DEFECTS AND REMARKS:

The observed faults and defects shall be attended to no later than ____ / ____ 20 ____

The observed faults and defects have been attended to ____ / ____ 20 ____

Signature _____

Signer _____

ENCL.:

☐

P.T.O. for more remarks

Instructions on inspection

DISTR.

Manufacturer

Owner's manual

Inspector

