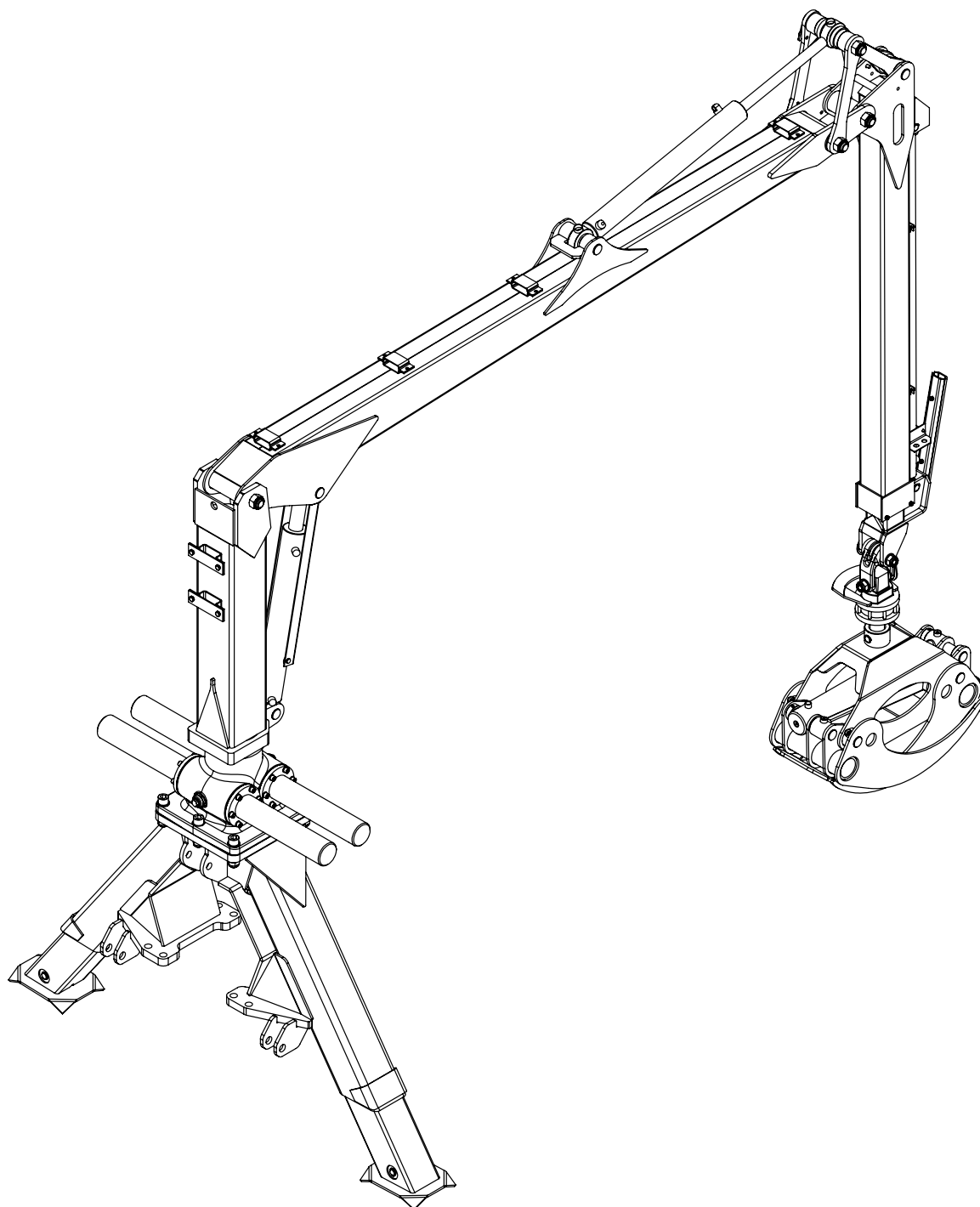


USER MANUAL



FOREST CRANE PALMS 640

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1. GENERAL

This manual gives you a detailed overview about forest crane **Palms 640**. Read the manual carefully before you start using this machine. The manual contains essential directions for efficient and safe use of this equipment. These instructions should always be followed. This forest crane is constructed for loading works in forestry and agriculture. It can be mounted on Palms forest trailers by unified connection. This forest crane has three point linkage system, by which it can be connected directly to agricultural tractors. This machine meets all technical standards and safety regulations of EU Machinery Directive and its amendments. Palms forest crane has CE marking.

Operator of forest crane is obliged to be aware of and strictly follow all safety precautions and instructions described in this manual.

In addition to this, instructions of local occupational safety authorities, as well national laws and regulations, must be followed.

Even if you are experienced user of this equipment, do not use it unless you have read the user manual.

Using the machine for other tasks than those for which it is intended or exceeding its performance is not allowed.

The manufacturer/dealer is not responsible for damage caused by misuse of the forest crane.

Pay attention to regular maintenance. In case there will occur problems with forest crane, which are not covered in this manual, contact authorized dealer or manufacturer.

Palmse Mehaanikakoda LLC reserves the right to make changes to user manuals and to revise the data without prior notice.

2. SAFETY

2.1 General

Read the manual carefully before you start operating this forest crane. Use forest crane only for right purposes. The operator must have a proper valid licence to work with the tractor and the forest crane. The operator has to have sufficient training prior using of this machine.

Notice, avoid and prevent all potentially hazardous situations!

IT IS STRONGLY FORBIDDEN:



- to use forest crane in state of intoxication by alcohol, drugs or other psychoactive substances.
- to exceed maximum loading values.
- to leave the load in UP position without supervision.
- to use forest crane for lifting people.
- to rebuild forest crane.
- to use repairing materials without the producer's permission.
- to localize a leakage from hydraulic hoses or connections by hand.

BEFORE YOU START OPERATING FOREST CRANE, MAKE SURE THAT:

- crane is in working condition.
- you have full visibility over all the working area.
- crane is placed firmly on even ground.
- the tractor parking brake is engaged.

IT IS RESPONSIBILITY OF THE USER:

- to ensure that attachments and connections to the vehicle are designed and adapted in such a way that they meet the crane's needs according to technical data.
- to install a loose crane on equipment other than a Palms trailer such way that the vehicle has the necessary capacity to cope with the lifting and slewing torques that the crane is designed to handle.

2.2 Safety distances



General safety distance for working with forest crane is 20 metres!

Follow special safety distance when working close to live electrical conductors:

Rated voltage, kV	Safety area, m
Up to 0,5	2
Up to 20	10
35 – 110	25
220 – 330	40

Table 1. *Safety area*

All live electrical conductors must be clearly visible while operating the forest crane.

2.3 Hydraulic system



- Hydraulic system must be serviced by qualified and experienced hydraulics mechanic only.
- Continually inspect the condition of hydraulic system. Repair all safety en-dangering defects immediately.
- Before hydraulics maintenance work make sure that the system is not under pressure.
- When replacing hydraulic components and hoses, use original spare parts or parts recommended by the manufacturer.
- When performing maintenance work, use safety goggles and gloves.
- Prevent oil dripping to the ground in order to avoid environmental pollution.
- When working in ecologically sensitive areas, use bio-oil.

2.4 Operations



- Ensure, that forest crane is in good working condition.
- Operating with damaged or defective machine is prohibited.
- Ensure, that you have best possible sight and control over the working area.
- Prevent unauthorized persons access to the working area.
- Support legs must be used while working with forest crane.
- Be sure not to endanger anyone while lowering support legs.
- Pull support legs up before moving the tractor.
- Use tractor parking brake during working with forest crane.
- Do not use an equipment, which is not recommended by the manufacturer.
- Never lift heavier load, than allowed by the manufacturer.
- When leaving the machine, always secure it from unauthorized access and unintended operation.
- Manufacturer is not responsible for any damage or loss, that is caused by misuse or incorrect, careless, unauthorized and inappropriate use of the machine.
- Follow the traffic regulations while driving on public roads!

3. TECHNICAL DATA

3.1 Dimensions of the forest crane

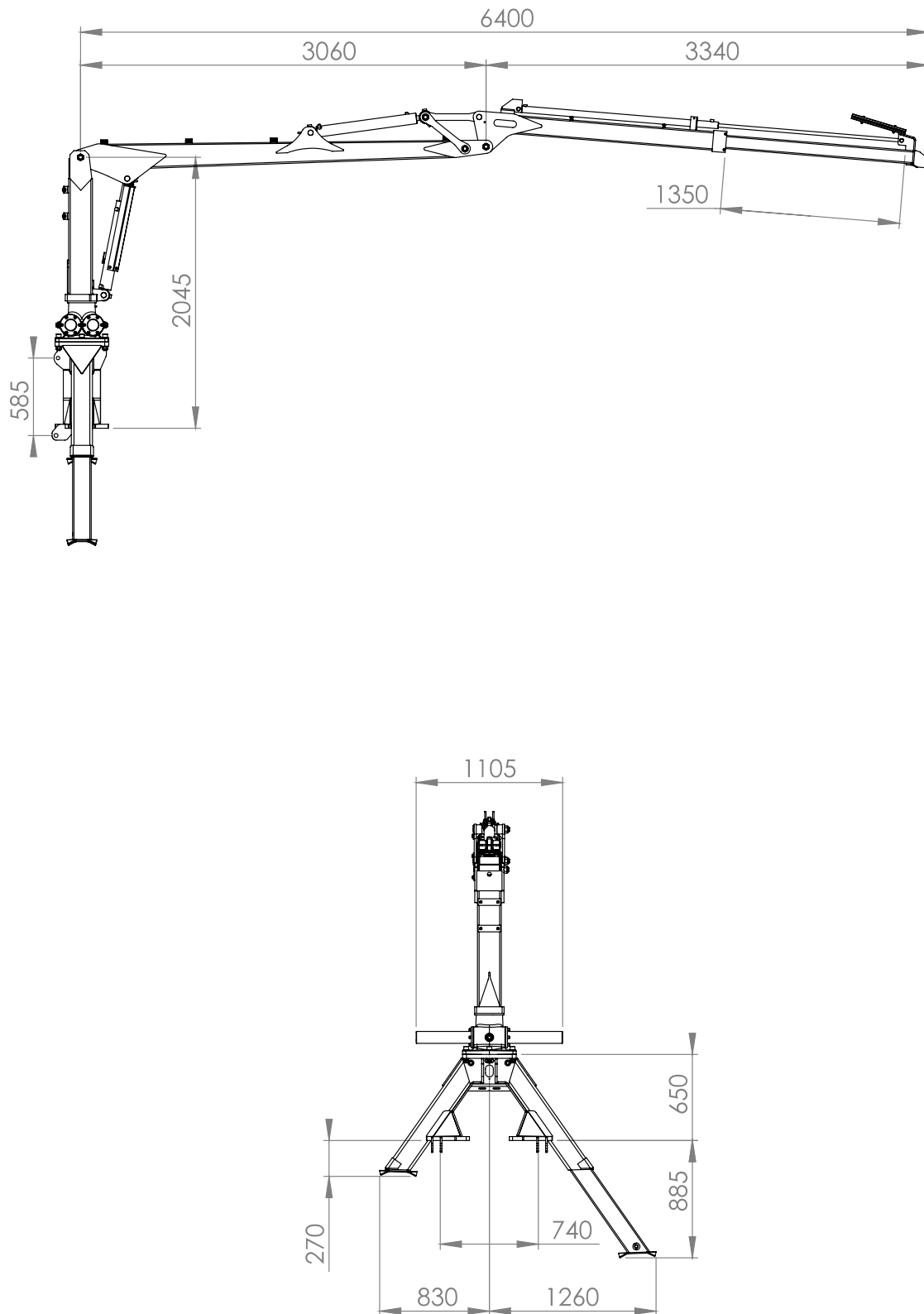


Figure 1. Forest crane Palms 640 dimensions (mm)

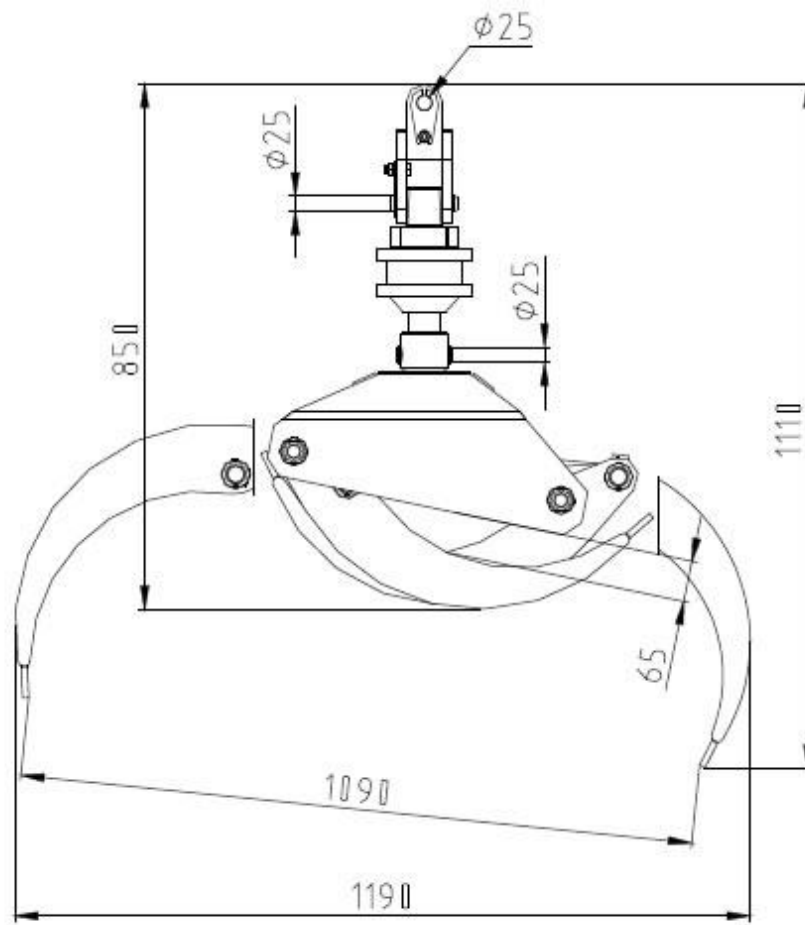


Figure 2. Dimensions of 0,17 grapple(mm)

3.2 Lifting reach

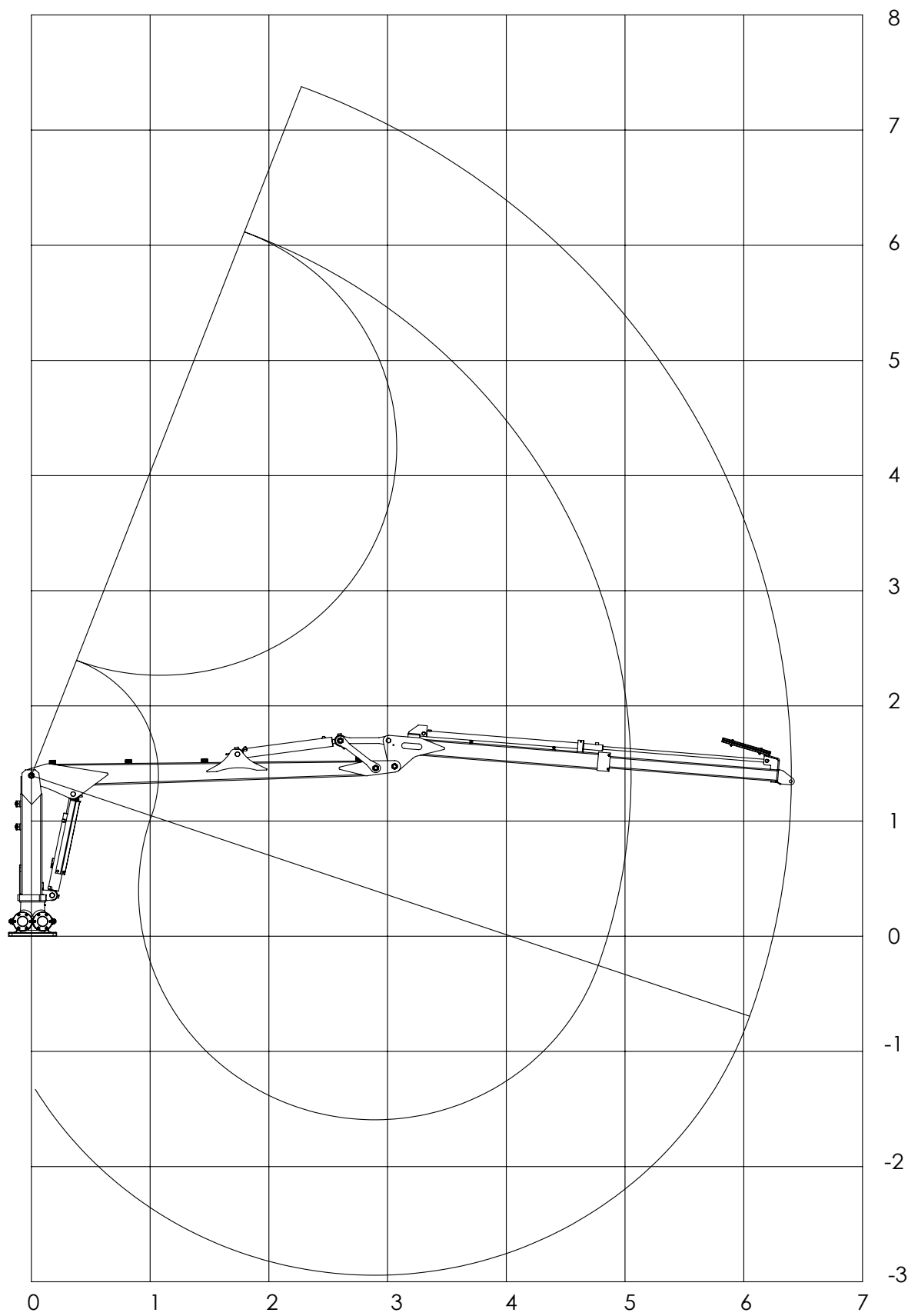


Figure 3. Lifting reach of Palms 640 forest crane

3.3 Technical data

Max reach, m	6,40 m
Lifting torque, kNm, bruto	33 kNm
Lifting power on 4m without grapple and rotator	650 kg
Lifting power on full reach without grapple and rotator	360 kg
Grapple, m ³	0,17 m ³
Rotator	3 kN
Grapple and rotator weight	79 kg
Slewing torque	11,5 kNm
Slewing cylinders	4 kpl
Boom rotation, °	370°
Hydraulic valve, standard	HC 4/8 XY + 2 x on/off
Working pressure, bar	180 bar
Hydraulic pump capacity, l/min	50 l/min
Total weight, kg	610 kg

Table 2. Technical data table of Palms 640

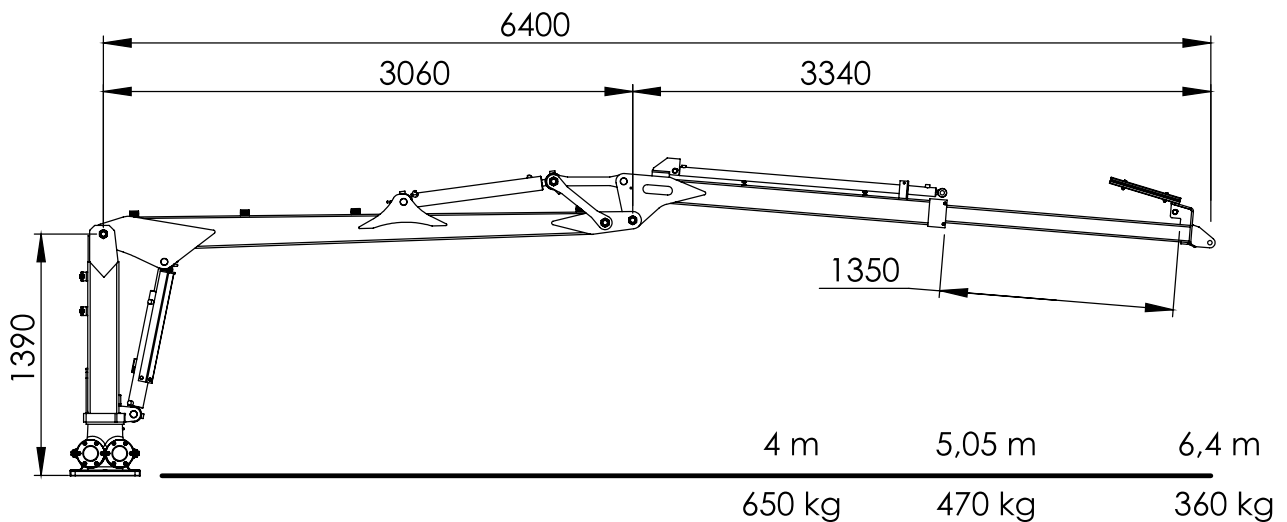


Figure 4. Palms 640 lifting power on different distances

Manufacturer reserves the right to change specifications without prior notice.

4. ASSEMBLY AND MOUNTING

Read these instructions before starting any assembly or mounting of crane. Improper mounting, carried out in a manner other than specified in this manual, may cause dangerous situations to user and surrounding objects. Improper mounting, useage and installations will void the manufacturer warranty.

4.1 Mounting forest crane to Palms trailer

Mounting of forest crane should be performed at the dealer service center or by person authorized by the manufacturer or dealer. Mounting/detaching the crane can also be made by end user, if professional equipment is used, all safety regulations are followed and at least one qualified mechanic is present during all the mounting/detaching process. Strength class for mounting bolts of slewing device-support legs (pos. 1, fig.5) and support legs-trailer (pos. 2, fig. 5) has to be 12.9 (DIN912). Use self-locking nuts M24. The tightening torque for the mounting bolts of the crane (pos. 1, fig. 5) and supporting legs (pos. 2, fig. 5) is 1220 Nm.



Retighten bolts after the test run and after first 8 hours of use! Check 40 working hours, tighten if needed. Later on do visual check.

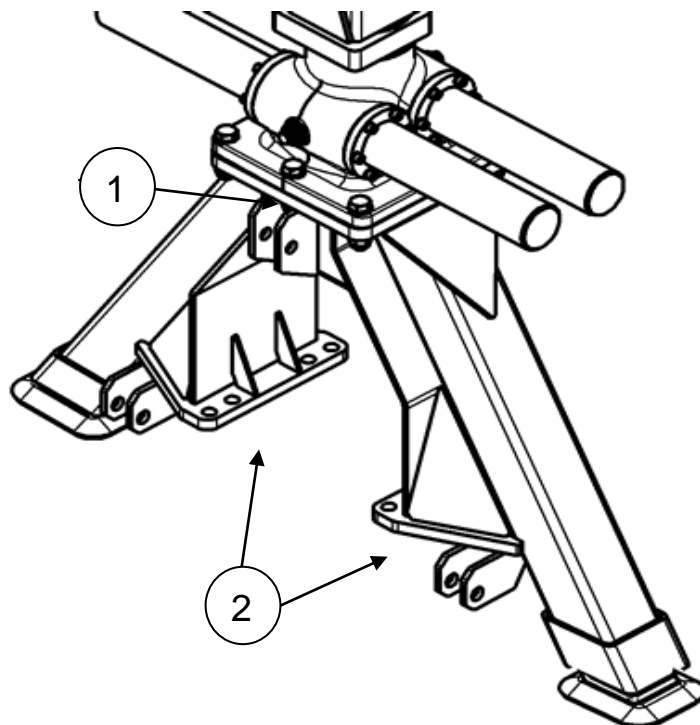


Figure 5. Connection junctions on Palms 640

4.2 Mounting forest crane to the other manufacturer's trailer or to any other machine than Palms forest trailer.

Use the mounting plate (fig. 6) then mounting the loader to the tractor's frame or trailer different than Palms. Use mounting plate with thickness not less than 30 mm. Make sure that there will be enough space at mounting point for service access.

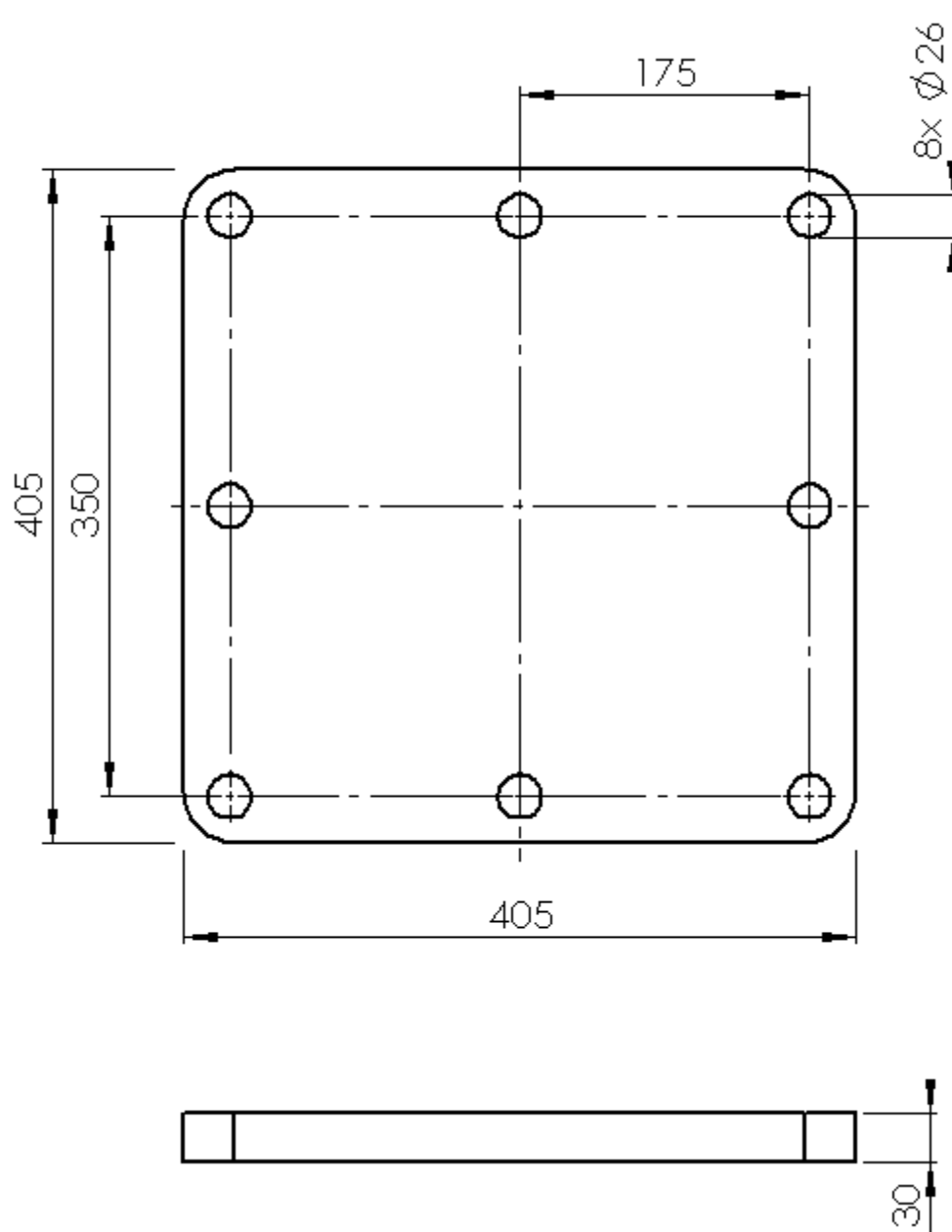


Figure 6. *Mounting plate measures*

4.3 Mounting forest crane to the tractor with 3-point linkage system

Before mounting crane to the 3-point linkage (pos.1, fig. 6.1) make sure that:

- tractor is heavy enough and will not keel over
- tractor is placed firmly on even ground
- tractor 3-point linkage equipment is in working condition
- hydraulic hoses and couplings are not damaged
- there is enough oil in tractor hydraulic system

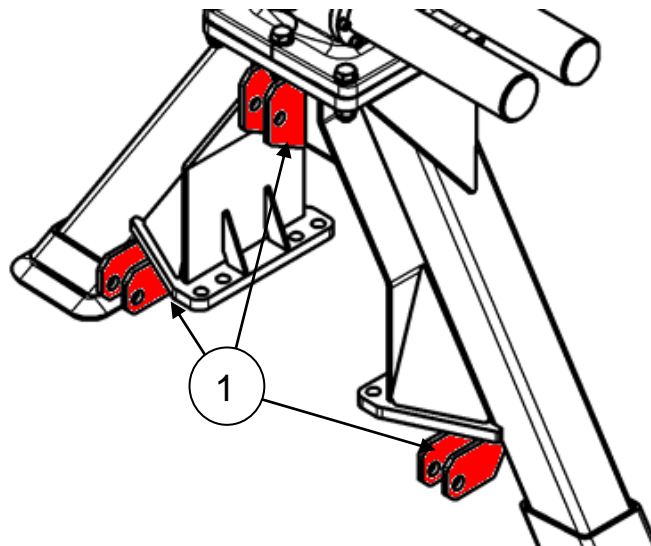


Figure 6.1 3-point linkage junctions on Palms 640 A-type support legs



Do not use hydraulic puller for connecting upper junction of 3-point linkage!

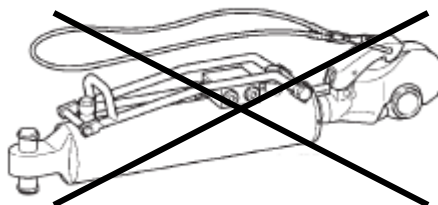


Figure 6.2 Hydraulic puller

4.4 Mounting the control valve



The valve must be installed in the way that levers cannot be used inadvertently!

Install the valve to desired location using the included bracket. Leave enough space for hoses to avoid risk of abrasion or clamping while working with forest crane.



Hoses in the operator's cabin must be covered in the way that the user is protected from the direct oil jets in case of hose breakage!

5. HYDRAULIC SYSTEM

5.1 Hydraulic connection

Before connecting forest crane to the tractor's hydraulic system, make sure, that hydraulic oils are compatible. Forest crane has been tested and should use Addinol HVLP 32 hydraulic oil or other compatible oil that meets DIN 51524-3 requirements. Check level of hydraulic oil. We recommend connecting the pressure hose to the single-acting hydraulic outlet and the return hose to the tank via the return filter. Intended minimum flow rate for filter is 70 l/min and the filtering density is 10-50 µm.

Make sure the connection has made properly.



In order to avoid valve damages, always connect hydraulic hoses according to user manual!

Make sure you connect the return line, bolder hose, always first and disconnect it last.

Ensure, that the control valve pressure line, thinner hose, P has been connected properly and that the return line, bolder hose, T is not obstructed.



In case there is obstruction in return line (quick couplings are not connected or are not locked properly) the pressure might rise over 10 bar and cause malfunction of control valve.

Forest crane can be also connected to the double-acting hydraulics outlet. If this option will be used, make sure, that the lever of the double-acting valve is in the right position and the pressure is directed to the pressure connection of the crane's control valve. Check also vehicle's operating manual for hydraulic system connecting instructions.

If your crane has pilot operated valve control with pilot operated TP return line installed, TP return line has to be connected straight to the hydraulic oil tank. Pilot operated TP line hose has 1/4" size connection fitting. Some vehicles have separate quickcoupling installed on hydraulic oil tank, which you can use for pilot operated TP line, some of them do not.

Pilot operated TP return line can not take more than 6 bar of backpressure!

Do not connect pilot operated color TP line in to the main return line!

If crane is not used, leave pilot operated TP return line open. Do not close TP return line with regular plug fitting. Pressure can build up and damage valves.

5.2 Parker hydraulic diagrams and control functions

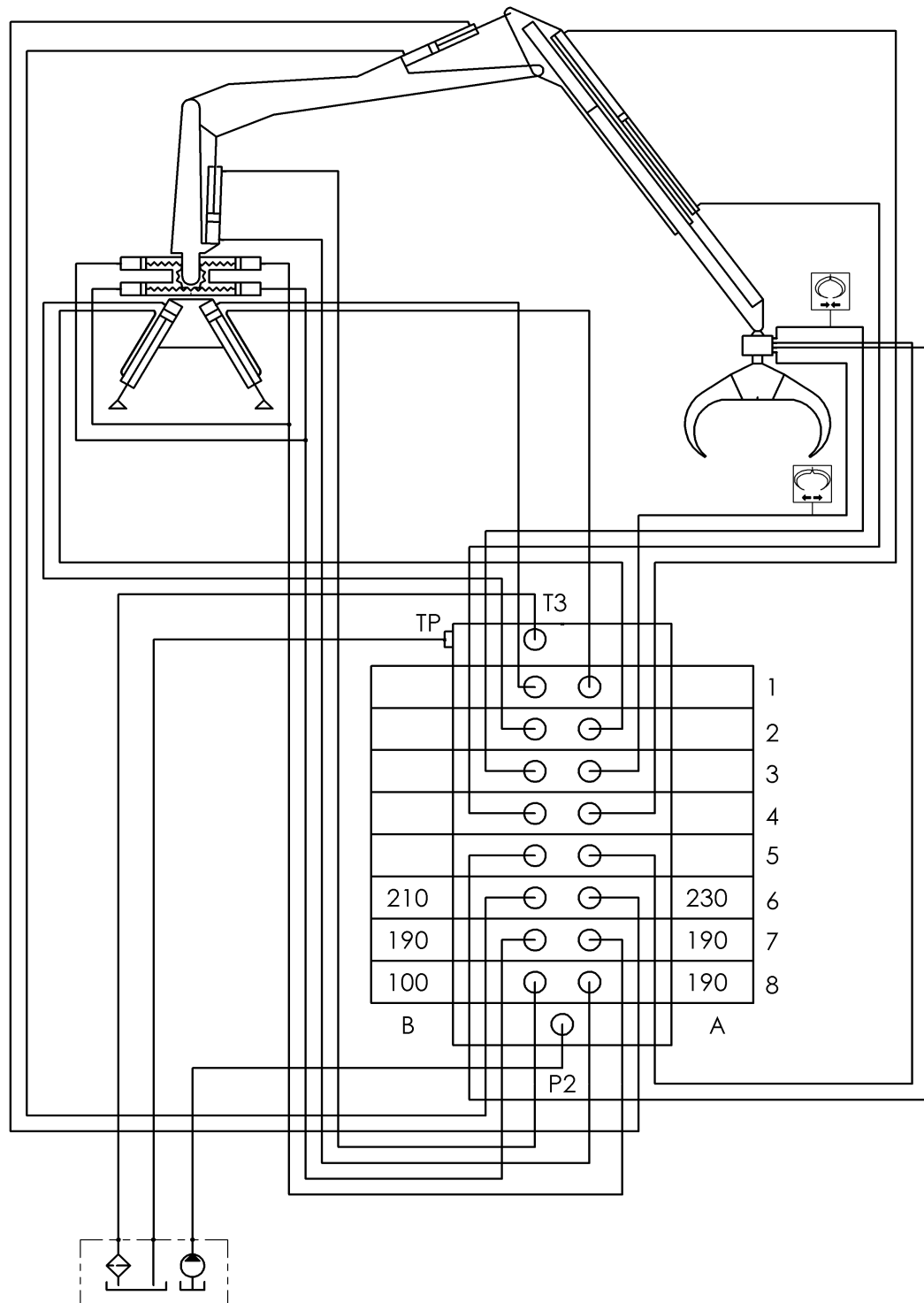


Figure 7. Hydraulic diagram for Parker P70 (A11) pilot operated control valve

5.3 Nordhydraulic hydraulic diagrams and control functions

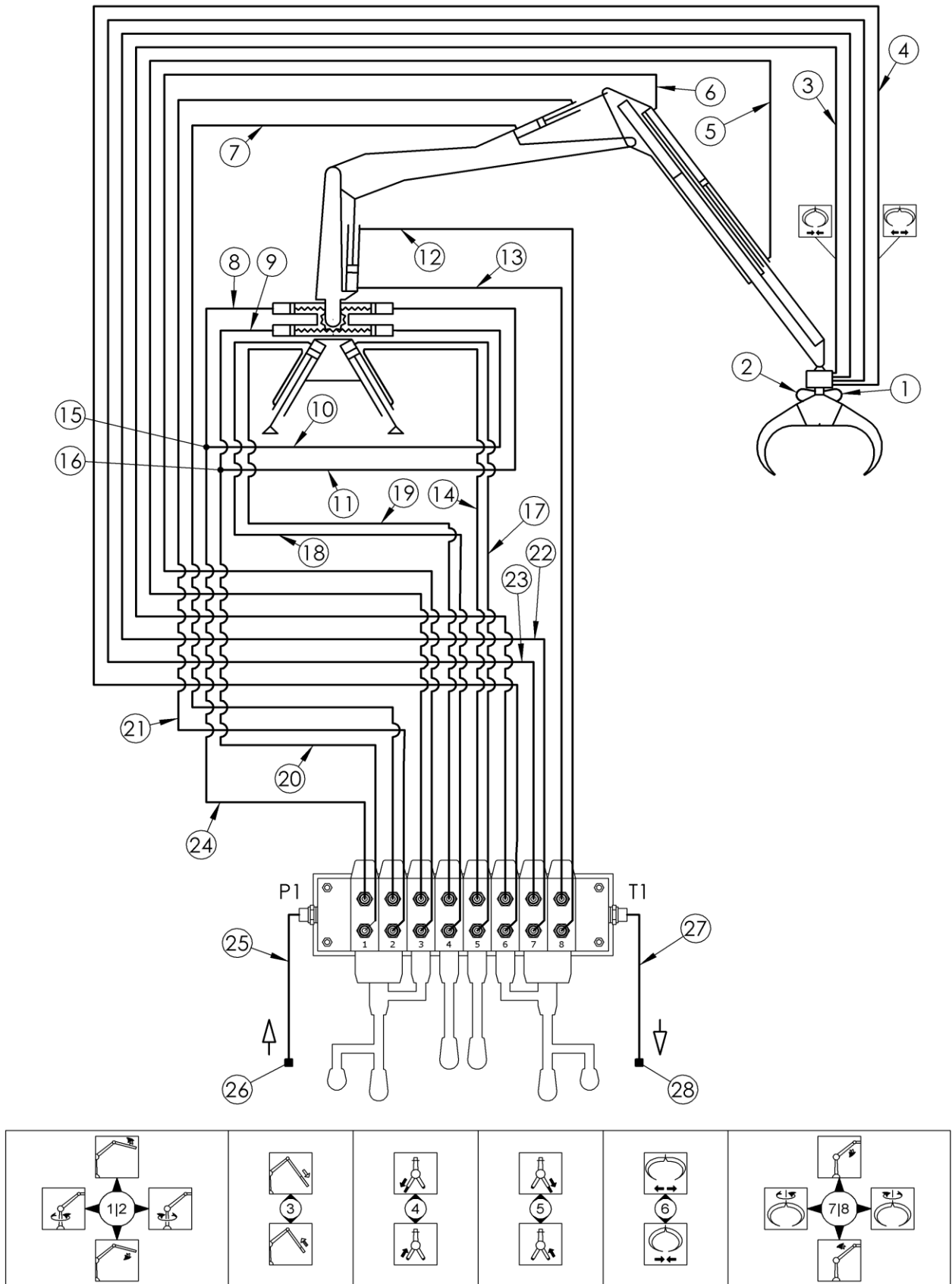


Figure 8. Hydraulic diagram for Nordhydraulic NH 4/8 XYZ (A7) electric on/off control valve

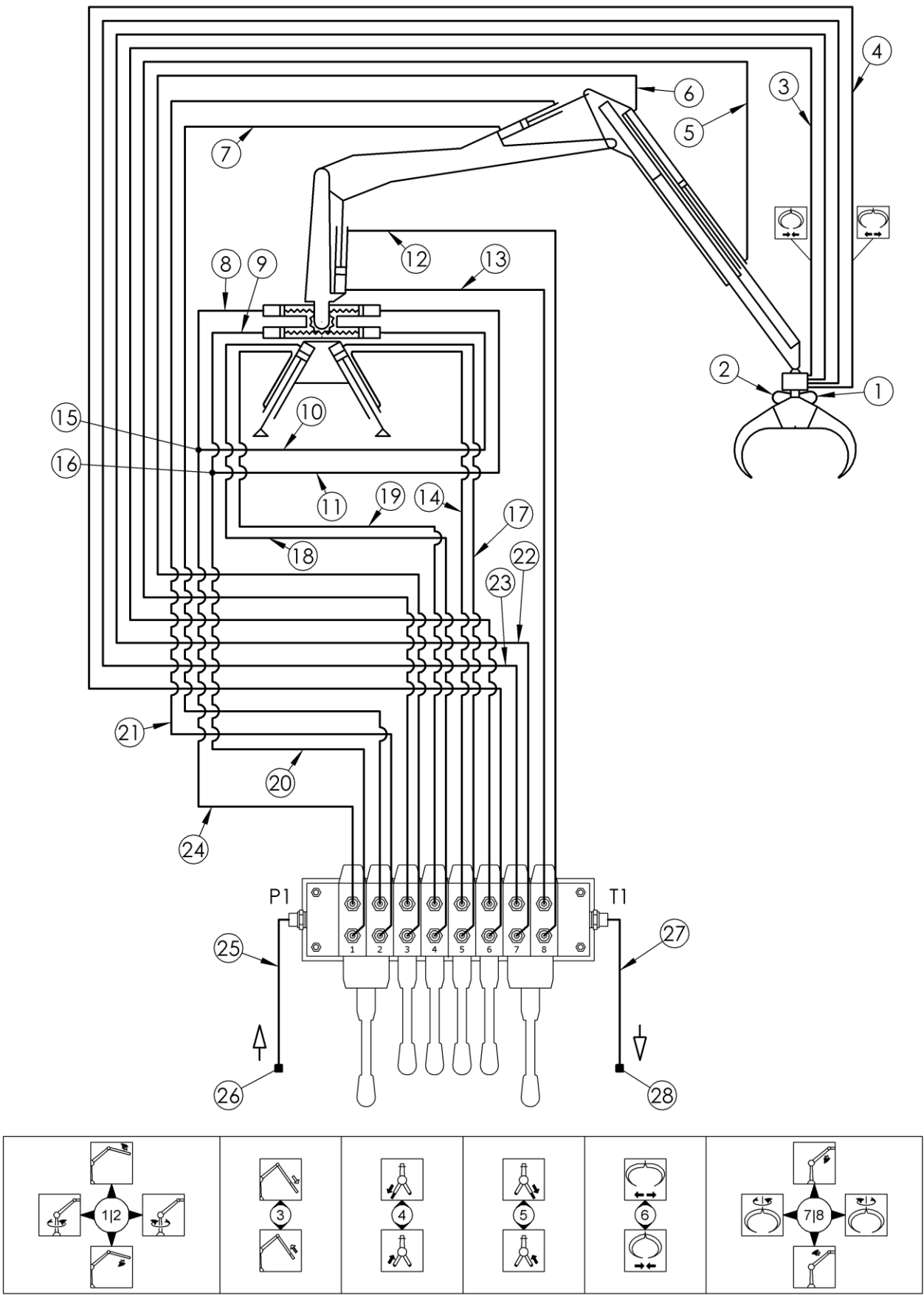


Figure 9. Hydraulic diagram for Nordhydraulic NH 6/8 XY (A3) control valve

5.4 Hydrocontrol hydraulic diagrams and control functions

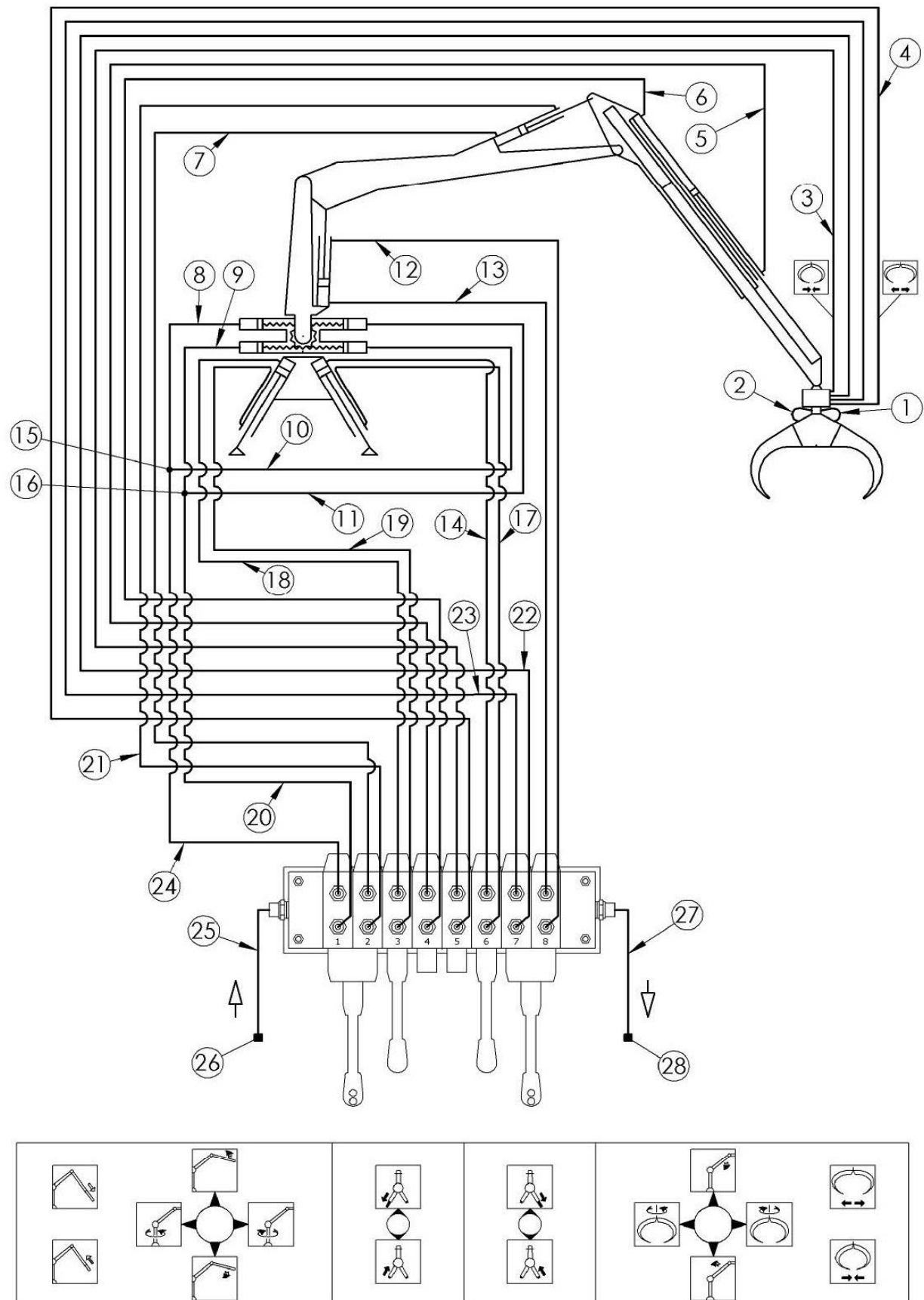


Figure 10. Hydraulic diagram for Hydro-Control HC 4/8 (A4) electric on/off control valve

6. OPERATING INSTRUCTIONS

6.1 Testing

Ensure that the control valve levers are in the middle position. Switch on the pump and let oil flow through the valve for a while. Lower the support legs.



Ensure that there are no people or obstacles in the operating area. The danger zone is 20 m!

Carefully drive crane movements one by one in the way, that all cylinders reach their extreme positions and repeat this until all movements are smooth.



Be careful when getting air out of system. If you drive cylinder to its extreme position at full force, the air pressure in the cylinder will damage the seals! Be extremely careful, when there is air in the cylinders!

After testing forest crane, inspect connections and repair leaks if any appeared. Check the mounting bolts of the crane and support leg, tighten them if necessary. Check the hydraulic oil level, and fill up if necessary.

6.2 Practice runs



Forest crane should not be operated if temperature is below -25°C. Note that the hydraulic seals, hoses and steel structures may get damaged at low temperature. When starting to work at cold temperature, first let the oil flow freely through the valve for a couple of minutes. The maximum operating temperature for hydraulic oil is +75°C.

Drive through every movement with an unloaded crane, paying attention to the positions in which the crane might hit surrounding obstacles.



Never move the boom to its extreme position at full speed!

Move the control levers smoothly and stoutly, avoiding quick and jerky movements.

Learn to use several functions simultaneously. Start at low engine speed to avoid sudden movements. After you have become accustomed to the crane's movements, choose appropriate engine speed so, operations are smooth and efficient, but you still have the movements under control. Loading big and heavy logs from distance, keep load close to the ground. When reaching the trailer, lift it up to load. When unloading do vice versa.

Working on inclined surface, do not operate with the full lifting torque and be extremely careful. Loading uphill note, that turning crane with too much load might cause the oil pressure in slewing device cylinders to reach critical point, where shock valve has to intervene. This could make slewing device uncontrollable and crane might turn back to downhill direction in a way, that it might fall over. In such case lower the load as close to ground as possible, but not too rapidly .



Use the support legs only for purpose to provide additional support for the vehicle! Don't forget to lift the support legs UP before moving to another place!

Support legs are equipped with extra valves, which will keep them in working position in case feeding hoses of support leg cylinder break.



Do not exceed the speed limit when driving! Adjust speed according to the road and weather conditions. Be especially careful on turns! For driving always attach crane by grapple to trailers frame. When driving with load, leave one log sticking out from pile and attach crane by grapple to it. Keep crane boom as low as possible.



Do not use support legs in DOWN position while parking!

When using forest crane in combination with forest trailer, use trailer parking leg (fig.11) and make sure, that crane support legs are not leaning to the ground.

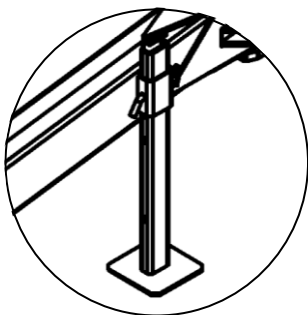


Figure 11. Parking leg of trailer

7. DETACHING FOREST CRANE

Choose sufficiently hard and even level ground for detaching forest crane. Ensure, that no unauthorized persons are around crane during detaching and storing process. When storing control valve, make sure it is out of the reach of children.

- Lower the support legs to support crane properly.
- Fix crane firmly by proper hoist.
- Make sure that crane can not lean or fall over.
- Detach quick couplings and put covers on them.



Always switch the pump off before disconnecting quick couplings!

- Detach crane from the vehicle.

8. STORAGE INSTRUCTIONS

- Clean forest crane and if necessary, repaint any points, where paint has peeled off or gets damaged, this will avoid rust.
- Lubricate forest crane thoroughly (see lubricating instructions).
- Do not leave electric operated and pilot operated valve controls uncovered, water and moist may damage wiring and contacts.
- Release pressure from the cylinders.
- Protect the cylinder piston rods and exposed parts of the control valve with grease.
- Store forest crane in a sheltered area (under the roof), avoid direct contact with the ground.

9. MAINTENANCE

9.1 Maintenance table

OBJECT	ACTION		
	Maintenance interval, working hours		
	8 h or after working shift	40 h or after working week	320 h
1. Crane	Check cylinders and hoses for leakages	Check pins and lockings, tighten mounting bolts	Check the condition of primary structures
2. Slewing device	Grease bearings		Check mounting bolts, tighten if needed. Check gear racks, adjust if needed
3. Booms and ext	Grease slide bearings, cylinder eyelets and joints		Check slide bearings and adjust if needed, change if necessary
4. Cylinders	Grease eyelets		Check hydraulic cylinders
5. Grapple	Grease joints		Check grapple-rotator junction
6. Support legs		Grease joints and cylinder eyelets	

Table 4. *Maintenance table*

9.2 Adjusting the gearracks

- Turn column into center position.
- Release the locking nut widely enough, so it will not obstruct tightening (pos. 2 fig. 12).
- Tighten the bolt (pos. 1, fig. 12) against the gear rack with 20-25 Nm (2-2,5 kg*m).
- Tighten the locking nut (pos. 2 fig. 12).
- Repeat same procedure with both bolts.
- Make sure you adjust bolts after every 200 working hours.
- With professional everyday usage, tighten bolt at least once a month.

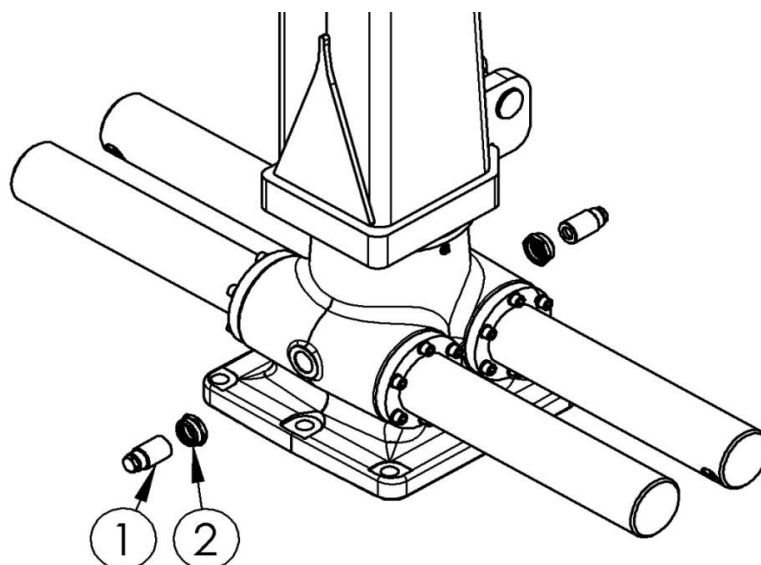


Figure 12. *Adjusting racks of slewing device*

9.3 Changing oil in slewing device

There is Addinol SAE 80W90, API GL4, GL5 oil in slewing device by manufacturer.

1. Change oil after 960 working hours or once a year.
2. Ensure that the slewing device is in horizontal position, as shown on fig. 12.
3. Release the lock nut (pos. 2, fig. 12).
4. Remove the bolt (pos. 1, fig. 12).
5. Pump the oil out with appropriate pump.
6. Fill up the slewing device with appropriate oil.
7. Tighten the lock nut according to manual's point 9.2 (pos. 2, fig. 12).



Oil should be changed at least once a year. Oil level has to be up to the lower edge of bolt hole (pos. 1)!

During the first oil change open turning house base cover (mounted with 4 bolts) and remove accumulated particles.

If there is need to change gearrack's polypack gaskets, change always oil as well.

Follow environmental regulations. Drain and collect old oil in to specific container.

9.4 Lubrication

Using the appropriate lubricants like Beacon EP2, Multipurpose GR Moly, Mobilux EP2, Mobil Grease MP Special, Energrease LS-EP2 or similar.

Right lubricants guarantee troublefree operation of the machine.

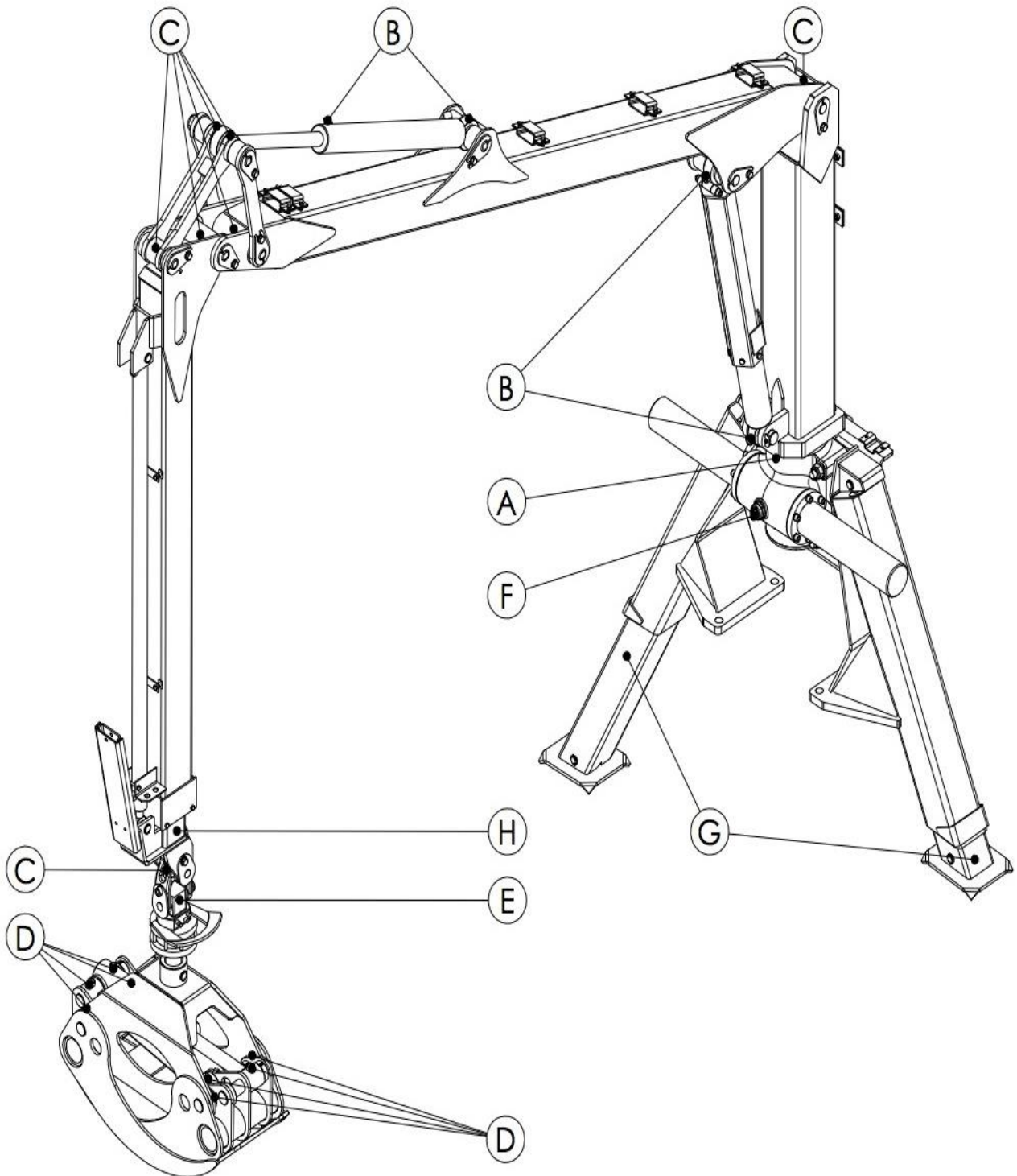


Figure 13. Greasing points of Palms 640

Lubrication point	Qty	Action	Interval, h	Notes
Slewing device				
1. Bearings, A	1	Greasing	8	2% molybdensulfide
2. Slewing device, F	1	Oil	2000	Addinol STOU SAE 80W90
Booms				
3. Joint, C	3	Greasing	8	2% molybdensulfide
4. Cylinder eyelet, B	4	Greasing	8	2% molybdensulfide
Telescope				
5. Sliding surfaces, H			8	2% molybdensulfide
Hanger				
6. Joint, C			8	2% molybdensulfide
Grapple				
7. Joints, D	8	Greasing	8	2% molybdensulfide
Rotator				
8. Joint, E	1		8	2% molybdensulfide
Support legs				
9. Sliding surfaces, G	2	Greasing	40	2% molybdensulfide

Table 5. Oil and lubricant grade table of Palms 625

9.5 Changing the hydraulic oil

Change hydraulic oil at least once in two years. Forest crane hydraulic system has been filled with Addinol HVLP ISO VG. 32 (DIN 51524/3) hydraulic oil at the factory. Oil temperature should not exceed 75°C in summer, winter oil can be used all year round.

9.6 Hydraulic oil requirements



- Freezing point must be below -50°C
- Viscosity must not be lower than 1.5 E°, +50°C for piston pumps and 2.5 E°, + 50°C for gear pumps
- Hydraulic oil must contain the necessary additives for lubrication, rust protection and defoaming

10. TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
CRANE'S WORKING MOVEMENTS ARE SLOW	PUMP RUNNING TOO SLOWLY	CHECK PUMP ROTATING SPEED
	NOT ENOUGH OIL	ADD OIL (AIR-BLEEDING)
	FAULTY PUMP	CHANGE OR GET THE PUMP FIXED
	LEAKS OR OBSTRUCTIONS IN OIL LINES	INSPECT AND CLEAN OIL LINES
	OIL TOO THICK	CHANGE TO A THINNER (PROPER) OIL GRADE
CRANE'S DESCENDING MOVEMENTS ARE SLOW	OBSTRUCTIONS IN THE OIL LINES	CHECK THE LINES AND THE CHOKES
	CLOGGED-UP (RETURN) FILTER	CLEAN OR RENEW FILTER
	OIL TOO THICK	CHANGE TO A THINNER (PROPER) OIL GRADE
CRANE'S MOVEMENTS ARE TOO FAST	ROTATION SPEED TOO HIGH OR PUMP IS TOO POWERFUL	CHOOSE A CORRECT PUMP/ SPEED OF ROTATION
	INCORRECT OPERATION	LEARN TO OPEN THE CONTROL VALVE TO A SUITABLE DEGREE
CRANE'S WORKING MOVEMENTS ARE POWERLESS	NOT ENOUGH OIL	ADD OIL (ALSO AIR BLEEDING)
	FAULTY PUMP	CHANGE OR GET THE PUMP FIXED
	FAULTY OF RELIEF OR SHOCK VALVES OR WRONG ADJUSTMENT	CHANGE THE RELIEF OR SHOCK VALVES OR ADJUST IN RIGHT WAY
	FAULTY CONTROL VALVE	CHANGE OR GET THE VALVE FIXED
	FAULTY CYLINDERS OR SEALS	CHECK THE CYLINDERS AND CHANGE THE SEALS
CRANE'S MOVEMENTS ARE JERKY	AIR IN HYDRAULIC SYSTEM	CHECK OIL LEVEL, BLEED AIR FROM SYSTEM
		CHECK FOR OBSTRUCTIONS OR LEAKS ON THE INLET SIDE
	FAULTY PUMP	INSPECT THE PUMP AND GET IT FIXED
BOOMS DESCEND BY THEMSELVES	FAULTY CONTROL VALVE	REPLACE/FIX THE VALVE
	FAULTY CYLINDERS OR HOSES	FIX THE LEAKAGE POINT, CHECK CYLINDER SEALS
CONTROL VALVE STEMS STICKING	VALVE'S FIXING SCREWS TOO TIGHT	CHECK SCREWS TIGHTENING TORQUE (50 Nm (5 kPm, 37 ftXlb))
	VALVE NOT ON LEVEL MOUNTING BASE	MOUNT THE VALVE ON A LEVEL BASE
	VALVES' TIE BOLTS TOO TIGHT	CHECK SCREWS TIGHTENING TORQUE 27,5 Nm (2,75 kPm, 20 ftXlb)
GRAPPLE'S OPENING BY ITSELF	FAULTY VALVE	FIX THE VALVE
	FAULTY CILINDER OF THE GRAPPLE	FIX OR CHANGE THE CILINDER
	FAULTY ROTATOR	FIX OR CHANGE THE ROTATOR

Table 6. Troubleshooting table

11. SPARE PARTS

Main parts

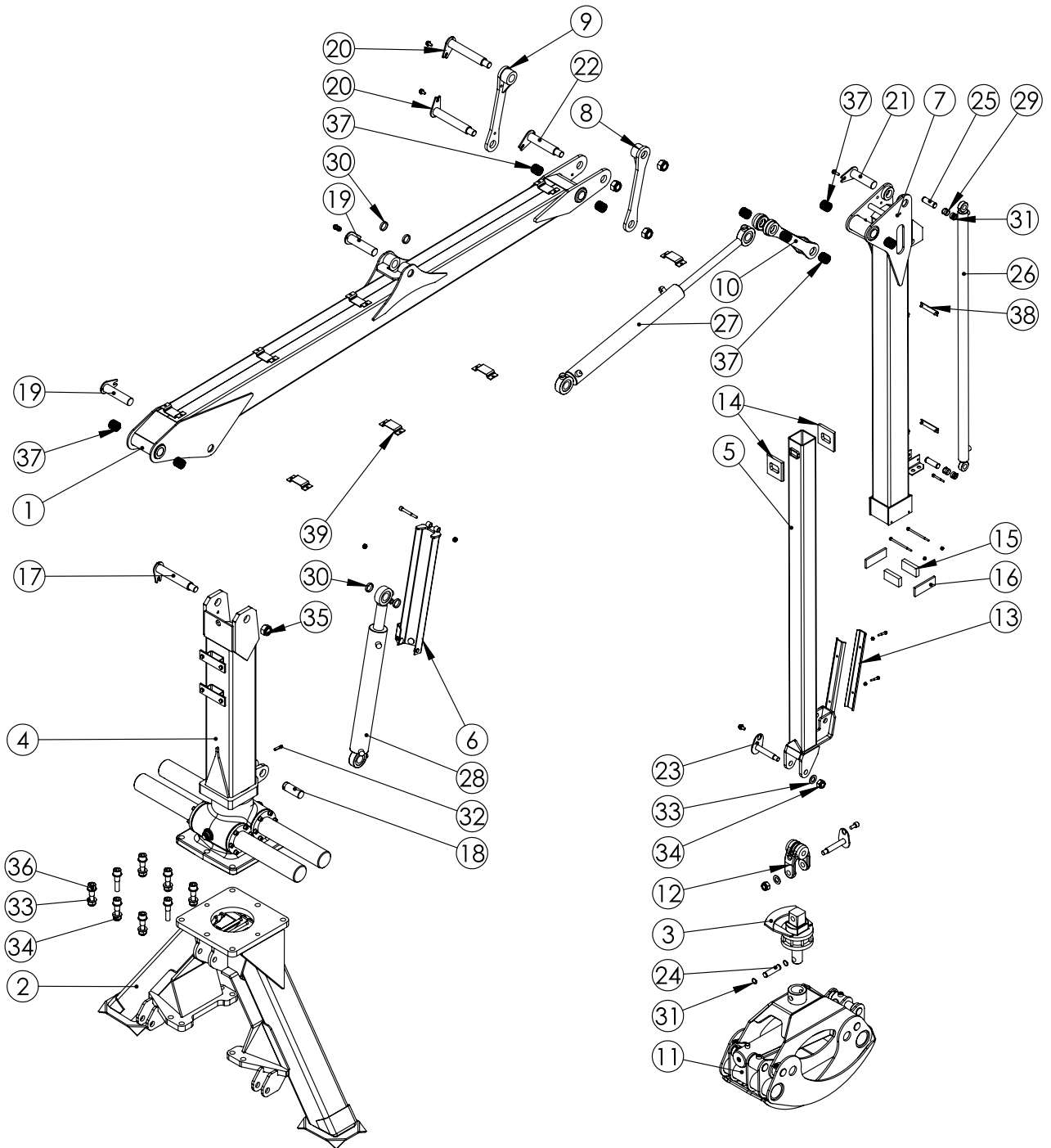


Figure 14. Palms 640 exploded view

Pos	Part №	Part name	Qty
1	670.03.01.00D/640	640 Main boom	1
2	AJ2.00.00.00	A-leg	1
3	FR CR304	Rotator	1
4	640 t.m.w.p	670 slewing mechanism and pillar	1
5	625.06.02.00	Telescope	1
6	670.04.00.00	Cylinder protector	1
7	625.05.03.00	Extension boom	1

8	670.06.00.00P	Puller 3	1
9	670.06.00.00	Puller 2	1
10	670.05.00.00	Puller 1	1
11	H22	Grapple	1
12	CDBL7325-9025	Link	1
13	655.00.00.04	Holder for hoses telescope	1
14	840.00.00.PL7	Sliding plate for extension boom	2
15	625.06.00.09	Extension boom top sliding plate	2
16	625.06.00.08	Extension boom side sliding plate	2
17	470.07.00.02B	Pillar-main boom shaft	1
18	470.07.00.01	Main boom cylinder shaft lower	1
19	625.11.00.00B	Main boom cylinder shaft upper	2
20	625.13.00.00B	Wide angle joint's shaft	2
21	625.14.00.00	Wide angle mounting shaft	1
22	625.12.00.00B	Main boom-extension boom shaft	1
23	25x93 pin	Upper pin 7325-9025	2
24	25x93 pin	Lower pin 7325-9025	1
25	25x73 pin	Telescope cylinder pin (25 x 73)	2
26	40-25-1350	Telescope cylinder (No 3)	1
27	70-36-620	Main boom cylinder (No 1)	1
28	80-50-535	Extension boom cylinder (No 2)	1
29	25L10	25 L10-dv	4
30	40L9	40 L9-dv	4
31	ø25x1.2lh	Locking hoop ø25x1.2 DIN 471	6
32	10x50sp	Stopper pin ø10x50 DIN 1481	1
33	M24w	Washer M24 DIN 125	16
34	M24n	Nut M24 DIN 985	8
35	M30n	Nut M30 DIN 985	4
36	M24x100b	Hex head bolt M24x100 DIN 912	8
37	L11FB0924040	Bronze slide bearing	10
38	625.05.01.02	Hose clamp	2
39	520.05.00.18	Pillar hose clamp	4

Table 7. *Palms 640 Spare parts list*

12. WARRANTY

Duration of warranty:

- Parts manufactured by Palmse Mehaanikakoda LLC, warranty is two years.
- Hydraulic hoses and seals warranty is 7 days of usage.
- All other parts and equipment not manufactured by Palmse Mehaanikakoda LLC, manufacturer warranty applies. Components warranty for cylinders, rotators, pumps, valve controls is one year starting from date of shipment.

The warranty does not apply:

- to any faults or defects arising from normal wear, negligence or improper operation. The machine shall not be taken into use before the operating manual is thoroughly read and understood.
- to faulty installation or incorrect or inadequate maintenance.
- to parts that wear during the normal usage, for example hydraulic hoses and seals.

The warranty is invalidated:

- if any repairs or constructional changes to the warranted products have been made by others than the manufacturer or a service shop authorized by the manufacturer or if the equipment has been altered without co-ordination with manufacturer.
- if the settings of the pressure relief valves of the loader's directional control valves have been changed without co-ordination with manufacturer.

Palmse Mehaanikakoda LLC will be not responsible for any damages caused by the machine, if the instructions and safety instructions in the manual are not followed.

The manufacturer will not assume any liability for any economical losses or for any consequential damage to persons or property, which may incur during product's usage or failure.

Product warranty is **NOT VALID** in case of user's incompetence and/or irrespective handling of the equipment. Warranty does not cover transportation cost, repairing labor or loss of profit due to normal abrasion or product failure.

Manufacturer:

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