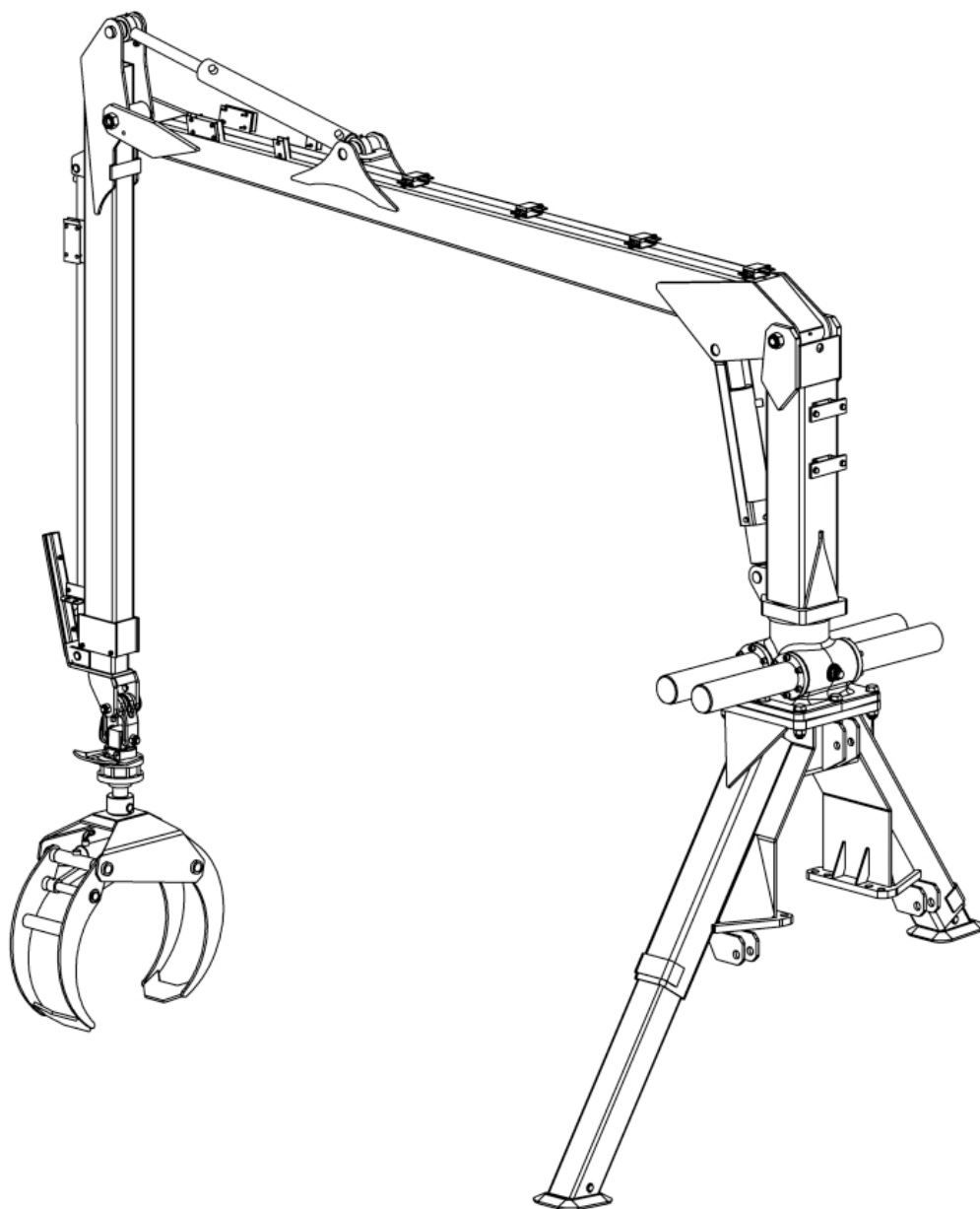


USER MANUAL



FOREST CRANE PALMS 675

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1. GENERAL

This manual gives you a detailed overview about forest crane **Palms 675**. 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 also 3-point linkage, 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. Forest crane is fitted out with 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. 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.

2. SAFETY

2.1 General

Read the manual carefully before you start operating with 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 and has sufficient training to use 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 rebuilding 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

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 with 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 endangering defects immediately
- Before hydraulics maintenance work make sure that the system is not pressurized
- 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 to avoid environment pollution
- When working in ecologically sensitive areas, use bio-oil

2.4 Operation



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

3. TECHNICAL DATA

3.1 Dimensions

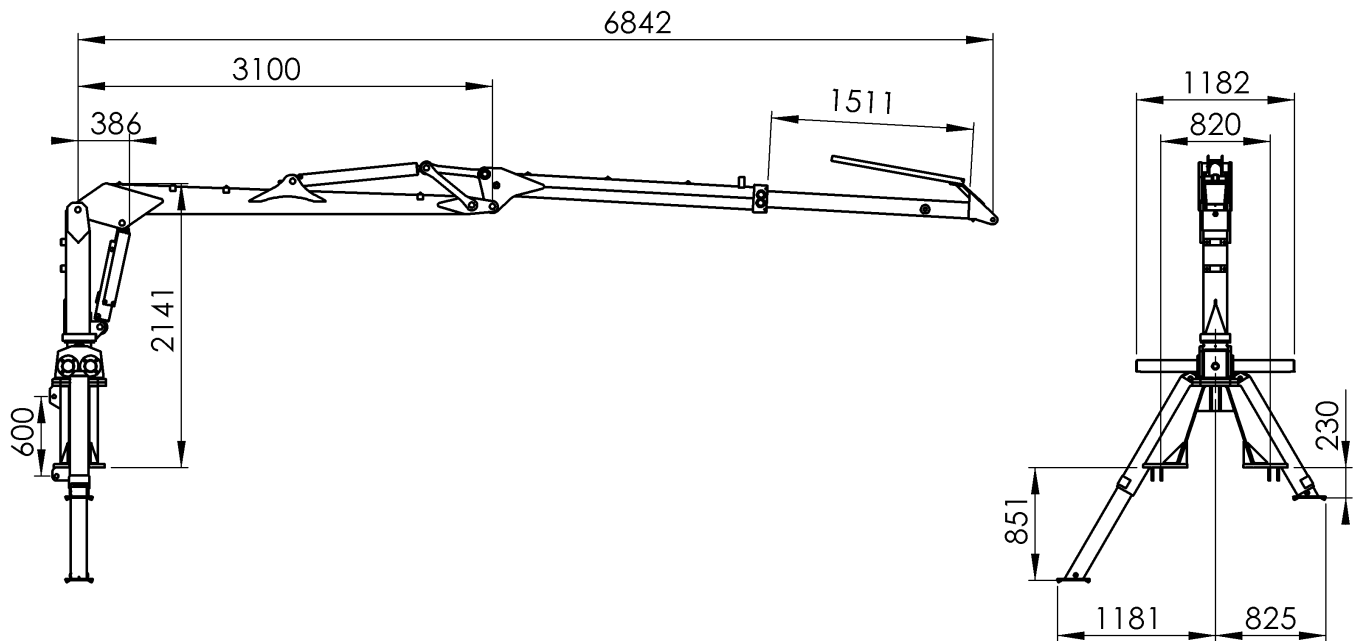


Figure 1. Palms 680 dimensions (mm)

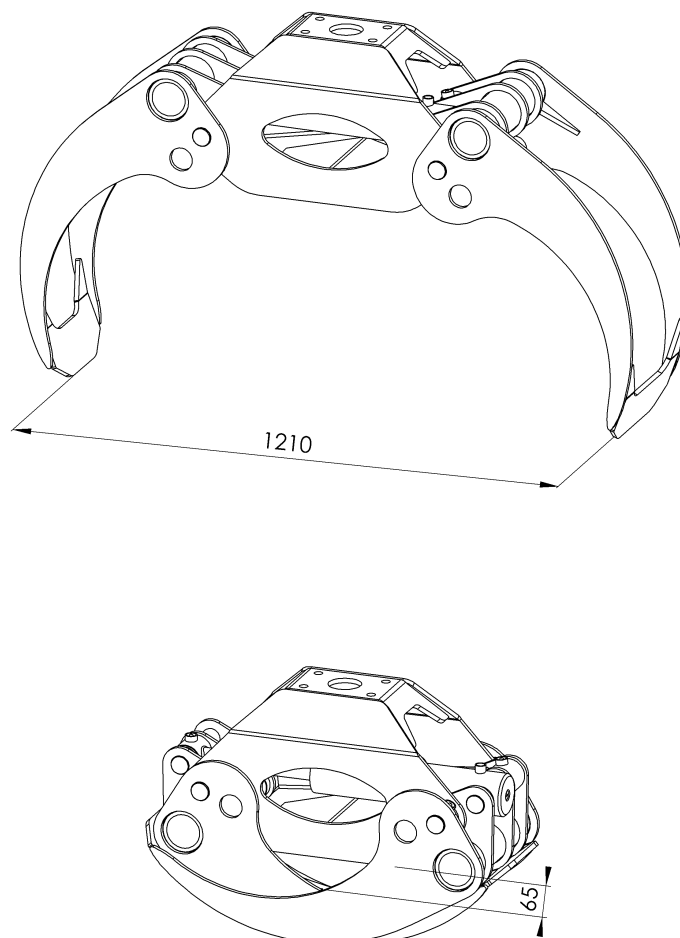


Figure 2. Grapple 0,22 dimensions (mm)

3.2 Lifting reach

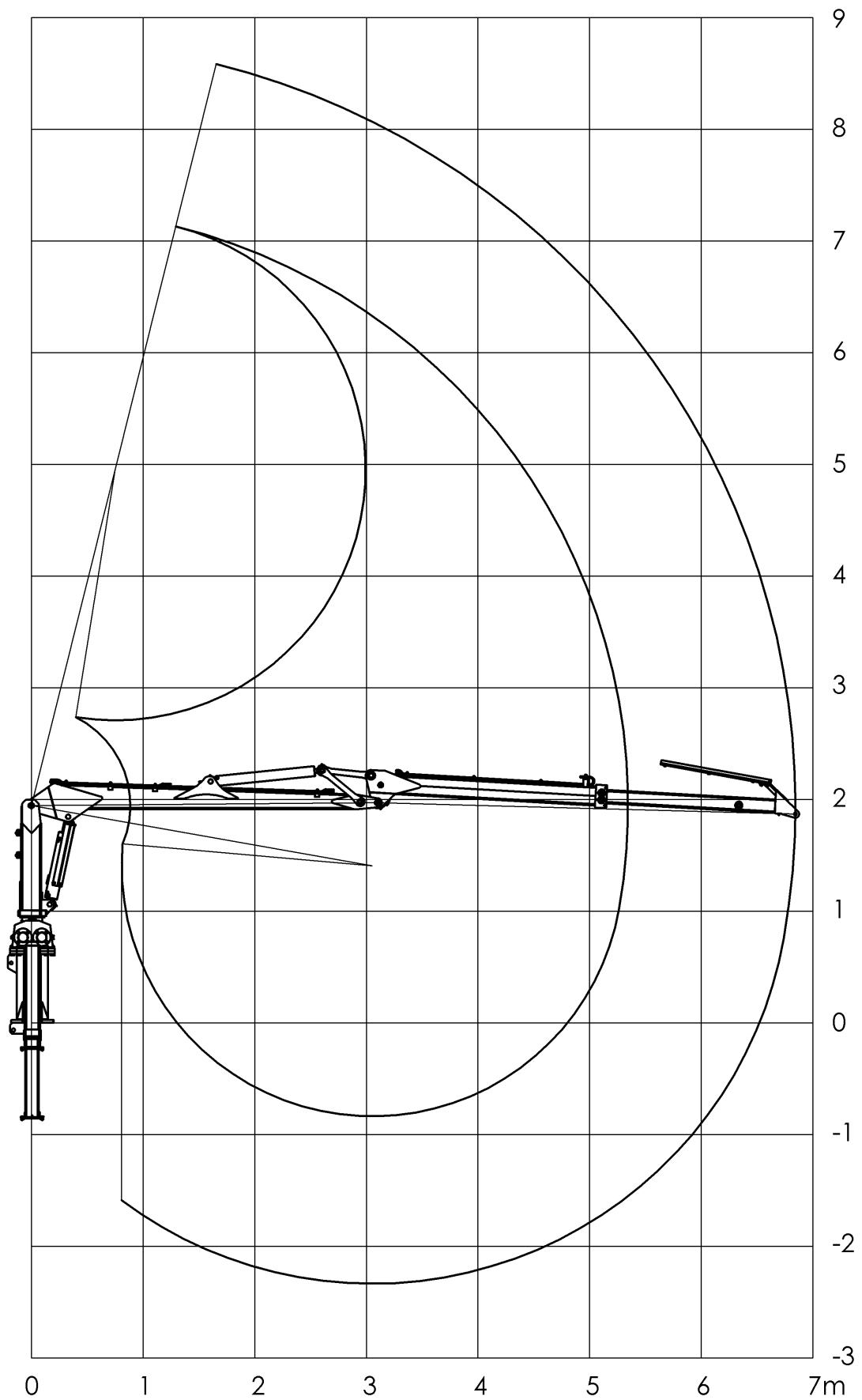


Figure 3. *Lifting reach of Palms 680 forest crane*

4. Technical data

Max reach, m	6,8
Lifting torque, kNm, bruto	47 kNm
Lifting power on 4m without grapple and rotator, kg	870
Lifting power on full reach without grapple and rotator , kg	550
Grapple, m ²	0,22
Rotator	GR 46
Grapple and rotator weight, kg	135
Slewing torque, kNm	10
Slewing cylinders	4
Boom rotation, °	370
Hydraulic valve, standard	HC 6/8 XY 80L
Working pressure, bar	180
Hydr pump capacity, l/min	60-80 l/min
Total weight, kg	1130

Table 2. Technical data table of Palms 700

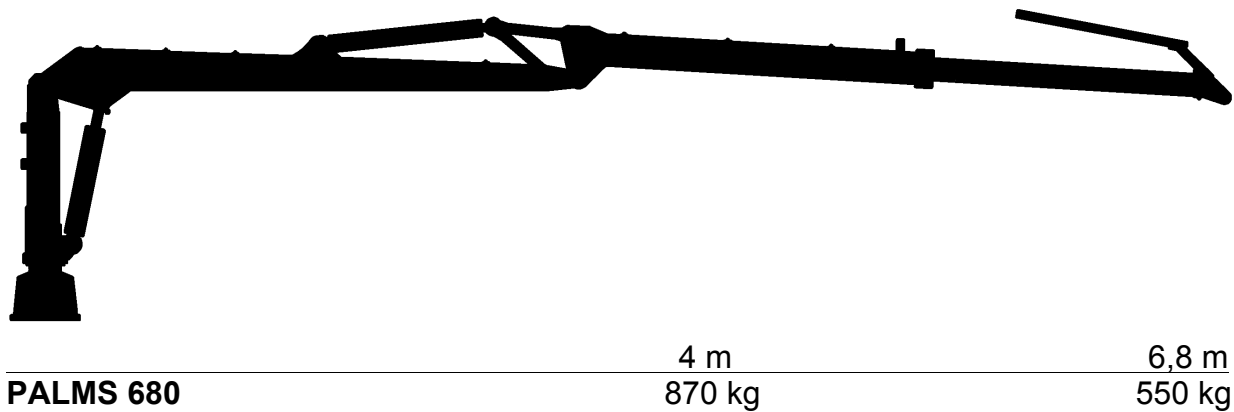


Figure 4. Palms 680 lifting power on different distances

Manufacturer reserves the right to change specifications without prior notice.

5. ASSEMBLY AND MOUNTING

Read these instructions before starting any assembly or mounting work. Improper mounting can cause hazards during use of the forest crane. Mounting, carried out in a manner other than specified in this manual, can expose the user to danger and will void the manufacturer's warranty.

5.1 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 in 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 after 40 working hours, tighten if needed. Later on do visual check.

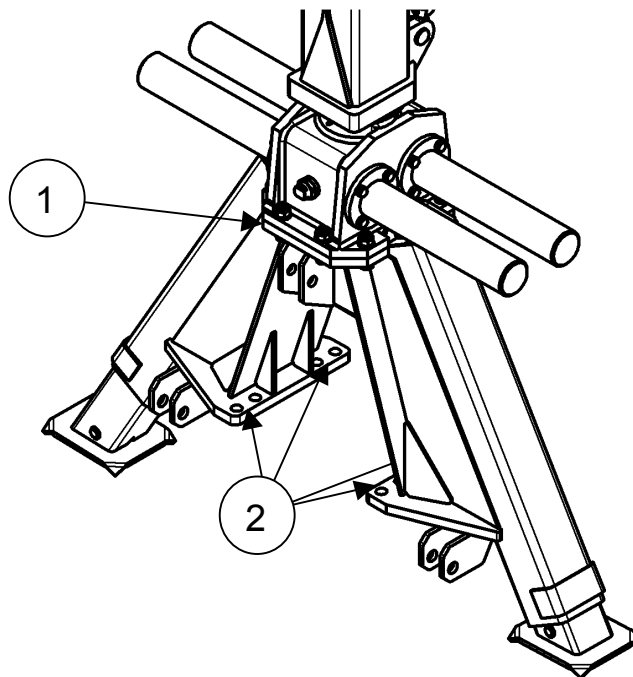


Figure 5. Connection junctions on Palms 680 support legs

5.2 Mounting forest crane to the trailer of other producer or to any other machine then Palms forest trailer.

Use the mounting plate (fig. 6) when mounting the loader to the tractor frame or trailer of other producer. Use mounting plate with thickness no less than 30 mm. Make shure there will be enough space at mounting point for later service.

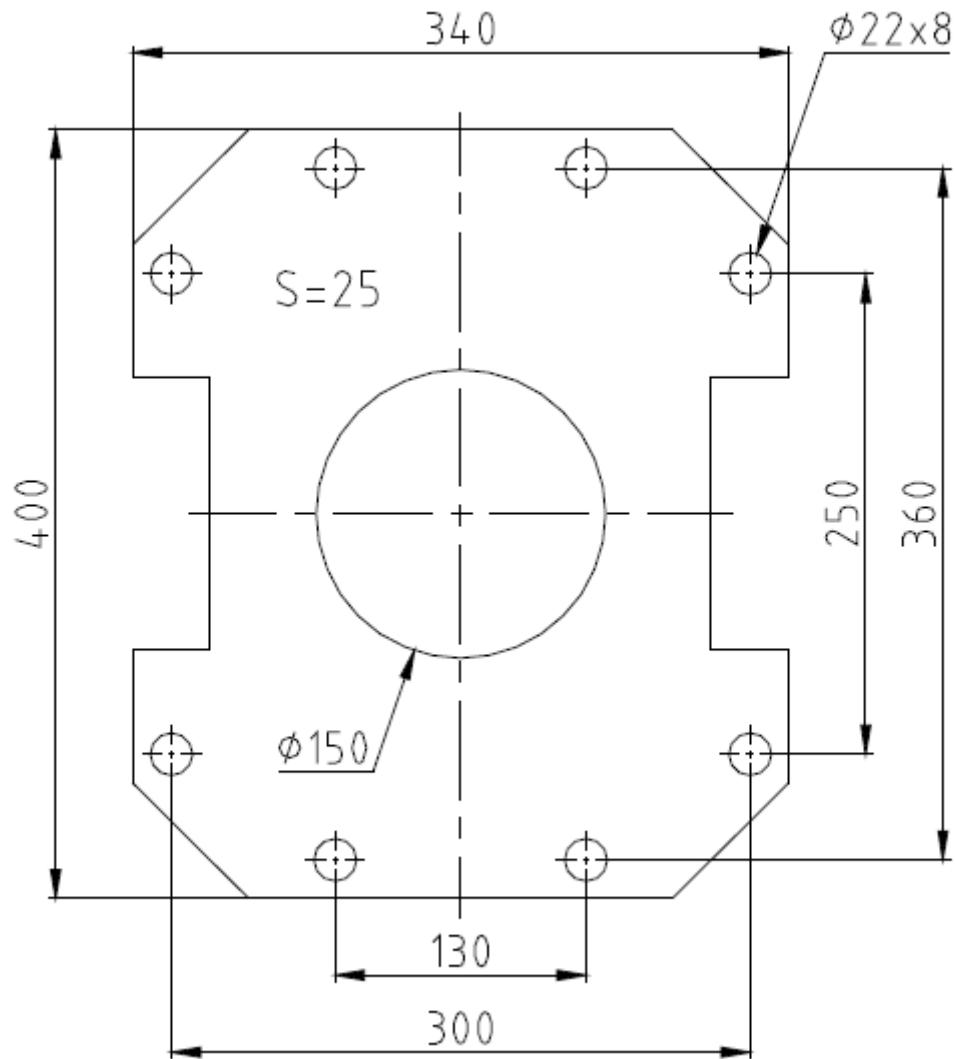


Figure 6. Mounting plate measures

5.3 Mounting forest crane to the 3-point linkage

Before mounting to the 3-point linkage make sure that:

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



Do not use the hydraulic puller for connecting the middle shaft!

5.4 Mounting control valve



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

Install the valve at 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!

6. HYDRAULIC SYSTEM

6.1 Connection

Before connecting forest crane to the tractor's hydraulic system, make sure that the oils are compatible. Forest crane has been tested using Addinol HLP 46 hydraulic oil that meets DIN 51524-2 requirements. Check the hydraulic oil level. We recommend connecting the pressure hose to the single-acting hydraulic outlet and the return hose to the tank via the return filter. The filter's intended minimum flow rate is 50 l/min and the filtering density is 10-50 µm. Make sure you connect the return hose always first and disconnect it last. Make sure the connection has made properly.



Ensure, that the control valve's pressure line (P) has been connected properly and that the return line (T) is unobstructed. 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 also be 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.



All PALMS forest crane control valves are fitted with the one-way flow valve, which protects control valve in case return line is by mistake connected to pressure line. If pump is directly connected to cranes control valve return line, there will be danger of breaking pump or hoses from overpressure, because one-way flow valve will block oil flow in wrong direction.

6.2 Hydraulic diagram and control functions

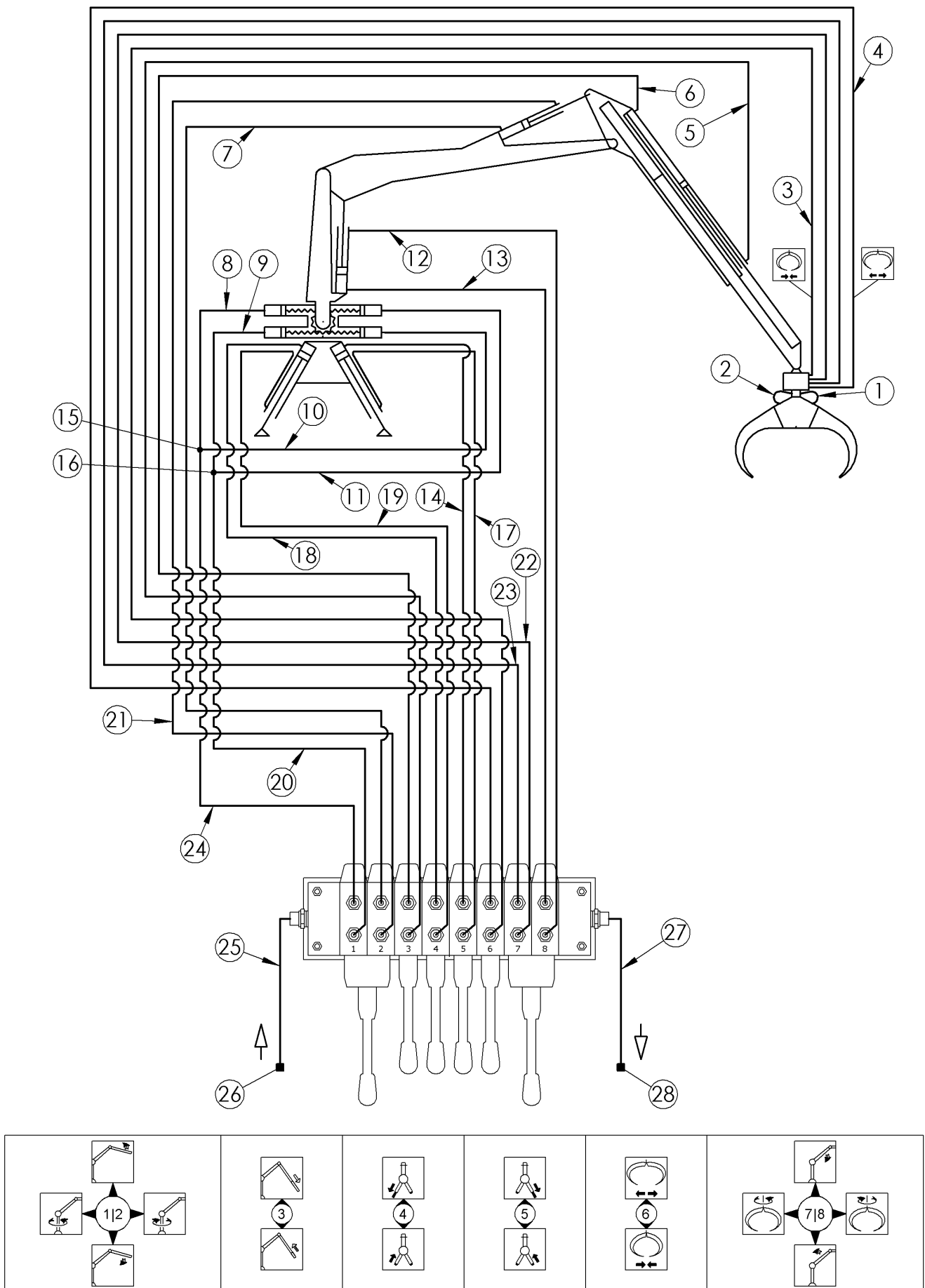


Figure 7. Palms 680 hydraulic diagram with HC6/8XY 80L control valve.

6.3 Shock valves

FUNCTION	HC 6/8 XY VALVE		
	BLOCK	SHOCK VALVE (bar)	
		A	B
SLEWING	1	160	160
BENDING	2	190	120
TELESCOPE	3	-	80
SUPP. LEG L	4	-	-
SUPP. LEG R	5	-	-
GRAPPLE	6	-	-
ROTATION	7	-	-
LIFTING	8	-	190
MAIN SAFETY VALVE		180	

Table 3. Shock valve pressures for HC 6/8 XY control valve

7. OPERATING INSTRUCTIONS

6.1 Testing

Ensure that the control valve's 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 are prone to damage at low temperature. When starting 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, that operation is 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, wich will keep them in working position in case feeding hoses of support leg cylinder breakes.



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.

8. DETACHING FOREST CRANE

Choose sufficiently hard and level ground for detaching forest crane. Ensure, that no unofferized persons are around during detaching and storing process. When storing control valve, make shure 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 cannot lean over
- Detach quick couplings and put covers on them



Always switch the pump off before disconnecting quick couplings!

- Detach crane from the vehicle

9. STORAGE INSTRUCTIONS

- Clean forest crane and if necessary, touch up any points, where paint has peeled off
- Lubricate forest crane thoroughly (see lubricating instructions)
- 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.

10. MAINTENANCE

10.1 Maintenance table

OBJECT	ACTION		
	Maintenance interval, working hours		
	8 h or after working shift	40 h or after working week	250 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. Adjust the gear racks
3. Booms and ext	Grease slide bearings and joints		Check slide bearings and adjust, change if necessary
4. Cylinders	Grease eyelets		Check hydraulic cylinders
5. Grapple	Grease joints		Check grapple-rotator junction
6. Support legs		Grease jsiding surfaces	

Table 4. *Maintenance table*

10.2 Adjusting the racks

- Check the racks at least once per year or after 250 working hours
- Turn the boom to the side ~90°
- Release lock nut (pos. 16 fig. 7)
- Screw the bolt (pos. 5, fig. 7) up to contact with the rack and tighten 15 – 30 degrees
- Screw up lock nut (pos. 16 fig. 7)
- Make sure you adjust both racks

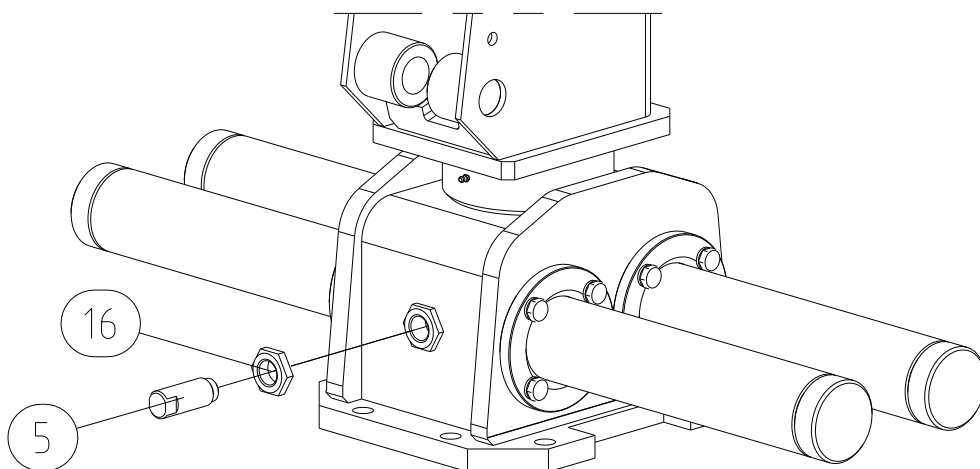


Figure 7. *Adjusting racks of slewing device*

10.3 Changing oil in slewing device

There is Addinol MU1045 Super Tractor oil in slewing device by manufacturer.

- Ensure that the slewing device is in horizontal position
- Release the lock nut (pos. 16, fig.7)
- Remove the bolt (pos. 5, fig. 7)
- Pump the oil out with appropriate pump
- Fill up the slewing device with appropriate oil



Oil level has to be up to the bolt hole lower edge!

- Screw the bolt (pos. 5, fig. 7) up to contact with the rack and tighten 15 – 30 degrees
- Screw up the lock nut (pos. 16, fig.7).



Follow environmental conditions. Collect wasted oil in a container. Hydraulic oil is recommended to be changed once in 2 years.

10.4 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.

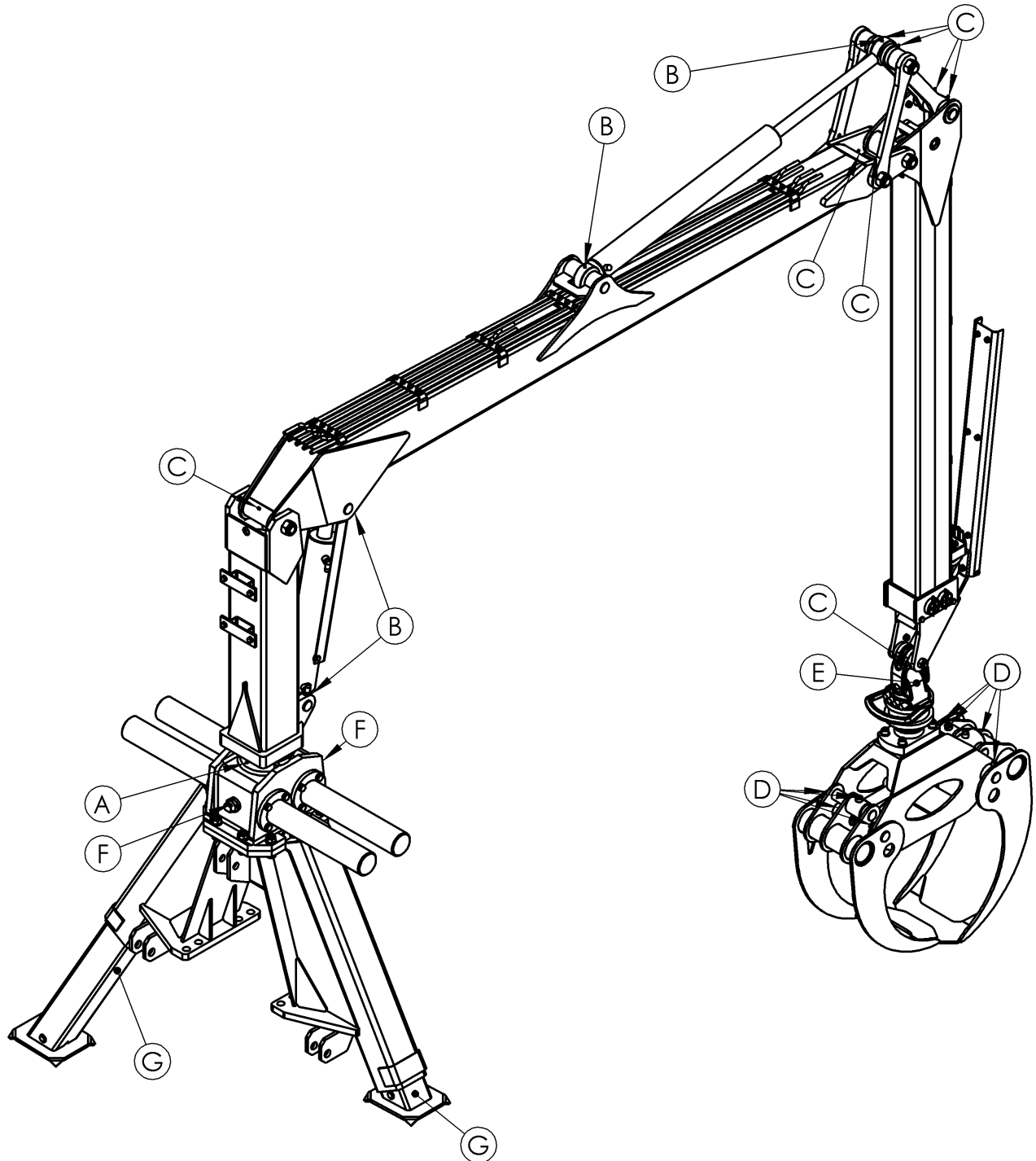


Figure 8. Greasing points of Palms 680

Lubrication point	Qty	Action	Interval, h	Notes
Slewing device				
1. Bearings, A	1	Greasing	8	2% molybdenulfide
2. Slewing device, F	1	Oil	2000	Addinol MU1045 Super Tractor
Booms				
3. Joint, C	7	Greasing	8	2% molybdenulfide
4. Cylinder eyelet, B	4	Greasing	8	
Grapple				
5. Joint, D	8	Greasing	8	
Rotator				
7. Joint, E	1		8	
Support legs				
8. Sliding surface, C	2	Greasing	40	

Table 5. Oil and lubricant grade table of Palms 680

10.5 Changing the hydraulic oil

Change the oil according to the vehicle's maintenance recommendations. Forest crane hydraulic system has been filled with Addinol HLP 46 hydraulic oil at the factory. If the oil temperature does not exceed 75°C in summer, winter oil can be used all year round.

10.6 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

11. 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

12. SPARE PARTS

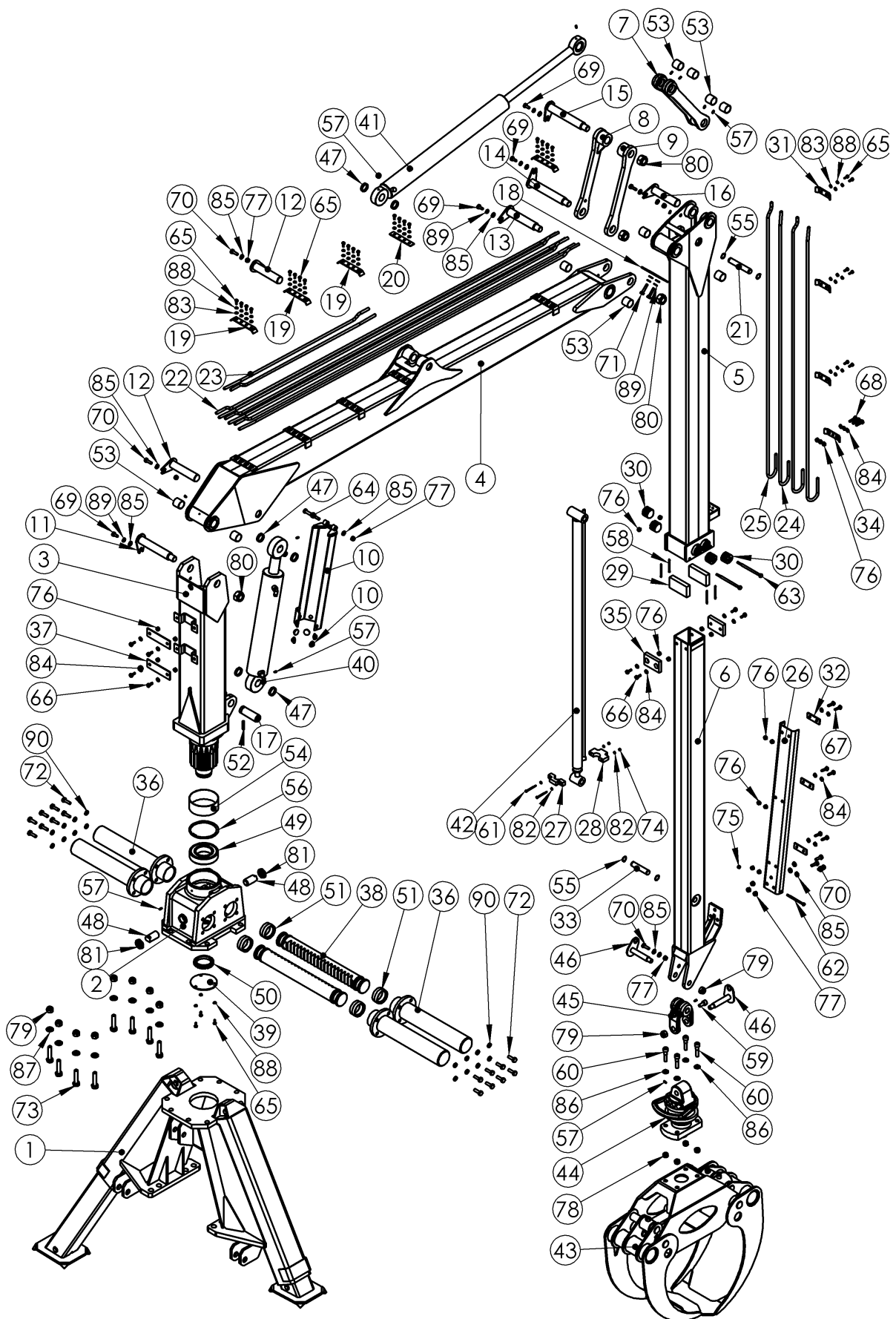


Figure 9. Spare parts of Palms 680 forest crane

Pos	Code	Part name	Qty
1	680100001	A-leg	1
2	680100002	Housing of turning device	1
3	680100003	Column	1
4	680100004	Main boom	1
5	680100005	Ext. boom	1
6	680100006	Telescope	1
7	680100007	Puller 1	1
8	680100008	Puller 2	1
9	680100009	Puller 3	1
10	680100010	Cylinder cover	1
11	680100011	Shaft of column-boom junction	1
12	680100012	Cylinder shaft on main boom	2
13	680100013	Shaft of boom-boom junction	1
14	680100014	Shaft of wide angle junction	1
15	680100015	Puller shaft on ext. boom	1
16	680100016	Shaft of cylinder on column	1
17	680100017	Mounting plate of ext. boom hoses	1
18	680100018	Tube clamp curved	1
19	680100019	Tube clamp straight	4
20	680100020	Shaft 1 of telescope cylinder	1
21	680100021	Tube 1 on main boom	1
22	680100022	Tube 2 on main boom	6
23	680100023	Tube 1 on ext. boom	2
24	680100024	Tube 2 on ext. boom	2
25	680100025	Saddle	2
26	680100026	Support 1 of telescope cylinder	1
27	680100027	Support 2 of telescope cylinder	1
28	680100028	Slider of ext. boom	1
29	680100029	Threaded slider of ext. boom	2
30	680100030	Clamp of hoses on ext. boom	4
31	680100031	Hoses clamp on saddle	3
32	680100032	Shaft 2 of telescope cylinder	3
33	680100033	Clamp of tubes on ext. boom	1
34	680100034	Slider of telescope	1
35	680100035	Hollows 80x432+55	2
36	680100036	Clamp of hoses on column	4
37	680100037	Gear rack	2
38	680100038	Cover of slewing device housing	2
39	680100039	Cylinder on main boom	1
40	680100040	Cylinder on ext. Boom	1
41	680100041	Telescope cylinder	1
42	680100042	Grapple 0,22	1
43	680100043	Rotator 46	1
44	680100044	Hanger	1
45	680100045	Shaft of hanger	1
46	680100046	Distance ring of cylinder	2
47	680100047	Supportive bolt of gear rack	6
48	680100048	Spherical roller bearing 23022E	2
49	680100049	Nut M100x2	1

Pos	Code	Part name	Qty
50	680100050	Polupac-gasket DBM 275196	1
51	680100051	Tube pin $\varnothing 10 \times 50$ DIN 1481	4
52	680100052	Bronze slide bearing 40-44x40 WB800	1
53	680100053	Bronze slide bearing 150-155x60 WB800	10
54	680100054	Locking hoop $\varnothing 25 \times 1.2$ DIN 471	1
55	680100055	Locking hoop $\varnothing 150 \times 4.0$ DIN 472	4
56	680100056	Lubrication nipple M6	1
57	680100057	Cotter pin 5x71 DIN 94	13
58	680100058	Socket head cap bolt M16x30 DIN 912	4
59	680100059	Socket head cap bolt M16x65 DIN 912	1
60	680100060	Hex head cap bolt M6x70 DIN 931	4
61	680100061	Hex head cap bolt M8x120 DIN 931	2
62	680100062	Hex head cap bolt M10x170 DIN 931	1
63	680100063	Hex head cap bolt M12x100 DIN 931	2
64	680100064	Hex head cap bolt M8x20 DIN 933	1
65	680100065	Hex head cap bolt M10x25 DIN 933	29
66	680100066	Hex head cap bolt M10x35 DIN 933	8
67	680100067	Hex head cap bolt M10x40 DIN 933	6
68	680100068	Hex head cap bolt M12x25 DIN 933	3
69	680100069	Hex head cap bolt M12x35 DIN 933	4
70	680100070	Hex head cap bolt M12x50 DIN 933	7
71	680100071	Hex head cap bolt M14x40 DIN 933	2
72	680100072	Hex head cap bolt M20x80 DIN 933	16
73	680100073	Nylon lock nut M6 DIN 985	8
74	680100074	Nylon lock nut M6 DIN 985	2
75	680100075	Nylon lock nut M10 DIN 985	1
76	680100076	Nylon lock nut M12 DIN 985	19
77	680100077	Nylon lock nut M16 DIN 985	8
78	680100078	Nylon lock nut M20 DIN 985	4
79	680100079	Nylon lock nut M30 DIN 985	10
80	680100080	Nut M30	4
81	680100081	Washer M6 DIN 125	2
82	680100082	Washer M8 DIN 125	4
83	680100083	Washer M10 DIN 125	26
84	680100084	Washer M12 DIN 125	17
85	680100085	Washer M16 DIN 125	16
86	680100086	Washer M20 DIN 125	4
87	680100087	Spring washer M8 DIN 127 B	8
88	680100088	Spring washer M12 DIN 127 B	29
89	680100089	Spring washer M14 DIN 127 B	6

Table 7. Spare part list of Palms 680 forest crane

13. WARRANTY

Product warranty is valid for one year starting from the date of delivery or issuing an invoice. Product warranty is valid only in case if:

- rules and recommendations mentioned in the manual were followed
- during the maintenance original spare parts were used
- maintenance work was performed by qualified specialists
- forest crane was not overloaded
- proper pressure was used in the hydraulic system.

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

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