TIMBER CRANE
OPERATORS MANUAL

NOTICE!

Thanks for your purchase of a timber crane. We hope your experience with it is enjoyable, productive and safe. The help ensure that it is please do take notice of the following:

1. Before using the Timber Crane, we strongly advise you to read this manual carefully regardless of past experience.
2. Please do not retrofit or make modifications to the Timber Crane as this may affect both its capability or void your warranty.
3. Please adhere strictly to the operating procedures in this manual and use the Timber Crane in accordance to gain the longest, safest use. In doing so you will also avoid potential damage to the unit. Damage caused by not adhering to the usage guidelines will not be covered by your warranty.
4. All of the information, pictures and technical data in the manual are current with the latest information available as the date of publication of this manual.

Updates to the manual as they become available can be found online at our website: https://LawnAndForest.com/timbercrane/manuals/

NOTES FOR SAFETY

1. The driver must adhere to state law and be licensed, and be familiar with the use of the Timber Crane and Tractor. This includes:
    a. Safety Guidelines
    b. Service and Maintenance and
    c. General Operation
2. Do NOT allow anyone to stand under the lift arm or grapple.
3. Take note of your load and do not drive over the capacity of what the trailer can handle.
4. Pickup logs from balanced center do not pick up logs by the ends as it may cause damage to the grappling unit, or lifting arm. The weight exerted against the unit due to leverage past center is significantly more stressful on the machine. The farther from center you pick up logs the more stress caused. It is always ideal to try an pick up the log at the balance point.
5. When parking on a slope the hand brake needs to be engaged and the wheels need to be chocked.
6. Never park close to fire.
7. Pay attention to the readings of instruments on the tractor at all times.
8. Disassemble, assemble and adjust the machine in according with the manual.
9. Check whether the brake system is safe and reliable. Otherwise, don’t drive until you eliminate all malfunctions.
10. When transporting the timber, don’t use the trailer to tow another trailer or vehicle. This is both a hazard to the Timber Crane and a traffic hazard.

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APPLICATION AND FEATURES

The Timber Crane and Trailer is most suitable for the movement of timber from thinning to clearcutting. It is also well suited for transporting different materials on the work sites.

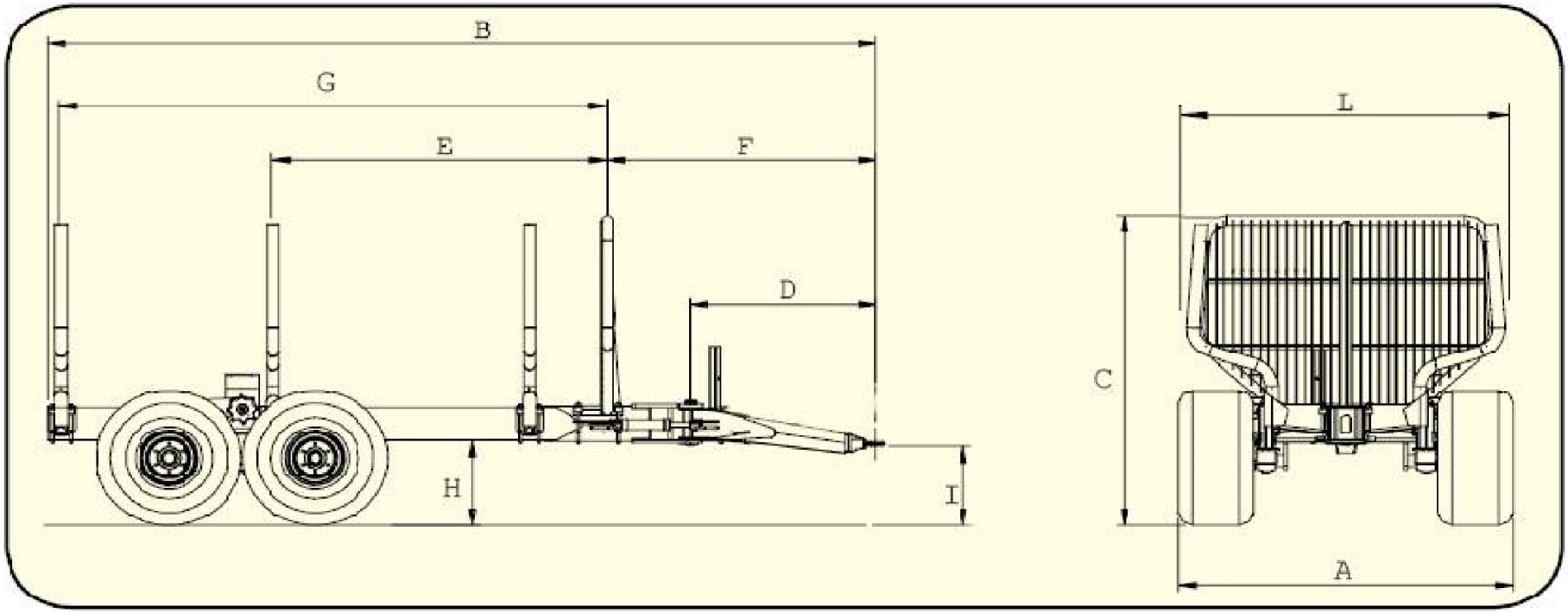
The Timber Crane and Trailer have proven their productivity and reliability in different applications including but not limited to forest trailers, chippers, road transport, agriculture, stationary use in loading and unloading etc.

The manufacturing process combines state-of-the art technology, carefully selected raw materials and experienced engineers to ensure that the cranes are reliable and productive.

TECHNICAL DATA

Log Loading Trailer with Crane	1T	3T	5T	8T	10T	12T
Model	ZM1002	ZM3004	ZM5004	ZM8006	ZM10006	ZM12006
Matching Tractor HP	10-20	20-40	50-60	70-80	80-90	90-100
New Weight (kg)	800	1550	1700	2400	2600	2800
Trailer	TR10	TR30	TR50	TR80	TR100	TR120
Load Capacity (kg)	1000	3000	5000	8000	10000	12000
Load Area (m2)	.85	1	1.6	2.2	2.5	2.8
Total Length (mm)	3600	5100	5100	5900	6300	6300
Loading Length (mm)	2000	3100	3100	3860	4300	4300
Total Width (mm)	1400	1600	1800	2200	2300	2500
Frame tube dimensions (mm)	80x80x6	140x140x6	140x140x6	160x160x6	160x160x6	160x160x6
Shaft Journals (mm)	ϕ 36	ϕ 38	ϕ 38	ϕ 38	ϕ 38	ϕ 38
Without Brakes	Standard	Standard	Standard	n/a	n/a	n/a
Air Brakes in front hubs	n/a	n/a	Optional	Optional	Optional	Optional
Air Brakes in 4 hubs	n/a	n/a	Optional	Standard	Standard	Standard
Tires	6.0-13	7.0-16	8.25-16	400/60-15.5	400/60-15.5	400/60-15.5
Crane	CR02	CR04	CR04	CR06	CR06	CR06
Reach Max(mm)	3500	4300	4300	6000	6000	6000
Lifting torque(kNm)	23.3	44.6	44.6	60.9	60.9	60.9
Lifting capacity (kg)/outreach(m) (without Grapple and Rotator)	520/2, 510/3, 500/3.5	900/2, 860/3, 820/4, 800/4.3	900/2, 860/3, 820/4, 800/4.3	990/3, 820/4, 730/5, 680/6	990/3, 820/4, 730/5, 680/6	990/3, 820/4, 730/5, 680/6
Slewing Angle	370°	400°	400°	400°	400°	400°
Hydraulic system	CR02.7	CR04.7	CR04.7	CR06.7	CR06.7	CR06.7
Gear pump	CBT-E306FER2 (12L)	CBT-E308FER2 (16L)	CBT-E308FER2 (16L)	CBT-E310FER2 (20L)	CBT-E310FER2 (20L)	CBT-E310FER2 (20L)
Hydraulic valve	750G3	750G3	750G3	750G3	750G3	750G3
Rotator	CLB10	CLB30	CLB30	CLB30	CLB30	CLB30
Hydraulic Center	O(6.5HP)	O(9HP)	O(9HP)	O(11HP)	O(11HP)	O(11HP)
Grapple	TG019	TG024	TG024	TG029	TG029	TG029
Grapping area (m2)	0.19	0.24	0.24	0.29	0.29	0.29
Weight (kg)	70	110	110	150	150	150

2. Dimensions:

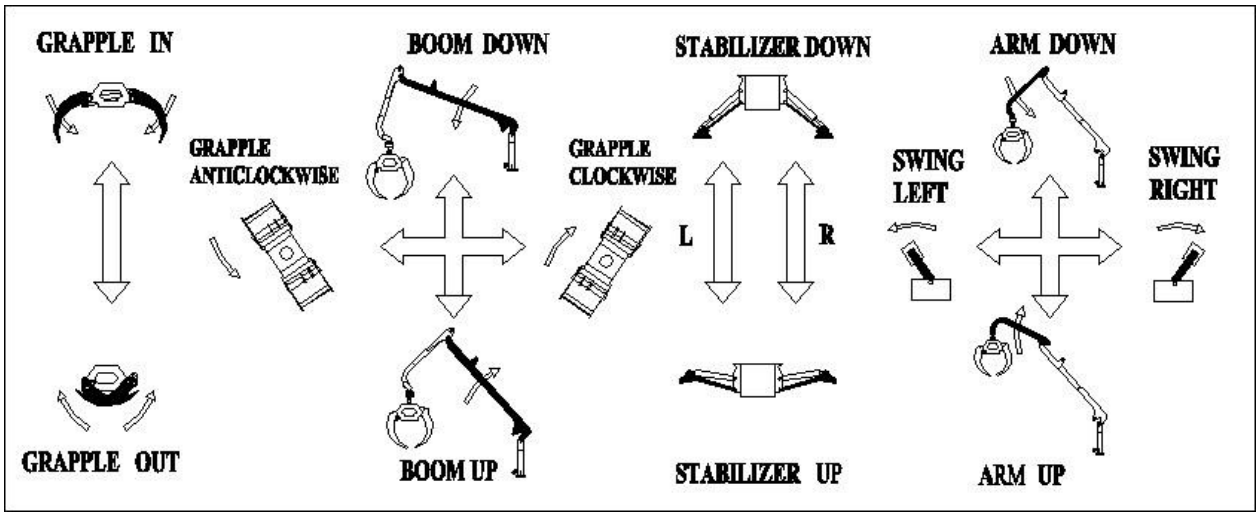


	1T (mm)	1T (in)	3T (mm)	3T (in)	5T (mm)	5T (in)	8T (mm)	8T (in)	10T (mm)	10T (in)	12T (mm)	12T (in)
A	1425	56.10	1560	61.42	1770	69.69	2200	86.61	2300	90.55	2500	98.43
B	3500	137.80	5100	200.79	5100	200.79	5900	232.28	6300	248.03	6300	248.03
C	1325	52.17	1600	62.99	2000	78.74	2290	90.16	2290	90.16	2290	90.16
D	n/a	n/a	1010	39.76	1010	39.76	1010	39.76	1010	39.76	1010	39.76
E	1290	50.79	1830	72.05	1830	72.05	2450	96.46	2900	114.17	2900	114.17
F	1160	45.67	1860	73.23	1860	73.23	1920	75.59	1920	75.59	1920	75.59
G	2280	89.76	3180	125.20	3180	125.20	3860	151.97	4300	169.29	4300	169.29
H	390	15.35	460	18.11	500	19.69	580	22.83	580	22.83	580	22.83
I	405	15.94	415	16.34	465	18.31	430	16.93	430	16.93	430	16.93
L	1420	55.91	1470	57.87	1810	71.26	1990	78.35	2110	83.07	2290	90.16

OPERATION

The operator of the Timber Crane should be fully understand the specification, structure, operation methods, technical maintenance and service of the unit in order to guarantee safe use and operation.

There are 7 primary control lever functions installed in the control panel. The control levers control the actions of all parts of the Timber Crane allowing you to control the grapple, lifting, etc. The functions of the control levers are as listed below.



GENERAL SAFETY FOR OPERATIONS

Using a Timber Crane involves several important safety considerations to ensure safe operation and prevent accidents. Here's a brief safety guide for using a Timber Crane:

1) Control Arm Movement: Avoid moving the loader arm too quickly or abruptly, especially when handling heavy loads or maneuvering in tight spaces. Smooth, controlled movements reduce the risk of tipping or losing control.

2) Position Wood Properly: When grabbing wood with the grapple, ensure the wood is positioned close enough to the trailer or designated loading area. Attempting to lift wood that is too far away can strain the equipment and increase the risk of accidents.

3) Load Within Capacity: Do not overload the Timber Crane, especially at maximum arm reach. Loading beyond the loader's capacity can destabilize the equipment and lead to tipping or structural damage.

4) Only operate the Timber Crane on level ground with the stabilizer feet engaged.

5) Avoid Releasing Grapple Mid-Air: Never release the grapple while wood is suspended in the air. This action can cause the wood to fall unpredictably, posing a significant hazard to nearby personnel or equipment. Always lower the wood to a secure position before releasing the grapple.

6) Inspect and Maintain Equipment: Conduct pre-operation inspections of the Timber Crane to ensure all components, including hydraulic systems, grapples, and safety devices, are in good working condition.

7) Use Personal Protective Equipment (PPE): Wear appropriate PPE such as hard hats, gloves, safety boots, and high-visibility clothing while operating the Timber Crane. PPE helps protect against potential hazards like falling debris or accidental contact with equipment.

8) Communication and Awareness: Maintain clear communication with ground personnel or spotters to coordinate movements and ensure everyone remains clear of the operating zone. Be aware of your surroundings at all times, especially when maneuvering or swinging the loader arm to avoid collisions or entanglements.

9) Training and Supervision: Ensure operators are properly trained and certified to operate the Timber Crane. Provide ongoing training and supervision to reinforce safe operating practices and address any safety concerns.

10) Emergency Procedures: Familiarize yourself with emergency shutdown procedures and how to safely exit the equipment in case of malfunction or emergency.

11) Follow the Instructions laid out in this book: Adhere to all safety guidelines these guidelines are designed to maximize safety and efficiency during operation.

WORKING CAUTION AND INSPECTING

Followings are the introductions of cautions and notices for working, as the reference to users:

1) Preparations before work.

Clear and level the working site firstly.

2）Grappling.

First, drive timber crane to the working site and operate the control levers to let the stabilizers down to the firm ground. Then we can use the grapple to work.

3) Transporting

Operated the control levers to let the stabilizers up and lifted the working device of the grapple high to the place of suiting for transportation. We can drive the timber crane at a certain of speed chosen according to the road condition.

1. Notes for operation

a. The driver, with driving license suitable for the operation of an adequate tractor for the specified Timber Crane size should read thoroughly through this manual and be trained with to hand the Timber Crane in adherence with traffic regulations, structural principle of Timber Crane and practical operation before driving and work. There should be only operator at any one time controlling the Timber Crane.

b. Use oils of required brand that meet the quality standards.

c. Maintain the machine periodically according to the requirements in this manual.

d. After starting make the tractor run the engine in idle for 5-10 minutes or until the readings of all gauges are normal. Only then should you engage the tractor releasing the hand brake to begin driving.

e. Temperature of engine coolant should not exceed 100℃ (212°F) during operation, and that of PTO converter should not exceed 120℃ (250°F). If temperatures exceed these levels immediately stop operation for cooling.

2. **Roving check**

Perform the following daily check list before working with the Timber Crane.

a. Check the conditions for damage, wear or looseness in working device, hydraulic cylinders, linkage rods as well as hoses. Repair them before operation.
b. Remove dirt and dusts around engine, battery and radiator.
c. Check whether there is oil or water leakage in engine and repair the abnormal parts.
d. Inspect whether there is leakage in gear box case, driving axles, hydraulic tanks, hoses as well as connectors and repair them.
e. Check whether there is leakage in brake lines.
f. Check for tires damage, worn or loose bolts.
g. Check whether the handrails and treadles are damaged, or bolts are loose.
h. Check if gauges and electrical parts are damaged, or bolts and couplings are loose.

3. **Checks and maintenance before and after work**

a. Checks before engine starting**:**
    i. Whether the fuel in tank is sufficient.
    ii. Whether the coolant in engine radiator is adequate.
    iii. Whether the lubricant in oil pan is at the required level.
    iv. Whether the working hydraulic oil and brake oil are sufficient.
    v. Whether the tire pressure is normal.
    vi. Whether the bolts for rims and driving shafts are loose.
    vii. Whether the gearshift high-low speed control levers and working device control lever are in neutral positions.

b. Checks after engine starting**:**
    i. Whether readings of all gauges are normal.
    ii. Check for leakage in tractor and all equipment.
    iii. Whether each switch, lamp, gauge and horn are normal.
    iv. Whether there is abnormal noise in engine or transmission system.
    v. Whether each handle or lever is flexible or reliable.

vi. Whether the steering wheel is loose.
vii. Whether the brakes are reliable.
viii. Whether the operations of working device is normal.

c. Maintenance after work:
   i. Check the fuel level in diesel tank.
   ii. Check whether the oil level in oil pan is normal.
   iii. Check for overheat in transmission system and Timber Crane.
   iv. Check whether the bolts of rims and driving shafts as well as set plate of each pin shaft are loose.
   v. Check whether the outline and pressure of tires are normal.
   vi. Fill grease to each rotating part.

Drain the coolant out of engine radiator and engine during winter if anti-freeze solution was not used. Disregard if anti-freeze was used in normal operation.

DRIVING

Starting

1) Put the gearshift control lever to neutral position.
2) Hand brake switches to “Brake” position.
3) Insert the key to power switch and start tractor.
4) Start the engine.

Traveling

1) After starting, run the engine in low speed for 5min, check all gauge readings are normal.
2) Roll the bucket back to carrying position (pin clearance app.400mm)
3) Disengage hand brake.
4) Put the high-low speed lever and gearshift lever to suitable position, press down the throttle pedal to travel.

Parking

1) Before parking, gear the gearshift lever to neutral position, run the engine in low speed for 3-5min.
2) Engage the hand brake.
3) Disengage power.
4) If parking for an extended time we suggest disengaging the central power to the tractor to help maintain the battery.

TECHNICAL MAINTENANCE

In order to guarantee the Timber Crane's continuous full-load operation and maintain performance of your unit thus preventing wear periodical maintenance is necessary. To keep your Timber Crane in an ideal state the following is necessary:

After Assembly

After initial assembly of your unit:

1) fill hydraulic oil in the reservoir checking the level on the dip stick until adequate hydraulic fluid registers. Suggested hydraulic fluid for use is: L-HM46
2) Lubricant all lubrication points on the unit.
3) Run unit and each part until hydraulic fluid is fully worked into lines and working cylinders.
4) After break-in period of 20 hours replace hydraulic oil.

General Maintenance

5) Replace hydraulic oil every 1000 working hours or half a year.
6) The maintenance of PTO hydraulic motor should be checked after every use once the tractor stops completely and the hydraulic system has been unloaded.
7) The maintenance should include:
   a) Check the linkage between the PTO motor and tractor PTO shaft. Inspect for wear, damage, and abnormality.
   b) Check whether the fuel in tank is sufficient and whether there is leakage in hydraulic system.
   c) Grease all lubrication points every 30 days, or ten hours of use whichever comes first.
   d) After work, the grapple should be on the ground, so as to assure safety and relieve strain from hydraulic lines.
   e) If you don't plan on using your Timber Crane for an extended period we suggest storing it under cover to help avoid wear and rust.

CONNECTING THE HYDRAULIC MOTOR TO THE TRACTOR.

Connecting a hydraulic motor to a tractor's Power Take-Off (PTO) shaft involves specific steps to ensure proper setup and safe operation.

By following these step-by-step instructions, you can safely and effectively connect the hydraulic motor for your Timber Crane to your tractor's PTO shaft.

Safety First: PTO systems involve rotating shafts and high torque, so prioritize safety at all times during installation and operation.

Here's a detailed guide:

1) Check the hydraulic fluid reservoir on the Timber Crane to make sure you have adequate hydraulic fluid.

2) Ensure the hydraulic motor you have is designed to connect to your tractors PTO shaft. It should have a compatible interface and be rated for the appropriate torque and speed. If necessary, acquire an adapter.

3) Prepare the Tractor:
    a. Park the tractor on a flat, stable surface and engage the parking brake.
    b. Turn off the tractor and wait for all moving parts to come to a complete stop.

4) Locate the PTO Shaft: Identify the PTO shaft on the tractor. This is typically located at the rear of the tractor and can be identified by its splined shaft with a protruding spline lock.

5) Install PTO Adapter (if needed):
    a. If your hydraulic motor does not directly fit the tractor's PTO shaft, you may need to use a PTO adapter.
    b. Attach the PTO adapter to the tractor's PTO shaft according to the tractor manufacturer's instructions. Ensure it is securely fitted and locked in place.

6) Connect Hydraulic Motor to PTO Shaft:
    a. Align the hydraulic motor's PTO interface with the tractor's PTO shaft.
    b. Slide the hydraulic motor onto the PTO shaft, ensuring the splines match up.
    c. Engage the spline lock mechanism on the Hydraulic Motor shaft to secure the hydraulic motor in place.

7) Secure the chains from the motor to a solid point on the tractor. Try to take out any slack on the chains so that the motor cannot move more than necessary.

8) Test Operation:
    a. Start the tractor and engage the PTO.
    b. Gradually increase the PTO speed to test the hydraulic motor's operation.
    c. Verify that the hydraulic motor is functioning correctly and that there are no abnormal noises or vibrations and that the motor is connected and steady.

9) Operational Safety Check:
    a. Ensure all safety precautions are followed from your tractor manufacturer.
    b. Wear safety glasses
    c. Ensure all connections are secure before operating the hydraulic motor.
    d. Stand clear of moving parts and be wary of loose clothing.

10) Maintenance and Monitoring:
    a. Regularly inspect the hydraulic motor and connections for leaks or wear.
    b. Monitor hydraulic fluid levels in the Timber Crane Reservoir is adequate.
    c. Watch for leaks. If you notice a leak stop operation fix the leak and then resume operation. Running the motor with inadequate hydraulic fluid can damage the hydraulic motor and void your warranty on the part.

LOWERING STABILIZER FEET

RAISING THE STABILIZER FEET

1) When ready to retract the stabilizer feet, activate the control mechanism to raise them slowly and smoothly.

2) Monitor each stabilizer foot as it retracts to ensure it moves smoothly and evenly without binding or jerking.

3) Final Inspection:
    a. Conduct a final visual inspection of the stabilizer feet and surrounding area to ensure there are no signs of damage or issues.
    b. Secure any loose items and prepare the Timber Crane for the next operational task.

Additional Tips:

Safety First: Always prioritize safety by wearing appropriate personal protective equipment and following all safety guidelines.

Regular Maintenance: Ensure that the stabilizer feet are regularly inspected and maintained to ensure safe and efficient operation.

Training: Operators should receive proper training on the use of stabilizer feet and other safety features of the Timber Crane.

TROUBLE AND TROUBLE-SHOOTING

Here only introduce the trouble and trouble-shooting of the working device and hydraulic system.

Slow or no operation of lift arm raising and bucket tilting

1.Damaged oil seals in cylinders	1.Replace with new seals
2.Oil leakage in pipe lines	2.Check and repair
3.Severe inner leakage of pump	3.Repair or replace the pump
4.Improper adjustment of pump	4.Adjust the system pressure to required value
5.Air enters into oil suction pipes of working pump or oil filter is blocked	5.Clean the filter or replace the oil suction pipe
6.Over large fitting clearance of working valves	6.Repair or replace the valve

Empty suction of oil or foams in oil

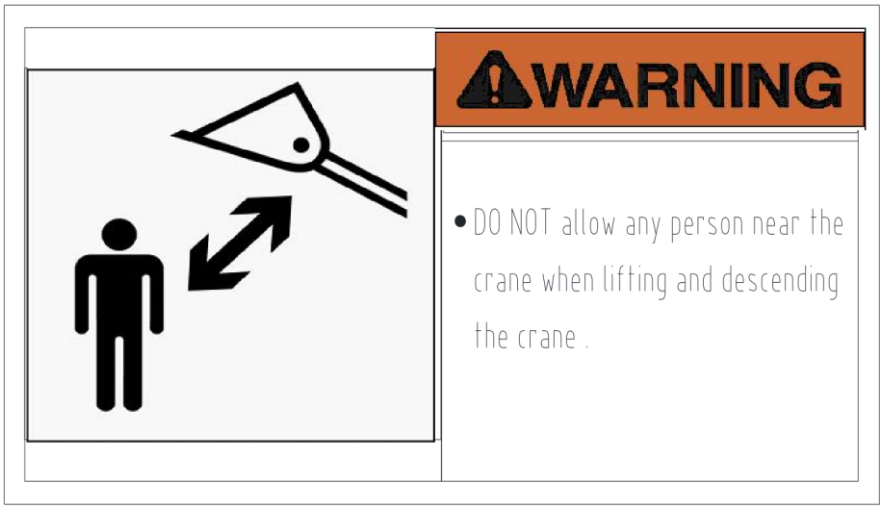
1.Overlow oil level	1.Fill oil to required level
2.Filter is blocked	2.Clean the filter
3.Damaged oil pump	3.Repair or replace the pump
4.Air leakage of oil suction pipes or damaged seals in pump	4.Repair or replace the damaged parts
5.Bad or deteriorated oil	5.Replace with required oil

Over high oil temperature

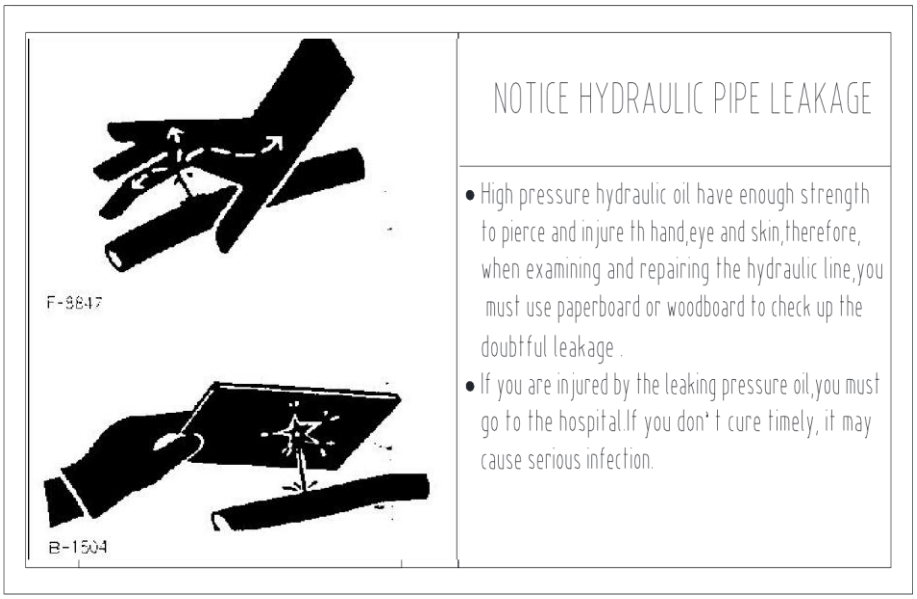
1.Over long working time with full load	1.Stop for cooling
2.Over high system pressure	2.Adjust to required pressure
3.Oil level is over low	3.Fill oil to required level
4.Damaged oil pumps	4.Repair or replace the pump
5.Blocked pipe lines	5. Repair, clean or replace

SAFETY LABELS

1. Warning.



2. Notice hydraclic pipe leakage.



PARTS CATALOGUE

1. Parts Catalogue for the ZM Series Log Loading Trailer with Crane

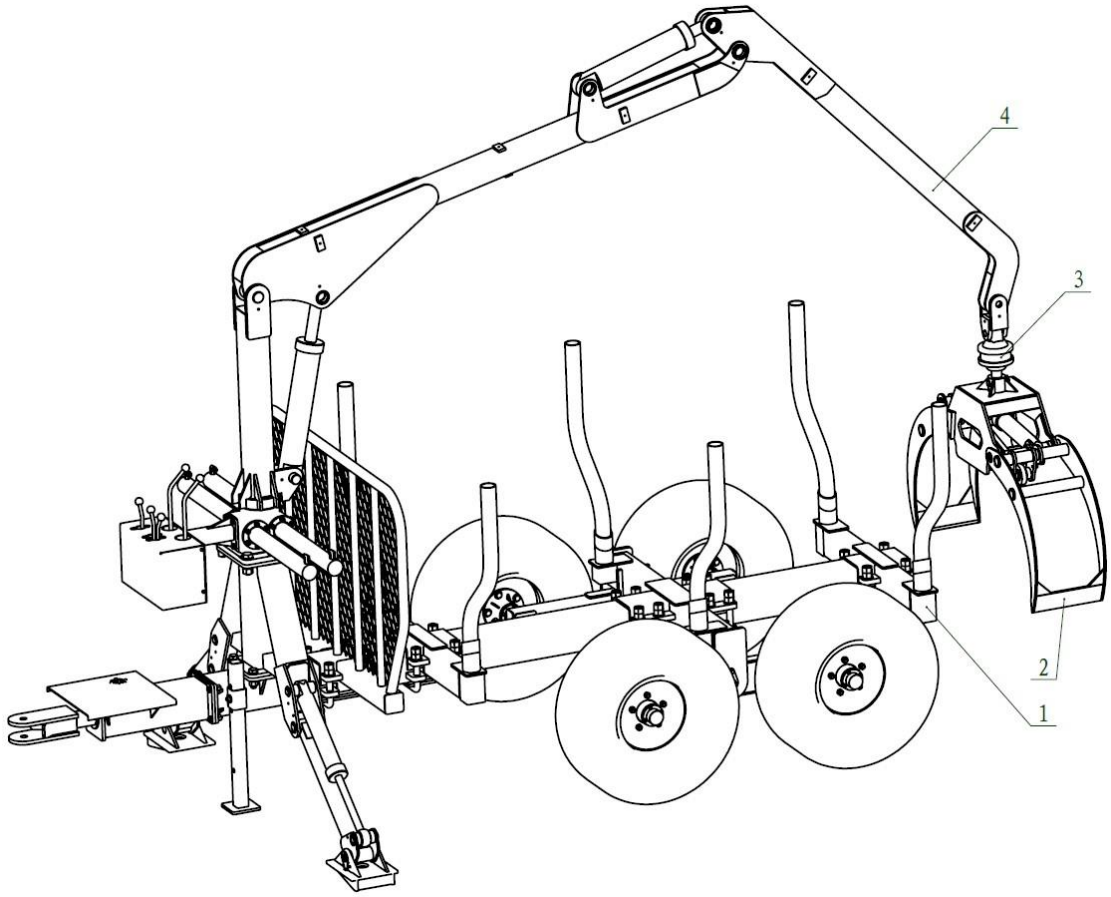


Figure 1 ZM1002DSeries

Table 1 ZM1002BSeries

Item NO.	Part Number	Part Name and Specification	Qty.
1	TR10D.0	Trailer	1
2	TG019A.0	Grapple	1
3	CLB-10	Motor	1
4	CR02C.0	Crane	1

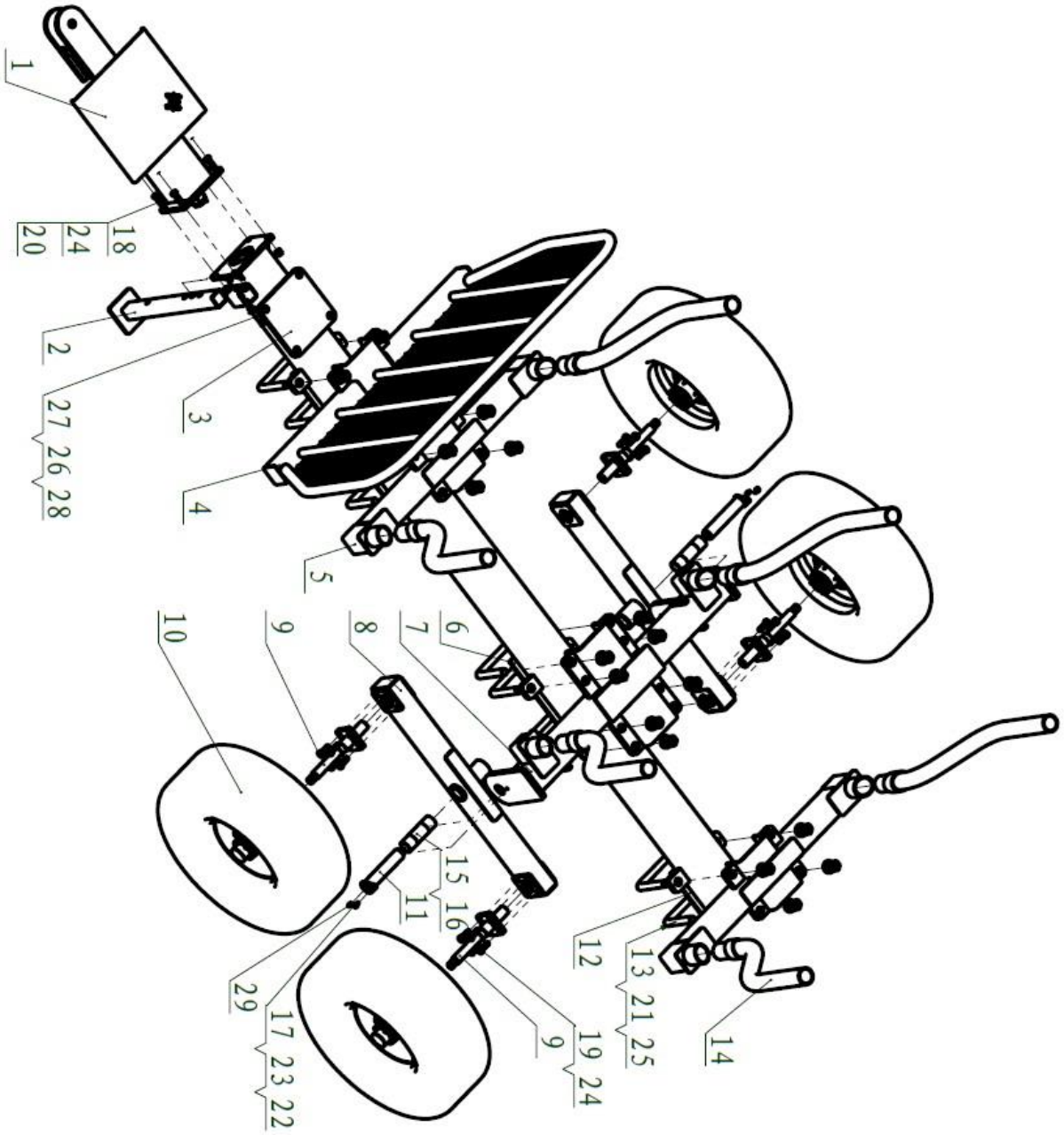


Figure 2 Trailer Assembly

Table 2 Trailer Assembly

Item NO.	Part Number	Part Name and Specification	Qty.
1	TR10D.1.02	Drawbar	1
2	TR10A.13	Supporting Base	1
3	TR10D.1	Solebar	1
4	TR10D.8	Safety Barrier	1
5	TR10D.9	Side Tube Support	2
6	TR10D.0-103	Backing Plate2	1
7	TR10D.10	Wheel Support	1
8	TR10D.4	Tire Connecting Seat	2
9	TR10A.14	Drive Shafts	4
10	TR10A.7	Wheel	4
11	TR10.5	Pin Roll 1	2
12	TR10D.0-102	Backing Plate1	3
13	TR10D.0-101	U-bolt	10
14	TR10.3	Side Tube	6
15	Q/SNK004-2010	Composite Sleeve42×46×65	2
16	Q/SNK003-2010	Composite Sleeve40×46×40	4
17	GB/T 5783-2000	Bolt M8×16	2
18	GB/T 5783-2000	Bolt M14×40	4
19	GB/T 5783-2000	Bolt M14×1.5×40	16
20	GB/T 6170-2000	Nut M14	4
21	GB/T 6171-2000	Nut M24×2	40
22	GB/T 93-1987	Single Coil Spring Lock Washer8	2
23	GB/T 97.1-2002	Plain Washer8	2
24	GB/T 93-1987	Single Coil Spring Lock Washer 14	20
25	GB/T 97.1-2002	Plain Washer24	20
26	GB/T 93-1987	Single Coil Spring Lock Washer 16	1
27	GB/T882-2008	Pin B16×75	1
28	GB/T91-2000	Pin 3.2X32	1
31	GB/T 1152-1985	Oil Cup M10×1	2

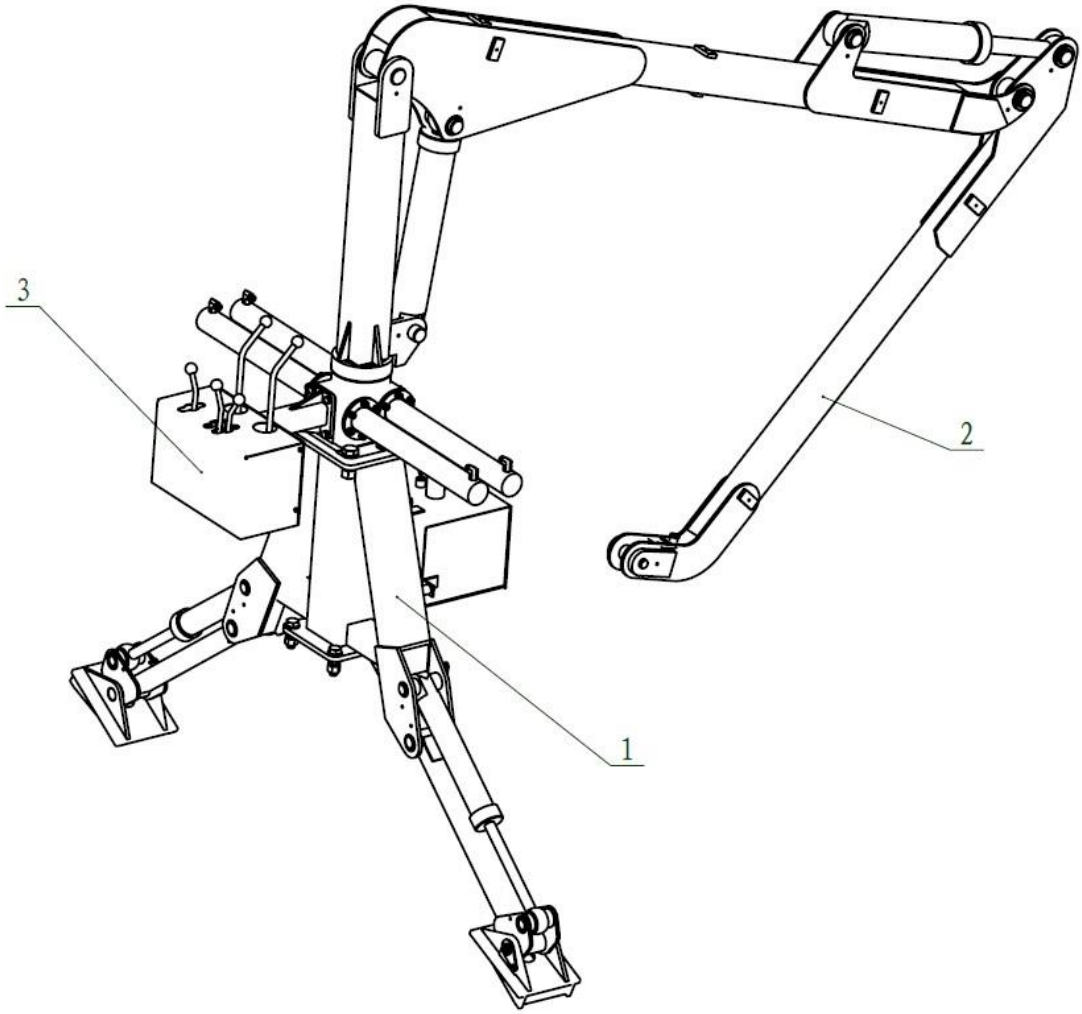


Figure 3 Crane Assembly

Table 3 Crane Assembly

Item NO.	Part Number	Part Name and Specification	Qty.
1	CR02D.3	Seat Assembly	1
2	CR02C.2	Actuator	1
3	CR02.7Y	Hydraulic Pipeline Assembly	1

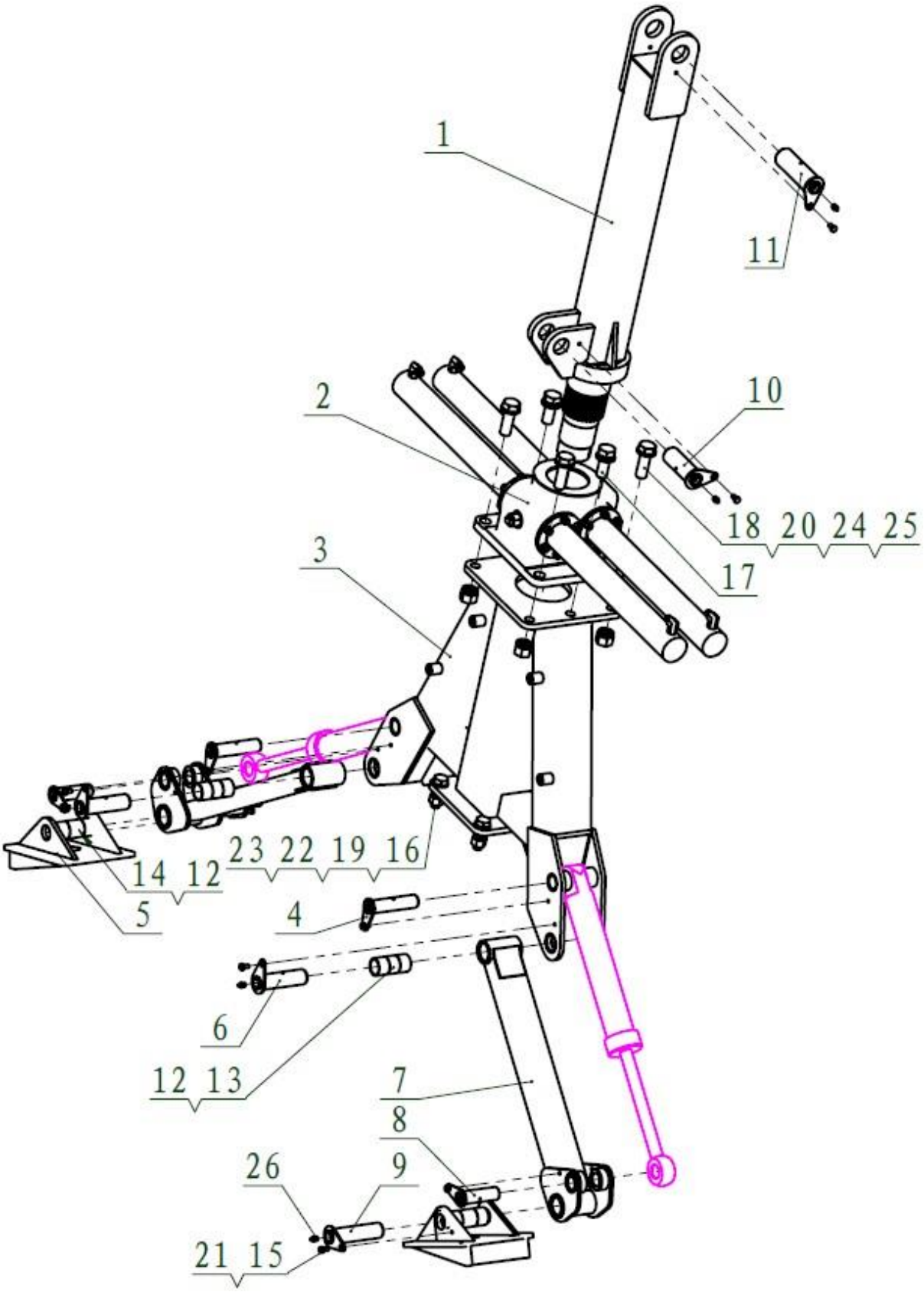


Figure 4 Seat Assembly

Table 4 Trailer Assembly

Item NO.	Part Number	Part Name and Specification	Qty.
1	CR02.3.01	Vertical Seat Welding Assembly	1
2	CR02.3.04	Turning Framework	1
3	CR02D.3.05	Supporting Seat Welding Assembly	1
4	CR02.3.07	Pin Axle Welding Assembly 5	2
5	LW6U1.1-101	Support Leg	2
6	LW7.1.18	Turning Pin for Leg	2
7	CR02.3.06	Supporting Arm Welding Assembly	2
8	TZ03.3.02	Pin Axle Welding Assembly1	2
9	LW7.1.30	Pin Axle Welding Assembly2	2
10	LW7.1.34	Pin Axle Welding Assembly3	1
11	CR02.3.02	Pin Axle Welding Assembly9	1
12	Q/SNK003-2010	Composite Sleeve35×41×30	8
13	Q/SNK004-2010	Composite Sleeve37×41×28	2
14	Q/SNK004-2010	Composite Sleeve37×41×40	2
15	GB/T 5783-2000	Bolt M8×16	10
16	GB/T 5783-2000	Bolt M20×65	4
17	GB/T 5783-2000	Bolt M24×60	2
18	GB/T 5783-2000	Bolt M24×70	4
19	GB/T 6170-2000	Nut M20	4
20	GB/T 6170-2000	Nut M24	4
21	GB/T 93-1987	Single Coil Spring Lock Washer 8	10
22	GB/T 93-1987	Single Coil Spring Lock Washer 20	4
23	GB/T 97.1-2002	Plain Washer20	4
24	GB/T 93-1987	Single Coil Spring Lock Washer 24	6
25	GB/T 97.1-2002	Plain Washer 24	6
26	GB/T 1152-1985	Oil Cup M10×1	10

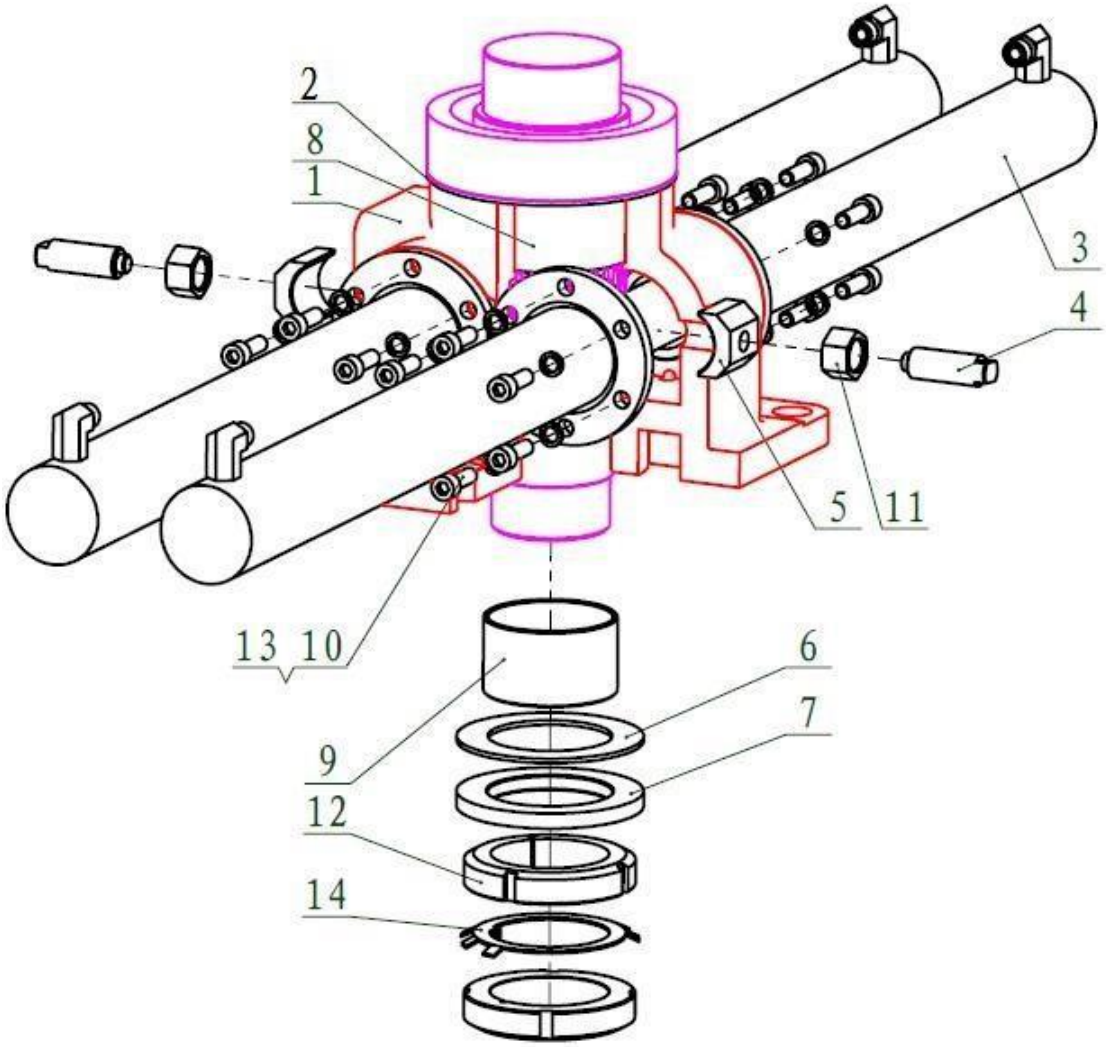


Figure 5 Turning Framework

Table 5 Turning Framework

Item NO.	Part Number	Part Name and Specification	Qty.
1	CR02.3.04-107	Transmission Case	1
2	CR02.3.04-102	Copper Washer2	1
3	CR02.7.04	Combined Turning Cylinder	2
4	CR02.3.04-109	Adjusting Bolt	2
5	CR02.3.04-108	Restrict Block	2
6	CR02.3.04-105	Copper Washer1	1
7	CR02.3.04-101	Washer	1
8	Q/SNK003-2010	Composite Sleeve100×106×50	1
9	Q/SNK003-2010	Composite Sleeve80×86×50	1
10	GB/T 70.1-2000	Hexagon Socket Head Cap Screw M10×30	24
11	GB/T 6170-2000	Nut M20	2
12	GB/T 812-1988	Round Nut M76×2	2
13	GB/T 93-1987	Single Coil Spring Lock Washer10	24
14	GB/T858-1988	Tab Washer for Round Nut 76	1

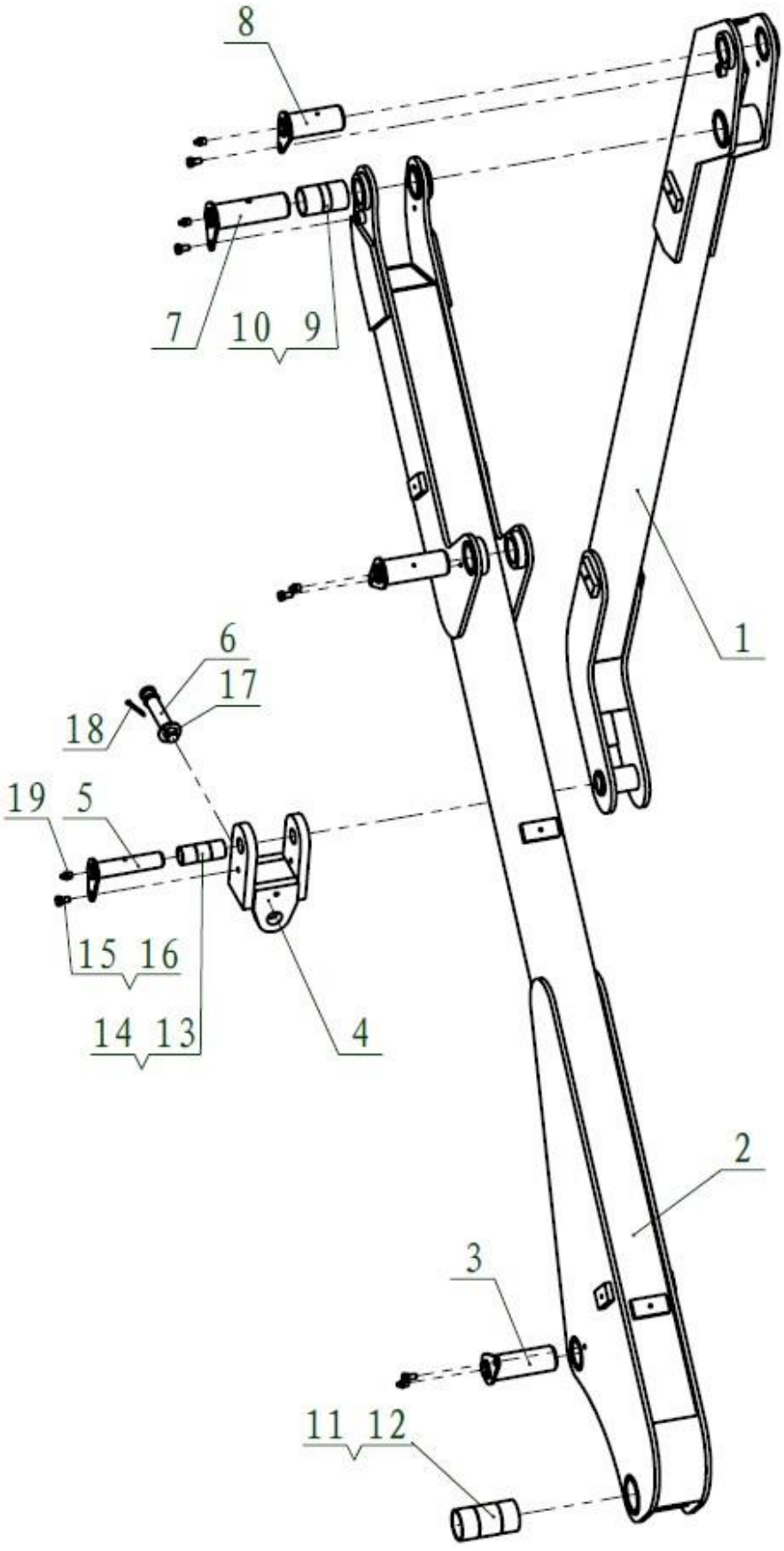


Figure 6 Actuator Assembly

Table 6 Actuator Assembly

Item NO.	Part Number	Part Name and Specification	Qty.
1	CR02C.2.02	Front Connecting Arm Welding Assembly	1
2	CR02C.2.03	Rear Connecting Arm Welding Assembly	1
3	LW7.1.34	Up Connecting Pin for Turning Framework	2
4	CR02.2.01	Hook Welding Assembly	1
5	CR04.2.05	Pin Axle Welding Assembly 5	1
6	TX150.2-103	Pin Axle Welding Assembly 3	1
7	CR04.2.07	Pin Axle Welding Assembly 7	1
8	LW7.1.33	Down Connecting Pin for Turning Framework	1
9	Q/SNK004-2010	Composite Sleeve42×46×14	1
10	Q/SNK003-2010	Composite Sleeve40×46×30	2
11	Q/SNK003-2010	Composite Sleeve45×51×30	2
12	Q/SNK004-2010	Composite Sleeve47×51×39	1
13	Q/SNK004-2010	Composite Sleeve26×29×24	1
14	Q/SNK003-2010	Composite Sleeve25×29×25	2
15	GB/T 5783-2000	Bolt M8×16	5
16	GB/T 93-1987	Single Coil Spring Lock Washer 8	5
17	GB/T 97.1-2002	Plain Washer 20	1
18	GB/T 91-2000	Split Pin 4×36	1
19	GB/T 1152-1985	Oil Cup M10×1	5

Figure 7 Visual Hydraulic Control Diagram

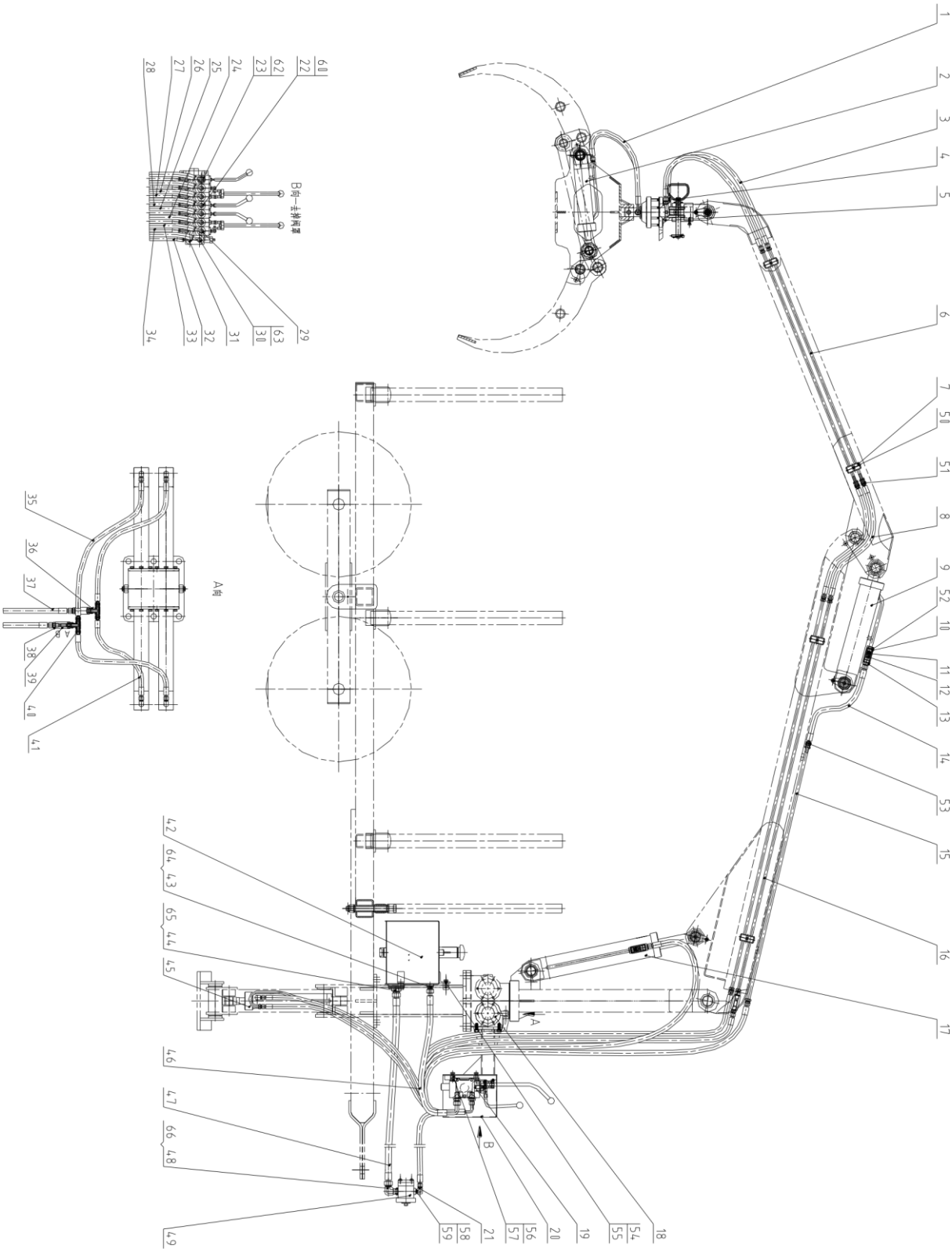


Figure 8 Hydraulic Pipeline Assembly

Table 8 Hydraulic Pipeline Assembly

Item NO.	Part Number	Part Name and Specification	Qty.
1	CR02.7-104	Rubber Hose 8Ⅱ-600(1×90°)	2
2	CR02.7.03	Grapple Cylinder	1
3	CR02.7-105	Rubber Hose 8Ⅱ-850	4
4	CR02.7-103	Pipe Joint M16-G1/4	6
5	CLB10	Hydraulic Motor	1
6	CR02.7.09	Steel Pipe Welding Assembly Ⅰ	4
7	TZ04.7-104	Pipe Clamp	10
8	CR02.7-106	Rubber Hose 8Ⅱ-600	4
9	CR02.7.02	Front Arm Cylinder	1
10	LW12.4J-119	Joint Body N7/8-N7/8	2
11	LW12.4J-115	Spring	2
12	LW12.4J-120	Slide Block	2
13	LW12.4-108	Pipe Joint 18-7/8	2
14	CR02.7-107	Rubber Hose 10Ⅱ-450	2
15	CR02.7.07	Steel Pipe Welding Assembly for Arm	2
16	CR02.7.08	Steel Pipe Welding Assembly for Motor	4
17	CR02.7.01	Rear Arm Cylinder	1
18	CR02.7.04	Combined Turning Cylinder	1
19	750G3	Hydraulic Valve	1
20	CR02.7.05	Hydraulic Valve Seat	1
21	TZ08D.7.02-YT	Joint Welding AssemblyM18×1.5	1
22	TZ04D.7-101A	Pipe Joint M14-M18	4
23	TZ04D.7-101	Pipe Joint M16-M18	6
24	CR02.7-108	Rubber Hose 8Ⅱ-1200(1×90°)	2
25	CR02.7-109	Rubber Hose 6Ⅱ-1500 (1×90°)	2
26	CR02.7-110	Rubber Hose 8Ⅱ-2150 (1×90°)	2
27	CR02.7-111	Rubber Hose 8Ⅱ-2100(1×90°)	2
28	CR02.7-112	Rubber Hose 6Ⅱ-1450 (1×90°)	2
29	TZ04D.7MV3-101-	Pipe Joint M18-M18	4
30	TZ04.7FV3-102	Pipe Joint M22-M22	1
31	TZ04.7FV3-101	Pipe Joint M18-M22	1
32	CR02.7- 113	Rubber Hose 10Ⅱ-2000(1×90°)	1
33	CR02.7- 114	Rubber Hose 10Ⅱ-2150(1×90°)	2
34	CR02.7- 115	Rubber Hose 10Ⅱ-2100(1×90°)	2
35	CR02.7- 116	Rubber Hose 8Ⅱ-750	2
36	CR04.7-101	Switch Joint	2
37	CR02.7- 117	Rubber Hose 10Ⅱ-650(1×90°)	2
38	TZ04D.7FVd-101	Pipe Joint M18-G3/8	2
39	ST1740-S00B	Flow Valve	2
40	TZ04.7FV3-108	Pipe Joint	2
41	CR02.7- 118	Rubber Hose 8Ⅱ-500	2

42	CR02.7.06	Oil Box	1
43	TZ04D.7V-102	Pipe Joint 22-3/4	1
44	LW8.4Y-102	Pipe Joint M27-M58	1
45	CR02.7.11	Supporting Leg Cylinder	2
46	CR02.7- 119	Rubber Hose 13Ⅰ-2000(1×90°)	1
47	CR02.7- 120	Rubber Hose 16Ⅰ-2000 (only for oil tank)	1
48	LW8.4Y.01	Joint Welding Assembly M27	1
49	CBT-E306FBR2	Gear Pump	1
50	GB/T 70.1-2000	Hexagon Socket Head Cap Screw M6×20	10
51	GB/T 1235-1976	O Ring 11×1.9	36
52	GB/T 1235-1976	O Ring 20×2.4	6
53	GB/T 1235-1976	O Ring 14×1.9	12
54	GB/T 5781-2000	Bolt M10×25	4
55	GB/T 93-1987	Single Coil Spring Lock Washer10	8
56	GB/T 6170-2000	Nut M12	4
57	GB/T 5781-2000	Bolt M10×35	4
58	GB/T 93-1987	Single Coil Spring Lock Washer 8	4
59	GB/T 5781-2000	Bolt M8×30	4
60	GB/T 1235-1976	O Ring 10×1.9	8
61	JB 982-1977	Washer 18	14
62	JB 982-1977	Washer 22	2
63	JB 982-1977	Washer 16	10
64	GB/T 3452.1-2005	O Ring 16×2.65	2
65	GB/T 1235-1976	O Ring 16×2.4	2
66	GB/T 3452.1-2005	O Ring 20×2.65	1

Note:*Depending on requirement.

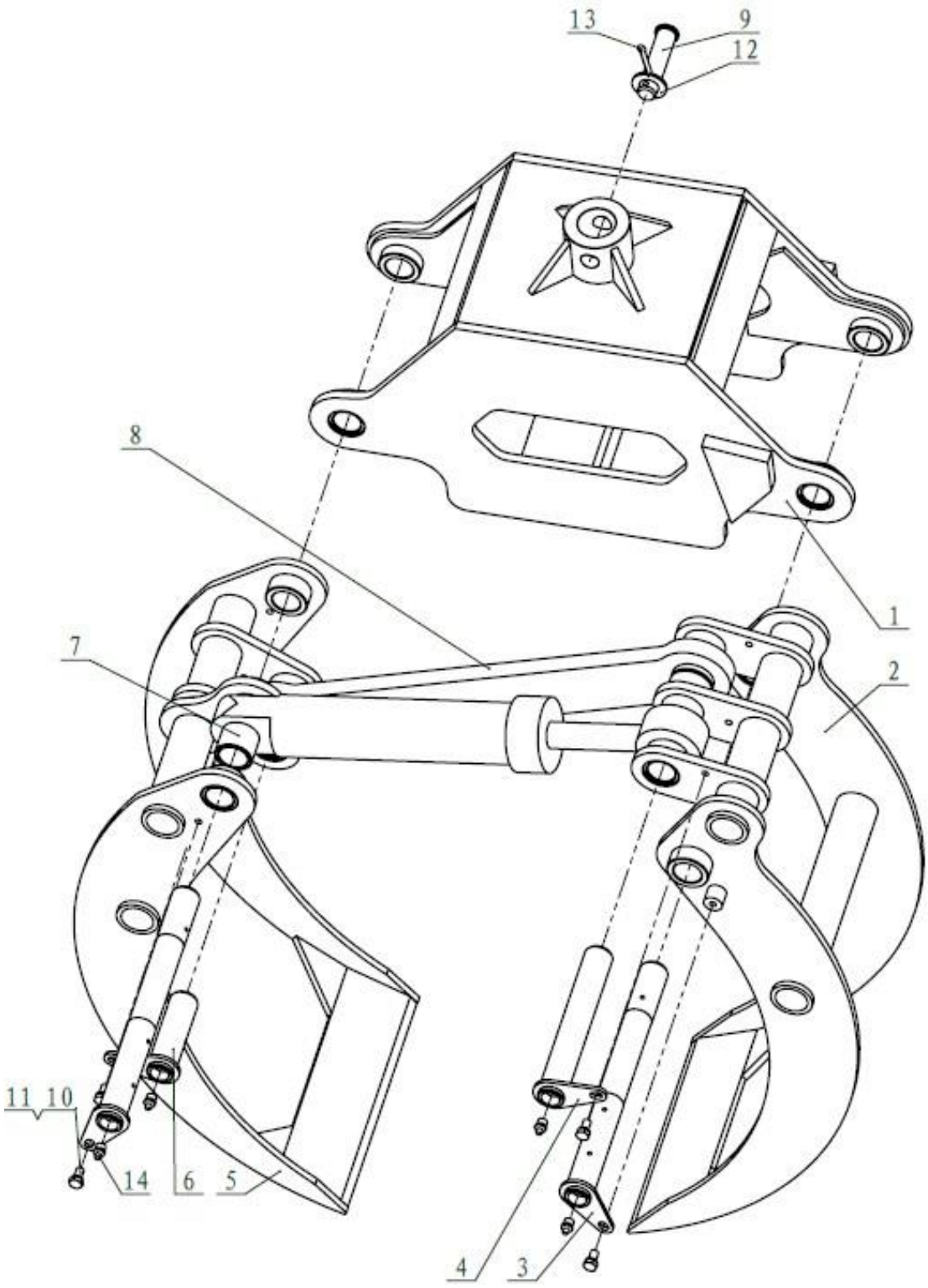


Figure 9 Grapple Assembly

Table 9 Grapple Assembly

Item NO.	Part Number	Part Name and Specification	Qty.
1	TGZ019.3	Linking Seat Welding Assembly	1
2	TG019A.2	Right Claw Welding Assembly	1
3	TG019.5	Pin Axle Welding Assembly1	2
4	TG019.7	Pin Axle Welding Assembly 3	1
5	TG019A.1	Left Claw Welding Assembly	1
6	TZ03.3.02	Pin Axle Welding Assembly	1
7	TG019.0-101	Axle Sleeve 1	1
8	TG019.4	Rod Welding Assembly	1
9	TG019.0-103	Pin Axle	1
10	GB/T 5783-2000	Bolt M8×16	4
11	GB/T 93-1987	Single Coil Spring Lock Washer8	4
12	GB/T 97.1-2002	Plain Washer 20	1
13	GB/T 91-2000	Split Pin5×32	1
15	GB/T 1152-1985	Oil Cup M10×1	7