Foreword

⚠ The roll clamp is a special attachment to the forklift for handling paper rolls and handles horizontally or vertically placed paper rolls. Its clamping arm is designed to transport, stack, withdraw, and to handle loads on trailers or carriage vehicles. The roll clamp is able to rotate 360°and, as required by the operation, a roll clamp with a fixed short arm is specially designed for holding paper rolls of approximately the max diameter; a roll clamp with an adjustable short arm can hold paper rolls of smaller diameters; while a roll clamp with separated long arms may hold two overlapped paper rolls at one time. The roll clamps designed and produced by us, testified by the market for many years, have matured and series products are being made now.

⚠ This operating manual is designed to familiarize operators with the equipment and its intended application. The manual contains important notes concerning safe, proper and economic working with the equipment. Strict observation of these notes will help to avoid risks, reduce repair costs and down time, and increase the reliability and useful life of the equipment. In addition to the instructions contained in this manual, all pertinent national and local codes and regulations relating to safety and environmental protection must be observed in full. This operating manual must be kept available for ready reference at the equipment's place of use.

⚠ The manual must be read and followed by all persons involved in work with or on the equipment. This work includes:

-Operating the equipment, including setting up for use, correcting trouble in use, collection and disposal of production scrap, cleaning and routine servicing, disposal of spent lubricants and other wastes.

-Inspection, maintenance and repair

-Handling

⚠ In addition to this operating manual and the safety codes and regulations in force at the place of use, standard practice relating to safe and proper working tools and machines must be observed at all times.

Contents

1 Safety

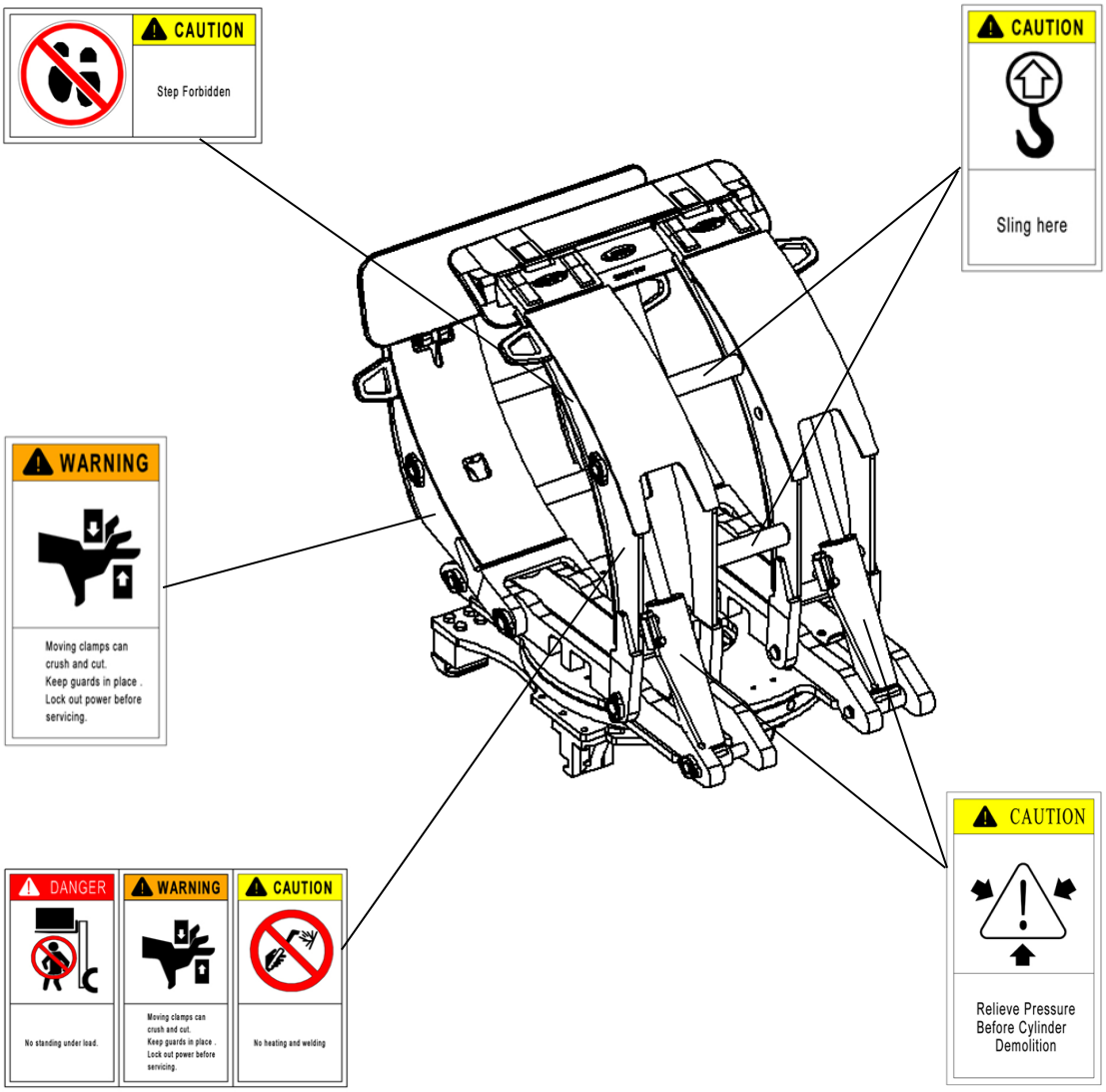
1.1 Safety Notes and Marks

The following marks and symbols are used in this operating manual to highlight details holding special importance:

⚠ **DANGER:** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

⚠ **WARNING**: indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ **CAUTION**: indicates a hazard with a low level of risk which, ifnot avoided, could result in minor or moderate injury.



1.2 Organizational Notes

- Operating, maintenance and servicing/repair personnel must have read and understood the operating manual before commencing work with or on the equipment.
- All safety and danger notices on the machine and equipment must be observed.
- The operation of this paper roll clamp or relates to the paper roll clamp operation, shall be responsible for, a forklift training personnel to complete, in addition must follow the provisions of the relevant legal minimum working age.
- Working with and on the machine and/or equipment may only be carried out by responsible and Highly trained personnel of forklift truck, who must be of the legally required minimum age.
- Operating temperature range range of －20℃ to ＋40℃, relative humidity should be less than 85% , altitude should be less than 1000 meters, Wind speed does should be less than 5m / s.

1.3 Operator's Safety Notes

1.3.1 Assembly, installation and commissioning

Use exclusively suitable handling and lifting equipment of adequate load capacity （self weight of the bale clamp, as per nameplate attached）

WARNING!

KEEP CLEAR OF SUSPENDED LOADS.

1.3.2 Operation

- The machine and equipment must be inspected for visible damage and defects. Any changes occurring (on or in the machine or equipment itself and its workings)must

be reported immediately to the officer responsible. The machine and equipment must be shut down immediately if conditions warrant. While the rotator is in operating condition, make sure that any faults that could cause injury to people have been removed.

- When working with the machine and equipment, we recommend running hydraulic cylinder below 80℃, or failures may occur to the cylinder.
- When working with the machine and equipment, make sure that risk of injury to all persons due to the machine and equipment is satisfactory ruled out.
- The forklift operator must watch out for persons within his range of work and travel.
- All activities detrimental to the stability of the machine and equipment must be avoided.
- Maximum capacity always denotes lifting with two or more forks or load handling arms.
- Attention is required to the rated load capacity, maximum working pressure and load center stated on the nameplate.
- Moving, reciprocating or rotating parts of the attachment entail danger of pinching, crushing, snagging and dragging. Safe distance must be maintained at all times to prevent clothing, body parts or hair from being caught by such parts.
- Loads may only be handled when their pallets, crates, containers and packaging are in satisfactory condition.

1.3.3 Maintenance

- Mandatory regular inspection intervals, including those specified in the operating manual, must be observed. Inspection may only be carried out by authorized and qualified personnel.
- Maintenance and repair work must only be carried out when the machine and equipment is supported on a level and firm surface and is secured from rolling and tipping.

- When replacing components and assemblies, they must be fastened securely to hoisting equipment so as to eliminate all danger. Use exclusively appropriate hoisting equipment and load handling devices in satisfactory condition and of adequate capacity. Keep clear of suspended loads.
- Do not make any alterations, additions or conversions to the machine or equipment that might affect their safety unless duly authorized by the supplier. This includes fitting and adjusting safety valves and other safety devices and welding work on supporting members.

> ⚠ **Caution**
>
> **Unauthorized alterations to any parts and assembly or installation other than as specified in the instructions will render all guarantees null and void.**

- If safety devices need to be dismantled for setting up, maintenance or repair work, they must be re-installed and checked for proper function immediately on completion of the work.
- Spare parts must meet the manufacturer's technical specifications. This is assured by using exclusively original spare parts.

> ⚠ **Caution**
>
> **All screws or bolts loosened for maintenance and repair work must be tightened at the permissible torque . Replace screws and bolts that have been retightened three times.**

Note the following tightening torques which are valid for screws with connecting surfaces according to ISO4762 , ISO4014 , ISO4032 etc. :

Bolt Rating	8.8	10.9	12.9
M 10	45N.m	66N.m	77N.m
M12	77N.m	115N.m	135N.m
M16	190N.m	280N.m	330N.m
M20	385N.m	550N.m	640N.m

- Work on hydraulic equipment may only be carried out by personnel specially trained and experienced in hydraulics.
- All hydraulic pipes, hose lines and couplings must be inspected regularly for leaks and visible damage. All damage must be repaired immediately. Leaking oil can cause accidents and is a fire hazard.

1.4 General Hazard Notes

Serious injury to persons or damage to equipment and property may be caused as a result of:

- Improper use of the equipment
- Incorrect operation of the equipment
- Inadequate maintenance and servicing

Failure to observe the safety notes contained in the operating manual can lead to injury or even death. This applies particularly to improper use of the equipment.

Persons under the influence of drugs, alcohol or medications affecting normal responses must not be allowed to perform any work with or on the machine or equipment.

The machine and equipment must not be operated in explosion-hazard areas unless expressively designed and authorized for use in such areas.

For preventions of fire, burn, electric shock, chemical hazards (toxic exhaust, etc.), risks of electromagnetic interference, noise and other vibration, please refer to the machine manual.

2 Mounting Instructions

Before any use of the roll clamp, two hydraulic control systems and four HP oil tubes with inside diameter of 7mm(G1/4”) min are to be furnished, with a one-way hydraulic lock installed at the connection of the cylinder to hold the roll from falling off in the event of any emergency like sudden blowout of the oil tube.

Before mounting the clamp, first clean up the carriage and make sure the surface is free of any defect, the surfaces where the carriage joins the upper and lower slide blocks of the clamp are lubricated. In addition, it is also crucial to confirm the compatibility between the roll clamp and the forklift in terms of their carrying capacities and verify the rated carrying capacity and center distance of the forklift after the clamp is mounted.

Rated load capacity

The rated carrying capacity of the roll clamp is the nominal carrying capacity defined for the clamp according to its mechanical structure. As this rated capacity does not include the nature of the loads or the operation conditions, the combined forklift-clamp carrying capacity is not stationary and is subject to the loads, the operation conditions and the combined forklift-clamp capacity at a specific height.

Actual carrying capacity

The forklift vendor or manufacturer should calculate the real combined forklift-clamp capacity.

Please refer to the nameplate attached to the clamp for detailed information.

⚠ Danger

Do not handle any load unless you have checked the rated load on the nameplate attached to the roll clamp to make sure that the load to be handled is admissible.

Before installing the hydraulic part, the user is advised to make sure that the hydraulic system of the assembly is the same as shown in the hydraulic diagram of the User's Manual, and connect the part as indicated in the diagram. Make sure that the hydraulic tube is compatible with the hydraulic cylinder of the roll clamp in terms of the rated pressure, and that the rated pressure of the flexible/rigid tubes are larger than 28MPa. Make sure that the parameter settings of the safety valve are compatible with the working pressure of the hydraulic cylinder (the recommended pressure to be used is 14MPa). Verify the inlet and outlet of the hydraulic tube and make sure that they are in the same direction as the movement of the control lever. The flow and pressure of the hydraulic system are detailed in the table below:

Model	Pressure value（bar）		Flow value （L/min）		
			Rotary motion		
	min	max	min	recommend	max
ZJ10R/11R/12R/13R/13H	140	160	19	26	38
ZJ22H/25H/27H/33H	140	160	19	38	57
ZJ38H/35R/42H/45R	140	160	38	57	76

Description:

① Flows lower than the min can result in malfunction of the clamp.

② Flows higher than the max can result in overheating and thereby degrade the system performance and reduce the service life of the hydraulic system.

The dimension of the forklift carriage is shown in figure 1 below (to ISO2328-2007) and detailed in the table below:

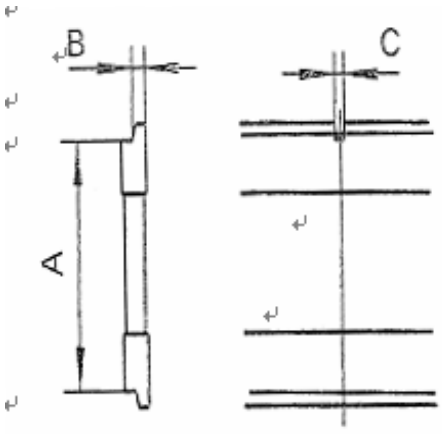


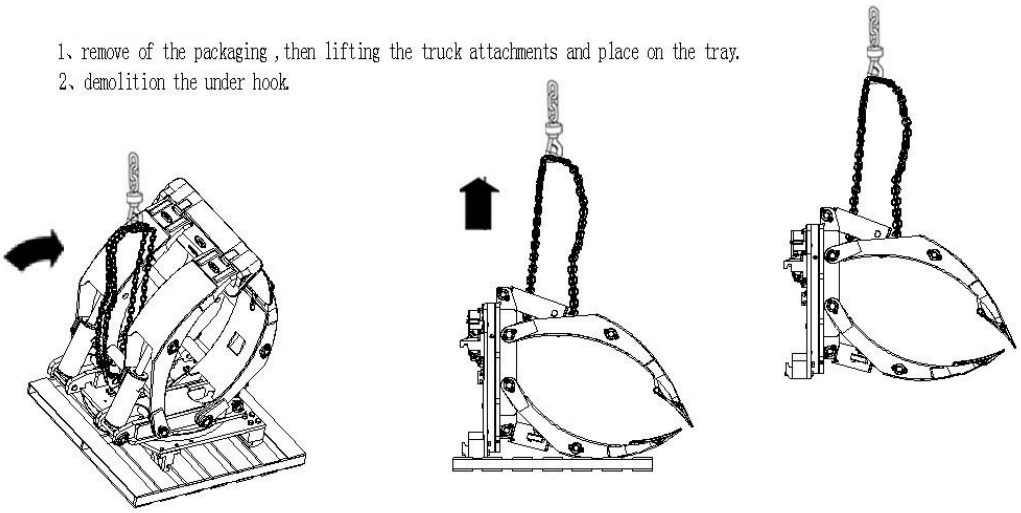
Figure 1

Installation level	A		B		C	
	min	max	min	max	min	max
II	380	381	15	16	15.2	16.8
III	474.5	476	20.5	21.5	18.2	19.8
IV	595.5	597	24.5	25.5	18.2	19.8

3 Installation Methods

Note: Before installing the clamp on the forklift, first release the lock bolt on the lower hook and remove the lower hook.

3.1 Clean up the forklift carriage and make sure it is smooth and flat on the surface and free of any damage on the central notch.



⚠ Note: The lower hook must be removed before the attachment can be installed.

3.2 Remove the metal cap from the vent hole on the reducer, check the oil in the reducer and make sure the oil level is visible from the oil hole. If not, refill it with friction resistant lubricant in conformity with grade GL-5 SAE-80W/90 or above.

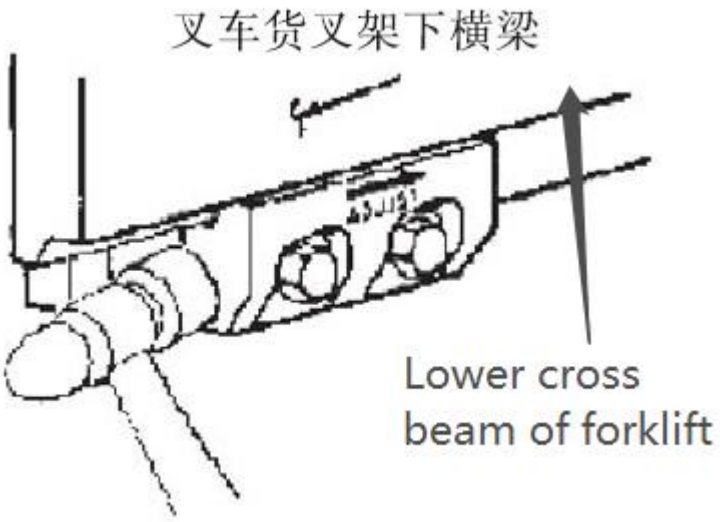
3.3 Place the roll clamp on the pallet as per its installation position and make sure it is vertical at the point of its upper hook.

3.4 Remove the lower hook of the clamp.

3.5 Lift the carriage till it leans against the underside of the attachment. Lift the attachment 5cm till it comes off the pallet. Align the clamp to the carriage, with the stopper of one of the upper hooks in the appropriate notch on the upper crossbeam of the carriage.

3.6 Mount the lower hook and bolt. Tighten up the bolt by hand and hit the

lower hook gently with a hammer along the key slot till it fits into the bend of the carriage. Then lock up the bolt to the moment of 142～155N.m.



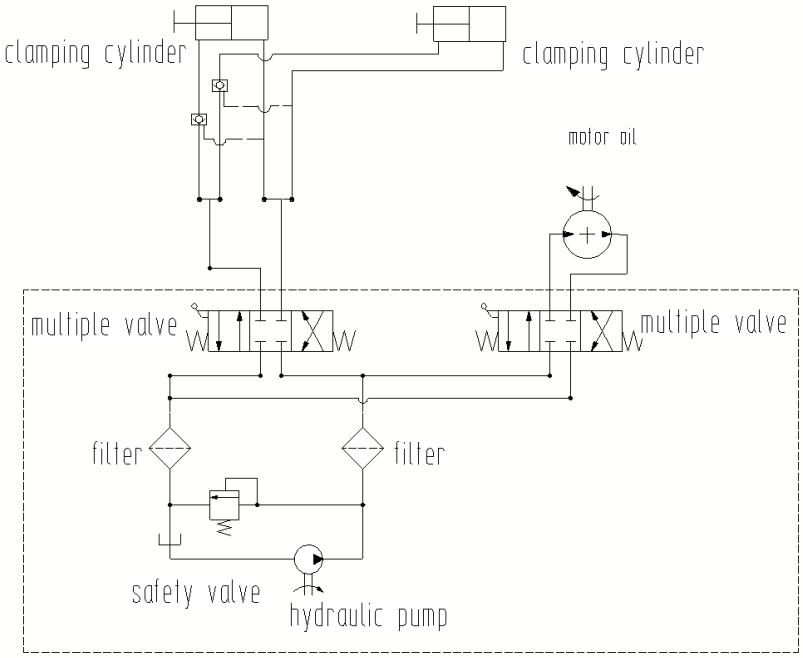
3.7 Connect the rubber hose of the hydraulic motor. You are recommended to select the rubber hose as specified below:

——10mm (nominal diameter) for clamps with rated carrying capacity ≦ 2600Kg;

——13mm (nominal diameter) for clamps with rated carrying capacity ＞ 2600Kg.

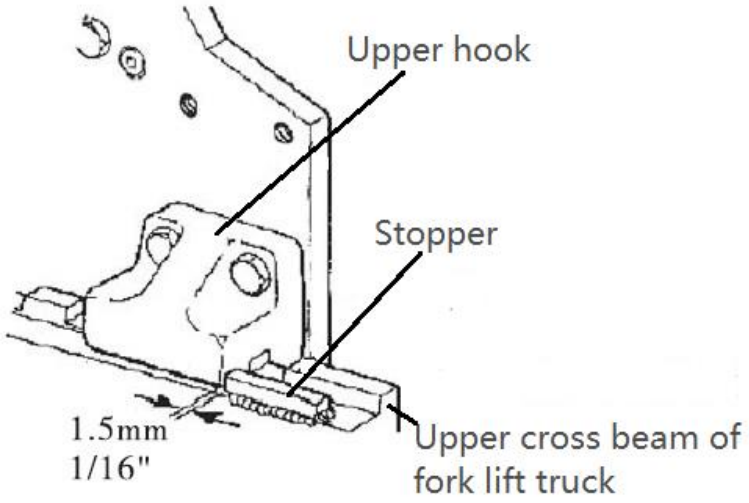
Select a proper length of HP rubber hose and connect it to the connector of the dividing valve. The connector thread should be M18x1.5 and should be flush sealed.

The hydraulic circuit of the roll clamp mainly consists of oil cylinders, a hydraulic pump, multi-way valves, filters and a number of oil tubes and is composed in the way shown in below:



3.8 After the pipeline of the clamp is installed, operate the clamping and rotation valve spindles alternatively to remove the air in the hydraulic circuit.

3.9 Weld a stopper on the upper crossbeam of the forklift carriage at 1.5mm away from the outer side of the upper hook to stop the attachment from sliding over the forklift carriage. If the carriage is not wide enough, please weld the stopper at the inner side of the upper hook. Before welding the stopper, heat the welding zone on the upper crossbeam of the carriage and the stopper to 200℃.



Upper hook、Stopper、Upper crossbeam of the forklift carriage

3.10 Set the clamp to its max working pressure. Operate the clamp with load and check the tightness of the connectors.

3.11 Preparation before work:

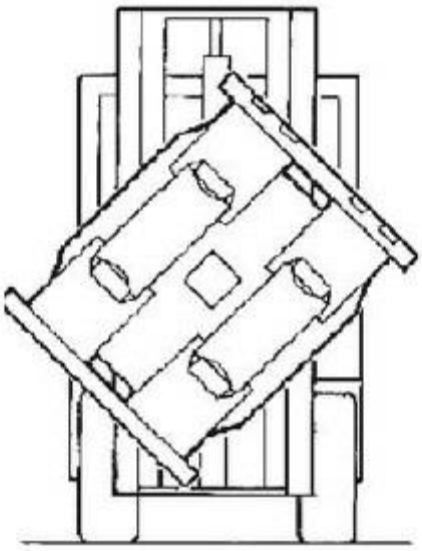
（1）Check if there is any leakage in the tube joint or the piston rod side of the cylinder. (Note: Make sure the attachment is free of any people in its proximity before any preloading operation.)

（2）Have the attachment run in dry cycles and discharge the air in the oil circuit into the forklift hydraulic tank before loading it.

●Turn the clamp in two directions.

●Place the clamp horizontally and vertically and open/close the long arm several times.

●For a clamp with an adjustable short arm: Turn the clamping arm to any point of 45°, and open/close the short arm several times.



Turn to any point of 45° to adjust the short arm

（3）Clamp and turn the max load. Check the pipeline of the hydraulic system again if the attachment isn't able to turn or turns unsteadily.

⚠ Warning

When the clamp is mounted, first apply lubrication grease and debug the clamp under zero and small load to verify it rotates and clamps correctly. The clamp will not be used normally unless it is free of any abnormality.

During the inspection, please note that the multi-way valve handle of the forklift moves in the right direction that corresponds to the hydraulic movement of the attachment in conformity with the following standard:

Function	Attachment movement	Valve handle movement

Rotation	Clockwise	Backward or upward
	Anticlockwise	Forward or downward
Holding	Hold	Backward or upward
	Release	Forward or downward

Before any normal work is started, the clamp should be preheated and should run from side to side, hold and release a number of times without load before it can start work under normal load.

Note: The direction of the hydraulic movement should be that as observed from the driver’s position.

4 Operating Instructions

4.1 Make sure the load handled is not heavier than the rated carrying capacity labeled on the attachment.

4.2 The roll should be handled along the middle part.

4.3The clamping pressure should be selected according to the size of the rolls (as specifically required by the user, since the pressure is normally shop adjusted) to avoid damage to the roll surface.

4.4 Any of the following operation is deemed incompliance and should be prohibited:

☆People on the roll handled by the forklift;

☆Use of the attachment on any improper occasion;

☆ Load in excess of the rated settings of the attachment;

☆One roll over the other, with the lower one being held on the clamping board only;

☆Forward operation of the forklift at the time of any oversize load on it;

☆External impact on the working attachment;

☆People standing under the forklift where the roll it holds may cover when it falls;

Stopping uphill;

Electrical connection to the clamp for welding purpose;

Working against the local traffic rules;

Shutdown of the forklift without landing the roll or pulling down the manual brake;

Roll in contact with the ground when handled by the forklift; the load handled or the clamping board should be 50mm min above the ground at the lowest point during operation along flat ground, and 100mm min above the ground at the lowest point during operation outdoors or under poor road conditions;

☆Use of the attachment before removal of any failure in it.

4.5 Make sure the roll clamped is aligned to the clamping board and the connection line between the two clamping boards runs through the axis of the roll along the diameter. This is done by having the clamping board of the short arm (the short arm of a fix-frame clamp should remain unmoved) attached to the outside surface of the roll and function the long arm to clamp the roll.

4.6 A fix-frame roll clamp may hold two rolls at the same time provided that the rolls are of the same or very similar diameters. A separated-arm roll clamp should be used if the two rolls are substantially different in the diameter.

4.7 Make sure the roll clamped is lifted at least 50mm from the ground, with the gantry 3~4 degrees backward if it is handled from flat ground, and at least 100mm from the ground during operation outdoors or under poor road conditions.

4.8For a roll clamp with an adjustable short arm, pre-adjust the position of the short arm and turn the attachment 45° before adjusting the short arm to its optimal position by releasing/clamping the control lever.

4.9 For a separated roll clamp used to hold and handle two rolls:

☆Use the forklift accelerator when holding or opening the separated roll clamp.

☆When holding the rolls, make sure that both rolls are aligned to the two clamping boards, and the connection line between the two clamping boards run through the axis of both rolls along the diameter. Keep the clamping board of the short arm to the outside surface of the rolls and then function the long arm to clamp the rolls.

☆When no rotation is needed, the max height of the roll clamped should not be larger than 3 times the height of the separated clamping board.

☆When rotation is needed, the height of the roll is preferably not larger than twice the height of the separated clamping board and should be 3 times max.

4.10 For energy efficiency, the clamping force should not be more than just enough to handle the load reliably.

4.11 Keep the gantry vertical or slightly backward when holding or placing a roll with its axis in the vertical direction (with the roll standing up), and keep the gantry forward when holding a roll with its axis in the horizontal direction (with the roll lying levelly).

4.12 Lift the load steadily to maintain stability of the forklift.

4.13 Operate the control lever continuously and steadily to avoid hydraulic impact that may damage the hydraulic elements and also to prevent impairment to the stability of the forklift when the load is lifted to a certain height.

4.14 The operator should select the right speed of the forklift according to the following conditions: forklift stability, load weight, road condition, slope size, space, presence of any obstacle at the workplace or wind force and the like.

4.15The following operations should be avoided:

☆The clamping arm is kept open when the forklift is not working.

☆The forklift continues to run at high speed when the roll is lifted substantially high;

☆The roll is not held from the middle part of the roll;

☆Clamp before the clamping board of the roll clamp touches the roll;

☆The attachment is hauled before the clamp placed on the ground is lifted from the ground, which may result in damage to the parts.

5 Maintenance and conservation

Daily maintenance of the roll clamp includes a two-level maintenance regime of 200h and 2000h maintenance as detailed below:

5.1 200h maintenance

☆Check if the connectors of the hydraulic circuit have come loose and if the hoses are damaged;

☆Check if the fixing bolts on the upper and lower hook have come loose.

☆Check if the pin shaft lock bolts on each moving parts have come loose (note: All the pin shafts should be removed in the same way as the pin shaft of the combined force gantry, i.e. by hitting the connecting rod after fastening with bolts);

☆Check if there is any protruding or deformation in the clamping boards or underlay and replace them for any irregular slide or defect;

☆Check the lubrication of the rotary reducing gear and apply lubricant to the reducing gear (in conformity with grade GL-5 SAE-80W/90 or above).

5.2 2000h maintenance

The following should be done in addition to details for 200h maintenance:

☆Check the abrasion of the rotary pin shaft bushing of the clamping arm and replace it if the abrasion is in excess of 0.5mm;

☆The pin shaft bushing is self-lubricated. However, the pin shaft should be removed and lubricated both after long service and long storage;

☆Check if there is any crack in the clamping board. If yes, replace the clamping board;

☆Check the thickness of the stiffing board of the short arm (mounted on the head of the clamping arm body, with a bush coupling the clamping board), and reinforce it at this point by welding a 10-15mm thick steel plate if the abrasion is in excess of 2mm;

☆Under dynamic load conditions check if the attachment provides the normal clamping force for at least 10 minutes. If not, check the hydraulic circuit, find out the leaking element and replace the sealing or all the elements of the circuit.

☆altitude of Troubleshooting: When is a failure at high altitude，Make Forklift Mast down to touch the ground roll folder, the Forklift attachments will be remove from the door, and then repair, waste hydraulic oil processing should comply with local laws and regulations.

6 Troubleshooting

6.1 Slow holding movement but with ability to hold loads:

☆Insufficient flow of the hydraulic pump: increase the pump flow (the rated flow of general attachments is 30-50L/min);

☆Heavy abrasion on the multi-way valve of the forklift: replace the worn multi-way valve;

☆Blockage in the hydraulic circuit: wash the circuit and remove the blockage.

6.2 Slow holding movement and inability to hold loads:

☆Polluted or damaged multi-way valve of the forklift or control valve of the attachment: check and wash the element and replace any that is heavily worn;

☆Leakage in the cylinder: replace the sealing or, for any deformation in the cylinder block, replace the cylinder block.

6.3 Clamping:

☆Insufficient oil in the oil tank: refill the oil tank as required for normal work;

☆Blockage in the oil filter: wash the connector;

☆Air infiltration in the hydraulic circuit: remove the air in the circuit;

☆Heavy abrasion in the hydraulic pump: repair or replace the hydraulic pump;

☆Failure in the regulating valve of the forklift: repair or replace the regulating valve (the max pressure should be 170bar);

☆Heavy internal leakage of the cylinder: check if any of the part surfaces of the cylinder is damaged. If no, replace the sealing; if yes, replace the damaged part.

6.4 Frequent repair of the cylinder:

☆Heavy pollution of the hydraulic oil: wash the whole hydraulic system and then replace the hydraulic oil'

☆Scratch on the piston rod: grind with sand paper if the scratch is shallow; otherwise replace the piston rod;

☆Scratch on the cylinder block: replace the cylinder block.

6.5 Slow rotation with insufficient moment:

☆Internal leakage in the hydraulic circuit: replace the leaking element;

☆Air infiltration into the circuit during installation: remove the air;

☆Insufficient flow, with blockage in the circuit: wash the circuit and remove the blockage;

☆Heavy abrasion in the hydraulic motor: repair or replace the hydraulic motor;

☆Abrasion in the multi-way valve of the forklift: repair or replace it;

☆Heavy abrasion in the hydraulic pump of the forklift: repair or replace it.

6.6 Large vibration during rotation:

☆Excessive load or effective thickness resulting in higher than normal movement: try to reduce the load or effective thickness;

☆Check the gear wheel of the motor output shaft or the clearance of the reducer worm, and replace the worm or motor where necessary.

6.7 Lubricant leakage:

☆Excessive lubrication or abrasion in the oil seal gasket (softwood rubber): release some lubricant or replace the gasket.

6.8 Oil leakage in the rotation joint:

☆Abrasion in the sealing: replace the sealing;

☆Abrasion in the cork rubber gasket: replace the cork rubber gasket;

☆Abrasion or flexibility in the hydraulic part: fasten the hydraulic part or replace it where necessary.

6.9 Noise of the whole transmission gear during work:

☆Abrasion in the bearing: replace the bearing; check if the clearance between the gear ring and the pinion is in excess of 0.3mm;

☆Check if the side clearance between the worm and the turbine is not in excess of 0.1mm.

7 Special Statement

Thank you very much for selecting products from Anqing Liandong Engineering Trucks Attachments Co., Ltd. To full guarantee your rights and interests, please read this statement carefully.

7.1 The quality assurance defined for the forklift attachment products manufactured by Anqing Liandong Engineering Trucks Attachments Co., Ltd. should be：

(1) 24 months or 4,000 hours of product use, whichever comes first, from delivery of new products to the first carrier.

(2) Economy and non-standard customized products are delivered to the first carrier 12 months or 2000 hours of product use, whichever comes first.

7.2 The purchasers and the final users are advised that:

◆In order to make Anqing Liandong Engineering Trucks Attachments Co., Ltd.'s warranty matters can be implemented smoothly, the purchasers and the final users should comply with our User's Manual in the installation, commissioning, operation and maintenance of our products to enable successful execution of our quality assurance;

◆The purchasers and the final users may repair the purchased appliance only after obtaining authorization from Anqing Liandong Engineering Trucks Attachments Co., Ltd. but may not arbitrarily dismantle or replace the parts on the product;

◆Use of unauthorized repairs, alterations, use of parts not supplied by the original company of Anqing Liandong Engineering Trucks Attachments Co., Ltd. or violation of the relevant provisions of Anqing Liandong Engineering Trucks Attachments Co., Ltd.'s user's guides, test specifications, operation guides and maintenance manuals will result in the loss of warranty eligibility.

◆We assume no responsibility for any loss of , or any personal injury or property damage(including any indirect loss or damage)in connection with , the attachment product provided once it is owned or used by the buyer or final user.

7.3 Notes:

(1) Anqing Liandong Engineering Trucks Attachments Co., Ltd. does not guarantee the use of the Attachment Product for special operations beyond the rated range.

(2) The warranty of Anqing Liandong Engineering Trucks Attachments Co., Ltd. does not cover wear and tear, consumption in normal use and normal or regular maintenance work.

(3) Anqing Liandong Engineering Trucks Attachments Co., Ltd. shall not guarantee anything beyond the contents of this warranty policy and the terms and conditions related to the products described in the sales contract of Anqing Liandong Engineering Trucks Attachments Co., Ltd.