

Operating Manual

C Series of Electric Reach Forklift Truck

(KLR-C)

The first edition of 2021
Jiangsu King-lift Equipment.,Ltd.

Read to comprehend this operating manual & various warning labels that are attached on the vehicle before operating the vehicle

Preface

Welcome to use Series C electric reach Truck made in King-lift, China, the vehicle is made of special sectional steel, with compact design, durable performance, easy-operation. For the sake of your safety and proper operation, please read to comprehend the operating manual as well as various warning labels that are labelled on the vehicle.

Notice:

All the parameters are subject to the publish date of operating manual, we reserve the right of our products updated without prior notice; please contact King-lift if you need the latest parameters.

Statement:

those forklifts, that are made in King-lift, China , are special purpose vehicle indoors used in some special zones of factory, scenery, pleasure ground, which are stipulated by “Special Equipment Safety Supervision Regulations”.

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1. Use Range

Series C Electric Reach Forklift Truck is a warehousing forklift which is specially designed for high stacking & flat ground transport.

2. Operation Rules

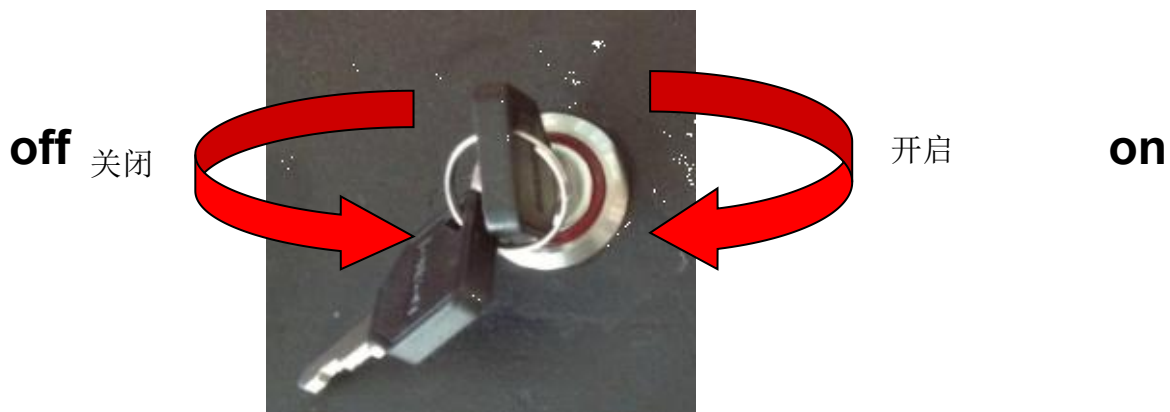
Check before use

1. Please contact the dealer, stop using if the reach truck gets damaged in the transport
2. Fill up the grease and hydraulic oil into the vehicle before delivery from factory
3. Please check the height and density of electrolyte of battery after the charging of battery pack.
4. Check if the battery charger is available or unavailable for charging anyway.

Operation

Turn on or Turn off of power supply

- 1) Turn key- switch towards right to start
- 2) Start electric lock, self-check of steering system & controller, initializing, keeping the same direction of the drive wheel & control handle.
- 3) Turn key- switch towards left to turn off

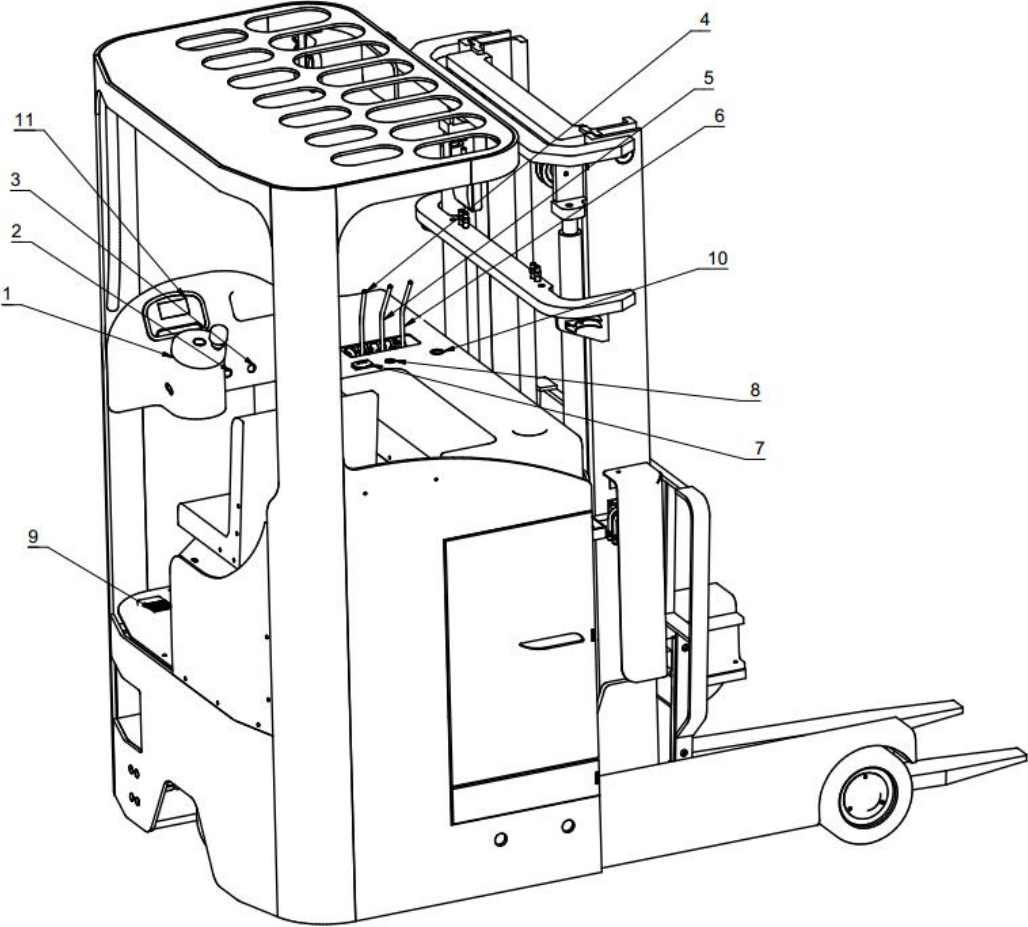


电锁钥匙

Electric Lock

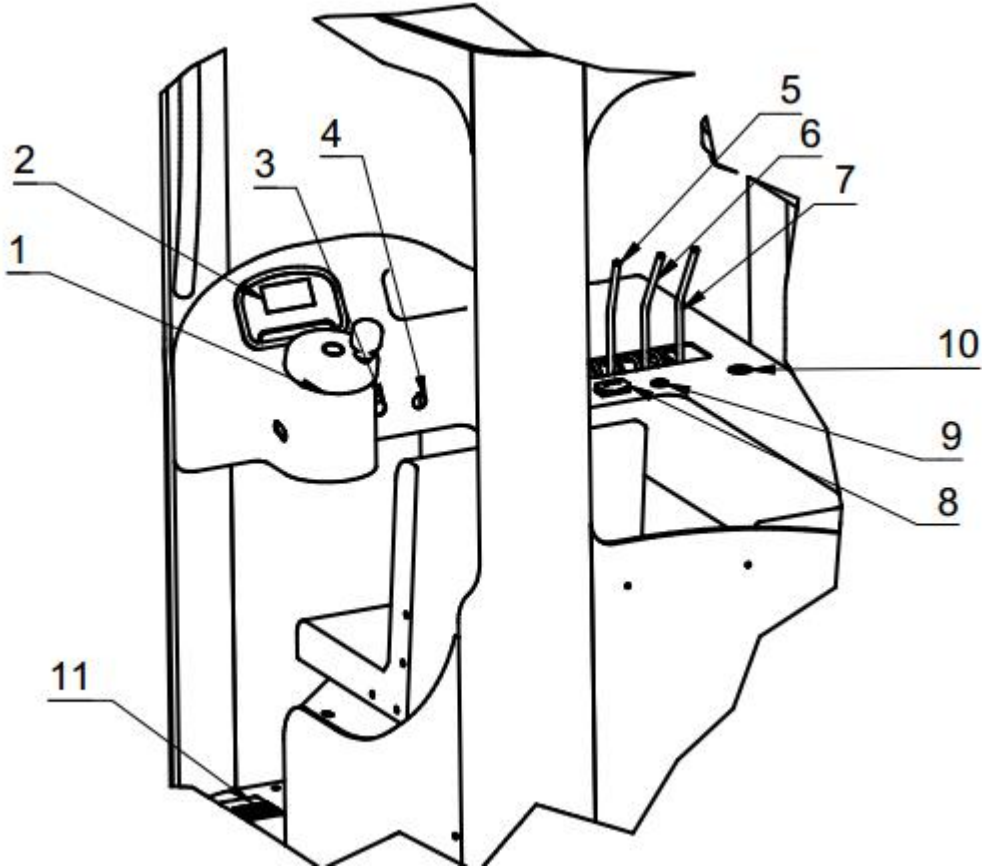
4) This forklift has two keys of electric lock, one is for operation, another for spare one. It is advised to place spare - key separately, in case of the missing of operation key, the spare -key can replace the operation key to start the forklift still.

The line drawing of the travel & mast operation as below:



- 1. Steering Wheel
- 2. headlight switch
- 3. Key Switch of Power
- 4. Lifting Joystick
- 5. Reach Joystick
- 6. Tilt Joystick
- 7. Travel Pedal
- 8. Horn button
- 9. Travel Trigger Switch
- 10. Emergency Outage Switch
- 11. Panel Assembly

the Partial Detailed Line Drawing of Operation Board



- 1. Steering Wheel
- 2. Instrument Assembly
- 3. Headlight Switch
- 4. Key Switch
- 5. Lifting Joystick
- 6. Reach Joystick
- 7. Tilt Joystick
- 8. Travel Switch
- 9. Horn button
- 10. Emergency Outage Switch
- 11. Travel Trigger Switch

Preparatory work before its operation.

Before its operation, the driver should strictly abide by wearing work uniform, banning from barebacked, bare feet, high-heel shoes & sandal worn to operate the vehicle;

There are no object installed around the overhead guard & vehicle body to affect the operation and sight line.

Operation and its cautions of starting and travel of the forklift

1. Before the travel, first the driver should make the forklift aisle accessible.
2. After the driver gets on the forklift, first buckle up, operate next.
3. When starting, turn the key, then by a foot holds down the trigger switch.
4. When travelling, should speed up gradually; does not allow to travel at a low speed as always. When meeting a vehicle, the unladen vehicle gives way to the laden vehicle.
5. The driver should pay special attention to avoid the falling down of the forklift forward and backward, due to sudden starting, rapid braking, sudden reverse, fast steering.
6. By a foot holds down the trigger switch, meanwhile steer the steering wheel properly to drive the vehicle forward and backward.
7. Lifting goods by pulling back the lifting joystick.
8. The body of porters does not be allowed to reach out of the overhead guard when the cargo has been lifting to 2 meter high.
9. It is okay to lower the cargo by pushing forward the joystick
10. Watch out ! Honk horn when the forklift is starting and cornering travel and travel downslope; slow down the travel speed when the ground is not flat or travel through narrow aisle.
11. When travelling, should be careful for the pedestrians, obstacles, and rough terrain, as well as the clearance from over the forklift. Banned from travelling on the soft or bumpy ground & the platform and scaffold with unknown safety carrying capacity. Electrical cable which is exposed to the ground, and pipeline, and groove with 5 cm opening are not favourable to go through.
12. When service voltage is lower than the lowest limit of the vehicle battery, must stop the operation, charging the battery pack immediately.
13. must immediately stop to check if abnormal phenomenon is found, additionally shoot the troubles; banned from transporting a person by the forks; banned from driving the vehicle with any of its faults.

Work after Operation

1. after the use of the vehicle, must clean up entirely the vehicle in time, moreover parking at a proper place, pay attention to being freezing proof, sun proof, rain proof.
2. Must turn off electric lock, press down emergency outage button, lower the forks to the ground, furthermore retract various piston rods into the cylinders.
3. clean and check the battery pack, replenish distilled water if necessary; check and adjust the specific gravity of electrolyte; check the voltage of battery pack, and charge the battery if necessary; Charge the battery pack immediately when service voltage is lower than the lowest limit.
4. Check if there is oil leakage from the pipeline of hydraulic system, connectors, cylinders, distribution valve.
6. keep the work shifting done well, and accomplish the maintenance project.

3 . Upkeep and Maintenance

Daily routine check is essential to ensure that the forklift is normal to work.

1. Check the battery capacity.
2. Check the capacity of hydraulic oil inside the oil tank as the forks lift at the top, fill the special hydraulic oil to the proper level if necessary.
3. Weekly Routine Check
 - 1). Check the lifting leaf chain, clean it up, and grease oil putting on it if necessary
 - 2). Make certain all the screws and bolts are fixed completely

Replacement of hydraulic oil

1. Replace hydraulic oil once a month, commonly the aggregate work hours 200 hours is a circle time; once a year if the forklift is rarely used.
2. The method of hydraulic oil replacement as below: first of all, lower the mast and forks of forklift, open the oil outlet of oil tank that is under the hydraulic power unit, let off the used hydraulic oil, and close the oil outlet, then put the assisted device into the oil tank, push the red button of oil pump, fill the special hydraulic oil into the oil tank to the proper level.
3. May use 46 # hydraulic oil if the work temperature is relatively low.

4. Battery

Upkeep and Maintenance

Check the density of electrolyte once a week, make up for the electrolyte if the density is low, keep the battery surface dry and clean. Prevent the battery body from being eroded by the electrolyte, which results in leakage. The adding of daily running water will cause leakage as well as the battery performance degrades, distilled water instead.

Check

Check the charging status of battery, by the means of hydrometer, the density of electrolyte shall not be less than 1.160 (at the 90% full charge)

1.260~1.280	100%
1.230~1.250	75%
1.200~1.220	50%
1.170~1.190	25%
1.140~1.160	90%

Charging & Replacement of Storage Battery

1. Battery charging station has to be set up in a specific zone.the station should be equipped with the facility, which can rinse and neutralize the overflowing electrolyte,also fire-fighting equipment,taking precautions to prevent the charging device from damage by the forklift, as well as the ventilation facility that can disperse the gas out of the battery charged.
2. Banned from smoking, with warning labels (no smoking) the specific charging zone.
3. The battery is replaced and charged by those who are trained and approved.the battery repairer has to wear protection suit.
4. All work of battery replacement should be implemented in accordance with the instruction of manufacturing factory.
5. Measures have to be taken to make the battery properly connecting, positioning and fixing when reinstalling a battery.
6. Do not put tools and other metal objects on a lidless storage battery.

7. Without the professional permission (such as from the vehicle manufacturing factory) the forklift battery cannot be replaced by those batteries that are with different voltage or different weight or different size. The battery has to be replaced by the specified one that the manufacturing factory appoints to.
8. During the process of battery replacement, have to be furnished with the safety device. Have to use insulation boom while the battery is being lifted by a hoist
9. If adopt loop chain hoist, have to be furnished with drive chain case; if adopt hand-chain hoist, a lidless battery has to be covered by a layer of rubber slab or insulating material, in case of short circuit occurred between hoist chain and the connecting wire of battery.

5. Safety Norm

Operational Safety Rule for Users and Operators

Proper Users

All users include the vehicle owners, or a person or an enterprise , who rents the vehicle.

Passenger

In addition of a passenger seat furnished, the vehicle is unable to carry a passenger. Banned from carrying a person by the lifting device and its attachments.

Use of Vehicle

1. The vehicle cannot be overloaded during the use, in terms of its rated capacity.
2. Without the approval of manufacturing factory, the vehicle cannot be modified, nor append extra objects, in case of affecting the vehicle capacity and its safety.
3. With regard to the modification of adopting an attachment, which cannot diminish the safety level, in addition to complying with the operating manual. After an attachment adopted, the indicator and labels and graphic patterns of vehicle's capacity and operation and maintenance should be changed accordingly and respectively.
4. The user makes certain that all the labels and signs are fixed on the specific position, furthermore keep label words clean.

Stability

The stability may be possibly affected by the factors as followings: the status of ground and floor, ramp slope, Travel speed, load capacity, battery weight, dynamic force & static force as well as the training status of drivers.

Aisle and Stacking Site

1. The ground surface of operating site is able to bear the sufficient load capacity, strengthen the ground's maintenance and keep the safety operation without affection.
2. The transport corridor has to be well-visual and easily-steered, getting clear of ramp slope, steep slope, narrow aisle and low ceiling, making the corridor of travel accessible and clear and workable.
3. Have to rebuild the aisle width if meeting up with the aisle of pedestrian vehicle.
4. The advisable ramp slope is less than 8%, the top and bottom of ramp should be of smooth transition, in case of load vibration & the collision between the bottom of vehicle and the ground surface. Label installed is recommended if the ramp slope is more than 8%.
5. The cargo has to be put behind the vehicle if the cargo blindfolds the sight of the operator. For instance, the cargo is needed to put front of the vehicle under some certain circumstances such as (stacking and ramp climbing), at this moment, the driver must be

extremely careful to drive the vehicle. Special attention: assist staff organized or assist device furnished are sometimes necessitated in terms of the requirements of operation.

6. In good operation condition do the aisle, roadway, passage, floor & ground as well as ramp keep, in case that the vehicle and cargo get damaged.

7. Have to mark on the striking place highlighting the danger status, particularly barrier danger on the top.

8. It has to be accessible for firefighting aisle, aisle of going upstairs, aisle of firefighting equipment furnished.

Applicable Rules for Driver

The safety operation of engine-powered industrial vehicle mostly depends on the operation method of driver. The main aspects of applicable safety rules for driver are as below:

1. Common Rules

2. Loads Transport(lift and stack) Rules

3. Travel (Drive) Rules

4. Rules of vehicle maintenance by driver

5. If disobey the above rules, it may result in as followings:

(a) Severe danger of harming the driver and other persons

(b) Destroy the material

Common Rules

1. Engine-powered industrial vehicle is only operated by those who are trained.

2. Engine-powered industrial vehicle cannot carry passengers until special facility furnished

3. The driver has to pay special attention to the operation environment, including nearby persons, fixed and moving objects, is careful about the pedestrians anytime.

4. Banned from standing under the lifting device no matter the vehicle is unladen or laden.

5. Any an accident of persons, architect, structure or equipment should be reported to the relevant authority.

6. Banned from modifying the vehicle for a driver, which could affect the performance.

7. The driver has to use the vehicle within its use range.

Loads Transport(lift and stack) Rules

1. Loads

Industrial vehicle and industrial vehicle with an attachment are only allowed to transport those loads that are not more than rated load capacity. The load capacity of the vehicle with an attachment may be less than the rated capacity noted on the nameplate.

Banned from boosting the lifting capacity by any means, such as adding persons or counterweight.

Anytime, especially with an attachment, the driver has to pay attention to the operation, positioning, fixing and transport when the vehicle is laden; should regard an attachment as a loads when the vehicle is unladen.

It only allows to transport some loads that are regularly-shaped, stable, safe, especially

be exceptionally cautious to carry longer and higher items, also be specially careful for uncertain goods to move on.

Take cautions when the goods is forked to move

The outer width of two forks must be fit for the goods

The forks must fork under the goods as deep as possible, however, the operation cannot let the forks collide foreign items, then the forks lifts to sufficient height to make the goods to move on.

(c) Be cautious exceptionally for transporting higher and stacked unit cargo as the driver has to make the mast minimally tilt backward to limit to stabilize the loads

(d) Be cautious to lay down the loads. To be more convenient and easily get the forks out of the cargo if make the mast minimally tilt forward.

2, Stacking

(a) When stacking, the mast should tilt backward as much as possible to ensure the loads stable, slowly approach to the aggregate stacking goods.

When the vehicle approach and face the aggregate stacking goods, adjust the mast be vertical and a little bit higher than the aggregate stacking goods, then the vehicle moves forward or the forks reaches out to lower the forks and lay down the loads.

(b) Be cautious to control the brake no matter the vehicle is laden or unladen so long as the travel of vehicle in the state of lifting.

(c) . Pull the forks out of the goods after stacking, and lower the forks to the travelling level, driving the vehicle at a barrier-free roadway, to stabilize the loads by tilting backward the mast.

3、 Separation of stacking

(a) Gradually the vehicle approaches to the aggregate stacking goods, stop as the forks keep the distance 0.3 meter from the goods

The outer width of two forks should be adjusted to fit for the loads' width, furthermore the weight of loads must be checked and ensure the weight of loads does not be overloaded to the rated capacity of the vehicle.

Have to lift the forks vertically for positioning to insert the forks under the loads.

(b) No matter it is unladen or laden, the vehicle is at the state of lifting, be meticulously discreet to drive around and stably control the brake.

(c) The forks must insert under the loads as deep as possible, on the other hand, be cautious to avoid the forks to collide some other foreign objects, then the forks should be lifted to the proper height to fork the loads, next keeping lifting the forks and make the loads from the aggregate stacking goods separately. Keep stabilizing the goods by tilting backward.

(d) Make certain the aisle is clear and carry the loads out of the aggregate stacking goods.

Driving (Operation) Rules

1、 Routine Rules

(a) The driver must drive along the right side, the sight of roadway should be clear to the driver, and pay attention to the safety clearance, pedestrians as well as other vehicles.

(b) The driver must abide by all the traffic rules including the speed limit at the factory.

(c) Must keep distance from the front driving vehicle

(d) The driver has to be responsible for driving the vehicle. Banned from suddenly starting driving, from suddenly stopping, from turning at a high speed.

(e) Be recommended not to place the joysticks at the limiting position except of the demands of its operation. Be much careful to drive the vehicle so long as the joystick is placed at the limiting position.

(f) Keep its loads and load device at the proper height as well as tilting backward when driving, prohibited from lifting the loads except of the time of the operation of stacking. The above rule is not subject to some specially-designed forklifts that are with peculiar device for lifting.

(g) Should put the loads behind if the loads blocks the sight of driver when the vehicle drives.

(h) Decrease the travel speed when the cargo blocks the driver's sight at a crossing way, in addition of honking horn.

(i) Have to steer and brake slowly and stably when the vehicle is driven with the cargo which is at the state of lifting.

(j) Prohibited from catching up with other vehicles that drive towards the same direction when driving at a crossing road or when the driver's sight blocked or at the circumstance under which the drive is in the state of danger.

(k) cannot drive across some soft objects to avoid resulting in cargo damage and harming person.

(l) Banned from putting human arms, legs, heads into the vertical columns of the mast as well as other transmission components

(m) Banned from protruding the body of driver out of the vehicle's body when the vehicle moves.

(n) Send out warning signal if there are other vehicles around or pedestrians nearby when turning.

(o) Have to abide by the rules from all the labels and signs on which the ground load capacity and safety precautions are pointed out.

(p) The load capacity of ramp and aisle must be considered when driving towards the elevator.

2 Vehicle Speed

Vehicle speed should be matched with persons' activity, the driver's visibility, roadway's circumstance as well as the loading's situation, accordingly.

Under any circumstance, the driver has to control the vehicle's speed within the scope of safety parking.

2、 Drive on the ramp, have to abide by the following rules:

(a) The driver has to be slow to go up and come down the ramp.

(b) The vehicle cannot make a turn on the ramp.

(c) The driver should be careful to approach to a ramp and a high platform, at least keep proper distance from the ramp or platform for safety driving.

(d) In regard to all the operations on a ramp, the driver has to tilt backward and lift high enough to go through all possible aisles and barriers.

4. Aisle Clearance

Make certain keep proper aisle clearance between vehicle and the driver and the loads before drive through an aisle and a gate.

5. Charging & Replacement of vehicle's battery

(a) All the charging and replacement of battery should be operated by those who have got trained or been certified in the light of the operating manual of battery or vehicle manufacturing companies. Normally the driver acts as the person.

(b) The vehicle has to be positioned and braked properly before charging and replacement of battery.

When charging, prevent electrolyte from splashing from the battery as set the vent cap at a proper position, even ensure the vent pore is workable, open (or open in intervals) the lid of battery to let off the gas or heat.

(c) In charging zone of battery, precaution measures taken: prohibited from open fire, from spark and electric arc, no smoking at all.

Keep tools and metal objects away from the top of a lidless battery pack.

(d) Keep the upper of battery dry, keep its connection terminal spotless, coat with vaseline and fasten properly. Without approval, banned from replace the original battery with those that are of different voltage, of different weight, of different size.

(e) Must place the battery into the proper position of vehicle as reinstalling.

Banned from checking the surface of electrolyte by open fire.

(f) Must use the tilting gearing or syphon of the sulphuric acid container when take the sulphuric acid out of its container. When dilute sulphuric acid, only allow adding concentrated sulphuric acid into water, being prohibitive from adding water into concentrated sulphuric acid.

6. Maintenance & Upkeep

Summary: whether or not engine-powered industrial vehicle is satisfied to use, which depends on meticulous maintenance; the vehicle could hazard person and destroy property if neglect maintenance.

1. Maintenance Details

(a) Base on plan schedule and the following items arranged, especially the operating manual offered by manufacturing company, all engine-powered industrial vehicles must get engaged in protective check, lubrication, maintenance and repair regularly.

(b) Only those who are professionals are allowed to check, maintain, repair and mend industrial vehicles. Brake, turning mechanism, steering mechanism, warning device, lamination, adjuster as well as overloaded lifting - free must be in a state of safety operation.

(c) All the parts and components of lifting mechanism must be checked regularly, and keep being in a state of safety operation.

(d) Safety protection frame and safety device must be checked regularly, and keep being in a state of safety operation.

(e) All the hydraulic system must be checked and maintained regularly.

(e) Must check oil cylinders, valves and the related parts, make certain the possible inside oil leakage and outer oil leakage will not cause hazard

(f) Must check and maintain battery, engine, controller, contactor, limit switch, protection device, wire and connectors, making them be in good condition, particularly watch out the state of electrical insulation.

2、Check

(a) After check, if there are some potential safety hazard of defection, wearing out and damage, repair & fix first, use the vehicle then.

(b) Comply with the planning and schedule to get engaged with protection maintenance, lubrication and check for the vehicle. Save the log and data of maintaining work.

7. Common Faults & Troubleshooting

Serial	Faults	Reasons	Troubleshooting
1	Vehicle cannot start (contactor doesn't work)	① fuse of control circuit has burnt	replace
		② poor contact of broken of power supply switch.	repair or replace
		③ protector fuse of main circuit is burnt	replace
		④ poor contact or broken of electrolock switch	Repair or replace
		⑤ loosening or falling off of battery connection	fasten
	Vehicle cannot start (but contactor works)	① brake is not engaged, vehicle is in a state of braking	Repair or replace
		② poor contact of the magnet exciting coils and wire terminal of travel engine	Repair or replace
		③ poor contact of contact terminal of contactor	Repair or replace
④ breakdown of MOSFET tube circuit board		Repair or replace	
2	vehicle only can travel forward (or only travel backward)	① poor contact or burnt of contactor	Repair or replace
		② breakdown of circuit board	Repair or replace
3	vehicle cannot stop during travel	① damaged of contactor's terminal that cannot be gone back to home position.	cut off power supply and replace contactor terminal
4	brake loses function	① loosening or damaged of the mounting bolt of microswitch	adjust or fasten the bolt, or replace the microswitch
		② brake wiring is loosening, or brake is damaged	fasten the bolt or repair the brake
		③ the pad of brake wears off	replace the brake pad
5	steering gets stuck	① steering gear bearing is damaged	Replace the bearing
		② steering bearing is lack of	rinse the bearing

		grease or more dusts inside.	
6	it is hard to steer the drive wheel, with noise, the engine is overloaded.	① gear and bearing got stuck by foreign objects	rinse or replace the bearing
		② clearance existed during bearing installation, or circlip falls off	reinstalling or adjust the clearance
		③ the front wheel bearing is damaged	Replace the bearing
7	goods forks cannot be lifted	① overloaded to use	decrease the loads
		② the pressure of overflow valve is too low	adjust to higher
		③ abnormal inside oil leakage of lifting oil cylinder	replace oil seal
		④ the hydraulic oil is insufficient	add proper amount of hydraulic oil
		⑤ the voltage of battery is severely lacking	Charging battery
		⑥ control handle is not vertical or horizontal, pump engine is not electrified	Operate properly
		⑦ pump engine is damaged	Repair or replace
		⑧ pump is damaged	Repair or replace
		⑨ lifting joystick is damaged	Repair or replace
		⑩ electrolock has not switched on or damaged	Repair or replace
8	forks cannot lower down after they get lifted	① inside mast deforms by overloaded	Repair or replace
		② outer mast deforms by overloaded	Repair or replace
		③ roll wheel of mast is stuck	Repair or adjust
		④ guidance rail of mast got curved	Repair or straighten
		⑤ oil return hole is jammed	Clean up
		⑥ electromagnetic valve of hydraulic power unit is out of control	shoot the faults of electromagnetic valve
9	the voltage of battery goes down after charging	① individual battery cell is damaged	Repair or replace
		② the level of electrolyte gets lowering	Add electrolyte
		③ the electrolyte is impure	Replace the electrolyte

7. Electrical Schematic Diagram

