

VIPER

LIFT TRUCKS

SERVICE MANUAL

1-3.5T ELECTRIC

INTERNAL COMBUSTION BALANCED FORKLIFT TRUCK



CONTACT US WITH ANY QUESTIONS

PARTS@VIPERLIFTTRUCKS.COM

TOLL FREE: (888) 745-0577

Foreword

Through reading the original operation instructions carefully, the user can master the technical knowledge necessary for the safe operation of forklifts.

We sincerely recommend that you to read the manual and be sure to the detail in mind including content, It's the only way for the machine were able to reduce the failure and to play the highest security features under such normal operation and proper maintenance. It is strictly prohibited to users to refitting vehicle privately; thus all the consequences of this Company shall not be responsible for. Every driver can do to comply with the safety rules listed in the manual, we believe, is a big help for you under safe operation.

The operating instructions are written for different types of forklift. The operator must pay attention to the implementation of the specific provisions of the corresponding forklift models in operational use and maintenance process

Our Company will research and development for the equipment continually. Therefore, customers should understand that we have this authority to modify the shape, equipment and technology. For this reason, from the operating instructions of the content may not be extended out for any equipment specific properties of those rights.

STATEMENT

Vehicles under the manual are special-purpose vehicles for specific places such as factory, tourist attraction, playground etc. according to « Special Equipment Safety Supervision Regulations» .

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A Provisions using

The manual is an integral part of the operating instructions must be strictly observed. Your country's relevant laws and regulations will not be affected.

The forklift is described in the Operating Instructions for a ground handling equipment, which is suitable for lifting and transporting goods.

The customer must be based on the data operate and maintenance of the forklift within the Operating Instructions. The equipment is used for any other purpose, but is not in line with the provisions of the operating behavior; it may result in personal injury of forklift or other property damage. It is important that we need to prevent the overload caused by the load overweight or sway in one side. You must comply with the maximum load limitation prescribed in the equipment the nameplate or load graphical. Equipment using must ensure that legible load graphical, for any damage must be replaced. Shall not be used in an area of fire and explosion hazards. Nor in the area of easy to cause corrosion rust or dust in the ground transportation equipment.

The obligations and responsibilities of the equipment user: In the instructions, “the equipment user” means every natural or legal person use directly or appoints others to use the ground transportation equipment. In the special case of the lease, rental, equipment user on behalf of the parties to hold the prescribed operating obligations under the terms of the contract entered into between the owners and users of equipment.

Equipment user must be fit for the purpose provisions ensure that the use of forklift, and remove all the dangers that may endanger the life and health of the operator or a third party. In addition, equipment user must be strict compliance with the accident prevention regulations and other safety regulations, as well as the operation of the equipment, maintenance and repair guidelines. The user must ensure that all operators read carefully and fully understand the contents of the instructions.

If you do not comply with the instructions, the Company's quality assurance will be lapsed automatically. If the client and / or third-party to perform the non-standard operation without authorization, this Company for the resulting loss also does not undertake any responsibilities

Mounting accessories: the additional equipment installation needed or retrofitting, it must obtain prior written consent from the Company if the ground transports equipment impacted or have added. In accordance with the actual situation, you may also have to obtain the consent from the local authorities. Approved by the local authorities and do not represent the views of the Company, the consumer still need to obtain the authorization of the Company. In addition, the use of attachments may speed up the forklift wear out.

Trailer and towing loads: the forklift had to be used to towing the trailer or load compliance.

1 Useable range description

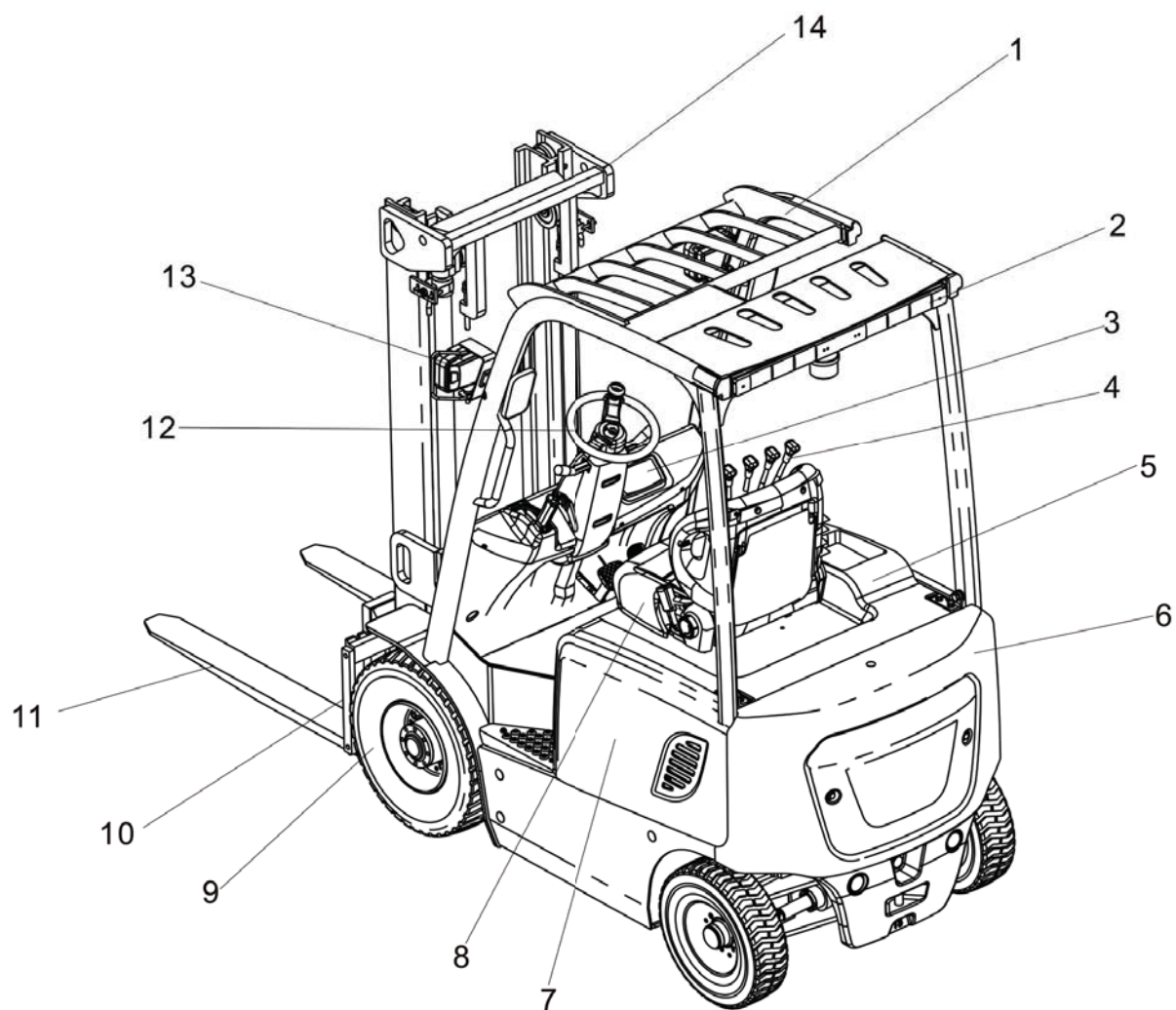
The FB Series forklift is the 4-wheel sitting drive type electric forklifts. Use a fork mounted in front of forklift, the operator can unload kinds of trucks easily and stack the goods on the loading platform or shelf. It can even handling the cargo tray with a closed base.

Forklift models and maximum rated capacity:

Model	Max Rated Capacity*)	Load Center
FB10	1000Kg	500mm
FB15	1500Kg	500mm
FB18	1800Kg	500mm
FB20	2000Kg	500mm
FB25	2500Kg	500mm
FB30	3000Kg	500mm
FB35	3500Kg	500mm

*)Please comply with the specified rated capacity in forklift illustrated.

2 Components and Function



Serial number	Name	Serial number	Name
1	Overhead guard	8	Seat
2	Back lights	9	Driving Device
3	Instrument Panel	10	Lift Bracket
4	Lever	11	Fork
5	Hood	12	Steering system
6	Counter weight	13	Front combination lamps
7	Battery in side board	14	Mast

2.1 Forklift device

Steering system: the forklift has a good steering transfer performance, small steering force, 3-4 weeks of steering wheel rotated, and the steering operation can be easily and quickly achieved.

The driver's seat: The driver's seat is the center of a forklift. The steering Pillar and the seat of direction can be adjusted, comes with paper storage box for driver storage of personal belongings and documents.

Electrical and electronic components: using the most advanced CAN bus AC technology, fewer cables. Not only can reduce an affair occurs significantly in cable breakage, but also can identify the accident lines quickly in the event of a failure. Thus makes such complicated control system becomes more flexible and convenient.

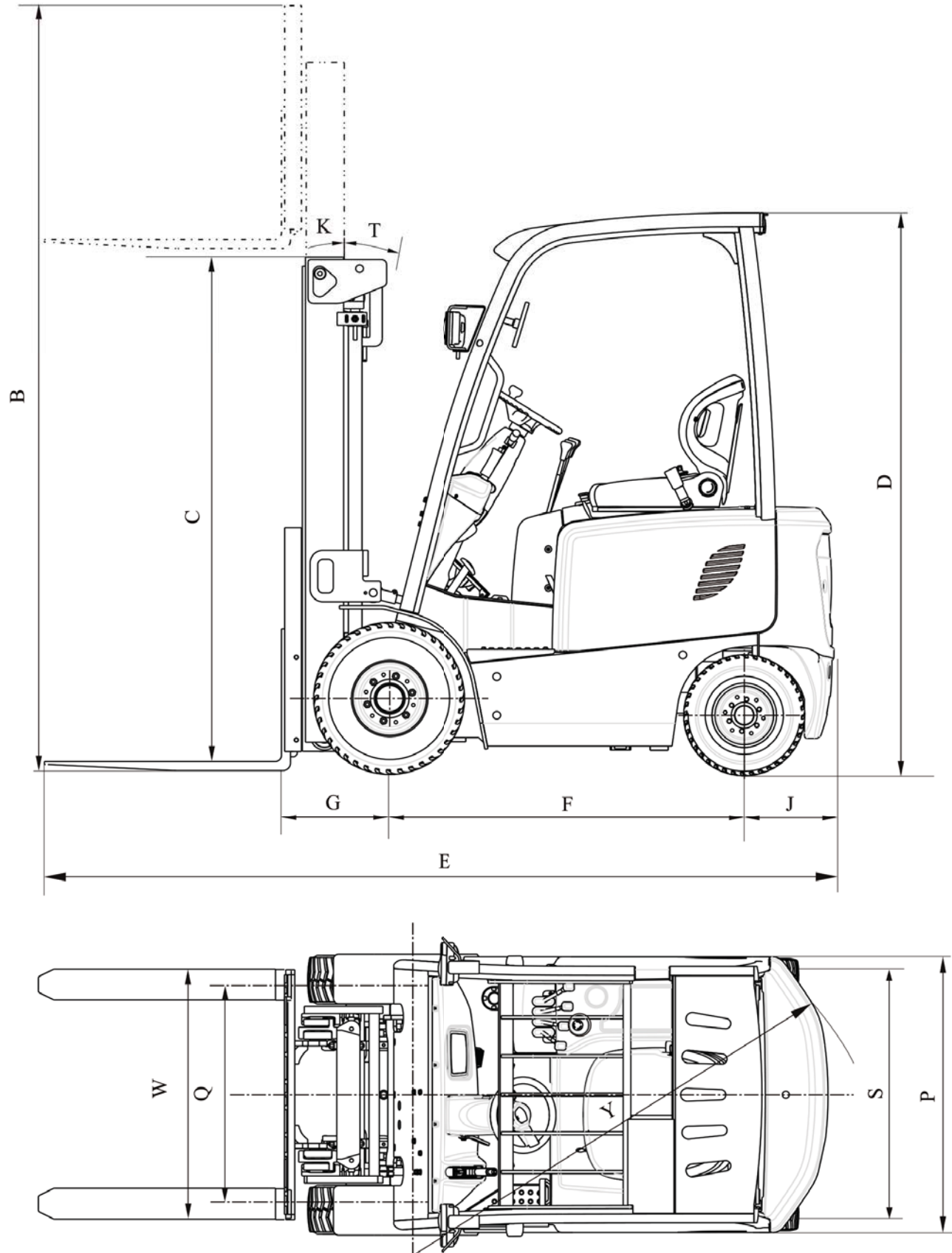
Driving and brake system: the front wheel driving system of the forklift provides superior traction force. The driving system is the hydraulic drum brake. The transmission of a closed shell to ensure that operations are foolproof in any harsh environment. Another forklift have a set of parking brake acts on the front wheel drum brake device, after tensioning the parking brake, even if the forklift parked on the ramp are not slide easily.

The hydraulic system: the system is designed to ensure that all functions are operating flexible, the proportion of moderate reaction sync (no damage to the safety performance). Working Mechanism and steering power with a motor-driven use the steering priority system; to improve the steering performance adopt the liquid system.

Mast: Our goal is to strive for the best angle of sight. The triplex mast is made of super high strength cold-rolled steel casting, to ensure that the operation will not stand in the way of observe the fork operation. The principle of fork holder design and the effect is the same. The Wheel's lubrication is going well; it can fully guarantee the lifting operation of the rail and fork holder.

3 The main technical parameters

The technical data given below are in line with national standards technical changes and additional rights reserved.



Forklift outline drawing

Main Technical Parameters

Model		Unit	FB10	FB15	FB18
Rated Capacity		Kg	1000	1500	1800
Load Center		mm	500	500	500
Lift Height		mm	3000	3000	3000
Mast Tilt Angle (F/R)		°	6/12	6/12	6/12
Lifting (Full load)		mm/s	390	360	330
Free Lift		mm	115	115	115
Max Traveling Speed		km/h	15	15	15
Turning Radius Y		mm	2010	2010	2010
Gradeability (Laden)		%	15	15	15
Outlook	Length E	mm	3115	3115	3115
	Wide P	mm	1090	1090	1090
	Overhead Guard Height D	mm	2195	2195	2195
Mast Lowered Height C		mm	1995	1995	1995
Mast Extended Height B		mm	3945	3945	3945
Fork (L×W×T)		mm	920×120×35	920×120×35	920×120×35
Front Overhang G		mm	420	420	420
Wheelbase F		mm	1420	1420	1420
Lateral fork adjustment W		mm	240-970	240-970	240-970
Ground Clearance H		mm	95	95	95
Tread	Front tire Q	mm	890	890	890
	Rear tire S	mm	920	920	920
Battery	Voltage	v	48	48	48
	Capacity	Ah	400(450/500)	450(500)	500(550)
Motor Power	Driving Motor	kw	8(AC)/5.3(DC)	8(AC)/5.3(DC)	8(AC)/5.3(DC)
	Lifting Motor	kw	8.6(AC)/8.2(DC)	8.6(AC)/8.2(DC)	8.6(AC)/8.2(DC)
Tires	Front tire		6.50-10-10PR	6.50-10-10PR	6.50-10-10PR
	Rear tire		5.00-8-10PR	5.00-8-10PR	5.00-8-10PR
Service weight		kg	3175	3245	3340

Main Technical Parameters

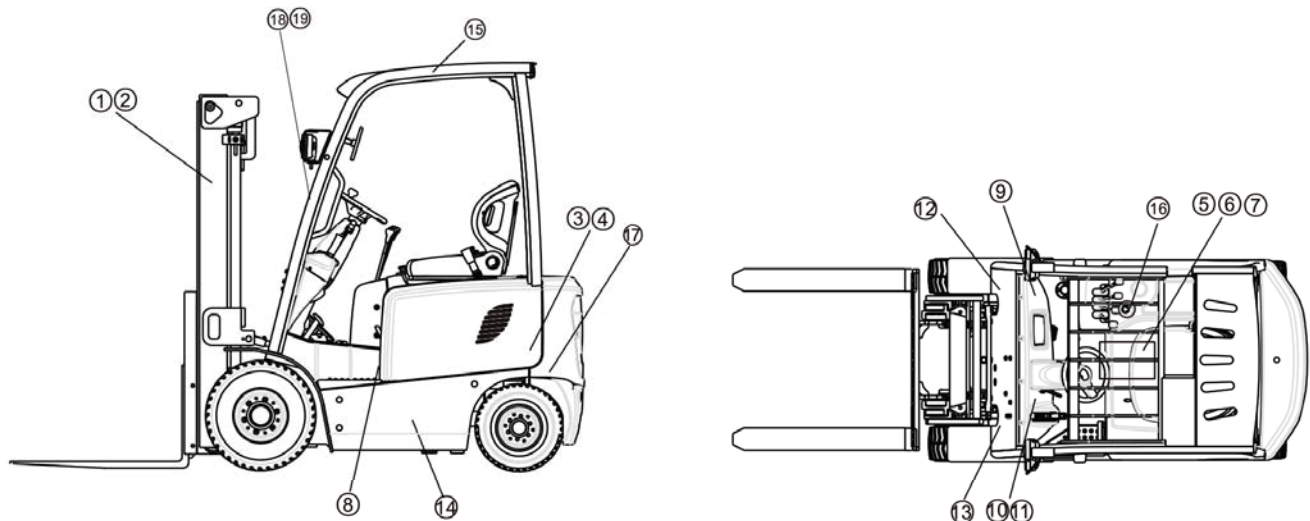
Model		Unit	FB20	FB25	FB30	FB35
Rated Capacity		Kg	2000	2500	3000	3500
Load Center		mm	500	500	500	500
Lift Height		mm	3000	3000	3000	3000
Mast Tilt Angle (F/R)		°	6/12	6/12	6/12	6/12
Lifting (Full load)		mm/s	300	270	300	280
Free Lift		mm	125	125	130	130
Max Traveling Speed		km/h	15	15	15	15
Turning Radius Y		mm	2075	2075	2315	2315
Gradeability (Laden)		%	15	15	15	15
Outlook	Length E	mm	3430	3430	3630	3630
	Wide P	mm	1160	1160	1230	1230
	Overhead Guard Height D	mm	2240	2240	2250	2250
Mast Lowered Height C		mm	2070	2070	2120	2120
Mast Extended Height B		mm	4020	4020	4160	4160
Fork (L×W×T)		mm	1070×120×40	1070×120×40	1070×125×45	1070×125×50
Front Overhang G		mm	465	465	480	480
Wheelbase F		mm	1510	1510	1700	1700
Lateral fork adjustment W		mm	240-1020	240-1020	250-1100	250-1100
Ground Clearance H		mm	110	110	120	120
Tread	Front tire Q	mm	960	960	1000	1000
	Rear tire S	mm	950	950	980	980
Battery	Voltage	v	48	48	80	80
	Capacity	Ah	560(630/700)	630(700/770)	500(550/600)	550(600)
Motor Power	Driving Motor	kw	11(AC)/7(DC)	11(AC)/7(DC)	15(AC)/10.2(DC)	15(AC)/10.2(DC)
	Lifting Motor	kw	8.6(AC)/8.6(DC)	8.6(AC)/8.6(DC)	12(AC)/10(DC)	12(AC)/10(DC)
Tires	Front tire		7.00-12-12PR	7.00-12-12PR	28×9-15-12PR	28×9-15-12PR
	Rear tire		18×7-8-14PR	18×7-8-14PR	18×7-8-14PR	18×7-8(实心胎)
Service weight		kg	4170	4410	5100	5350

3.1 Working condition

Environmental temperature

For a long time in the environment of large changes in temperature or humidity forklift must install special equipment, and to obtain the permission of the manufacturer to run in the environment within -20 ° C to 40 ° C.

Warning and instruction signs, load diagram, stop point and nameplate must be legible to figure it out, it should be replaced when it necessary



Serial number	Name	Serial number	Name
1	Decal, safety	12	Name plate
2	Decal, sling	13	Noise sign
3	Decal, tire safety	14	Customers Decal
4	Decal, caution	15	Warning logo
5	Decal	16	Decal, Emergency stop switch
6	Decal, iubrication chart	17	Weight lifting logo
7	Ban manned sign	18	Read instructions warning
8	Electrical warning logo	19	Fasten seat belts warning logo
9	Decal, capacity chart	20	Decal, padlod mast space
10	Decal	21	Decal, notice thumb hand
11	Decal, parking brake adjustment		

4.1 Forklift nameplate

COUNTERBALANCED BATTERY FORKLIFT

Model	23	Service Weight	29
Controller	24	Self Weight (without battery)	30
Tire Pressure	F: 25 kPa R: kPa	Max. Battery Weight	31
Equipment No.	26	Min. Battery Weight	32
Serial No.	27	Battery Voltage	33
Manufacture Date	28	Capacity	34
		Rated Output of Driven Motor	35
		Rated Load Capacity	35

	Load Center "B"	Max. Lift Height "A"	Max. Load Capacity "G"
Without Attachment	36	37	38
With Attachment	39	40	41

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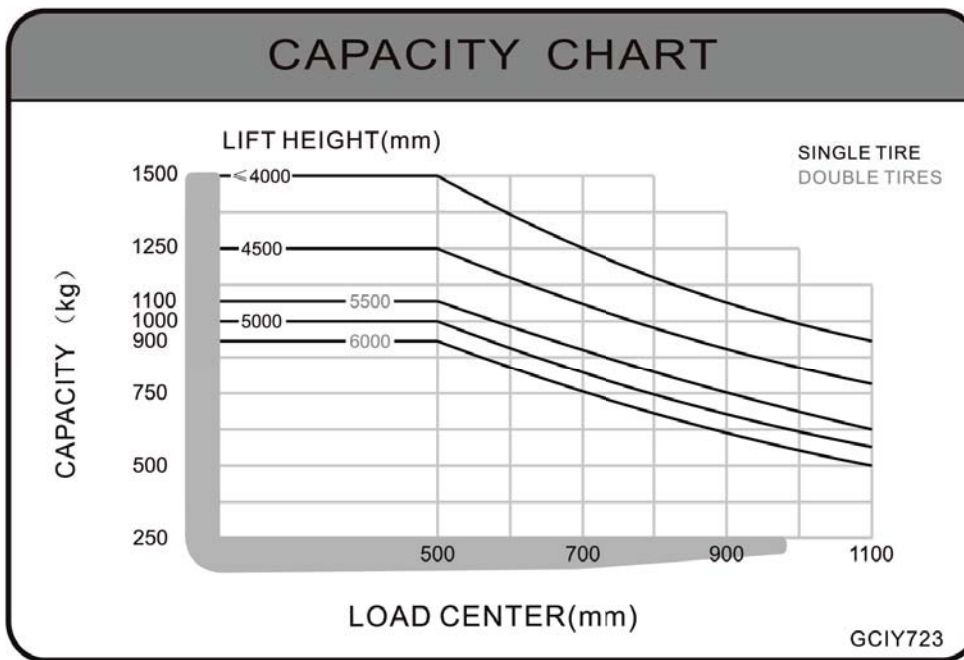
Serial number	Name	Serial number	Name
23	Forklift model	33	Battery rated voltage (V)
24	Controller type	34	Driving motor rated power (Kw)
25	Inflation perssure (Kpa)	35	Rated capacity (Kg)
26	Equipment code	36	Load center (mm)
27	Serial No.	37	Capacity(Kg)
28	Manufactur date	38	Max. lift height (mm)
29	Weight (Kg)	39	Load center(with attachments)
30	Weight (without battery) (Kg)	40	Capacity(with attachments)
31	Max.Weight (with battery) (Kg)	41	Max. lift height(with attachments)
32	Min.Weight (with battery) (Kg)		

Any questions about forklift or spare parts please provide forklift serial number (fill in the table above).

4.2 Forklift graphical

Forklift illustration shows the mast in a vertical state, the rated load of the truck Q (kg). The scutcheon are listed in the form of the curve D (mm) and the desired lifting height H (mm) to determine the distance of load center and the corresponding maximum capacity.

For example:



If the forklift is with 4.5m mast, the load capacity should be lower than the standard load of 1250Kg. However, the position of the load center is located away from 700mm at the rear of the fork. According to the graph, to identify the load center point of 700mm on the map first, along this point up, with the deadweight lines intersected, then from the point of intersection to the left, for a horizontal line to intersect with the deadweight line, this intersection is lifting deadweight about 1100Kg, 1250Kg, has far exceeded this number, you must reduce it.

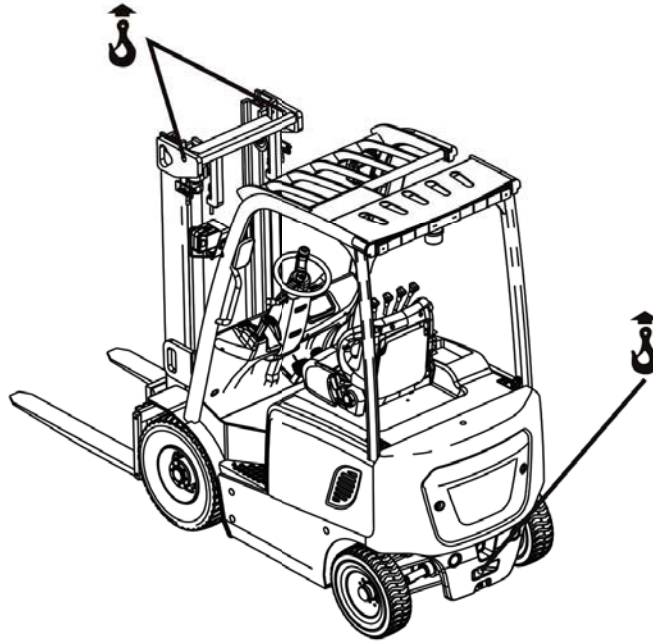
C Transport and put into operation for the first time

1 Crane loading

It only use lifting equipment with sufficient load capacity (loading weight > service weight, please look through the forklift nameplate).

- Park in the required place. (Please refer to Chapter E).
- Fix the mast beams and the lifting tool in tractor pin.

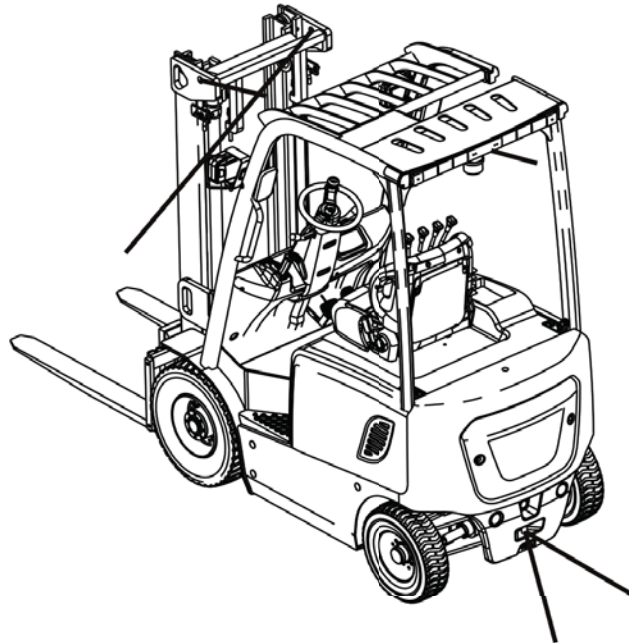
Install the fixed tools of crane, pay attention to the lifting process, these fixed lifting tool does not touch to the forklift components or overhead guard.



2 Safety device of forklift transportation

When operate the truck or trailer transportation is needed fix the forklift properly. The truck or trailer must have a fixed ring. Loading forklift shall be operated by specially trained personnel. To ensure that the correct handling security measures to be implemented accurately at all times.

Use stop point of the mast beams and traction pin fixedly mounted of forklift mast.



3 Put into operation for the first time

The forklift put into operation for the first time and only can be done by specially trained technician.

Only use battery to drive the forklift. The alternating current will damage the electronic component of the truck through rectifying.

When the transportation arrived, you must do the following steps put the forklift into use:

- Check whether the device is completely or not.
- Check the battery interface.
- Start the forklift according to the regulation. (Please refer to the Chapter E).

4 Drag forklift without the drive of the forklift itself

When drag the forklift, refer to the following steps:

- Put the traction rod or traction rope are fixed on trailers and trailer kingpins.
- Disconnect the battery plug (please refer to the Chapter D).
- Release the parking brake.

The operator must sit in the driving position of trailer to control the direction of trailers. Trailers are asked to use the walking speed when it drags.

Note: due to forklift auxiliary steering device does not start, it should be turning the steering wheel extremely.

D Battery maintenance, charging and replacement

1 Use the safe operation provisions of the acid batteries

You must observe the provisions of the forklift parked before performing the operation to the battery, (see Chapter E).

Maintenance personnel: battery charging, maintenance and replacement can only be carried out by specially trained technicians. And must strictly comply with this operating manual during the operation, as well as the relevant provisions of the battery and charger manufacturers.

Fire prevention measures: no smoking or use naked flame around the battery. Do not put the inflammables and equipments that may cause the sparks which can be needed to charge far away from at least 2 meters. The working place must have good ventilation effect. The fire-fighting equipment must be ready.

Battery maintenance: the electric hood should be kept dry and clean. Wiring terminal and cable lug must keep tightening, clean, and should daub little special grease. If the battery electrode without through the insulation treatment .it is necessary to put a skidproof insulation pad on the electrode.

Battery waste treatment: dispose of used batteries must be strictly in compliance with the country's current environmental regulations or waste disposal regulations. In the process of waste treatment, also be strictly in accordance with the manufacturer's instructions when operate it.

Note: You must make sure that the battery cables are not damaged until the battery cover is closed. Acid liquor of the battery is corrosive. Therefore, put on protective clothing and goggles before any operation starts. Avoid touch the battery acid liquor directly.

If battery acid gets on your hands, clothing, skin or into the eyes, flush the affected area with plenty of water immediately, skin or eye contact should be examined by a doctor in a timely manner. And neutralize spilled battery acid at once.

Use the battery when the battery box is off.

Battery's weight and size have a significant impact on the job security of the forklift. To replace the battery equipment has agreed by the Company in advance.

2 Battery types

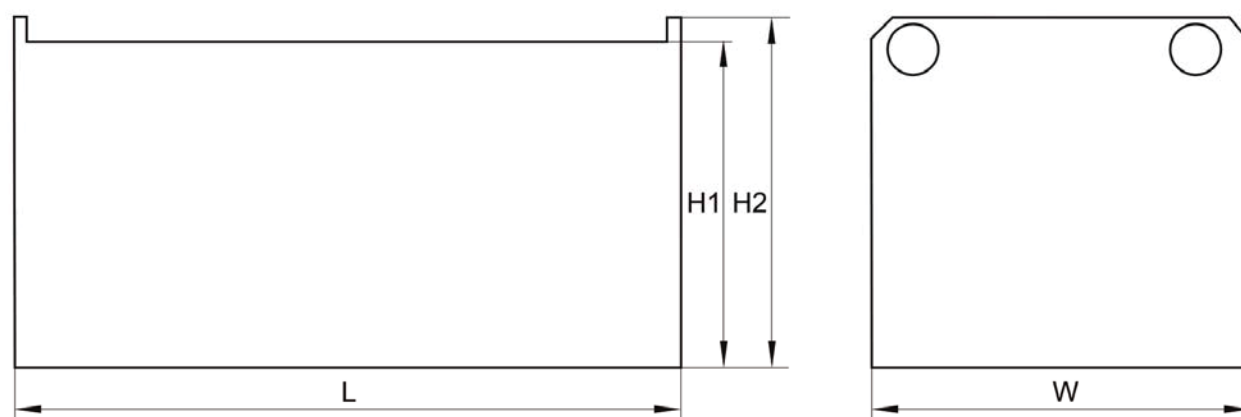
Based on the actual use, the assembly of different models of forklift battery types are not the same. The following table lists a variety of battery capacity and the corresponding required forklift model:

Model	Battery Capacity	Model	Battery Capacity
FB10	48V/400Ah	FB25	48V/630Ah
	48V/450Ah		48V/700Ah
	48V/500Ah		48V/770Ah
FB15	48V/450Ah	FB30	80V/500Ah
	48V/500Ah		80V/550Ah
			80V/600Ah
FB18	48V/500Ah	FB35	80V/550Ah
	48V/550Ah		80V/600Ah
FB20	48V/560Ah		
	48V/630Ah		
	48V/700Ah		

The weight is marked on the nameplate of the battery.

Replacing or installing the battery, the battery should be securely fixed in the battery box.

Battery weight and size has a great influence on the stability of the forklift. Therefore, the size and weight of the battery must be consistent with the data in the chart. Such as the discrepant battery using must be licensed by the Company.



Model	Dimensions(mm)				Battery Weight (Kg) (-5/+8%)	Battery Capacity (Ah)
	L(Max)	W(Max)	H1+/-2mm	H2+/-2mm		
FB10	967	393	750	780	727	400
					799	450
					821	500
FB15	967	393	750	780	799	450
					821	500
FB18	967	393	750	780	821	500
					880	550
FB20	980	515	800	810	975	560
					1090	630
					1195	700
FB25	980	515	800	810	1090	630
					1195	700
					1225	770
FB30	1015	690	800	815	1415	500
					1451	550
					1635	600
FB35	1015	690	800	815	1451	550
					1635	600

3 Reveal the battery

Forklift parked in accordance with the regulations (see Chapter E).

- Pulling outward elastic lock (1).
- Flips up the hood and the driver's seat carefully.
- Disconnect the battery plug (2).

Connect or disconnect the battery plug when the master switch must be in the off-position.

4 Battery charging

- Show up battery (please refer to “showing battery”)

The battery plug can not be plugged into or remove from battery charger until the charger is in off-position. The battery surface should be outward to keep good heat dissipation effect. And no metal objects on the surface.

Before charging, you should check whether there is obvious damage on all cable connection and connector assembly or not.

- Plug charging cable into battery plug (2)

-Start battery charger and charge according to manufacturer's operating provisions.

-Before charging, you should open the plastic cap of storage battery monomer.

You must strictly comply with battery manufacturer's related safety regulations. The cover plate of battery should not be closed during charging to guarantee that gas volatilizes timely. No flames or direct light. Be careful of explosion!

Forbid removing charging plug or battery plug to stop charging. If done, it will lead to explosion.

5 Dismantle and install battery

Mode 1:

- Show up battery (please refer to “showing battery”)

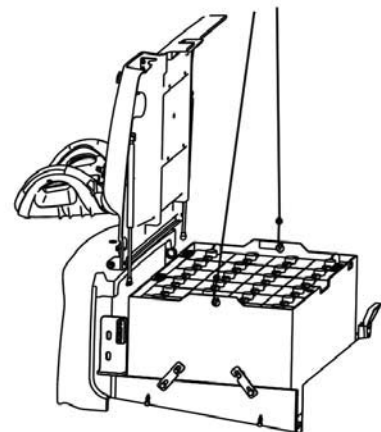
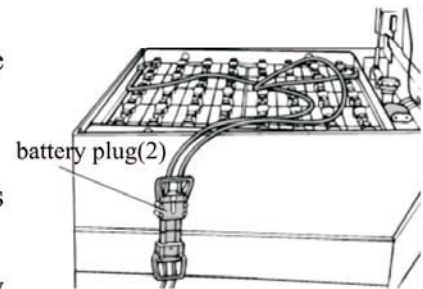
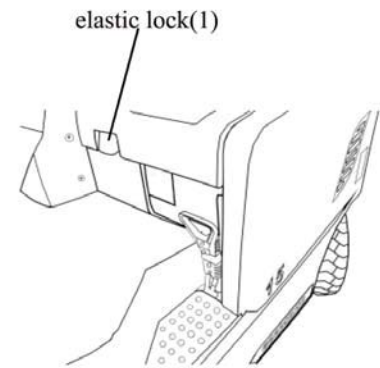
- Open side cover

- Fix the lifting tool on the battery.

-Lift the battery upward and rightward to the position above the frame, and side it out.

- Operated procedures of installation opposite to the above.

To avoid short-circuit, the exposed electrode or joint of battery should retain plastic cap. When replacing battery, the lifting tool should have enough capacity (please refer to battery nameplate to understand the weight of battery). The lifting tool is pulled by gap on the driver's overhead guard, and the tension force should be vertical in order to avoid battery being damaged into deformation. Pay attention to the fixed direction of the lifting hook to prevent the hook falling on the battery surface once being loosen by the lifting tool.



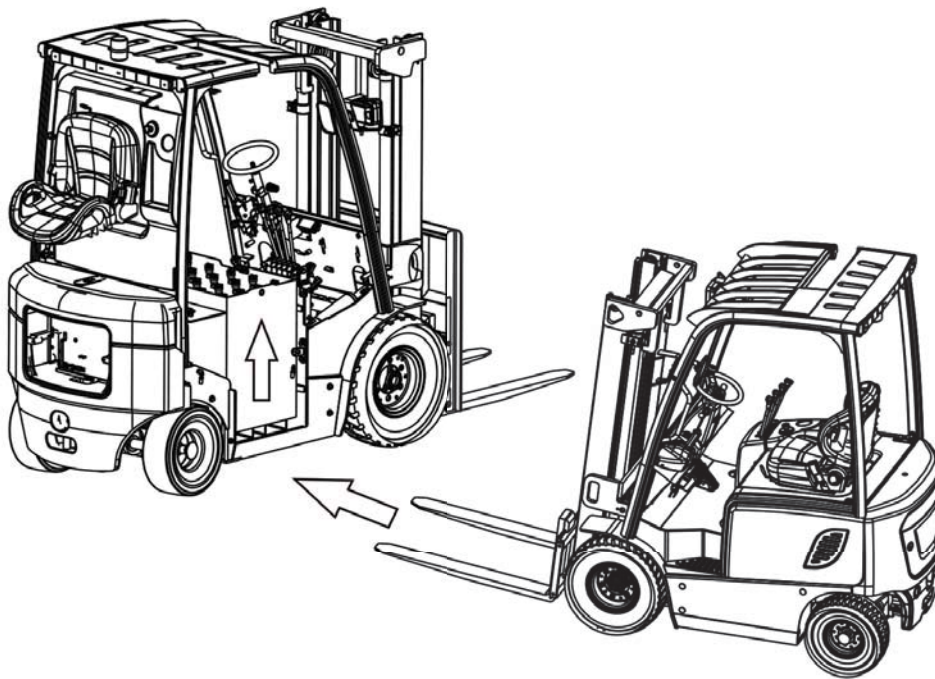
Mode 2:

- Show up battery (please refer to “showing battery”)
- Open side cover.
- Remove the right exterior panel of the forklift body.
- Drive another forklift to fork the battery out at side.

-Operated procedures of installation opposite to the above.

The new battery parameters must be exactly the same with the original battery. After installing the new battery, you have to check whether there is obvious damage on all the cable connection and plug connection parts. The outer cover and right exterior panel must be locked again.

Battery should be firmly in the forklift battery while being replaced or installed.



6 Battery maintenance

The battery will release hydrogen and oxygen during charging, When hydrogen content reaches 4% in the air, it would lead to the explosion hazard. Please note exhaust.

The electricity discharged battery should be charged in a timely manner is not allowed to set aside more than a day.

The battery should be fully charged; otherwise it will damage the battery, and affect their working life. After charging every day to check the electrolyte level is lower than the nominal liquid level, then need to add water. Only join deionized water or distilled water, but can not add the liquid too much, otherwise it will overflow.

Respond to the battery for a balanced charge in one week , this can extend the working life for the battery.

Open the plug slightly during battery charging (to prevent the gas can not be released in the charging process).

Do not carry out the maintenance on the battery when the battery is charging.

Keep the battery surface clean (the dust falls on the battery in a long period of time can cause self-discharge) , do not use a dry cloth, otherwise it will cause static.

It is prohibited to place a metal tool on the battery.

The connecting piece should be checked monthly, tighten it if loose.

The attention of moisturizing:

- Must use the distilled water or deionized water.
- Moisturizing after the end if charging (add water before charging, the level rises,electrolyte tumbling spill it out after charging)
 - Don't add water during charging.
 - Add water slowly to prevent the spilling due to the too much water added.
 - If add too much water, it can lead to electrolyte spill out from the battery.
 - The reduce pf Battery capacity.
 - Each monomer electrolyte density is not the same.
 - Cell monomer battery forklift between the fittings and other metal parts by corrosion.
- After moisturizing, please check all the Charging plug.
- The container can not be made of iron, for the optional choice is the pure lead tank, porcelain can or PVC (plastic container).

Shelved indefinitely without battery preservation methods:

If you purchase a battery is a backup battery and is not being used for a long period, it is best to buy dry-charged battery, that means without the liquid battery as a backup. If your battery is adding liquid, but they need to set aside for a period, it will self-discharge. The self-discharge will reduce the capacity of the battery (storage amount), cause the counter electrode vulcanization, and damages the battery's working life with the time migration hazards, so it must consider the following measures.

If the battery is not being used for a long period, it must be stored in a dry, cool place, charge of the battery regularly in one month, even if the measuring battery electrolyte density is still very high, but should be carried out this step.

Ensure full charging until all of the monomer is emitting with gas, and the value is maintained for 2 hours, while the battery voltage and electrolyte density unchanged.

Shelved indefinitely battery re-use should be balanced charging, check the electrolyte density and level.

E Operation instructions

1 The using safety regulations of forklift

Driving License: forklift driving can only be operated by specially trained technicians. The operator must go through the testing of the equipment, be familiar with the device driver and load handling skills, get the appointment from the equipment using party or the principal formally.

Driver's rights, obligations and codes of conduct: Drivers must understand their rights and obligations, received forklift truck operation guidance on the use of training, and are familiar with the operation instructions of the content. All the rights must be granted to operating personnel

When operating the forklift, that operators need to walk with vehicle, they must put on the protective boot.

Non-working personnel forbids the use of equipment: During the use of forklift, the driver should take full responsibility for the equipment. Who have the responsibility to prohibit non-working personnel driving or operating forklift. Fork lift truck shall not be used for carrier or enhancing personnel.

Equipment damage and defects: If damage or other defects are found in the forklift trucks or their fittings, operators must immediately report to the competent personnel. The forklift which is not perfect in performance (such as tyre wear or brake failure, etc.), shall not be used without proper repair.

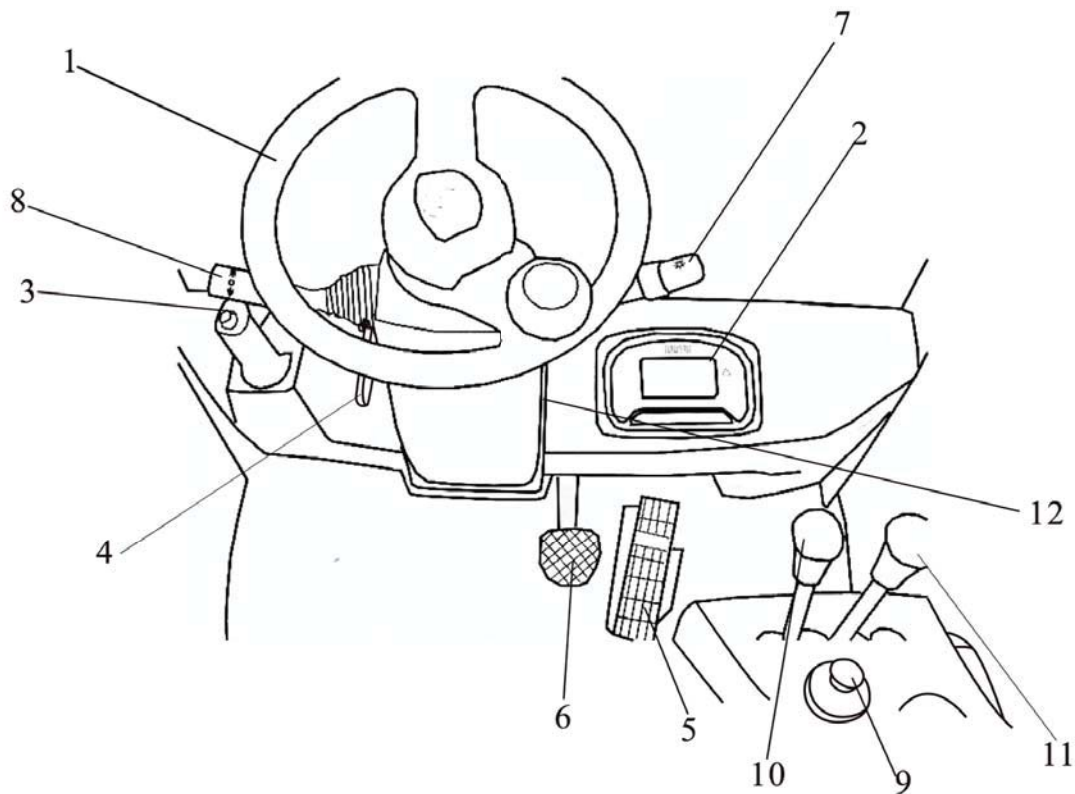
Equipment maintenance: Without special training and licensing, the driver shall not repair or change forklift truck without authorization. The driver absolutely does not disable or adjust safety device and switch.

Dangerous areas: Risk area which refers to the risk of injury to personnel area are mainly from the truck itself and its load components (such as fork tooth and fittings, etc.), and the driving and lifting movement. The danger zone also includes the area that may be caused by the loaded object falling or working device dropping or falling.

Non-working personnel must be far away from the danger zone. Dangerous areas must hang warning signs. If refused to leave the danger zone, the non-working personnel must immediately stop forklift truck.

Safety device and warning signs: must strictly abide all rules the manual inside about safety device, warning marks and warning provisions.

2 Operation and instructions displaying element



Number	Operation and displaying element	Function
1	Steering wheel	Make the forklift steering, the steering wheel from left to right can turn a total of 3~4 weeks.
2	Instrument	Display battery power, operation hours, fault information and important warning information.
3	Parking brake	Fixed the forklift in the stationary state.
4	Steering column lock device	Adjust and fix the steering column according to the required distance.
5	Accelerator pedal	Stepless speed regulating forklift.
6	Brake pedal	Executive brake operation.
7	Control switch	Control work light condition
8	Driving direction switch	Set the forklift driving direction according to the need.
9	Emergency stop switch	Open or shut off the power.
10	Lifting lever	Fork will raise or fall.
11	Tilt lever	Fork will forward or backward tilt.
12	Key switch	Turned on, and interrupt control current. Unplugging the switch key can lock ensure the forklift not accidental activation.

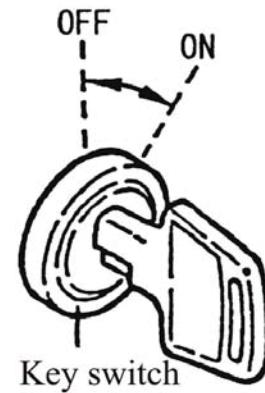
(1) Key switch

OFF: This is the position where the switch is off and the key can be put in or taken off.

ON: Turning to right from the off position closes the switch to allow the operation of the truck.

Note:

- Do not turn the switch on with depressing the accelerator pedal.
- Be sure to take the key off when leaving the truck.
- When parking the truck or charging the battery on the truck, remove the key.

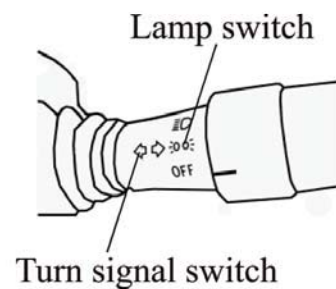


(2) Lamp switch

This switch is two step drawn.

Lamp \ Operation	OFF	1st step	2st step
Head lamp	×	×	○
Small lamp	×	○	○

○:Lamp-on ×:Lamp-off



(3) Turn signal switch

Make the turn signal lamp flashing.

Left turn : Push forward.

Right turn: Pull backward.

(4) Driving direction switch

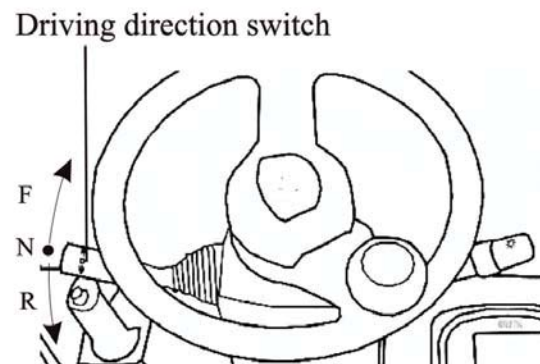
Indicate the driving direction.

Moving forward: Push the handle forward and bore down on the accelerator pedal.

Backward driving: Pull back the handle and bore down on the accelerator pedal.

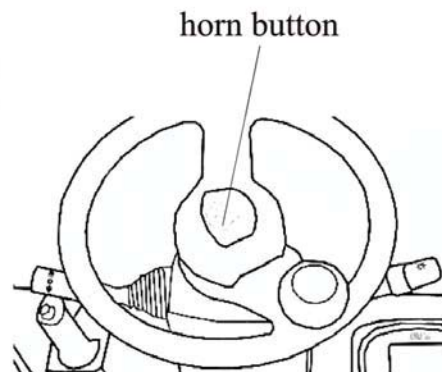
Attention:

- The driving speed is controlled by the angle of the accelerator pedal you bore down.
- When park the forklift, the direction switch handle should be placed in the middle. (N)
- Do not slam on the accelerator pedal to avoid forklift starting or accelerating suddenly.



(5) The horn button

Press the button on the steering wheel center to peel the horn. Even if the key switch is turned off, but the speaker also sounds.

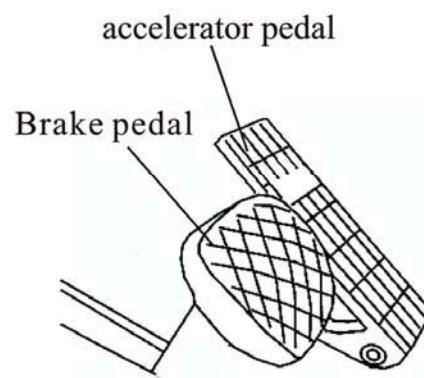


(6) Brake pedal and the accelerator pedal

Step on the accelerator pedal slowly. The speed of forklift is controlled by the angle of the accelerator pedal.

Attention:

- When the brake pedal is depressed, to ensure that the foot from the accelerator pedal.



(7) Parking brake lever

In order to prevent the forklift moving, pull the parking brake lever completely when park the forklift.

Ready to drive, you need to hold down the button on the parking brake, and then the parking brake lever is pushed forward to the end.



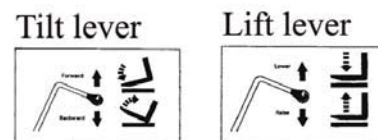
(8) Lift lever

Lift up the forks: Pull the lift lever backward.

Lift down the forks: Push the lift lever forward.

Attention:

- Appropriate lift and lower speeds by handling are regulated by the stroke of lift lever.
- Do not make a sudden lowering and lowering stop.



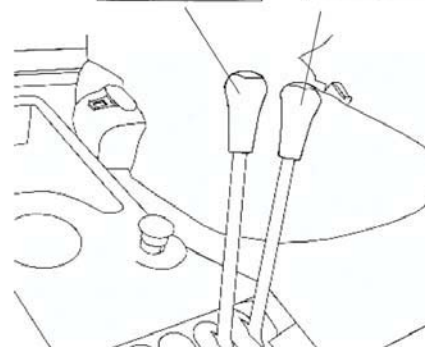
(9) Tilt lever

Tilt the mast backward: Pull the tilt lever backward.

Tilt the mast forward: Push the tilt lever forward.

Attention:

- Appropriate tilting speeds by handling are regulated by the stroke of tilt lever.



2.2 Instrument

(1) Instrument appearance figure



(1)Brake oil level warning lights

(2)Direction display

(3)Lighting instructions

(4)Alarm information

(5)speed control selector switch

(6)Mode Setting

(7)Seat safety instructions switch

(8)Parking brake indicator light

(9)Battery power

(10)Overheat warning lights

(11)Driving speed / alarm fault code

(12)Walking speed paragraph instruction

(13)Hour meter / odometer / weight / voltage /
seat contactor status

(14)Corner

(15)Abnormal warning lights

(16)Speed control indicator

SME Instrument appearance figure

(2) Working Process and direction for use

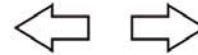
Brake oil level warning lights (1)

When the brake oil is fewer, this indicator (1) will on.



Direction display (2)

When the direction light works, the instrument light will flash.



Lighting instructions (3)

The current size of the lights works, the instrument lighting instructions will be lit.



Alarm information (4)

When the vehicle malfunction or misuse, the alarm light will shine.



Speed control indicator (16)

When the speed control functions work, display this indicator (16). For security, speed control function will slow the speed down.

Press the speed control selector switch (5) show the speed control instructions (with the turtle mark) (16), the forklift can only set the driving speed or lower speed. Press the switch again, remove this function and instructions. This can be controlled according to the set of operating conditions.



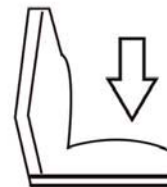
Mode Setting (6)

E is currently used in the energy-saving mode, and S indicates that the current traveling in standard mode, H means current traveling in the high-efficiency mode.



Seat safety instructions switch (7)

When the operator with the correct posture when sitting in the seat, this indicator disappear. Conversely, the indicator light is working, the truck will stop working.



Parking brake indicator light (8)

When the key switch to the ON position, put the parking brake (pull the parking lever back), this indicator (8) will lit.

⚠Note

If you add the parking brake when you are driving, the buzzer will warn the operator. You should release the parking brake or stop the forklift immediately.



Battery power (9)

The power which stored in the instructions battery. With the power out of the battery, The instruction goes out from the top to the bottom. When fully charged, this table is full of grid.

△Note

Over discharge (battery capacity less than 20%) continues to work, will shorten the battery life significantly. We should stop work and to charge the battery immediately.



Overheat warning lights (10)

When the temperature of motor controller arrives the alarm point, this indicator lights up to remind the operator should stop operating. If the operator still working, the motor will Stop working.



Driving speed / alarm fault code (11)

Display the speed under normal circumstances, when exception occurs, the speed / alarm fault code fault code and alarm code (11) will be displayed. If there is a fault code, the forklift in need of repair maintenance. You should stop working and contact the forklift agent /dealer for maintaining.



Walking speed paragraph instruction (12)

Indicates the speed of walking ,and speed (11) corresponds to the fast speed, the right lights of walking speed paragraph instruction(12)In contrast ,The left lights will lit.

Hour meter / odometer / weight / voltage / scat contactor status (13)

Of hours, or mileage, or weight, determined by the programmer.

Seat contactor status to "Ee," blinking.

Corner (14)

The left corner lights up when the forklift turn left, the right corner lights up when the forklift turn right.



Abnormal warning lights (15)

If the forklift has any irregularity situation, it needs to inspect and maintenance, this warning light (with wrench logo) (15) will lit. If an exception occurs, this light will flash for 10 seconds early; the alarm buzzer will be warned at the same time.



MEANING OF EYE PLUS-DISPLAY-ALPHABETIC ALARMS CODES

Eye plus alarm code	Alarm description	Single & twin drive trucks description
1	Maximum battery voltage	Battery voltage , measured by an internal circuit , exceeds following levels: 63V , in case of systems working at 36V ; 63V , in case of systems working at 48V ; 106V , in case of systems working at 80V ;
2	Minimum battery voltage	Battery voltage , measured by a circuit inside control unit , is lower than: 24V , in case of systems working at 36V ; 24V , in case of systems working at 48V ; 46V , in case of systems working at 80V ;
3	Pedal trimmer fault	Voltage measured on accelerator circuit exceeds the value calculated averaging calibration and reachable voltages ; moreover , start switch seems to be open.
5	Eeprom alarm	Eeprom does not work properly , or one of memorised values is out of correct limits.
6	Pre-charge capacitors low voltage alarm	Voltage level of pre-charge capacitors is less than 70% of nominal battery level. It could happen, in example , if the inverter is working with main breaker open. Capacitors voltage decreases cause energy spent to keep motors in motion.
8	Right drive inverter desaturation or overcurrent alarm/ drive inverter desaturation or overcurrent alarm	Actual current exceeds specific power module current limits.
9	Inverter capacitors pre-charge too fast	Pre-charge capacitor voltage increases too fast when you turn the system on.
10	Pump motor inverter over-temperature	The inverter temperature (measured with a temperature probe) , exceeds 100°C [212° F] , or inside 95°C~100°C [203~212° F] range at least 30 s.
11	Capacitors too charged on start	When you turn on the system , capacitors are not completely discharged by pump motor. In fact , if you turn suddenly on the lift truck ,after a turning off , capacitors voltage level is too high. You have to discharge them before checking the presence of any fault (both of capacitors and of main board).
12	Low battery alarm	Battery voltage level is lower than minimum charge value expected.
13	Right drive motor over-temperature/drive motor overtemperature	The measure of drive motor temperature exceeds 155°C [311° F].
14	Pump motor overtemperature /pump motor overtemperature	The measure of pump motor temperature exceeds 155°C [311° F].
15	Right drive motor current offset alarm/drive motor current offset alarm	Non-zero phase current when lift truck is turned on.
16	Left drive motor current offset alarm	Non-zero phase current when lift truck is turned on.

MEANING OF EYE PLUS-DISPLAY-ALPHABETIC ALARMS CODES

Eye plus alarm code	Alarm description	Single & twin drive trucks description
17	Main break fault	Overcurrent on main breaker coil.
18	Watchdog timer alarm	Improper communication between DSPs present on control board , or/and defect control board.
19	Left drive motor overtemperature	The measure of drive motor temperature exceeds 155°C[311° F].
20	Right drive motor inverter overtemperature/drive motor inverter overtemperature	Inverter temperature , measured with a probe , exceeds 100°C[212° F] or remain in the range 95~100°C[203~212° F] at least 30s.
21	Serial communication alarm	Error in serial communication between the two DSP ; DSP present on main board make a mutual software control , to insure fast diagnosis of such a fault.
22	Left drive motor inverter overtemperature	Inverter temperature , measured with a probe , exceeds 100°C[212° F] or remain in the range 95~100°C[203~212° F] at least 30s.
24	Pump inverter desaturation or overcurrent alarm/pump inverter desaturation or overcurrent alarm	Actual current exceeds specific power module current limits.
25	Left drive inverter desaturation or overcurrent alarm	Actual current exceeds specific power module current limits.
36	Pump motor current offset alarm/pump motor current offset alarm	Non-zero phase current when lift truck is turned on.
37	Alarm on 5V encoder voltage supply	Twin drive: Main board k1-14 terminal(5V output) voltage is lower than 4.3V; Single drive : Main board k1-16 terminal(5V output) voltage is lower than 4.3V
38	Alarm on 12V output voltage supply	Twin drive : Voltage on main board k1-12 terminal(12V output) is lower than 10.5V; Single drive: Voltage on main board k1-17 terminal(12V output) is lower than 10.5V
50	Pump motor commands active on start	A pump motor command active is found when you turn your system on
61	Right drive motor blocking overtemperature/drive motor blocking overtemperature	Motor temperature exceeds 165°C
62	Left drive motor blocking overtemperature	Motor temperature exceeds 165°C
63	Seat switch open on start	When you start working ,you find seat switch open , or , after the main breaker is closed , the seat switch remains opened for at least "seat switch delay"s
64	Wrong start	When you start working , you find accelerator pedal pressed or a forward /reverse switch active

MEANING OF EYE PLUS-DISPLAY-ALPHABETIC ALARMS CODES

Eye plus alarm code	Alarm description	Single & twin drive trucks description
65	Pump motor blocking overtemperature/pump motor blocking pvertemperature	Motor temperature exceeds 165°C
74	Right drive motor encoder alarm/drive motor encoder alarm	An encoder channel is disconnected , and motor is working
75	Left drive motor encoder alarm	An encoder channel is disconnected , and motor is working
77	Right drive motor thermal probe alarm/drive motor thermal probe alarm	Twin drive : Temperature different between any two of the 3 motors is greater than 70°C[158° F] Single drive : Temperature different between two motors is greater than 70°C[158° F]
78	Left drive motor thermal probe alarm	Twin drive:Temperature different between any two of the 3 motors is greater than 70°C[158° F]
79	Pump motor thermal probe alarm/pump motor thermal probe alarm	Twin drive : Temperature different between any two of the 3 motors is greater than 70°C[158° F] Single drive : Temperature different between two motors is greater than 70°C[158° F]
80	Right drive inverter temperature probe/drive inverter temperature probe	Twin drive : Temperature different between any two of the 3 inverters is greater than 70°C [158° F] Single drive : Temperature different between two inverters is greater than 70°C[158° F]
81	Left drive inverter temperature probe	Temperature different between any two of the 3 inverters is greater than 70°C[158° F]
82	Pump inverter temperature probe/pump inverter temperature probe	Twin drive:Temperature different between any two of the 3 inverters is greater than 70°C[158° F] Single drive:Temperature different between two inverters is greater than 70°C[158° F]
83	CRC fault alarm	Faulty eeprom or mismatching software release
84	Bank CRC restored	There was an eeprom restore , caused by a CRC alarm
91	Steering sensor alarm	Steer circuit voltage is out of nominal range
98	Capacitors pre-charge too slow	Pre-charge capacitor voltage grows too slowly at the system turn on
99	Capacitors pre-charge timeout	Pre-charge capacitor voltage grows too slowly at the system turn on

(3) Direct for Use

(a) Turn key switch on. Meter panel connect to 12V power supply. Meter panel and electric control circuit connect to 48V power supply through start relay in relay box. Traction fault code display “0,0”, meaning traction control equipment normal. Lifting fault code display “0,0”, meaning pump control equipment normal.

(b) Hand brake display

When hand brake on, indication light “hand brake” in panel on. Light off when hand brake released.


(c) Drive state display

When left turn light on, “left” indication light on. When right turn light on, “right” indication light on.

(d) Battery quantity display

When meter panel started, battery coulometer should display battery quantity grade. Ten electric quantity grades in coulometer, ten horizontal bars(LCD)in panel accordingly. Battery voltage range: 41.5V-56V.

The upper LCD on means full battery quantity. The lower two coruscate alternately means electric quantity under lower limit, battery needs charged. Display LCD decline one grade means battery quantity drop around 8%. Power is insufficient to enhance the locking function.

(e)  Show to enhance the locking and instrument control.

(f) Fault code display.

(g)Status fault codes

1244 Traction failure code

Programmer display	LED code	malfunction explanation	Malfunction reason
HW FAILSAFE 1—2-3	1, 2	Self-test or watchdog failure	Controller is broken
M-SHORTED	1, 3	Internal M-short to B-	Controller is broken
FIELD OPEN		Field winding malfunction	1.Motor excitation winding loose 2.The motor field winding open circuit
ARM SENSOR		Armature current sensor malfunction	Controller is broken
FLD SENSOR		Excitation current sensor malfunction	Controller is broken
THROTTLEFAULT1	2, 1	Beyond the scope of the wiper signal	1.Accelerator input wiring open circuit 2.The accelerators line short circuit to B + or B
THROTTLEFAULT2		Potentiometer is in low breakdown	1.The Speed control potentiometer is broken 2.Choose the wrong speed control device type
SRO	2, 2	SRO malfunction	1.Key switch, the interlock switch and direction of operations are in the wrong order 2.choose the wrong SRO types 3.Interlock or direction switch is opened 4.Sequence delay is too short
HPD	2, 3	HPD malfunction	1.Direction and the accelerator operating in the wrong order 2.choose the wrong HPD Type 3.adjust the error between Accelerator and potentiometer 4.Sequence delay is too short
BB WIRING CHECK	2, 4	Emergency reverse wiring fault	1.Emergency reverse wiring fault 2.Emergency reverse wiring fault
CONT DRVR OC	3, 1	Contactor drive output overcurrent	The main contactor coil short-circuit
MAIN CONT WELDED	3, 2	The main contactor control adhesion	1.Main contactor bonding 2.Drive a short circuit of the main contactor
PRECHARGE FAULT	3, 3	Startup, the internal voltage is too low	1.Controller is broken 2.External B-short circuit to B + or leakage
MISSING CONTACTOR	3, 4	Can't find Contactor	Any of the contactor coil is open circuit or missed
MAIN CONT DNC	3, 4	The main contactor is not closed	1.The main access contactor coil is off 2.The main contactor coil driver circuit.
LOW BATTERY VOLTAGE	4, 1	The battery voltage is low.	1.Battery voltage undervoltage owe off 2.Corrosion of the battery terminals 3.the battery or controller terminal loose
OVER VOLTAGE	4, 2	Overvoltage	1.The battery voltage is pressure cut off 2.Vehicles work is charging at the same time 3.Regenerative braking, battery disengage
THERMAL CUTBACK	4, 3	Over / under temperature cut off	1.Temperature exceeds 85 °C or below -25 °C 2.Overloaded vehicles 3.Controller installation inappropriate 4.Work in extreme environments
ANTI-TIEDOWN	4, 4	The beginning of the mode switch when placed in Mode 4 or 2	1.Mode switch on the B + short-circuit 2.Mode switch to "tie up" in 4 or 2

1253 Lifting failure code

status code	status lamp	meaning	possible cause
LED OFF	off	No voltage or the controller does not work	
Solid ON	on	The controller error (such as the MCU failure, etc.)	
0, 1	■ □	Controller is working properly, there is no known failures	
1, 1	□ □	EEPROM malfunction	1. EEPROM Data loss or damage 2. EEPROM Data validation error 1311 programmer to change any parameter in the controller can eliminate this error.
1, 2	□ □ □	Hardware failure	1. MOSFET is shorted. 2. Motor open
1, 3	□ □ □ □	Electrical short circuit	Electrical short circuit
2, 1	□ □ □	Depth of undervoltage	Battery voltage < undervoltage shutdown value
2, 2	□ □ □ □	Enhance the locking	1. Trigger the controller to enhance locking function 2. SS upgrade the lock parameters are set incorrectly
2, 3	□ □ □ □ □	Startup lockout	1. Accelerator / SS input and the order of the KSI or Interlock input error 2. Startup lockout choose a wrong tyre 3. Accelerator adjustment error
2, 4	□ □ □ □ □ □	Accelerator malfunction	1. Accelerator wiring fault (open or shorted) 2. Accelerator product defects 3. Accelerator type a wrong choice
3, 1	□ □ □ □	CONT DRVR OC	Contactor coil short-circuit
3, 2	□ □ □ □ □	Access to device bonding	1. Access to device bonding 2. Parameter CONTACT CNTRL not set correctly 3. The main contactor short circuit
3, 3	□ □ □ □ □ □	Pre-charge failure	1. Pre-charging circuit is not working properly 2. External short circuit or leakage between the B + and B-
3, 4	□ □ □ □ □ □ □	Main contactor is not installed or is not closed (DNC)	1. A loose connection of the main contactor coil 2. Main contactor is not working properly 3. CONTACT CNTRL parameter is not set correctly
4, 1	□ □ □ □ □	Battery voltage is too low	1. Battery voltage < LOVOLT CUTBACK settings 2. Battery terminal corrosion 3. Battery or controller terminal connections loose
4, 2	□ □ □ □ □ □	Overvoltage	1. Battery voltage > over-voltage shutdown settings 2. Working controller charger not disconnect
4, 3	□ □ □ □ □ □ □	Temperature protection1	1. The controller temperature is higher than 85 C or less than -25 C 2. Pump motor load is too large 3. Controller is not installed 4. To work in extreme environments 5. Temperature sensor failure

1234/36/38 troubleshooting chart

CODE	PROGRAMMER LCD DISPLAY EFFECT OF FAULT	POSSIBLE CAUSE	SET/CLEAR CONDITIONS
12	Controller Overcurrent ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake.	1. External short of phase U,V, or W motor connections. 2. Motor parameters are mis-tuned. 3. Controller defective.	Set: Phase current exceeded the current measurement limit. Clear: Cycle KSI.
13	Current Sensor Fault ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake.	1. Leakage to vehicle frame from phase U, V, or W (short in motor stator). 2. Controller defective.	Set: Controller current sensors have invalid offset reading. Clear: Cycle KSI.
14	Precharge Failed ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake.	1. External load on capacitor bank (B+ connection terminal) that prevents the capacitor bank from charging. 2. See 1311 menu Monitor Battery: Capacitor Voltage.	Set: Precharge failed to charge the capacitor bank to the KSI voltage. Clear: Cycle Interlock input or use VCL function Precharge().
15	Controller Severe Undertemp ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake; ShutdownThrottle; FullBrake.	1. Controller is operating in an extreme environment. 2. See 1311 menu Monitor Controller: Temperature.	Set: Heatsink temperature below -40°C. Clear: Bring heatsink temperature above -40°C, and cycle interlock or KSI.
16	Controller Severe Overtemp ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake; ShutdownThrottle; FullBrake.	1. Controller is operating in an extreme environment. 2. Excessive load on vehicle. 3. Improper mounting of controller. 4. See 1311 menu Monitor Controller: Temperature.	Set: Heatsink temperature above +95°C. Clear: Bring heatsink temperature below +95°C, and cycle interlock or KSI.
17	Severe Undervoltage Reduced drive torque.	1. Battery Menu parameters are misadjusted. 2. Non-controller system drain on battery. 3. Battery resistance too high. 4. Battery disconnected while driving. 5. See 1311 menu Monitor Battery: Capacitor Voltage. 6. Blown B+ fuse or main contactor did not close.	Set: Capacitor bank voltage dropped below the Severe Undervoltage limit (see page 55) with FET bridge enabled. Clear: Bring capacitor voltage above Severe Undervoltage limit.
18	Severe Overvoltage ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake; ShutdownThrottle; FullBrake.	1. Battery Menu parameters are misadjusted. 2. Battery resistance too high for given regen current. 3. Battery disconnected while regen braking. 4. See 1311 menu Monitor Battery: Capacitor Voltage.	Set: Capacitor bank voltage exceeded the Severe Overvoltage limit (see page 55) with FET bridge enabled. Clear: Bring capacitor voltage below Severe Overvoltage limit, and then cycle KSI.
21	Controller Undertemp Cutback None, unless a fault action is programmed in VCL. tle; FullBrake.	1. Controller is performance-limited at this temperature. 2. Controller is operating in an extreme environment. 3. See 1311 menu Monitor Controller: Temperature.	Set: Heatsink temperature dropped below -25°C. Clear: Bring heatsink temperature above -25°C.

1234/36/38 troubleshooting chart,continued

CODE	PROGRAMMER LCD DISPLAY EFFECT OF FAULT	POSSIBLE CAUSE	SET/CLEAR CONDITIONS
22	Controller Overtemp Cutback Reduced drive and brake torque.	<ol style="list-style-type: none"> 1. Controller is performance-limited at this temperature. 2. Controller is operating in an extreme environment. 3. Excessive load on vehicle. 4. Improper mounting of controller. 5. See 1311 menu Monitor» Controller: Temperature. 	<p>Set: Heatsink temperature exceeded 85°C. Clear: Bring heatsink temperature below 85°C.</p>
23	Undervoltage Cutback Reduced drive torque.	<ol style="list-style-type: none"> 1. Normal operation. Fault shows that the batteries need recharging. Controller is performance limited at this voltage. 2. Battery parameters are misadjusted. 3. Non-controller system drain on battery. 4. Battery resistance too high. 5. Battery disconnected while driving. 6. See 1311 menu Monitor» Battery: Capacitor Voltage. 7. Blown B+ fuse or main contactor did not close. 	<p>Set: Capacitor bank voltage dropped below the Undervoltage limit (see page 55) with the FET bridge enabled. Clear: Bring capacitor voltage above the Undervoltage limit.</p>
24	Overvoltage Cutback Reduced brake torque.	<ol style="list-style-type: none"> 1. Normal operation. Fault shows that regen braking currents elevated the battery voltage during regen braking. Controller is performance limited at this voltage. 2. Battery parameters are misadjusted. 3. Battery resistance too high for given regen current. 4. Battery disconnected while regen braking. 5. See 1311 menu Monitor» Battery: Capacitor Voltage. 	<p>Set: Capacitor bank voltage exceeded the Overvoltage limit (see page 55) with the FET bridge enabled. Clear: Bring capacitor voltage below the Overvoltage limit.</p>
25	+5V Supply Failure None, unless a fault action is programmed in VCL.	<ol style="list-style-type: none"> 1. External load impedance on the +5V supply (pin 26) is too low. 2. See 1311 menu Monitor» outputs: 5 Volts and Ext Supply Current. 	<p>Set: +5V supply (pin 26) outside the +5V±10% range. Clear: Bring voltage within range.</p>
26	Digital Out 6 Overcurrent Digital Output 6 driver will not turn on.	<ol style="list-style-type: none"> 1. External load impedance on Digital Output 6 driver (pin 19) is too low. 	<p>Set: Digital Output 6 (pin 19) current exceeded 15 mA. Clear: Remedy the overcurrent cause and use the VCL function Set_DigOut() to turn the driver on again.</p>
27	Digital Out 7 Overcurrent Digital Output 7 driver will not turn on.	<ol style="list-style-type: none"> 1. External load impedance on Digital Output 7 driver (pin 20) is too low. 	<p>Set: Digital Output 7 (pin 20) current exceeded 15 mA. Clear: Remedy the overcurrent cause and use the VCL function Set_DigOut() to turn the driver on again.</p>

1234/36/38 troubleshooting chart,continued

CODE	PROGRAMMER LCD DISPLAY EFFECT OF FAULT	POSSIBLE CAUSE	SET/CLEAR CONDITIONS
28	Motor Temp Hot Cutback Reduced drive torque.	<ol style="list-style-type: none"> 1. Motor temperature is at or above the programmed Temperature Hot setting, and the requested current is being cut back. 2. Motor Temperature Control Menu parameters are mis-tuned. 3. See 1311 menus Monitor Motor: Temperature and Monitor Inputs: Analog2. 4. If the application doesn't use a motor thermistor, Temp Compensation and Temp Cutback should be programmed Off. 	<p>Set: Motor temperature is at or above the Temperature Hot parameter setting.</p> <p>Clear: Bring the motor temperature within range.</p>
29	Motor Temp Sensor Fault MaxSpeed reduced (LOS, Limited Operating Strategy) and motor temperature cutback is disabled.	<ol style="list-style-type: none"> 1. Motor thermistor is not connected properly. 2. If the application doesn't use a motor thermistor, Temp Compensation and Temp Cutback should be programmed Off. 3. See 1311 menus Monitor Motor: Temperature and Monitor Inputs: Analog2. 	<p>Set: Motor thermistor input (pin 8) is at the voltage rail (0 or 10V).</p> <p>Clear: Bring the motor thermistor input voltage within range.</p>
31	Coil1 Driver Open/Short ShutdownDriver1.	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	<p>Set: Driver 1 (pin 6) is either open or shorted.</p> <p>Clear: Correct open or short, and cycle driver.</p>
31	Main Open/Short ShutdownDriver1; ShutdownMotor; ShutdownEMBrake.	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	<p>Set: Main contactor driver (pin 6) is either open or shorted.</p> <p>Clear: Correct open or short, and cycle driver.</p>
32	Coil2 Driver Open/Short ShutdownDriver2.	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	<p>Set: Driver 2 (pin 5) is either open or shorted.</p> <p>Clear: Correct open or short, and cycle driver.</p>
32	EM Brake Open/Short ShutdownDriver2; ShutdownThrottle; FullBrake.	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	<p>Set: Electromagnetic brake driver (pin 5) is either open or shorted.</p> <p>Clear: Correct open or short, and cycle driver.</p>
33	Coil3 Driver Open/Short ShutdownDriver3.	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	<p>Set: Driver 3 (pin 4) is either open or shorted.</p> <p>Clear: Correct open or short, and cycle driver.</p>
34	Coil4 Driver Open/Short ShutdownDriver4.	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	<p>Set: Driver 4 (pin 3) is either open or shorted.</p> <p>Clear: Correct open or short, and cycle driver.</p>
35	PD Open/Short ShutdownPD.	<ol style="list-style-type: none"> 1. Open or short on driver load. 2. Dirty connector pins. 3. Bad crimps or faulty wiring. 	<p>Set: Proportional driver (pin 2) is either open or shorted.</p> <p>Clear: Correct open or short, and cycle driver.</p>
36	Encoder Fault Control Mode changed to LOS (Limited Operating Strategy).	<ol style="list-style-type: none"> 1. Motor encoder failure. 2. Bad crimps or faulty wiring. 3. See 1311 menu Monitor Motor: Motor RPM. 	<p>Set: Motor encoder phase failure detected.</p> <p>Clear: Cycle KSI.</p>

1234/36/38 troubleshooting chart,continued

CODE	PROGRAMMER LCD DISPLAY EFFECT OF FAULT	POSSIBLE CAUSE	SET/CLEAR CONDITIONS
37	Motor Open ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake.	1. Motor phase is open. 2. Bad crimps or faulty wiring. 3. Bad crimps or faulty wiring.	Set: Motor phase U, V, or W detected open. Clear: Cycle KSI.
38	Main Contactor Welded ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake.	1. Main contactor tips are welded closed. 2. Motor phase U is disconnected or open. 3. An alternate voltage path (such as an external precharge resistor) is providing a current to the capacitor bank (B+ connection terminal).	Set: Just prior to the main contactor closing, the capacitor bank voltage (B+ connection terminal) was loaded for a short time and the voltage did not discharge. Clear: Cycle KSI
39	Main Contactor Did Not Close ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake.	1. Main contactor did not close. 2. Main contactor tips are oxidized, burned, or not making good contact. 3. External load on capacitor bank (B+ connection terminal) that prevents capacitor bank from charging. 4. Blown B+ fuse.	Set: With the main contactor commanded closed, the capacitor bank voltage (B+ connection terminal) did not charge to B+. Clear: Cycle KSI.
41	Throttle Wiper High ShutdownThrottle.	1. Throttle pot wiper voltage too high. 2. See 1311 menu Monitor Inputs: Throttle Pot.	Set: Throttle pot wiper (pin 16) voltage is higher than the high fault threshold (can be changed with the VCL function Setup_Pot_Faults()). Clear: Bring throttle pot wiper voltage below the fault threshold.
42	Throttle Wiper Low ShutdownThrottle.	1. Throttle pot wiper voltage too low. 2. See 1311 menu Monitor Inputs: Throttle Pot.	Set: Throttle pot wiper (pin 16) voltage is lower than the low fault threshold (can be changed with the VCL function Setup_Pot_Faults()). Clear: Bring throttle pot wiper voltage above the fault threshold.
43	Brake Wiper High FullBrake.	1. Brake pot wiper voltage too high. 2. See 1311 menu Monitor Inputs: Brake Pot.	Set: Brake pot wiper (pin 17) voltage is higher than the high fault threshold (can be changed with the VCL function Setup_Pot_Faults()). Clear: Bring brake pot wiper voltage below the fault threshold.
44	Brake Wiper Low FullBrake.	1. Brake pot wiper voltage too low. 2. See 1311 menu Monitor Inputs: Brake Pot.	Set: Brake pot wiper (pin 17) voltage is lower than the low fault threshold (can be changed with the VCL function Setup_Pot_Faults()). Clear: Bring brake pot wiper voltage above the fault threshold.
45	Pot Low Overcurrent ShutdownThrottle; FullBrake.	1. Combined pot resistance connected to pot low is too low. 2. See 1311 menu Monitor Outputs: Pot Low.	Set: Pot low (pin 18) current exceeds 10mA. Clear: Clear pot low overcurrent condition and cycle KSI.

CODE	PROGRAMMER LCD DISPLAY EFFECT OF FAULT	POSSIBLE CAUSE	SET/CLEAR CONDITIONS
46	EEPROM Failure ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1; ShutdownDriver2; ShutdownDriver3; ShutdownDriver4; ShutdownPD; FullBrake.	1. Failure to write to EEPROM memory. This can be caused by EEPROM memory writes initiated by VCL, by the CAN bus, by adjusting parameters with the 1311, or by loading new software into the controller.	Set: Controller operating system tried to write to EEPROM memory and failed. Clear: Download the correct software (OS) and matching parameter default settings into the controller and cycle KSI.
47	HPD/Sequencing Fault ShutdownThrottle.	1. KSI, interlock, direction, and throttle inputs applied in incorrect sequence. 2. Faulty wiring, crimps, or switches at KSI, interlock, direction, or throttle inputs. 3. See 1311 menu Monitor Inputs.	Set: HPD (High Pedal Disable) or sequencing fault caused by incorrect sequence of KSI, interlock, direction, and throttle inputs. Clear: Reapply inputs in correct sequence.
47	Emer Rev HPD ShutdownThrottle; ShutdownEMBrake.	1. Emergency Reverse operation has concluded, but the throttle, forward and reverse inputs, and interlock have not been returned to neutral.	Set: At the conclusion of Emergency Reverse, the fault was set because various inputs were not returned to neutral. Clear: If EMR_Interlock = On, clear the interlock, throttle, and direction inputs. If EMR_Interlock = Off, clear the throttle and direction inputs.
49	Parameter Change Fault ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake.	1. This is a safety fault caused by a change in certain 1311 parameter settings so that the vehicle will not operate until KSI is cycled. For example, if a user changes the Throttle Type this fault will appear and require cycling KSI before the vehicle can operate.	Set: Adjustment of a parameter setting that requires cycling of KSI. Clear: Cycle KSI.
51-67	OEM Faults (See OEM documentation.)	1. These faults can be defined by the OEM and are implemented in the application-specific VCL code. See OEM documentation.	Set: See OEM documentation. Clear: See OEM documentation.
68	VCL Runtime Error ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1; ShutdownDriver2; ShutdownDriver3; ShutdownDriver4; ShutdownPD; FullBrake.	1. VCL code encountered a runtime VCL error. 2. See 1311 menu Monitor Controller: VCL Error Module and VCL Error. This error can then be compared to the runtime VCL module ID and error code definitions found in the specific OS system information file.	Set: Runtime VCL code error condition. Clear: Edit VCL application software to fix this error condition; flash the new compiled software and matching parameter defaults; cycle KSI.

CODE	PROGRAMMER LCD DISPLAY EFFECT OF FAULT	POSSIBLE CAUSE	SET/CLEAR CONDITIONS
69	External Supply Out of Range None, unless a fault action is programmed in VCL.	<ol style="list-style-type: none"> 1. External load on the 5V and 12V supplies draws either too much or too little current. 2. Fault Checking Menu parameters Ext Supply Max and Ext Supply Min are mis-tuned. 3. See 1311 menu Monitor Outputs: Ext Supply Current. 	<p>Set: The external supply current (combined current used by the 5V supply [pin 26] and 12V supply [pin 25]) is either greater than the upper current threshold or lower than the lower current threshold. The two thresholds are defined by the Ext Supply Max and Ext Supply Min parameter settings (page 52).</p> <p>Clear: Bring the external supply current within range.</p>
71	OS General ShutdownMainContactor; ShutdownMotor; ShutdownEMBrake; ShutdownThrottle; ShutdownInterlock; ShutdownDriver1; ShutdownDriver2; ShutdownDriver3; ShutdownDriver4; ShutdownPD; FullBrake.	<ol style="list-style-type: none"> 1. Internal controller fault. 	<p>Set: Internal controller fault detected.</p> <p>Clear: Cycle KSI.</p>
72	PDO Timeout ShutdownInterlock; CAN NMT State set to Pre-operational.	<ol style="list-style-type: none"> 1. Time between CAN PDO messages received exceeded the PDO Timeout Period. 	<p>Set: Time between CAN PDO messages received exceeded the PDO Timeout Period.</p> <p>Clear: Cycle KSI.</p>
73	Stall Detect Control Mode changed to LOS (Limited Operating Strategy).	<ol style="list-style-type: none"> 1. Stalled motor. 2. Motor encoder failure. 3. Bad crimps or faulty wiring. 4. Problems with power supply for the motor encoder. 5. See 1311 menu Monitor Motor: Motor RPM. 	<p>Set: No motor encoder movement detected.</p> <p>Clear: Either cycle KSI, or detect valid motor encoder signals while operating in LOS mode and return Throttle Command = 0 and Motor RPM = 0.</p>
87	Motor Characterization Fault ShutdownMainContactor; ShutdownThrottle; ShutdownEMBrake; ShutdownMotor.	<ol style="list-style-type: none"> 1. Motor characterization failed because of an Overvoltage or Undervoltage fault, Motor Temperature Sensor fault, or Motor_Temperature > 150 °C during the characterization process. 	<p>Set: Motor characterization failed during the motor characterization process.</p> <p>Clear: Cycle KSI.</p>
88	Encoder Characterization Fault ShutdownMainContactor; ShutdownThrottle; ShutdownEMBrake; ShutdownMotor Encoder_Steps set to value = 31.	<ol style="list-style-type: none"> 1. Encoder characterization failed during the motor characterization process. 2. Motor encoder pulse rate is not a standard value (32, 48, 64, 80 ppr). 	<p>Set: During the motor characterization process, encoder pulses were detected but the Encoder_Steps were not detected as 32, 48, 64, or 80 ppr. Clear: Manually set Encoder_Steps to the correct value for the motor encoder and cycle KSI.</p>

1234/36/38 troubleshooting chart,continued

CODE	PROGRAMMER LCD DISPLAY EFFECT OF FAULT	POSSIBLE CAUSE	SET/CLEAR CONDITIONS
89	Motor Type Fault ShutdownMainContactor; ShutdownThrottle; ShutdownEMBrake; ShutdownMotor.	1. The Motor_Type parameter value is out of range.	Set: Motor_Type parameter is set to an illegal value. Clear: Set Motor_Type to correct value and cycle KSI.
92	EM Brake Failed to Set Enter Position Hold.	1. Vehicle movement sensed after the EM Brake has been commanded to set. 2. EM Brake will not hold the motor from rotating.	Set: After the EM Brake was commanded to set and time has elapsed to allow the brake to fully engage, vehicle movement has been sensed. Clear: Activate the throttle.
93	Limited Operating Strategy (LOS) Enter LOS control mode.	1. Limited Operating Strategy (LOS) control mode has been activated, as a result of either an Encoder Fault (Code 36) or a Stall Detect Fault (Code 73). 2. Motor encoder failure. 3. Bad crimps or faulty wiring. 4. Vehicle is stalled.	Set: Encoder Fault (Code 36) or Stall Detect Fault (Code 73) was activated, and Brake or Interlock has been applied to activate LOS control mode, allowing limited motor control. Clear: Cycle KSI, or if the LOS mode was activated by the Stall Fault, clear LOS by ensuring encoder senses proper operation, Motor RPM = 0, and Throttle Command = 0.
94	Emer Rev Timeout ShutdownThrottle; ShutdownEMBrake.	1. Emergency Reverse was activated and concluded because the EMR Timeout timer has expired. 2. The emergency reverse input is stuck On.	Set: Emergency Reverse was activated and ran until the EMR Timeout timer expired. Clear: Turn the emergency reverse input Off.

3 Put the forklift truck into use

Before the equipment input operation or lift heavy goods , forklift driver should obliged to make sure that there is no other staff stay in the dangerous area.

3.1 The compulsory check before operating the forklift in daily use

-Visual inspection for forklift truck, pay a special attention to the wheels and weight-carrying parts and make sure there is no damnification.

-Visual inspection for forklift truck, pay a special attention to the wheels and weight-carrying parts and make sure there is no damnification.

-Check the tensioning degree of the weight-carrying chain to see whether it is uniform or not.

-Visual inspection for the fixing of the storage battery and connection status of the electric cable.

-Test the status of the lights.

-Test the operating force of the parking brake and braking effect.

-Check the function of safety belt.

-Check the function of the instrument.

-Check the hydraulic pressure system leaks, working oil sufficiency, add enough lubricating oil on the lubrication parts.

3.2 Adjust the driver's seat

In order to obtain a comfortable driving effect, must according to the driver's figure to adjust the driver's seat.

Adjustment of the seat backrest

-Clockwise rotation of the backrest adjustment knob, push the backrest back forcibly to let the backrest tilted backwards.

-Clockwise rotation of the backrest adjustment knob, release the backrest let the let the backrest tilted forwards.

And release the backrest adjustment knob to lock the backrest.

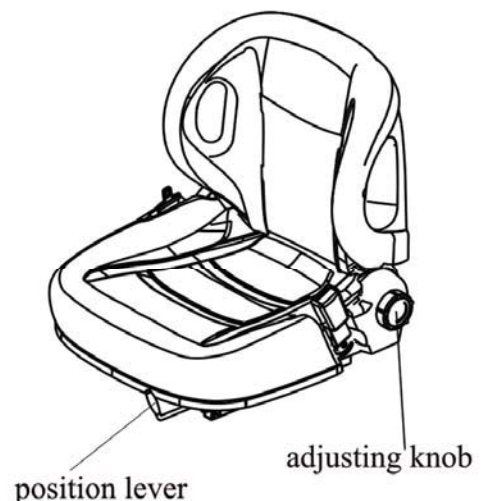
Adjustment of the seat position:

-Pull the driver's seat locator bar to the left, at the same time move the backrest back and forth to the right position.

-Loosen and wedge the seat position lever.

After adjusting the seat, must ensure that the locating device is wedged again. There should be no more adjustment during the driving.

The adjusting operation above is only applicable standard model of seat. If you are not use the standard model of seat, please abide by the adjustment operation provided by the manufacturer. During the adjustment, it should be taken to ensure that the driver is available to use all operation elements during the driving.



3.3 Adjust the steering column

-Pull the steering column positioning device and move it back and forth to the position you need.

-Lock the positioning device again.

3.4 Starting device

-Unclip emergency stop switch.

Methods:

-Counterclockwise rotation switch, until the master switch bounce.

-Let the key insert into the switch lock. And turn right into 'I' stop position.

Check the functions of hydraulic brake and parking brake.

Forklift truck enters the preparation operation state.

The discharge of the storage battery and the fault indicator shows the current battery capacity.

Attention:

After opening the emergency stop switch and the key switch to the right, forklift truck will be self-test in 3-4 seconds (check the control system and motor), during this period of time please not run the forklift.

3.5 Safety belt

Please fasten the safety belt before driving the forklift.

When accident occurs, the safety belt can play an important role in protecting the driver.

Clean the safety belt regularly, avoid soiling (e.g. while still covering protection). If the locking device or the tightening device of the safety belt happened to be frozen, please unfreeze and wipe the water stains to avoid a second freezing.

Making any changes on the safety belt is not allowed, or it will cause danger for the reason of function fault.

-Every time after the accident, the safety belt must be replaced.

-Assembling and servicing must use the original spare parts.

The replacement of the damage or failure of safety belt must be made by franchised dealer or manufacturer's branches.

The measures should be taken under special circumstance

It is strictly prohibited to unfasten the safety belt for jumping to escape when the forklift truck has the risk of rollover.

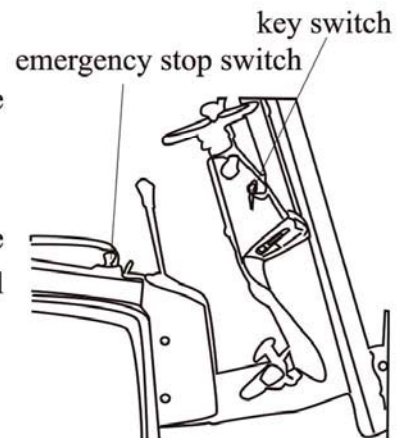
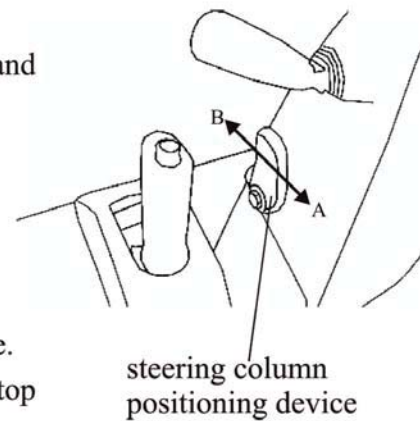
Jumped out of the car may lead to more serious physical injury.

Correct operation:

-Upper body bend to the steering wheel.

-With both hands grip the steering wheel firmly and support with the feet.

-Let the body lean toward the direction that opposite the forklift overturned direction.



4 Operating forklift

4.1 Safety regulations for driving operation

The route and work area: Only can drive the forklift at the certain route. Non staff must stay away from the working area. The goods can only placed in a prescribed position.

Matters needing attention during the driving: The driver must master the speed according to the actual situation. When in the corner, in a narrow lane, through the swinging door and the place where the line of sight is hindered, must keep driving slowly. Must always keep an adequate breaking distance with the forklift ahead, and control the forklift continuously. It is not allowed to stop suddenly in a dangerous or sight hindered position (except the accident). Quick turn or overtaking is also not permitted. Not allowed to explore the body outside the cab or hand out the cab.

The driver's line of sight during the driving: The driver must be maintained the line of sight in the driving direction, and pay attention to the circumstances of the driving route at all times. If the goods which you are transporting block the driver's line of sight, must adjust the goods to the rear of the driver's line of sight. If unable to adjust, then it needs extra personnel on the front side of the driver's and accompanied with the forklift so that they can report the road ahead to the driver timely.

Uphill or downhill: when uphill and downhill, must follow the prescribed route. Keeping the road clean, no slip, and abide by technical function of the forklift, security and reliable. Laden uphill, must keep the forklift move forward. Downhill, should reverse travel, and should always keep the goods in the slope side. When driving uphill and downhill, it is not allowed to turn, oblique or park forklift at the midway. Must be slow down when downhill, and be ready for brake.

Drive the forklift to the lift or loading platform: If you need to drive the forklift to the lift or loading platform, you should make sure that the elevator and charging platform have adequate load capacity, and the structural design bear to lift the forklift. At the same time also must obtain equipment use permission. Must check according to the requirement before performing the operation. When the forklift driving into the life, must let the cargo advanced. Select the appropriate park location to avoid the collision with the well wall during the process of lifting. If there is the staff is using the lift at the same time, must let the operator completely park the forklift then can the staff gets in. At a predetermined altitude, let the staff leave the lift first.

The condition should have when handling the goods: the driver must ensure that the transported goods are in accordance with relevant provisions. The transported goods should be fastened beforehand according to the provisions. Absolutely not allowed to transport the goods which height are exceed the forklift fixed frame or over the cargo barrier top object after loading.

4.2 Get on and get off

-Hold the handrail with left hand, and hold the seat back with right hand, with the left foot on the pedal, then you can get on the forklift safely.

-Hold the handrail with right hand, and hold the seat back with left hand, with the left foot on the pedal, then you can get off he forklift safely.

Don't grab the wheel when you getting on the forklift, don't jump from a forklift or jump on.

4.3 Driving

When driving, if the electromagnetic field beyond the permissible limit, it may cause to uncontrolled movement of the forklift. Press the emergency stop immediately (master switch), use service brake to brake and start the parking brake.

Check the reason of the trouble, if needed; get contact with the manufacturer repair service department.

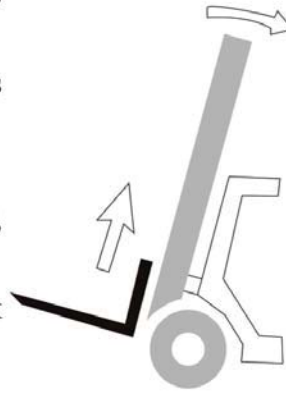
Before driving a forklift, make sure that the all of the clamshell is locked firmly.

Keep the road smooth operator.

The speed must obey the actual situation of the driving roadway, operating regional and handling requirements.

-Lift the fork frame up to the height about 300 mm; avoid the fork teeth colliding with the ground.

-Lift the mast let it completely backward.



Running forward

Make sure that there is no obstruct among the driving area.

-Release the parking brake.

-Let the direction of travel switch push forward.

-Press the accelerator pedal slowly.

Running backward

Make sure that there is no obstruct in the rear driving area.

-Push the direction of travel switch backward.

-Press the accelerator pedal slowly, until it reaches the desired speed.

Transform direction

Before transforming the direction should make sure that there is no obstruct in the rear driving area.

-Release accelerator pedal, wait until the forklift is completely stopped running (stop it through the electromagnetic braking of the motor, or press down brake pedal).

-The switch of driving direction and pushing in opposite of the directions.

-Slow down on the accelerator pedal, until it reaches the desired speed.

Forklift acceleration

-Press the accelerator pedal gradually to operate the forklift.

-Continue to step on the accelerator pedal.

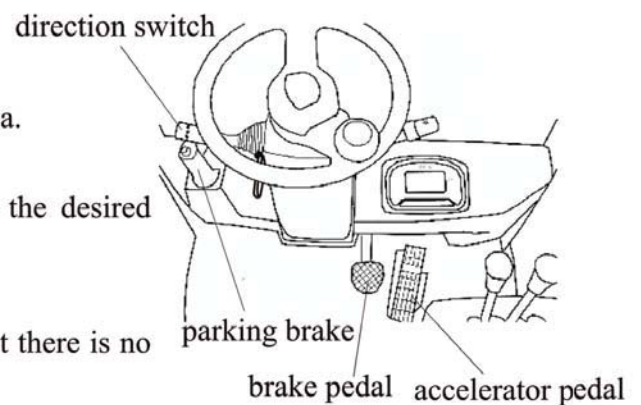
Forklift motor speed and driving speed are rising continuously.

Forklift brake

Forklift truck braking performance greatly depends on the road condition. Driver in forklift driving process must take this into account. Braking should be particularly careful, Avoid goods fall.

Trailer cargo should pay attention to the braking distance will be extended.

-Release the accelerator pedal, If necessary, gently depress the brake pedal.



4.4 Steering

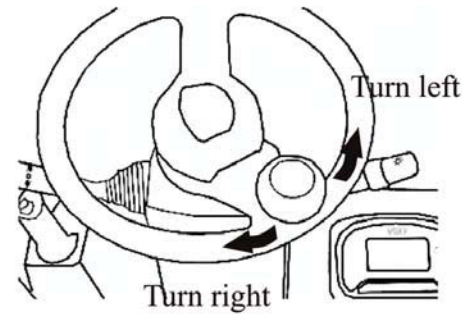
The forklift truck equipped with a hydraulic power steering system, steering without vigorously, just flick the steering wheel.

Right driving

-Based on the steering angle, turn the steering wheel in a clockwise direction.

Left driving

-Based on the steering angle, turn the steering wheel in a counterclockwise direction.



4.5 Brake

There are four kinds of braking way available:

- Service brake
- Electromagnetic brake
- Commutation brake
- Parking brake

Service brake:

- The brake pedal is not step on until an adequate braking pressure.

Service brake through the friction disc brake driving wheel.

Electromagnetic brake:

-Release the accelerator pedal. The forklift is by driving current controller regenerative roll stop brake.

The braking mode can reduce the energy consumption.

Commutation brake:

-In the process of moving, the driving direction switch to the opposite direction. The forklift will be driving the current controller regenerative roll parked braking, and began driving in the opposite direction.

Parking brake:

- Pull back the parking brake. Start parking brake, the brake lever will be locking in this position.
- Press the parking brake lock button, Push rod to release the parking brake.

The parking brake driving wheel can be mechanical braking friction plate.

As forget to release the parking brake when driving, forklift trucks will not operate any more.

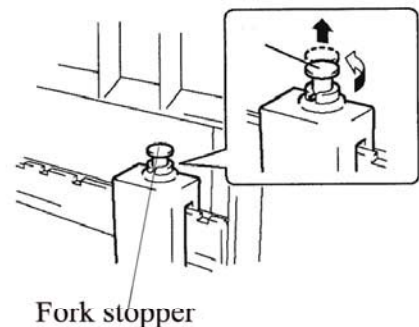
When the ground is tidy; parking brake can ensure the rated maximum load with forklift smooth Park in the slope of the maximum of 10% slopes.

4.6 Fork adjustment

Adjust the fork should pay attention to the two fork distance equal to the distance from the outer edge of the fork holder, load center is located in the middle of the fork tines.

- Pull up the start and end pin.
- Fork fork holder moves to the correct position.

Put down the stop pin, mobile fork, until the stop pin card into a fixed slot so far.



4.7 Picking, transport and storage of goods

Before picking the goods, the driver must ensure that the goods have been correct code battlements, and the weight does not exceed the rated load of the forklift. Pay attention to comply with load in the graphic provisions.

Picking goods

- Take the goods to the packing side carefully.
- Start the parking brake.
- Vertical lift mast.
- Fork rises to the desired height.
- Forklift and forks as far as possible into the cargo below.

At least two-thirds of the fork length into the cargo tray.

-Lifting fork fixed frame, make the fork to lift the cargo completely.

-The driving direction switch is set to backward running , release the parking brake.

Note the rear barriers.

-Careful, slow backward driving, left the stacking area to the goods.

It is strictly prohibited to lift the goods stay below.

Do not put your hands to the lifting mast.

- The lifting mast tilted backwards carefully.
- Lower the cargo, according to the actual condition handling retain sufficient ground clearance (about 150-300 mm) .

Handling the cargo must maintain lift mast after the dumping and try to lower the fork.

Handling of goods

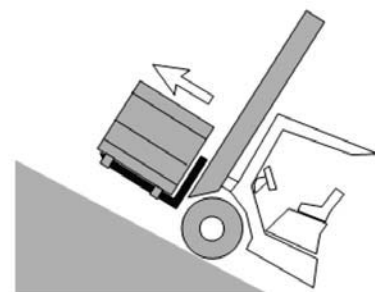
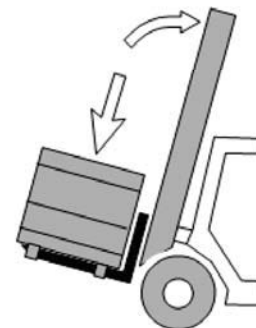
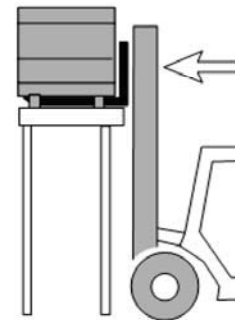
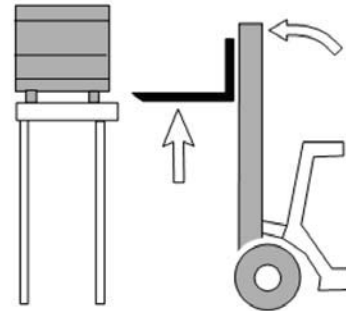
When cargo stacks too high to block the sight of a driver, it need to running back then handling the goods.

-When use the accelerator pedal to make the forklift smoothly acceleration, Be careful with the brake pedal brake. Get ready for brake at any time.

-According to the route and the handling goods of the actual conditions to control the speed of the vehicle. Pay attention to the pedestrian or vehicles at junctions and channels.

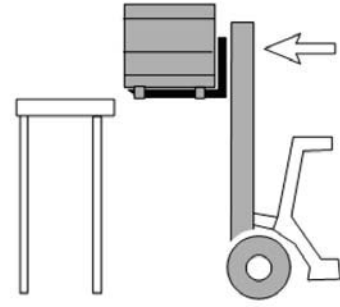
-When the visual line is obstructed, the operation should under the guidance of other staff.

Laden uphill, we must keep fork moving forward, When going downhill, you should reverse driving. Do not cross slope or turn on the slope.



Storage of goods

- Drive the forklift next to the shelves with care.
- Start the parking brake.
- Erect the lifting mast vertically.
- Lift the fork to the right position according to the shelf.
- Release the parking brake.
- Drive into the shelf with care.
- Slow down the goods until the fork teeth not bearing.



Placing the goods may not be too violent, attention to the protection of cargo and truck parts will not be harmed.

Truck parts raised only allowed in the front or top of the stacking forward.

4.8 Park the forklift securely

If the driver needs to leave the forklift, even if leaving a very short time, must be in accordance with the regulations prior to the forklift parked.

- Driving the forklift to the flat place.
- Start the parking brake.
- Pull-down the forks completely to elevate gantry forward.

It's prohibition to parking or leave forklift with rising commodities

- Press main switch (emergency shutdown switch).
- The key in the lock switch as "0" position.

Pull-out the key out of the lock switch.

4.9 Towing a trailer

Truck can be dragged by forklift when traffic ground is dry, flat or in a good condition.

The max trailer load refer to nominal load which shows on the scutcheon of nominal load.

Trailer load is constitute of the weight of trailer and nominal load.

When using fork to transport cargoes, trailer load must be minus the weight of cargoes.

The important introduction of drag trailer:

- Continuous operation is prohibited.
- Ban infliction on traction.
- The max speed for 5 km/h.
- Only on the flat and reinforced road can make a turn.
- Pay attention on related rules of manufacture of coupling devices if forklifts equip special coupling devices.
- Under the specified conditions of use, the operator must use the commissioning checks trailer license trailer load running.

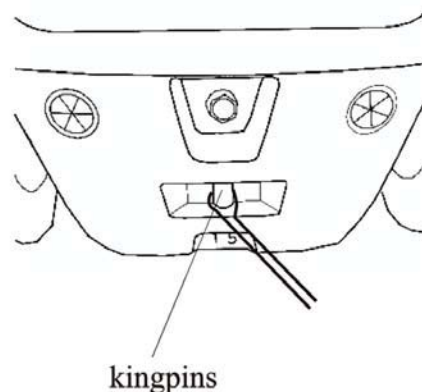
The connection of trailer

Chauffeurs should ensure the max load of trailers under the limit.

- Make the connect between Traction pin and draw bar.

Note:

1. Guaranteeing the joint fixation between wire rope and traction pin before using traction pin.
2. Unfasten wire rope slowly in case of the resilient strength of wire rope take damage
3. Assist people leave the wire rope; it can only close after loose the wire rope

**5 Error Assistance**

This chapter is to help users identify and eliminate the simple bugs or the problem that caused by missed operation. Please check the operation sequence step by step by following the below chart and confirm the specific reasons of bugs.

Fault	Reason	Method
Abnormal noise in drive axle	1.The circular cone gear was worn out or the clearance was too wide.	Just change the circular cone gear or adjust the clearance.
	2.The crossing shaft of the differential worn out	Just change a new one.
	3.The circular cone roller bearing was worn out or loose.	Just change a new one or adjust the bearings.
The main reduction of the drive axle was too hot	1.The bearings of the drive gears are too tight.	Just readjust the bearings pretightening force.
	2.The lubricants of the gears are too much or too little.	If the oil starts to output from the plug, it is the right volume.
Turn sharply or can not turn at all	1.The safe load pressure of the shunt valve which keeps a steady volume is too low.	Adjust pressure.
	2.There maybe air among the oil pipes in the turning system.	Just drain the air off.
	3.The return function of the turning unit is out of work, and the elasticity of the positioned spring is not enough and is torn out.	You should change a new one.
	4.The turning angle of the steering tire is not right.	Adjust the turning angle (inside and outside).
	5.The body of the steering axle is out of shape.	Should be repaired.
	6.The tilting cylinder has over-leakage inside.	You should check and change the seal and piston.
Floating when turning and stringing of the tire	1.The volume when turning is over.	Just adjust the volume of the shunt valve and adjust the bolts.
	2.The lever to turning connected not tightly.	Pinch it tightly.
	3.The nut to fix the wheel is too loose, or the bearing of the wheel shell is too loose.	Please adjust and change a new one.
The foot brake heat	1.The part of auto-adjustment is out of work. And the clearance between the brake drum and the friction plate of the brake unit is too wide or is out of the position.	Just adjust and correct.
	2.The spring of the brake was too weak.	Just change a new one.
	3.The cup piston is blocked because it is bloated.	Change a new cup piston.

Fault	Reason	Method
The brake by foot is out of work	1.The part of auto-adjustment is out of work.And the cleara-nce between the brake drum and the friction plate of the brake unit is too wide or is out of the position.	Just adjust and correct.
	2.The master cylinder and the liquid for input and output are out of work.	Have to dismantle them to check and repair.
	3.The cup piston is blocked because it is bloated.	Change a new cup piston.
	4.Maybe air inside or leak.	Just drain the air off and repair the leak part.
	5.The friction of the bake plate is worn out.	Change a new one.
	6.The two wheels can not brake at the same time.	Please adjust the clearance and drain the air inside the pipe.
	7.Too much free route of the brake pedal.	Just to adjust it.
	8.The brake loses the function of force-generation.	You should check and adjust.
The hand brake is out of work	1.The clearance between the brake drum and the friction plate of the brake unit is too wide or is out of the position.	Just adjust and correct.
	2.The spring of the brake was too weak.	Just change a new one.
	3.The strut is too loose.	Please adjust the pretightening.
	4.The strut is blocked.	You should make it to operate flatly and smoothly.
It is difficult to load or can not load at all.	1.The clearance between the brake drum and the friction plate of the brake unit is too wide or is out of the position.	You can change a new gear or pump.
	2.The piston ring of the lifting cylinder has been worn and torn and also over-leakage.	You should change a new piston ring.
	3.Multi-valve and the spring of the safe valve are out of work.	You should change a new spring.
	4.Mutual wear and tear between the control lever of the multi valve and the valve lead to over-leadage.	You should plate chromium on the lever.
	5.Leakage among the valves.	You should reconfigure after grinding, then tighten the screw in in-sequence.
	6.Hydraulic pipeline leaks	should connect the nut closely.And check whether the nut connects the sealed liner was damaged or not.
	7.The temperature of the hydraulic oil is too high or the hydraulic oil is too thin.Maybe the flow is insufficient.	In this case,you should change the hydraulic oil which is stipulated to conform to or reduce the oil when parking. Find out why the temperature is so high.
	8.Overload	please operate according to the regulation.
	9.The slide valve of the shunt valve was blocked.	Just dismant the shunt valve to repair.

Fault	Reason	Method
The mast and the fork shelf can not tilt freely itself.	1.The wall of the tilting cylinder and the seal ring are worn excessively.	Just change the seal ring or the cylinder.
	2.The spring of the lever on the multi-valve is out of work.	Just change a new one.
The fork shelf can not lift and tilt flexibly.	1.The piston blocks the casing wall or the cylinder rod is crooked.	Just change the damaged one.
	2.ar is too dirty and it is sealed too tightly.	You should wash it and adjust the sealing cover to a proper degree.
Light kit-head light,turning light,rear light can not stay bright.	1.The plug can not connect well.	Just tighten the plug.
	2.The start switch is damaged or can not connect well.	Just change a new one.
	3.The bubble is damaged.	Just change a new one.
	4.The connection is not well.	Please tighten the bolts.
The deficiency of the pump pressure.	1.he seal ring for deal with the tighten parts is worn and torn,which lead to leakage.	Just change a new one.
	2.The seal ring of the oil cap inside	just change a new one.
	3.The surface of the bearing was worn and torn.	Changing!
	4.The gear was worn and torn.	Just change a new oil pump.
	5.The rotational direction is wrong.	Please correct it.
	6.The hydraulic oil sneaks into the air and spumes, and the pipe leak.Mabe there is also deficiency hydraulic oil.	You should clear up air and repair the leak point.

Please connect the after-sales department of our company if the bugs doesn't eliminate after execute "solution" operating steps which given above.

F Forklift maintenance

1. Operation safety and environmental protection

According to the listed deadline of maintenance check list .implement part of introductive each inspection and maintenance operation.

Prohibit the use of forklift, especially for the safety device modified. It's not allowed to reset each work speed.

Only original parts correspond with demand of quality management of our company. It's only can use original parts which manufactured by our company in order to ensure the equipment possess stable、reliable operation system. In term of current environmental regulations to handle with aged parts or replaced liquid medium. You also can connect after-sales department if you require replacing oil.

It must be Implemented the “restarted operation”, operation steps which regulated by first chapter after inspection and maintenance operation. (Please refer to chapter F).

2.Maintenance and safety regulations

Maintenance Personnel: Forklifts maintenance and repair should implement by professionals of our company. Our service department supports a batch of filed technicians. We advise that users sign contract with service maintenance station of us.

Elevation and jacking device: Install the lifts tool on the provisions of fixed position when fork is elevated. When the fork raised up, using the suitable tools ,like, wedge block、wood block to fix the equipment in case of the danger of rolling or turning over. Must use enough firm chains to fix and protect forks if the operation under the risen loaded parts.

Cleaning operation: Forklifts-cleaning must be without any flammable liquid. It is necessary to avoid sparks of operation processing (like short circuit) before starting cleaning operation. If forklifts charge by storage battery, please ensure the jack-plug pull-out of the forklifts. It should take low-intensity gas or compressed air when clean electric and electronic components ,meanwhile not allowed to use no-conducting, antistatic brush to cleaning the dust of component surface.

After cleaning operation, restart operation must be executed which is the regulation operation steps in first chapter.

Operation of electronic system: operation related to electronic system must conduct though the professional personnel who were trained by electronic technical domain. Operator has to take any measures to avoid electronic accident before started. If forklifts need power supply, make sure the jack-plug of accumulator pull-out to release the voltage of forklifts.

Soldering operation: Before starting soldering, remove the Electrical and electronic components of forklifts to avoid extra harm of components when operated soldering.

Regulation parameters: please obey the related regulation parameters when maintains and change hydraulic, electrical and electronic components.

Wheel: The wheel of a direct impact on the quality of the forklift stability and driving performance. If you need to replace the assembled tire from factory, and fitted at the factory with the specifications of the tire in order to meet the models on the list of data index.

To ensure that forklift position does not inclined when replace the wheels (which is replace the wheel in pairs, that is to replace the left and right wheels at the same time).

Lifting chain: Inadequate lubrication will accelerate the damage from the lifting chain. The mainte-

nance checklist is only suitable for using in the ordinary case within the interval of provision. If the operating conditions of intensity are higher than the general level, such as dust, temperature fluctuations, so increases the frequency of re-lubrication operation. Use the chain sprays according to the provisions. Only in the outside of chain daub the lubricating grease, and can not achieve the desired lubricating effect.

The hydraulic system of high pressure hose: The longest service life of high pressure hose is six years, and must be replaced after the expiration. If replace the components of a hydraulic system, high pressure hose should be replaced within this system.

3 Maintenance and inspection

Thorough specification for maintenance is one of the crucial preconditions to keep a forklift in a stable and reliable performance. If due to the careless to carry out regular maintenance of the truck, may lead to equipment failure and malfunction, and it may threaten the security of the operator.

The required maintenance parts damaged depends on the actual operation largely and the using conditions of the forklift.

We recommend that customer could consultant to develop appropriate maintenance intervals to minimize the damage according to the actual situation of the workplace by the specialist.

Maintenance intervals specified in the maintenance checklist only for a single work shift system and normal operation conditions of use. If the intensity higher than the general level of the operating conditions of use, for example, dust, temperature fluctuations, or perform shift work system, must be to shorten the maintenance intervals appropriately.

In the following maintenance checklist lists the specific time of maintenance and operations.

Forklift in the running-in phase (after approximately 100 hours of operation) the equipment user should to check the wheel nuts and bolts fixed, re-tighten it if necessary.

4 Maintenance Checklist (the FB Series 10 /15/18/20/25/30/35 forklift).

Battery

○ – Check, revise, adjust
× – Replace

Checking item	Service required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Storage battery	Electrolyte level	Eyeballing		○	○	○	○
	Electrolyte proportion	Densimeter		○	○	○	○
	Battery quantity		○	○	○	○	○
	Terminal looseness		○	○	○	○	○
	Looseness of connecting wire		○	○	○	○	○
	cleanness of the battery surface		○	○	○	○	○

Checking item	Service required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Storage battery	If there is tool on the battery.		○	○	○	○	○
	The tightness of air cap			○			
	Far away from firing		○	○	○	○	○

Controller

Checking Item	Service Required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Controller	Check connector for worn					○	○
	Check contactor for running					○	○
	Check inching switch for running					○	○
	Check the connection among motor, battery and power unit.					○	○
	Check the controller error diagnose system						First time 2 years

Motor

Checking Item	Service Required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Motor	Clean the foreign body on the motor				○	○	○
	Clean or replace the bearing						○
	Check the carbon brush and commutator for worn, if spring is normal				○	○	○
	If the connection is correct and firm.				○	○	○
	Brush carbon powder on shift plate and shift device.					○	○

Driving system

Checking Item	Service required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Transmission	Check for noise		○	○	○	○	○
	Check for oil leaks		○	○	○	○	○
	Change oil						×
Driving axle (front axle)	Check wheel hub bearing for looseness, noise			○	○	○	○
	Clean and replace grease					×	×
	Check the axle body for deformation, crack or damage				○	○	○
	Check bolts which is connected to the truck body for looseness				○	○	○
	Check wheel hub bolts for tighten torque	Torque wrench	○	○	○	○	○

Wheels (Front, Rear Wheels)

Checking Item	Service required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Tyre	Check for abrasion, cracks or damage		○	○	○	○	○
	Check for spikes, stones or foreign matter				○	○	○
	Check the wheel hub for damage		○	○	○	○	○
	Check the split body wheel hub-bolts for looseness	Test hammer	○	○	○	○	○

Steering System

Checking Item	Service required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Steering wheel	Check for peripheral play		○	○	○	○	○
	Check for vertical looseness		○	○	○	○	○
	Check for sideways looseness		○	○	○	○	○
	Check for proper operation		○	○	○	○	○
Steering Gear box and valve	Check mounting bolts for looseness				○	○	○
Steering axle	Check king pins for looseness or damage				○	○	○
	Check for deflection, deformation, cracks or damage				○	○	○
	Check for mounting condition	Test hammer			○	○	○
Steering cylinder	Check for operation		○	○	○	○	○
	Check for oil leaks		○	○	○	○	○
	Check for mounting parts and joints for looseness				○	○	○
	Check sensor wire connection					○	○

Brake system

Checking item	Service required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Brake pedal	Check for free travel	Scale	○	○	○	○	○
	Check for pedal travel		○	○	○	○	○
	Check for proper operation		○	○	○	○	○
	Check for air mixed in brake piping		○	○	○	○	○
Parking brake	Check for lever is securely locked and has sufficient lever stroke		○	○	○	○	○
	Check for proper operation		○	○	○	○	○
Rod, Cable, etc	Check for operation				○	○	○
	Check connections for looseness				○	○	○
Hoses and Pipes	Check for damage, leakage or collapse				○	○	○
	Check for loose connection or clamping parts				○	○	○
Brake Master Cylinder, Wheel Cylinder	Check for fluid leaks				○	○	○
	Check for fluid level, Change brake fluid		○	○	○		×
	Check master cylinder and wheel cylinder for proper operation						○
	Check master cylinder and wheel cylinders for fluid leaks or damage						○
	Check master cylinder piston cup, and check valve for wear or damage change						×

Hydraulic system

Checking item	Service required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Hydraulic reservoir	Check for oil level, Change oil		○	○	○	○	×
	Clean suction strainer						○
	Drain for foreign matter						○
Control lever	Check levers for looseness at link		○	○	○	○	○
	Check for proper operation		○	○	○	○	○
Control valve	Check for oil leaks		○	○	○	○	○
	Check relief valve and tilt lock valve for proper operation				○	○	○
	Measure relief pressure	Oil press gauge					○
Hose, Piping Hose Reel& Swivel Joint	Check for oil leaks, looseness,collapse, deformation and damage				○	○	○
	Replace hoses.						×
Hydraulic Pump	Check hydraulic pump for oil leaks or noise		○	○	○	○	○
	Check pump drive gear for wear			×	○	○	○

Lifting system

Checking item	Service required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Chains & Sheave	Check chain for tension, damage or rust		○	○	○	○	○
	Lubrication of chains				○	○	○
	Check connection of chain anchor pin and chain for looseness				○	○	○
	Check sheaves for deformation or damage				○	○	○
	Check sheave bearings for looseness				○	○	○
Optional Attachment	Perform general inspection				○	○	○
Lifting cylinder	Check piston rod, rod screw and connection for looseness deformation or damage	Test hammer	○	○	○	○	○
	Check cylinders for proper operation		○	○	○	○	○
	Check for oil leaks		○	○	○	○	○
	Check pins and cylinder bushings for wear or damage				○	○	○
Fork	Check forks for damage, deformation or wear				○	○	○
	Check for stopper pins for damage or wear					○	○
	Check fork base and hook welding for defective cracks or wear				○	○	○
Mast & Lift Bracket	Check cross members on outer and inner masts for defective weld, cracks or damage				○	○	○
	Check tilt cylinder bracket and mast for defective weld, cracks or damage				○	○	○
	Check outer and inner masts for defective weld, cracks or damage				○	○	○
	Check for defective weld, cracks or damage of lift bracket				○	○	○
	Check roller bearings for looseness				○	○	○
	Check mast support bushings for wear or damage						○
	Check mast support cap bolts for looseness				○ (for 1st time only)		○
	Check lift cylinder tall bolts, piston rod headbolts, Ubolts, and piston head guide bolts for looseness	Test hammer			○ (for 1st time only)		○
	Check rollers, roller pins and welded parts for cracks or damage				○	○	○

Additional

Checking item	Service required	Tools	Daily (8 hrs)	Weekly (50 hrs)	Monthly (200 hrs)	Trimonthly (600 hrs)	Semiannually (1200 hrs)
Overhead Guard & Load Backrest	Check for tight installation	Test hammer	○	○	○	○	○
	Check for deformation, cracks or damage		○	○	○	○	○
Turn signal	Check for proper operation and tight installation		○	○	○	○	○
Horn	Check for proper operation and tight installation		○	○	○	○	○
Light & Lamps	Check for proper operation and tight installation		○	○	○	○	○
Buck-up Buzzer	Check for proper operation and tight installation		○	○	○	○	○
Meters	Check meters for proper operation		○	○	○	○	○
wire	Wire damage or looseness			○	○	○	○
	Looseness of Electric circuit Joint				○	○	○

4.1 Replace the key safe parts termly

① Some parts should be checked termly to detect the damage, for improving the safety more, users should replace the parts termly which is listed in the table as follows.

② If the parts are abnormal before the replacing time is coming, it should be replaced immediately.

Key safe part's description	Term of using (year)
Brake hose or tube	1~2
Hydraulic hose for lifting system	1~2
Lifting chain	2~4
High-pressure hose, hose for hydraulic system	2
Brake oil cup	2~4
Brake master cylinder, brake slave cylinder cover and dust sleeve	1
Inner hermetic, rubber matter	2

4.2 Table for bolt's tight torque

Unit N·m

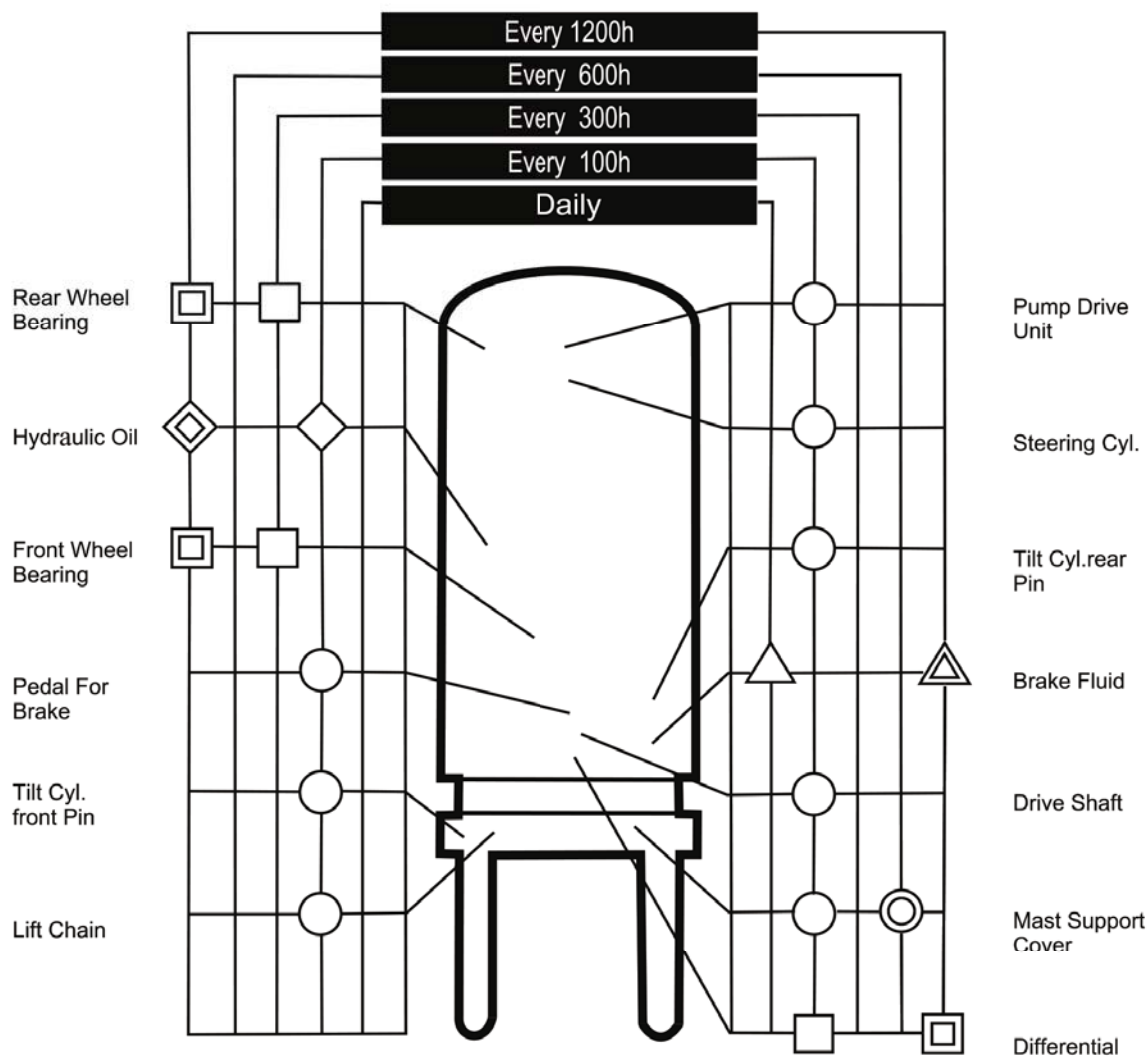
Bolt's diameter	Grade			
	4.6	5.6	6.6	8.6
6	4-5	5-7	6-8	9-12
8	10-12	12-15	14-18	22-29
10	20-25	25-31	29-39	44-58
12	35-44	44-54	49-64	76-107
14	54-69	69-88	83-98	121-162
16	88-108	108-137	127-157	189-252
18	118-147	147-186	176-216	260-347
20	167-206	206-265	245-314	369-492
22	225-284	284-343	343-431	502-669
24	294-370	370-441	441-539	638-850
27	441-519	539-686	637-784	933-1244

Note

- Use entirely 8.8 grade bolt in the important joint position.
- Bolt's grade can be found in the head of the table, if it can't be found, the grade is 8.8.

5 Lubrication diagram (the FB Series 10 /15/18/20/25/30/35 forklift)

LUBRICATION SYSTEM DIAGRAM



○ Grease

□ Gear Oil

△ Brake Fluid

□ Wheel Bearing Grease

◇ Hydraulic Oil

△ ◇ ○ □ Supply

◇ □ ○ △ Replace

6 Maintenance Instructions

6.1 Preparation before maintenance operations

Please take all necessary security measures in order to avoid accidents in the maintenance process. You must complete the following steps carefully:

- Forklift parked in accordance with the regulations (see Chapter E).
- Pull out of the battery plug, to prevent forklift accidents happened (see Chapter D).

If you need to operate the forklift in rising and lifting, we must take effective measures to prevent accidents, for example, fall, tip over or slide. Enhance forklift handling and first put into operation within a chapter relevant provisions must be strictly observed.

If you need to repair or maintenance operation, the parking brake must pay attention to take effective measures to prevent forklift accidents scroll.

6.2 Check wheel fixed

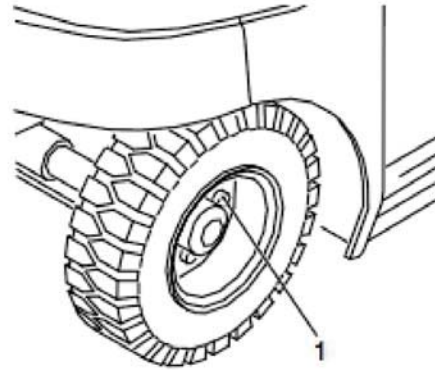
Forklift truck - parked in accordance with the regulations (see Chapter E).

- Cross-tighten the wheel nut (1) using a torque wrench.

Bolt tightening torque

Driving wheel $M = 220\text{Nm}$

Rear wheel $M = 170\text{Nm}$



6.3 Checking the hydraulic oil level

Must completely drop down load heavy parts.

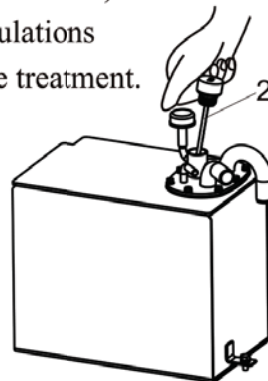
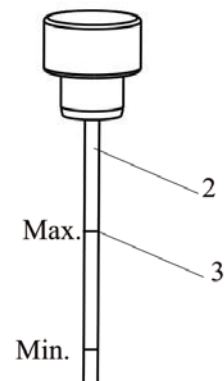
- The completion of the preparatory work before the maintenance operation.
- Pull out the ruler (2).
- Visual inspection of the ruler (2) shows the hydraulic oil level.

Hydraulic oil level is the highest scale (3) show that the oil fill.

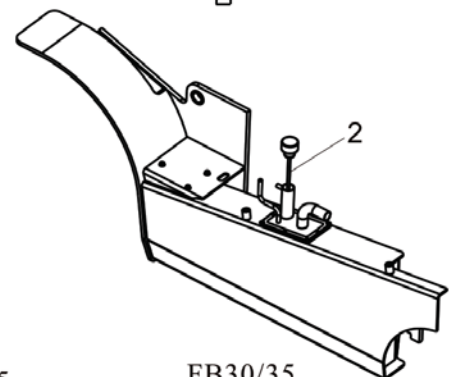
- Based on the need to replenish the hydraulic oil, the oil level reaches the highest scale position.

Filled hydraulic oil should pay attention to do not exceed the maximum scale, otherwise it may cause a system failure or damage. (Note: non-standard mast or to increase the variety of attachments, shall be increased according to the actual situation of oil mass.)

In accordance with current environmental regulations should be replaced the liquid medium into the treatment.



FB10/15/18/20/25



FB30/35

Schematic diagram of the location of the hydraulic tank

6.4 Check the transmission oil level

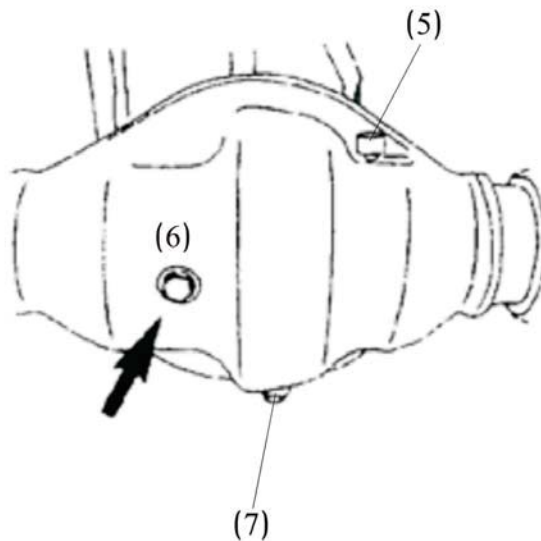
The gear oil is added dropwise to the soil, check the oil collection tank placed below the transmission is prohibited.

Forklift truck - parked in accordance with the regulations (see Chapter E).

- Spin out oiling the bolts (5).
- Check the oil level and add as needed. Add oiling bolts (5) at.

The oil level must reach the lower edge (6) of the filling hole. Must be in accordance with current environmental regulations replaced

Liquid medium to be processed.



6.5 Emissions from oil

- Emissions from oil, the oil should be at operating temperature.
- Place the oil collecting groove in the following.
- Unscrew the the fuel emissions bolt (7), gear oil emissions.

6.6 Replace the hydraulic oil filter

FB10/15/18/20/25

Hydraulic oil filter is located under the battery cover, hydraulic tank, removed, you can see the tank cover.

- Remove the cover of the hydraulic oil (see schematic diagram of the location of the hydraulic tank).
- Replace the filter.
- Replace the cover of the hydraulic oil.

FB30/35

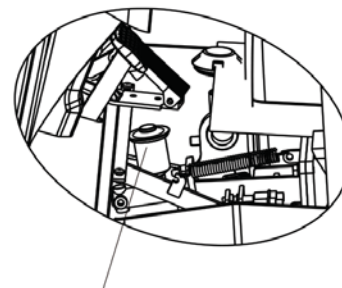
Two hydraulic oil filter, suction filter is located on the left side, hydraulic tank, take off the tank cover to see; return oil filter is located below the pedal, pedals removed, you can see.

- Remove the cover of the hydraulic oil (see schematic diagram of the location of the hydraulic tank).
- Replace the filter.
- Replace the cover of the hydraulic oil.
- Remove the pedals
- Two clamps to loosen the filter, replace the filter
- Re-tighten the two clamps, to replace the pedals.

6.7 Check the brake fluid level

The brake fluid is toxic, so you must use the original container and kept under seal.

- Forklift truck parked in accordance with the regulations (see Chapter E).
- Remove the Ottomans.
- Unscrew the retaining bolt and remove the pedals.



brake fluid storage tank

- View the brake fluid level in the brake fluid storage tank, fill the brake fluid as needed.

The brake fluid level must be in the "Min." And "Max." Scale between.

Must be processed in accordance with current environmental regulations replaced the liquid medium.

6.8 Seat belts maintenance

The driver must check the function and state of the seat belt before using forklifts. Only in regular checks can find out the functional failure.

-Pull out the belt completely, check the wear pattern of the surface fibers.

-Check the functionality of the seat belt buckle locking device, and whether the tightener is tightening the seat belt normally or not!

-Check the cover of damage.

Detecting belts automatic locking device:

-Park in the forklift level.

-Pull out of the safety belt quickly.

At this time, the locking device must be able to stop the seat belt.

If seat belt failures shall not continue to operating the forklifts, must replace a new seat belt at once!

6.9 Check the electric safety device

FB10 /15/18/20/25

-Preparation before the maintenance operation.

-Turn on the pedals.

-Open the cap.

-The numerical inspection insurance device functions of the technical parameter.

FB30/35

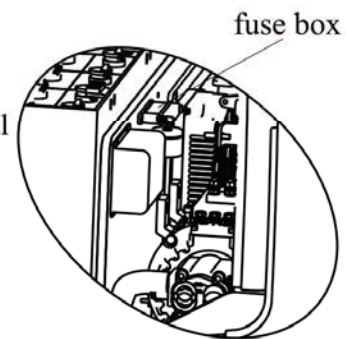
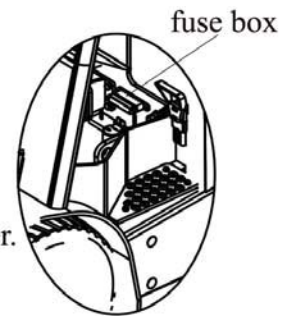
-Preparation before the maintenance operation.

-Open the battery cover.

-Open the cap.

-The numerical inspection insurance device functions of the technical parameter.

To avoid damage to the electric system equipment should be given value the installation settings insurance device.



Item	Discription	Current circuit	Value
4	F1	Control fuse	10A
5	F2	DC control fuse	10A
7	1F3	Horn control fuse	20A
8	2F3	Lights control fuse	10A

6.10 Check the mast and fork

Whether is to rising or falling freely when operate the lifting poker?

Whether the mast can tilt back and forth manipulation easily?

Check the cylinders and hydraulic oil whether leaks or not.

Whether the fork fixed pin is in the right position?

Whether the fork is distorted and deformation? Or the fork hook welded seam is out of crack.

If the forklift is carried out with maximum loading capacity of the goods frequently. The fork need to check every day.

1. check the fork whether it will be deformed carefully.

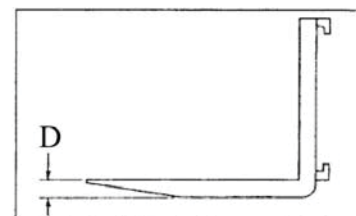
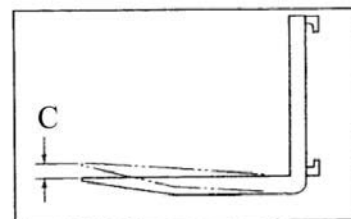
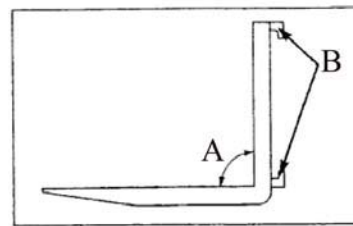
Especially the big angle between the A and B at the two hooks whether is cracking or not.

2. When loading heavy cargo to check the height difference of the two fork tip. This can not be at the level of a height difference between the handling of goods and will produce other problems.

The height difference of the fork tip that is referred in C at the maximum difference does not exceed 5mm. If the difference exceeds the value, It's required to replace a fork or two at the same time.

3. To check the thickness of fork at D, if the thickness is less than the prescribed, the fork should remove from the device.

Fork will become shorter due to the tip is prone to damage, especially the front end of the smaller shape fork gradually. If the fork length not within the specified range, it needs to be removed from the device.



6.11 Back into operation

After cleaning or maintenance, you must do the following steps before the forklift into operation.

- Check the function of main switch.
- Check the function of brake.
- For forklift lubrication according to the lubrication schematic diagram.

7 Disable and stored forklift

If the forklift disabled for more than two month, the forklift must be stored in a frost-free dry space.

Before and after storage, and the operation must be performed in the storage process is described in detail in the following subsections.

The forklift must use the bracket and all the wheels are off the ground in the storage process. Only in this way to ensure that the wheels and wheel bearings are out of damage during storage.

If stored for more than 6 months, the user must get in touch with the company service department to identify other measures need to be taken or not.

7.1 Storage notes

- Thoroughly clean the forklift.
- Check the brakes.
- Check hydraulic oil level. If necessary, add hydraulic oil (see Chapter F).
- Apply a thin layer of oil or grease on all mechanical parts without surface coloring process.

- For the forklift lubrication according to the lubrication schematic diagram (see Chapter F).
- Battery charging (see Chapter D).
- Remove the terminals on the battery, clean the battery and special grease smear on the electrode bolts.

Please observe the instructions and regulations from the battery manufacturer's at the same time.

- Spraying the appropriate contacts sprays in all the exposed contact surfaces.

7.2 Storage processes notes

Every two months:

- Charge the battery (see Chapter D).

If the forklift is driven by the battery:

Charge the battery periodically ,otherwise, the battery discharging reaches a certain level automatically, it will cause the battery out of power, causing the battery vulcanization, so battery is declared worthless.

7.3 After storage and back into operation

- Clean the forklift thoroughly .
- Lubricate the forklift according to the lubrication schematic diagram (see Chapter F).
- Clean the battery electrode bolt smear special oils, and install fixed the battery on the terminal.
- Battery charging (see Chapter D).
- Check the gear oil whether is with the condensed water or not. Replace the gear oil if you need.
- Check the hydraulic oil whether is with the condensed water. Replace the hydraulic oil if you need
- Put the forklift into use (see Chapter E).

If the switch operation of electrical system has some problems, it should be sprayed in the contact sprays of the exposed contact surface, and removed by repeated execution of the switching operation to the operating element contacts the surface of the oxide layer.

Put the forklift into use, the driver should repeated testing of the braking performance at once.

8 Changing a tire

DO NOT attempt to change the tire with the truck loaded. Injury and/or damage may result.



Be sure no one is on the truck when raising the front or rear tires.



Stop raising the truck when the tire clears the ground. DO NOT raise the truck more than necessary.



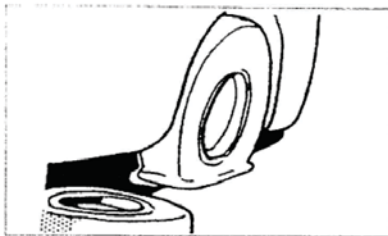
Do not place any part of your body under the truck. Securely support the truck with blocks after jacking it up.



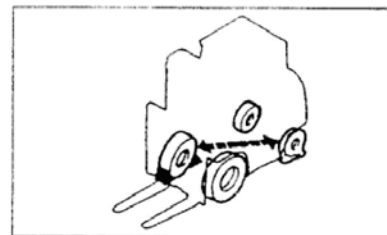
WARNING

- Consult your Mitsubishi Forklift Truck Dealer for proper tire changing procedure.
- Changing of tire and adjustment procedure must be made by a trained mechanic or dealer personnel.
- Perform all maintenance in the factory with proper equipment.

1. Park the truck on level ground with parking brake applied, transmission in neutral, forks lowered and engine stopped.



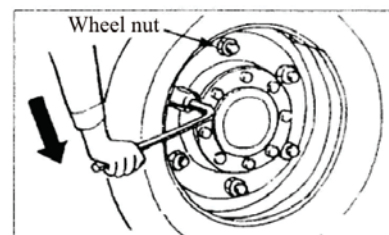
2. Prepare tools, jack and wheel blocks.
Jack Capacities: 5 tons



3. Block the diagonally opposite wheel.

To Remove Tire

1. Loosen the wheel nuts about two rotations.
Notice: Only loosen the wheel nuts. Do not remove them.
2. Position the jack under the truck at the specified jacking point.
3. Raise the truck by operating the jack until the tire just clears the ground.



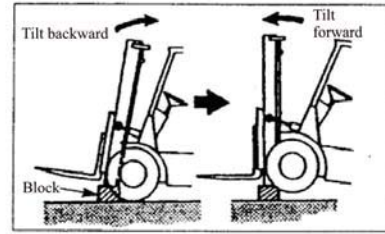
To Raise Front Tire

Position the jack under the frame and raise the truck until the front tire clears the ground. Next, place stands or blocks of wood on both sides under the frame to support it.



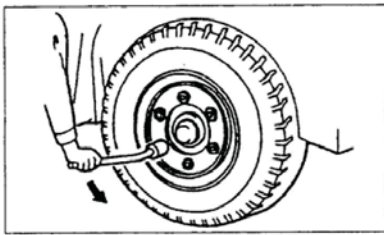
Other Method

Tilt the mast all the way back, place blocks under the mast, and tilt the mast forward.



To Remove Tire

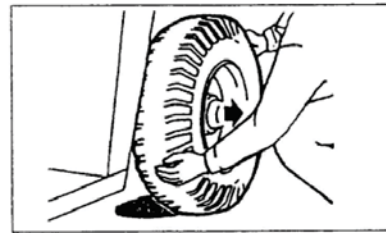
1. Loosen the wheel nuts about two turns. Notice: Do not remove the wheel nuts. Only loosen them.
2. Position the jack under the truck at the specified jacking point.
3. Raise the truck by operating jack until the tire just clears the ground.



4. Remove the wheel nuts by hand.
5. Firmly grip the tire with both hands, and remove it from the truck.

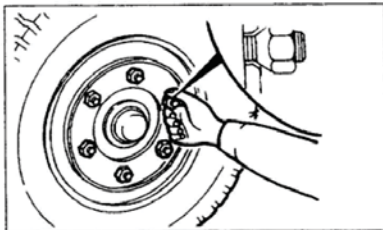
Caution

When removing the tire, be careful not to strip the wheel bolt threads on the edges of the bolt holes in the rim.

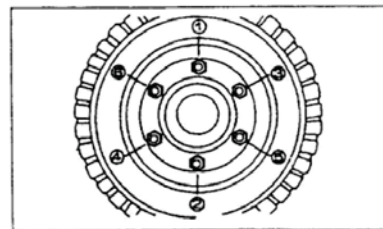


To Install Tire

1. Tighten the wheel nuts just enough to hold the tire without rattling, making sure the clamping surface of each nut comes in full face contact with the counterbore of the wheel disc.



2. Lower the truck until the tire touches the ground. Tighten the wheel nuts, in two or three steps, to the specified torque. Each of the steps must follow the tightening sequence shown above.



9 Equipment obsolescence and waste handling practices

Ground transportation equipment and final disposal, waste processing, must be carried out in accordance with the laws and regulations of force in the using State. Give the special attention on the scrap batteries, fuel and electronics, electric equipment.

Appendix

1 Forklift operator safety norms

Warning

No overguard or backrest driving is dangerous.

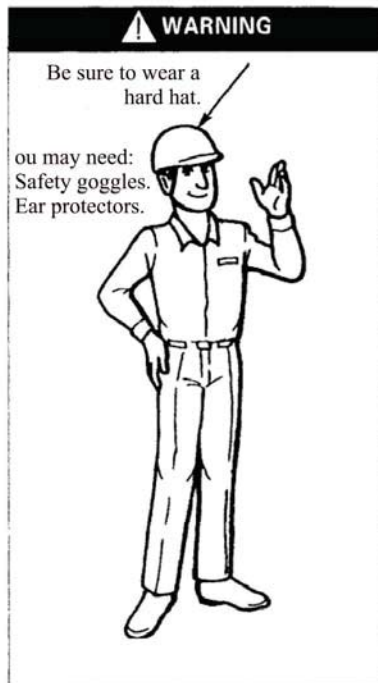
(1) Authorized , trained operator only !



(2) DO NOT travel on public roads !



(3) Dress properly for the job !



(4) Be alert !



(5) Know your forklift truck and attachments !



(6) Unauthorized addition or modification is prohibited !



(7) Know all signals and traffic rules !



(8) Exhaust fumes can kill you !



(9) Inspect your forklift truck prior to operation !



(10) Do not remove the overhead guard !



(11) Keep the operator's compartment clean !



(12) Do not operate an unsafe forklift truck !



(13) Always stay healthy on the job !



(14) Know your forklift truck is safe !



(15) Operate only in approved areas !



(16) DO NOT operate a damaged or defective forklift truck !



(17) Be sure the assist grip is properly tightened



(18) Position controls correctly for starting !



(19) Operator should know where the fire extinguishers located



(20) Adjust the seat before operation !



(21) Make sure your forklift truck is in safe operating condition !



(22) Fasten the seat belt properly



(23) Always check overhead clearance !



(24) Use lights in dark, dim areas !



(25) Stay within the confines of the truck !



(26) Avoid travelling on weak or nonprepared ground .Only running on a level and rigid placel.



(27) Stay under the overhead guard !



(28) Be careful of forks that extend beyond the load !



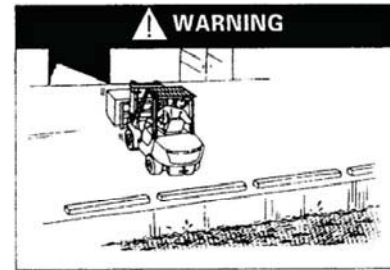
(29) Avoid off-center loading !



(30) Check fork stopper pin for engagement !



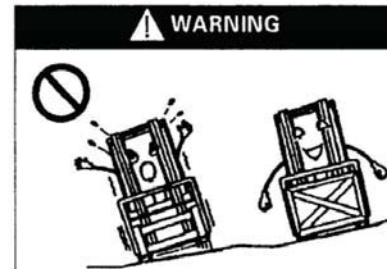
(31) Check work areas for high risk !



(32) Stay away from slippery surfaces !



(33) Be aware of the stability of an empty forklift truck !



(34) Take special care when carrying a long or wire load .



(35) Do not allow any riders !



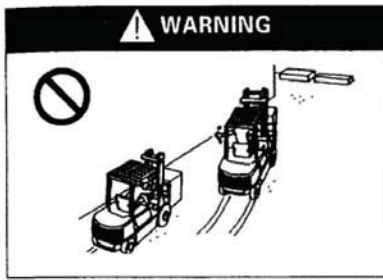
(36) If you cannot see where you are going , do not move!



(37) Use pallets and skids suitable for the load .



(38) Do not pass another truck !



(39) Do not allow anyone to hold loads !



(40) Always look in the direction of travel !



(41) Do not engage in stunt driving or horseplay !



(42) Travel in reverse if forward visibility is blocked !



(43) Obey all traffic rules and warning signs !



(44) Travel safely on grades with a loaded forklift truck !



(45) Be particularly careful when driving up or down a steep slope !



(46) Travel safely on grades with an empty forklift truck !



(47) Start forklift truck upgrade carefully !



(48) Do not turn on a ramp or grade !



(49) Move your forklift truck safely !



(50) Allow for counterweight swing distance !



(51) A helper should not be near the forklift truck !



(52) Always be alert for tipovers !



(53) Danger ! Keep out !



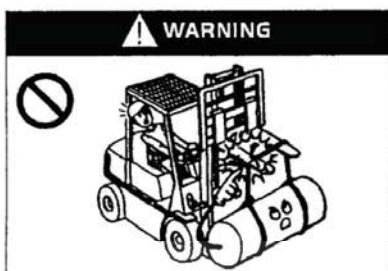
(54) Be careful of changes in rated capacity !



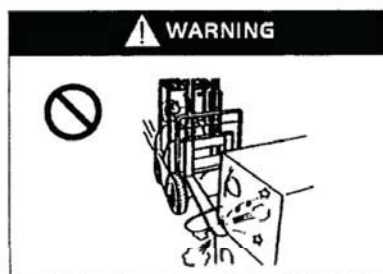
(55) Watch out for pedestrians at all times !



(56) Use forks properly !



(57) Do not speed when approaching loads !



(58) Do not move when someone's next to truck !



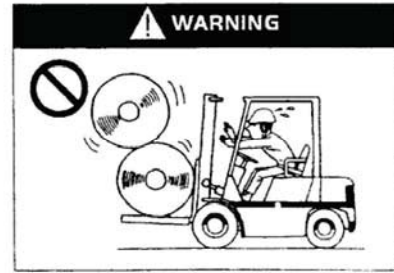
(59) Do not allow anyone to walk or stand under raised forks !



(60) DO NOT pick up unsecured loads that extend above the backrest extension height !



(61) Handle only stable loads !



(62) Do not allow unloading from raised loads !



(63) Do not use damaged pallets !



(64) Do not abuse your forks !



(65) Drive onto a trailer carefully !



(66) Do not allow any riders !



(67) Do not abuse your equipment !



(68) Stay clear of pinch points !



(69) Shift the transmission smoothly !



(70) Use only specialized equipment designed to safely raise personnel to high work areas !



(71) Always stay within the rated capacity !



(72) Do not operate in blustery weather .



(73) Forbid to operate in the circumstance here is easy to explode .



(74) Park a disabled machine safely !



(75) Park in authorized areas only !



(76) Do not park on a grade



2 How to avoid a tipover; how to survive one

(1) Do not tilt elevated loads forward !



(2) Do not elevate tilted loads !



(3) Do not pick up an off-center load !



(4) Do avoid slippery surfaces !



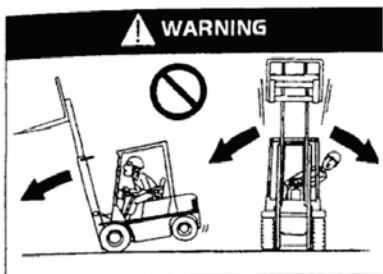
(5) Do not attempt to pick up or deposit a load unless the forklift truck is level !



(6) Do not go over obstacles-curbs,ditches, ridges and railroad tracks !



(7) Do not travel with forks higher than 15 to 20cm(6 to 8 in.)above the ground !



(8) Do not make fast or sharp turns with a loaded or unloaded truck !



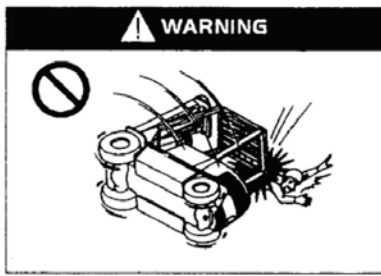
(9) Do not turn too sharply , even with an empty raised mast , to avoid a tipover !



(10) DO fasten your seat belt !



(11) Do not jump off your truck if it starts to tipover !



(12) Do wear a hard hat !

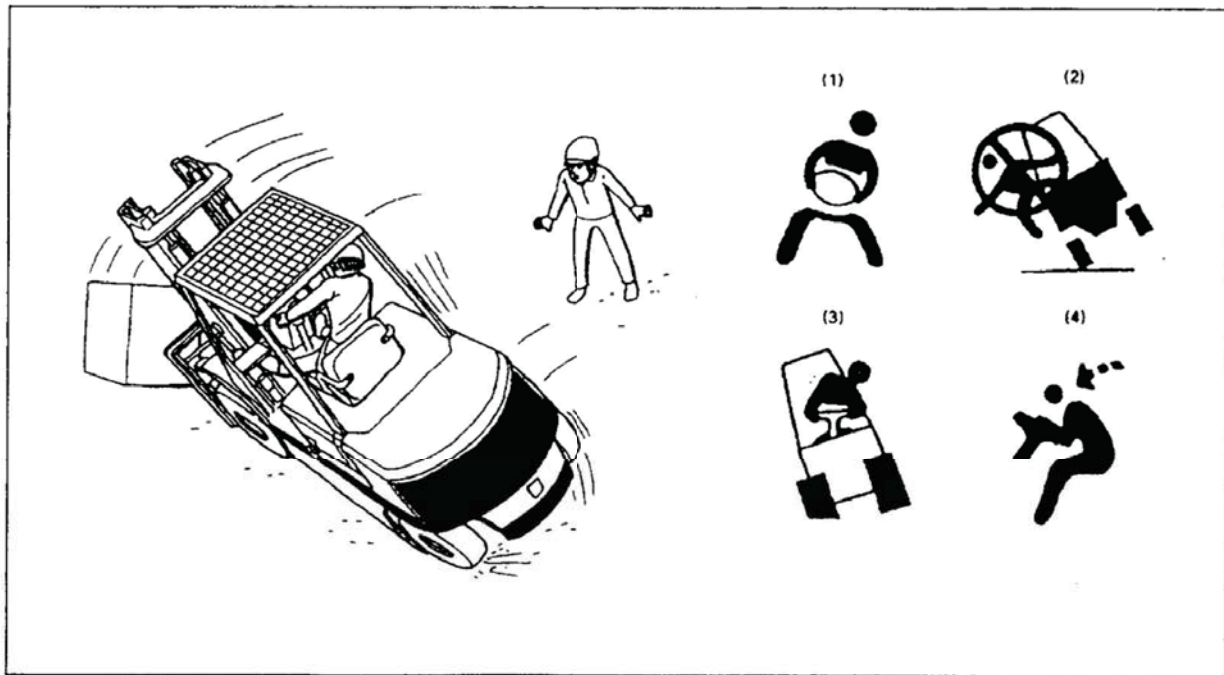


How to Survive in a Tipover

DANGER

Remember , your chances for survival with your seat belt fastened in a tipover are better if you stay in your truck . If your truck starts to tipover :

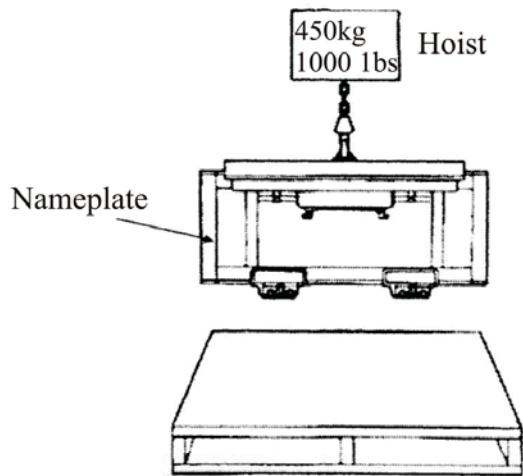
- 1.Firmly hold on to the steering wheel and brace your feet .
- 2.DO NOT jump off !
- 3.Lean away from impact .
- 4.Lean forward .



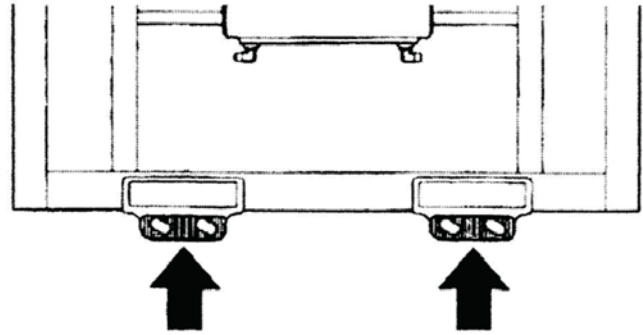
3 Notice of Sideshift's installation, employment and security

Installation

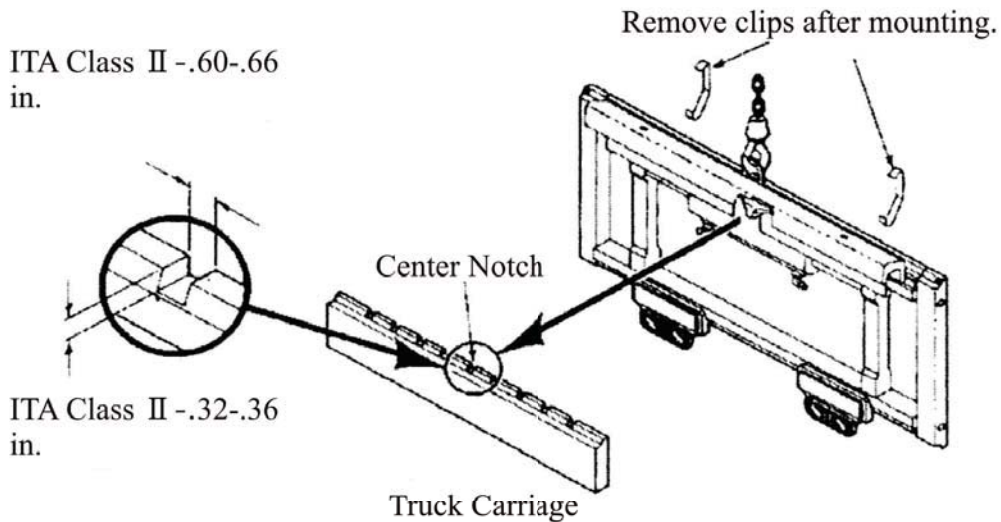
1.Remove from pallet



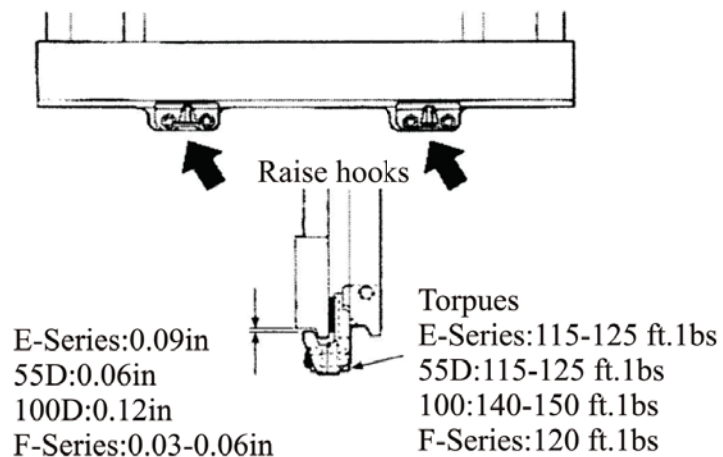
2.Remove Lower Hooks



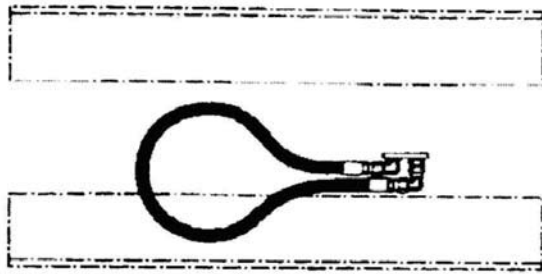
3.Mount on Lift truck



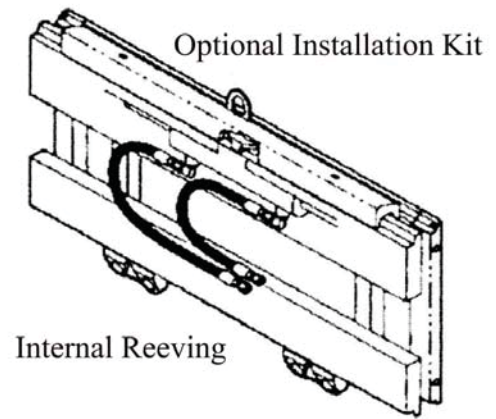
4.Install lower hooks



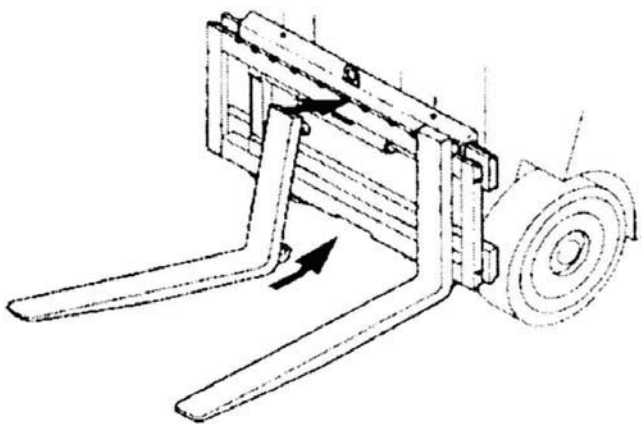
5. Flush supply hoses



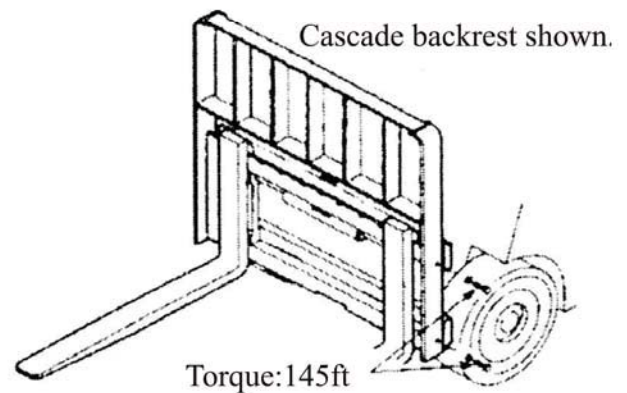
6. Install hoses



7. Install fork

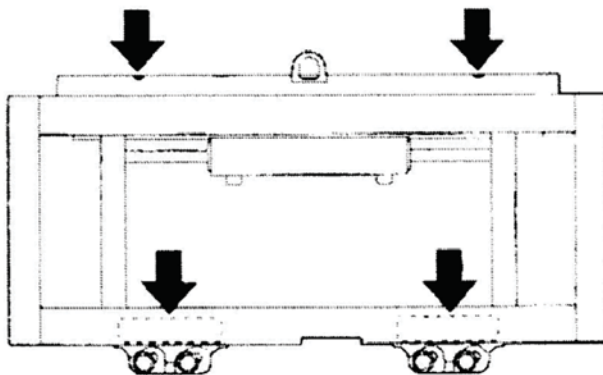


8. Install backrest

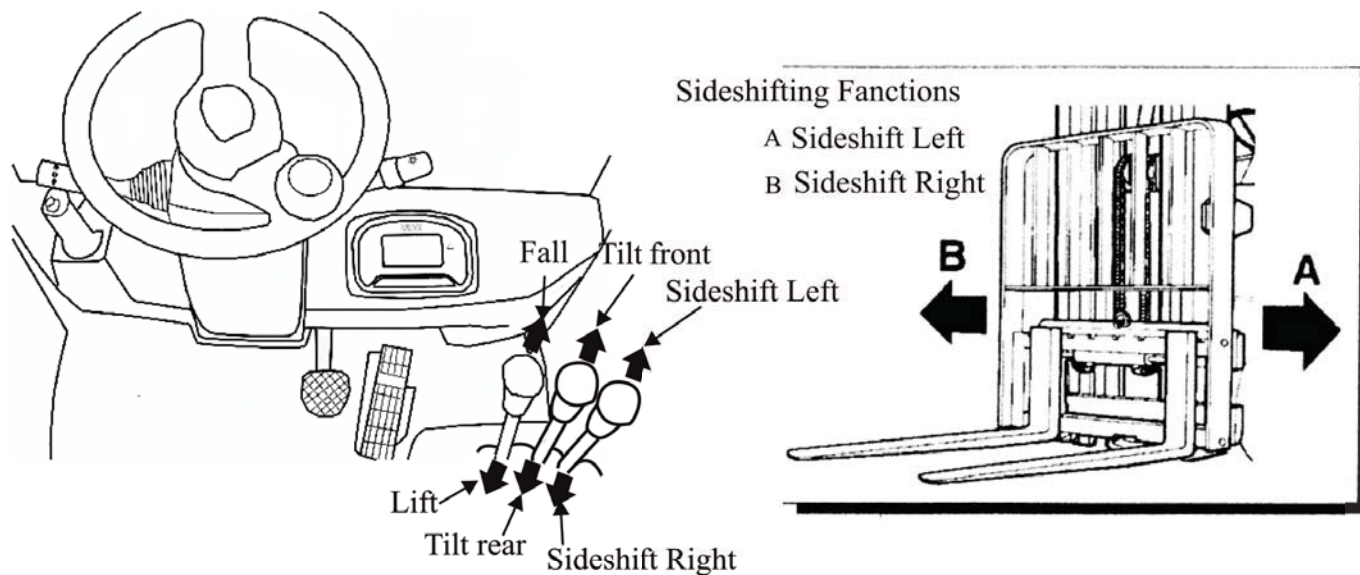


9. Lubrication Points

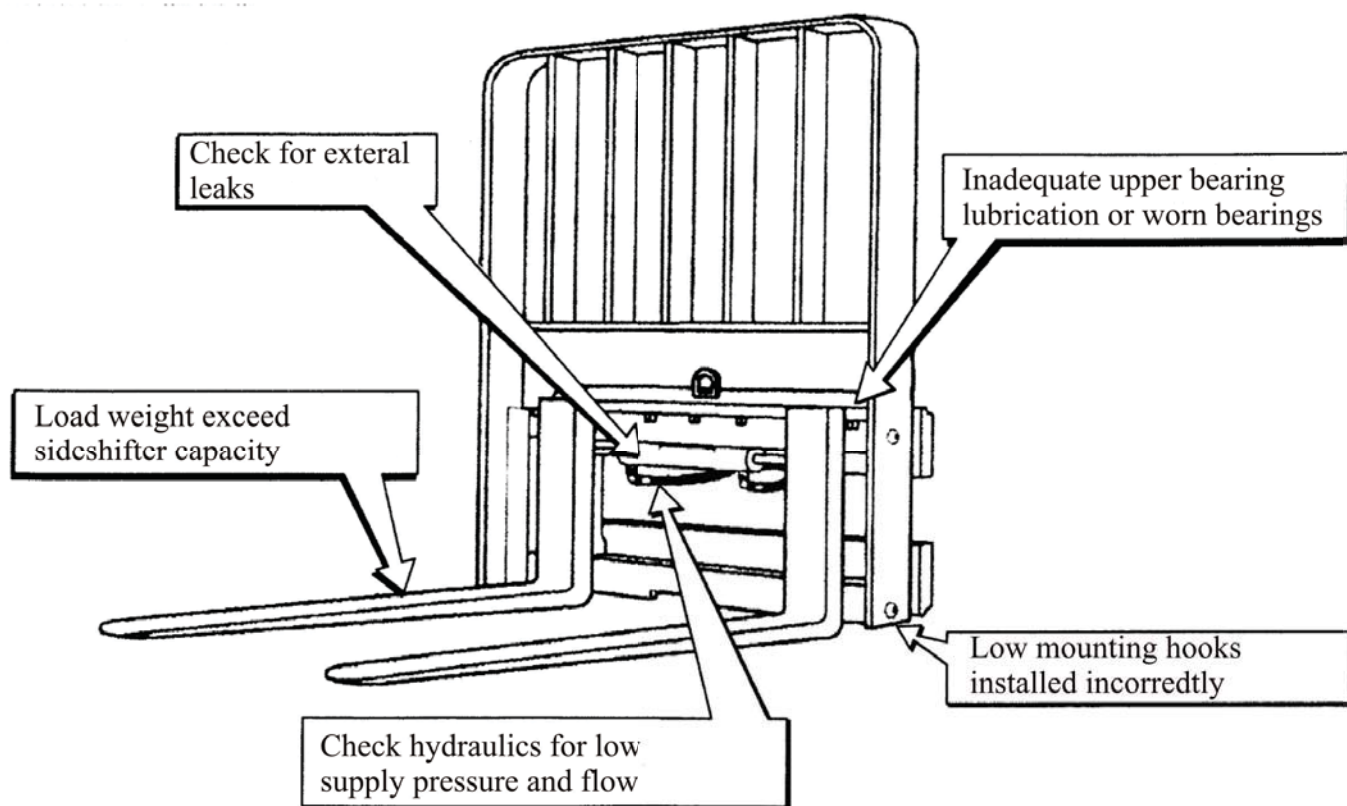
- The upper bearings and lower bearings should be greased at
- After first 500 hours, lube all bearings with chassis grease.



Sideshifter operation



Load will not sideshift



4 Maintenance records

[illegible]

