
User Manual

ES10 Series



Foreword

The present original operating instructions are designed to provide sufficient instruction for the safe operation and maintenance of the stacker. Please be sure to read this operator manual carefully if you are operator or are in charge of the stacker, before you operate and service the stacker. Only in this way can you protect yourself and make the stacker play a role as much as possible.

Our stackers are subject to ongoing development, so maybe there are some differences between your product and the description in this manual. And the operator manual details will be different because of customer's special requirements.

If you have any questions ,please keep in touch with the sales department or let the dealer know.

Notes:

1. This manual is used for operation and maintenance , the detail parameters, size and specifications in context is only for reference , the real parameters will depend on sale files.
2. Manual pictures for reference only, the real car shall prevail, and shall not affect the manual use.
3. Manual pictures only sign for one of the models in this series models.

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WARNING!
TO PREVENT SETIOUS RISK OF INJURY TO
YOURSELF AND OTHERS OBSERVE THE
FOLLOWING SAFETY INSTRUCTIONS.

These stackers may become hazardous if adequate maintenance is neglected. Therefore, adequate maintenance facilities, trained personnel and procedures should be provided.

Maintenance and inspection shall be performed in conformance with the following practices:

1. A scheduled planned maintenance, lubrication and inspection system should be followed.
2. Only qualified and authorized personnel shall be permitted to maintain, repair, adjust, and inspect stacker.
3. Before leaving the stacker:
 - Do not park the stacker on an incline.
 - Fully lower the load forks.
 - Press the emergency brake switch .
 - Set the key switch to the "OFF" position and remove the key.
4. Before starting to operate stacker:
 - Be in operating position
 - Place directional control in neutral
 - Before operating stacker, check functions of lift systems, directional control, speed control, steering, warning devices and brakes.
5. Avoid fire hazards and have fire protection equipment present. Do not use open flame to check lever, or for leakage of electrolyte and fluids or oil. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.
6. Brakes, steering mechanisms, control mechanisms, guards and safety devices shall be inspected regularly and maintained in legible condition.
7. Capacity, operation and maintenance instruction plates or decals shall be maintained in legible condition.
8. All parts of lift mechanisms shall be inspected to maintain them in safe operating condition.
9. All hydraulic systems shall be regularly inspected and maintained in conformance

with good practice. Cylinders, valves and other similar parts shall be checked to assure that "drift" has not developed to the extent that it would create a hazard.

10. Stacker shall be kept in a clean condition to minimize fire hazards facilitate detection of loose or detective parts.

11. Modifications and additions which affect capacity and safe stacker operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation and maintenance plates or decals shall be changed accordingly.



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Correct use and Application

The “Guidelines for the Correct Use and Application of Industrial Trucks” (VDMA) are supplied with the stacker. The guidelines is an important component of these operating instructions and must be observed. Your country's relevant laws and regulations is not affected.

The stacker described in the present operator manual is an industrial stacker designed for lifting and transporting load units.

It must be used, operated and serviced in accordance with the present instructions. Any other type of use is beyond the scope of application and can result in damage to personnel, the stacker or property. In particular, avoid overloading the stacker with loads which are too heavy or placed on one side. The data plate attached to the stacker or the load diagram are binding for the maximum load capacity. The stacker must not be used in fire or explosion endangered areas, or areas threatened by corrosion or excessive dust.

Proprietor responsibilities

For the purposes of the present operator manual the “proprietor” is defined as any natural or legal person who either uses the stacker himself, or on whose behalf it is used. In special cases (e.g. leasing or renting) the proprietor is considered the person who, in accordance with existing contractual agreements between the owner and user of the stacker, is charged with operational duties.

The proprietor must ensure that the stacker is used only for the purpose it is intended for and that danger to life and limb of the user and third parties are excluded.

Furthermore, accident prevention regulations, safety regulations and operating, servicing and repair guidelines must be followed. The proprietor must ensure that all stacker users have read and understood this operator manual.

Failure to comply with the operator manual shall invalidate the warranty. The same applies if improper work is carried out on the stacker by the customer or third parties without the permission of the manufacturer's customer service department.

Adding accessories

The mounting or installation of additional equipment which affects or enhances the performance of the stacker requires the written permission of the manufacturer. Local authority approval may also need to be obtained.

Local authority approval does not however constitute the manufacturer's approval.

1. Stacker Description

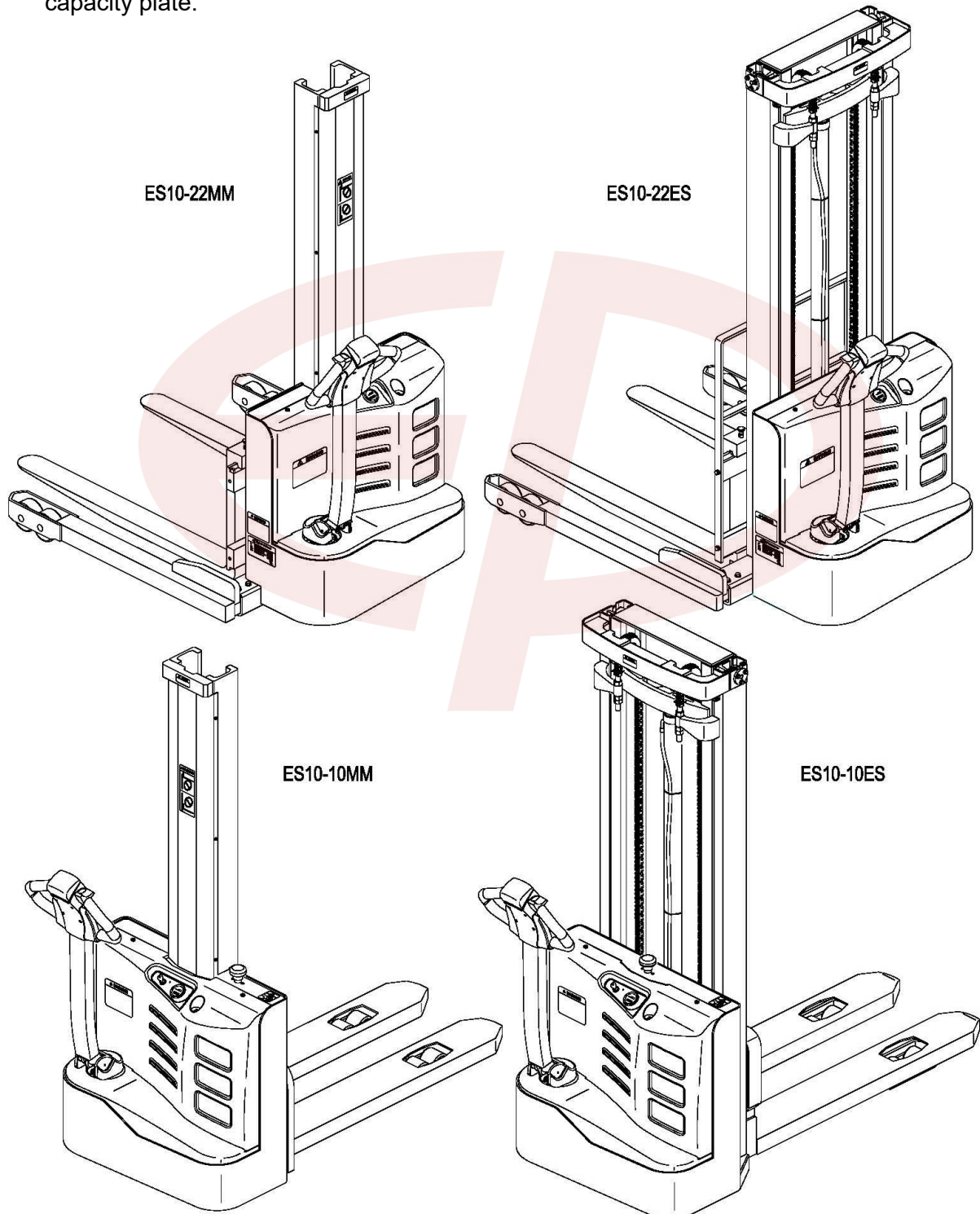
1.1 Application

The stacker is tiller guided electric stacker with a steered drive wheel.

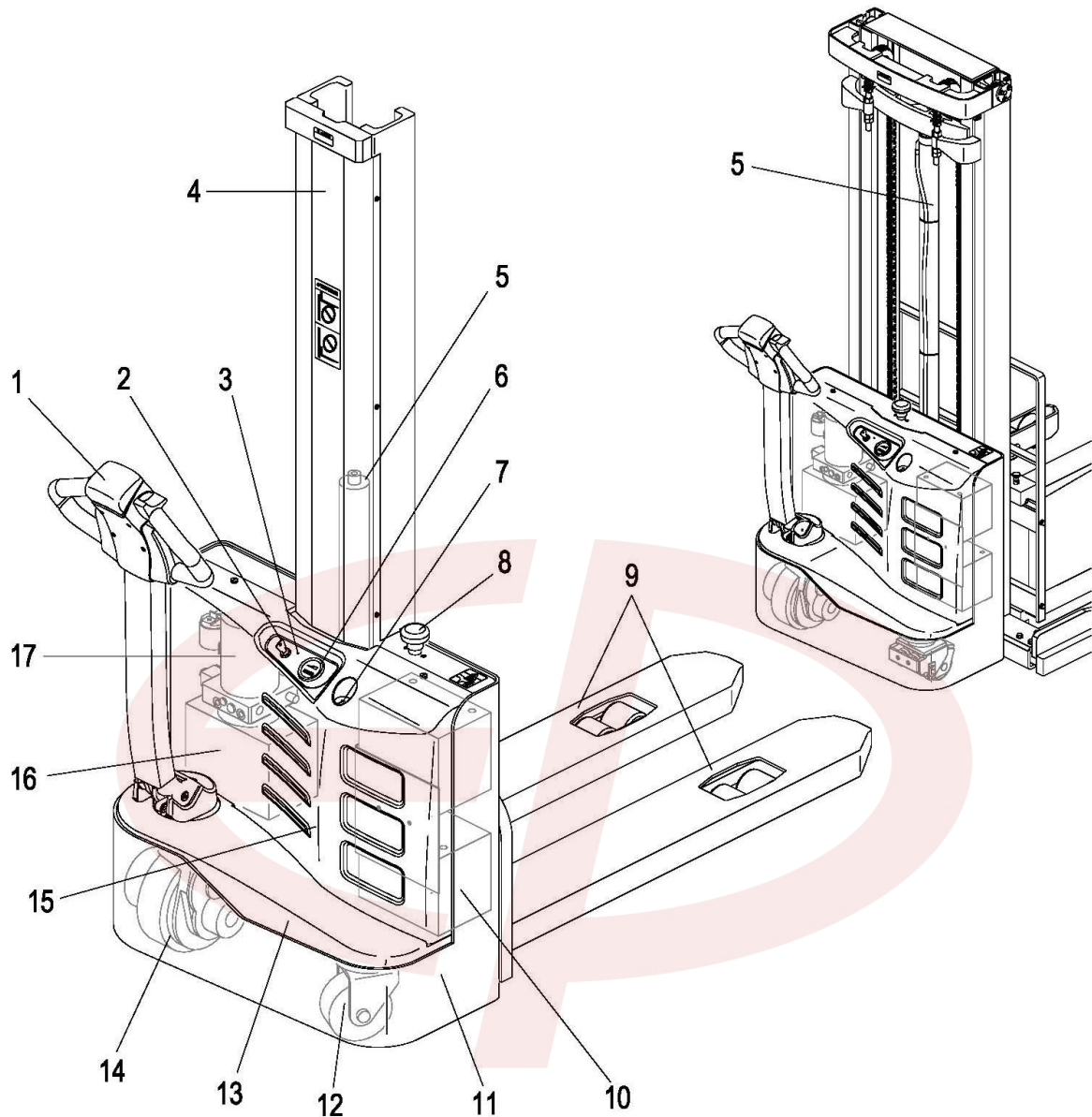
It is designed for use on level floors to lift and transport palletised goods. Open bottom pallets or roll cages can be lifted.

The capacity can be obtained from the data plate.

The capacity with respect to lift height and load center of gravity is indicated on the capacity plate.



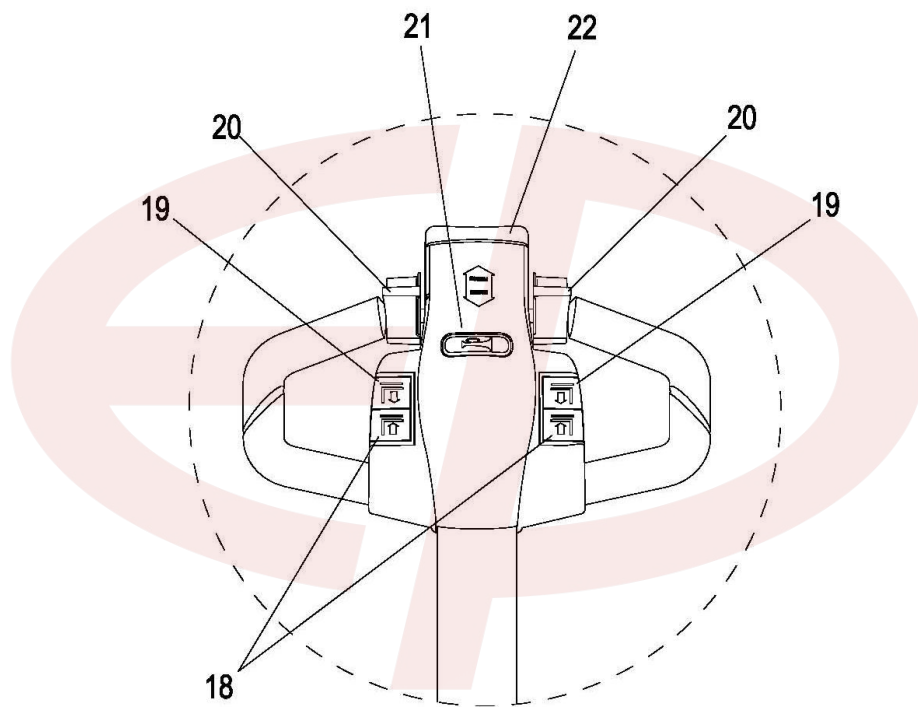
1.2 Stacker Assemblies



Item	Component	Item	Component
1	Control Handle	10	Battery
2	Key switch	11	Chassis
3	LED Lamp	12	Balance wheel
4	Mast cover	13	Cover (nether)
5	Lift Cylinder	14	Driving wheel
6	Battery discharge indicator	15	Cover(upper)
7	Battery charge connector	16	Tank
8	Emergency brake switch	17	Hydraulic Pump
9	Lift mechanism		

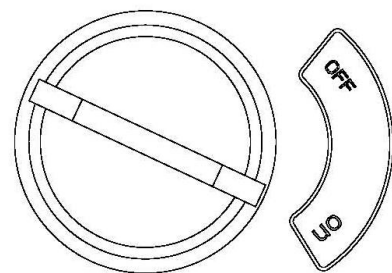
1.2.1 Control Handle

Item	Component	Function
18	"Lower" button	Lowers load forks.
19	"Lift" button	Raises load forks.
20	Travel switch	Controls the driving speed and direction
21	Warning signal button	Triggers a warning signal.
22	Collision safety switch	Safety function which, when activated, forces the stacker to reverse until the switch restored to neutral.



1.2.2 Key switch

Switches control current on and off.
Removing the key prevents the stacker from being switched on by unauthorised personnel.



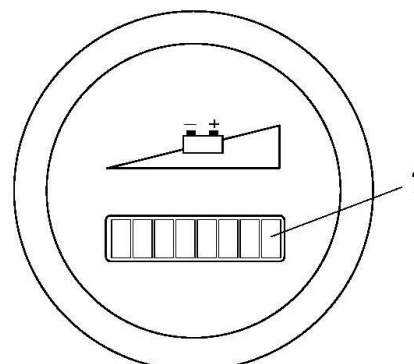
1.2.3 Battery discharge indicator

1. Battery Discharge Indicator(Without hour meter)

The LEDs (1) represent battery residual capacity.

Battery Discharge Indicator(1)

When the stacker has been released via the key switch, the battery charge status is displayed.



The colours of the LEDs (1) represent the following conditions:

Component	LED colour	value
Standard battery residual capacity	Red	20-100%
	Flashing Red	0-20%

Battery Discharge for 80%, flashing reds show on battery charge used up warning, Lifting is now inhibited. The battery must be charged.

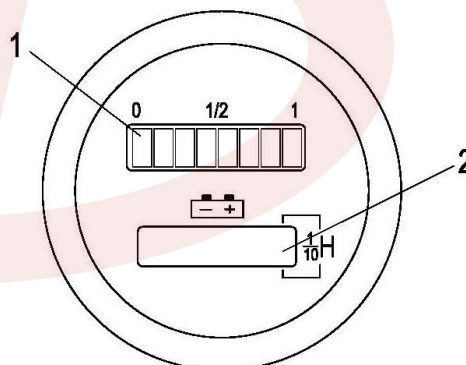
2. Battery Discharge Indicator(With hour meter)

The LEDs (1) represent battery residual capacity, The LCD (2) displays the operating hours.

Battery Discharge Indicator(1)

When the stacker has been released via the key switch, the battery charge status is displayed.

The colours of the LEDs (1) represent the following conditions:



Component	LED colour	value
Standard battery residual capacity	Green	70-100%
	Orange	30-60%
	Flashing Red	0-20%

Battery Discharge for 70%, A flashing red show on storage battery charge warning. Battery Discharge for 80%, Two flashing reds show on battery charge used up warning, Lifting is now inhibited. The battery must be charged.

Operating hours display(2)

Display range between 0.0 and 99,999.0 hours. Travel and lifting are logged. This is a backlit display.

Power up test

On power up the display shows:

- the operating hours
- the charge status

Low Voltage Protection

This vehicle has a low-voltage protection function.

When the battery voltage is less than, the vehicle will appear that the driving speed is slow ,but the fork can be lifted.And now the battery needs to be charged.

1.3 Standard Version Specifications

Technical specification details in accordance with VDI2198. Technical modifications and additions reserved.

1.3.1 Performance data for standard stackers

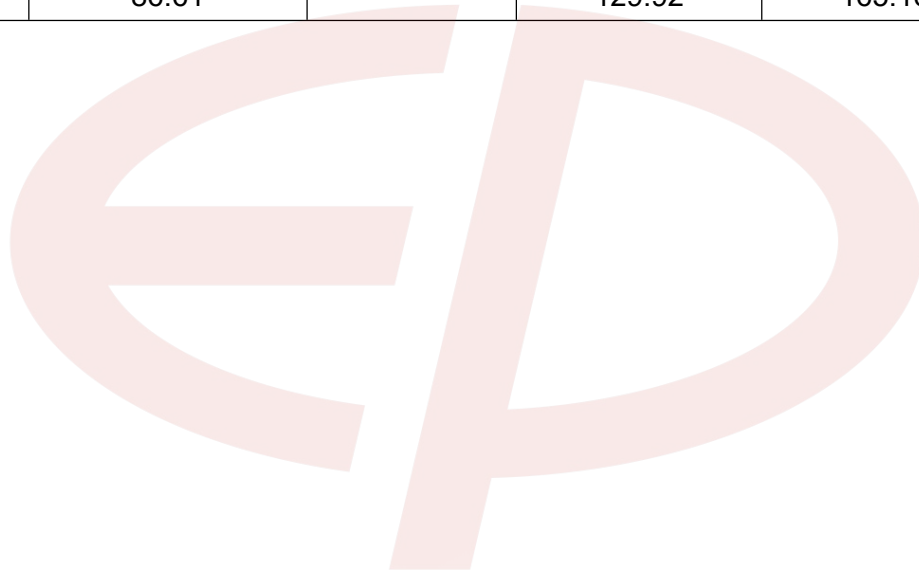
Item	Description	ES10-10MM	ES10-22MM	ES10-10ES	ES10-22DM	Unit
Q	Load capacity	1000	1000	1000	1000	kg
c	Load center	23.62	23.62	23.62	23.62	in
	Travel speed, laden/ unladen	3.5/4	3.5/4	3.5/4	3.5/4	km/h
	Lifting speed, laden/ unladen	0.12/ 0.22	0.12/ 0.22	0.12/0.22	0.12/0.22	m/ s
	Lowering speed, laden/ unladen	0.12/ 0.11	0.12/ 0.11	0.12/0.11	0.12/0.11	m/ s
	Maximum gradeability, laden/ unladen S2 5 min.	3/ 10	3/ 10	3/10	3/10	%
	Service weight (Incl. battery)	462	543	540	625	kg
	Axle loading, laden operator/load side	641/821	683/860	640/852	720/905	kg
	Axle loading, unladen operator/load side	343/119	420/123	419/121	497/128	kg
	Drive motor rating S2 60 min.	0.65	0.65	0.65	0.65	kW
	Lift motor rating at S3 15%	2.2	2.2	2.2	2.2	kW
	Battery voltage/ rated capacity	2×12/85	2x12/85	2×12/105	2×12/105	V/Ah
	Sound level at operator's ear	74	74	74	74	dB(A)

1.3.2 Dimensions

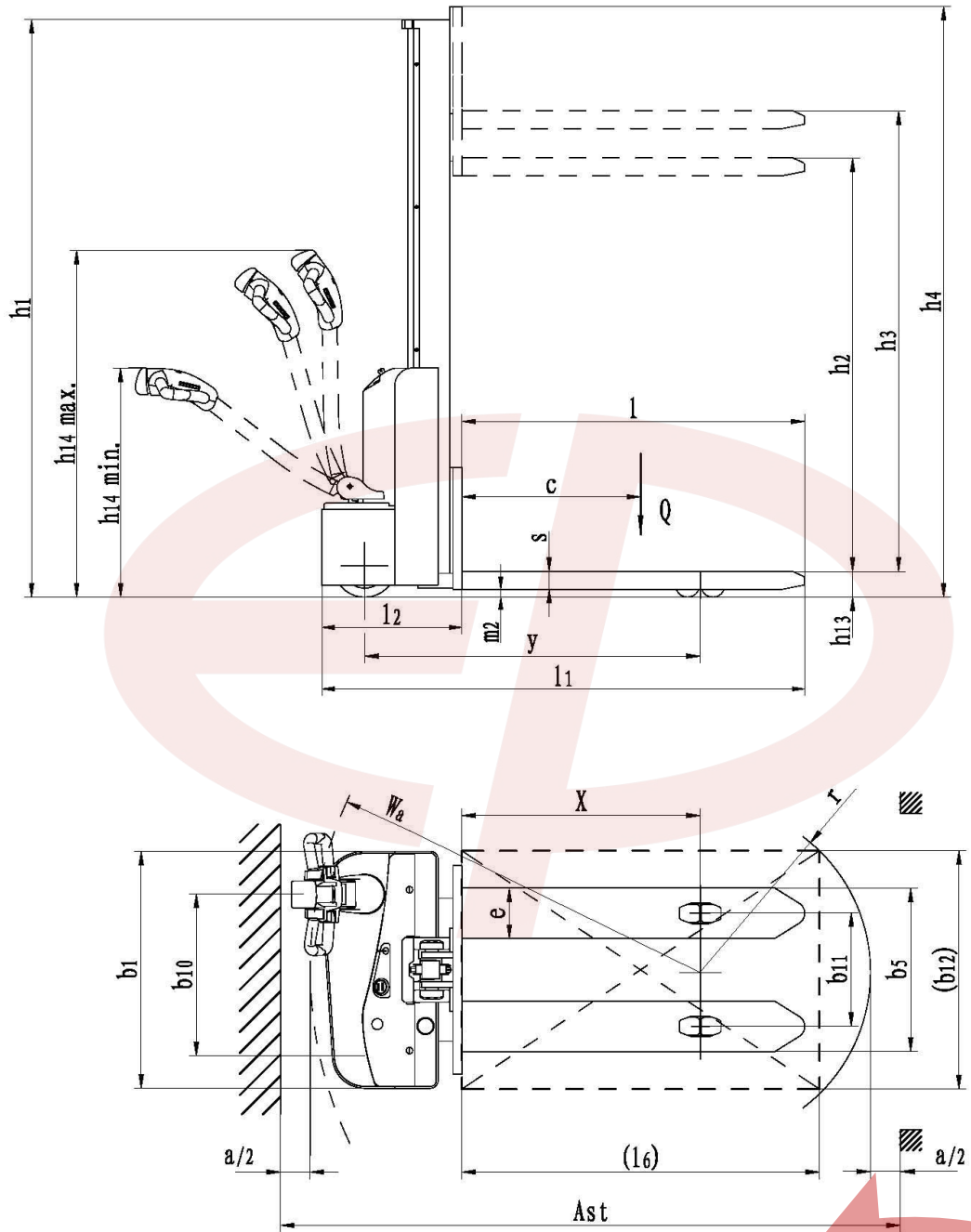
Item	Description	ES10-10MM	ES10-22MM	ES10-10ES	ES10-22DM	Unit
x	Load distance	31.70	33.46	29.88	33.27	in
y	Wheelbase	44.33	47.64	48.82	50.79	in
h ₁₄	Height of tiller arm in operating position, min/ max	33.86/47.24	33.86/47.24	33.86/47.24	33.86/47.24	in
h ₁₃	Fork height, lowered	3.35	2.36	3.35	2.36	in
l ₁	Overall length	63.58	61.81	68.50	64.96	in
l ₂	Length to face of forks	18.31	19.69	23.23	22.83	in
b ₁ / b ₂	Overall width	31.50/—	44.69/48.62/ 52.56 /56.50	31.50/—	44.69/48.62/ 52.56 /56.50	in
s/e/l	Fork dimensions	2.36/6.69/ 45.28	1.38/3.94/ 42.13	2.17/6.30/ 45.28	1.38/3.94/ 42.13	in
b ₅	Outside fork width, minimum/ maximum	21.65	7.87/30.12	22.05	7.87/30.12	in
m ₂	Ground clearance	1.18	1.57	1.18	1.57	in
Ast	Aisle width ¹⁾ , 1000×1200 pallet crossways	84.13	85.63	87.60	88.78	in
Ast	Aisle width ¹⁾ , 800×1200 pallet lengthways	81.18	82.68	84.65	85.83	in
Wa	Outer turning radius	50.98	52.32	55.43	55.28	in
b ₁₀	Tread, operator side	20.98	20.98	20.98	20.98	in
b ₁₁	Tread, load side	14.96	41.73/45.67/ 49.61 /53.54	15.75	41.73/45.67/ 49.61 /53.54	in
	Tyre type	PU/ PU	PU/ PU	PU/PU	PU/PU	
	Tyre size, operator side	Ø8.27×2.76	Ø8.27×2.76	Ø8.27×2.76	Ø8.27×2.76	in
	Tyre size, load side	Ø3.15×2.36	Ø3.94×1.97	Ø3.15×2.36	Ø3.94×1.97	in
	Balance wheels (dimensions)	Ø5.12×2.17	Ø3.94×1.97	Ø5.12×2.17	Ø3.94×1.97	in
	Wheels, number operator/load side (x=drive wheels)	1×+ 1/ 4	1×+ 1/ 4	1× +1/4	1× +1/4	
	Type of drive control	DC	DC	DC	DC	

¹⁾ Including safety distance a = 7.87 in

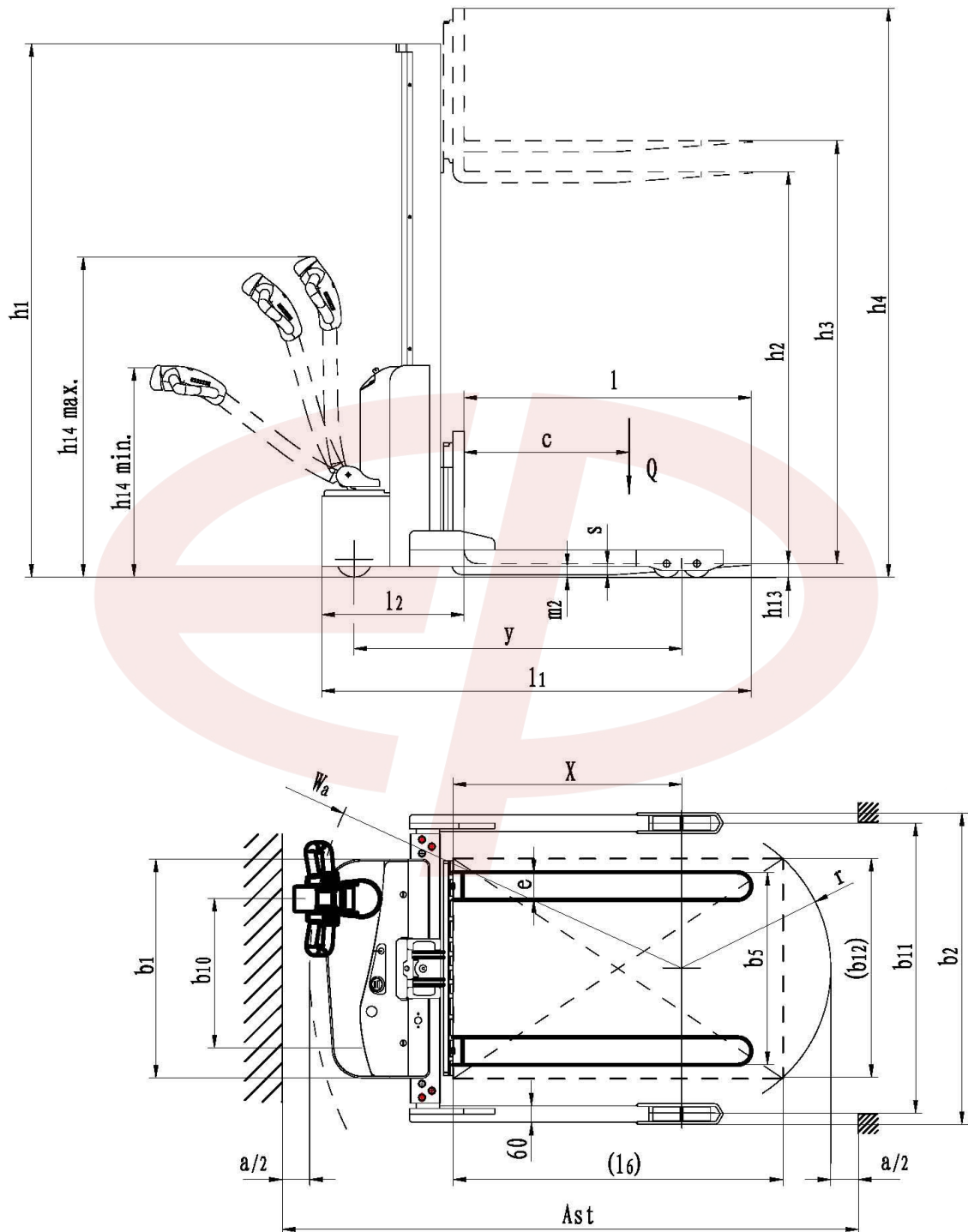
Model	Height ,mast lowered (h1)	Free lift (h2)	Lift height (h3+h13)	Height ,mast extended (h4)	Unit
ES10-10MM	76.38	62.70	62.99	76.97	in
	90.16	76.38	78.74	90.75	in
ES10-22MM	76.38	59.06	62.99	80.51	in
	90.16	72.83	78.74	94.29	in
ES10-10ES	70.87		98.43	117.32	in
	74.80		106.30	125.20	in
	80.71		118.11	137.01	in
	86.61		129.92	148.82	in
ES10-22DM	70.87		98.43	133.66	in
	74.80		106.30	141.54	in
	80.71		118.11	153.35	in
	86.61		129.92	165.16	in



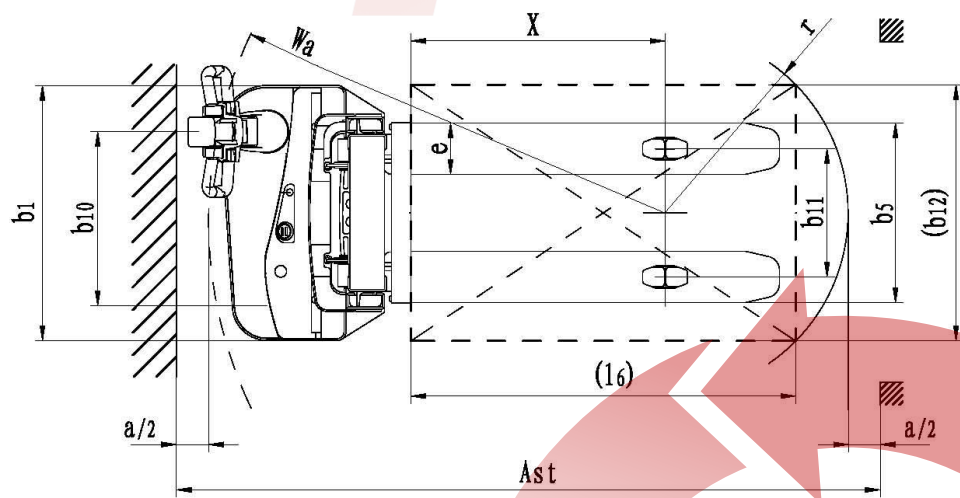
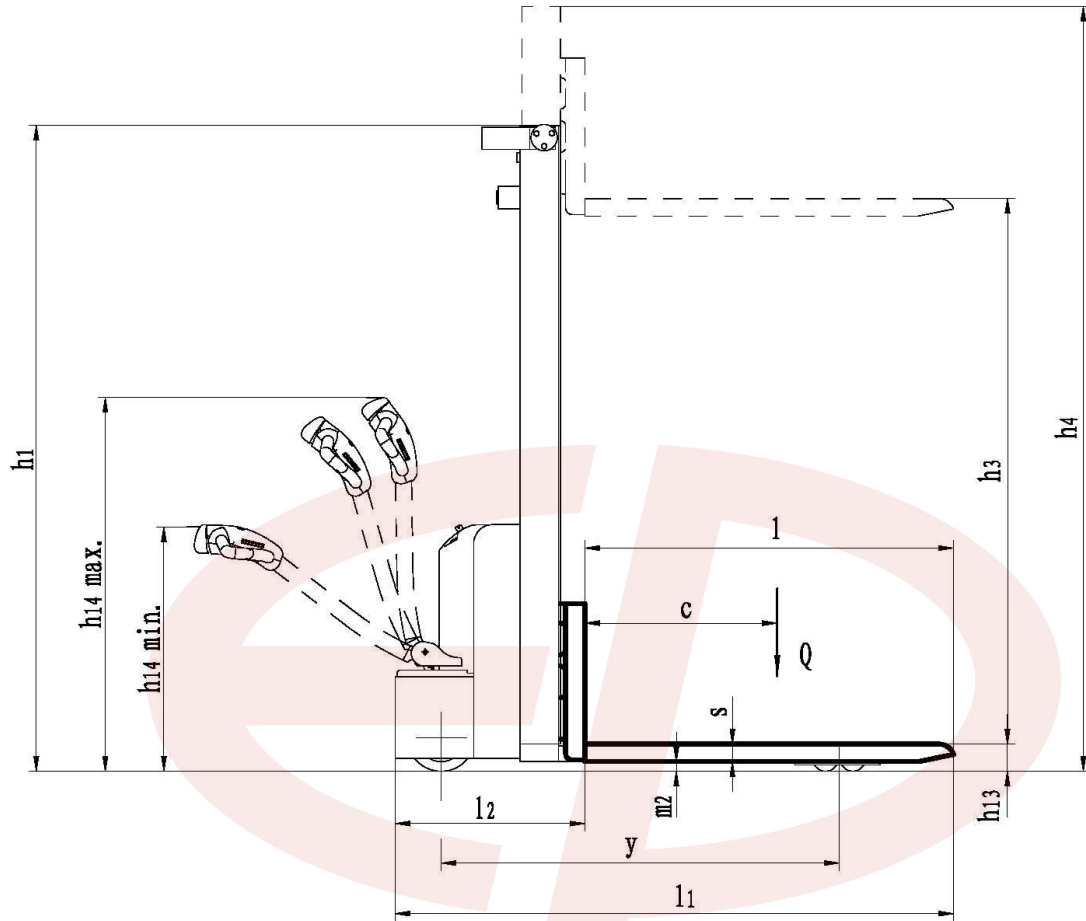
ES10-10MM



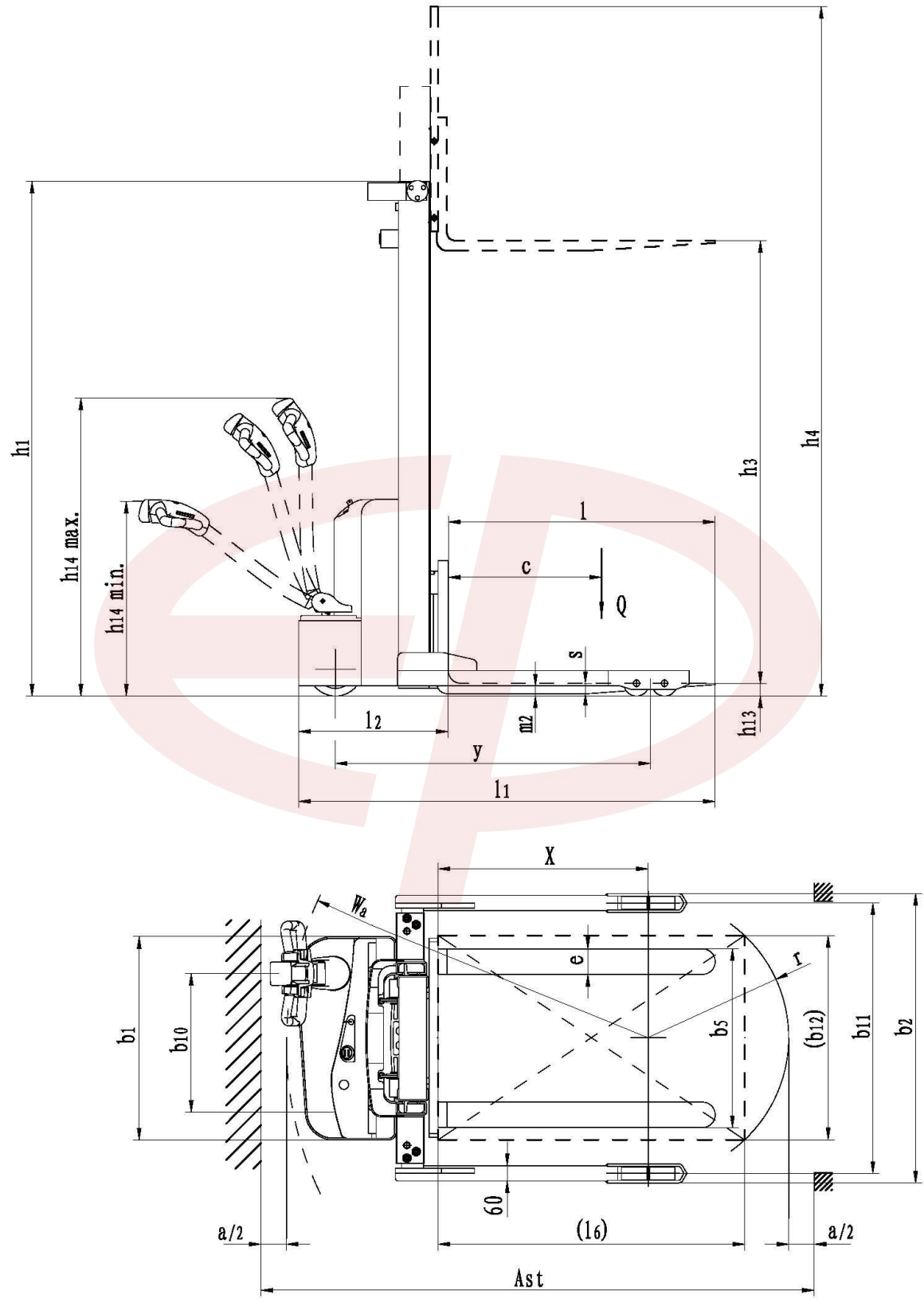
ES10-22MM



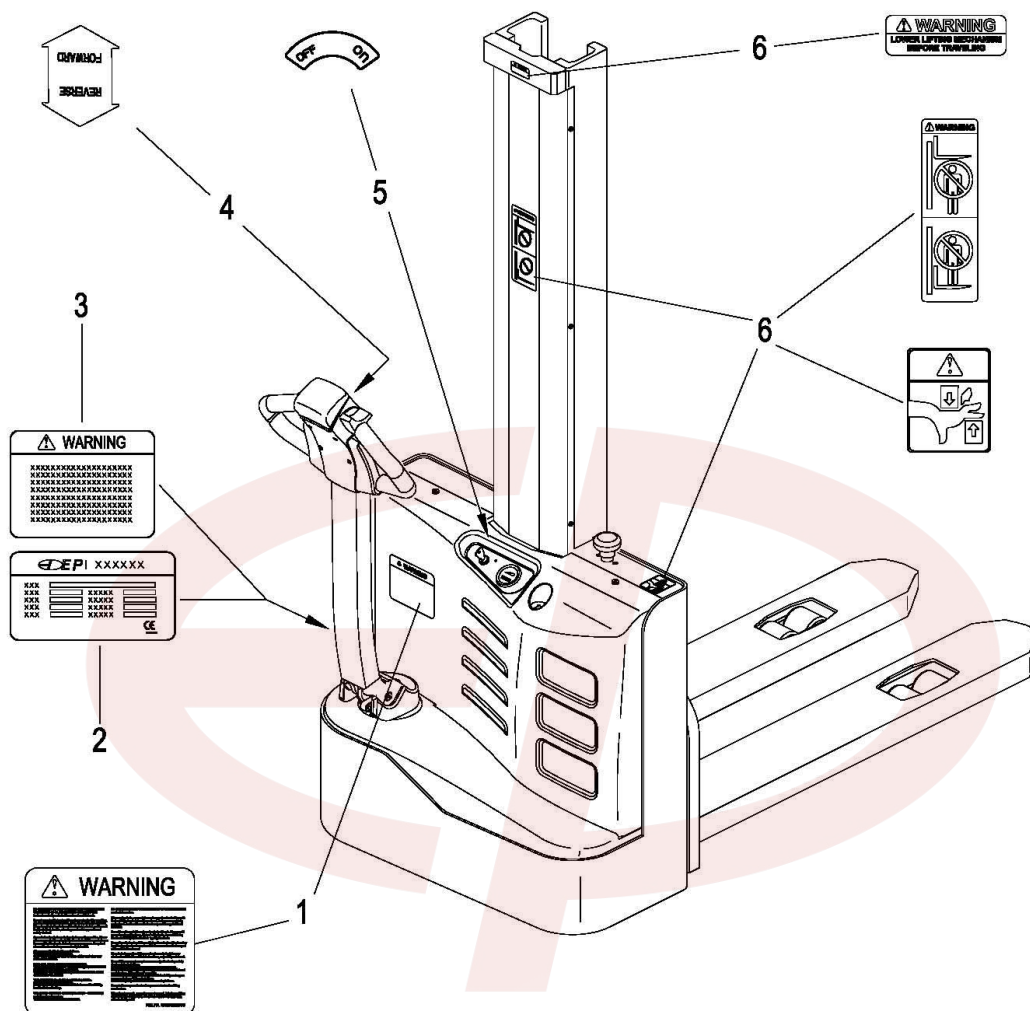
ES10-10ES



ES10-22DM

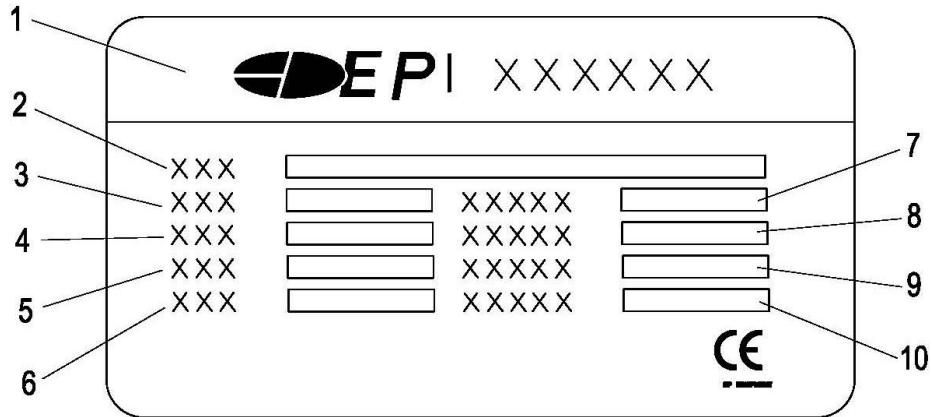


1.4 Identification points and data plates



Item	Description
1	Operator Warning Decal
2	Stacker data plate
3	Warning plate
4	Direction Decal On Control Handle
5	Key Switch Decal
6	Warning Decal

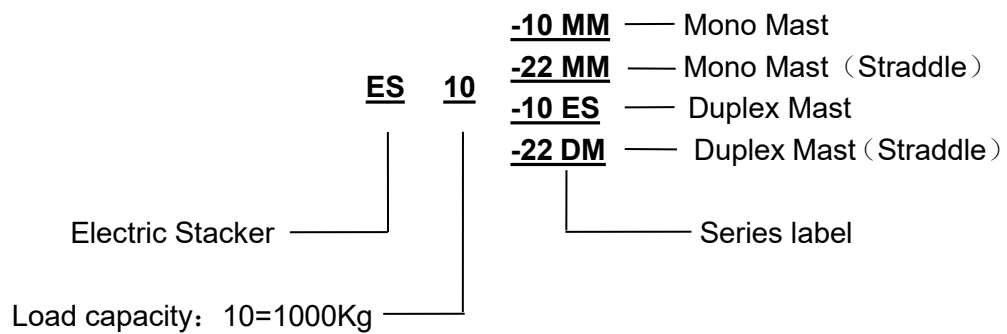
1.4.1 Stacker data plate



Item	Description	Item	Description
1	Manufacturer	6	Fork length
2	Type	7	Lift height
3	Load capacity (kg)	8	Battery nominate capacity
4	Load center	9	Service weight with battery
5	Fork width	10	Serial no.

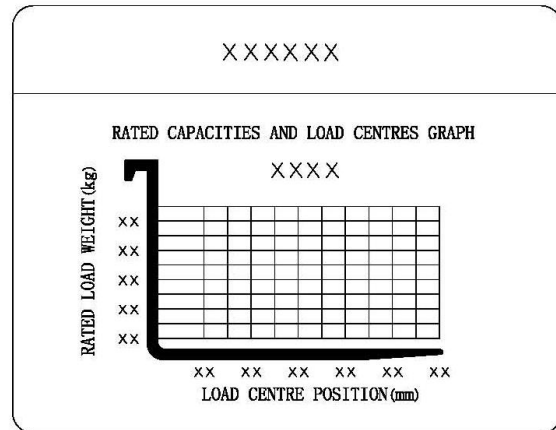
For queries regarding the stacker or ordering spare parts please quote the stacker serial number(10).

MODEL NUMBER EXAMPLE



1.4.2 Capacity chart

The chart given above shows the relation between the load center and the weight of loads.



2. Commissioning

2.1 Using the Stacker for the First Time

Only operate the stacker with battery current.

Preparing the stacker for operation after delivery or transport.

Procedure

- Check the equipment is complete.
- Check the hydraulic oil level.
- Install the battery if necessary (where required), (see "4.4 Battery removal and installation" on page 24) do not damage battery cable.
- Charge the battery, (see "4.3 Charging the battery" on page 23).

When the stacker is parked the surface of the tyres will flatten. The flattening will disappear after a short period of operation.

2.2 During brake-in

We recommended operating the machine under light load conditions for the first stage of operation to get the most from it. Especially the requirements given below should be observed while the machine is in a stage of 100 hours of operation.

- Must prevent the new battery from over discharging when early used. Please charging when remain power less than 20%.
- Perform specified preventive maintenance services carefully and completely.
- Avoid sudden stop, starts or turns.
- Oil changes and lubrication are recommended to do earlier than specified.
- Limited load is 70~80% of the rated load.

3.Operation

3.1 Safety Regulations for the Operation of Stackers

Driver authorisation: The stacker may only be used by suitably trained personnel, who have demonstrated to the proprietor or his representative that they can drive and handle loads and have been authorised to operate the stacker by the proprietor or his representative.

Driver's rights, obligations and responsibilities: The driver must be informed of his duties and responsibilities and be instructed in the operation of the stacker and shall be familiar with the operator manual. The driver shall be afforded all due rights. Safety shoes must be worn with pedestrian operated stackers.

Unauthorised Use of Stacker: The driver is responsible for the stacker during the time it is in use. He shall prevent unauthorised persons from driving or operating the stacker. It is forbidden to carry passengers or lift personnel.

Damage and Faults: The supervisor must be immediately informed of any damage or faults to the stacker. Stackers not safe for operation (e.g. wheel or brake problems) must not be used until they have been rectified.

Repairs: The driver must not carry out any repairs or alterations to the stacker without the necessary training and authorisation to do so. The driver must never disable or adjust safety mechanisms or switches.

Hazardous area: A hazardous area is defined as the area in which a person is at risk due to stacker movement, lifting operations, the load handler (e.g. forks or attachments) or the load itself. This also includes areas which can be reached by falling loads or overwing operating equipment.

- Unauthorised persons must be kept away from the hazardous area.
- Where there is danger to personnel, a warning must be sounded with sufficient notice.
- If unauthorised personnel are still within the hazardous area the stacker shall be brought to a halt immediately.

Safety Devices and Warning Signs: Safety devices, warning signs and warning instructions shall be strictly observed.

3.2 Operate and run the stacker

3.2.1 Preparing

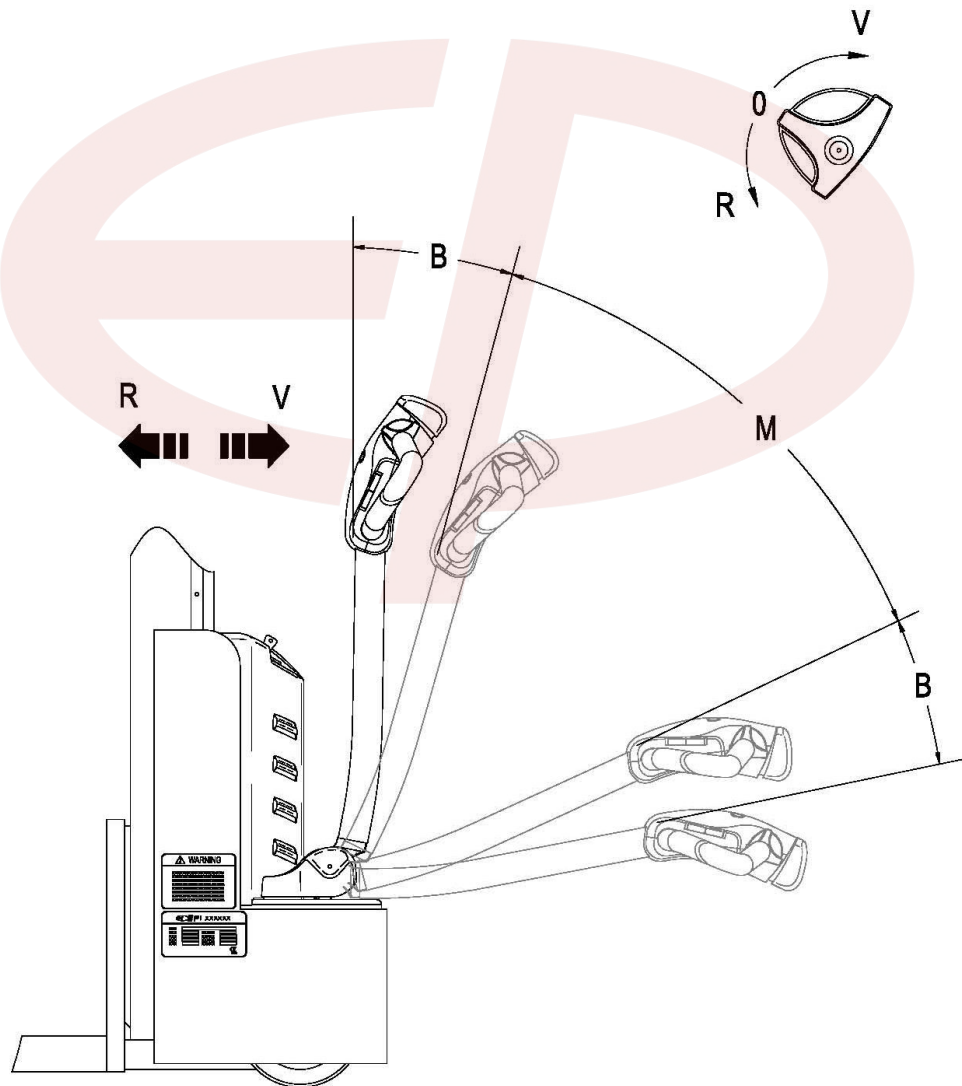
Before the stacker can be commissioned, operated or a load unit lifted, the driver must ensure that there is nobody within the hazardous area.

Checks and operations to be performed before starting daily work

- Visually inspect the entire stacker (in particular wheels and load handler) for obvious damage.

3.2.2 Travel, Steering, Braking

Do not drive the stacker unless the panels are closed and properly locked.



1. Driving

Set the control handle to the travel zone (M). Set the travel switch (20) (see Page 4) to control the driving speed and direction.

2. Steering

Apply the control handle(1) to the left or right.

3. Braking

The brake pattern of the stacker depends largely on the ground conditions. The driver must take this into account when operating the stacker.

The driver must be looking ahead when travelling. If there is no hazard, brake moderately to avoid moving the load .

The stacker can brake in four different ways:

- Emergency braking
- Automatic braking
- Regenerative braking
- Inversion braking

• Emergency braking

Press the emergency brake switch(2), all electrical functions are cut out and the stacker automatically brakes.

• Automatic braking

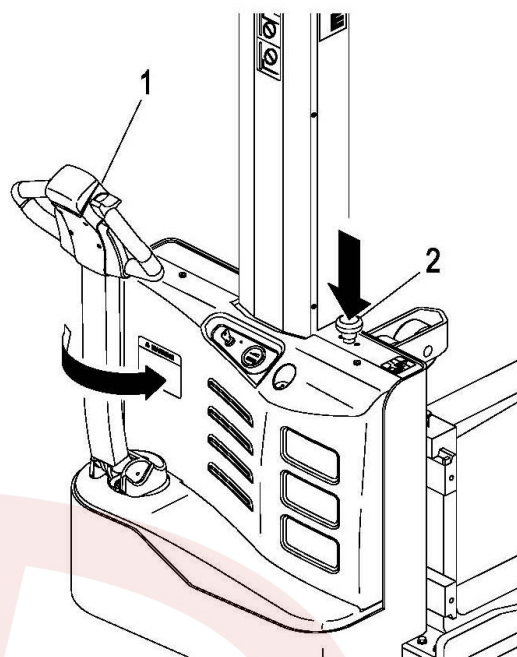
When the control handle(1) is released it automatically sets itself to the upper brake zone (B) and automatic braking ensues.

• Regenerative braking

If the travel switch (20) (see Page 4) is set to "0", the stacker automatically brakes regeneratively. When the speed below 1Km/h the brake then applies and motor brake stop.

• Inversion braking

You can set the travel switch (20) (see Page 4) to the opposite direction when travelling. The stacker brakes regeneratively until it starts to move in the opposite direction.



Warning!

If the control handle moves slowly or not at all to the upper brake zone, the stacker must be taken out of service until the cause of this fault is be rectified.

Replace the gas pressure spring if

Warning!

If the travel switch moves slowly or not at all to 0, the stacker must be taken out of service until the cause of this fault is be rectified.

Replace the control handle if necessary.

Warning!

In hazardous situations set the control handle to the brake position or set the travel switch (20) to the opposite direction.

3.2.3 Lifting, transporting and depositing loads

Unsecured and incorrectly positioned loads can cause accidents

·Instruct other people to move out of the hazardous area of the stacker. Stop working with the stacker if people do not leave the hazardous.

·Only carry loads that have been correctly secured and positioned. Use suitable precautions to prevent parts of the load from tipping or falling down.

·Do not transport with bad handbarrow (as stacker and stock) .

·Never stand underneath a raised load handler.

·Do not stand on the load handler.

·Do not lift other people on the load handler.

·Insert the forks as far as possible underneath the load.

Warning!

Before lifting a load unit the driver must make sure that it has been correctly stowed and does not exceed the stacker's capacity.

Do not lift long loads at an angle.

Lift

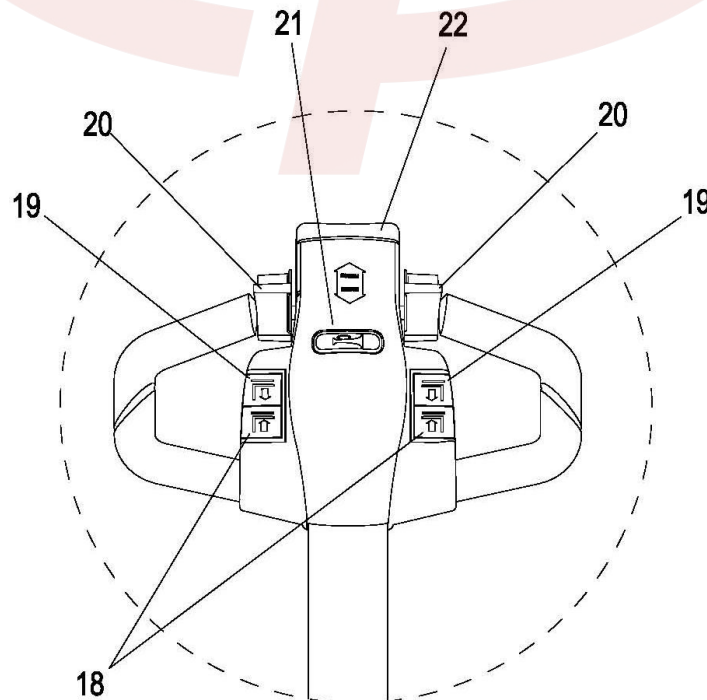
Press "Lift" button(19) until the height you need.

Lower

Press "Lower" button (18) until the lowest position.

Warning!

Don't lift to tiptop, to avoid shorted life of oil cylinder.



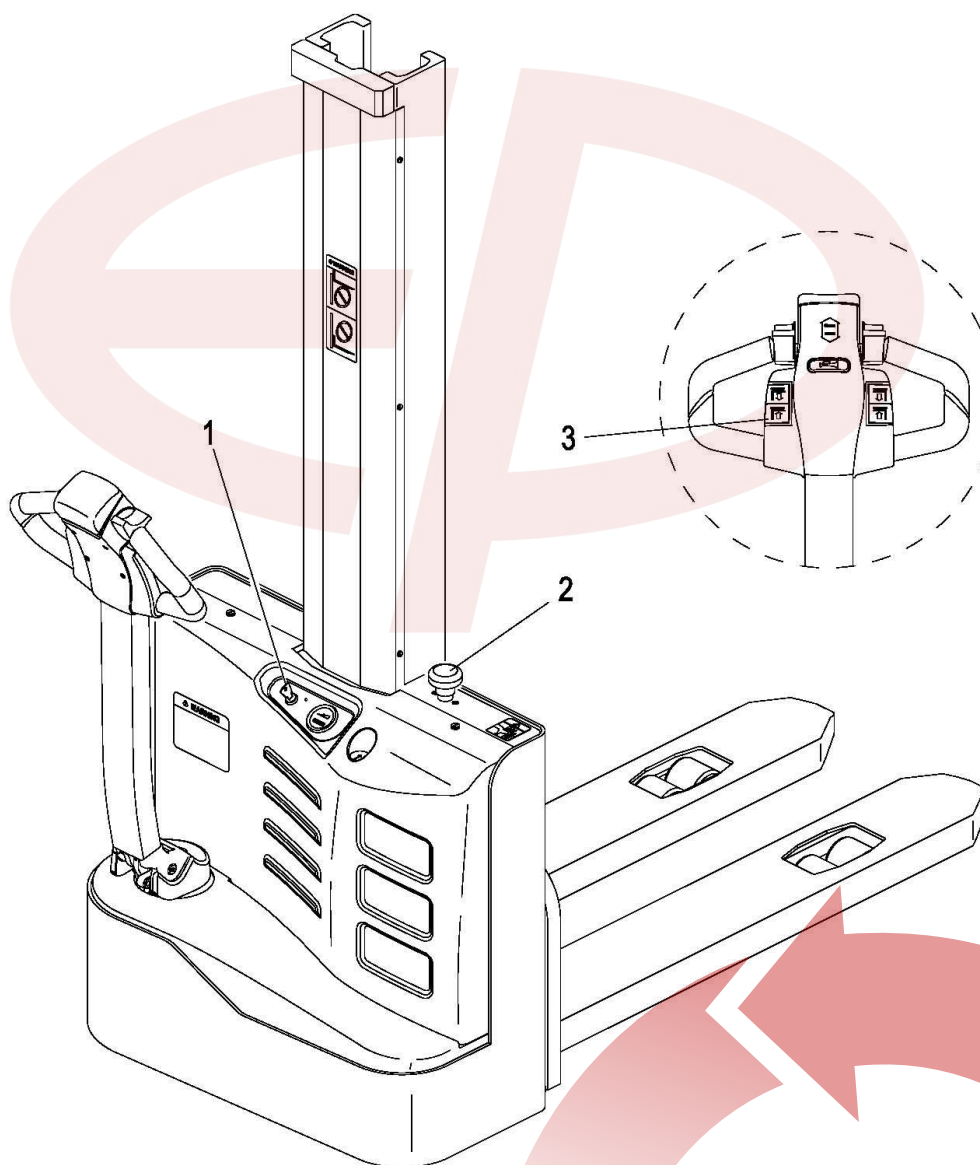
3.2.4 Parking the stacker securely

When you leave the stacker it must be securely parked even if you only intend to leave it for a short time.

- Press “Lower” button(3), fully lower the load handler.
- Fully lower the forks.
- Press the emergency brake switch(2).
- Turn off the key switch and remove the key(1).

Warning!

Parking the stacker securely.
Forbid parking on an incline.
Always fully lower the forks.



4. Battery Maintenance & Charging

4.1 Safety regulations for handling acid batteries

Park the stacker securely before carrying out any work on the batteries.

Maintenance personnel : Batteries may only be charged, serviced or replaced by trained personnel. The present operator manual and the manufacturer's instructions concerning batteries and charging stations must be observed when carrying out the work.

Fire protection :

- Smoking and naked flames must be avoided when working with batteries.
- Wherever a stacker is parked for charging there shall be no inflammable material or operating fluids capable of creating sparks within 2 meters around the stacker.
- The area must be well ventilated.
- Fire protection equipment must be provided.



Protection against electric shock:

- Battery has high voltage and energy.
- Do not bring short circuit.
- Do not approach tools to the two poles of the battery, which can cause the sparkle.

4.2 Battery type & dimension

Battery type & dimension as follow :

Tuck type	Battery type	voltage/ rated capacity	Battery height (in)	Battery length (in)	Battery width (in)
ES10-10MM	Industry battery	2×12/60	8.27	10.24	6.50
ES10-22MM		2×12/80	8.27	10.08	6.50
ES10-10ES	Industry battery	2×12/80	8.27	10.08	6.50
ES10-22DM		2×12/105	8.27	12.01	6.50
		2×12/120	8.27	12.80	6.50

When replacing or installing batteries, ensure that the battery is correctly secured in the battery compartment of the stacker.

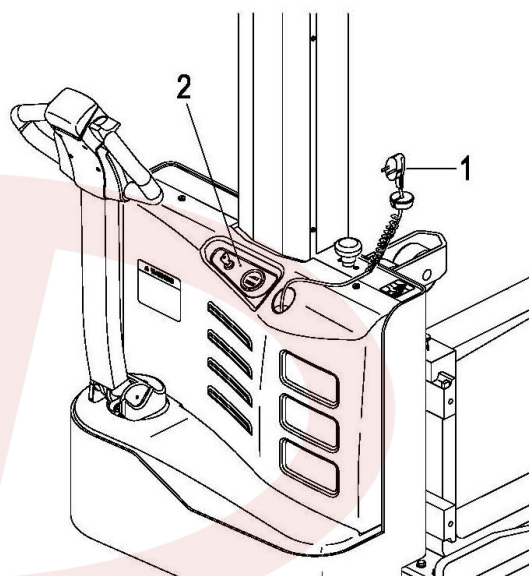
4.3 Charging the battery

Safety regulations for Charging the battery

- To charge the battery, the stacker must be parked in a closed and properly ventilated room.
- Do not place any metal objects on the battery.
- Before charging, check all cables and plug connections for visible signs of damage.
- Before start and finish charging to make sure power is turn OFF.
- It is essential to follow the safety regulations of the battery and charging station manufacturers.

Charging step

- Check whether the condition is according with "Safety regulations for Charging the battery".
- Park the truck securely(See 3.2.4 Parking the truck securely Page21).
- Remove the battery plug .
- Connect the battery plug (1) with the charging lead of the stationary charger and turn on the charger.



Warning!
Mains voltage:100-240V

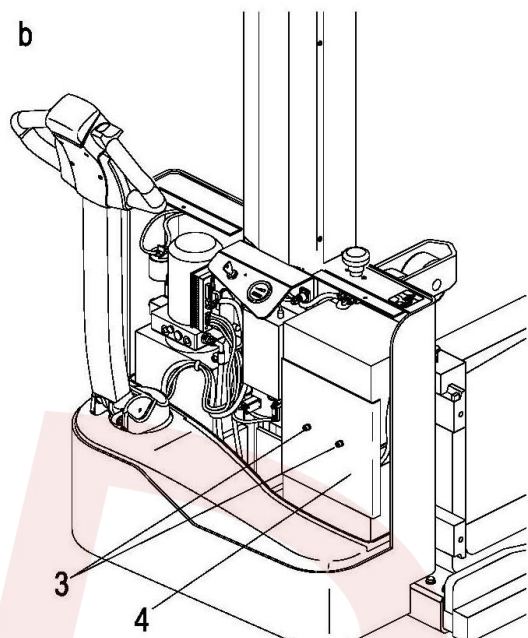
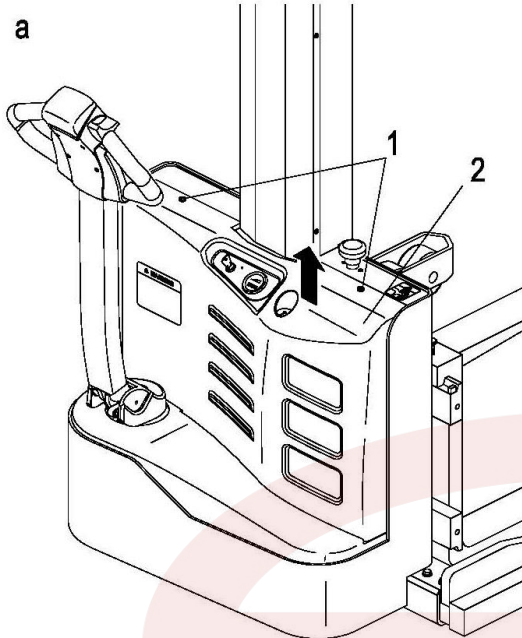
Battery Charging LED Light (2)		
DISPLAY	DESCRIPTION	TROUBLESHOOTING
Solid Red	Battery is charging	Running normally.
Solid Green	Battery has fully charged	Running normally.
Solid Yellow	Battery failure	The battery voltage is less than 13V or greater than 32.5V.
Flashing Yellow	Charger failure	a. Output current or output voltage is too large. b. The temperature of charger is too high.
Flashing Red	Charger without output current	a. Charger failure. b. The battery is not connected ; battery failure.
NO Lighting	Charger failure	a. Charger failure. b. The input of charger is not connected.

4.4 Battery removal and installation

Park the stacker securely and turn off the power before removal and installation battery.

Battery removal and installation steps:

a: Remove two screws(1), take out the Cover(2).



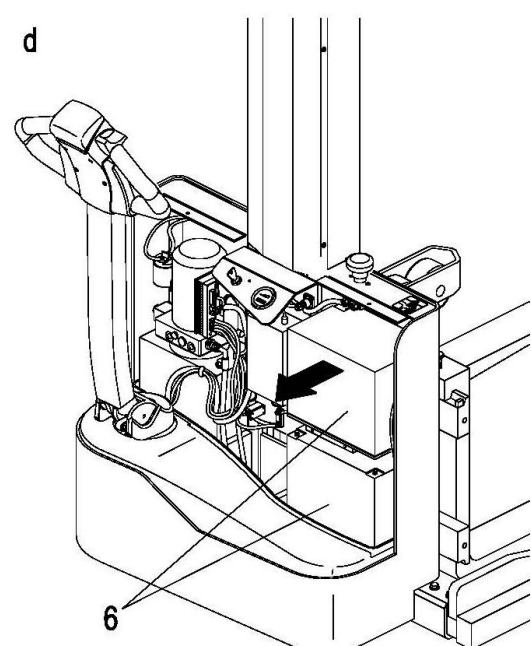
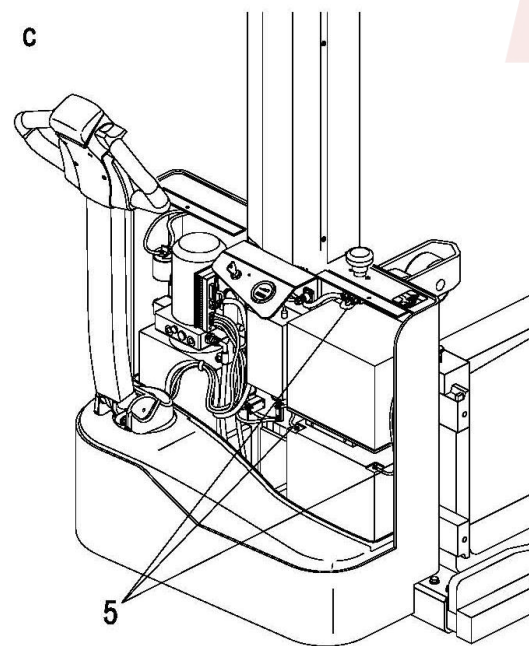
b: Remove two screws(3), take out the Bracket(4)

c: Remove 3 battery cable(5) as shown in figure.

d: Put battery(6) in or removal battery(6).

Warning!

Well place cables to avoid be damaged when you removal and installation battery.



- Installation is in the reverse order of operations, pay attention on battery install position and cable connection. Make sure the well place cables to avoid be damaged when you removal and installation battery.

4.5 Battery maintenance

Do not overuse battery:

- If you use up the energy of battery till the forklift immovability, you will shorten its working hours.
- Shower for battery appears need for charge, please charge it quickly.

Battery maintenance:

The battery cell covers must be kept dry and clean. The terminals and cable shoes must be clean, secure and have a light coating of dielectric grease. Batteries with non insulated terminals must be covered with a non slip insulation mat.

Warning!

1. Do not use dry cloth or fibre cloth to clean the battery, avoiding static to bring the explosion.
2. Unfixing battery plug.
3. Cleaning with wet cloth.
4. Wearing glasses for protecting eyes rubber overshoes and rubber glove.

Battery storage:

If batteries are taken out of service for a lengthy period they should be stored in the fully charged condition in a dry, frost-free room. To ensure the battery is always ready for use a choice of charging methods can be made:

- a monthly equalizing charge as in point 4.3(see Page 23)

4.6 Battery Disposal

Batteries may only be disposed of in accordance with national environmental protection regulations or disposal laws. The manufacturer's disposal instructions must be followed.

Batteries contain an acid solution which is poisonous and corrosive . Therefore , always wear protective clothing and eye protection when carrying out work on batteries . Above all avoid any contact with battery acid.

Nevertheless, should clothing, skin or eyes come in contact with acid the affected

parts should be rinsed with plenty of clean water-where the skin or eyes are affected call a doctor immediately. Immediately neutralise any spilled battery acid.

Only batteries with a sealed battery container may be used.

The weight and dimensions of the battery have considerable affect on the operational safety of the stacker. Battery equipment may only be replaced with the agreement of the manufacturer.



5. Stacker Maintenance

5.1 Operational safety and environmental protection

- The servicing and inspection operations contained in this chapter must be performed in accordance with the intervals indicated in the servicing checklists.
- Any modification to the stacker assemblies, in particular the safety mechanisms, is prohibited. The operational speeds of the stacker must not be changed under any circumstances.
- Only original spare parts have been certified by our quality assurance department. To ensure safe and reliable operation of the stacker, use only the manufacturer's spare parts. Used parts, oils and fuels must be disposed of in accordance with the relevant environmental protection regulations. For oil changes, contact the manufacturer's specialist department.
- Upon completion of inspection and servicing, carry out the activities listed in the "Recommissioning (on page 32)" section.

5.2 Maintenance Safety Regulations

Maintenance personnel

Stackers must only be serviced and maintained by the manufacturer's trained personnel.

The manufacturer's service department has field technicians specially trained for these tasks. We therefore recommend a maintenance contract with the manufacturer's local service center.

Lifting and jacking up

When a stacker is to be lifted, the lifting gear must only be secured to the points specially provided for this purpose.

When jacking up the stacker, take appropriate measures to prevent the stacker from slipping or tipping over (e.g. wedges, wooden blocks).

You may only work underneath a raised load handler if it is supported by a sufficiently strong chain.

Cleaning

Do not use flammable liquids to clean the stacker.

Prior to cleaning, all safety measures required to prevent sparking (e.g. through short circuits) must be taken. For battery-operated stackers, the battery connector must be removed.

Only weak suction or compressed air and non-conductive antistatic brushes may be used for cleaning electric or electronic assemblies.

If the stacker is to be cleaned with a water jet or a high-pressure cleaner, all electrical and electronic components must be carefully covered beforehand as moisture can cause malfunctions.

Do not clean with pressurised water.

After cleaning the stacker, carry out the activities detailed in the “Recommissioning (on page 32)” section.

Electrical System

Only suitably trained personnel may operate on the stacker’s electrical system. Before working on the electrical system, take all precautionary measures to avoid – electric shocks.

For battery-operated stackers, also de-energise the stacker by removing the battery connector.

Welding

To avoid damaging electric or electronic components, remove these from the stacker before performing welding operations.

Settings

When repairing or replacing electric or electronic components or assemblies, always note the stacker-specific settings.

Tyres

The quality of tyres affects the stability and performance of the stacker. When replacing factory fitted tyres only used original manufacturer’s spare parts, as otherwise the data plate specifications will not be kept.

When changing wheels and tyres, ensure that the stacker does not slew (e.g. when replacing wheels always left and right simultaneously).

5.3 Servicing and inspection

Thorough and expert servicing is one of the most important requirements for the safe operation of the stacker. Failure to perform regular servicing can lead to stacker failure and poses a potential hazard to personnel and equipment.

The service intervals stated are based on single shift operation under normal operating conditions. They must be reduced accordingly if the stacker is to be used in conditions of extreme dust, temperature fluctuations or multiple shifts.

The following maintenance checklist states the tasks and intervals after which they should be carried out. Maintenance intervals are defined as:

W = Every 50 service hours, at least weekly

A = Every 250 operating hours

B = Every 500 operating hours, or at least annually

C = Every 2000 operating hours, or at least annually

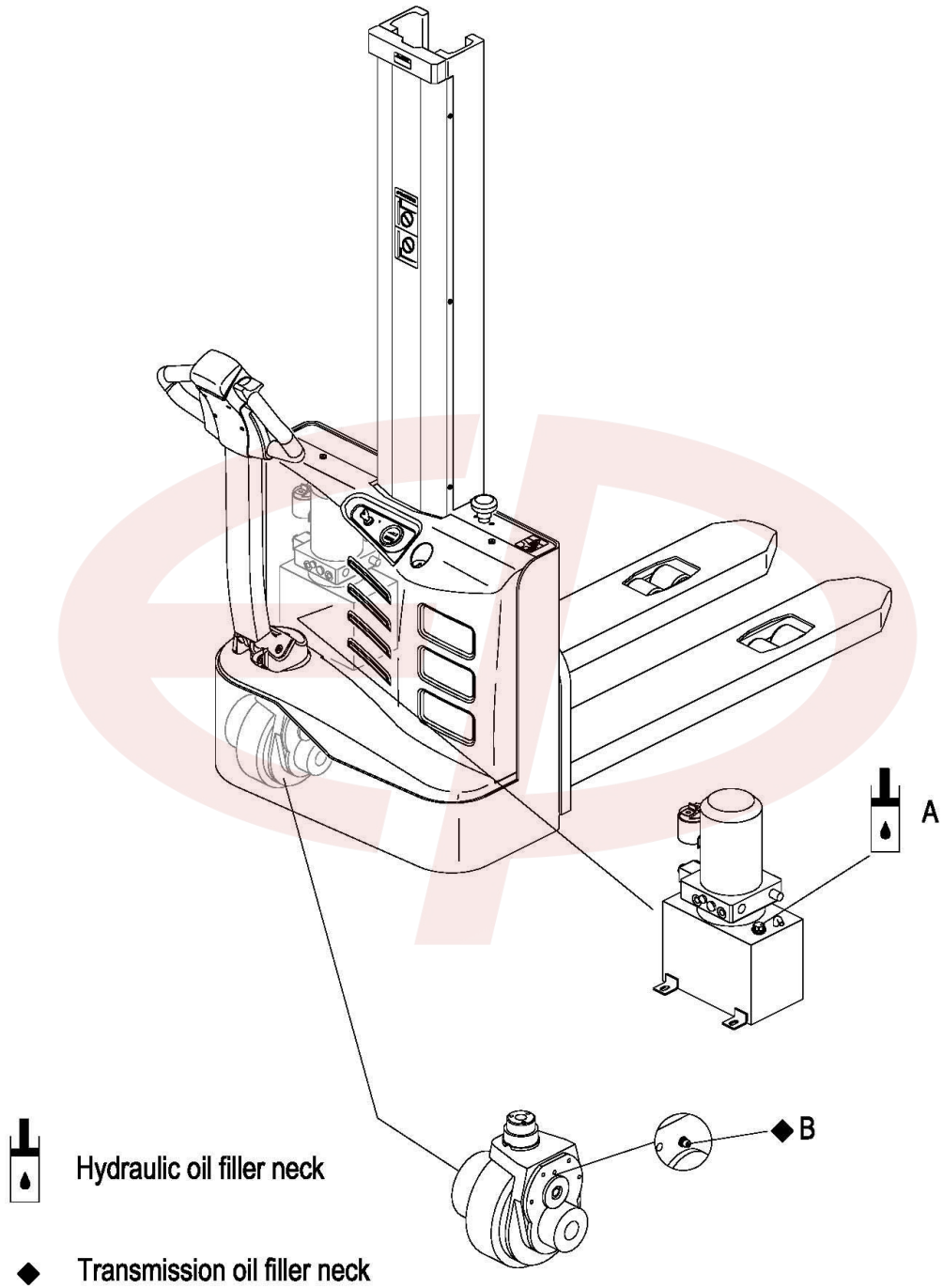
W service intervals are to be performed by the customer.

In the run-in period - after approx. 100 service hours - or after repair work, the owner must check the wheel nuts/bolts and re-tighten if necessary.

5.3.1 Maintenance Checklist

		Maintenance interval ●			
		W	A	B	C
Braking	Check magnetic brake air gap.			●	
Electrical system	Test instruments, displays and control switches.	●			
	Test warning and safety device.		●		
	Make sure wire connections are secure and check for damage.			●	
	Test micro switch setting.	●			
	Check relays.			●	
	Fix the motor and cable			●	
Power supply	Visually inspect battery		●		
	Visually inspect battery plug			●	
	Check battery cable connections are secure, grease terminals if necessary.			●	
Travel	Check the transmission for noise and leakage.			●	
	Check travel mechanism, adjust and lubricate if necessary. Check control handle recuperating function.		●		
	Check wheels for wear and damage.			●	
	Check wheel bearings and attachments.			●	
Stacker frame	Check stacker frame for damage.			●	
	Check labels are present and complete			●	
	Check mast attachment			●	
Hydraulic operations	Test hydraulic system.		●		
	Check that hose and pipe lines and their connections are secure, check for leaks and damage.		●		
	Check cylinders and piston rods for damage and leaks, and make sure they are secure.			●	
	Check load chain setting and tension if necessary.			●	
	Visually inspect mast rollers and check contact surface wear level			●	
	Check forks, load handler for wear and damage			●	
	Check hydraulic oil level.			●	
	Replace hydraulic oil.				●
	Check and clean hydraulic oil filter. Replace it if necessary.				●

5.3.2 Lubrication Schedule



Consumables

Handling consumables type material: Consumables must always be handled correctly. Follow the manufacturer's instructions.

Improper handling is hazardous to health, life and the environment. Consumables must only be stored in appropriate containers. They may be flammable and must therefore not come into contact with hot components or naked flames.

Only use clean containers when filling up with consumables. Do not mix consumables of different grades. The only exception to this is when mixing is expressly stipulated in the Operating Instructions.

Avoid spillage. Spilled liquids must be removed immediately with suitable bonding agents and the bonding agent/consumable mixture must be disposed of in accordance with regulations.

Code	Description	Used for
A	HM46#	Hydraulic system
B	Grease(contain Mus ₂)	gear case

5.3.3 Maintenance Instructions

Prepare the stacker for maintenance and repairs

All necessary safety measures must be taken to avoid accidents when carrying out maintenance and repairs. The following preparations must be made:

- Park the stacker securely (See 3.2.4 Parking the stacker securely Page 21).
- Remove the key to prevent the stacker from accidentally starting.
- When working under a raised lift stacker, secure it to prevent it from tipping or sliding away.

Open the cover(upper)

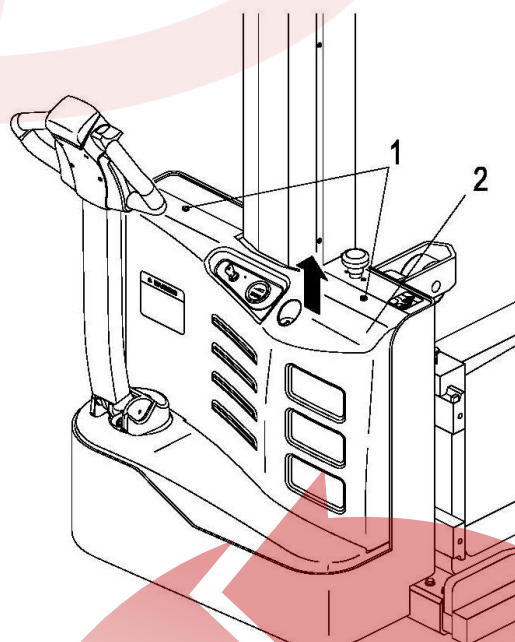
- Remove the two screws (1).
- Carefully open the cover(upper) (2).

Replacing the drive wheel

The drive wheel must only be replaced by authorised service personnel.

Check the hydraulic oil level

It is going to add hydraulic oil when you heard explosion sound from pipe during lifting.



Warning!
Forbid adding hydraulic oil within impurity.

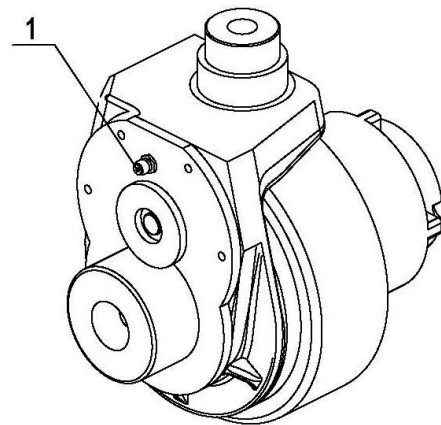
- Prepare the stacker for maintenance and repairs (See 5.3.3 Maintenance Instructions Page31).

- Opening the cover(upper).

- Add hydraulic oil of the correct grade (See 5.3.2 Lubrication Schedule P30) .

Add hydraulic oil till you cant hear explosion sound during lifting.

Installation is the reverse order.



Check transmission oil level

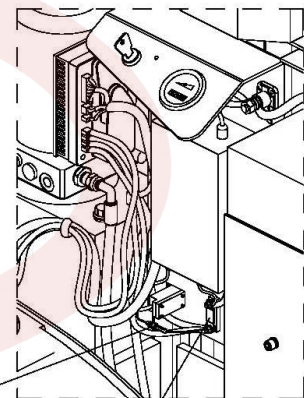
- Prepare the stacker for maintenance and repairs (See 5.3.3 Maintenance Instructions Page31).

- Add transmission oil of the correct grade to oil cup(See 5.3.2 Lubrication Schedule Page30).

- add transmission oil every 1000 operating hours, or at least annually.

Installation is the reverse order.

Warning!
 Forbid adding transmission oil within impurity.

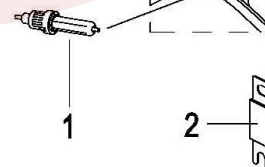


Checking electrical fuses

- Prepare the stacker for maintenance and repairs (See 5.3.3 Maintenance Instructions Page31).

- Open the cover(upper) (See 5.3.3 Maintenance Instructions Page31).

- Check rating of all fuses in accordance with table, replace if necessary.



Item	To protect:	Rating
1	Traction/Lift motor Fuse	150A
2	Controller Fuse	10A

Recommissioning

The stacker may only be recommissioned after cleaning or repair work, once the following operations have been performed.

- Test horn.
- Test Emergency brake switch.
- Test brake.
- Lubricate the stacker in accordance with the maintenance schedule.

5.4 Decommissioning the stacker

If the stacker is to be decommissioned for more than two months, e.g. For operational reasons, it must be parked in a frost-free and dry location and all necessary measures must be taken before, during and after decommissioning as described.

On decommissioning the stacker must be jacked up so that all the wheels are clear of the ground. This is the only way of ensuring that the wheels and wheel bearings are not damaged.

If the stacker is to be out of service for more than 6 months, further measures must be taken in consultation with the manufacturer's service department.

5.4.1 Prior to decommissioning

- Thoroughly clean the stacker.
 - Check the brakes.
 - Check the hydraulic oil level and replenish as necessary (See 5.3.3 Maintenance Instructions Page 31).
 - Apply a thin layer of oil or grease to any non-painted mechanical components.
 - Lubricate the stacker in accordance with the maintenance schedule (See 5.3.2 Lubrication Schedule P30).
 - Charge the battery (See 4.3 Charging the battery P23).
 - Disconnect the battery, clean it and apply grease to the terminals.
- In addition, follow the battery manufacturer's instructions.
- Spray all exposed electrical contacts with a suitable contact spray.

Warning!

Charge every month:

– Charge the battery.

Battery powered stackers:

The battery must be charged at regular intervals to avoid depletion of the battery through self-discharge. The sulfatisation would destroy the battery.

5.4.2 Restoring the stacker to operation after decommissioning

- Thoroughly clean the stacker.
- Lubricate the stacker in accordance with the maintenance schedule (See 5.3.2 Lubrication Schedule P30).
- Clean the battery, grease the terminals and connect the battery.
- Charge the battery (See 4.3 Charging the battery P23).
- Check hydraulic oil for condensed water and replace if necessary.
- Start up the stacker (see 3.2 Operate and run the stacker P18).

Battery powered stackers:

If there are switching problems in the electrical system, apply contact spray to the exposed contacts and remove any oxide layers on the contacts of the operating controls by applying them repeatedly.

Perform several brake tests immediately after re-commissioning the stacker.

5.5 Safety checks to be performed at regular intervals and following any unusual incidents

Carry out a safety check in accordance with national regulations. We have a special safety department with trained personnel to carry out such checks. The stacker must be inspected at least annually (refer to national regulations) or after any unusual event by a qualified inspector. The inspector shall assess the condition of the stacker from purely a safety viewpoint, without regard to operational or economic circumstances. The inspector shall be sufficiently instructed and experienced to be able to assess the condition of the stacker and the effectiveness of the safety mechanisms based on the technical regulations and principles governing the inspection of stackers.

A thorough test of the stacker must be undertaken with regard to its technical condition from a safety aspect. The stacker must also be examined for damage caused by possible improper use. A test report shall be provided. The test results must be kept for at least the next 2 inspections.

The owner is responsible for ensuring that faults are immediately rectified. A test plate is attached to the stacker as proof that it has passed the safety inspection. This plate indicates the due date for the next inspection.

5.6 Final de-commissioning, disposal

Final, proper decommissioning or disposal of the stacker must be performed in accordance with the regulations of the country of application. In particular, regulations governing the disposal of batteries, fuels and electronic and electrical systems must be observed.

6. Troubleshooting

This chapter is designed to help the user identify and rectify basic faults or the results of incorrect operation. When locating a fault, proceed in the order shown in the table.

Fault	Possible cause	Action
Stacker does not start.	<ul style="list-style-type: none"> • Key switch in “OFF” position • Battery charge too low • Faulty fuse • Stacker in charge mode 	<ul style="list-style-type: none"> • Set key switch to “I” • Check battery charge, charge battery if Necessary • Test fuses • Interrupt charging
Load can not be lifted	<ul style="list-style-type: none"> • Hydraulic oil level too low • Excessive load 	<ul style="list-style-type: none"> • Check the hydraulic oil level • Note maximum capacity (see data plate)

If the fault cannot be rectified after carrying out the remedial procedure, notify the manufacturer 's service department ,as any further troubleshooting can only be performed by specially trained and qualified service personnel.

Error Message

The error message can be obtained in two ways: by reading the appropriate display on the hand set display or by observing the fault codes issued by the status LED.

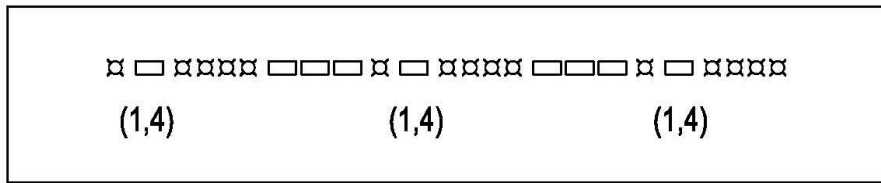
HAND SET DISPLAY DIAGNOSTICS

Faults are displayed in the Faults menu.

LED DIAGNOSTICS

During normal operation, with no faults present, the status LED is steadily on. If the controller detects a fault, the status LED flashes a fault identification code continuously until the fault is corrected.

The status LED uses a 2-digit code. For example, code “1,4”—UNDERVOLTAGE FAULT, appears as:



▣ LED BLINKS □ 1 SECOND STOP

1212 MOTOR CONTROLLER

Error Message	LED BLINKS digit 1	LED BLINKS digit 2
THERMAL FAULT	1	1
THROTTLE FAULT	1	2
SPEED POT FAULT	1	3
UNDERVOLTAGE FAULT	1	4
OVERVOLTAGE FAULT	1	5
MAIN OFF FAULT	2	1
(not used)	2	2
MAIN FAULT	2	3
MAIN ON FAULT	2	4
(not used)	2	5
WIRING FAULT	3	1
BRAKE ON FAULT	3	2
PRECHARGE FAULT	3	3
BRAKE OFF FAULT	3	4
HPD FAULT	3	5
CURRENT SENSE FAULT	4	1
HARDWARE FAILSAFE	4	2
EE CHECKSUM FAULT	4	3
(not used)	4	4
BATTERY DISCONNECT FAULT	4	5

1212 MOTOR CONTROLLER

LED BLINKS digit 1	LED BLINKS digit 2	Error Message	EXPLANATION	Possible cause
		Error text		
1	1	THERMAL FAULT	over-/under-temperature cutback	<ol style="list-style-type: none"> 1. Temperature >80°C or < -10°C. 2. Excessive load on vehicle. 3. Operation in extreme environments. 4. Electromagnetic brake not releasing.
1	2	THROTTLE FAULT	PotLow and/or PotWiper out of range	<ol style="list-style-type: none"> 1. Throttle input wire open or shorted. 2. Throttle pot defective. 3. Wrong throttle type selected.
1	3	SPEED POT FAULT	speed limit pot wiper out of range	<ol style="list-style-type: none"> 1. Speed limit pot wire(s) broken or shorted. 2. Broken speed limit pot.
1	4	UNDERVOLTAGE FAULT	battery voltage too low	<ol style="list-style-type: none"> 1. Battery voltage <17 volts. 2. Bad connection at battery or controller.
1	5	OVERVOLTAGE FAULT	battery voltage too high	<ol style="list-style-type: none"> 1. Battery voltage >31 volts. 2. Vehicle operating with charger attached. 3. Intermittent battery connection.
2	1	MAIN OFF FAULT	main contactor driver Off fault	<ol style="list-style-type: none"> 1. Main contactor driver failed open.
2	3	MAIN FAULT	main contactor fault	<ol style="list-style-type: none"> 1. Main contactor welded or stuck open. 2. Main contactor driver fault.
2	4	MAIN ON FAULT	main contactor driver On fault	<ol style="list-style-type: none"> 1. Main contactor driver failed closed.

3	1	WIRING FAULT	HPD fault present >10 sec.	1.Misadjusted throttle. 2.Broken throttle pot or throttle mechanism.
3	2	BRAKE ON FAULT	brake On fault	1.Electromagnetic brake driver shorted. 2.Electromagnetic brake coil open.
3	3	PRECHARGE FAULT	precharge fault	1. Brake driver shorted. 2. Precharge circuit damaged. 3. MOSFET failure.
3	4	BRAKE OFF FAULT	brake Off fault	1.Electromagnetic brake driver open. 2.Electromagnetic brake coil shorted.
3	5	HPD FAULT	HPD (High Pedal Disable)	1. Improper sequence of throttle and KSI,push, or inhibit inputs. 2. Misadjusted throttle pot.
4	1	CURRENT SENSE FAULT	current sense out of range	1.Short in motor or in motor wiring. 2. Controller failure. ★
4	2	HARDWARE FAILSAFE	motor voltage out of range	1.Motor voltage does not correspond to throttle request. 2.Short in motor or in motor wiring. 3. Controller failure. ★
4	3	EE CHECKSUM FAULT	EEPROM fault	1. EEPROM failure or fault.
4	5	BATTERY DISCONNECT FAULT	battery disconnected	1. Battery not connected. 2.Poor connection to battery terminals.