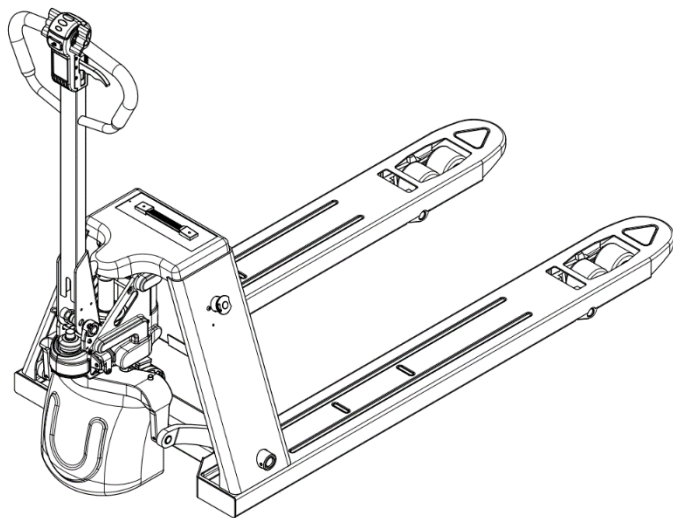
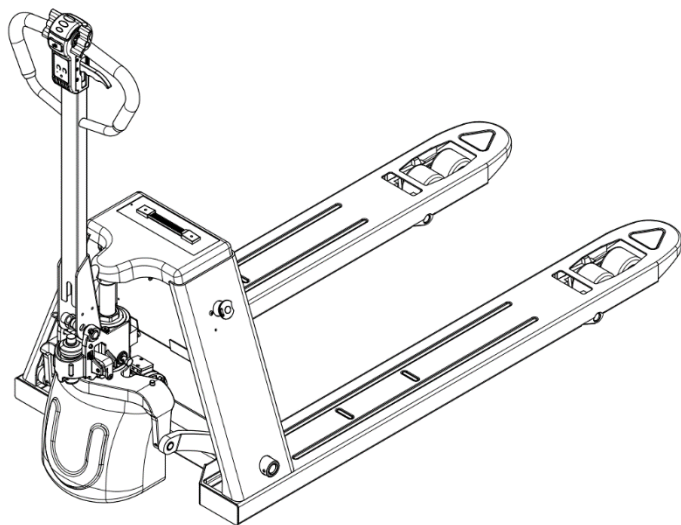


Operation & Maintenance Manual



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FOREWORD

Thank you very much for purchasing our products!

This operation manual will tell you how to use the electric pallet truck correctly and guide you in safe operation and maintenance. Relevant operators and maintenance personnel must read this manual carefully before using this product. Only in this way can the maximum use of the pallet truck be brought into play and your safety can be protected. With the continuous updating and improvement of our company's products, the product in your hand may be different from some introductions in this manual. Due to the special requirements of some customers, the manual will also be different.

The electric pallet truck that our company applies for manufacturing licenses is a special motor vehicle in the field (factory) only used in specific areas such as factories, tourist attractions, amusement parks, etc. as stipulated in the "Regulations on the Safety Supervision of Special Equipment". If you have any questions, please contact our sales department or agent.

Pay attention to:

1. This manual is mainly used for operation instructions and simple maintenance instructions. Specific parameters, sizes, and specifications in the content are only for reference and are specific to the sales materials.
2. The pictures in the manual are only for reference. The actual vehicle takes precedence, which does not affect the use of the manual.
3. The pictures in the manual indicate only one of the models in this series.

WARNING

To ensure the personal and property safety of you and others, please strictly abide by the following instructions:

If proper maintenance is neglected, the pallet truck will have certain safety hazards. Therefore, adequate maintenance equipment, professional maintenance personnel, and a maintenance program must be in place.

The use, maintenance, and inspection of the pallet truck shall be carried out by the following terms:

1. The maintenance, lubrication, and inspection plan of the truck must be strictly implemented.
2. Before leaving the pallet truck, do the following:
 - Don't park on slopes.
 - Lower the forks completely.
 - Press the emergency stop switch and remove the key.
3. Before starting the operation:
 - The operator must be in the operating position.
 - The operating handle is placed in its neutral position.
 - Check that lifting, steering, speed control, handling, alarm, and braking functions are all normal before operation.
4. The workplace must be equipped with fire-fighting equipment. Don't use an open flame to check the level of electrolytes or other oils and fluids, as well as leaks.
5. Braking, maneuvering, control, alarm, and safety devices should be regularly inspected and maintained to keep them in good condition.
6. All nameplates and safety signs on the pallet truck should be cleaned regularly to ensure that their contents are clear and identifiable.
7. All devices of the lifting system should be regularly inspected and maintained to ensure their safe operation.
8. The hydraulic system should be inspected regularly according to the usage. Cylinders, hydraulic valves, and some other hydraulic components should be verified to be leak-free before use.
9. The parking environment of the pallet truck must be clean to minimize the possibility of fire.
10. Without the consent of the manufacturer, the customer is not allowed to modify the pallet truck. The nameplate and safety signs on the pallet truck should be changed after the permitted modification.

SPECIFIED USE

The pallet truck introduced in this operation instruction is a ground transport equipment, suitable for lifting and transporting goods. The equipment must be operated and maintained in strict accordance with the provisions in this operation instruction. Use of equipment for any other purpose is inappropriate and may cause injuries and damage to the vehicle or other property. Above all, overloading due to excessive or sideways loads must be prevented. The maximum load limit specified on the equipment nameplate or load diagram must be observed. The equipment shall not be used in areas with fire and explosion risk, in a wet environment, or in areas easy to cause corrosion, rust, or dust.

Obligations and Responsibilities of the Equipment User:

In this operation manual, "equipment user" means any natural person or legal person who directly uses or appoints others to use the equipment. In special cases such as lease and sale, etc., the "equipment user" represents the party who undertakes the stipulated operation obligations according to the terms of the contract between the equipment owner and the user.

The equipment user must ensure that the truck is only used for the specified purposes and promptly eliminate all hazards that may endanger the life and health of the user or the third party. In addition, the equipment user must also strictly abide by the accident prevention regulations, other safety and technical regulations, and the equipment operation, maintenance, and repair guidelines. The equipment user must ensure that all operators carefully read and fully understand the contents of this operation manual.

If this operation manual is not followed, our company's quality assurance will automatically fail. Our company shall not be liable for any damages arising from the unauthorized operation of the equipment by the customer, the user of the equipment, or a third party.

Installation accessories:

Additional devices that need to be installed or added, if they affect or supplement the function of the equipment, must obtain prior written consent from our company. According to the actual situation, it may also be approved by the local competent authorities.

The audit results of the competent authorities do not represent the opinions of our company.

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1. Model Introduction

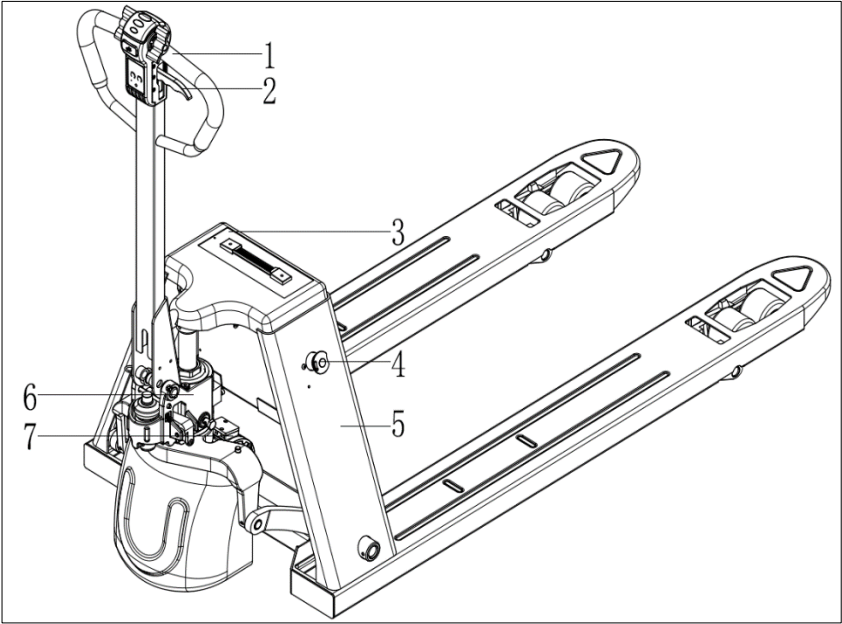
1.1 Description of Use Scope

This series of pallet truck is suitable for carrying goods on a flat ground. The pallets used can be open or with horizontal bars.

Its applicable ambient temperature is 5°C - 40°C.

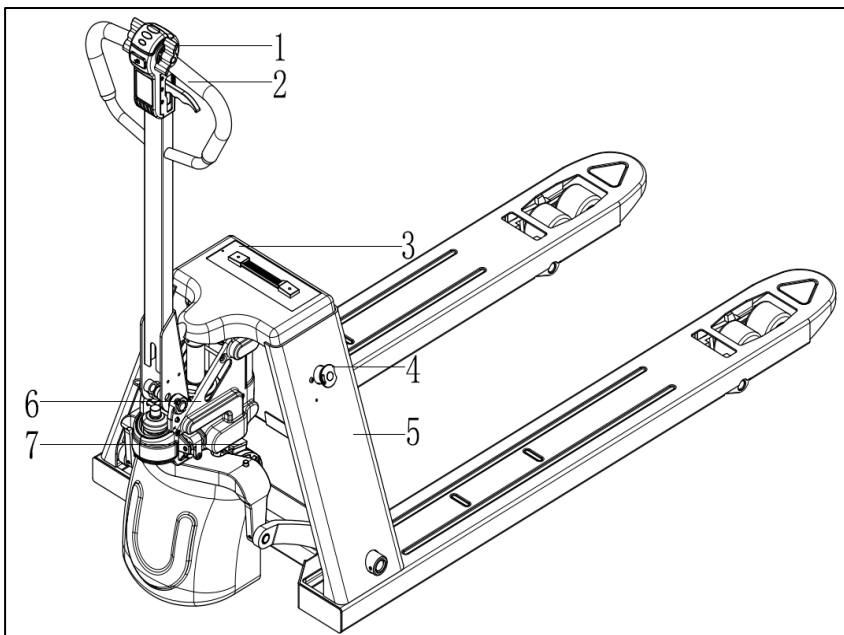
If the pallet truck is used for a long period of time in an environment lower than 5°C, in a cold storage or under extreme conditions of temperature and humidity changes, additional special protection must be installed, which should be approved by our company.

1.2 Assembly



T20

No.	Item	No.	Item
1	Handle assembly	5	Frame assembly
2	Hydraulic release lever	6	Hydraulic cylinder
3	LFP battery (48V/10Ah)	7	Drive system
4	Emergency stop switch (key)		

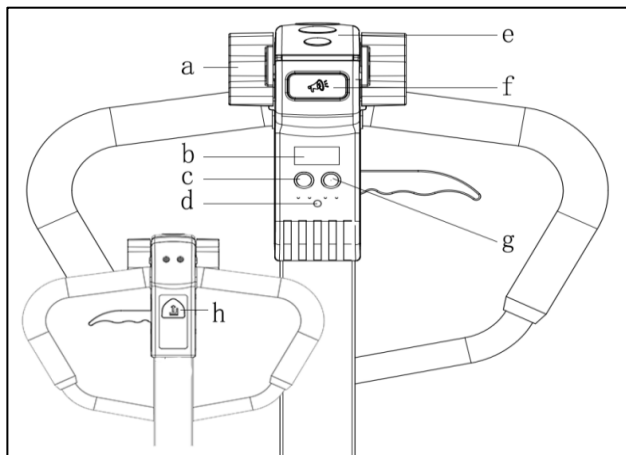


T20i

No.	Item	No.	Item
1	Handle assembly	5	Frame assembly
2	Hydraulic release lever	6	Hydraulic cylinder
3	LFP battery (48V/15Ah)	7	Drive system
4	Emergency stop switch (key)		

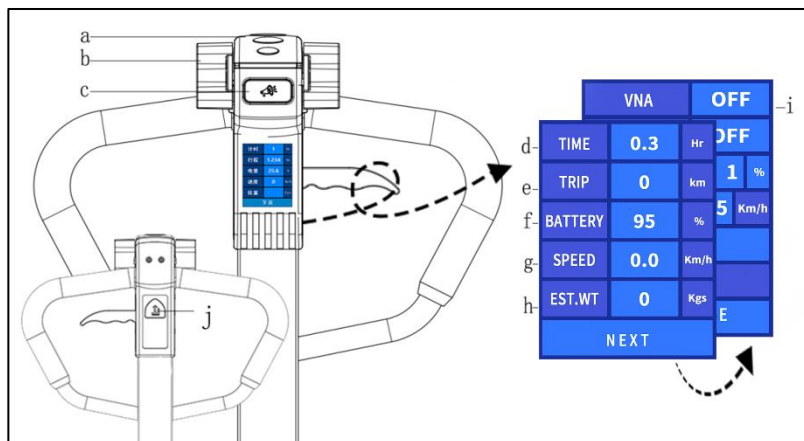
1.2.1 Handle Assembly

1.2.1.1 Front of Ordinary Handle



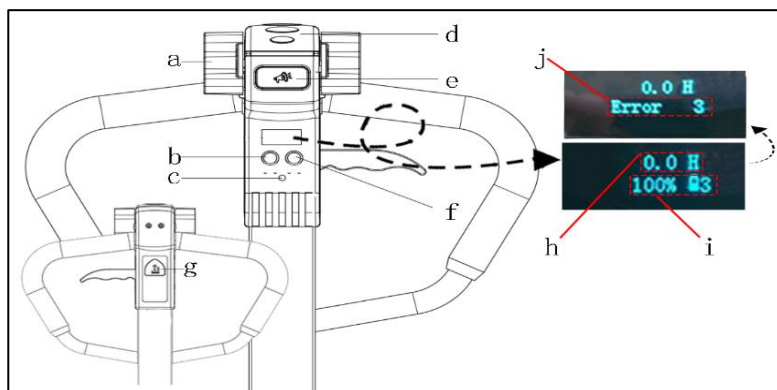
No.	Name	Function
a	Directional knob (forward/backward)	Control the driving direction and speed
b	Battery level indicator	Display the remaining battery level
c	Turtle mode button	The vehicle moves at turtle speed (can be simultaneously with upright mode)
d	Led flash indicator	Display current functional status (No light - normal use; green - turtle mode; blue - upright mode; light blue - turtle mode & upright mode)
e	Emergency reverse button	Protection function: the vehicle will leave the operator once the button is pressed
f	Horn button	Sound an alarm
g	Upright mode button	The vehicle can walk when the handle is upright (can be simultaneously with turtle mode)
h	Lift button	Electrically lift (T20I ONLY)

1.2.1.2 Front of I-Touch Screen Handle



No.	Name	Function
a	Emergency reverse button	Protection function: the vehicle will leave the operator once the button is pressed
b	Directional knob (forward/backward)	Control the driving direction and speed
c	Horn button	Sound an alarm
d	Run time	Cumulative run time
e	Distance traveled	Cumulative mileage traveled
f	Battery level	Display the remaining battery level
g	Driving speed	Actual driving speed
h	Estimated weight	Approximate cargo weight (not accurate weight)
i	Upright mode	The vehicle can walk with the handle in upright position
j	Lift button	Electrically lift (T20I ONLY)

1.2.1.3 Front of OLED Screen Handle

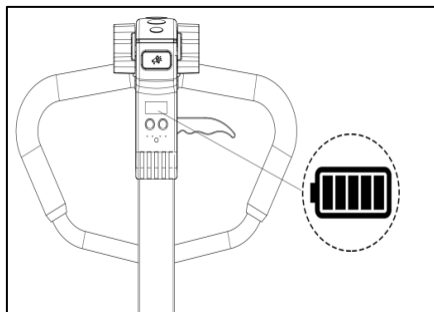


No.	Name	Function
a	Directional knob (forward/backward)	Control the driving direction and speed
b	Turtle mode button	The vehicle moves at turtle speed (can be simultaneously with upright mode)
c	Led flash indicator	Display current functional status (No light - normal use; green - turtle mode; blue - upright mode; light blue - turtle mode & upright mode)
d	Emergency reverse button	Protection function: the vehicle will leave the operator once the button is pressed
e	Horn button	Sound an alarm
f	Upright mode button	The vehicle can walk with the handle in upright position (can be simultaneously with turtle mode)
g	Lift button	Electrically lift (T20I ONLY)
h	Run time	Cumulative run time
i	Battery level indicator	Display the remaining battery level
j	Fault indication	Display fault code

1.2.2 Battery Level Display

1.2.2.1 Battery Level Indicator

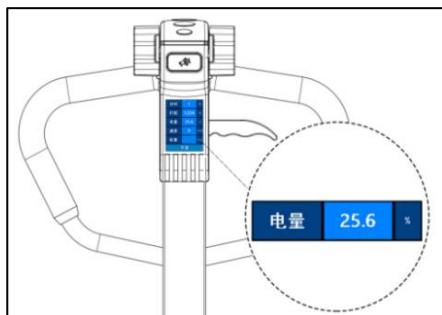
Battery level indicator on ordinary handle can display the battery level. The current grid number shows the remaining battery power, which is green. When the red-light flashes, the pallet truck is unable to travel on electricity, and must be charged immediately.



1.2.2.2 I-Touch Screen

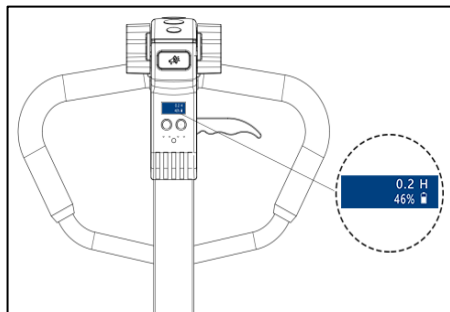
The I-Touch screen can display the battery level from 0 - 100%.

Tips: When the battery level is too low, please charge in time!



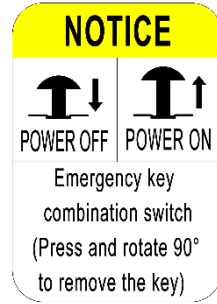
1.2.2.3 OLED Screen

The OLED screen can display total run time (in hours), battery level, and fault code. Battery level is 0 - 100%.



1.2.3 Emergency Stop Switch

The electrical system circuit is interrupted after this switch is pressed. All electric functions stop, and the vehicle automatically brakes.

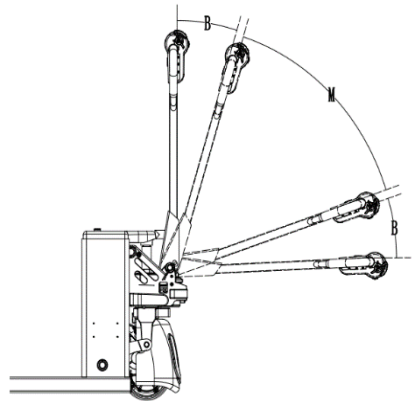


1.2.4 Brake

After the brake is installed on the drive, the brake operation can be controlled by controller.

1) Braking principle

Swing the handle into the braking area (B) and the traction motor is braked by regenerative braking (motor brake). The mechanical brake (electromagnetic brake) is activated only if regenerative braking cannot achieve sufficient braking effect. The mechanical brake (electromagnetic brake) starts when the vehicle stops. Release the handle and self-shake into the upper braking area (B).



2) Brake working range:

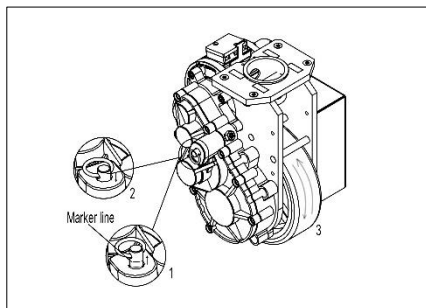
When the handle is pressed down to the driving range (M), the brake is off, and the pallet truck can work. When the handle is in the range (B), the brake is on, and the traction motor is braked.

1.2.5 Manual/Electric Mode

1) Manual mode

Pull the ring (Part 2) up to the marker line, then the pallet truck can be operated in manual mode.

Tips: To easily pull the ring, the operator can shake the drive wheel (Part 3) slightly forward and backward, then the inside structure will be gear-off.



2) Electric mode

Push the ring (Part 2) to the position where the marker line is tangent to the gearbox, so the pallet truck can be operated in electric mode.

1.2.6 Handle Installation

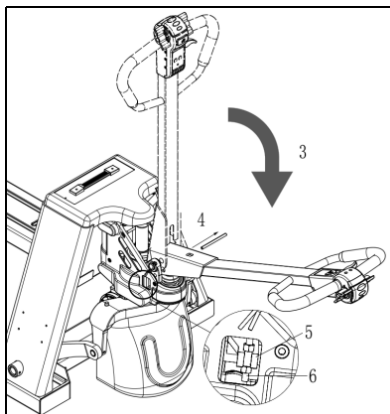
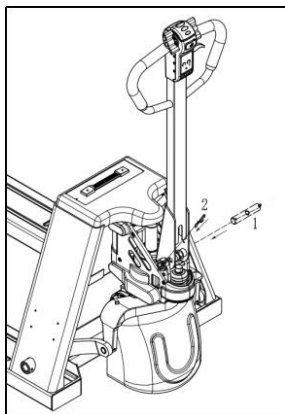
Tips: To easily push the rod, the operator can shake the drive wheel (Part 3) slightly forward and backward, so the inside structure will be gear-on.

1.2.6.1 T20I Handle Installation

1. Handle installation

1) After checking the handle assembly 3 (61-300-300-10) with the frame number, install the handle assembly on the hydraulic system with the handle pin shaft 1 (27-300-003-10) and R-type opening pin 2 (90-053-003-65). Press the handle assembly 3 (right fig. below) and remove process bar 4 (27-

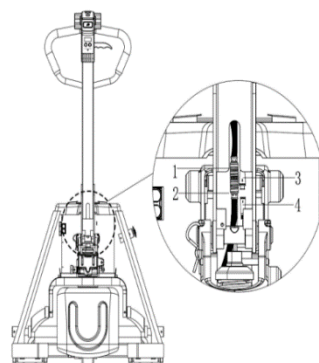
200-216-10). After the handle is reset, press the lever plate 5 (27-200-236-10), pull the screw at the lower end of the pull rod chain assembly 6 (27-300-204-10), and push it into the position (right fig. below). Then the handle installation is complete.



NOTE: Pull rod chain assembly 6 (27-300-204-10) must pass through the center round hole in handle pin 1 (27-300-003-10).

2. The way to thread

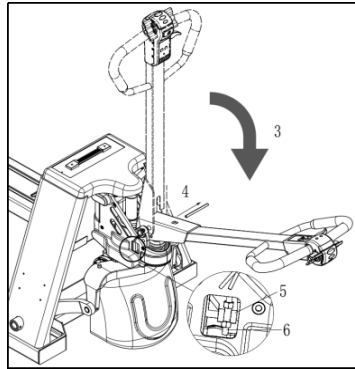
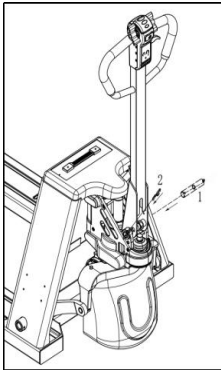
- 1) Connect the handle wire harness 1 (61-560-002-10) and main wire harness 2 (61-560-001-10) (right fig.).
- 2) Connect the weighing module wire harness to handle 3 (61-560-010-10) and the weighing module wire harness 4 (61-560-011-10) (I-Touch Screen ONLY).
- 3) Check that the connection is firm.



1.2.6.2 T20 Handle Installation

1. Handle installation

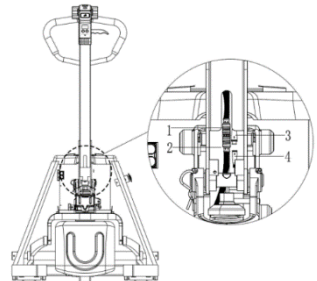
1) After checking the handle assembly 3 (61-300-300-10) with the frame number, install the handle assembly on the hydraulic system with the handle pin shaft 1 (27-300-003-10) and R-type opening pin 2 (90-053-003-65). Press the handle assembly (right fig. below) and remove process bar 4 (27-200-216-10). After the handle is reset, press the lever plate 5 (27-200-236-10), pull the screw at the lower end of the pull rod chain assembly 6 (27-300-204-10), and push it into the position (right fig. below). Then the handle installation is complete.



NOTE: Pull rod chain assembly 6 (27-300-204-10) must pass through the center round hole in handle pin 1 (27-300-003-10).

2. The way to thread

- 1) Connect the handle wire harness 1 (61-560-002-10) and main wire harness 2 (61-560-001-10) (right fig.).
- 2) Check that the connection is firm.



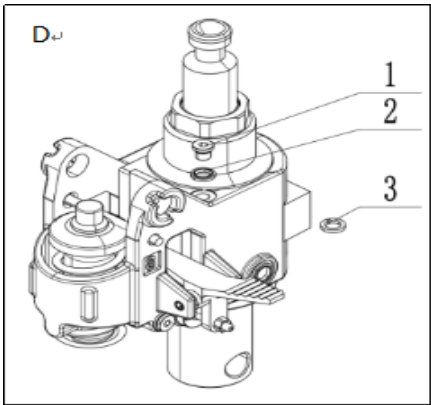
1.2.6.3 Handle Installation Precautions and Troubleshooting

- (1) Precautions: Necessary protective tools must be worn during installation debugging.
- (2) Installation debugging and troubleshooting methods.

No.	Fault	Cause	Troubleshooting	Remarks	Notes
1	The fork doesn't fall or falls slowly.	The cable assembly and the cable plate are pressed not tightly enough.	Adjust the tension of the cable assembly and the cable plate.	Lowering speed: 55.00±5mm/s	1) During installation, press the hydraulic release lever to the max. position, and press the cable assembly and the cable plate to make the valve core 2mm away from fully in. 2) When the lowering cable does not pull the hydraulic release lever, the hydraulic plate and the spool thimble shall remain without compression. 3) After the installation, test whether the pallet truck lifts and lowers normally.
2	Fork drops sharply without load.	The cable assembly and the cable plate are pressed too tightly.			
3	When the release lever is not pulled, the fork drops by itself.	The cable assembly and the cable plate are pressed too tightly.	Reduce the tension of the cable assembly and the cable plate.		
4	When the hydraulic release lever is quickly pulled to the max. position, the fork, with full load, lowers rapidly instantly.			With full load, the fork takes no less than 0.3 secs from max. lifting height to full lowering.	

1.2.7 Cylinder Exhaust Washer Replacement

- 1) Remove the hydraulic screw plug 1 (90-030-010-00) with an Allen wrench (Fig. D).
- 2) Replace the original combination pad 2 (90-085-010-00) with the supplied spring washer 3 (90-093-010-00) and screw on the hydraulic screw plug 1 (90-030-010-00) until the plug just contacts the spring washer 3 (90-093-010-00).



1.3 Nameplate and Safety Decals

1.3.1 Nameplate

电 动 托 盘 搬 运 车		CE
ELECTRIC PALLET TRUCK		
型 号	电 池 容 量	
Model	Battery Capacity	
额 定 起 重 量	含 电 瓶 自 重	
Rated Capacity	Self Weight With Battery	
货 叉 宽 度	出 厂 编 号	
Fork Width	Serial Number	
货 叉 长 度	制 造 年 份	
Fork Length	Year of manufacture	

Please provide truck model when you ask for questions or order spare parts.

Model Example:

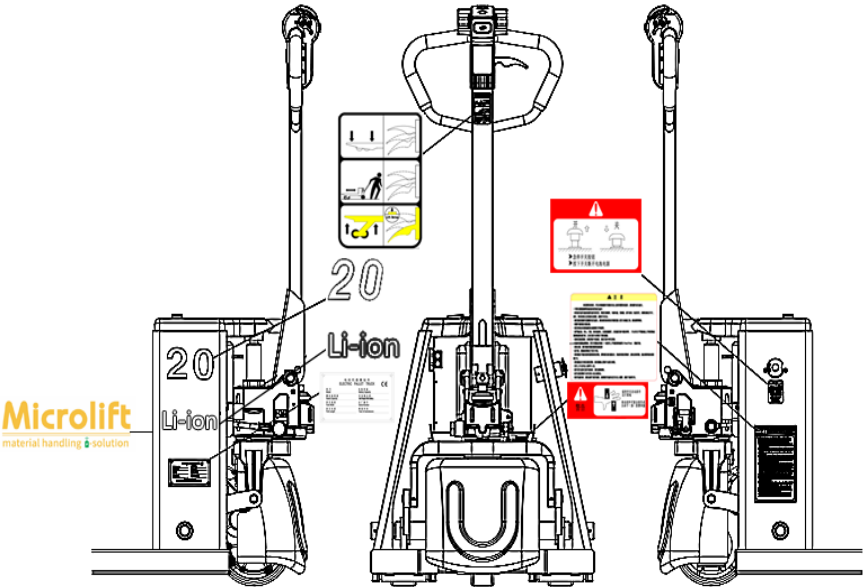
T20I

Identification code

Load capacity: 20=2000 kg

All electric

1.3.2 Safety Signs and Decals



1.4 Parameters

The technical data given below are in accordance with GB/T27542-2011 standard, and our company reserves the right to make technical changes and supplements. This parameter is for reference only and is subject to change or alteration without prior notice.

1.4.1 Performance Parameters

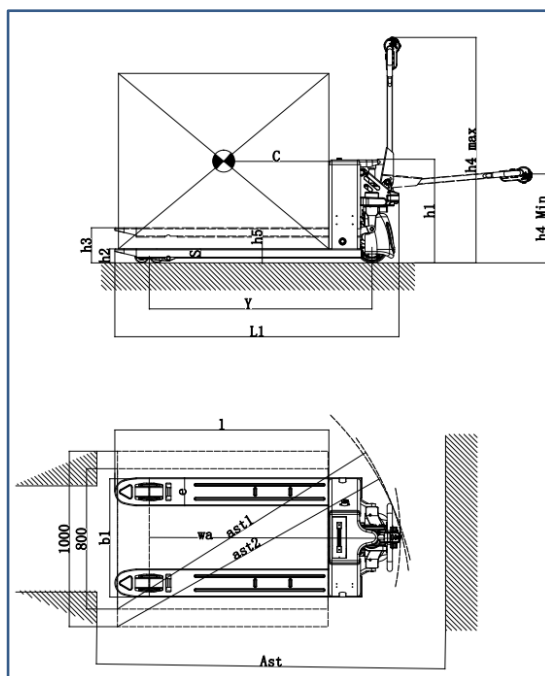
No.	Name		Parameter		Unit
			T20	T20i	
1	Load capacity (Q)		2000		kg
2	Load center distance (C)		600		mm
3	Driving speed	Laden	4.0		km/h
		Unladen	4.5		km/h
4	Max. gradeability	Laden	8		%
		Unladen	20		%
5	Brake		Electromagnetic type		
6	Service weight (with battery)		106/110	116/122	kg
7	Motor	Drive	0.75		kW
		Lift	NA	0.65	kW
8	Tire type (drive/load wheel)		PU/PU		
9	Drive wheel dimension (diameter x width)		Ø180×53		mm
10	Load wheel size		2×Ø80×60/1×Ø74×88		mm
11	Battery	Voltage/ Capacity	48/10	48/15	V/Ah
		Weight	5.5	7.7	kg

1.4.2 Dimensions and Parameters

Characteristics				
1.1	Manufacturer	Microlift		
1.2	Model		T20	T20i
1.3	Drive type		Electric	
1.4	Operator type		Walkie	
1.5	Load capacity	Q	2000kg	
1.6	Load center	C	600mm	
1.7	Wheelbase	Y	1202/2172	
Weight				
2.1	Service weight (including battery)	Q	106/110	116/122
Wheel				
3.1	Wheel type		PU	
3.2	Drive wheel size		Φ 180×53mm	
3.3	Load wheel size		Φ 80×60mm/Φ 74×88mm	
3.4	Balance wheel size		NA	
3.5	Number of wheels (X= drive wheel)		1X+0/4	
Chassis, Dimension				
4.1	Lift height	h3	200mm	
4.2	Tiller head height	h4max/ h4min	1285mm/507mm	
4.3	Fork Height (lowered)	h2	80mm	
4.4	Overall length	l1	1546mm/1616mm	
4.5	Overall width	b1/b2	540mm/680mm	
4.6	Fork size	l/e/s	1150/1220×160×53mm	
4.7	Outside fork width	b5	540mm/680mm	
4.8	Ground clearance	m2	27mm	
4.9	AST, 1000X1200 pallet crossways	ast1	1711	
4.10	AST, 800X1200 pallet crossways	ast2	1674	
4.11	Min. outside turning radius	wa	1361mm/1431mm	

Performance				
5.1	Driving speed (Laden/Unladen)		4.0/4.5km/h	
5.2	Lift speed (Laden/Unladen)		NA	0.04/0.05m/s
5.3	Max Gradeability (Laden/Unladen)	%	8/20	
Drive				
6.1	Drive motor	kW	0.75 AC	
6.2	Lift motor	kW	NA	0.65 DC
6.3	Battery capacity	V/Ah	48/10 LFP	48/15 LFP
Others				
7.1	Controller		Microlift	
7.2	Service brake		Electric regenerative braking	
7.3	Parking brake		Electromagnetic brake	

This parameter is for reference only and is subject to change or alternation without prior notice.



2. Transport and Initial Use

2.1 Transport

Handling and unloading

1. Only use handling equipment with sufficient load capacity.
2. The actual cargo weight should not exceed the rated load capacity.
3. Pallets (wooden boxes) should be large and strong enough to support the weight of the truck.
 - Park the pallet truck as required.
 - Make sure the forks are aligned with the pallet, advance slowly, and stop after inserting the forks into the pallet as far as possible.

WARNING!

- Avoid damage to the forks when moving the trucks to pallet.
- Please move the truck in open and flat area to avoid scratches of trucks.
- Avoid collapse of trucks when lifting or lowering the pallet (box).

2.2 Initial Use

Only use the battery power to drive the truck!

The following inspection must be performed before using the truck:

- Check that the pallet truck is complete and normal.
- Check that the hydraulic system is normal.
- Please make sure to install the battery and pay attention not to damage the battery cable during installation.
- If the pallet truck is parked for too long, the ground-touch surface of the wheels may be slightly flattened. After a short run of the truck, the leveling part will automatically recover.
- If the battery level is low, charge the battery.

2.3 Notes During the Break-In Period

The pallet truck should be operated under low load at the initial stage of operation. Especially within 100h, the following requirements should be met:

1. Prevent over-discharge of the new battery during the initial use. Generally, it should be recharged in time when the battery level is 30%.
2. Thoroughly perform the prescribed preventive maintenance.
3. Avoid hard braking, sharp turns, or driving sharply.
4. Change oil or lubricate in time as specified.
5. Limit the load weight to 70~80% of the rated load.

3. Operation and Use

3.1 Safety Regulations

Operation license

The pallet truck can only be operated and driven by specially trained personnel. The operator must pass the test of the equipment user, master the skills of equipment operation and material handling, and be formally appointed by the equipment user or its entrusting party.

Operator's rights, obligations, and code of conduct

The operator must understand their rights and obligations, receive guidance training in the operation and use of the truck, and be familiar with the contents of this operation instruction. The user must grant the operator the rights it should have.

Non-workers are prohibited from using the pallet truck

The operator is solely responsible for the pallet truck during operating it. Non-staff member is not allowed to operate it. Do not use pallet trucks to carry or lift personnel.

Equipment damage and defects: If any damage or other defects are found on the truck and its device, the situation must be reported to the supervisor immediately. For example, worn tires or malfunctioning brakes, etc., must not be used without proper maintenance.

Equipment repair

Without special training and permission, the operator shall not repair or change the pallet truck. Without authorization, the operator must never deactivate or adjust safety devices and switches.

Dangerous area

A dangerous area refers to the area where people are at risk of injury. These hazards mainly come from the vehicle itself, its loading, driving, and lifting part. The dangerous area also includes the range of danger that may be caused due to the fall of the load objects or the descent/fall of the working devices.

- Non-staff members must be kept away from dangerous areas.
- Warning signs must be hung in time in areas with personal danger.
- If the non-staff members refuse to leave the dangerous area, the moving truck must be stopped immediately.

Safety devices and warning signs

All safety devices, warning signs and warning instructions in this manual must be strictly followed.

3.2 Operate the Pallet Truck

3.2.1 Preparing

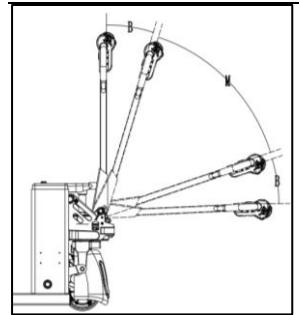
Before putting the pallet truck into use or lifting the weights, the operator must ensure that no other person stays in the dangerous area.

Inspection and preparations that must be performed before putting the truck into daily use:

- Comprehensive visual inspection of the truck (especially the wheels and forks) for obvious damage.

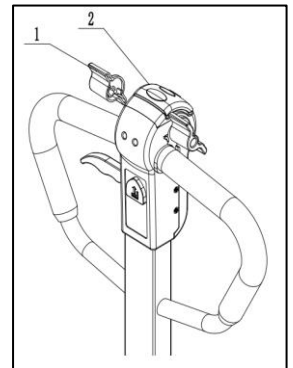
3.2.2 Driving

Swing the operating handle to the travel area (M) and turn the directional knob to the desired travel direction (forward or backward). The larger the rotation angle, the faster the corresponding speed.



WARNING!

The pallet truck in upright mode will automatically move when the emergency reverse button 2 or driving forward/backward knob 1 is pressed. Therefore, people or obstacles shouldn't stand in front of the pallet truck, in case of any damage to people or



Steering

Turn the operating handle left or right in the desired direction.

Braking

1. Emergency stop

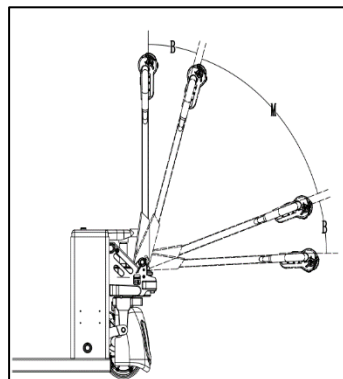
Press the emergency stop switch. All electrical functions will be interrupted.

2. Forced braking

Releasing operating handle will force the brake. The handle automatically turns to the upper brake area (B). Pressing the handle into the lower brake area (B) will also force the brake.

WARNING!

If the handle moves slowly in the brake area (B), find the cause, and correct the fault.



3. Electric regenerative braking

Release the directional knob and the truck will slow down by electric regenerative braking. The directional knob will automatically return to the initial position.

WARNING!

After releasing the driving switch, if the driving switch cannot quickly return to the initial position or the return speed is slow, find the cause and remove the fault.

4. Reverse braking

During travel, the directional knob can be switched to the opposite direction. And the truck is braked by the reverse current, then starts to travel in the opposite direction.

WARNING!

In case of danger, the operating handle can be placed in the brake area to apply a forced brake, or a reverse braking. The exact method to be used depends on the actual situation.

3.2.3 Pick up and Store the Goods

There is a danger of causing accidents when goods are not placed and fixed as required.

- Remind the personnel to leave the dangerous area. If any person stays in the dangerous area, stop the moving truck immediately.

- Transport only the goods placed and fixed in accordance with the regulations. If the goods are danger of overturning or falling during handling, appropriate protection must be taken.

- Do not use damaged handling tools such as pallets, pallet trucks, to carry the goods.

- Never enter and stay under the raised load component.
- Prohibit personnel from entering the load parts.
- Do not use the pallet truck to lift personnel.
- Drive the fork under the loads.

WARNING!

- The operator must ensure that goods are properly palletized before picking.
- The weight should not exceed the rated load capacity.
- Do not pick long objects horizontally.

WARNING!

To prolong the service life of the cylinders, avoid raising the forks to the highest position each time.

T20I

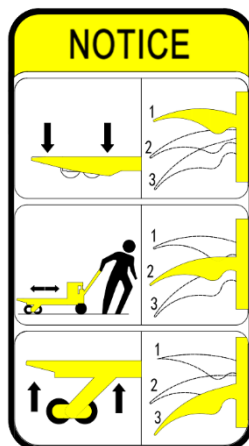
Lifting

Press the hydraulic release lever to the position (3) and press the lifting button until the forks rise to the required lifting height.

Lowering

Pull the relief lever to the position (1) until the forks fall to the bottom, and then put the release lever back to the position (2).

(Note: Pull the release lever up along the handle rod. The larger the angle, the faster the forks drop).



T20

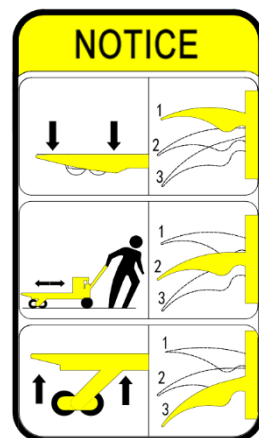
Lifting

Press the release lever to the position (3) and swing the handle up and down until the forks rise to the required lifting height.

Lowering

Pull the release lever to the position (1) until the fork fall to the bottom, and then put the relief handle back to the position (2).

(Note: Pull the release lever up along the handle rod. The larger the angle, the faster the forks drop).



3.2.4 Safely Park the Truck as Required

If the operator needs to leave the pallet truck, even for a short time, he must park the pallet truck in advance according to the regulations.

The steps are: Lower the forks completely; press the emergency stop switch; finally rotate the switch ninety degrees clockwise and take out the key.

WARNING!

- Park the pallet truck as required all the time.
- Do not park the pallet truck on the slope.
- The forks must be completely lowered.

4. Use and Maintenance of Batteries

Check that the LFP battery power in the pallet truck is sufficient. To meet the transportation requirements, the battery of the pallet truck is not fully charged. And it should be charged after the initial use.

4.1 Replacement of LFP Battery

Only replace the LFP battery with the same type and weight as the original LFP battery. (The weight of the LFP battery affects the stability of the truck and its braking function.)

WARNING!

- * The battery has high voltage and energy. Do not cause short-circuit. Do not let the tools close to the battery poles to avoid sparks or short-circuit. Cut off the power supply when maintaining and servicing the whole vehicle.
- * Do not change the weight and size of the LFP battery, otherwise it will affect the center of gravity of the truck. Heavy weight or light weight of LFP battery will affect the stability and braking capability of the truck.

4.2 Charging

4.2.1 No Smoking or Using an Open Flame During Charging

The operator must use the original charger provided by the manufacturer to charge the LFP battery. Pay attention not to undercharge or overcharge, to avoid damage to the LFP battery. The maximum charging current is:

Model	LFP battery (V/Ah)	Charger (A)
T20	48/10	5A
T20i	48/15	5A

DANGER!

LFP battery can never be positive and negative pole short connected. Otherwise, there is an explosion danger!

4.2.2 Charging Preparation

The pallet truck must be charged as soon as possible after use:

- (1) After parking, press the emergency stop switch and pull out the emergency stop key.
- (2) Connect the charger socket and start charging.

4.2.3 Charging Period

Refer to the LFP battery instruction for charging method and maintenance. The following methods can be used to judge whether the battery power is sufficient:

- (1) The battery level indicator turns green.
- (2) There is no significant shortening of the pallet truck usage time.

WARNING!

Maintain a good ventilation environment when charging, especially in a closed area.

Dripping water, open flame, electric spark and so on are likely to cause an explosion during charging! Therefore, the charging power supply should be cut off before unplugging the socket.

5. Storage

5.1 Storage

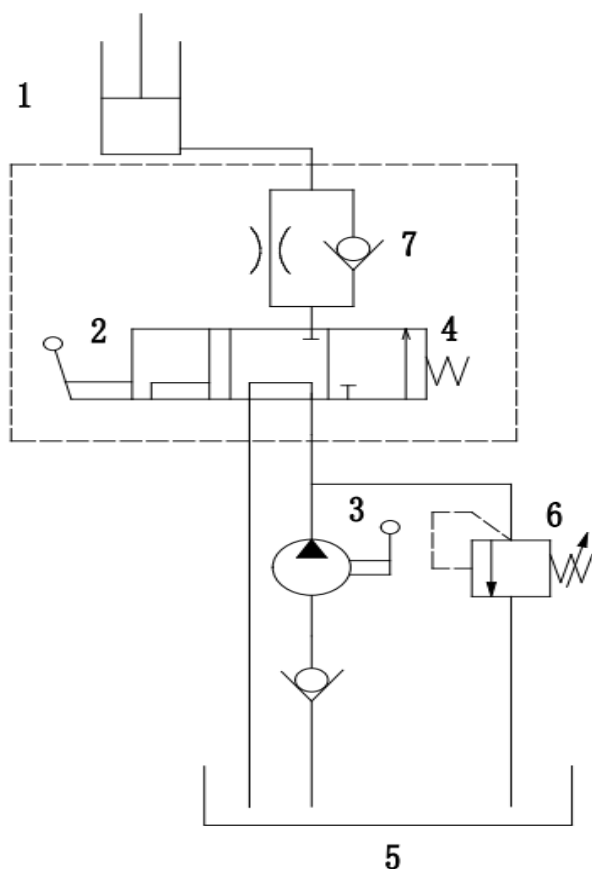
The pallet truck shall be placed in dry environment and shall disconnect the battery if it isn't used for a long period of time.

5.2 Return into Use After Storage

1. Check that all parts of the truck are in good condition and install the battery.
2. Charge the battery.

6. Hydraulic Schematic Diagram

6.1 T20 Hydraulic Schematic Diagram



1: Cylinder

4: Neutral Valve

7: Check Valve

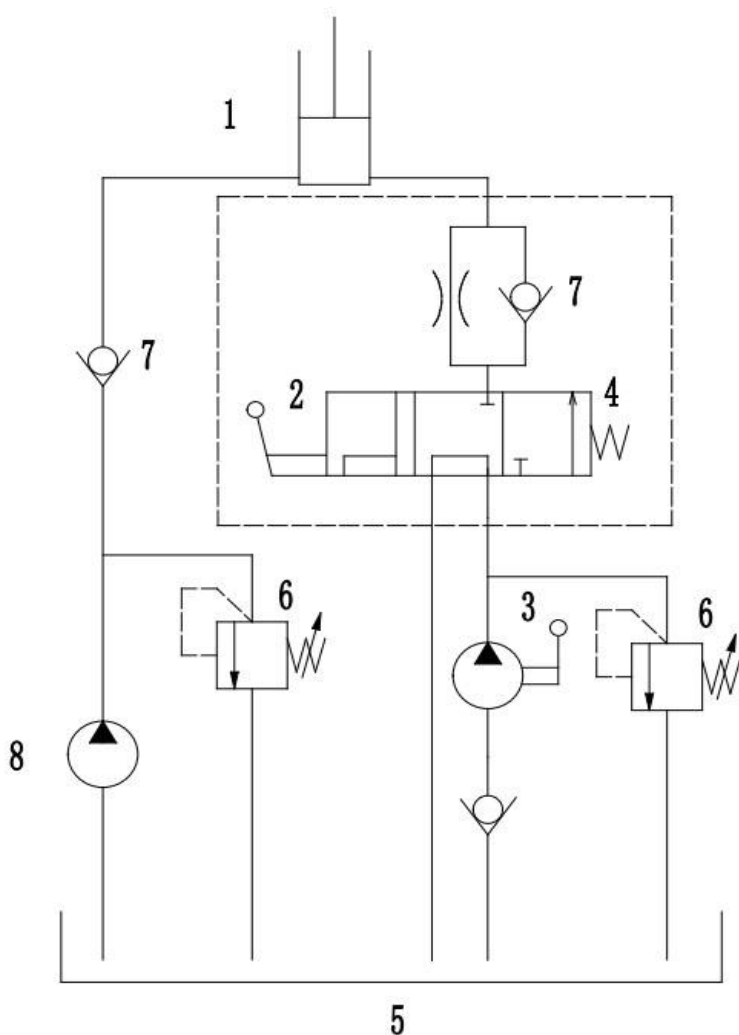
2: Relief Valve

5: Oil Tank

3: Hand Pump

6: Safety Valve

6.2 T20I Hydraulic Schematic Diagram



1: Cylinder

2: Relief Valve

3: Hand Pump

4: Neutral Valve

5: Oil Tank

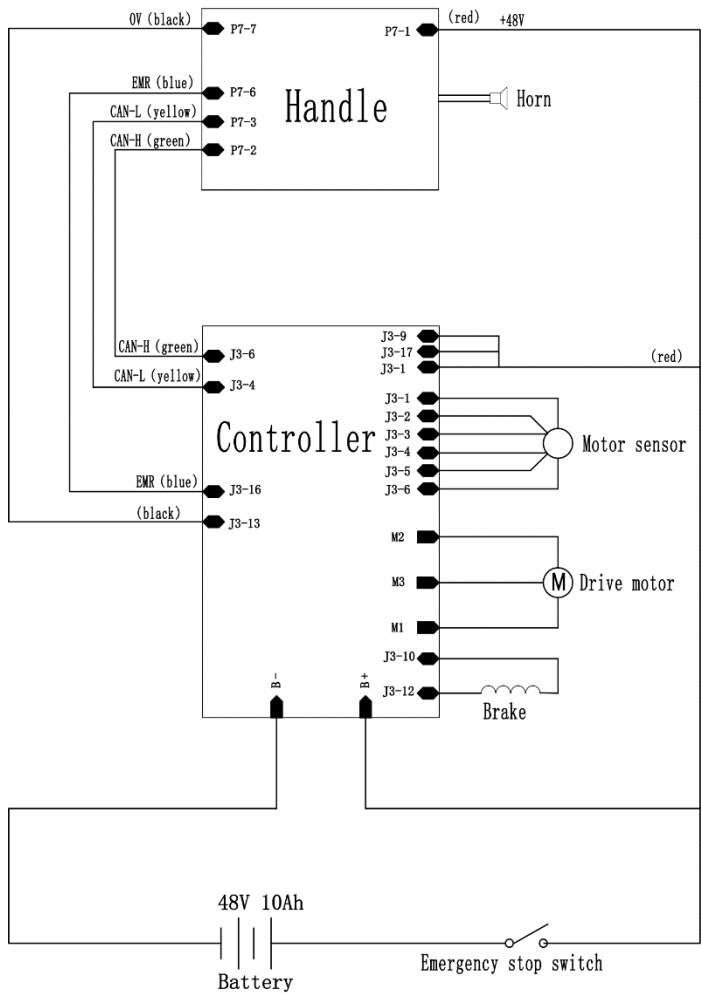
6: Safety Valve

7: Check Valve

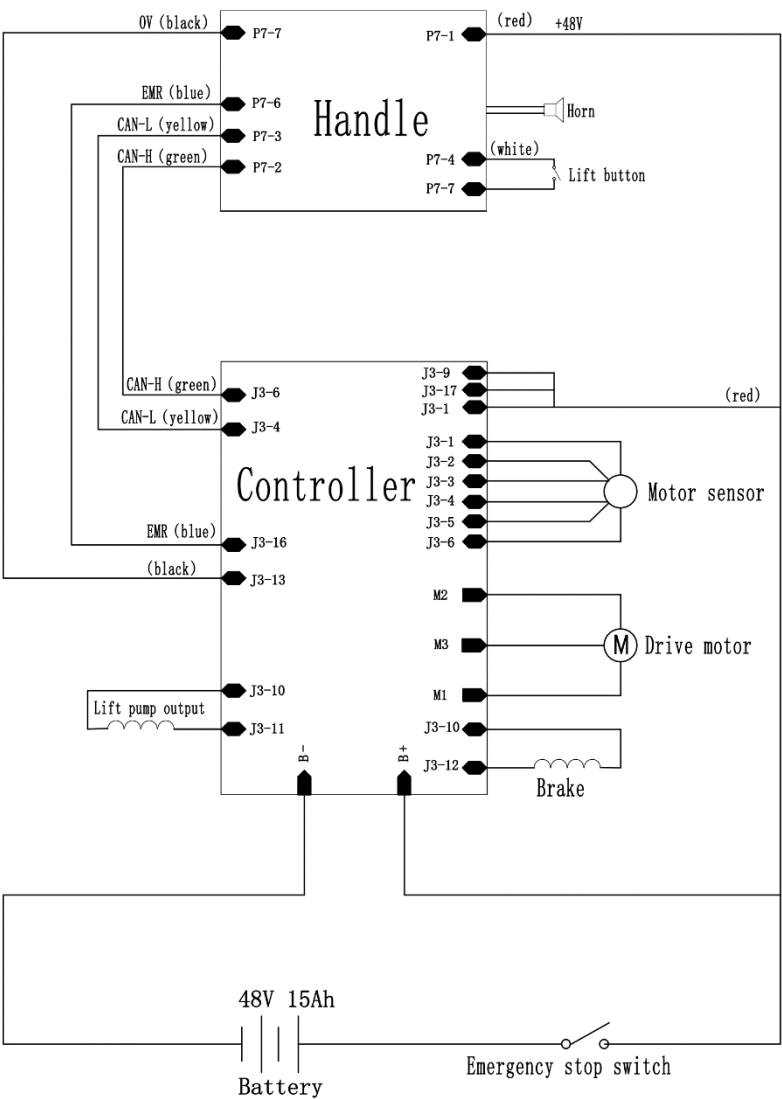
8: Gear Pump

7. Electrical Schematic Diagram

7.1 T20 Electrical Schematic Diagram



7.2 T20I Electrical Schematic Diagram



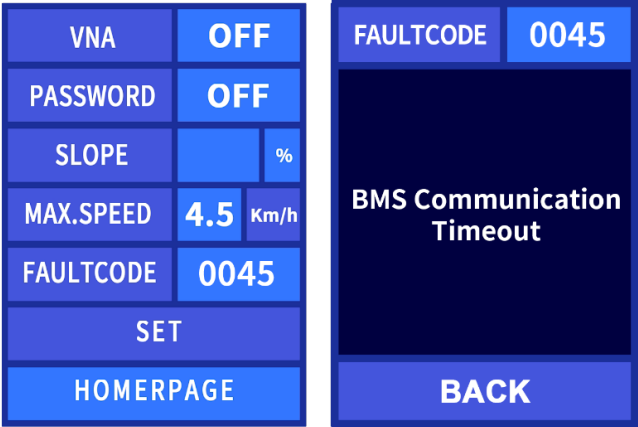
8. Common Fault Codes

8.1 Fault Indication on LCD/OLED Screen

When the controller fails, there are two places, **LCD/OLED** screen on the handle and the **LED flash indicator** on the controller, to help identify the fault.

For example, when the fault type is BMS Communication Timeout:

(1) The fault code column of the **LCD** screen will automatically display "0045" after 5 secs, and after clicking it, the corresponding fault type "BMS Communication Timeout" will appear;



and the **OLED** screen only displays the fault code "Error 45".

(2) The blue (○) and red (●) lights on the LED flash indicator of **Controller** will flash as "○○○○ ●●●●●". The blue light represents the tens digit, and the red light represents the ones digit. In this way, the flashing pattern means the fault code is 45.

The corresponding faults are shown in the table below.

Code	Fault Display			Cause
	LCD	OLED	Controller	
1	Motor Stalled	Error 1	○	1. Motor phase line is not connected. 2. Controller is missing phase line.
2	Encoder Fault	Error 2	○○	1. Encoder plug-in is connected virtually. 2. Encoder board is damaged.
3	Motor Overtemperature	Error 3	○○○	1. Motor temperature > 120°C 2. Motor overload 3. Electromagnetic brake is not released.
4	Controller Overtemperature	Error 4	○○○○	1. Controller temperature > 90 °C 2. Motor overload
5	Controller Temperature Alarm	Error 5	○○○○○	1. 75°C< Controller temperature <90°C 2. Motor overload
6	U-Phase Hardware Overcurrent	Error 6	○○○○○○	1. Phase line short circuit 2. Motor overload 3. Controller fault
7	V-Phase Hardware Overcurrent	Error 7	○○○○○○○	
8	W-Phase Hardware Overcurrent	Error 8	○○○○○○○○	
9	Busbar Overvoltage	Error 9	○○○○○○○○○	1. Busbar voltage >60V 2. Bad connection of B+, B- circuits
10	Busbar Overcurrent	Error 10	○	1.Phase line short circuit 2.B+, B- short circuit 3. Controller fault
11	Hardware Protection	Error 11	○ ●	1. Phase line short circuit 2. Motor overload 3. Controller fault
12	Battery Overvoltage	Error 12	○ ●●	1. Battery voltage >60V 2. Bad connection of B+, B- circuits
13	Battery Undervoltage	Error 13	○ ●●●	1. Battery voltage <36V 2. Loose connection of B+, B- circuits

14	Motor Temperature Alarm	Error 14	○ ●●●●	1. 100°C< Motor temperature <120°C 2. Motor overload
15	Low Battery	Error 15	○ ●●●●●	1. Battery voltage <40V 2. Loose B+, B- circuit connection
16	Busbar Overvoltage	Error 16	○ ●●●●●●	1. Busbar voltage >60V 2. Bad connection of B+, B- circuits
17	Busbar Lowvoltage	Error 17	○ ●●●●●●●	1. Busbar voltage <30V 2. Bad connection of B+, B- circuits
18	Busbar Overcurrent	Error 18	○ ●●●●●●●●	1. Phase line short circuit 2. Motor overload 3. Controller fault
19	Current Limit Timeout	Error 19	○ ●●●●●●●●●	1. Motor overload 2. Electromagnetic brake is not released.
20	Accelerator not Reset	Error 20	○○	1. Handle knob fault
21	Loss of Interlock	Error 21	○○ ●	1. Interlock contactor fault
22	Accelerator Starts Before Interlocking.	Error 22	○○ ●●	1. Handle knob fault
23	Emergency Reverse	Error 23	○○ ●●●	1. Emergency reverse button is triggered.
24	Directional Knob Fault	Error 24	○○ ●●●●	
25	Overspeed Fault	Error 25	○○ ●●●●●	1. Encoder fault 2. Magnetic ring is damaged. 3. Phase lines are connected in the wrong order.
26	Abnormal EPROM	Error 26	○○ ●●●●●●	1. EEPROM read/write fault

27	Driving Prohibited During Charging	Error 27	○○ ●●●●●●●●	1. The charger is not removed.
28	Current Sampling Damaged	Error 28	○○ ●●●●●●●●●●	1. Current sensor is damaged.
29	Deceleration Timeout Protection	Error 29	○○ ●●●●●●●●●●	1. Controller is abnormal.
30	Emergency stop	Error 30	○○○	
31	MTSOC (Motor Temperature Sensor Open Circuit)	Error 31	○○○ ●	1. Temperature sensor is damaged. 2. Temperature harness is damaged.
32	MTSSC (Motor Temperature Sensor Short Circuit)	Error 32	○○○ ●●	
33	MTSOC (Controller Temperature sensor open circuit)	Error 33	○○○ ●●●	
34	MTSSC (Controller Temperature sensor short circuit)	Error 34	○○○ ●●●●	
35	U-Phase Software Overcurrent	Error 35	○○○ ●●●●●●	1. Motor overload
36	V-Phase Software Overcurrent	Error 36	○○○ ●●●●●●●●	
37	W-Phase Software Overcurrent	Error 37	○○○ ●●●●●●●●●●	
38	Busbar Contactor Open Circuit	Error 38	○○○ ●●●●●●●●●●	1. Busbar contactor drive circuit is open.
39	Busbar Contactor Adhesion	Error 39	○○○ ●●●●●●●●●●	1. Busbar contactor is adhering. 2. Bus contactor drive fault
40	Brake Open Circuit	Error 40	○○○○	1. Brake fault 2. The plug-in harness is disconnected.

41	Power Drive Short Circuit	Error 41		1. Brake/lift relay/lowering relay is short-circuited.
42	Lift Output Timeout	Error 42		1. Lift relay drive fault 2. Hoist limit switch failure
43	Power-Down Protection	Error 43		1. Electric lock voltage <30V 2. Poor contact of electric lock wire
44	Handle Communication Timeout	Error 44		1. CAN communication loss
45	BMS Communication Timeout	Error 45		
46	CAN Communication Fault	Error 46		
47	Interlock not Reset	Error 47		1. Tie rod has no mechanical return. 2. Interlock contactor fault
48	Emergency Reverse not Reset	Error 48		1. Emergency reverse button is not returned to the original position. 2. Emergency reverse function is abnormal.
50	Emergency Reverse is Set Before Interlocking	Error 50		
51	Lack Phase of W or UV or UVW	Error 51		1. Motor wire is not connected. 2. Motor wire circuit has poor contact.
52	Lack V-Phase	Error 52		
53	Lack U-Phase	Error 53		
54	Lift Relay Open Circuit	Error 54		1. Relay coil or wiring harness is disconnected.
55	Lowering Relay Open Circuit	Error 55		

8.1 Fault Indication on LED Flash Indicator

When the controller fails, there are two places, LED flash indicator on the **ordinary handle** and the LED flash indicator on the **controller**, to help identify the fault.

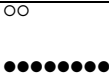
For example, when the fault type is BMS communication timeout:

- (1) The flashing red light at the bottom of the **handle** will flash as “●●● ●●● ●●●”;
- (2) The blue (○) and red (●) lights on the LED flash indicator of **Controller** will flash as “○○○○ ●●●●”.The blue light represents the tens digit, and the red light represents the ones digit. In this way, the flashing pattern means the fault code is 45.

The corresponding faults are shown in the table below.

Fault Display		Code	Type	Cause
Handle	Controller			
●●●	○○○○ ●●●●	45	BMS Communication Timeout	1. CAN communication loss
●●●●	○○	20	Accelerator not Reset	1. Handle knob fault
● ●●	○○○○ ●●●	43	Power-Down Protection	1. Electric lock voltage <30V 2. Poor contact of electric lock wire
	○ ●●●	13	Battery Undervoltage	1. Battery voltage <36V 2. Loose connection of B+, B- circuits
	○ ●●●●●●	17	Busbar Lowervoltage	1. Busbar voltage <30V 2. Bad connection of B+, B- circuits
● ●●●	●●●●●●●●	9	Busbar Overvoltage	1. Busbar voltage >60V 2. Bad connection of B+, B- circuits
	○ ●●	12	Battery Overvoltage	1. Battery voltage >60V 2. Bad connection of B+, B- circuits
	○ ●●●●●	16	Busbar Overvoltage	1. Busbar voltage >60V 2. Bad connection of B+, B- circuits
● ●●●●	●●●●	4	Controller Overtemperature	1. Controller temperature > 90 °C 2. Motor overload
	●●●●●	5	Controller Temperature alarm	1. 75°C< Controller temperature <90°C 2. Motor overload
	○○○ ●●●	33	MTSOC (Controller Temperature Sensor Open Circuit)	1. Temperature sensor is damaged. 2. Temperature harness is damaged.
	○○○ ●●●●	34	MTSSC (Controller Temperature Sensor Short Circuit)	
● ●●●●●	●●●	3	Motor Overtemperature	1. Motor temperature > 120°C 2. Motor overload 3. Electromagnetic brake is not released.

	○ ●●●●	14	Motor Temperature Alarm	1. 100°C< Motor temperature <120°C 2. Motor overload
	○○○ ●	31	MTSOC (Motor Temperature Sensor Open Circuit)	1. Temperature sensor is damaged. 2. Temperature harness is damaged.
	○○○ ●●	32	MTSSC (Motor Temperature Sensor Short Circuit)	
●● ●	○○ ●	21	Loss of Interlock	1. Interlock contactor fault
	○○ ●●	22	Accelerator Starts Before Interlocking.	1. Handle knob fault
	○○○○○	50	Emergency Reverse is Set Before Interlocking	1. Emergency reverse button is not returned to the original position. 2. Emergency reverse function is abnormal.
●● ●●	○○○ ●●●●●●●●	38	Busbar Contractor Open Circuit	1. Busbar contactor drive circuit is open.
	○○○ ●●●●●●●●	39	Busbar Contactor Adhesion	1. Busbar contactor is adhering. 2. Bus contactor drive fault
●● ●●●	●	1	Motor Stalled	1. Motor phase line is not connected. 2. Controller is missing phase line.
	●●	2	Encoder Fault	1. Encoder plug-in is connected virtually. 2. Encoder board is damaged.
	○○ ●●●●●	25	Overspeed Fault	1. Encoder fault 2. Magnetic ring is damaged. 3. Phase lines are connected in the wrong order.
●● ●●●●	○○○○○ ●	51	Lack Phase of W or UV or UVW	1. Motor wire is not connected
	○○○○○ ●●	52	Lack V-Phase	2. Motor wire circuit has poor contact.

		53	Lack U-Phase	
		40	Brake Open Circuit	1. Brake fault 2. The plug-in harness is disconnected.
		41	Power Drive Short Circuit	1. Brake/lift relay/lowering relay is short-circuited.
		48	Emergency Reverse not Reset	1. Emergency reverse button is not returned to the original position. 2. Emergency reverse function is abnormal.
		54	Lift Relay Open Circuit	1. Relay coil or wiring harness is disconnected.
		55	Lowering Relay Open Circuit	
		46	CAN Communication Fault	1. CAN communication loss
		44	Handle Communication Timeout	
		28	Current Sampling Damage	1. Current sensor is damaged.
		6	U-Phase Hardware Overcurrent	1. Phase line short circuit 2. Motor overload 3. Controller fault
		7	V-Phase Hardware Overcurrent	
		8	W-Phase Hardware Overcurrent	
		11	Hardware Protection	
		47	Interlock not Reset	1. Tie rod has no mechanical return. 2. Interlock contactor fault
		15	Low Battery	1. Battery voltage <40V 2. Loose B+, B- circuit connection

●●●●●●●●●●	○○ ●●●●●●	26	Abnormal EPROM	EEPROM read/write fault
	○	10	Busbar Overcurrent	1.Phase line short circuit 2.B+, B- short circuit 3. Controller fault
	○ ●●●●●●●●	18	Busbar Overcurrent	1. Phase line short circuit 2. Motor overload 3. Controller fault
	○ ●●●●●●●●	19	Current Limit Timeout	1. Motor overload 2. Electromagnetic brake is not released.
	○○ ●●●	23	Emergency Reverse	1. Emergency reverse button is triggered.
	○○ ●●●●	24	Directional Knob Fault	
	○○ ●●●●●●●	27	Prohibition of Operating Vehicle During Charging	1. The charger is not removed.
	○○ ●●●●●●●●	29	Deceleration Overtime Protection	1. Controller is abnormal.
	○○○	30	Emergency stop	
	○○○ ●●●●●	35	U-Phase Software Overcurrent	1. Motor overload
	○○○ ●●●●●●	36	V-Phase Software Overcurrent	
	○○○ ●●●●●●●	37	W-Phase Software Overcurrent	
	○○○○ ●●	42	Lift Output Timeout	1. Lift relay drive fault 2. Hoist limit switch failure

9. Product Quality Warranty

Our company will provide the following guarantees.

9.1 Product Quality Commitment

(1) During the normal use by the end user and within the guarantee period, the parts that are confirmed to be damaged due to unqualified manufacturing will be repaired or replaced free of charge.

(2) Our company only provides quality assurance for the product itself, and other indirect losses such as: loss of downtime, extra cost, loss of reputation, etc., are not covered in the guarantee.

(3) The user must use the product in strict accordance with the "Operation and Maintenance Manual". If don't do so, any loss caused will not be covered by the warranty.

9.2 Warranty Period and Range

(1) The warranty period starts from the production date on the invoice.

(2) Parts with a warranty period of 1 year or 1200 operation hours (whichever expires first):

Drive assembly (excluding carbon brushes and seals), controller assembly (excluding contactors), drive motor, lift motor, steering motor; lift cylinder (excluding seals), truck body, fork, chain, accelerator, operating handle.

(3) The warranty period for LFP battery is 18 months.

(4) The warranty period of all components except (2) (3) and the following Clause 9.4 is 6 months or 600 operation hours (whichever expires first), such as high-pressure hose, bearing, contactors, instruments.

9.3 Warranty Conditions

When the pallet truck fails, the user must contact the maintenance shop designated by our company or the dealer who sells the pallet truck at the first time.

9.4 Excluded by the Warranty Range

- (1) Not in the warranty period or don't meet the warranty conditions.
- (2) Damage caused by operating or repairing not in accordance with the instructions, insufficient maintenance, or overloading.
- (3) Quality problems caused by user's lack of operating experience or improper use, or force majeure such as accidents and natural disasters.
- (4) Damage caused by structural modification or repair performed by the user without the consent of our company.
- (5) Damage caused by using parts not provided by our company.
- (6) Damage caused by repairs performed by maintenance personnel not authorized by our company.
- (7) Component damage due to external causes, such as external impact, electric shock, and corrosion from atmospheric or other chemicals.
- (8) Components that can be repaired and restored to performance with simple adjustments.
- (9) Wearing parts not covered by the warranty:
 - (a) Various fluids, filters such as: working oil, lubricating oil, electrolyte, and other consumables that need to be maintained and replaced during the warranty period.
 - (b) Other consumables:
Various seal rings, sealing gaskets, rubber tubes, self-lubricating bearings, nuts, bolts, washers, gaskets, pins, and other standard parts.

Inspection & Maintenance Record

No.	Interval	Content	Record	Remarks
1	50 hours/1 month	Check each handle control switch and the function of display instrument		
2		Check display equipment, alarm system (if equipped) and safety equipment		
3		Check emergency reverse button, reverse braking, emergency stop switch and other braking functions		
4		Check steering function of the handle		
5		Check drive/load/mechanism wheel (if equipped) for wear, tear, or damage		
6	250 hours/2 months (Maintenance to be performed in addition to the existing 50-hour maintenance after 250 hours of operation)	Check for damage to power plugs, main wiring harnesses, and cables		
7		Check for loose or detached screws		
8		Check for worn fuel lines		
9		Check for hydraulic oil leaks		
10		Check and lubricate sliding surfaces such as gearbox bearings with lithium grease and grease the gears		

11	500 hours/3 months	Check that battery cables are securely connected and not crossed and lubricate the terminals if necessary		
12	(Maintenance to be performed in addition to the existing 50-hour and 250-hour maintenance after 500 hours of operation)	Check that labeling is clear and complete		
13		Check and tighten controller and other electrical components		
14		Check that lift height reaches the standard height and add hydraulic oil in time		
15	1000 hours /6 months (Maintenance to be performed in addition to the existing 50-hour, 250-hour and 500-hour maintenance after 1000 hours of operation)	Check gearbox for abnormal noises or leaks.		
16		Check the wear and tear of drive/load/mechanism wheel (if equipped) and replace them if they are badly worn		
17		Check that oil pipes, tubes, and joints are firmly connected, and the seals are reliable		
18		Check that braking distance is within the standard range, adjust and replace the brake pads if necessary.		
19		Check chassis for cracks or damage		
20		Check hydraulic cylinder for damage, jamming and sound during lift and lowering		
21		Check and replace the hydraulic oil filter		
22		Check cylinder and piston for damage and good sealing		

23	2000 hours/12 months (Maintenance to be performed in addition to the existing 50-hour, 250-hour, 500-hour, and 1000-hour maintenance after 2000 hours of operation)	Clean oil tank and change the hydraulic oil		
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Note: This table is for reference only. Requirements in actual use must be higher than those in the table.