Motive Power battery

Operation and maintenance manual

Tianneng Group

(2019 version)

Group Profile

Tianneng Group is a leading enterprise in China's new energy motive battery industry. Founded in 1986 and after more than 30 years of development, Tianneng has become a large-scale industrial group focus on environmentally friendly motive battery manufacturing for electric vehicle, integrating research and development, production and sales of new energy vehicle lithium batteries, automobile start-stop batteries, and wind energy solar energy storage batteries, as well as reuse and recycling of used batteries, urban intelligent micro-grid construction, and green intellectual industrial park construction into one entity.

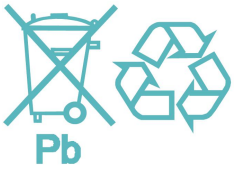
In 2007, Tianneng Power successfully listed on the Main Board in Hong Kong as China's first motive battery share. The group now has more than 40 domestic and foreign subsidiaries, 10 production bases in Zhejiang, Jiangsu, Anhui, Henan and Guizhou provinces. The Group's comprehensive strength ranks among the World's Top 500 New Energy Company, the Top 500 Chinese enterprises, the China's Top 500 Private Enterprise, and the top 10 enterprises in China's battery industry.

Corporate vision: To be the most respected world-class new energy enterprise.

Content

1. Safety Precautions

Please read the operation manual carefully before use



Discarded batteries cannot be thrown away and need to be recycling disposal

The electrolyte in the battery is highly corrosive acid. If it splashes on the skin or clothes or gets into the eyes, please immediately rinse with plenty of water and seek medical advice if necessary

Danger

To avoid corrosion

Protective glasses must be worn

Electric hazard

Be careful of electric shock: do not put any metal items on the battery, avoid short terminal connection, cause spark

NO Fireworks

◆ Attention

- ❋ Battery should be in the place out of reach of children;
- ❋ Explosive gas will be produced when the battery is used and charged. It is strictly prohibited to be near the open fire or high temperature. Moreover, it is not allowed to throw the battery into the fire.During the high temperature season, direct exposure of batteries in the sun is strictly prohibited;
- ❋ Disused batteries after use, there was electricity, beware of short circuit and electric spark, otherwise it may catch fire explosion;
- ❋ Do not connect the battery directly to the ac power supply.
- ❋ Do not dismantle, repair, decompose or transform the battery by yourself, otherwise the toxic substances inside the battery will cause harm to people and the environment;
- ❋ Please use the appropriate battery wire, please firmly connect the terminal bolts, or there will be a fire, etc.;
- ❋ The battery shell cannot be cleaned with organic solvent, and carbon dioxide fire extinguisher cannot be used to put out battery fire. Special dry powder fire extinguisher should be equipped.

2.Battery Usage

2.1 Application

The motive power valve-controlled sealed lead-acid battery produced by tianneng group is divided into two categories according to market demand: valve-controlled lead-acid battery for moped and lead-acid battery for electric road vehicles.

Product type	Valve-controlled lead-acid battery for moped（C2：12~28Ah）	Lead-acid battery for electric road vehicles（C3 ≥32Ah）
Application	Electric tools or toys、 Electric sight-seeing tour bus、Electric bicycle、Sweeper、Golf trolleys、Wheelchairs、Patrol cars、Lawn mowers etc.	Electric Tricycle、Electric Sight-seeing Tour Bus、Low speed electric vehicles、Sweeper、golf cart、Electric Wheelchairs、Patrol cars、Lawn mowers etc.

2.2 Battery Installation

(1) Before installation, check the appearance of the battery without damage, and clean the surface of the battery with a dry cloth, if the battery shell is found broken, there is liquid leakage, the battery must be replaced, so as not to cause acid corrosion.

(2) The metal installation tools (such as wrench) with insulation tape package, insulation treatment.Before connecting, check all the connecting wires and the battery, and confirm that there is no hardware damage and the battery polarity is correct.Before connection should wipe the battery terminal, make it appear metallic luster, before and after connection, in the battery terminal surface coated with an appropriate amount of anti-rust agent (vaseline).

(3) When multiple batteries are used together, connect the batteries first, and then connect the batteries with the charger or the load.Note that the positive terminal of the battery should be connected to the charger or the positive terminal of the load, and the negative terminal should be connected to the negative terminal.If the battery is not connected to the charger or the load motor correctly, the charger or the load motor will be burnt out.

(4) Battery should be installed upright, not inverted installation, not stack installation (if the power box designed to stack, stack up and down when the battery must be separated).Each battery in series connection, wire diameter must conform to the provisions on electrical installations, positive and negative polarity should be connected correctly, not short circuit, the connection shall be welded or bolted, and the terminals and sealing parts shall not be damaged during operation, and the connection point shall be in good contact. The recommended torque of terminals shall reach a certain value (as shown in the table below) to prevent sparks from being generated, and the connection line shall not be crossed, overlapped or squeezed.The space between adjacent batteries should be more than 20mm. At the same time, it should be anti-vibration and anti-pressure. The installation should be firm.In the process of use, do not allow channeling impact, mutual friction, not water.

Number	Range of application	The recommended torque value
1	M6	11～14.7N.m(111～150kgf.cm)
2	M8	14.7～19.6N.m(150～200kgf.cm)

(5) The battery shall not be placed in an airtight container, and the power box shall not be designed to be too sealed. There shall be a reserved ventilation hole or gaps to facilitate the timely discharge of trace gas and the timely release of heat generated during charging.

(6) Electric door locks, safety socket and other devices prone to spark should be isolated from the battery.

2.3 Battery Charge

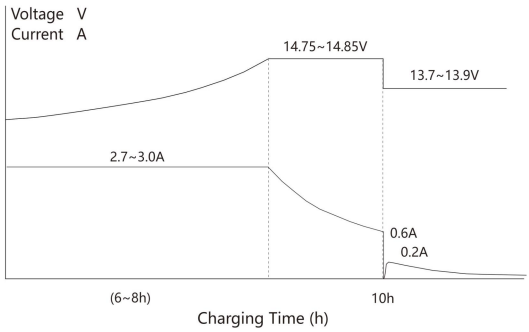
2.3.1 When the battery is charging, the ambient temperature should be kept between 10 ℃ ～ 30 ℃ , avoid low temperature, high temperature and direct sunlight, and keep well ventilated.The lower temperature will affect the charging efficiency and even lead to sulfation.The higher temperature is easy to make the charger components parameters drift, or even cause thermal runaway,make the battery bulge.

2.3.2 The charging mode of the battery is as follows:

(1) The charging mode of electric moped battery（C2：12Ah~28Ah） and electric road vehicle battery (32≤C3＜60Ah) is as follows:

- The first stage: Constant current charging, constant current value is 0.25I2A ~ 0.3I2A (electric moped series), 0.35I3 A ~ 0.4I3A (electric road vehicle series).
- The second stage:Constant voltage charging, the constant voltage value of a single battery (12V) is 14.8v.
- The third stage:Trickle charging,the constant voltage value of a single accumulator (12V) is 13.8v, and the current gradually approaches to 0A from 0.06I2A (electric moped series) and 0.08I3A (electric road vehicle series).
- Take 12V20Ah battery as an example, the charging current and voltage diagram are as follows.Please refer to annex 1 for charging parameters of other models。

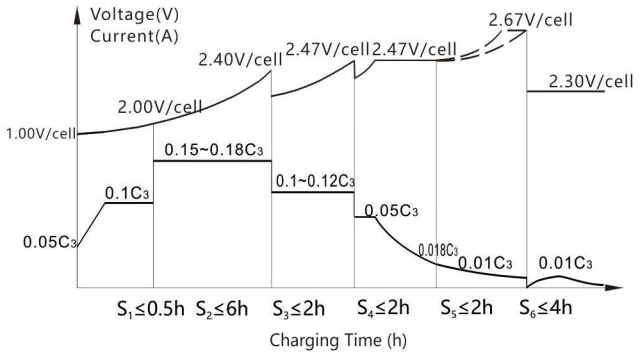
Charging Characteristics (25℃)



(2) The charging method of electric road vehicle battery (C3≥60Ah) is as follows:

- The first stage: : pre-charging, constant current (0.05 ~ 0.1) C3A is charged to 12V or 0.5h, if it fails to reach 12V, the charger should give an alarm to indicate abnormal conditions.
- The second stage: when the constant current (0.15 ~ 0.18) C3A is charged to 14.4v or the charging time reaches 6h, the charging will be automatically converted to the third stage.
- The third stage: when the constant current (0.1 ~ 0.12) C3A is charged to 14.8v or the charging time reaches 2h, the charging will be automatically converted to the fourth stage.
- The fourth section: constant voltage 14.8v, current limit 0.05 C3A charging, charging to the current to 0.018C3A or charging time to reach 2h, charging automatically converted to the fifth stage.
- The fifth stage: limit voltage 16V, limit current 0.01 C3A, charging time ≤2h automatically converted to the sixth stage.
- The sixth stage: floating charging. The floating charging voltage is 13.8v, the current limiting is 0.01C3A, and the charging time is no more than 4h.But when the second stage is less than 3h, the fifth stage is not required.
- Take the 12V100Ah (C3) battery as an example, the charging current and voltage diagram are as follows. Please refer to annex 2 for the C3 capacity of other models:

Charging Characteristics@25℃(77℉)



Note:

1) The charging process of standard temperature is 25 ℃, with lower or higher temperature, battery voltage adjustment coefficient for the + or - 0.004 V/(℃. Cell).

2) If the daily operation (discharge) time is short (the discharge capacity is less than 10%), there is no need to charge every day. The infrequent use of the battery should be every period of time (such as 1 month or 2 months) to do a full discharge and timely charge, in order to maintain the capacity of the battery and not shorten its life.(note: for users with short cycling distance at ordinary times, it is suggested to discharge the battery once a month to the protection point of under voltage and then give the battery sufficient power in time, which will make the battery life longer).

2.4 Battery Discharge

(1) In normal use, the temperature during battery discharge should be controlled within the range of -15 to +50℃.

(2) Battery discharge: When the car is running, it is the discharge process of the battery, and the battery is strictly prohibited from being over-discharged. In order to avoid over-discharge of the battery, the minimum discharge protection voltage of each battery (12V) is 10.5V.

(3) The ambient temperature range should be recorded during discharge. When the temperature is not within the specified range, the discharge capacity is calculated according to the following correction formula.

$$Ca = \frac{I_2 \times T}{1 + f(t - 25)}$$

T----discharge duration, h;

T——the average surface temperature of the battery during discharge, ℃;

Ca——the actual capacity at the reference temperature of 25 ℃, Ah;

f - temperature coefficient, 1 / ℃; the value is 0.006.

2.5 Precautions

(1) The battery should be kept away from moisture and possible flooding during use. The battery should not be close to the source of fire or heat. Do not throw the battery into the fire or immerse it in the water. Do not expose it to direct sunlight or charge it in the sun.

(2) The battery must not be short-circuited and should not be inverted.

(3) To avoid damaging the battery, the battery is prohibited from over-discharging, under-charging and over-charging during use.

(4) The battery is in the state of charged, If the delivery time is short, the user can use it directly (or load the vehicle).If

the delivery time is long (more than 3 months), in order to make up for the loss of capacity in storage and transportation, the user shall make up the electricity before loading and using.
(5) The method is: Plug the car charger into the battery box, connect the 220V AC power supply, and charge it to 2h~3h after the charger turns green.
(6) The charger used in the vehicle must have sufficient accuracy and steady flow performance. It is strictly forbidden to use the charger with low quality, low price and poor aging resistance. Otherwise, the battery will be damaged. Please refer to attachment 1"Charger Parameter Table" for the charger parameters of some models.
(7) Charging the battery should first connect the charger to the vehicle socket, then connect 220V AC; after charging, disconnect the 220V AC, then disconnect the charger from the vehicle socket.
(8) When the battery is continuously charged for more than the maximum charging time, if the charger indicator does not turn green or the battery is hot, stop charging immediately. Do not continue charging if the charger indicator does not turn green.
(9) The vehicle often vibrates due to the uneven road surface during use. If the charger vibrates, its component parameters will drift, affecting the charging performance and even damaging the battery (insufficient charging or charging drum battery). Therefore, it is strictly prohibited to carry the charger with the vehicle (except the car charger).
(10) Battery charging: When the capacity of the battery is more than 70% or the total continuous mileage exceeds 70%, the battery should be charged in time.
(11) Different models, different brands, new and old batteries and different types of chargers must not be mixed, non-battery professionals should not dissect the battery.
(12) The battery capacity is based on the ambient temperature of 25℃. When the temperature drops by 1℃, the battery capacity drops by about 1%. The influence of ambient temperature should be considered during the use.
(13) The battery is a consumable. After a period of charge and discharge cycle, the battery capacity will gradually decrease, resulting in a decrease in the mileage of the car. This is a normal phenomenon, but when the battery capacity drops below 60% of the standard value during the warranty period, It is considered as a battery failure, please contact us in time. When the battery capacity drops below the standard value of 60% after the warranty period, it is normal loss and is not covered by the warranty .
(14) If the battery is used beyond the warranty period, the battery should be inspected thoroughly to confirm that there are no safety hazards before continuing to use.
(15) Retired batteries should be disposed of by the recycling station (merchant) and should not be discarded.
(16) If it is accidentally splashed on the skin, it should be washed immediately with plenty of water. If it is serious, it should be sent to hospital for treatment.

3.Transportation and storage

3.1 Transportation requirements

(1) During the loading and unloading of the battery and the transportation process, the battery must be protected from sun and drenching. It is strictly forbidden to expose the battery to the sun and rain， put an end to battery dampness.
(2) The vehicle loaded with batteries must be well protected from the sun, rain and other measures, pay attention to ventilation, easy to heat dissipation.In summer, domestic transport to avoid the use of containers and other closed mode of transport.
(3) When loading the battery, it is strictly prohibited to put it upside down or on the side, No heavy weight or chemical contamination.
(4) The battery should be placed gently during transport without rolling.
(5) During transportation, loading or transportation, the battery is strictly prohibited from being subjected to severe

mechanical shock or falling.

3.2 Storage requirements

(1) The battery storage environment must be dry, clean, well ventilated, and be well protected against sun and moisture.
(2) The storage temperature of the battery should be controlled at 5° C～40° C. If it exceeds 40° C, effective cooling measures such as fan cooling or air conditioning must be taken.
(3) Battery storage method: When storing in a centralized manner, stacking and stacking, the limit of horizontal vertical stacking number of each pile is 4 columns, and a gap of not less than 20cm is left between the stack and the stack to facilitate heat dissipation of the battery. The height of the battery should be controlled below 5 layers (1.2m).
(4) The battery should be stored away from direct sunlight, away from heat sources (heating equipment, etc.), flammable and explosive materials and chemicals. At least 2m away from the heat source.
(5) The battery shall not be placed upside down or sideways when placed, and shall not be subject to any mechanical shock or heavy pressure.
(6) Daily inspection of the battery surface temperature and environmental temperature, and prevent the battery moisture or high temperature, pay attention to maintain ventilation.
(7) When the battery is not in use, the battery needs to be fully charged for storage, and the power supply once a month to avoid long-term losses caused by the plate sulfuric acid.
(8) For new batteries, if the delivery time is longer and the storage time exceeds 3 months, full charging is recommended.

4. Battery maintenance

4.1 Fault check

4.1.1 Appearance inspection of the battery: visual inspection, the inspection personnel should carefully observe whether there is leakage, bulging (deformation), case damage and burnout, hole at the bottom, date modified, terminal burnout, Terminal deformation, etc. defect.
(1) battery leakage check
Common leakage phenomenon: 1 the battery cover and the battery slot are not well sealed or collided, resulting in cracking of the sealing glue; 2 safety valve leakage; 3 leakage at the terminal; 4 battery tank damage leakage fluid.
(2) Appearance bulging (deformation) inspection
①A group of batteries are deformed at the same time, and the battery voltage is measured to determine whether it is short-circuited. If there is no short circuit, the deformation is caused by thermal runaway caused by over-charging. The charging parameters of the charger should be checked. The highest charging voltage is high without overcharge protection or the conversion current is low. It is required to replace the charger and the battery is processed accordingly. ②Only one or two of a group of batteries are deformed by the following possibilities: one is that the charged state is inconsistent, and some batteries are overcharged during charging to cause deformation. . Regarding the cause of the different charged state, there may be a short circuit single cell, a self-discharge unevenness, or a separate charging, etc. The second type is that the reverse polarity of the battery causes heat distortion during charging. Undeformed batteries should be checked for discharge capacity and self-discharge characteristics.
4.1.2 Inspection of backward battery: backward battery generally only needs to be measured by open circuit voltage. When only one battery of the whole battery has an open circuit voltage lower than 1.75V/cell (except for short circuit, open circuit or manufacturing reasons), When the other voltages are higher than 1.75V/cell, it can be judged as a single overdischarge.

4.1.3 The whole group of battery over-discharge inspection: use a multimeter to measure the open circuit voltage of each battery in the whole battery, and the average voltage of the single cell is below 1.75V for over-discharge.

4.1.4 Open circuit inspection

(1) Use a multimeter to measure the open circuit voltage of a single battery and display it as 0V, which can be directly determined as an open circuit.

(2) Use a multimeter to measure the voltage of a single battery, use the car charger to charge a single battery to be tested for more than 10 minutes, and then use a resistor with a resistance of 1 to 1.5 ohms to discharge the battery, or discharge with constant current 10A to15A, when the voltage drops to zero in 10 seconds, which is determined to be an open circuit.

4.1.5 Short circuit check

(1) After the battery to be tested is fully charged, stand for 2 hours,Then measured the open circuit voltage of the single battery by a multimeter, thevoltage is an integer multiple of 2V lower than the normal voltage.

(2) When the battery is charged, the calorific value is big.

4.1.6 Capacity inspection (in accordance with the standard GB/T 22199.1-2017 "sealed lead-acid battery for electric bicycles" or standard GB/T 32620.1-2016 "lead-acid batteries for electric road vehicles - Part 1: Technical conditions" for testing) The ambient temperature range should be recorded during discharge. When the temperature is not within the specified range, the discharge capacity is calculated according to the following correction formula.

$$Ca = \frac{I_2 \times T}{1 + f(t - 25)} :$$

4.2 Maintenance project

(1) Keep the battery and connecting wires dry and clean to avoid leakage. Regularly clean the battery surface and connecting wires with a dry cloth. Do not use organic solvents to wipe. If the appearance of the battery is adversely affected, it should be replaced in time.

(2) Check the terminals regularly and there should be no looseness. Remove oxides from the terminals and wire joints, and strictly prohibit metal debris and other debris from entering the battery.

(3) Try to avoid deep discharge and over-discharge, the charge is best when the discharge depth is about 70% (that is, when the remaining power is about 30%).

(4) The battery should use the original charger and the charger matched by the regular manufacturer. After the battery is fully charged, it should not be charged for a long time to avoid overcharging and losing water. The charging process should avoid outdoor cold weather in winter and exposure to hot sun or other high temperature scenes in summer.

(5) When the battery is in storage, the battery should be fully charged and stored, and periodically recharged every other month to avoid sulphation and capacity loss of the battery plate.

(6) When the battery usage time is suddenly shortened sharply or the discharge performance is greatly reduced, it should be checked to a professional maintenance in time to check whether the charger, motor, battery, etc. are abnormal, and abnormalities are eliminated in time.

(7) During the use of the battery, the maintenance of single charge and single discharge is done every six months, which helps to extend the service life of the battery.

5.Battery replacement

5.1 Common failure types of battery

(1) Poor appearance: leakage, bulging (deformation), broken shell, damaged shell.

(2) Low capacity: single backward capacity, low capacity of the whole group, short circuit fault, etc.

5.2 Replacement precautions

(1) When replacing the battery, the charger should be checked for compatibility. The unmatched charger must be replaced.
(2) When replacing the battery that is different from the original battery, confirm the installation conditions and ask for the correct battery according to the model requirements of the vehicle.
(3) The installation after battery replacement is carried out in accordance with the new battery installation requirements.
(4) Short circuit should be prevented during battery use, installation and disassembly.
(5) The battery should not be dismantled at will to avoid danger.
(6) Waste batteries must be recycled and should not be discarded at will to avoid affecting the environment.

5.3 Replacement time

The battery is a consumable and has a certain life. Considering the influence of factors such as the use conditions and ambient temperature, replace the battery before it reaches the design life of the battery. Fully ensure the power system is safe, reliable and normal operation.

Attachment 1："Charger Parameter Table"

Parameters / Specifications	Charge Current （A）	Max. Charge Voltage(V)	Float Voltage(V)	Conversion current(A)
36V/10Ah～13.2Ah(C2)	1.5～1.8	44.4±0.2	41.4±0.2	0.35～0.40
36V/14Ah～15Ah(C2)	2.0～2.4	44.4±0.2	41.4±0.2	0.40～0.45
36V/20Ah～23Ah(C2)	2.7～3.0	44.4±0.2	41.4±0.2	0.55～0.60
48V/10Ah～13.2Ah(C2)	1.5～1.8	59.2±0.2	55.2±0.2	0.35～0.40
48V/14Ah～15Ah(C2)	2.1～2.4	59.2±0.2	55.2±0.2	0.40～0.45
48V/20Ah～23.0Ah(C2)	2.7～3.0	59.2±0.2	55.2±0.2	0.55～0.60
48V/24Ah～25Ah(C2)	3.5～3.8	59.2±0.2	55.2±0.2	0.55～0.60
48V/26Ah～28Ah(C2)	3.8～4.2	59.2±0.2	55.2±0.2	0.60～0.65
48V/30Ah～32Ah(C3)	4.2～4.5	59.2±0.2	55.2±0.2	0.60～0.65
48V/33Ah～36Ah(C3)	4.5～5.0	59.2±0.2	55.2±0.2	0.65～0.70
48V/38Ah～42Ah(C3)	5.5～6.0	59.2±0.2	55.2±0.2	0.65～0.70
48V/43Ah～46Ah(C3)	6.0～6.5	59.2±0.2	55.2±0.2	0.70～0.75
48V/50Ah～52Ah(C3)	7.0～7.5	59.2±0.2	55.2±0.2	0.70～0.75
48V/56Ah～58Ah(C3)	7.5～8.0	59.2±0.2	55.2±0.2	0.75～0.80
60V/10Ah～13.2Ah(C2)	1.5～1.8	74.0±0.2	69.0±0.2	0.35～0.40
60V/14Ah～15Ah(C2)	2.0～2.4	74.0±0.2	69.0±0.2	0.40～0.45
60V/20Ah～23.0Ah(C2)	2.7～3.0	74.0±0.2	69.0±0.2	0.55～0.60
60V/24Ah～25Ah(C2)	3.5～3.8	74.0±0.2	69.0±0.2	0.55～0.60
60V/26Ah～28Ah(C2)	3.8～4.2	74.0±0.2	69.0±0.2	0.60～0.65
60V/30Ah～32Ah(C3)	4.2～4.5	74.0±0.2	69.0±0.2	0.60～0.65
60V/33Ah～36Ah(C3)	4.5～5.0	74.0±0.2	69.0±0.2	0.65～0.70
60V/38Ah～42Ah(C3)	5.5～6.0	74.0±0.2	69.0±0.2	0.65～0.70
60V/43Ah～46Ah(C3)	6.0～6.5	74.0±0.2	69.0±0.2	0.70～0.75
60V/50Ah～52Ah(C3)	7.0～7.5	74.0±0.2	69.0±0.2	0.70～0.75
60V/56Ah～58Ah(C3)	7.5～8.0	74.0±0.2	69.0±0.2	0.75～0.80
64V/10Ah～12Ah(C2)	1.5～1.8	79.0±0.2	73.6±0.2	0.35～0.40
64V/14Ah～15Ah(C2)	2.0～2.4	79.0±0.2	73.6±0.2	0.40～0.45
64V/20Ah～23Ah(C2)	2.7～3.0	79.0±0.2	73.6±0.2	0.55～0.60
72V/10Ah～13.2Ah(C2)	1.5～1.8	88.8±0.2	82.8±0.2	0.35～0.40
72V/14Ah～15Ah(C2)	2.0～2.4	88.8±0.2	82.8±0.2	0.40～0.45
72V/20Ah～23Ah(C2)	2.7～3.0	88.8±0.2	82.8±0.2	0.55～0.60
72V/24Ah～25Ah(C2)	3.5～3.8	88.8±0.2	82.8±0.2	0.55～0.60
72V/26Ah～28Ah(C2)	3.8～4.2	88.8±0.2	82.8±0.2	0.60～0.65
72V/30Ah～32Ah(C3)	4.2～4.5	88.8±0.2	82.8±0.2	0.60～0.65
72V/33Ah～36Ah(C3)	4.5～5.0	88.8±0.2	82.8±0.2	0.65～0.70
72V/38Ah～42Ah(C3)	5.5～6.0	88.8±0.2	82.8±0.2	0.65～0.70
72V/43Ah～46Ah(C3)	6.0～6.5	88.8±0.2	82.8±0.2	0.70～0.75
72V/50Ah～52Ah(C3)	7.0～7.5	88.8±0.2	82.8±0.2	0.70～0.75
72V/56Ah～58Ah(C3)	7.5～8.0	88.8±0.2	82.8±0.2	0.75～0.80

Attachment 2: "Battery Model Table"

NO.	Model	Nominal Capacity C2 (Ah) 1.75Vpc/25°C	Nominal Capacity C3 (Ah) 1.75Vpc/25°C	Nominal Capacity C5 (Ah) 1.75Vpc/25°C	Nominal Capacity C20 (Ah) 1.80Vpc/25°C	Dimension (±2mm)				Weight (Kg) ±5%	Terminal
						L	W	H	TH		
1	TNE12-15	12	/	13	15	151	99	98	103	4.20	T2
2	TNE12-18	15	/	16	18	151	99	107	108	4.90	I9
3	TNE12-25	20	/	22	25	181	77	169	170	6.70	I10
4	TNE12-26	21	/	23	26	189	100	127	130	7.00	I9
5	TNE12-35B	28	/	32	35	175	166	121	125	9.50	I10
6	TNE16-12	10	/	10.9	12	151	101	109	109	4.90	T2
7	TNE16-17	14	/	15.4	17	201	113	100	101	6.50	I9
8	TNE16-25	20	/	22.6	25	250	100	128	128	9.30	I9
9	TNE6-190	/	150	159	187	260	180	247	252	28.50	I7
10	TNE6-230	/	180	192	230	306	168	220	224	31.00	I7
11	TNE6-235	/	180	194	235	260	180	270	274	32.00	I7
12	TNE6-245	/	190	204	245	243	188	275	275	32.50	I7
13	TNE6-250	/	200	213	250	260	180	270	274	34.00	I7
14	TNE6-250L	/	200	213	250	330	180	222	222	35.00	I7
15	TNE6-270	/	220	233	270	260	180	270	274	36.00	I7
16	TNE8-180B	/	150	158	180	330	180	222	222	34.00	I7
17	TNE8-180C	/	150	158	180	262	182	280	280	36.00	I7
18	TNE8-220	/	180	190	220	330	180	222	222	36.50	I7
19	TNE8-250	/	200	213	250	330	190	250	250	45.50	I7
20	TNE12-38	/	32	34	38	267	77	170	170	9.80	I10
21	TNE12-40	/	33	35	40	195	130	157.	162	11.10	I1
22	TNE12-45	/	38	40	45	198.	166	169.	169.	13.20	I3
23	TNE12-45L	/	38	40	45	222	106	171	171	11.30	I10
24	TNE12-52	/	45	47	52	224	120	175	175	13.00	I1
25	TNE12-58	/	52	54	58	224	135	178	178	14.60	I1
26	TNE12-60B	/		54	60	229	138.	211	216	16.50	I3
27	TNE12-65	/	58	60	65	224	150	178	178	16.30	I1
28	TNE12-75	/	60	64	75	262	165	170	170	20.00	I3
29	TNE12-90	/	71	76	90	260	168	210	210	23.50	I3
30	TNE12-100	/	80	85	100.0	260	168	210	210	26.00	I3
31	TNE12-125	/	100	106	125	330	171	214	214	32.50	I7
32	TNE12-125L	/	100	106	125	453	222	146	152	36.00	I7
33	TNE12-140	/	110	117	140	339	172	281	281	41.50	I7
34	TNE12-150	/	120	128	150	407	171	240	240	41.00	I7
35	TNE12-170	/	135	144	170	339	172	281	281	45.00	I7
36	TNE12-190	/	150	159	187	480	170	236	236	51.50	I7
37	TNE12-190S	/	150	159	187	453	300	146	152	52.50	I7
38	TNE12-200	/	160	170	200	484	235	170	170	55.50	I7
39	TNE12-230	/	180	192	230	532	207	215	220	59.00	I7
40	TNE12-250	/	200	213	250	532	207	215	220	62.20	I7

Attachment 3: "Battery Test Record Table"

Site name: **Test time:**

Battery model:	**Numbers of battery:**	**Numbers of group:**
Production date:	**Installation date:**	**Ambient Temperature (℃) :**
Battery group ( ) Charge ☐ Discharge ☐ **Total voltage (V) Operate current (A)**		

NO.	Voltage Of Signal Battery						Remark
	Open Voltage	1h	2h	3h	4h	5h	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							

Remark:

Tested by: Approved by:

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Tianneng Group Wanyang Green Energy Co., Ltd.
Tianneng Group (Henan) Energy Technology Co., Ltd.
Zhejiang Tianneng Battery (Jiangsu) Co., Ltd.
Tianneng Battery (Wuhu) Co., Ltd.
Tianneng Battery Group (Anhui) Co., Ltd.
Tianneng Power (Hong Kong) Co., Ltd.

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