Maintenance Manual of Model MAX

Contents

1. Product Introduction

1.1 Specification of MAX 2.0

Product name	Max
Max. Speed Limit (Configurable by FW)	25km/h
Net weight(±0.5kg)	20kg
Full charge trip	60km
Battery capacity	36V 551Wh Lithium Battery
Gradeability	14% (Approx. 8°), (Test under 75kgs, approx.12km.h)
Charging time	Approx.6h (Built-in 2.9A charger)/Approx.4h (External 5A charger)
Charging temperature Range	Available (0-40℃)； Recommended (10-35℃)
Battery type	Non-Swappable battery
IP rating	Vehicle IPX4, Battery Pack IPX7, Controller IPX5, Built-in charger IPX7
Motor nominal power	350W
Driven mode	Rear-wheel drive
Tire	Rubber Tire + Anti-puncturing Layer
Vehicle cable design	Exposed cable
Front wheel brake	Drum brake
Rear wheel brake	Electronic brake
Front fork type	Rigid front fork
Connection mode between battery compartment cover and vehicle frame	Disconnect-type
Battery compartment cover lock	NONE
Front light	E-mark LED
Tail light	LED tail light (without reflector)
Kickstand	Single side kickstand

1.2 Parts Identification

A. Stem Assembly
B. Brake line assembly
C. Front Tube Assembly
D. Front tube clamps
E. Front Fork Assembly
F. Drum brake
G. Fore tire
H. Footpad
I. Rear fender
J. Frame assembly
K. Controller
L. Battery
M. Battery compartment
N. Foot kickstand
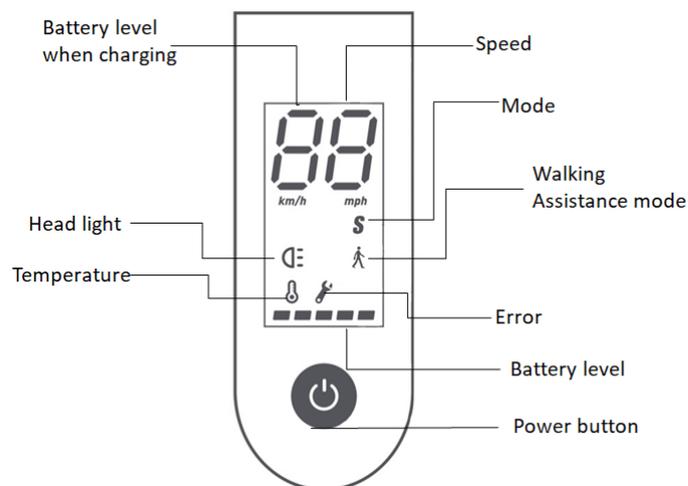O. Motor Assembly
P. Built-in charger
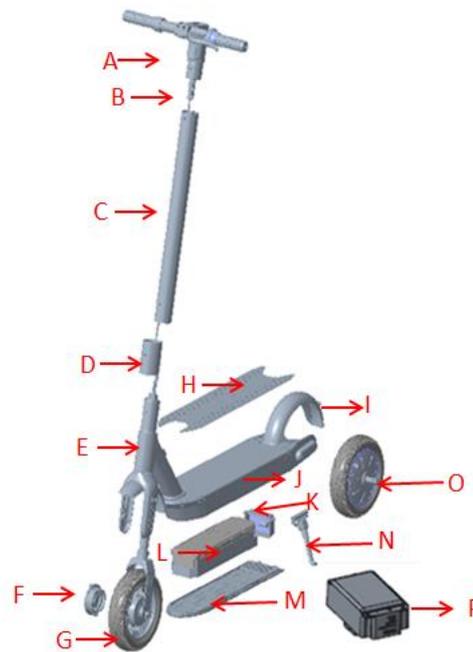
Remark：Related parts can be purchased, please contact customer support service.

1.3 Function

1.3.1 Display introduction

Detailed explanation of different icons on the display

Battery level when charging
Speed
Mode
Walking Assistance mode
Head light
Temperature
Error
Battery level
Power button

km/h   mph

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The detailed explanations of these icons are shown below:

Icon Type	Icon Display	Display Description
88 km/h mph	LED Display Enabled	When the Speed Display is enabled, the number will indicate the speed.
		When the Battery Capacity Display is enabled, the number will indicate the battery capacity.
		When the Error Type Display is enabled, the number will indicate the error code
	LED Display Off	Turn off the Nixie Tube Display
S	Mode Icon Display Enabled S Enabled D Enabled ECO	Sport mode is enabled, the S Display will be turned on. Distance mode is enabled, the D Display will be turned on. Economical mode is enabled, the ECO Display will be turned on.
🚶	Mode Icon Display	Walking assistance mode: Long pressed the throttle when the scooter is stationery; If the Mode Icon Display is enabled in walking assistance mode, it will be turned on.
	Mode Icon Display Off	The Speed Mode Display will be turned off
🌡	Temperature Alarm Display	It will be turned on only if the battery temperature is too high or too low;
		It will be turned off
🔧	Error Icon Display Enabled	It will be turned on only if an error occurs and the nixie tube displays an error;
	Error Icon Display Off	It will be turned off

There are 3 modes:

S = Sport Mode. It can accelerate fast, has the fastest speed mode, but the scooter range will be low.

D = Distance. Comparing to the Sport Mode, the Distance Mode accelerates slowly. It is the medium speed.

ECO = Economic mode. Among all 3 modes, this one uses the lowest power of the battery which means it accelerates slowly, but the scooter range can be higher comparing to other modes.

* You can switch the modes by double clicking the power button on the display.

* When you ride on the scooter, the display will have some icons lightened on the it.

## 1.3.2 Transportation mode

After unpack and take out the kick scooter,

1) There is a transportation mode that designed to keep healthy battery during long time transportation to avoid over-discharge.
2) Turn on the Transportation Mode: it is operated by the IOT App ;
3) Turn off the Transportation Mode: Plug the charger, charging longer than 3 seconds to turn on the scooter, and transportation mode is turned off. Your Scooter is in working mode.
4) Scooters need to be in transportation mode during long term storage.

1.3.3 Learning to ride

1. Wear an approved helmet and other protective gear to minimize any possible injury; and stand on the footrest with one foot and push off with another foot to start riding.

2. With an initial speed no lower than 2.5mph and press the throttle to start the scooter, sport mode with maximum speed of 15.5mph, and it also can be customized for local customer's actual speed requirement. To turn, shift your body weight and turn the handle slightly.
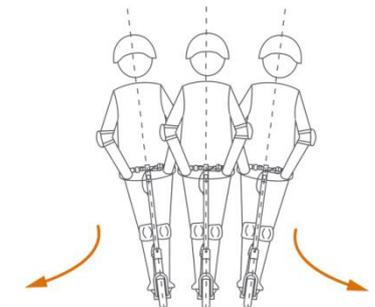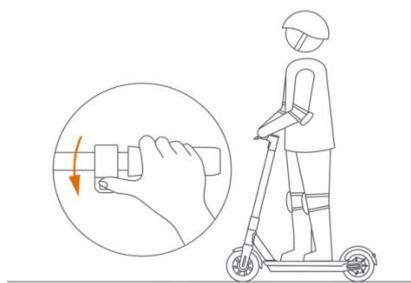
3. Press the throttle on the right hand to speed up when you are balanced, and slow down by releasing the throttle. The electrical brake is integrated in the mechanical brake handlbar, when press the brake, the drum brake of fore wheel and electrical brake of rear wheel will activate together, and the rear light flash continuously.


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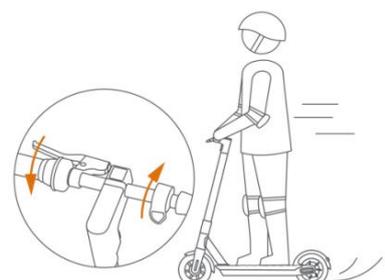
2. Battery and charging

2.1 Battery parameter

Item	parameter
Rated voltage	36V
Maximum charging pressure	42V
Rated capacity	15300mAh/551Wh
Cycle times	500times, remaining capacity>70%

2.2 Charging

Your scooter is fully charged with the LED on the charger changes from red (charging) to green (trickle green), it will take 4 hours for charging fully. When charging, the screen on the battery will display different color; when not charging, press the button for 2 seconds to display remaining power. And the display will show the battery level when charging.
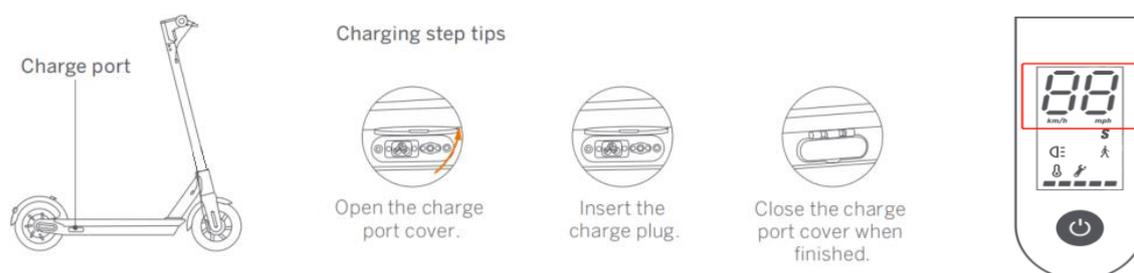
2.3 Charging precaution

1) Lithium Battery Product needs to charge regularly. Use the charger for Model Max to charge the scooter when the power level is low.

2) Fully charge the scooter and reset the scooter to transportation mode before keep in store house longer than one week. Recharge when battery level is low. Over Discharge will bring the unrecoverable damage to your battery.

3) Do not leave scooter charger or single battery without your awareness.

4) Recommended Recharge Frequency as following if stored in the recommended Temperature Range. Aged battery requires recharge more frequently, shorter time period for older battery.

Transportation Mode	Scooter or the Battery	Recharge

	(Spare Part)	
Transportation Mode is enabled before leaving Factory	A new Scooter shipped out from NB factory	Within 150 days from delivery (after Leaving NB factory)
Customer enable the Transportation Mode	A fully charged Scooter, with the brand-new or like brand-new battery	Within 150 days after fully charged.
Customer enable the Transportation Mode	A fully charged Scooter, used(aged) battery	Within 120 days after fully charged. Various depending on the battery age
Customer doesn't enable the Transportation Mode	A new or like-new, fully charged Scooter	Within 45 days after fully charged
Customer doesn't enable the Transportation Mode	A used(aged) but fully charged Scooter	Within 30 days after fully charged, various depending on the battery age
N/A	Brand New Standalone Battery	Within 150 days after fully charged
N/A	Used standalone battery	Within 90 days, various depending on the battery age.

2.4 Storage and Operating Temperature

Recommended temperatures are shown below:

Range	Ambient Temperature
Operating Temperature	14 - 104 ˚F(-10℃~40℃)
Storage Temperature	-4 - 122˚F (-20℃~50℃)

3. Maintenance

3.1 Tool and torque value list

Item	Description		Item	Description
1	PH1-L		12	wrench head 8#
2	PH2-S		13	wrench head11#
3	S2.5-S		14	wrench head14#
4	S3-S		15	wrench head15#

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5	S5-L		16	wrench head18#
6	T10hollow-S		17	wrench head26#
7	T15hollow-L		18	Wrench lever_25N.M
8	T20hollow-S		19	Wrench lever_100N.M
9	T25hollow-S		20	Valve tools_1
10	T30hollow-S		21	Valve tools_2
11	T45hollow-S		22	Valve tools_3

3.2 Regular check list

You can download the full checklist in our customer support system here.

3.3 Replacement of common parts

List of Max SOP				
NO.	Name of SOP		NO.	Name of SOP
1	SOP of Display Incompletely		9	SOP of Replacing Rear Wheel
2	SOP of the Throttle cannot Rebound		10	SOP of Replacing Rear Fender Assembly
3	SOP of Shaking on Front/Rear Wheel		11	SOP of Solving Shaking in Riding
4	SOP of Replacing Battery		12	SOP of Replacing Controller
5	SOP of Replacing Built-in Charger		13	SOP of Front Tube Shaking in Riding
6	SOP of Replacing Display		14	SOP of Unable to Boot
7	SOP of Replacing Display Cover		15	SOP of Flat Tire Inspection
8	SOP of Replacing Fore Wheel			

3.4 Failure Diagnosis

You can view the full list of Error Codes, their problem description and their solutions in our customer support system here.

Table of Error code				
Diagnostic index	Problem description		Diagnostic index	Problem description
MAX-10	Communication abnormality between the display and the main control board		MAX-26	Flash saves error
MAX-11	Motor A-phase current sampling abnormality		MAX-27	Wrong main control board password
MAX-12	Motor B-phase current sampling abnormality		MAX-28	Motor driven MOS upper bridge short circuit
MAX-13	Motor C-phase current sampling		MAX-29	motor driven MOS under bridge fault

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	abnormality			
MAX-14	Throttle Hall sensor abnormality	MAX-30	undefined
MAX-15	Brake Hall sensor abnormality	MAX-31	program jump error
MAX-16	undefined	MAX-32	IOT heartbeat timeout
MAX-17	undefined	MAX-33	undefined
MAX-18	Motor Hall sensor abnormality	MAX-34	undefined
MAX-19	Abnormal battery voltage detection	MAX-35	Scooter with default serial number
MAX-20	undefined	MAX-36	undefined
MAX-21	BMS Communication Error	MAX-37	Failure of charging base or battery charging cable
MAX-22	Wrong BMS password	MAX-38	undefined
MAX-23	BMS default serial number	MAX-39	Temperature sensor abnormality of Battery
MAX-24	System voltage detection abnormality	MAX-40	Abnormal temperature sensor of controller
MAX-25	undefined	MAX-41	Temperature of the motor is abnormal

3.5 Firmware Update

Customers should

1) Keep the firmware up to date through the backend management system "Dashboard" or mobile app Launcher.
2) Talk to Segway Discovery Engineer to find out an alternative way of upgrade
3) Report problems to customer service.

4. Safety issues
4.1Safety on riding

4) When in riding, do not ride the kick scooter in the rain. Do not get wet. Keep your speed between 5-10km/h. When you ride through speed bumps, elevator door, bumpy roads or other uneven surfaces. Slightly bend your knee to better adjust mentioned surfaces.
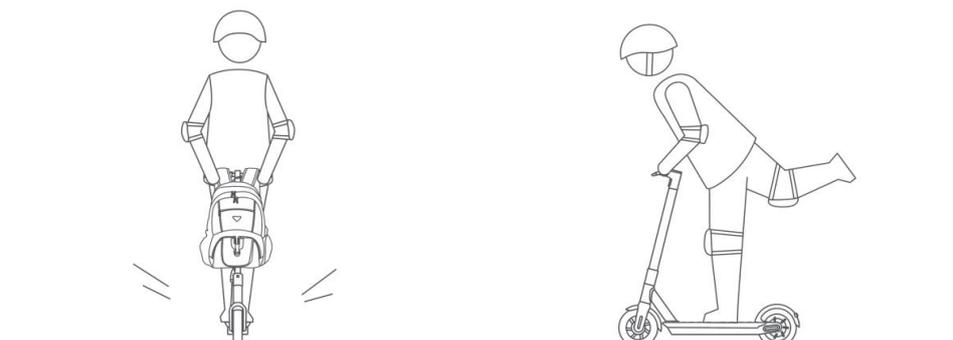
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5) Do not keep your feet on the rear fender; avoid contacting obstacles with the tire/wheel.
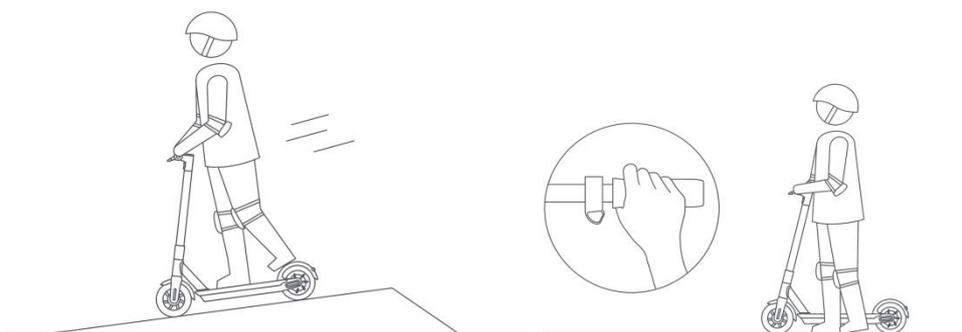
6) Do not ride on public roads, motorways or high ways; do not rotate the handle violently while driving at high speed.
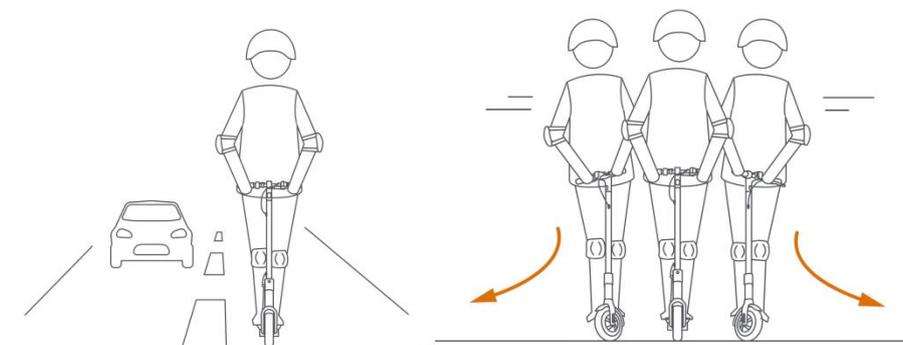

7) Do not carry heavy objects on the handle bar; do not ride the kick scooter with one foot.

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8) Do not ride through puddles or any other (water) obstacles. In such a case please lower your speed and bypass the obstacles, and do not carry any passengers, and do not carry a child, and do not ride when pregnant.
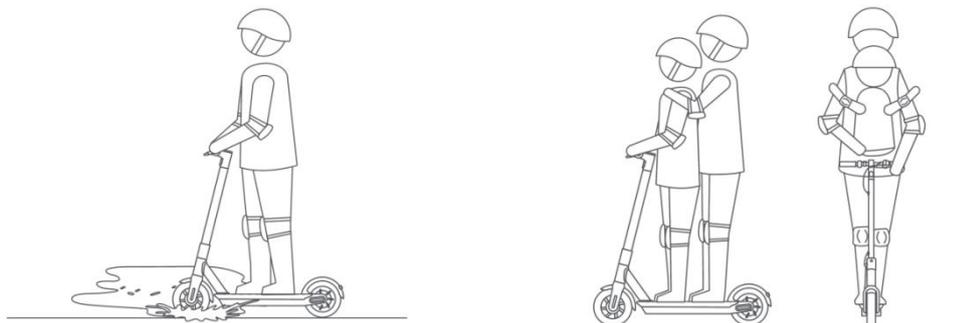
9) Do not touch the hub motor after riding because it can get hot.
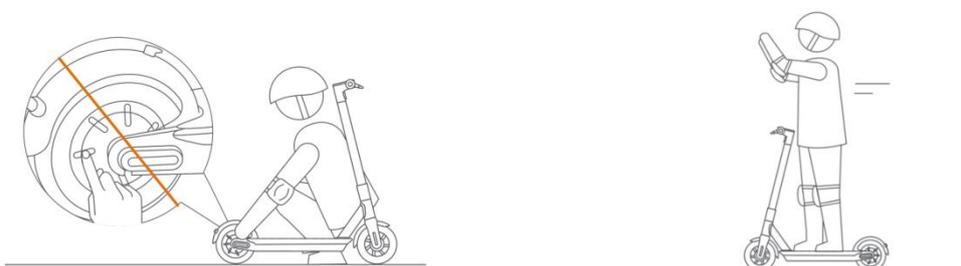
4.2 Design Requirement

The controller can read the battery temperature from Battery Management System, and the BMS can limit the highest battery output current (Bus Current); Two Temperature Sensors are on the surface of the battery cell.

i)   Battery Cell Maximum surface temperature is safe below 158 ˚F（70℃）；

ii)   If the cell surface temperature < +107.6 ˚F（42℃）, the maximum Bus Current is 25A

iii)   If the cell surface temperature reaches 107 ˚F（42℃）, start to reduce the maximum current

iv)   If the cell surface temperature reaches 122 ˚F（50℃）, the output maximum current reduces to 6A.

v)   If the cell surface temperature reaches < 14˚F （-10℃）， BMS will turn off the battery output. When the battery is shut down, the scooter loses the power.

vi)   There is 41 ˚F（5℃） temperature difference designed in buffer between the Shut Down temperature and the Battery Cell Maximum Surface Temperature.

vii)   When the controller receives the BMS feedback with the temperature out of the range of -4 ˚F ~ +158 ˚F（-20℃~70℃）, the system will prompt the error code 39#, indicating that the BMS temperature is reported incorrectly, or over-temperature cut off function failure. And If the battery is shut down, even when the temperature falls back under 149 ˚F（65℃）, the system does not boot automatically. When the scooter is rebooted again, and the error code 39# will be disappeared.

Remark: We recommend stopping operating when the Ambient Temperature is over 104˚F(40℃).

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4.3 Safety on battery

1) No disassembling, squeezing, puncturing the kick scooter; no touching the contact pots; no disassembling or puncturing the battery case; do not put the kick scooter in the water/fire (including the cooking range, heating, and other heat resource.) or expose it in the temperature which is higher than 122℉ (50℃) or is lower than -4℉ （-20℃） (e.g., do not put the battery or the kick scooter exposed in the car in the sun when in summer）. And please avoid the metal object contacts the battery contact pots to cause the short circuit, and it will cause the battery damaged or the injury.

2) It will cause the internal circuit damaged if the battery is in water and even cause the possibility of explosion, and please do not use the battery immediately and contact our CSE.

3) The kick scooter can only use the original battery, and the battery can only use the original charger, or else it will cause the damage or fire.

Undeserved disposition of waste and useless battery will cause the heavy environment pollution. And please follow the local regulations on waste and useless battery. Please do not throw away the battery, and protect natural environment together.

---**Ending**---

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