

Description of adjustment of control parameters of nanjing remote drive controller

Due to the wide variety of motors on the market, different electrical machines have different working parameters.

1. Basic parameters:

1.1 maximum phase current: the maximum phase line current of the working motor.

The maximum motor output from static to rated speed is determined Torque.

The maximum phase current has a maximum limit on the controller hardware, and the set value is not allowed to exceed the factory setting.

Otherwise it will lead to

The probability that the controller will burn down is greatly increased.

Different types of motors will have different output torque performance under the same maximum phase current setting value.

torque

Version of the motor output torque, balance version of the output is slightly smaller, the speed version of the motor output is the smallest.

Low constant speed motor output torque,

High constant speed motor output torque is small.

1.2 maximum line current: the maximum busbar current of the controller working battery.

The maximum output power of the motor is determined.

control

Maximum input power = battery voltage \* maximum line current.

This value determines the highest output power and thus the highest speed.

1.3 rated voltage: the maximum number of battery strings for nanjing remote drive controller with different voltages is as follows:

Lead-acid battery ternary lithium battery iron phosphate lithium battery

48V 4 strings 13-14 strings 16 strings

60V 5 strings 17 strings 20 strings

72V 6 strings 21 strings 24 strings

75V 6 strings 22 strings 25 strings

84V 7 strings 24 strings 28 strings

96V 8 strings 28 strings 32 strings

108V 9 strings 32 strings 35-36 strings

1.4 throttle threshold:

On the market rotating knob is uneven, different rotating knob or gas pedal voltage value will be different

Idle voltage full voltage

Electric motorcycle turn 0.8V-0.9V 4.1-4.3V

Central control transfer 0.8V-0.9V 4.5-4.95V

12V accelerator pedal 0.0V-0.2V 4.6-4.8V

1.4.1 we set the low throttle threshold according to the idle voltage.

Set a low throttle threshold to take into account the voltage fluctuation

Generally, it is 0.2-0.3v higher than idle voltage to ensure that the motor works in idle state when stopped.

For example, the low throttle threshold of the electric friction handle will be set to 1.1v, while the low throttle threshold of the 12V accelerator pedal will be set

Set to 0.5 V.

1.4.2 we set the high throttle threshold according to the full voltage.

In order for the controller to output at full bar

At full power, we need to set the value below the full voltage.

But be careful not to set it too low.

In order to automatically

To detect whether the electronic throttle is damaged, we set a value 0.6v higher than the high throttle threshold as the alarm boundary

Limit, once exceeded, that is, it is considered to be damaged, the controller immediately stop power output, so as to avoid the vehicle flying, to avoid

Cause a flying car accident.

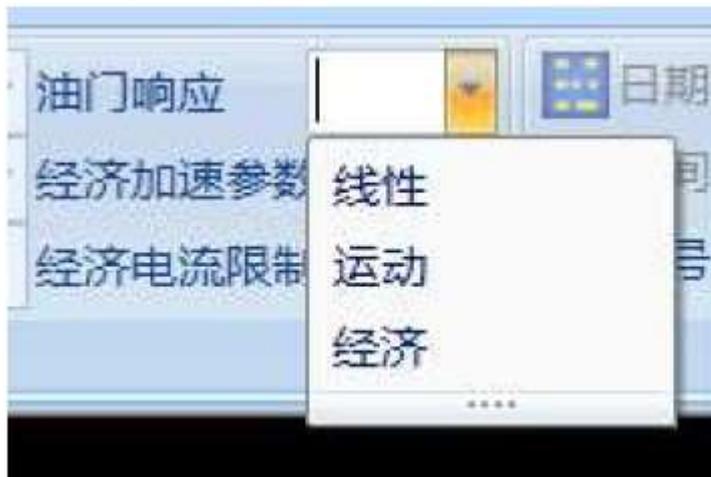
So when we set a high throttle threshold, such as the full handle of an electric motorcycle 4.1-4.3v, we will set it

3.9v as high throttle threshold.

For the high throttle threshold of 12V accelerator pedal, we will set it at 4.3v.

The 742 version adds the throttle self-learning function, when self-learning to turn to the bottom, the controller will automatically identify the handle/pedal The maximum throttle signal voltage, and according to this voltage generated throttle high threshold.

1.5: throttle response: for different user preferences, the turn feature has three configurations: linear, athletic, and economical.



1.6 phase shift: the

key characteristics of the motor's Angle position. Generally, manufacturers will indicate the Angle position. Most of the hub motors on the market are City 30° , 210° and 90° three kinds, but also some special motors.

If this Angle is not clear, can through the method of self-learning Find this value.

1.6.1 startup self-learning method: 1) the controller defaults; 2) the controller is fixed; and 3) the new controller is started through the upper computer

Fixed, through the operation method to start self-learning.

1.6.2 methods of starting self-learning or changing motor direction without using the upper computer:

Note that this method is not suitable for the 485 communication controller, because the 485 communication controller comes with bluetooth, the function is blocked

Condition: no neutral (default forward) electric motorcycle, tricycles and quadricycles, need to be connected to the brake line.

For electric quadricycle with neutral, do not need to connect the brake line.

1: keep the motor in no-load state (the wheel is suspended) and the controller is kept off.

2: pinch the brake or neutral, throttle to turn to the bottom.

3: start, throttle to maintain the bottom turn 10 seconds.

4: back to the throttle three times to turn the throttle: (back to the throttle 0.5 seconds, then turn 0.5 seconds, then back 0.5 seconds, then turn, and then Back, back again, back again).

5: the controller will be a long two short call, is the prompt into the self-learning state.

At this time according to the self-learning operation steps can be completed.

Note that step 4 turns the throttle three times is self-learning, step 4 if you turn the throttle five times is to change the direction of the motor.

2 steady speed and weak magnetism:

2.1 constant speed: the speed of the motor at rated voltage, referred to as rated speed, often referred to as constant speed in the electric friction industry.

This constant speed determines the highest motor speed.

General general controller, in the rated voltage state, can be driven

The maximum speed of the motor is near the constant speed.

When the controller is self-learning, it will recognize the rated speed under the current voltage.

2.2 expansion speed: the motor speed is pushed to a higher speed than the fixed speed, which is called expansion speed.

Speed expansion method 1: improve the working voltage, the higher the voltage, the higher the motor speed.

Speed expansion method two: do not increase the working voltage, through the weak magnetic, increase the motor speed.

2.3 nanjing remote drive controller adopts weak magnetic expansion speed: without changing the battery voltage, it directly controls the current limiting parameters to improve the power

Machine speed.

2.4 maximum speed, backward speed: limits the maximum speed of the motor.

In the ev market, the maximum speed is generally not limited, but through the back of the limiting parameters to limit the maximum speed.

After the speed exceeds the fixed speed, it automatically enters the weak magnetic state.

The more the speed exceeds the fixed speed, the greater the weak magnetic depth.

2.5 weak magnetic depth: Weak magnetic depth : (maximum speed - steady speed)/steady speed \*100%.

Generally, the weak magnetic depth of hub motor can reach 50%.

Some hub motors have a weak magnetic depth of more than 100%.

Therefore, we stipulate that the weak magnetic depth of the surface paste motor

should not exceed 50%.

The weak magnetic depth of the embedded motor does not exceed 150%.

2.6 current limiting parameters: adjust the maximum speed by adjusting this parameter.

First,

速度 (rpm)	系数	速度 (rpm)	系数	速度 (rpm)	系数	速度 (rpm)	系数	速度 (rpm)	系数
500rpm	30	2000rpm	90	3500rpm	30	5000rpm	30	6500rpm	30
1000rpm	100	2500rpm	30	4000rpm	30	5500rpm	30	7000rpm	30
1500rpm	30	3000rpm	70	4500rpm	30	6000rpm	30	7500rpm	30
								8000rpm	30
								8500rpm	30
								9000rpm	30

Let's first talk about the 500RPM, 1000RPM in the lower flow...

Conversion of 8500RPM and 9000RPM.

These speeds are the speeds of the central motor.

The corresponding parameters are also the parameters of the central motor.

For the hub motor needs to do a conversion.

The normal number of poles for a hub motor is 16, 20, 24, 28, and 30.

And usually the middle motor is 4 pairs.

Hub motor and central motor pole logarithm ratio

Hub motor pole

logarithmic

16, 20, 24, 28, 30

And central motors

Polar logarithm ratio

4, 5, 6, 7, 7.5

After we obtain a hub motor pole pair value, we can set the current limiting parameters according to the speed requirements.

For example, the pole logarithm of hub motor is 16, divided by 4 to get the pole logarithm ratio =16/4=4.

then

The actual speed of the 16-pole hub motor corresponding to the 500RPM is 125RPM.

The actual speed of the 16-pole hub motor corresponding to the 1000RPM is 250RPM.

The actual speed of the 16-pole hub motor corresponding to 4000RPM is 1000RPM.

The actual speed of the 16-pole hub motor corresponding to 5000RPM is 1250RPM.

The actual speed of the 16-pair hub motor corresponding to 5500RPM is 1375RPM.

The actual speed of the 16 - pole hub motor corresponding to 6000RPM is 1500RPM.

The actual speed of the 16-pair-hub motor corresponding to 6500RPM is 1625RPM.

The actual speed of the 16 - pole hub motor corresponding to 8000RPM is 2000RPM.

2.7 weak magnetic limitation: gradually increase the current limiting parameters

The current limit value we set should be considered according to the actual demand.

For a motor with a constant speed of 1000RPM, consider weak

The magnetic depth is 50%.

The maximum speed is also considered to be 1500RPM, and it is hoped that the motor does not work above 1625RPM.

Therefore, the current limit value is set as 30% at 6000RPM, and the speed of 6500RPM and above is set as less than 5%.

This ensures that the motor in idling also weak magnetic 50%.

And will not weak magnetic too deep cause motor jitter or even burn control.

For many motors, the weak magnetic depth can reach 100%, and the 1000-rpm motor can work at a high speed of 2000RPM.

right

In this kind of motor, in order to play a higher performance, can continue to expand the current limiting coefficient, the current limiting parameter can be within 8000RPM

According to the normal value above 70, 8500 is set at 30, 9000RPM is set below 5. The setting of current limit value starts from the safety value and gradually increases the speed. It must be ensured that the weak magnetism cannot be overdone.

Once found

If the idle speed is unstable or even outgoing MOE or OVER protection, it indicates that the speed is too high and the weak magnetic field is excessive I need to change it back.

3. Control parameters:

3.1 acceleration sensitivity: there is a big difference in accelerator acceleration requirements between electric cars and electric motors.

Electric cars are generally the gas pedal, and electric friction is the throttle knob or central control.

Electric cars have a moderate response to the throttle, whereas electric motors are different. Some customers want them to be light, slow and steady.

Some clients want to be responsive and explosive.

Acceleration sensitivity refers to how fast the accelerator responds.

This parameter is between 16 and 224.

The bigger the number, the throttle

The faster the better.

The 16 is already slow, and is typically set at around 32 on electric cars, rarely more than 64.

For electric friction, in addition to setting it at 32, many users prefer to react quickly, so it is set at 64.

128.

The track race is even set at 224.

3.2 AN: characteristics of the motor body AN value, parameter range 0~16.

Standard sheet sticker motor AN=0.

Standard IPM motor AN=16.

This parameter setting must conform to the motor characteristics.

Hub motor, middle mounted motor, AN less than 8.

The value of AN of the embedded middle motor is not less than 8.

AN = 16 is used for encoder middle motor and permanent magnet synchronous motor.

All hub motors on the market belong to tabbed motors, AN value is generally set as 0, not more than 4.

If the value of AN is not set correctly, the starting efficiency will be reduced, and even MOE/OVER protection will appear.

3.3 LM: motor acceleration matching parameter of the vehicle, which is used to adjust the motor's running fluency on the vehicle.

The default is 22.

Values used in most motors and vehicles on the market.

However, there are some motor types that are poorly matched with the whole vehicle, starting from the low speed segment, the middle speed segment will feel the obvious resonance shake

Moving. Adjusting LM will improve.

Starting from 22, if the jitter is accelerated at low speed, LM will be reduced, and the effect will be tested from 16, 14, 12, 11, 8, 5

As a result, the middle of those Numbers will also play a role, general considerations would rather be larger, as far as possible not too small.

Too small will not control the current, lead

Start MOE/OVER protection and even burn control.

So the LM value is the best parameter when the jitter disappears. Don't make it any smaller.

Some motors and the whole vehicle are very smooth when LM=22, but it will cause jitter after being reduced, so pay attention to it

LM is equal to 22 and we don't have a problem adjusting this parameter.

Or after the occurrence of dither resonance, LM value is changed from 22 to 16, 14, ...

Even 5 doesn't have much effect

It has nothing to do with this parameter, so make sure you go back to the maximum value, like 22, instead of leaving a random number in the controller

The inside.

3.4 PID parameters: StartKI, MidKI, MaxKI/StartKP, MidKP, MaxKP.

Default parameters StartKI=4, MidKI=8, MaxKI=12 / StartKP=40, MidKP=80, MaxKP=120.

The greater the motor power, the higher the voltage, the smaller the PID.

PID parameters can not be filled in casually, otherwise it will lead to abnormal work

Even burn control.

The following are the values of commonly used PID Settings.

There are 9 sets in total. Choose one set of parameters to match the motor Car, under the guidance of a professional to modify.

StartKI MidKI MaxKI StartKP MidKP MaxKP

1 1 1 1 1 10 10 10 surfboard default 2 2 2 3 20 20 30 super power motor

3, 3, 3, 4, 30, 30, 40

4, 4, 4, 6, 40, 40, 60 power default

5, 4, 5, 8, 40, 50, 80

6 6 6 9 60 60 90 medium power motor

7, 6, 7, 10, 60, 70, 100

8 8 8 12 80 80 120 medium power default

9, 8, 9, 13, 80, 90, 130

10, 8, 10, 15, 80, 100, 150

11, 8, 11, 16, 80, 110, 160

12, 10, 12, 18, 100, 120, 180

13, 10, 13, 19, 100, 130, 190

14, 10, 14, 21, 100, 140, 210

15, 10, 15, 22, 100, 150, 220

16, 16, 16, 24, 160, 160, 240 low-power motor

Note that improper PID parameter setting will lead to abnormal system work, or even MOE/OVER/PHASE failure

And so on, too much difference will cause burning control, to pay special attention to.

3 speed, electronic brake, power display, under-voltage protection parameters:

4.1 three-speed control: high speed, medium speed and low speed.

The current ratio is regulated by four parameters.



High gear :

display D on mobile APP/ computer.

Full power on, operating at maximum line current and maximum phase current.

Medium speed: display DM on mobile APP/ computer.

Power open part, phase current affects start acceleration, line current

The maximum speed is generally set as, the proportion of medium speed phase current is 75% of the maximum phase current, and the proportion of medium speed line current is

50% of the maximum line current.

Low speed: show DL on mobile APP/ PC.

Power open part, phase current influence start acceleration, line current shadow

The loudest maximum speed is generally set as, the proportion of low-speed phase current is 50% of the maximum phase current, and the proportion of low-speed line current is the most

25% of the current in a large wire.

4.2 the electronic brake is controlled by two parameters: stop reflux and maximum reflux: charging current limit in reverse charging.



For the electronic brake

function, when braking, the vehicle gives a brake signal to the controller, the controller detects the brake

After the signal, the electronic brake is applied with the current stopping the backflow, and the brake current does not exceed the maximum backflow value.

Note that to use the electronic brake feature, you must select the electronic brake from the following items to enable this feature.

And set the

Return current.

Note that the maximum reflux is generally 25%~50% larger than the stop reflux when setting parameters.

4.3 electric quantity coefficient: 0 electric quantity coefficient, full

electric quantity coefficient: calibrate the parameters displayed in the electric quantity. The controller itself can estimate the battery power, and a comparison can be obtained by adjusting the 0 power coefficient and the full power coefficient

Correct power indication.

When the battery is full, adjust the full charge coefficient so that the display capacity is exactly 100%.

When the battery power is low, adjust the 0 power coefficient, so that the display capacity and power are basically consistent.

Let's say the remaining 10%

When it comes to electricity, adjust the zero coefficient of electricity so that the electricity display is exactly 10%.

4.4 undervoltage protection: protection measures for extending battery life in case of power shortage.

When the battery voltage approaches the undervoltage protection point, the controller reduces the power output, so that the battery will not be damaged due to excessive discharge.

one

General battery undervoltage setting is as follows:

Rated voltage 48V 60V 72V 84V 96V 108V

Undervoltage protection point 42V 52.5v 63V 73.5v 84V 94.5v

4. Auxiliary parameters:

4.1 three-speed control: high speed, medium speed and low speed.

The current ratio is regulated by four parameters.



high

High gear: display D on mobile APP/ computer.

Full power on, operating at maximum line current and maximum phase current

And the maximum speed.

Medium speed: display DM on mobile APP/ computer.

Power open part, phase current affects start acceleration, line current

In addition, there is also a speed limit. Generally, the medium speed phase current ratio is set as 75% of the maximum phase current.

The proportion of medium speed line current is 50% of the maximum line current.

Low speed: show DL on mobile APP/ PC.

Power open part, phase current influence start acceleration, line current shadow

In addition, there is also a speed limit. Generally, the low-speed

phase current ratio is set as 50% of the maximum phase current. The low speed linear current ratio is 25% of the maximum linear current.

4.2 stop reflux, maximum reflux: charging current limit in reverse charging. For the electronic brake function, when braking, the vehicle gives a brake signal to the controller, the controller detects the brake

After the signal, the electronic brake is applied with the current stopping the backflow, and the brake current does not exceed the maximum backflow value.

Note that to use the electronic brake feature, you must select the electronic brake from the following items to enable this feature.

And set the

Return current.

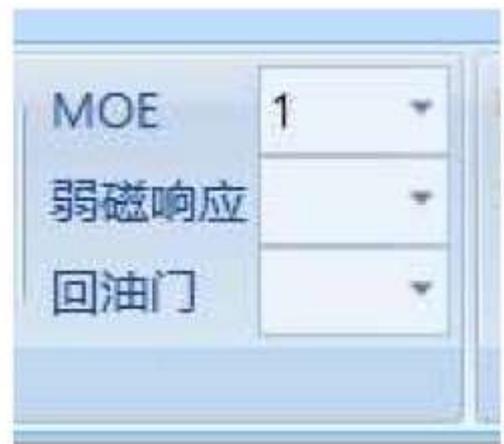
Note that the maximum reflux is generally 25%~50% larger than the stop reflux when setting parameters.

4.3 0 power coefficient, full power coefficient:.

The default is 22.

Values used in most motors and vehicles on the market.

However, there are some motor types that are poorly matched with the whole vehicle, starting from the low speed segment, the middle speed segment will feel the obvious resonance shake



Moving. Adjusting LM will improve.

Starting from 22, if the jitter is accelerated at low speed, LM will be reduced from 16, 14, 12, 11,

8, 5 to test the effect, the middle of the number will also play a role, the general consideration would rather be larger, try not to be too small.

Is too small will

Unable to control the current, causing MOE/OVER protection and even burn control.

So LM is the best parameter when the jitter disappears

Count, no less.

Note that MOE of 1 means MOE protection is valid, while MOE of 0 means protection is invalid.

4.4 under voltage protection:.

Some motors and the whole vehicle are very smooth when LM=22, but it will cause

jitter after being reduced, so pay attention to it

LM is equal to 22 and we don't have a problem adjusting this parameter.

Or after the occurrence of dither resonance, LM value is changed from 22 to 16, 14, ...

Even 5 doesn't have much effect

It has nothing to do with this parameter, so make sure you go back to the maximum value, like 22, instead of leaving a random number in the controller The inside.

4.5 speedometer calibration

Hall pulse meter: the number of hall pulses is 1~ 16,485.

Analog instrument: 60V corresponding to 10000RPM

4.6 speedometer mode: pulse/analog/isolated pulse

4.7: cruise

Cruise has grounding cruise and floating cruise, generally choose to ground cruise, that is, cruise line and ground contact,

Enable cruise function and drive at current speed automatically.

One more press or one more throttle or brake will take you out of the cruise Manual drive mode.

Note that the cruising maximum speed is limited by the maximum RPM of the low gear.

If exceed low speed maximum speed, press cruise, automatic

When driving, it will automatically reduce the speed to the highest speed of the low gear.