1，　软件概述：

南京远驱控制器监控手机 APP 软件是南京远驱科技有限公司开发的智能监控软件，通过蓝牙连接南京远驱研发的控制器，监控控制器的工作状态和设置参数。

本手机软件能够方便快捷地监视电机转速，电池电压，电流，输出功率，工作状态，并对运行状态的所需要各种参数进行配置，并绘制工作曲线，实时了解电机工作特性，通过调试参数，使得电机工作在匹配优化状态。

支持在线升级功能，可以对控制器进行软件升级。

南京远驱监控 APP 软件操作界面简洁美观、视觉豪华，操作步骤简单易懂，具有极佳的用户体验，是南京远驱控制器的调试好帮手。

1. Software Overview:

Nanjing remote drive controller monitoring mobile phone APP software is an intelligent monitoring software developed by Nanjing remote drive Technology Co., Ltd. It connects the controller developed by Nanjing remote drive through Bluetooth to monitor the working state and setting parameters of the controller.

The mobile phone software can easily and quickly monitor the motor speed, battery voltage, current, output power, working state, and configure the various parameters needed for the running state, draw the working curve, and understand the working characteristics of the motor in real time. Through debugging parameters, the motor works in matching optimization state.

Support online upgrade function, can upgrade the controller software.

Nanjing remote drive monitoring APP software operation interface is

simple and beautiful, visual luxury, easy to understand the operation steps, with excellent user experience, Nanjing remote drive controller debugging good helper.

2， 硬件系统：

带蓝牙功能的智能手机，

2. Hardware systems:

Smart phones with Bluetooth,

3， 操作系统：

安卓,IOS

3. Operating system:

Android, IOS

4， 操作说明：

4. Operating Instructions:

5， 安装和启动：

在公网上下载程序包，点击安装包自动开始安装，安装完成后在手机桌面上显示 MoterNet 图标。点击即可开始运行。

5. Installation and start-up:

Download the package on the public network, click on the installation package to start the installation automatically, and display the M oterNet icon on the mobile phone desktop after installation. Click to start running.

6， 权限要求：

6.1 本软件由于通过蓝牙和控制器通信，所以需要南京远驱提供的蓝牙模块

连接到控制器上。

6.2 而本软件需要打开蓝牙功能需要的定位权限，只有有了定位权限，本监控软件才能扫描到蓝牙设备。

6.3 另外本软件可以对控制器升级，因而需要文件存储功能权限，将手机上通过微信，QQ 或者电脑等途径收到的文件通过蓝牙发送到控制器内部，对控制器进行软件升级。

6. Permission requirements:

6.1 Due to communication with the controller via Bluetooth, the Bluetooth module provided by Nanjing Remote Drive is required to be connected to the controller.

6.2 The software needs to open the Bluetooth function required positioning permissions, only with positioning permissions, the monitoring software can be scanned to Bluetooth devices.

6.3 In addition, the software can upgrade the controller, so the file storage function permissions are required, and the files received on the mobile phone through WeChat, QQ or computer are sent to the controller through Bluetooth to upgrade the controller.

7，　首页界面：

本软件运行在智能手机上。分 4 个基本页面，首页，图表，曲线和通信。

通俗易操作，本软件启动后首页界面显示控制器的基本参数,如下图：

7. Home interface:

This software runs on the smartphone.Divided into 4 basic pages, home page, chart, curve and communication.

Easy to operate, this software after the start of the first page interface display controller basic parameters, such as the following:

最上部分显示一些公司产品介绍等图片信息，

中间显示控制器的型号，电压功率，母线电流和相线电流等参数。

The top part shows some picture information such as company product introduction,

Intermediate display controller model, voltage power, bus current and phase line current and other parameters.

并显示各种参数,如下图所示：

Various parameters are displayed, as shown below:

这些参数可以通过本手机 APP 软件进行修改，来改变控制器的工作状态。

These parameters can be modified by the mobile phone A PP software to change the working state of the controller.

8，　图表页面：

在本页面中，通过仪表方式显示控制器目前的工作状态，直观地展示了电机的当前运行转速，功率，相电流。控制器的工作电压，工作电流，工作状态等。如下图所示：

8. Chart page:

In this page, the current working state of the controller is displayed by instrument, and the current running speed, power and phase current of the motor are displayed intuitively. Controller working voltage, working current, working state, etc. As shown below:

在本页面上，有 4 个按钮：取消跟随，测试角度，自学习，保存。

取消跟随：可以实时取消控制器跟随状态，让电机空转时更快地停止下来。

测试角度：在电机高速转动后，松开油门，点击本按钮，观测电机运行角度。

自学习：在停止状态，为了找到一款新电机地工作角度而设立的功能。可以找到电机最佳工作角度。

保存：当角度学习好后，点击保存即可保存控制器当前工作参数。使得控制器在断电后能保存最新工作参数。

On this page, there are 4 buttons: cancel follow, test angle, self-study, save.

Cancel follow: can cancel the controller follow state in real time, let the motor stop faster when idling.

Test angle: after the motor rotates at high speed, release the throttle, click this button, observe the motor running angle.

Self learning: in the stop state, to find a new motor working angle and set up a function. The best working angle of the motor can be found.

Save: when the angle is learned, click Save to save the current working parameters of the controller. The controller can save the latest working parameters after power off.

9，　曲线页面：

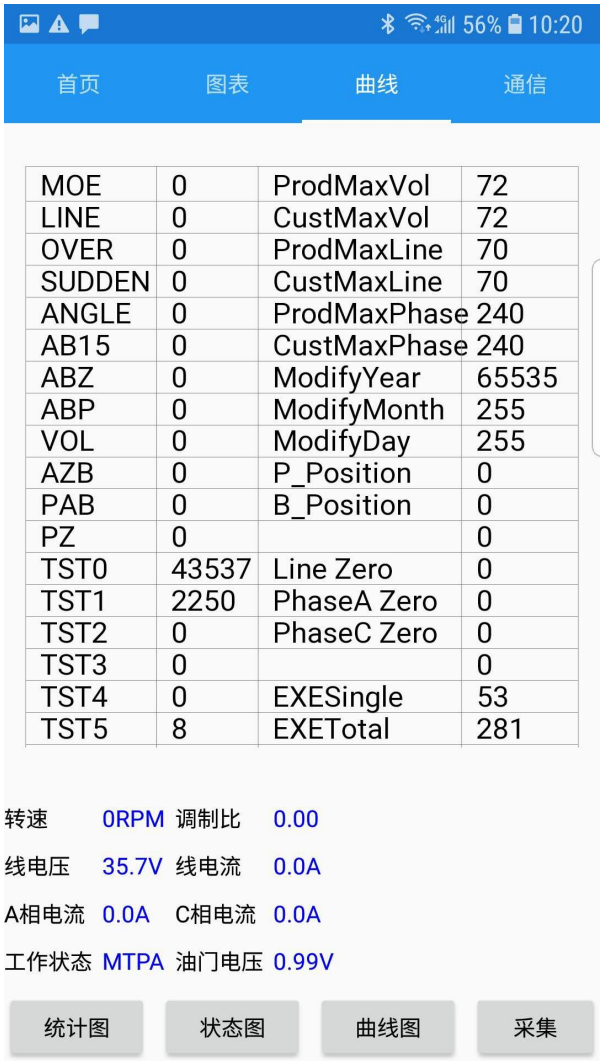
曲线页面展示了三种信息页面：

第一张信息页面是统计数据，如下图：

9. Curve page:

The Curve page shows three information pages:

The first information page is statistical, as shown below:

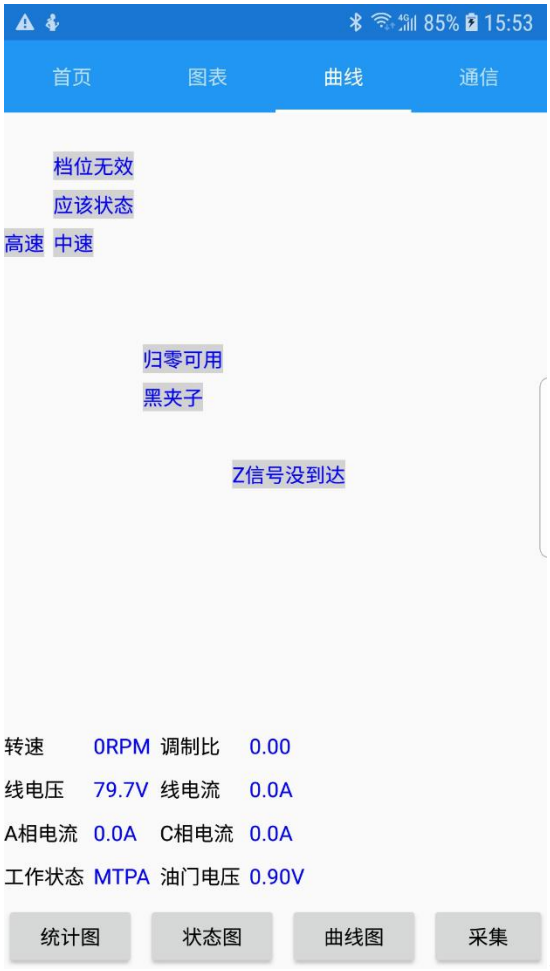


本信息页面展示了当前工作的基本转速，调制比，线电流线电压，相电流，工作状态，油门电压等信息外，还展示了 MOE,LINE 等统计数据，这些数据记录了开机工作以来的数值记录。

Besides the basic speed, modulation ratio, line streamline voltage, phase current, working state, throttle voltage and so on, this information page also shows the statistical data such as M OE,LINE, which record the numerical records since the start-up work.

第二张信息页面是状态数据，如下图：

The second information page is status data, as shown below

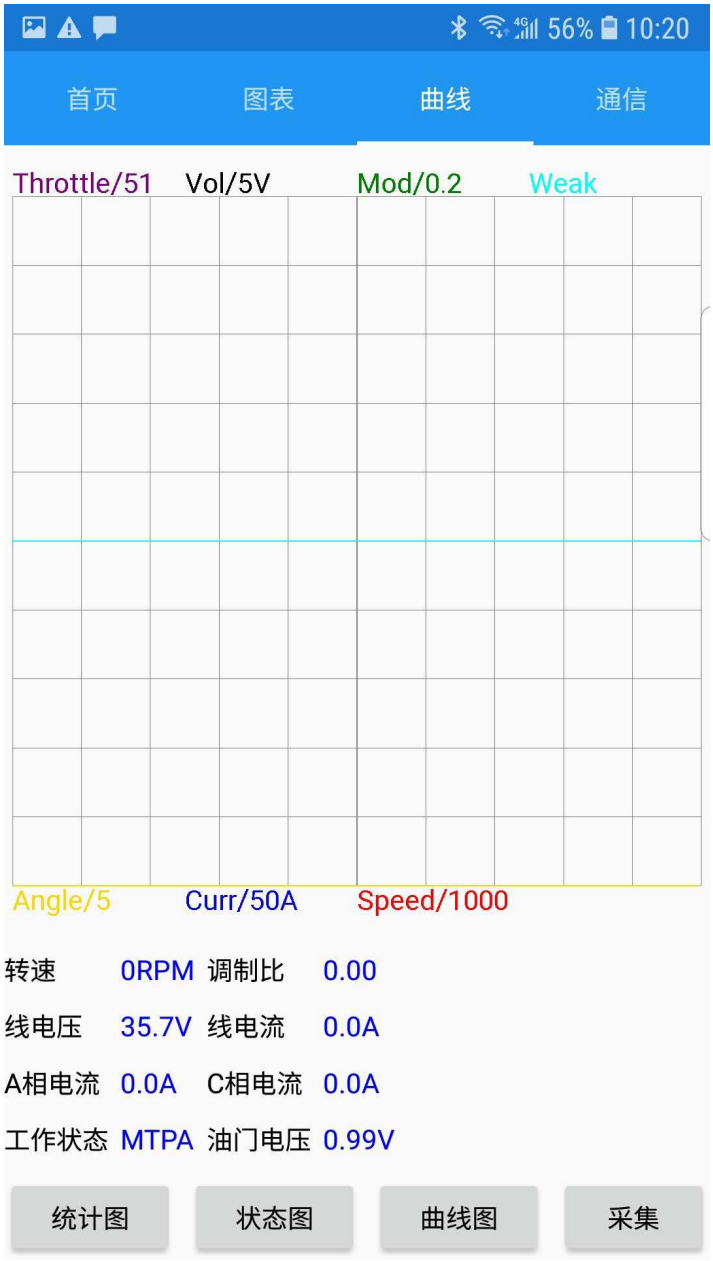


本信息页面当前工作的基本转速，调制比，线电流线电压，相电流，工作状态，油门电压等信息外，展示了控制器的各种工作状态，如高速，中速等状态，方便用户观察自己的控制器和电机工作状态，

In addition to the basic speed, modulation ratio, line streamline voltage, phase current, working state, throttle voltage and so on, this information page shows the various working states of the controller, such as high speed, medium speed and so on. Easy for users to observe their controller and motor working state,

第三张信息页面是曲线表，展示了自控制器开机以来前 55 秒内的工作曲线，如下图：

The third information page is the curve table, showing the working curve in the first 55 seconds since the controller started, as shown below:



其中：

红色为速度

蓝色为电流

黄色为角度

绿色 为调制比

黑色为电压

紫色为油门

青色为弱磁状态。

Among them:

Red speed

Blue current

Yellow is the angle

Green modulation ratio

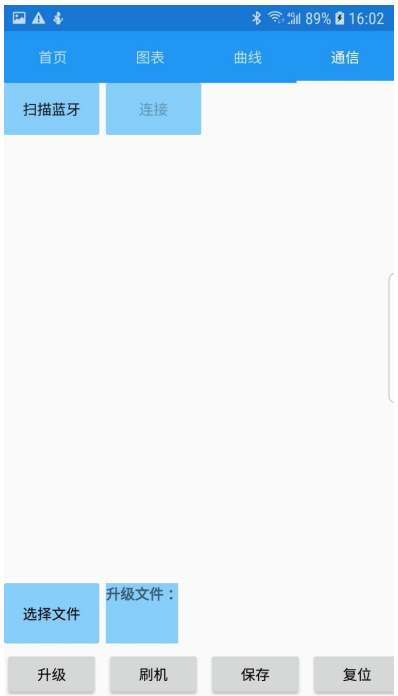
Black voltage

Purple for throttle

The cyan is a weak magnetic state.

10， 通信界面，如下图所示：

10. The communication interface is shown below:

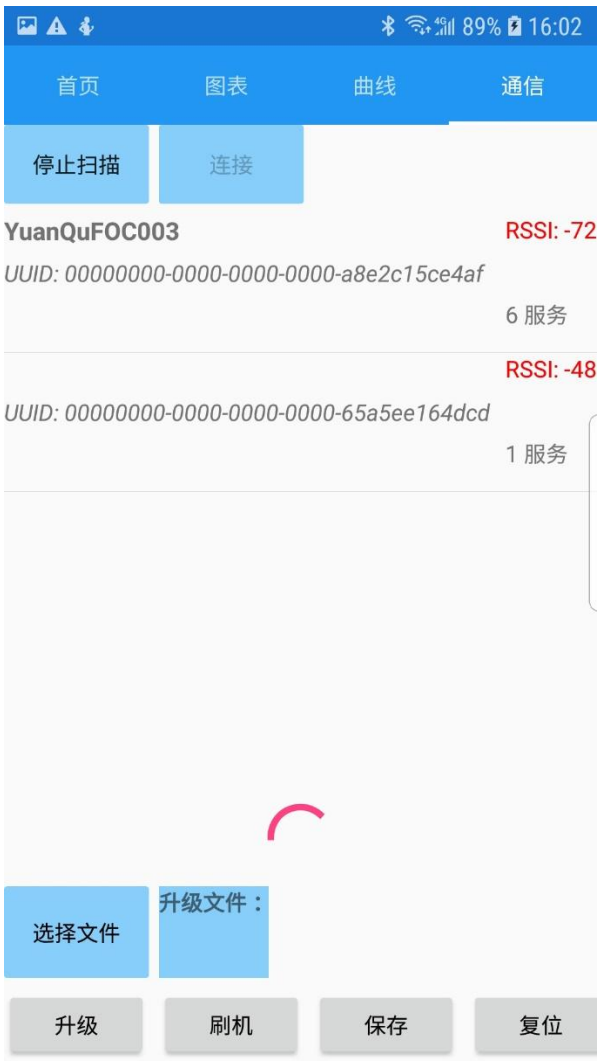


这个时候表示蓝牙没有连接，升级文件也没有选择。

这个时候点击扫描蓝牙，即可寻找附近的蓝牙，找到后就会放在列表里，如下图所示：

This time means Bluetooth is not connected and upgrade files are not selected.

This time click scan Bluetooth, you can find nearby Bluetooth, found will be placed in the list, as shown below:



这个时候点击列表里面的蓝牙项，并选择连接后，手机开始连接控制器蓝牙。

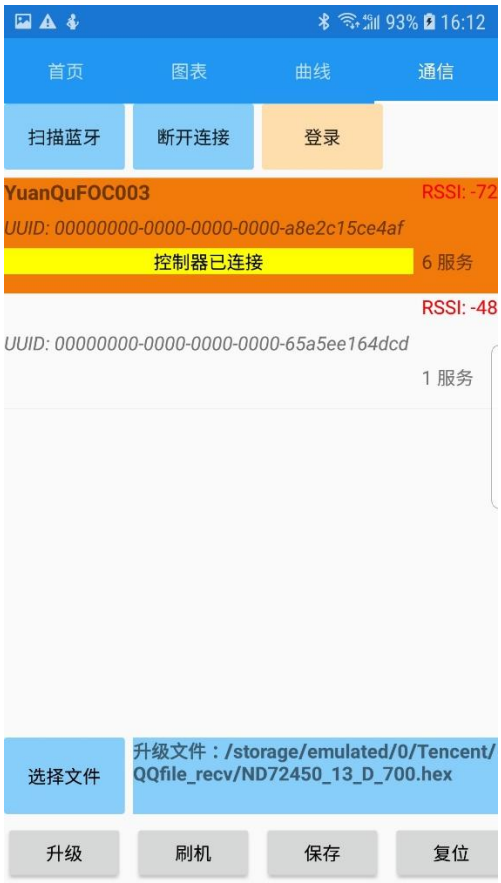
注意，蓝牙默认名称都是 YuanQu 开头，表示是远驱控制器连接的蓝牙模块，方便识别。

连接后，如果以前没有登录过这个控制器，就会提示要登录，如下图：

At this time click on the list of Bluetooth items, and select the connection, the phone began to connect to the controller Bluetooth.

Note that Bluetooth default names are the beginning of the Y uanQu, indicating that the remote drive controller connected to the Bluetooth module, easy to identify.

After the connection, if you have not logged in to the controller before, you will be prompted to log in, as shown below:



点击登录，进入下面的界面：

Click login to enter the following interface:

如果不知道密码，可以通过手机号或者产品序列号找回密码：

如下图：

If you do not know the password, you can get the password through the phone number or product serial number:

As shown below:

通过手机号找回密码：是控制器内部已经注册了手机号码，那么用户可以根据注册的手机号码重新设置密码。

另外如果手机号码丢失无法通过手机号码重置密码，，则可以通过输入产品的序列号，重新注册手机号码来重置密码。

控制器在发货以后的初始状态是不需要密码，则会显示注册，输入手机号码和新密码即可注册控制器，在注册之前，任何手机均可操作控制器。

若手机成功登录此控制器以后，为了方便操作，软件下次自动记录登录密码，减少登录操作，方便查看控制器状态，并设置控制器参数。这个时候，不需要登入和注册，显示下面的界面：

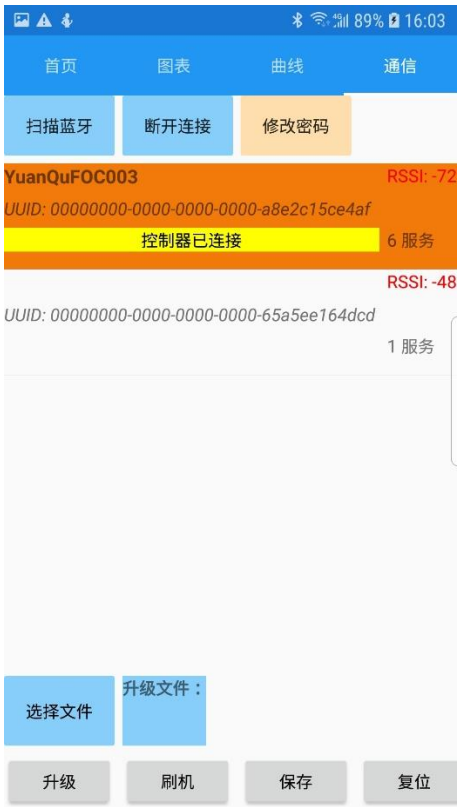
Find the password through the mobile phone number: the controller has registered the mobile phone number, then the user can reset the password

according to the registered mobile phone number.

In addition, if the mobile phone number is lost and the password can not be reset through the mobile phone number, the password can be reset by entering the serial number of the product and re-registering the mobile phone number.

The initial state of the controller after shipment does not require a password, it will display registration, enter the mobile phone number and new password to register the controller, before registration, any mobile phone can operate the controller.

If the mobile phone successfully logs in to this controller, in order to facilitate the operation, the software automatically records the login password next time, reduces the login operation, facilitates to view the controller state, and sets the controller parameters. At this point, you do not need to log in and register, showing the following interface:

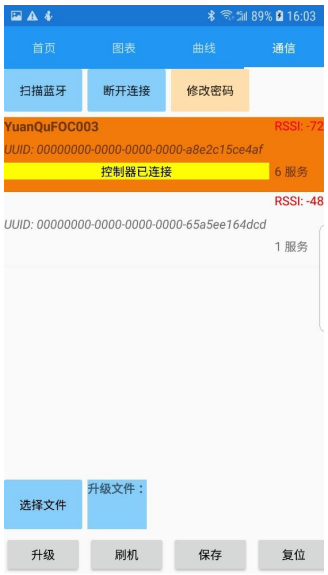


这种状态表示，连接蓝牙后登录成功，此时用户可以修改密码。点击即进入修改密码页面，如下图：

This state indicates that the login is successful after connecting Bluetooth, and the user can modify the password. Click to enter the password modification page, as shown below:

11，　软件升级：

11. Software upgrade:



在这个界面下，已经连接了蓝牙，并成功登录了控制器，可以升级控制器了。

此时要有升级文件，才可以操作。

手机不同于电脑，文件来源一般来源于社交软件，如微信，QQ 等，比电脑的 U 盘，邮箱等要更方便些。

控制器的软件文件名后缀为 hex。

那么通过微信,qq 收到的文件一般 APP 是打不开的，比如 qq 软件，收到文件后显示如下图：

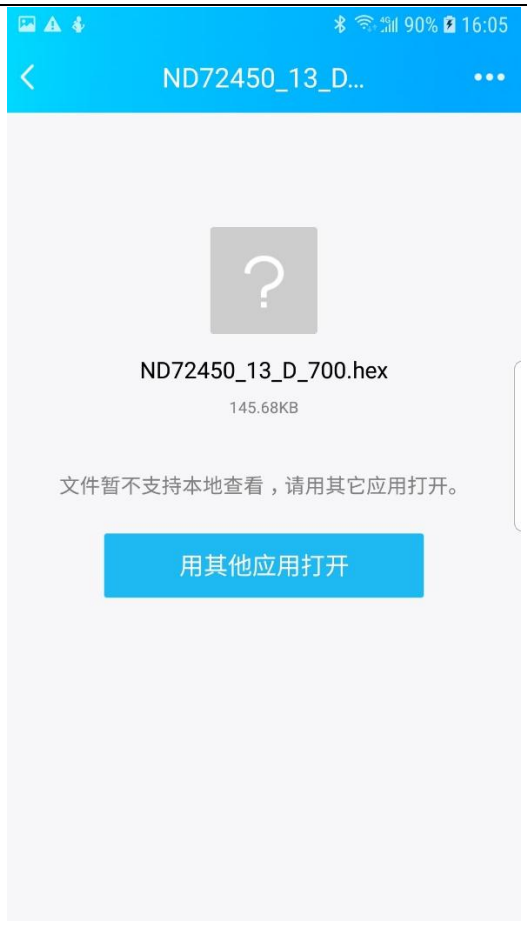
In this interface, Bluetooth has been connected, and successfully logged in to the controller, can upgrade the controller.

At this time to have an upgrade file, can operate.

Mobile phones are different from computers, and file sources are generally derived from social software, such as WeChat, QQ, etc., more convenient than computer U disks, mailboxes, etc.

Controller software file name suffix h ex.

Then through WeChat, the qq received documents are generally A PP not open, such as q q software, after receiving the file display as follows:

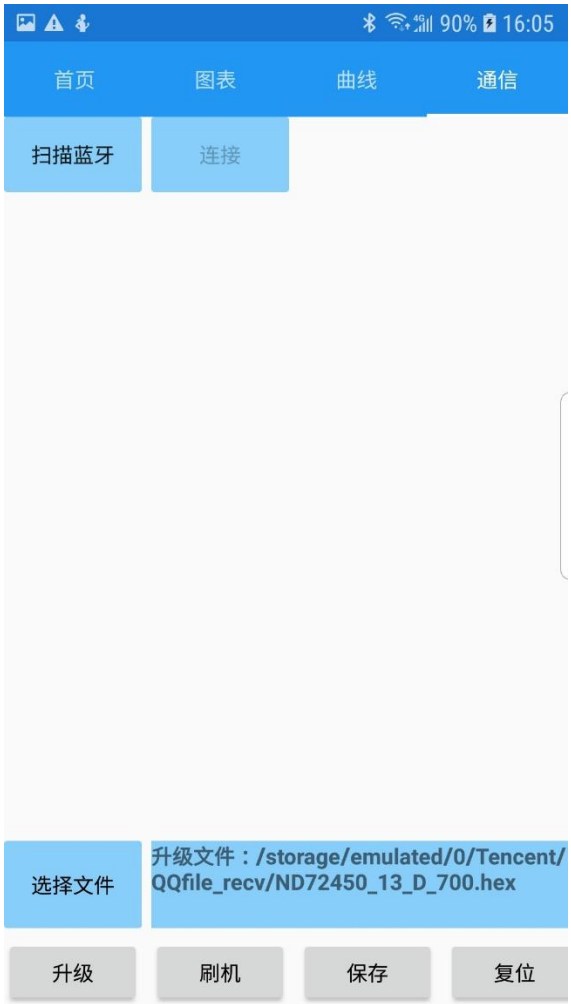


选择其他应用打开，显示图下图：

Select other applications to open, showing the following figure:

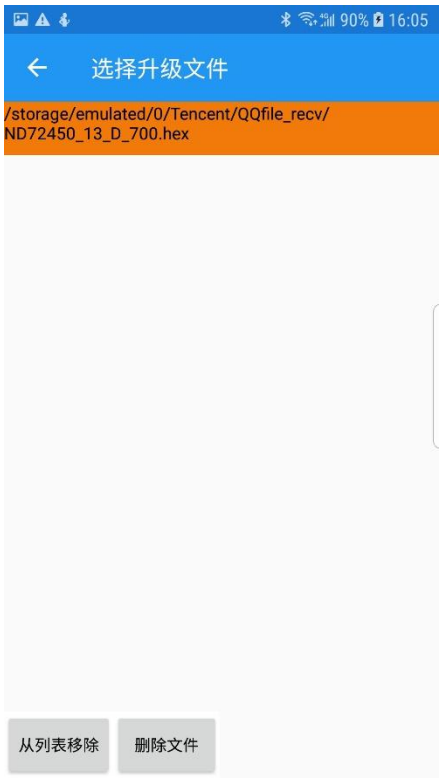
选择远驱监控，选择总是或者仅此一次，即可转到远驱监控软件下，再到通信页面，如下图：

Select remote drive monitoring, select always or only once, you can go to the remote drive monitoring software, and then to the communication page, such as the following:



点击选择页面即可显示文件列表如下图：

Click on the Select page to display the file list as shown below:



通过←返回通信页面

下面有 4 个按钮：

升级，刷机，保存，复位

升级：点击升级，即可根据选择的升级文件对控制器升级。

刷机：点击刷机，除了完成升级外，对控制器的参数也进行恢复到升级文件自带的初始状态。，

保存： 再刷机后，要求点击保存，以保证最新参数得到修改保存，否则控制器不工作。

复位，：点击复位，控制器放弃现在的参数进行复位，采用保存的数据进行工作。

Returns the communication page through ←

There are four buttons below:

Upgrade, brush, save, reset

Upgrade: click upgrade, you can upgrade the controller according to the selected upgrade file.

Brush machine: click on the brush machine, in addition to the completion of the upgrade, the controller parameters are also restored to the initial state of the upgrade file. ,

Save: after brushing the machine, click Save to ensure that the latest parameters are modified and saved, otherwise the controller does not work.

Reset: click reset, the controller gives up the current parameters to reset, using saved data to work.

南京远驱控制器控制参数的调整说明

The Parameters Description of Nanjing FarDriver Controller

由于市面上电机种类繁多，对应不同电机会有不同的工作参数。

Because of many kinds motor in the market, there are many different parameters with those motors.

1 **基本参数**：

1.1 最大相电流：工作电机相线电流最大值。决定了静止到额定转速下的电机输出最大扭矩。

最大相电流在控制器硬件上有最大限制，设定值不允许超出出厂设置。否则会导致控制器烧毁的概率大大增加。

不同类型电机在同样最大相电流设定值的情况下会有不同输出扭矩的表现。扭矩版电机输出扭矩大，平衡版输出稍小，速度版电机输出最小。定速低的电机输出扭矩大，定速高的电机输出扭矩小。

1. **Basic parameters:**

1.1 Maximum phase current: maximum phase line current of working motor. The maximum torque of the motor at static to rated speed is determined.

The maximum phase current has the maximum limit on the controller hardware, and the set value is not allowed to exceed the factory setting. Otherwise, the probability of controller burning will be greatly increased.

Different types of motors have different output torque under the same maximum phase current setting.Torque version motor output torque, balance

version output slightly smaller, speed version motor output minimum.The output torque of the motor with low constant speed is large and the output torque of the motor with high constant speed is small.

1.2 最大线电流：控制器工作电池母线电流最大值。决定了电机输出最大功率值。控制器最大输入功率=电池电压*最大线电流。

这个值决定了最高输出功率，从而决定了最高速度。

1.2 Maximum line current: Controller working battery bus current maximum. The maximum output power of the motor is determined. Controller maximum input power = battery voltage * maximum line current.

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

1.3 **额定电压**：不同电压的南京远驱控制器对电池最大串数如下：

	铅酸电池	三元锂电池	磷酸铁锂电池
48V	4 串	13-14 串	16 串
60V	5 串	17 串	20 串
72V	6 串	21 串	24 串
75V	6 串	22 串	25 串
84V	7 串	24 串	28 串
96V	8 串	28 串	32 串
108V	9 串	32 串	35-36 串

1.3 Rated voltage: Nanjing remote drive controller with different voltages for the maximum number of batteries as follows:

	Lead acid batteries	ternary lithium battery	Lithium iron phosphate battery
48V	4 s	13-14 s	16 s
60V	5 s	17 s	20 s
72V	6 s	21 s	24 s
75V	6 s	22 s	25 s
84V	7 s	24 s	28s
96V	8 s	28s	32 s
108V	9 s	32 s	35-36s

1.4 油门阈值：

市面上转把参差不齐，不同转把或者油门踏板的电压值会有不同

	空闲电压	满把电压
电动摩托车转把	0.8V-0.9V	4.1-4.3V
中控转把	0.8V-0.9V	4.5-4.95V
12V 油门踏板	0.0V-0.2V	4.6-4.8V

1.4 Throttle threshold:

There are uneven turns on the market, and the voltage values of different turns or throttle pedals will vary

	Idle voltage	Full voltage
Electric motorcycle turns	0.8 V-0.9V	4.1-4.3 V

Central Control Transfer	0.8 V-0.9V	4.5-4.95 V
12V accelerator pedal	0.0 V-0.2V	4.6-4.8 V

1.4.1 我们根据空闲电压来设定低油门阈值。考虑到转把电压波动，设置低油门阈值一般要比空闲电压高 0.2-0.3V，才能保证停止时让电机工作在空闲状态。

比如电摩转把的低油门阈值会设定到 1.1V，而 12V 油门踏板的低油门阈值会设定到 0.5V。

1.4.1 we set the low throttle threshold based on the idle voltage. Considering the voltage fluctuation of the switch, setting the low throttle threshold is generally 0.2-0.3 higher than the idle voltage V, in order to ensure that the motor works in the idle state when it stops.

The low throttle threshold of the electric friction handle is set to 1.1 V, while the low throttle threshold of the 12 V pedal is set to 0.5 V.

1.4.2 我们根据满把电压来设定高油门阈值。为了使得控制器能够在满吧状态下输出满功率，我们需要让设定值低于满把电压。但这里得注意不能设定太低。为了自动检测电子油门是否有损坏，我们设定了一个比高油门阈值高 0.6V 的值作为报警界限，一旦超过，即认为转把损坏，控制器立即停止功率输出，以免车辆飞车，避免引起飞车安全事故。

所以我们设定高油门阈值时，比如电动摩托车转把满把 4.1-4.3V，我们会设定 3.9V 作为高油门阈值。对于 12V 油门踏板的高油门阈值，我们会设定在 4.3V。

742 版本增加了油门自学习功能，自学习时转到底，控制器会自动识别转把/踏板

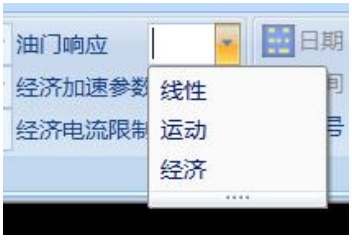
的油门信号最大电压，并根据这个电压生成油门高阈值。

1.4.2 we set the high throttle threshold based on the full voltage. In order to enable the controller to output full power in full bar state, we need to make the set value lower than the full voltage. But here we have to be careful not to set too low. For automatic detection of electronic throttle damage, we set a value of 0.6 V higher than the high throttle threshold as an alarm limit. Once it is exceeded, the controller immediately stops the power output to avoid the vehicle flying. Avoid causing safety accidents.

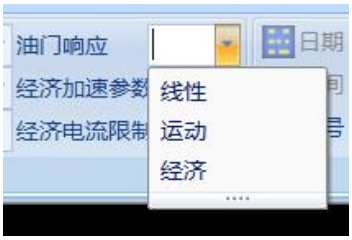
So when we set a high throttle threshold, such as an electric motorcycle turn full 4.1-4.3 V, we set 3.9 V as a high throttle threshold. We'll set V high throttle threshold at V .4.3 for the 12th pedal

The 742 version adds the throttle self-learning function, and the controller automatically recognizes the maximum throttle signal voltage of the switch / pedal and generates the throttle high threshold based on this voltage.

1.5：油门响应：对于不同用户喜好，转把特性有三种配置：线性，运动，经济。



1.5. Throttle response: For different user preferences, there are three configurations for turn-on features: linear, moving, and economical.



1.6 相移：电机角度位置关键特性，一般电机厂会标明角度位置，市面上轮毂电机大部分都市 30°，210°和 90°三种，但是也有些电机特殊。若对此角度不清楚，可通过自学习的方法找到这个值。

1.6 Phase shift: the key characteristics of the motor angle position, the general motor factory will indicate the angle position, the market hub motor most of the city 30°210° and 90° three, but some motors are special. If this angle is not clear, you can find this value by self-learning.

1.6.1 启动自学习方法：1）控制器默认.2)控制器固定，通过上位机启动自学习 3）新控制器固定，通过操作方法启动自学习。

1.6.1 start self-learning method :1) controller default .2) controller fixed, through the upper computer start self-learning 3) new controller fixed, through the operation method start self-learning.

1.6.2 不通过上位机来启动自学习或改变电机方向的方法：

注意这套方法不适应 485 通信控制器，因为 485 通信控制器自带蓝牙，该功能被屏蔽了。

条件：不带空挡（默认前进）的电摩、三轮车和四轮车，需要接刹车线。

对于带空挡的电动四轮车，不需要接刹车线。

1：保持电机在空载状态（轮子悬空），控制器保持关机。

2：捏住刹车或者挂空档，油门转把转到底。

3：开机，油门转把维持转到底 10 秒。

4：回油门转三次油门：（回油门 0.5 秒，再转 0.5 秒，再回 0.5 秒，再转，再回，再转，再回）。

5：控制器会一声长两声短地叫，是提示进入自学习状态。

此时按自学习操作步骤即可完成自学习。

注意第 4 步转了三次油门是启动自学习，第 4 步如果转了 5 次油门就是改变电机方向。

1.6.2 does not use the upper computer to start self-learning or change the direction of the motor:

Note that this method is not suitable for 485 communication controllers, because 485 communication controllers have Bluetooth and the function is blocked.

Conditions: no neutral (default forward) motor friction, tricycle and four-wheeled vehicle, need to be brake line.

For an electric four-wheel car with an empty gear, there is no need to connect the brake line.

1： keep the motor in the no-load state (the wheel is suspended), the controller remains shut down.

2： hold the brake or hang the gap, the throttle turns to the end.

3： boot, throttle turn to maintain to 10 seconds.

4： throttle three times throttle :(return throttle 0.5 seconds, then turn 0.5 seconds, then back 0.5 seconds, then turn back, then turn back, then turn back).

5： controller will be a long two short call, is prompted to enter the state of self-learning.

At this time according to the self-learning operation steps to complete self-learning.

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

2 **定速与弱磁**：

2.1 定速：电机在额定电压下的转速，简称额定转速，电摩行业经常称之为定速。

这个定速决定了最高的电机转速。一般普通控制器，在额定电压状态下，可以驱动电机最高转速到定速附近。

控制器在自学习时会识别当前电压下的额定转速。

2 Constant velocity and weak magnetism:

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

This constant speed determines the highest motor speed. General ordinary controller, in the rated voltage state, can drive the maximum speed of the motor near the constant speed.

The controller will identify the rated speed at the current voltage during self-learning.

2.2 扩速：将电机速度推到比定速更高的速度，称之为扩速。

扩速方法一：提高工作电压，电压越高，电机转速越高。

扩速方法二：不提高工作电压，通过弱磁，提高电机转速。

2.2 Spread speed: The speed of the motor is pushed to a higher speed than the constant speed, called spread speed.

Expansion method 1: increase the working voltage, the higher the voltage, the higher the motor speed.

Spread speed method 2: do not increase the working voltage, through weak magnetic, improve motor speed.

2.3 南京远驱控制器采用弱磁扩速：不改变电池电压，直接通过控制限流参数来提高电机转速。

2.3 The Nanjing remote drive controller uses the weak magnetic expansion speed: does not change the battery voltage, directly through controls the current limiting parameter to raise the motor speed.

2.4 最大转速，后退转速： 限制了电机最高转速。

在电动车市场，最大转速一般不做限制，而是通过后面的限流参数来限制最高转速。在速度超过定速后，自动进入弱磁状态。转速超过定速越多，弱磁深度越大。

2.4 Maximum speed, back speed: limit the maximum speed of the motor.

In the electric vehicle market, the maximum speed is generally not limited, but through the current limiting parameters to limit the maximum speed. After the speed exceeds the constant speed, it automatically enters the weak magnetic state. The more the speed exceeds the constant speed, the greater the weak magnetic depth.

2.5 弱磁深度：

弱磁深度：(最高转速-定速) / 定速 *100%。

一般轮毂电机弱磁深度可达 50%。

有些轮毂电机弱磁深度可达 100%以上。所以我们规定表贴电机弱磁深度不超过 50%，而内嵌电机的弱磁深度不超过 150%。

2.5 Weak magnetic depth:

Weak magnetic depth :(maximum speed-fixed speed)/ constant speed 100.

General hub motor weak magnetic depth can reach 50.

Some hub motors have a weak magnetic depth of up to 100% or more.So we stipulate that the weak magnetic depth of the motor is not more than 50, and the weak magnetic depth of the embedded motor is not more than 150.

2.6 限流参数：通过调整这个参数来调整最高转速。

先说一下限流里面的 500RPM,1000RPM,…….8500RPM,9000RPM 的换算。

这些转速是中置电机的转速。对应的参数也是中置电机的参数。

而对于轮毂电机则需要做一个换算。

通常轮毂电机的极对数是 16，20，24，28，30 对极。

而通常中置电机是 4 对极。

轮毂电机和中置电机极对数比

轮毂电机极对数	**16**	**20**	**24**	**28**	**30**
和中置电机极对数比值	**4**	**5**	**6**	**7**	**7.5**

2.6 Current limiting parameter: Adjust the maximum speed by adjusting this parameter.

First of all, the conversion of 500 RPM,1000RPM,…….8500RPM,9000RPM in the current limit.

These speeds are the speed of the intermediate motor. The corresponding parameters are also the parameters of the intermediate motor.

For hub motors, a conversion is required.

Usually the pole logarithm of the hub motor is 16/20/24/28/30.

And usually the middle motor is 4 pairs of poles.

Logarithmic ratio of pole of hub motor and middle motor

Pole	**16**	**20**	**24**	**28**	**30**

logarithm of hub motor					
Ratio of pole to pole of central motor	4	5	6	7	7.5

在我们取得一个轮毂电机极对数值后，我们就可以根据转速要求进行设置限流参数了。

比如轮毂电机极对数是 16，除以 4 后得到极对数比值=16/4=4.

那么

500RPM 对应的 16 对极轮毂电机实际转速就是 125RPM.

1000RPM 对应的 16 对极轮毂电机实际转速就是 250RPM.

4000RPM 对应的 16 对极轮毂电机实际转速就是 1000RPM.

5000RPM 对应的 16 对极轮毂电机实际转速就是 1250RPM.

5500RPM 对应的 16 对极轮毂电机实际转速就是 1375RPM.

6000RPM 对应的 16 对极轮毂电机实际转速就是 1500RPM.

6500RPM 对应的 16 对极轮毂电机实际转速就是 1625RPM.

8000RPM 对应的 16 对极轮毂电机实际转速就是 2000RPM.

After we get a pole pair value of the hub motor, we can set the current limiting parameters according to the speed requirement.

Such as hub motor pole logarithm is 16, divided by 4 to get the pole

logarithmic ratio =16/4=4

So then

500RPM corresponding 16 pairs of pole hub motor actual speed is 125 RPM.

1000RPM corresponding 16 pairs of pole hub motor actual speed is 250 RPM.

4000RPM corresponding 16 pairs of pole hub motor actual speed is 1000 RPM.

The actual speed of the 16 pairs of pole hub motors corresponding to the 5000RPM is RPM.1250

5500RPM corresponding 16 pairs of pole hub motor actual speed is 1375 RPM.

6000RPM corresponding 16 pairs of pole hub motor actual speed is 1500 RPM.

6500RPM corresponding 16 pairs of pole hub motor actual speed is 1625 RPM.

8000RPM corresponding 16 pairs of pole hub motor actual speed is 2000 RPM.

2.7 弱磁限制：逐步增加限流参数

我们设定的限流值应根据实际需求来考虑。对于定速为 1000RPM 的电机来说，考虑弱磁深度为 50%。最高转速也考虑在 1500RPM，并且希望电机不要工作在 1625RPM 以

上。所以限流值设定，在 6000RPM 为 30%，6500RPM 及以上转速设定为 5%以下.

这样保证电机在空转时也就弱磁 50%。而不会弱磁过深引起电机抖动甚至烧控。

很多电机 ,弱磁深度可以到达 100%,1000RPM 电机能够工作在 2000RPM 高转速上。对于这种电机，为了发挥更高的性能，可以把限流系数继续扩大，8000RPM 以内限流参数可按正常值 70 以上设置，8500 设置在 30,9000RPM 设置在 5 以下.

限流值的设定，是从安全值开始，逐步增加转速，一定要保证弱磁不能过度。一旦发现空转转速不稳定甚至出线 MOE 或者 OVER 保护，则表明该转速太高了，弱磁过度了，参数要改回来。

2.7 Weak magnetic limitation: gradually increasing current limiting parameters

The current limit value we set should be considered according to the actual demand. For a motor with a fixed speed of 1000 RPM, the weak magnetic depth is considered to be 50. The maximum speed is also considered at 1500 RPM, and the motor does not work above 1625 RPM.So the current limit value is set at 6000 RPM to 30,6500 RPM and above to less than 5% speed.

This ensures that the motor in idling also weak magnetic 50. And will not be weak magnetic too deep cause motor jitter or even burning control.

A lot of motors, Weak magnetic depth can reach 100%, 1000RPM motor can

work at 2000 RPM high speed. For this motor, For better performance, The current limiting factor can continue to expand, Flow limiting parameters within 8000RPM can be set above 70 normal values, Set at 30, 9000RPM set below 5.

The setting of current limit value is to start from the safe value and increase the rotational speed step by step. Once it is found that the idle speed is unstable or even out of line M OE or OVER protection, it shows that the speed is too high, the weak magnetic field is excessive, and the parameters should be changed back.

3 **控制参数**：

3.1 加速灵敏度：电动汽车和电摩对油门加速要求有很大区别。

电动汽车一般是油门踏板，而电摩则是油门转把或者中控。

电动汽车对油门的反应要适中，而电摩的要求则不同，有些客户要求要轻，缓，稳，有些客户则要求反应灵敏，一触即发。

加速灵敏度指的就是油门反应的快慢。这个参数在 16~224 之间。数字越大，油门加速越灵敏。

16 已经很缓慢了，电动汽车上一般设置在 32 左右合适，很少超过 64.

而对于电摩来讲，除了设置在 32 之外，很多用户更喜欢反应快，所以设置在 64，128。赛道比赛甚至设置在 224.

3 Control parameters:

3.1 Acceleration Sensitivity: Electric vehicles and electric motorcycle on the throttle acceleration requirements differ a lot.

Electric vehicles usually use throttle pedals, while electric motorcycle use throttle knob or central control.

The response of electric vehicles to throttle should be moderate, while the requirements of electric friction are different. Some customers require light, slow and stable, while some customers require sensitive and hair-trigger response.

Acceleration sensitivity refers to the speed of throttle reaction. this parameter is between 16~224. The larger the number, the more sensitive the throttle accelerates.

16 has been slow, electric vehicles are generally set at about 32 appropriate, rarely more than 64.

For electric friction, in addition to setting at 32, many users prefer to react quickly, so set at 64128. The race is even set at 224.

3.2 AN：电机本体特性 AN 值，参数范围 0~16。

标准表贴电机 AN=0.

标准 IPM 电机 AN=16.

这个参数设定一定要符合电机特性。

轮毂电机，表贴中置电机，AN 小于 8。

内嵌中置电机 AN 值则不小于 8。

与南京远驱配合的编码器中置电机，汽车永磁同步电机，均采用 AN=16。

市面上所有轮毂电机均属于表贴电机，AN 值一般设定为 0，不超过 4。

AN 值设定不对，会导致起步效率变低，甚至出现 MOE/OVER 保护。

3.2AN ： motor body characteristics A N value, parameter range 0~16.

Standard watch sticker motor A N=0.

Standard IPM motor A N=16.

This parameter setting must conform to the motor characteristics.

Hub motor, table sticker motor, A N less than 8.

Embedded motor A N value is not less than 8.

Encoder with Nanjing remote drive medium motor, automobile permanent magnet synchronous motor, all adopt A N=16.

All hub motors on the market belong to the watch motor, the A N value is generally set to 0, not more than 4.

The wrong setting of A N value will lead to low starting efficiency and even M OE/OVER protection.

3.3 LM：整车电机加速匹配参数，这个值用来调整电机在整车上的运转流畅性。

默认设置是 22。市面上大部分电机和整车采用的值。

但是有个别电机类型和整车匹配很差，起步低速段，中速段会感觉到明显的共振抖动. 调整 LM 值会有改善.

先从 22 开始，若低速段加速抖动，则降低 LM，从 16，14，12，11，8，5 开始测试效果,中间那些数字也会起作用，一般考虑宁可大些，尽量不要太小。太小会控制不住电流，引起 MOE/OVER 保护，甚至烧控。所以当抖动消失后的 LM 值就是最佳参数，不要再调小。

有些电机和整车在 LM=22 时非常流畅，但是改小后反而会带来抖动，所以要注意在 LM=22 的情况下没有问题就不去调节这个参数。

或者发现抖动共振出现后，LM 值从 22 改小 16，14 „。。甚至 5 都没多大效果，则说

明和这个参数无关，此时一定要改回到最大值，比如 22，而不是随意一个数字保留在控制器里面。

3.3 LM ： Vehicle motor acceleration matching parameters, this value is used to adjust the motor running fluency on the vehicle.

The default setting is 22. The value of most motors and vehicles on the market.

However, some motor types and the whole vehicle match is very poor, starting low speed section, medium speed section will feel obvious resonance jitter adjustment L M value will be improved..

First from 22, if the low speed segment accelerates jitter, then the reduction L M, starts from 16/14/12/11/8/5 to test the effect. Those numbers in the middle will also work. Too small can not control the current, cause M OE/OVER protection, or even burn control. So when the jitter disappears, the L M value is the best parameter. Don't lower it.

Some motors and vehicles are very smooth at 22:00 L M=, but when they are small, they will bring jitter, so we should pay attention to not adjusting this parameter in the case of L M=22.

Or after the jitter resonance appears, the L M value is changed from 22 to 1614,. Even 5 doesn't have much effect, so it has nothing to do with this parameter. It must be changed back to the maximum value, such as 22, instead of keeping a random number in the controller.

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

默认参数 StartKI=4,MidKI=8,MaxKI=12 / StartKP=40,MidKP=80,MaxKP=120.

电机功率越大，电压越高，PID 越小。PID 参数不能随便填写，否则会导致工作不正常甚至烧控。以下是常用的 PID 设定参数值。总共 9 套，选择其中一套参数用于匹配电机整车，在专业人士的指导下进行修改。

	StartKI	MidKI	MaxKI	StartKP	MidKP	MaxKP	
1	1	1	1	10	10	10	冲浪板默认
2	2	2	3	20	20	30	超大功率电机
3	3	3	4	30	30	40	
4	4	4	6	40	40	60	大功率默认
5	4	5	8	40	50	80	
6	6	6	9	60	60	90	中功率电机
7	6	7	10	60	70	100	
8	8	8	12	80	80	120	中小功率默认
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	小功率电机

注意 PID 参数设置不当都会引起系统工作不正常，甚至出现 MOE/OVER/PHASE 故障等，差异太大会引起烧控，要特别注意。

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

The default parameters S tart KI =4, M id KIS tart KI =8, M ax KIS tart KI =12/ S tart KP S tart KI =40, M id KPS tart KI =80, M ax KPS tart KI =120.

Higher motor power, higher voltage, smaller P ID.P ID parameters can not be filled in casually, otherwise it will lead to abnormal work or even burning control. Here are commonly used P ID set parameter values. A total of 9 sets, select one of the parameters to match the motor vehicle, under the guidance of professionals to modify.

	S tartKI	**M idKI**	**M axKI**	**S tartKP**	**M idKP**	**M axKP**	
1	**1**	**1**	**1**	**10**	**10**	**10**	**Surfing board 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**	**High 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 and**

							Small 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 setting of P ID parameters will cause abnormal system work, even M OE/OVER /PHASE failures, etc.

4 三速、电子刹车、电量显示、欠压保护参数：

4.1 三速控制：高速档，中速档，低速档。

电流比例通过 4 个参数调节。

高速档：手机 APP/电脑上显示 D。动力全开，工作在**最大线电流和最大相电流。**

中速档：手机 APP/电脑上显示 DM。动力开一部分，相电流影响起步加速，线电流影响最高车速，一般设定为，中速相电流比例为最大相电流的 75%，中速线电流比例为

最大线电流的 50%。

低速档：手机 APP/电脑上显示 DL。动力开一部分，相电流影响起步加速，线电流影响最高车速，一般设定为，低速相电流比例为最大相电流的 50%，低速线电流比例为最大线电流的 25%。

4 Three-speed, electronic brake, power display, undervoltage protection parameters:

4.1Three speed control: high speed, medium speed, low speed.

The current ratio is adjusted by 4 parameters.

Speed: mobile phone A PP/ D. on computer Full power on, working at maximum line current and maximum phase current.

Medium speed: mobile phone A PP/ display D M. computer In the part of power opening, the phase current affects the starting acceleration, and the line current affects the maximum speed. Generally, the ratio of medium speed phase current is 75% of the maximum phase current, and the ratio of medium speed line current is 50% of the maximum line current.

Low speed: mobile phone A PP/ display DL. on computer In part of the power opening, the phase current affects the starting acceleration, and the line current affects the maximum speed. Generally, the low speed phase current ratio is 50% of the maximum phase current, and the low speed line current ratio is 25% of the maximum line current.

4.2 电子刹车由两个参数控制：停止回流，最大回流：反充电时的充电电流限制。

对于电子刹车功能，在刹车时，整车给出刹车信号送到控制器，控制器检测到刹车信号后即以停止回流的电流进行电子刹车，并且刹车电流不超过最大回流值。

注意要使用电子刹车功能时，必须在**跟随**项中选择**电子刹车**来启用此功能。并设置回流电流。注意设置参数时最大回流一般比停止回流大 25%~50%。

4.2 The electronic brake is controlled by two parameters: stop reflow, maximum reflow: charging current limit during back charge.

For the electronic brake function, when braking, the brake signal is given to the controller. After the controller detects the brake signal, the electronic brake is carried out with the current of stopping reflux, and the brake current does not exceed the maximum reflux value.

Note that to use the electronic brake function, you must select the electronic brake in the following item to enable this function. And set the reflux current. Note that the maximum reflux when setting parameters is generally 25~50 larger than the stop reflux.

4.3 电量系数：0 电量系数，满电量系数：校准电量显示的参数。

控制器本身可以估算电池电量，通过调整 0 电量系数和满电量系数可以获得比较准确的电量显示。

在电池电量满的时候，调整满电量系数，使得显示容量刚好为 100%。

在电池电量没电的时候，调整 0 电量系数，使得显示容量和电量基本相符。比如剩余 10%电量的时候，调整 0 电量系数使得电量显示刚好为 10%。

4.3 Power coefficient :0 power coefficient, full power coefficient: calibration of power display parameters.

The controller itself can estimate the battery power. By adjusting the 0 power coefficient and the full power coefficient, a more accurate power display can be obtained.

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

When the battery power is out of power, adjust the 0 power coefficient to make the display capacity and electricity basically consistent. For example, when the remaining 10% of the electricity, adjust the 0 power coefficient so that the power display is just 10.

4.4 欠压保护：在缺电时的为了延长电池寿命而做的保护措施。

在电池电压接近欠压保护点时，控制器降功率输出，使得电池不会过于放电而损坏。一般电池欠压设定如下：

额定电压	48V	60V	72V	84V	96V	108V

欠压保护点	42V	52.5V	63V	73.5V	84V	94.5V

4.4 Under-voltage protection: protection measures to extend battery life during power shortage.

When the battery voltage is close to the undervoltage protection point, the controller drops the power output so that the battery will not be damaged by excessive discharge. General battery undervoltage settings are as follows:

Rated voltage	48V	60V	72V	84V	96V	108V
Under pressure protection point	42V	52V.5	63V	73.5 V	84V	94.5 V

4 **辅助参数**：

4.1 三速控制：高速档，中速档，低速档。

电流比例通过 4 个参数调节。

高速档：手机 APP/电脑上显示 D。动力全开，工作在**最大线电流和最大相电流，以及最大转速。**

中速档：手机 APP/电脑上显示 DM。动力开一部分，相电流影响起步加速，线电流影响最高车速，另外也有转速限制，一般设定为，中速相电流比例为最大相电流的 75%，中速线电流比例为最大线电流的 50%。

低速档：手机 APP/电脑上显示 DL。动力开一部分，相电流影响起步加速，线电流影响最高车速，另外也有转速限制，一般设定为，低速相电流比例为最大相电流的 50%，

低速线电流比例为最大线电流的 25%。

4 Auxiliary parameters:

4.1Three speed control: high speed, medium speed, low speed.

The current ratio is adjusted by 4 parameters.

Speed: mobile phone A PP/ D. on computer Full power on, working at maximum line current and maximum phase current, and maximum speed.

Medium speed: mobile phone A PP/ display D M. computer In part of the power opening, the phase current affects the starting acceleration, the line current affects the maximum speed, and there is also a speed limit. The medium speed phase current ratio is 75% of the maximum phase current, and the medium speed line current ratio is 50% of the maximum line current.

Low speed: mobile phone A PP/ display DL. on computer In part of the power opening, the phase current affects the starting acceleration, the line current affects the maximum speed, and there is also a speed limit. The low speed phase current ratio is 50% of the maximum phase current, and the low speed line current ratio is 25% of the maximum line current.

4.2 停止回流，最大回流：反充电时的充电电流限制。

对于电子刹车功能，在刹车时，整车给出刹车信号送到控制器，控制器检测到刹车信号后即以停止回流的电流进行电子刹车，并且刹车电流不超过最大回流值。

注意要使用电子刹车功能时，必须在跟随项中选择电子刹车来启用此功能。并设置回流电流。注意设置参数时最大回流一般比停止回流大 25%~50%。

4.2 Stop reflow, maximum reflow: Charge current limit during reverse charging.

For the electronic brake function, when braking, the brake signal is given to the controller. After the controller detects the brake signal, the electronic brake is carried out with the current of stopping reflux, and the brake current does not exceed the maximum reflux value.

Note that to use the electronic brake function, you must select the electronic brake in the following item to enable this function. And set the reflux current. Note that the maximum reflux when setting parameters is generally 25~50 larger than the stop reflux.

4.3 0 电量系数，满电量系数：。

默认设置是 22。市面上大部分电机和整车采用的值。

但是有个别电机类型和整车匹配很差，起步低速段，中速段会感觉到明显的共振抖动. 调整 LM 值会有改善.

先从 22 开始，若低速段加速抖动，则降低 LM，从 16，14，12，11，8，5 开始测试效果,中间那些数字也会起作用，一般考虑宁可大些，尽量不要太小。太小会控制不住电流，引起 MOE/OVER 保护，甚至烧控。所以当抖动消失后的 LM 值就是最佳参数，不要再调小。

注意 MOE 为 1 表示 MOE 保护有效，而 MOE 为 0 则保护无效。

4.3 40 Electricity factor, full power factor:.

The default setting is 22. The value of most motors and vehicles on the market.

However, some motor types and the whole vehicle match is very poor, starting low speed section, medium speed section will feel obvious resonance jitter adjustment L M value will be improved..

First from 22, if the low speed segment accelerates jitter, then the reduction L M, starts from 16/14/12/11/8/5 to test the effect. Those numbers in the middle will also work. Too small can not control the current, cause M OE/OVER protection, or even burn control. So when the jitter disappears, the L M value is the best parameter. Don't lower it.

Note that a M OE of 1 indicates that M OE protection is valid, while a M OE of 0 does not.

4.4 欠压保护：。

有些电机和整车在 LM=22 时非常流畅，但是改小后反而会带来抖动，所以要注意在 LM=22 的情况下没有问题就不去调节这个参数。

或者发现抖动共振出现后，LM 值从 22 改小 16，14 „。。甚至 5 都没多大效果，则说明和这个参数无关，此时一定要改回到最大值，比如 22，而不是随意一个数字保留在控制器里面。

4.4 Under pressure protection:.

Some motors and vehicles are very smooth at 22:00 L M=, but when they are small, they will bring jitter, so we should pay attention to not adjusting this parameter in the case of L M=22.

Or after the jitter resonance appears, the L M value is changed from 22 to 1614,. Even 5 doesn't have much effect, so it has nothing to do with this parameter. It must be changed back to the maximum value, such as 22, instead of keeping a random number in the controller.

4.5 速度表校准

霍尔脉冲仪表：霍尔脉冲个数 1~32，485 仪表通过这个脉冲数可以校准速度显示。

模拟仪表：60V 对应 10000RPM

4.5 Speed gauge calibration

Hall pulse instrument: Hall pulse number 1~32 485 instrument through this pulse number can be calibrated speed display.

Simulator :60 V for 10000 RPM

4.6 速度表方式：脉冲/模拟/隔离脉冲

4.6 Speed meter mode: pulse/simulation/isolation pulse

4.7：巡航

巡航有接地巡航和浮空巡航方式，一般选择接地巡航，也就是巡航线和地接触一下，开启巡航功能，以当前速度自动行驶。再按一次或者加一次油门或者刹车就会退出巡航进入手动行驶模式。

注意巡航的最高速度由低速档最高转速限制。如果超过低速最高转速时按巡航，自动行驶时，会自动降低速度到低速档最高转速行驶。

4.7 Cruise

Cruise has grounding cruise and floating cruise mode, generally choose grounding cruise, that is, cruise line and ground contact, turn on cruise function, with the current speed of automatic driving. Press again or add the throttle or brake to exit the cruise into manual mode.

Note that the maximum speed of cruising is limited by the maximum speed of the low speed gear. If the cruising speed exceeds the low speed maximum speed, the speed will be automatically reduced to the low speed maximum speed.

4.8 电池容量：

4.8 Battery capacity:

4.9 弱磁特性：

4.9 Weak magnetic properties:

1. Overview

The ND series Hall one-line controller is a high-end high-power permanent magnet synchronous motor controller, which has the advantages of high quality, high efficiency and intelligence. It is suitable for vehicle applications of various Hall motors. It is suitable for high-speed motorcycles with hub motors and mid-mounted motors, and high-end electric tricycles. Adopt high-quality imported MOS core, all-metal shielding and aluminum die-drawing heat dissipation structure, perfect matching and fine optimization in hardware architecture and software implementation.

Accurate matching control function:

Using 32-bit intelligent microprocessor, matching high-precision motor angle encoder, and innovative vector control algorithm and intelligent control technology, the motor efficiency is maximized. The wide high-efficiency dynamic range enables the driving vehicles to obtain strict cruising range requirements under comprehensive road conditions. Expand and highlight the advantages of comfort performance and weak magnetic expansion speed.

Anti-slope function, maximum speed limit, electronic brake, energy feedback, current limit, host computer communication and other functions are all available to meet various needs.

Rich software parameter configuration:

- Monitor and configure the controller through the visual computer interface, update and upgrade online.
- The current at different speeds can be adjusted online.
- Can set the maximum speed of forward and backward, economic speed.
- The overall bus current and phase current can be set.
- Throttle pedal threshold can be set to adjust the response sensitivity of the pedal.

Perfect protection function:
Monitor working voltage, current, temperature, motor, gear, accelerator pedal, brake, etc. Ensure the safety of vehicle driving control:

Encoder fault protection	Accelerator pedal fault protection	Controller temperature protection	Motor temperature protection
Motor leakage protection	Anti-speeding protection	Overvoltage protection	Undervoltage protection
Overcurrent protection	Phase short circuit protection		

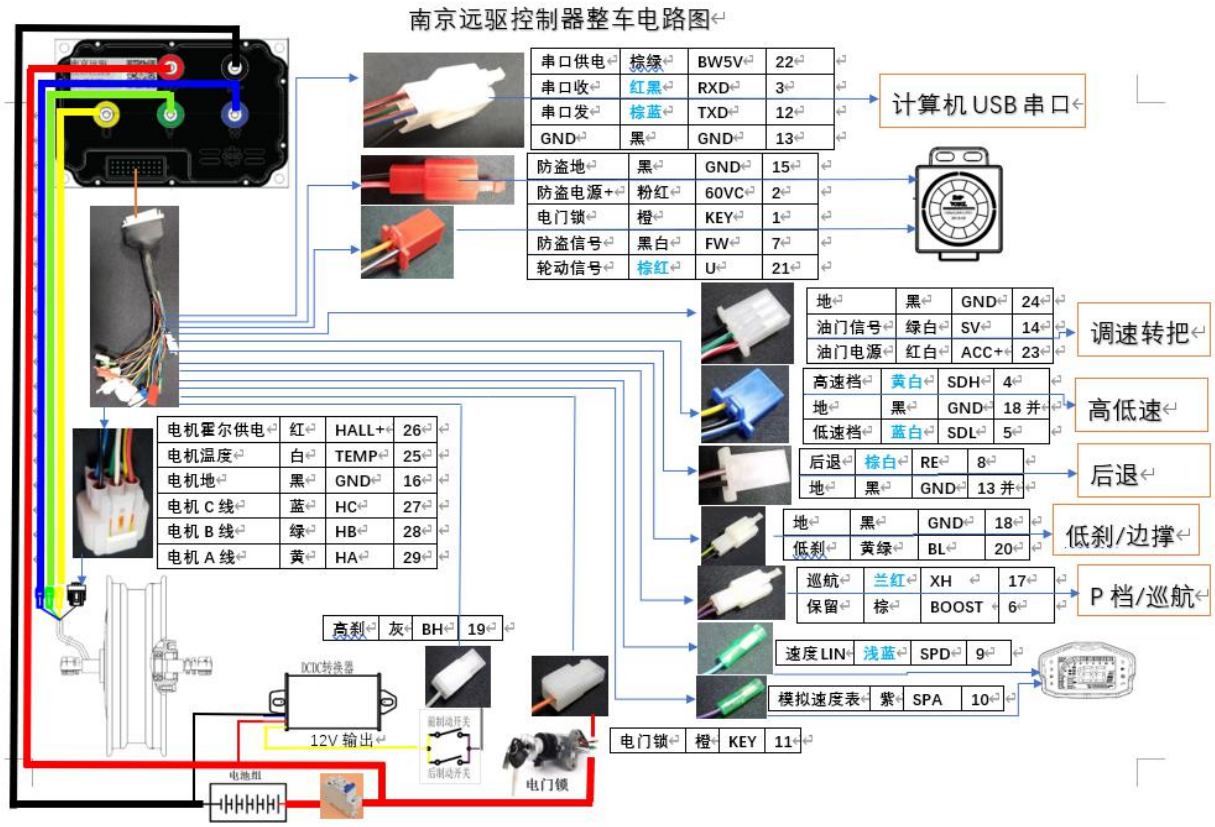
2. Index Parameter

Model	Maximum bus	Maximum Phase line	Operating voltage	Size	Weight
72240	70A	240A	52V~90V	189mm*121mm*63.5mm	1.7kg
72300	110A	300A	52V~90V	189mm*121mm*63.5mm	1.7kg
72350	170A	350A	52V~90V	189mm*121mm*63.5mm	2.0kg
72450	210A	450A	52V~90V	189mm*121mm*63.5mm	2.0kg
72520	250A	520A	52V~90V	189mm*121mm*63.5mm	2.0kg
72660	330A	660A	52V~90V	189mm*121mm*63.5mm	2.0kg
72800	430A	800A	52V~90V	189mm*121mm*63.5mm	2.0kg
72880	430A	880A	52V~90V	222mm*142mm*71mm	3.2kg
721200	600A	1200A	52V~90V	238*155*88mm	4.0kg
721800	800A	1800A	52V~90V	238*155*88mm	4.0kg

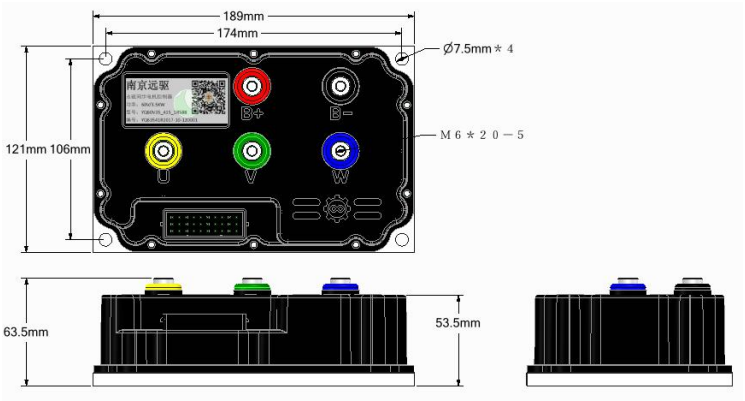
Project	**Index**
Control Method	Double current loop true vector control
Speedometer display	Isolated pulse meter or CAN communication meter
Energy feedback	Yes
Protection level:	Completely sealed glue
Insulation class	DC1000V leakage current 0.05
Working temperature	-30℃～+55℃
Storage temperature	-45℃～+85℃

Effectiveness	99%
Cooling method	Natural cooling
Vibration standard	GB/T2423
Cooling requirements	Good ventilation or increased air cooling

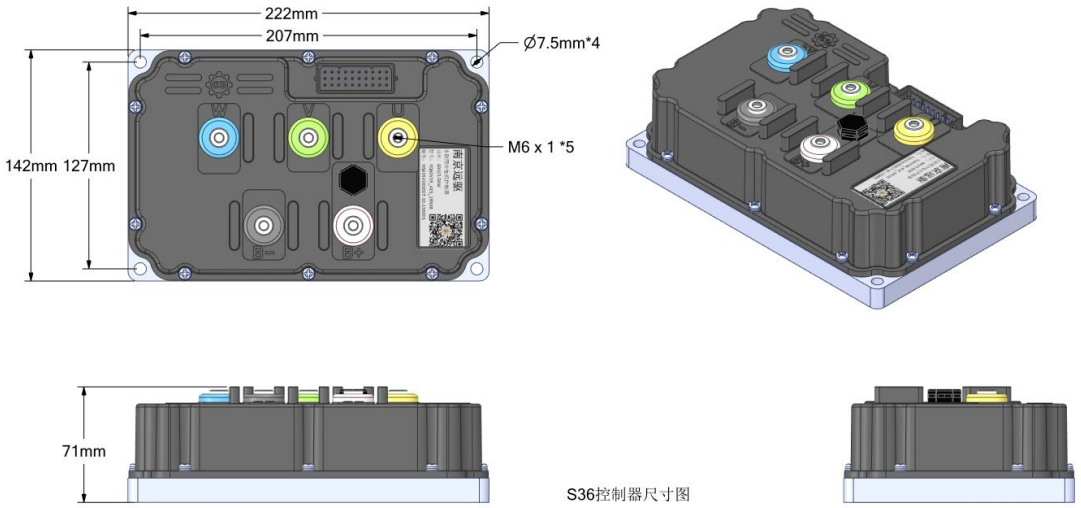
3. Wiring diagram



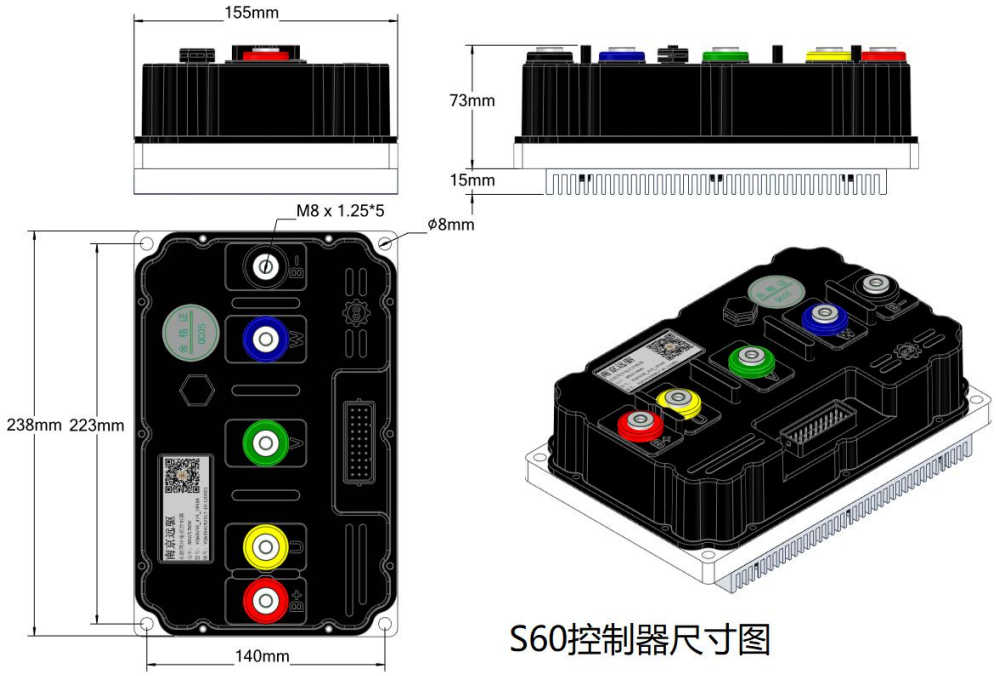
4. Dimensions



S24 Controller dimension drawing



S36控制器尺寸图



S60控制器尺寸图

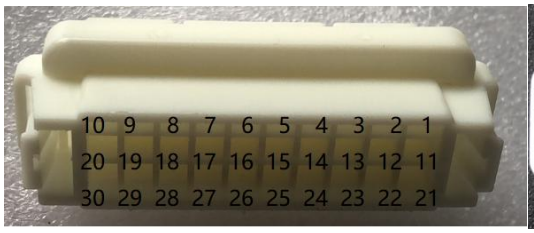
5. Electrical Characteristics：

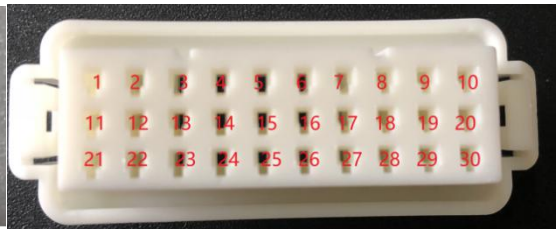
S/N	Content		
1	Motor HALL+	14V (No load) 8V/30Ma (Load)	
2	Accelerator pedal power supply 5V	5.1V	Matching
3	Accelerator pedal signal	0.5V~4.3V 1.1V~3.9V	Host computer settings
4	BW5V	Bluetooth 5V, used to power the Bluetooth module	
5	High speed/low speed	Dangling invalid Effective grounding	
6	Backward gear	Dangling invalid Ground or battery is active	
7	Anti-theft signal	Dangling invalid Ground or battery is active	
8	Low brake	Suspended grounding parking Suspended parking ground driving	Host computer settings
9	High brake	Suspended driving to stop Suspended parking for high traffic High: 12V with or without battery isolation	Host computer settings
10	Small key switch output	That is, the electric door lock signal supplies power to the controller	
11	RX	Computer receiving signal, controller output, TTL level	
12	TX	Computer sends signal, controller input, TTL level	
13	GND	Signal	

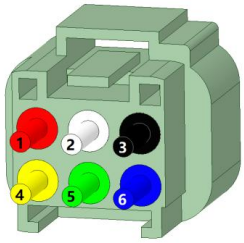
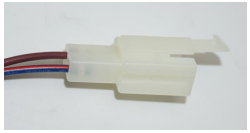
6. Outlet interface description

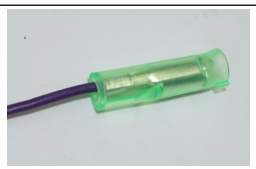
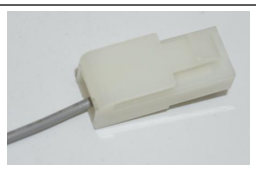
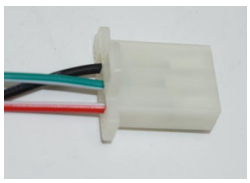
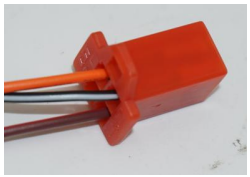
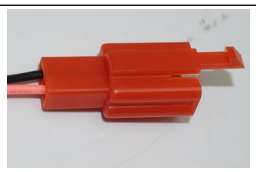
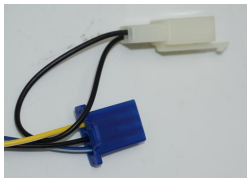
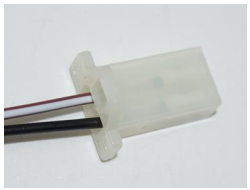
6.1 Nanjing Yuandrive Technology plastic case controller Hall first line version of the line drawing is suitable for Hall's first-line controller. 30PIN connector recommended color definition.

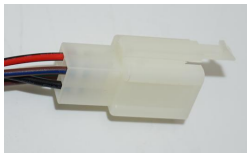
21	22	23	24	25	26	27	28	29	30
U		ACC+	GND	TEMP	HALL+	HC	HB	HA	
Brown red		Red whit	Black	White	Red	Blue	Green	Yellow	
11	12	13	14	15	16	17	18	19	20
60VKEY	TXD	GND	SV	GND	GND	XH	GND	BH	BL
Orange	Brown blue	Black	Green white	Black	Black	Blue red	Black	Gray	Yellow green
1	2	3	4	5	6	7	8	9	10
60VKEY	60VC	RXD	SDH	SDL	BOOST	FW/FD	RE	SPD	SPA
Orange	Pink	Red black	Yellow white	Blue white	Brown	Black white	Brown white	Light blue	紫





Connector		Description	Colour	Definition	Pin
Hall line length 290mm		Motor 12V	Red	HALL+	26
		Motor temperature	White	TEMP	25
		Motor ground	Black	GND	16
		Motor C wire	Blue	HC	27
		Motor B line	Green	HB	28
		Motor A line	Yellow	HA	29
Electric door lock length 290mm		Electric door lock key	Orange	KEY	11
Cruise BOOST length 290mm		Cruise	Blue red	XH	17
		BOOST	Brown	BOOST	6

Low brake length 290mm		Ground	Black	GND	18
		Low brake	Yellow green	BL	20
Analog speedometer length 290mm		Analog speedometer	Purple	SPA	10
High brake length 290mm		High brake	Gray	BH	19
Throttle length 290mm		Ground	Black	GND	24
		Accelerator signal	Green white	SV	14
		Accelerator power	Red white	ACC+	23
Anti-theft signal length 290mm		Anti-theft	Black white	FW	7
		Phase line	Brown red	U	21
		Electric door lock	Orange	KEY	1
Anti-theft power supply length 290mm		Battery +	Pink	60VC	2
		Battery -	Black	GND	15
High and low speed length 290mm	 Three-core female head cover 1 short-circuited three-core male head (default high speed)	High speed	Yellow white	SDH	4
		Ground	Black	GND	18 (and)
		Low speed	Blue white	SDL	5
Backward gear length 290mm		Back	Brown white	RE	8
		Ground	Black	GND	13 (and)

Velocity pulse length 290mm		Speed pulse / one line	Light blue	SPD	9
Upgrade port line length 190mm		Serial power supply	Brown green	BW5V	22
		Serial port	Red black	RXD	3
		Serial port	Brown blue	TXD	12
		GND	Black	GND	13

7. Buzzer alarm

The controller is equipped with a buzzer. When an alarm occurs, the buzzer will send out the corresponding alarm message.

7.1 Description of buzzer alarm sound times：

7.1.1 During normal boot, the buzzer will sound once, then no longer。

7.1.2 If there is a long beep, please check whether the brake and the throttle are effective at the same time.
Using this function, you can check whether the brake and the throttle are normal: step on the buzzer at the same time, let go of any one will not sound.

7.1.3 If there are 2 short sounds and 1 long sound, and the cycle is repeated, it means that the controller is in the self-learning state, and the self-learning should be completed according to the self-learning operation steps.

7.1.4 If there are 2 short sounds, pause for a short time, then 1 short sound, and then repeat, indicating that the controller program verification failed. In this case, the program must be upgraded again.

7.1.5 If there are 4 short sounds, 1 long sound, and 5 short sounds, and then repeat, it means that the upgraded program does not match the controller. Please check whether the program matches the model on the controller label. If it does not match, find the matching program and restart upgrade.

7.1.6 If there are 1 to 15 sounds, judge the fault according to the number of sounds.

	Fault description	Number of sounds	
1	Motor Hall failure	1	The signal line between the controller and the motor is not connected properly.

2	Accelerator pedal failure	2	The accelerator did not return to zero, or the accelerator pedal was broken. Note that the fault will be displayed by default when the controller is restarted. When the self-test passes, the fault will disappear.
3	Current protection restart	3	Abnormal protection alarm
4	Phase current overcurrent	4	Abnormal protection alarm
5	Voltage failure	5	The voltage is too low or too high, which exceeds the allowable range of the controller.
6	Anti-theft alarm signal	6	Keep
7	Motor over temperature	7	The motor temperature is too low or too high beyond the use range
8	Controller over temperature	8	The controller temperature is too low or too high beyond the use range
9	Phase current overflow	9	Abnormal protection alarm
10	Phase current zero fault	10	Controller internal alarm
11	Phase short circuit fault	11	The phase wire is shorted, or the motor is faulty.
12	Line current zero fault	12	Controller internal alarm
13	MOSFET upper bridge failure	13	The upper bridge of the controller is damaged
14	MOSFET lower bridge failure	14	The lower bridge of the controller is damaged
15	Peak line current protection	15	Hardware overcurrent protection alarm