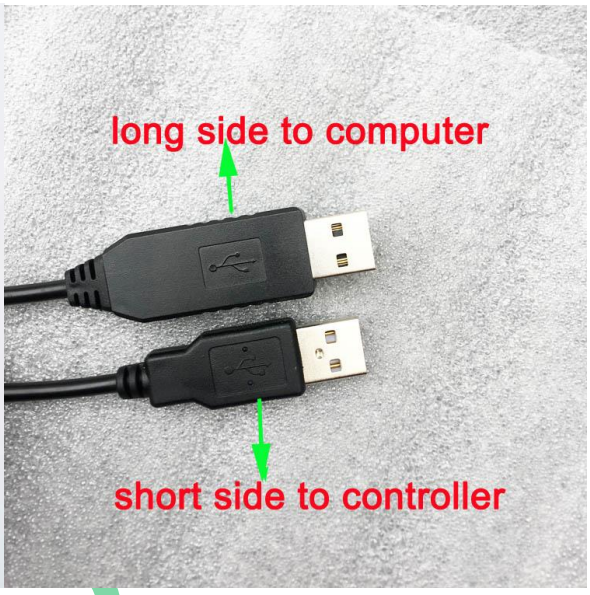
ESWCV2 ES_V2.2(2020.07.27)

Chartper one: Introduction

1.1 electric wheelchair controller



1.2 Rated value and specification

Controller			MX ES WCDCSPV2.2
RATED	Max continuous（A）(for each motor)		20A
	primary circuit	Working voltage（V）	18-60V
		Max output current（A）	40A
SPEC	Drive method		SVPWM: sine wave
	Signal Feedback		Hall sensors/without hall sensors
	Operation Condition	temperature	0～＋50℃ / -25～＋55℃
		humidity	<90%RH）
		vibration/lash resistance	4.9m/s² / 19.6m/s²
		IP Code	IP67
	Protection		Over current,over load, under-voltage

1.3 Operation interface

Increase speed gear	Power on/off
Decrease speed gear	Horn switch
Speed gear indicator	Battery power indicator

1.4 system functions

Rotation and speed control	Power on/off
Horn switch button	Speed gear adjust and display
Battery capacity display	Joystick default value calibration
Auto shut off power	Error display
Smart phone charging USB port	Parameter setting

1.5 operation buttons

1.5.1 power on/off: press to power on，press once motor to power off.

1.5.2 horn: press to activate horn alarm, release horn stopping alarm.

1.5.3 add speed gear: press to add gear, max value 5,speed is faster when value is bigger.

1.5.4 reduce speed gear: press to reduce gear, mini value 1, speed is slower when value is smaller.

1.5.5 joystick calibration: keep the joystick at center position, press and at the same time, the board LED flashing,do not release them until horn alarms once, release buttons and calibration completed

1.6 LED display

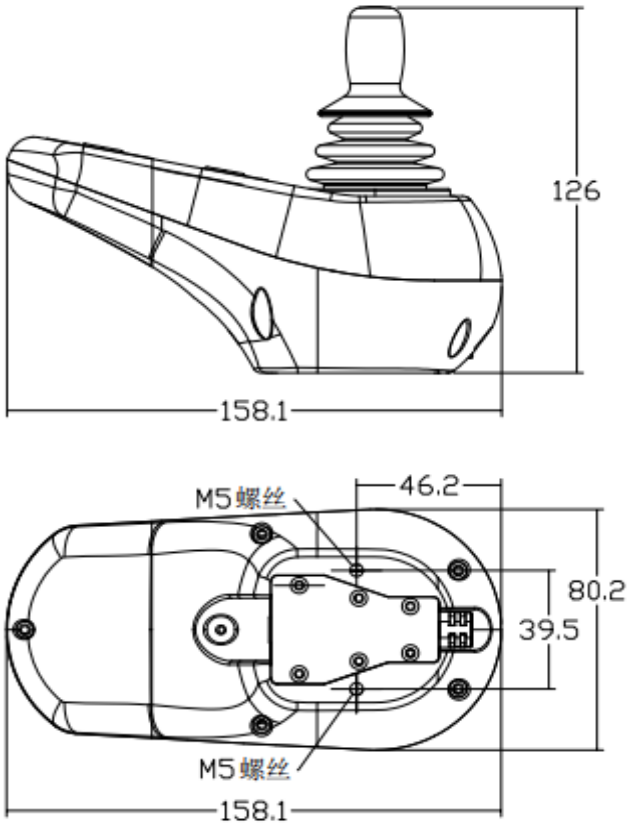
1. when battery capacity is empty, last LED flashing.
2. When “UART”or“joystick”errors，LED board light flashing（ref: errors list）
3. when“controller”,“motors”，“EMB braking” errors, LED board flashing（ref: errors lis）,at this situation there will be alarms when joystick is moved.

Errors checking list:

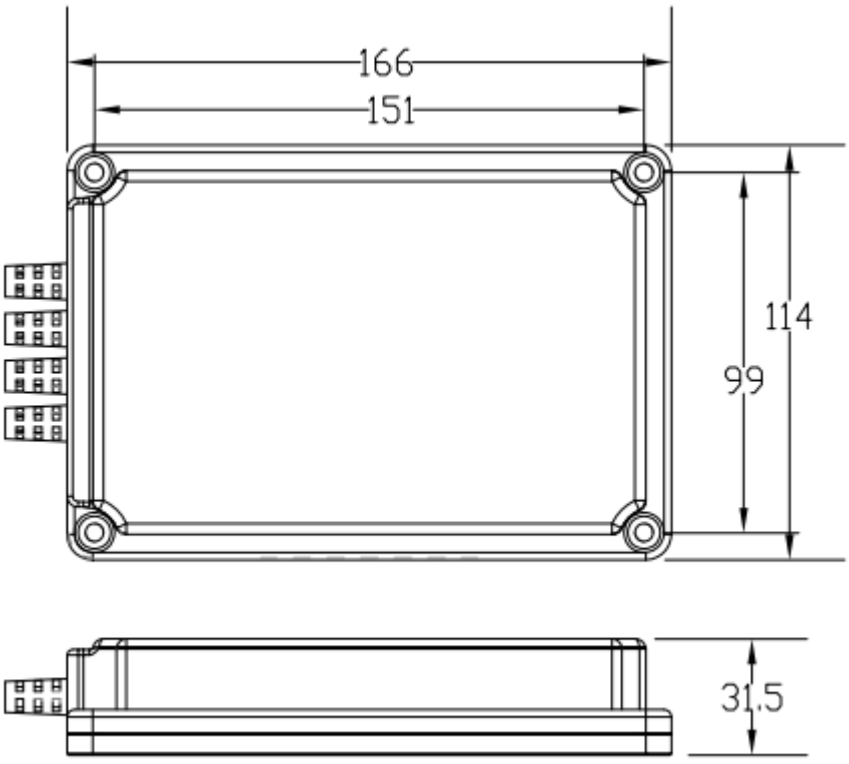
Joystick control board	
Gear display LED(left）	Battery power indicator LED（right）
L_LED5(top）	R_LED5（top）
L_LED4	R_LED4
L_LED3	R_LED3
L_LED2	R_LED2
L_LED1（bottom）	R_LED1（bottom）
When error happens, only indicator LED flashing, other LED does not work	
Left EMB error	L_LED4 flashing
Right EMB error	R_LED4 flashing
Left and right EMB error	L_LED4，R_LED4 both flashing
Left motor error	L_LED3 flashing
Right motor error	R_LED3 flashing
Left and right motor error	L_LED3，R_LED3 both flashing
Controller error	L_LED2 flashing
overheating（optional）	R_LED2 flashing
UART error	L_LED1 flashing
Joystick error	R_LED1 flashing

Charpter two: Size and Install

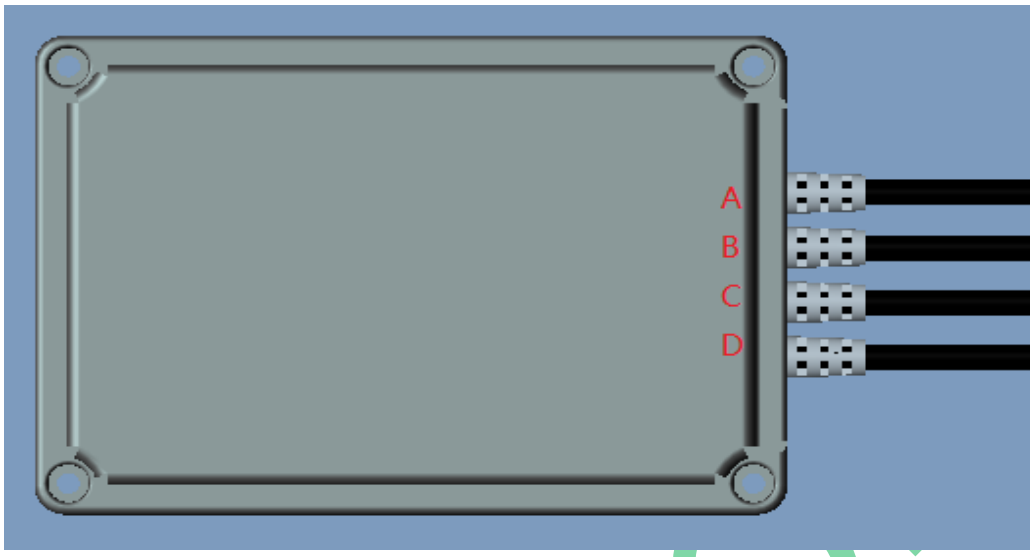
2.1 Joystick size



2.2 controller size

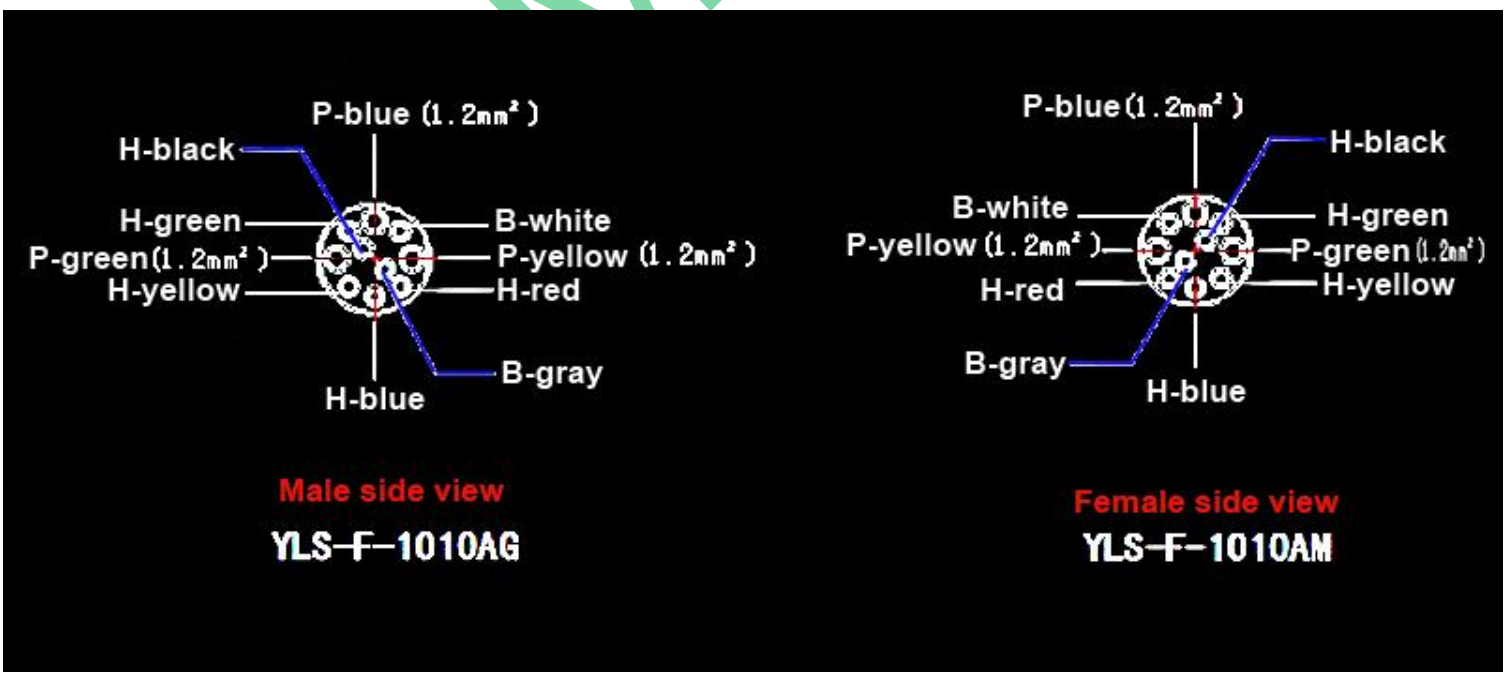


2.3 controller cables



A: Right side motor cable (right hand side when sitting in the wheelchair)
B: Joystick cable
C: Battery power cable
D: Left side motor cable (left hand side when sitting in the wheelchair)

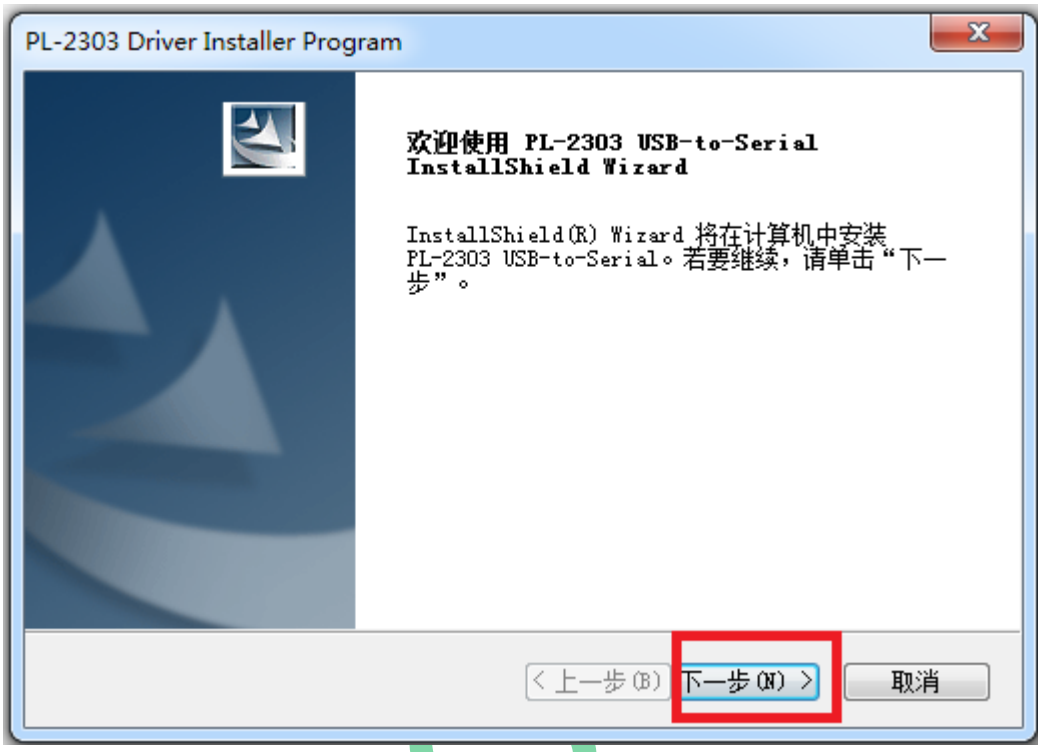
The motor cable wires diagram

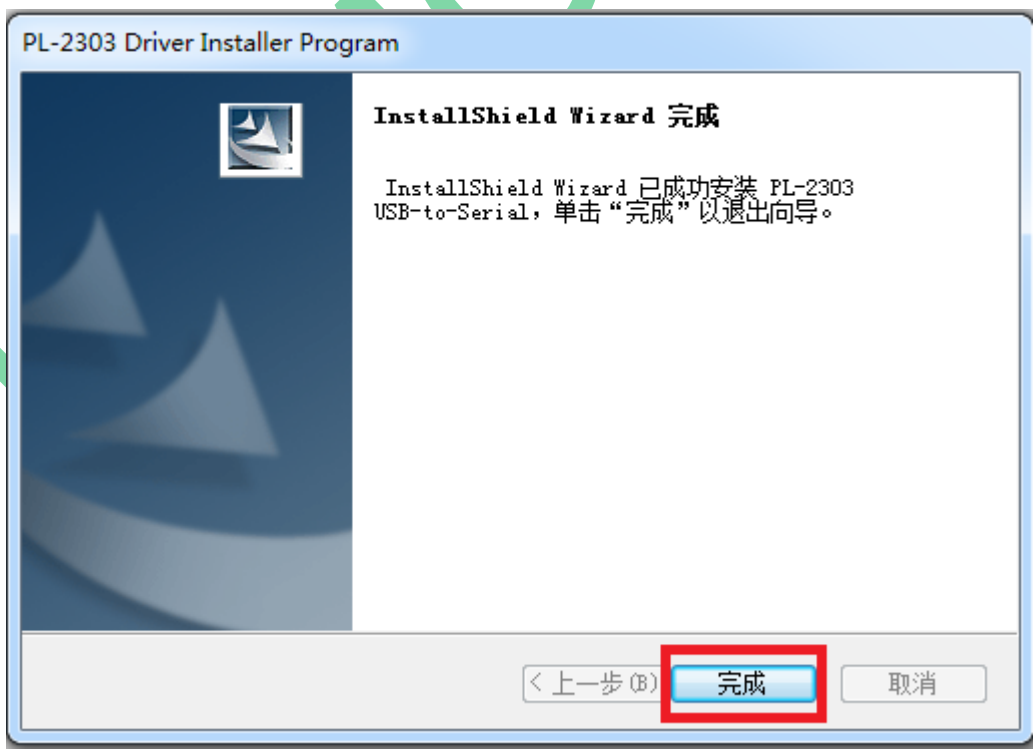


Charpter three: Software and USB driver

3.1 install programming software driver

3.1.1 Double click MX ES DriverInstaller.exe

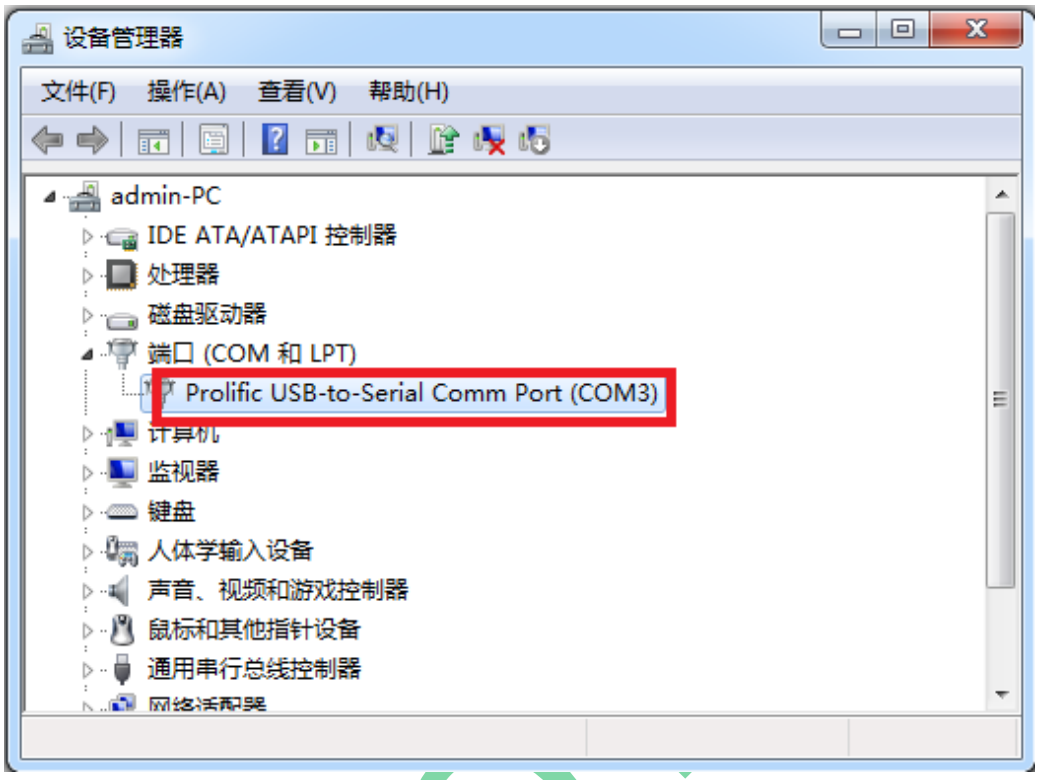




3.1.2 Connect programming USB to computer

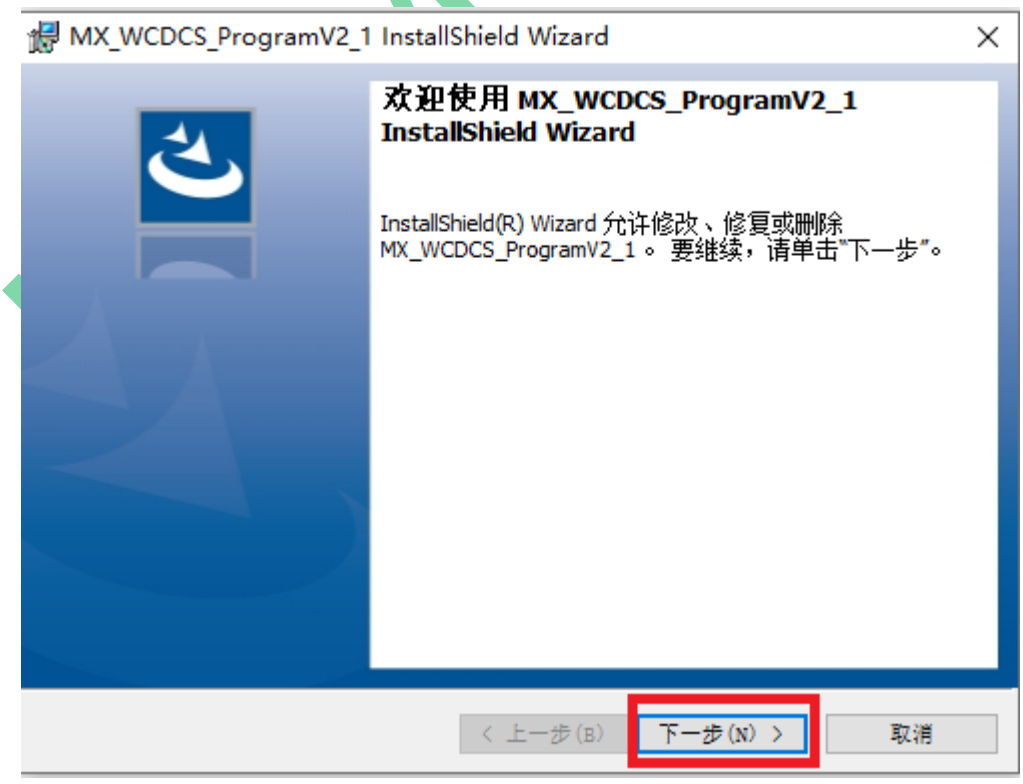
3.1.3 Check whether driver is ok installed

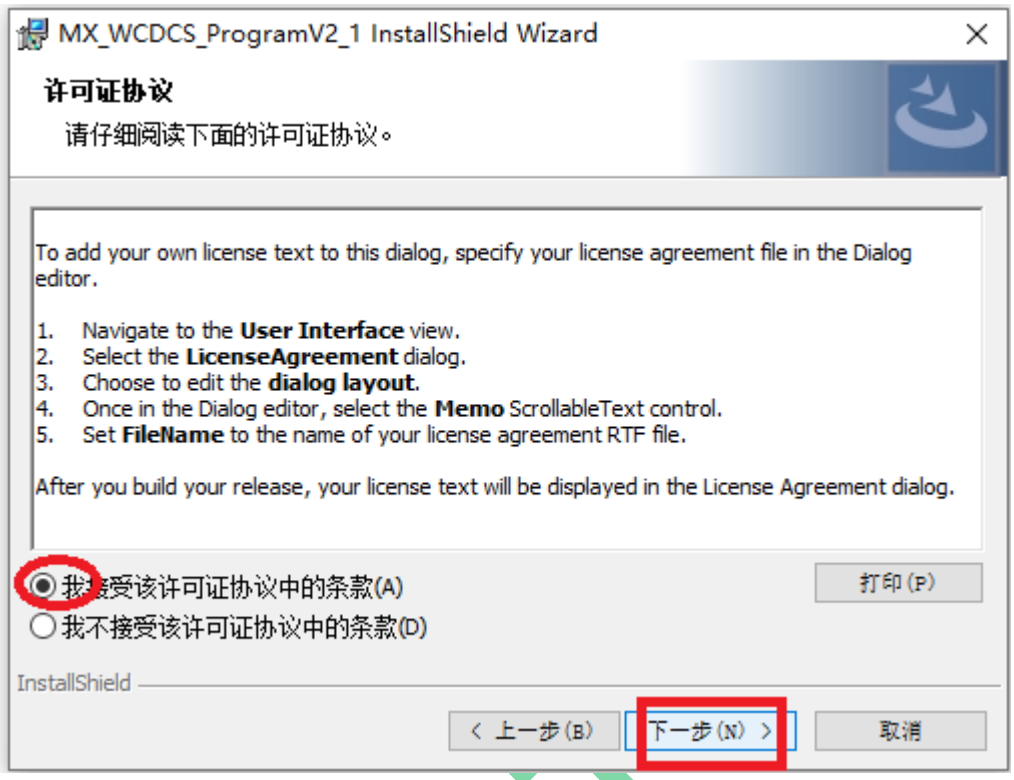
Open “computer” ,“Device Manager”，check the port number and it is successful,this demo installation driver power is **COM3**

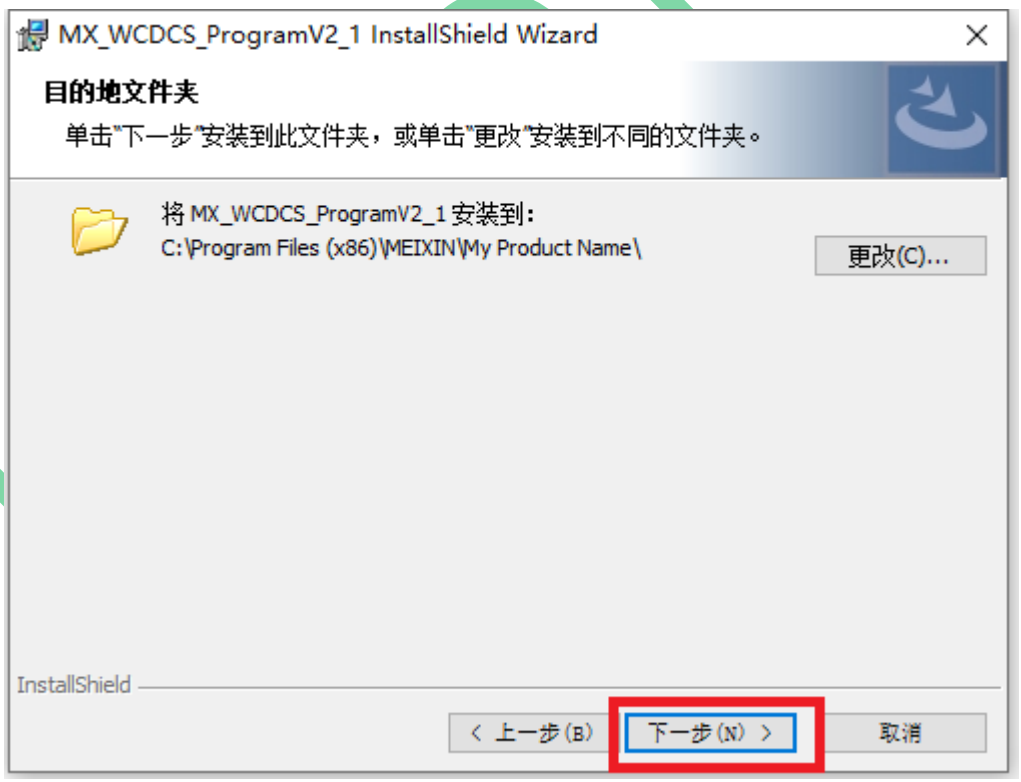


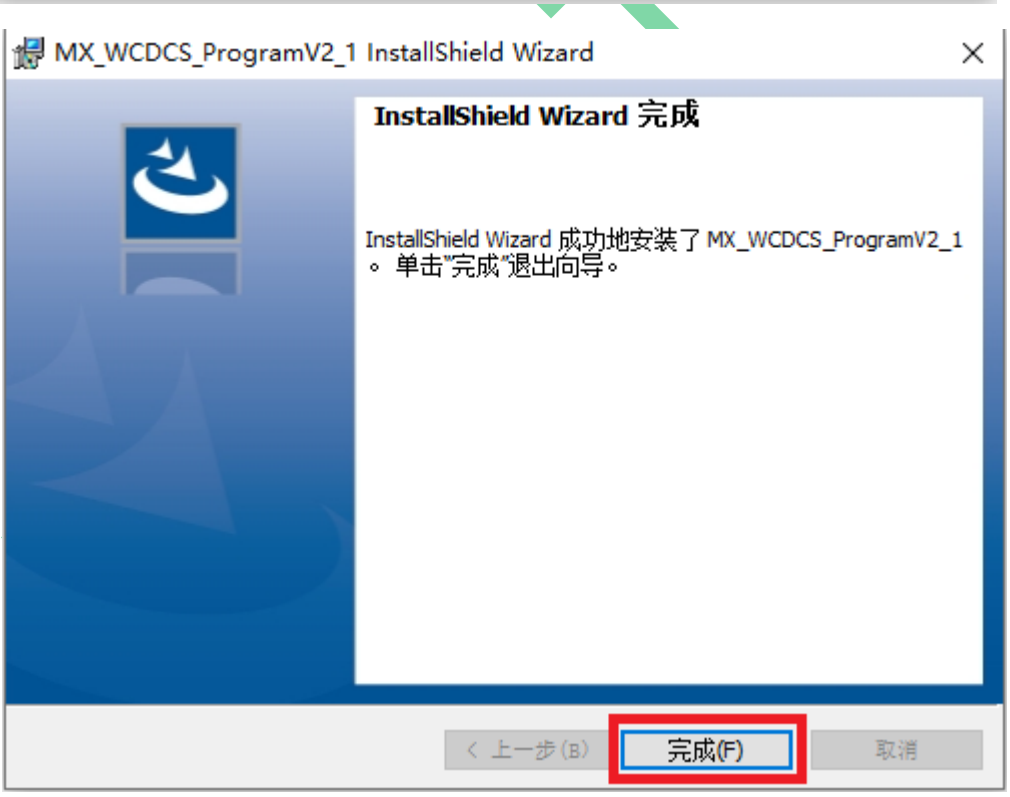
3.2 install programming software

Double click **setup.exe**




MX_WCDCS_ProgramV2_1 InstallShield Wizard
许可证协议
请仔细阅读下面的许可证协议。
To add your own license text to this dialog, specify your license agreement file in the Dialog editor.
1. Navigate to the User Interface view.
2. Select the LicenseAgreement dialog.
3. Choose to edit the dialog layout.
4. Once in the Dialog editor, select the Memo ScrollableText control.
5. Set FileName to the name of your license agreement RTF file.
After you build your release, your license text will be displayed in the License Agreement dialog.
我接受该许可证协议中的条款(A)
我不接受该许可证协议中的条款(D)
打印(P)
InstallShield
< 上一步(B)
下一步(N) >
取消


MX_WCDCS_ProgramV2_1 InstallShield Wizard
目的地文件夹
单击"下一步"安装到此文件夹，或单击"更改"安装到不同的文件夹。
将 MX_WCDCS_ProgramV2_1 安装到:
C:\Program Files (x86)\MEIXIN\My Product Name\
更改(C)...
InstallShield
< 上一步(B)
下一步(N) >
取消



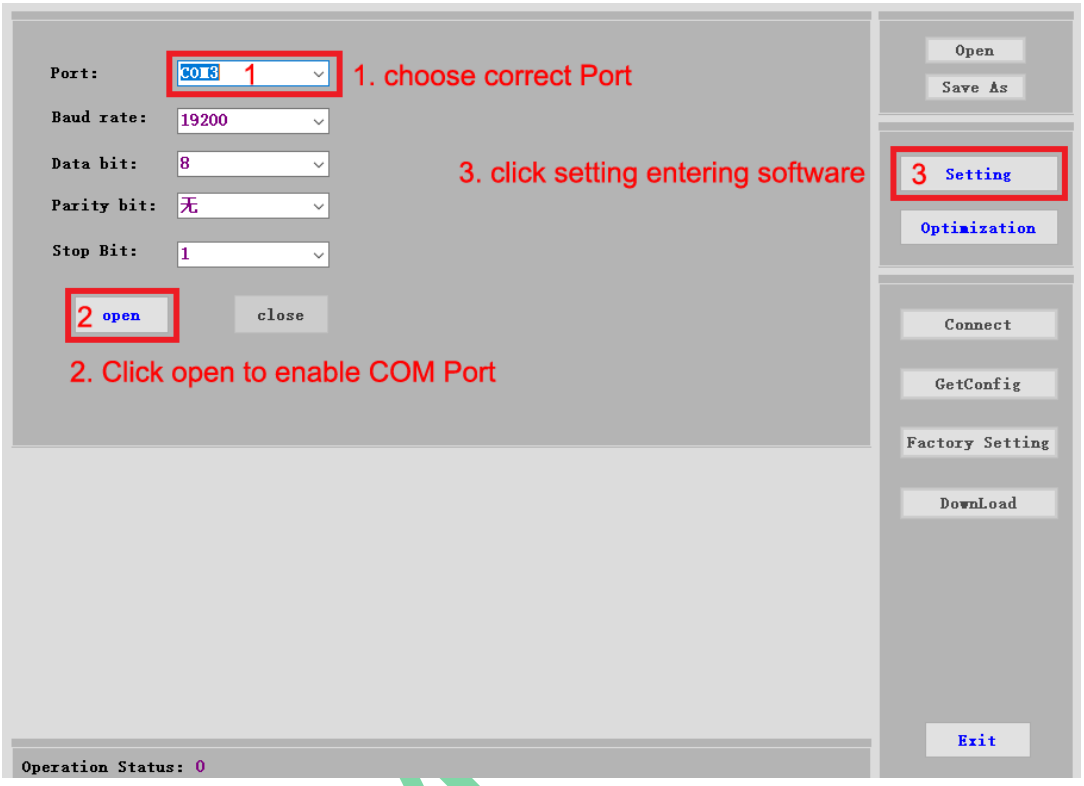
When finished, there will be an icon 

Close all your anitvirus and saftyguard software before you download and install sofetware and driver

3.3 software introduction

Open the software icon, you will see the following window

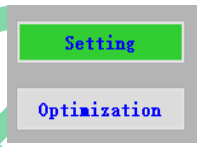
Note：this（COM3）is demo installation port should be the same as MXES driver portnumber. Different computer, this port number may be different, you need to choose the correct port number for software.



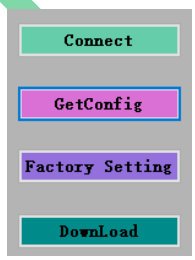
Choose the right COM port and click the “**open**” button and then the “**setting**” button, then you will see the programming window as follows:

1. Command buttons

Open: import parameter data files to controller.
Save As: export controller current data to be a file.



Setting: set parameters
Optimization: not avaiable now.

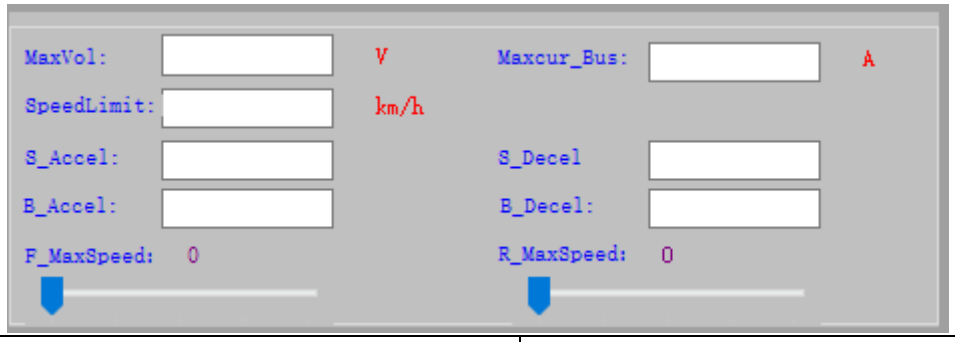


Connect: connect software and controller.
GetConfig: get controller configuration.
Factory: Recover factory default setting.
DownLoad: Save parameter to controller.

Exit: Exit the programming software

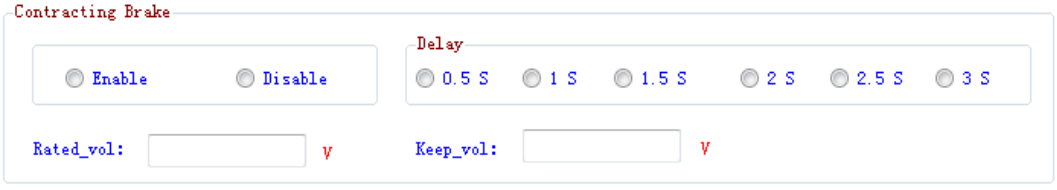
The data transmission sometimes is slow, please pay attention to the botton of the “operation status”.

2. Parameter settings



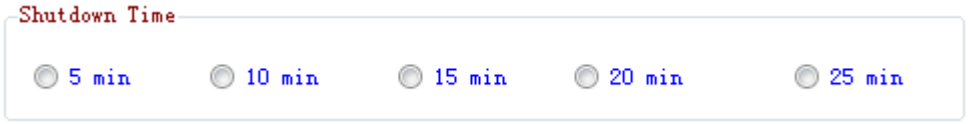
Maxvol: Max input Voltage	**MaxVolR**： Max reversing voltage
Maxcur_Bus: max Bus current	**MaxcurR**： Max reversing current
Maxcur_P: Max phase current	**Speedlimi**t: speed limit for downslope
S_Accel: Acceleration	**S_Decel**: Deceleration
B_Accel: Turn Acceleration	**B_Decel**: Turn Deceleration
F_max_Speed: Max forward speed, including 5 gears: 1,2,3,4,5.(5 is 100%，4 is 97.5%，3 is 95%，2 is 92.5%，1 is 90%).	
R_max_Speed: Max reverse speed, including 5 gears: 1,2,3,4,5.(5 is 100%，4 is 97.5%，3 is 95%，2 is 92.5%，1 is 90%).	

Forward: Adjust motor's rotation to forward
Reversal: Adjust motor's rotation to reverse
Speed Bias : Speed deviation（correct motor speed）is Proportion value, max value is 100. For example, If value is 100, speed after correction = original speed - original speed*50/1000）



Enable: Enable EMB braking function	**Disable**: Disable EMB braking function
Dealy: Braking delay. The time for E,B braking close/brake after the joystick back to zero position.	
Rated_vol: EMB braking rated voltage, the EMB braking working rated voltage	
Keep_vol: EMB braking voltage open/release when the motor is running	

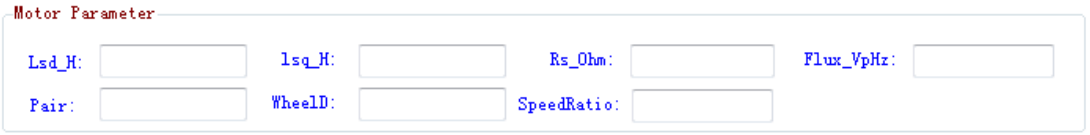
Enable: enable reversing alarm sound	**Disable**: To disable reversing alarm sound



Shutdown Time: to set auto cut off power time when the wheelchair is not operated.

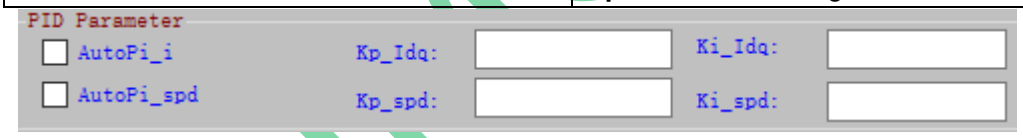
Battery Parameter :

Undervoltage : the mini voltage that controller can work.
When displaying：the display shows full when the voltage >**80%** value
When charging：the display shows full when voltage reach **Full** value



Motor Parameter:

Lsd_H: motor inductance value（the value of Lsq_H and Lsd_H must be the same）	
Lsq_H: motor inductance value（the value of Lsq_H and Lsd_H must be the same）	
Rs_Ohm: motor resistance	
Flux_VpHz: motor EMF	**Pair**: motor pairs
WheelD: motor wheel size（inch）	**SpeedRatio**:motor gear ratio



When using “MotorID”, AutoPi_i, Kp_Idq and Ki_Idq will be auto filled by controller.
When do not use “MotorID”, AutoPi_i, Kp_Idq and Ki_Idq can be input manually.
When using “MotorID”, AutoPi_spd, Kp_spd and Ki_spd will be auto filled by controller
When do not use “MotorID”,AutoPi_spd, Kp_spd and Ki_spd can be input manually.

Current_resEst: the resistance current for reading motor data
Current_indEST: the inductive current for reading motor data
fluxEstFreq: the frequency for reading motor data
Current_resEst, **Current_indEST** and **fluxEstFreqa:** the default value does not need to change for most motors

Status at the bottom of the software window

Charpter four: simple guide for pragramming

4.1 Brief

When new motors connected to our joysitck controller, the controller may not work with the motors due to the phase angle and hall sensors issues. So we need to use the program software to read the motor data and can make controller work with motors.

4.2 To set controller with motor

1.Connect the joystick, co ntroller,motor,battery together. Press the joystickpower  on/off button to turn on the system.

2. connect the programming USB cable to computer and joystick.

3. Open the software from the ico 

and choose the correct COM port 

4. click the “**open**” button 

5. click the “**Setting**” button 

, then programmign software window as follows:

6. Click the "**connect**" button 

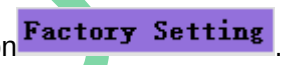
, connecting the software and controller.(each time re-boot the controller(power on/off), you need to re-click the "**connect**" button)

7. Click the "GetConfig" button 

, to get the controller data.

8. Modify the data as you like and then click the "download" button 

, to save the data to controllers.

9. If you need to recover the controller default data, please click the "Factory Setting" button 

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4.3 to make motors and controllers working together

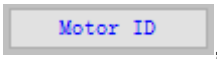
Repeat the "**4.2 set controller with motor ” step 1 to step 5.**

6. click the "Connect" button 

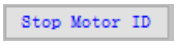
, connecting the software and controller.

7. Click the "GetConfig" button 

, get the controller data.

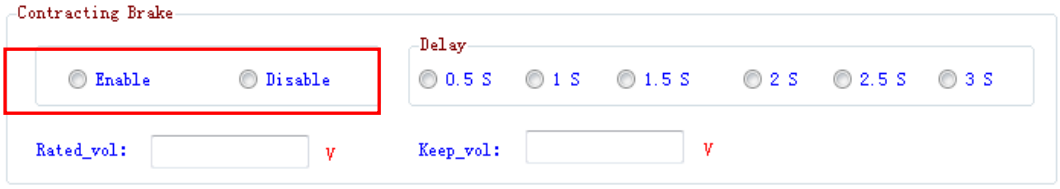
8. Click the "Motor ID" button 

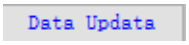
, controller starts to read motor data, at current time, **one of the motors will make small noise first, and then for a while , the motor will auto running.** If the motor shaking and big noise, please click the "Stop Motor

ID" button 

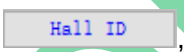
to stop the motor data reading. And check the all the wires connections and power supply, then re-start the "Motor ID"

(Do make sure the motor's EMB is on or released, or you can not get the motor run. You need to switch the EMB on motor according to the software setting, Disable or Disable.)



9. After the motor data is read, the motor will auto stopped, at current time, to click the "Data Updata" button 

to save the motor data to the controller.

10. To read hall sensors data. Click the "Hall ID" button 

, When the bottom "Operation Status" appears **HALL ID**, push the joystick forward, the motor will run and stop in a very short period. At this moment, the motor hall sensors data is read and saved. The controller will be ok to drivw motors after all these set.

11. If the motors running direction are not correct, for example one is forware and one is backward, or both backward. It needs to re-click the "Connect" button 

to communicate with controller again. Click the "GetConfig" button 

to get controller saved date and then adjust the motor running direction from "Forward" and "Reversal" button 

, then Click "DownLoad" button 

to save the changed parameter.

Note:

1. Each time click the control button on the software , the bottom will shows the status.
2. To operate the software, you need to Click the "Connect" button each time after you used joystick when setting data. Because when you push joystick, the USB cable communication will be closed. That is why you need to re-click the "Connection" button re-communicate the software with controller.

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