Nebula 4100 Lite

HTTP://FILMPOWER.COM

3-AXIS DIGITAL GYROSCOPE STABILIZER

User manual

Please read the User manual carefully before using the product and keep it properly

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2 Disclaimers and Warnings

Congratulations on purchasing your new Filmpower product. Please read this manual and disclaimer carefully before using this product. By using this product, you hereby agree to this disclaimer and signify that you have read it fully. You agree that you are responsible for your own conduct and any content created while using this product, and for any consequence thereof. You agree to use this product only for purposes that are proper and in accordance with local regulations, terms and any applicable policies and guidelines.
Do not modify or adjust the Nebula 4100.
As Filmpower has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, set-up, or assembly of the product, the user accepts all resulting liability. Filmpower assumes no liability for damages or injuries incurred directly or indirectly from the use of this product.

By reading this disclaimer, you also agree:

1. Any part of this disclaimer is subject to change without prior notice, refer to www.filmpower.com for the latest version.
2. Filmpower reserves the right of final interpretation of this disclaimer.Filmpower and Nebula are registered trademarks of Filmpower. All names of products, brands, etc., appearing in this manual are trademarks or registered trademarks of their respective owner companies. This product and manual are copyrighted by Filmpower, with all rights reserved. No part of this product or manual shall be reproduced in any form without the prior written consent or authorization of Filmpower. No patent liability is assumed with respect to the use of the product or information contained herein.

Using Lithium Polymer (LiPo) Batteries

LiPo smart batteries can be extremely hazardous and require special attention when handled. Always follow these instructions when using LiPo batteries:
1. Filmpower smart batteries must be charged with a Filmpower charger.
2. Filmpower smart batteries are designed to stop charging when full. However, it is good practice to monitor the charging progress and disconnect the battery from the charger once fully charged.
3. Do not charge a smart battery near flammable materials or on flammable surfaces such as carpet or wood.
4. Never charge a swollen, leaky or damaged battery.
5. Examine charger regularly for damage to the cord, plug, enclosure or other parts. Never use a damaged charger.
6. Disconnect the charger when not in use.
7. Do not clean the charger with denatured alcohol or other flammable solvents.

3 Disclaimers and Warnings

Usage and Storage

Keep batteries out of the reach of children and pets.
Never discharge batteries below 3V per cell.
Do not heat the battery.
Do not insert or remove batteries if the plastic cover has been torn or compromised in any way.
Do not drop or strike batteries.
Never use a swollen, leaky or damaged battery.
Clean battery terminals with a clean, dry cloth.
Do not expose batteries to extreme temperatures, including excessive heat. Do not leave the batteries inside vehicles on hot days.
Do not allow batteries to come into contact with any kind of liquid. Do not leave batteries out in the rain or near a source of moisture.
Do not leave batteries in a microwave oven or in a pressurized container.
Do not attempt to dismantle, pierce or cut a battery. Do not attempt to repair batteries yourself.
Do not place loose battery cells on any conductive surface, such as metal-toppled tables.
Do not put the loose cells in a pocket, bag or drawer where they may short-circuit against other items or where battery terminals could be pressed against each other.
Do not place or use batteries on strong electrostatic or electromagnetic surfaces or surrounding areas. This may result in battery damage.
Do not place heavy objects on the batteries or charger. Avoid dropping batteries.
Avoid direct contact with the electrolyte contained within the batteries. The electrolyte and electrolysis vapors are harmful to your health.
Do not mix battery brands inside the controller.
Do not attach the battery to wall or car charger sockets directly. Always use a Filmpower approved adapter.

Battery Disposal

Discarding batteries in general household waste is bad for the environment. Please dispose of batteries properly.
Do not dispose of batteries in fire.
Damaged or unusable batteries must be disposed of in a container specially reserved for this purpose. When disposing of batteries, follow appropriate local guidelines and regulations. For further information, contact your local solid waste authority or a battery store.
Only use the Filmpower smart battery.
Always use the Filmpower smart battery charger.

4 In the box

Storage case*1

Smart battery*1

Charger*1

4100 gimbal*1

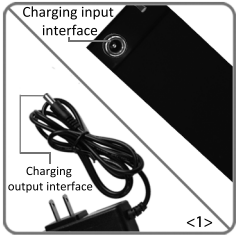
5 Battery instructions

The smart battery is specially designed for Nebula 4100. It has a battery capacity of 1800mAh with charging protection circuit and power management functionality. When the battery is fully charged, it has a maximum run time of 100 minutes.

Battery Functions	
Balance Charging	Automatically balances the voltage of each battery cell during charging
Over Current Protection	Charging stops automatically when the current is too large
Overcharge Protection	Charging stops automatically when the battery voltage is too high to prevent overcharge damage
Over Discharge Protection	Charging stops automatically when the battery voltage is too low to prevent overcharge damage
Short Circuit Protection	Automatically cuts power supply when a short circuit is detected
Charging Temperature Detection	The battery will charge only when the temperature is between 15°C and 40°C

Battery Specifications	
Model	X-BATTERY
Type	LiPo
Capacity	1800mAh
Charging Environment Temperature	15° C~ 40°C
Operating Environment Temperature	-10°C ~ 50°C

6 Charging



<1> By using DC port charging, please check the charging input interface and charging output interface before charging;

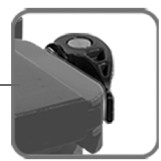
<2> Connect the battery to the char ger and connect the charger to a wall socket, using the plug set if necessary;

<3> The indicator lights red on the charger while charging, and if the battery is fully charged when the indicator light turns green.
(P.S. Please charge in time when finish using to prolong the battery life.)

7 Main parts of Nebula 4100

1. Clamp of Pitch axis
To balance Pitch axis and to set up cage.

2. Cage
The original cage of Nebula 4100 can be directly taken off by loosing clamp of Pitch axis, specifically designed for filming, camera with smart cage can be attached with tripod plate, convenient for users directly install onto the gimbal or tripod.



3. Clamp of Yaw axis
To balance Yaw axis.

4. Handle

5. Battery compartment
To load/replace battery.

8 Main parts of Nebula 4100

6. Clamp of Roll axis
To balance Roll axis.

7. Screw of cage
To fasten and adjust camera.

8. Buttons on the handle
Including:
①Joystick ②Power on/off
③Mode button
④Record button

9. Standard 1/4 screw hole
Supports accessories with 1/4 screw hole.

9 Quick set up 1: To load battery

<1> Open the battery compartment under the handle of Nebula 4100;

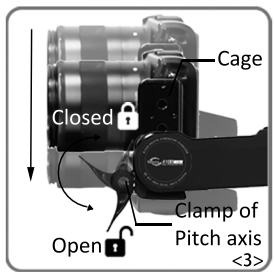
<2> As the picture shows, put Nebula 4100's smart battery (sticker side up) into the battery compartment;

<3> Close the battery compartment.

Quick set up2: To set up camera

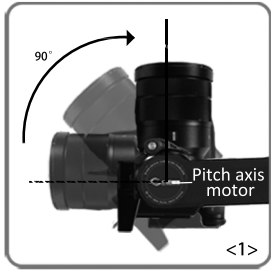
<1> Make sure that the screw hole on the bottom of the camera is aiming at the screw on the cage;

<2> Fasten the camera onto the cage in a clockwise direction;



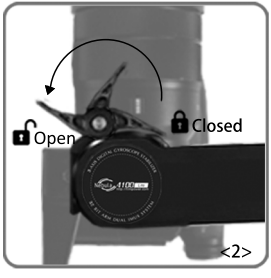
<3> Loosen the clamp of Pitch axis, put the cage into the dovetail slot and fasten the clamp.

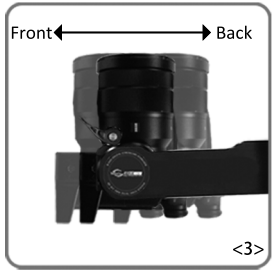
11 Quick set up3: To balance Pitch axis

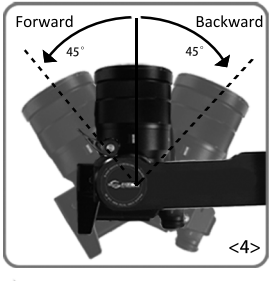


<1> Lift the lens upwards, make sure it's perpendicular to the Pitch axis motor, and release it to see if it tilt frontward/backward (camera will tilt to the direction as the center of gravity).

<2> Keep the camera perpendicular to the Pitch axis motor and then loosen the clamp of Pitch axis.



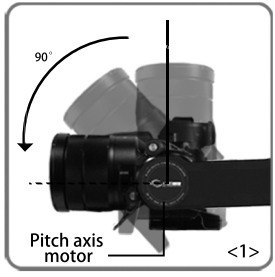




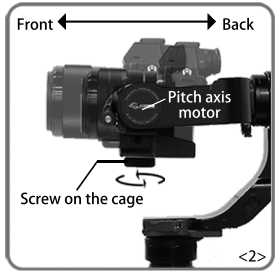
<3> Adjust the cage to a position where the camera keeps still.

<4> Try to adjust lens upward or forward 45°and see if it stays still. Balance complete if lens doesn't tilt, please fasten the Pitch axis clamp.

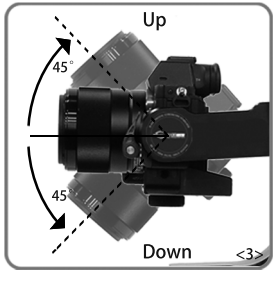
Quick set up4: To balance gravity center



<1> After Pitch axis balancing complete, please turn the lens parallel with gimbal and release it to see if it tilt frontward/backward (camera will tilt to the direction as the center of gravity);

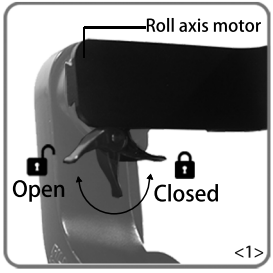


<2> Loosen the screw of cage and adjust camera to a position where it remains horizontal with Pitch axis motor;



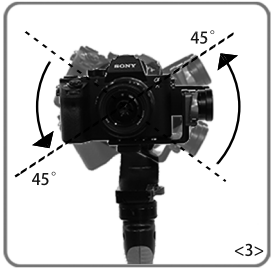
<3> As the picture shows, adjust the camera up or down as 45° and see if it stays still. Balance complete if lens doesn't tilt, please fasten the screw.

Quick set up5: To balance Roll axis



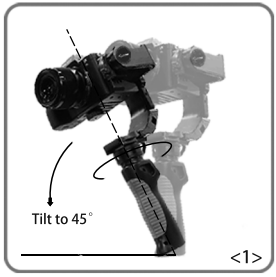
<1> Square up the gimbal, loosen the clamp of Roll axis;

<2> Adjust camera to a position where it keeps still;

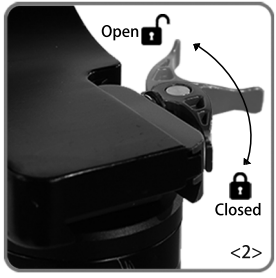


<3> As the picture shows, adjust the camera left or right as 45° and see if it stays still. Balance complete if lens doesn't tilt, please fasten the clamp.

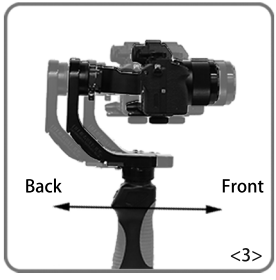
14 Quick set up6: To balance Yaw axis



<1> Turn the Nebula 4100 to 45°, and see if gimbal stays still. We need to balance Yaw axis if gimbal tilt;



<2> Loosen the clamp of Yaw axis;



<3> Adjust gimbal's position and return to step <1>, turn Nebula 4100 to 45°, and see if gimbal stays still. Balance complete if gimbal doesn't tilt, please fasten the clamp.

Buttons on the handle

1 Power on/off

To turn on the gimbal, push it to left;To turn off the gimbal, push it to right.

2 Joystick

To control the Pitch and Yaw axis, convenient for shooting (see at P23).

3 Mode button

To stop/continue gimbal's working and to switch mode (see at P19).

<1> The default mode is follow mode, and press once to return to follow mode;
<2> Press twice to switch to semi-lock mode;
<3> Press three times to switch to lock mode;
<4> Press four times to calibrate gimbal acceleration sensor (see at P16);
<5> Press five times to calibrate gyro sensor;
<6> Hold down the mode button to turn on/off the gimbal, convenient to calibration sensor and can save electricity.

4 Record button

To remote control camera to record.(see at P17)

16 Calibration of gimbal

If the following happens, please calibrate the gimbal.

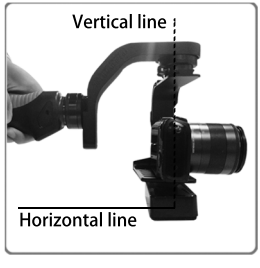
(1) There is angular deviation between Pitch axis and horizontal lines after gimbal powers on;
(2) There is angular deviation between Roll axis and horizontal lines;
(3) Yaw axis moves under lock mode.
Recommendation: Usually there is no need to calibrate the gimbal unless the problems above appear.

How to calibrate

<1> After set up the camera and balancing, please turn on the Nebula 4100;

The position of Power on/off and Mode button

<2> Please hold down the Mode button (as picture above shows) to turn off the gimbal and find a plane table (as the following picture shows) to put the cage of Nebula 4100 on it (It is recommended to put two bars of battery under the cage for a more accurate calibration), press Mode button for 4 times to calibrate the accelerator sensor of gimbal, after the alert tone please press Mode button for 5 times to calibrate the gyro sensor of gimbal, calibration complete after the alert tone. You may hold down the Mode button and turn on the gimbal.



17 Infrared function

Nebula 4100 is built-in infrared function to directly remote control camera for recording by pressing REC button on the handle of Nebula 4100.

How to use:

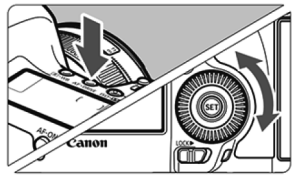
<1> Nebula 4100 can remote control camera to start/stop recording through infrared. Thus, please make sure that your camera is built-in infrared function.

<2> Then please open the infrared and make sure your camera is in the remote recording mode.

Different model of camera has its own setting, for example:

(1) Canon 5D3

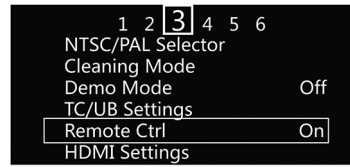
Turn on the camera and press “AF·DRIVE” button, turn the wheel to the “ten seconds self/remote” mode(as picture shows).



(2) Sonyα7

Turn on the camera and press “MENU” button to enter the menu. Select the third option “SETUP”, then turn on the “REMOTE CTRL”.

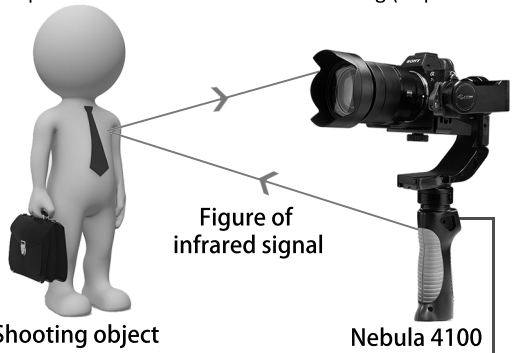
SETUP icon



P.S. To use different model of camera, please follow its user’s manual to set to the remote mode.

Infrared function

<3> Nebula 4100 infrared function works by transmitting infrared signals, accepted by camera-infrared receiver through reflection from the shooting object, to remote control the camera video recording to start and stop. After setting your camera and before remote, please ensure that Nebula 4100 is aiming at your shooting object which can reflect infrared (such as the wall, the floor, the furniture and etc). Then press Record button to start recording (as picture shows).

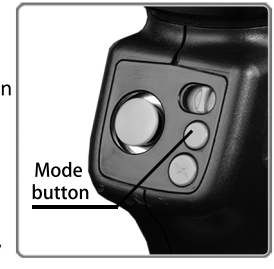


<4> Also, to stop recording, please find the object that can reflect infrared and make sure the Nebula 4100 is aiming at it (just like step 3), press the Record button to stop recording.

P.S. The distance of infrared reflectance is about 2-3 meters, as different model of camera has different infrared incepting and infrared receiving may be influenced by strong light outside. Nebula 4100 supports all of the mirroless camera and some of the DSLR of Canon and Sony (DSLR depends on camera lens, volume and weight).

19 Mode switching

The 3 axis of Nebula 4100 is Roll axis(controls Roll direction), Pitch axis (controls pitch direction) and Yaw axis(controls yaw direction).
There are 3 modes of Nebula 4100:
<1> Follow mode
<2> Semi-lock mode
<3> Lock mode
To switch mode by using the mode button (See at P15).
Nebula 4100 supports custom modes setting through the assistant App, for example, the Roll axis mode (release the lock of Roll axis under follow mode), the Invert mode (convenient for invert shooting) and etc. (see at P27, P36).



Mode switching

Follow mode

Follow mode is the default mode of Nebula 4100. Press mode button once to switch to follow mode, under this mode, the Pitch axis and Yaw axis will follow our moving and change direction (as picture shows).

21 Mode switching

Semi-lock mode

Press mode button twice to switch to semi-lock mode, under this mode, the Yaw axis will follow our moving and change direction (as picture shows).

22 Mode switching

Lock mode

Press mode button for 3 times to switch to lock mode, under this mode, both Yaw axis and Pitch axis is locked (as picture shows).

23 Joystick

By using the joystick of Nebula 4100 to control the direction of Pitch axis and Yaw axis for changing the angle of camera.

Push joystick left/right to control the direction of Yaw axis.

Push joystick up/down to control the direction of Pitch axis.

Soft of Nebula

<1> Scan the QR code to download the soft for computers.

http://chdntech.com/shop/chdnupload/nebula_gimbal_MAC_WIN_LINUX.zip

<2> Scan the QR code to download the apk for smartphones.

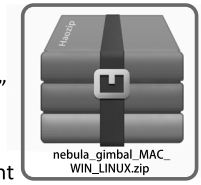
http://chdntech.com/shop/chdnupload/nebula_gimbal_android.apk

25 Nebula PC/MAC assistant tuning

The tuning setting of PC and MAC are the same, double click the "SimpleBGC_GUI.exe" file to install for PC and double click "SimpleBGC_GUI.jar" file to install for MAC.

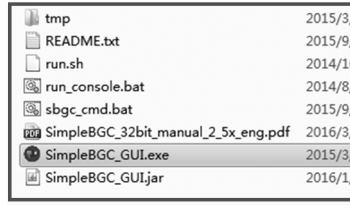
Install Nebula PC/MAC assistant tuning:

<1> Unzip the "nebula_gimbal_MAC_WIN_LINUX.zip" file into the computer (see picture 1);



picture 1

<2> Double click "SimpleBGC_GUI" file to run assistant (see picture 2).



picture 2

<3> Follow the steps to install Java program and finish the installation(see picture 3, 4) and you may use it as needed.

picture 3

picture 4

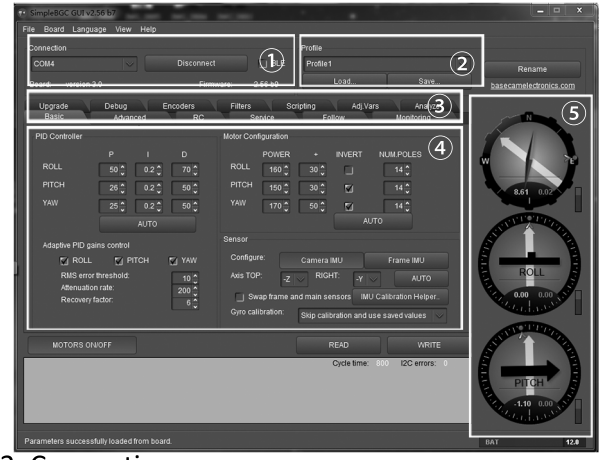
P.S. Assistant can be used directly if Java program has already installed the computer.

Nebula PC/MAC assistant tuning

Warning! Please strictly execute to the instruction, Filmpower assumes no liability for damages or failure incurred directly or indirectly from the wrong operation in other undistinguished cases.

1. User interface:

①Connection②Profile③Menu④Parameter settings
⑤Control panel (see picture 5)



picture 5

2. Connection:

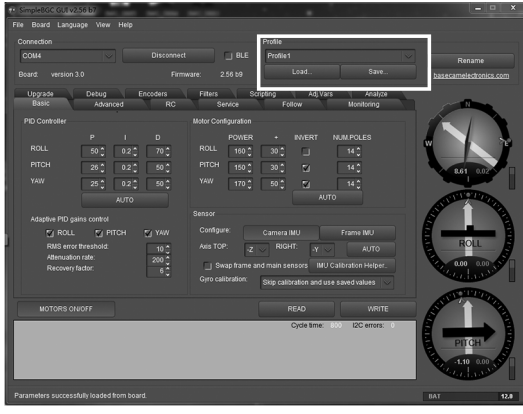
<1> Turn on the Nebula 4100;
<2> Turn on the Bluetooth of computer, searching for “Nebula” and enter the default pairing password: 2222.
<3> Open the assistant, select COM-port (see picture 6) and click “connect” button. After version number shown on board, connection complete.

picture 6

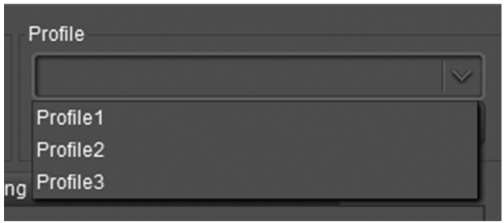
Nebula PC/MAC assistant tuning

3. Modes

There are 3 modes of Nebula 4100: Follow mode, Semi-lock mode and Lock mode (see at P19), while using the Nebula assistant APP, please select Profile number (see ② at previous page), Profile 1 corresponds to Follow mode; Profile 2 corresponds to Semi-lock mode; Profile 3 (see picture 7, 8)corresponds to Lock mode. Before setting please choose the mode needed and then the default mode will change when powers on.



picture 7

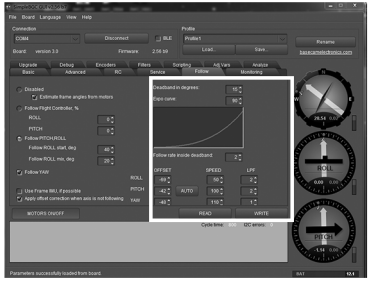


picture 8

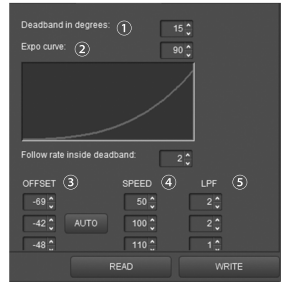
Nebula PC/MAC assistant tuning

4. FOLLOW settings

Follow – settings related to special mode of the camera xontrol when it follows the frame (see picture 9, 10), including:



picture 9



picture 10

① Deadband in degrees：you can set a range where the rotation of an outer frame does not affect the camera. It helps to skip small jerks when you operate gimbal by hands. (Please do not set the angle less than 5 degree which is not conducive to making sport video)

② Expo curve：when the expo curvature parameter is greater than zero, a small or medium declination of an outer frame from neutral allows makes only very fine control. But the strength of control exponentially grows when angles of declination become greater (up to ±45 degrees). This feature gives considerable freedom in camera operation, from fine and smooth control to very fast movements.

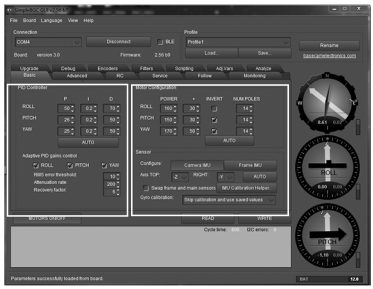
③ OFFSET：this is a setting that allows you to properly configure the exact initial position of the gimbal. For YAW axis it allows fine adjustment of the camera heading relative to a frame heading. For PITCH and ROLL axis there is an option to calibrate offset auto button. Don't forget to write setting when finished. If the camera after power on is not leveled, you need to adjust the offset setting.

④ Speed - adjust the speed of the camera rotation. Don't set big values that motors cannot handle (if motor does not produce enough torque to move the camera, it will skip steps and synchronization will be broken). In this case an acceleration limiter may help to have high speed but not to miss steps.

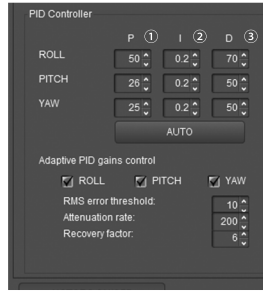
⑤ LPF - adjust the low-pass filter applied to the speed control in the “Follow” mode. If this value is set high, fast movements of the handle will be smoothed. But it requires careful operation and a little training to prevent unwanted oscillations of the camera.

Nebula PC/MAC assistant tuning

5. Basic setting



picture 11



picturea 12

Basic setting includes “PID” and “Motor settings” (see picture 11).
P,I,D – PID regulation parameters for all axes. Motor settings – controls the physical characteristics of all axes.

PID (see picture 12)

ROLL：Rool axis PITCH：Pitch axis YAW：Yaw axis

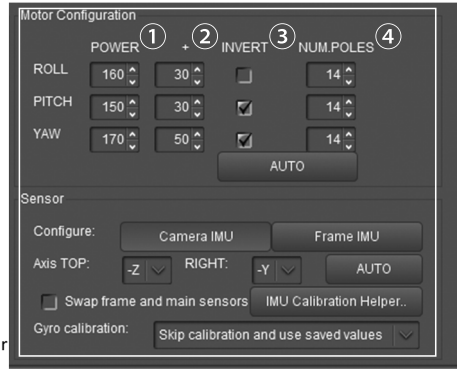
①P： describes the power of disturbance response. Higher values means a stronger response reaction to external disturbance. Raise this value until the stabilization quality of fast disturbances will be adequate. If the “P” value is too high, oscillations of the axis will start to be present. These oscillations will get worse if there are vibrations that reach the IMU sensor board. If oscillations occur, raise the “D” parameter by 1 or 2 units, and then try to raise the “P" value again. If the “P” value is less than 18, may cause jerking while shooting.

②D： The “D” value reduces the reaction speed. This value helps to remove low-frequency oscillations. A “D” value that is too high can cause high-frequency oscillations, particularly when the IMU sensor is exposed to vibrations. In special cases, it may be filtered out by digital filters (see below). If “D” value is lower than “P” value as 5, may cause jerking in angular movement.

③I： The “I” value changes the speed at which the gimbal moves to incoming RC commands and to move the gimbal back to neutral. Low values result in a slow and smooth reaction to RC commands and to getting back to neutral. Increase this value to speed up the movement. If “I” value is too high, may cause jerking of gimbal. (The default value is obtained after testing, no need to change)

Motor Configuration (see picture 13)

ROLL：Rool axis
PITCH：Pitch axis
YAW：Yaw axis



picture 13

①POWER: maximum voltage supplied to the motors (0 - 255, where 255 means full battery voltage).Choose this parameter according to your motor characteristics. Motors should not get too hot! Motor temperatures of over 80C will cause permanent damage to motor magnets.

A Power value that is too low will not provide enough force for the motor to move the gimbal and stabilize the camera adequately. A low power value will be most noticeable in windy conditions, when the gimbal is not well balanced, or if the gimbal suffers from mechanical friction. Slowly lower the Power parameter to find its optimal value. Find the lowest value that still provides good stabilization and adequate holding torque.

The default value of Nebula 4100 is a general value. To raise the value of PITCH and ROLL for 20 if the camera weights more than 800g; if the camera weights less than 300g, may turn down the value of PITCH and ROLL for 20.

②"+"：Additional power that will be add to the main power in case of big error (caused by missed steps). It helps to return camera to the normal position. If main power + additional power is greater than 255, the result is limited to 255.

③INVERT：reverse motor rotation direction. Recommendation: Please do not change this option, wrong option may cause motor failure.

④NUM.POLES：Number of motor poles. This value needs to be equal to the number of magnets in your motor's bell, no need to change the value.

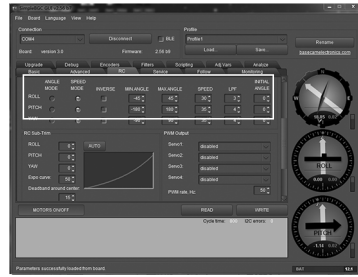
6. RC settings

Provides very flexible configuration of Nebula 4100's joystick by adjusting speed and LPF (see picture 14, 15). The higher the value is, the smoother the reaction is to stick commands.

ROLL：Rool axis

PITCH：Pitch axis

YAW：Yaw axis



picture 14

①RC settings: for adjusting joystick

②ANGLE MODE：RC stick will control the camera angle directly. The full RC range will cause a camera to go from min to max angles, as specified above. If RC stick doesn't move camera stands still. The speed of rotation depends on the "SPEED" setting and the acceleration limiter setting.

③SPEED MODE：RC stick will control the rotation speed. If stick is centered-camera stands still, if stick is deflected, camera starts to rotate, but does not exceed min-max range. Speed of rotation is proportional to stick angle and the SPEED setting. RC control inversion is allowed in both of control modes.

④SPEED: The higher the value is, the faster the rotation of motor. Recommendation: Please do not set the value too high.

⑤LPF：Signal low-pass filtering. The higher the value is, the smoother the reaction is to stick commands. This filter cuts fast stick movements but adds some delay as a consequence.

P.S. Joystick does not control the Roll axis of Nebula 4100, there is no need to adjust the value of ROLL.

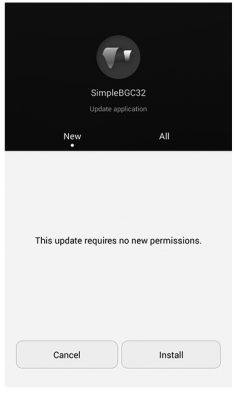
picture 15

32 Nebula Android assistant tuning

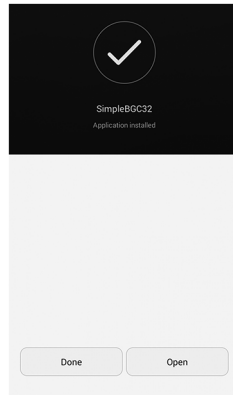
Installation:

<1> Download the Nebula Assistant App onto your phone;

<2> Follow instructions to install (see picture 16,17);

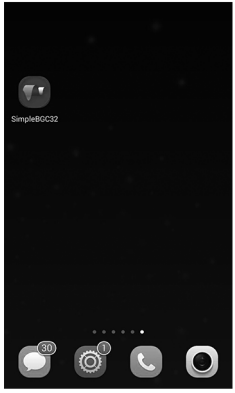


picture 16



picture 17

<3> Then you may open and use it (see picture 18).



picture 18

P.S. Only for Android.

33 Nebula Android assistant tuning

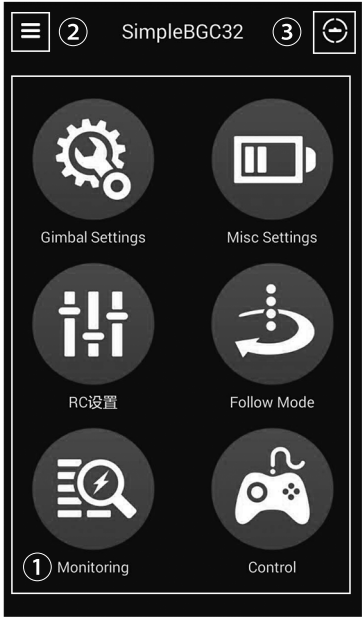
1. User interface (see picture 19, 20)

①Parameter adjustment

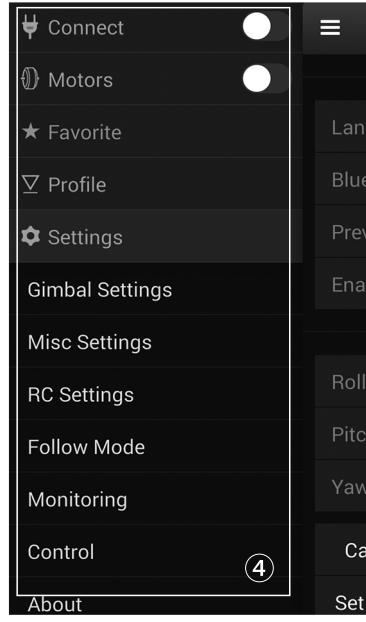
②Menu button

③Monitoring button

④Menu



picture 19



picture 20

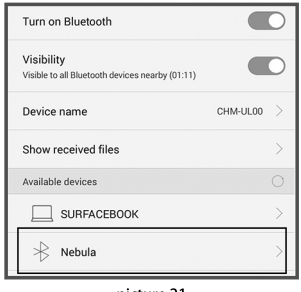
Nebula Android assistant tuning

Warning! Please strictly execute to the instruction, Filmpower assumes no liability for damages or failure incurred directly or indirectly from the wrong operation in other undistinguished cases.

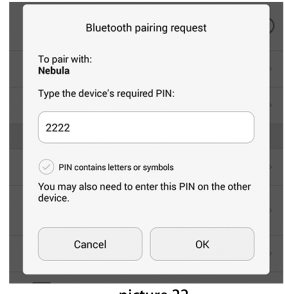
2. Connection:

<1> Turn on the Nebula 4100, open the Bluetooth of your phone and searching for pairing (see picture 21);

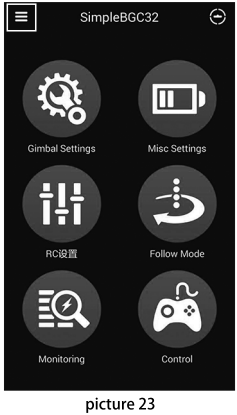
<2> Select “Nebula” and enter the default password “2222”(see picture 22);



picture 21

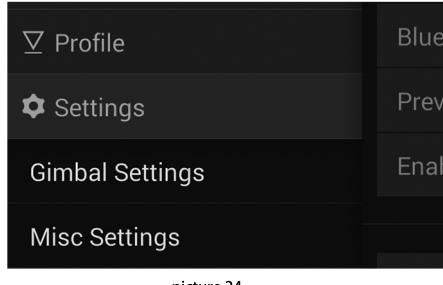


picture 22



picture 23

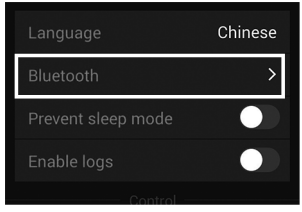
<3> After pairing complete, please open the assistant app and click the menu button to open the menu (see picture 23), then select “Settings” option to enter the Settings(see picture 24);



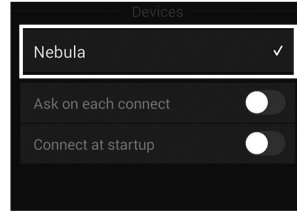
picture 24

Nebula Android assistant tuning

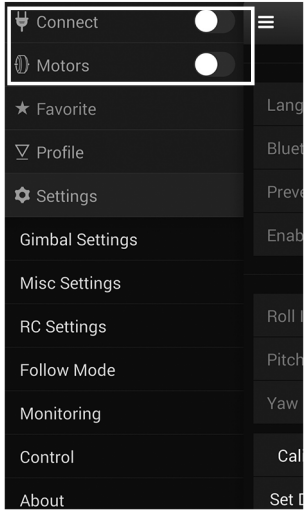
<4> After enter the Settings, please select “Bluetooth” option (see picture 25) and choose “Nebula” (see picture 26), then back to the Menu (see picture 27), turn on the “Connect” and it will be connected automatically (see picture 28), connection complete after the ID of gimbal shown on the screen (see picture 29).



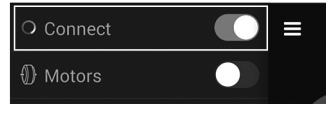
picture 25



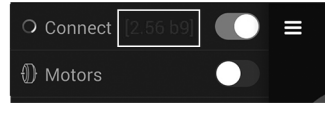
picture 26



picture 27



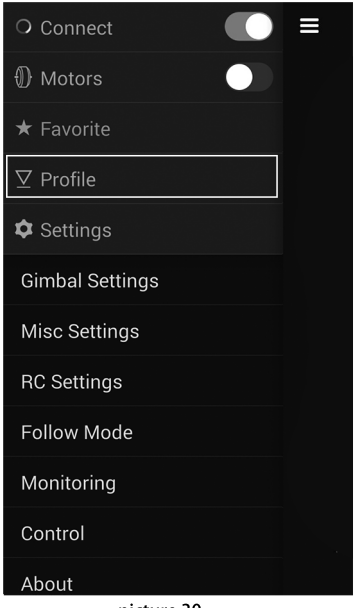
picture 28



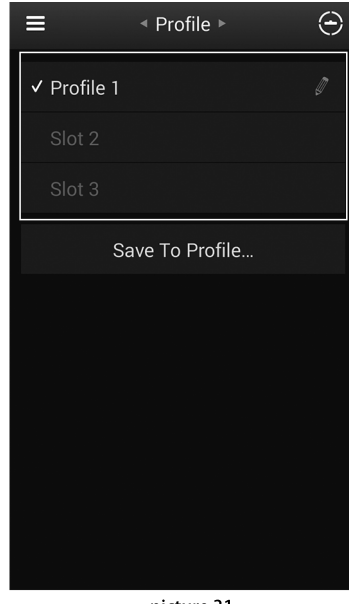
picture 29

3. Modes

There are 3 modes of Nebula 4100: Follow mode, Semi-lock mode and Lock mode (see at P19), while using the Nebula assistant APP, please select Profile number at menu (see picture 30), Profile 1 corresponds to Follow mode; Profile 2 corresponds to Semi-lock mode; Profile 3 corresponds to Lock mode. (see picture 31)Before setting please choose the mode needed and then the default mode will change when powers on.



picture 30



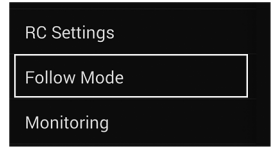
picture 31

Nebula Android assistant tuning

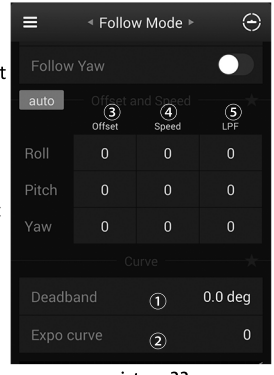
4. FOLLOW settings

<1> Select the “Follow Mode” option on the menu; (see picture 32)

<2> Follow – settings related to special mode of the camera xontrol when it follows the frame (see picture 33), including:



picture 32



picture 33

①Deadband in degrees：you can set a range where the rotation of an outer frame does not affect the camera. It helps to skip small jerks when you operate gimbal by hands. (Please do not set the angle less than 5 degree which is not conducive to making sport video)

②Expo curve：when the expo curvature parameter is greater than zero, a small or medium declination of an outer frame from neutral allows makes only very fine control. But the strength of control exponentially grows when angles of declination become greater (up to ±45 degrees). This feature gives considerable freedom in camera operation, from fine and smooth control to very fast movements

③OFFSET：this is a setting that allows you to properly configure the exact initial position of the gimbal. For YAW axis it allows fine adjustment of the camera heading relative to a frame heading. For PITCH and ROLL axis there is an option to calibrate offset auto button. Don't forget to write setting when finished. If the camera after power on is not leveled, you need to adjust the offset setting.

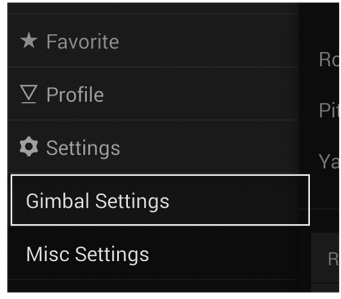
④Speed：adjust the speed of the camera rotation. Don't set big values that motors cannot handle (if motor does not produce enough torque to move the camera, it will skip steps and synchronization will be broken). In this case an acceleration limiter may help to have high speed but not to miss steps.

⑤LPF：adjust the low-pass filter applied to the speed control in the “Follow” mode. If this value is set high, fast movements of the handle will be smoothed. But it requires careful operation and a little training to prevent unwanted oscillations of the camera.

5. Gimbal Settings

<1> Select “Gimbal Settings” on the menu (see picture 34)

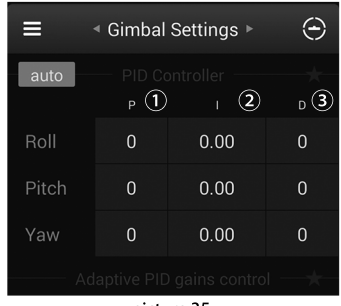
<2> Basic setting includes “PID” and “Motor settings” (see picture 35, 36). P,I,D – PID regulation parameters for all axes. Motor settings – controls the physical characteristics of all axes.



picture 34

PID (see picture 35)

ROLL：Rool axis
PITCH：Pitch axis
YAW：Yaw axis



picture 35

①P： describes the power of disturbance response. Higher values means a stronger response reaction to external disturbance. Raise this value until the stabilization quality of fast disturbances will be adequate. If the “P” value is too high, oscillations of the axis will start to be present. These oscillations will get worse if there are vibrations that reach the IMU sensor board. If oscillations occur, raise the “D” parameter by 1 or 2 units, and then try to raise the “P" value again. If the “P” value is less than 18, may cause jerking while shooting.

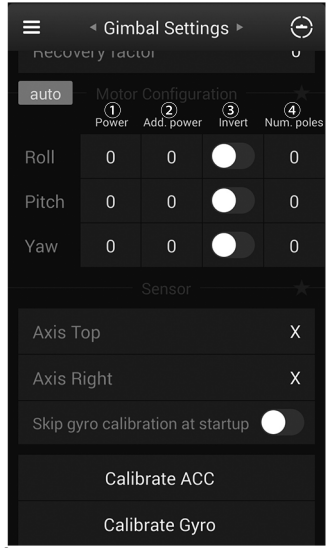
②D： The “D” value reduces the reaction speed. This value helps to remove low-frequency oscillations. A “D” value that is too high can cause high-frequency oscillations, particularly when the IMU sensor is exposed to vibrations. In special cases, it may be filtered out by digital filters (see below). If “D” value is lower than “P” value as 5, may cause jerking in angular movement.

③I： The “I” value changes the speed at which the gimbal moves to incoming RC commands and to move the gimbal back to neutral. Low values result in a slow and smooth reaction to RC commands and to getting back to neutral. Increase this value to speed up the movement. If “I” value is too high, may cause jerking of gimbal. (The default value is obtained after testing, no need to change)

Nebula Android assistant tuning

Motor Configuration (see picture 36)

ROLL：**Rool axis**
PITCH：**Pitch axis**
YAW：**Yaw axis**



picture 36

①POWER：maximum voltage supplied to the motors (0 - 255, where 255 means full battery voltage).Choose this parameter according to your motor characteristics.
Motors should not get too hot! Motor temperatures of over 80C will cause permanent damage to motor magnets. A Power value that is too low will not provide enough force for the motor to move the gimbal and stabilize the camera adequately. A low power value will be most noticeable in windy conditions, when the gimbal is not well balanced, or if the gimbal suffers from mechanical friction. Slowly lower the Power parameter to find its optimal value. Find the lowest value that still provides good stabilization and adequate holding torque. The default value of Nebula 4100 is a general value. To raise the value of PITCH and ROLL for 20 if the camera weights more than 800g; if the camera weights less than 300g, may turn down the value of PITCH and ROLL for 20.

②Add：Additional power that will be add to the main power in case of big error (caused by missed steps). It helps to return camera to the normal position. If main power + additional power is greater than 255, the result is limited to 255.

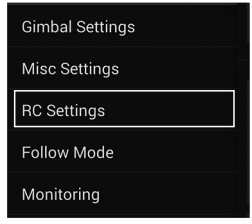
③INVERT：reverse motor rotation direction. Recommendation: Please do not change this option, wrong option may cause motor failure.

④NUM.POLES：Number of motor poles. This value needs to be equal to the number of magnets in your motor's bell, no need to change the value.

6. RC Settings

<1> Select the RC Settings on the menu (see picture 37)

<2> Provides very flexible configuration of Nebula 4100's joystick by adjusting speed and LPF (see picture 38). The higher the value is, the smoother the reaction is to stick commands.



picture 37

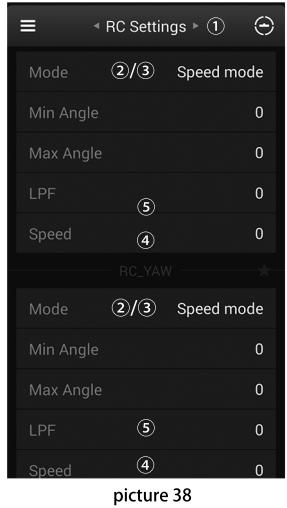
①RC settings: for adjusting joystick.

②ANGLE MODE：RC stick will control the camera angle directly. The full RC range will cause a camera to go from min to max angles, as specified above. If RC stick doesn't move camera stands still. The speed of rotation depends on the "SPEED" setting and the acceleration limiter setting.

③SPEED MODE：RC stick will control the rotation speed. If stick is centered- camera stands still, if stick is deflected, camera starts to rotate, but does not exceed min-max range. Speed of rotation is proportional to stick angle and the SPEED setting. RC control inversion is allowed in both of control modes.

④SPEED: The higher the value is, the faster the rotation of motor.Recommendation: Please do not set the value too high.

⑤LPF：Signal low-pass filtering. The higher the value is, the smoother the reaction is to stick commands. This filter cuts fast stick movements but adds some delay as a consequence.



picture 38

P.S. Joystick does not control the Roll axis of Nebula 4100, there is no need to adjust the value of ROLL.

Specification

General

Build-in functions	Three Operation Modes(Follow Mode/Semi-lock Mode/Lock Mode) Follow control、Orientation-locked control、Steady system、 Infrared system、Remote system、 Support flipping modes.	Bluetooth Module USB Connection 2.4GHz Receiver 32 BIT dual IMUs sensor ARM controller
Operating Temperature	-15° C ~50° C(-5° F~120° F)	
Weight	990g(including battery)	
Gimbal Dimensions	320*125*155mm	

Peripheral

Camera Tray	Sony A series; Panasonic GH series; Canon M series; BPPCC and etc
Connection	Bluetooth
Assistant Software Requirements	WINDOWS/MAC OS/LINUX/ANDROID
Cameras Built-in Infrared function	All of the mirrorless and DSLR of Sony and Canon

Electrical Characteristics

Charger Specifications	Charging 12.6V /1000mA
Operating Current	1100mA
Battery Capacity	12.8V/1800mAh (with charging protection circuit)
Motor	Import 45mm large load brushless motor

Working Performance

Load Weight Capacity (Reference Value)	1.2KG
Control Angle Accuracy	0.01°
Control Rotation Range	Yaw axis ±178° Pitch axis ±178° Roll axis 90°

Others

G.W.S	1.8KG
Storage Case Dimensions	380mm(W)x205mm(D)x125mm(H)

Troubleshooting

<1> Pitch axis vibrating; Yaw axis seems to be drifting; Yaw axis seems off center.

Solution: Recalibrate gimbal, see at P16, P22.

<2> Nebula 4100 cannot be connected through Bluetooth.

Solution: Check if your phone/computer is connected to Nebula, please make sure they are disconnected and try again.

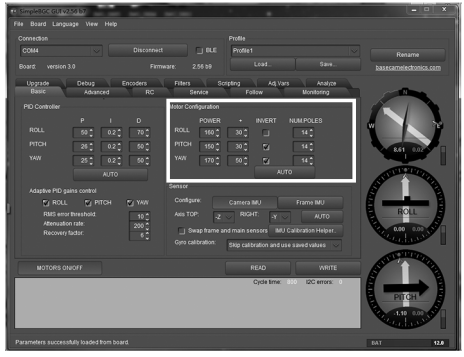
<3> Motor overheating.

Solution: It is normal for Gimbal to give out heat (<70℃) while using.

<4> Test the motor direction.

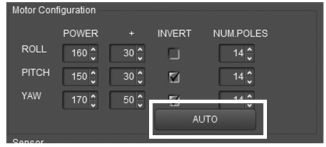
Solution:

(1)Open the assistant App and select “Basic” option (see at P29, P38);



picture 39

(2)Select the “Auto” button of “Motor settings” and gimbal will automatically find the direction of motor in about 2 minutes. Please do not move or touch the gimbal while finding. (see picture 39, 40)



picture 40

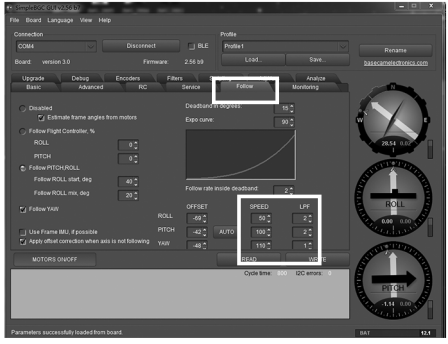
P.S. Normally there is no need to change these option.

Troubleshooting

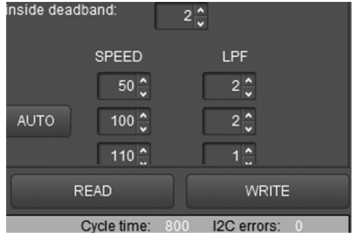
<5> About the speed of Yaw axis and Pitch axis (see at P28, P37)

Solution:

(1)Open the assistant App and select Follow option (see picture 41, 42);



picture 41



picture 42

(2)To adjust the value of Speed and LPF, the higher the value is, the smoother the reaction is to stick commands.

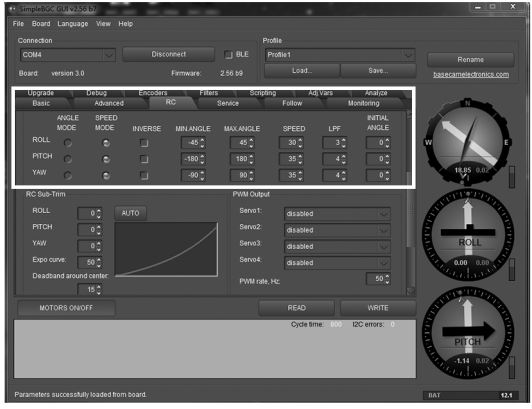
(3)Select Write to save.

Troubleshooting

<6>About Joystick (see at P31, P340)

Solution:

(1)Open the assistant App and select RC option (see picture 43, 44);



picture 43

picture 44

(2)To adjust the value of Speed and LPF, the higher the value is, the smoother the reaction is to stick commands;

(3)Select Write to save.

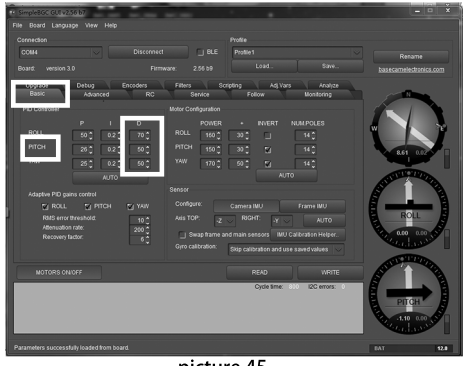
Troubleshooting

<7> About load weight capacity

Camera overload/underweight may causes gimbal buzzing after balancing andbooting.

Solution:

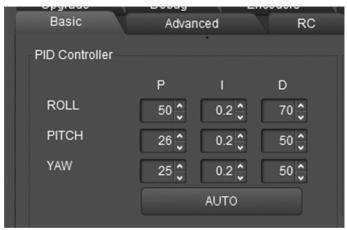
(1)Open the assistant App and select Basic option (see at P29, P38);



picture 45

(2)Per “5” as a unit, to adjust the “D” value of PITCH, the higher the value is, the higher load weight capacity;
(see picture 45, 46)

(3)Select Write to save.



picture 46

Maintenance

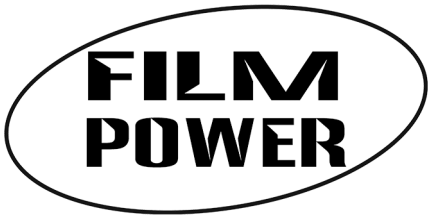
Please transport or move the Nebula 4100 in proper way with the storage case.The Nebula 4100 is a precise machine and it is not water resistant. Keep it awayfrom sand and dust during usage. After use, it is recommended to wipe the Nebula 4100 down with a soft dry cloth. Never spray any cleaning liquids onto the Nebula 4100.

<1> Scan the following QR code to visit Filmpower official YouTube.

https://www.youtube.com/channel/UCM9BI0BBu9mkDNQ3ZUNCmow

<2> Scan the following QR code to download Nebula 4100 user menu.

http://chdntech.com/shop/chdnupload/Nebula4100_Manual_EN.pdf



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