



## 10 LED Status Explanation

Flashing Mode	Light Meaning	Solution
Looping 1 short flash	Oversupply	Replace the battery (with a voltage lower than 81V).
Looping 2 short flashes	Undervoltage	Replace the battery (with a voltage higher than 25V).
Looping 3 short flashes	Overcurrent	<ul style="list-style-type: none"><li>• Re-power the propulsion system and check for any foreign objects in the motor.</li><li>• Check if there is no folding force between the blades and the propeller adapter.</li><li>• Contact the after-sales service.</li></ul>
Looping 1 long flash	Throttle lost	<ul style="list-style-type: none"><li>• Check if the signal cable is connected to the flight controller.</li><li>• Check if the transmitter and flight controller are powered on.</li><li>• Check the resistance of the black and white wires. Contact after-sales if short-circuited.</li></ul>
Looping (1 long flash + 1 short flash)	The throttle is not reset to zero.	If this issue occurs during motor rotation, check the aircraft battery and circuit.
Looping (1 long flash + 2 short flashes)	MOSFET overtemperature (above 110°C)	Wait for the propulsion system to cool down before re-powering.
Looping (1 long flash + 3 short flashes)	Capacitor overtemperature (above 100°C)	Wait for the propulsion system to cool down before re-powering.
Looping (1 long flash + 4 short flashes)	Triggered stall protection	<ul style="list-style-type: none"><li>• The motor can be restarted after the throttle is reset to zero.</li><li>• Check the motor for foreign objects and clear them before restarting.</li></ul>
Looping (2 long flashes)	High-side open circuit	<ul style="list-style-type: none"><li>• Check if the motor is in good condition.</li><li>• Contact the after-sales service.</li></ul>
Looping (2 long flashes + 1 short flash)	High-side short circuit	<ul style="list-style-type: none"><li>• Check if the motor is in good condition.</li><li>• Contact the after-sales service.</li></ul>
Looping (2 long flashes + 2 short flashes)	Motor phase loss / broken wire	<ul style="list-style-type: none"><li>• Re-power the propulsion system to restore it to normal conditions.</li><li>• Contact the after-sales service.</li></ul>
Looping (2 long flashes + 3 short flashes)	Phase A operational amplifier malfunction	<ul style="list-style-type: none"><li>• Re-power the propulsion system to restore it to normal conditions.</li><li>• Contact the after-sales service.</li></ul>
Looping (2 long flashes + 4 short flashes)	Phase B operational amplifier malfunction	<ul style="list-style-type: none"><li>• Re-power the propulsion system to restore it to normal conditions.</li><li>• Contact the after-sales service.</li></ul>
Looping (3 long flashes)	Phase C operational amplifier malfunction	<ul style="list-style-type: none"><li>• Re-power the propulsion system to restore it to normal conditions.</li><li>• Contact the after-sales service.</li></ul>

## 11 Daily Usage

### 1 Parameter Adjustment Using the Transmitter

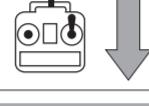
The rotation direction and LED color of the X13 G2 can be changed by moving the throttle stick on the transmitter. The parameter setting steps are as follows:

Using the throttle stick on transmitter to set parameters is divided into four steps:

① Enter the setting mode; ② Select the parameter setting item; ③ Select the parameter value; and ④ Exit the setting mode.

#### 1. Enter the Setting Mode:

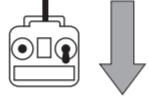
Turn on the transmitter and move the throttle stick to the top position. Connect the ESC to the battery and wait 2 seconds until the motor emits a "1113" beep. Then, wait for another 5 seconds, the motor will emit the "1113" beep again, indicating that it has entered the setting mode. Proceed to the second step, "Select the parameter setting item".



#### 2. Select the Parameter Setting Item:

After entering the setting mode, the motor will produce three types of beeps, which will loop in the following order. After a beep is heard, move the throttle stick to the bottom position within 3 seconds to enter the corresponding parameter setting item until the "3331" beep is heard. Proceed to the fourth step "Exit the setting mode".

1 "Beep"	Rotation Direction	(1 short beep)
2 "Beep-beep"	LED color	(2 short beeps)
3 "Beep-beep-beep"	Save and exit (Proceed to the fourth step).	(3 short beeps)



#### 3. Select the Parameter Value:

After entering the setting item, the motor will emit beeps in a loop. After a beep is heard, move the throttle stick to the top position to select the parameter value corresponding to that beep. A "1113" beep indicates the parameters are temporarily saved. At this point, return to the second step to select other parameter items or exit the setting mode.

Parameter Value (Beep Sounds)	1 "Beep"	2 "Beep-beep"	3 "Beep-beep-beep"	4 "Beep-beep-beep-beep"	5 "Beep—"
1 Rotation Direction	CCW	CW			
2 LED color	Red	* Green	White	Blue	Off

The default direction is CW or CCW marked on the propulsion system.

#### 4. Exit the Setting Mode:

In the second step, after the motor emits the three short "Beep-beep-beep" (i.e., the third setting item), move the throttle stick to the bottom position within 3 seconds to select "Save and Exit". Then, the motor will emit the "33112" beep, indicating all parameters are saved. To this end, the parameter adjustment process is finished and will proceed to the self-check step. Once the self-check is completed, the system is ready for use.

### 2 LED Color Adjustment

The LED is set to green in factory default. The X13 G2 has canceled physical LED switches, except using transmitter, the LED color can only be changed using the software or the flight controller via CAN.

The DataLink V2 needs to be purchased separately from Taobao, distributors, or HOBBYWING Sales; the CAN analyzer also needs to be purchased separately. For flight controller operation, contact the manufacturer to check if such changes are supported. Gray parameters are not available for adjusting during parameter setting.

Be cautious when changing advanced parameters, as the loop control parameters and motor control parameters involve the drive program control logic and affect actual flight performance. Ensure consistency in propulsion parameters of ESCs on the same aircraft. Incorrect parameters may cause your drones to crash.

This Manual only provides instructions for adjusting parameters of propulsion system via DataLink V2 and does not cover CAN analyzer or flight controller operations. For CAN analyzers, follow HWCAN/DroneCAN protocol (i.e., Cyphal (UAVCAN)). For flight controllers, contact the corresponding manufacturer.

#### DataLink V2 box Operation Method

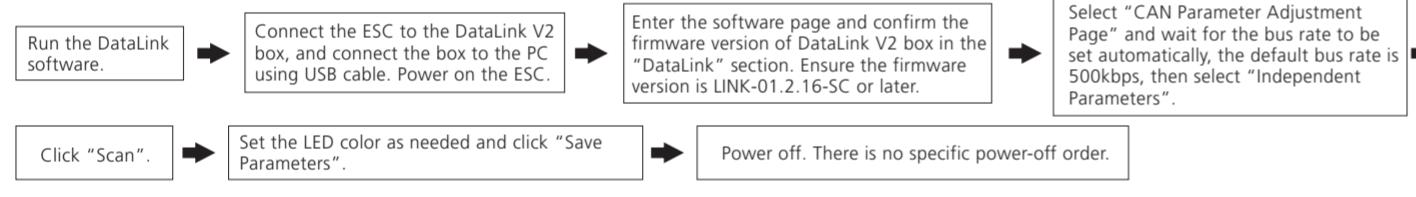
##### 1) Wiring

Use the USB cable to connect the DataLink V2 box to the PC.

ESC ----> DataLink V2 box connect as "Yellow, gray and green" cable ----> " - CH1 CL1". No external power is required for the XT30 interface on the DataLink V2 box.

The wiring diagram between the ESC and DataLink V2 box is shown below.

##### 2) Software Operation



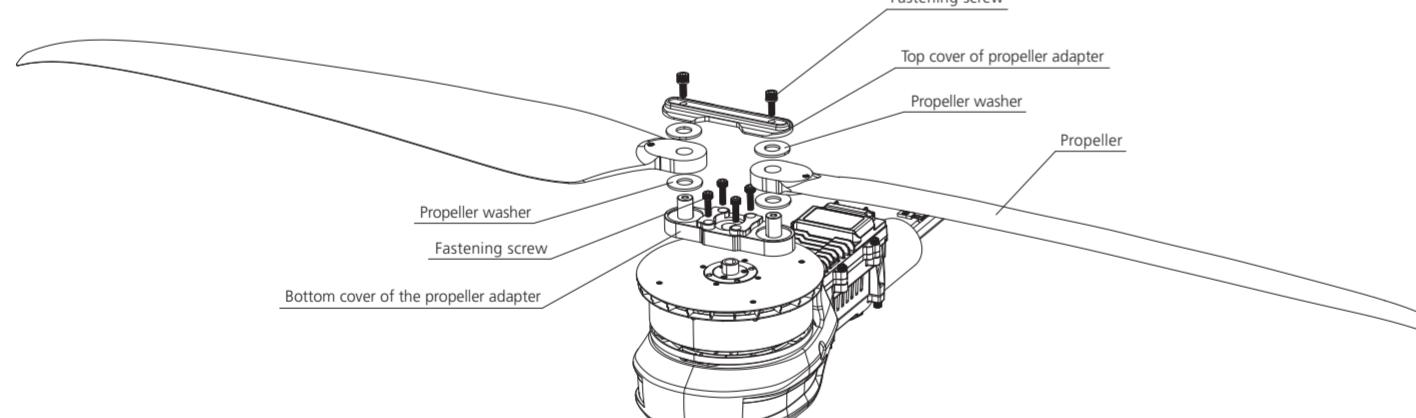
### 3 Replace the Propeller

• Use an Allen wrench to remove the two fastening screws of the blades, and replace them with new blades. If the propeller adapter also needs replacing, use tools to remove the fastening screws of the propeller adapter and replace the entire set of propeller adapter and blades.

• When installing the propeller adapter and blades, first install the bottom cover of the propeller adapter on the motor, then install the blades, propeller washer, and top cover, and install the fastening screws. Note: after installing and fastening the propeller screws, there should be a certain folding force between the blades and the propeller adapter. Use medium-strength screw adhesive to ensure that the fastening screws of the propellers and the motor are tightened.

• Make sure the unique codes of the two blade are consistent. If one blade is damaged, replace both.

**Note:** If screws haven't been loosened for a long time, anaerobic thread adhesive on the screws may have solidified. Loosening screws with force may break them down or cause them to slip. Heat the screws with a hot air gun or hair dryer. Heat the screws to around 70°C and then use an Allen wrench to remove them.



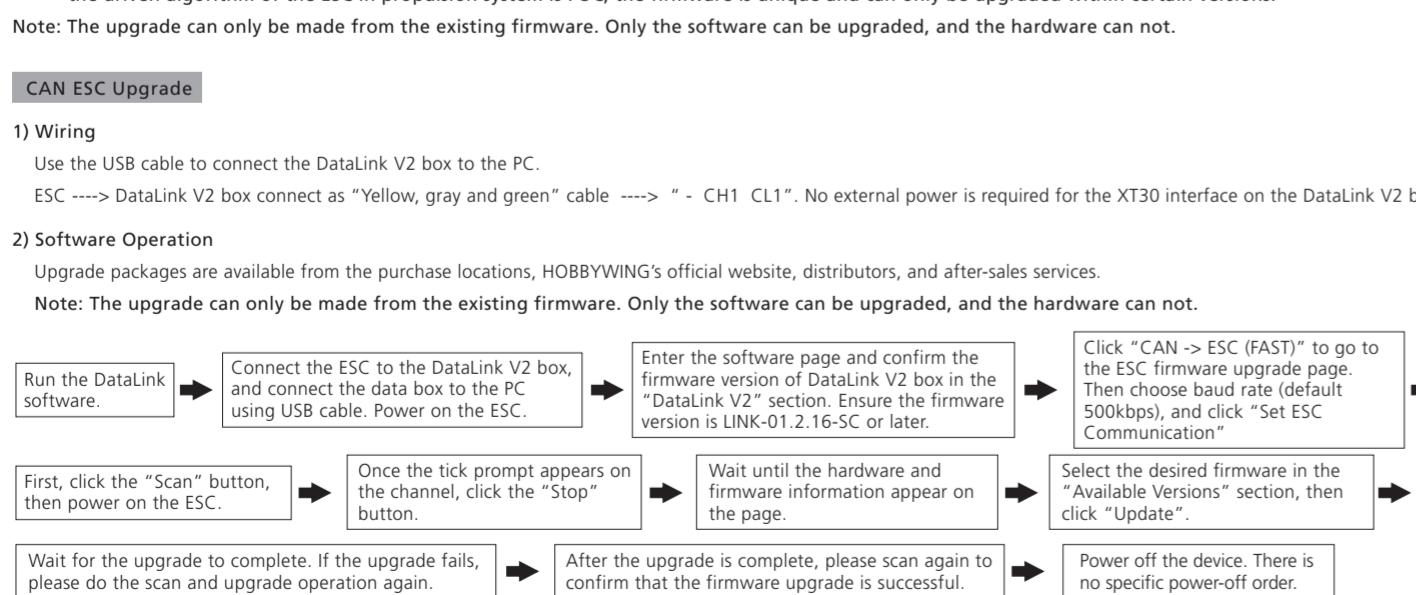
### 4 Firmware Upgrade

The software can be updated via online upgrade on PC or flight controller remote upgrade (OTA). Remote upgrade requires cooperation of the flight controller, this part is omitted. This function requires the DataLink V2, corresponding upgrade package (DataLink software with corresponding firmware), and a USB cable.

The firmware version of DataLink V2 required is LINK-01.2.16-SC or later; for DataLink software, contact HOBBYWING for access.

**Note:** Ensure the computer has the Visual C++ Runtime Library installed before using this function. Otherwise, this function is not available. A typical upgrade package only contains one firmware for one type of ESC. For other firmwares, obtain additional packages. For more details, refer to the DataLink V2 User Manual. Upgrade packages are available from the purchase locations, HOBBYWING's official website, distributors, and after-sales services. Since the driven algorithm of the ESC in propulsion system is FOC, the firmware is unique and can only be upgraded within certain versions.

**Note:** The upgrade can only be made from the existing firmware. Only the software can be upgraded, and the hardware can not.



### 5 Using the CAN Parameter Adjustment Feature

Unless otherwise required, the ESC Node ID during ex-factory is 1, the throttle ID is 1, and the bus rate is 500kbps.

The X13 G2 unlocks multiple features for parameter adjustments. Parameters can be adjusted based on actual needs. In addition, throttle range adjustment, changing to DroneCAN protocol, and LED color change are supported.

For detailed information, please refer to the relevant documents. To ensure proper usage, make sure that the firmware version of the DataLink V2 box is LINK-01.2.16-SC or later.

Be cautious when changing advanced parameters, as the loop control parameters and motor control parameters involve the drive program control logic and affect actual flight performance. Ensure consistency in propulsion parameters of ESCs on the same aircraft. Incorrect parameters may cause your drones to crash.

This feature can communicate with the flight controller and follow the HWCAN and DroneCAN protocols. For open-source flight controllers, follow the settings of both protocols.

For commercial flight controllers, please contact the flight controller manufacturer.

For Arduplot flight controller, refer to <https://ardupilot.org/copter/docs/common-hobbywing-dronecan-esc.html>.

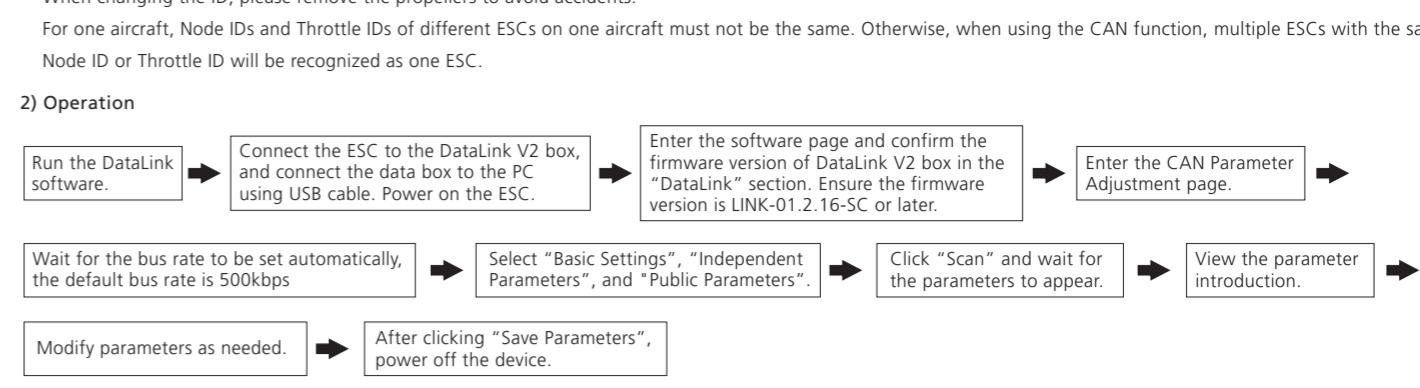
For all other method of this feature except via flight controller, an additional purchase of the DataLink V2 box is required.

Before using this feature, ensure that Microsoft Visual C++ 2013 is installed on the computer; otherwise, it will not work.

### 1) Wiring

ESC ----> DataLink V2 box connect as "Yellow, gray and green" cable ----> " - CH1 CL1". No external power is required for the XT30 interface on the DataLink V2 box. Connect the DataLink V2 box to the PC via USB cable.

### 2) Operation



### 6 Fault Storage

The Fault Storage function can record overvoltage, overcurrent, throttle lost, MOS overtemperature, capacitor overtemperature, motor stall, open-circuit faults, short-circuit faults, disconnection faults, etc. In case of any such faults, their accumulated fault count will increase by 1. This feature will also record the corresponding runtime and power-on count when the last fault occurred.

The total power-on count is recorded. Each time the ESC is re-powered, the count value will increase by 1. The cumulative running time is recorded as well, which is the total time the ESC has been running. The manufacturers who produce complete drones can set the maintenance standards based on running times and power-on counts.

This function requires a DataLink V2 box, DataLink software, serial port assistant, and a USB cable.

**Note:** The DataLink software is available from HOBBYWING's official website, distributors, sales, and after-sales services.

Version requirement of DataLink V2 box: LINK-01.2.16-C or later; serial port assistant requirements: USB to TTL protocol; DataLink software should be the fault storage version, which can be obtained from the official website, WeChat official account, or after-sales service.

The DataLink V2 box has three power supply methods (+5V, USB data cable, serial port assistant, or external power supply cable. Either one can be selected without the need for repeated powered.

**Note:** For details, please refer to the DataLink V2 box User Manual.

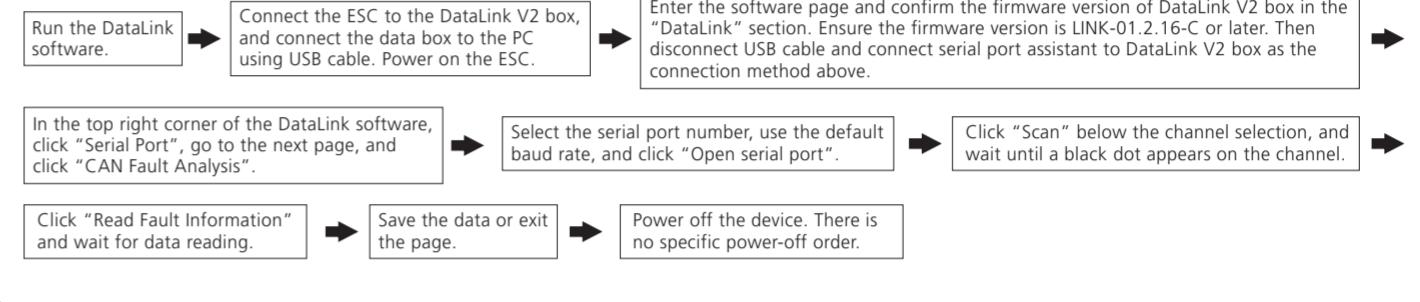
### 1) Wiring

Serial port assistant ----> DataLink V2 box "GND 5V TX RX" ----> " - RX2 TX2" (please follow the connection method);

ESC ----> DataLink V2 box connect as "Yellow, gray and green" cable ----> " - CH1 CL1". No external power is required for the XT30 interface on the DataLink V2 box. Multiple ESCs can be connected in parallel.

**Note:** When multiple ESCs are used in parallel, Node IDs and Throttle IDs of different ESCs used in parallel must not be the same. Otherwise, only one ESC can be recognized.

### 2) Software Operation



### 7 Real-time Data Reading

Power on the propulsion system to transmit real-time data. The data format follows the HWCAN (default) and DroneCAN protocols. The real-time data can be viewed through the flight controller, DataLink V2 box, and CAN analyzer. For the flight controller and CAN analyzer, follow the HWCAN and DroneCAN protocols. The usage method is omitted in this Manual.

This Manual only briefly introduces how to view the real-time data through DataLink V2 box.

For Arduplot flight controller, refer to <https://ardupilot.org/copter/docs/common-hobbywing-dronecan-esc.html>

For the closed-source flight controllers such as VK, Beyer and Jyi, please contact the manufacturer of flight controller for usage instructions.

The ESC will output real-time data for motor rotation speed, throttle, current, voltage, ESC temperature, MOSFET temperature, capacitor temperature, motor temperature, and ESC status. To measure the motor temperature, an additional temperature sensor must be installed in the motor, which is not provided with the standard motor. For the standard version, this value has no practical significance.

For real-time data reading using DataLink V2 data box, a DataLink V2 box, DataLink software, serial port assistant, and a USB cable are required.

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