EWM700 Series

ExpressLRS 915MHz/2.4GHz ELRS Receiver Module



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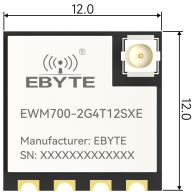
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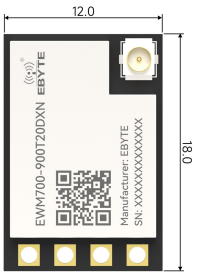
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1 Introduction

1.1 Brief Introduction







The EWM700 series is a next-generation wireless receiver module developed based on the ExpressLRS open-source project. It features extended communication range, low latency, high refresh rates, robust anti-interference capabilities, and flexible configuration. The series utilizes the ESP8285+SX1276/SX1281 chipset architecture, operating in the FCC 915MHz and 2.4GHz frequency bands. It supports TTL-level input and output with a maximum output power of 100mW, making it ideal for unmanned aerial vehicles and remote control applications.

1.2 Features

- Supports the selection of FCC 915MHz and 2.4GHz ISM frequency bands;
- Equipped with a shielding cover to enhance anti-interference performance;
- Ultra-lightweight design, weighing as little as 0.7g, (ensuring compatibility with various devices);
- Supports firmware updates via serial port or Wi-Fi, featuring an onboard PCB Wi-Fi antenna for streamlined operation;
- Designed and developed based on the ExpressLRS open-source project (Open-source repository: https://github.com/ExpressLRS);

1.3 Application

- Fixed-wing UAVs;
- Agricultural UAVs;
- Multi-rotor UAV applications;
- Model cars, boats, and aircraft;
- General remote control systems;
- First-Person View drone applications;

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2 Specification and parameter

2.1 Product Selection Comparison

Model	Chipset	Frequency	Transmit Power① (dBm)	Dimensions② (mm)	Antenna Interface③
EWM700-900T20DXN	ESP8285+SX1276	FCC 915MHz	20（100mW）	12.0*18.0*3.5	IPEX 1
EWM700-2G4T12SXE	ESP8285+SX1281	ISM 2.4GHz	12（15.8mW）	12.0*12.0*3.3	IPEX 1
EWM700-2G4T20DXN	ESP8285+SX1281	ISM 2.4GHz	20（100mW）	12.0*18.0*3.5	IPEX 1

Notes:

Transmit power①: Margin of error ±1dBm.

Dimensions②: Margin of error ±0.2mm.

Antenna ③: Equivalent impedance of about 50Ω

2.2 Basic parameter

2.2.1 EWM700-900T20DXN Parameters

(Conditions: Tc=25°C, VCC=5.0V, 915MHz)

Parameter	Description
Model No.	EWM700-900T20DXN
Connection protocol	CRSF
Frequency	FCC 915MHz
Chipset	ESP8285+SX1276
Interface Type	2.54mm Pin Header
Communication Interface	UART
Telemetry Power	100mW
Antenna Interface	IPEX1
Weight	1.1g±0.1g
Dimensions	18.0*12.0*3.5mm(L* W* H)
Default Firmware	ExpressLRS 3.4.2 Generic ESP8285 SX127x 900MHz RX
Operating Environment	
Operating Temperature	-40°C to +85°C (Industrial Grade)

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Operating Humidity	10～90%RH
Storage Temperature	-40℃～+125℃
Electrical Parameters	
Supply Voltage	3.3V to 5.5V (5.0V recommended; exceeding 5.5V risks permanent module damage)
Communication Level	TTL
Transmit Current	≈141mA (Wi-Fi disabled, instantaneous power consumption)
Receive Current	≈33mA (Wi-Fi disabled)

2.2.2 EWM700-2G4T12SXE Parameters

(Conditions: Tc=25°C, VCC=5.0V,2.4GHz)

Parameter	Description
Model No.	EWM700-2G4T12SXE
Connection protocol	CRSF
Frequency	ISM 2.4GHz
Chipset	ESP8285+SX1281
Interface Type	2.54mm Castellated Hole
Communication Interface	UART
Telemetry Power	15.8mW
Antenna Interface	IPEX1
Weight	0.7g±0.1g
Dimensions	12.0*12.0*3.3mm(L* W* H)
Default Firmware	ExpressLRS 3.4.2 Generic ESP8285 2.4Ghz RX
Operating Environment	
Operating Temperature	-40°C to +85°C (Industrial Grade)
Operating Humidity	10～90%RH
Storage Temperature	-40℃～+125℃
Electrical Parameters	
Supply Voltage	3.3V to 5.5V (5.0V recommended; exceeding 5.5V risks permanent module damage)
Communication Level	TTL
Transmit Current	≈60mA (Wi-Fi disabled, instantaneous power consumption)
Receive Current	≈33mA (Wi-Fi disabled)

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2.2.3 EWM700-2G4T20DXN Parameters

(Conditions: Tc=25°C, VCC=5.0V,2.4GHz)

Parameter	Description
Model No.	EWM700-2G4T20DXN
Connection protocol	CRSF
Frequency	ISM 2.4GHz
Chipset	ESP8285+SX1281
Interface Type	2.54mm Pin Header
Communication Interface	UART
Telemetry Power	100mW
Antenna Interface	IPEX1
Weight	1.0g±0.1g
Dimensions	18.0*12.0*3.5mm(L* W* H)
Default Firmware	ExpressLRS 3.4.2 Generic ESP8285 PA 2.4Ghz RX
Operating Environment	
Operating Temperature	-40°C to +85°C (Industrial Grade)
Operating Humidity	10～90%RH
Storage Temperature	-40℃～+125℃
Electrical Parameters	
Supply Voltage	3.3V to 5.5V (5.0V recommended; exceeding 5.5V risks permanent module damage)
Communication Level	TTL
Transmit Current	≈165mA (Wi-Fi disabled, instantaneous power consumption)
Receive Current	≈37mA (Wi-Fi disabled)

General Parameter Notes:

1.The major firmware version of the remote controller/transmitter module must match the receiver's firmware (i.e., version 3.0 is required); otherwise, binding will fail.

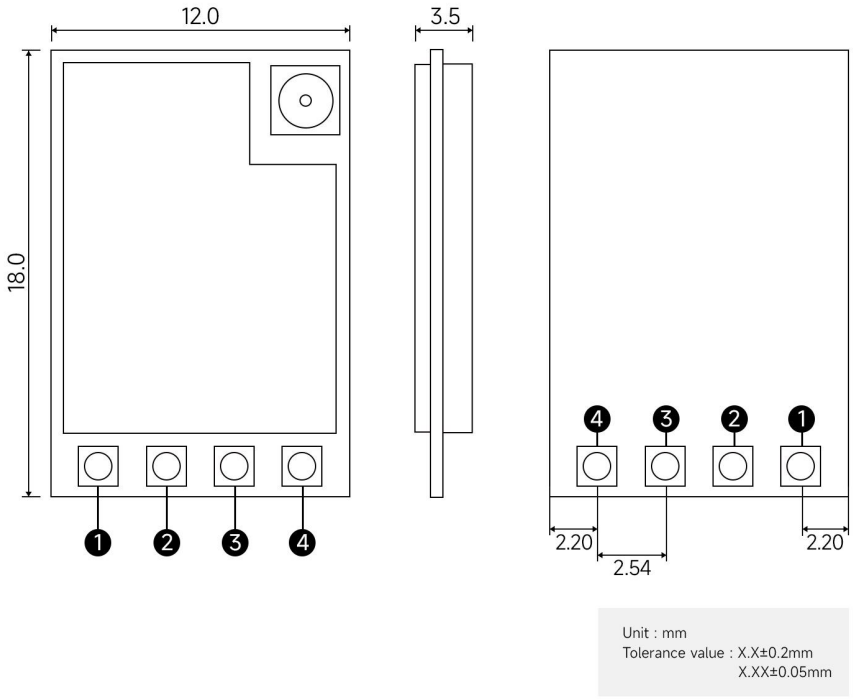
2.ELRS receivers are shipped without a default binding phrase.

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3 Size and pin definition

3.1 EWM700-900T20DXN Size and pin definition

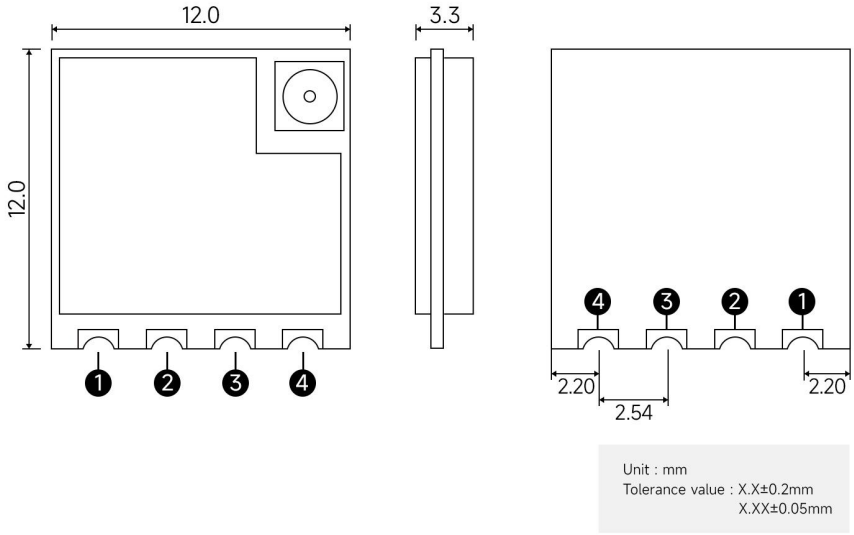


Pin No.	Name	Direction	Description
1	TX	Output	Serial data input
2	RX	Input	Serial data output
3	VCC	Input	Power Interface, DC 3.3 to 5.5 V
4	GND	-	Ground

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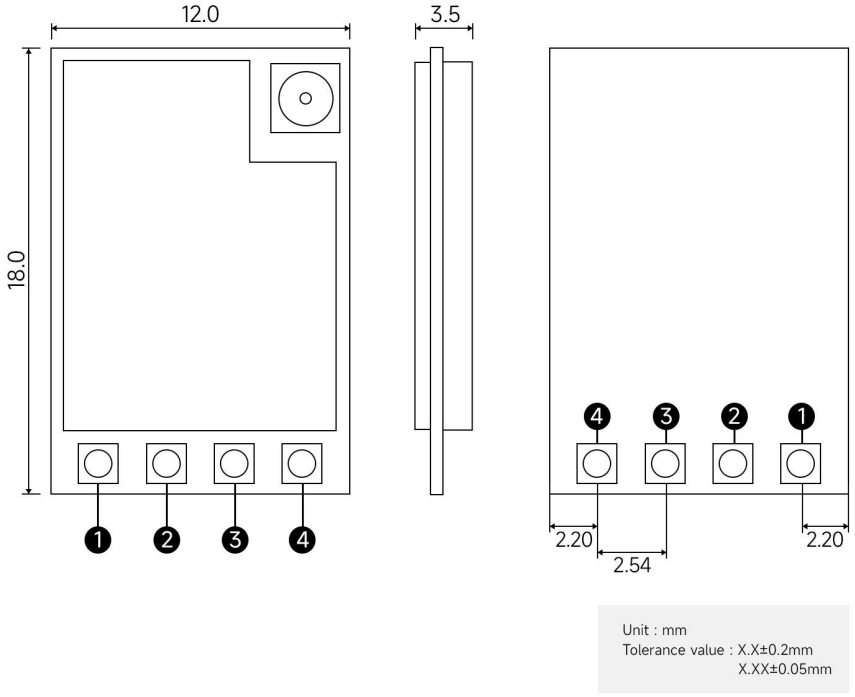
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3.2 EWM700-2G4T12SXE Size and pin definition



Pin No.	Name	Direction	Description
1	TX	Output	Serial data input
2	RX	Input	Serial data output
3	VCC	Input	Power Interface, DC 3.3 to 5.5 V
4	GND	-	Ground

3.3 EWM700-2G4T20DXN Size and pin definition

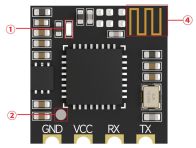


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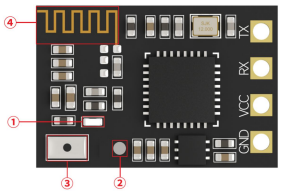
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Pin No.	Name	Direction	Description
1	TX	Output	Serial data input
2	RX	Input	Serial data output
3	VCC	Input	Power Interface, DC 3.3 to 5.5 V
4	GND	-	Ground

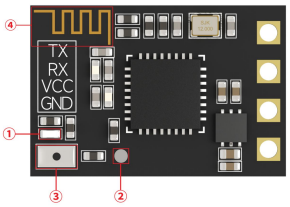
3.4 EWM700 Indicator Lights and Buttons



EWM700-2G4T12SXE



EWM700-2G4T20DXN



EWM700-900T20DXN

Item No.	Name	Function
1	Status Indicator	Solid: Successfully bound or connection established. Double Flash: Binding (pairing) mode. Slow Flash: Connection lost, no transmitter signal, awaiting connection. Fast Flash: Wi-Fi enabled; firmware updates can be performed via Wi-Fi.
2	BOOT Contact	Short-circuiting the BOOT contact and GND functions identically to pressing the BOOT button.
3	BOOT Button	Press and hold the BOOT button while powering on; the indicator will remain solid, initiating serial firmware upgrade mode. After power-on, press and hold the BOOT button; once the indicator flashes rapidly, release the button to enter Wi-Fi upgrade mode.
4	PCB Antenna	Dedicated Wi-Fi Antenna.

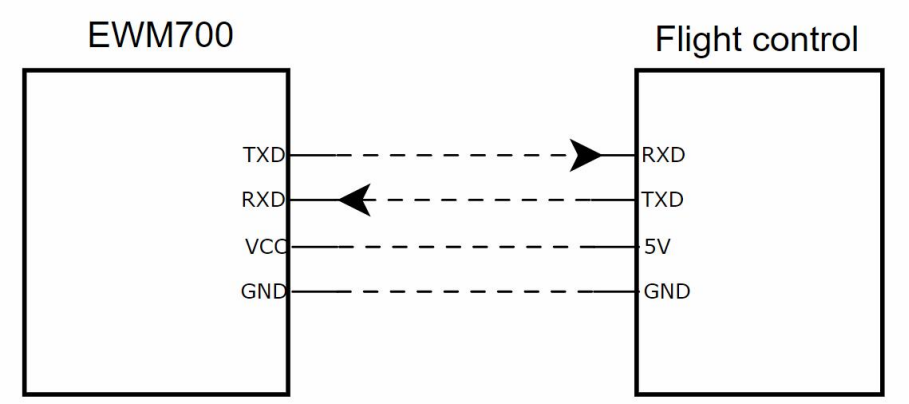
Notes:

- If left unconnected for 60 seconds after power-on, or if the button is long-pressed (for the EWM700-2G4T12SXE, short the BOOT contact and GND), Wi-Fi will activate, and the LED will flash rapidly.
- The default password for Wi-Fi firmware upgrades is expresslrs.
- Power cycling the EWM700 rapidly three times initiates binding (pairing) mode, indicated by a double-flashing LED.
- Upon successful binding between the transmitter and receiver, the LED remains solid.
- If a bound receiver loses the transmitter signal, the solid LED will transition to a slow flash.

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4 Recommended Wiring Diagram



Item No.	Precaution
1	Ensure the power supply strictly remains within the 3.3 to 5.5V range.
2	Ensure the Flight Controller (FC) TX connects to the Receiver RX, and the FC RX connects to the Receiver TX.

5 Hardware Design

- The communication distance will be affected when obstacle exists;It is highly recommended to power the module using a DC stabilized power supply with minimal ripple; the module must be reliably grounded.
- Ensure the correct connection of the power supply's positive and negative terminals; reverse polarity may induce permanent damage to the module.
- Verify that the power supply voltage is within the recommended range; exceeding the maximum limit will result in permanent damage.
- Ensure power supply stability; the voltage must not fluctuate significantly or frequently.
- When designing the power circuit, it is recommended to retain a margin greater than 30% to facilitate long-term, stable operation.
- Keep the module away from components generating substantial electromagnetic interference, such as power supplies, transformers, and high-frequency signal routing.
- High-frequency digital/analog routing and power routing must bypass the area directly beneath the module. If routing beneath the module is unavoidable (assuming the module is soldered on the Top Layer), lay copper ground on the Top Layer directly under the module (fully copper-poured and strictly grounded). It must be kept close to the module's digital section, with the actual routing placed on the Bottom Layer.
- Assuming the module is placed on the Top Layer, arbitrary routing on the Bottom Layer or other layers is incorrect and will degrade the module's spurious emissions and receiving sensitivity.
- Devices generating significant electromagnetic interference nearby will drastically degrade module performance. Maintain an appropriate distance based on interference strength, and implement isolation and shielding if feasible.

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- Nearby routing with high electromagnetic interference (high-frequency digital/analog, power lines) will also significantly impair performance. Maintain an appropriate distance based on interference strength, and implement isolation and shielding if feasible.
- The antenna installation structure fundamentally impacts performance. Ensure the antenna is exposed and preferably oriented vertically upwards.
- If the module is housed within a casing, utilize a high-quality antenna extension cable to route the antenna outside the enclosure.
- Never install the antenna inside a metal enclosure, as this will result in severe transmission range attenuation.

6 FAQ

6.1 Suboptimal Transmission Distance

- Communication distance attenuates when Line-of-Sight obstacles are present.
- Variables such as temperature, humidity, and co-channel interference increase the communication packet loss rate.
- The ground absorbs and reflects radio waves; therefore, testing close to the ground yields suboptimal results.
- Seawater possesses a high capacity for absorbing radio waves; testing near coastal environments yields suboptimal results.
- Signal attenuation is severe if metallic objects are near the antenna or if the module is placed inside a metal enclosure.
- Incorrect power register configurations or excessively high over-the-air data rates decrease the effective range (the higher the over-the-air data rate, the shorter the distance).
- If the power supply voltage at room temperature drops below the recommended value, the transmission power will decline correspondingly.
- Poor impedance matching between the antenna and module, or inherent defects in antenna quality.

6.2 Module Susceptibility to Damage

- Verify the power supply remains within the recommended voltage range; exceeding the maximum limit will inflict permanent damage.
- Ensure power supply stability; voltage must not fluctuate significantly or frequently.
- Implement rigorous anti-static (ESD) precautions during installation and use, as high-frequency components are highly sensitive to static electricity.
- Avoid excessively high humidity during installation and use, as specific components are moisture-sensitive.
- Unless specifically necessitated, avoid operating the module in extreme high or low temperatures.

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6.3 High Bit Error Rate

- Co-channel signal interference may be present nearby. Move away from the interference source, or modify the frequency/channel to evade it.
- Unstable power supplies can induce data corruption. Ensure the absolute reliability of the power source.
- Poor quality or excessively long extension cables and feeder lines will elevate the bit error rate.

7 Soldering Guidelines

7.1 Reflow Soldering Parameters

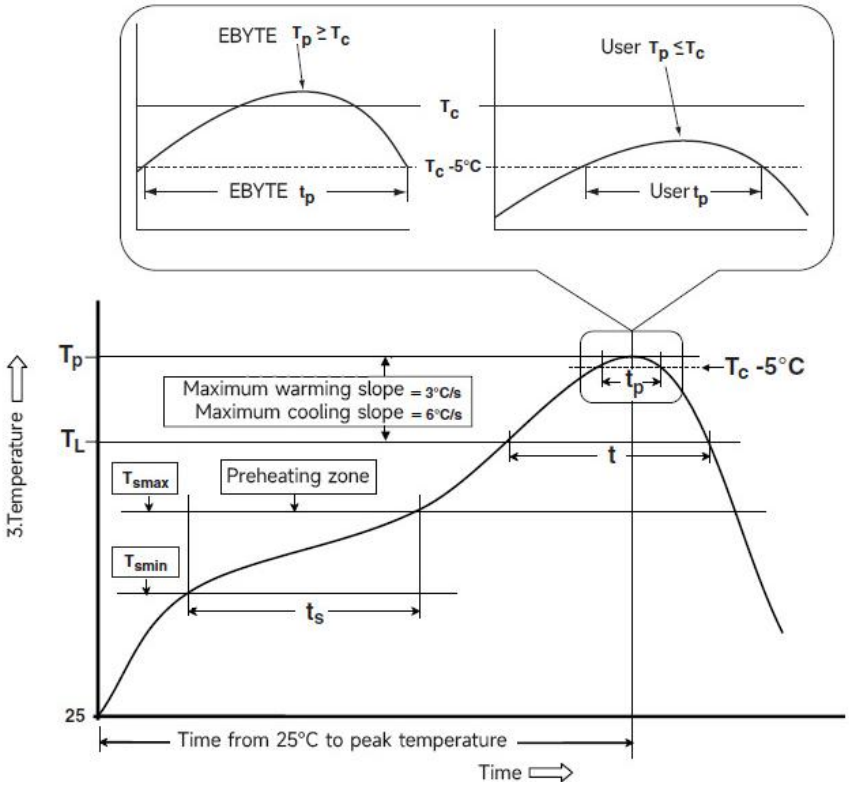
Reflow Profile Feature		Sn-Pb Assembly	Pb-Free Assembly
Preheat/Soak	Minimum Temp （Tsmin）	100℃	150℃
	Maximum Temp（Tsmax）	150℃	200℃
	Time (Tsmin to Tsmax)	60s–120s	60s–120s
Ramp-up Rate (TL to Tp)		3°C/second max	3°C/second max
Liquidus Temperature (TL)		183℃	217℃
Time Maintained Above TL		60s~90s	60s~90s
Peak Package Body Temp (Tp)		Must not exceed MSL label limits.	Must not exceed MSL label limits.
Time within 5°C of Classification Temp (Tc)		20 seconds	30 seconds
Ramp-down Rate (Tp to TL)		6°C/second max	6°C/second max
Time 25°C to Peak Temperature		6 minutes max	8 minutes max

Note: The Peak Temperature tolerance in the profile is defined as the user's upper limit.

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7.2 Reflow soldering curve



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Legal Disclaimer

I. Product Nature and Target Audience

- This ELRS receiver module is professional-grade electronic equipment, not a toy, and is strictly unsuitable for minors under 18 years of age. It is developed specifically for industrial applications such as agricultural protection, surveying, and aerial photography, and must be operated by users possessing requisite aeromodelling knowledge and skills.
- Prior to use, strictly read this disclaimer and the entire manual. Initiating use constitutes full understanding, acknowledgment, and acceptance of all terms herein, as well as the operational and safety guidelines stipulated within the manual.

II. Exemption from Liability

The company assumes no liability for direct, indirect, or incidental damages (including equipment damage, third-party injury, and property loss) under the following conditions:

1. Improper Operation

- Failure to install, debug, operate, or maintain the product in strict accordance with the manual's guidelines.
- Errors in subjective judgment or manual control, or operating under the influence of alcohol, drugs, or psychological/physical impairment.
- Proceeding with flight operations while consciously aware that the product is in an abnormal state (e.g., damaged components, signal anomalies).
- Failure to remove propellers when utilizing configuration software, or failing to verify wiring and power integrity prior to flight.

2. Environmental and Regulatory Violations

- Flying in zones with severe magnetic or radio interference, or in government-restricted no-fly zones (e.g., airports, military zones, densely populated areas).
- Operating in severe meteorological conditions (e.g., heavy rain, lightning, strong winds, smog), culminating in equipment failure or accidents.
- Incidents induced by obstructed Line-of-Sight, preventing accurate assessment of aircraft attitude and the surrounding environment.

3. Modifications and Third-Party Accessories

- Unauthorized disassembly or modification of the flight control module and accessories, or the integration of unapproved third-party components causing abnormal performance or physical damage.
- Quality or compatibility issues stemming from user-supplied third-party products (e.g., frames, batteries, motors) triggering module failure or flight accidents.
- Insufficient structural integrity or pre-existing damage to the aircraft itself leading to mid-flight failure or subsequent accidents.

Revision history

Version	Date	Description	Issued by
1.0	2026/5/29	Initial version	Bin

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