PRODUCT INSTRUCTIONS

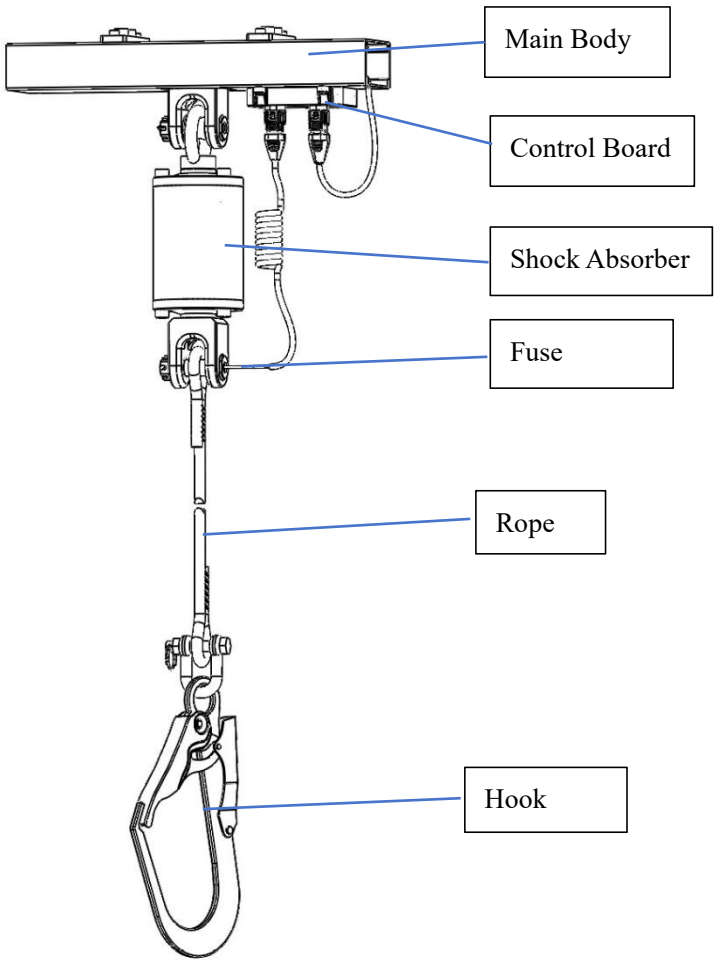
ELM50/100 Smart Lifting Module

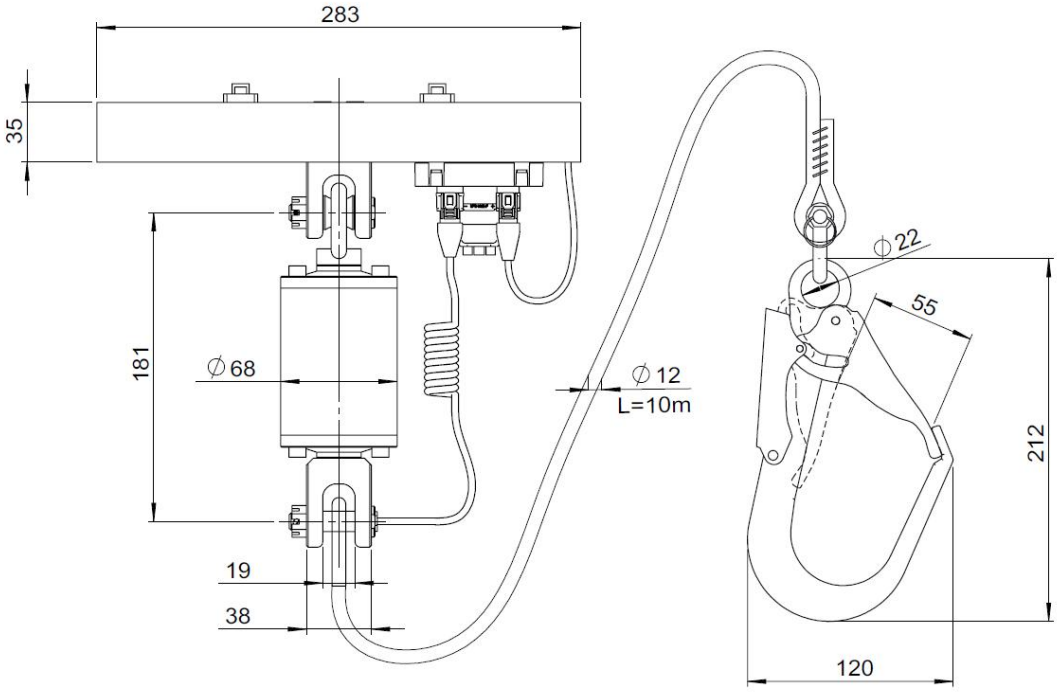
Version 1.0

CONTENT

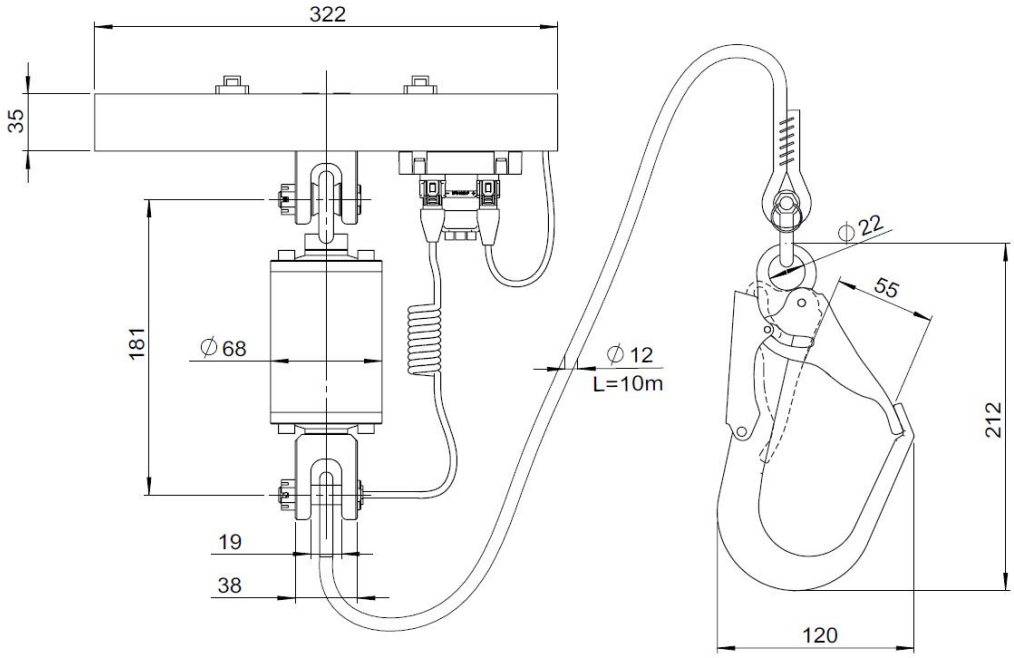
I. Product Introduction

The ELM50/100 Smart Lifting Module is made of aluminum alloy, making it lightweight, corrosion-resistant, and easy to handle, and simple to maintain. It features an integrated lifting rope and fuse, with a one-touch remote fuse function that can be quickly activated in critical situations to cut the rope, ensuring drone safety and operational security. A built-in high-precision weight sensor displays the weight of lifted materials in real time, helping prevent overloading and enabling accurate weight-based settlement.





ELM50



ELM100

***The ELM 50 and ELM 100 look the same, but differ in size. Please distinguish them by dimensions.**

II. PARAMETERS

Model	ELM50	ELM100
Working Voltage	60-80V	60-80V
Weight	2.9kg	3.1kg
Rope Length	10m	10m
Max Payload	50kg	100kg
Fuse Time	≤30s (10 kg load, RT)	≤30s （10 kg load, RT）
Rated Power	0.6-0.8W (Non-fusing State)	0.6-0.8W (Non-fusing State)
Fuse Power	420W	420W
Working Temp.	0-50℃	0-50℃
Control Mode	CAN	CAN
IP Rating	IP55	IP55
Features	Real-time Weighing、Emergency Fuse、Shock Absorbing	Real-time Weighing、Emergency Fuse、Shock Absorbing

III. PACKAGE LIST

Main Body	1
Shock Absorber	1
Fuse	1
Control Board	1
Rope	1
Hook	1
Instructions	1

IV. CONTROL BOARD AND PIN DEFINITION

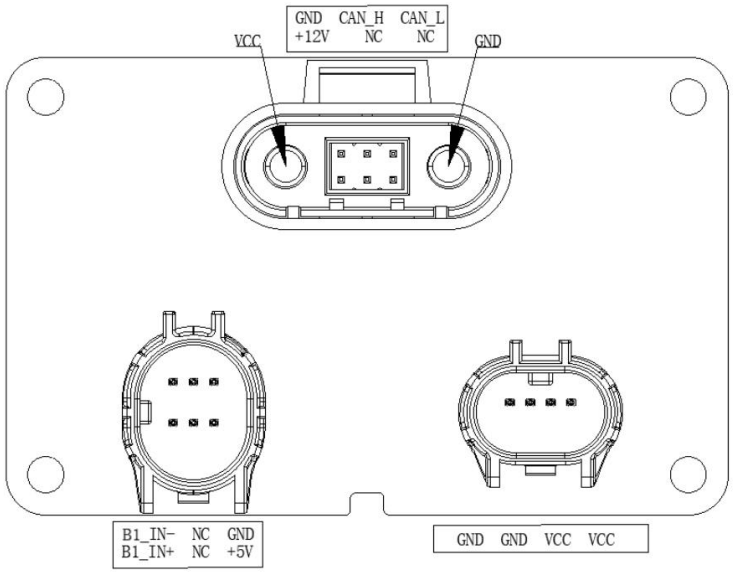
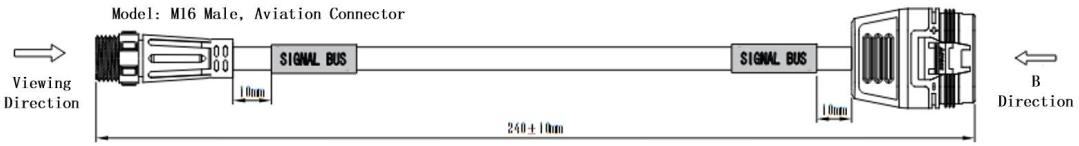


Figure1：Control Board Pin Definition



1 PIN	None
2 PIN	None
3 PIN	None
4 PIN	0.3mm2 (vcc)
5 PIN	0.3mm2 (CAN_L)
6 PIN	0.3mm² (CAN_H)
7 PIN	0.3mm2 (GND)
8 PIN	0.3mm² (vc0)
9 PIN	0.3mm² (GND)
10 PIN	None
11 PIN	None
12 PIN	None

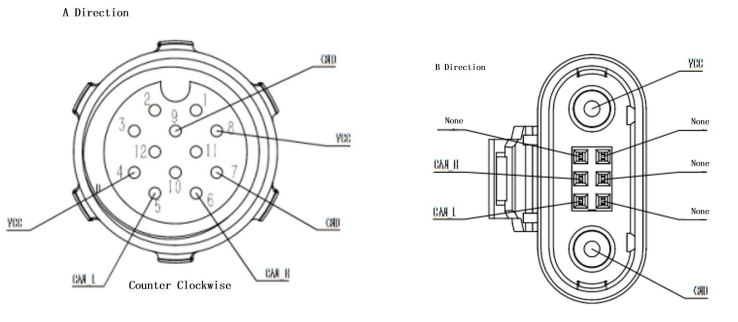


Figure2：Signal Bus Cable Pin Definition（For EFT Z30P/Z50P）

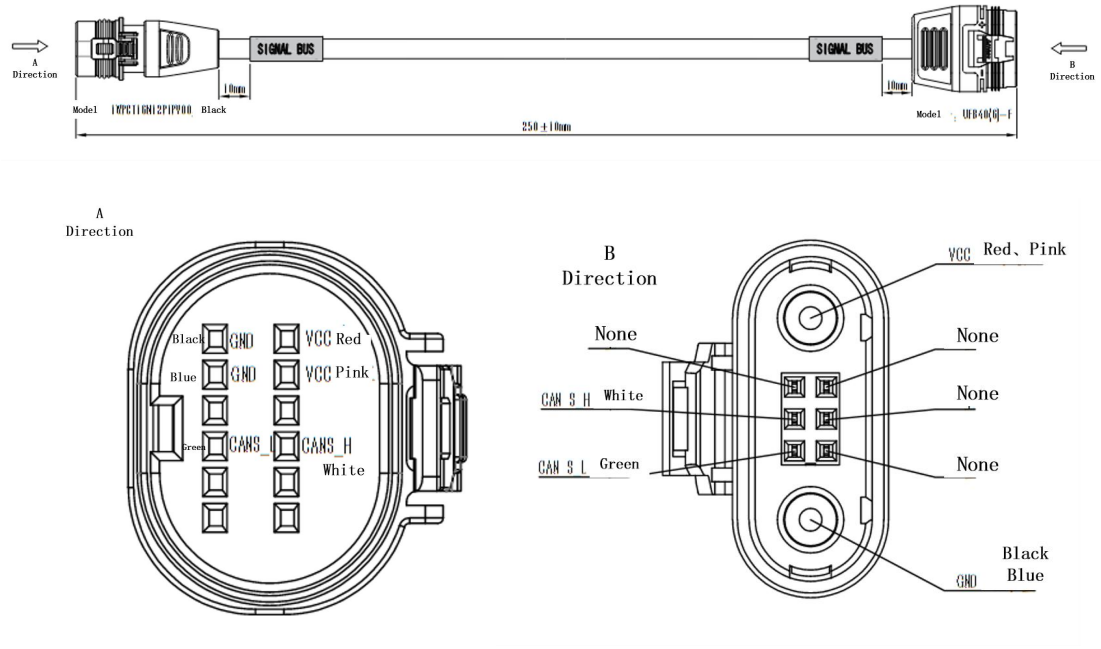
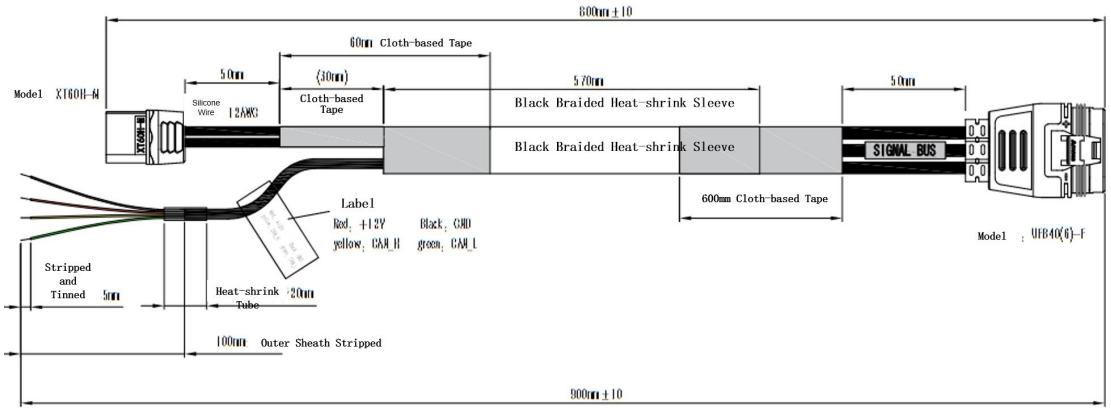


Figure3：Signal Bus Cable Pin Definition（For EFT Z20）



Label：

Red:+12V Black:GND

Yellow:CAN_H Green:CAN_L

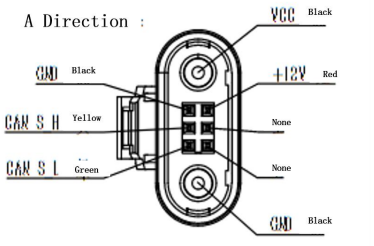


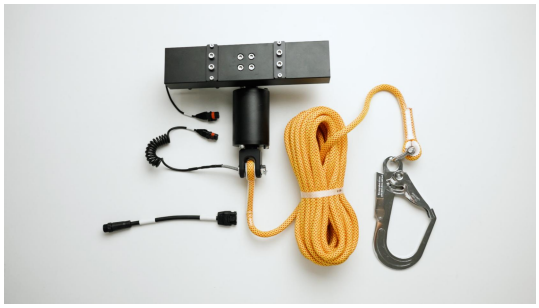
Figure4：Signal Bus Cable Pin Definition（For Non-EFT Model）

V. Installation

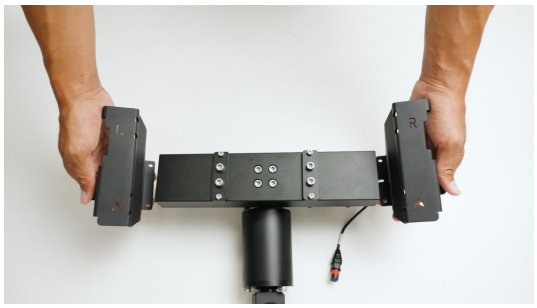
5.1 Lifting Module Installation

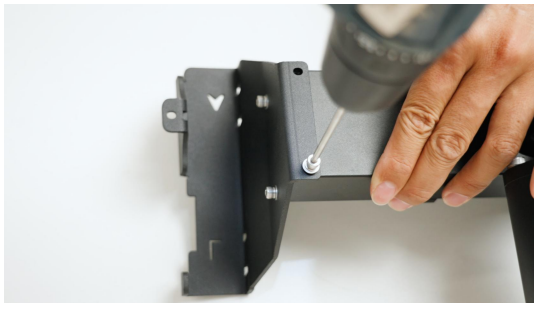
(Using EFT Z50P as an Example)

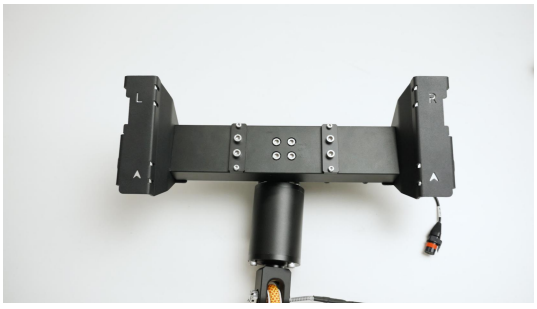
Step 1: Prepare all parts according to the list (as shown below).



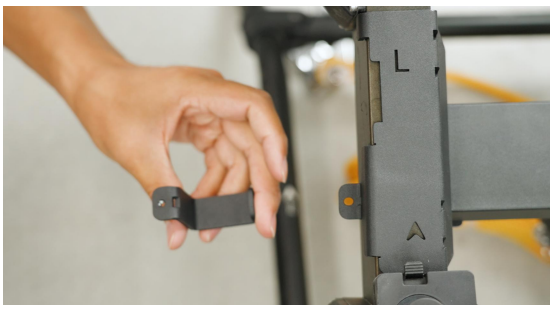
Step 2: Install the adapters on the left and right sides of the lifting module as shown in the figure (check the installation direction). The weight cable is at the right side. When installing the right-side adapter, route the weight signal cable through the designated slot before securing the screws.(M4*12 cylindrical head combination screws)

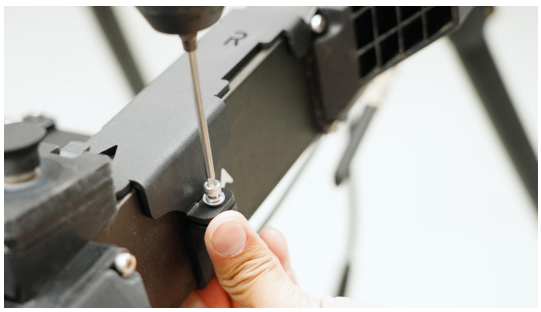
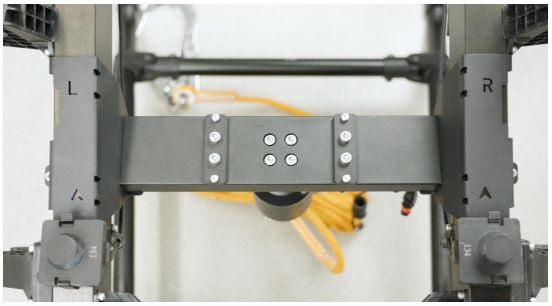




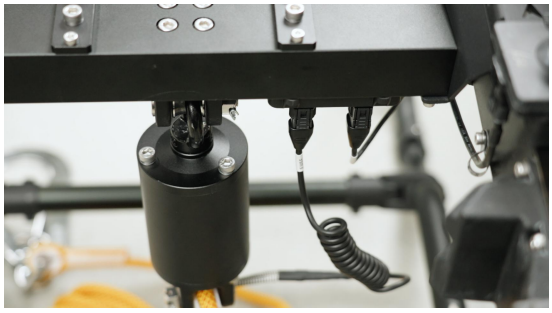


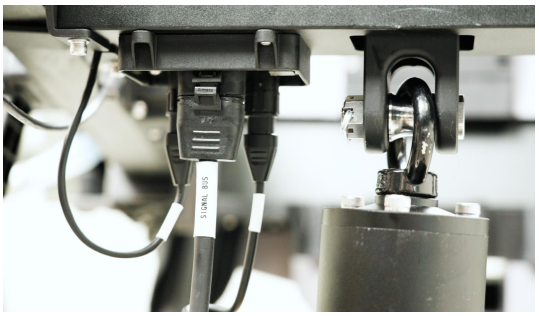
Step 3: Place the lifting module at the center of the drone as shown in the figure (ensure the arrow on the adapter points toward the drone nose). Secure the mounting parts by hooking it from the bottom of the frame beam upwards and aligning it with the screw holes of the adapter. Then tighten them using screws (M4×12 cylindrical head combination screws).

Step 4: Insert the fuse and weight cable into the control board. Then connect the signal bus cable to the 24-pin cable and plug it into the control board. The assembly is now complete.

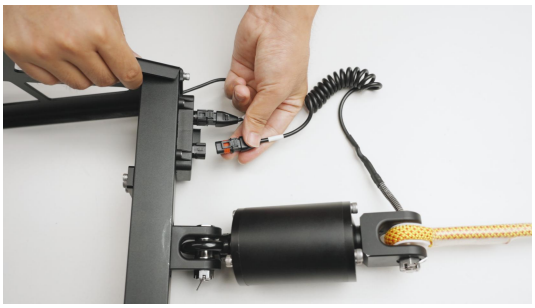


***Note**: The adapters on the lifting module are optional. Customers must purchase compatible adapters based on the actual drone model for proper installation.

5.2 Fuse Replacement Procedure

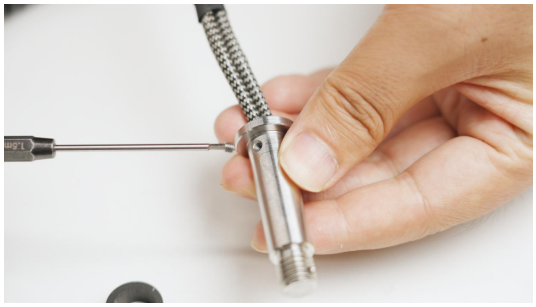
Step 1: Prepare tools: pliers and hex screwdriver (M1.5). Unplug the fuse cable connector from the control board (as shown below).

Step 2: Straighten the cotter pin using pliers and remove it.


Step 3: Unscrew the retaining nut and remove the fuse.


Step 4: Use an M1.5 hex screwdriver to remove the fuse fixing screw, then take the fuse out of the pin. (After replacing with a new fuse, reinstall by following the disassembly steps in reverse.)




VI. Safety Warnings

Installation Safety: Before installation or removal, disconnect the main power supply to avoid short circuits caused by plugging or unplugging cables under power. Do not pull or bend the weight cable, as damage may result in inaccurate measurements.
Operation Safety: The lifting load must not exceed the rated capacity (ELM50 ≤ 50 kg, ELM100 ≤ 100 kg). Overloading will damage the weight sensor. The “One-touch Fuse” function is only for emergency scenarios such as rope entanglement with obstacles. When testing, ensure an open area, as the load will fall after fuse cutting. Keep personnel and equipment clear from below.
Maintenance Safety: When replacing the fuse, power must be disconnected. Only original fuses may be used.

VII. Maintenance

Routine Inspection: Check for rope wear (replace if ≥3 broken strands), ensure the hook latch operates smoothly (no looseness after locking), and inspect the control board connectors for dust or moisture (clean with a dry brush if needed).
Regular Calibration: Perform weight calibration in the APP to avoid deviation after long-term use.
Storage Requirements: When not in use, store in a dry environment at room temperature, avoiding direct sunlight and rain. The rope should be coiled (to prevent knots), and the fuse should be stored separately in a dry container.

VIII. Troubleshooting

Issue	Possible Cause	Solution
No weight displayed on the flight control	Weight cable not firmly connected / signal cable broken	Reconnect the cable, check the signal cable for damage (replace if damaged)
Fuse Function not responding	Fuse failure / poor contact of fuse cable	Replace with the same model fuse, reconnect the fuse cable
CAN communication interrupted	Cable not firmly connected / signal cable broken	Reconnect the cable, check the signal cable for damage (replace if damaged)
Weight deviation > 5%	Zero Calibration not performed / sensor drift	Send “0xE1 (Zero Calibration)” command and recalibrate

IX. Disclaimer

This disclaimer is intended to clarify the scope of responsibility for the ELM 50/100 Smart Lifting Module (hereinafter referred to as “the Product”) and its corresponding Instructions (hereinafter referred to as “the Instructions”). Any individual or entity using the Product or relying on the Instructions (hereinafter referred to as “the User”) is deemed to have fully read, understood, and accepted all terms of this disclaimer. If you do not accept these terms, please immediately cease using the Product and the Instructions.

1. Operational and Installation Responsibility

1、The installation, debugging, operation, and maintenance of the Product must be performed by qualified technical personnel (e.g., professionals familiar with UAV/aircraft electrical systems, mechanical installation, and CAN communication protocols) and strictly follow the instructions in the “Installation Guide” and “Maintenance” sections of the Instructions. The manufacturer (hereinafter referred to as “we/us”) shall not be liable for any product damage, equipment malfunction (e.g., drone compatibility issues, wiring short circuits), personal injury, or property loss caused by non-professional operation.

2、Before installation, Users must ensure the Product is compatible with the drone (e.g., the EFT Z50P shown in the Instructions). Any deviations or failures caused by non-original connectors, wiring, or other components purchased by the User shall be borne by the User. For adaptation to non-listed drone models, Users must confirm the compatibility plan with us in advance. Any issues resulting from unconfirmed adaptations are the User’s responsibility.

2. Usage Scope and Risk Statement

1、The Product must be used strictly within the limits specified in the “Specifications” section, including but not limited to: maximum load (ELM50 ≤ 50kg, ELM100 ≤ 100kg), operating temperature (0–50°C), and protection rating (IP55). Use beyond these limits, or in extreme environments (e.g., heavy rain, strong wind, high electromagnetic interference, flammable or explosive scenarios), is strictly prohibited. We shall not be liable for product damage (e.g., weight sensor failure, fuse malfunction), falling loads, drone damage, or third-party losses resulting from such misuse.

2、The Product’s one-touch fuse function is intended solely for emergency situations (e.g., rope entanglement, load jam threatening flight safety), and activation will inevitably result in the load falling. Before using this function, Users must ensure the area below the fuse mechanism is clear of personnel, valuable equipment, and flammable or explosive materials. We shall not be liable for any personal injury or property damage caused by failure to confirm a safe environment. The fuse is a consumable component; misuse in non-emergency scenarios and any resulting losses shall not be covered by us.

3. Maintenance and Calibration Responsibility

1、Users must perform regular inspection and maintenance as specified in the Instructions, including but not limited to rope wear inspection, weight sensor calibration, and control board interface cleaning. We shall not be liable for performance issues or failures caused by failure to maintain or improper maintenance (e.g., using non-standard weights for calibration).

2、Repairs must be performed by our authorized service personnel. Any damage or safety risk caused by unauthorized disassembly or modification (e.g., changing CAN protocol parameters, replacing fuses with non-original parts) is the User’s responsibility, and such actions will void the product warranty.

4. Instruction Information and Third-party Responsibility

1、While we strive to ensure the Instructions is accurate and complete, technical updates, typesetting, and proofreading may result in delays or minor deviations (e.g., interface labeling, parameter descriptions). We reserve the right to update the Instructions without prior notice. Users are advised to obtain the latest version through official channels (e.g., official website, authorized distributors). We shall not be liable for operational errors caused by reliance on outdated versions.

2、The Product only provides lifting functionality and does not include drone flight control or safety assurance functions. Any failure of the Product to operate properly or related losses due to drone malfunctions (e.g., flight controller errors) or third-party equipment compatibility issues are not our responsibility.

5. Limitation of Liability

1、In all cases, our liability regarding the Product and the Instructions is limited to repair or replacement of the Product itself (subject to warranty terms and conditions). We shall not be liable for any indirect or consequential losses, including but not limited to: downtime, load damage, drone repair costs, or third-party claims.

2、Any matters not covered in this disclaimer are subject to applicable national laws, regulations, and industry standards. If any provision of this disclaimer conflicts with the law, the law shall prevail, without affecting the validity of other provisions.

X. Appendix-Lifting Module CAN Protocol

1. CAN Message Reception Protocol

(Flight Control Side Receiving Information)

1. Description of Lifting Board CAN Protocol

Item	Details
Frame Type	Extended Frame
ID	0x88BA
Baud Rate	1000kbps
Frame Interval	200ms

2. Definition of Lifting Board CAN Protocol Data Format

Byte	Bit	Description
0	0-7	Weight Value Low Byte of the Weighing Module (unit: 10 g; for example, if the message sends 0x0064, it represents a weight of 1000 g)
1	0-7	Weight Value High Byte of the Weighing Module
2	0	0: Normal; 1: Fuse Short-Circuit Alarm
	1	0: Normal; 1: Fuse Short-Circuit Alarm
	2-7	Reserved
3	0-7	Reserved
4	0-7	Reserved
5	0	Reserved
6	0-7	Reserved
7	0-7	Reserved

Message Example 1：F4 01 00 00 00 00 00 00
Weight：(0x01*256+0xF4)*10g = 5000g

Message Example 2：00 00 01 00 00 00 00 00
Alarm：Fuse Short-Circuit Alarm，please replace the fuse.

Message Example 3：00 00 02 00 00 00 00 00
Alarm：Fuse Short-Circuit Alarm，please replace the fuse.

2. CAN Message Sending Commands

Flight Controller Sending Information

1. Command Format

Item	Details							
Frame Type	Extended Frame							
ID	0x88BB							
Command Format	Byte0	Byte 1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
	Command Code	D1	D2	D3	D4	0xF1	0xF3	D5

Note：Byte6-Byte7； Checksum（0xF1 0xF3）

2. Command Code

Command Code	Function	Parameters
0xE1	Zero Calibration	Sent Message E1 00 00 00 00 F1 F3 00 **ID：0x88BB** Response Message E1 00 00 00 00 F1 F3 00 **ID：0x88BC**
0xE2	Weight Calibration	Sent Message E2 D1 D2 00 00 F1 F3 00 **ID：0x88BB** Response Message E2 D1 D2 00 00 F1 F3 00 **ID：0x88BC** D1：Calibrated Weight Low Byte D2：Calibrated Weight High Byte
0xF2	Setting Baud Rate	Sent Message F2 D1 D2 00 00 F1 F3 00 **ID：0x88BB** Response Message F2 D1 D2 00 00 F1 F3 00 **ID：0x88BC** D1: Baud Rate Low Byte D2: Baud Rate High Byte Valid values: 500, 1000. The system will perform a soft restart immediately upon success.
0xF3	Query Serial Number	Sent Message F3 00 00 00 00 F1 F3 00 **ID：0x88BB** Response Message F3 D1 D2 D3 D4 F1 F3 D5 **ID：0x88BC** D1:E1 // E:EFT 1：Lifting Board D2:Year D3:Month D4:Date D5:Number
0xF4	Query Version Number	Sent Message F4 00 00 00 00 F1 F3 00 **ID：0x88BB** Response Message F4 D1 D2 D3 D4 F1 F3 D5 **ID：0x88BC** D2: Hardware Major Version D3: Hardware Minor Version D4: Software Major Version

		D5: Software Minor Version For example, if the hardware version is V1.0 and the software version is V2.0, it will be displayed as V1.0.2.0
0xF5	Query Operating Duration	Sent Message F5 00 00 00 00 F1 F3 00 **ID：0x88BB** Response Message F5 D1 D2 D3 D4 F1 F3 D5 **ID：0x88BC** D2:Cumulative Operating Minutes D3:Lower 8 Bits of Cumulative Operating Hours D4:Upper 8 Bits of Cumulative Operating Hours
0xF7	Fuse Command	Sent Message F7 D1 D2 00 00 F1 F3 00 **ID：0x88BB** Response Message F7 D1 D2 00 00 F1 F3 00 **ID：0x88BC** D1:1 Start Fuse,0 Fuse Complete; **The Fuse command cannot be canceled once issued, and the fuse wire is a one-time consumable.Use it only in emergencies, and keep extra samples on hand for testing purposes.**

※ Thank you for reading this instructions. For any questions or feedback, please contact EFT official after-sales support

Kindly check the latest updates on the EFT website. Download tutorial, software, and firmware packages,and access the latest version online.

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