

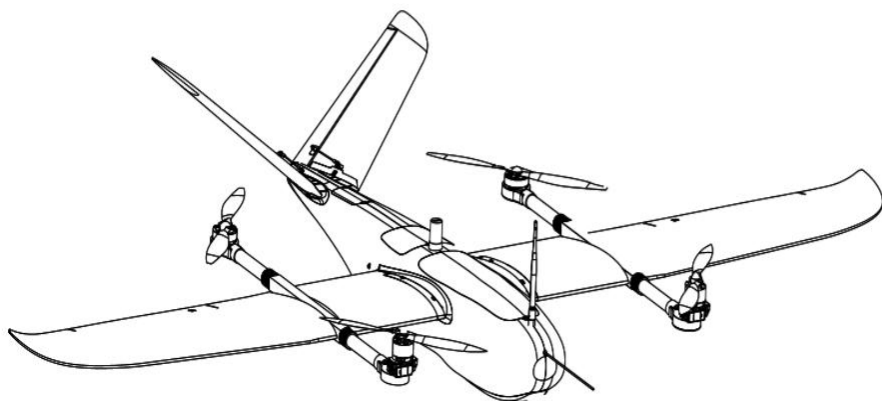
自由者 2100

freeman2100

用户手册 v1.0

User ManualV1.0

2019.04



mfe
makeflyeasy

产品概述

简介 Introduction

自由者 2100 是一款倾转式垂直起降固定翼飞行平台,具有携带易用,操作友好,稳定耐用等特点。自由者 2100 定位为一款高性价比的入门级垂直起降固定翼,让更多航测用户能够先飞起来,享受翱翔天空的自由。

模块化设计理念让飞机组装工作简单快捷,可快拆机翼、可折叠机臂,可快拆尾翼、使飞机具有实用的便携性和友好的用户体验。独立的飞控舱支持常见的倾转式垂直起降固定翼飞控,推荐挂载 Sony A7R 3600W 像素全画幅相机,搭配 6S@16000mah 锂聚合物电池,可以实现 80KM 的续航和高质量的拍摄效果。

配合适量控制点成图结果满足 1:1000 和 1:2000 航测标准,可应用于地形测绘、农林牧防护、电力巡线、环保、水利等方面。

Freeman 2100 is a fixed-wing design aircraft which is tilting type and vertical take-off and landing. It is characterized by many advantages such as portability, simplicity, stability and durability. The market positioning of Freeman 2100 is high cost perform and entry-level, and aim to help more aircraft enthusiasts enjoy the excitement and easy process of flying.

Thanks for the Modular design of whole aircraft; it's very convenient to conduct the assembly during outside aerial photogrammetric field operation. Quick release wings, empennage and foldable arms provide excellent using experience for our customers. Separate flight control module could support the common vertical take-off and landing flying control. We recommend use Sony A7R full frame camera with 3600W pixels and concomitant with 6S@16000mah aluminum polymer battery, which could bring 8km long endurance and high quality shooting effect.

Using proper control point cooperatively, the final mapping would satisfy 1:1000 and 1:2000 aerial survey standard, which realized a wide-ranging application such as geography surveys, farmland, forestry land and grassland protection, power line inspection, environment protection, water conservancy and etc.

产品规格

材质：EPO、EVA、碳纤维、工程塑料等
翼展：2100mm 机身高：180mm
机身长：1070mm 翼面积：53dm²
推荐飞行速度：18m/s 失速速度：10m/s
推荐有效载荷：550g 载荷舱尺寸:120*150*119mm
最大航程：80km(550g 负载) 最大起飞重量：6.5kg
实用升限：4000m 抗风能力：5 级
起降方式：垂直起降拆装方式：无工具拆装
运输箱寸：1.15m*0.48m*0.32m

Products specifications:

Material: EPO, EVA, carbon fiber, engineering plastics and etc.
Wing Span: 2100mm Fuselage height: 180mm
Fuselage length: 1070mm Wing area: 53dm²
Suggested flight speed: 18m/s Stalling speed: 10m/s
Suggested payload: 550g Payload bay size: 120*150*119mm
Longest flight range: 80km (contain 550g load) Max take-off weight: 6.5kg
Practical ceiling height: 4000m Wind resistance: 5
Take-off and landing approach: vertical Dismounting way: tool-free
Transport case size: 1.15m*0.48m*0.32m

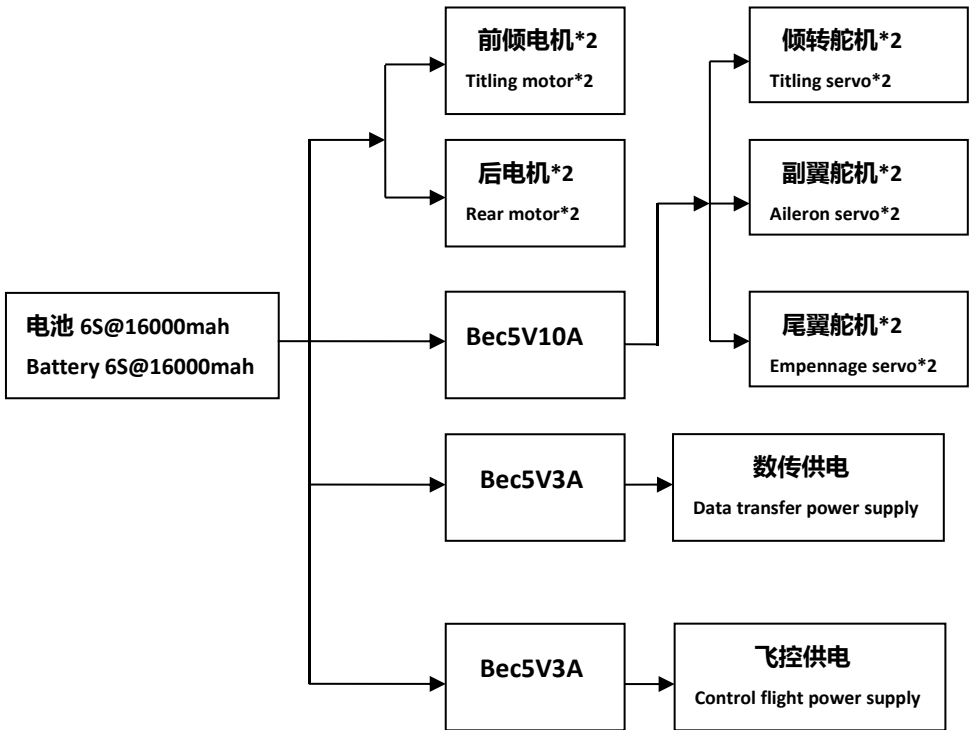
产品使用注意事项 Usage Attentions

安装注意 Installation Attentions

1. 在焊接大电流连接器时，一定要注意焊接线序要相互对应，以免烧毁电调、舵机。
1. Pay attention to the welding wires sequence which should be corresponding to each other during the welding of large current connector. Or maybe the electric regulator and servo suffered burning-out.
2. 副翼和尾翼推荐使用银燕 **ES3054** 数字舵机，或者其他相同尺寸的舵机及圆盘舵角，便于舵机安装，和尾翼快拆装置的安装。
2. We recommend the EMAX ES3054 metal digital servo, or other same size servo and round board helmangle for the easy installing of servo and tail wings quick release devices.
3. 起飞重量大于 6.5kg 情况，需要用户自己加强机翼和尾翼。
3. Stiffening the wings and empennages when the take-off weight was more than 6.5kg.
4. 在安装电机座时注意调至水平。
4. Please adjust the front and rear motor frame to the level during installation.
5. 自由者电源供电方案请参考下图。
5. Please refer to below the Freemanpower supply conceptual drawing when you were confused by the Installing sequence.

自由者供电方案图

Freeman power supply conceptual drawing



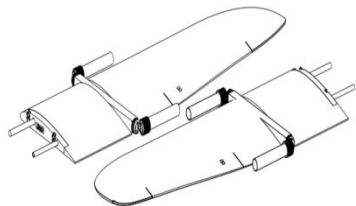
飞行注意 Flying Attentions

1. 请避免在 15m/s 以下的速度飞行转弯，以免飞机失速。
1. Don't cornering when the aircraft flying speed was less than 15m/s, or the aircraft maybe stalling.
2. 飞行前请务必检查电机、螺旋桨安装正确稳固，电调信号线和电源线插头连接坚固可靠。
2. Ensure the motor and propeller were installed correctly and toughly before flying, inspecting the electronic regulating signal wires and power lines plug, ensure they were connected toughly.
3. 飞行时请远离不安全因数，如障碍物、人群、儿童、建筑物、高压线等。
3. Away from the unsafe factors such as barrier, crowd, children, buildings, high-voltage wires and etc while flying.
4. 务必在安全起飞重量下飞行，切勿在机场净空区范围飞行。
4. Takeoff under the safety weight and never flying in the area of airfield clearance zone.
5. 请按标识重心位置配重（位于机翼翼根塑料件下突起处沿尾翼方向移动 5mm）。
5. Conduct the counterweight at the marked center of gravity position. (At the protrusion which was under the plastic parts of wings root and moved towards wings tail 5mm.)

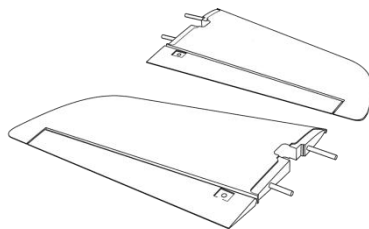
盒内物品清单 Contents in the box

EPO 部件 EPO Parts

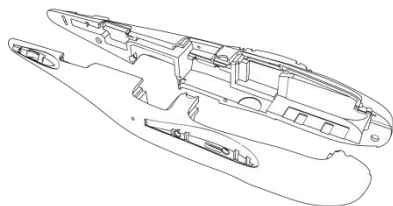
1 左右机翼 1 left & right wing



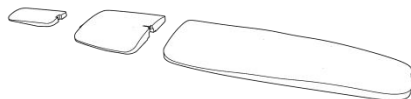
2 左右尾翼 2 left & right empennage



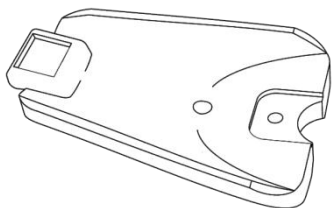
3 左右机身 2 left & right fuselage



5 机舱盖 5 Cabin cover



6 伞舱盖 6 Parachute cabin cover



碳管部件 Carbon tube parts

1 机身支撑碳管

1 Fuselage supporting carbon tube

14*12*206mm

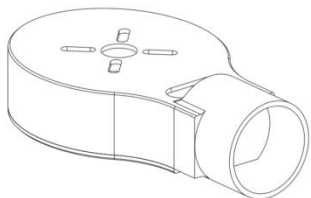
12*10*206mm



金属及碳片部件

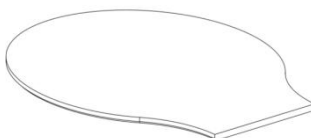
1 电机座*4

1 Motor frame



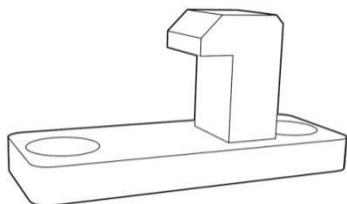
2 电机盖片

2. Motor cover plate



3 金属锁钩*8

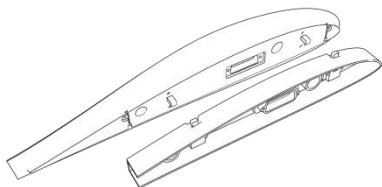
3 Mental latching hook*8



塑料件 Plastic parts

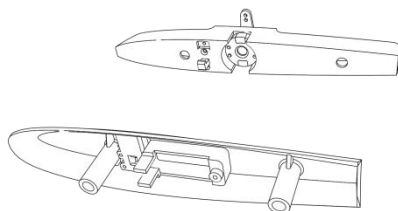
1 机翼连接件*2

1 Wings connecting parts*2



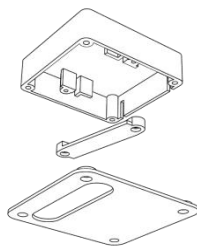
2 尾翼连接件*2

2 Empennages connecting parts*2



3 舵机固定件*2

3 Servo fixing parts*2



舵机安装座

servo installing base

舵机压片

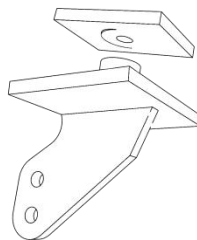
servo presser

舵机盖板

servo covering plate

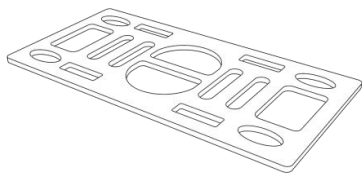
4 舵角*4

4 Helmangle *4



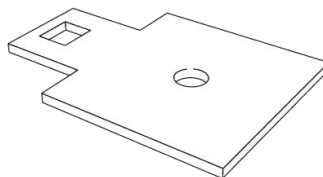
5 电池固定板*1

5 Battery fixing board*1

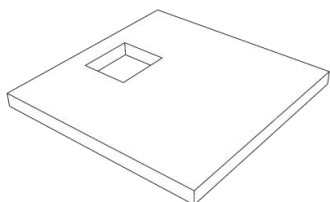


6 天线固定板*2

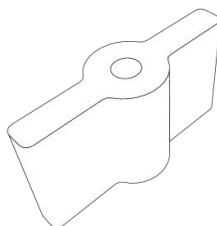
6 Antenna fixing board*2



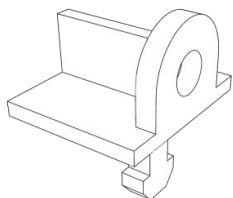
7 舱盖固定板*1
7 Cabin cover fixing board*1



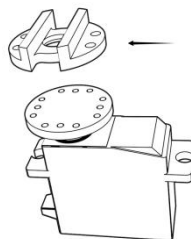
8 螺丝柱*12
8 Stud*12



9 舱盖锁钉*4
9 Cabin cover locking nail*4

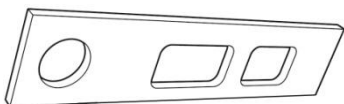


10 卡盘*2
10 Chuck*2

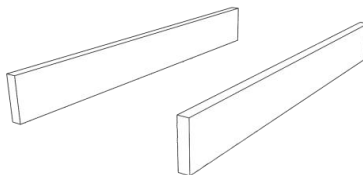


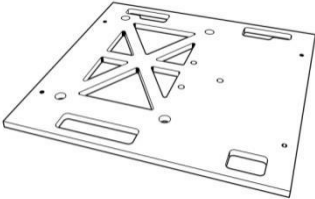
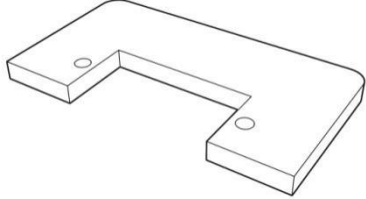
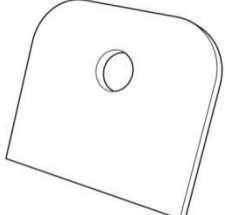
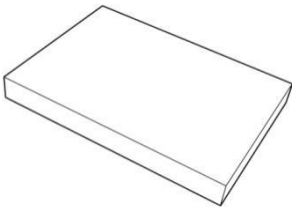
木板部件 Wooden parts

1 机身加强层板*2
1 Fuselage reinforcing plate*2





2 机尾加强层板
2 Tail reinforcing plate



<p>3 飞控放置板*1 3 Autopilot locating board*1</p> 	<p>4 伞舱舵机座*1 4 Basement of parachute servo*1</p> 
<p>5 伞舱盖木板*1 5 Wooden plate of parachute hatch cover*1</p> 	<p>6 伞舱盖加强板*1 6 Stiffer of parachute hatch cover *1</p> 

EVA 部件 (电池区缓冲垫、飞控区缓冲垫)

EVA parts (Cushion at battery area, cushion at flight control area)

<p>1 电池区缓冲垫 1 Cushion at battery area</p> 	<p>2 飞控区缓冲垫 2 Cushion at flight control area</p> 
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其他配件 Other fittings

序号 NO.	名称及型号 Name & Model	数量 Qty	备注 Notes
1	大电流连接器 Large electronic current connector	2 套 2 groups	
2	尾翼舵机延长线 30cm Empennage servo extending wire	2 根 2 sets	机身部分 fuselage section
	机翼机身信号单端母头延长线 30cm fuselage and wings signal single-head female connector extending wire 30cm	8 根 8 sets	
	副翼/油门 Y 线 10cm Aileron/Fuel gate Y wire 10cm	2 根 2 sets	
3	14AWG 硅胶线 (黑) 14AWG Silicone wire (black)	2 米 2 m	
	14AWG 硅胶线 (红) 14AWG Silicone wire (red)	2 米 2 m	
4	热缩管直径 2.5mm*15mm Diameter of heat shrink tubing 2.5mm*15mm	20 段 20 sections	
	热缩管直径 6mm*15mm Diameter of heat shrink tubing 6mm*15mm	12 段 12 sections	
5	束线管 Wire harness tube	1 米 1m	
	魔术扎带 Magic tie straps	2 根 2 sets	与电池固定板搭配使用 Matching the battery fixing board
6	透明泡沫胶 Transparent foam glue	2 支 2 PCS	

7	球头 Ball head	8 个 8PCS	球头连杆 Ball link rod
	连杆 Link rod	4 根 4 sets	球头连杆 Ball link rod
	圆头螺钉 M2X10 Button head screw M2X10	8 颗 8PCS	球头连杆 Ball link rod
	防松螺母 M2 Block nut M2	8 颗 8 PCS	球头连杆 Ball link rod
8	塑料锁扣 Plastic latch	3 个 3PCS	舱盖锁钉 Hatch cover locking nail
9	断尾圆头螺丝 M2.5X8 Tail button head screw M2.5X8	10 颗 10PCS	大电流连接器、伞舵机 Large electronic current connector, parachute servo
10	断尾圆头螺丝 M2X10 Tail button head screw M2X10	8 颗 8PCS	舵机压片、飞控放置板 Servo presser, autopilot locating board
11	断尾圆头螺丝 M2X8 Tail button head screw M2X8	34 颗 34PCS	机翼舵角、尾翼舵角、金 属锁钩、舵机盖板 Wing helmangle, empennage helmangle, mental latching hook, servo covering plate

辅助安装工具和材料 (自备)

Auxiliary installation tools and materials (Self-contained)

工具 Tools	用途 Usage
3.0mm 十字螺丝刀 3.0 Philips screwdriver	安装螺丝 Installing the screws
1.5mm-3mm 内六角 1.5mm-3mm Hexagon socket head cap screw	电机座安装 Installing the motor frame
电烙铁、焊锡丝 Electric iron, solder wire	焊接电源、舵机线 Welding the power line and servo line

打火机 Lighter	固定热缩管 Fixed heat shrink tube
小刀 Knife	剥线 Wire stripping tool
纸胶、透明胶、纤维胶带(Transparent) adhesive tape, fabric adhesive tape	飞机粘合辅助定位、飞机局部加强 Aircraft bonding and auxiliary positioning, local reinforce

测试配置与性能 Test configuration & performance

种类 Types	型号 Model	数量 Qty
倾转电机 Tilting motor	朗宇 Sunny sky 3520kv520	2 个 2PCS
后电机 Rear motor	朗宇 Sunny sky 4112kv400	2 个 2PCS
电调 Electronic speed controller	好赢乐天 40A HobbyWing 401A	4 个 4PCS
副翼/尾翼舵机 Aileron/Empennage servo	银燕 ES3054 EMAX ES3054	4 个 4PCS
倾转舵机 Tilting servo	DS3225	2 个 2PCS
前电机桨 Front motor rotor	APC1485 正反桨 APC1485 Positive and negative rotor	1 对 1pair
后电机桨 Rear motor rotor	1555 碳纤维正反桨 1555 Carbon fiber rotor of positive and negative	1 对 1pair
BEC	5V@3A 5V@10A	2 个 2PCS
飞控 Flight control	Pixhawk2.4.6	1 套 1group

动力电池 Power battery	6S@16000mah 锂聚合物 6S@16000mah lithium polymer	1 组 1group
负载重量 Payload weight	SONY A7R (550g)	1 台 1set
起飞重量 Take-off weight	约 6.5kg (含负载 550g) Approximate 6.5kg (including 550g load)	
续航 Endurance	80km 左右 Approximate 80km	
测试条件 Test condition	海拔 500 米, 温度 15 摄氏度, 3 级风 Altitude:500m, Temperature:15°C, Wind behavior:3	

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QQ group



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