U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

July 13, 2015

Exemption No. 12016
Regulatory Docket No. FAA–2015–0592

Mr. Richard E. Doran
Mr. Steven M. Hogan
Ausley McMullen Attorneys and Counselors at Law
Counsel for Vortex UAS, LLC
123 South Calhoun Street
P.O. Box 391
Tallahassee, FL 32301

Dear Messrs. Doran and Hogan:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter dated March 9, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Vortex UAS, LLC (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct aerial photography and videography, precision agriculture, geosurvey, aerial mapping, aerial monitoring services for first responders, sUAS pilot training[1], utility inspection, and real estate inspection.

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

[1]The petitioner also requested authority to conduct UAS training. At this time, the FAA is unable to authorize UAS operations for training until a further assessment is completed. When the FAA completes its review, we will proceed accordingly and no further action will be required by the petitioner. However, the petitioner is permitted to train its own pilot in commands and visual observers in accordance with condition no. 14 and the other conditions and limitations in this exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

Airworthiness Certification

The UAS proposed by the petitioner are the DJI Phantom 2 Vision, DJI Spreading Wings S900, and PrecisionHawk Hawkeye Mk−III.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[2]. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and

[2]Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Vortex UAS, LLC is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Vortex UAS, LLC is hereafter referred to as the operator.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 2 Vision, DJI Spreading Wings S900, and PrecisionHawk Hawkeye Mk−III when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS

capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal Government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least 5 minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

    The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on July 31, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/
John S. Duncan
Director, Flight Standards Service

AUSLEY MCMULLEN

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March 9, 2015

Via Electronic Submission and Certified U.S. Mail
Docket Operations
U.S. Department of Transportation
West Building, Ground Floor
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

Re: Application for Exemption from Specified Aviation Regulations Under Section 333 of the FAA Modernization and Reform Act of 2012.
Applicant: Vortex UAS, LLC
Attn: Vince Donohue
1112 Valley Stream Drive
Wheeling, Illinois 60090
Telephone: (847) 571-8496
Email: vince@vortexuas.com

Dear Sir or Madam:

Please accept this letter as the application of Vortex UAS, LLC, for exemption from specified provisions of the Code of Federal Regulations. This exemption request is submitted under Section 333 of the FAA Modernization and Reform Act of 2012 ("FMRA").

Vortex UAS, LLC (the "Applicant"), specializes in commercial applications of unmanned aircraft system technology. The mission of Vortex UAS is to educate, advocate, and facilitate the cutting-edge use of unmanned technology in a variety of industries. Vortex UAS accomplishes these goals by implementing the decades of knowledge possessed by its team of experts while implementing state-of-the-art tools, techniques, and materials. Using these resources, Vortex UAS has the ability to develop the right solution to each customer's situation.

The Applicant proposes to use small unmanned aircraft systems ("sUAS") in six different industries. These industries are:

1. Aerial photography and videography;

2. Precision Agriculture;
3. Geosurvey;
4. Aerial Mapping;
5. Aerial monitoring services for First Responders;
6. sUAS Pilot Training.
7. Utility (Pipeline and Powerline) inspection; and
8. Real Estate photography, videography and inspection

The Applicant has a team of experienced professionals ready to perform services in each of these industries at the highest level. The Applicant requests exemption from the following regulations for this purpose: 14 C.F.R. Part 21, Subpart H; 14 C.F.R. § 45.23(b); 14 C.F.R. § 61.113(a), (b); 14 C.F.R. § 61.3(d)(2)(iii); 14 C.F.R. § 91.7(a), (b); 14 C.F.R. § 91.9(b)(2); 14 C.F.R. § 91.103; 14 C.F.R. § 91.109; 14 C.F.R. § 91.119(b), (c); 14 C.F.R. § 91.121; 14 C.F.R. § 91.151(a)(1); 14 C.F.R. § 91.203(a), (b); 14 C.F.R. § 91.405(a), (b); 14 C.F.R. § 91.407(a)(1); 14 C.F.R. § 91.409(a)(1)-(2); and 14 C.F.R. § 91.417(a), (b).

Summary of Applicant's Scope of Operations

The Applicant proposes to conduct commercial sUAS operations in the six areas specified above (the "Proposed Operations"). The Applicant has developed a set of "Standard Operating Procedures for Flight Operations" (the "SOP") that sets forth the standards for performing the Proposed Operations.[1] The SOP provides a baseline to ensure that all operations, including training operations, are conducted safely within the National Airspace System ("NAS").

Each operation will be initiated following a discrete COA application. The Applicant proposes to conduct its commercial operations in Operations Areas that are clearly defined in each COA application (the "Operations Areas").

The Pilot in Command ("PIC") for each operation will hold, at a minimum, a private pilot certificate. The students training under the PIC in each operation will meet the standards specified in the SOP, as well as any other additional requirement the FAA requires under this

[1] A copy of the SOP is enclosed as Attachment 1. The SOP is submitted as a Confidential Document under 14 C.F.R. § 11.35(b). The entire SOP contains proprietary information that the Applicant has not and will not share with others. The SOP contains operating conditions and procedures that are not available to the public and are protected from release under 5 U.S.C. section 552, et seq. A hard copy of the SOP will be submitted under a separate cover letter referencing the docket number of this exemption request.

application. The PIC and the students in training will be specifically trained to operate the sUAS platforms utilized in the Applicant's operations.

Aircraft and Equivalent Level of Safety

The Applicant's commercial operations and training activities will take place in Operations Areas defined by the Applicant's COA applications prior to each commercial flight or training exercise. The sUAS operations in these Operations Areas will pose little risk of injury or property damage.

The Applicant proposes to use the following sUAS platforms for its operations under this application:

1. DJI Phantom 2 Vision [2]
2. DJI Spreading Wings S900 [3]
3. PrecisionHawk Hawkeye Mk-III [4]

These platforms all weigh less than 55 pounds, including energy sources and equipment. Manufacturer-provided manuals and checklists are enclosed with this application (the "Manufacturer Instructions"). The Manufacturer Instructions will be used in conjunction with the Applicant's SOP to ensure that the sUAS platforms are operated safely.

The Applicant will apply to register the sUAS platforms with the FAA prior to conducting operations. These registrations will be in accordance with the FAA's guidance to COA holders from the FAA UAS Integration Office dated November 5, 2014, as the same may be updated from time to time.

The Applicant agrees to be bound by the following limitations and conditions when conducting commercial operations under an FAA issued exemption include:

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[2] The User Manual for the DJI Phantom 2 Vision is enclosed as Attachment 2.

[3] The User Manual for the DJI Spreading Wings S900 is enclosed as Attachment 3.

[4] The User Manual for the PrecisionHawk Hawkeye Mk-III is enclosed as Attachment 4. This User Manual is submitted as a Confidential Document under 14 C.F.R. § 11.35(b). The entire User Manual contains proprietary information that the Applicant has not and will not share with others. The User Manual contains operating conditions and procedures that are not available to the public and are protected from release under 5 U.S.C. section 552, et seq. A hard copy of the User Manual will be submitted under a separate cover letter referencing the docket number of this exemption request.

1. The sUAS will weigh less than 55 lbs including energy sources and equipment.
2. The sUAS will be flown at a speed less than a ground speed of 50 knots.
3. Flights will be operated at an altitude of no more than 400 feet AGL.
4. Flights will be operated within line of sight of the Pilot in Command (PIC) at all times.
5. All operations will utilize a visual observer (VO). The VO and PIC will be in communications at all times.
6. The Applicant's SOP and the relevant Manufacturer Instructions will be maintained and made available to the FAA upon request.
7. Prior to each flight, the PIC will inspect the sUAS to ensure it is in a condition for safe flight.
8. The Applicant will follow the manufacturer's sUAS aircraft and component maintenance, overhaul, replacement, inspection, and life limit requirements.
9. The PIC will possess at least a private pilot certificate and a third-class medical certificate. The PIC will also meet the flight review requirements specified in 14 CFR 61.56 in an aircraft in which the PIC is rated on his/her pilot certificate.
10. The sUAS will not be operated directly over any person below an altitude that is hazardous to persons or property on the surface in the event of an sUAS failure or emergency.
11. The Applicant will utilize the documented emergency procedures appropriate to each sUAS platform in the event of engine or power failure, fire, loss of control link, loss of GPS, loss of telemetry data link, and loss of video downlink. These procedures shall be those set forth in the Applicant's SOP and the Manufacturer Instructions.
12. The Applicant will obtain an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA) prior to conducting any operations under the grant of exemption. The COA will require the operator to request a Notice to Airman (NOTAM) not more than 72 hours in advance, but not less than 48 hours prior to the operation.
13. If required, the word "Experimental" will be placed on the fuselage in compliance with § 45.29 (f). The equivalent level of safety will be provided by having the sUAS marked on its fuselage as required by § 45.29(f) where the pilot, observer and others working with the sUAS will see the identification of the sUAS as "Experimental." The FAA has issued the following exemptions to this regulation to Exemptions Nos. 10700, 8738, 10167 and 10167A. The FAA has also waived the marking requirement entirely in other Section 333 Exemption applications, such as Exemptions Nos. 11109 and 11110.

14. The Applicant will document and maintain a record of the sUAS maintenance in the UAS airframe logbook as set forth in the Applicant's SOP.
15. Each sUAS operated under this exemption will comply with all manufacturer Safety Bulletins.
16. At least 3 days before flight operations, we will submit a written Plan of Activities to the local FSDO with jurisdiction over the area to be flown. The Plan of Activities will include at least the following:
    a. Dates and times for all flights.
    b. Name and phone number of the PIC for the sUAS flight conducted under the grant of this exemption.
    c. Make, model, and serial or N-number of sUAS to be used.
    d. Name and certificate number of sUAS PIC.
    e. A statement that the operator has obtained permission from property owners and/or local officials to conduct the flight.
    f. Signature of exemption holder or representative.
    g. A description of the flight activity, including maps or diagrams of the area where the flight will be conducted.
17. The documents required under 14 C.F.R. sections 91.9 and 91.203 will be available to the PIC at the ground control station of the sUAS any time the aircraft is operating.
18. The sUAS will remain clear and yield the right of way to all other manned operations and activities at all times (including, but not limited to, ultralight vehicles, parachute activities, parasailing activities, hang gliders, etc.).
19. sUAS operation will be conducted during daylight hours.
20. The sUAS will be operated by the PIC from a stationary position, i.e., not from any moving device or vehicle.
21. The sUAS will not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.
22. The sUAS will not operate in Class B, C, or D airspace without written approval from the FAA. The sUAS will not operate within 5 nautical miles of the geographic center of a non-towered airport as denoted on a current FAA-published aeronautical chart unless a letter of agreement with that airport's management is obtained and the operation is conducted in accordance with a NOTAM as required by the operator's COA.
23. Any 1) incident, 2) accident, or 3) flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA will be reported to the FAA's UAS Integration Office (AFS-80) within 24 hours. Accidents will be reported to the National Transportation Safety Board (NTSB)

per instructions contained on the NTSB Web site. Further flight operations will not be conducted until the incident, accident, or transgression is reviewed by AFS-80 and authorization to resume operations is provided.

Regulations From Which the Applicant Requests Exemption

The Applicant requests exemption from the following regulations:

14 C.F.R. Part 21, Subpart H
14 C.F.R. § 45.23(b)
14 C.F.R. § 61.113(a), (b)
14 C.F.R. § 61.3(d)(2)(iii)
14 C.F.R. § 91.7(a) (b)
14 C.F.R. § 91.9(b)(2)
14 C.F.R. § 91.103
14 C.F.R. § 91.109
14 C.F.R. § 91.119(b), (c)
14 C.F.R. § 91.121
14 C.F.R. § 91.151(a)(1)
14 C.F.R. § 91.203(a), (b)
14 C.F.R. § 91.405(a), (b)
14 C.F.R. § 91.407(a)(1)
14 C.F.R. § 91.409(a)(1)-(2)
14 C.F.R. § 91.417(a), (b)

The sUAS platforms the Applicant seeks approval to use through this exemption request all weigh 55 pounds or fewer, including payload. They operate, under normal conditions at a speed of no more than 50 knots. The rotorcraft platforms have the capability to hover and move in the vertical and horizontal plane simultaneously. Each sUAS platform will operate only in visual line of sight and will operate only within the Operations Areas defined by the discrete COA applications filed prior to each flight. These operations will ensure that the sUAS will "not create a hazard to users of the national airspace system or the public," as contemplated by Section 333(b) of FMRA.

Given the small size of the sUAS platforms involved and the limited environments within which they will operate, the applicant falls squarely within that zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of sUAS to commence immediately. Also, due to the size of the sUAS platforms and the defined areas in which the relevant sUAS will operate, approval of the

application presents no national security issue. Given the clear direction in Section 333 of the FMRA, the authority contained in the Federal Aviation Act, as amended; the strong equivalent level of safety surrounding the proposed operations, and the significant public benefit in producing graduates that are trained in sUAS operations, it is in the public interest to grant the requested exemption. Accordingly, the applicant respectfully requests that the FAA grant the requested exemption without delay.

Narrative Regarding Requested Exemptions

14 C.F.R. Part 21, Subpart H: Airworthiness Certificates 14 C.F.R. § 91.203(a)(1)

The FAA has previously determined that no airworthiness certification is necessary for sUAS platforms. *See*, *e.g.*, Exemption No. 11110. The Applicant therefore believes that no exemption is necessary from Part 21, Subpart H.

To the extent that the FAA finds that Part 21 is applicable to the Applicant's proposed operations, the Applicant requests an exemption from it. Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by 14 C.F.R. § 91.203(a)(1). Given the size and limited operating area associated with the sUAS platforms to be utilized by the Applicant, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the FMRA. The Federal Aviation Act (49 U.S.C.§ 44701(f)) and Section 333 of the FMRA both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the particular sUAS. In all cases, an analysis of these criteria demonstrates that the sUAS operated without an airworthiness certificate, in the restricted environment and under the conditions proposed will be at least as safe, or safer, than a conventional aircraft operating with an airworthiness certificate without the restrictions and conditions proposed.

The sUAS platforms to be operated under this exemption all weigh less than 55 pounds, fully loaded. The platforms carry no pilots or passengers, no explosive materials or flammable liquid fuels, and will operate exclusively within the Operations Areas defined in this application. Operations under this exemption will be tightly controlled and monitored by the operator. The FAA will have advance notice of all operations. These safety enhancements provide a greater degree of safety to the public and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Application of these same criteria demonstrates that there is no credible threat to national security posed by the sUAS platforms due to their size, speed of operation, location of operation, lack of explosive materials or flammable liquid fuels, and inability to carry a substantial external load.

14 C.F.R. § 45.23(b). Marking of the Aircraft

The FAA has previously determined that an exemption from § 45.23(b) is not required for sUAS platforms that do not need to be certified under Part 21. *See, e.g.*, Exemption No. 11110. The Applicant therefore believes that no exemption is necessary from 14 C.F.R. § 45.23(b). To the extent that the FAA finds that § 45.23(b) is applicable to the Applicant's intended operations, the Applicant requests an exemption therefrom as follows.

The regulation requires:

> When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited," "restricted," "light-sport," "experimental," or "provisional," as applicable.

Even though the sUAS platforms will have no airworthiness certificate, an exemption may be needed as the sUAS will have no entrance to the cabin, cockpit or pilot station on which the word "Experimental" can be placed. Given the size of the sUAS platforms, two-inch lettering may be impossible. The word "Experimental" will be placed on the fuselage in compliance with 14 C.F.R. § 45.29(f).

The equivalent level of safety will be provided by having the sUAS marked on its fuselage as required by 14 C.F.R. § 45.29(f) where the pilot, observer and others working with the sUAS will see the identification of the sUAS as "Experimental." The FAA has issued the following exemptions to this regulation to Exemptions Nos. 10700, 8738, 10167 and 10167A.

14 C.F.R. § 61.113 (a) & (b): Private Pilot Privileges and Limitations: Pilot in Command

Sections 61.113 (a) & (b) limit private pilots to non-commercial operations. Because the sUAS will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current operations by requiring the PIC operating the aircraft to have a private pilot's certificate rather than a commercial pilot's certificate to operate this sUAS. Unlike a conventional aircraft that carries the pilot and passengers, the sUAS is remotely controlled with no living thing on board. The Operations Areas will be controlled and all flights will be planned

and coordinated in advance. The level of safety provided by the requirements included in the Applicant's SOP and the Manufacturer Instructions exceeds that provided by a single individual holding a commercial pilot's certificate operating a conventional aircraft. The risks associated with the operation of sUAS are so diminished from the level of risk associated with commercial operations contemplated by Part 61 when drafted, that allowing operations of sUAS as requested with a private pilot as the PIC exceeds the present level of safety achieved by 14 C.F.R. § 61.113 (a) & (b). The FAA has approved sUAS operations with a private pilot's certificate in other exemptions. *See, e.g.*, Exemption No. 11110.

14 C.F.R. § 61.3(d)(2)(iii): Requirement for Certificates, Ratings, and Authorizations

The regulation requires that "no other person other than the holder of a flight instructor certificate issued under this part with the appropriate rating on that certificate may . . . [e]ndorse a pilot logbook to show training given." The Applicant requests exemption from this regulation as the PIC performing training activities under this exemption may not hold an FAA-issued flight instructor certificate. An equivalent level of safety will be achieved by the Applicant's adherence to the procedures set forth in the SOP and the Manufacturer Instructions.

14 C.F.R. § 91.7(a): Civil aircraft airworthiness

The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. As there will be no airworthiness certificate issued for the aircraft, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. An equivalent level of safety will be provided by the small size of the aircraft and the requirements contained in the SOP and Manufacturer Instructions for maintenance and use of safety check lists prior to each flight. The Applicant will ensure that the sUAS is in an airworthy condition prior to each flight based on compliance with the specifications in the SOP and Manufacturer Instructions.

14 C.F.R. § 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft

Section 91.9(b)(2) provides:

> No person may operate a U.S.-registered civil aircraft …
>
> (2) For which an Airplane or Rotorcraft Flight Manual is not required by § 21.5 of this chapter, unless there is available in the aircraft a current approved airplane or Rotorcraft Flight Manual,

> approved manual material, markings, and placards, or any combination thereof.

The sUAS platforms, given their size and configuration, have no ability or place to carry a flight manual. An equivalent level of safety will be maintained by keeping the flight manual at the ground control point where the pilot flying the sUAS will have immediate access to it. The FAA has issued the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700. The FAA has previously determined that an exemption from this regulation is not necessary, as relevant materials may be kept in a location accessible to the PIC and not on the sUAS itself. *See* Exemption No. 11110.

14 C.F.R. § 91.103: Preflight action

This regulation requires each pilot in command to take certain actions before flight to insure the safety of flight. As FAA approved flight manuals will not be provided for the aircraft an exemption will be needed. An equivalent level of safety will be provided through the PIC following the procedures set forth in the SOP and Manufacturer Instructions. The PIC will take all actions including reviewing weather, flight battery requirements, landing and takeoff distances and aircraft performance data before initiation of flight. The PIC will account for all relevant site-specific conditions in the preflight procedures. The FAA has granted exemption from this regulation to other sUAS operators. *See* Exemption No. 11109.

14 C.F.R. § 91.109: Flight instruction

Section 91.109 provides that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls. By their design, sUAS and remotely piloted aircraft do not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. The FAA has approved exemptions for flight training without fully functional dual controls for a number of aircraft and for flight instruction in experimental aircraft. *See* Exemption Nos. 5778K and 9862A. The equivalent level of safety provided by the fact that neither a pilot nor passengers will be carried in the aircraft and by the size and speed of the aircraft.

For sUAS platforms that require manual flight control, the PIC and the student that the PIC is training will use a “buddy box” system utilizing two transmitters. The PIC instructor will be able to control the sUAS with his or her transmitter, flip a switch to transfer control to the student, and may flip the switch again to regain control. In this manner, the PIC instructor can demonstrate how to fly the sUAS or perform a “rescue” of the sUAS if the student makes a poor

aeronautical decision. Use of the buddy box system allows this level of control without having the PIC and student pass a physical controller between them.

When the PIC is performing training on sUAS platforms that utilize a computer, tablet, or other non-radio transmitter as their primary source of control, the PIC will provide an equivalent level of safety through the use of a radio transmitter that can override autonomous control via a switch located on the radio transmitter. When this switch is activated, control is transferred from the autopilot to the transmitter, immediately taking the autopilot offline. The sUAS will then be operated in the same manner as a basic radio controlled aircraft. The PIC will maintain visual line of sight at all times in order to determine whether such intervention becomes necessary.

14 C.F.R. § 91.119: Minimum safe altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119(d) allows helicopters to be operated at less than the minimums prescribed, provided the person operating the helicopter complies with any route or altitudes prescribed for helicopters by the FAA. As this exemption is for sUAS that are similar to helicopters, and the exemption requests authority to operate at altitudes up to 400 AGL, an exemption may be needed to allow such operations. The sUAS platforms will not be operated at higher than 400 AGL.

The equivalent level of safety will be achieved given the size, weight, speed of the sUAS platforms as well as the locations where they are operated. The low-altitude operations of the sUAS platforms will ensure separation between these sUAS operations and the operations of conventional aircraft that must comply with Section 91.119.

14 C.F.R. § 91.121: Altimeter Settings

This regulation requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "…to the elevation of the departure airport or an appropriate altimeter setting available before departure." As the sUAS platforms may not have a barometric altimeter, but instead a GPS altitude read out, an exemption may be needed. An equivalent level of safety will be achieved by the operator, pursuant to the SOP and Manufacturer Instructions, confirming the altitude of the launch site shown on the GPS altitude indicator before flight.

14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions

Section 91.151 (a) prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing, and, assuming normal cruising speed – (1) During the

day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes."

Given the limitations on the proposed Operations Areas, a longer time frame for VFR conditions is reasonable. Applicant believes that an exemption from 14 CFR § 91.151(a) falls within the scope of prior exemptions. *See* Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with 14 C.F.R. § 91.151 (a)).

Operating the sUAS platforms in controlled Operations Areas does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the sUAS platforms. Similar exemptions have been granted to other operations, including Exemptions 2689F, 5745, 10673, and 10808.

14 C.F.R. § 91.203 (a) and (b): Carrying Civil Aircraft Certification and Registration

The FAA has previously determined that no airworthiness certification is necessary for sUAS platforms. *See*, *e.g.*, Exemption No. 11110. The Applicant therefore believes that no exemption is necessary from § 91.203. However, to the extent that the FAA finds that section 91.203 is applicable to the Applicant's operations, the Applicant requests an exemption therefrom.

The regulation provides in pertinent part:

> (a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:
>
> (1) An appropriate and current airworthiness certificate. . . .
>
> (b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

The sUAS platforms weigh no more than 55 pounds fully loaded, and are operated without an onboard pilot. As such, there is no ability or place to carry certification and registration documents or to display them on the sUAS.

An equivalent level of safety will be achieved by keeping these documents at the ground control point where the pilot flying the sUAS will have immediate access to them, to the extent they are applicable to the sUAS. The FAA has issued numerous exemptions to this regulation. A representative sample of other exceptions includes Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

14 C.F.R. § 91.405 (a); 407 (a) (1); 409 (a) (2); 417(a) & (b): Maintenance Inspections

These regulations require that an aircraft operator or owner "shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter...," and others shall inspect or maintain the aircraft in compliance with Part 43.

Given that these section and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to the Applicant. Maintenance will be accomplished by the operator pursuant to the SOP and the Manufacturer Instructions. An equivalent level of safety will be achieved because these sUAS are very limited in size, will carry a small payload, and will operate only in defined Operations Areas for limited periods of time. If mechanical issues arise the sUAS platforms can land immediately and will be operating from no higher than 400 feet AGL. As provided in the SOP and Manufacturer Instructions, the operator will ensure that the sUAS is in working order prior to initiating flight, perform required maintenance, and will keep a log of any maintenance performed. Moreover, the operator is the person most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety.

Federal Register Summary

Pursuant to 14 C.F.R. Part 11, the following summary is provided for publication in the Federal Register, should it be determined that publication is needed:

> Applicant seeks an exemption from the following rules:
> 14 C.F.R. Part 21, Subpart H; 14 C.F.R. § 45.23(b); 14 C.F.R. § 61.113(a), (b); 14 C.F.R. § 61.3(d)(2)(iii); 14 C.F.R. § 91.7(a), (b); 14 C.F.R. § 91.9(b)(2); 14 C.F.R. § 91.103; 14 C.F.R. § 91.109; 14 C.F.R. § 91.119(b), (c); 14 C.F.R. § 91.121; 14 C.F.R. § 91.151(a)(1); 14 C.F.R. § 91.203(a), (b); 14 C.F.R. § 91.405(a), (b); 14 C.F.R. § 91.407(a)(1); 14 C.F.R. § 91.409(a)(1)-(2); and 14 C.F.R. § 91.417(a), (b), to operate a small unmanned aircraft system weighing less than fifty-five pounds for training purposes.

Approval of exemptions allowing commercial operations of sUAS platforms for commercial purposes will enhance safety by providing services to customers without the danger and cost associated with manned aircraft. Approval of commercial training of sUAS pilots will enhance safety by providing trained sUAS pilots for hire to the commercial sUAS industry. The operation of sUAS, weighing less than 55 pounds, conducted in accord with the conditions outlined above, will provide an equivalent level of safety supporting the grant of the exemptions requested herein, including exempting the applicant from the requirements of Part 21 and allowing commercial operations. These lightweight aircraft operate at slow speeds, close to the ground, and in a sterile environment. As a result, sUAS are far safer than conventional operations conducted with manned aircraft.

Privacy Considerations

All flights will be conducted in the Operations Areas defined in the Applicant's discrete pre-flight COA applications. These areas will present no privacy issues of consequence.

Conclusion

The Applicant requests that the FAA grant the exemption requested herein. The Applicant looks forward to training the next generation of sUAS pilots that will carry the commercial industry forward.

Respectfully Submitted,

/s/ Vince Donohue
Vince Donohue
Vortex UAS, LLC

/s/ Richard E. Doran, Steven M. Hogan
Richard E. Doran and Steven M. Hogan
Ausley McMullen
Attorneys for Vortex UAS, LLC

ATTACHMENT 1

Vortex UAS, LLC

Standard Operating Procedures for Flight Operations

This attachment will be submitted in hard copy under a separate cover letter. This Attachment is submitted as a Confidential Document that contains Proprietary Information within the meaning of 14 C.F.R. § 11.35(b). The Applicant requests that the contents of this Attachment be held in a separate file to which the public does not have access.

ATTACHMENT 2

PHANTOM 2 VISION

User Manual V1.04

November 18, 2013 Revision

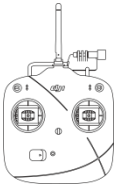
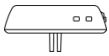
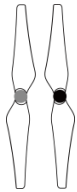
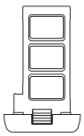
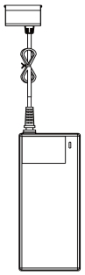
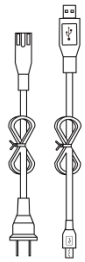
Congratulations on purchasing your new DJI product. Please thoroughly read the entire contents of this manual to fully use and understand the product.

It is advised that you regularly check the PHANTOM 2 VISION's product page at **www.dji.com** which is updated on a regular basis. This will provide services such as product information, technical updates and manual corrections. Due to any unforeseen changes or product upgrades, the information contained within this manual is subject to change without notice.

If you have any questions or concerns regarding your product, please contact your dealer or DJI Customer Service.

Index

In the Box

PHANTOM 2 VISION X1	5.8GHz Remote Controller X1	Range Extender X1
		
Propeller Pair X4	Mobile Device Holder X1	Micro-SD Card X1
		
Intelligent Battery X1	Charger X1	Cables X1
		
Plug Set X1	Screw X12	Screwdriver X 1
		
Assistant Wrench X1	Accessories Box X1	
		

Required Items

AA Battery x4


Symbol Legend

Forbidden(Important) Caution Tip Reference

Watch the Quick Start Videos

This user manual details installation and usage procedures of the product. In addition, we provide a range of quick start videos. It is advised that you watch them fully before attempting to use the product.

Approach 1	Direct link.	www.dji.com/phantom-2-vision/training	
Approach 2	Scan the QR code to get the quick start video link.		Preparing for flight.
			How to connect to the DJI VISION App.
			The basics of flying, recording and sharing.

Downloading the DJI VISION App

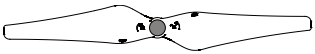
Before attempting to use the product, please download and install the DJI VISION App. Get the DJI VISION App according to the following methods.

Approach 1	Download from the App store or Google Play.	iOS user	Search “DJI VISION” from App Store.
		Android user	Search “DJI VISION” from Google Play.
Approach 2	Scan the QR code to get the download link.		Scan and download.

1 Attaching the Propellers

Please use the original 9-inch propellers which are classified by the color of each central nut. Damaged propellers can be replaced by purchasing new ones if necessary.

1.1 Introduction

Propellers	Grey Nut (9443)	Black Nut (9443 R)
Diagram		
Assembly Location	Attach to the motor thread that **does not have a black dot**.	Attach to the motor thread that **has a black dot**.
Fastening/Un-fastening Instructions	Lock: Tighten the propeller in this direction. Unlock: Remove the propeller in this direction.	

1.2 Assembly

1. (Fig.1) Remove the four warning cards from the motors after you read them.
2. (Fig.2) Prepare the two grey nut propellers and two black nut propellers. Make sure to match the black nut propellers with the correctly marked black dot motors. Tighten the propellers according to the fastening instructions.

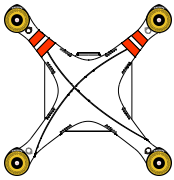


Fig.1

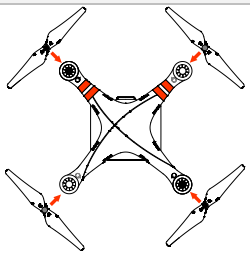


Fig.2

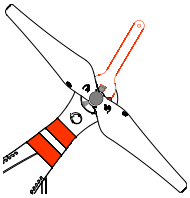


Fig.3

1.3 Removing the Propellers

(Fig.3) Keep the motor deadlocked in place with the assistant wrench (or one hand) and remove the propeller according to the un-fastening instructions.

1.4 Notes

(1) Propellers are self tightening during flight. DO NOT use any thread locker on the threads.

(2) Make sure to match the propeller nut colors with the corresponding motors.

(3) It is advised to wear protective gloves during propeller assembly and removal.

(4) Check that the propellers and motors are installed correctly and firmly before every flight.

(5) Check that all propellers are in good condition before flight. DO NOT use any ageing, chipped, or broken propellers.

(6) To avoid injury, STAND CLEAR of and DO NOT touch the propellers or motors when they are spinning.

(7) ONLY use original DJI propellers for a better and safer flight experience.

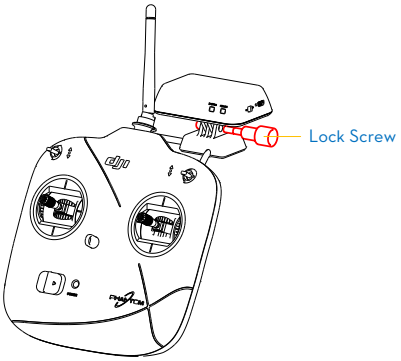
2 Installing the Range Extender and Mobile Device Holder

2.1 Installing the Range Extender

1. Adjust the range extender to align with the mounting bracket installed on the carrying handle.
2. Tighten the lock-screw to affix the range extender on the right side of the carrying handle.

(1) Make sure the assembly orientation is correct with the LED side facing you.

(2) To obtain better communication, try to keep the range extender facing the aircraft during flight.

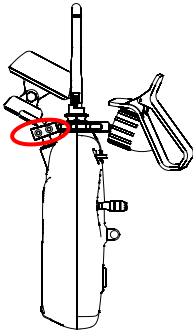


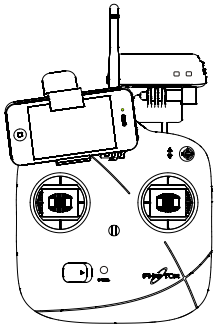
2.2 Installing the Mobile Device Holder

1. Tighten the Philips screws as shown to correctly attach the mobile device holder on the left side of the carrying handle.
2. Affix the mobile device sideways within the holder.

(1) Make sure the assembly orientation is correct. The mobile device should be facing you when mounted.

(2) It is recommended not to use oversized mobile devices (e.g. iPad), which cannot be placed into the Mobile Device Holder.





3 Preparing the Remote Controller

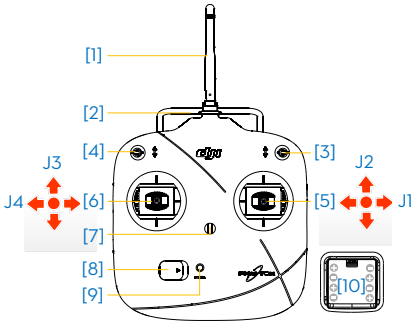
The PHANTOM 2 VISION remote control is a wireless communication device that uses the 5.8GHz frequency band. It is compliant with CE and FCC (see the FCC ID) regulations and is set to Mode 2 and CE compliance before delivery. If FCC compliance is required, it can be configured by twisting the potentiometer knob on the back of the remote controller. The stick configuration can also be reset in the PHANTOM RC assistant software. Please refer to < PHANTOM RC Assistant> and <Compliance Configuration> for details.

(1) CE compliant devices have an effective communication range of 300 meters in open spaces due to power limitations. Be sure to watch your fight distance as the PHANTOM 2 VISION will enter Failsafe mode (auto-landing or go home and land) if it flies beyond this range.

(2) FCC compliant devices have an effective range of 500 meters in open spaces. Be sure to watch your fight distance as the PHANTOM 2 VISION will enter Failsafe mode (auto-landing or go home and land) if it flies beyond this range.

(3) Pay attention to and follow local laws and regulations.

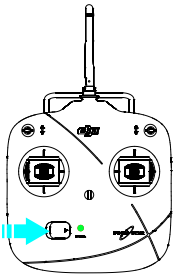
3.1 The Remote Controller



[1]	Antenna
[2]	Carrying Handle
[3]	Switch S1
[4]	Switch S2 (Reserved)
[5]	Joystick(J1: Roll [left&right], J2: Pitch [front&back])
[6]	Joystick(J3: Throttle [up&down], J4: Yaw [rotation])
[7]	Neck Strap Attachment
[8]	Power Switch
[9]	Power Indicator
[10]	Battery Compartment (On the back)

3.2 Power on the Remote Controller

1. Install the four AA Batteries (not included) into the battery compartment on the back of the remote controller according to the negative and positive poles.
2. Set the S1 and S2 switches to the upper most position and all sticks are at mid-point before switching on the power switch.
3. There is a power on indicator beep. If the remote controller is set to be CE compliant, then there will be one beep while the FCC compliant version will emit 2 beeps. The power indicator blinks green quickly indicating the remote controller and receiver is linking. Once fully linked, the power indicator will change to a solid green.



(1) If the low voltage warning alert sounds (refer to the <Remote Controller Power Indicator Status Information>), please replace batteries as soon as possible.

(2) Using the incorrect type of battery may prevent a risk of damage.

(3) Remove the batteries after use and dispose of them safely.

(4) For long term storage, be sure to remove the batteries from the remote controller.

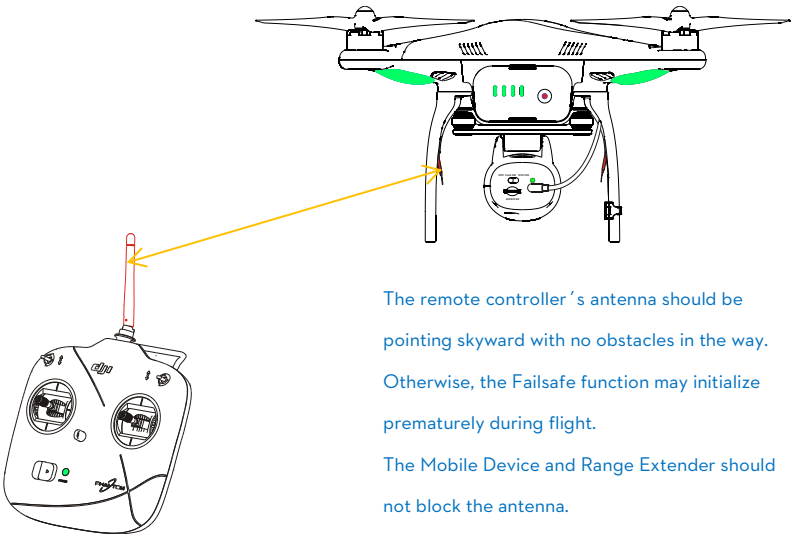
3.3 Remote Controller Power Indicator Status Information

Power indicator	Sound	Remote Controller State
▬▬▬	None	Functioning normally.
●●●●●●	None	Establishing a link between the remote controller and the receiver.
● ● ● ●	B-B-B.....	Low voltage (at 3.9V-4.5V), should replace the batteries immediately.
●●●●●●	BBBB	Low voltage (lower than 3.9V). The remote controller will automatically power off. Batteries should be replaced immediately.
● ● ● ●	B-B-B.....	The remote controller will give a visual indication of an alarm after 15 minutes of non-operation. The alarm status will disappear once you start operation of the remote controller.

The remote controller will blink the LED and sound an alert when the voltage drops below 3.9V and automatically power off after 3 seconds. This process will repeat even if you power cycle the remote controller. If this low voltage warning occurs during flight, the remote controller will automatically power off causing the aircraft to enter Failsafe mode which cannot be interrupted (refer to <Failsafe Function> section for details). It is strongly recommended to replace batteries if the 3.9V-4.5V low voltage warning occurs.

3.4 Antenna Orientation

Try to keep the antenna pointing skyward, perpendicular to the ground, in order to achieve the maximum communication range during flight.



The remote controller's antenna should be pointing skyward with no obstacles in the way. Otherwise, the Failsafe function may initialize prematurely during flight.

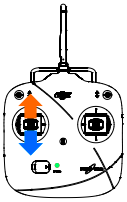
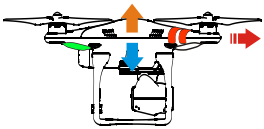
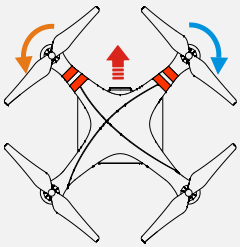
The Mobile Device and Range Extender should not block the antenna.

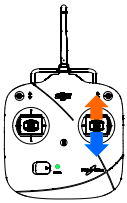
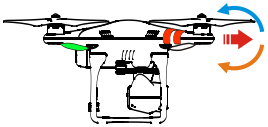
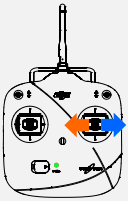
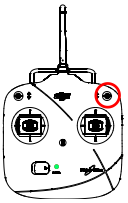
3.5 Remote Controller Operation

Definitions

The '**stick neutral**' positions and '**stick released**' mean the control sticks of the remote controller are placed at the central position.

To '**move the stick**' means that the stick of remote controller is pushed away from the central position.

Remote Controller (Mode 2)	Aircraft (nose direction)	Operation details
		The throttle stick controls the aircraft elevation. Push the stick up and the aircraft will rise. Pull the stick down and the aircraft will descend. The aircraft will automatically hover and hold its height if the sticks are centered. Push the throttle stick above the centered (neutral) position to cause the aircraft to take-off. We suggest that you push the throttle stick slowly to prevent the aircraft from sudden and unexpected elevation.
		The yaw stick controls the aircraft rudder. Push the stick left and the aircraft will rotate counter clock-wise. Push the stick right and the aircraft will rotate clock-wise. If the stick is centered, the aircraft will always fly in the same direction. The command stick controls the rotating angular velocity of the aircraft. Increasing movement of the

		command stick results in faster aircraft rotation velocity.
		The pitch stick controls the aircraft's front & back tilt. Push the stick up and the aircraft will tilt and fly forward. Pull the stick down and the aircraft will tilt and fly backward. The aircraft will keep level and straight if the stick is centered. Increasing movement of the command stick will result in a larger tilt angle (maximum is 35°) and faster flight velocity.
		The roll stick controls the aircraft left & right tilt. Push the stick left and the aircraft will tilt and fly left. Push the stick right and the aircraft will tilt and fly right. The aircraft will keep level and straight if the stick is centered. Increasing movement of the command stick will result in a larger tilt angle (maximum is 35°) and faster flight velocity.
	 Position-1 Position-2 Position-3	S1 is for compass calibration. Toggle the S1 from position-1 to position-3 and back to position-1 about 6 to 10 times which will force the aircraft to enter into compass calibration mode.

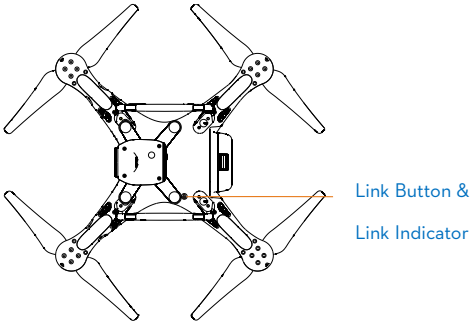
(1) For `Ready to Fly' the aircraft will hover (hold a stable horizontal position) when all sticks are released.

(2) For `Ready to Fly (non-GPS)' the aircraft will keep the aircraft level without horizontal positioning when all sticks are released.

3.6 Link between the Remote Controller and Receiver

There is a 5.8G receiver in the PHANTOM 2 VISION, with the link button and indicator located on the bottom of the aircraft as illustrated in the following diagram.

The link between the remote controller and aircraft is already established for you so you can initially skip this procedure. If you ever replace the remote controller, re-establishing the link is required.



Link Procedures

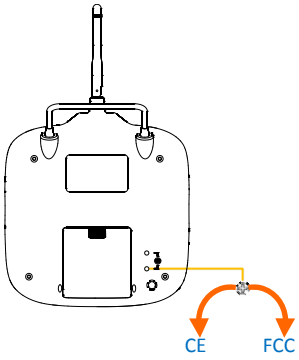
1. Power off the remote controller, power on the aircraft. You will see the link indicator blinking red.
2. Press the link button with a thin object and hold until the link indicator blinks yellow. Release the link button.
3. Power on the remote controller and the link indicator should switch off. This indicates that the link has been successfully established.

Link Indicator

Link Indicator	Description	Operation
	No signal received.	Switch on the remote controller or perform a link procedure.
	In link status.	Switch on the remote controller.

3.7 Compliance Version Configuration

The compliance version can be reconfigured by twisting the potentiometer knob (See the following diagram) on the back of the remote controller using a flathead screwdriver. For CE compliance, set the remote controller to CE compliance by carefully turning the potentiometer knob to the full counter clock-wise position. For FCC compliance, set the remote controller to FCC compliance by carefully turning the potentiometer knob to the full clock-wise position. Users should follow their local regulations accordingly.



When adjusting the potentiometer knob to its limit position, be very careful to prevent damaging the potentiometer knob. Do not apply too much force during this adjustment. Also be sure to use the correct sized screwdriver.

(1) The remote controller comes set for CE compliance up delivery as the default setting.

(2) It is recommended to use a flathead screwdriver of Φ 2.4mm for adjustment.

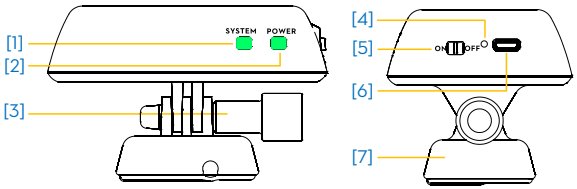
(3) You can use the DJI screwdriver with the flathead for adjustment.

4 Preparing the Range Extender

The PHANTOM 2 VISION range extender is a wireless communication device that operates within the 2.4 GHz frequency band and is used for extending the effective range of communication between a mobile device (Smartphone) and the PHANTOM 2 VISION. In an open unobstructed area, the transmission distance can reach up to 300 meters, but is usually affected by the surrounding environment, such as trees, buildings and other sources of the same frequency. Before every flight, it is suggested that you ensure the range extender functions properly. Otherwise you may experience a communication issue with the mobile device and the PHANTOM 2 VISION.

Each range extender has a unique MAC address and network name (SSID), details of which are printed on the back label as `Phantom_1xxxxx'. The `xxxxx' represents the last five letters or numbers of the MAC address for the range extender.

4.1 The Range Extender



Front View Right View

[1]	Wi-Fi Signal Indicator
[2]	Power Indicator
[3]	Lock-screw
[4]	Reset Button
[5]	Power Switch
[6]	Micro-USB
[7]	Mounting Bracket

4.2 Function Description

[1] Wi-Fi Signal Indicator (SYSTEM)

Tells you the system status of the range extender.

Wi-Fi Signal Indicator	Description
● ● ● ●	The range extender system is working normally.
Off	The range extender system is working abnormally.

[2] Power Indicator (POWER)

Tells you the power status of the range extender.

Power Indicator	Description
▬	The range extender is working normally or completely charged.
▬	Low voltage alert, a re-charge is required.
▬	The range extender is charging (allow for 3~4 hours, depending on USB power output).

(1) Make sure to charge the range extender completely before using it for the first time.

(2) If the power indicator is a solid red light, the ranger extender may stop working at any moment. Recharge it as soon as possible.

(3) It is recommended to charge the range extender completely before each use.

(4) Turn off the range extender after every use.

(5) Keep the range extender facing the aircraft during flight for the best communication link.

[3] Lock-screw

For attaching the range extender on the right side of the remote controller's carrying handle.

[4] Reset Button:

Press to link the range extender and the camera.

[5] Power Switch:

ON – Power on.

OFF – Power off.

[6] Micro-USB

Used to charge the range extender.

[7] Mounting Bracket

It has been pre-installed on the remote controller's handle. It is used to attach the range extender.

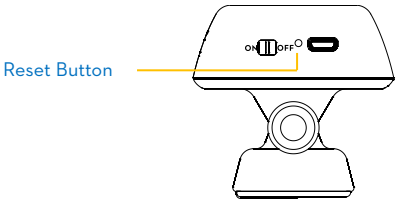
4.3 Powering on the Range Extender

1. Toggle the power switch of range extender to ON position.
2. Wait for approximately 30 seconds. The Wi-Fi signal indicator should blink green indicating the range extender is communicating properly.

It is advised that you power off the range extender after every flight to avoid discharging the battery.

4.4 How to Bind the Camera & Range Extender

If the camera and range extender connection is lost, or one of them needs to be repaired or replaced, a camera and range extender binding will need to be performed via the DJI VISION App.



1. Power on the camera and range extender. Note:(Place the camera power switch to the 'WIFI ON' position).
2. Approximately 30 seconds later, press the reset button on the range extender with a thin object until the Wi-Fi signal indicator turns off. The range extender will then restart automatically.
3. Approximately 30 seconds later, the Wi-Fi signal indicator should start to blink green, which indicates the range extender is now ready to be bound.
4. Find and select the Phantom_1xxxxx via the Wi-Fi list on the mobile device to connect the range extender.
5. (Fig.1) Run the DJI VISION App->Settings->General->Binding. (Fig.2) Select 'Scan the QR Code' to scan the camera QR code on the product packaging. (Fig.3) Get the camera SSID (E.g. FC200_0xxxxx) and the MAC address, select the tick on the top right corner. The range extender should automatically restart. The binding procedure is now complete.

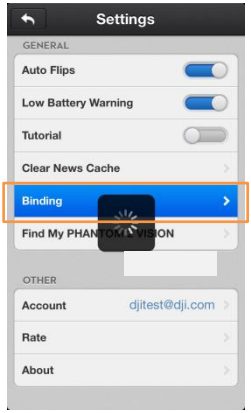


Fig.1

Fig.2 (QR code is only for example.)

Fig.3

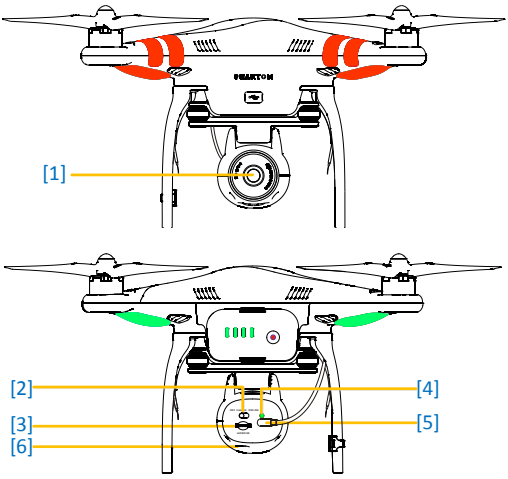
(1) If both the camera and range extender are powered on and working normally, you will be able to find the SSID on the Wi-Fi list of the mobile device.

(2) DO NOT push the reset button of the range extender unless you are ready to rebind the range extender and the camera! This will unbind your camera and you must follow the steps above to rebind.

(3) The QR code is located on the packaging of the PHANTOM 2 VISION. If you cannot find the QR code, please contact DJI customer service to receive the QR code related to your camera's serial number.

5 Preparing the Camera

5.1 The built-in camera



[1]	Lens
[2]	Camera Power Switch
[3]	Micro-SD Card Slot
[4]	Camera Status Indicator
[5]	Camera Cable
[6]	Capture/Record Button

Camera Features	Specifications
Resolution	14 Megapixels
FOV	140° / 120° / 90°
Sensor size	1/2.3"
Functions	Supports multi-capture, continuous capture and timed capture Supports HD Recording (1080p30/1080i60) Supports both RAW and JPEG photo formats

5.2 Main Functions

[1] Lens

For viewing and photographing, with main parameters of f/2.8 , FOV 140°.

Please remove the lens cover when the camera is in use and replace the cover for storage.

[2] Camera Power Switch (on the back of the camera)

Used to power the camera on and off.

OFF – Powered off.

CAM ON – Power on, Wi-Fi off.

WIFI ON – Power and Wi-Fi are both on. Make sure to switch to `WIFI ON' and the range extender is powered on if using the DJI VISION App.

[3] Micro-SD Card Slot (on the back of the camera)

Make sure that the Micro-SD card is inserted before you take any photos or record any videos.

(1) Maximum supported Micro-SD card capacity is 32GB.

(2) The DJI VISION App may not be able to read the Micro-SD card prepared by the user. It is suggested that you use the DJI VISION App to format the Micro-SD card when first used in the camera.

(3) Refer to the <Camera Settings> for Micro-SD card formatting details.

[4] Camera Indicator (on the back of the camera)

The Camera Indicator is used to inform the user of the working status of the camera.

Camera indicator	Wi-Fi	Camera status
Solid	OFF	Power On; Idle State
Slow Blink (0.2s on, 1.8s off)	ON	Idle State
Fast Blink (0.1s on, 0.3s off)	ON	Synchronizing photos and videos
Solid	OFF	Recording
Blink Once (0.2s on, 0.3s off)	ON/OFF	Taking a single capture
Blink 3 Times(0.1s on, 0.1s off)	ON/OFF	Taking 3 or 5 photos per shot
Fast Blink (0.1s on, 0.3s off)	ON/OFF	Firmware Upgrading
(0.2s green, 1.8s yellow)	ON	Recording
Solid	ON/OFF	Critical error
Slow Blink (0.2s on, 1.8s off)	ON/OFF	CMOS sensor error
Blink Once (0.2s on, 0.3s off)	ON/OFF	Operation failed
Blink 3 Times(0.1s on, 0.1s off)	ON/OFF	Micro-SD Card error
Fast Blink (0.1s on, 0.3s off)	ON/OFF	Upgrade error
(0.5s green, 0.5s yellow, 0.5s red, 0.5s Off)	ON/OFF	Camera has overheated

When camera temperature rises above 80℃, the LED indicator will blink . The camera will automatically power off if the temperature rises above 85℃.

[5] Camera Cable (on the back of the camera)

Make sure that the camera cable is firmly attached to the camera before powering the camera on.

[6] Capture/Record Button (on the bottom of the camera)

Capture function: Press the button once (less than 2 seconds) to take a single capture.

Record function: Press the button once (greater than 2 seconds) to begin recording. Press once again to stop.

6 Downloading and Installing the DJI VISION App

6.1 Download and Install

Download and install approaches		
Approach 1	Scan the QR code to read the download link. Download and install the DJI VISION App on your mobile device. You can find the QR code on the `Quick Start Guide' as well as on the packaging of the PHANTOM 2 VISION.	
Approach 2	iOS user	Search "DJI VISION" from App Store, download and install on your mobile device.
	Android user	Search "DJI VISION" from Google Play, download and install on your mobile device.

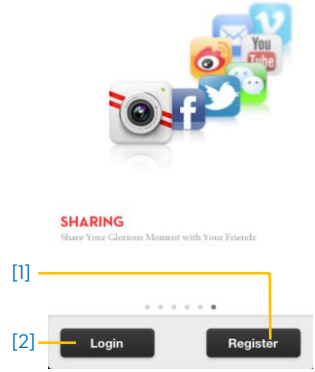
Supported mobile devices	
iOS (iOS6 or above)	Recommended: iPhone4s, iPhone5, iPhone5s, iPhone5C, iPod Touch4, iPod Touch5; Available but not recommended: iPAD3, iPAD4, iPAD mini.
Android (System 4.0 or above)	Samsung Galaxy S3, S4, Note2, Note3 or mobile devices of similar configuration.

DJI continues to support many mobile devices and any information from users are welcome. Please send any questions or queries to the following mailbox: phantom2vision@dji.com.

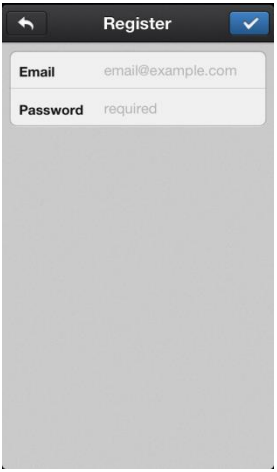
Be aware that the DJI website regularly updates so make sure you visit often as well as the App Store or Google Play in order to download the latest version of the DJI VISION App.

6.2 Register & Login

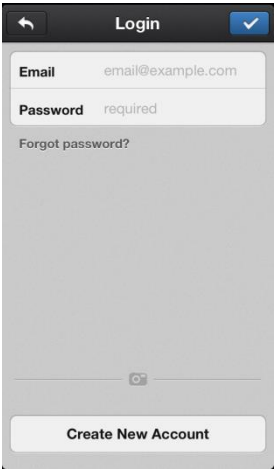
Access the Internet to register and login.



The App Welcome Page



Registration Page



Login Page

[1] Register

Select `Register' to enter the registration page. Fill in your Email and Password information and then select to create a new account.

[2] Login

Select `Login' to enter the login page. Fill in your registered Email and Password and then select to login.

(1) You should login to your account the first time you use the DJI VISION App.

(2) If you do have an account, but forgot the password, select the "Forgot password" to retrieve it.

[3] Usage tips

Useful tips will display when you enter the welcome page. Tap the screen to display the next useful tip.

7 Preparing the Flight Battery

Before use, please read and follow the user manual, disclaimer, and the warnings on the battery.

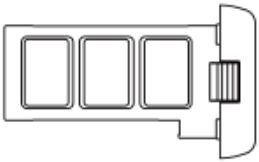
Users take full responsibility for all operations and usage.

7.1 Intelligent Battery and Charger Instructions

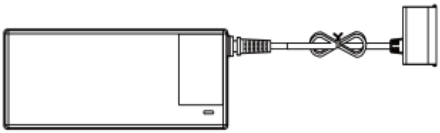
The intelligent battery is specially designed for the PHANTOM 2 VISION, with a battery capacity of 5200mAh, voltage of 11.1v and charge-discharge management functionality. The battery should only be charged with the charger provided by DJI. DJI does not take any responsibility for operation of any charger from a third party.

There are many features provided by the DJI charger:

- Balance charge protection
- Full charge protection
- Short circuit protection
- Output protection
- Sleep protection
- Overheating protection



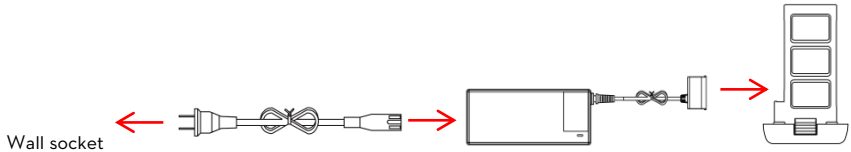
Intelligent Battery



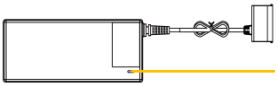
Charger

7.2 Charging Procedures

1. Connect the battery to the charger while the power is OFF.
2. Connect the charger to a wall socket. The charger indicator light will turn a solid red when it is charging.
3. Wait until the charger indicator turns solid green to which indicates that the battery is completely charged.



Wall socket

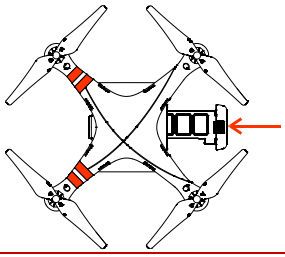


Charger Indicator

Charger indicator	Status of charge
	Charging.
	Completely charged.

7.3 Install the Battery

Push the battery into the battery compartment correctly as the following diagram shows. Make sure to push the battery into the compartment until you hear a `click' sound.



An incorrectly inserted battery may cause one of the following to occur:

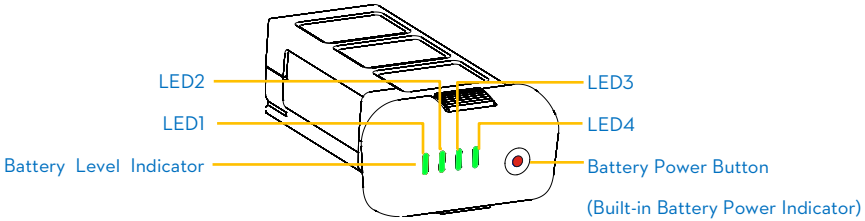
(1) Bad contact.

(2) Unavailable battery information.

(3) Unsafe for flight.

(4) Unable to take off.

7.4 Battery Usage



(1) Checking the battery level: When the battery is powered off; pressing the battery power button once will indicate the current battery level. Refer to < Battery Level Indicator Description> for details.

(2) Powering on: When the battery is powered off; press the battery power button once and then press and hold for 2 seconds to turn on the intelligent battery.

(3) Powering off: When the battery is powered on; press the battery power button once and then press and hold for 2 seconds to turn off the intelligent battery.

More battery information is available in the battery tab of the PHANTOM 2 VISION assistant software.

Description of the Battery Level Indicator

The current battery level is shown during both the charging and discharging process. Refer to the following table for details

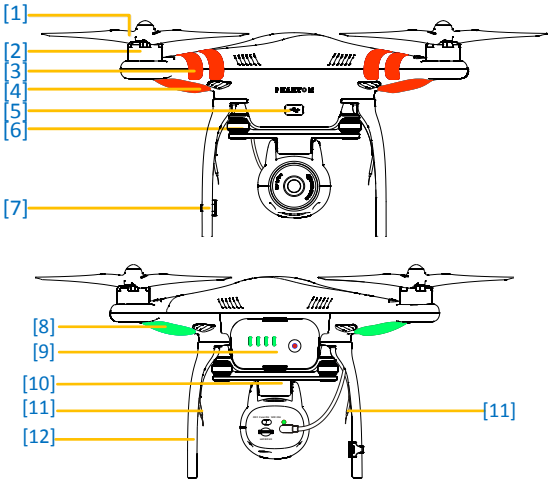
Battery level indicator				Current battery level
LED1	LED2	LED3	LED4	
On	On	On	On	87.5%~100%
On	On	On	Blinking	75%~87.5%
On	On	On	Off	62.5%~75%
On	On	Blinking	Off	50%~62.5%
On	On	Off	Off	37.5%~50%
On	Blinking	Off	Off	25%~37.5%
On	Off	Off	Off	12.5%~25%
Blinking	Off	Off	Off	0%~12.5%
Off	Off	Off	Off	<0%

7.5 Correct Battery Usage Notes

- It's suggested you purchase a new battery after you have discharged your current battery over 300 times.
- It's recommended to charge and discharge the battery thoroughly once every 20 charge/discharge cycles. Users should discharge the battery until there is less than 8% power left or until the battery can no longer be turned on. Refer to the DJI VISION App for an exact readout of the battery percentage level. You should then fully recharge the battery to maximum capacity. This power cycling procedure will ensure the battery is working at its optimal level.
- Turn the power OFF when you have finished flying and remove the battery from its compartment.
- Take the battery out of the aircraft after every flight and store the battery in a safe and secure place.
- Adhere to the notes for the battery in the disclaimer and regard safety as your first priority.
- The battery should be charged in an environment that is between 10℃ to 40℃, and be discharged in an environment that is between -20℃ to 60℃. Both charging and discharging should be in an environment that the relative humidity is lower than 80%.
- It's suggested that you purchase a new battery if the current battery is swollen or damaged in any way.
- Never try to recharge or fly with a battery that is swollen or damaged in any way.
- Never charge the battery unattended. Always charge the battery on a non-flammable surface such as concrete and never near any flammable materials.

8 PHANTOM 2 Aircraft

8.1 The Aircraft



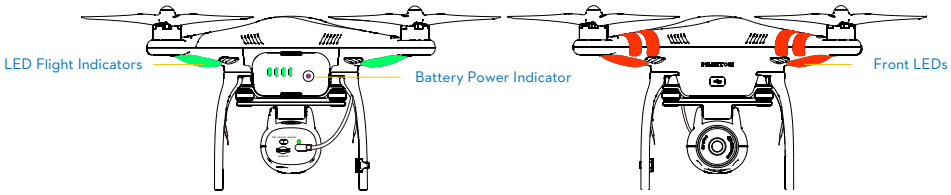
[1]	Propeller
[2]	Motor
[3]	Front Side
[4]	Front LEDs
[5]	Micro-USB
[6]	Vibration Absorber
[7]	Compass
[8]	LED Flight Indicators
[9]	DJI Intelligent Battery
[10]	Servo
[11]	Receiver Antenna
[12]	Landing Gear

8.2 Built-in Flight Control System Instructions

The built-in flight control system is used to control the entire aircraft's functions in flight such as Pitch (forwards and backwards), Roll (left and right), Elevator (up and down) and Yaw (turn left or right). The flight controller contains the MC (Main Controller), IMU, GPS, compass, receiver and LED indicators. The IMU (Inertial Measurement Unit) has a built-in inertial sensor and a barometric altimeter that measures both attitude and altitude. The compass reads geomagnetic information which assists the GPS (Global Position System) to accurately calculate the aircrafts position and height in order to lock the aircraft in a stable hover. The receiver is used to communicate with the remote controller and the MC acts as the brains of the complete flight control system connecting and controlling all the modules together.

8.3 LED Flight Indicators Description

After powering on the intelligent battery, the LED flight indicators light up to show the aircraft's current status.



Front LEDs

The front LEDs are for indicating where the nose of the aircraft is. They light up solid red only after the motors have started spinning.

LED Flight Indicators Description

Normal status	LED flight indicators	Notes
Power On Self-Test		----
Warming Up		Aircraft cannot take off.
Ready to Fly		Slow blinking green.
Ready to Fly (non-GPS)		Slow blinking yellow.
Abnormal status	**LED flight indicators**	
Remote Controller Signal Lost		Fast blinking yellow. Refer to <Failsafe Function>.
1st Level Low Battery Capacity Warning		Slow blinking red.
2nd Level Low Battery Capacity Warning		Fast blinking red.
Not Stationary or Sensor Bias is too big		Keep aircraft stationary or perform IMU calibration.
Error*		Cannot fly.
Compass Needs Calibration		Refer to <Calibrating the Compass>.

(1) The aircraft should be kept stationary on level ground before takeoff.

(2) Make sure the aircraft's status is in Ready to Fly or Ready to Fly (non-GPS) mode before takeoff.

(3) If an error occurs (LED is solid red), please connect to the PHANTOM 2 VISION assistant software for more detailed information.

NO.	Errors	Operation
1	IMU calibration is required.	Calibrate within the assistant software.
2	IMU is abnormal.	Should be repaired.
3	Compass is abnormal.	Should be repaired.
4	Remote controller's mid-point is set abnormally.	Refer to < How to solve large margin(s) mid point error?>.

9 Connecting to the Camera

9.1 Camera Connection Procedures

Please carry out the following procedures to connect a mobile device to the PHANTOM 2 VISION.

1. Power on the remote controller and the range extender.
2. Make sure the switch on the back of the camera is set to “WIFI ON” and then power on the PHANTOM 2 VISION.
3. (Fig.1)Enable the Wi-Fi on your mobile device; wait for about 30 seconds, and then select the Phantom_1xxxxx from theWi-Fi network list.
4. (Fig.2)Run the DJI VISION App on your mobile device which will indicate the current Wi-Fi connection status on the main menu. The Wi-Fi connection indicator will turn solid green which means the connection is good.
5. Tap the “CAMERA” icon and the DJI VISION App will establish a live camera preview (Fig.3). This means everything is now functioning.

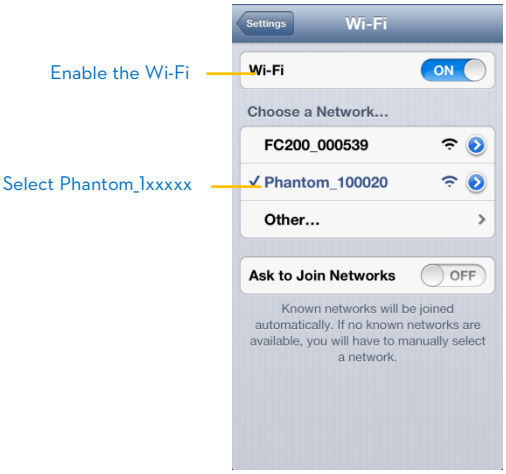


Fig.1

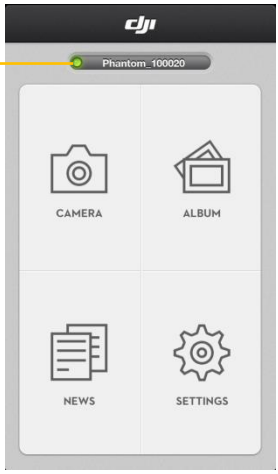


Fig.2

Fig.3

Wi-Fi Connection Indicator Description

Icon		Description
	Solid green	Wi-Fi is now connected to the PHANTOM 2 VISION.
	Solid blue	Wi-Fi is connected to another Wi-Fi network and NOT to the PHANTOM 2 VISION.
	Off	No Wi-Fi connection.

(1) The first time you launch the DJI VISION App, Internet access is required to finish the login process or new account creation.

(2) The SSID is unique for each PHANTOM 2 VISION which should appear in your Wi-Fi list as Phantom_1xxxxx. Always connect to the SSID starting with Phantom_1xxxxx. FC200_0xxxxx is the SSID of the camera and should not be connected to. If the SSID FC200_0xxxxx is connected to, then the connection signal range will be extremely shortened.

10 Calibrating the Compass

IMPORTANT: Make sure to perform the Compass Calibration procedures prior to the first flight.

The compass is very sensitive to electromagnetic interference which causes abnormal compass data and leads to poor flight performance or even flight failure. Regular calibration of the compass enables the compass to perform at its optimal level.

10.1 Calibration Warnings

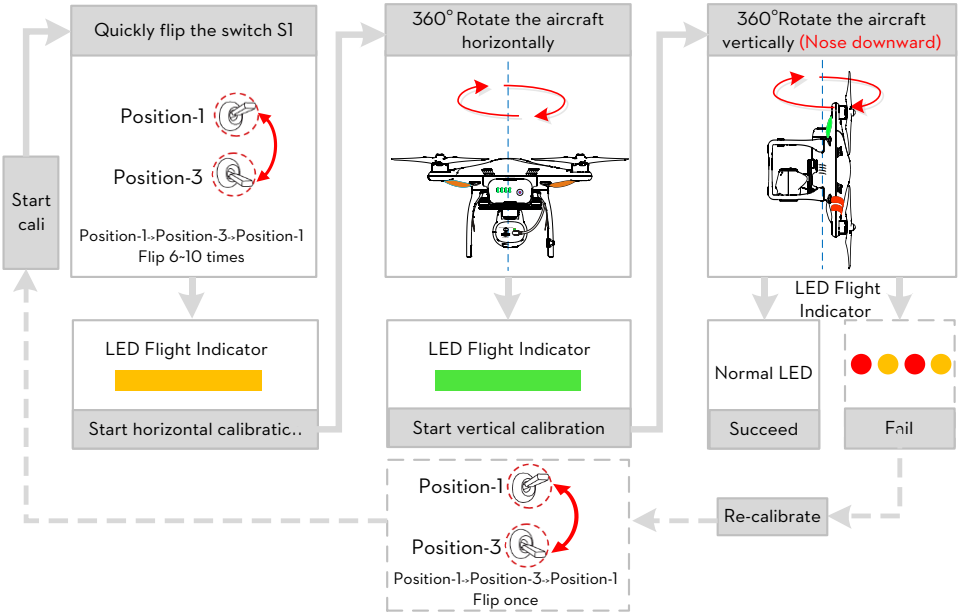
(1) DO NOT calibrate your compass where there is a possibility for the existence of strong magnetic interference such as magnetite, parking structures, and steel reinforcement underground.

(2) DO NOT carry ferromagnetic materials with you during calibration such as keys or cellular phones.

(3) Compass Calibration is very important; otherwise the flight control system will not work properly.

10.2 Calibration Procedures

Choose an open space to carry out the following procedures. Please watch the quick start video of the PHANTOM 2 VISION for more compass calibration details.



10.3 When Recalibration is Required

(1) When Compass Data is abnormal, the LED flight indicator will blink alternating between red and yellow.

(2) Last compass calibration was performed at a completely different flying field/location.

(3) The mechanical structure of the aircraft has changed, i.e. changed mounting position of the compass.

(4) Evident drifting occurs in flight, i.e. the aircraft doesn't fly in straight lines.

11 Flight

11.1 Flying Environment Requirements

(1) Before your first flight, please allow yourself some flight training (Using a flight simulator to practice flying, getting instruction from an experienced person, etc.).

(2) DO NOT fly in bad weather, such as rain or wind (more than moderate breeze) or fog.

(3) The flying field should be open and void of tall buildings or other obstacles; the steel structure within buildings may interfere with the compass.

(4) Keep the aircraft away from obstacles, crowds, power lines, trees, lakes and rivers etc.

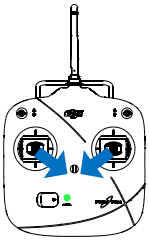
(5) Try to avoid interference between the remote controller and other wireless equipment. (No base stations or cell towers around)

(6) The flight control system will not work properly at the South Pole or North Pole.

(7) All parts must be kept out of the reach of children to avoid CHOKING HAZARDS; if a child has accidentally swallowed any part, you should seek immediate medical assistance.

11.2 Starting the Motors

A Combination Stick Command (CSC) is used to start the motors instead of simply pushing the throttle stick up. This is a safety precaution to prevent the motors from accidentally spinning up. Push both sticks to their bottom corners as indicated in the diagram below to start the motors. Once the motors have spun up, release both sticks simultaneously. The same combination stick command (CSC) is used to stop the motors.



11.3 Takeoff/Landing Procedures

1. Start by placing the PHANTON 2 VISION on the ground with the battery level indicator facing you.
2. Power on the remote controller.
3. Power on the range extender.
4. Switch the camera to the “WIFI ON” position.
5. Power on the aircraft by turning on the intelligent battery, refer to <Battery Usage> for details.
6. Connect the mobile device to the PHANTOM 2 VISION and then run the DJI VISION App to enter the camera preview page.
7. Wait until the LED flight indicator starts to slowly blink green/yellow. This means the aircraft is initializing and entering the “Ready to Fly”/“Ready to Fly (non-GPS).” state. Then proceed to execute the CSC

command to start motors.

8. Push the throttle stick up slowly to lift the aircraft off the ground. Refer to <Remote Controller Operation Mode> for more details.
9. Enjoy your flight while capturing and recording with the DJI VISION App. Refer to the<DJI VISION App Usage> for more details.
10. Be sure you are hovering over a level surface. Pull down on the throttle stick gently to descend and land.
11. After landing the aircraft on the ground, keep the throttle stick at its lowest position for about 3 to 5 seconds which will automatically stop the motors.

You SHOULD NOT execute the CSC during normal flight! This will stop the motors and cause the aircraft to descend rapidly and drop without any type of control.

(1) When the LED flight indicator blinks yellow rapidly during flight, the aircraft has entered into Failsafe mode, refer to <Failsafe Function> for details.

(2) A low battery capacity warning is indicated by the LED flight indicator blinking red slowly or rapidly during flight. Refer to the <Low Battery Capacity Warning Function> for details.

(3) Watch the quick start video about flight for more flight information.

11.4 Failsafe Function

The aircraft will enter Failsafe mode when the connection from the remote controller is lost. The flight control system will automatically control the aircraft to return to home and land to reduce injuries or damage. The following situations would make the aircraft fail to receive a signal from the remote controller and enter Failsafe mode:

(1) The remote controller is powered off.

(2) The aircraft has flown out of the effective communication range of the remote controller.

(3) There is an obstacle obstructing the signal between the remote controller and the aircraft, essentially reducing the distance the signal can travel.

(4) There is interference causing a signal problem with the remote controller.

Failsafe works differently depending on the mode the aircraft is in when Failsafe mode is initiated whether it is in the Ready to Fly or Ready to Fly (non-GPS) mode.

Ready to Fly (non-GPS) ---- Automatic landing

The flight control system will try to keep the aircraft level during descent and landing. Note that the aircraft may be drifting during descent and landing process.

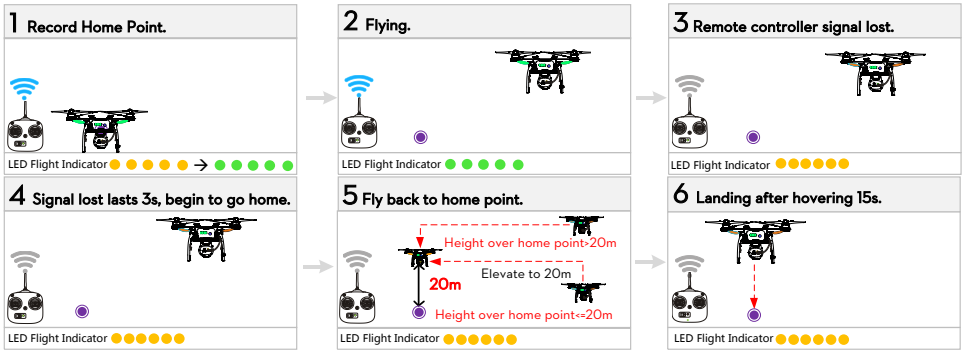
Ready to Fly ---- Automatic go home and land

The flight control system will automatically control the aircraft to fly back to the home point and land.

Home Point

When the aircraft is initializing the Ready to Fly status, the aircraft will record the current GPS coordinates as the home point. It is recommended to lift off only after Ready to Fly status is confirmed for the safety of being able to fly back to home point successfully in case the Failsafe mode is initiated.

Go Home Procedures



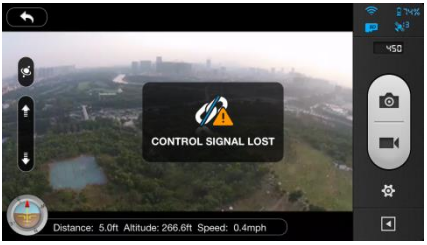
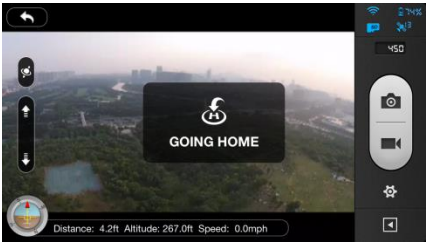
Switching the S2 of remote controller from upper most position to its bottom most position will reset the home point of Phantom 2 Vision. Definition of "home point" is i) where the Phantom 2 Vision return to when control signal is lost ii) the home position which is used to calculate the horizontal distance between you and the aircraft which is displayed on your cell phone app. When the home point is set, you will see a very short period of fast green light flashing on the LED Flight Indicator.

Regaining Control During Failsafe Procedure

Position of Switch S1	Position-1	Position-2	Position-3
How to regain control	When the S1 switch is switched to Position-1, toggle the S1 switch to any other position once to regain control. If remote controller's signal is recovered, control is returned back to the pilot.	Regain control as soon as signal is recovered.	

Failsafe on the DJI VISION App

The DJI VISION App will provide information during Failsafe.

	
Control Signal Lost Indicator	Going Home Indicator

Refer to the <DJI VISION App Usage> for details.

11.5 Low Battery Capacity Warning Function

The low battery capacity warning alerts users when the battery is close to depletion during flight. When it appears, users should promptly fly back and land to avoid accidental damage. The PHANTOM 2 VISION has two levels of low battery capacity warning. The first appears when the battery has less than 30% power and the second when it has less than 15%.

When battery power drops below 30% an LED indicator will blink red slowly and an alert will show on the DJI VISION app; refer to the <DJI VISION app Low Battery Capacity Warning>. At lower than 15% the LED indicator will blink red rapidly and the DJI VISION app will sound an alarm; refer to the <DJI VISION app Low Battery Capacity Warning>. The PHANTOM 2 VISION will also begin to descend and land automatically. After it has landed, keep the throttle stick at its lowest point or execute CSC; refer to <Starting the Motors>.

If you push the throttle stick above the mid-point, the PHANTOM 2 VISION will ascend slowly. Use the throttle, pitch, roll and yaw sticks normally to find a more appropriate landing area if required.

There is a hidden third low battery threshold in addition to the 1st and 2nd level warnings. This uses 10.65V as its threshold. Both this voltage threshold and the 2nd Level Low Battery Warning will trigger auto-landing. Altitude can be maintained if necessary by pulling up on the throttle.)

DJI VISION App Low Battery Capacity Warning

DJI VISION App will show low battery capacity warnings.

(1) A red rectangle will blink on the camera screen.

(2) Audible alarm. Make sure the sound is turned on and volume is turned up on your mobile device.

(3) The aircraft battery icon will turn red.

Low Battery Capacity Warning

Refer to the <DJI VISION App Usage> for details.

(1) Remember to fly your PHANTOM 2 VISION back as soon as you see a low battery capacity warning.

(2) The PHANTOM 2 VISION is "Ready To Fly," "Ready to Capture" and "Ready to Share" but it is still an aircraft. Keeping the battery contact needles and pads clean is very important. Any dirt and dust may cause a communication failure.

12 DJI VISION App Usage

The DJI VISION App controls the PHANTOM 2 VISION camera including capture and recording, settings, pitch angle adjustments, and displays essential status including flight parameters and battery life.

12.1 DJI VISION App Main Menu

After login you will come to the main page. This shows the current Wi-Fi connection and four app function icons.

Icons		Description
	Camera	Tap to enter camera preview
	Album	Tap to enter Album
	News	Tap to enter DJI news
	Settings	Tap to enter App settings

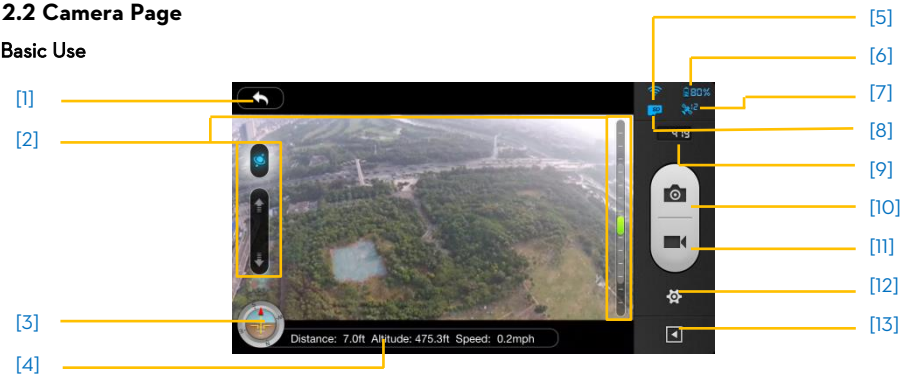
(1) Connect your mobile device to the PHANTOM 2 VISION Wi-Fi network to use the camera and onboard album.

(2) Connect your mobile device to the internet (mobile or Wi-Fi) to share photos, videos and read DJI news.

(3) If you receive a phone call during flight, the live camera preview screen may be interrupted. It's recommended to ignore the call and pay full attention to your flight.

12.2 Camera Page

Basic Use



[1] Return

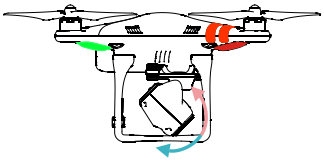
 - Return to the preview page

[2] Camera Tilt Control

 - Tilt Control Mode. Tap and hold to enter the Accelerometer Sensor Mode. Release to return to normal mode.

 **Normal Mode**

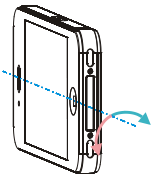
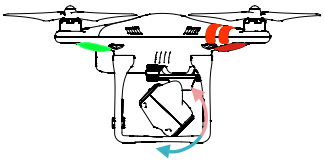
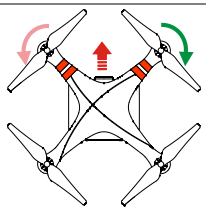
Tap up arrow () to pitch camera upwards and down arrow () to pitch downwards. Green slider indicates current camera pitch.

Normal Mode pitch control	Pitch movement
	

 **Accelerometer Sensor Mode**

Tap and Hold to switch on Accelerometer Sensor Mode to control camera pitch and rotation by moving your mobile device.

Tilt device forward to pitch camera downward and backward to pitch upward. Lean it left to rotate left() and right to rotate right().

Accelerometer Sensor Mode Pitch Control		Pitch Movement
		
Accelerometer Sensor Mode Yaw Control		**Yaw Movement**
		

In Accelerometer Sensor Mode, the pitch angle indicator will show a grey area. When the green pitch indicator is inside the grey area, the camera will move according to pitch gestures. When the indicator is outside of the grey area, pitch gestures will control the camera's pitch speed. The bigger the gesture of the mobile device, the faster the camera will move.

[3] Flight Attitude and Radar Function

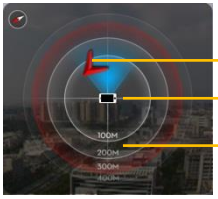
Flight attitude is indicated by the flight attitude icon.

(1) The red arrow shows which direction the PHANTOM 2 VISION is facing.

(2) Blue and brown areas indicate its pitch.

(3) Tilting of the brown and blue area shows roll angle.

Tap the flight attitude icon to turn on the radar function. Home is located in the center of the radar and the red icon indicates the PHANTOM 2 VISION's current heading, direction, and approximate distance from home. Tap the flight attitude icon again to disable the radar.



(1) By default, the center of the radar indicates the home point that has been recorded by the PHANTOM 2 VISION. Tap the center of the radar to switch the center to your mobile device's current location.

(2) If your mobile device contains a compass, the top portion of the Radar is the direction you are pointing. If not, the radar will be oriented due north.

[4] Flight Parameters

Distance: Horizontal distance from home point.

Altitude: Vertical distance from home point.

Speed: Horizontal flying speed.

Distance will appear as NA if the PHANTOM 2 VISION is not Ready to Fly.

[5] Wi-Fi Signal Intensity

Indicates camera is connected to your mobile device and Wi-Fi is working normally.

The connection between the camera and mobile device may fail if Wi-Fi signal strength is low. Refer to the <PHANTOM 2 VISION CONNECTION BROKEN>on the camera page.

[6] Aircraft Battery Level

(1) When available power is more than 30%, the battery icon is blue (e.g. ). This battery level is appropriate for flight.

(2) When below 30%, the battery icon will turn red (e.g. ) and the LED flight indicator will slowly blink red. This battery level is low for flight. It is recommended that you fly your PHANTOM 2 VISION home and land it as soon as possible.

(3) After available power drops below 15% (e.g. ), there is no longer enough power for flight. The LED flight indicator will begin to flash red rapidly and the PHANTOM 2 VISION will begin an automatic descent and land.

The available power thresholds mentioned above can be adjusted in the PHANTOM 2 VISION assistant software.

[7] Aircraft GPS Status

Displays GPS status and the number of available satellites. The icon is highlighted when more than 6 satellites are found, enabling Ready to Fly mode.

[8] Micro-SD Card Status

Displays Micro-SD Card Status. The icon is highlighted when a valid Micro-SD card is inserted. If there is no Micro-SD card present, it is grayed out.

[9] Remaining Shots

Displays estimated shots remaining, based on the current Photo Size setting of camera and the storage capacity of the Micro-SD card. This shows `0' if:

(1) Micro-SD card is not inserted.

(2) Micro-SD card is full.

(3) Micro-SD card is damaged.

(4) Connection between the DJI VISION App and camera is broken.

[10] Shutter Button

Tap to take photos.

Single capture: press once for a single capture.

Continuous capture: press once for 3 or 5 captures.

Timed capture: press once to begin a timed capture, press again to stop.

(1) Shutter button is disabled during video recording.

(2) Capture modes can be reconfigured in camera settings; refer to the <Camera Settings>.

[11] Record Button

Start and Stop video recording. Tap once to start recording. A red dot will blink to indicate recording is in progress and a time elapsed counter will appear in the top right corner of the preview screen. Press again to stop recording.

[12] Camera Settings

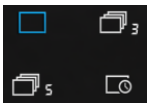
Tap to open the camera settings menu, refer to <Camera Settings>.

[13] Hide or Show Flight Parameters.

Tap to hide the flight parameters. Tap again to show.

Camera Settings

[1] Capture Mode

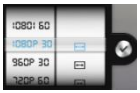


	Single capture.
	3 captures.
	5 captures.
	Timed capture. Also selectable: a) Intervals between two shots (3~60 s) b) Number of shots (2~254, or infinite shots until Micro-SD card is filled)
Capture Button will change according to the selected capture mode. (, , , .)	

[2] Photo Size

	Large: 4384 x 3288, 4:3, 14.4MP
	Medium: 4384 x 2922, 3:2, 12.8MP
	Small: 4384 x 2466, 16:9, 10.8MP

[3] Video Resolution

	1920 x 1080 60i, 16:9
	1920 x 1080 30p, 16:9
	1280 x 960 30p, 4:3
	1280 x 720 60p, 16:9
	1280 x 720 30p, 16:9
	640 x 480 30p, 4:3 (VGA)
Three Field of View (FOV) options are supported when shooting in 1920x1080 60i and 1920x1080 30p: Wide (140˚), Medium (120˚) and Narrow (90˚).	

[4] Photo Format

	JPEG
	RAW The PHANTOM 2 VISION camera shoots in JPEG and RAW file formats simultaneously when this option is selected. See the following table for detailed specifications.

JPEG photo size	4384 X 3288	4384 X 2922	4384 X 2466
RAW photo size	4384 X 3288	4384 X 2920	4384 X 2464

RAW is not supported in continuous capture mode or timed capture mode. JPEG photos will be created automatically.

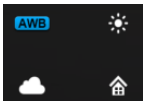
RAW format support will be coming soon with DJI Conversion Software to convert PHANTOM 2 VISION ' s Camera RAW files to Adobe DNG.

[5] Selectable ISO

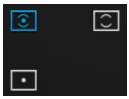
	AUTO
	100
	200

	400

[6] White Balance

	AWB (auto)
	Sunny
	Cloudy
	Indoor

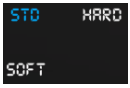
[7] Exposure Metering

	Center
	Average
	Spot

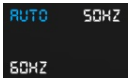
[8] Exposure Compensation

	-2.0 (EV)	2.0 (EV)
	-1.7 (EV)	1.7 (EV)
	-1.3 (EV)	1.3 (EV)
	-1.0 (EV)	1.0 (EV)
	-0.7 (EV)	0.7 (EV)
	-0.3 (EV)	0.3 (EV)
	0 (EV)	

[9] Sharpness

	Standard
	Hard
	Soft

[10] Anti-flicker

	Auto
	50Hz
	60Hz

[11] Restore Default Settings

Restores all camera default settings. Camera reboot is needed to allow restoration to take effect.

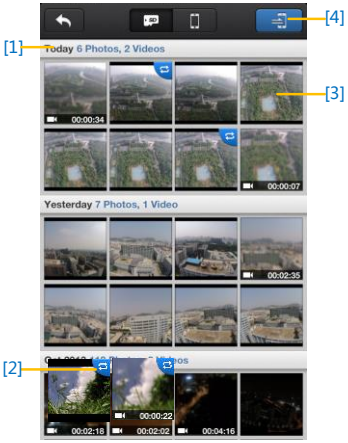
[12] Format SD Card

Format the Micro-SD card. All data stored in the Micro-SD card will be lost after formatting. Remember to backup before formatting.

12.3 Album Page

Camera SD CARD Album

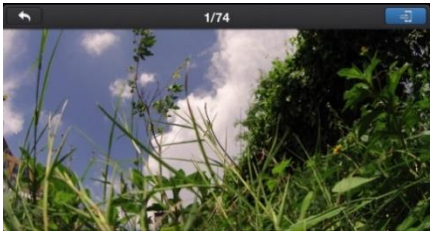
Browse thumbnails of photos and videos stored on the Micro-SD card. Tap to view photo or watch video.



[1] Photos and Videos are listed and grouped by date.

[2] All photos and videos that have already been synced to your mobile device are identified with the icon.

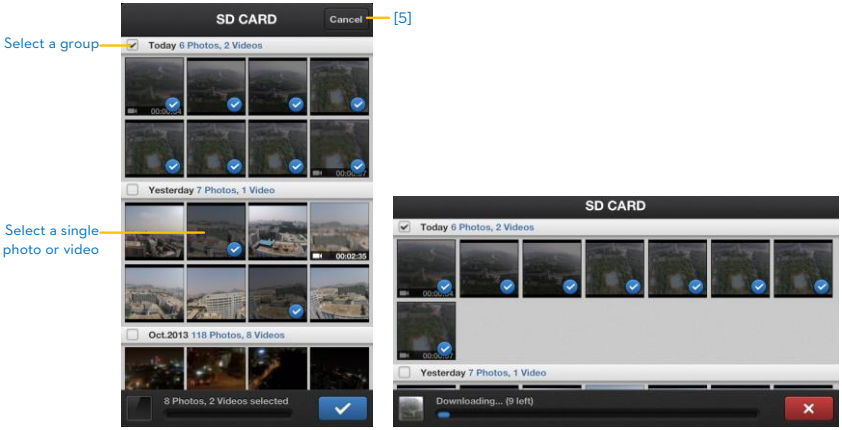
[3] Tap any thumbnail for single view mode. Tap a Photo thumbnail that hasn't been synchronized to the mobile device to view the photo. Swipe left or right to view the previous or next photo item. Tap on a video thumbnail to play it and view the video's length. A progress bar will also appear at the bottom of the screen. Tap to enter single synchronization mode to synchronize a single photo or video, or to synchronize and play a video at the same time.



[4] Tap the button to enter multiple synchronization mode (as shown in the following diagram). Tap thumbnails

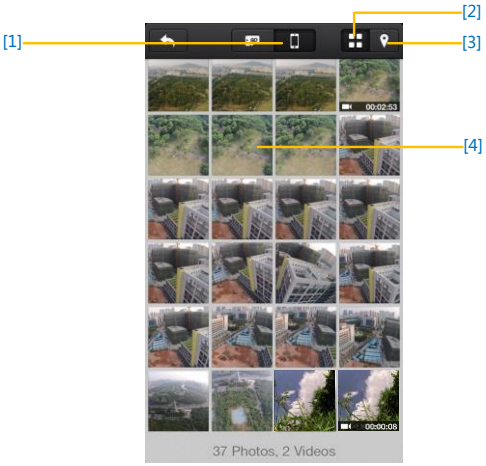
to select photos or videos to synchronize to your mobile device (The thumbnails identified by the check mark are successfully selected.). Or you can select one or more groups to be synchronized by checking the box before the group, and then Tap  to start synchronizing. During the synchronization process, users can tap  to cancel the synchronization. Photos and videos that have been synchronized to the mobile device will remain.

> Some mobile devices may fail to support synchronization of 1080i60 video files.



[5] Tap “Cancel” or “Finished” to exit the multiple synchronization mode and return to the SD CARD page.

Mobile Device Album



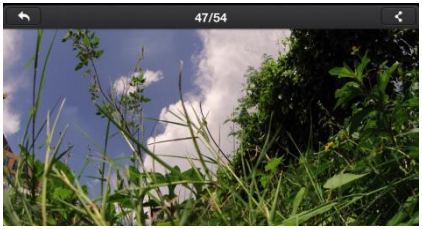
[1] You can browse all photos and videos in the album which have been synchronized to the mobile device, view a selected photo or play a selected video.

[2] Photos and videos are listed in thumbnail style and sorted by capture time.

[3] Pictures and videos are sorted by captured/recorded Geo-tagged locations.

> ⚠ Access to the Internet is required to load a map.

[4] Tap any thumbnail for single view; you can slide left or right to view the previous or next photo. Tap a video thumbnail to play a single video.

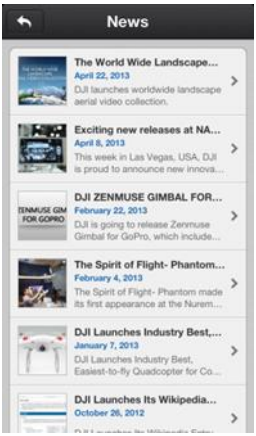


[5] Tap to share your photos and videos to social network sites.

> ⚠ Access to the Internet is required to share your photos and videos.

12.4 News Page

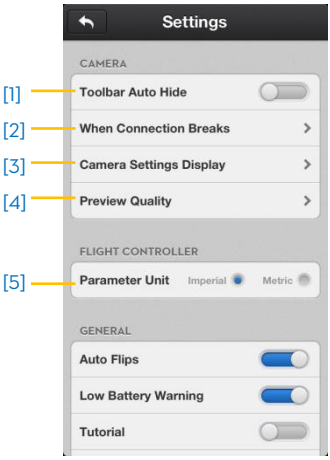
View the latest DJI news. (Internet access is required.)

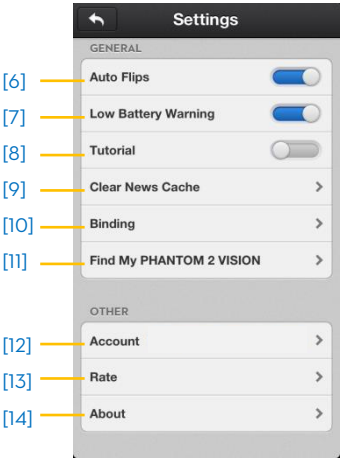


News List

News Details

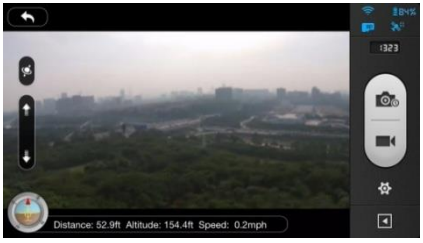
12.5 Settings Page



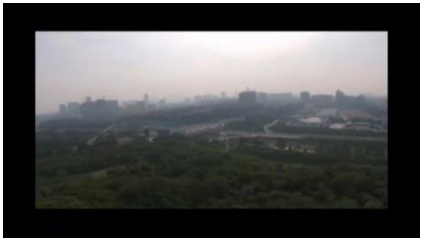


[1] Toolbar Auto Hide

Slide the switch from left to right to enable this function. The toolbar will auto hide on the camera page.

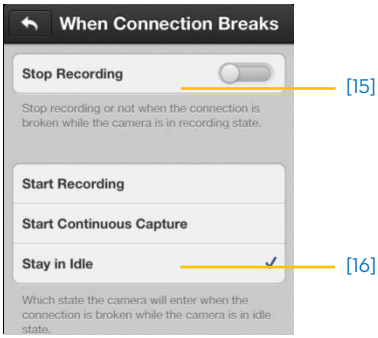


Toolbar Auto Hide Disabled



Toolbar Auto Hide Enabled

[2] When Connection Breaks



[15] Stop Recording:

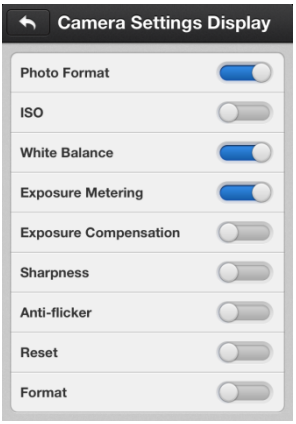
Enabled: Stop recording when the Wi-Fi connection between the mobile device and the camera breaks while the camera is recording.

Disabled: Keep recording when the Wi-Fi connection between the mobile device and the camera breaks while the camera is recording.

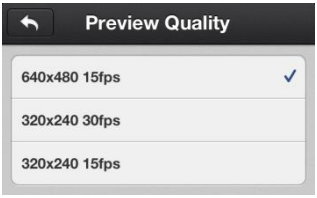
[16] Select the state the camera will enter in the event of a Wi-Fi Connection break between the mobile device and the camera. Use this function to ensure you continue to capture the scenes you don't want to miss during a flight.

[3] Camera Settings Display

An enabled item will display in the camera settings toolbar, while a disabled item will be hidden.



[4] Preview Quality



High: 640 x 480@30fps

Medium: 320 x 240@30fps

Low: 320 x 240@15fps (Recommended when there is a lot of interference.)

[5] Parameter Unit

Select imperial or metric units of measurement.

[6] Auto Flips

The user interface of the DJI PHANTOM 2 VISION App will flip if the mobile device's auto-flip is enabled.

[7] Low Battery Warning

If enabled, an alarm will sound when the battery level is too low. Be sure sound is enabled on the mobile device and try to adjust the volume to the highest level.

[8] Tutorial

Usage tips will be displayed.

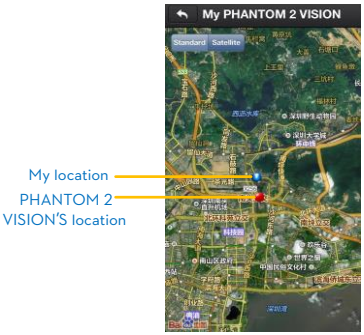
[9] Clear News Cache

Tap to clear news cache.

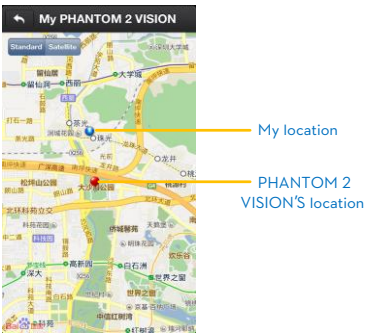
[10] Binding

In the event the camera and range extender bind is lost or one of them requires repair or replacement, camera and range extender binding should be performed via the DJI VISION App. Refer to the <How to Perform a Camera & Range Extender Binding > for details.

[11] Find My PHANTOM 2 VISION



Satellite Mode



Standard Mode

[12] Account

Tap to see user's account information.

[13] Rate

Tap to rate the DJI VISION App. Internet access is required.

[14] About

Tap to see the current version of the DJI VISION App and also for contact information.

13 Assistant Software Installation and Configuration

13.1 Installing the Driver and Assistant Software

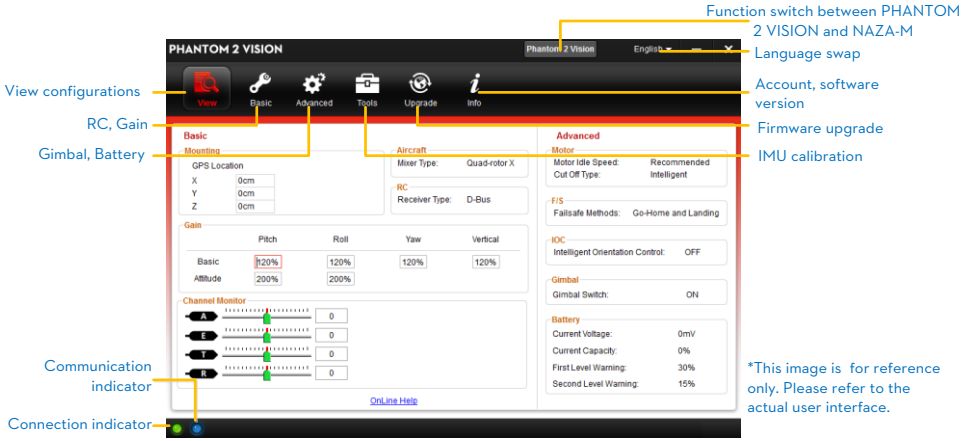
The PHANTOM 2 VISION Assistant software and the PHANTOM RC Assistant software are used for advanced adjustments of the PHANTOM 2 VISION. Please follow the steps below to install the Driver and Assistant software.

1. Download	2.Connect	3.Install Driver	4.Install Software
Download the driver installer and assistant software installer from the DJI website.	Connect the Micro-USB port of PHANTOM 2 VISION to a USB port of PC via a Micro-USB cable.	Run the driver installer and follow the prompts to finish installation.	Run the assistant software installer and follow the prompts to finish installation.

⚠ The PHANTOM 2 VISION Assistant software currently only supports Windows operating systems (Win XP, Win7, Win8 (32 or 64 bit)).

13.2 Using the PHANTOM 2 VISION Assistant Software on a PC

1. Start up the PC, power on the PHANTOM 2 VISION, then Connect the PHANTOM 2 VISION to the PC with a Micro-USB cable. DO NOT disconnect until configuration is finished.
2. Run the PHANTOM 2 VISION Assistant Software and wait for the PHANTOM 2 VISION to connect to the Assistant Software. Observe the indicators on the bottom left of the screen. When connected successfully, the connection indicator is and communication indicator is blinking .
3. Choose [Basic] or [Advanced] configuration pages.
4. View and check the current configuration in the [View] page.



⚠ (1) Users should not enable the Naza-M function before finishing the “Advanced Flight Maneuvers” procedure, in accordance with the "Phantom Pilot Training Guide”. If the Naza-M function is enabled, users can switch the control mode to either the ATTI. Mode, GPS Mode or Manual Mode,

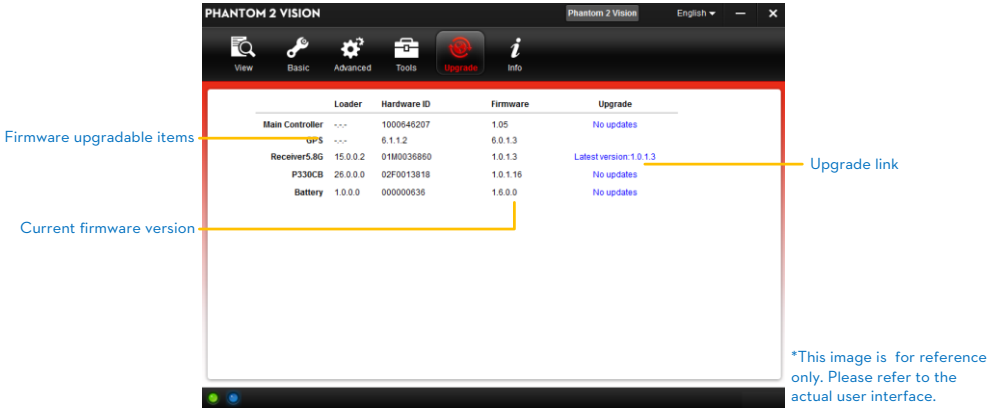
and access the advanced settings (e.g. IOC). In addition, the LED located on the rear frame arms will display the flight status according to the Naza-M's indicator, instead of the Phantom 2 Vision's indicator. Do not enable the Naza-M function unless you are an experienced user or guided by a professional.

(2)You can change to the Phantom 2 Vision function by tapping the same button if the Naza-M function is enabled. This operation will disable the Naza-M function and enable the Phantom 2 Vision function. All parameters will be returned to factory settings.

13.3 Firmware upgrade of the PHANTOM 2 VISION

Please follow the procedures to upgrade the software and firmware; otherwise the PHANTOM 2 VISION might not work properly.

1. An internet connection is required to upgrade the PHANTOM 2 VISION's firmware.
2. Click the [Upgrade] icon to check the current firmware version and whether the installed firmware is the latest version. If not, click the relative links to upgrade.
3. Be sure to wait until the Assistant software shows "finished". Click OK and power cycle the PHANTOM 2 VISION after 5 seconds. Once completed, the firmware is up to date.



(1) DO NOT power off until the upgrade is finished.

(2) If the firmware upgrade failed, the main controller will enter a waiting for firmware upgrade status automatically. If this happens, repeat the above procedures.

Firmware upgradable items:

(1) Main Controller

(2) GPS

(3) 5.8G Receiver

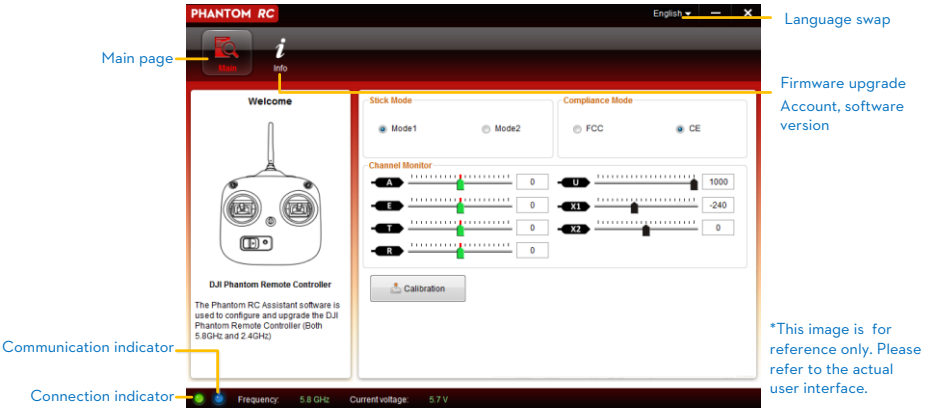
(4) P330CB (Main Board)

(5) Battry

13.4 PHANTOM RC Assistant Software Description

Please follow the procedures to finish the configuration of the remote controller.

1. Turn off the remote controller and find the Micro-USB port on the back of it. (If there is no one, users should open the rear cover to find the Micro-USB port on the board inner the remote controller.)
2. Start up the PC, power on the remote controller, and then Connect the remote controller to the PC with a Micro-USB cable. DO NOT disconnect until the configuration is finished.
3. Run the PHANTOM RC Assistant Software and wait for the remote controller to connect to the Assistant Software. Observe the indicators on the bottom left of the screen. When connected successfully, the connection indicator is and communication indicator is blinking .
4. Finish configuration in the [Main] page.
5. Finish upgrade in the [Info] page if necessary.



14 Troubleshooting（FAQ）

14.1 How to solve large margin(s) mid-point error?

If the Remote Controller stick(s) mid-point margin of error is too big, the motors will fail to start when you execute the Combination Stick Commands (CSC) and the aircraft will not take off. Below are possible situations where the Remote Controller's stick(s) mid-point margins of error could be too big:

(1) One of the Remote Controller's stick position (except the throttle stick) is not centered when powering on the PHANTOM 2 VISION.

Solution: Place all Remote Controller sticks at their mid-point positions and then power cycle the PHANTOM 2 VISION to re-record the mid-point. If the problem persists, this can be caused by scenario (2).

(2) The Remote Controller sticks have been trimmed which leads to a large deviation of the mid-point position.

Solution: Use the Assistant Software to perform a Remote Controller calibration. To do so, carry out the following procedures.

(a) Connect to the Assistant software, tap Basic-> RC-> Command Sticks Calibration, and push all Remote Controller sticks through their complete travel range to see if any stick cannot reach its outer most position.

(b) Power cycle the PHANTOM 2 VISION. Note that a power cycle is required.

(c) Redo the Remote Controller calibration according to the Assistant software.

If the above solutions do not solve your issue, please send your Remote Controller to DJI Customer service for repair.

14.2 How to restore a video file if power is turned off during a recording session?

Solution: Keep or place the Micro-SD card back into the camera. Power cycle the camera and wait about 30 seconds for the video file to be restored.

14.3 Failure to acquire the SSID.

Solution: Double check whether both the camera and Range Extender are powered on and the power switch of the camera is switched to "WIFI ON."

14.4 What to do if PHANTOM 2 VISION is out of sight and the Wi-Fi connections is lost?

Solution: Turn off the Remote Controller to trigger the Failsafe mode and the aircraft will start to fly back, descend, and land at the Home point automatically. Please make sure there are no obstacles within the go home route and you are familiar with the regaining control procedure.

14.5 Wi-Fi connection fails all the time.

Solution: Double check the current Wi-Fi connection status of the mobile device. The mobile device may be connecting to other Wi-Fi networks after a connection breaks with the PHANTOM 2 VISION.

14.6 Files fail to synchronize.

Solution: Video files that are too large (file sizes close to 4GB) cannot be synchronized to the mobile device. Some mobile devices also fail to support synchronization of the 1080i60 video files.

14.7 Albums fail to synchronize.

Solution: Reset the settings of your mobile device as illustrated below. Enable the Settings ->Private->Photos->DJI VISION. Otherwise the Albums will fail to synchronize with your mobile device.

14.8 Failure to share.

Solution: Please make sure the mobile device has access to the Internet.

14.9 Some mobile Android devices have a problem connecting to the PHANTOM 2 VISION Wi-Fi Extender.

Solution: Some mobile Android devices do not allow for both a Wi-Fi connection and a mobile data connection at the same time. When trying to connect to the PHANTOM 2 VISION Wi-Fi network, most devices will check whether an Internet connection has a certain Wi-Fi setting enabled, e.g. Auto network switch or Test for Internet connection. If no Internet connection is found because the PHANTOM 2 VISION creates a non-routable connection it will drop the PHANTOM 2 VISION Wi-Fi network connection and scan for the next available connection. Example: For the Samsung Note 3, carry out the following procedures to solve this issue. Tap Settings -> Wi-Fi, and then tap the "Menu" button. Select "Advanced" then uncheck the "Auto network switch". You might see a warning that indicates the Internet connection is unstable but just ignore this message.

14.10 Usage tips for the App used on multiple mobile devices.

During flight, if you use the App on multiple mobile devices, please turn off the App on the first mobile device, and then turn on the App on the second one to ensure the App can work normally on the second mobile device.

14.11 How to land the aircraft smoothly in a better way?

First pull the throttle stick position down to lower than 5%, then execute the CSC command to stop the motors.

14.12 Why the discharge times of a new battery not at zero?

A battery aging test is performed prior to delivery which affects the discharge time of the new battery. This is why the discharge time of a new battery is not zero. The battery is okay to use.

15 Appendix

LED Flight Indicator Status

Normal status	LED Flight Indicators
Power On Self-Test	
Warming Up	
Ready to Fly	
Ready to Fly (non-GPS)	
Warning and Error	**LED Flight Indicators**
Remote Controller Signal Lost	
1st Level Low Battery Capacity Warning	
2nd Level Low Battery Capacity Warning	
Not Stationary or Sensor Bias is too big	
Error*	
Compass Needs Calibration	

*You can figure out the error by connecting the PHANTOM 2 VISION to the PHANTOM 2 VISION's Assistant Software.

Specifications

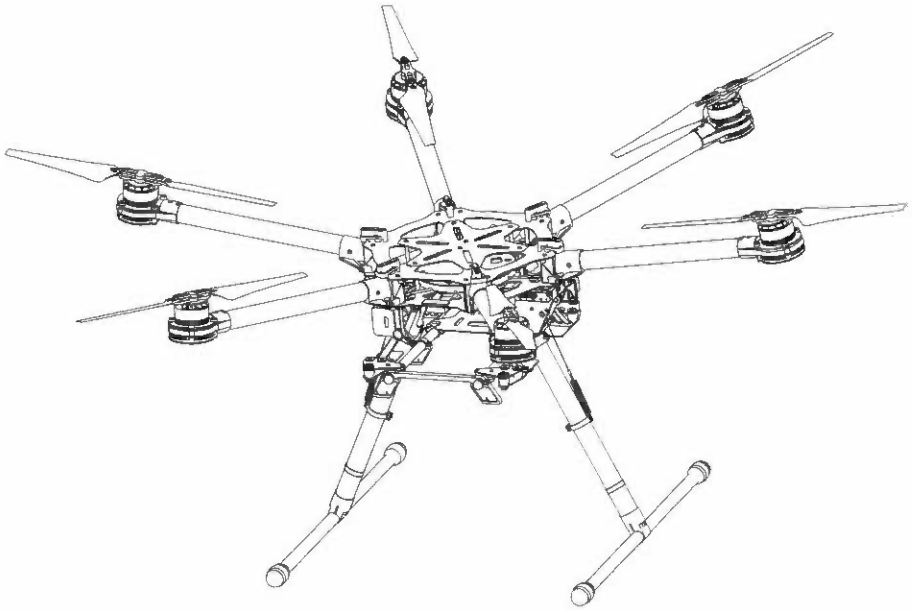
Aircraft	
Supported Battery	DJI 5200mAh Li-Po Battery
PHANTOM 2 VISION Weight	1160g
Hovering Accuracy (Ready to Fly)	Vertical: 0.8m; Horizontal: 2.5m
Max Yaw Angular Velocity	200°/s
Max Tilt Angle	35°
Max Ascent / Descent Speed	6m/s
Max Flight Speed	15m/s (Not Recommended)
Wheelbase	350mm
Tilting Range of Gimbal	0° - 60°
Remote Controller	
Operating Frequency	5.728 GHz - 5.85 GHz
Communication Distance (open area)	CE Compliance: 300m; FCC Compliance: 500m
Receiver Sensitivity (1%PER)	-93dBm
Transmitting Power (EIRP)	CE Compliance: 25mW; FCC Compliance: 125mW
Working Current/Voltage	80 mA@6V
Battery	4 AA Batteries
Camera	
Resolution	14 Megapixels
FOV	140°/ 120° / 90°
Sensor Size	1/2.3"
Functions	Supports multi-capture, continuous capture and timed capture Supports HD Recording (1080p30,1080i60) Supports both RAW and JPEG photo formats
Range Extender	
Operating Frequency	2412MHz - 2462MHz
Communication Distance (open area)	300m
Transmitting Power	17dBm
Power Consumption	1.5W
DJI VISION App	
Supported Mobile Devices	Recommended: iPhone4s, iPhone5, iPhone5s, iPhone5C, iPod Touch4, iPod Touch5; Available but not recommended: iPAD3, iPAD4, iPAD mini. Samsung Galaxy S3, S4, Note2, Note3 or phones of similar configuration.
System Requirement of Mobile Device	iOS 6.0 or above; Android system 4.0 or above

ATTACHMENT 3

Spreading Wings S900

User Manual V1.2

2014.12



Disclaimer

Thank you for purchasing the S900. Please visit the Spreading Wings S900 page on www.dji.com regularly to keep up to date with product information, technical updates and manual corrections. Information in this manual is subject to change without notice.

In using this product, you hereby agree to this disclaimer and signify that you have understood all points completely. When assembling this product, follow all instructions carefully. The manufacturer and seller assume no liability for any damage or injury arising from the use of this product.

This is a class A product of the FCC certification. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

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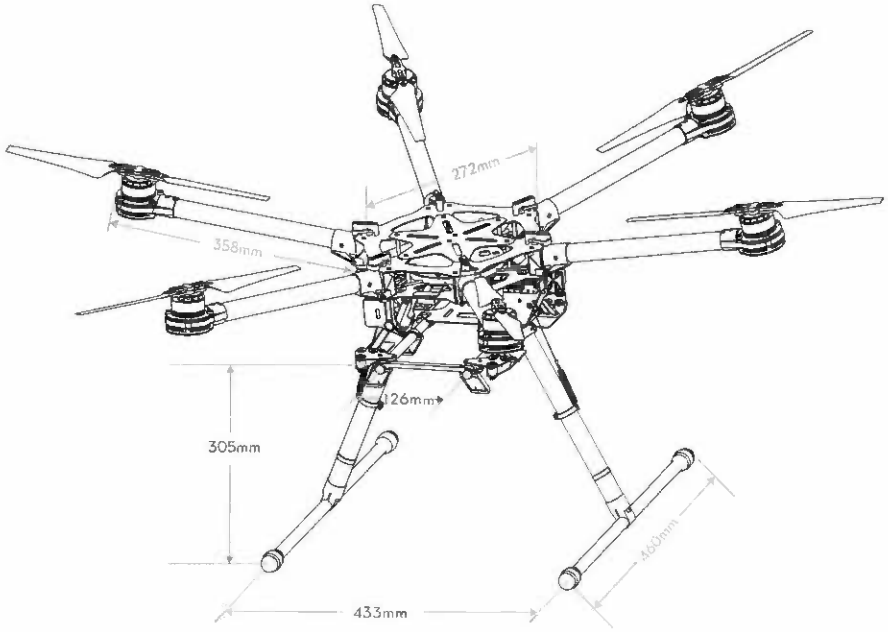
About

The S900 is designed for professional aerial photography and cinematography. It is user friendly, safe, stabilized and easy to fly while its integrated design makes assembly and configuration simple and fast. Retractable landing gear, vibration dampers, slightly angled arms and a minimalized gimbal mount allow for a clear 360 degree view from the camera. A patented power distribution board, built-in high-speed ESCs and motors with high efficiency propellers ensure dynamic stability and maximized power efficiency. Used with a professional DJI multi-rotor autopilot system, the S900 can hover and fly reliably making it ideal for photography and cinematography.



Contents

Cautions

When flying, the rotating propellers may cause serious damage and injury. Please fly safe at all times.

Assembly Cautions

1. Use a bracket to mount the GPS module on the center frame to avoid interference with the power board.
2. Ensure the IMU is mounted with the arrow pointing toward the nose of the aircraft.
3. If using a receiver, attach it under the bottom board of the center frame with the end of the antenna facing downwards and away from obstructions to avoid signal loss.
4. Ensure frame arms are mounted correctly.
   a) Motor mounts with CCW marks should be mounted to the center frame positions with the following marks: M1, M3 and M5.
   b) Motor mounts with CW marks should be mounted to the center frame positions with the following marks: M2, M4, and M6.
5. Do not remove any glued-in screws.
6. Screws that already have blue glue can be used once without thread locker. On other occasions, apply appropriate thread locker first.
7. The S900 should be lifted off the ground when testing landing gear or recalibrating servo travel.

Flight Cautions

1. ESCs are not water-proof, please do not fly in rain or snow.
2. **Ensure all soft dampers and vibration absorbers are in good condition before every flight. If not, replace immediately. Otherwise, the flight performance of your aircraft will be adversely affected.**
3. Ensure all parts are in good condition before each flight. Do not fly with worn or broken parts.
4. Ensure propellers and motors are installed correctly and propellers are unfolded before flying.
5. Ensure ESC signal connectors and power cable connectors are tight before every flight.
6. When flying, maintain a safe distance away from people, buildings, high-voltage lines, tall trees, water and other hazards.
7. Use only 6S LiPo batteries for the power supply.
8. Ensure all output signals from M1 to M6 are in proper working order when using the DJI A2 flight control system to avoid damage or injury.
9. Do not overload the system.
10. Do not get close to or touch motors or propellers when they are spinning as this can cause serious injury.
11. Disconnect the battery and remove the camera during transportation to avoid damage or injury.
12. We strongly recommend using as many DJI manufactured parts as possible.

Others

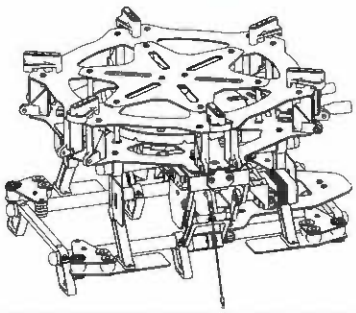
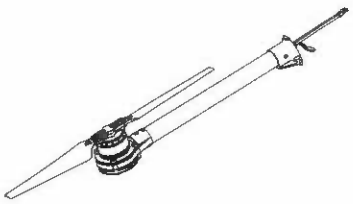
If you have any problems you cannot resolve, contact your dealer or DJI customer service.

Legend

⚠ Important

Hints and Tips

In The Box

Center Frame ×1	Frame Arms ×6
	
Landing Skid Tubes ×2 (with Silicone Rubber Dampers)	Landing Gear Legs ×2
	
GPS Collapsible Mount ×1	Springs ×2
	
Connection Cable	Accessories Package ×1
Connector Set ×1  or 3-PIN Connection Cables ×8 	CW propellers ×2 CCW propellers ×2 Magic tapes ×4 The red knobs ×6 Landing gear leg rings ×4 Soft dampers ×50
3-PIN Servo Cable ×1	Screw Package ×1
	For frame arms mount: M4×35 For landing gear mount: M3×8, M2.5×8 (socket cap), M3×22 (socket cap)

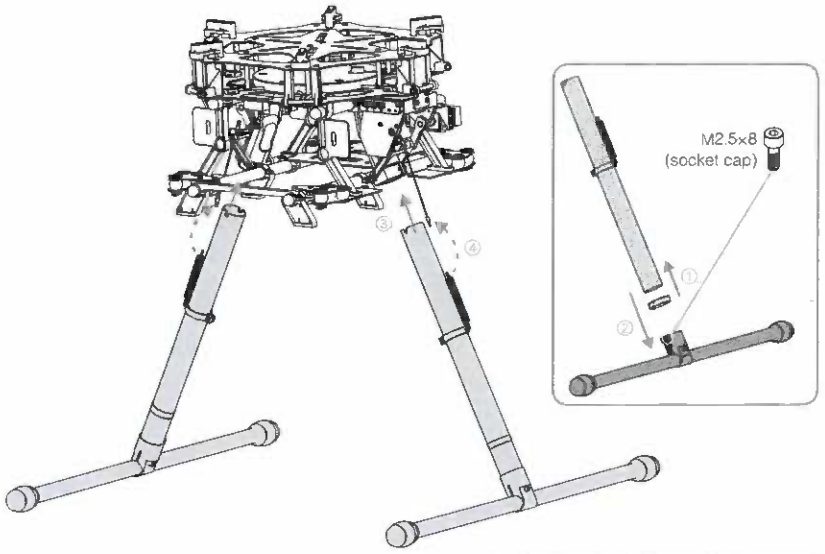
Tools Required

Tools	Usage
2.0mm Hex Wrench, 2.5mm Hex Wrench	Mounting screws.
Thread Locker	Fastening screws.
Nylon Cable Tie, Scissors, Cutting Pliers/Dykes	Binding devices and wires.
Foam Double Sided Adhesive Tape	Mounting receiver, controller and other modules.

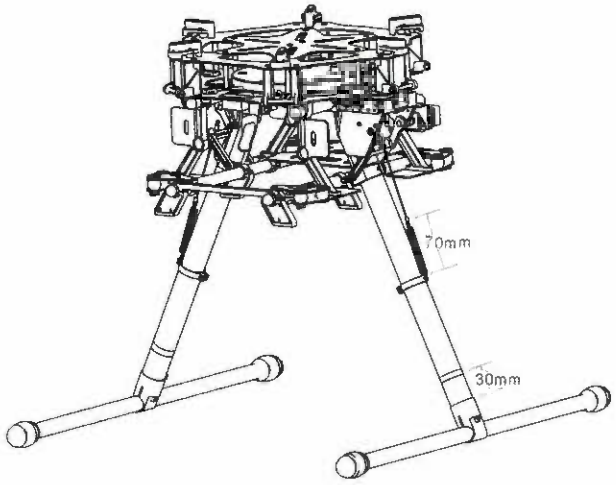
Mounting the Landing Gear

Instructions

1. Put one landing gear leg ring onto each landing gear leg.
2. Insert one landing gear leg into each landing skid tube and secure it in place by tightening the M2.5×8 (socket cap) screw. Ensure silicone rubber dampers are attached to each end.
3. Insert the landing gear leg into connection point on the center frame. Affix in place with M3×8 screws.
4. Connect both springs on the legs to the center frame.



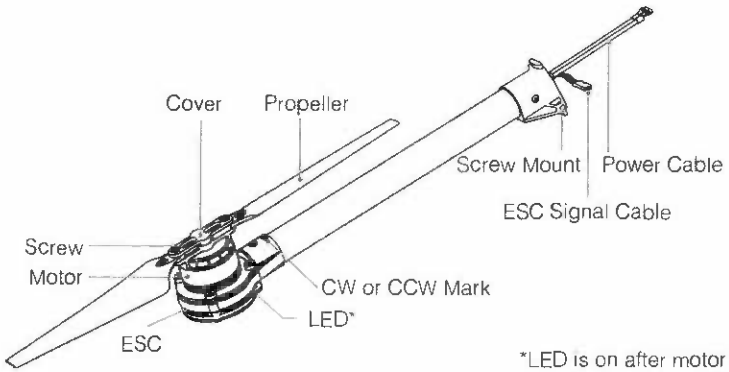
- Note the springs are 58.5mm before connecting to the center frame, and are stretched to 70mm when mounting is completed.
- It is recommended that the landing gear leg ring be placed about 30mm above the landing skid tube.



Mounting Frame Arms

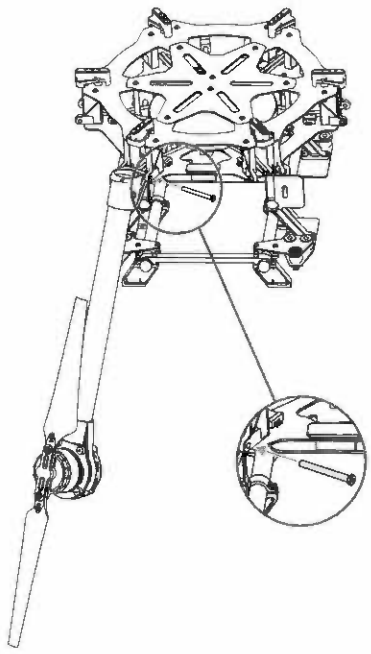
Instructions

1. Prepare the arms.
   (1) Check all propellers for cracks, then install and screw each propeller cover on tightly.
   (2) Ensure all motors are mounted firmly and rotate freely.
   (3) Mount all arms with red propeller covers to M1 and M2 to indicate the nose of the S900.
   (4) Identify the CW and CCW marks on the arms. Mount the arms with the CCW mark to the M1, M3 and M5 positions of the center frame. The arms with the CW mark should be mounted to the M2, M4 and M6 positions of the center frame.

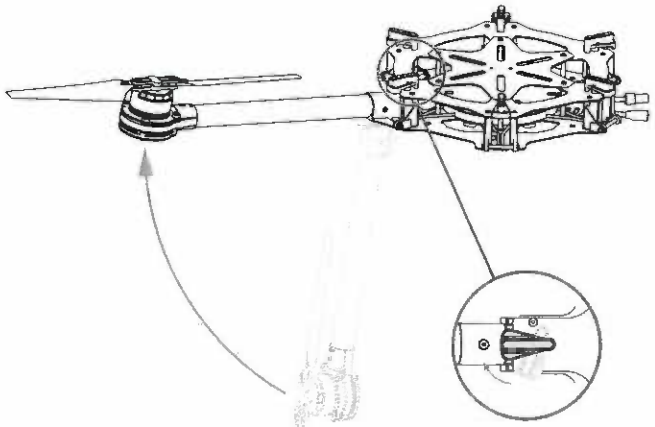


*LED is on after motor started.

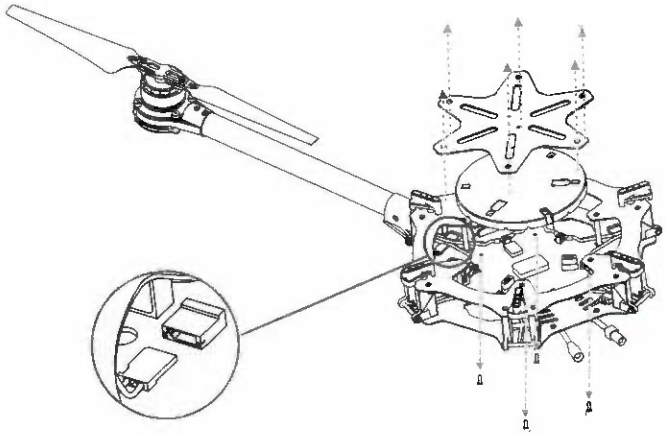
2. Insert each frame arm vertically into the mounting area on the center frame.
3. Line up the screw holes of the frame arm and center frame.
4. Insert the M4x35 screw from the right of the frame arm (the thread is located on the left of the screw mount). Tighten each screw correctly. Over tightening may lead to connector abrasion.



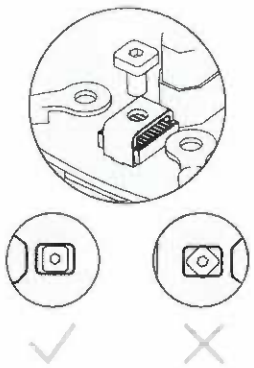
5. Gently lift the frame arm.
6. Twist the red knob to lock each arm in place. Be sure there is an audible click, which indicates a proper lock. Check the arm for movement. To store, untwist the knob and lower the frame arm.

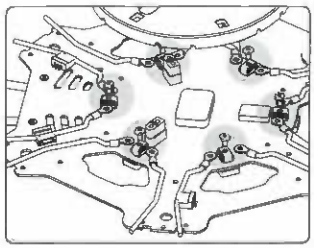


7. Now unscrew 6 screws (M2.5×8 cheese) on the upper plate of the center frame and remove the upper plate. Then unscrew the 4 screws (M3×8 self-tapping, found under the center frame) of the round cover and remove it to gain access to the ESC and power cable installation area.
8. Plug each ESC signal cable into the slot near each arm on the center frame.

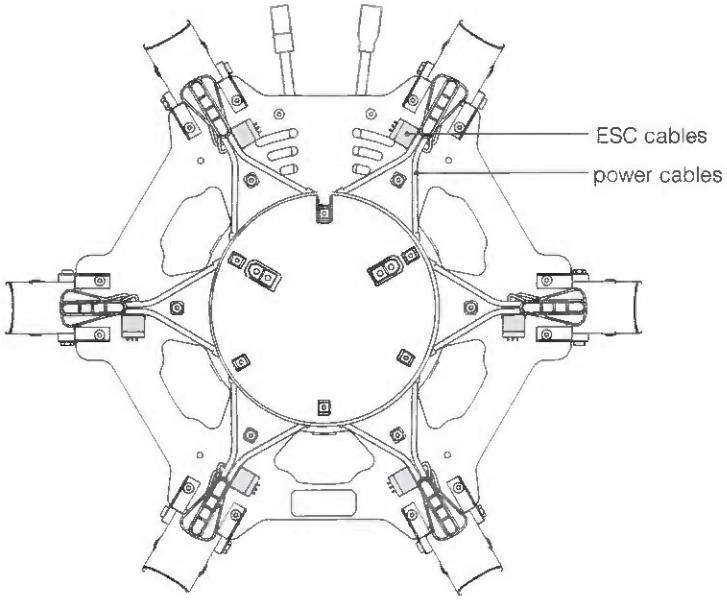


9. Connect the power cables to the center frame. Each cable must be screwed into a positive (+) or negative (-) gold bracket. Each bracket will have two cables of the same color screwed into it. Red cables are positive and black cables are negative.
10. To ensure a reliable connection, rotate the screw until it is both tight and parallel to the connecting bracket.

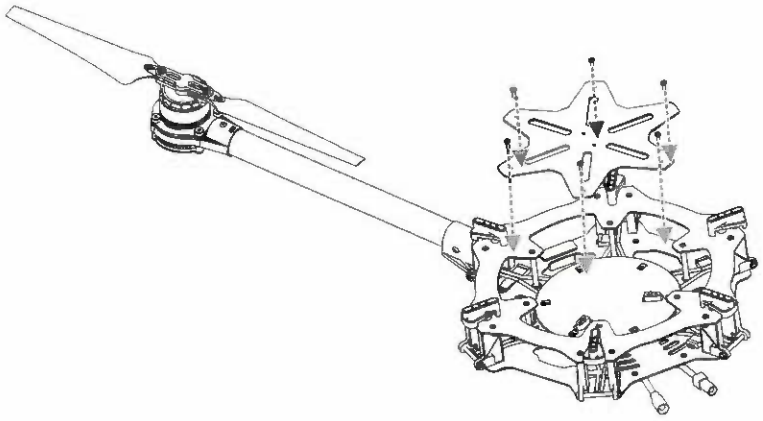




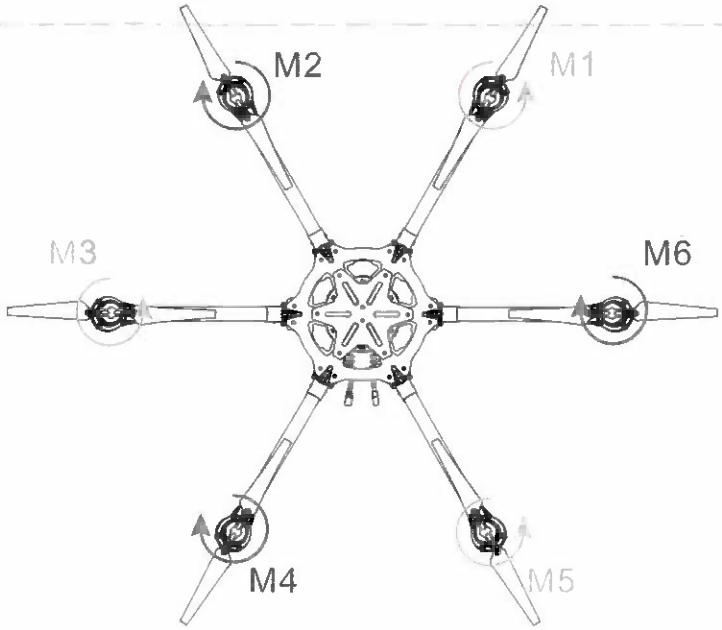
11. Ensure all ESC cables, and power cables are correctly installed onto the center frame.



12. Replace the round cover of the center plate, and re-tighten the 4 screws (M3x8 self-tapping). Then replace the upper plate of the center frame, and re-tighten the 6 screws (M2.5x8 cheese).



13. Double check all frame arms. Arms M1 and M2 are the forward facing (nose), arms M4 and M5 are the tail. Seen from the top, motors on arms M1, M3 and M5 rotate counter clockwise while those on arms M2, M4 and M6 rotate clockwise.

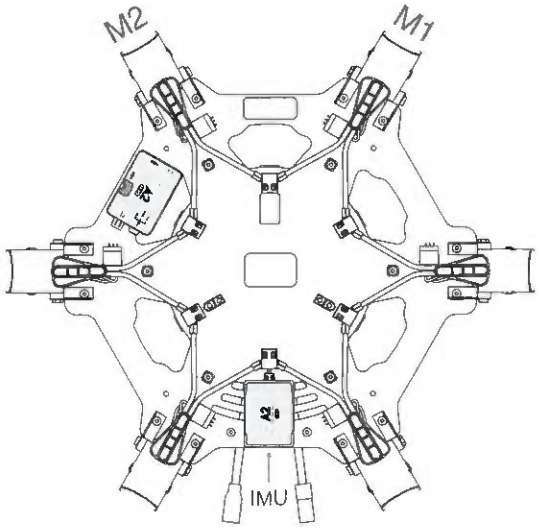


Mounting Electronics and Wiring

Eight positions are reserved for mounting a flight control system, wireless video transmission module, receiver, and other accessories. The DJI A2 flight control system has been used here as an example. If using an A2, follow mounting and wiring instructions found in the A2 flight control system user manual. If using the DJI WK-M flight control system, please refer to the WK-M user manual for connections. Also be sure the firmware on your DJI flight controller has been updated to the latest version.

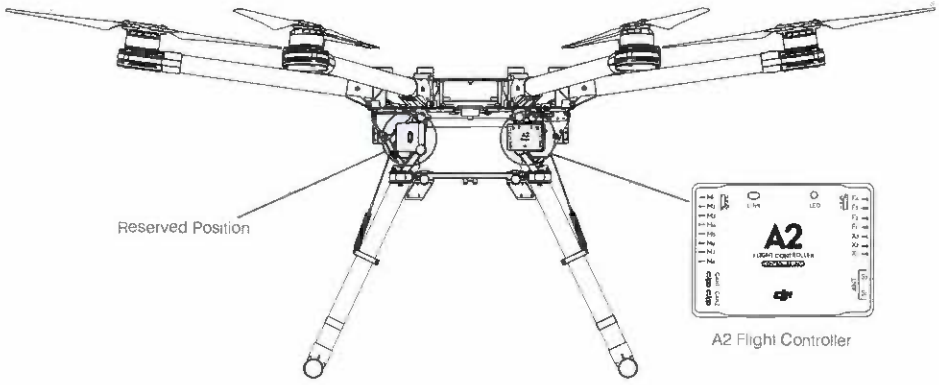
Instructions

1. Attach IMU module to the IMU area of the center frame. Ensure that it points toward the nose.
2. Attach the PMU module to the center frame.



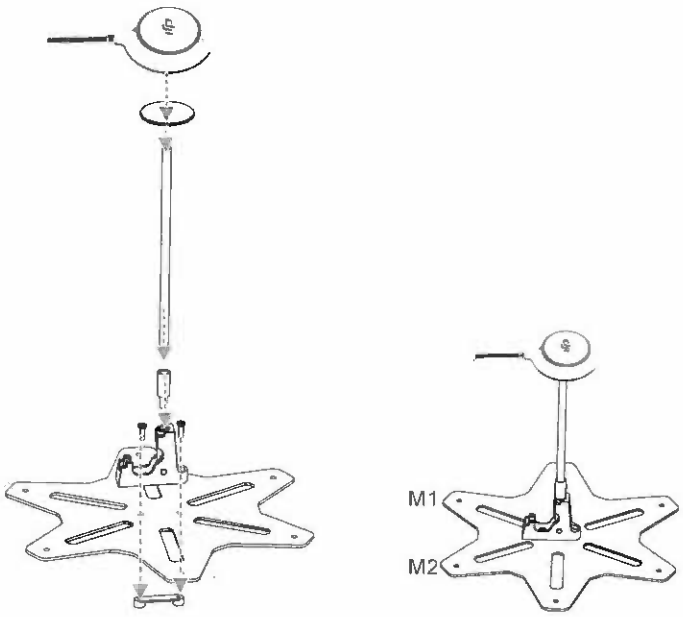
⚠ Only mount the IMU in the IMU position of the center frame.

3. Mount the flight controller in the reserved position near the PMU module.

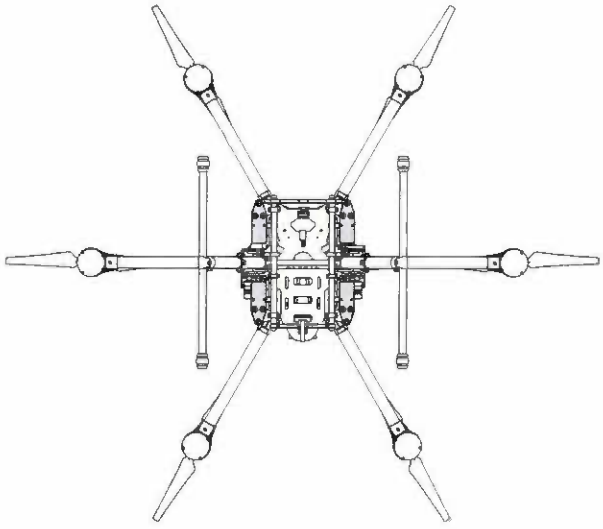


A2 Flight Controller

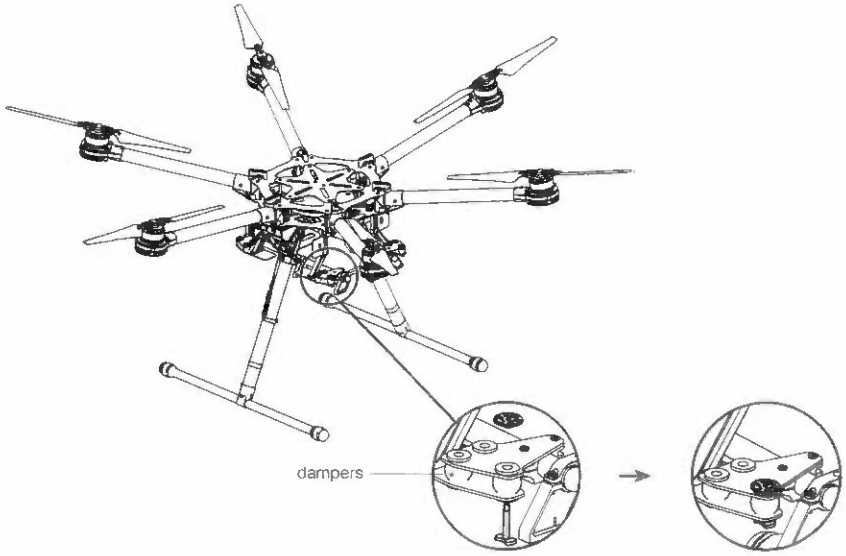
4. Attach the GPS collapsible mount to the center frame using M2 5×8 screws.
5. Mount a GPS module to the GPS mount with a bracket. Ensure the arrow points toward the nose and avoid catching your fingers in the bracket when folding for transportation.



6. The other reserved positions are indicated in the diagram below and can be used for mounting a receiver, LED flight indicator, iOSD module and wireless video transmission module.



7. Check that every anti-drop screw has been firmly installed in the reserved positions. Thread locker is recommended.
   (1) Remove the anti-drop screws to apply appropriate thread locker.
   (2) Replace and tighten.
8. Note that the dampers are 30° silicon rubber. If you use other dampers or vibration absorbing balls, the quality of your aerial photography may be affected.



⚠
- Mount the GPS with a bracket to avoid interference from the center frame power board.
- Use glue to install the GPS bracket. Ensure it is firm and stable before every flight.
- Always test motors using the Assistant Software after installation. Refer to your flight control system user manual for details.

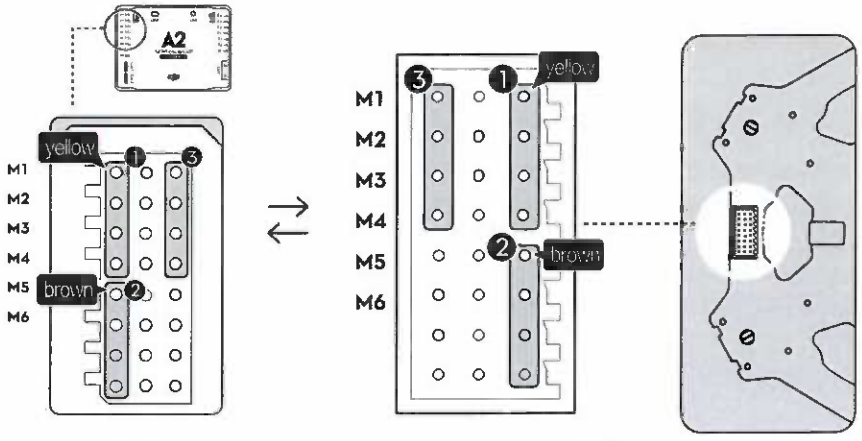
Connecting the flight controller to the center frame

1. Connect the flight control system according to your flight control system user manual.
2. Connect the flight controller to the center frame with the connection cables.
   There are two kinds of connection cables. Choose the corresponding connection mode according to the connection cable in the box.

Using the connector set: 

Plug in the connector set to the ESC signal outlet on the center frame. Then plug in the connector set to flight controller as shown below.

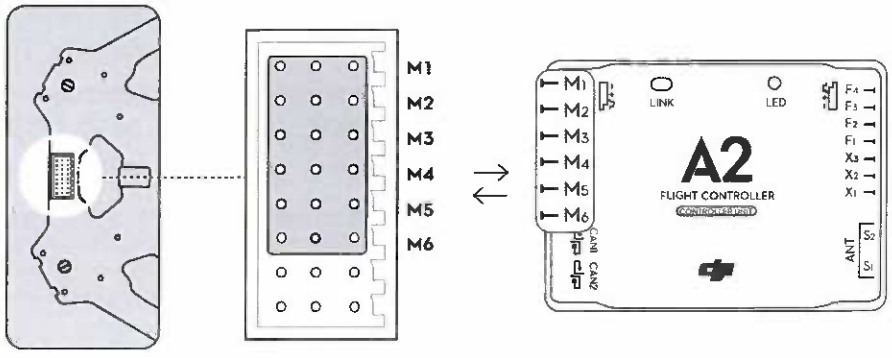
(1) Yellow 4-pin cables are for M1~ M4 connections. The yellow cable should be connected to M1.
(2) Brown 4-pin cables are for M5~ M6 connections. The brown cable should be connected to M5.
(3) Black 4-pin cables are for four continuous ground pins connections. M1~M4 are connected as the following diagram shows.



A2 Flight Controller　　the ESC Signal Outlet

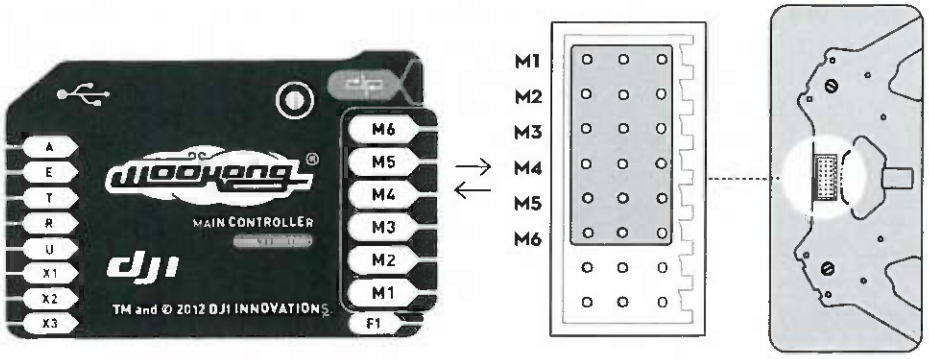
Using the 3-pin connection cable: 

M1 through M6 correspond to each motor number.



the ESC Signal Outlet　　A2 Flight Controller

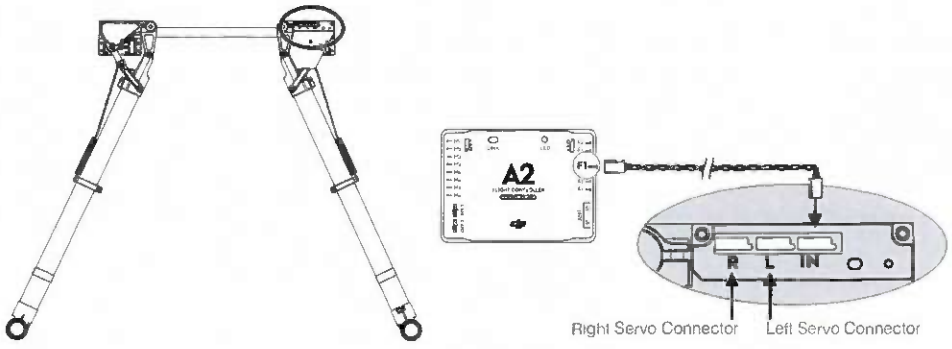
⚠ If using a DJI WK-M flight controller, you must use the wires that came with the WK-M. M1 through M6 correspond to each motor number.



WKM Flight Controller　　the ESC Signal Outlet

Connecting the flight controller and landing gear

1. Connect the left servo (between M3 and M4) cable to the "L" port of the landing gear control board.
2. Connect the right servo (between M5 and M6) cable to the "R" port of the landing gear control board.
3. For the A2 flight control system, connect the F1 port of the flight controller to the "IN" port of the landing gear control board. Other flight control systems connect a 2-position channel receiver to the "IN" port.



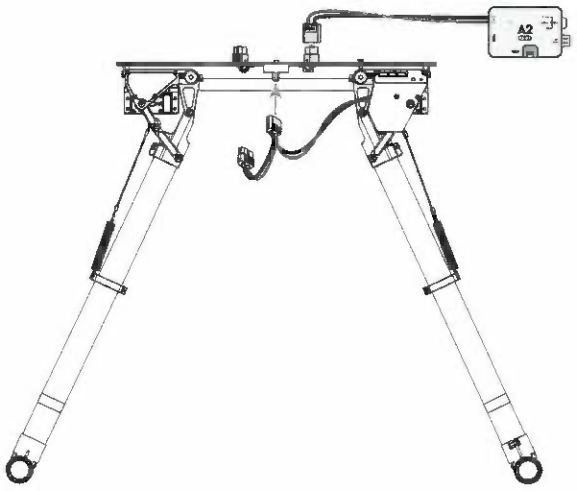
⚠
- If right and left servo cables are reversed, the landing gear will not function properly.
- Connect all wires carefully and neatly to avoid cable damage caused by frame edges.

Connecting XT60 Ports on the Center Frame

The bottom board is a power distribution board with three XT60 connectors for battery power.

Instructions

1. Connect the PMU power cable to the XT60 connector on top of the bottom board.
2. Connect the landing gear control board cable to the XT60 connector on the bottom of the bottom board.
3. Other connectors can supply power for other DJI devices, as required.

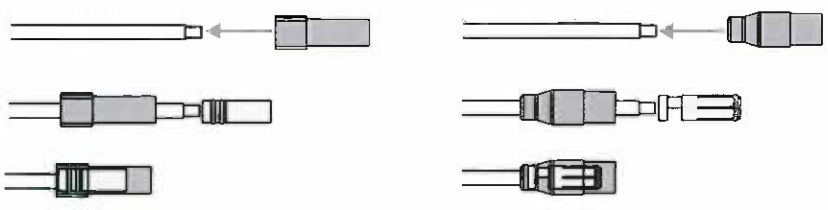


Installing Battery

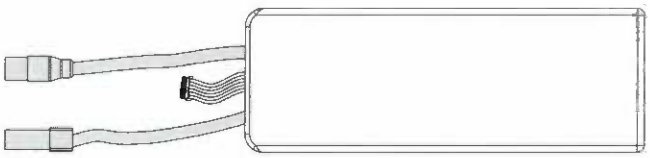
Soldering battery connectors

AS150 spark-proof connectors are used. They must be soldered to your battery power cables.

1. Remove the original battery connectors. Avoid cutting the power and ground cables at the same time, as this can cause a short circuit. We recommend wrapping unsoldered cables with insulating tape to prevent accidental connections.
2. Pass the black ground wire through the black housing. After passing the wire through, solder the female bullet connector to the ground wire. Wait for the soldered connection to cool, then pull the housing back over the bullet connector.
3. Screw and pass the red power wire through the red housing. After passing the wire through, solder the male bullet connector to the power wire. Wait for the soldered connection to cool, and then screw and pull the housing back over the bullet connector.



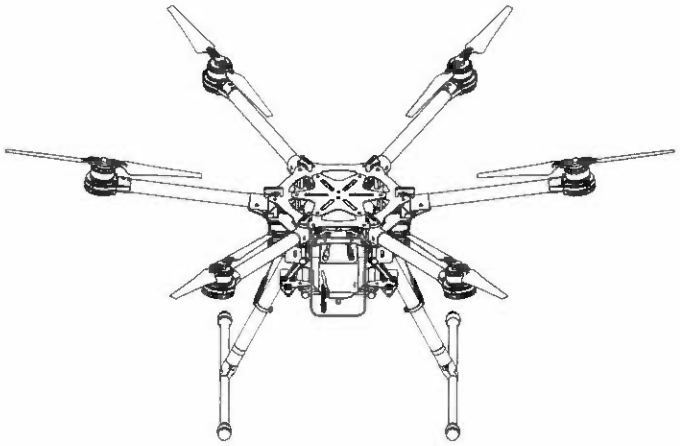
Connectors soldering diagram

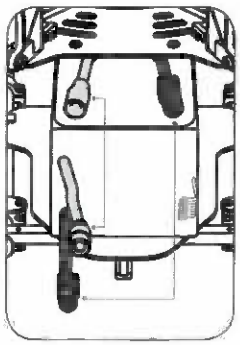


Connectors are soldered

Installing and connecting battery

1. Attach battery to battery tray. Do not use an oversized battery. Maximum installation dimension is 80mm X 120mm X 200mm.
2. Connect the black connector and then the red connector to power on. Disconnect the red connector then black connector to power off.



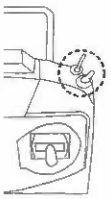


Setting Up the Landing Gear

Using a 2-position RC transmitter switch, landing gear retraction can be carried out remotely.

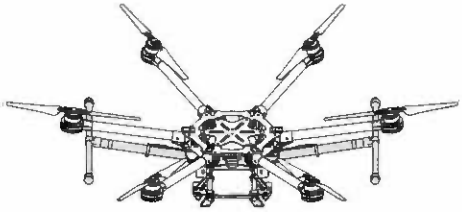
Setting up the transmitter

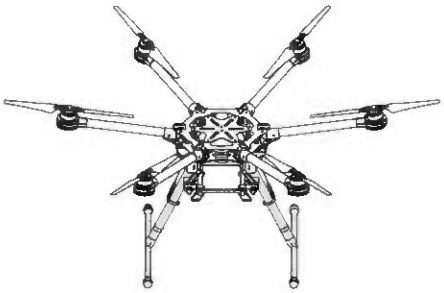
Select a 2-position switch (default setting is OK) as the control input for the landing gear. Ensure the corresponding receiver port is connected to the "IN" port on control board. For the A2 flight control system, connect the flight controller's F1 port to "IN" port on control board.



Upper: Toggle the switch to this position to raise the landing gear.

Lower: Toggle the switch to this position to lower the landing gear.





⚠
- If the transmitter switch has a FailSafe function, set the FailSafe value to the [Lower] position. This ensures that the landing gear will lower automatically when the receiver enters FailSafe mode.
- To avoid accidental switch triggering, slide levers or other controls can be used for landing gear control.

Usage procedures

1. Ensure transmitter and receiver batteries are fully charged.
2. Toggle the switch to the [Lower] position, and then turn on the transmitter.
3. Ensure the "R", "L" and "IN" connections are correct.
4. Ensure the landing gear is in the [Lower] position, then power on the system. If a solid green LED on the landing gear control board lights up, everything is normal. If it flashes green slowly, re-calibrate the system according to instructions in "Recalibrating Servo Travel".
5. Toggle the switch to the [Upper] position ONLY AFTER takeoff.
6. Toggle the switch to the [Lower] position for landing.

- Servo power will shut off 3 seconds after the landing gear has reached its target position.
- When powering on the system, if the transmitter switch is in the [Upper] position, the LED will flash red quickly as a warning. Toggle the switch to the [Lower] position to continue.
- If there is an abnormal signal or no signal input into the "IN" port, the LED will slowly flash red. Check receiver and connections for problems.
- If servo power consumption is too high, the LED will light up red. If this lasts more than 4 seconds, the landing gear will lower and the LED will flash green slowly. Re-calibration is needed before flying.
- A2 flight control system users can use the A2 Assistant to set intelligent gear on the "Advanced" page. Refer to the "A2 user manual" for details.

LED Control Board Indicator

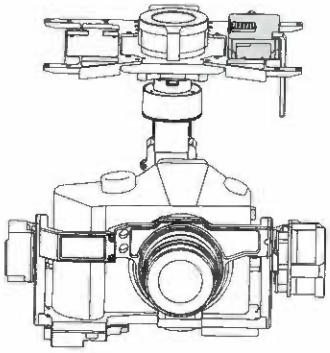
System normal	G — Solid green.
Calibration required	G ····· Blinks rapid green.
Recalibration required	G ····· Blinks slow green.
Calibration failed	Y — Solid yellow.
Enter calibration mode	Y ····· Blinks rapid yellow.
System calibrating	Y ····· Blinks slow yellow.
Motor stalled	R — Solid red.
Unsafe startup alert	R ····· Blinks rapid red.
Input signal abnormal	R ····· Blinks slow green.

Landing Gear Specifications

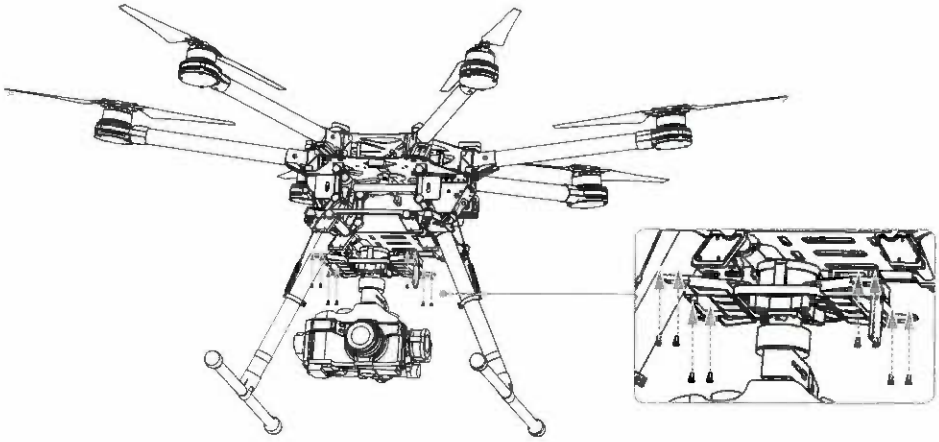
Parameter	Range	Parameter	Range
Working Voltage	3S~6S (LiPo)	Input Signal	PWM (High-Pulse Width 800us~2200us)
Working Current	Max 1A@6S	Output Signal	PWM (Mid Position is 1520us) in 90Hz
Working Temperature	-20~70° C	Output Voltage	6V
Total Weight	875g	Servo Travel	150° (Minimum 120°)

Mounting the Gimbal

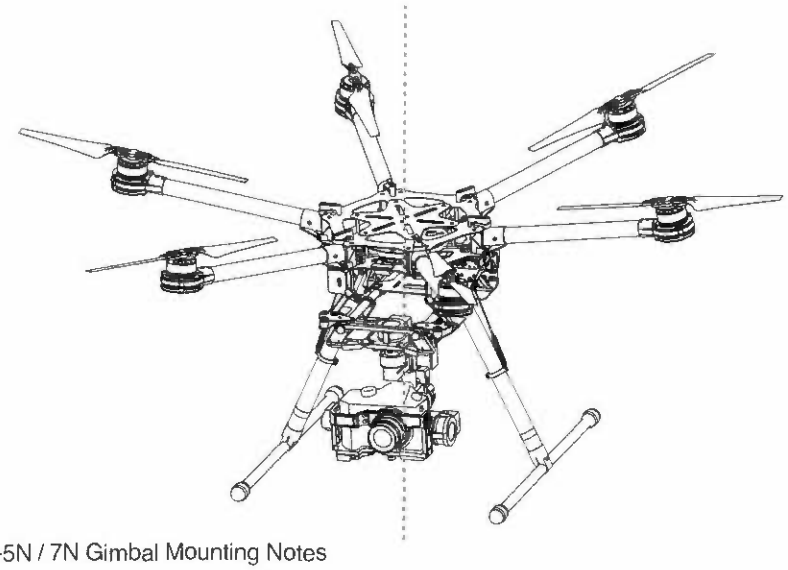
Before assembling the gimbal, install the GCU as shown below. Be sure to install on the side as shown below. A DJI Z15-GH4 (HD) gimbal has been used as an example in the following diagrams.



The connectors on gimbal should be removed for better performance, then the gimbal can be mounted to the lower connection points. Users of DJI Z15-5N / 7N gimbal, refer to the DJI Z15-5N / 7N Gimbal Mounting Notes (Page 21) for details.



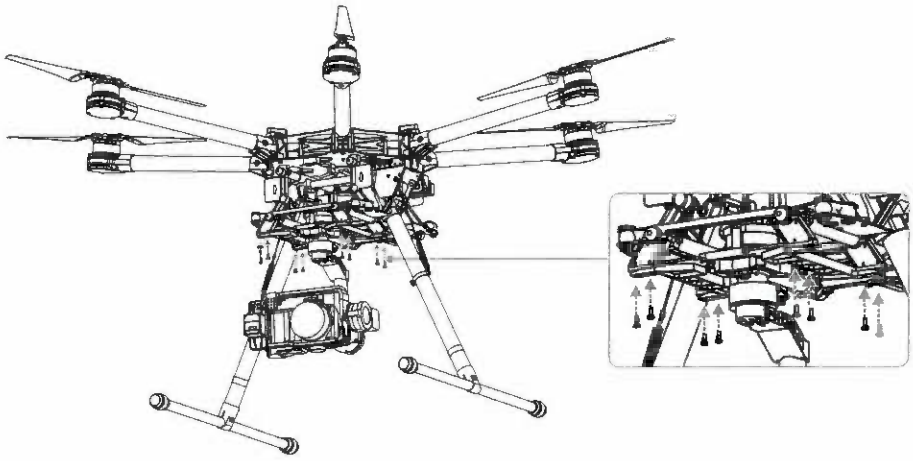
Check that the system's center of gravity is on the line as shown in the diagram below.



DJI Z15-5N / 7N Gimbal Mounting Notes

- Due to the size restriction of the Z15-5N / 7N gimbal, users should purchase extended landing gear legs (used with Z15-5N / 7N gimbal) to avoid damage and/or failure during the self-test. Refer to the Part List Package No.34 (Page 31) for details.
- Follow the Mounting the Landing Gear (Page 6) instructions to mount extended landing gear legs. Then the gimbal can be mounted as shown below.

Package No.34 is for users whose landing gear legs are 300mm. Users whose landing gear legs are 350mm have no need to purchase this part.



Appendix

ESC Sound

ESC State	Sound
Ready	♪1234567–B–B
Throttle stick is not at bottom	BBBBBB...
Input signal abnormal	B·····B·····B...
Input voltage abnormal	BB···BB···BB···BB...

ESC LED

ESC State	LED
Standby	Off
Motor rotating	Solid Red or Green On
Motor rotating at full throttle position	Solid Yellow On

⚠ DJI ESCs are specifically designed for multi-rotors. When used with DJI autopilot systems parameters and travel ranges do not have to be calibrated.

Specifications

Frame	
Diagonal Wheelbase	900mm
Frame Arm Length	358mm
Frame Arm Weight (with Motor, ESC, Propelier.)	316g
Center Frame Diameter	272mm
Center Frame Weight (with Landing Gear Mounting Base, Servos)	1185g
Landing Gear Size	460mm(Length)×450mm(Width)×360mm(Height)
Motor	
Stator Size	41×14mm
KV	400rpm/V
Max Power	500W

Weight (with Cooling Fan)	158g
ESC	
Working Current	40A
Working Voltage	6S LiPo
Signal Frequency	30Hz ~ 450Hz
Drive PWM Frequency	8KHz
Weight (with Radiators)	35g
Foldable Propeller (1552/1552R)	
Material	High strength performance engineered plastics
Size	15x5.2 inch
Weight	13g
Flight Parameters	
Takeoff Weight	4.7Kg ~ 8.2Kg
Total Weight	3.3Kg
Power Battery	LiPo (6S,10000mAh~15000mAh,15C(Min))
Max Power Consumption	3000W
Hovering Power Consumption	1000W (@6.8Kg Takeoff Weight)
Hovering Time	18min (@12000mAh & 6.8Kg Takeoff Weight)
Working Environment Temperature	-10° C ~ 40° C

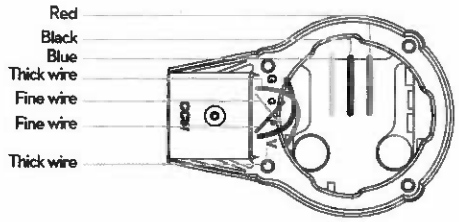
Gain Value Settings

Flight Control	Basic			Attitude		
	Pitch	Roll	Yaw	Pitch	Roll	Vertical
A2	110%	110%	120%	220%	220%	120%
WooKong-M	160%	160%	160%	190%	190%	100%

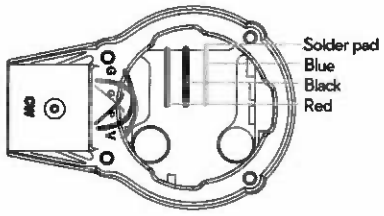
FAQ

Soldering the ESC

Be sure to solder the thick wires and fine wires correctly when soldering an ESC to the frame arm. Clockwise (CW) and counter clockwise (CCW) motors have a different arrangement of the colored wires.



CCW arms



CW arms

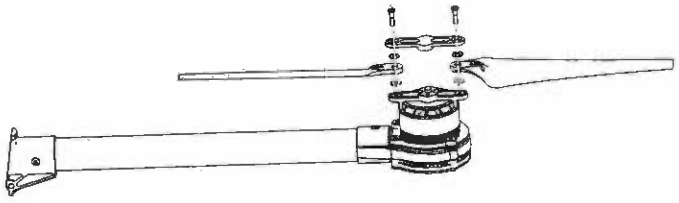
Remounting the Propellers

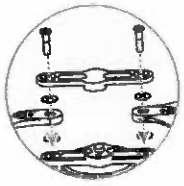
Instructions

1. Use two M3×12.3 screws and four washers to remount propellers.
2. Apply thread locker to the thread of the propellers mount first.
3. Affix screws with 4Kg · cm (0.4N · m) torque.

Refer to original screw tensions if you are unfamiliar with torque measurements. Applying thread locker to the propeller mount first avoids getting thread locker into the holes of the plastic propeller.

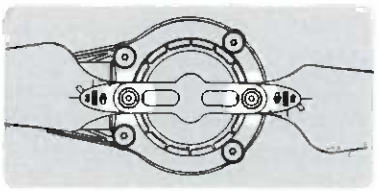
Loose screws cannot be securely locked with thread locker.





Propeller Precautions

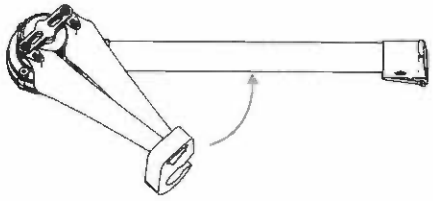
Torque markers on the screws and propeller covers will give you a visual cue to check whether the propellers are loose. Check the torque markers before every flight.



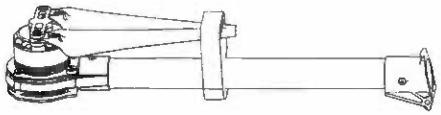
Using the Propeller Holder

Instructions

1. Insert the propeller blades into the propeller holder.

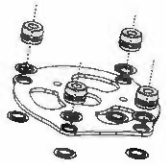


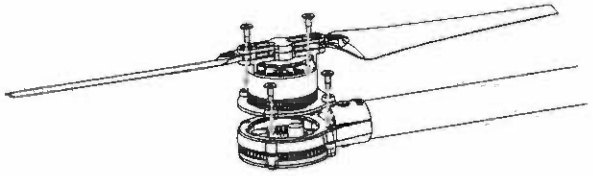
2. Attach the propeller holder to the frame arm.



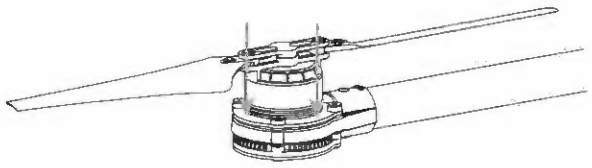
Assembling Motor Vibration Absorbers

A soft damper is part of the vibration absorber. Assemble soft dampers as shown below. Assembly is the same for CCW and CW propellers.





- Ensure all soft dampers and vibration absorbers are in good condition before every flight. If not, replace immediately. Otherwise, the flight performance of your aircraft will be adversely affected.
- Before installing the soft dampers, put the copper gaskets onto the four mounting holes on the carbon plate. Then put the soft dampers into the mounting holes.
- After tightening the screws, the vibration absorbers may be twisted. If this is the case, hold the motor with your thumbs under the base plate and fingers on the top carbon plate, and squeeze the plates together to make the vibration absorbers flat and parallel with the plates.

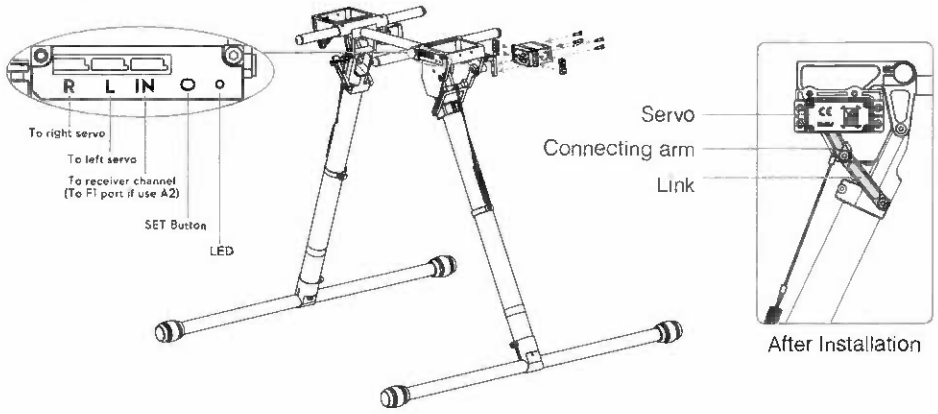


Remounting the Landing Gear Servo

Remounting servos is not recommended as they are pre-installed.

Instructions

1. Connect the left servo cable to the "L" port of the landing gear control board.
2. Connect the right servo cable to the "R" port of the landing gear control board.
3. Press and hold the SET button using a pin then power on. You will see a yellow LED beside the SET button flashing quickly. Wait as servos complete position initialization.
4. Make sure the arm connecting to the servo is parallel to the link as shown in the following diagram.
5. Assemble the left and right servos to the left (between M3, M4) and the right (between M5, M6) parts of the landing gear. Power off.



Recalibrating Servo Travel

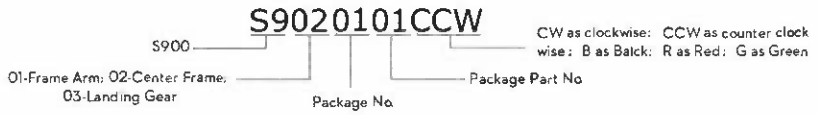
Instructions

1. Keep your hands away from all moving parts.
2. Ensure the "R", "L" and "IN" connections are correct.
3. Keep the whole aircraft off of the ground during calibration, as landing gear will move.
4. Press and hold the SET button using a pin while powering on, then release. An LED will flash yellow quickly. Press the SET button again. Auto calibration will begin and the LED will flash yellow slowly. DO NOT obstruct any moving parts during auto calibration.
5. During calibration, the left landing gear will raise and lower, followed by the right landing gear.
6. After calibration, both the left and right landing gears will be lowered and the LED will display a solid green light. This indicates that the landing gear is working properly.

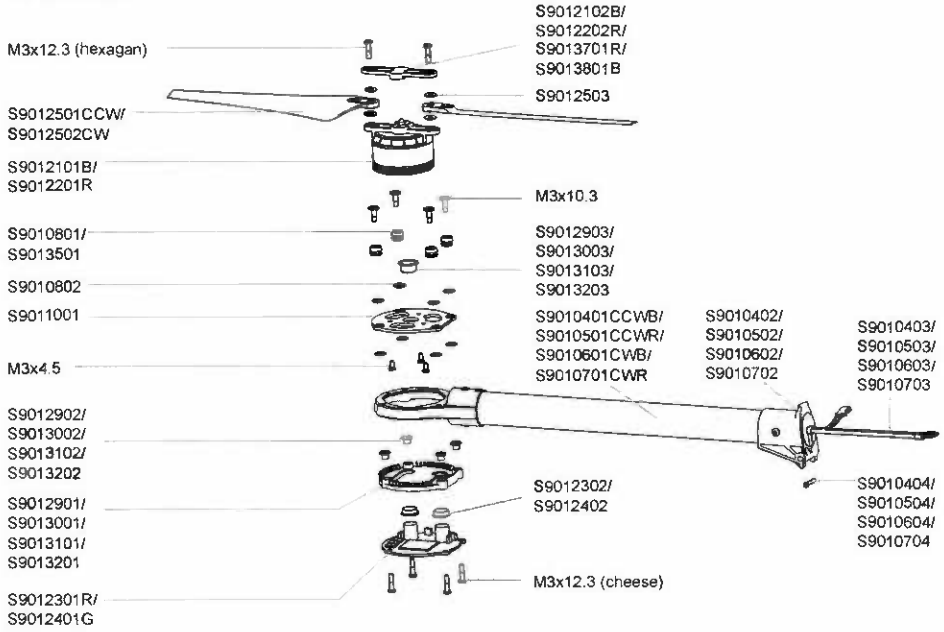
- If the LED is solid yellow after calibration, a problem has occurred. Carry out the instructions in "Remounting the Landing Gear Servo" then try again.
- Avoid obstructions during calibration. If the landing gear was obstructed, recalibration will be required, per the above steps.
- If the "R" and "L" servo cables are reversed, travel will not be measured correctly. Fix the connections and recalibrate the landing gear using the above steps.
- Landing gear travel has been pre-calibrated. Mechanical adjustment of the gear travel is not recommended.

Part List

If you require a replacement part, locate the part that you wish to replace in the following tables. Then order the package that comes with the specified part. The numbering of the part is defined as follow:



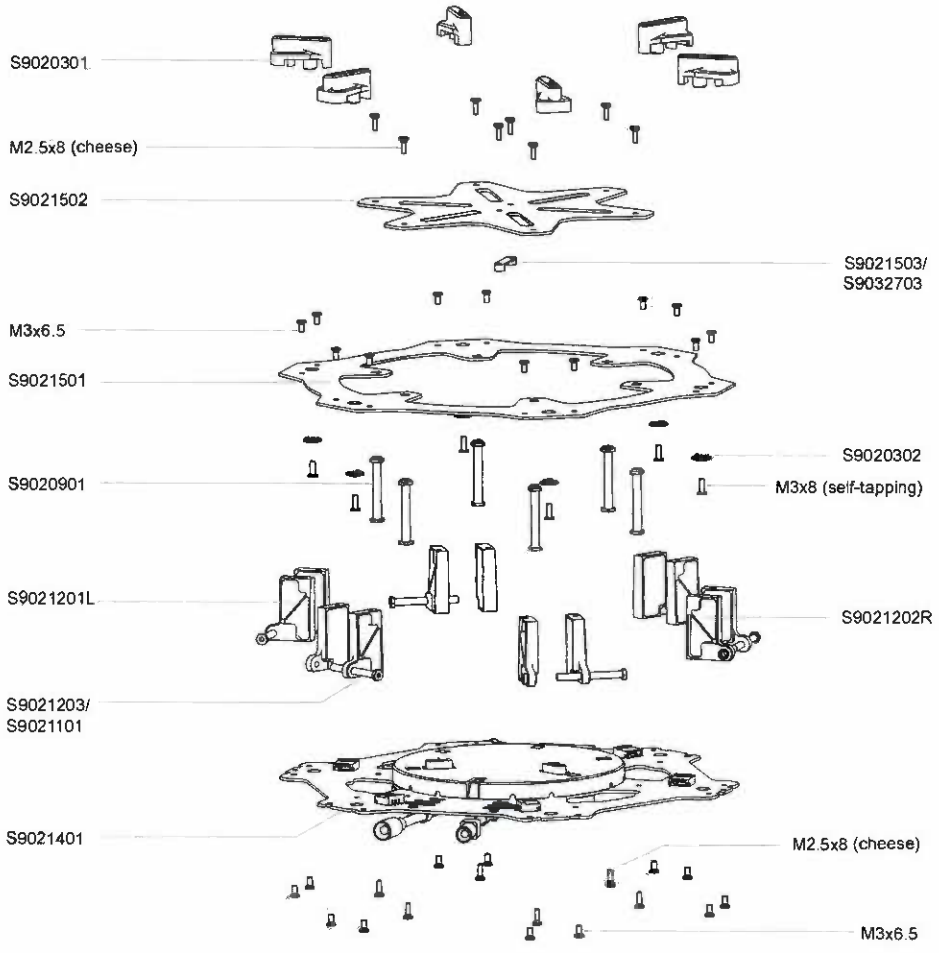
Frame Arm



Package No.	Name	Part No.
4	S900 Frame Arm CCW - Black	S9010401CCWB, S9010402, S9010403, S9010404, M3x12.3 (cheese)
5	S900 Frame Arm CCW - Red	S9010501CCWR, S9010502, S9010503, S9010504, M3x12.3 (cheese)
6	S900 Frame Arm CW - Black	S9010601CWB, S9010602, S9010603, S9010604, M3x12.3 (cheese)
7	S900 Frame Arm CW - Red	S9010701CWR, S9010702, S9010703, S9010704, M3x12.3 (cheese)
8	S900 Motor Damping Unit	S9010801, S9010802, M3x10.3
10	S900 Motor Mount Carbon Board	S9011001, M3x4.5

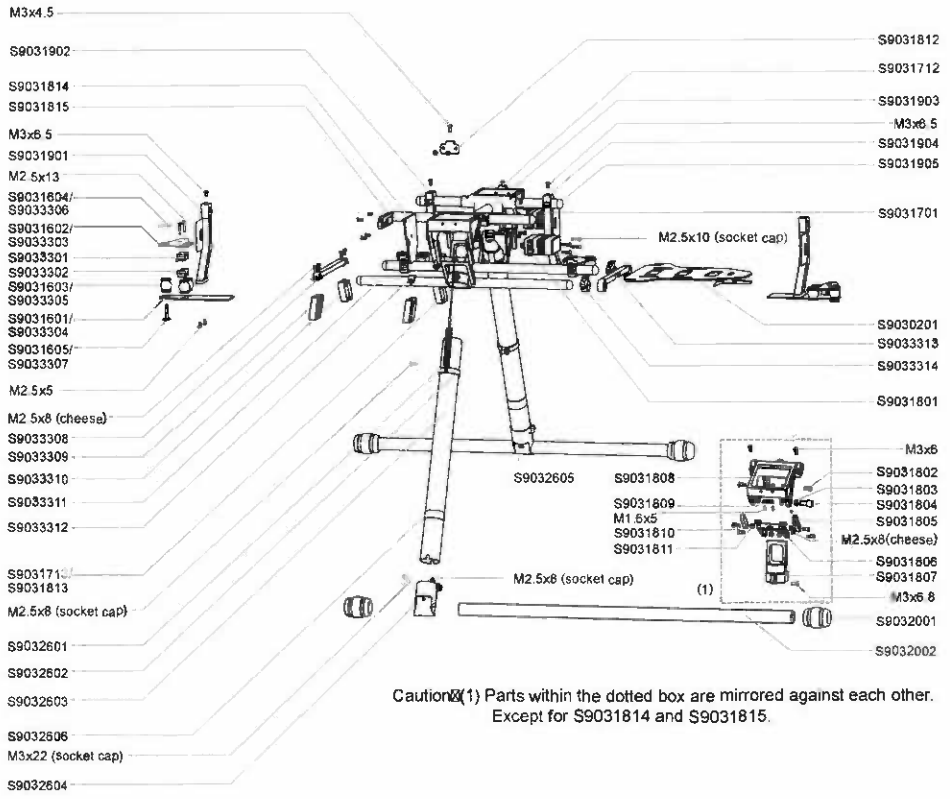
21	S900 4114 Motor with black Prop cover	S9012101B, S9012102B, M3x4.5
22	S900 4114 Motor with red Prop cover	S9012201R, S9012202R, M3x4.5
23	S900 ESC with Red LED	S9012301R, S9012302, M3x12.3 (cheese)
24	S900 ESC with Green LED	S9012401G, S9012402, M3x12.3 (cheese)
25	S900 Propeller Pack	S9012501CCW, S9012502CW, S9012503, M3x12.3 (hexagan)

Center Frame



Package No.	Name	Part No.
3	S900 Lock Knob	S9020301, S9020302, M3x8 (self-tapping)
9	S900 Center Frame Support Pillar	S9020901, M2.5x8 (cheese)
12	S900 Arm Mounting Bracket	S9021201L, S9021202R, S9021203, M3x6.5
14	S900 Center Frame Bottom Board	S9021401, M3x4.5 (cheese), M3x8 (self-tapping), M3x6.5, M3x5.5
15	S900 Center Frame Top Board	S9021501, S9021502, S9021503, M3x6.5, M2.5x8 (cheese)
11	S900 Frame Arm Mounting Steel Shaft	S9021101

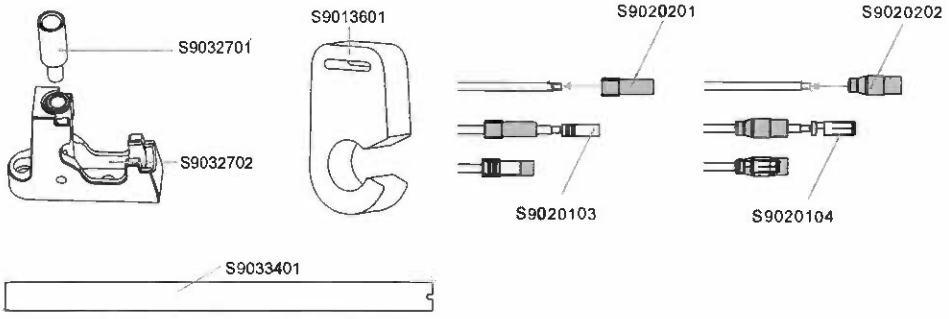
Landing Gear



Caution: (1) Parts within the dotted box are mirrored against each other. Except for S9031814 and S9031815.

Package No.	Name	Part No.
16	S900 Gimbal Damping Bracket	S9031601, S9031602, S9031603, S9031604, S9031605, M2.5x5, M2.5x13
17	S900 Retractable Module (Right)	S9031701, S9031702, S9031703, S9031704, S9031705, S9031706, S9031707, S9031708, S9031709, S9031710, S9031711, S9031712, S0031713, M1.6x5, M2.5x10 (socket cap), M2.5x8 (cheese), M2.5x5, M3x8, M3x4.5, M3x6.8
18	S900 Retractable Module (Left)	S9031801, S9031802, S9031803, S9031804, S9031805, S9031806, S9031807, S9031808, S9031809, S9031810, S9031811, S9031812, S9031813, S9031814, S9031815, M1.6x5, M2.5x10 (socket cap), M2.5x8 (cheese), M2.5x5, M3x8, M3x4.5, M3x6.8
19	S900 Gimbal Damping Connecting Brackets	S9031901, S9031902, S9031903, S9031904, S9031905, M2.5x5, M3x6.5
20	S900 Landing Skid	S9032001, S9032002
26	S900 Landing Gear Leg	S9032601, S9032602, S9032603, S9032604, S9032605, S9032606, M2.5x8 (socket cap), M3x22 (socket cap)
2	S900 Battery Tray	S9030201
33	S900 Gimbal Mounting Accessories	S9033301, S9033302, S9033303, S9033304, S9033305, S9033306, S9033307, S9033308, S9033309, S9033310, S9033311, S9033312, S9033313, S9033314, M2.5x5, M2.5x13, M2.5x8 (cheese)

Miscellaneous



Caution: This part is used with Z15-5N / 7N gimbal.

Package No.	Name	Part No.
13	S900 Center Frame	Package 3, 9, 12, 14, 15
29	S900 Complete Arm [CW-RED]	Package 7, 8, 10, 11, 22, 23, 25, S9012901, S9012902, S9012903
30	S900 Complete Arm [CW-Green]	Package 6, 8, 10, 11, 21, 24, 25, S9013001, S9013002, S9013003
31	S900 Complete Arm [CCW-RED]	Package 5, 8, 10, 11, 22, 23, 25, S9013101, S9013102, S9013103
32	S900 Complete Arm [CCW-Green]	Package 4, 8, 10, 11, 21, 24, 25, S9013201, S9013202, S9013203
27	S900 GPS Holder	S9032701, S9032702, S9032703, M2.5x8 (cheese)
28	S900 Screw Pack	Assorted screws
1	S900 Power Cord Plug	S9020101, S9020102, S9020103, S9020104
34	S900 Extended Landing Gear Leg	S9033401
35	S900 Rubber Damper for 4114 Motor	S9013501, M3x10.3
36	S900 Propeller Holder	S9013601
37	S900 4114 Motor-Red Prop Cover	S9013701R, M3x12.3 (hexagan)
38	S900 4114 Motor-Black Prop Cover	S9013801B, M3x12.3 (hexagan)

FCC Statements

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

User manual is subject to change without prior notice.

You may visit DJI offical website to obtain the latest version of user manual.

http://www.dji.com/product/spreading-wings-s900

ATTACHMENT 4

PrecisionHawk, Inc.
User Manual: PrecisionHawk Hawkeye Mk-III

This attachment will be submitted in hard copy under a separate cover letter. This Attachment is submitted as a Confidential Document that contains Proprietary Information within the meaning of 14 C.F.R. § 11.35(b). The Applicant requests that the contents of this Attachment be held in a separate file to which the public does not have access.