High-Precision Rotation Microwave Radar

User Guide

V1.0 2018.01

Disclaimer

Congratulations on purchasing your new DJI™ product. The information in this document affects your safety and your legal rights and responsibilities. Read this entire document carefully to ensure proper configuration before use. Failure to read and follow instructions and warnings in this document may result in serious injury to yourself or others, damage to your DJI product, or damage to other objects in the vicinity. This document and all other collateral documents are subject to change at the sole discretion of DJI.

By using this product, you hereby signify that you have read this disclaimer and warning carefully and that you understand and agree to abide by the terms and conditions herein. You agree that you are solely responsible for your own conduct while using this product, and for any consequences thereof. You agree to use this product only for purposes that are proper and in accordance with all applicable laws, rules, and regulations, and all terms, precautions, practices, policies and guidelines DJI has made and may make available.

DJI accepts no liability for damage, injury or any legal responsibility incurred directly or indirectly from the use of this product. The user shall observe safe and lawful practices including, but not limited to, those set forth in this document.

Notwithstanding above, your statutory rights under applicable national legislation are not affected by this disclaimer.

Warnings

1. The High-Precision Rotation Microwave Radar (abbreviated as “Microwave Radar”) is only compatible with the AGRAS™MG-1SAdvancedand Agras MG-1P series aircraft. DO NOT use it with other products.
2. The Microwave Radar can be used with flat farmland only and cannot be used with slope fields which have aninclination more than 10° andwhere height differences may occur.
3. To avoid interference, ensure that there is no other equipment using microwave radio frequencies nearby. For example, automotive microwave radars, satellite communication stations, etc.
4. Obey local radio transmission laws and regulations.
5. Before use, ensure that the outer protective cover is not cracked, chipped, sunken, or misshapen.
6. Keep the protective cover clean. Clean the surface with a soft damp cloth and air dry before using again.
7. The obstacle avoidance functions are disabled in Attitude mode.
8. Obstacle avoidance is adversely affected when aircraft pitch exceeds 15°. Please fly with care.
9. Obstacle avoidance is disabled when flying over surfaces at a height of < 0.8 m.

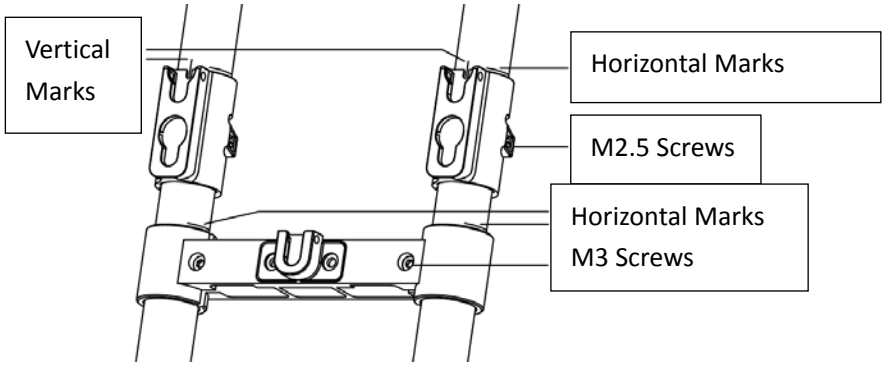
10. Aircraft speed should not exceed 5 m/s when flying over surfaces at a height of < 2 m. Aircraft speed should not exceed 7 m/s when flying at a height of ≥ 2 m. Obstacle avoidance will otherwise be greatly compromised or even disabled.
11. The Microwave Radar will only maintain a fixed distance from vegetation within its working range (1.5-3.5 m). Observe the aircraft's distance from the vegetation at all times.
12. Operate with extra caution when flying over inclined surfaces (depending on aircraft speed). Recommended maximum inclination at different speeds: 10° at 1 m/s, 6° at 3 m/s and 3° at 5 m/s.
13. Please maintain full control of the aircraft at all times. DO NOT rely solely on the DJI MG app. Keep the aircraft within a visual line of sight observing it at all times. Use your discretion to operate it manually to avoid obstacles.
14. DO NOT attempt to disassemble any part of the Obstacle Avoidance Radar that has already been mounted prior to shipping.
15. DO NOT use threadlocker when mounting the radar to avoid damage to the connectors.

Introduction

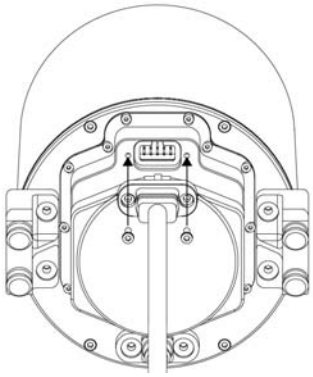
The High-Precision Rotation Microwave Radar is designed for DJI Agras MG-1S Advanced and Agras MG-1P series aircraft. It integrates the three altitude stabilization radars and one obstacle avoidance radar. Its sensitivity has been improved to the twice of the last generation and omnidirectional detection is supported, which effectively enhance the ability of sensingobstacles andperceiving the change of terrain. Active obstacle avoidance function makes the radar fully operational in dusty or nighttime conditions. The radar can sense the horizontal wire with a radius of 0.5 cm at a distance of 15 meters in front and can effectively reduce the safety risk caused by common obstacles on farmland, such as wires and tree rods. While improving the performance of the work, the radar's ingress protection performance is also increased to IP67(IEC standard 60529), fully adapting to the complicated environment in the field.

Installation

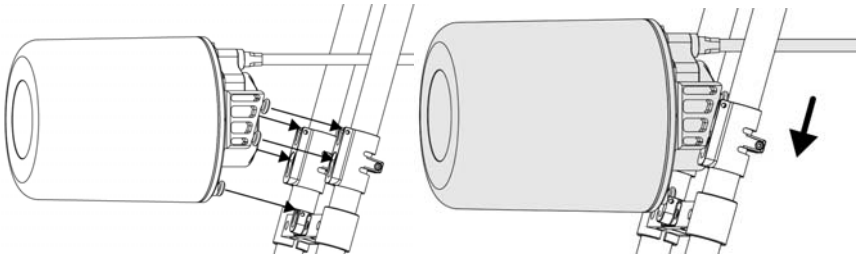
In this example we connect to Agras MG-1S Advanced. The radar should be mounted to the left landing gear leg of the aircraft. Hex keys for the following screws are required: M2.5, M3.
1. Slide the three radar connectors on the left landing gear leg to their corresponding horizontal marks. Rotate the two upper connectors to align the gaps on them to the vertical marks on the landing gear leg. Then tighten the two M2.5 screws and two M3 screws.



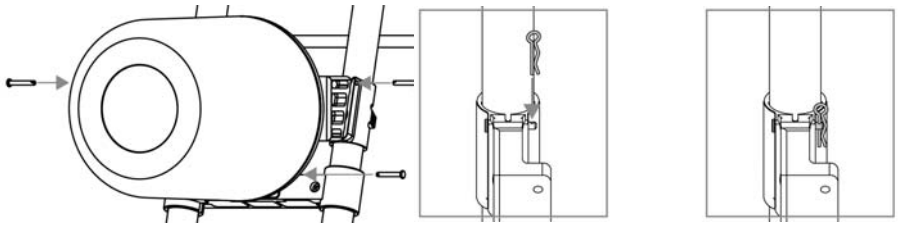
2. Prepare the radar cable. Make sure that there is a rubber pad on the 10-pin connector, then connect it to the port on the radar and tighten the two M2.5×5 screws.



3. Mount the radar to the connectors on the landing gear. Slide downwards to make sure that the fins on the radar is completely inserted into the connectors.



4. Insert the three pins into the mounting holes on the three connectors, and then fix them with cotter pins.

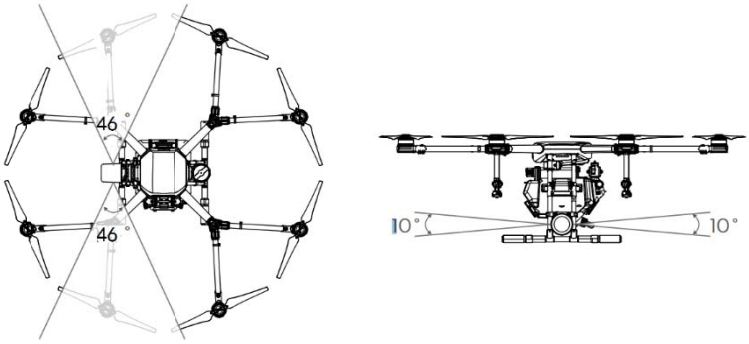


5. Connect the radar cable to the radar port on the aircraft body.

Usage

Detection Range

The detection range of the radar is depicted as follows. Note that the aircraft cannot sense obstacles that are not within detection range. Please fly with caution.



Aircraft Actions

Altitude Stabilization and Terrain Follow

Altitude stabilization and terrain follow functions are available in A-B Route, Route or Manual Plus operation. Set the height between the aircraft and the crop or other surface in the app, then the aircraft will fly above the crop at a constant spraying distance.

Obstacle Avoidance

Obstacle avoidance function is available in A-B Route, Route, Manual Plus or Manual operation.

1. The aircraft will enter speed-limited status when it has a distance of 22 m from the obstacles. The allowable maximum flying speed reduces as the distance reduces. It will hover in place about 3 m away from the obstacle.
2. After the aircraft hovered, users can pull the control stick in the opposite direction away from the obstacle to exit from obstacle avoidance and regain control of the aircraft.
3. If obstacles are detected at a short distance from the aircraft during flight, the aircraft will immediately brake and hover in place.
4. When the aircraft is in A-B Route or Route operation, it will pause the current task and record a break point when slowing down. Users can resume operation after controlling the aircraft to avoid the obstacles.

Specifications

Model	RD2412R
Dimensions	109 mm × 152 mm
Operating Frequency	SRRC / CE / FCC: 24.00 GHzto 24.25 GHz MIC / KCC: 24.05 GHzto 24.25 GHz
Power Input	DC 12 - 30 V
Power Consumption	12 W
Altitude Stabilization and Terrain Follow	Detection range: 1 - 30 m Working range: 1.5 - 3.5 m

Obstacle Avoidance	Obstacle Sensing Range: 1.5 -30 m (horizontal wire with a radius of 0.5 cm at a distance of 15 m, and multi-strand high-voltage lines at a distance of 30 m) Operating Conditions: Height over the objects below is more than 1.5 m and flying speed is lower than 7 m/s Safety Distance : 3 m Obstacle Avoidance Directions: Forward, backward and upward according to the flying direction
Ingress Protection	IP67 (IEC standard 60529)

Compliance Information

FCC Compliance Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

KCC Warning Message

“ 해당무선설비는운용중전파혼신가능성이있으므로인명안전과관련된서비스는할수없습니다.”

“해당무선설비는운용중전파혼신가능성이있음”

NCC Warning Message

低功率電波輻射性電機管理辦法

第十二條經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

EU Compliance Statement: SZ DJI TECHNOLOGY CO., LTD hereby declares that this device is in compliance with the essential requirements and other relevant provisions of the Directive 2014/53/EU.

A copy of the EU Declaration of Conformity is available online atwww.dji.com/euro-compliance

EU contact address: DJI GmbH, Industriestrasse 12, 97618, Niederlauer, Germany

Declaración de cumplimiento UE: SZ DJI TECHNOLOGY CO., LTD por la presente declara que este dispositivo cumple los requisitos básicos y el resto de provisiones relevantes de la Directiva 2014/53/EU.

Hay disponible online una copia de la Declaración de conformidad UE en www.dji.com/euro-compliance

Dirección de contacto de la UE: DJI GmbH, Industriestrasse 12, 97618, Niederlauer, Germany

EU-verklaring van overeenstemming: SZ DJI TECHNOLOGY CO., LTD verklaart hierbij dat dit apparaat voldoet aan de essentiële vereisten en andere relevante bepalingen van Richtlijn 2014/53/EU.
De EU-verklaring van overeenstemming is online beschikbaar op www.dji.com/euro-compliance

Contactadres EU: DJI GmbH, Industriestrasse 12, 97618, Niederlauer, Germany

Declaração de conformidade da UE: A SZ DJI TECHNOLOGY CO., LTD declara, at ravés deste documento, que este dispositivo está em conformidade com os requisitos essenciais e outras disposições relevantes da Diretiva 2014/53/EU.
Existe uma cópia da Declaração de conformidade da UE disponível online em www.dji.com/euro-compliance

Endereço de contacto na UE: DJI GmbH, Industriestrasse 12, 97618, Niederlauer, Germany

Dichiarazione di conformità UE: SZ DJI TECHNOLOGY CO., LTD dichiara che il presente dispositivo è conforme ai requisiti essenziali e alle altre disposizioni rilevanti della direttiva 2014/53/EU.
Una copia della dichiarazione di conformità UE è disponibile online all'indirizzo Web www.dji.com/euro-compliance

Indirizzo di contatto UE: DJI GmbH, Industriestrasse 12, 97618, Niederlauer, Germany

Déclaration de conformité UE : Par la présente, SZ DJI TECHNOLOGY CO., LTD déclare que cet appareil est conforme aux principales exigences et autres clauses pertinentes de la directive européenne 2014/53/EU.
Une copie de la déclaration de conformité UE est disponible sur le site www.dji.com/euro-compliance

Adresse de contact pour l'UE : DJI GmbH, Industriestrasse 12, 97618, Niederlauer, Germany

EU-Compliance: Hiermit erklärt SZ DJI TECHNOLOGY CO., LTD, dass dieses Gerät den wesentlichen Anforderungen und anderen einschlägigen Bestimmungen der EU-Richtlinie 2014/53/EU entspricht.
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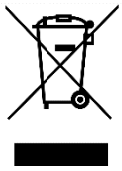
Kontaktadresse innerhalb der EU: DJI GmbH, Industriestrasse 12, 97618, Niederlauer, Germany

CE

CAUTION: RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

Environmentally friendly disposal



Old electrical appliances must not be disposed of together with the residual waste, but have to be disposed of separately. The disposal at the communal collecting point via private persons is for free. The owner of old appliances is responsible to bring the appliances to these collecting points or to similar collection points. With this little personal effort, you contribute to recycle valuable raw materials and the treatment of toxic substances.