

D-RTK 2 High-Precision GNSS Mobile Station

User Guide

V1.0

2018.06

Disclaimer

Thank you for purchasing D-RTK™ 2 (hereinafter referred to as the “Product”). Read this disclaimer carefully before using this Product. By using this Product, you hereby agree to this disclaimer and signify that you have read it fully. Please use this Product in strict accordance with the manual and be sure to pay attention to the Warnings. SZ DJI TECHNOLOGY CO., LTD., and its affiliated companies assume no liability for damage(s) or injuries incurred directly or indirectly from using, installing or refitting this Product improperly, including but not limited to using non-designated accessories.

DJI™ is a trademark of SZ DJI TECHNOLOGY CO., LTD. (abbreviated as “DJI”) and its affiliated companies. Names of products, brands, etc., appearing in this manual are trademarks or registered trademarks of their respective owner companies. This Product and manual are copyrighted by DJI with all rights reserved. No part of this Product or manual shall be reproduced in any form without the prior written consent or authorization of DJI.

This disclaimer is produced in various languages. In the event of divergence among different versions, the Chinese version shall prevail when the Product in question is purchased in China, and the English version shall prevail when the Product in question is purchased in any other region.

Warnings

1. MG-12000S/ MG-12000P batteries can be used for R400BS. Please purchase them separately and DO NOT use other battery models.
2. Only use the R400BS in the corresponding frequency band and in accordance with local laws and regulations.
3. DO NOT bend or fold the cables excessively.

4. Ensure that the R400BS is perfectly level when mounted and placed.
5. Only operate in an open environment free from radio interference. Turn off nearby devices using the same frequencies as the D-RTK Base Station (e.g. radio transceivers).
6. Ensure that the antennas of all the devices used are unobstructed when in use.
7. Only use genuine DJI parts or parts certified by DJI. Unauthorized parts or parts from non-DJI-certified manufacturers may cause the system to malfunction and compromise safety.
8. Ensure that the R400BS and its components are free from contamination (e.g. water, oil, soil and sand).
9. DO NOT attempt to disassemble any part of the R400BS that has already been mounted prior to shipping.
10. Handle the sharp ends of the tripod with caution.
11. Take necessary measures to protect the base station and batteries from water in rain, snow, and/or thunderstorms. Operate with caution in severe weather conditions.

Product Profile

Introduction

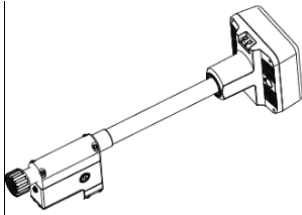
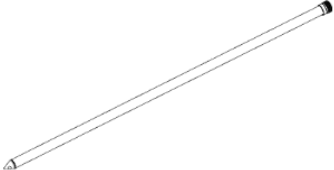


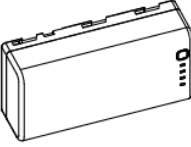




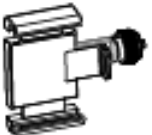


D-RTK 2 High-precision GNSS mobile station (abbreviated as R400BS mobile station) is a new high-precision satellite signal receiver that supports GPS, Compass, GLONASS, and Galileo 4 systems with 9-band satellite signal reception, with built-in OCUSYNC™ Wi-Fi, LAN and CAN Data transmission links are convenient for users to use in different application scenarios. The R400BS mobile station can be used as an RTK mobile base station to increase the positioning accuracy of an aircraft equipped with a DJI RTK positioning system (such as MG-1P RTK, PHANTOM™ 4 RTK, etc.) from meters to centimeters. It can provides strong anti-magnetic interference to ensure reliable operation flight under strong


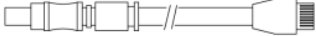
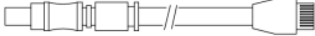
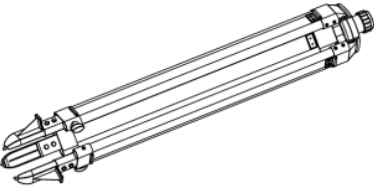
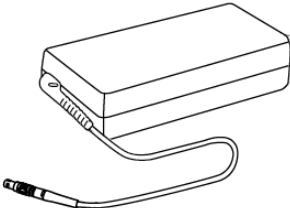
magnetic interference environments such as high-voltage lines and metal construction. The R400BS mobile station can also be used as a Handheld Mapping* for hand-held surveying and mapping, engineering lofting and other purposes, enabling more accurate farm planning. In addition, R400BS can also be used as DJI Position Service (DPS)* to quickly establish network RTK services.

* Coming soon.

Note: The construction of network RTK services must comply with the local laws, regulations and qualification requirements. DJI only provides technical services.

In the Box

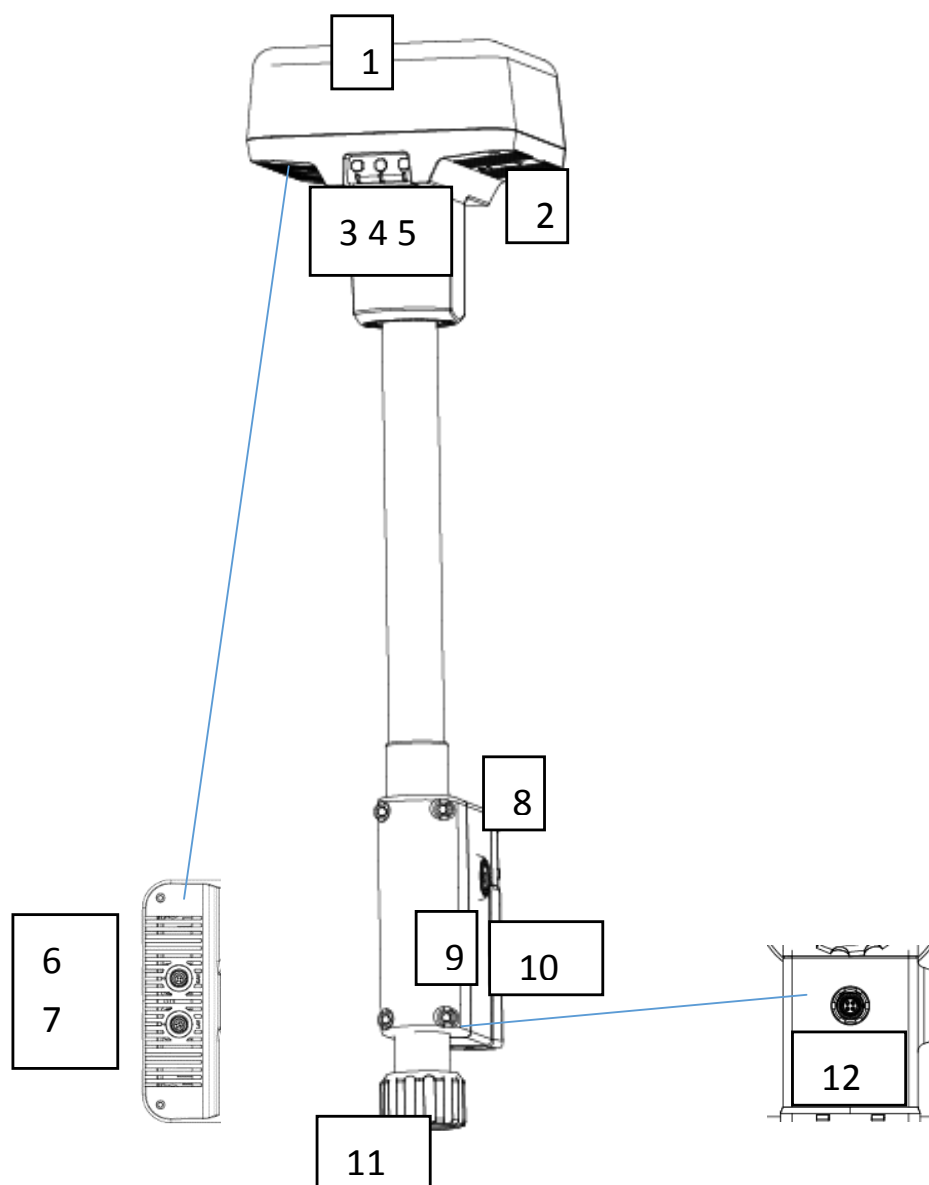
R400BS Body ×1	Extension Rod ×1	MG Battery Holder ×1
		
Charging Hub ×1	Intelligent Battery (WB37) ×2	Battery Cover ×1
		
Power Adapter ×1	AC Cable ×1	MG Power Cable ×1
		
Mobile Phone Holder ×1	USB-C Cable ×1	USB-C OTG Cable ×1
		

Hexagon Wrench ×1	LAN Cable ×1 *	CAN Cable ×1 *
		
Tripod ×1 *	Power Adapter II ×1 **	Manuals
		

* Optional items.

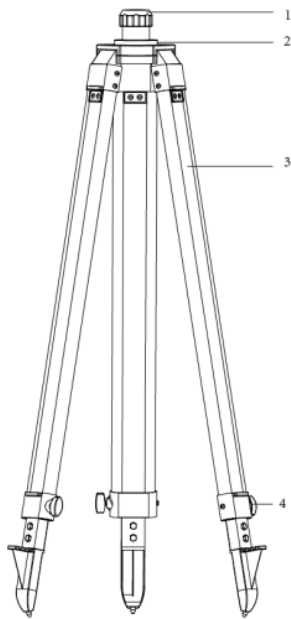
** Optional item when the R400BS is working as a CORS station.

Overview



R400BS Body

- | | |
|--------------------------------------|--------------------------------------|
| 1. R400BS Antenna | 7. LAN Port |
| 2. USB-C Port | 8. Mobile Phone Holder Mounting Port |
| 3. Link Button and Indicator | 9. Battery Compartment |
| 4. Power Button and Indicator | 10. Battery Cover |
| 5. Working Mode Button and Indicator | 11. Locking Nut |
| 6. CAN Port | 12. External Power Port |



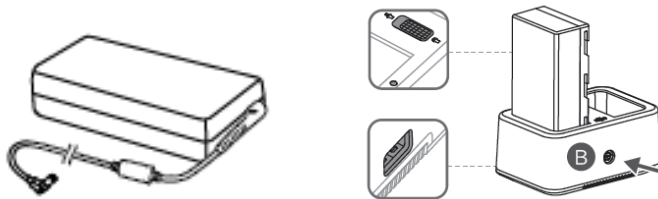
Tripod

- 1. R400BS Sleeve
- 2. Mount Base
- 3. Retractable Legs
- 4. Knobs

Preparing

Charging the Battery

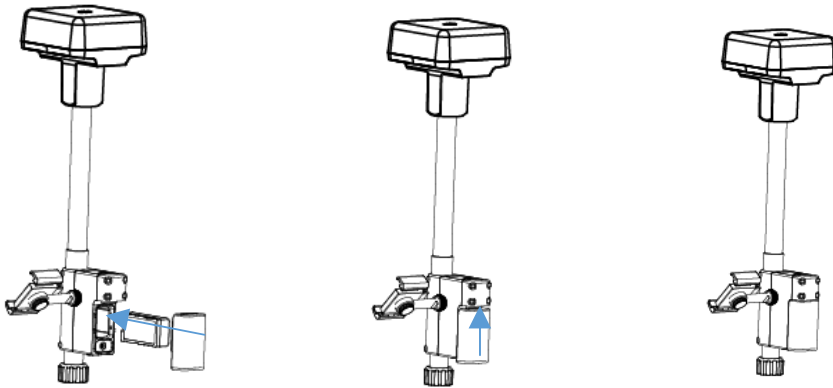
Place the battery into the charging hub, and connect the battery charger to the charging hub, then connect the battery charger to a power outlet (100-240V, 50/60Hz). The Status LED turns solid green when fully charged. At the same time, the buzzer will begin beeping when charging is complete. Remove the battery or turn off the Buzzer Switch to stop it.



Tip:

Refer to the Charging Hub (WCH2) User Guide for more details.

Mounting the Battery



Mounting the Dongle

Important:

Only use a DJI approved dongle.

The dongle supports various network standards. Use a SIM card that is compatible with the chosen mobile network provider and select a mobile data plan according to the planned level of usage.

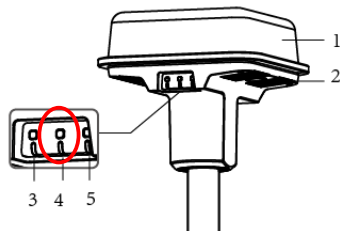
Use the dongle and the SIM card in accordance with their manuals.

1. Remove the Dongle cover with the M2.5 Hexagon Wrench.
2. Insert the SIM card into the dongle and then insert the dongle into the compartment. Test to ensure that they function properly.*
3. Re-mount the dongle compartment cover.

* Test procedure: Turn on the R400BS. In the DJI MG app select Network Diagnostics. If the statuses of all the devices in the network chain are shown in green the dongle and SIM card are functioning properly.

Turning on/ Turning off the R400BS

Press and hold on the power button to turn on / turn off the R400BS.



Switching the Working Modes

Press and hold on the working mode button to switch the working modes and the indicator blinks yellow once to indicate that the switch is successful.

The mode indicator blinking count in the green light cycle indicates the different working modes.

	Working Mode 1	Working Mode 2*	Working Mode 3*
Mode Name	Mobile Station	Stationary Station (CORS)	Handheld Mapper
Green Blinking Count	Once	Twice	Three Times



*Coming soon.

Linking

Linking Procedures

R400BS can work with MG-1P RTK and Phantom 4 RTK together as a Mobile Station. Link between the R400BS and the remote controller of MG-1P RTK and Phantom 4 RTK is required, and the Procedure is almost the same for MG-1P RTK

and Phantom 4 RTK. Below Procedures use the MG-1P RTK for example.

1. Turn on the R400BS, wait for the indicator to turn green on, and then press and hold on the working mode switch to enter the Working Mode 1.
2. Power on the MG-1P RTK remote controller and ensure that the DJI MG App is available.
3. Go to the DJI MG app > Operation View >  First, tap  on the sidebar to ensure that the Connected DJI Device Type is set to "Base Station." Next, tap the RTK tag on the sidebar > "RTK Linking." A sound emitted from the remote controller indicates that the remote controller has initiated linking.
4. Press the Link Button on the R400BS and the link indicator blinks alternately red and green indicates that the R400BS has initiated linking.
5. Both remote controller indicator and D-RTK link indicator turn green indicates successful linking.
6. Refer to the MG-1P RTK User Manual to learn how to link the remote controller and the aircraft.

Link Indicator Description

The link indicator blinks alternately red and green indicates that the R400BS has initiated linking.

The link indicator blinks as below indicates that the R400BS has quitted linking.

Working Mode 1 and 3	Status
Green on	Ocusync signal quality >70%
Fast green blinking	Ocusync signal quality: 35%-70%
Slow green blinking	Ocusync signal quality: ≤ 35%
Red on	Ocusync signal quality =0

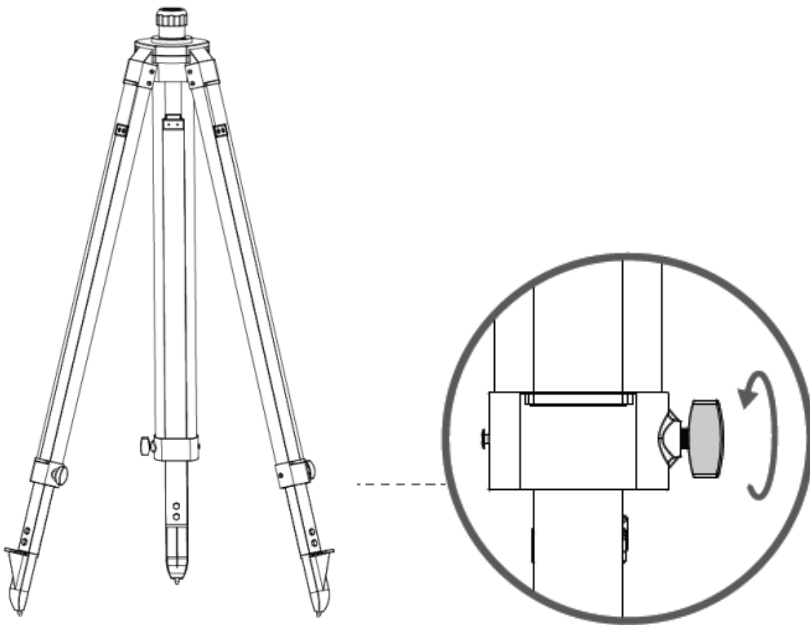
Working Mode 2	Status
Green on	Network connected
Red on	Network disconnected

Usage

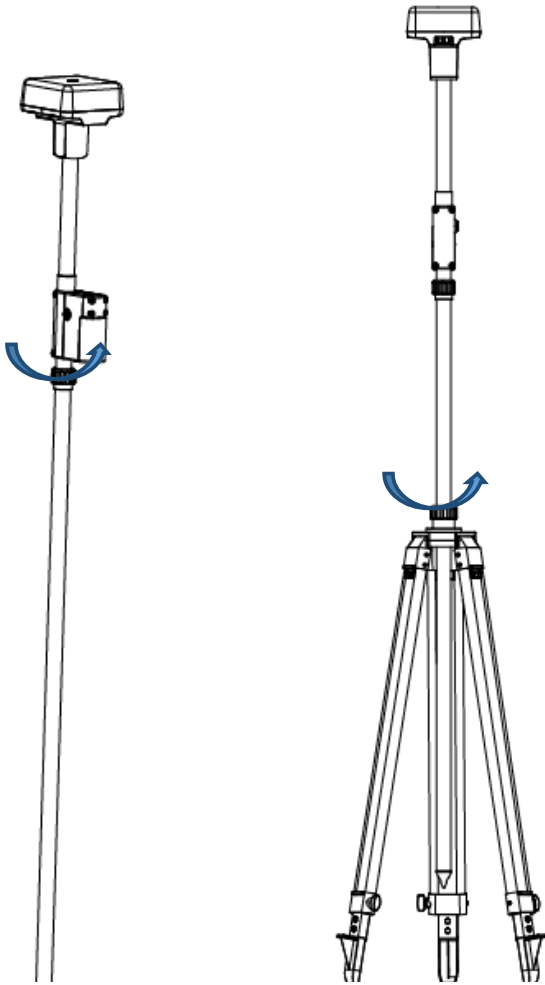
Mounting the R400BS Mobile Station

Choose an appropriate location to set up the base station. Mark the location to ensure that the base station can be placed at the same location after moving it.

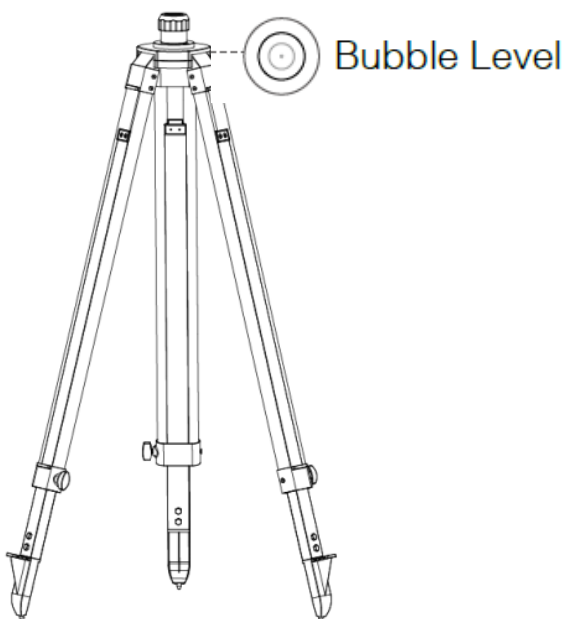
1. Unfold the tripod, stretch the three retractable legs to the desired length, and then tighten each of the three knobs.




2. Attach the R400BS body onto the Extension Rod, and then plug the Extension Rod into the tripod and tighten the base station sleeve.




3. Adjust the angle of each retractable leg so that the bubble of the bubble level on the mount base is located within the black circle (viewed from the top of the bubble level vertically) while keeping the tripod secure.



	<p>DO NOT change the position or angle of the tripod or base station after the tripod has already been adjusted to be level, or else it should be readjusted.</p> <p>The setup environment requires a wild vision field. Ensure that there are no obstructions (trees, buildings) above 15° around the R400BS antenna to avoid the GNSS signal being absorbed or blocked.</p> <p>The setup environment should be at least 200 meters away from high-power radio emission sources (such as television stations, microwave stations, etc.) and at least 50 meters away from high-voltage transmission lines to avoid electromagnetic field interference with GNSS signals.</p> <p>The setup environment should be away from large-area waters or objects that strongly interfere with satellite signal reception to reduce the effects of multipath effects.</p>
---	--

Using the R400BS

1. Lift the Extension Rod in the tripod to adjust the R400BS mobile station to the desired height.
2. Turn on the R400BS, wait for the indicator to turn green on, and then press and hold on the working mode switch to enter the Working Mode 1.
3. Power on the MG-1P RTK remote controller and ensure that the DJI MG App is available.
4. Go to the DJI MG app > Operation View > *** First, tap “RTK” on the sidebar to open “RTK Options”, select “RTK Base Station” from “RTK signal Receiving Way”. Next, tap the “Base Station Device” tag and you can see it displaying “RTK”, which indicates that the remote controller and aircraft are linked.
5. RTK logo and signal number will be displaying on the status bar of the Operation View page. The RTK logo will be red if the RTK is not initiated and turn white after initiation, and the home point will be recorded at the same time.

	<p>DO NOT move the R400BS mobile station if other devices are using the</p>
---	---

	RTK data from it to avoid severe bias.
--	--

Specifications

GNSS receiver	GNSS frequency	At the same time receive: GPS: L1 C/A, L2, L5, BEIDOU: B1 GLONASS: G1, G2 Galileo: E1, E5A, E5B
	Positioning accuracy	Single point: Horizontal: 1.5m RMS Vertical: 3.0m RMS RTK: Horizontal: 1cm+1ppm (RMS) Vertical: 2cm+1ppm (RMS)
	Positioning update rate	1Hz, 2Hz, 5Hz, 10Hz and 20Hz
	Cold start	Less than 45s
	Hot start	Less than 10s
	Recapture satellite time	Less than 1s
	Initialization reliability	>99.9%
	Differential data	RTCM2.X/3.X, CMR
Communication and data storage	Data link	Ocusync, Wi-Fi, LAN
	Memory capacity	16G
IMU		Built-in high precision 6-axis accelerometer R400BS mobile monitoring Tilt measurement Electronic bubble

Electrical characteristics	Power Consumption	12 W
	Power	14.4V~25.6VDC , 44.4~58.8VDC
	Battery	Type: LiPo battery Capacity: 4920 mAh Energy: 37.3WH
	Standby time	Provided battery >2h 12S MG-1P battery >50h
Physical characteristics	Dimension (R400BS body and Extension Rod)	168 mm×168 mm×1708 mm
	IP rating	IP67
Operating Temperature		0℃ to 45℃

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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

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 RED Directive.

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



Warning: Operation of this equipment in a residential environment could cause radio interference.