

COPYRIGHT NOTICE



All rights reserved.

No part of this manual may be reproduced, copied, transmitted, disseminated, downloaded or stored in any storage medium, for any purpose, without the express prior written consent of ROTOR.

ROTOR grants permission to download a single copy of this manual onto a hard drive or other electronic storage medium to be viewed and to print one copy of this manual or of any revision hereto, provided that said electronic or printed copy contain the complete text of this copyright notice and that it is further indicated that any unauthorized commercial distribution of this manual or any revision hereto is strictly prohibited.

The information in this document is subject to change without notice. ROTOR reserves the right to change or improve its products and to make changes in the content without obligation to notify any person or organization of such changes or improvements.

Visit ROTOR's website (www.rotorbike.com) for updates and supplemental information concerning the use and operation of this and other ROTOR products.

This manual was published: 01/18
 Model#: ROT115
 FCC ID:R3AROT115
  203-JN0556



CONTENTS

■ 1. Product description	35
■ 2. Crank installation	36
■ 3. Pairing	43
■ 4. Calibration / Zeroing	45
■ 5. First steps with your ROTOR 2INpower®	47
■ 6. Battery	48
■ 7. ROTOR 2INpower® training use	49
■ 8. Maintenance	52
■ 9. Frequently asked questions	53
■ 10. Safety warning	60
■ ROTOR Warranty policy	60
■ Regulatory statements	61
■ CEE Regulation	61

1. PRODUCT DESCRIPTION

1.1. 2INpower® CRANKSET

Drive-side crank assembly (crank+axle+spider) contains the power meter unit and specific Bluetooth® Smart / ANT+™ sensor ID number.

Non-drive-side crank assembly includes bolt and DTT insert.

ATTENTION: DO NOT REMOVE THE BOLT AND THE DTT INSERT IN THE LEFT SIDE.

TOOLS NEEDED: left and right 2INpower® crank assembly requires the use of the following tools:

- 5 mm allen wrench.

Power meter **RIGHT**



Non-drive-side crank assembly
WARNING: DO NOT DISASSEMBLE



Drive-side crank assembly
WARNING: DO NOT DISASSEMBLE



1.2. COMPATIBILITY

2INpower® cranks use a 30 mm Universal Bottom Bracket (UBB) system and the BOOST standard in the MTB version that's compatible with BB30, PF30, BBright, BSA30, ITA30, BB86, 386 EVO, BB89, BB92 and BOOST frames.

For more information consult your ROTOR Authorized Dealer or bike dealer to ensure correct compatibility of 2INpower® with your frame.

Visit our website: www.rotorbike.com



WARNING!



Read and understand this manual carefully before installing your cranks. Improvements of product specifications may occur without any prior notification.

2. CRANKS INSTALLATION

When installing your ROTOR 2INpower® for the first time, complete the following steps:

- 2.1. Spacer verification (page 37).
- 2.2. Uninstall your old cranks (page 39).
- 2.3. Drive-side crank assembly installation (page 41).
- 2.4. Left-side crank assembly spacer selection (page 41).
- 2.5. Left-side crank assembly installation (page 42).
- 2.6. Fine-tuning adjustment (page 42).
- 2.7. Uninstalling 2INpower® cranks (page 42).



WARNING!



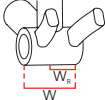

Ensure there is no interference between the cranks and the frame or any other component part.

2.1.1. SPACER VERIFICATION FOR MTB CRANKS

To correctly use your ROTOR 2INpower®, it is necessary to select the appropriate spacers for your frame.

NOTE: if different bearings are used, spacing may differ.

Select your MTB frame and spacers from the table below:

Frame Cuadro				NDS - L						DS - R						Compatible BB Pedalier compatible
	Width (mm)	WR (mm)		Inner diam (mm)	Type A: 2.5 mm	Type B: 5.5 mm	Type C: 8.5 mm	Type D: 11.5 mm	Type E: 0.5 mm	Type F: 3.0 mm	Type A: 2.5 mm	Type B: 5.5 mm	Type C: 8.5 mm	Type D: 11.5 mm	Type E: 0.5 mm	
BB92	92	48.5 Asym	41			X										PF4130
		47.25 Asym			X					X					X	
BB89	89.5	44.75 Sym	41	X					X					X	X	PF4130
BSA - 73	73	39 Asym	BSA Thread			X								X		BSA30
		37.75 Asym		X		X	X	X								
		36.5 Sym		X			X								X	
PF30 - 73	73	39 Asym	46			X							X		UBB PF30	
		37.75 Asym		X		X	X	X								
		36.5 Sym		X			X									X
BSA - 68	68	34 Sym	BSA Thread			X			X					X	BSA30	
PF30 - 68	68	34 Sym	46			X			X					X	UBB PF30	

Nds - L: Non-Drive side - Left; Ds - R: Drive side - Right; Asym: Asymmetric; Sym: Symmetric

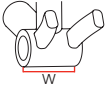

Read your bottom bracket manual to verify compatibility with your frame.

2.1.2. SPACER VERIFICATION FOR ROAD CRANKS

To correctly use your ROTOR 2INpower®, it is necessary to select the appropriate spacers for your frame.

NOTE: if different bearings are used, spacing may differ.

Select your road frame and spacers from the table below:

Frame <hr/> Cuadro			NDS - L						DS - R						Compatible BB <hr/> Pedalier compatible
			Type A: 2.5 mm	Type B: 5.5 mm	Type C: 8.5 mm	Type D: 11.5 mm	Type E: 0.5 mm	Type F: 3.0 mm	Type A: 2.5 mm	Type B: 5.5 mm	Type C: 8.5 mm	Type D: 11.5 mm	Type E: 0.5 mm	Type F: 3.0 mm	
BB86	86,5 mm	41 mm					X							X	Press Fit 4130
BB30 - 68	68 mm	42 mm				X	X					X	X		BB30
PF30 - 68	68 mm	46 mm			X	X					X	X			Press Fit 4630
						X						X			UBB PF30
PF30 - BBright	79 mm	46 mm				X					X	X			Press Fit 4630
						X						X			UBB BBright
BB386	86 mm	46 mm	X				X		X				X		Press Fit 4630
							X						X		UBB 386
BSA	68 mm	BSA Thread					X						X		BSA30
ITA	70 mm	ITA Thread					X						X		BSA30

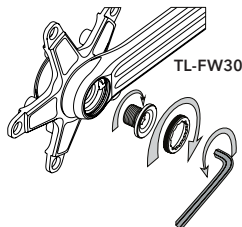
NDs - L: Non-Drive side - Left; Ds - R: Drive side - Right

Read your bottom bracket manual to verify compatibility with your frame.

2.2. UNINSTALL YOUR OLD CRANKS

2.2.a. If you already have a ROTOR crankset

- 1*. Remove drive-side bolt using an 8 mm allen wrench.
- 2*. Remove drive-side nut using a cassette lockring tool (Shimano TL-FW30 or similar).
- 3*. Screw the drive-side bolt clockwise into the spindle.
- 4*. Flip the drive-side nut over and screw it clockwise into the crank arm to be used as a selfextracting cap. It must be flush with the outer face of the arm and all of its threads must be engaged.
- 5*. Unscrew the drive-side alloy bolt counterclockwise using an 8 mm allen wrench until the drive-side assembly disengages from the spindle.



2.2.b. If you have a crankset from another manufacturer

Read the corresponding instructions to correctly remove cranks from another manufacturer.



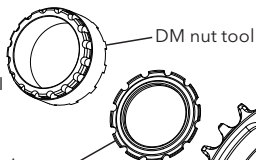
WARNING!



Do not follow steps 1* to 5* if you want to remove INpower cranks. In this case go to page 45 of the INpower manual.

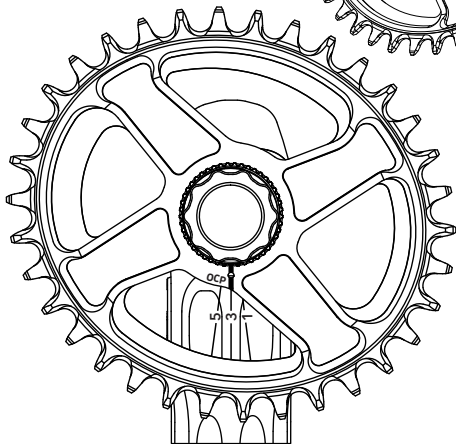
2.3. DIRECT MOUNT INSTALLATION IN DRIVE-SIDE CRANK

*Use a BB wrench that is Shimano® Hollowtech® II compatible



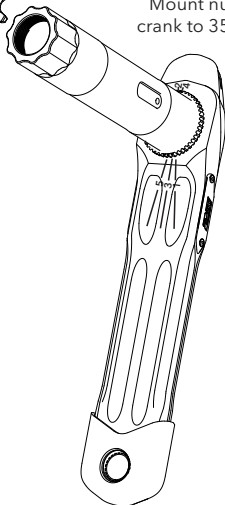
DM chainring nut

DM chainring in position OCP #3



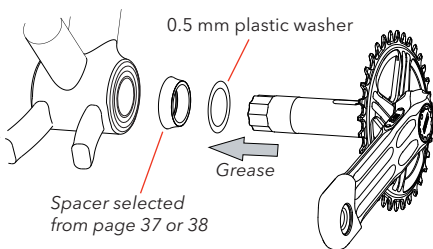
Introduce the Direct Mount chainring through the axle and position it over the drive-side crank. To properly regulate the OCP position of your chainring, align the correspondent number in the crank with the OCP mark on the chainring.

Once the chainring is correctly positioned, tighten the Direct Mount nut into the crank to 35-40 Nm*.



2.4. DRIVE-SIDE CRANK ASSEMBLY INSTALLATION

- 2.4.1.** Place a 0.5 mm plastic washer on the axle next to the chainring.
- 2.4.2.** Select the appropriate spacer(s) for the drive-side on page 37 or 38 and pass it through the axle next to the 0.5 mm washer.
- 2.4.3.** Lightly grease the outside of the axle to facilitate passage through the bearings. Insert the drive-side crank assembly through the bearings and frame.
- For MTB cranks installation, make sure that the bearings are situated more to the outside than the limit lines marked on the axle.



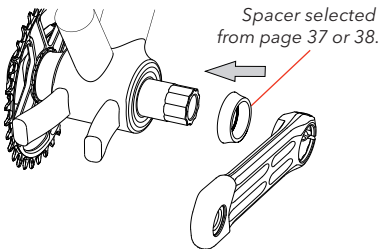
WARNING!



Do not strike or force the cranks to avoid damaging the product.

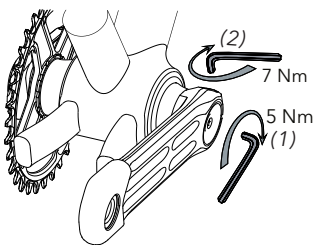
2.5. LEFT-SIDE CRANK ASSEMBLY SPACER SELECTION

- 2.5.1.** Grease the left end of the axle.
- 2.5.2.** Select the appropriate spacer(s) for the left-side on page 37 or 38 and place it between the frame and the left crank.
- 2.5.3.** The DTT bolt comes from issue in dead point. It is necessary to unscrew it 1.5 turns counterclockwise to open the crank and introduce it onto the left end of the axle. **Do not remove the DTT bolt. If it is removed it will break and this will void the warranty.**



2.6. 2INpower® LEFT-SIDE CRANK ASSEMBLY INSTALLATION

Tighten the left-side bolt (1) using a 5 mm allen wrench in order to approach the crank to the frame, placing it in its position. Tighten the DTT bolt in the left crank (2) to 7 Nm using a 5 mm allen wrench. This allows the crank to be fixed to the axle. Finally tighten the left-side bolt (1) to 5 Nm to make sure that it is not lost. Do not overtighten the bolts.



2.7. FINE TUNE ADJUSTMENT

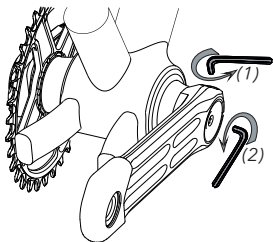
2.7.1. If the crank does not turn smoothly even with the left-side bolt not tightened, remove the 0.5 mm washer from the left side and repeat the installation.

2.7.2. If you see that there is lateral play even with the left-side bolt completely tightened, use an additional 0.5 mm plastic washer on the left side and repeat the installation steps.

2.8. UNINSTALLING 2INpower® CRANKS

2.8.1. Counterclockwise turn the DTT bolt (1) in the left-side crank using a 5 mm allen wrench. Afterwards, unscrew the left-side bolt (2) using a 5 mm allen wrench until it is removed. Take the left crank out of the axle.

Do not remove the DTT bolt. If it is removed it will break and this will void the warranty. perderá la garantía.



3. PAIRING

3.a. ANT+™ PAIRING

Connect your ROTOR 2INpower® with any device that's ANT+™ compatible.

For a complete list of ANT+™ certified products, visit:

<http://www.thisisant.com/directory/>

Read the ANT+™ device manual for further instructions.

Pairing can be done both automatically or using the manual mode (recommended when other ANT+™ power meters are close).

Before pairing ROTOR 2INpower® with a monitor, make sure you are at least 10 meters (30 feet) away from any other ANT+™ power sensor. This will prevent accidental pairing with another power sensor.

The ROTOR 2INpower® retains its "SENSOR ID" after charging or replacing the battery and will remain properly paired.

3.a.1. ACTIVATION PROCESS

3.a.1.1. To minimize battery consumption, the system is activated by applying a force to the pedals of at least 2.5 kg. Riding a few meters is sufficient.

3.a.1.2. Your ROTOR 2INpower® is sending a radio signal and is ready to be paired and measure data.

3.a.2.a. AUTOMATIC PAIRING

Once 2INpower® is active and within two minutes of activation (2INpower® enters sleep mode after two minutes), push the "SCAN" button on your ANT+™ device at the ANT+™ Power screen. The "SCAN" button is usually placed in the menu:

Settings\Bike settings\Bike profiles\Your profile\ANT+ Power.

Wait for confirmation from the monitor.

3.a.2.b. MANUAL PAIRING

If there is more than one ANT+™ power sensor close to you: once 2INpower® is active and within two minutes of activation (2INpower® enters sleep mode after two minutes), manually introduce the 2INpower® “SENSOR ID” into the ANT+™ device.

The “SENSOR ID” can be found on the inner side of the left crank. This serial number can also be found both under the barcode of the spindle sticker and on the first page of this manual.



Sensor ID: 17878

3.b. BLUETOOTH® SMART PAIRING

Connect your ROTOR 2INpower® with any Bluetooth® Smart compatible device.

Once 2INpower® is active and within two minutes of activation (2INpower® enters sleep mode after two minutes of inactivity), push the “PAIR” button on your Bluetooth® Smart device at the “GENERAL SETTINGS” screen. The “PAIR” button is usually located in the SETTINGS menu:

Settings\General Settings\Pair and syncro\Pair other devices

Wait until you see the “SENSOR ID” in the screen’s device and select it. Wait until it is paired.

4. CALIBRATION / ZEROING

The main reason to calibrate/zero your ROTOR 2INpower® is to ensure an exact power measurement.

Calibrating the power meter compensates for any mechanical change that influences measurement since the last calibration/zeroing. Calibrate your ROTOR 2INpower® cranks after assembling your bike with all its accessories, including pedals.

ROTOR 2INpower® power meters require a second calibration to calibrate the angle. It is necessary to strictly follow all the steps described in the following section to ensure an accurate power measurement and **TORQUE 360** and **OCA** representation.

There's no need to calibrate your ROTOR 2INpower® every time you use your bike. It should be done when installing on the bike for the first time, pedals are installed or switched, or when swapping chainrings requiring the cranks to be disassembled. It is also convenient to perform another calibration after the first 30 hours of use.

The detailed calibration process is described in section 4.1. Complete the entire calibration process step by step to ensure correct power and cadence measurement.

4.1. CALIBRATION PROCESS

- 4.1.1. Activate your power meter (follow instructions in section 3.1. of the user manual) and complete the following calibration process in less than two minutes.
- 4.1.2. With the bike upright and level with the ground, place the left crank in the 6 o'clock position as shown in the picture. Make sure to complete the calibration process with the pedals already installed; do not place any weight on them until the process has finished.
- 4.1.3. First calibration: follow the specific instructions for your ANT+™ device to send the "CALIBRATION" signal.
- 4.1.4. The device must show a value of 1000 or a message of successful calibration. Turn the cranks backwards at least two turns at a moderate speed, returning again to a vertical position with the left pedal down, making sure that the crank is as perpendicular as possible to the ground for accurate angle measurement.
- 4.1.5. Second calibration: press again the "CALIBRATION" button. The device then returns a calibration value between +/- 200. There are some monitors in which a successful calibration message will be shown. The second calibration has finished and the power meter is ready to use.

For more information about the calibration process, user utilities and training options, visit our website: www.power.rotorbike.com



5. FIRST STEPS WITH YOUR ROTOR 2INpower®

ROTOR 2INpower® becomes active when applying a 2.5 kg force to it. This can be easily achieved by riding a few meters. After two minutes of inactivity it enters hibernation mode. To activate it again, just apply a 2.5 kg force on the pedals as explained.

Note: 2INpower® has an LED that can be observed from the right side of the crankset. The LED is only visible if the dust cover protecting the charging connector is opened. The LED blinks while the power meter is active in green, yellow or red light depending on the battery level. Right after activation and during firmware updates, the LED color turns blue.



6. BATTERY

6.1. INSTALLATION AND SPECIFICATIONS

ROTOR 2INpower® is powered by a Lithium (Li-ion) battery with 3.7 V of nominal tension.

Estimated riding time: 250 hours*.

When battery level is lower than 3.55 V, the computer device will show a “low battery” message. From that moment, estimated riding time is 30 hours, and recharging is recommended. A complete charging cycle takes approximately 4 hours in which the LED will blink until the battery is fully charged. The battery's charge level can be checked with any computer or Bluetooth® Smart / ANT+™ compatible device.

Battery can be fully recharged at least 300 times without being damaged, so it shouldn't be necessary to replace the battery during the life time of the power meter. A special tool is required in case battery replacement is needed. For that purpose, contact your ROTOR distributor and they will assist you.

*Tests performed in laboratory conditions. Fast mode consumption (only when connected to the Advanced Training Mode with the User Software) is greater, reducing the hours of autonomous use.

6.2. BATTERY RECHARGING

6.2.1. Open the dust cover in the right crank. Do not use any tool or cutting object.

6.2.2. Connect the magnetic charger to the charging port in the right crank. After that, connect the USB terminal to a power source.



7. ROTOR 2INpower® TRAINING USE

After pairing ROTOR 2INpower®, follow the configuration options for your computer device to select the metrics you would like to display on your device.



Consult your personal trainer in order to evaluate which of the measured values provided by ROTOR 2INpower® are optimal to maximize your performance.

ROTOR 2INpower MEASUREMENT

ROTOR 2INpower® starts measuring data automatically when pedaling. The following data are sent by radio signal to your head unit:

POWER: power of the last complete pedal cycle. The power displayed on your computer device is the sum of the power measured for each leg.

BALANCE: gives the information about how much power is applied by each leg. It is shown as two complementary percentages. This balance number is not an estimate but a real value, as 2INpower takes into account the complete pedal stroke (positive and negative force applied by each leg) for its calculation.

CADENCE: measured in RPM's (revolutions per minute).

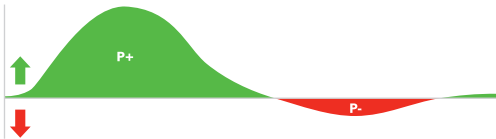


WARNING!



Remove any cadence sensor from your bike, it is not necessary and may cause interference. Turn off the cadence sensor on the monitor; this will be displayed thanks to 2INpower.

TORQUE EFFECTIVENESS: used to interpret how much negative force is exerted by pedaling, its value being the ratio between the total torque delivered and the positive torque.



PEDAL SMOOTHNESS: used to interpret if the pedal stroke is rounder or more piston-like, its value being the ratio between the total torque and the maximum torque of each cycle.

TORQUE 360: INpower®'s technology allows us to feature – among other data, the polar curve of the effective torque – or force – applied to the pedal, which intuitively displays the distribution of power exerted at different angles throughout a pedal rotation.

The fact that the ROTOR INpower® technology doesn't measure the combined power of both legs same as other systems in the market, but rather measures each leg independently, allows us to analyze the complete pedal rotation and how power is delivered both in the descending phase of a pedal rotation (positive) and the ascending phase of a pedal rotation (usually a negative reference). The polar display is useful to know your pedaling pattern to help you to improve your pedaling technique.

OCA: stands for Optimum Chainring Angle and is one of the new data features offered by ROTOR 2INpower®.

OCA determines the angle in degrees, measured from the dead spot at the highest point, in which the effort's (area enclosed by the torque curve or the force curve) barycenter is shown in the **TORQUE 360** graph.

To calculate the **OCA**, 2INpower® takes into account all torque values, both positive and negative (the pedal stroke's rebound).

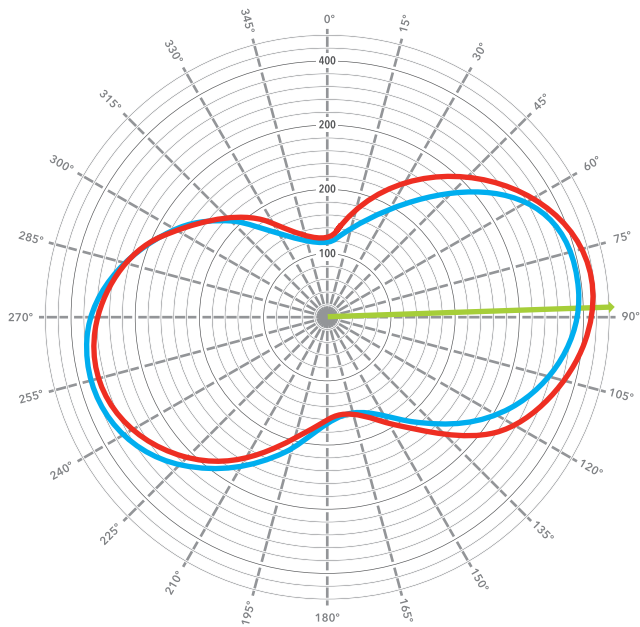
The **OCA** is closely linked to ROTOR Q RINGS®, since the **OCA** (Optimum Chainring Angle) suggests in which position to install your Q RINGS®, positions are marked by OCP (Optimum Chainring Position) points on the chainrings.

A range of **OCA** values corresponds to OCP points. For example, if your **OCA** is between 87° and 93°, you should start using Q RINGS® in OCP #3.

Visit www.rotorbike.com for more information and to download the ROTOR *User Software*, its documentation and to learn more about **OCA**.

APPLIED FORCE (N)

- Previous pedal rotation
- Current pedal rotation
- OCA (Optimum Chainring Angle)



8. MAINTENANCE

Inspect your ROTOR product for damage including cracks, dents and serious scratches before each ride and after every fall or crash.

Do not use your ROTOR product until it has been thoroughly inspected, repaired or replaced.

Cyclists should inspect their bicycle and parts on a regular basis or consult with a professional bicycle mechanic to determine the need for service and to detect damage that may have occurred from normal use.

Check the bolts and other fasteners periodically for tightness. Ensure they are tightened to the correct torque values.



WARNING!



Never use high pressure cleaning equipment or chemical products to clean ROTOR 2INpower®.

“Waterproof level: IPX7”.

Do not try to disassemble any electronic ROTOR 2INpower® part, the seal could be damaged and this invalidates the warranty.

In case of any electronic failure, service must be performed at an authorized ROTOR technical service center.

Continuing to use damaged parts may lead to loss of control and cause serious injury or death.

9. FREQUENTLY ASKED QUESTIONS

9.1. GENERAL

ROTOR INpower® vs 2INpower®?

ROTOR INpower® measures in the spindle power generated by the left leg. The power value that's shown is the result of extrapolation (default operation to multiply by two) power measured in the left leg. ROTOR 2INpower® keeps INpower® technology and adds strain gauges to the drive-side crank, which allows the measurement of the power applied by each leg independently. In addition to the new metrics that ROTOR INpower® introduced for pedal analysis and monitoring: **TORQUE 360** and **OCA** (Optimum Chaining Angle), ROTOR 2INpower® goes further allowing analysis for each leg separately and providing balance information.

What ANT+™ devices is ROTOR 2INpower® compatible with?

They are listed in the ANT+ directory:

<http://www.thisisant.com/directory/>

Which Bluetooth™ devices is ROTOR 2INpower® compatible with?

Any Bluetooth® Smart device is compatible with ROTOR 2INpower®, from mobile phones to computers, with the complete range of Bluetooth® Smart cycle devices in between.

What am I going to find in the 2INpower® product box?

When buying a 2INpower®, you will find, in addition to the crankset, one bolt, one USB cable for battery charging, an installation and a *User Software* manual, and a TrainingPeaks postcard. Training Peaks has

offered 2INpower® customers a free premium account subscription for one month. Visit the site trainingpeaks.com/ROTOR to obtain the maximum benefit from this alliance.

How do I know if my frame is compatible with the 2INpower® axle?

2INpower® is equipped with the UBB30 axle system, which was introduced by ROTOR. UBB30 axle is a 30 mm axle compatible with almost all standard frames in the market (when used with the correct spacers).

ROTOR 2INpower® can be installed on your bicycle even if your current cranks are 24 mm diameter.

UBB30 is compatible with the following standards: BB30 (68/73 mm), PF30 (68/73 mm), BSA threaded, ITA threaded, BBright, BB86, BB386 EVO, BB89 and BB92.

The only frames not compatible with the UBB30 system are the BB90 and BB95 (for 24 mm axle). These two standards use bearings that are directly pressed into the frame, without using any intermediate bottom bracket.

How does ambient temperature affect power measurements?

Ambient temperature does not positively or negatively affect how 2INpower® works. 2INpower® gives accurate and stable power measurement independently of changes in temperature during a ride (e.g. long climbs with higher temperatures at the bottom and lower temperatures at the top).

It is not necessary to calibrate 2INpower® to compensate for temperature changes.

Can I disassemble the elements of my power meter?

No. Inadequate handling of the product will invalidate the warranty.

The only parts that can be disassembled are those that are involved in installing and uninstalling the cranks on the bicycle. Read the user manual carefully before handling the product.

Never try to disassemble the plastic pieces on the sides of the right crank arm or the electronics inside the axle.

Do not try to disassemble either the mechanical elements assembled by the manufacturer, such as the axle with the right crank, or the DTT bolt and insert in the left crank.

How to charge the battery?

Read the user manual for proper battery charging.

Open the dust cover in the drive-side crank and connect the magnetic connector from the USB cable included in the box. Make sure that the LED in the right crank blinks yellow or green. The LED light will turn off when charging is complete.

Can I replace the battery?

ROTOR 2INpower® uses a Lithium (Li-ion) battery the same size as a standard AA battery. It has 3.7 V nominal tension and 800 mAh capacity. It can complete 300 charges without damage, and a complete charge lasts for 250 hours of use. This means that one single battery should last for 75000 hours without damage, enough time not to require replacement during the complete lifetime of the power meter. In case battery replacement is needed you should contact your ROTOR dealer and they will assist you.

If I usually connect my 2INpower® to the User Software running on the computer, is the battery life still 250 hours?

If fast mode is active (only possible with *User Software*), battery consumption is higher due to the higher frequency of data emission required by the TORQUE 360 graph. Always disconnect the power meter when closing the program to make sure that fast mode is off.

How can I clean my 2INpower® cranks? Are they waterproof?

2INpower® is waterproof. It has successfully passed IPX7 level.

However, it is not recommended to clean your power meter with high pressure and avoid direct water impact on the seals. Do not use solvents or degreasers; they can damage some power meter elements.

How can I update the firmware for my cranks? How often do I have to update the firmware?

ROTOR sometimes offers firmware updates with improvements.

The update process is wireless; to complete this you will need to download the *User Software* from the ROTOR website.

To connect the crank to the computer, the USB ANT+™ dongle is needed.

You can also connect the 2INpower® to the *User Software* via Bluetooth® Smart.

What happens if there is an error while updating the firmware?

If any error occurs during the updating process, you need to try the update again until it successfully finishes. If the update process begins and the program detects any problem, the process will restart a maximum of 5 times before cancelling the update.

If the firmware update is done via ANT+™, it is recommended to place the ANT+™ dongle as close to the cranks as possible for better radio signal reception.

9.2. INSTALLATION

How often do I need to calibrate my ROTOR 2INpower®?

To assure accurate measurement, it is necessary to correctly calibrate the cranks. It is not necessary to calibrate your 2INpower® before every ride, but it must be calibrated when:

- Power meter is installed on the bicycle
- Pedals are installed or changed
- Chainrings are installed, requiring the cranks to be disassembled.

Calibration is not required after charging the battery.

Calibrating a second time is recommended after 30 hours of riding.

Read the user manual carefully to successfully complete the calibration process.

Why do I have to calibrate twice?

The calibration process requires pressing the calibration button twice on your head unit. Inpower technology requires this second calibration step because not only force has to be calibrated, but angle too.

It is very important that you follow the steps described in the user manual for correct calibration. This assures an accurate power measurement.

What are the calibration values?

ROTOR 2INpower® requires angle and force calibration. After the calibration button is pressed the first time, you must see a value of 1000 on your device's screen. After the calibration button is pressed a second time, the screen's value must be between +/-200. This second calibration value is specific to each power meter.

If I have doubts that I've correctly calibrated my power meter.

Read the user manual carefully and calibrate the cranks as explained.

If you have doubts about correct calibration, repeat the entire calibration process and compare the two values obtained in the last step of each process. Variations of +/-5 units are normal. You can calibrate your cranks using either your head unit or the *User Software*, which can be downloaded for free from ROTOR's website. Read the *User Software* manual for information about how to calibrate with it.

9.3. POWER INFORMATION. METRICS

How often are the power values shown?

ROTOR 2INpower® becomes active after pedaling starts.

Sampling frequency is 200 Hz, which means that force data are measured 200 times per second.

The data sent to the computer device are from the last completed pedal rotation. How long a single pedal rotation lasts depends on the cadence of the cyclist, for example, if the cyclist pedals at 90 rpm then the rotation lasts 0.67 seconds.

The power measurement of a rotation is sent according to ANT+™ protocol: 4 times per second.

How data are recorded and accumulated depends on the computer device.

Which data related to power are provided by 2INpower®?

2INpower® processes and provides values of: Power, Cadence, Left-Right Balance, *Torque Effectiveness* and *Pedal Smoothness*.

2INpower® also calculates and shows additional information that can only be viewed through the *User Software*: **TORQUE 360** and **OCA** (Optimum Chaining Angle). These two parameters are INpower technology specific.

How can I see *Torque Effectiveness* and *Pedal Smoothness* data?

Both metrics are accessible by ANT+™-compatible device manufacturers and it is their decision whether to show them or not on their devices.

Most ANT+™-compatible devices already feature these metrics' recordings and visualizations.

Check for the metrics supported by your Bluetooth® Smart device.

How can I see the **TORQUE 360** graph and my **OCA** value?

Currently these data are only accessible using the *User Software* that can be downloaded for free from ROTOR's website. Once you have successfully downloaded and installed the software, you can use ANT+™ or Bluetooth® Smart connection to connect your power meter to the software.

Visit www.rotorbike.com for further information, to download the *ROTOR User Software*, and to learn more about **TORQUE 360** and **OCA**.

What is **TORQUE 360**?

INpower®'s technology allows us to feature – among other data, the polar curve of the effective torque – or force – applied to the pedal, which intuitively displays the distribution of power exerted at different angles through a pedal rotation.

The fact that the ROTOR INpower® technology doesn't measure the combined power of both legs same as other systems in the market, but rather measures each leg independently, allows us to analyze the complete pedal rotation and how power is delivered both in the descending phase of a pedal rotation (positive) and the ascending phase of a pedal rotation (usually a negative reference).

The polar display is useful to know your pedaling pattern to help you improve your pedaling technique.

What is **OCA**?

OCA stands for Optimum Chaining Angle and is one of the new data features offered by ROTOR INpower® technology.

OCA determines the angle in degrees, measured from the dead spot at the highest point, in which the effort's barycenter (where the area enclosed by the torque curve or the force curve is divided by two) is shown in the **TORQUE 360** graph.

To calculate the **OCA**, INpower® technology takes into account all torque values, both positive and negative (the pedal stroke's rebound).

The **OCA** is closely linked to ROTOR Q RINGS®, since the **OCA** (Optimum Chainring Angle) suggests in which position to install your Q RINGS®, positions are marked by OCP (Optimum Chainring Position) points on the chainrings.

A range of **OCA** values corresponds to OCP points. For example, if your **OCA** is between 87° and 93°, you should start using Q RINGS® in OCP #3.

Visit www.rotorbike.com for more information and to download the ROTOR *User Software*, its documentation and to learn more about **OCA**.

Is it necessary to install a cadence sensor on my bicycle?

Your ROTOR 2INpower® cranks have a cadence sensor incorporated in the axle and do not need an external sensor.

It is recommended to uninstall any cadence sensor from your bicycle to avoid interferences.

9.4. TROUBLESHOOTING

My ANT+™ device does not detect the power sensor.

First of all make sure that your ANT+™ device has the power sensor option active, then pair the power meter with the device.

Read the user manual to correctly pair your power meter with your ANT+™ device. The first step is to activate the power meter by riding a few meters (a 2.5 kg force must be applied on the pedals).

Take into account that after two minutes of inactivity, 2INpower® enters hibernation mode to reduce battery consumption.

My 2INpower® does not activate even after applying force to the pedals.

Check to see if the battery is charged enough. For that purpose, apply some force on one of the pedals and check if the LED light under the dust cover in the right crank arm blinks in green or yellow. If it blinks red you need to recharge the battery. If it doesn't blink, try to connect the charger and see if the LED starts blinking. If the LED light doesn't blink in any of these cases, contact your ROTOR dealer or local distributor for more information.

My power meter does not connect with my Bluetooth® Smart device.

Follow the instructions in the user manual to correctly pair your power meter with your Bluetooth® Smart device.

Make sure that the 2INpower® is active. Keep in mind that after two minutes of inactivity it will enter hibernation mode. You will need to activate the cranks again if this happens.

My power meter connects with the computer but not with the computer device.

If the meter is correctly paired and active and connects with the computer (with the *User Software*) without any problem but does not connect to the computer device on your bicycle, it is possible that the cranks are still in fast mode.

To avoid this, always disconnect your power meter from the *User Software* before closing the program.

How do I get spare parts?

Please contact your ROTOR dealer or local distributor.

Do not try to disassemble your power meter's parts except to install it. Improper handling will void the warranty.

Who do I contact for warranty issues?

Please contact your ROTOR dealer or local distributor.

ROTOR provides two years of warranty for all its products in compliance with European law.

What kind of support can I expect if I need assistance with my 2INpower®?

You will find all the necessary information about installation and how to use 2INpower® by visiting:

<http://power.rotorbike.com/>

If you have any questions, suggestions or technical service requests, contact your retailer or local distributor. You can also contact ROTOR technical service directly by emailing:

techservice@rotorbike.com

9.5. HOW TO TRAIN WITH POWER

What does it mean to train with power?

Visit trainingpeaks.com for a better understanding of how training with power works.

ROTOR recommends subscribing to TrainingPeaks to obtain the maximum benefit of the data provided by your power meter.

What software can I use to analyze my data?

<http://home.trainingpeaks.com>

<http://goldencheetah.orh/>

<http://www.o-synce.com/en/software/trainingsoftware>.

<http://www.garmin.com/en-US>

10. SAFETY WARNING

This owner's manual contains important and useful information regarding the proper installation, operation, care, and maintenance of your ROTOR product. Carefully read, follow and understand the instructions as detailed in this owner's manual. Keep this manual in a safe place for future reference.

If you have any doubt whatsoever regarding your ability to install or service this product, please consult your ROTOR dealer and seek the assistance of a professional bicycle mechanic. Do not perform any modifications or adjustments that are not outlined in this manual.

Incorrect installation or servicing may impair performance, and could result in a dangerous situation leading to serious injury or death. Components that have experienced excessive wear, deformations or impacts or other damage need immediate professional inspection or replacement.

Please have this product regularly inspected by a qualified mechanic for any signs of wear or damage.

Failure to perform necessary and essential maintenance could drastically reduce the service life of your ROTOR product and reduce its performance.

If you have any questions, please contact a professional bike mechanic or your nearest ROTOR dealer for additional information.

ROTOR WARRANTY POLICY

- ROTOR products and its components are guaranteed for 2 YEARS against any manufacturer defects or defective materials. In the event of a warranty defect, ROTOR's sole obligation under this warranty is to repair or replace, at its discretion, the defective part or product at no charge. Moreover, in some countries, ROTOR is obliged to ensure any legal warranty defined by law for the customer's protection.
- Elements subject to wear and failures that the manufacturer is not responsible for, are not covered by this warranty.
- Failures caused by improper use, poor assembly or inadequate maintenance as declared in the supplied instructions or the user manual are not covered by this warranty.
- Always keep your receipt or invoice.
- The following acts void this warranty:
 - Failure to fulfill the requirements above.
 - Improper installation.
 - Improper use or installation of inadequate parts.

Warranty Service: Original purchaser must send their ROTOR product along with the retailer's original bill, credit card receipt or other satisfactory proof of date of purchase.

REGULATORY STATEMENTS

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) this device must accept any interference received, including interference that may cause undesired operation of the device.

NOTE: 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.

ROTOR has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.

Repairs should only be made by ROTOR distributors. Unauthorized repairs could result in permanent damage to the equipment and void your warranty.

CEE REGULATION

This product is compliant with Directive 93/42/EEC



ROTOR

 www.rotorbike.com

 /RotorBikeComponents

 /ROTOR_bike