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1. PRODUCT DESCRIPTION

1.1. OPTION A: COMPLETE INpower CRANKSET

Non-drive-side crank assembly (crank + axle) contains the power meter unit and specific ANT+ sensor ID number.

Drive-side crank assembly (crank + spider) includes drive-side bolt, washer and selfextractor nut specific to INpower.

ATTENTION: DO NOT REMOVE THE DRIVE-SIDE BOLT AND SELF-EXTRACTOR NUT.

Unlike the drive-side bolt on ROTOR cranks without the power meter, the INpower bolt and self-extractor nut is joined to the right crank and should not be disassembled. See the section on installing and removing the cranks to learn more about this process.

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

- 8 mm allen wrench.
- 2 mm allen wrench.



Drive-side crank assembly
WARNING: DO NOT DISASSEMBLE



Power meter **LEFT**



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



1.2. OPTION B: SENSOR/NON-DRIVE-SIDE CRANK ASSEMBLY

Sensor/non-drive-side crank assembly contains the power meter unit and specific ANT+ sensor ID number.

In order to convert your current ROTOR drive-side crank into INpower: drive-side bolt, washer and self-extractor nut included with the option B package must be used to substitute their equivalent parts used in the crankset's drive side before installing the power meter.

IMPORTANT: the bolt and self-extractor nut on ROTOR cranks without the power meter ARE NOT COMPATIBLE with INpower's left crank. The use of an incorrect bolt will damage the electronics and void the product warranty.

TOOLS NEEDED: assembling a left INpower crank with a right crank of a different ROTOR model requires:

- 8 mm allen wrench.
- 2 mm allen wrench.
- Cassette wrench (Shimano TL-FW30 or similar).
- Special glue for threads (Loctite 2701 or similar).



Non-drive side crank assembly
WARNING: DO NOT DISASSEMBLE



1.3. COMPATIBILITY

INpower cranks use a 30 mm Universal Bottom Bracket (UBB) system that's compatible with BB30 frames: PressFit30, BBright, BBright Direct fit, BSA, ITA, BB86, 386 EVO, BB89 and BB92.

The necessary spacers required for installation on whichever frame* can be found in the product packaging.

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

Visit our website: www.rotorbike.com

*Except for "A" spacers for 386 EVO frames (see pages 40 and 41 of the manual). Visit your ROTOR retailer to obtain "A" spacers.



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 INpower for the first time, complete the following steps:

- 2.1./2.2. Road/MTB spacer verification (pages 40 and 41).
- 2.3. Uninstall your old cranks (page 42).
- 2.4. Left-side crank assembly installation (page 42).
- 2.5. Drive-side crank assembly spacer selection (page 43).
- 2.6.a. Drive-side INpower crank assembly installation (page 43).
- 2.6.b. Existing ROTOR drive-side crank assembly installation / Conversion into INpower (page 44).
- 2.7. Preload adjustment (page 45).
- 2.8. Fine-tuning adjustment (page 45).
- 2.9. Uninstalling INpower cranks (page 45).



WARNING!



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

2.1. SPACER VERIFICATION FOR ROAD CRANKS

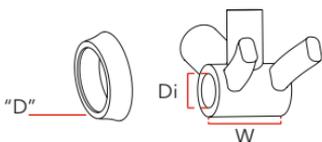
To correctly use your ROTOR INpower road cranks, it is necessary to select the appropriate spacers for your frame.

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

Select your frame and spacers from the list below:

- BB30 frame:** place one "D" spacer (11.5 mm) on drive side and one "D" spacer on non-drive side.
- Pressfit30 frame:** Place one "D" spacer (11.5 mm) on drive side and one "D" spacer on non-drive side.
- BBright frames:** place one "D" spacer (11.5 mm) on drive side.
- BSA frame:** place one BSA30 cup (L) on non-drive side and one BSA30 cup (R) on drive side of the frame.
- ITA frame:** place one ITA30 cup on non-drive side and one ITA30 cup on drive side of the frame.
- BB86 frame:** place one PF4130 cup on non-drive side and one PF4130 cup on drive side of the frame.
- 386 frame:** place one PF4630 cup with an "A" (2.5 mm) spacer on non-drive side and one PF4630 cup with an "A" spacer on drive side of the frame. ("A" spacers not included, visit your ROTOR distributor).

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



	 BB30	 Pressfit30	 BBright	BSA30	ITA30	BB86	
W	68mm	68mm	79mm	68mm	70mm	86,5mm	86mm
Di	42mm	46mm	42mm (Direct fit) / 46mm (PressFit)	BSA	ITA	41mm	46mm

2.2. SPACER VERIFICATION FOR MTB CRANKS

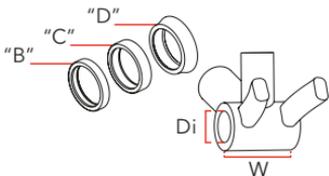
To correctly use your ROTOR INpower MTB cranks it is necessary to select the appropriate spacers for your frame.

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

Select your frame and spacers from the list below:

- BB30 and Pressfit30 68 mm frames:** place one "C" (8.5 mm) spacer with one "D" (11.5 mm) spacer on the drive side and one "D" (11.5 mm) spacer with one "A" (2,5 mm) spacer on the non-drive side.
- BB30 and Pressfit30 73 mm frames:** place one "D" (11.5 mm) spacer with one "B" (5.5 mm) spacer on the drive side and one "D" (11.5 mm) spacer on the non-drive side.
- BBright frame:** place one PF4630 cup with one "D" (11.5 mm) spacer with one "B" (5.5 mm) spacer on the drive side and one PF4630 cup on the non-drive side. Place one 0.5 mm spacer on the non-drive side if necessary.
- BSA 68 mm frame:** place one BSA30 cup with one "C" (8.5 mm) spacer on drive side and one BSA cup with one "A" (2.5 mm) spacer on the non-drive side.
- BSA 73 mm frame:** place one BSA30 cup with one "B" (5.5 mm) spacer on drive side and one BSA cup with one 0.5 mm spacer (only if needed) on the non-drive side.
- BB89 and BB92 frames:** place both PF4130 cups with one "B" (5.5 mm) spacer on both sides of the frame. Place one 0.5 mm spacer on each side of the BB89 frame.

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

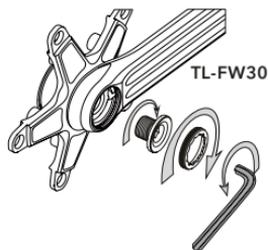


	 BB30	Pressfit30	 BBright	BSA30	BB89	BB92
W	68/73mm	68/73mm	84mm	68/73mm	89,5mm	92mm
Di	42mm	46mm	46mm	BSA	41mm	41mm

2.3. UNINSTALL YOUR OLD CRANKS

2.3.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 locking 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.



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

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



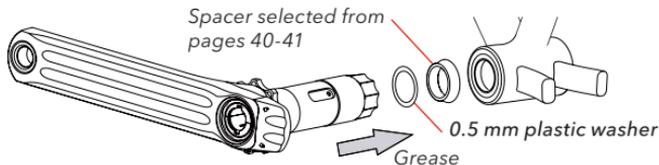
WARNING!



Do not follow steps 1* to 5* if you want to remove INpower cranks. In this case go to page 45 (2.9. Uninstalling INpower cranks).

2.4. LEFT SIDE CRANK ASSEMBLY INSTALLATION

- 2.4.1. Make sure the battery and its cover are not installed.
- 2.4.2. Place a 0.5 mm plastic washer on the axle next to the preload nut.
- 2.4.3. Select the appropriate spacer(s) for the nondrive-side on page 40 (road) or 41 (MTB) and place them onto the axle after the 0.5 mm plastic washer.



- 2.4.4. Lightly grease the outside of the axle to facilitate passage through the bearings. Insert the left crank assembly through the bearings and frame.



WARNING!



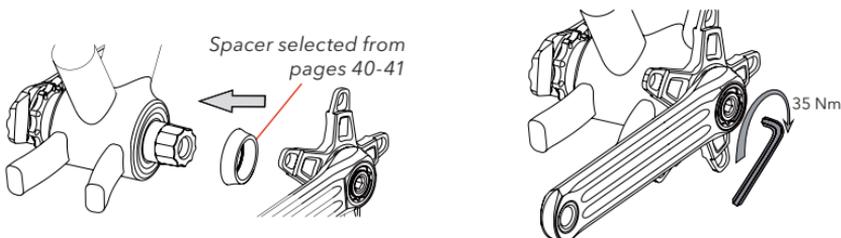
Do not strike or force the cranks to avoid damaging the product.

2.5. DRIVE-SIDE CRANK ASSEMBLY SPACER SELECTION

- 2.5.1. Grease the right end of the axle.
2.5.2. Select the appropriate spacer(s) for the drive-side on page 40 (road) or 41 (MTB) and place it between the frame and the drive-side crank.

2.6.a. DRIVE-SIDE INPOWER CRANK ASSEMBLY INSTALLATION

Tighten drive-side bolt to 35 Nm using an 8mm allen wrench.



WARNING!



If you already own a ROTOR crankset and have acquired the non-drive-side crank + axle only, you must not use the drive-side bolt and/or self-extractor nut that came with the previous cranks.

Using these will damage the electronics inside the axle and void the warranty. Use the washer, bolt and extractor nut supplied with the new product.

2.6.b. EXISTING ROTOR DRIVE-SIDE CRANK ASSEMBLY INSTALLATION / CONVERSION INTO INpower

- 2.6.b.1.** Once the drive-side crank assembly is removed following the instructions in section 2.3.a., clean the threads carefully. Make sure that no grease or dirt remain.
- 2.6.b.2.** Assemble the washer, drive-side bolt and selfextractor nut specific to INpower included in the packaging. The order of assembly is shown below, first the washer must be placed in the crank housing. (fig. 1)
- 2.6.b.3.** Washer must be positioned on the inner side of the drive-side bolt.
Tip: you can lightly grease the washer to attach it to the bolt, making installation easier.
- 2.6.b.4.** Applying grease to the bolt, turn clockwise using an 8 mm allen wrench to screw it in place. Make sure the washer is positioned underneath the bolt head.
- 2.6.b.5.** Apply glue to the threads of the selfextractor nut using Loctite 2701 or similar.
- 2.6.b.6.** Ensuring that the threads are well-greased, screw the extractor nut clockwise onto the right crank. Ensure that the nut is screwed in flush with the outer face of the crank. Use a cassette wrench (Shimano TL-FW 30 or similar).
- 2.6.b.7.** Tighten the bolt to 35 Nm using an 8 mm allen wrench. (fig. 2)

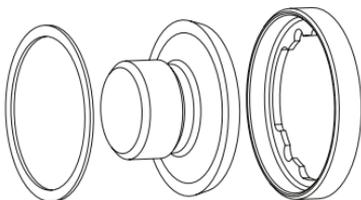


fig. 1

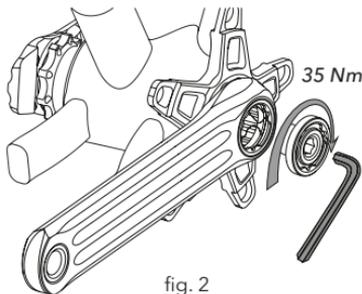
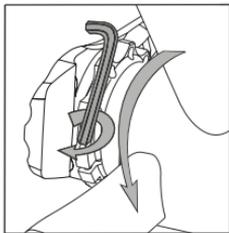


fig. 2

2.7. PRELOAD ADJUSTMENT

- 2.7.1.** Eliminate lateral play by tightening the preload nut counterclockwise.
2.7.2. Lock the preload nut by tightening the pinch bolt clockwise with a 2 mm allen wrench.



WARNING!



Do not overtighten the bolt. It is enough to tighten holding the wrench by its short side.



WARNING!



Make sure that the preload nut does not separate (more than 2 mm) from the crank.

2.8. FINE TUNE ADJUSTMENT

- 2.8.1.** If the crank does not turn smoothly even with the preload nut completely threaded on the left crank, remove the 0.5 mm plastic washer on non-drive-side and repeat the "preload adjustment" steps 2.7.1. and 2.7.2.
2.8.2. If the preload nut separates more than 2 mm from the crank in order to reduce lateral play, use an additional 0.5 mm plastic washer on the non-drive side and repeat the "preload adjustment" steps 2.7.1. and 2.7.2.

2.9. UNINSTALLING INpower CRANKS

Remove the battery. Unscrew the drive-side bolt counterclockwise using an 8 mm allen wrench until the drive-side crank assembly disengages from the spindle.

2.10. ROTOR INpower INSTALLATION

Once the cranks are mounted, place the AA battery with the positive side facing outward to make contact with the lid when closing. There is no need for any other installation in order to use the power meter.

All sensors and electronic parts are already mounted with the cranks.

3. PAIRING

Connect your ROTOR INpower 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 INpower 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 INpower retains its "SENSOR ID" throughout battery replacements and will remain properly paired.

3.1. ACTIVATION PROCESS

3.1.1. 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.

3.1.2. Your ROTOR INpower is sending a radio signal and is ready to be paired and measure data.

3.2.a. AUTOMATIC PAIRING

Once INpower is active and within two minutes of activation (INpower 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:

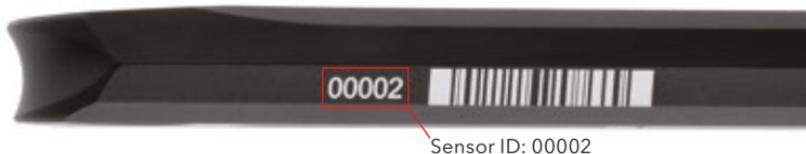
```
Settings\Bike settings\Bike profiles\Your profile\ANT+ Power.
```

Wait for confirmation from the monitor.

3.2.b. MANUAL PAIRING

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



4. CALIBRATION / ZEROING

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

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

There's no need to calibrate your ROTOR INpower 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.

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. You can usually find the "CALIBRATION" button in the menu: Settings\Bike settings\Bike profiles\Your profile\ANT+Power.
- 4.1.4. The device must show a value of 1000 or a message of successful calibration. Turn the cranks counterclockwise 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.

There's no need to calibrate your ROTOR INpower 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 recommended to repeat the calibration process after an adjustment period of approximately 30 hours of riding.

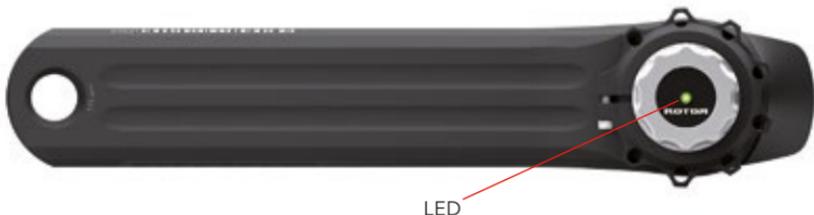
For more information about the calibration process, user utilities and training options, visit our website: www.power.rotorbike.com



5. FIRST STEPS WITH YOUR ROTOR INPOWER

ROTOR INpower becomes active after battery installation without any extra procedure. After two minutes of inactivity it enters hibernation mode. You can activate it by applying a 2.5 kg force or by riding a few meters.

The device has a yellow LED situated at the extreme right of the ROTOR INpower axle. The LED is visible only if the drive-side crank assembly is uninstalled. This LED blinks while the power meter is active.



6. BATTERY

6.1. INSTALLATION AND SPECIFICATIONS

ROTOR INpower is powered by one standard AA battery (not included).

Estimated riding time: 300 hours*.

The battery must be installed correctly, with the positive "+" facing outward, and should have enough charge for use. The battery's charge level can be checked with any computer or ANT+™ compatible device. The type of battery and the polarity are printed on the inner side of the battery cover. The battery charge can be checked by any computer or bike device compatible with ANT+™.



The battery cover should only be removed when it's necessary to change the battery or when uninstalling the cranks. Repeated opening can damage the internal contacts and O-ring (OR-24x1.5 NBR).

Do not extract any part from the inner side of the battery cover. The battery cover parts are assembled as shown left.

Be careful when turning the battery cover to prevent any damage to the internal contacts and the seal.



*Tests performed with alkaline batteries from leading brands. Consumption in fast mode (active only when connected to the *User Software* running on a computer) is greater, thus reducing the hours of autonomous use.

6.2. BATTERY REPLACEMENT

- 6.2.1.** Open the battery cover by turning it counterclockwise and aligning the tab with the opened lock image pictured on the crank cap. You can use the tab to easily turn the cover.
- 6.2.2.** To remove the cover and battery, do not use any tools or sharp objects, the spring will expel the battery.
- 6.2.3.** Insert the new battery in its place, with the positive side facing toward the outside.

- 6.2.4. The O-ring and its placement in the crank come lubricated, however with use it is advised to lubricate them again when changing the battery. Use lubricants free of lithium or other substances that could damage the O-ring material (OR-24x1.5 NBR).
- 6.2.5. Replace the cover by aligning its tab with the opened lock image. Make sure the contacts on the battery cover enter their respective housings in the axle and avoid forcing them. Press the cover while turning it clockwise until the tab points to the closed lock image. Once in this position, the cover is closed and the battery replacement process is complete.

Open position



Closed position

**WARNING!**

Make sure the battery cover contacts are not damaged after extracting it. This might produce connectivity errors or a bad seal.

Verify that the O-ring is well-positioned in the battery cover.

Use only batteries in good condition; discard those that show signs of corrosion.

**WARNING!**

Do not throw the old batteries away with normal waste; batteries should be disposed of properly according to local regulations.

7. ROTOR INpower TRAINING USE

After pairing ROTOR INpower, follow the configuration options for your ANT+™ device to select the metrics you would like to display on your device.



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

ROTOR INpower MEASUREMENT

ROTOR INpower starts measuring data automatically when pedaling. The following data are sent by radio signal to the ANT+™ device.

POWER: power of the last complete pedal cycle. The power displayed on your ANT+™ device is the measured power for the left leg multiplied by 2 by default (which corresponds to a rider with a 50%/50% balance, which is a parameter that can be modified).

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



WARNING!



Remove any ANT+ 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 INpower.

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



PEDAL SMOOTHNESS (left leg): used to interpret if the pedal stroke is rounder or more piston-like, its value being the ratio between the total torque and 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 visualizes the distribution of power exerted at different angles throughout a pedal rotation. The fact that the ROTOR INpower axle doesn't measure the combined power of both legs same as other systems in the market, but rather measures the left 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 in order to improve your technique.

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

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

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

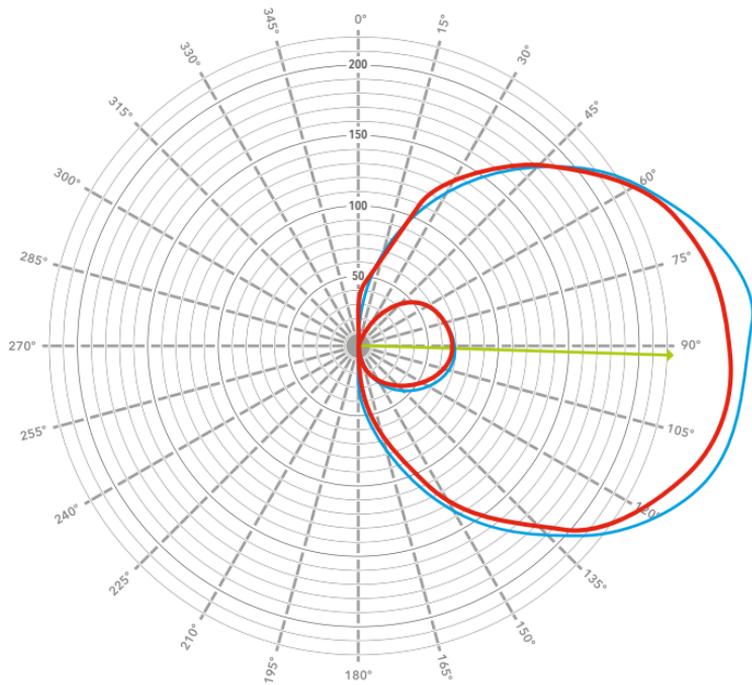
The **OCA** is closely linked to ROTOR Q-Rings, since the **OCA** (Optimum Chaining Angle) suggests in which position to install your Q-Rings, positions are marked by OCP (Optimum Chaining Position) points on the chainrings.

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 Chaining 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 INpower.

“Waterproof level: IPX7”.

Do not try to disassemble any electronic ROTOR INpower 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 Power vs INpower?

ROTOR Power measures both legs separately using gauges placed in each crank. 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). In addition to the new metrics for pedal analysis introduced by ROTOR Power: *Torque Effectiveness* and *Pedal Smoothness*, ROTOR INpower offers additional information, such as the **TORQUE 360** graph and the **OCA** (Optimum Chaining Angle) value.

What ANT+™ devices is ROTOR INpower compatible with?

They are listed in the ANT+ directory:
<http://www.thisisant.com/directory/>

How do I decide which INpower to buy if I already have a ROTOR crankset?

One of the many advantages of the INpower power meter is its compatibility with every ROTOR crankset with 30 mm axles (FLOW, 3D+ and 3D30 road cranks; REX1 and REX2 MTB cranks; it is also compatible with the specific 3D+ and 3D30 models for cyclocross).

If you are already using a ROTOR crankset, you have the opportunity to purchase the non-drive-side INpower assembly for your current model (if it is not prior to 2013). To complete the installation, you may use the drive-side crank assembly that you already have.

Make sure the length of the new INpower crank and your current crank are the same in order to guarantee full compatibility.

WARNING: you must use the self-extractor set of washer, bolt and nut included with your left INpower assembly. If another bolt is used it will damage the electronics located inside the spindle. If this happens, the warranty is no longer valid. Follow the instructions on the user manual to correctly install the INpower drive-side crank assembly.

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

There are two possibilities when buying INpower. When buying the complete set of left and right crank assemblies, you will find an installation and a *User Software* manual (*User Software* can be downloaded for free from ROTOR's website), and a Training Peaks postcard. Training Peaks has offered INpower customers a free premium account subscription. Visit trainingpeaks.com/ROTOR to obtain the maximum benefit from this new alliance.

If you only buy the left crank assembly, together with it you will find the same manuals mentioned previously, and a set of washer, bolt and self-extractor nut. These must be used to install the right crank assembly of your existing cranks with your new left INpower crank assembly. Never use another bolt or self-extractor nut to install INpower cranks.

Why is there bolt, nut and washer together with my INpower left-crank assembly if I bought it separately?

The bolt and self-extractor nut from the non-power meter cranks are not compatible with the INpower axle.

If you have purchased the left-crank assembly with the axle because you already have ROTOR cranks, you need to substitute the old bolt and self-extractor nut with the new washer, bolt and self-extractor nut included in the INpower package.

Read the user manual carefully to correctly install these INpower parts. If you have purchased the complete set of left and right-crank assemblies, the self-extractor mechanism is already installed and you do not need to make any modifications.

Do not uninstall the self-extractor set once it has been successfully installed.

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

INpower is equipped with the UBB30 axle system, which was introduced by ROTOR.

UBB30 is a 30 mm diameter axle which is compatible with almost all standard frames in the market (when used with the correct spacers).

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

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

The only frames not compatible with the UBB30 system are BB90 and BB95 (both for 24 mm diameter 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 measurement?

Ambient temperature does not positively or negatively affect how ROTOR INpower works.

INpower gives accurate and stable power

measurement no matter changes in temperature during a ride (e.g. long climbs with higher temperatures at the beginning and lower temperatures at the end).

It is not necessary to calibrate INpower due to 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 both the cranks on the bicycle, and the battery and battery cap. Read the user manual carefully before handling the product.

Never try to disassemble the plastic part at the end of the left crank and/or the electronics inside the axle.

Do not try to disassemble the mechanical elements assembled by the manufacturer, such as the axle with the left crank, the self-extractor system, or the spider with the chainrings on the right side.

How often should the battery be replaced?

ROTOR INpower uses a standard AA 1.5 V battery. The battery is not included in the original packaging.

Battery life is usually 300 hours for fully-charged, alkaline batteries from leading brands. When the battery is near the end of its life, the ROTOR INpower cranks will send a message to your ANT+™ device that will warn you that you'll need to change it soon.

You can see the battery status by connecting the crank to the ROTOR *User Software* running on your computer. The *User Software* can be

downloaded for free from ROTOR's website.

In order to connect the crank to the computer, a USB ANT+ stick is necessary. Contact your ROTOR retailer or local distributor to acquire one.

Read the user manual before opening the battery cap. Opening the battery cap is only recommended when it is necessary to change the battery or uninstall the cranks. Inadequate handling of the battery cap can damage the O-ring and the seal.

How do I replace the battery?

Read the user manual for correct battery replacement.

The positive side must be facing outward.

The battery model and polarity are printed on the inside of the plastic cap.

Can I use rechargeable batteries?

Yes, you can use them if they are AA batteries with 1.5 V.

Battery life depends on the manufacturer and model. Rechargeable batteries usually have a lower life, which is reduced even further the more you recharge them.

My battery seems swollen or shows signs of corrosion.

Discard damaged batteries immediately. Using damaged batteries can damage the electronic parts inside the axle and void the warranty.

If I usually connect my INpower to the User Software running on the computer, is the battery life still 300 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 INpower cranks? Are they waterproof?

INpower is waterproof. It has successfully passed IPX7 level.

Nevertheless, do not clean your power meter with high pressure and avoid direct impact on the joints.

Do not use solvents or degreasers; they can damage some power meter elements.

Make sure that the O-ring is correctly placed in the cap after every battery replacement.

How can I update the firmware for my cranks?

How often do I have to update the firmware?

ROTOR sometimes offers new versions of the firmware in order to improve previous versions.

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, a USB ANT+™ stick is needed. Contact your ROTOR retailer or local distributor to acquire one.

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

If any error occurs during the updating process, your cranks will keep functioning normally with the previously-installed firmware. If the update process begins and the program detects any problem, the process will restart a maximum of 5 times before cancelling the update.

It is recommended to place the USB ANT+™ stick as close to the cranks as possible for better radio signal reception.

9.2. INSTALLATION

How often do I need to calibrate my ROTOR INpower?

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

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

Battery replacement does not require recalibration.

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 ANT+ device. This is necessary for calibrating force and angle.

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 INpower also 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. This value must stay the same (variations of 1 or 2 units are normal). You can calibrate your cranks using either your ANT+™ device or the *User Software*, which can be downloaded for free from ROTOR's website.

9.3. POWER INFORMATION METRICS

How often are the power values shown?

ROTOR INpower 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 ANT+ 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 ANT+™ device. Devices usually offer the option to record data once per second, or to record data in “Smart” mode.

Which data related to power are provided by INpower?

INpower processes and provides values of: Power, Cadence, Torque Effectiveness and Pedal Smoothness.

A balance value is also shown, which is set by default as 50%/50% (assuming a perfectly-balanced cyclist).

INpower also calculates and shows additional information that can only be viewed through the *User Software*: **TORQUE 360** and **OCA** (Optimum Chainring Angle).

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.

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 will need a USB ANT+ stick to receive data sent by INpower (stick not included, contact your ROTOR retailer or local distributor to obtain one).

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 visualizes the distribution of power exerted at different angles throughout a pedal rotation.

The fact that the ROTOR INpower axle doesn't measure the combined power of both legs same as other systems in the market, but rather measures the left 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 in order to improve your technique.

What is OCA?

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

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

To calculate the **OCA**, INpower 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 Chaining Angle) suggests in which position to install your Q-Rings, positions are marked by OCP (Optimum Chaining 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 INpower 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 left pedal). Take into account that after two minutes of inactivity, INpower enters hibernation mode to reduce battery consumption.

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

Check to see if the battery is correctly installed with the positive side facing outward. Check to see if the battery is charged.

If you still have problems, uninstall the drive-side crank assembly and look at the inside of the axle on the right side. It isn't necessary to uninstall the axle from the bicycle. When installing a new battery, you must see the yellow LED light. If this does not occur, contact your ROTOR retailer or local distributor for more information.

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

Follow the instructions detailed in the user manual for correct pairing with your ANT+™ device. If the device is correctly paired and active and connects with the computer (with the *User Software*) without any problem but does not connect to the ANT+™ 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.

If fast mode cannot be disconnected, remove battery and wait a couple minutes before replacing it. During these two minutes the crank is still active even without the battery in order to avoid losing data in case of involuntary disconnections.

How do I get spare parts?

Please contact your ROTOR retailer or local distributor.

Do not try to disassemble your power meter except to install it and/or replace the battery. Improper handling will void the warranty.

Who do I contact for warranty issues?

Please contact your ROTOR retailer 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 INpower?

You will find all the necessary information about installation and how to use INpower 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 and with Industry Canada licence-exempt RSS standard(s).

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.

Modifications not expressly approved by this company could void the user/s authority to operate the equipment.

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 and with Industry Canada licence-exempt RSS standard(s).

The letters "IC" have no other meaning or purpose than to identify the Industry Canada certification number/registration number.

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.

This product does not contain any user-serviceable parts.

Repairs should only be made by ROTOR distributors.

Unauthorized repairs or modifications could result in permanent damage to the equipment, and void your warranty and your authority to operate this device under Part 15 regulations.

CEE REGULATION

This product is compliant with Directive 93/42/EEC

ROTOR RPM2
 FCC ID: R3AROT114
 IC: 10992A-ROT114





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