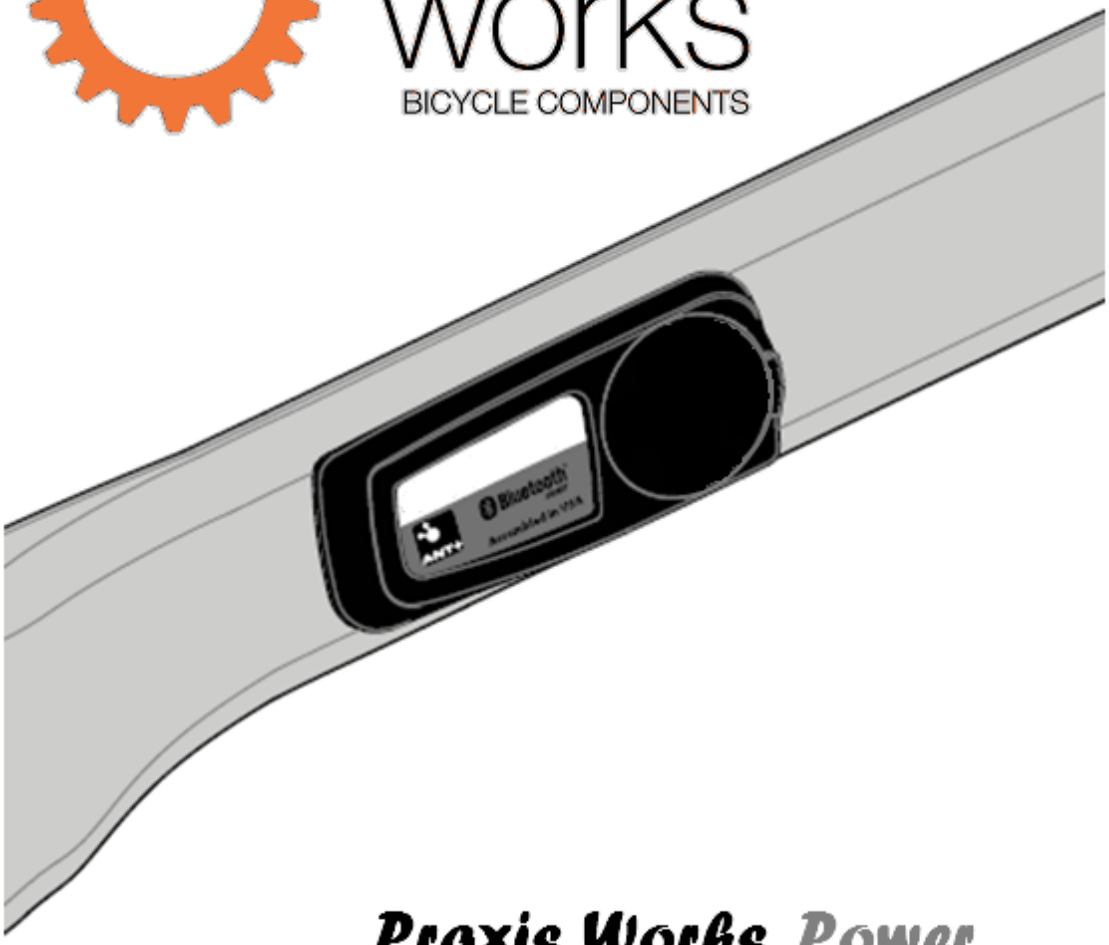
praxis works
BICYCLE COMPONENTS



Praxis Works Power

USER GUIDE

ANT+ Bluetooth

Praxis Works
www.praxiscycles.com
info@praxis-works.com
831-423-7464

Offices:

Sales, Accounting and Administrative: 207 McPherson Street, Suite E.
Santa Cruz, CA 95060 United States of America

Design, Manufacturing and Tech. Support: 207 McPherson Street, Suite E.
Santa Cruz, CA 95060 United States of America

Specifications

- Battery CR2032 – service life, approximately 180 hours
- Wireless transmission: 2.4GHz, ANT+™ and Bluetooth® Smart (4.0)
- Accuracy: +/-2% of measured power
- Weight: adds only 20g to weight of left crank arm
- Power measurement range: (watts): 0 – 1999
- Cadence range (RPM): 20-220
- Water resistance rating: IPX7

※ This product could use “replacement“ Battery

This product is ANT+ certified and complies with the following specified ANT+ Device Profiles :

www.thisisant.com/directory

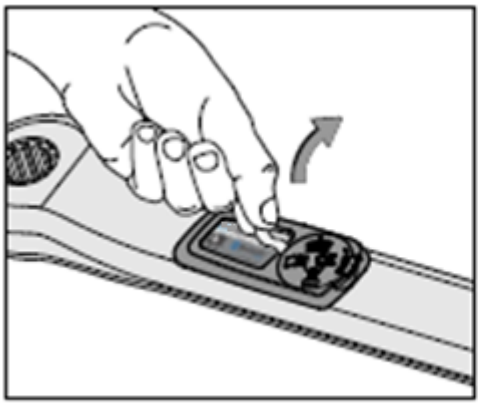


FIG 1

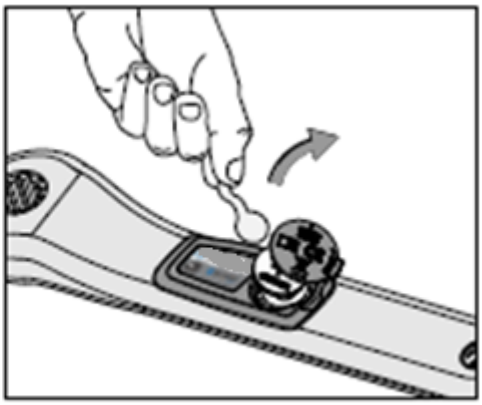


FIG 2

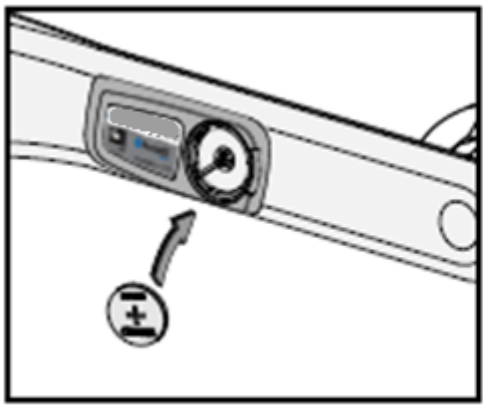


FIG 3

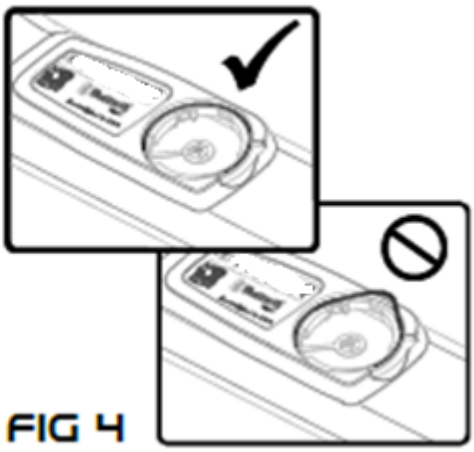


FIG 4

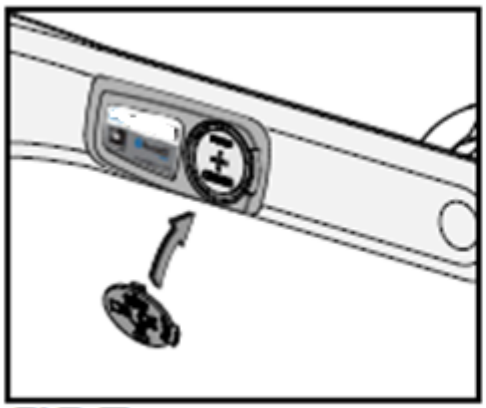


FIG 5

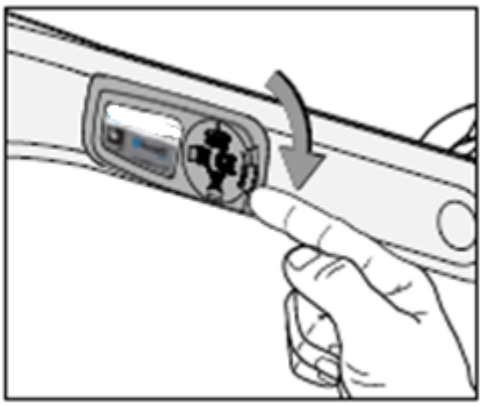


FIG 6

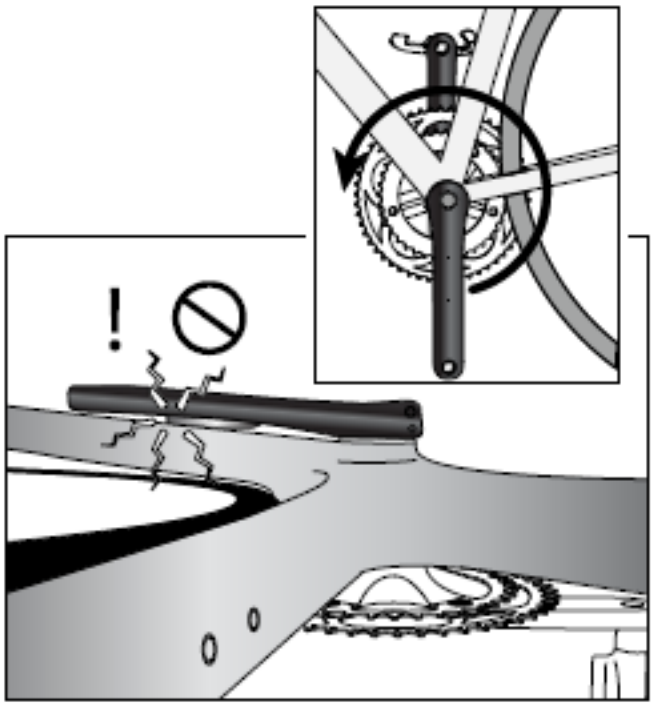


FIG 7

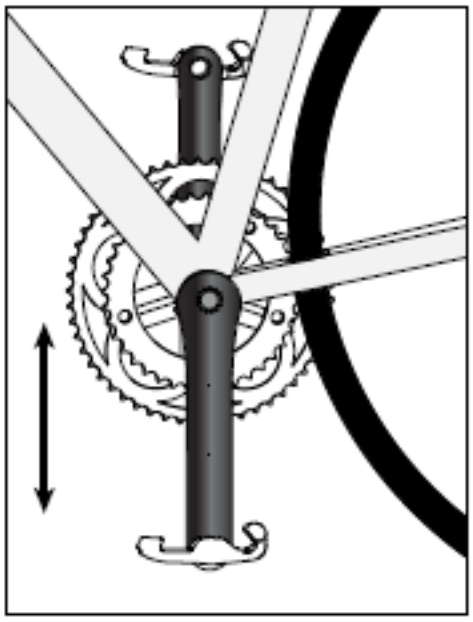


FIG 8

⚠ **The power meter ships without a battery installed.**

The battery must be installed before first use.

Battery installation or replacement

1. The power meter uses a CR2032 battery that can be installed or replaced by hand.
2. Referencing **FIG 1** and **2**; rotate the battery cover in the counter clockwise direction to release the cover.
   Do not attempt to use any tools to force or pry the battery cover open.
3. Place the new CR2032 battery into the battery receptacle with the "+" side facing out. It is critical that the battery is inserted in this orientation.
4. Before installing the battery cover take care to ensure the water seal o-ring is seated properly in its groove as illustrated in **FIG 4**.
5. Replace the battery cover as illustrated in **FIG 5**.
6. Once the battery cover has been properly inserted and is even with the surface of the power meter, use your finger to rotate the door back to the locked position as illustrated in **FIG 6**.

Replaceable batteries

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED

BY AN INCORRECT TYPE.

DISPOSE OF USED BATTERIES ACCORDING

TO THE INSTRUCTIONS

Water resistance notice

The Praxis Works® power meter is designed to provide excellent water resistance and tested to resist water ingress to the IPX7 standard (up to 1 meter). This provides outstanding water resistance for cycling conditions on-road and off, including stream crossing and heavy rain. Please keep in mind this is an electronic device not a scuba device; as such, there are limits to the water resistance.

⚠ **Do not subject the power meter to direct spray from a high pressure sprayer. Water exiting a sprayer can reach hundreds and sometimes thousands of pounds of pressure per square inch. This may be equivalent**

to the pressure found at ocean depths of 1000 feet or more! It is possible for water to be forced past the o-ring seal under these conditions and damage to the electronics may occur.

Power meter (crank arm) installation

IMPORTANT NOTICE: to ensure power meter compatibility with the frame and components, please follow these steps carefully and in the specific order. Do not install the pedals until compatibility of the power meter has been confirmed.

1. Attach the left crank arm to the bike following the instructions provided by the crank arm manufacturer and supplied with your power meter. Links to crank manufacturer's installation instructions may be found at the praxis cycles website.
   http://www.Praxis Workscycling.com/suport-general-instruction
2. Carefully and fully install the crank arm onto the bike but **DO NOT ATTACH THE PEDAL AT THIS TIME.**
3. **Carefully and slowly rotate the crank 1 full revolution to ensure there is no contact between the power meter sensor housing and any part of the frame or other components** as illustrated in **FIG 7.**
4. If there is interference between the power meter and the frame or other components, contact your retailer for technical assistance.
5. If no interference is found you may continue with the final installation of pedals according to the pedal manufacturer’s instructions.

Power meter wireless communication

The power meter is compatible with a wide range of display devices that use the ANT+ or Bluetooth Smart (4.0) wireless communication systems. Many brands of bicycle computers use the ANT+ “profile” for power measurement and can be used to display the power (Watts) and cadence (RPM) measured by the power meter and sent wirelessly to the computer. Bluetooth Smart is a popular wireless communication system included with many of the latest mobile phones. Utilizing Bluetooth Smart, a mobile phone running a compatible App can be used to display the power (Watts) and cadence (RPM) data within the App.

Pairing the power meter

The power meter must be connected or “paired” to the cycle computer or mobile device (collectively referred to as display units) according to the display manufacturer’s instructions. Each power meter has a unique ANT+ device ID and a unique Bluetooth ID. During the pairing process the applicable device ID is recorded by the display and will be used to communicate with the corresponding power meter. The ANT+ ID number is printed on the back of the power meter and also supplied with the documentation. The Bluetooth ID is recognized and displayed by the Bluetooth device during the pairing process. Once paired to the power meter, ride data (Watts and RPM) will be transmitted from the power meter to the display unit. Other important functions such as resetting the power meter’s zero offset will also be enabled through the display unit. **Both the ANT+ and Bluetooth IDs are permanently assigned to the power meter and are not affected by changing the power meter battery.**

ANT+: Check the power meter has a fully charged CR2032 battery properly installed. Rotate the crank arm one time to ensure the power meter is awake and ready to communicate. Follow the ANT+ device manufacturer’s instructions for pairing a power meter to the display unit.

Bluetooth Smart: Check the power meter has a fully charged CR2032 battery properly installed. Rotate the crank arm one time to ensure the power meter is awake and ready to communicate. Follow the Bluetooth Smart Ready (4.0) device manufacturer’s instructions for pairing a power meter to the display unit.

Zero offset calibration

The zero offset calibration is an important feature of the power meter that resets the zero offset value for the power meter sensors. There are physical and environmental conditions that may affect the zero offset value and there are methods both manual and automatic that will adjust this value to accommodate for the changing physical and environmental condition. The zero offset of the power meter is essentially the sensor reading or values measured when the power meter has no pedaling load (torque) applied. The act of calibrating the zero offset causes the power meter to measure the value at zero load and then records this value as the baseline for power measurement. Loads applied while pedaling will then be measured as torque and used by the sensor to determine power in Watts. The zero offset value can be affected by the installation of the crank arm and the tightening of the securing hardware. The torque applied to the securing hardware can impart some strain into the crank material that is easily accounted for by manually calibrating the zero offset. Any time the power meter is removed from the bike and reinstalled the zero offset should be calibrated.

Ambient temperature shifts can also affect the zero offset to some extent. To ensure maximum accuracy it is advisable to manually calibrate the zero offset before each ride. The power meter utilizes automatic temperature sensors to compensate for temperature changes that take place during the ride. This is done automatically while you ride and you need not take any further steps to calibrate the sensor during the ride.

How to calibrate the zero offset

Calibrating the zero offset is a function controlled by the cycle computer or mobile device (display units) paired to the power meter. Please note that some device manufacturers refer to the step of resetting the zero offset as “calibration”. When paired to a compatible ANT+ cycle computer or Bluetooth Smart mobile device, the power meter and display units are in two-way communication. The display unit can send a command to the power meter to calibrate the zero offset value and in some cases the resulting zero offset value will be sent back from the power meter to the display unit and be shown on the screen. Please note the displayed zero offset value will NOT be zero but rather a number that corresponds to the measurement taken by the sensor. The display units will also indicate if the procedure was successful or failed.

Before attempting to calibrate the zero offset value of the power meter, ensure that a working battery is in use. Rotate the power meter one revolution to ensure the power meter is awake and ready to communicate.

The left crank arm with power meter MUST be positioned straight down (6 o'clock position) and ensure there is no load on the pedals and the bike is stable. See FIG 8 for a visual reference. If the left crank arm is not straight down the reset procedure for zero offset will fail.

Although the process for calibrating the zero offset will vary depending on the display manufacturer, it should roughly follow these general steps; however, consult your display unit's manual for specific steps:

1. Ensure the power meter has been paired to and is communicating with the display unit.
2. Position the crank straight down (6 o'clock position) FG 8, and the bike is stable.
   Note: please see error code #32 in the troubleshooting section below.
   The power meter sensor will determine if the crank is positioned in an acceptable orientation during the zero reset process.
3. Access the settings function of the wireless display.
4. Select the power sensor (many times the power sensor is located within a "BIKE" setting).
5. Select the "CALIBRATE" or "Zero" function.
6. Calibration of the zero offset will begin and take only a few seconds to complete.
7. Upon completion the display will show a message indicating success or failure of the procedure.

Troubleshooting

Calibration time out

When using a Garmin® display unit with the heart rate (HR) sensor enabled, it is possible the calibration process will take too long and time out before completion. To resolve this either turn off the HR sensor on your Garmin while you calibrate your power meter (you can turn it back on once the power meter is calibrated) or put the HR strap on and ensure it has been detected by the display before you attempt to calibrate the zero offset.

Error Codes

An error code may be displayed if resetting the zero offset fails.

Please note the possible error codes below and corrective action that should be taken.

Code #s	Corrective Action
1,2,4,16	Simply attempt zero reset again. If code remains after several attempts please contact Praxis Works- Technical Support.
32	Power meter crank not in proper position (straight down) see **FIG 8**.

If no power (watts) or cadence (RPM) signal is being received by your compatible display unit when riding the bike, please confirm the following items:

1. Confirm that a working CR2032 battery is properly installed in the power meter according to the reference FIGs 1-6 of this manual.
2. Ride the bike with a pedaling cadence of greater than 20 RPM. Your paxis works Power meter will not send cadence or wattage to the display unless a true pedaling force is applied. If you pedal your bicycle in the work stand the display will not show cadence or watts — this is not a problem — as soon as you ride the bike you will see your cadence and power values displayed.
3. Ensure that the power meter has been successfully paired to the display unit being used according the manufacturer's specific instructions.
4. For further assistance with Troubleshooting, FAQs, videos and useful tips, please visit our website at: www.praxiscycles.com/support

The Praxis Works Power meter App may be used to confirm device communication, verify and update the firmware. Vist **www.praxiscycles.com/support-app** for additional information and links to the app store.

System Overview

The power meter device that mounted on left crank can measure the body and riding information of the rider such as heart beat and speed. The power meter can also convert the protocol from ANT+ to BLE.

The product supports both Bluetooth 4.0 BLE mode and ANT+ protocol, it can transmit sensor information from ANT+ to BLE. The power meter collects information of riders such as speed and heart rate sensor and then transmit to smart phone through BLE protocol. Riders can record their riding and body information therefore manage their training.

The riding information of collection can be displayed on cycle computer or smart phone. The power meter can help the rider to regulate physical condition while racing or training, and the workout data can be stored in cloud through smart phone.

⚠**You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.**

RF exposure:
To comply with the FCC RF exposure compliance requirements, this device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

Maintenance and cleaning

The only items of the power meter that can be serviced by the owner are the battery, battery cover and o-ring. No other items are serviceable and no attempt should be made to adjust or alter any other items.

The power meter uses a custom 0-ring and is lubricated with o-ring grease. The grease protects the 0-ring from abrasions, environmental conditions and is critical to ensure proper water resistance. When servicing the o-ring ensure it is well coated with a grease designed for use on o-rings which may be obtained at most hardware stores.

When cleaning the power meter use only water dampened cloth to wipe off dirt and debris. Never use any harsh cleaning chemicals that may damage the plastic housing. Inspect the battery compartment to ensure the batter contact is clean of any corrosion.

⚠ **Never directly spray the power meter or battery door with high pressure water.**

The water pressure from sprayers can reach thousands of pounds per square inch and may force water past the o-ring damaging the power meter electronics.

Firmware

Firmware is the programming that operates the power meter's computer.
The power meter has been designed to allow over-the-air (OTA) firmware updates. Updated firmware may be developed and released by Praxis Works to provide added or improved functionality. Firmware updates may be sent to the power meter by way of the Praxis Works Utility App for Apple® iOS devices using a Bluetooth Smart compatible (BLE 4.0) model such as the iPhone® 4s, 5 or newer and iPad® 3, Mini or newer. At the time of printing, Android™ Apps supporting Bluetooth OTA updates of the power meter firmware are not yet available; however, these may be developed and released at a later date. Please check our website at: **www.praxis-works.com/support-app** for links to the available utility Apps hosted in the App stores as well as instructions on how to utilize the App for firmware update and other procedures.

Warranty procedures

Complete warranty details are available in our Important Product Information document and at our website FAQ page:
http://www.praxis-works.com/support

The Praxis Works power meter is considered to be the entire left crank arm, not just the electronics and housing mounted to the crank arm. As such customers are instructed to contact their retailer or Praxis Works directly for all warranty claims related to the left crank arm power meter. Do not contact the crank arm manufacturer for warranty concerns regarding the left arm as they are not in a position to provide service for this product once the power meter electronics have been permanently integrated.

To pursue a warranty claim please contact the retailer that sold the power meter. If the power meter was purchased directly from Praxis Works please contact us directly via email or phone:

info@praxis-works.com
831-423-7464

In all cases a Return Authorization Number (RA#) must be issued by Praxis Works before any product is returned for warranty inspections and service.

The Praxis Works Power® device may be protected by USA or foreign patents or patents pending.
This document may contain trademarks or registered trademarks of Praxis Works LLC as represented by the use of ™ and® respectively.
ANT+™ is a trademark of Dynastream Innovations Inc.
Bluetooth® is a registered trademark of Bluetooth SIG, Inc.
Apple®, iPhone®, iPad® are registered trademarks of Apple Inc.
Android™ is a trademark of Google Inc.
Garmin ® is a registered trademark of Garmin Corporation
Wahoo™ is a trademark of Wahoo Fitness LLC
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Praxis Works™

Important Product Information

Contact Information:
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Suite E. Santa Cruz, CA 95060
United States of America
www.praxis-works.com
info@praxis-works.com

Product Name: Praxis Works Power™
Model Name: Praxis Works Power meter
Model No: DTPM-01
FCC ID: 2AG2O201703001
IC ID: 22599-201703001

California Proposition 65

The enclosed hardware and its packaging contain chemicals the State of California has found to cause cancer, birth defects or reproductive harm.

RoHS

Praxis Works certiffes that this product and its packaging are in compliance with European Union Directive 2011/65/EU on
the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronics Equipment, commonly known as RoHS.

FCC Rules Part 15

The enclosed hardware 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) it must accept any interference received, including interference that may cause undesired operation.

FCC Compliance Statement:

This equipment has been tested and found to comply with 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 residential installations. 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 interference to radio or television equipment 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

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example- use only shielded interface cables when connecting to a computer or peripheral devices).

⚠Caution! The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the users authority to operate the equipment.

IC Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 103 and users can obtain Canadian information on RF exposure and compliance.

Le présent appareil est conforme_aux CNR_d'Industrie Canada applicables aux appareils radio exempts de licence. L' exploitation est autorisée aux deux conditions suivantes: (1) l' appareil ne doit pas produire de brouillage, et (2) l' utilisateur de l' appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d' en compromettre le fonctionnement. Le dispositif rencontre l'exemption des limites_courantes d' évaluation dans la section 2.5 de RSS102 et les utilisateurs peuvent obtenir l' information canadienne sur l'exposition et la conformité de rf.

CE statement：

Europe – EU Declaration of Conformity This device complies with the essential requirements of the R&TTE Directive 1999/5/EC. The
following test methods have been applied in order to prove presumption of conformity with the essential requirements of the R&TTE
Directive 1999/5/EC:
EN 60950-1:2006+A12:2011
EN 55022+EN 55024(2010)
EN 301 489-1 V1.8.1(2008-04)
EN 301 489-3V1.4.1(2002-08)
EN 300 440-2 V1.3.1(2009-03)
This device is a 2.4 GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except
in France and Italy where restrictive use applies. In Italy the end-user should apply for a license at the national spectrum authorities in
order to obtain authorization to use the device for setting up outdoor radio links and/or for supplying public access to
telecommunications and/or network services. This device may not be used for setting up outdoor radio links in France and in some areas
the RF output power may be limited to 10 mW EIRP in the frequency range of 2454 – 2483.5 MHz. For detailed information the end-user
should contact the national spectrum authority in France. Hereby, Praxis Works declares that these products are in compliance with the
essential requirements and other relevant provisions of Directive 1999/5/EC.

PRAXIS WORKS LLC (1) One Year Limited Warranty

HOW CONSUMER LAW RELATES TO THIS WARRANTY

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE (OR BY COUNTRY OR PROVINCE). OTHER THAN AS PERMITTED BY LAW, PRAXIS WORKS DOES NOT EXCLUDE, LIMIT OR SUSPEND OTHER RIGHTS YOU MAY HAVE. FOR A FULL UNDERSTANDING OF YOUR RIGHTS YOU SHOULD CONSULT THE LAWS OF YOUR COUNTRY, PROVINCE OR STATE.

WARRANTY LIMITATIONS THAT MAY AFFECT CONSUMER LAW

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY AND THE REMEDIES SET FORTH ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL, WRITTEN, STATUTORY, EXPRESS OR IMPLIED. PRAXIS WORKS DISCLAIMS ALL STATUTORY AND IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND WARRANTIES AGAINST HIDDEN OR LATENT DEFECTS, TO THE EXTENT PERMITTED BY LAW. IN SO FAR AS SUCH WARRANTIES CANNOT BE DISCLAIMED, PRAXIS WORKS LIMITS THE DURATION AND REMEDIES OF SUCH WARRANTIES TO THE DURATION OF THIS EXPRESS WARRANTY AND, AT PRAXIS WORKS'S OPTION, THE REPAIR OR REPLACEMENT SERVICES DESCRIBED BELOW. IN NO EVENT WILL THE VALUE OF THE WARRANTY PROVIDED EXCEED THE ORIGINAL PURCHSE PRICE. SOME STATES (COUNTRIES AND PROVINCES) DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY (OR CONDITION) MAY LAST, SO THE LIMITATION DESCRIBED ABOVE MAY NOT APPLY TO YOU.

WHAT IS COVERED BY THIS WARRANTY?

Praxis Works warrants the Praxis Works -branded hardware product and accessories contained in the original packaging ("Praxis Works Product") against defects in materials and workmanship when used normally in accordance with Praxis Works's published guidelines for a period of ONE (1) YEAR from the date of original retail purchase by the end-user purchaser ("Warranty Period"). This warranty only applies to the original owner and is not transferable.

WHAT IS NOT COVERED BY THIS WARRANTY?

This warranty applies to Praxis Works branded products limited to crank arms when packaged or sold with Praxis Works hardware. Manufacturers, suppliers, or publishers, other than Praxis Works, may provide their own warranties to you but Praxis Works, in so far as permitted by law, provides their products "AS IS". Praxis Works does not warrant that the operation of the Praxis Works Product will be uninterrupted or error-free. Praxis Works is not responsible for damage arising from failure to follow instructions relating to the Praxis Works Product's use. Praxis Works's published guidelines include but are not limited to information contained in technical specifications, user manuals and service communications.

This warranty does not apply: (a) to consumable parts, such as batteries or protective coatings that are designed to diminish over time, unless failure has occurred due to a defect in materials or workmanship; (b) to cosmetic damage, including but not limited to scratches and dents; (c) to damage caused by use with another product; (d) to damage caused by accident, impact, abuse, misuse, _re, earthquake or other external cause; (e) to damage caused by operating the Praxis Works Product outside Praxis Works's published guidelines; (f) to damage caused by service, modifications or alterations performed by anyone other than Praxis Works or an
authorized Praxis Works Service Provider (h) to defects caused by normal wear and tear or otherwise due to the normal aging of the Praxis Works Product, or (i) if any serial number has been removed or defaced from the Praxis Works Product.

IMPORTANT RESTRICTION

Praxis Works may restrict warranty service to the country where
Praxis Works or its Authorized Distributors originally sold the
Praxis Works Product.