LEOMO

TYPE-R

Operations and Safety Manual

VERSION 1.5 (3/29/2019)

CONTENTS

NEW FEATURES

Compare Activities & Calendar view

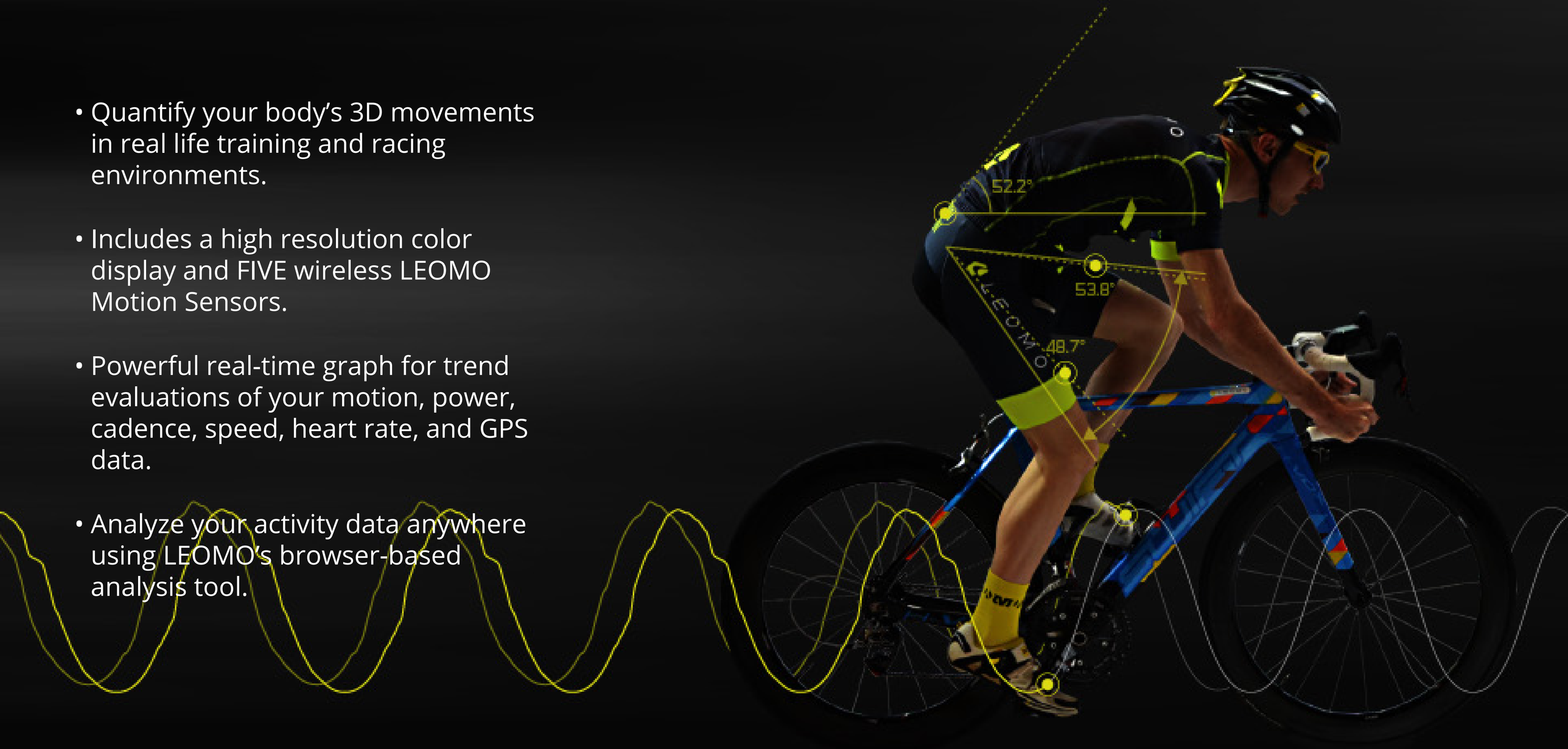
LEOMO

HIGHLY ACCURATE, REAL-TIME QUANTIFIED MOTION FOR CYCLING

Whether you are a coach who wants to add accuracy and effective tracking to your observations, or a cyclist wanting objective feedback of your motions in real-time, the lab-level accurate motion tracking capabilities of the TYPE-R will deliver. Combining the latest in technology, biomechanics, and cycling form analysis, the TYPE-R brings training, coaching, and injury prevention to a whole new level, inside and outside the lab.

FEATURES

- Quantify your body’s 3D movements in real life training and racing environments.
- Includes a high resolution color display and FIVE wireless LEOMO Motion Sensors.
- Powerful real-time graph for trend evaluations of your motion, power, cadence, speed, heart rate, and GPS data.
- Analyze your activity data anywhere using LEOMO’s browser-based analysis tool.



REQUIREMENTS

WI-FI CONNECTION

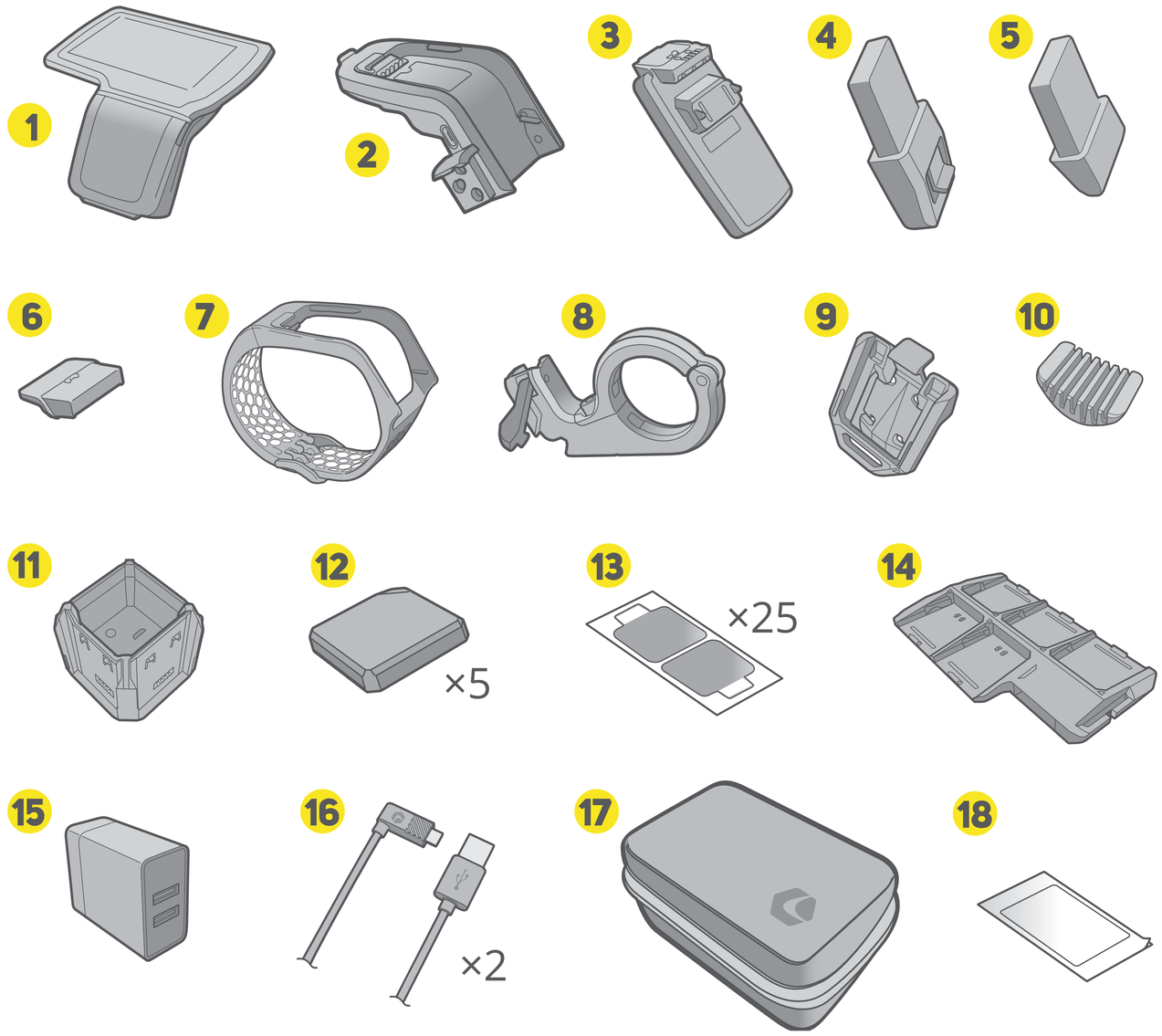
SMARTPHONE

- IOS: IOS 10.0 OR LATER
- IPHONE 5 OR LATER
- ANDROID: ANDROID 5.0 OR LATER

WEB BROWSER

- CHROME V55 OR LATER
- SAFARI V10 OR LATER
- FIREFOX V58 OR LATER
- EDGE V4.0 OR LATER

WHAT'S IN THE BOX

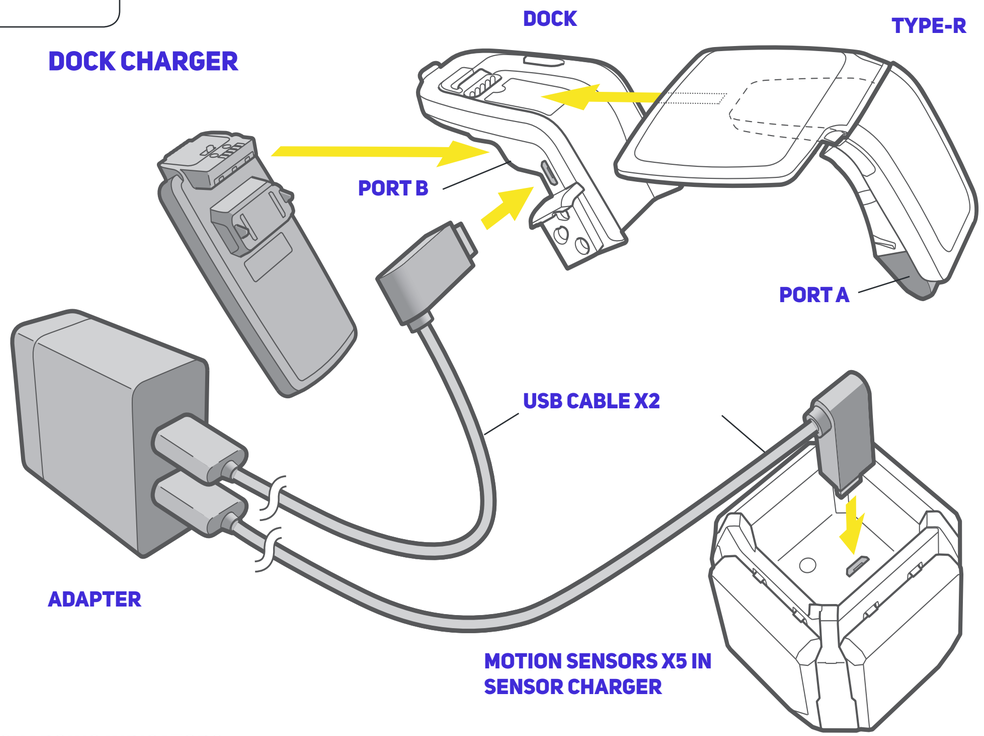


1. **TYPE-R (MAIN UNIT, DISPLAY)**
2. **DOCK** FOR FITTING ON BIKE MOUNT AND USB CHARGING
3. **DOCK CHARGER** FOR CHARGING PORT A BATTERIES
4. **L BATTERY** FOR PORT A BATTERY USE
5. **S BATTERY** FOR PORT A BATTERY USE
6. **PORT CAP** FOR SEALING PORT B WHEN NOT USING DOCK CHARGER
7. **WRISTBAND** FOR WEARING TYPE-R ON WRIST
8. **BIKE MOUNT** FOR MOUNTING TYPE-R ON BIKE
9. **SENSOR CLIP** FOR USING SENSORS ON SHOES
10. **ADJUSTMENT SPACER** FOR ADJUSTING WRISTBAND
11. **SENSOR CHARGER** FOR CHARGING MOTION SENSORS
12. **LEOMO MOTION SENSORS X5** FOR MOTION DATA COLLECTION
13. **SENSOR ADHESIVES X50** FOR WEARING MOTION SENSORS
14. **SENSOR CARRIER** CASE FOR KEEPING MOTION SENSORS POWERED OFF WHILE IN TRANSIT
15. **AC ADAPTER**
16. **USB CABLE X2**
17. **CARRYINGCASE**
18. **ANTI-GLARE FILM**

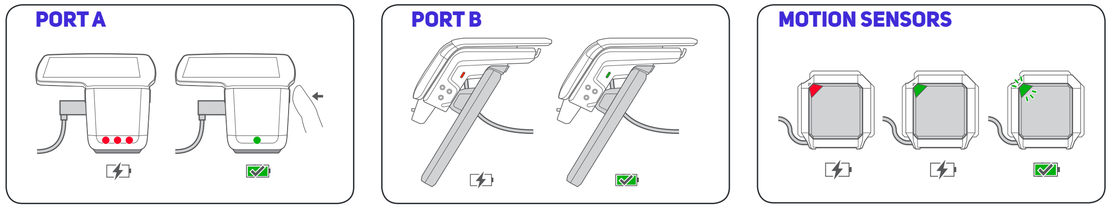
LEOMO

1 CHARGE DEVICES

Charge your TYPE-R, Dock Charger, and LEOMO Motion Sensors.



CHARGING INDICATORS



Anker/LEOMO AC adapter must be used for charging of TYPE-R and LEOMO Motion Sensors

2 DOWNLOAD LEOMO LINK

Download the LEOMO Link app for your smartphone. LEOMO Link is available on the App Store* and Google Play**.

Download on the App Store

GET IT ON Google Play

LEOMO LINK

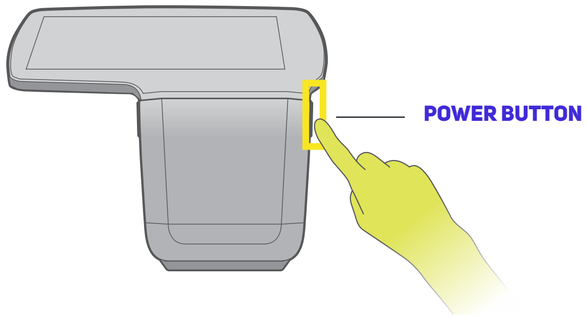
*Apple and the Apple logo are trademarks of Apple Inc., registered in the U.S. and other countries. App Store is a service mark of Apple Inc., registered in the U.S. and other countries.
**Google Play and the Google Play logo are trademarks of Google Inc.

3 LOG IN TO LEOMO LINK

Open the LEOMO Link and create a LEOMO account, or log in if you already have an account.

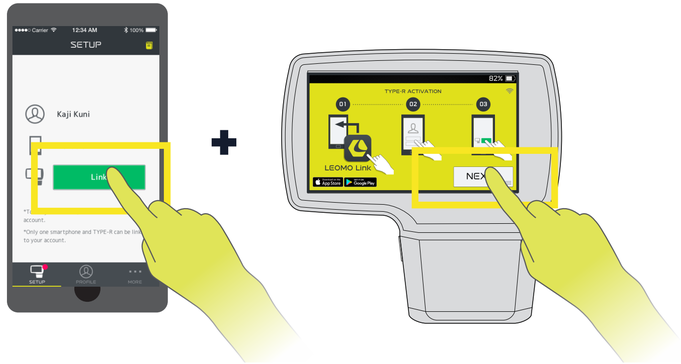
4 TURN ON THE TYPE-R

Turn on the TYPE-R by holding down the right hardware button on the side of the TYPE-R until the TYPE-R powers on.



5 LINK THE TYPE-R TO LEOMO LINK

Link your TYPE-R from the Setup tab on LEOMO Link. This will (1) pair your TYPE-R to your smartphone, (2) link your account to the TYPE-R, and (3) set up the Wi-Fi connection to be used on your TYPE-R.

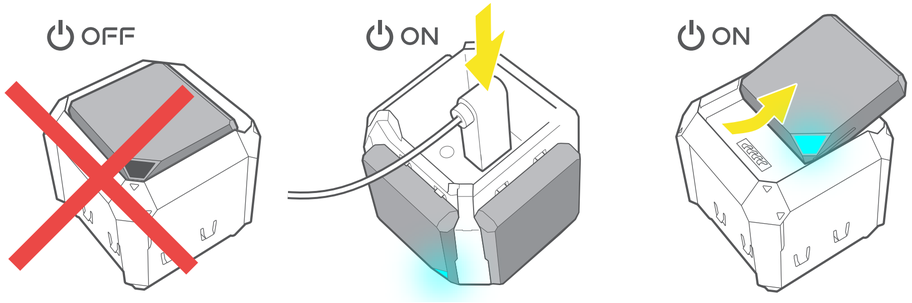


NOTE

- Only one TYPE-R and smartphone can be linked to your account at one time.
- The pairing process can only be done through the LEOMO Link app, and linking through your phone's settings can result in errors.

6 TURN ON ALL 5 LEOMO MOTION SENSORS

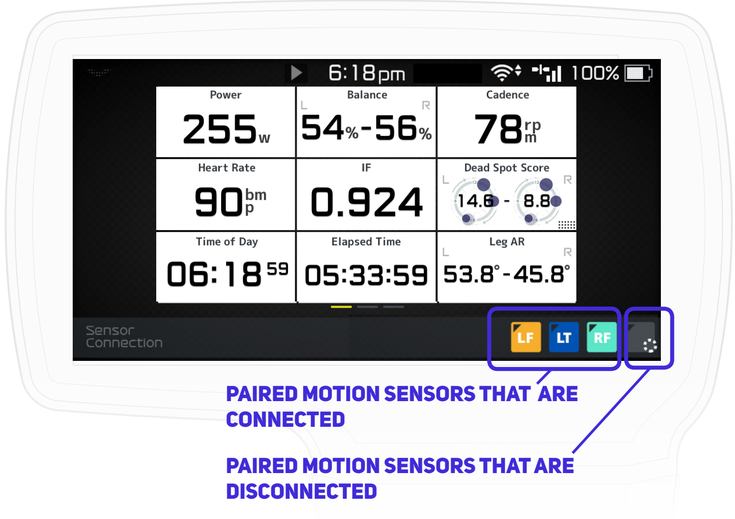
To turn on the motion sensors, insert them into a plugged-in sensor charger, or remove the motion sensors from the charger after they are charged sufficiently. If the motion sensors are inserted into an unplugged charger, they will be turned off.



Anker/LEOMO AC adapter must be used for charging of TYPE-R and LEOMO Motion Sensors

7 CONNECT LEOMO MOTION SENSORS TO TYPE-R

Make sure your motion sensors are connected to your TYPE-R by checking the sensor connection status on the home screen.

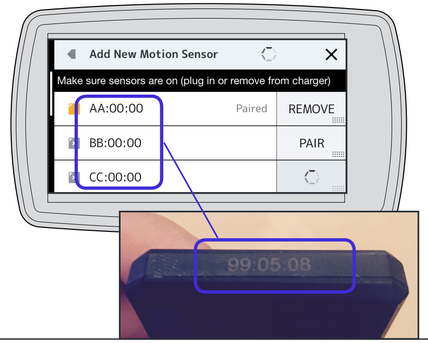


NOTE

- If a motion sensor is not connecting, manually connect it from Quick Menu (swipe down from the top of the screen) > Menu > Motion Sensors > (tap on paired sensor) > Connect.
- If manually connecting a motion sensor doesn't work, restart the sensor by inserting and removing it from the sensor charger.

MANUAL PAIRING

If you do not have 5 motion sensors paired to your TYPE-R, manually pair them from Quick Menu (swipe down from the top of the screen) > Menu > Motion Sensors

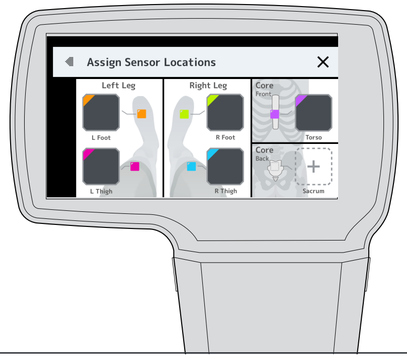


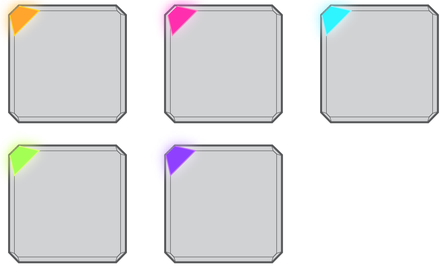
NOTE

- If you have more than 5 LEOMO Motion Sensors in your surroundings, pair to the correct sensor by matching the ID printed on the bottom of the sensor.

8 ASSIGN LEOMO MOTION SENSOR LOCATIONS

Motion sensors need to be assigned to a specific body location. When prompted, set the locations of your motion sensors (you can also manually access the location assignment page from Quick Menu > Menu > Motion Sensors > Assign Sensor Locations).





9 PAIR ANT+ SENSORS (NOT INCLUDED)

Optional: Pair ANT+ sensors from Menu > ANT+ Sensors > Add Sensor

- Power Meters
- Heart Rate Sensors
- Speed Sensors
- Cadence Sensors
- Speed / Cadence Sensors

10 PHYSICAL CONFIGURATIONS

Attach the bike mount to your bike's handebar. Place the L or S battery into port A of the TYPE-R, and lock the battery in place. Lock in the dock charger or port cap into port B of the dock. To place the TYPE-R and dock into the mount, lift up the handle bar, slide the dock in, then lock the handle bar by snapping it down into place.

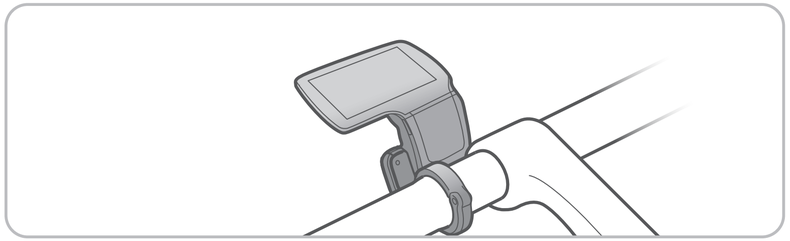
⚠ WARNING

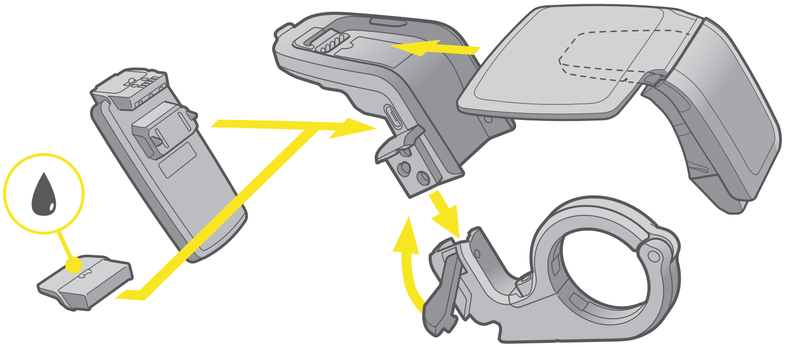
In order to maintain the product's waterproof capabilities, please follow all instructions written in this manual and the LEOMO terms of use listed below. Any damage resulting from user negligence will void the product warranty.

- Do not insert wet batteries.
- Make sure batteries are locked into place while charging or in use.
- Make sure the TYPE-R main unit is locked into the dock while charging or in use.
- Battery and charging components must be completely dry while charging.
- When not using the dock charger, cover the dock's port B with the port cap.

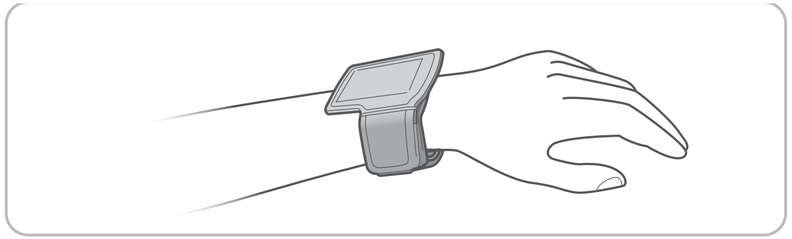
For more information, please go to http://leomo.io/warranty and http://leomo.io/terms

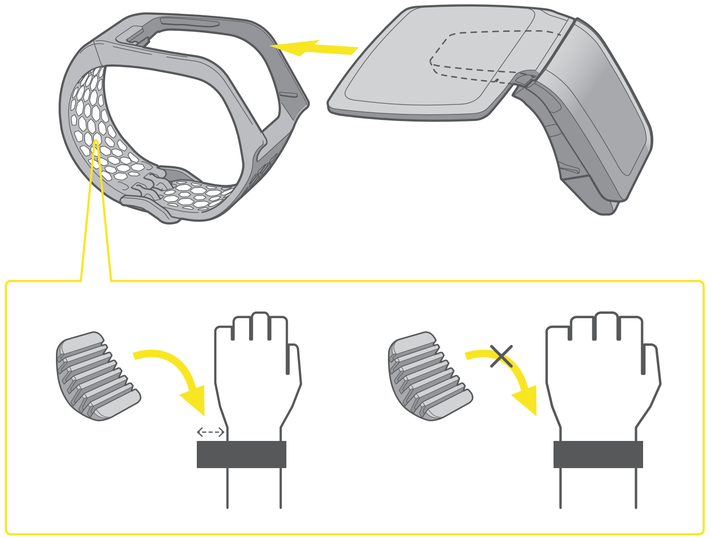
BIKE HANDLE BAR





BAND



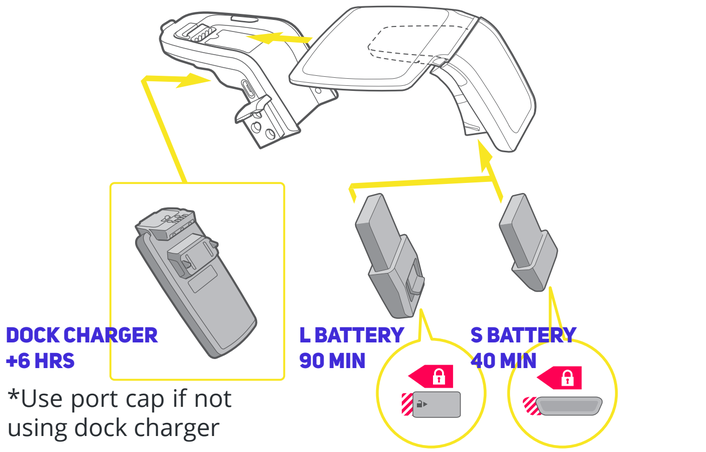


NOTE
The wrist band can also be used to mount the TYPE-R onto your bike, sans dock and dock charger.

RECORDING AN ACTIVITY

1 PREPARE THE TYPE-R

1) INSERT BATTERIES



*Use port cap if not using dock charger

*Lock battery while in use

NOTE ⚠
Leaving the dock charger in the dock without being connected to a power source will slowly drain the dock charger.

2) CONNECT TO SENSORS

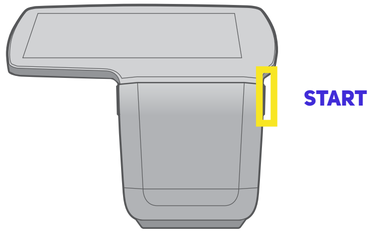
Connect to your LEOMO Motion Sensors and ANT+ sensors.

3) WEAR YOUR MOTION SENSORS

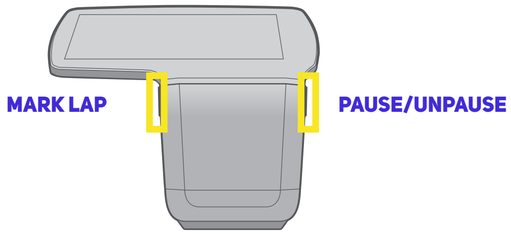
Place motion sensors on assigned locations. Note that sensors placed on non-assigned locations will have incorrect data. (check next page for locations)

2 RECORD ACTIVITY

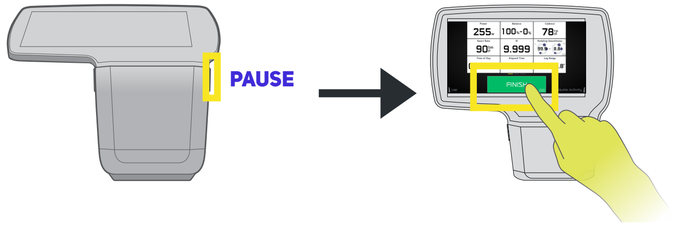
STARTING AN ACTIVITY



DURING AN ACTIVITY

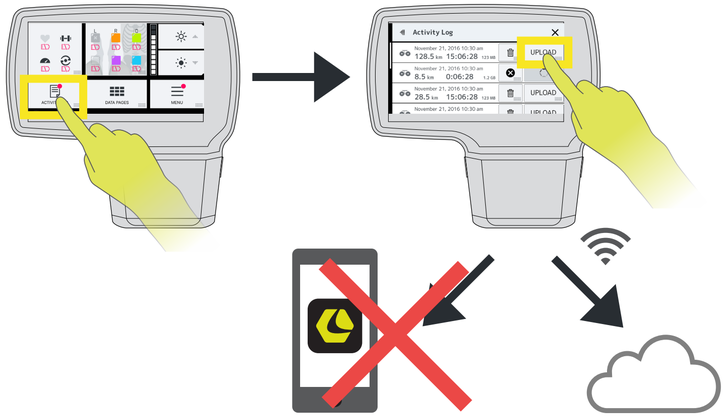


FINISHING AN ACTIVITY



3 UPLOAD ACTIVITY

Upload your activities via Wi-Fi directly from the TYPE-R to the cloud from Quick Menu > Activity Log. Note that the TYPE-R does not upload activities via Bluetooth or USB.



4 ANALYZE DATA ON WEB APP

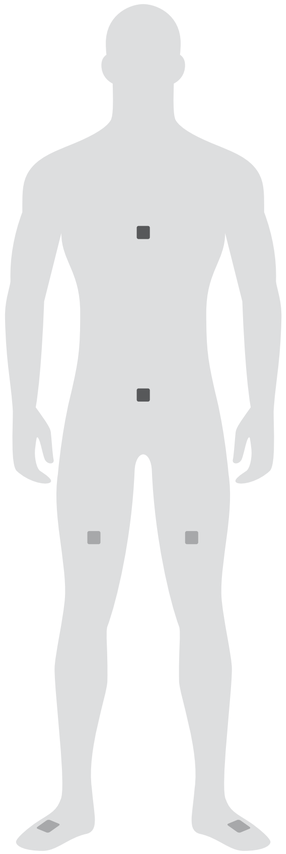
http://app.leomo.io

WEARING YOUR LEOMO MOTION SENSORS

Match your motion sensor's color to the assigned location on your body. For example, if you have assigned the orange sensor as the RT (right thigh) sensor, place the orange sensor on your right thigh.

LEOMO Motion Sensors may be placed in any direction and will automatically adjust to real-world XYZ coordinates.

To check what color is assigned to what location, go to Quick Settings > Motion Sensors > Assign Sensor Locations.



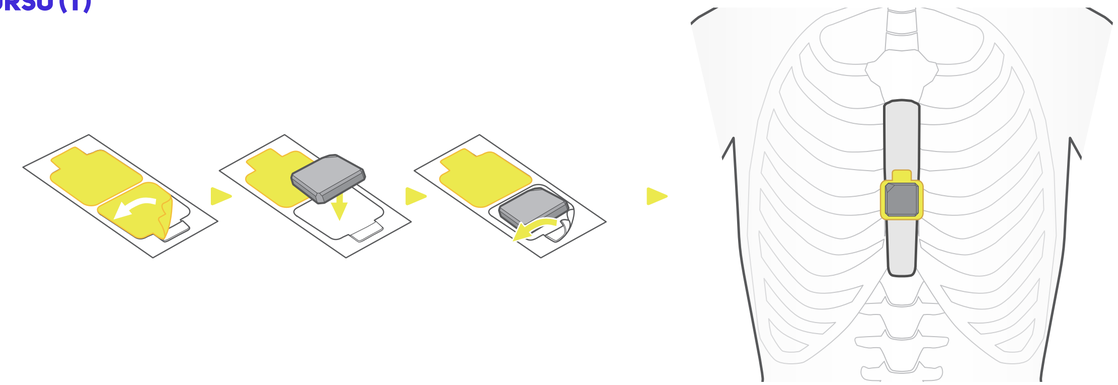
TORSO

SACRUM

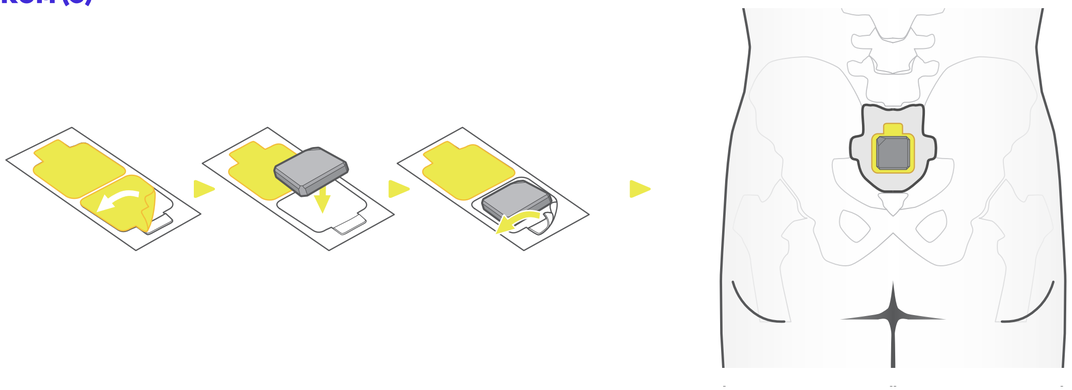
THIGHS

FEET

TORSO (T)



SACRUM (S)



NOTE
- sacrum can be found right above the tailbone.

⚠ WARNING!

Adhesives should always be used with all torso, sacrum, and thigh sensors. Failure to use adhesives could result in serious injury.

Match your motion sensor's color to the assigned location on your body. For example, if you have assigned the orange sensor as the RT (right thigh) sensor, place the orange sensor on your right thigh.

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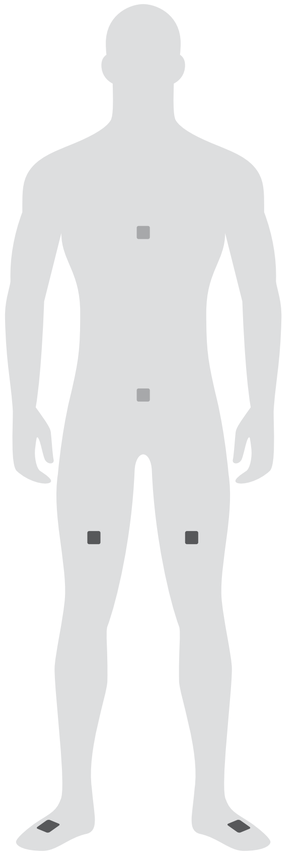


TORSO

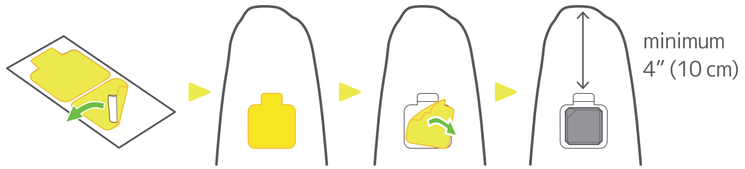
SACRUM

THIGHS

FEET

THIGH (RT AND LT)

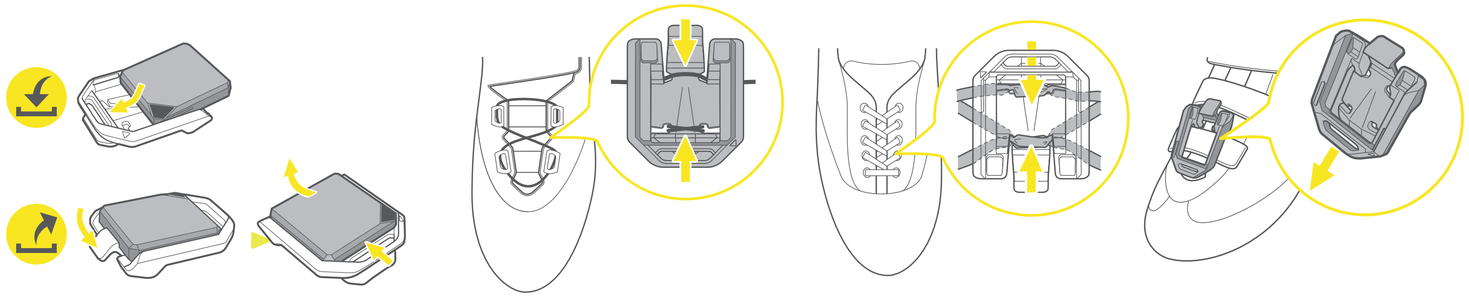
Horizontal offset will not affect readings.



⚠ WARNING!

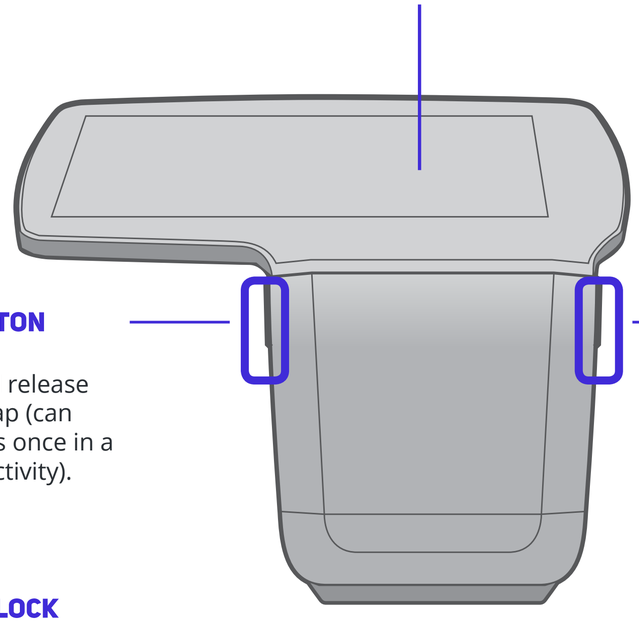
Adhesives should always be used with all torso, sacrum, and thigh sensors. Failure to use adhesives could result in serious injury.

THIGH (RT AND LT)



HARDWARE CONTROLS AND STATUSES

CONTROLS



LAP BUTTON

Press and release to mark lap (can only press once in a paused activity).

SCREEN LOCK

Press and hold for 2 seconds to lock the screen.

Press and hold again for 2 seconds to unlock the screen.

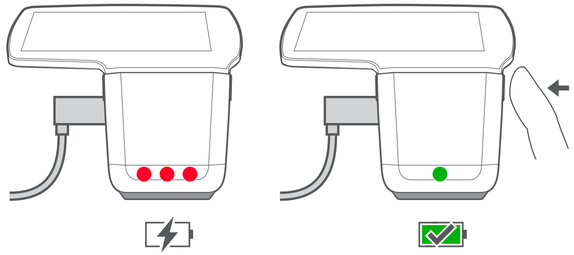
POWER / ACTIVITY BUTTON

Press and hold for 2 seconds to turn on the TYPE-R / Bring up the power menu.

Tap to start/pause/unpause activity.

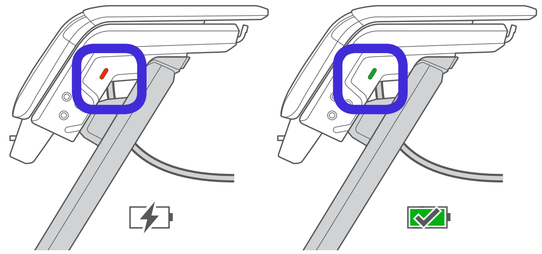
BATTERY STATUS

PORT A BATTERY



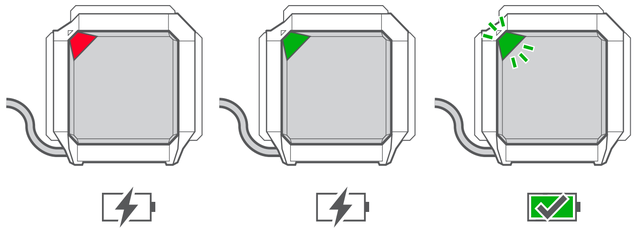
- Port A is located on the bottom of the TYPE-R. The battery inserted in port A will act as the main battery for the TYPE-R.
- Charging: A red LED gauge will illuminate at the base of the unit.
- Finished charging: The LED at the base of the unit will turn off. Pressing the right hardware key will activate a green LED.

PORT B BATTERY



- Port B is located on the back of the dock. The S/L batteries and the dock charger can be charged in port B. When using the device, insert the dock charger or dock cap.
- Charging: A red LED will illuminate next to the power button on the dock.
- Finished charging: A green LED will illuminate next to the power button on the dock.

MOTION SENSORS



- Charging (0-20%): Red LED
- Charging (20% - 100%): Green LED
- Finished Charging: Blinking green LED
- Note: When the motion sensors are connected to the TYPE-R, their assigned location color will take precedent over their charging color.

HOME AND MENU SCREENS

HOME SCREEN

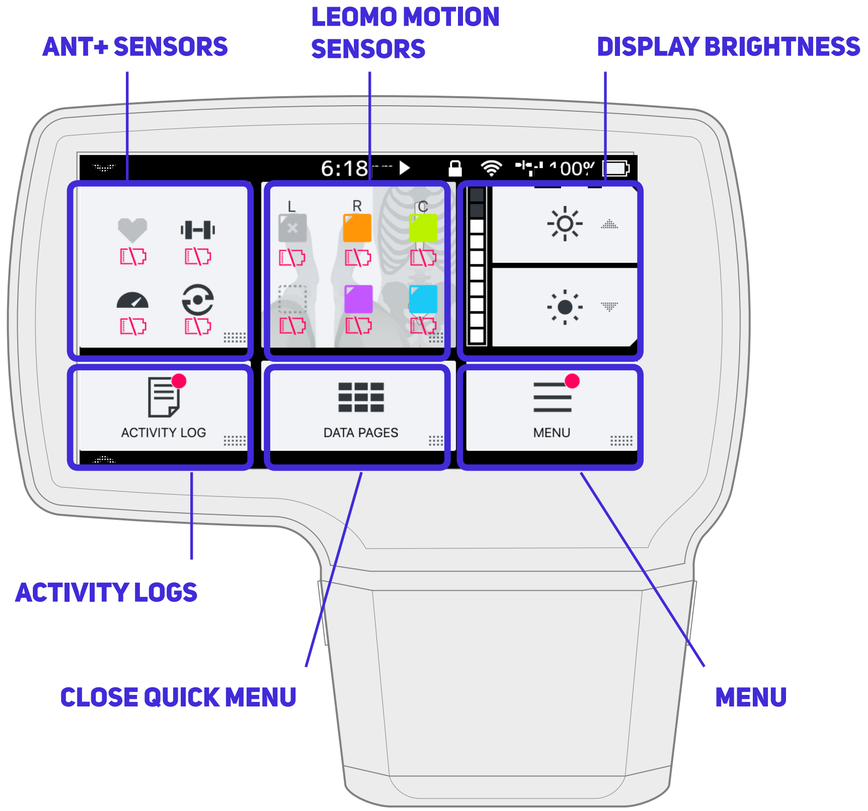
STATUS BAR
Tap or **swipe down** from the top of the screen to access **quick menu**.

DATA PAGES
Data pages can be customized though the **LEOMO Link app**. Swipe left / right to change pages.

PAIRED SENSORS CONNECTION STATUS
Paired LEOMO Motion Sensors and ANT+ sensors (power meters, heart rate sensors, speed sensors, and cadence sensors) will show here. Disconnected sensors will show as a dark grey icon. Connected ANT+ sensors will be white. Connected motion sensors will show assigned color and location:

- LF = Left foot
- RF = Right Foot
- LT = Left Thigh
- RT = Right Thigh
- S = Sacrum
- T = Torso
- Empty = Connected but not assigned (will not record data)

QUICK MENU SCREEN



STATUS BAR

LEOMO

ACTIVITY STATUS

- Activity recording
- Activity paused
- No activity recording

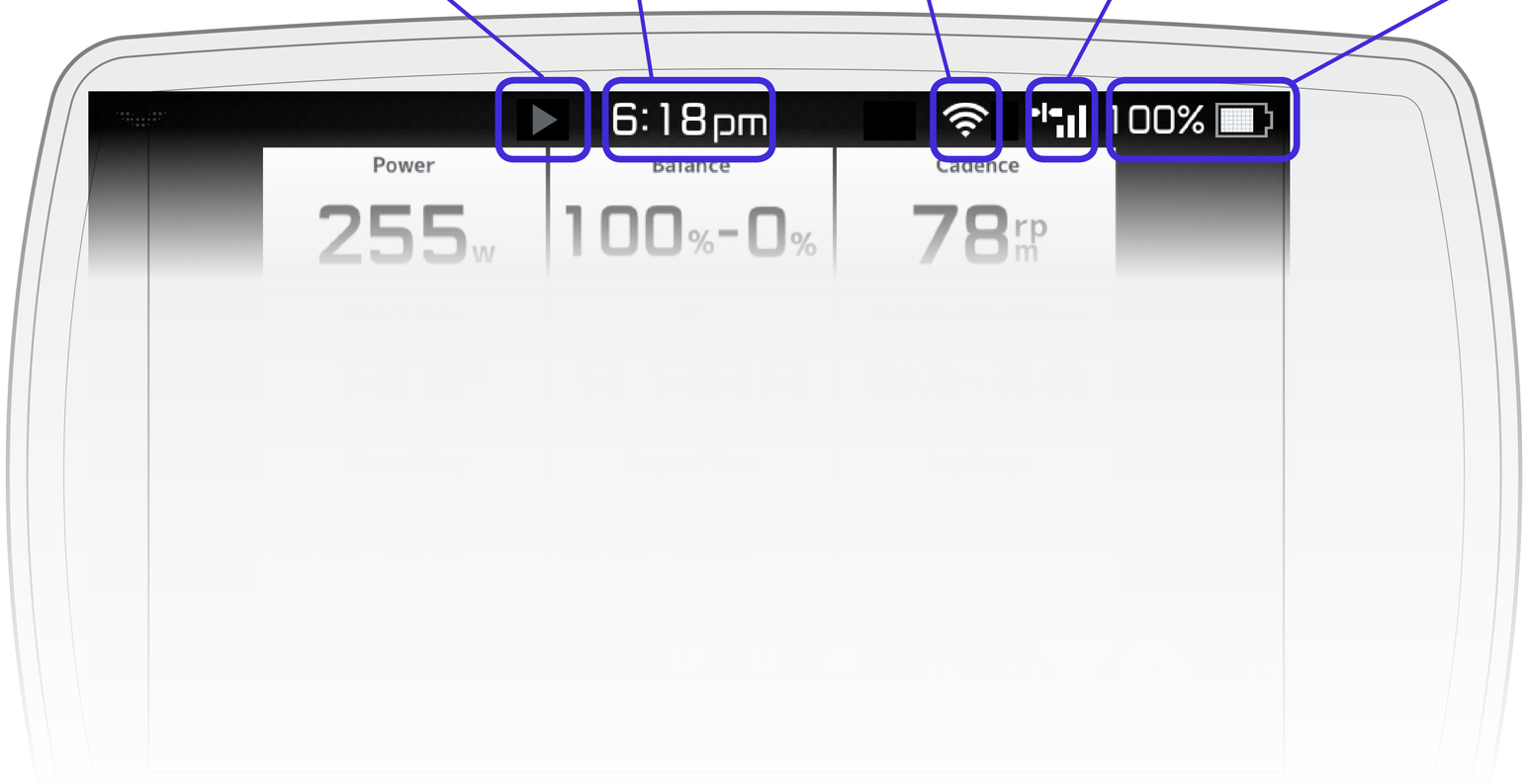
TIME

WI-FI STATUS

Wi-Fi connected (Weak: 1-2 bars)
Wi-Fi connected (Strong: 3-4 bars)
Wi-Fi not connected (no bars)
Wi-Fi searching (animated)

GPS STATUS

GPS connected (Weak: 1 bar)
GPS connected (Strong: 2-3 bars)
GPS not connected (no bars)
GPS searching (animated / blinking)



PORT A BATTERY STATUS

Not charging

- OK (15-100%)
  100%
- Warning (6-14%)
  14%
- LOW (0-5%)
  LOW

Charging

- Finished Charging
  100%
- Charging (6-100%)
  15%
- LOW (0-5%)
  LOW

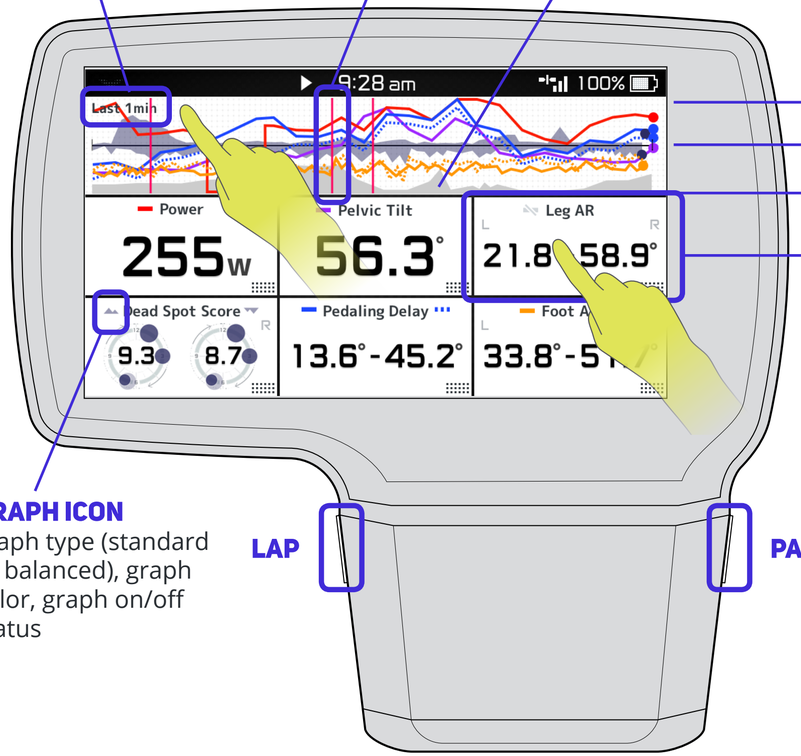
ACTIVITY SCREENS

DATA PAGES

GRAPH RANGE
Tap graph anywhere to change range.

LAP LINE

ELEVATION



MAX POINT (SCALED)

0 FOR "BALANCE" VALUES

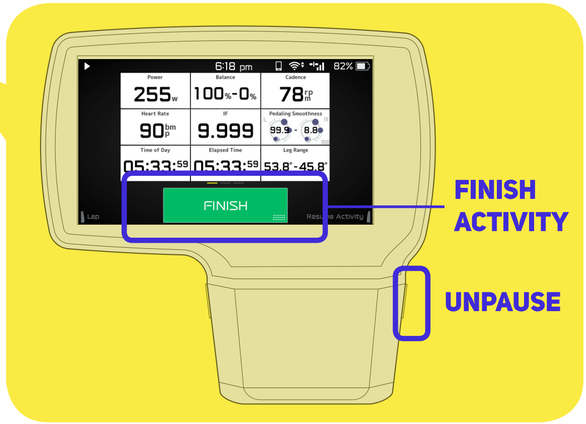
0 / MIN POINT (SCALED)

DATA BOX
Short press - turn graph on/off
Long press - open detailed data page

GRAPH ICON
graph type (standard or balanced), graph color, graph on/off status

LAP

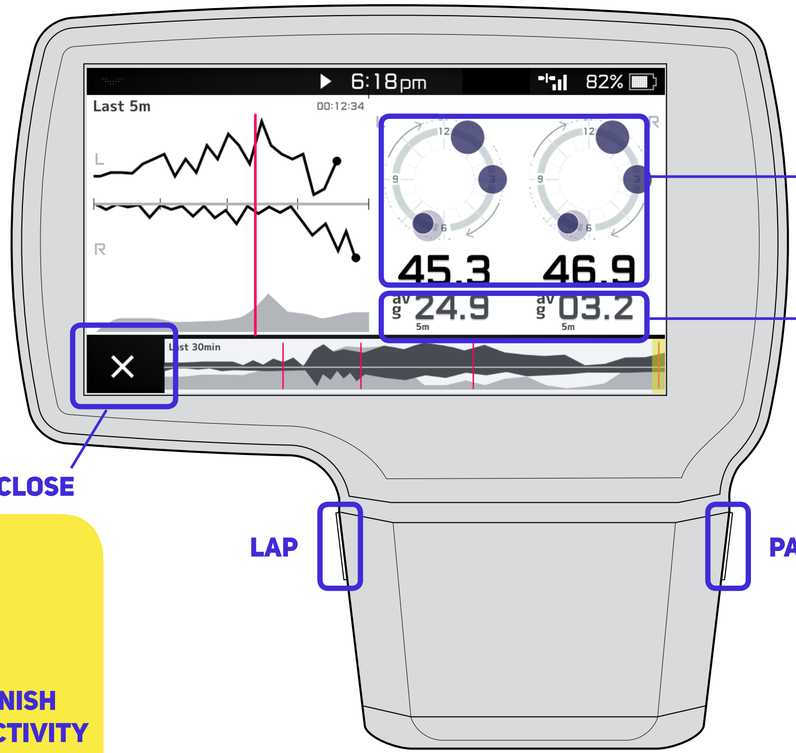
PAUSE



FINISH ACTIVITY

UNPAUSE

DATA DETAIL PAGE (MPIs ONLY)



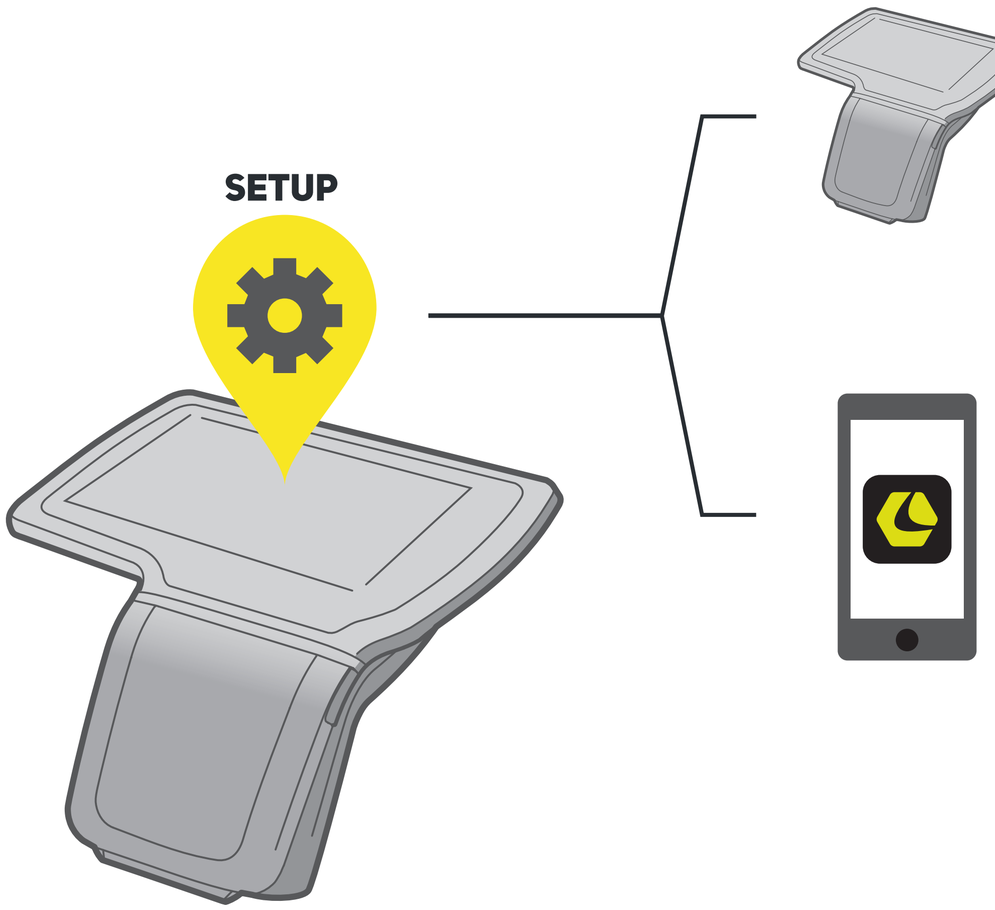
CURRENT VALUE

5 MIN AVERAGE

CLOSE

LAP

PAUSE



CONFIGURE ON THE TYPE-R

- Add, remove, and configure LEOMO Motion Sensors
- Add, remove, and configure ANT+ sensors
- Choose Wi-Fi connection
- GPS on/off

CONFIGURE THROUGH LEOMO LINK APP

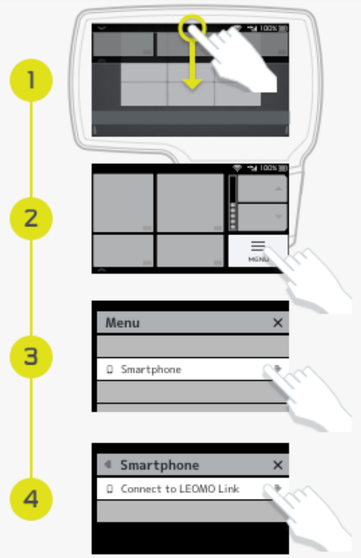
- Add, remove, and configure Wi-Fi networks on the TYPE-R
- Data page layouts
- FTP, Power Zones, etc
- Time, date, and unit formats
- Account Information

To customize your TYPE-R through LEOMO Link, open the LEOMO Link app on your smartphone, then on the TYPE-R, go to Menu > Smartphone > Connect to LEOMO Link.

The TYPE-R and LEOMO Link app should automatically connect. Note that your smartphone and TYPE-R must be linked, not just paired, for them to connect. Once connected, you can edit your TYPE-R's settings through LEOMO Link.

For troubleshooting, please check the link on the end of this manual.

Accessing the "connect to LEOMO Link" screen



HEADER

DASHBOARD

Display summary of athlete's data.

ACTIVITIES LIST

Show list of athlete's activities.

COMPARE

Compare athlete's activities data.

CALENDAR

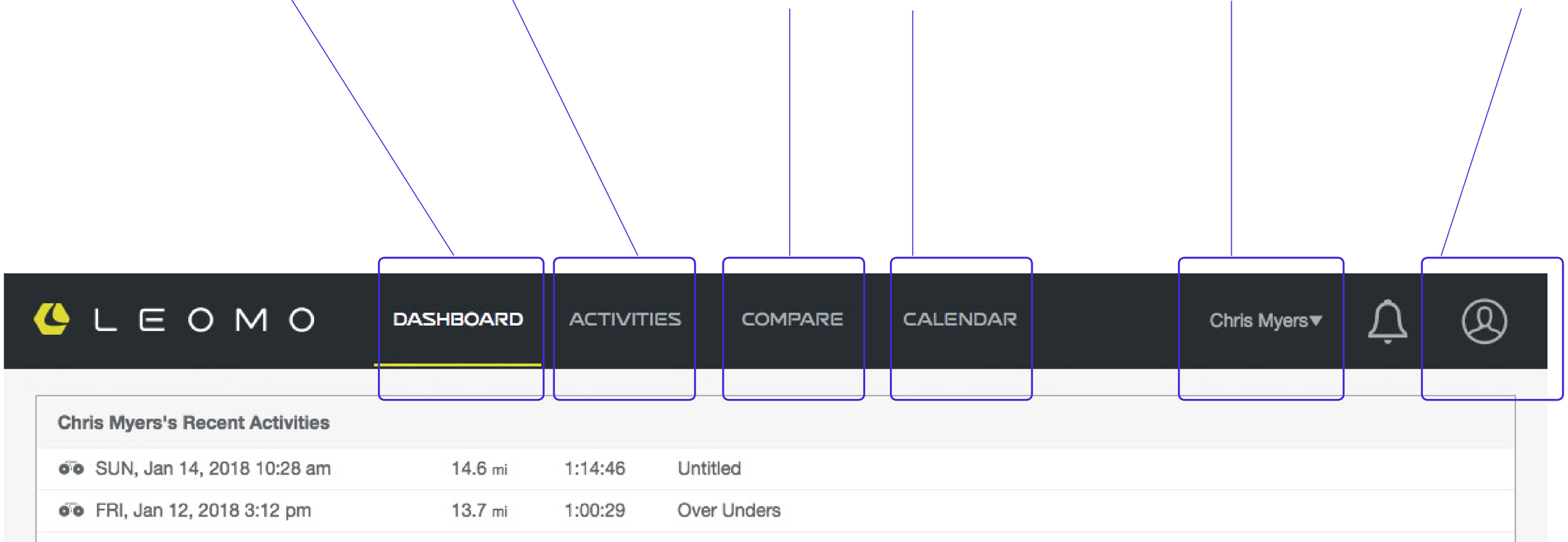
Display Athlete's activities in a calendar format.

ATHLETE

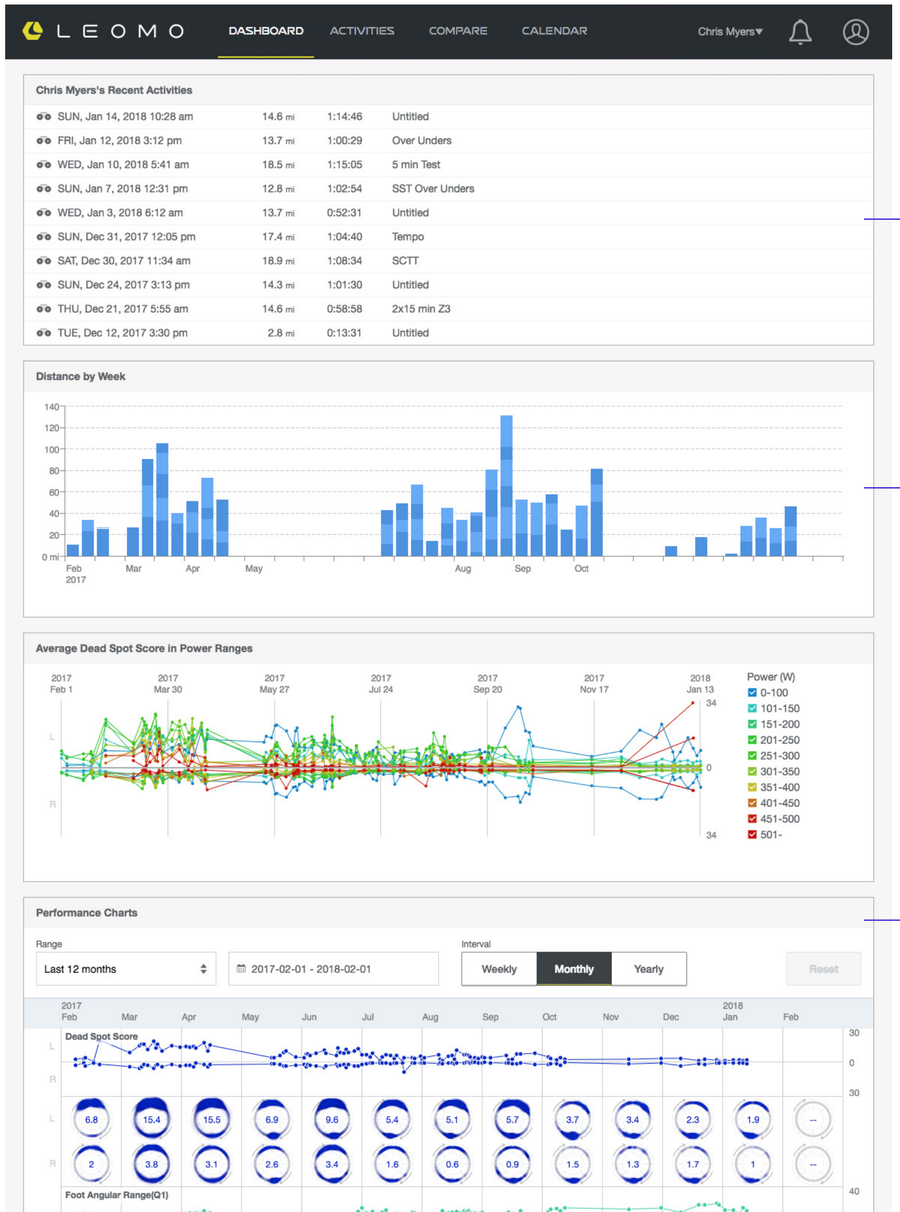
Indicate current athlete. If you are a coach, athletes registered under your name will be accessible here.

ACCOUNT

Bring up your account information.



DASHBOARD



RECENT ACTIVITIES

List of your (and if you're a coach, your athlete's) activities.

DISTANCE TRAVELED

Distance traveled per week for one year.

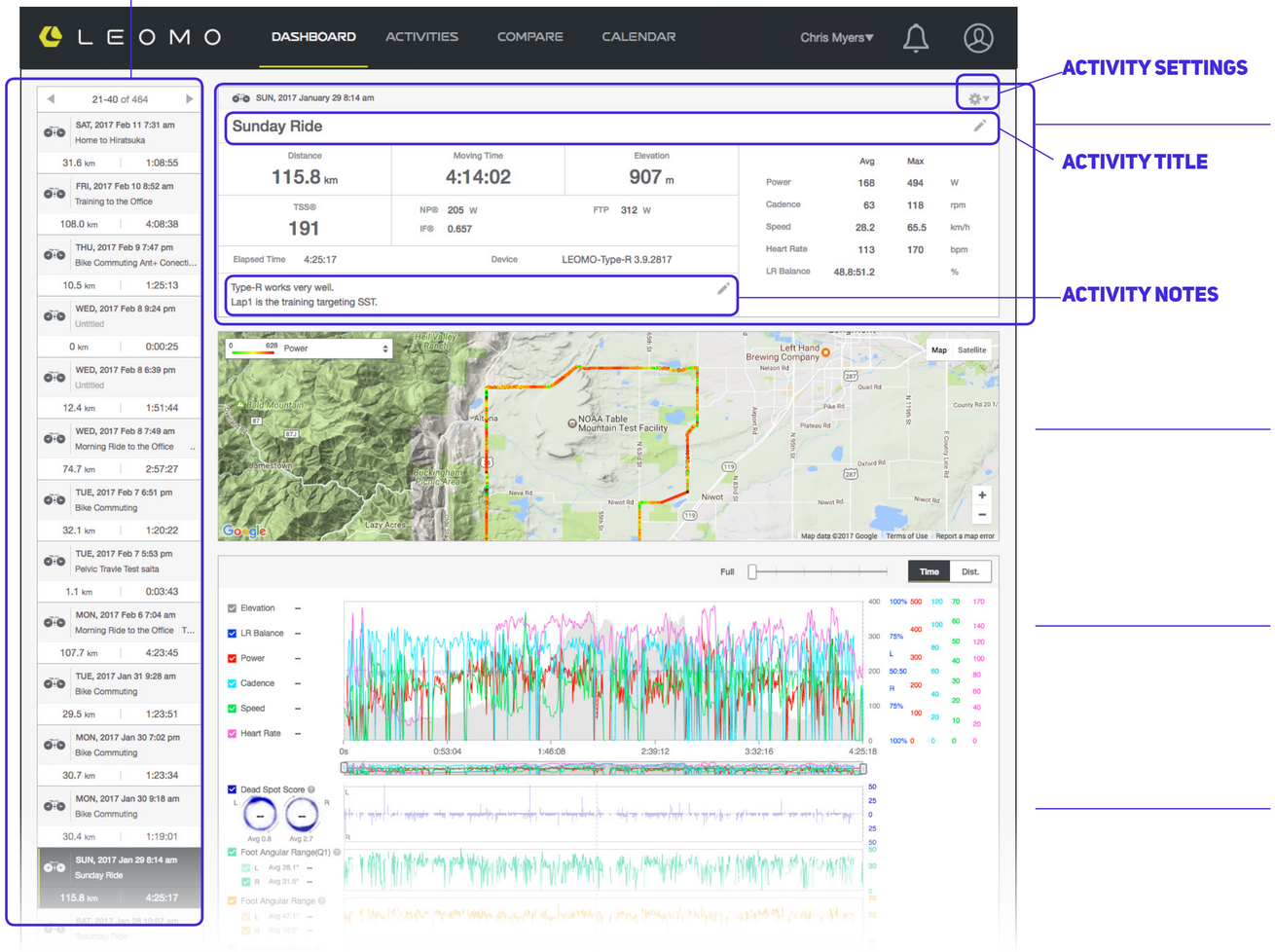
MPIs SUMMARIES

Summaries of all motion data types.

ACTIVITIES

ACTIVITY LIST

List of all activities.



ACTIVITY SETTINGS

ACTIVITY TITLE

ACTIVITY NOTES

ACTIVITY SUMMARY

Summary of this activity.
All owners can edit the “Title” and “notes” section by clicking on it. Make sure to save your notes when done. You can also share / export / delete the actiivity data from **Activity Settings**.

MAP

GPS data of your activity.

ANT+ SENSOR AND GPS GRAPH DATA

Collected data from connected ANT+ sensors and GPS.

SINGLE GRAPH FOR MULITPLE APIs

Single graph for multiple APIs

MOTION SENSOR GRAPH DATA

L and R data collected from connected motion sensors.

PEDAL STROKE INTELLIGENCE (PSI)

Cross analysis of power, cadence, and dead spot score.

PCD MAP

Maps power / cadence combinations that has the most dead spot scores. Higher opacity means more strokes in that combination. Hover your mouse over each cell to show **stroke count with DDS / total stroke count.**

RANGE DETAILS

Details for laps / ranges in the activity.
- Tap on a range to zoom into selected range in the above graphs.
- Select a range in the graphs above and tap “+” on “selected range” to save range.

COMPARE

SEARCH BOX

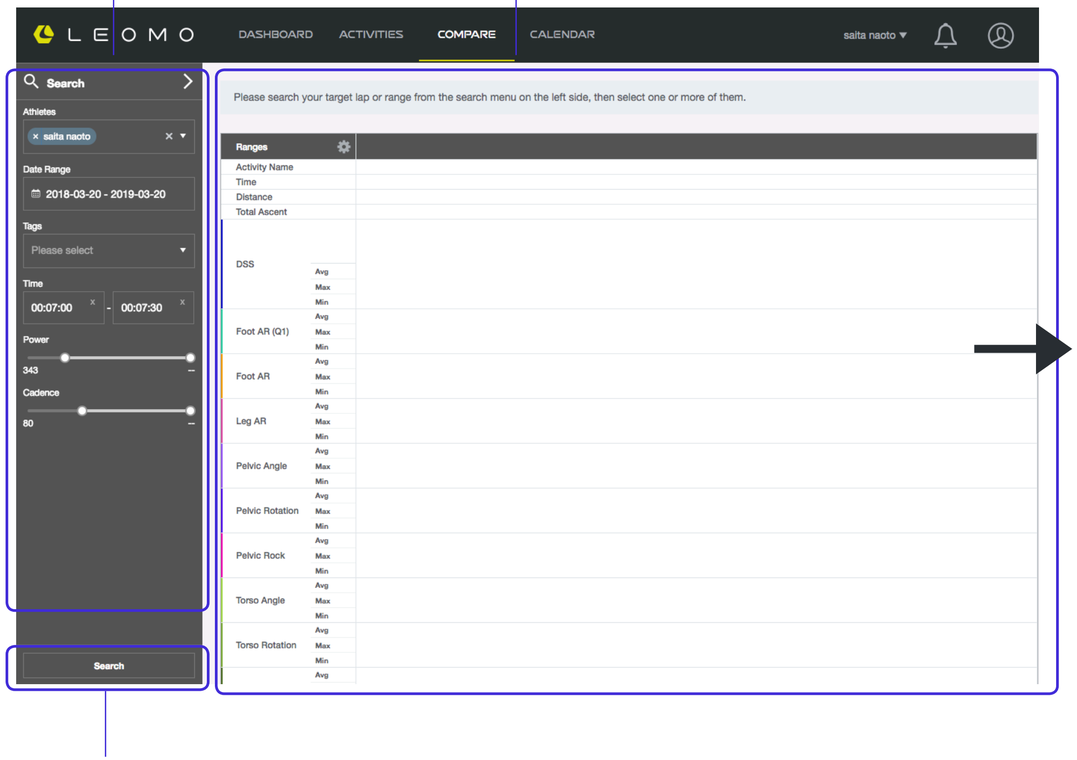
Narrow down the Activity Range.

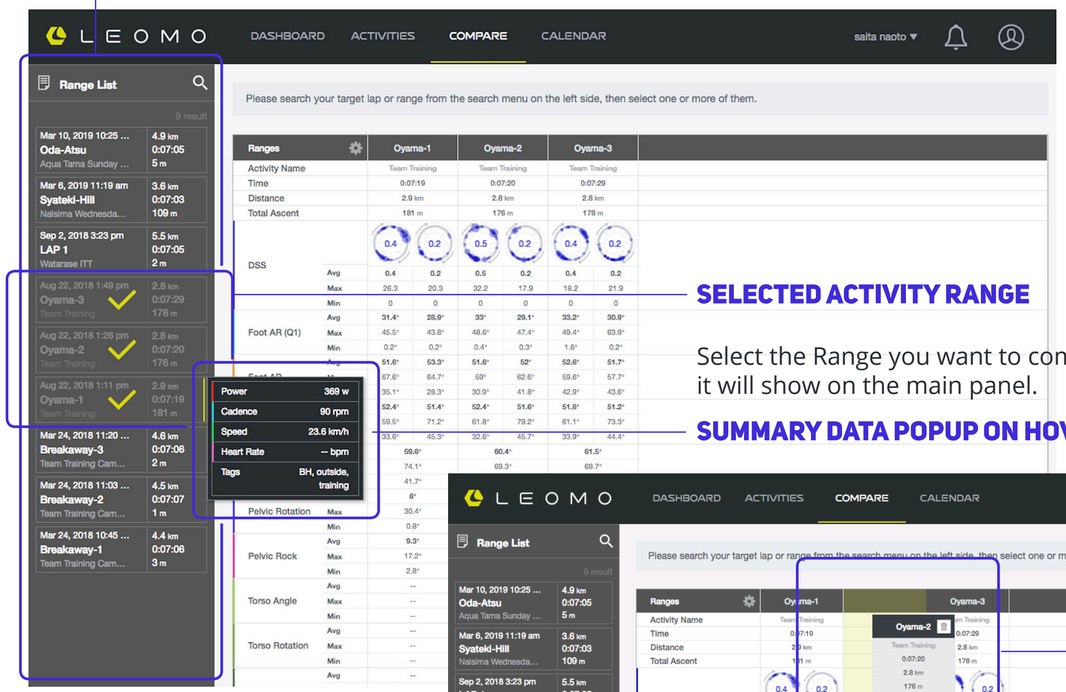
COMPARE AREA

This is where you actually compare data.

RESULT LIST

When the search button is pressed, the result will show here.
Select the Range to compare.

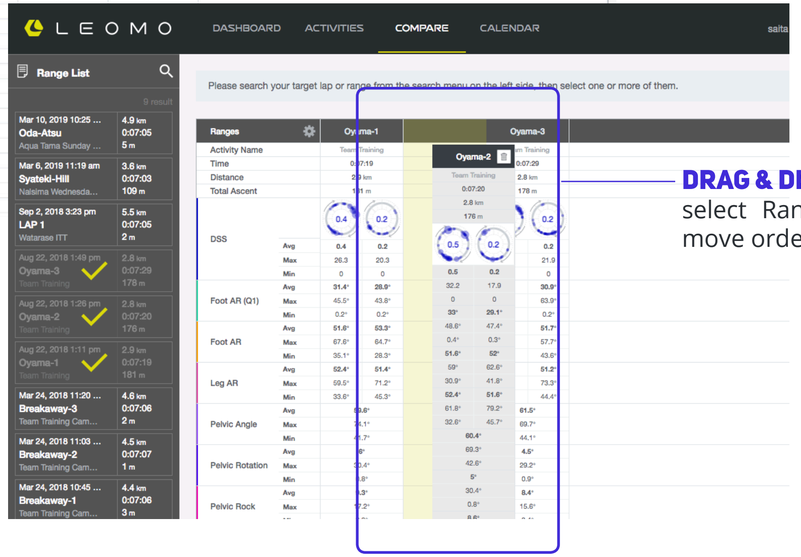




SELECTED ACTIVITY RANGE

Select the Range you want to compare and it will show on the main panel.

SUMMARY DATA POPUP ON HOVER STATE



DRAG & DROP

select Range and move order.

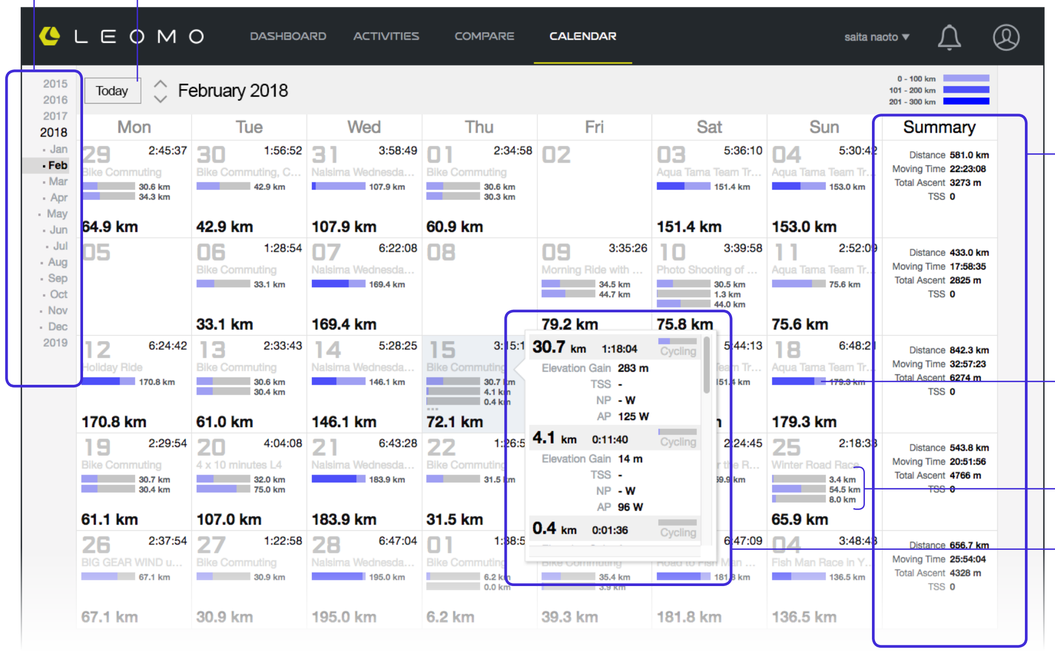
SEARCH BUTTON

Hit it to see result.

CALENDAR

SELECT MONTH/YEAR

A BUTTON THAT DIRECT TO "TODAY"

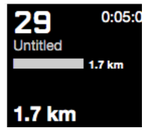


WEEKLY SUMMARY

ACTIVITY DISTANCE BY OVERLAP

DISTANCE BY ACTIVITY

POPUP ON HOVER STATE



CURRENT DAY (TODAY)

Current day which is available to come directly from Today button on top left is shown on black.

Display activity summary of the day at glance.
By clicking each, you can jump to the link and see details.

WHY MOTION?

ENDURANCE. POWER. TECHNIQUE.

When these three core skills come together, riders have the key ingredients to reach their maximum performance potential. Though endurance and power are universally used as the basis for cycling training, technique has been a challenging element to measure. Skills such as pedaling, positioning, breathing, muscle de-tension, cornering, and sprinting are all qualitative cycling elements.

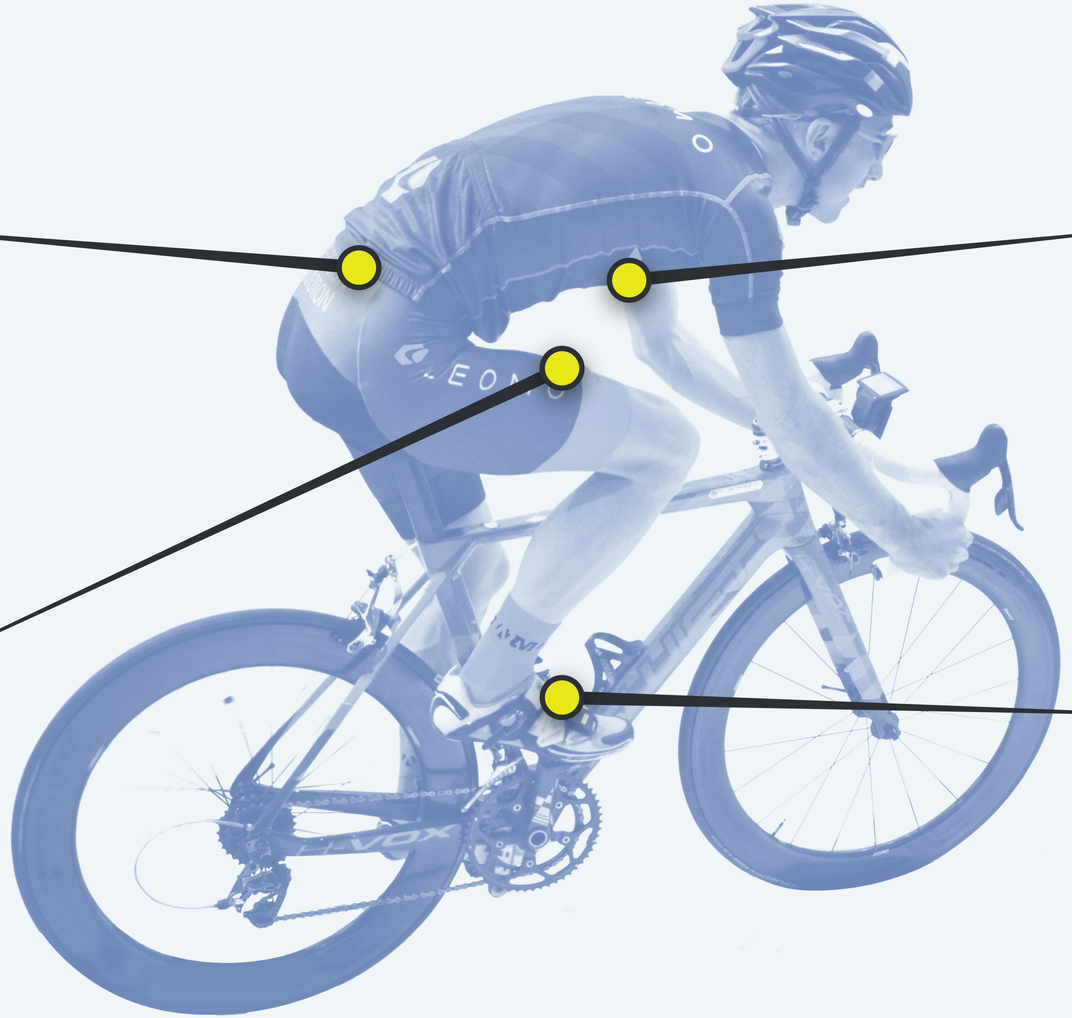
Thankfully, coaches know good pedaling skills and form when they witness it. With the TYPE-R's Motion Performance Indicators, or MPIs, coaches will now have actual values to validate their observations. MPIs give an edge to their assessments by making them more precise, more communicable, and more trackable. MPIs measure various motions related to cycling, and using them, coaches and athletes can:

- Perform a deep analysis of movement versus power, cadence, and fatigue.
- Establish baselines for various physical conditions and situations.
- Discover clues to improving both fitness and technique.

Since everyone's bodies and riding environments are different, each person has their own baseline values, similar to FTP. LEOMO is working with world-class coaches and research centers to continue to improve and expand MPIs to help coaches zero in on the analysis of technique.

MOTION PERFORMANCE INDICATORS

The TYPE-R comes with five LEOMO Motion Sensors and records several types of Motion Performance Indicators (MPIs).



PELVIC

1. PELVIC ANGLE
2. PELVIC ROTATION
3. PELVIC ROCK

TORSO

1. TORSO ANGLE
2. TORSO ROTATION
3. TORSO ROCK

RIGHT & LEFT LEG

1. LEG ANGULAR RANGE

RIGHT & LEFT FOOT

1. DEAD SPOT SCORE
2. FOOT ANGULAR RANGE
3. FOOT ANGULAR RANGE (Q1)

DEAD SPOT SCORE (DSS)

SUMMARY

Dead Spot Scores (DSS) pinpoint the magnitude and locations where **pedaling velocities lack smoothness along the left and right pedaling cycle**.

- Lack of smoothness is a secondary symptom of sub-optimal pedaling motions.

- Looking at the right and left DSS values provides insight to left/right movement imbalances.

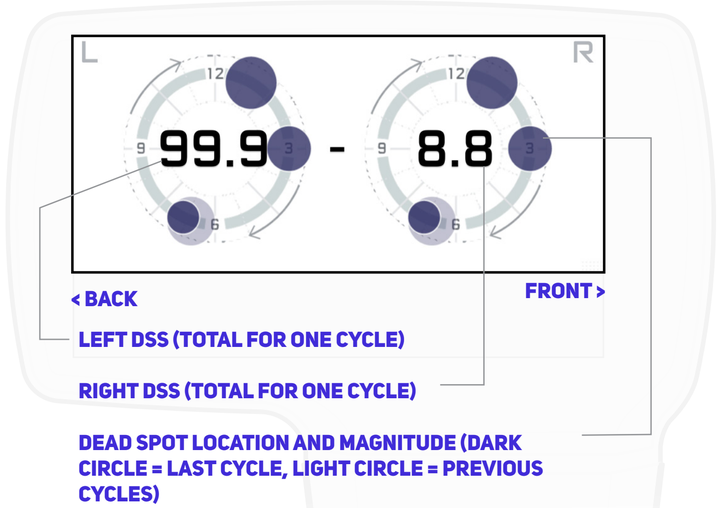
DETAILS

A “dead spot” is where pedaling power is lost when sub-optimally shifting from one movement pattern to another during a pedaling stroke (such as the shift between the power and recovery phase).

Optimal pedaling motions are smooth and apply less stress to the body than sub-optimal pedaling motions. DSS is measured by the foot’s angular velocity, where any deviation from a smooth angular velocity sine curve is considered a dead spot. Each dead spot is represented along the pedaling cycle by a filled circle, and a circle’s size indicates the magnitude of deviation.

Since dead spots are caused by many factors, a trained coach must find the primary cause of a high DSS. One known cause of a high DSS is the overuse of less powerful secondary muscles (such as hamstrings) over larger primary muscles (such as the glutes).

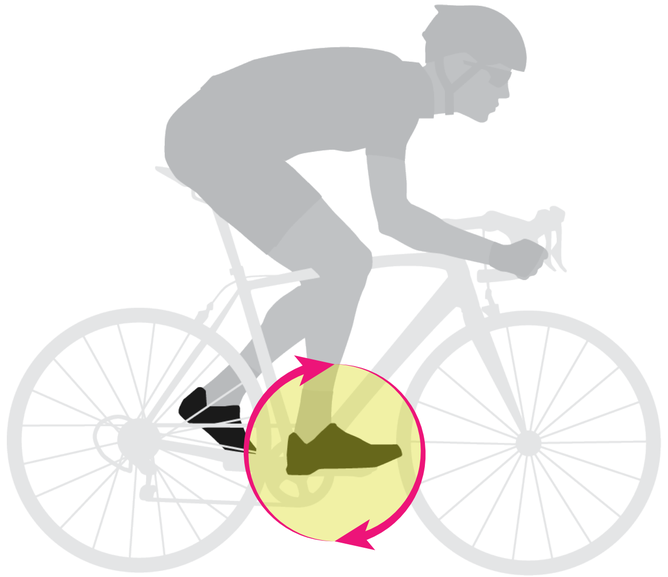
DISPLAY



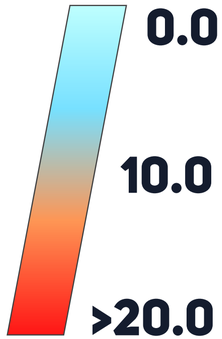
SCORE

The center value shows the **total sum** of magnitudes (measured in degrees/sec) of the dead spots that occurred in a single pedaling cycle. Each dead spot is represented along the pedaling stroke, with the size showing the magnitude of deviation from a smooth angular velocity.

MOTION



RATING



0.0	Optimum pedaling with little to no dead spots
10.0	Unsmooth pedaling
>20.0	Extremely unsmooth pedaling

LEG ANGULAR RANGE (LEG AR)

SUMMARY

Leg Angular Range measures how much the thighs move up and down while pedaling.

- Looking at right and left Leg AR values provides insight to left/right movement imbalances.

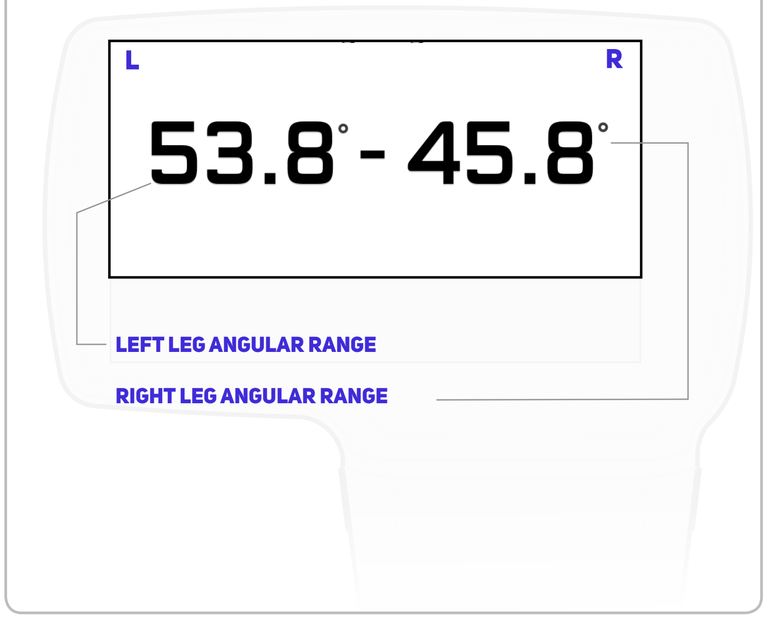
DETAILS

The Leg Angular Range is calculated by subtracting the angle of the thigh at its lowest point from its highest point. An athlete should attempt to maximize their Leg Angular Range without sacrificing a stable pelvic tilt or an aggressive torso angle. Leg Angular Range should not be increased using incorrect form or bad bike fit, such as by hyper-extension of the knee, a low saddle height, increasing the Foot Angular Range, by crank lengthening, etc.

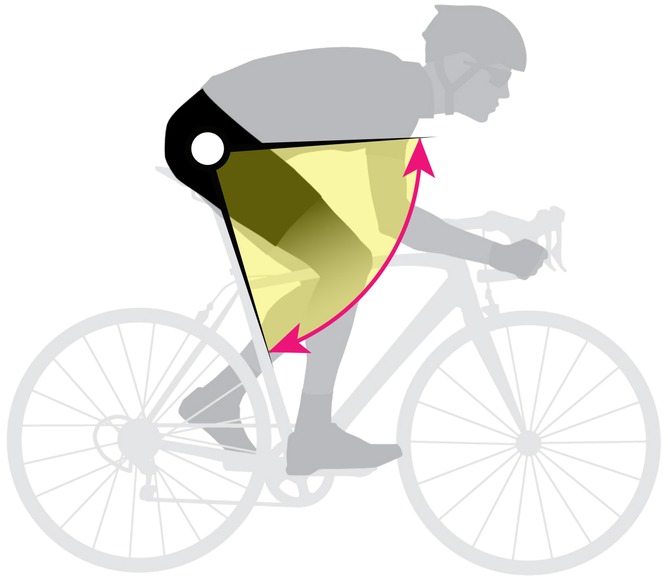
SCORE

The up-to-down angular range of the left and right thighs (with the hip as the vertex) along a pedaling stroke, in degrees.

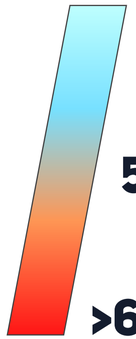
DISPLAY



MOTION



RATING



45.0° Small range

50.0° Normal Range

>60.0° Large range

FOOT ANGULAR RANGE (FOOT AR)

SUMMARY

Foot Angular Range measures how much the heel moves up and down while pedaling.

- Looking at the right and left Foot AR values provides insight to left/right movement imbalances.

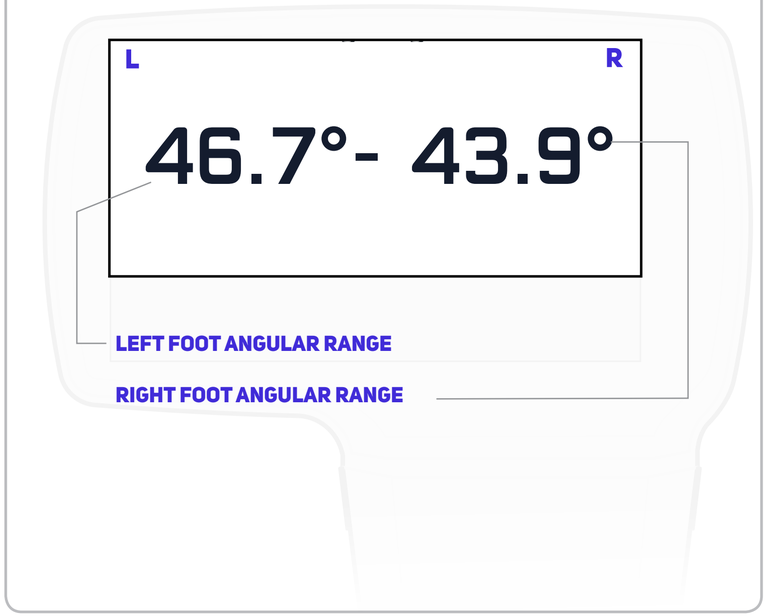
DETAILS

The Foot Angular Range is calculated by subtracting the angle of the foot at its lowest point from its highest point. This score is mainly used for characterizing an athlete's pedaling. The bigger the Foot Angular Range, the higher the heels rise during the 9 - 12 o'clock phase, and the more that ankling occurs between 0 - 6 o'clock.

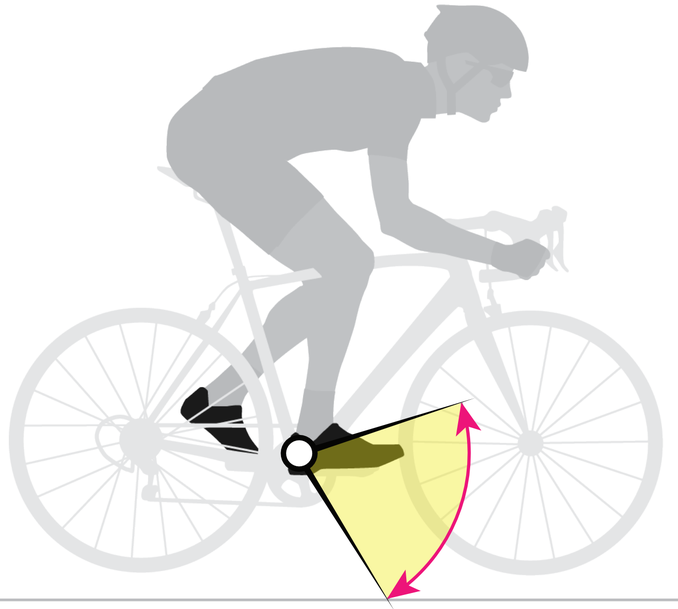
SCORE

The up-to-down angular range of the foot (with the pedal as the vertex) along a pedaling stroke, in degrees. The lower the range, the easier it is for the leg to transfer power to the pedal.

DISPLAY



MOTION



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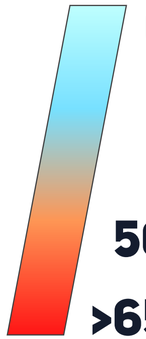


0.0	Static range
50.0	General Range
>65.0	Very dynamic range

FOOT ANGULAR RANGE Q1 (FOOT AR Q1)

SUMMARY

Foot Angular Range (Q1) shows the foot angular range of the first quadrant of the pedaling cycle - 12 o'clock to 3 o'clock position.

- Looking at the right and left Foot AR (Q1) values provides insight to left/right movement imbalances.

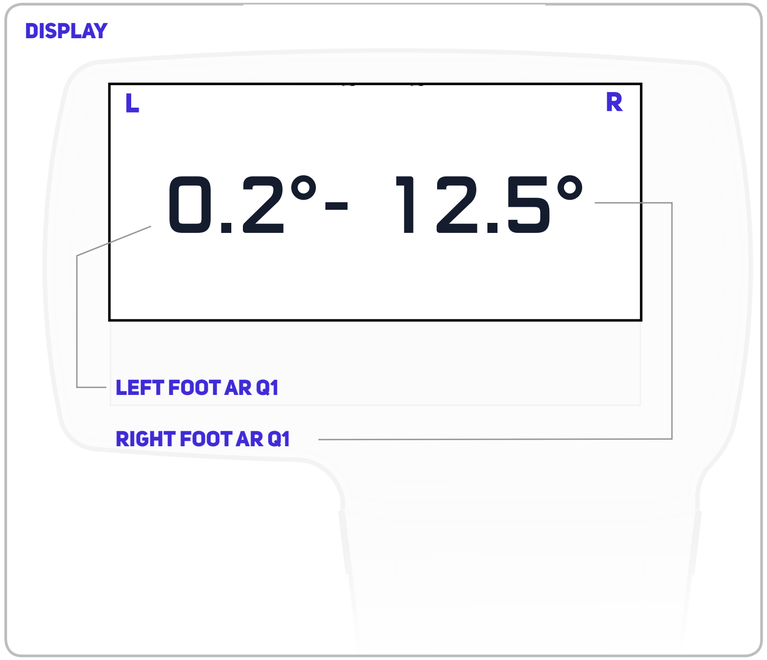
DETAILS

A large FAR Q1 shows that the cyclist pushes down hard after the 12 o'clock position, creating a thrust around the 1 and 2 o'clock positions. By pushing down earlier near the 12 o'clock position, the cyclist minimizes the total angle the foot shifts between the 12 - 3 o'clock position.

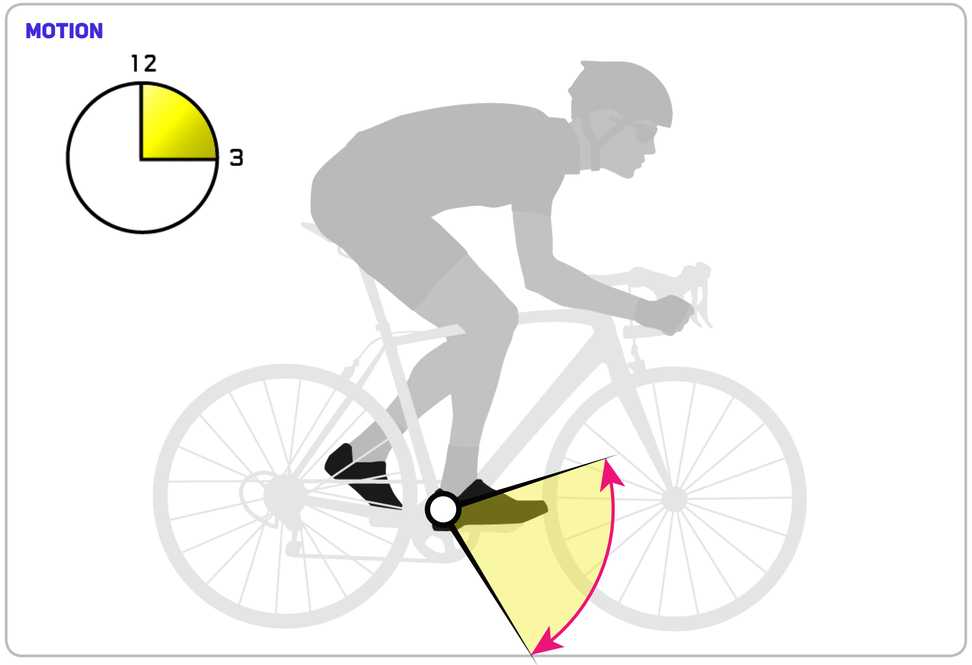
SCORE

Foot Angular Range (Q1) measures the range of angular movement that occurs between the 12 and 3 o'clock position. The higher the range, the longer the delay for the "push down" motion to start for the power phase.

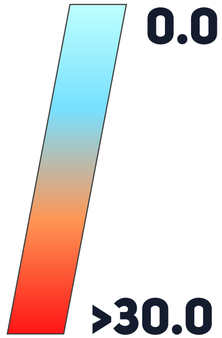
DISPLAY



MOTION



RATING



0.0 Small movement in Q1

>30.0 Large movement in Q1

PELVIC ANGLE

SUMMARY

Pelvic Angle indicates the degree to which the pelvis is tilted upward. The sensor should be fixed with adhesive on the lower back in the area of the sacrum.

DETAILS

Each cyclist has a different neutral pelvic alignment. Finding a natural pelvis position engages the core muscles and reduces lumbar spine strain. Coaches have observed that riders with an upright Pelvic Angle have a higher chance of back injury.

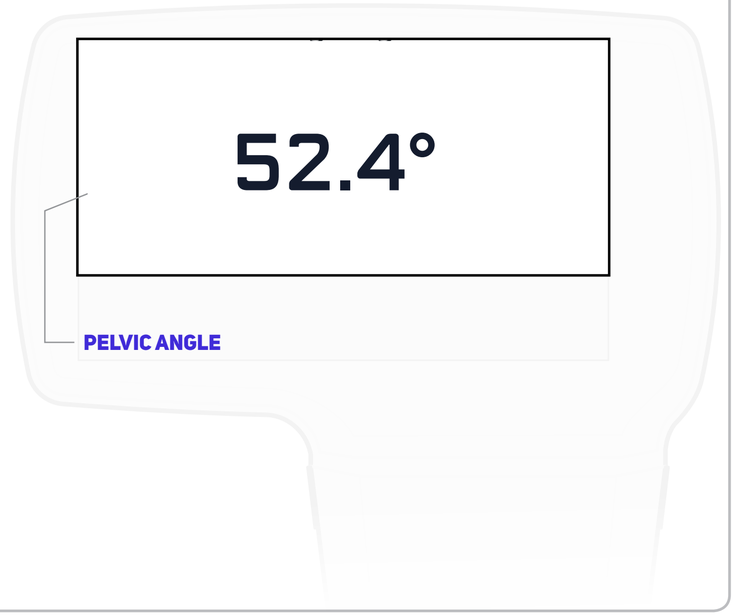
If the pelvis is tilted too far back, lumbar strain can occur, and if the pelvis is tilted too far forward, maximum Leg Angular Range cannot be achieved. Also, posterior rotation of the pelvis reduces power generation capability.

SCORE

The front-to-back (z-axis) angle of the hip relative to gravity. Straight up is 90 degrees, while 0 degrees is parallel to the ground*.

*Assuming that the cyclist is on flat ground.

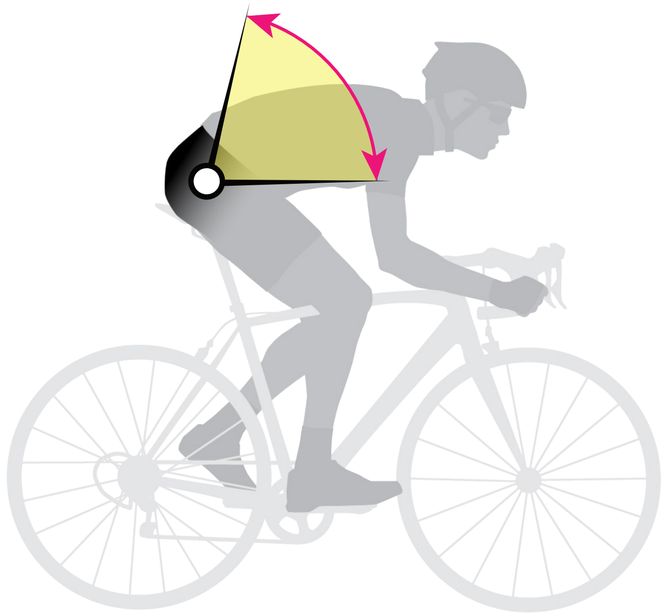
DISPLAY



NOTE

- Climbing, descent, and velodrome riding: remember that the Pelvic Angle score does not represent the angle relative to the bicycle or the ground, but to the direction of gravity. Therefore, care is necessary when verifying the data from banked or graded sections, such as encountered with climbing, descent, and velodrome riding.

MOTION



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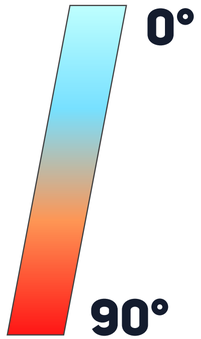


Parallel to ground*

*Assuming that the cyclist is on flat ground.

Upright

PELVIC ROCK

SUMMARY

Pelvic Rock measures the average up-down angular movement of the pelvis.

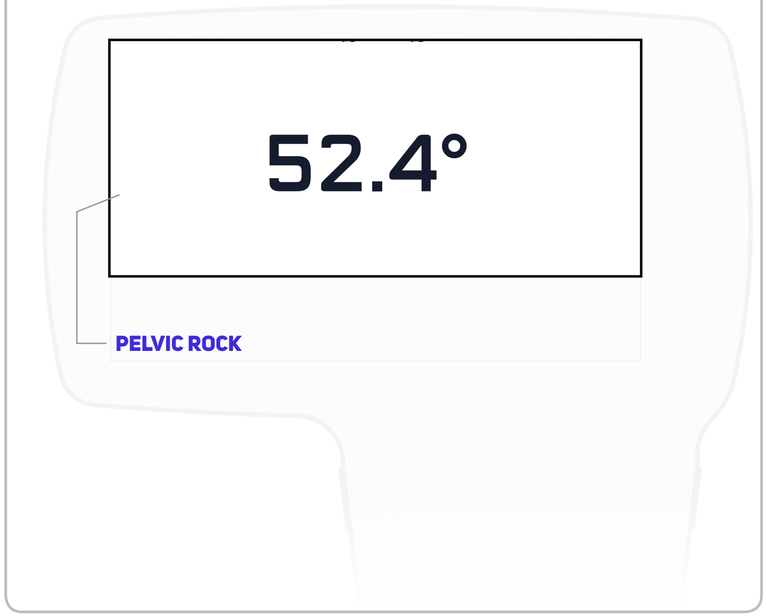
DETAILS

In more detail, Pelvic Rock represents the average angular rotational range along the pelvis' local sagittal axis (the axis that intersects the pelvis from front to back). When sitting up on flat ground, this front-to-back axis is parallel to the ground; when in riding position, this axis will tilt toward the base of the front wheel.

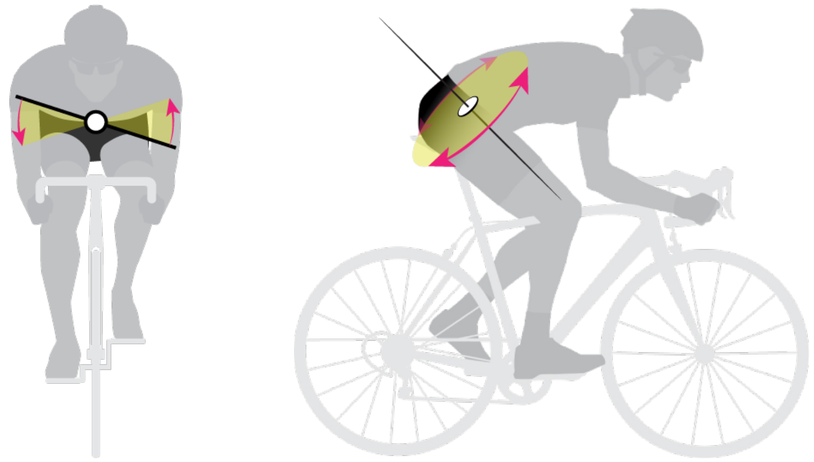
SCORE

Each clockwise and counterclockwise rotation occurring within each second is recorded, and then averaged. This motion is commonly known as "rocking on the saddle."

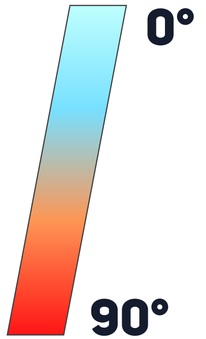
DISPLAY



MOTION



RATING



PELVIC ROTATION

SUMMARY

Pelvic Rotation measures the average angular rotational range of the pelvis.

DETAILS

Pelvic Rotation is the average angular rotational range of the pelvis, measured at the sacrum once per second. This measurement is dependent on the sacrum's local vertical axis, which will be perpendicular to the ground when sitting up, and may tilt toward the handlebars when in riding position.

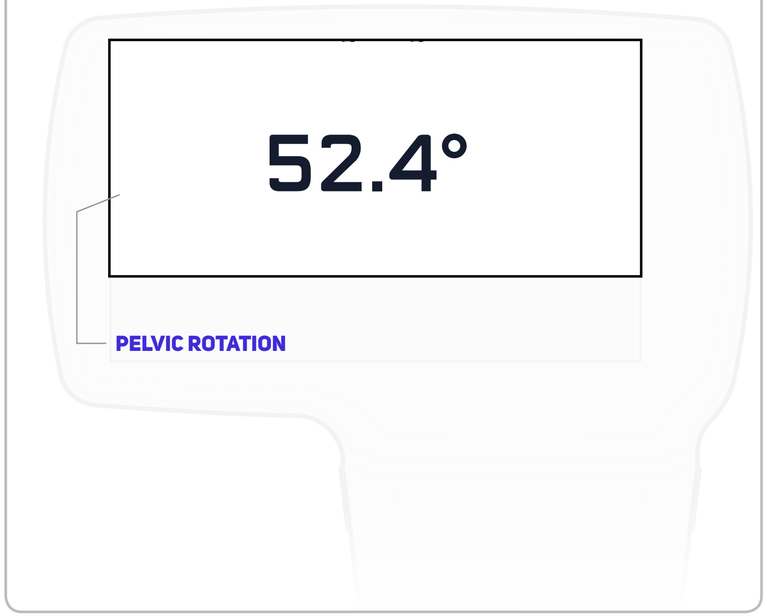
This motion can also be described as the anterior to posterior rotation of the pelvis along the transverse plane.

A larger Pelvic Rotation value indicates greater average rotation of the pelvis, and a lower value indicates more limited average rotation.

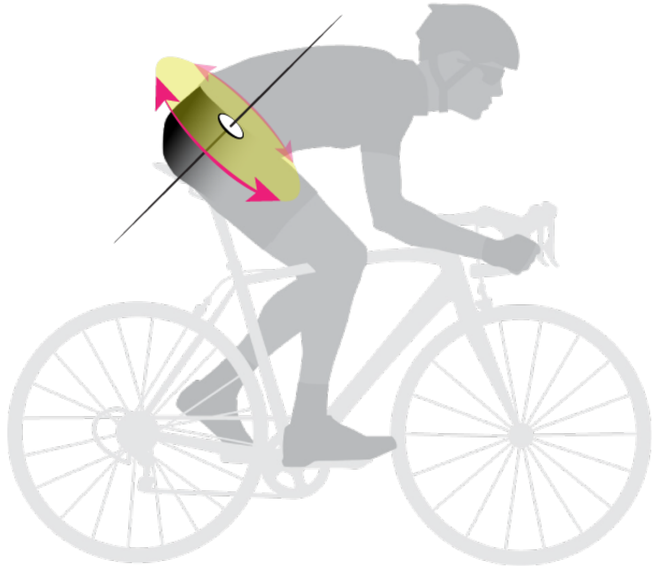
SCORE

Each clockwise and counterclockwise rotation occurring within each second is recorded and then averaged.

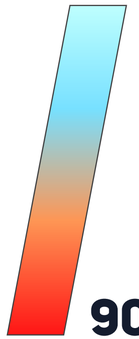
DISPLAY



MOTION



RATING



TORSO ANGLE

SUMMARY

Torso Angle indicates in degrees how much the chest (i.e. torso) is tilted upward relative to gravity. The sensor should be affixed along the sternum with an adhesive.

DETAILS

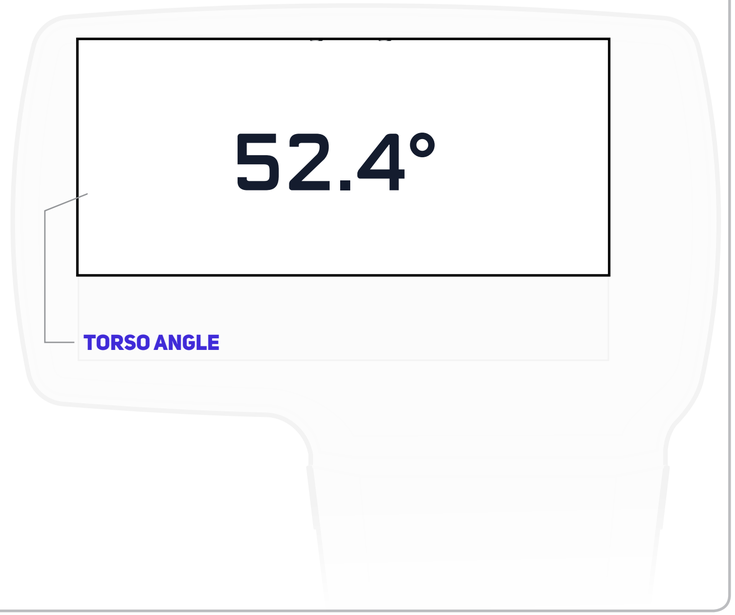
Torso Angle indicates the angle of the sternum relative to gravity. Generally speaking, Torso Angle decreases when riding in an aero position (upper body angled toward the ground), and increases when riding in a more upright position.

Intentional form change is not the only factor that affects Torso Angle; slight changes due to the influences of power, fatigue, and other factors also affect Torso Angle. For instance, when doing two-minute intervals, Torso Angle is likely to change since it will be difficult to keep a stable chest position as fatigue sets in.

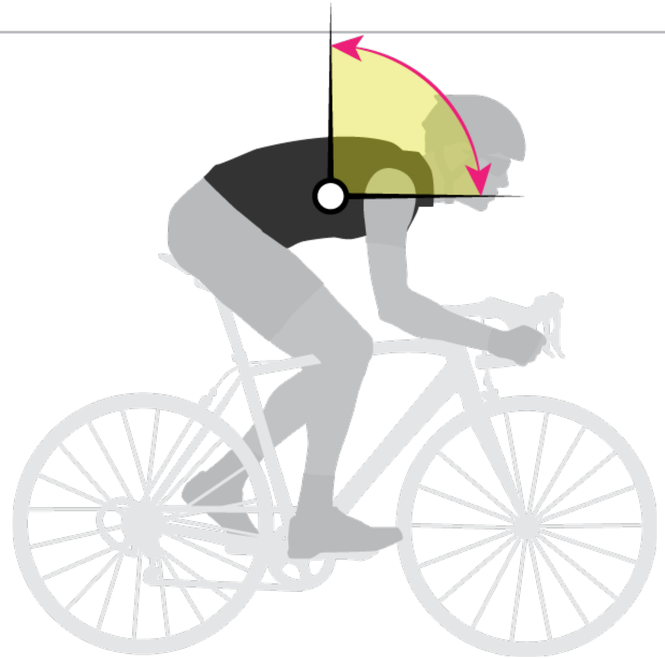
SCORE

The Torso Angle indicates the angle of the chest relative to gravity; sitting with the chest perpendicular to gravity will yield a 90° value, and a 0° value indicates that the chest is parallel to gravity.

DISPLAY



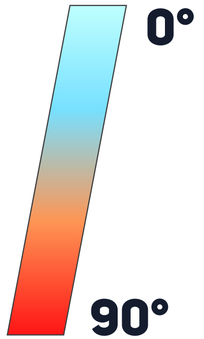
MOTION



NOTE

- Climbing, descent, and velodrome riding: remember that the Torso Angle score does not represent the angle relative to the bicycle or the ground, but to the direction of gravity. Therefore, care is necessary when verifying the data from banked or graded sections, such as encountered with climbing, descent, and velodrome riding.

RATING



0° **Parallel to gravity**

90° **Upright, perpendicular to gravity**

TORSO ROCK

SUMMARY

Torso Rock measures the average angular rotational range of the chest to the left and right.

DETAILS

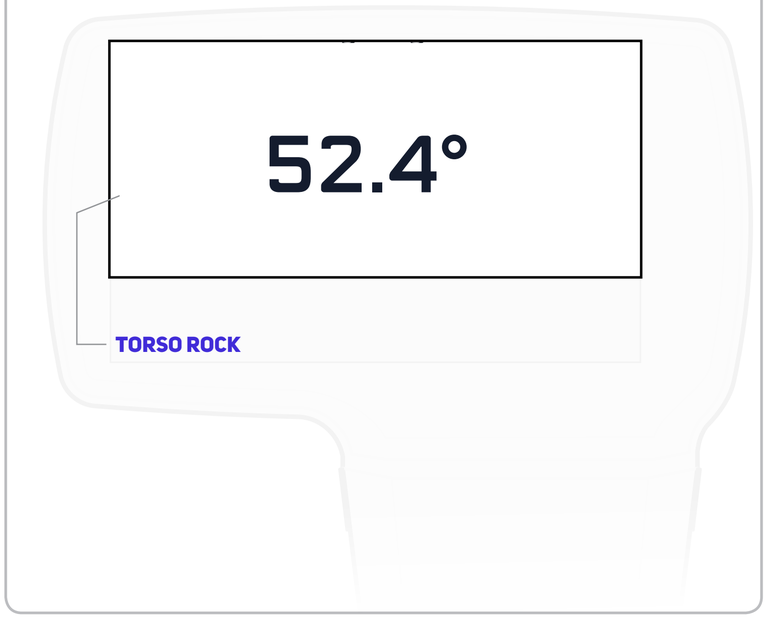
In more detail, Torso Rock represents the average angular rotational range of the torso, measured at the sternum once per second along the local sagittal axis (the sagittal axis intersects the lower back and the abdomen area above the pelvis).

A larger Torso Rock value indicates higher average torso rotation and a lower value indicates more limited rotation. Although torso movement from side to side can generally be called “rocking,” it is important to note that the amount of rocking observed is dependent on both torso rock and pelvic rock.

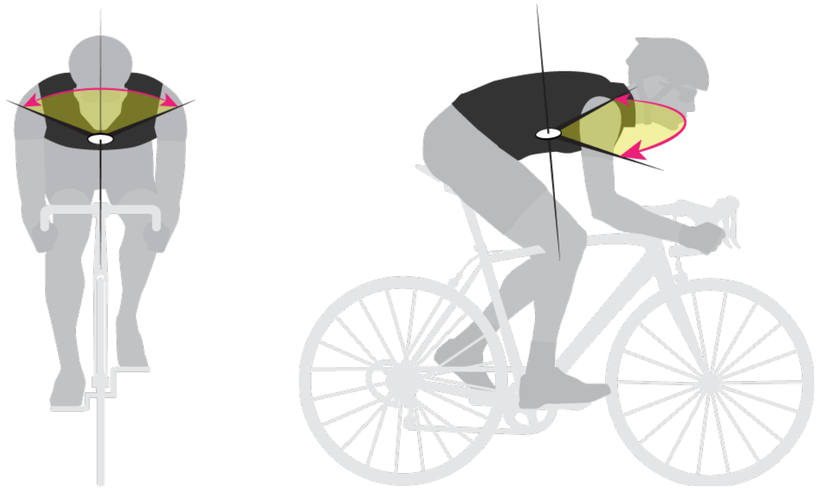
SCORE

Each clockwise and counterclockwise rotation occurring within a second is recorded and averaged, resulting in an angular score.

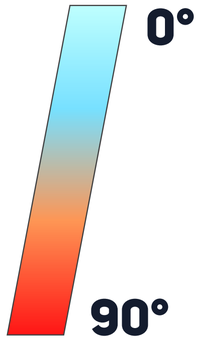
DISPLAY



MOTION



RATING



TORSO ROTATION

SUMMARY

Torso Rotation measures the average angular rotational range of the chest.

DETAILS

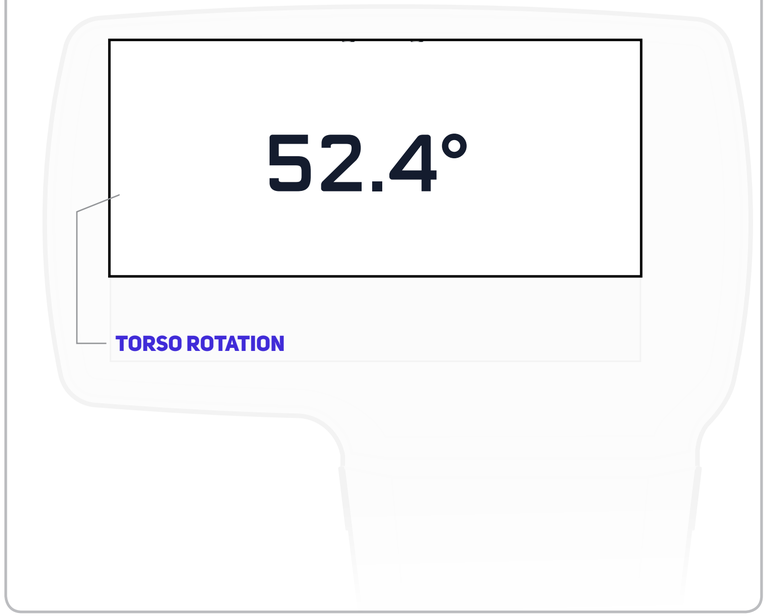
Torso Rotation is the average angular rotational range of the chest, measured at the sternum once per second. This measurement is dependent on the torso's rotational axis, which closely parallels the spine: when sitting up, the spine/rotational axis will be vertical (perpendicular to the ground), and when in riding position, the spine/rotational axis will tilt toward the handlebars.

A larger Torso Rotation value indicates greater average rotation of the torso, and a lower value indicates more limited average rotation. Although this motion might be thought of as being similar to twisting of the torso, it is important to note that the amount of "twisting" is dependent on actual torso rotation and pelvic rotation at the time of measurement.

SCORE

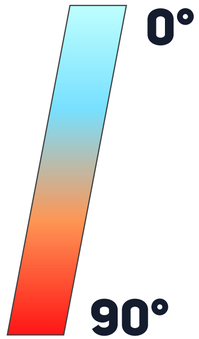
Score Each clockwise and counterclockwise rotation occurring within a second is recorded and averaged, resulting in an angular score.

DISPLAY



MOTION

RATING



LEOMO

TYPE-R

USAGE ALERTS

- 8GB Memory (6GB user available space for about 30 hrs ride)
- TYPE-R will not charge in less than 0 C / 32 F weather

SIZE

- W 3.5” x H 3.3” x D 1.7”

WEIGHT

- 84 g (w/ S Battery)
- 90 g (w/ L Battery)
- with Dock (w/ Dock Cap): + 32 g
- with Dock & Dock Charger: + 85 g

IPX RATING

- IPX 5

WIRELESS

- ANT+
- Bluetooth (For supplied LEOMO Motion Sensors only), Bluetooth Low Energy (For connection with smartphone)
- Wi-Fi (802.11 b/g/n (2.4GHz), For data connection)

BATTERIES

- Replaceable Li-ion Polymer Rechargeable Battery
- L: 615mAh, S: 375mAh, Dock Charger : 2030mAh
- Lasts up to 9 hrs 40 mins

MEMORY

- 8GB Memory (6GB user available space for about 30 hrs ride)

LEOMO MOTION SENSOR

SIZE

- W 1.5” x H 1.5” x D 0.3”

WEIGHT

- 12 g

IPX RATING

- IPX 7

BATTERIES

- Built-in Li-ion Polymer Rechargeable Battery
- Lasts up to 7 hrs 50 mins

LIMITATION OF LIABILITY

THE TYPE-R PRODUCT AND ALL ACCESSORIES ARE PROVIDED ON AN ‘AS IS’ BASIS WITHOUT ANY WARRANTIES OF ANY KIND. LEOMO DISCLAIMS ALL WARRANTIES, INCLUDING WITHOUT LIMITATION, THE WARRANTY OF MERCHANTABILITY, NON-INFRINGEMENT OF PROPRIETARY OR THIRD PARTY RIGHTS, AND THE WARRANTY OF FITNESS FOR PARTICULAR PURPOSE.

TYPE-R (LEM-TYPER)
FCC

Federal Communication Commission Interference Statement

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

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 of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that
- to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:
This device meets the government's requirements for exposure to radio waves.
This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.
The exposure standard for wireless device employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg. *Tests for SAR are conducted using standard operating positions accepted by the FCC with the device transmitting at its highest certified power level in all tested frequency bands.

FOR COUNTRY CODE SELECTION USAGE
Note: The country code selection is for non-US model only and is not available to all US model. Per FCC regulation, all WiFi product marketed in US must fixed to US operation channels only.

IC

Industry Canada statement
1. This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
1-1. this device may not cause interference, and
1-2. this device must accept any interference, including interference that may cause undesired operation of the device.

1. 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:
1-1. l'appareil ne doit pas produire de brouillage, et
1-2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

2. This Class B digital apparatus complies with Canadian ICES-003.
2. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

4. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter, except tested built-in radios.

4. Cet appareil et son antenne ne doivent pas être situés ou fonctionner en conjonction avec une autre antenne ou un autre émetteur, exception faites des radios intégrées qui ont été testées.

5. The County Code Selection feature is disabled for products marketed in the US/ Canada.
5. La fonction de sélection de l'indicatif du pays est désactivée pour les produits commercialisés aux États-Unis et au Canada.

Radiation Exposure Statement:
The product comply with the Canada portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

Déclaration d'exposition aux radiations:
Le produit est conforme aux limites d'exposition pour les appareils portables RF pour les Etats-Unis et le Canada établies pour un environnement non contrôlé.
Le produit est sûr pour un fonctionnement tel que décrit dans ce manuel. La réduction aux expositions RF peut être augmentée si l'appareil peut être conservé aussi loin que possible du corps de l'utilisateur ou que le dispositif est réglé sur la puissance de sortie la plus faible si une telle fonction est disponible.

CE
This device complies with Directive 2014/53/EU issued by the Commission of the European Community.
(Latest compliance Directives should be mentioned.)

A minimum separation distance of 0.5 cm must be maintained between the user's body and the device, including the antenna during body-worn operation to comply with the RF exposure requirements in Europe.

Frequency bands and Powers

- Frequency band(s) in which the radio equipment operates;

- Maximum radio-frequency power transmitted in the frequency band(s) in which the radio equipment operates

TYPE-R WLAN Frequency and MAX EIRP Power:
Operating Frequency: 2412 - 2472 MHz
EIRP Power (Measured Max. Average) 15.68 dBm

TYPE-R BT Frequency and MAX EIRP Power:
Operating Frequency: 2402 -2480MHz
EIRP Power (Measured Max. Average) 9.17 dBm

TYPE-R ANT+ Frequency and MAX EIRP Power:
Operating Frequency: 2403 -2480 MHz
EIRP Power (Measured Max. Average) 1.15 dBm

Declaration of Conformity
Hereby, LEOMO, Inc. declares that the radio equipment type LEM-TYPER is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address:

https://www.leomo.io/legal

LEOMO Motion Sensor (LEM-MS1)
FCC

Federal Communication Commission Interference Statement

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

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 of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that
- to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:
- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:
This device meets the government's requirements for exposure to radio waves.
This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.
The exposure standard for wireless device employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the FCC is 1.6W/kg. *Tests for SAR are conducted using standard operating positions accepted by the FCC with the device transmitting at its highest certified power level in all tested frequency bands.

IC

Industry Canada statement

1. This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
1-1. this device may not cause interference, and
1-2. this device must accept any interference, including interference that may cause undesired operation of the device.

1. 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:
1-1. l'appareil ne doit pas produire de brouillage, et
1-2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

2. This Class B digital apparatus complies with Canadian ICES-003.
2. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

4. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter, except tested built-in radios.
4. Cet appareil et son antenne ne doivent pas être situés ou fonctionner en conjonction avec une autre antenne ou un autre émetteur, exception faites des radios intégrées qui ont été testées.

5. The County Code Selection feature is disabled for products marketed in the US/ Canada.
5. La fonction de sélection de l'indicatif du pays est désactivée pour les produits commercialisés aux États-Unis et au Canada.

Radiation Exposure Statement:
The product comply with the Canada portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual. The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

Déclaration d'exposition aux radiations:
Le produit est conforme aux limites d'exposition pour les appareils portables RF pour les Etats-Unis et le Canada établies pour un environnement non contrôlé.
Le produit est sûr pour un fonctionnement tel que décrit dans ce manuel. La réduction aux expositions RF peut être augmentée si l'appareil peut être conservé aussi loin que possible du corps de l'utilisateur ou que le dispositif est réglé sur la puissance de sortie la

plus faible si une telle fonction est disponible.

CE

This device complies with Directive 2014/53/EU issued by the Commission of the European Community.
(Latest compliance Directives should be mentioned.)

A minimum separation distance of 0.5 cm must be maintained between the user's body and the device, including the antenna during body-worn operation to comply with the RF exposure requirements in Europe.

Frequency bands and Powers

- Frequency band(s) in which the radio equipment operates;
- Maximum radio-frequency power transmitted in the frequency band(s) in which the radio equipment operates

LEOMO Motion Sensor BT Frequency and MAX EIRP Power:
Operating Frequency: 2402 -2480 MHz
EIRP Power (Measured Max. Average) 8.48 dBm

Declaration of Conformity
Hereby, LEOMO, Inc. declares that the radio equipment type LEM-MS1 is in compliance with Directive 2014/53/EU.
The full text of the EU declaration of conformity is available at the following internet address:

https://www.leomo.io/legal

LEOMO

MORE INFORMATION AT:

HTTPS://LEOMO.ZENDESK.COM

E-MAIL SUPPORT REQUESTS TO:

SUPPORT@LEOMO.IO