


# QTM-DMC10 Device Manual
# v1.0.5

Quantum RTLS Dot Compact Mobile Node

**05-01-0002**
**Edition V1**
**October 2021**


# Revision Tracking

| Rev | EC | Author | Reviewer | Approver | Change Notes | Date |
|---|---|---|---|---|---|---|
| V1.0.0 | N/A | C. Lemmon | J. Wolf | | Initial Release | **2023/01/06** |
| V1.0.1 | N/A | J.Wolf | | | -Updated statements for Class B device | **2023/04/27** |
| V1.0.2 | N/A | J. Wolf | | | -Updated wording of FCC and IC statements | **2023/05/08** |
| V1.0.3 | N/A | J. Wolf | | | -Updated certification mark label<br>-Added battery warnings | **2023/05/29** |
| V1.0.4 | N/A | J. Wolf | | | -Updated FCC and ISED wording for portable device | **2023/06/06** |
| V1.0.5 | N/A | J. Wolf | | | -Updated FCC statement as per TUV recommendation | **2023/06/21** |

# Certification and Compliance

The radio used in this device has been certified for use according to Federal Communications Commission (FCC), Industry Canada (IC) and Conformitè Europëenne (CE) rules and regulations.

# FCC Regulatory Statement

Model: QTM-DMC10, FCC ID: 2AX6LQTMDMC10

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.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to 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.

Changes or modifications to this product not authorized by Zerokey could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product.

This equipment can be installed and operated with a minimum distance 5 millimeters between the radiator and user's body. This equipment has been evaluated to meet general RF exposure requirements at 5 millimeters distance.

Part 18

Model: QTM-DWR10, FCC ID: 2AX6LQTMDMC10

This device complies with part 18 of the FCC Rules.

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 to 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.

Responsible party (contact for FCC matters only):

Zerokey Inc.

3120 – 12 St NE

Calgary, Alberta T2E 8T3

Canada

https://zerokey.com/contact/

# ISED Regulatory Statement

Model: QTM-DMC10, IC: 26679-QTMDMC10

CAN ICES-003(B)/NMB-003(B)
This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

CAN ICES-003(B)/NMB-003(B)
L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.
Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 et la conformité à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne sur l'exposition et la conformité de rf.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 5 millimeters between the radiator and your body.
Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ou émetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 5 millimètres entre le radiateur et votre corps.

# CONTENTS

# PREFACE

## ABOUT THIS GUIDE

This guide contains the information you will need to operate a QTM-DMC10 with the Quantum RTLS system.

## WHERE TO FIND MORE INFORMATION

Refer to the following sources for additional information and for product and software updates.

- **QTM-DMC10 Resources**
  For more information and the most up to date user manual please visit our website (https://zerokey.com) which contains additional product specifications, user documentation, and notices.

- **Included product documentation**
  Your product package includes documentation detailing the setup, configuration, and operation of the Quantum RTLS system.

## CONVENTIONS USED IN THIS GUIDE

Take note of these symbols which indicate important information within this manual.

**CAUTION:** Important instructions to prevent damage or improper operation of the Smart Space system.

**NOTE:** Key information and helpful tips that

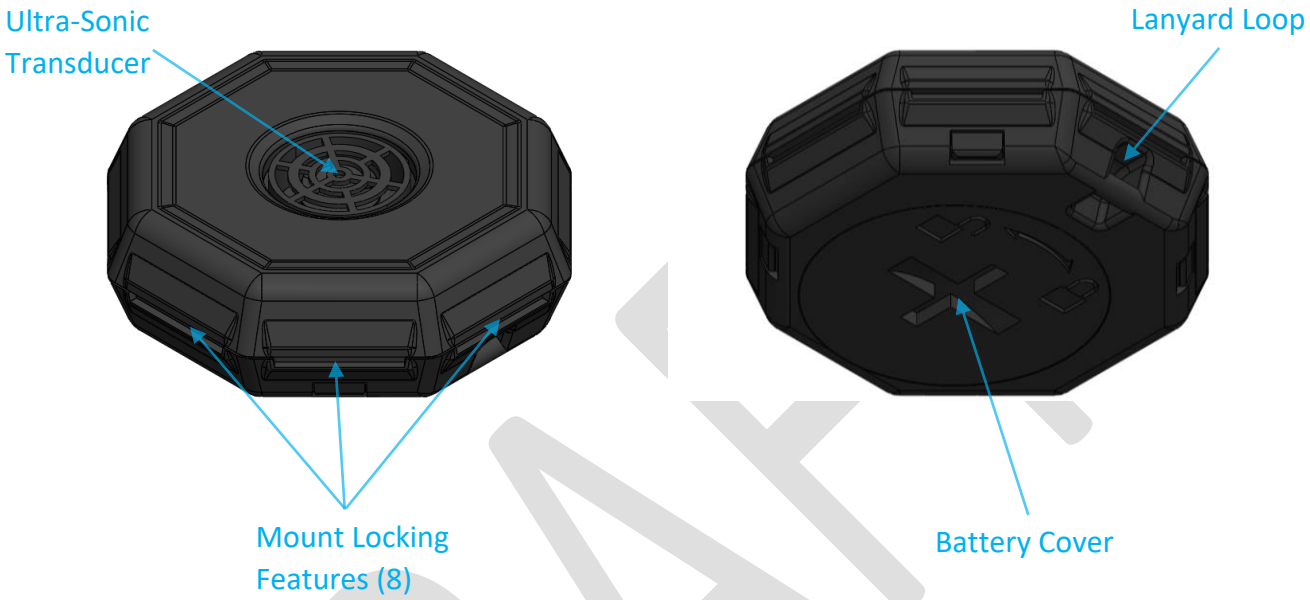
**CONFIG:** Critical setup information that MUST be followed prior to operation of the system.

## TYPOGRAPHY

| | |
|---|---|
| **Bold text** | Indicates the name of a menu item, field, or important variable. |
| *Italics* | Emphasizes a word or a phrase. |

# 2 PRODUCT OVERVIEW

The QTM-DMC10 is an ultra-compact, rugged, Mobile node for ZeroKey's Quantum RTLS (real-time location system). A Mobile node is a tracking reference and should be attached to the person or object of interest in the tracking system. The QTM-DMC10 is an ultra-compact, rugged node intended for long-term use in applications that involve extended periods of time with little to no movement.




## 2.2 PHYSICAL CHARACTERISTICS

### 2.2.1 SIZE

With Mount: 47 mm tall, 36 mm wide, 16mm deep.

Excluding mounting: 36 mm tall, 36 mm wide and 11 mm deep.

### 2.2.2 WEIGHT

With Mount: 15 grams.

Excluding mounting: 13 grams.

### 2.2.3 POWER

The QTM-DMC10 is battery powered with a user replaceable internal coin cell battery. ONLY use the same as supplied battery make and model (CR2032) as a replacement for the unit. Use of incorrect battery could cause damage or impair the device.

**CAUTION**: Dispose of used battery according to your local environmental laws and guidelines.
**WARNING**: Do not ingest battery; chemical burn hazard.

**CAUTION**: Risk of fire or explosion if the battery is replaced by an incorrect type.
**WARNING**: **This equipment is not suitable for use in locations where children are likely to be present.**

**WARNING**

Do not ingest the battery, Chemical Burn Hazard

The product contains one or more coin/button cell batteries. If the coin/button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.

Keep new and used batteries away from children.

If the battery compartment does not close securely, stop using the product and keep it away from children.

If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

## 2.3 ALERTS, WARNING AND INDICATORS

### 2.3.1 Battery Level Indicator

- Battery level for the unit can be viewed when the unit is connected to the network, through the Network tab in the ZeroKey Config Tool.
- Battery life is dependent on system usage and how frequently the unit is in motion.

### 2.3.2 Electrostatic Shock

- When using this product in areas where the air is very dry, it is easy to build up static electricity. To minimize the risk of electrostatic discharge, avoid using this product in extremely dry environments, or ensure you are grounded by touch a grounded unpainted metal object before using.

## 2.4 CERTIFICATION MARKS

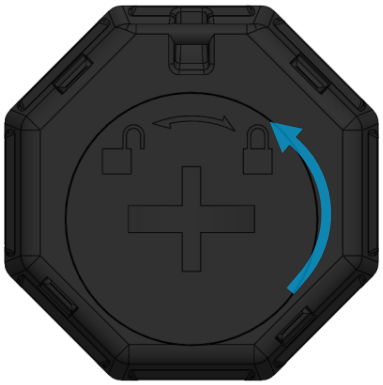
The QTM-DMC10 is a small device where it is impractical to label the certification marks in a legible manner. As such, the certification markings are included in this manual as shown below.

# 3 INSTALLATION

## 3.1 INSTALLING/REPLACING COIN CELL BATTERY

To install or replace the battery:

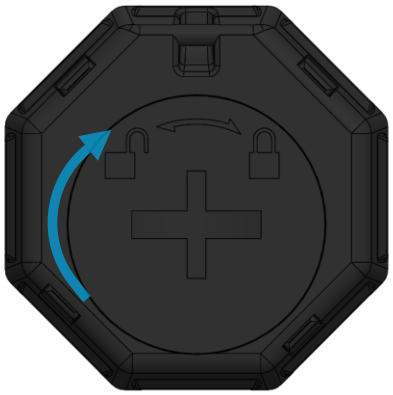
- Use the new battery, key, coin or screwdriver to turn the battery cover anti clockwise about 90 degrees until the cover pops free.



- Insert the CR2032 battery positive (+) side up.

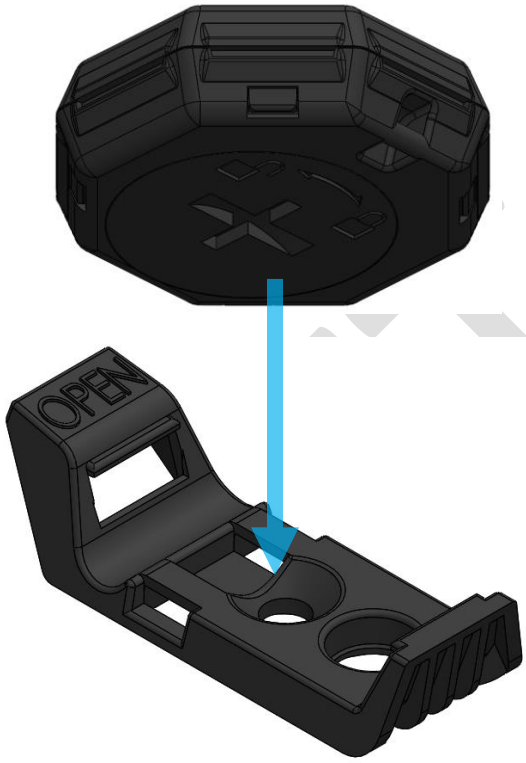

**CAUTION:** Use only CR2032 to prevent damage to your ZeroKey Device.

- Replace the battery cover by pushing down slightly and turning the cover clockwise about 45 degrees until it locks in place.



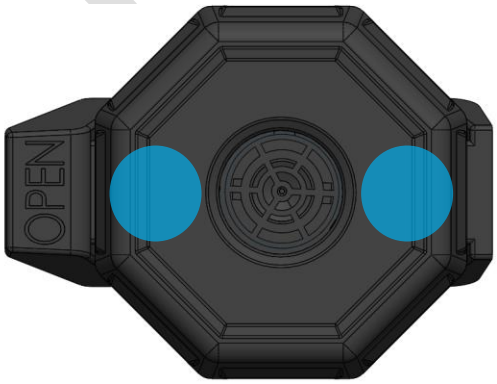
## 3.2 MOUNTING THE QTM-DMC10

### 3.2.1 INCLUDED DOT MOUNT



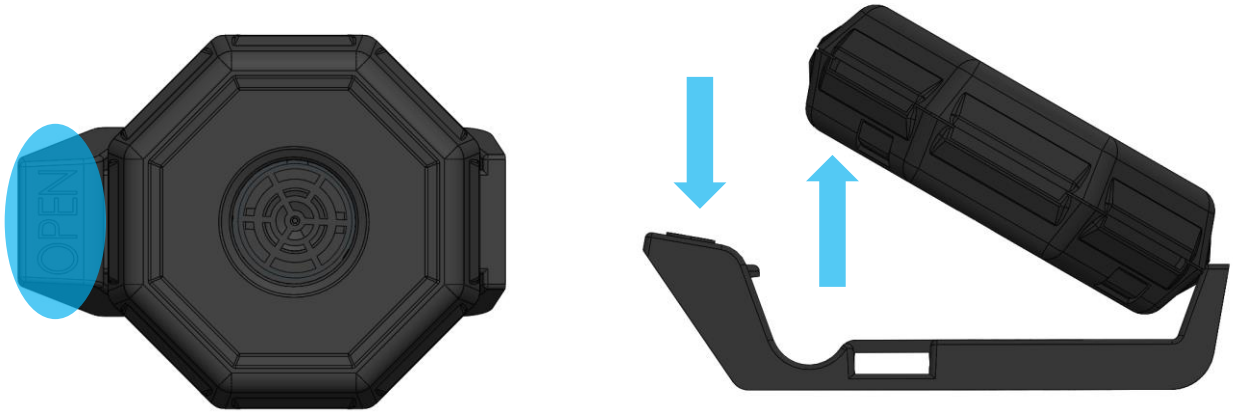

Installing Dot in universal mount:

- Line up any one of the eight grooves around the perimeter of the device with OPEN text embossed on the dot mount
- Press down on the shell of the device (blue areas shown below) firmly until both sides click firmly into the mount.




Removing Dot from universal mount:

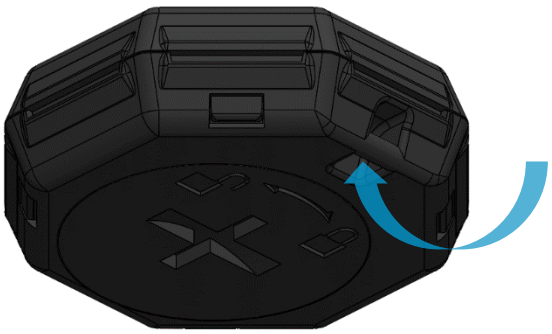
- Press and hold pressure on the embossed OPEN text.
- Lift the edge of the unit closest the OPEN text to release the dot from its mount.




### 3.2.2 Attaching the Mount

The DOT universal mount provides multiple methods for attaching it to the item to be tracked.


### 3.2.3 Lanyard Loop



To use the included wrist lanyard:

- Push the small loop on the end of the lanyard through the hoop on the end bottom edge of the device.

- Run the long end of the lanyard through the lanyard loop to secure the unit to the lanyard.

## 3.3 CONNECTING

The QTM-DMC10 features coin cell battery operation. Once the supplied battery is installed in the device, the device will appear in the Quantum RTLS network and can be configured further via the ZeroKey Config Tool. For best outcomes, consider the following recommendations:

- Ensure the unit is in clear line of sight to at least 4 Anchor nodes while configuring.
- Ensure the unit is in clear line of sight to the Gateway
- Ensure the unit is on the same channel as the Gateway and Quantum RTLS System.

Once power has been supplied to the system, refer to section 2.3.1 to verify that all devices are on and on and have entered idle state. Before affixing the QTM-DMC10, ensure that the device is detected by the ZeroKey Spatial Intelligence platform.

**NOTE:** For more information on system calibration, see ZeroKey Support Materials at zerokey.com.

## 3.4 CALIBRATION

The QTM-DMC10 is one component of a greater positioning system. To calibrate the ZeroKey Quantum RTLS for tracking the QTM-DMC10, see the ZeroKey Quantum RTLS System Guide.

**NOTE:** For more information on system calibration, see ZeroKey Support Materials at zerokey.com.

# 4 OPERATION

The QTM-DMC10 is a Quantum RTLS Mobile node. In Quantum RTLS, the mobile node is a tracking reference and should be attached to the person or object of interest in the tracking system. In regular operation the user attaches the mobile node to their clothing, equipment or asset in an outward-facing manner. The user then goes about their standard day to day activities. The QTM-DMC10 will provide updated location data to the ZeroKey Spatial Intelligence Platform whenever the unit detects that it is moving.

The QTM-UMR10 will interact with Anchor nodes and any Gateway devices in the Quantum RTLS system. Mobile nodes do not interact with each other.

# 5 PRODUCT CARE

## 5.1 GENERAL CARE

### 5.1.1 CLEANING

The device can be cleaned using a moistened soft cloth and nonabrasive hand/dish soap. DO NOT IMMERSE. Wipe dry to prevent any moisture build up.

### 5.1.2 OPERATING TEMPERATURE

This device is designed to operate from -20°C to +60°C ambient. Do not place the unit in direct sun for extended periods without proper ventilation as the unit may exceed the +60°C temperature. Operating the unit below 0°C may result in degraded battery performance.

# 6 REPAIRS AND DISPOSAL

## 6.1 FIRMWARE UPDATES

The QTM-DMC10 can be updated with new firmware through our over-the-air reprogramming application to correct, improve, or add new features to enhance the unit's performance. Details on how to perform these updates is included with each update installation package.

## 6.2 OPERATION LOGS

The QTM-DMC10 updates and maintains information concerning its operation and activities as it is being used around the site. This information is used to the monitor the health of the unit and improve the device performance. The information collected does not contain any personal information from the user.

## 6.3 REPAIRING DAMAGED DEVICE

Units that have been damaged or have failed to operate in the field can be returned for repair or replacement with a few exceptions. If the unit is intact but has ceased to operate, it can be returned via an RMA request to our repair center. Please contact your plan administrator for more information and to begin the RMA process.

## 6.4 DISPOSAL OF DEVICE

The QTM-DMC10 must be sent to an electronics recycling depot to reclaim the electronics. Please contact your nearest electronics recycling company for details on their collection requirements.

# APPENDIX A – SPECIFICATIONS

| | |
|---|---|
| Dimensions | 36 x 36 x 11 mm |
| Weight | 13 g |
| Accuracy | 1.5mm[1] |
| Update Rate | 20 Hz |
| Battery Power | SONY Lithium CR2032 Coin Cell |
| Battery Life | Up to 6-months[2] |
| Maximum Range | 20m |
| Wi-Fi Coexistence | Yes |
| Bluetooth Coexistence | Yes |
| Operating Temperature | -20 to 60 $^{o}C$[3] |
| Operating Humidity | 5 to 95% Non-condensing |
| Shock | 200g (max) |
| Vibration | 3g (max) |
| Mounting Options | Screw, strap, adhesive, magnet, velcro |
| RF Band | 2.4 GHz ISM |
| RF Modulation | GFSK |
| RF TX Power | 0-8 dBm |
| RF RX Sensitivity | -90 to -97 dBm |
| RF TX Burst Duration | 2.8 – 3.2 ms |
| Ultrasonic Frequency Band | 50.0KHz +/- 0.1KHz |
| Ultrasonic Output | 96 dB SPL (max) |
| Ultrasonic Duty Cycle | 2.8% (min) 3.2% (max) |
| Certifications | FCC (US) / IC (Can) / CE (EU) / JRL (JP) / KC (KR) |



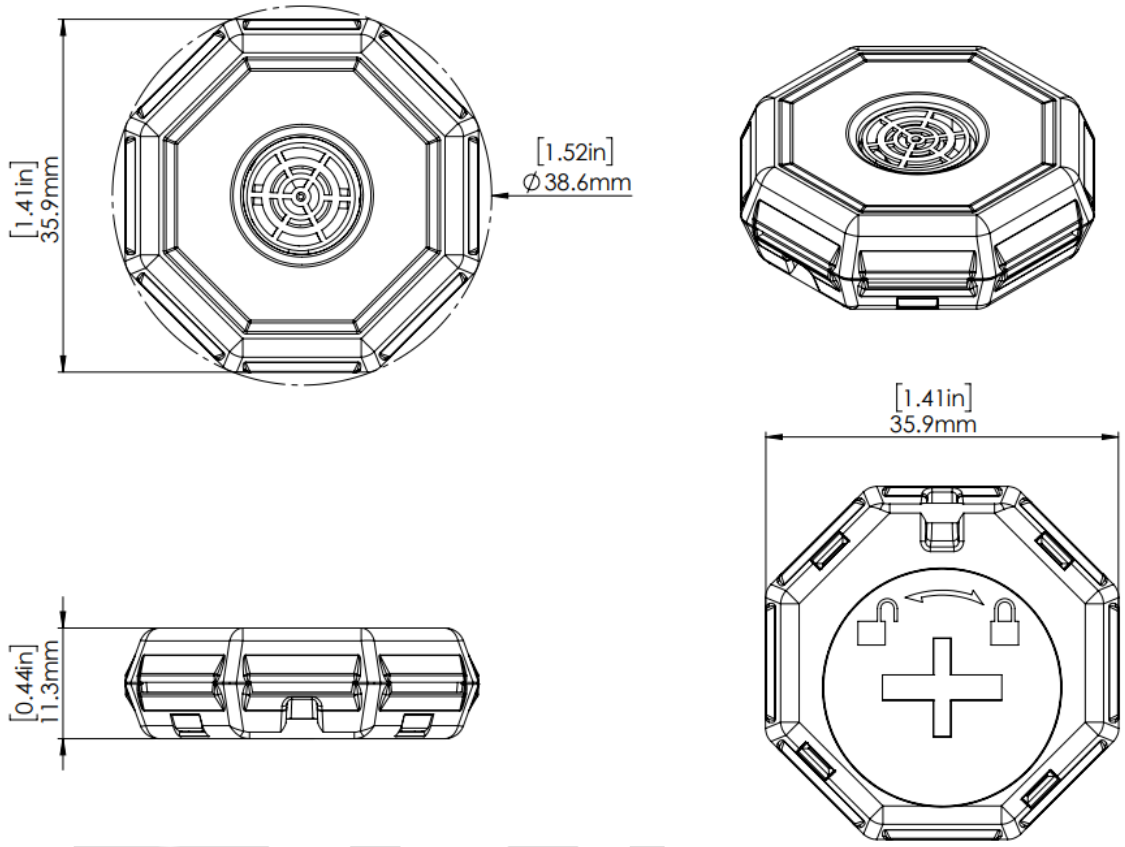
[1]Under unobstructed conditions with view to 6 anchor nodes with ideal geometry.

[2]Depending on firmware version and operating environment.

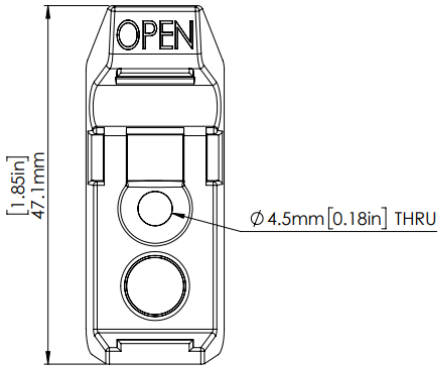
[3]Operation below 0 $^{O}C$ will result in degraded battery performance.

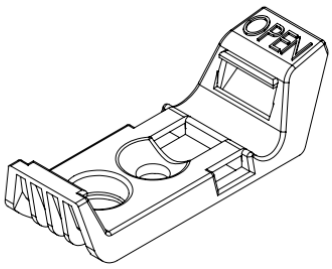
# APPENDIX B – MECHANICAL DRAWINGS

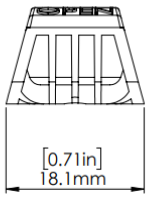
## QTM-DMC10

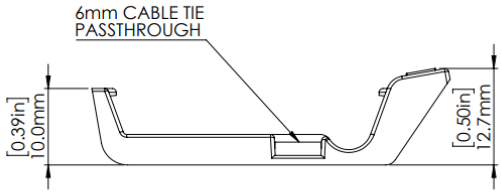


## MOUNT




## ASSEMBLED QTM-DMC10 WITH MOUNT

Insert mech drawing of assembly