

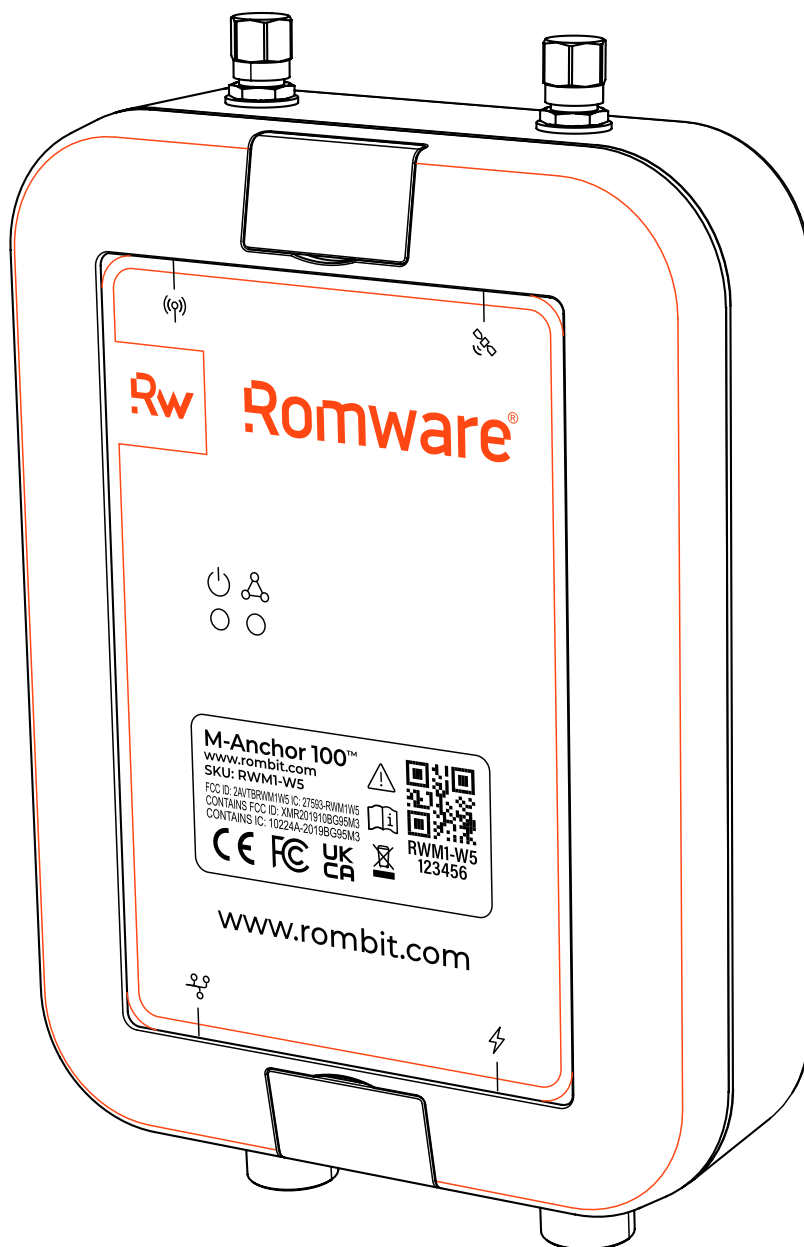


M-ANCHOR 100™ USER MANUAL

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M-ANCHOR 100™

USER MANUAL

1.94-EN

1. FOR YOUR SAFETY



Before using this product, carefully read this user manual. Failure to follow these safety instructions could result in fire, electric shock, injury, or damage to Rombit M-Anchor 100™ or other property. Do not dispose of this manual. Ensure that this information is retained and appropriately used by the product user.

DEFINITION OF ALERT SYMBOLS

The following alert symbols are used in this document to indicate and highlight areas of the associated text that require a greater awareness by the user.



WARNING

Indicates a hazard with a high risk level. If this hazardous situation is not avoided, it may result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation. If this is not avoided, injuries or damage to the product or the environment may occur. It may also be used to alert against unsafe practices.



NOTICE

Indicates additional information on how to use the product.

INTENDED USE

Rombit M-Anchor 100™ is a mobile device for worker safety and site security. It can be used standalone or as a component of a site-installed system to help warn users for unsafe situations, such as vehicle driving behaviour, keeping a safe distance from people or man-machine collisions.

Rombit M-Anchor 100™ is designed for use in industrial environments.

QUALIFICATION OF USERS

- ▶ Users must fully understand and strictly observe the instructions. Use the product only for the purposes specified in the Intended Use section of this document. Comply with all local and national rules and regulations associated with this product.
- ▶ Users of Rombit M-Anchor 100™ must be familiar with the relevant safety concepts of the industrial environment they are operating in, as well as applicable standards and other regulations. Always obey site-specific signs and instructions.

REPAIR AND MODIFICATIONS

- ▶ Only trained and competent personnel are permitted to inspect, repair and service Rombit M-Anchor 100™.
- ▶ Use only original Rombit parts and accessories for using and maintaining this product. Otherwise, the correct functioning of the product could be impaired. Rombit recommends a service contract for all maintenance activities and that all repairs are carried out by Rombit.



Modifications to any component of Rombit M-Anchor 100™ are not permitted, as they can endanger your safety or damage the device. Disassembling Rombit M-Anchor 100™ may cause damage, result in loss of water ingress protection, and may cause injury to the user.



WARNING

SAFETY PRECAUTIONS

RF EXPOSURE AND INTERFERENCE

Rombit M-Anchor 100™ uses radio signals to communicate with other devices. It is designed, tested, and manufactured to comply with regulations governing radio frequency emissions. Even so, radio-signal emitting devices can negatively affect the operation of other electronic equipment, causing them to malfunction.

Always turn off Rombit M-Anchor 100™ when use of radio equipment is prohibited, such as while traveling in aircraft, or when asked to do so by authorities.

POSSIBLE MEDICAL DEVICE INTERFERENCE

Rombit M-Anchor 100™ contains components that emit electromagnetic fields. This may interfere with medical devices, such as pacemakers and defibrillators. Consult your physician and medical device manufacturer for information specific to your medical device and whether you need to maintain a safe distance of separation between your medical device and Rombit M-Anchor 100™.

If you suspect Rombit M-Anchor 100™ is interfering with your medical device, stop using the Rombit system immediately and consult your physician.

NOT A MEDICAL DEVICE

Rombit M-Anchor 100™ is not a medical device and should not be used as a substitute for professional medical judgement. It is not designed or intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of any condition or disease.

NOT FOR USE IN A POTENTIALLY EXPLOSIVE ENVIRONMENT

Using Rombit M-Anchor 100™ in any area with a potentially explosive atmosphere, such as areas where the air contains high levels of flammable chemicals, vapors, or particles (such as grain, dust, or metal powders), may be hazardous.

Exposing Rombit M-Anchor 100™ to environments having high concentrations of industrial chemicals may damage or impair Rombit M-Anchor 100™ functionality.

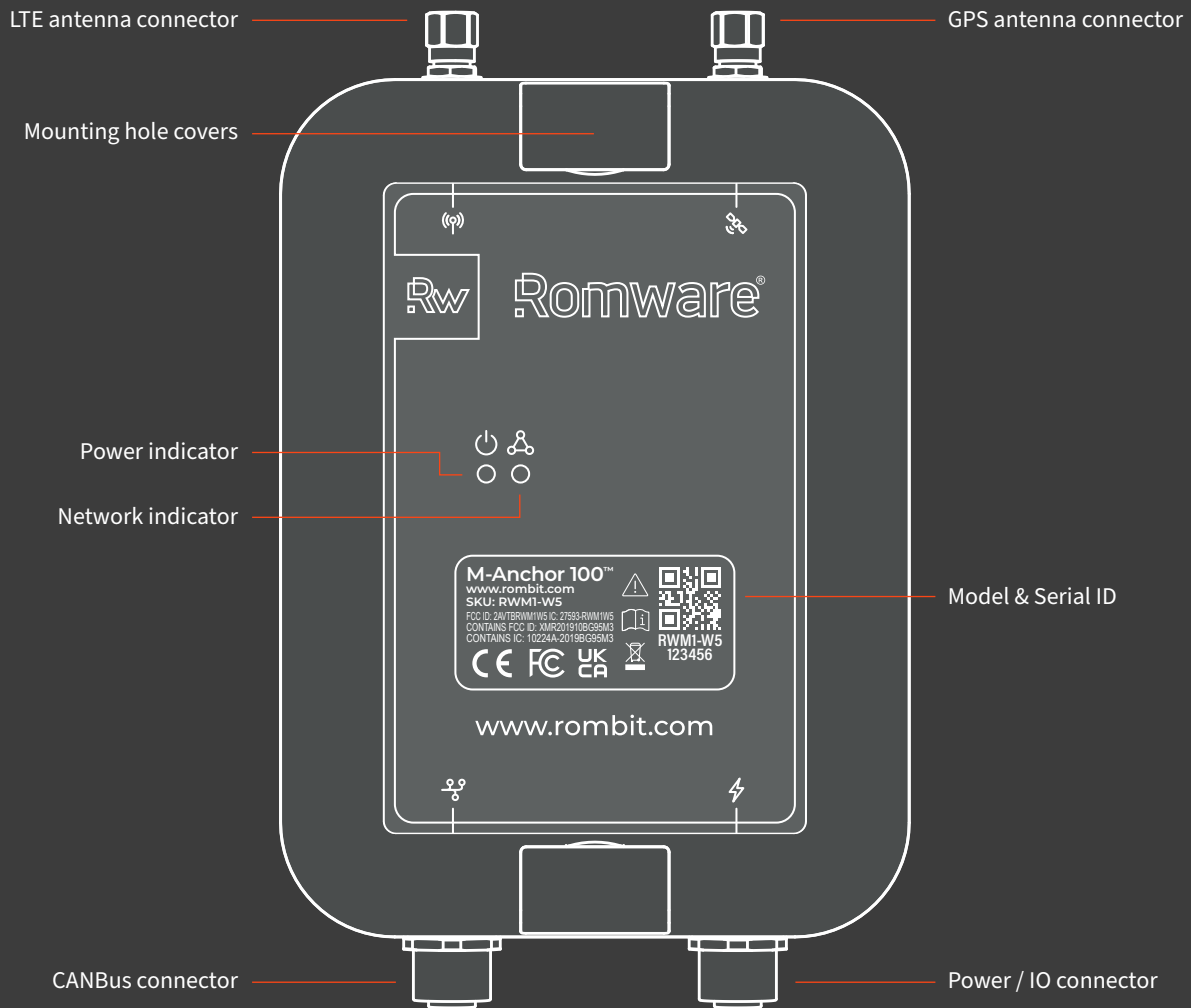
VIBRATION AND SHOCK RESISTANCE

Rombit M-Anchor 100™ was designed and tested to withstand the harsh environment of typical industrial sites. When implementing Rombit M-Anchor 100™ in extreme conditions, such as applications subject to high accelerations, extreme vibration or temperature, additional precautions and integration testing are required.

HIGH-CONSEQUENCE ACTIVITIES AND SAFETY INTERLOCK

Rombit M-Anchor 100™ is not intended for use where the failure of the device could directly lead to death, personal injury, or severe environmental damage. Rombit M-Anchor 100™ is intended and marketed as Assistive Technology: a system intended to help warn users of potentially unsafe situations and to raise awareness of the risks involved. As such, it is NOT intended to be used as a safety component of a machine setup as meant in article 2(c) of the European Machine Directive 2006/42/EC.

2. PRODUCT OVERVIEW



FUNCTIONAL DESCRIPTION

ROMBIT M-ANCHOR 100™

- ▶ Rombit M-Anchor 100™ is meant to be used as part of a mobile installation on industrial vehicles such as forklifts. It can be connected to a wide range of power supplies, such as the vehicle auxilliary power output.
- ▶ When entering the industrial area of relevance, Rombit M-Anchor 100™ must be powered on. Rombit M-Anchor 100™ connects via UWB to either a dedicated site network infrastructure or other Rombit devices nearby to provide assistive safety functionality.
- ▶ When connected to a cellular network, Rombit M-Anchor 100™ can upload data and events to the Rombit cloud platform.
- ▶ When this option is activated, Rombit M-Anchor 100™ can capture and process GPS/GNSS location data.

OPTIONAL DEVICES

- ▶ Rombit M-Anchor 100™ can be connected to auxilliary devices such as Rombit DriverBox™ through its CANbus connection.

3. INSTALLING



CAUTION

Rombit M-Anchor 100™ is designed for installation by a Rombit certified technician, as part of a total solution. Its correct functioning is highly dependent on a number of installation parameters, including the appropriate mounting position of the anchor and auxilliary antennas.

The following paragraph should be considered as a basic indication of installation parameters to consider, not a full installation guide.



CAUTION

OBSERVE LOCAL REGULATIONS REGARDING OUTDOOR NON-MOBILE UWB DEVICES

Region-specific regulations can apply that only allow UWB devices as a mobile or non-permanent installation when using them outdoors.

Before using Rombit M-Anchor 100™ as a permanent non-removable installation outdoors, check if local regulations allow this. **Applicable for US only:** vehicle installation of Rombit M-Anchor 100™ is restricted to non-passenger industrial vehicles only. It is required that the industrial vehicle operator must be able to exercise control over the device and the object to which the device is affixed at all times while it is operating, both indoors and outdoors.

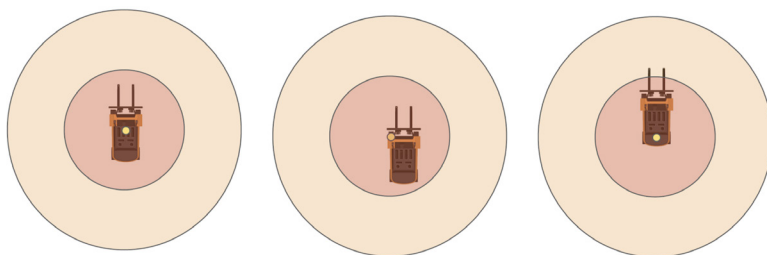
POSITION ON VEHICLE

The Anchor can be mounted on the inside or outside of a vehicle through several means:

- ▶ The anchor has holes for screw/bolt mounting
- ▶ Additional hardware is available for mounting on a cabin pillar, or magnet-based mounting

The optimal position on a vehicle is determined by considering feasibility and range:

- ▶ The M-anchor is preferably mounted in a vertical upright position, with a clear line of sight to pedestrians to ensure good UWB coverage and detection results
- ▶ Avoid mounting the anchor in a position where electromagnetic waves do not propagate properly (for example: behind or against a metal chassis, within a metal enclosure, ...).



- ▶ Rombit M-Anchor 100™ detects UWB devices in a circular shape around the device. As placement of the anchor will determine the center of this circle surrounding a particular vehicle, it is to be considered in relation to its size and shape.
- ▶ If desired, multiple anchors can be mounted onto one vehicle to enhance coverage.

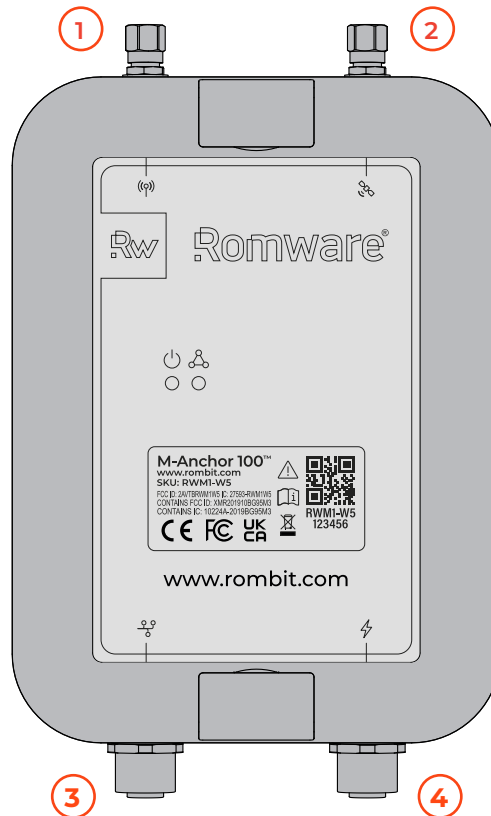


CAUTION

CONSULT ROMBIT FOR BEST ANCHOR POSITION

Rombit can assist you in evaluating the best mounting position of Rombit M-Anchor 100™ on a particular vehicle or location for the intended application.

WIRING



1. Cellular antenna
2. GPS antenna
3. Driverbox/CAN (optional)
4. Power and auxiliary I/O

SMA connector
SMA connector
M12 5 pin connector
M12 8 pin connector



USE PROTECTIVE CAPS ON UNUSED PORTS

To prevent malfunction due to dirt, corrosion or loss of water tightness, always cover unused ports with SMA and M12 dust caps.

Antennas

- ▶ Connect a compatible LTE and GPS antenna to the corresponding SMA connections on Rombit M-Anchor 100™. Depending on the installation type and region, Rombit can assist you in selecting the most suitable antenna type, frequency band and form factor, such as a whip or puck antenna.

Power

- ▶ Rombit M-Anchor 100™ requires a stable power supply between 6 and 24V DC with a minimal power rating of 1A.
- ▶ The equipment must be supplied by an external specific limited power source with limits ES1 and PS2 in compliance with the standard IEC 62368-1:2014.
- ▶ External short-circuit and overload protection on this power supply is mandatory, e.g. by using an inline 2A fuse, such as an ATO or similar inline fuse holder.

Power and auxilliary I/O pinout (M12-8pin connector)

Pin	Signal	Wire color °	Description
1	VCC	Brown	Power input 6...24V DC, max. 1A at 24V
2	GND	White	Ground
3	DIG IN1	Green	Digital input (max. 24VDC) *
4	DIG IN1	Yellow	Digital input (max. 24VDC) *
5	DIG OUT1	Grey	Digital output, open drain *
6	DIG OUT1	Pink	Digital output, open drain *
7	REL COM	Blue	Relay common *
8	REL NO	Red	Relay normal open dry contact (max 30VDC, 2A) *

* Optional depending on hardware and feature activation

° The provided wire colors are representative for the M12 cable provided with standard Rombit setups. Always check the correct device pinouts when connecting, as wire colors may vary across different cable models.



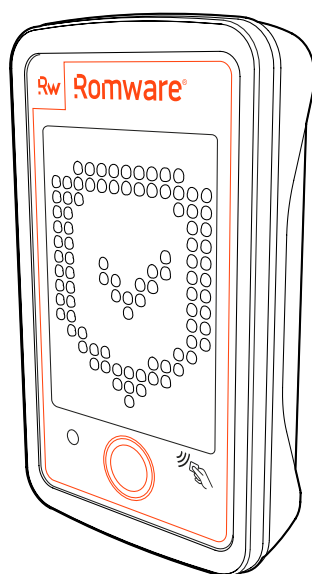
CAUTION

USE APPROPRIATE STABILISATION AGAINST POWER SPIKES.

On many vehicles, especially forklifts using an internal combustion engine, on-board power supply rails can be suspect to electrical noise or overvoltage due to for example starting loads or alternator charging current. Although the power input of Rombit M-Anchor 100™ is equipped with protection circuitry, using an external DC/DC convertor is highly recommended under these circumstances.

DRIVERBOX

Depending on the required functionality, Rombit M-Anchor 100™ can be equipped with an optional Rombit DriverBox™ module, providing visual and auditive feedback to the vehicle driver.



- ▶ If a Rombit DriverBox™ is provisioned, it can be directly connected to the anchor through the matching M12-5pin connector.
- ▶ For more information on connecting DriverBox™, consult the Rombit DriverBox™ documentation.

4. STARTING USE

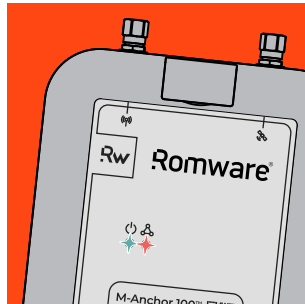


CAUTION

HANDLE WITH CARE

Although Rombit M-Anchor 100™ is designed to be used in an industrial environment, it contains sensitive electronic components and can be damaged if dropped, burned, punctured, or crushed. Do not use a faulty or incomplete product, or when it shows damage such as a cracked case, liquid intrusion, or damaged cabling.

SYSTEM STARTING



► System is starting up

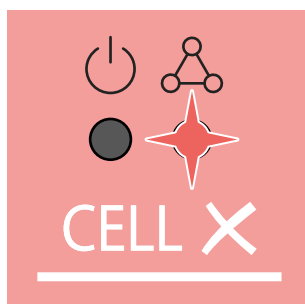
The green power indicator slowly blinks while the red connection indicator lights up continuously.

SYSTEM ACTIVE



► System is ready for use

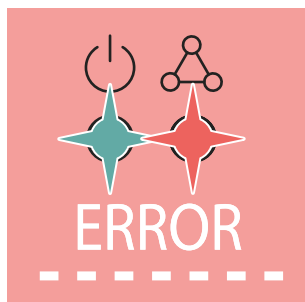
The green power indicator slowly blinks, indicating that the system is running correctly. When the system has determined its position through GPS, the green power indicator blinks faster.



► No cellular network connection available

The network indicator lights up red when no connection could be made to a cellular data network. The system is still active, and will keep trying to connect to a cellular network.

SYSTEM ERROR



► System error detected

Both the green power indicator and the red network indicator blink in a rapid pattern or are continuously on. Correct system functionality is no longer guaranteed.

5. CARE INFORMATION

CLEANING THE DEVICE CASING

- ▶ Clean the casing of Rombit M-Anchor 100™ with a damp cloth or a mild soap solution. Don't use abrasive cleaners. Do not immerse the device. Do not clean the device using high-pressure or high-temperature liquids, such as pressure washers or steam cleaners.

6. TECHNICAL DATA

Wireless technology

GPS/GNSS	
UWB	Channel 5 (default), Channel 2 (for licensed customers only)
	Channel 2 band: 3774 – 4243.2 Mhz, Center freq. 3993.6 Mhz
	Channel 5 band: 6240 – 6739.2 Mhz, Center freq. 6489.6 Mhz
Cellular	LTE-M or NB-2 / Bands 2, 3, 4, 5, 8, 12, 13, 20, 28
Sensors	Acceleration, Gyro, Compass
Indicators	Power and Network indicators

Wired connections

CANBus	Proprietary protocol for connecting Rombit accessories
I/O	2x Analog or Digital input, 2x Digital output, 1x relay output

Power supply 6...24VDC, 1A max. at 24V

Dimensions and weight 170 mm x 110 mm x 40 mm, 292g

Water and dust resistance IP67 rated

Ambient conditions

Operation	-20°C to 50°C, 0 % to 98 % relative humidity
Storage	-20°C to 60°C, 0 % to 98 % relative humidity
Altitude	0 to 2000m (operation and storage)

UWB channel licensing

Romware M-Anchor 100 and Driverbox contain an UWB transceiver capable of transmitting on UWB channel 2 and 5. As Rombit M-Anchor 100™ is a world-wide marketed device, and different regions pose restrictions on channels allowed, the relevant channels are switched on during installation of the device by a Rombit-certified technician. Be aware that restrictions may apply in other regions. It is the responsibility of the end-user to make sure local regulations are met when transporting the device to another region.

7. REGULATORY COMPLIANCE

EU DECLARATION OF CONFORMITY



The manufacturer, Rombit N.V., Meir 30 2000 Antwerp, Belgium declare that the product **M-Anchor 100™ (SKU RWM1-xx)** is in conformity with the relevant Union harmonisation legislation, provided that it is used in accordance with our instructions:

2014/53/EU (Radio Equipment Directive)

RF Safety (Art. 3.1a):

- EN 62311:2020

Product Safety (Art. 3.1a):

- EN 62368-1:2014 + AC:2015 + AC:2017 + A11:2017

EMC (Art. 3.1b):

- EN 301 489-1 V2.2.3 (2019-11)
- EN 301 489-33 V2.2.1 (2019-04)
- Final Draft EN 301 489-52 V1.2.0 (2021-09)

Radio Spectrum (Art. 3.2):

- EN 302 065-1 V2.1.1 (2016-11)
- ETSI EN 302 065-2 V2.1.1 (2016-11)
- ETSI EN 301 511 V12.5.1 (2017-03)
- ETSI EN 301 908-1 V13.1.1 (2019-11)

2011/65/EU (RoHS)

This declaration of conformity is issued under the sole responsibility of the manufacturer, importer or authorized representative.

Antwerp 2022-02-01

Rombit N.V.
Jan Vercammen, CEO

UK DECLARATION OF CONFORMITY



The manufacturer, Rombit N.V., Meir 30 2000 Antwerp, Belgium declare that the product **M-Anchor 100™ (SKU RWM1-xx)** is in conformity with the relevant legislation of United Kingdom, provided that it is used in accordance with our instructions:

Radio Equipment Regulations 2017

RF Safety (Art. 3.1a):

- BS EN 62311:2020

Product Safety (Art. 3.1a):

- BS EN 62368-1:2014 + AC:2015 + AC:2017 + A11:2017

EMC (Art. 3.1b):

- BS EN 301 489-1 V2.2.3 (2019-11)
- BS EN 301 489-33 V2.2.1 (2019-04)
- Final Draft BS EN 301 489-52 V1.2.0 (2021-09)

Radio Spectrum (Art. 3.2):

- BS EN 302 065-1 V2.1.1 (2016-11)
- ETSI EN 302 065-2 V2.1.1 (2016-11)
- ETSI EN 301 511 V12.5.1 (2017-03)
- ETSI EN 301 908-1 V13.1.1 (2019-11)

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

This declaration of conformity is issued under the sole responsibility of the manufacturer, importer or authorized representative.

Antwerp 2022-03-21

A handwritten signature in black ink that reads 'Jan Vercammen'.

Rombit N.V.
Jan Vercammen, CEO

FCC - REGULATORY NOTICES



FCC ID: 2AVTBRWM1W5

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.
2. This device must accept any interference received, including interference that may cause undesired operation.

RF exposure safety

This device complies with the FCC RF exposure limits and has been evaluated in compliance with mobile exposure conditions.

The equipment must be installed and operated with minimum distance of 20 cm of the human body.

Class B device notice

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

UWB device notice

UWB devices may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a satellite is prohibited.

ISED - REGULATORY NOTICES

IC: 27593-RWM1W5

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with ISED license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

RF exposure safety

This device complies with ISED RF exposure limits and has been evaluated in compliance with mobile exposure conditions. The equipment must be installed and operated with minimum distance of 20 cm of the human body.

CAN ICES-003 (B)

This Class B digital apparatus complies with Canadian ICES-003.

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