THE KINEXON VEHICLE TAG 2.1 (KNX-T3.6)

Precise real-time localization of transport vehicles.

The KINEXON Vehicle Tag is the robust and precise tracking solution for intralogistics vehicles where a maximum of accuracy is required.

The KINEXON Vehicle Tag enables a seamless global localization of transport and autonomous vehicles on the shop floor.

The Kinexon Vehicle Tag is designed for use in industrial environments due to its resistance against mechanical shocks and water splashes.

It offers multiple standard interfaces and works natively with the KINEXON Real-time IoT Platform (RIoTP), the open IoT platform for real-time localization and analytics and the KINEXON Train, the ready-to-use solution for effortless navigation of autonomous transport vehicles.

USE CASES

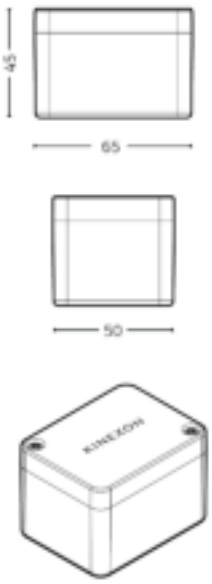
Vehicle Tracking:

- Precise & robust tracking of transport vehicles such as forklifts or tugger trains
- Standard interfaces for connecting external industrial sensors (e.g. weight sensors for fork movement)
- Visualization of intralogistics routes in real-time

AGV Control:

- Accurate positioning down to the centimeter
- Suitable for different vehicle types and kinematics
- Integrated data communication transmits commands and localizes a vehicle with one tag in one network
- Applicable to inhomogeneous fleets
- Integration of precise data of manually controlled vehicles

DIMENSIONS IN [MM]



KINEXON

KEYFACTS

RF SPECIFICATIONS

Positioning Principle	Real-time Location System (RTLS), Radio-based, Ultra-Wideband (UWB)
Frequency range	UWB (IEEE 802.15.4z): 3 - 5 GHz, 6 - 7 GHz
Positioning update rate	0.01 - 200 Hz
Positioning data	3D (x, y, z)
Positioning accuracy	< 10 cm (typ.)
Positioning precision	< 2 cm

INTERFACES & POWER SUPPLY

Data interface	Serial data interface (RS-232, RS-422, RS-485) CAN (ISO 11898) Analog interface (4...20mA with Vout 3...24V or 0...24V) 3 pcs. I/O (configurable: max. 24V external source)
Connectors	M8 12-pin male
Power supply	external (9 - 30Vdc, power consumption see Technical Parameters)

PHYSICAL SPECIFICATIONS

Indicators	Multicolor LED indicator
Inertial Measurement	9-axis (Accel, Gyro, Mag) sensor (up to 2000 °/s, up to 200 Hz) and Magnetometer
Material	Al
Weight	77 g
Dimensions	77 x 45 x 30 mm (with the M8 connector)
Mounting options	M4 screws Optional: Mounting plate

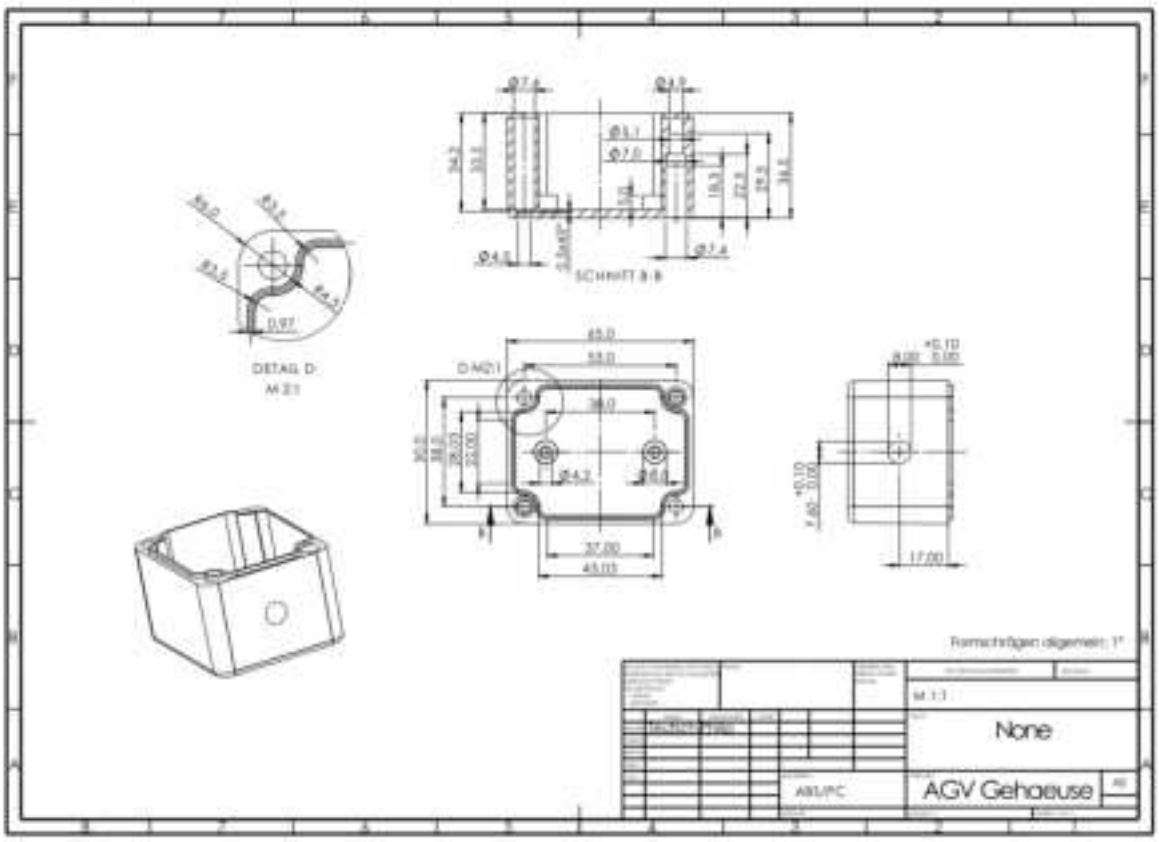
ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-25 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
Protection Class (cert. ongoing)	IP65
Regulatory Compliance (ongoing)	FCC Part 15 subpart F (15.519) – pending European Union: ETSI EN 302065-1 (UWB) ETSI EN 303883 (UWB) ETSI EN 103361 (UWB) EN 301 489-1, -33 (EMC) EN 62368-1 (Safety) EN 62479 (Human Exposure) 1999/519/EC (Human Exposure)

SPECIFICATION

Mechanical drawing

The enclosure of the Vehicle Tag has the following specifications:



Mechanical drawing Vehicle Tag

The height of the top cover is appr. 10mm the overall height 45mm.

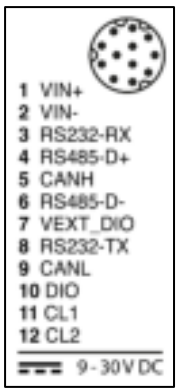
Label

MAIN-LABEL

1: Company name
2: EUI (Extended Unique Identifier)
3: Model and device part no.
4: CE mark

5: QR code

CONNECTOR-LABEL



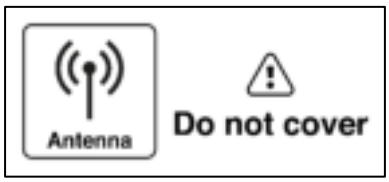
1: Power supply connection and CAN

2: Ethernet connection

Universal connector

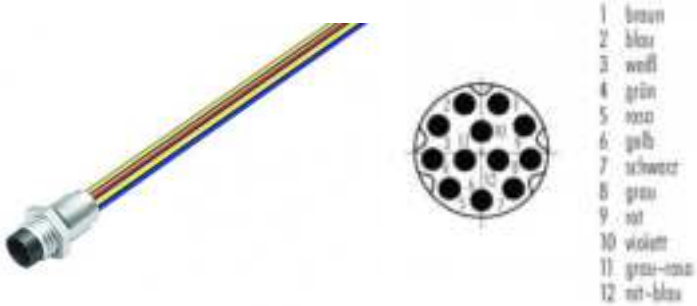
3: Input voltage range

LABEL FOR ANTENNA POSITION



External connector

A-side: standard-automation-connector M8-12 pin (male), unkeyed.



(color code according to DIN 47100 / 11.79)

Pin-no.	Color	Signal	Comment
1	brown	Vin+	Power supply
2	blue	Vin-	Power supply, GND
3	white	RS232-RX	RS-232 receive data
4	green	RS485-D+	RS-485 positive data
5	pink	CANH	CAN high level voltage
6	yellow	RS485-D-	RS-485 negative data
7	black	VEXT_DIO	external power supply for digital I/O
8	grey	RS232-TX	RS-232 transmit data
9	red	CANL	CAN low level voltage
10	purple	DIO	external digital I/O
11	grey-pink	CL1	Analog input 1 (current loop interface)
12	red-blue	CL2	Analog input 2 (current loop interface)

External interfaces

WIRELESS CONNECTION

For wireless connection a Ultra-Wide-Band (UWB) interface according to IEEE 802.15.4 is implemented.

CAN (CONTROLLER AREA NETWORK)

- Standard CAN FD controller with integrated transceiver
- Transceiver in ISO standard physical layer (according to ISO-11898-2 and ISO-11898-5)
- Data rate up to 1Mbit/s

RS-232

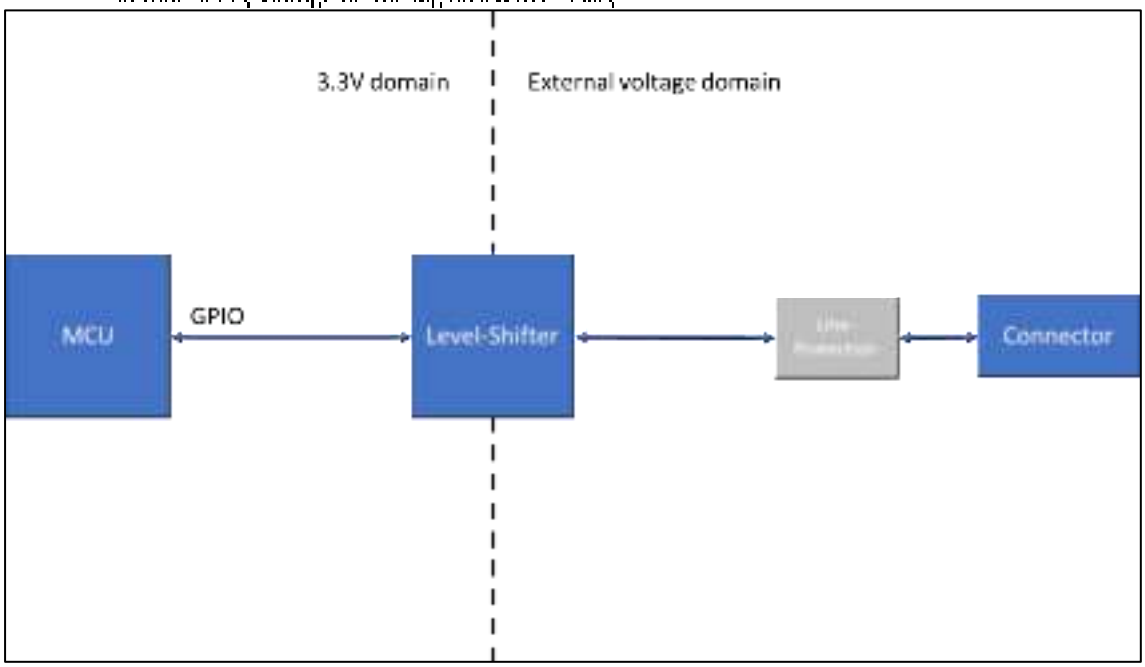
Standard RS-232 implementation for direct connecting to PC

RS-485

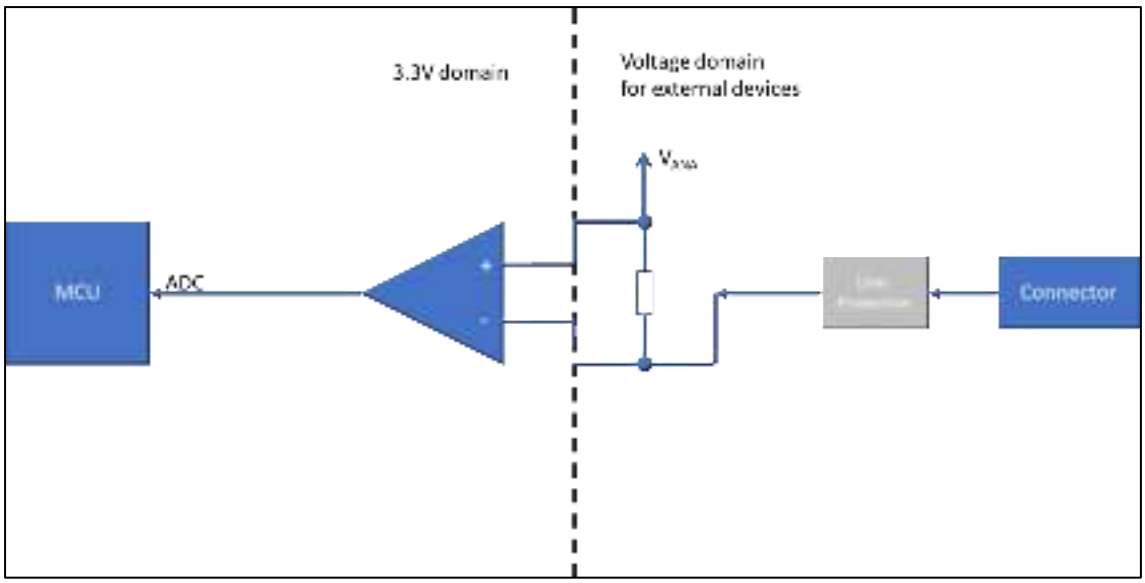
- Standard RS-485 implementation
- 3.3V device
- 3.3V power voltage
- 5V tolerant input

DIGITAL I/O

- Voltage level 3.3V to 24V
- max. 10mA
- External supply voltage for the digital I/O necessary



ANALOG INPUT (CURRENT-LOOP INTERFACE)



Analog input 1

- Analog voltage: 0V to 24V, controlled by FW
- : 4mA to 20mA

Analog input 2

- Analog voltage: 24V
- : 4mA to 20mA

Electrical parameters

Interface	Parameter [Unit]	Min	Typ	Max	Comment
Power Supply	Input voltage [V]	9		30	
	Input current [A]			450 mA	
RS-232	Voltage Min [V]	5	5.4		
	Voltage Max [V]	-5	-5.4		
RS-485	Voltage [V]		3.3		5V tolerant input
CAN	Voltage [V]	4.5		5.5	
Digital I/O	Voltage [V]	3.3		24	
	Current [mA]			10	
Analog in 1	Voltage [V]	5		24	
	Current [mA]	4		20	
Analog in 2	Voltage [V]		24		
	Current [mA]	4		20	

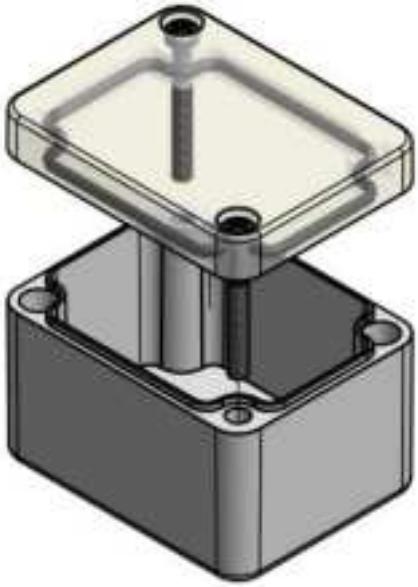
Variants

- CNX-LB-S-..1-.. Vehicle Tag 2.4 GHz
- CNX-LB-S-..2-.. Vehicle Tag 2.4 GHz + Multi-Protocol

External power supply must provide a line protection against shorts/over-voltage/over-current (max. 450 mA)

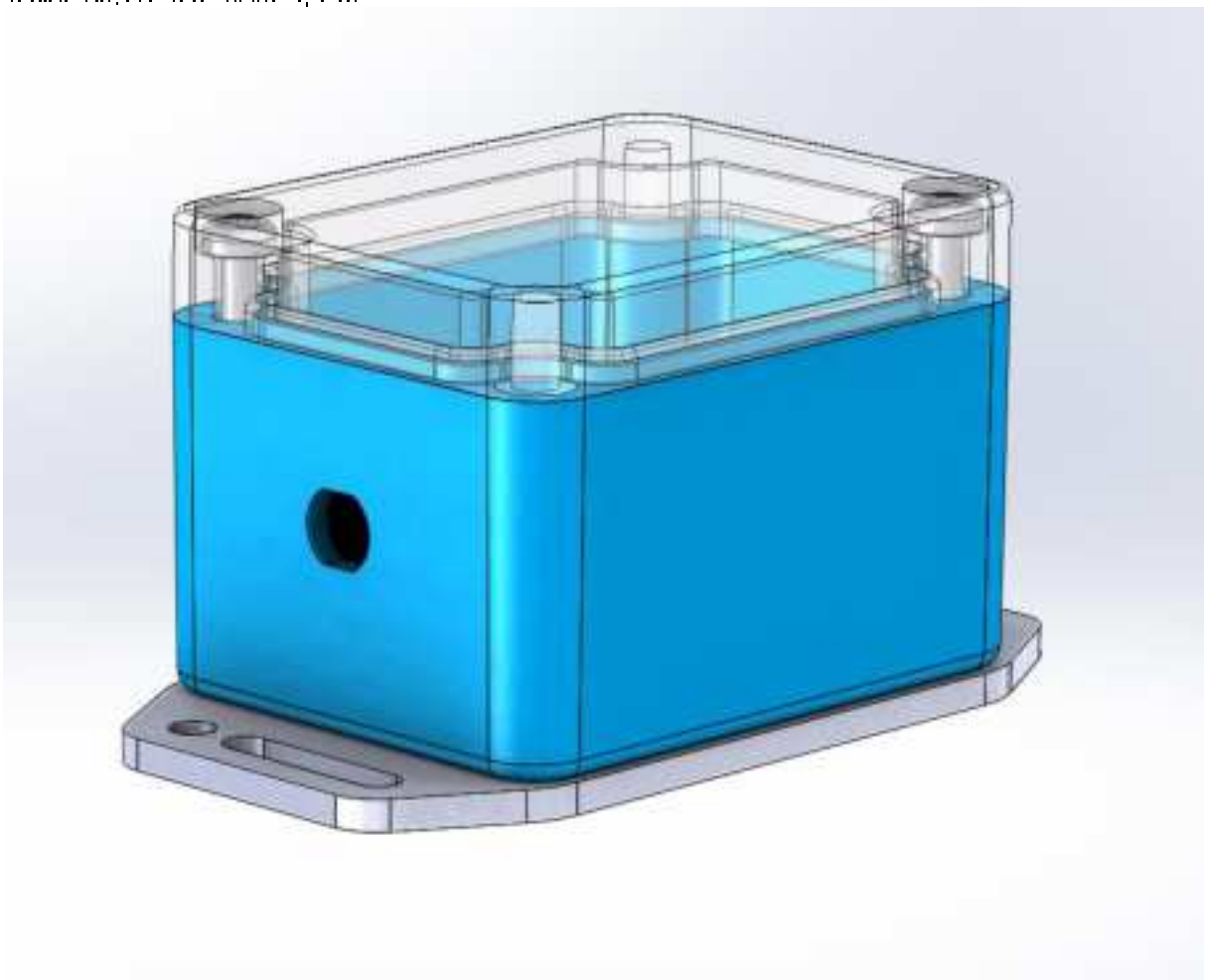
Mounting options

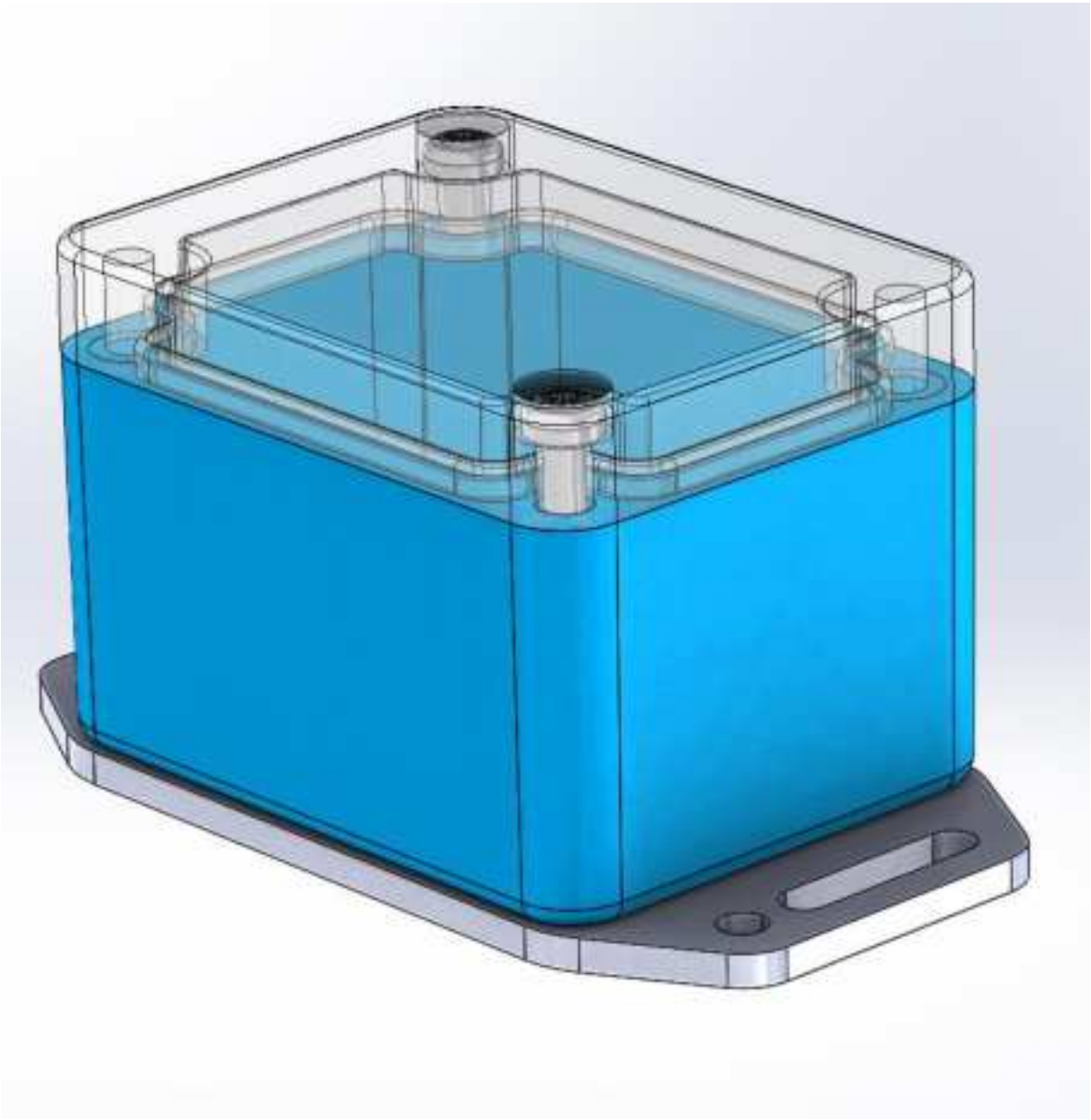
1. Vehicle Use 2.1 only
   a. Open the Vehicle Use

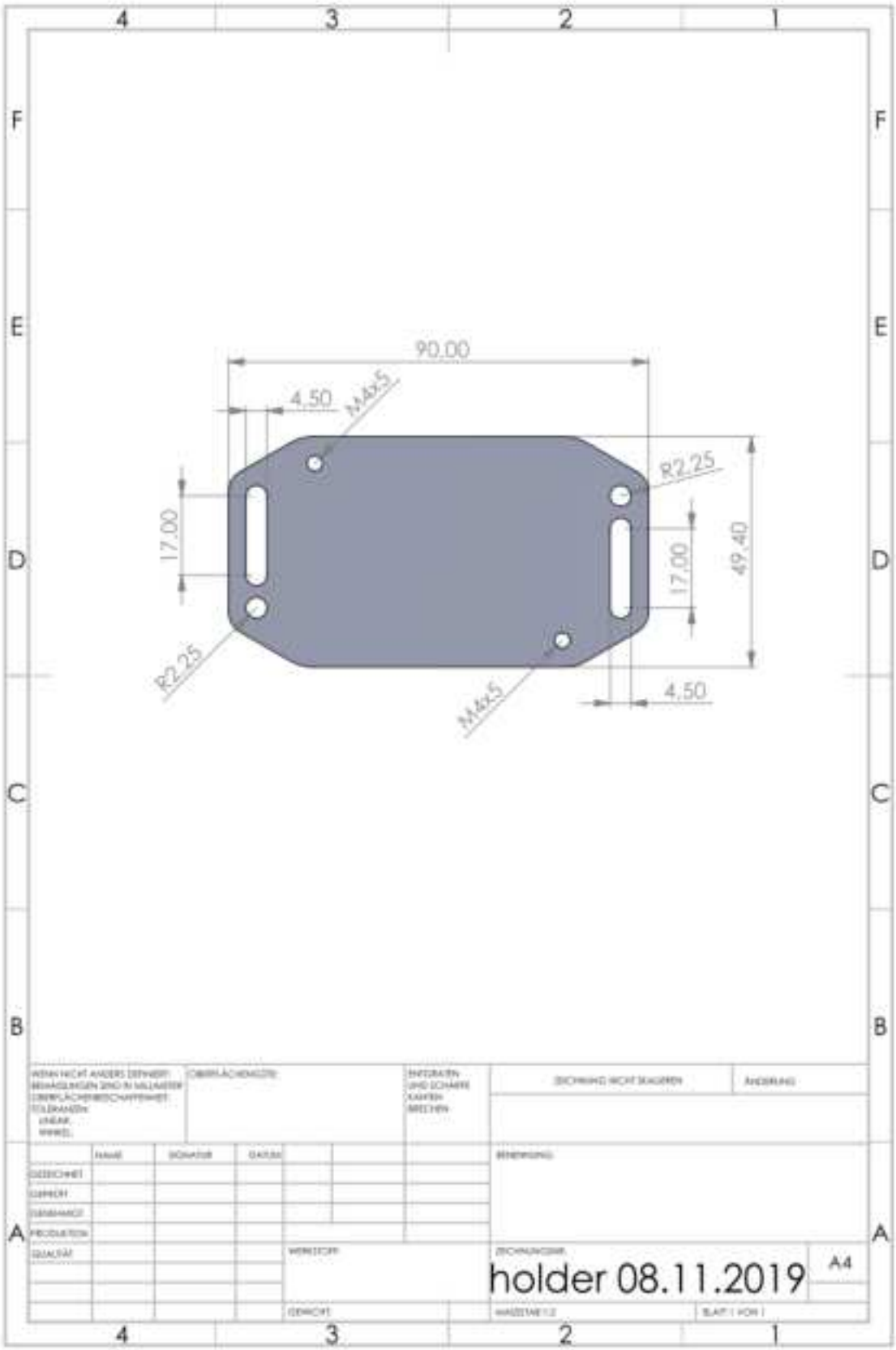


   b. Use 2x M4 screws for mounting – size and position see also Mechanical drawing

2. Vehicle Leg 2.1 with Neoprene Pad







Cable

- Max cable length: 3 m
- Voltage range max. 70V
- Power supply must be fused to a max. current of 450 mA
- Cable example:
  - 3 m, 1x open wires, 1x M8-12 pin (female):
    Binder Connector order no.: 77 7406 0000 50012-0300
  - For long cable runs (up to 30 m):
    reduce cable length of Binder Connector order no.: 77 7406 0000 50012-0500

Regulatory Notices

FCC COMPLIANCE

This device complies with FCC 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.

The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device may not be employed for the operation of toys. Operation onboard an aircraft, a ship or a vehicle is prohibited. The use of this device mounted on outdoor structures, e.g. on the outside of a building, or on a telephone pole or any fixed outdoor infrastructure is prohibited.

Moreover, the following statements apply:

Note: This equipment has been tested and found to comply with the limits for a Class A 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.

IMPORTANT NOTICE

This equipment may only be operated as a hand-held device. Operation with fixed outdoor antennas is prohibited and is subject to the operator to obtain all legal penalties. The Kinexon Tag will only operate to transmit UWB signals when activated without a RF exposure network.

FCC CAUTION

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

ISED CAUTION

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.

This device is not permitted for operation on board aircraft or satellites and shall also not be used for operating toys. The use this device is restricted to a fixed outdoor infrastructure, including antennas mounted on outdoor structures such as poles or buildings, and permitted for operation on board ships or on land vehicles.

Radiation Exposure Statement:
This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with greater than 20cm between the radiator & your body.

Cet appareil contient des émetteurs/récepteurs exempts de licence conformes aux RSS exempts de licence d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis aux deux conditions suivantes:
(1) Cet appareil ne doit pas causer d'interférences.
(2) Cet appareil doit accepter toutes les interférences, y compris celles susceptibles de provoquer un fonctionnement indésirable de l'appareil.

Cet appareil ne peut pas être utilisé à bord d'aéronefs ou de satellites et ne doit pas être utilisé pour faire fonctionner des jouets. Cette station est limitée aux infrastructures fixes situées à l'extérieur, comprenant les antennes montées sur des structures externes, telles que des poteaux ou des bâtiments, et est autorisée à bord des navires ou des véhicules terrestres.

Déclaration de l'exposition aux radiations:
Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à plus de 20 cm entre le radiateur et votre corps.

SAFETY INFORMATION

- Read and follow all instructions before using the Kinexon Tag.
- Never open the case of the Kinexon Tag.
- There are no user-serviceable parts or replaceable parts inside the case.
- Do not use the Kinexon Tag if it has been damaged.