



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 intra-logistics vehicles where a maximum of accuracy is required.

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

The Kinexon Vehicle Tag is ideal for use in industrial environments due to its resistance to mechanical shocks and waterproofness.

It offers industrial standard interfaces and works ideally with the KINEXON Real-Time IoT Platform (RIoT), the open IoT platform for real-time localization and analysis and the KINEXON Brain, the multimodal basis for effective navigation of autonomous transport vehicles.

USE CASES

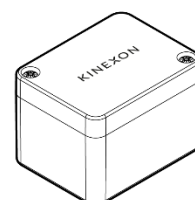
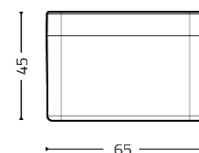
Vehicle Tracking:

- Precise & robust tracking of transport vehicles such as forklifts or tugger trains
- Standard interfaces for connecting external industrial sensors (e.g. height sensors for fork movements)
- 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: Transmit commands and localize a vehicle with one tag in one network
- Applicable to inhomogeneous fleets
- Integration of position data of manually controlled vehicles

DIMENSIONS IN [MM]



KEYFACTS

RF SPECIFICATIONS

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

INTERFACES & POWER SUPPLY

Data interface	Serial data interfaces (RS-232, RS-422, RS-485) CAN (ISO 11898) Analog Interfaces (4..20mA with V_{out} : 5..24V and 24V) Digital I/O (voltage level: max. 24V external source)
Connectors	M8 [12-pin] male
Power supply	external (9 - 30 V _{DC} , power consumption see "Electrical Parameters")

PHYSICAL SPECIFICATIONS

Indicators	multicolor light indicator
Inertial Measurement	9-axis, +/-16g, +/- 2000 °/s, up to 200 Hz and Magnetometer™
Material	PC
Weight	77 g
Dimensions	77 x 45 x 50 mm (with the M8 connector)
Mounting options	M4 screws Optional: Mounting plate

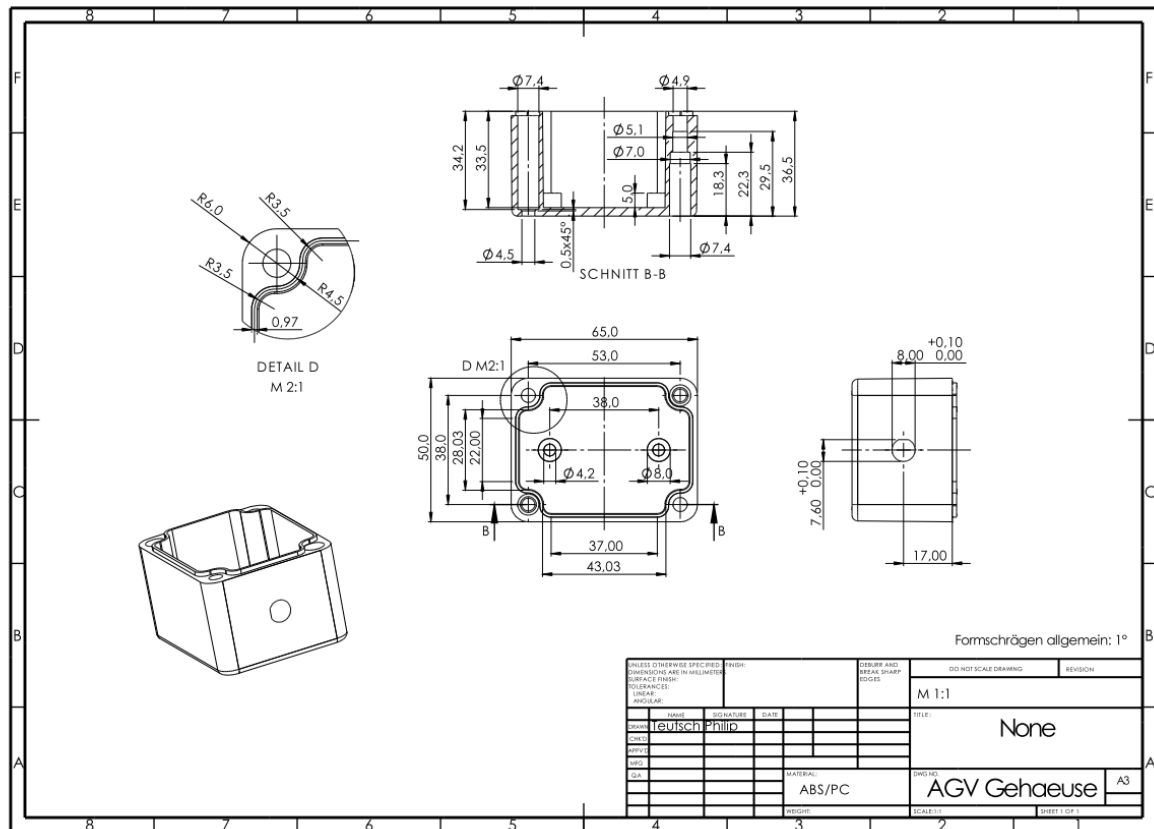
ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-25 °C to +85 °C
Storage Temperature	-40 °C to +85 °C
Protection Class (cert. ongoing)	IP65
Regulatory Compliance (ongoing)	US: FCC Part 15 subpart F (15.519) – pending European Union: ETSI EN 302065-1 (HF) ETSI EN 303883 (HF) ETSI TS 103361 (HF) EN 301 489 - 1, -33 (EMC) EN 61000-4-2, -4-3, (EMC) 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

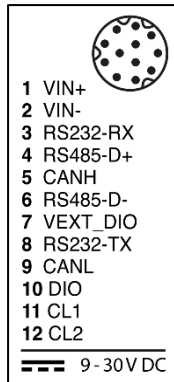
MAIN-LABEL

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



5: QR code

CONNECTOR-LABEL



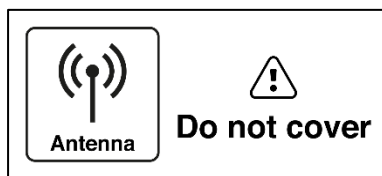
1: Drawing of connector incl. coding

2: Pinning (see also „

External connector“

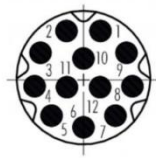
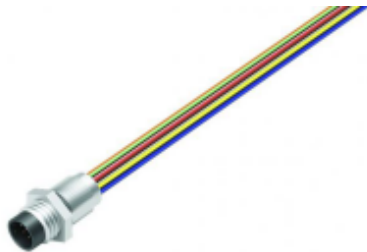
3: Input voltage range

LABEL FOR ANTENNA POSITION



External connector

A standard sensor-actor-connector M8-12 pin (male) is used.



- 1 braun
- 2 blau
- 3 weiß
- 4 grün
- 5 rosa
- 6 gelb
- 7 schwarz
- 8 grau
- 9 rot
- 10 violett
- 11 grau-rosa
- 12 rot-blau

(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 transmitt 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-Wideband (UWB) interface according to IEEE 802.15.4 is implemented.

CAN (CONTROLLER AREA NETWORK)

- Standalone CAN 2.0B controller with integrated transceiver
- Transceiver fulfill standard physical layer requirements ISO-11898-2 and ISO-11898-5
- Datarate: up to 1MBit/s

RS-232

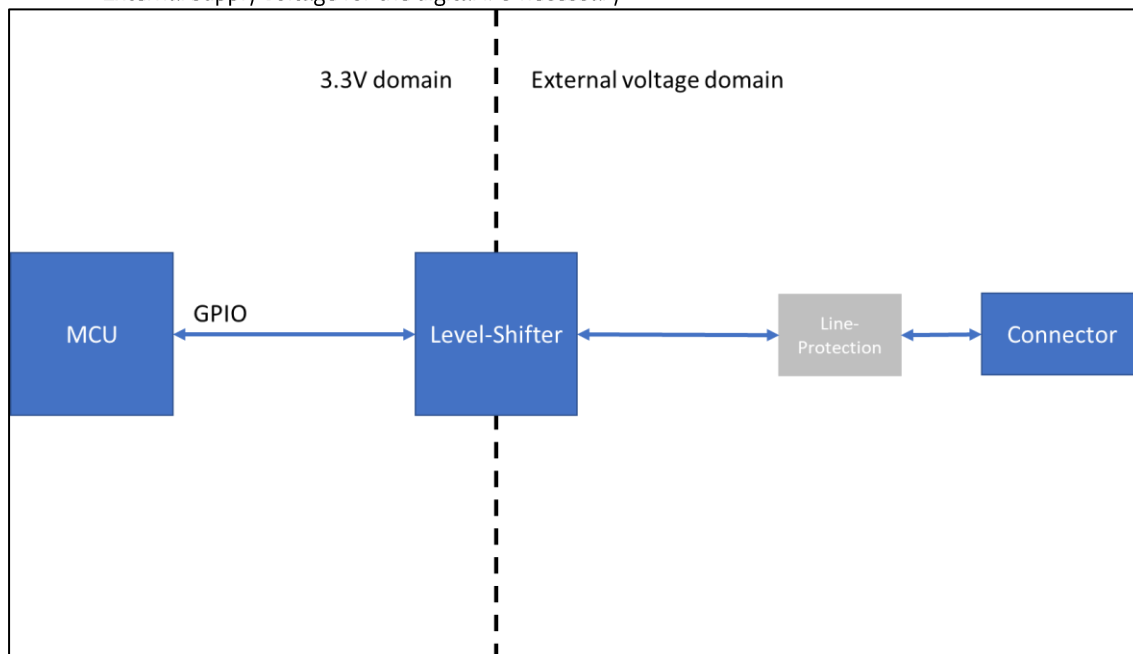
Standard RS-232 implementation for direct connection e.g. to PC

RS-485

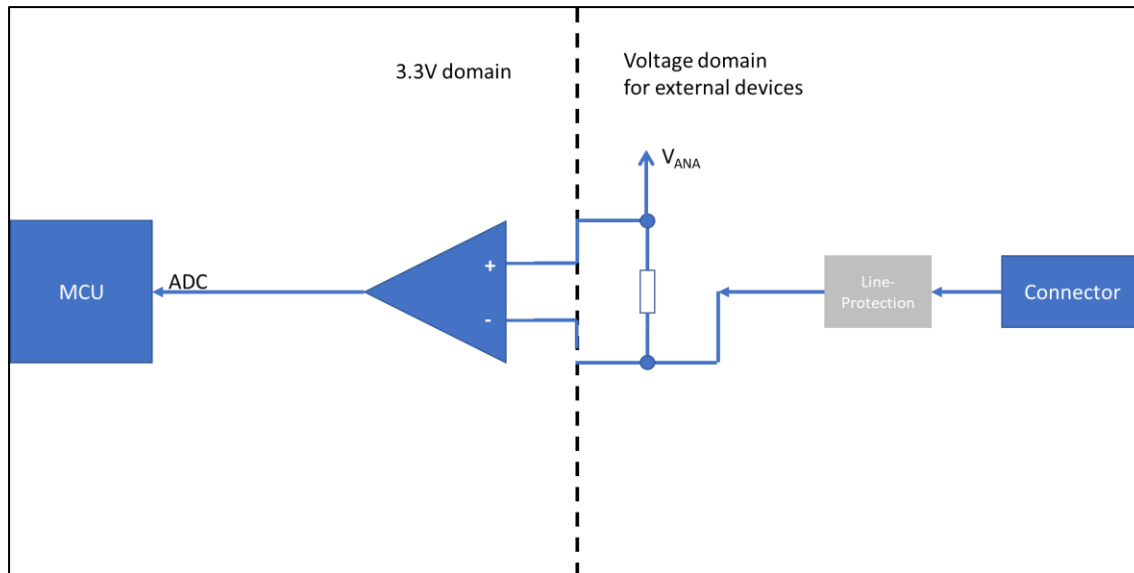
- Standard RS-485 implementation
- 3.3V device
- 3.3V driver voltage
- 5V tolerant input

DIGITAL I/O

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



ANALOG INPUT (CURRENT-LOOP INTERFACE)



Analog input 1

- Analog voltage: +5V to 24V, controlled by FW
- I: 4mA to 20mA

Analog input 2

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

Electrical parameters

Interface	Parameter [Unit]	Min	Typ	Max	Comment
Power supply ¹	Input voltage [V]	9		30	
	Input current [A]			450 mA	
RS-232	Voltage V _{OH} [V]	5	5.4		
	Voltage V _{OL} [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	

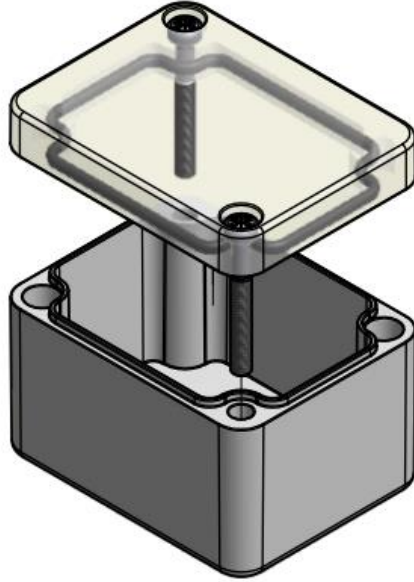
Variants

- KNX-T3.6-x.1-x: Vehicle Tag 2.1 only
- KNX-T3.6-x.2-x: Vehicle Tag 2.1 incl. mounting plate

¹ External power supply must provide a line protection against shorts/over-voltage/over-current (max. 450 mA)

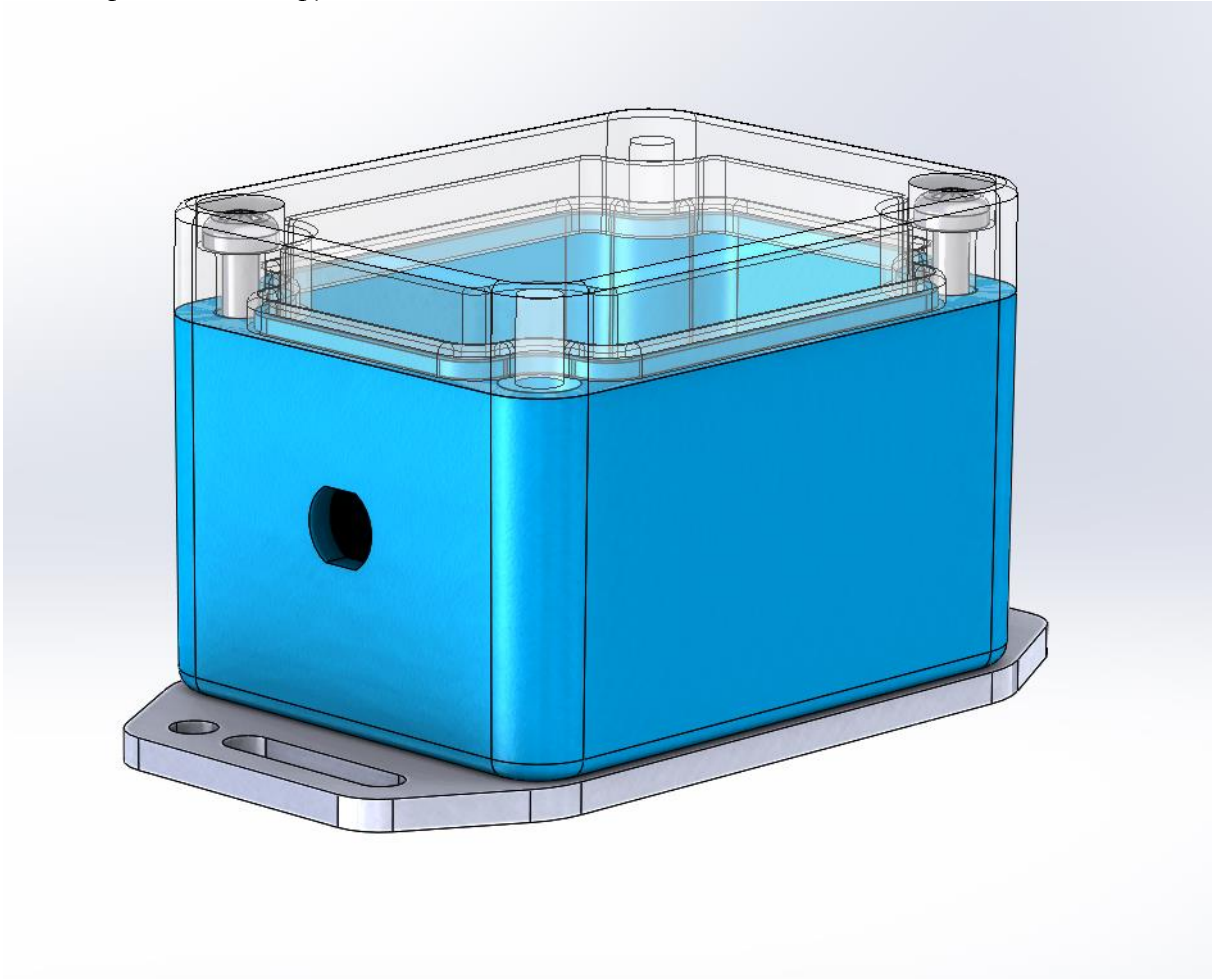
Mounting options

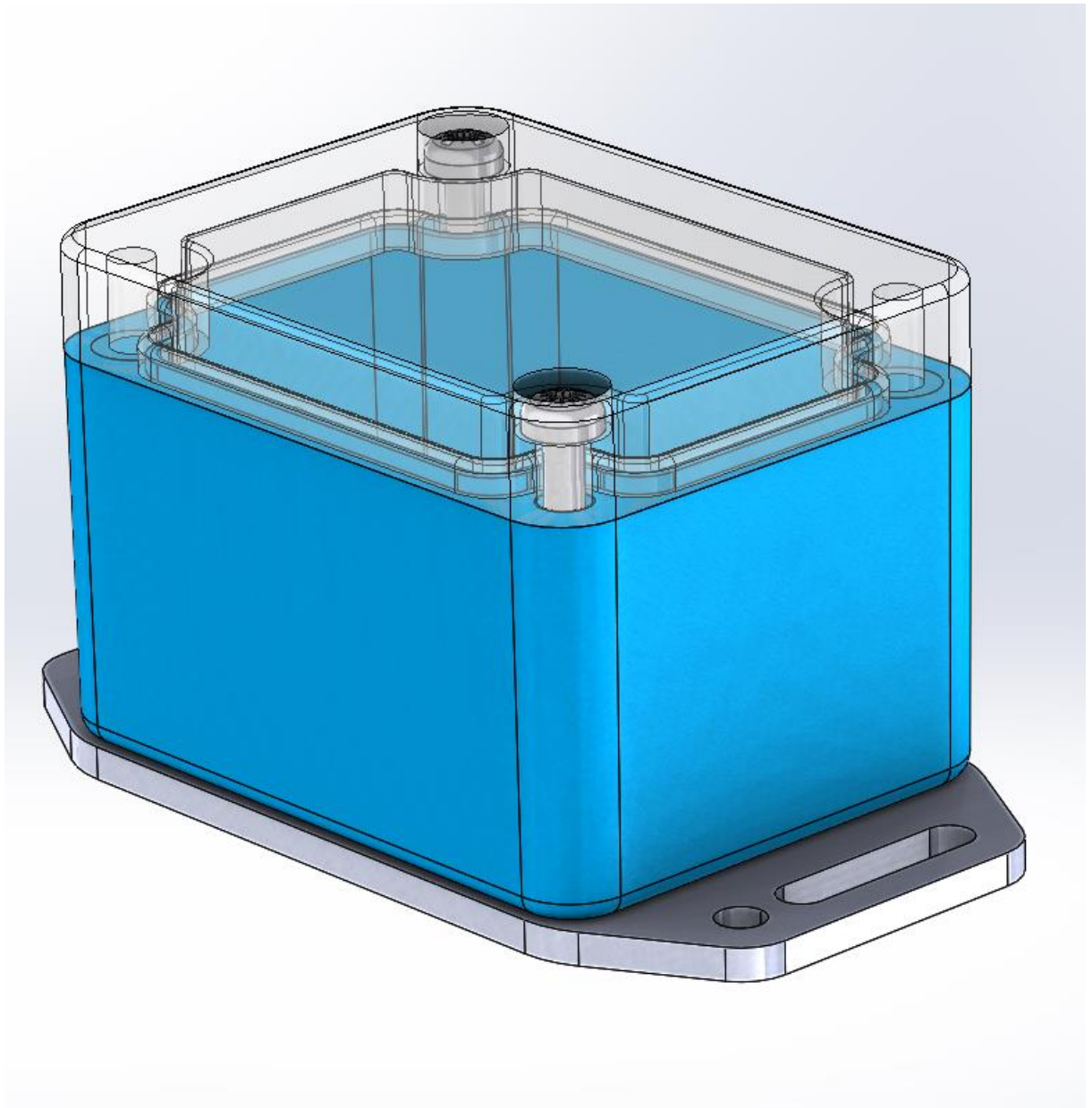
1. Vehicle Tag 2.1 only:
 - a. Open the Vehicle Tag

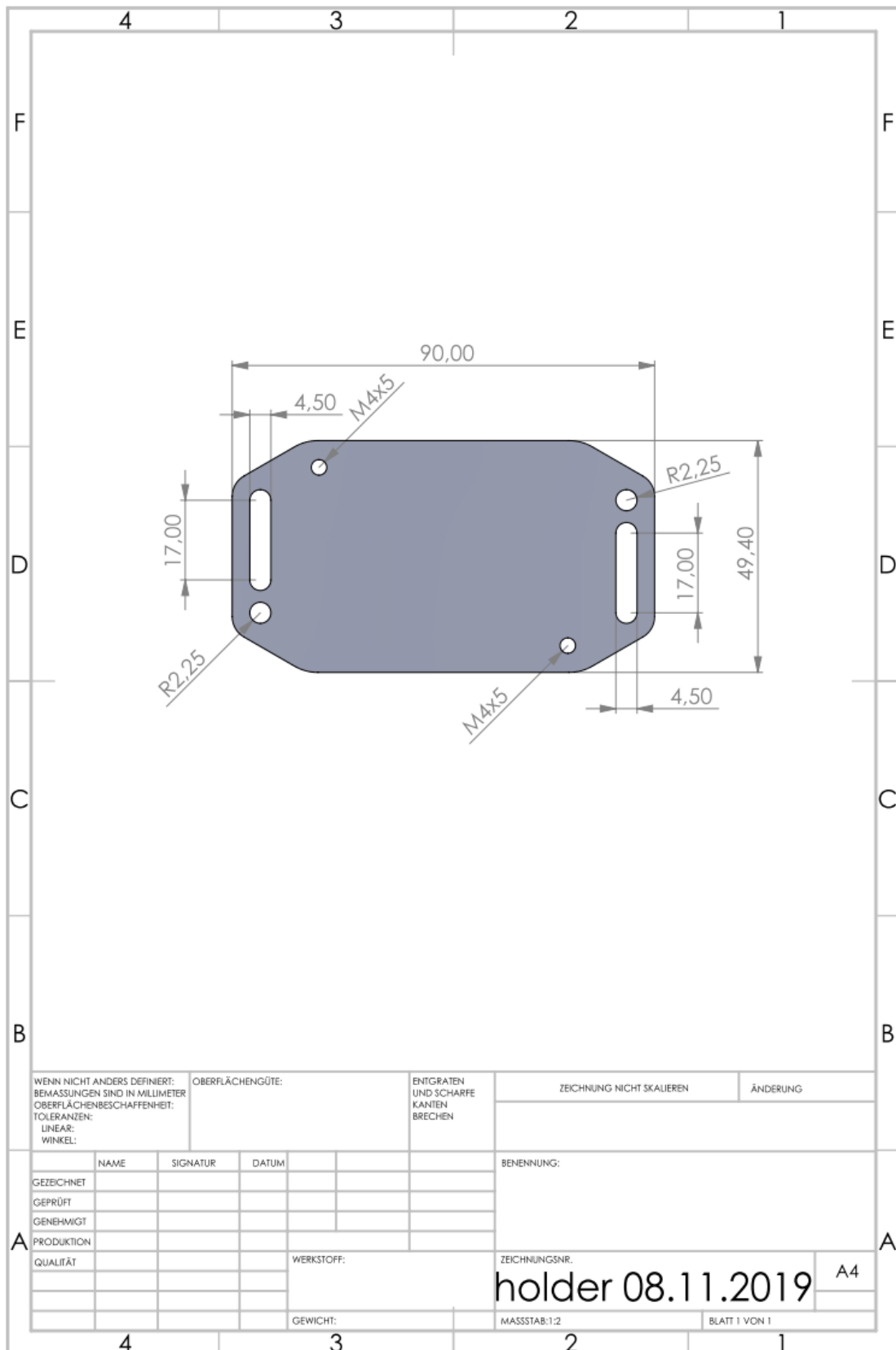


- b. Use 2x M4 screws for mounting – size and position see also Mechanical drawing

2. Vehicle Tag 2.1 with mounting plate







Cable

- Max cable length: 3m
- Voltage range: max. 30V
- Power supply must be fused to a max. current of 450 mA
- Cable example:
 - 2m, 1x open wires, 1x M8-12 pin (female)
Binder Connector: order no.: 77 3406 0000 50012-0200
 - For longer cables (up to 3m):
reduce cable length of Binder Connectors: order no.: 77 3406 0000 50012-0500

Regulatory Notices

FCC COMPLIANCE

This device complies with 47 CFR 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 satellite 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 outdoors 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 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.

IMPORTANT NOTICE

This equipment may only be operated as a handheld device. Operation with fixed outdoor antennas is prohibited and could subject the operator to serious legal penalties. The Kinexon Tag will only operate (i.e. transmit UWB signals) when activated within a Kinexon 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.

These devices are not permitted for operation on board aircraft or satellites and shall also not be used for operating toys. The use of this device mounted on a fixed outdoor infrastructure, including antennas mounted on outdoor structures such as poles or buildings, is not permitted, except for operation on board ships or 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 exemptés de licence conformes aux RSS (RSS) 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.

Les appareils ne peuvent pas être utilisés à bord d'aéronefs ou de satellites et ils ne peuvent pas être utilisés pour faire fonctionner des jouets. L'utilisation de cet appareil monté sur une infrastructure fixe d'extérieur, comprenant les antennes montées sur des structures externes telles que des poteaux ou des bâtiments, n'est pas autorisée, sauf lorsque les structures en question sont des bateaux ou des véhicules terrestres.

Déclaration d'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.