

TRIOMOBIL

FORKLIFT SAFETY ASSISTANCE

- Maximum safety for personnel and vehicles
- Comfort modules for total flexibility
- NEW: Collision protection for forklift trucks
- Intelligent technology for automatic safety
- Compatible with all major forklift truck models

Forklift Unit Installation Guide

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IMPORTANT INFORMATION FORKLIFT SAFETY ASSISTANCE

NOTICE

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.

NOTICE

The Pedestrian Safety Card (Model: UA2-PSC-V2) complies with FCC radiation exposure limits set forth for an uncontrolled environment.

NOTICE

Forklift Reader Unit 1 (Model: UA2-FRU1-V2) and Forklift Reader Unit 2 (Model: UA2-FRU2-V2) comply with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

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IMPORTANT INFORMATION FORKLIFT SAFETY ASSISTANCE



WARNING

Forklift Safety Assistant System is designed as an Assistant or supportive safety system. It does not make any commitment to provide certainty or 100% protection. Trio Mobil Assistant safety system does not eliminate operator responsibility or autonomy.

Trio Mobil Company is not responsible for any problems that may arise due to the use, non-use, activation or non-activation of the system.

The working principle defined in the topology document is for ideal conditions, it should be taken into account that environmental conditions and other factors (natural events, electrical and software factors) may affect the operation of the system.

It is the Customer's responsibility to inform all personnel who will use the system in this regard, and to maintain all previous occupational safety measures.

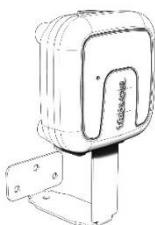
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DEFINITIONS FORKLIFT SAFETY ASSISTANCE



Forklift Central Unit (FCU)

NEW Forklift Central Unit (FCU) +
Early Warning Unit + Reader Units Connection Unit



Forklift Reader Unit : Ultra-Wide Band antennas to measure the range between forklifts and pedestrians, other forklifts or zone based speed limiters.

Vehicle : Forklift or similar machinery .



Pedestrian Safety Card : Mobile tracker units for pedestrians. Antennas connected to FCU unit communicate with pedestrian devices and measure the distance between them.



Ultra-Wide Band : Wireless communication technology which the forklift functional safety system is based on.





SAFETY INSTRUCTION FORKLIFT SAFETY ASSISTANCE AND LEGAL NOTICE

○ SAFETY INSTRUCTIONS

This section explains the safety rules for Forklift Central Unit installation. In order to avoid dangerous situations, please follow these requirements and recommendations. Please read these instructions carefully and follow strictly before operating the device!

The device can be powered with a DC voltage between 9V and 36V.

Before device installation, please check the device accessories.

Please be sure of the software settings of the device.

In order to disassemble the device, disconnect the power cable first.

○ LEGAL NOTICE

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The manufacturer reserves the right to make changes and/or improvements at any time in design, functionality, parameters and electrical characteristics without any prior notice and without incurring obligations.

○ DOCUMENT DETAIL

This document contains information about the Basic specifications, accessories, mechanical characteristics, and configuration of the Forklift Central Unit device.

Acronyms and terms used in the document:

- AC/DC - Alternating Current / Direct Current
- I/O - Input / Output



ELECTRICAL CONNECTION FORKLIFT SAFETY ASSISTANCE

Forklift Central Unit has multiple I/O interfaces that make the device an ideal choice for tracking and safety applications that require sophisticated integrations. Forklift Central Unit has been specifically designed to be used for functional safety and tracking purposes.

Wide operating voltage ensures reliable operation in light and heavy-duty vehicles. EMC proven design and uninflammable casing make it a safe solution for automotive applications.

Forklift Central Unit also has optional backup battery of up to 900 mAh. The device can operate for 18 hours autonomously in normal mode.

Forklift Central Unit has 6 open collector outputs that can be used with 12-24V relays, 2 digital inputs, 3 UART ports, 8 yellow leds, 6 red leds, a central led, a led bar (pedesterian device measure) an error led, a buzzer and optional 5V DC Power Supply (for Trio Mobil Pedesterian Safey Card Charging).

○ PACKAGE CONTENTS

Forklift Central Unit Box contains below listed items. Trio Mobil has the right to make a change on the below list.

- Forklift Central Unit Device Body
- I / O Ports Connection Cable

○ BASIC CHARACTERISTICS

○ WIRELESS INTERFACE

UWB (Ultra-Wide Band) Communication module

- Supports Forklift Safety Solution and Indoor tracking applications.
- I / O Ports Connection Cable

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ELECTRICAL CONNECTION FORKLIFT SAFETY ASSISTANCE

- **WIRED INPUTS**

- 2 x UART (for Trio Mobil Forklift Reader Units)
- 1 x Ignition Input
- 1 x General I/O

- **WIRED OUTPUTS**

- 3 x Digital Outputs (OC) (for Forklift inputs)
- 3 x Digital Outputs (OC) (for external Siren)
- 1 x UART (for Online System with Trio Mobil 4G/GSM/GPRS GW)
- 5V DC Power Supply (for Trio Mobil Pedesterian Tracker Charging)

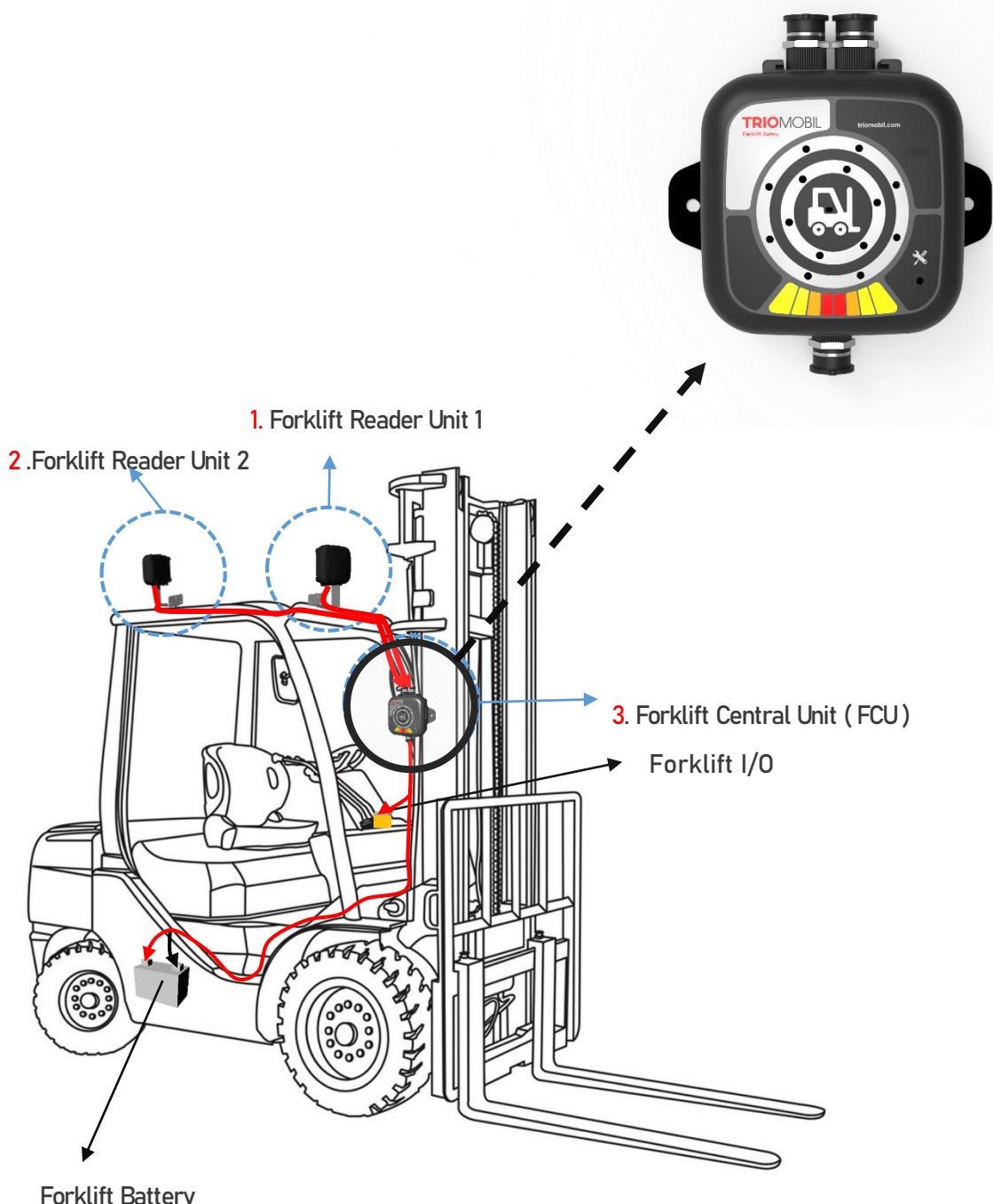
- **LEDS and BUZZER**

- 8 x Yellow Leds (Exterior Circle) (for Medium Speed)
- 6 x Red Leds (Inner Circle) (for Low Speed)
- 1 x Central Led
- 1 x Led Bar (for pedestrian device measure)
- 1 x Error Led
- 1 x Buzzer (for Warning)

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ANATOMY of the SYSTEM

FORKLIFT SAFETY ASSISTANCE

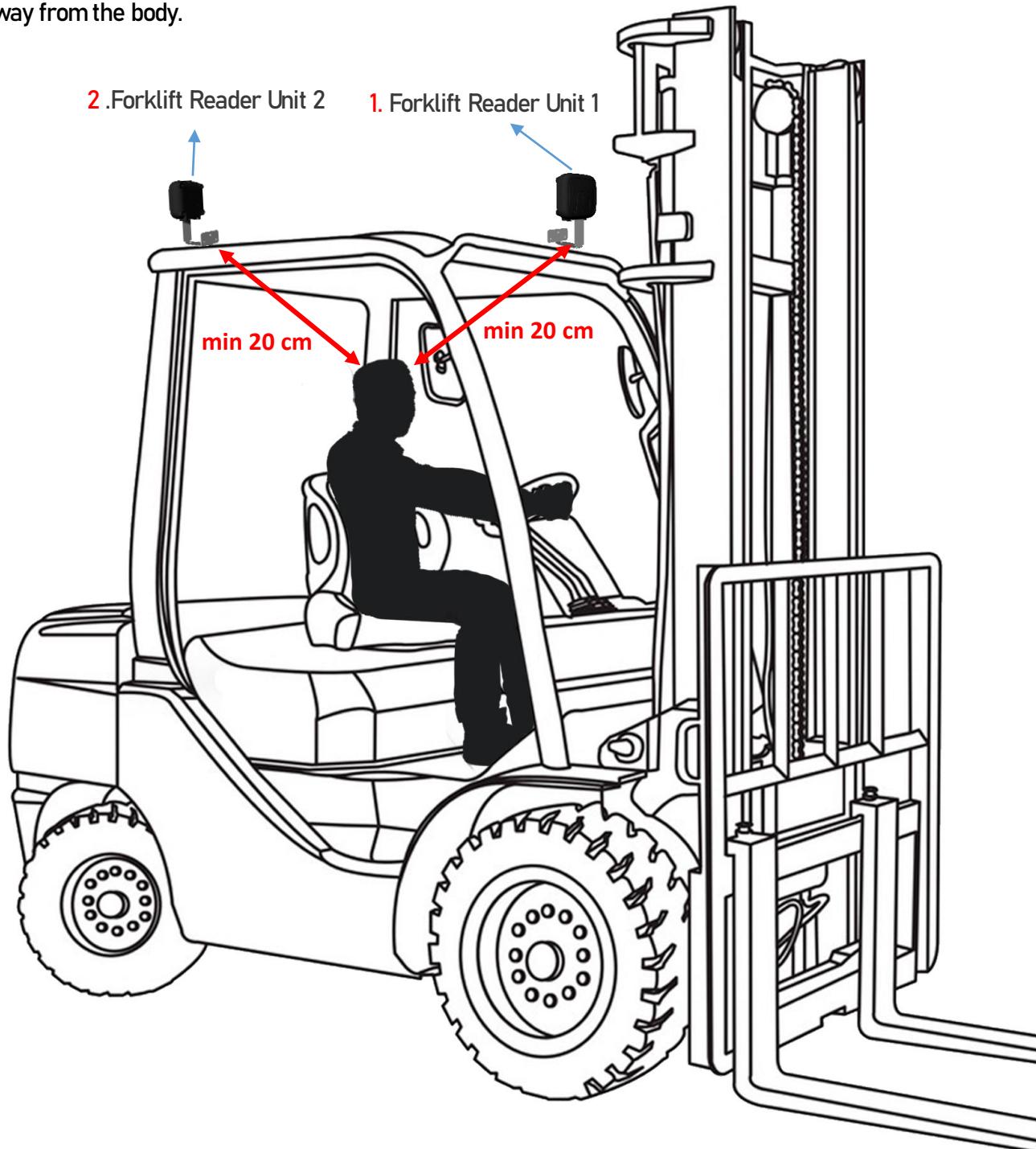


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ANATOMY of the SYSTEM

FORKLIFT SAFETY ASSISTANCE

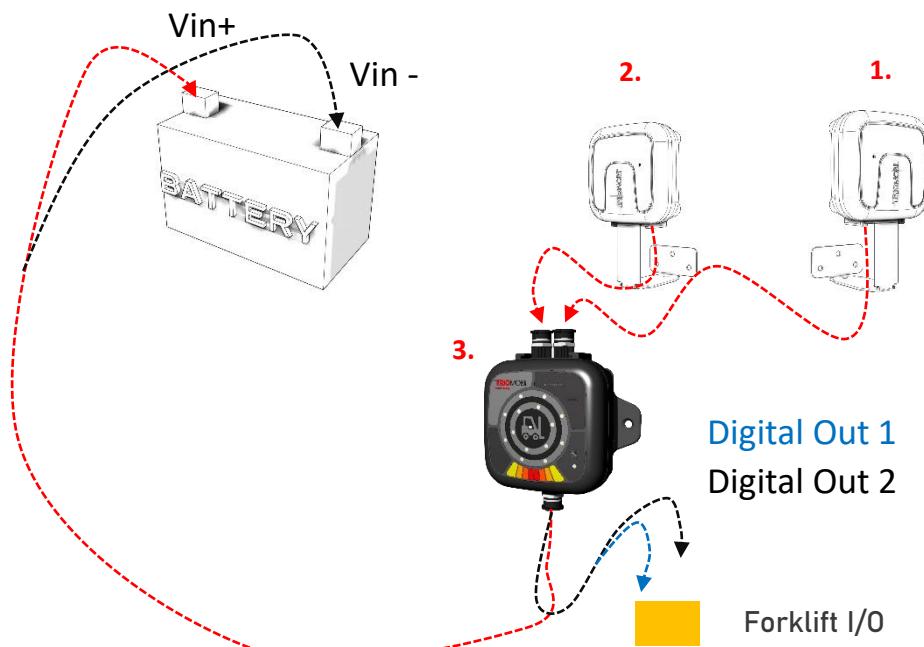
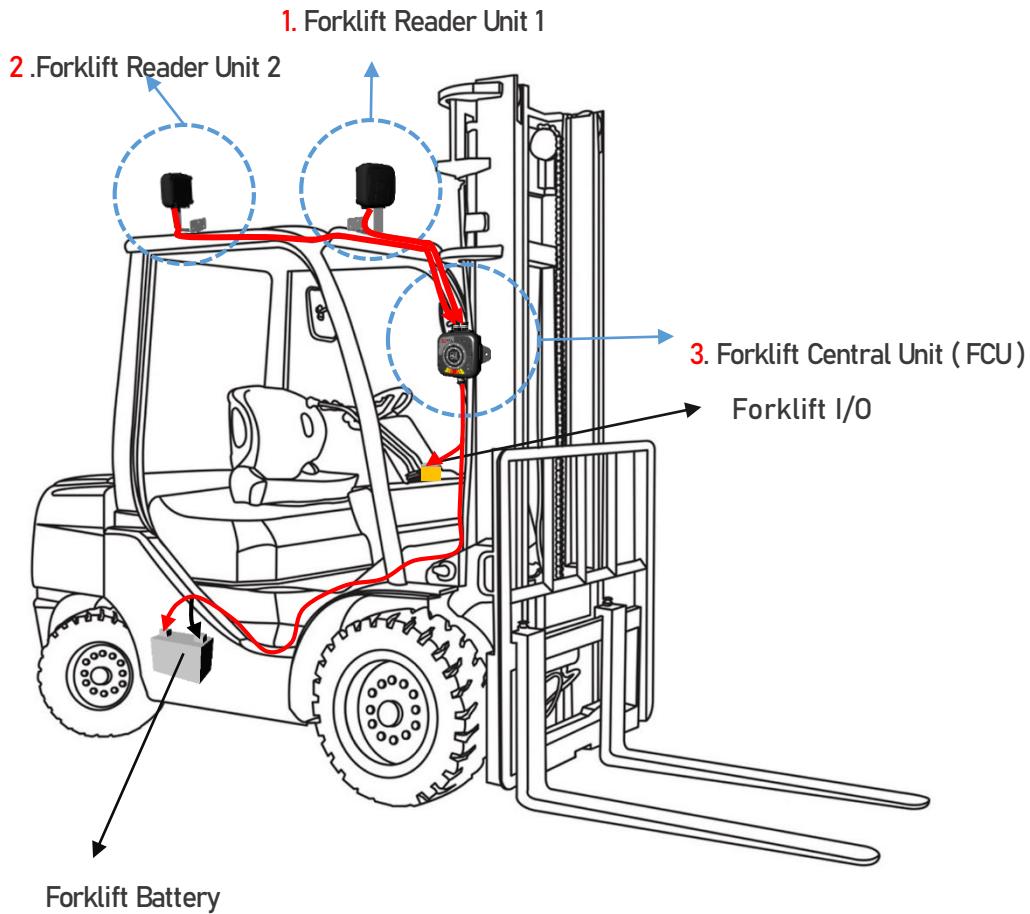
Forklift Readers are installed minimum 20 cm away from the body.



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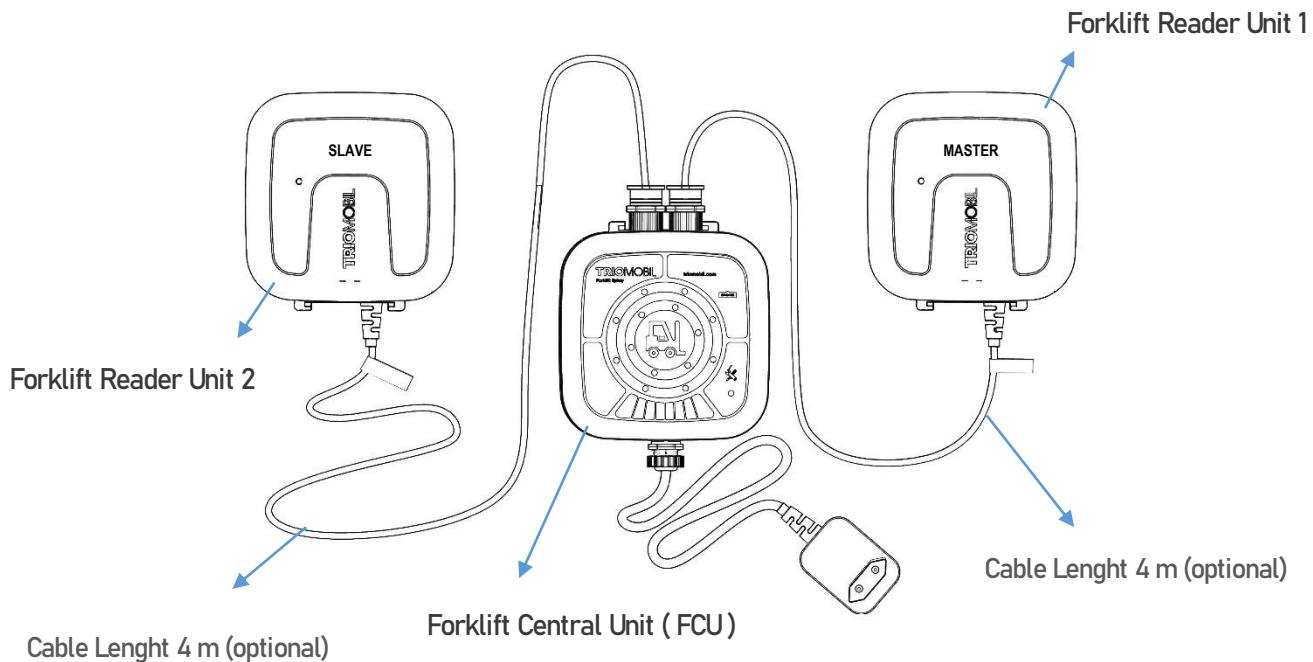
ANATOMY of the SYSTEM

FORKLIFT SAFETY ASSISTANCE



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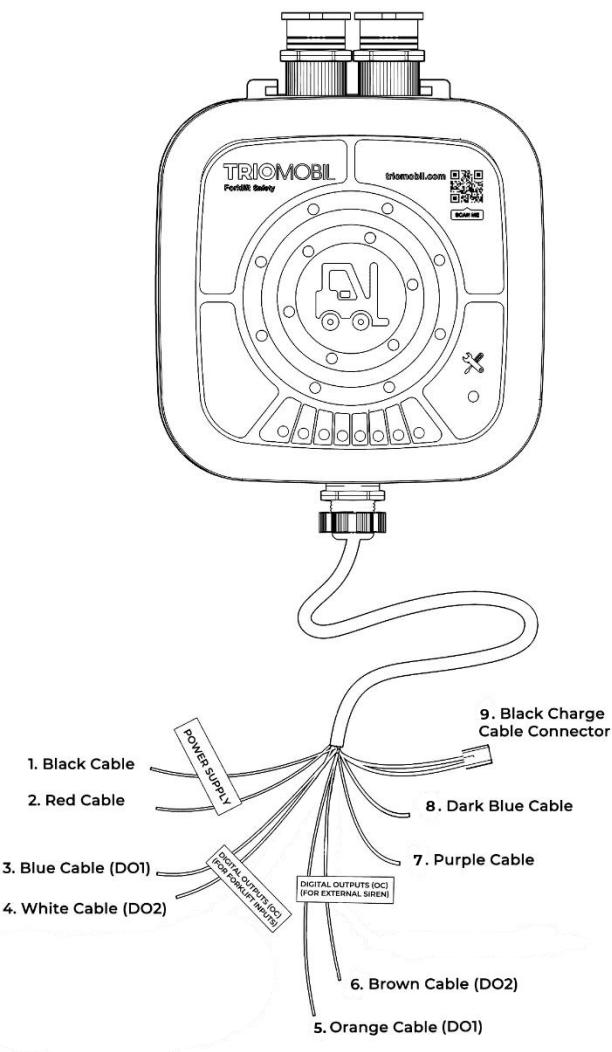
ELECTRICAL INPUTS / OUTPUTS FORKLIFT SAFETY ASSISTANCE CONNECTION DIAGRAM, PIN SCHEMATICS



1. The FCU is fixed inside the forklift cabin in an area where the forklift operator can see.
2. The cable set containing the power and output cables of the FCU is placed in the forklift control panel.
3. The FCU is powered.
4. Forklift Reader Unit 1 is placed on the front of the forklift in such a way that no material comes in front of it. Then the connection of the FCU to the master port is made.
5. Forklift Reader Unit 2 is placed on the back of the forklift in such a way that no material comes in front of it. Then the connection of the FCU to the slave port is made.
6. The forklift is started, and it is ensured that the LEDs of the FCU are properly lit. This test can be performed by bringing the personnel tracker closer to the forklift. First the yellow circle becomes active, then as you get closer to the forklift, the red circle activates. According to the distance of the staff, the led bar will light up.
7. After all the controls are done, 2 digital output connections can be made to the Forklift I/O.

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ELECTRICAL INPUTS / OUTPUTS FORKLIFT SAFETY ASSISTANCE CONNECTION DIAGRAM, PIN SCHEMATICS



The number 1 **black** cable is the 9-36 V Power Supply cable, it is connected to the vehicle's supply.

The number 2 **red** cable is the 9-36 V Power Supply cable, it is connected to the vehicle's supply.

The number 3 **blue** cable is the **low speed** output from the Forklift Central Unit. It is connected to the corresponding input on the Forklift Control Panel.

The number 4 **white** cable is the **medium speed** output from the Forklift Central Unit. It is connected to the corresponding input on the Forklift Control Panel.

The **orange cable** number 5 is the **low speed siren** wire, it is connected to the low speed siren input.

The **brown cable** number 6 is **medium speed siren** wire, it is connected to medium speed siren input.

The **purple cable** number 7 is the **ignition input** cable. It is connected to the ignition part of the vehicle.

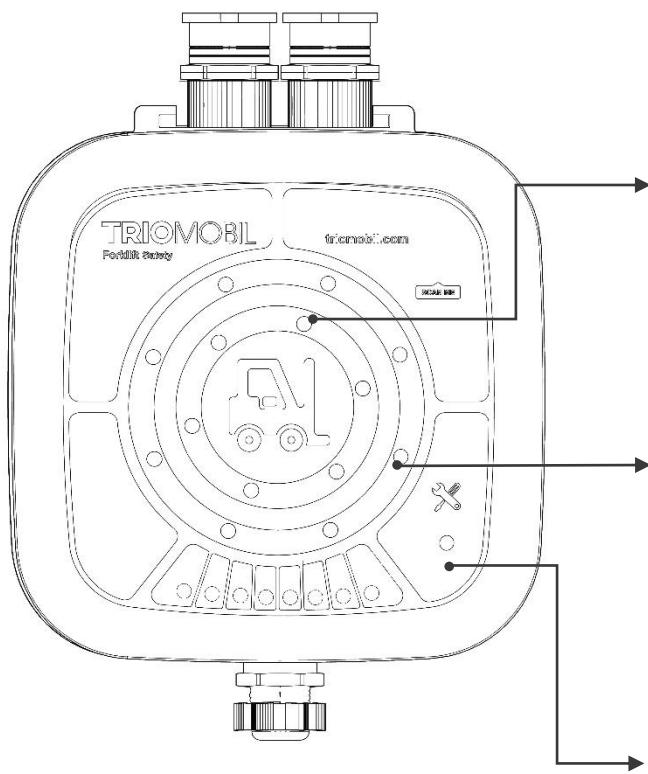
The number 8 **dark blue cable** is the General I/O cable.

2 black cables numbered 9 are 5V **pedestrian device charge** cable connector.

NOTE: During the installation all cables might or might not be used. The availability of cables depends on the installation. The function of each coloured cable will also be mentioned behind the device.

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INDICATORS DESCRIPTION FORKLIFT SAFETY ASSISTANCE



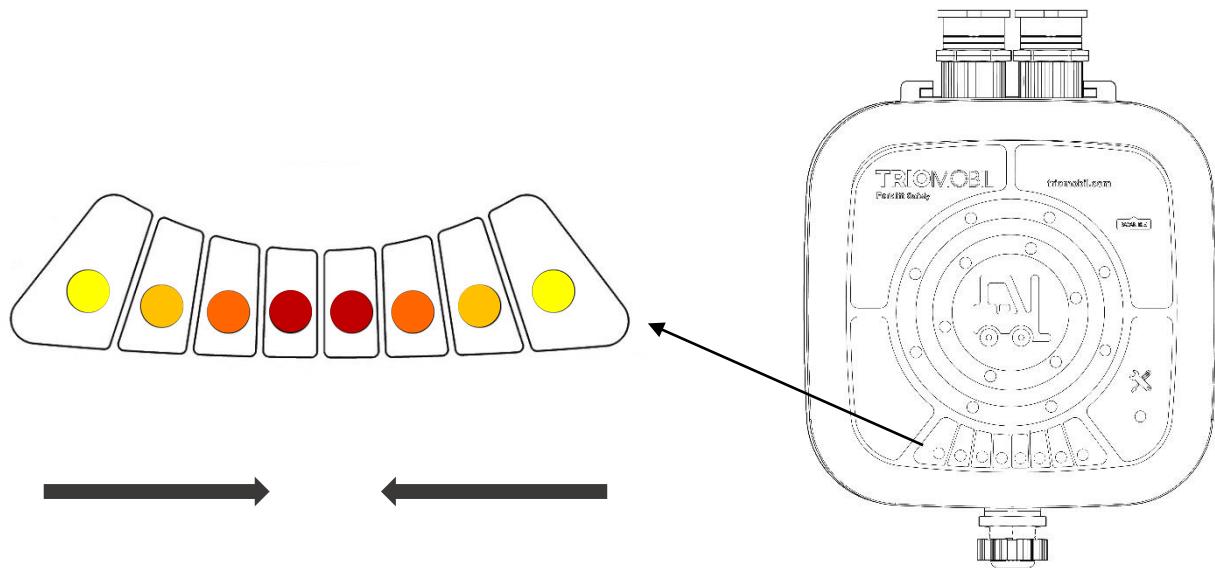
When forklifts or people are detected in the **first priority distance**, the driver is alerted by the red light located in the specified location and the forklift speed is set to **low speed** mode.

When forklifts or people are detected in the **second priority distance**, the driver is alerted by the yellow lights located in the specified location and the forklift speed is set to **medium speed** mode.

In error situations, the indicated lights turn **red**. Disconnection with Forklift Reader Unit 1 could be a possible scenario of such errors.

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INDICATORS DESCRIPTION FORKLIFT SAFETY ASSISTANCE



When people or forklifts are detected around the forklift, the lights in the led bar indicated in the image turn on according to the distance.

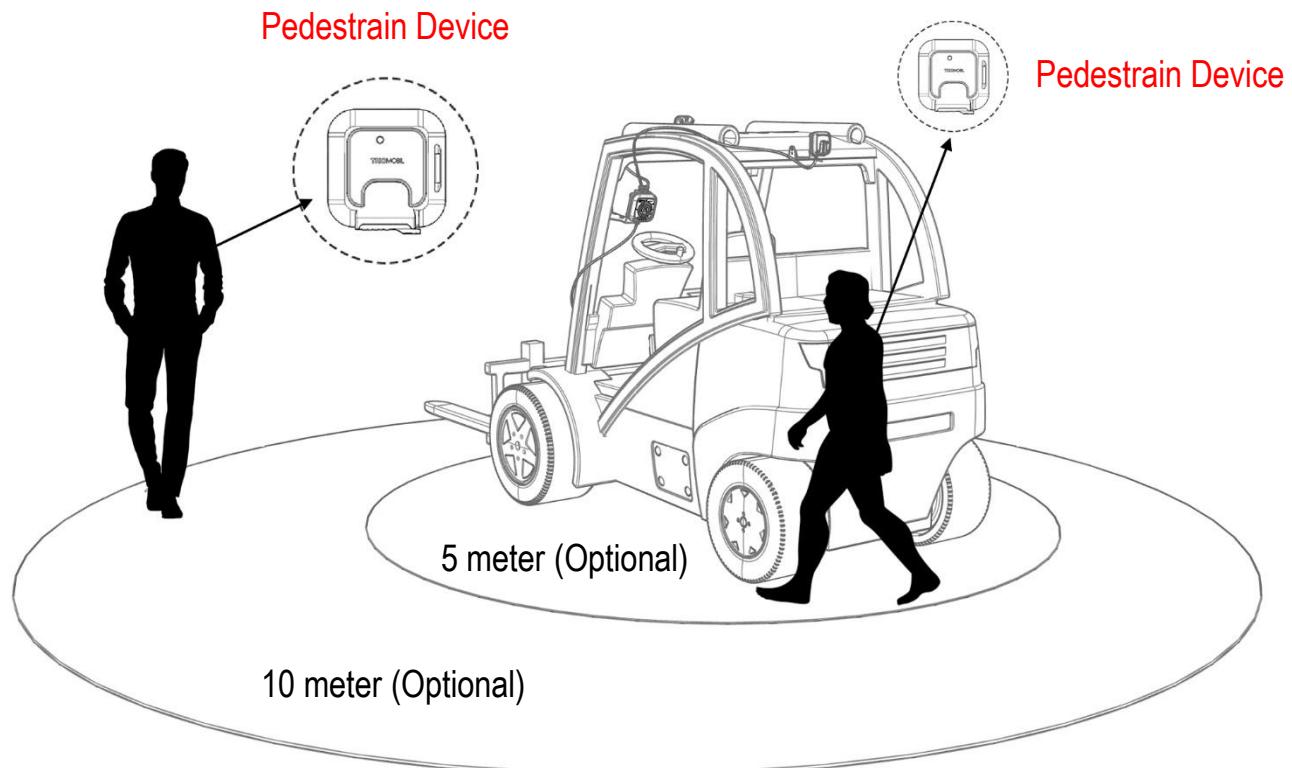
As the distance decreases, the lights start to turn on in the direction of the arrow. The light colors change from yellow to red from outside to inside.

Forklift devices and pedestrian devices communicate with each other and measure distance when they are within range. When a forklift and pedestrians get close to each other, the distance between them is measured (typically 5-10 times per second)

If they are closer than the predefined distance, the forklift control unit sets its output to give a slowdown command to the forklift.

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INDICATORS DESCRIPTION FORKLIFT SAFETY ASSISTANCE

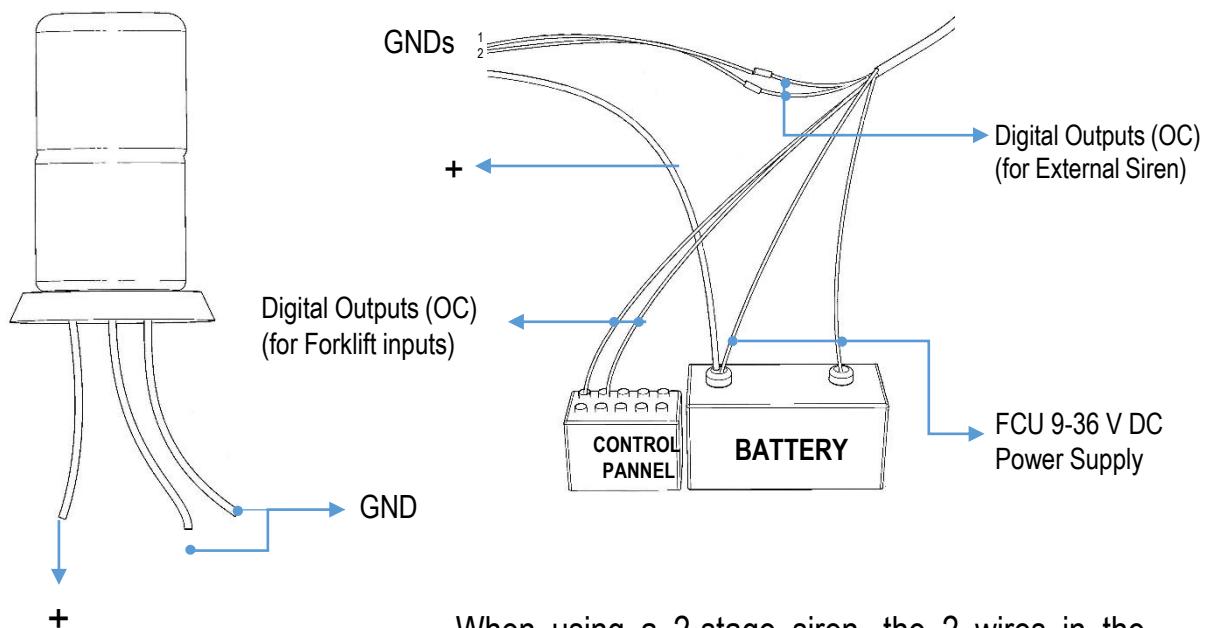


When there are people or forklifts in the low-medium-high risk areas around the forklift, the devices on the person and the forklift detect each other and the LEDs on the instrument panel give a warning. These distance settings are determined and sent according to the customer's request. It is possible to change them later.

Forklift Control Unit and pedestrian devices communicate and measure distance when they are within range. When a forklift connects with any pedestrian device, the distance between forklift and pedestrian is measured periodically (typically 5-10 times per second).

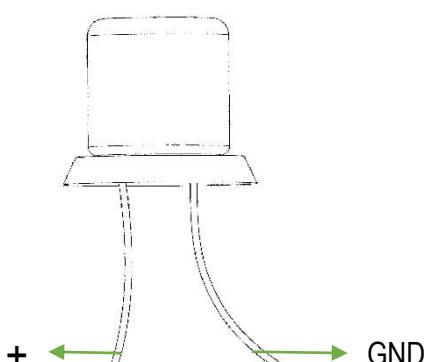
If they are closer than the predefined distance, the forklift control unit sets its output to give a slowdown command to the forklift.

2 STAGE- SIREN



When using a 2-stage siren, the 2 wires in the siren are connected with the external siren wires in the FCU.

1 STAGE- SIREN



from Stage 1
Siren

GND

from FCU I/O
Connector

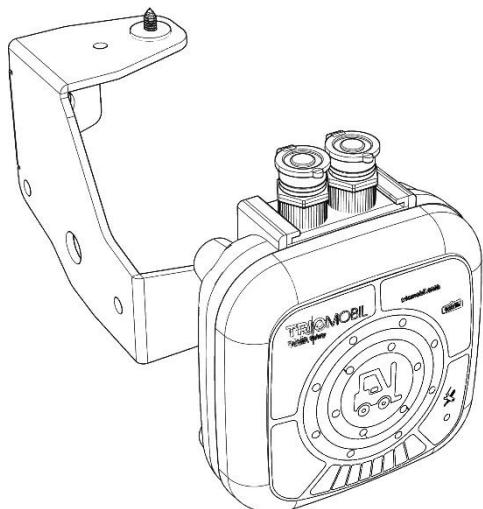
Digital Outputs (OC)
(for External Siren)

When using a 1-stage siren, only 1 of the 2 wires in the siren is connected to the relevant external siren wire in the FCU.

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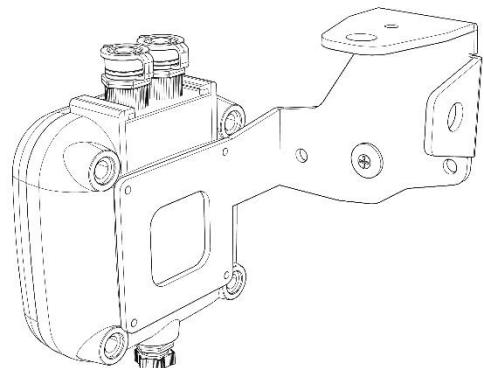
TYPES OF MOUNTING FORKLIFT SAFETY ASSISTANCE

Option 1

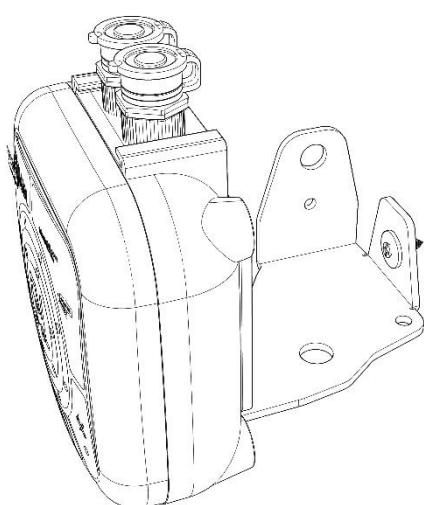


There are 2 types of apparatus used for mounting the device to the forklift. The spider apparatus with the code TRIO-F360-24092020 in images 1, 2 and 3 allows us to mount the device in different directions. The butterfly apparatus with the code TRIO-BTRF-19032020 in the image number 4 can be used wherever necessary appropriate.

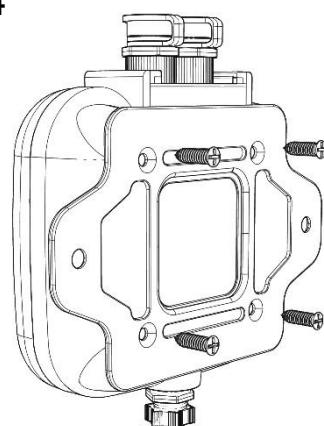
Option 2



Option 3



Option 4

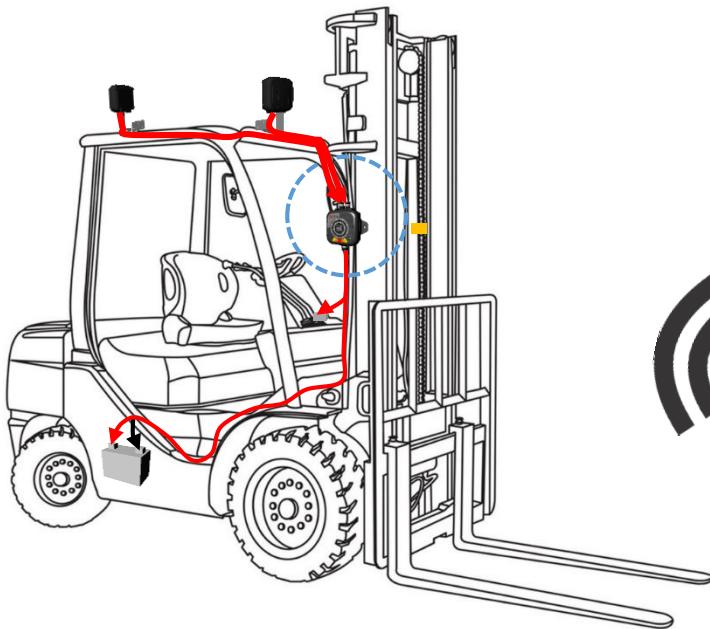


Butterfly Apparatus

08.06.2022

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SYSTEM SETTINGS FORKLIFT SAFETY ASSISTANCE



System installed on the forklift



Forklift Technician

Once the devices are installed on the forklift, an authorized forklift technician should connect to the forklift's control panel and set speed settings for the pins where low speed and medium speed signal wires are connected.

Attention: The connection between the signal wires of Trio Mobil safety system and the forklift pin socket and should be done under the supervision of authorized forklift technician.

Attention: The speed settings are done by the authorized forklift technician by connecting to the forklift control panel through the software available to them.

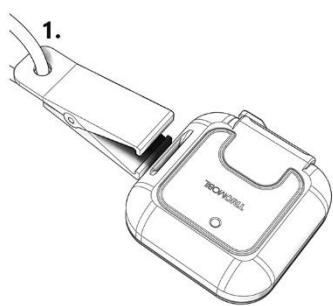
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TRACKER AND CHARGE UNIT

FORKLIFT SAFETY ASSISTANCE

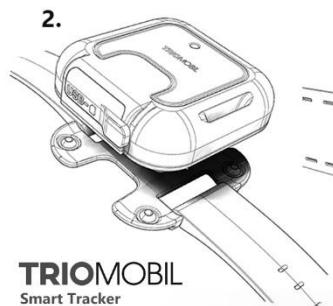


Tracker



USAGE OPTIONS

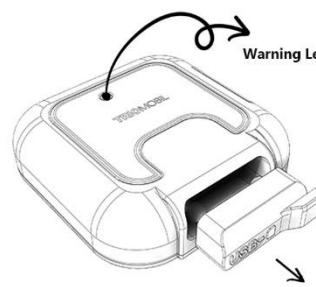
- 1 - With neck lanyard
- 2 - Use on arm
- 3 - Use on belt



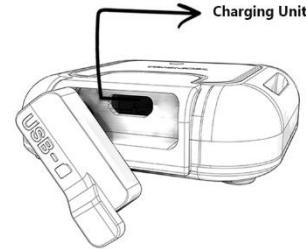
3.



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Smart Tracker



Charge the tracker for 3 hours before use.



TECHNICAL DETAIL

CHARGING POWER :	5V 1A
TEMPERATURE RANGE :	-20 / +50°C
DIMENSIONS :	52X52X14 mm
MATERIEL :	PC/ABS
WEIGHT :	33.68 gr

ATTENTION

Do not approach the fire to avoid detonation.
Do not disassemble the product.
Please do not hesitate to contact with us.
Support requests: tys-destek@triomobil.com
Other Inquiries info@triomobil.com



Charge Unit



FCC DECLARATION OF CONFORMITY

FORKLIFT SAFETY ASSISTANCE

FCC Part 15.19 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.

FCC Part 15.21 Statement

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 module is limited to Forklift Reader Unit 1 (Model: UA2-FRU1-V2) and Forklift Reader Unit 2 (Model: UA2-FRU2-V2)

Information for OEMs and host integrators

The OEM or integrator is obligated to adhere to these requirements and restrictions as a condition for using the module's certification. The OEM or integrator is responsible to perform the required additional host regulatory testing and/or obtaining the required host approvals for compliance.

This module is intended for OEM integrators under the following conditions:

This module is only FCC authorized for the specific rule parts 15.519 listed on the grant, and the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host product as being Part 15 Subpart B compliant.



FCC DECLARATION OF CONFORMITY

FORKLIFT SAFETY ASSISTANCE

The module may not be employed to operate toys. Operation on board an aircraft, a ship, or a satellite is prohibited. The module must be installed in handheld applications and do not employ a fixed infrastructure. The use of antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited.

The user manual of the end product should include (information for OEMs)

The module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this 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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The antenna(s) used for this transmitter must not transmit simultaneously with any other antenna or transmitter.

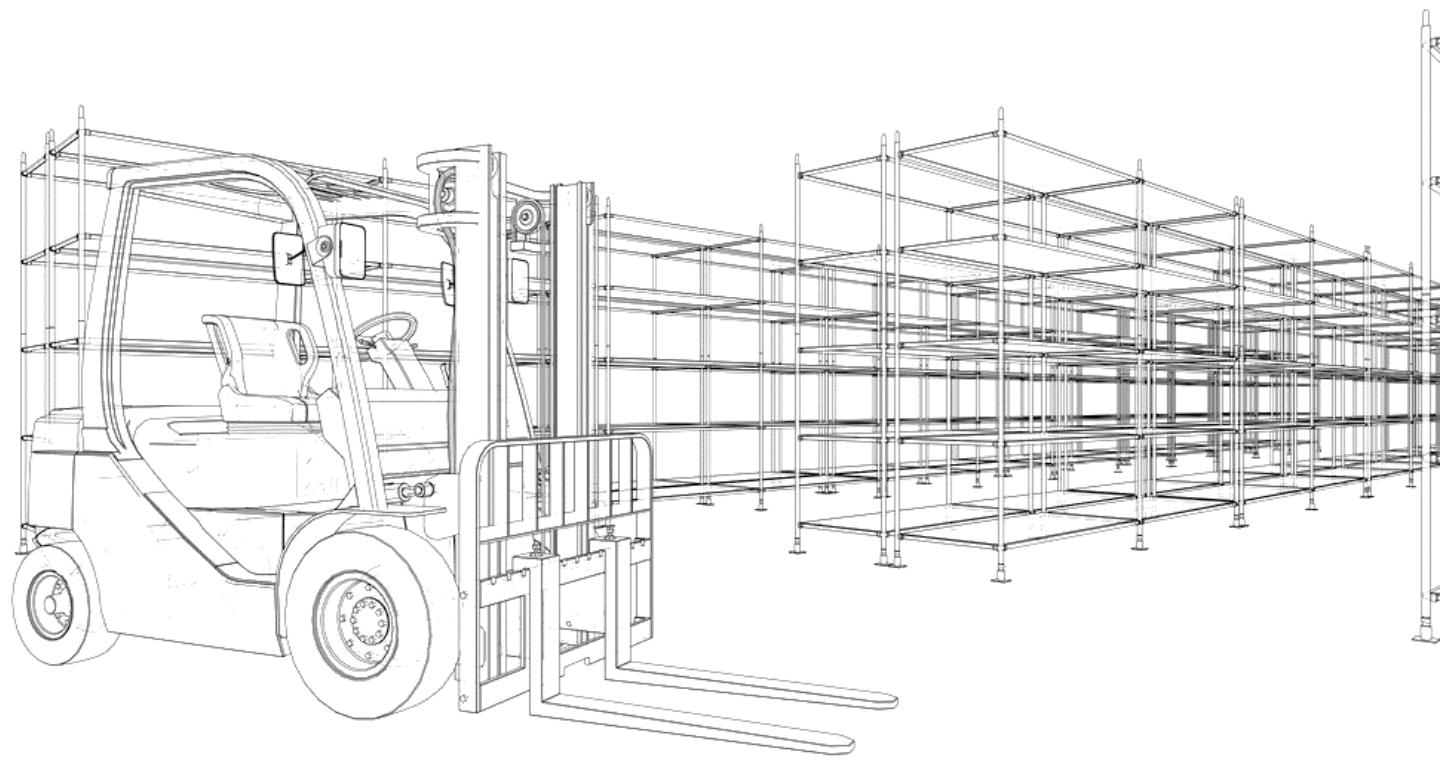
Label of the end product:

The host product must be labeled in a visible area with the following " Contains FCC ID: 2A6PMUA2-TMM-V2 ".

The end product shall bear the following 15.19 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.

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FORKLIFT SAFETY ASSISTANCE



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