

Leica iCON PA10



User Manual
Version 2.1
English

- when it has to be **right**

Leica
Geosystems

Introduction

Purchase

Congratulations on the purchase of the Leica iCON PA10.



This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "1 Safety Directions" for further information.

Read carefully through the User Manual before you switch on the product.

To ensure safety when using the system, please also observe the directions and instructions contained in the User Manual and Safety Handbook issued by the Machine manufacturer.



The content of this document is subject to change without prior notice. Ensure that the product is used in accordance with the latest version of this document.

Updated versions are available for download at the following Internet address:

<https://myworld.leica-geosystems.com> > myDownloads.

Product identification

The model and serial number of your product are indicated on the type plate.

Always refer to this information when you need to contact your agency or Leica Geosystems authorised service centre.

Available documentation

Name	Description/Format		
iCON PA10 Quick Guide	Provides an overview of the product together with technical data and safety directions. Intended as a quick reference guide.	✓	✓
iCON PA10 User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.	-	✓
iCON PA10 Installation Manual	System installation information for trained technicians and other qualified specialists.	-	✓

Refer to the following resources for all iCON PA10 documentation/software:

- the supplied data storage device
- <https://myworld.leica-geosystems.com>

Leica Geosystems address book

On the last page of this manual, you can find the address of Leica Geosystems headquarters. For a list of regional contacts, please visit **http://leica-geosystems.com/contact-us/sales_support**.



myWorld@Leica Geosystems (**<https://myworld.leica-geosystems.com>**) offers a wide range of services, information and training material.

With direct access to myWorld, you are able to access all relevant services whenever it is convenient for you.

Service	Description
myProducts	Add all products that you and your company own and explore your world of Leica Geosystems: View detailed information on your products and update your products with the latest software and keep up-to-date with the latest documentation.
myService	View the current service status and full service history of your products in Leica Geosystems service centres. Access detailed information on the services performed and download your latest calibration certificates and service reports.
mySupport	Create new support requests for your products that will be answered by your local Leica Geosystems Support Team. View the complete history of your support requests and view detailed information on each request in case you want to refer to previous support requests.
myTraining	Enhance your product knowledge with Leica Geosystems Campus - Information, Knowledge, Training. Study the latest online training material on your products and register for seminars or courses in your country.
myTrustedServices	Add your subscriptions and manage users for Leica Geosystems Trusted Services, the secure software services, that assist you to optimise your workflow and increase your efficiency.

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1 Safety Directions

1.1 General Introduction

Description

The following directions enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.

The person responsible for the product must ensure that all users understand these directions and adhere to them.

About warning messages





Warning messages are an essential part of the safety concept of the instrument. They appear wherever hazards or hazardous situations can occur.

Warning messages...

- make the user alert about direct and indirect hazards concerning the use of the product.
- contain general rules of behaviour.

For the users' safety, all safety instructions and safety messages shall be strictly observed and followed! Therefore, the manual must always be available to all persons performing any tasks described here.

DANGER, WARNING, CAUTION and **NOTICE** are standardised signal words for identifying levels of hazards and risks related to personal injury and property damage. For your safety, it is important to read and fully understand the following table with the different signal words and their definitions! Supplementary safety information symbols may be placed within a warning message as well as supplementary text.

Type	Description
 DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in appreciable material, financial and environmental damage.
	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

1.2

Definition of Use

Intended use

- Provide 360° line-of-sight awareness for machine drivers of heavy construction machinery in order to prevent them from not noticing pedestrians or other vehicles around the machinery.
 - Provide 360° line-of-sight awareness for pedestrians in order to prevent them from not noticing nearby heavy construction machinery.
 - Provide the option to set out avoidance zones or mark sensitive areas or items.
-

Reasonably foreseeable misuse

- Use of the product without instruction.
 - Use outside of the intended use and limits.
 - Disabling safety systems.
 - Removal of hazard notices.
 - Opening the product using tools, for example screwdriver, unless this is permitted for certain functions.
 - Modification or conversion of the product.
 - Use after misappropriation.
 - Use of products with recognisable damage or defects.
 - Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.
 - Inadequate safeguards at the working site.
 - Deliberate dazzling of third parties.
-

1.3

Limits of Use

Environment

Suitable for use in an atmosphere appropriate for permanent human habitation. For industrial and commercial use only. Not suitable for use in aggressive or explosive environments.

WARNING

Working in hazardous areas, or close to electrical installations or similar situations

Life Risk.

Precautions:

- ▶ Local safety authorities and safety experts must be contacted by the person responsible for the product before working in such conditions.
-

WARNING

Altered function and safety of the machine

Unauthorised modification of building and constructions machines by mounting or installing the product may alter the function and safety of the machine.

Precautions:

- ▶ Follow the instructions of the machine manufacturer. If no appropriate instruction is available, ask machine manufacturer for instructions before mounting or installing the product.
-

1.4

Responsibilities

Manufacturer of the product

Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geosystems, is responsible for supplying the product, including the User Manual and original accessories, in a safe condition.

Person responsible for the product

The person responsible for the product has the following duties:

- To understand the safety instructions on the product and the instructions in the User Manual.
 - To ensure that it is used in accordance with the instructions.
 - To be familiar with local regulations relating to safety and accident prevention.
 - To inform Leica Geosystems immediately if the product and the application becomes unsafe.
 - To ensure that the national laws, regulations and conditions for the operation of the product are respected.
-

1.5

Hazards of Use

WARNING

Unqualified installation on building or construction machinery

This may result in personal and material damage.

Precautions:

- ▶ Only an appropriately trained and qualified specialist may install this product on building or construction machinery.
-

WARNING

Distraction or loss of attention

During dynamic applications there is a danger of accidents occurring if the user does not pay attention to the environmental conditions around, for example obstacles, excavations or traffic.

Precautions:

- ▶ The person responsible for the product must make all users fully aware of the existing dangers.
-

WARNING

Inadequate securing of the working site

This can lead to dangerous situations, for example in traffic, on building sites and at industrial installations.

Precautions:

- ▶ Always ensure that the working site is adequately secured.
 - ▶ Adhere to the regulations governing safety, accident prevention and road traffic.
-

CAUTION

Unsuitable installation location

Installing near mechanically moving machine components may damage the product.

Precautions:

- ▶ Deflect the mechanically moving machine components as far as possible and define a safe installation zone.

CAUTION

Not properly secured accessories

If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example blows or falling, the product may be damaged or people can sustain injury.

Precautions:

- ▶ When setting up the product, make sure that the accessories are correctly adapted, fitted, secured, and locked in position.
- ▶ Avoid subjecting the product to mechanical stress.

DANGER

Risk of being struck by lightning

If the product is used with accessories, for example on masts, staffs, poles, you may increase the risk of being struck by lightning. Danger from high voltages also exists near power lines. Lightning, voltage peaks, or the touching of power lines can cause damage, injury and death.

Precautions:

- ▶ Do not use the product in a thunderstorm as you can increase the risk of being struck by lightning.
- ▶ Be sure to remain at a safe distance from electrical installations. Do not use the product directly under or close to power lines. If it is essential to work in such an environment contact the safety authorities responsible for electrical installations and follow their instructions.
- ▶ If the product has to be permanently mounted in an exposed location, it is advisable to provide a lightning conductor system. A suggestion on how to design a lightning conductor for the product is given below. Always follow the regulations in force in your country regarding grounding antennas and masts. These installations must be carried out by an authorised specialist.
- ▶ To prevent damages due to indirect lightning strikes (voltage spikes) cables, for example for antenna, power source or modem should be protected with appropriate protection elements, like a lightning arrester. These installations must be carried out by an authorised specialist.
- ▶ If there is a risk of a thunderstorm, or if the equipment is to remain unused and unattended for a long period, protect your product additionally by unplugging all systems components and disconnecting all connecting cables and supply cables, for example, instrument - antenna.

WARNING

Missing attention of operators or malfunctions

While steering or navigating the machine accidents may occur due to:

- The operator not paying attention to the surroundings (persons, ditches, traffic, etc.), or
- Malfunctions (...of a system component, interference, etc).

Precautions:

- ▶ The operator assures that the machine is operated, guided and monitored by a qualified user (e.g. driver).
 - ▶ The user has to be able to take emergency measures, for example an emergency stop.
-

WARNING

Incorrect fastening of the external antenna

Incorrect fastening of the external antenna to vehicles or transporters poses the risk of the equipment being broken by mechanical influence, vibration or airstream. This may result in accident and physical injury.

Precautions:

- ▶ Attach the external antenna professionally. The external antenna must be secured additionally, for example by use of a safety cord. Ensure that the mounting device is correctly mounted and able to carry the weight of the external antenna (>1 kg) safely.
-

WARNING

Exposure of batteries to high mechanical stress, high ambient temperatures or immersion into fluids

This can cause leakage, fire or explosion of the batteries.

Precautions:

- ▶ Protect the batteries from mechanical influences and high ambient temperatures. Do not drop or immerse batteries into fluids.
-

WARNING

Inappropriate mechanical influences to batteries

During the transport, shipping or disposal of batteries it is possible for inappropriate mechanical influences to constitute a fire hazard.

Precautions:

- ▶ Before shipping the product or disposing it, discharge the batteries by the product until they are flat.
 - ▶ When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed.
 - ▶ Before transportation or shipping, contact your local passenger or freight transport company.
-

WARNING

Improper disposal

If the product is improperly disposed of, the following can happen:

- If polymer parts are burnt, poisonous gases are produced which may impair health.
- If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination.
- By disposing of the product irresponsibly you may enable unauthorised persons to use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination.

Precautions:



The product must not be disposed with household waste. Dispose of the product appropriately in accordance with the national regulations in force in your country. Always prevent access to the product by unauthorised personnel.

Product-specific treatment and waste management information can be received from your Leica Geosystems distributor.

WARNING

Improperly repaired equipment

Risk of injuries to users and equipment destruction due to lack of repair knowledge.

Precautions:

- ▶ Only authorised Leica Geosystems Service Centres are entitled to repair these products.

For the AC/DC power supply and the battery charger:

WARNING

Unauthorised opening of the product

Either of the following actions may cause you to receive an electric shock:

- Touching live components
- Using the product after incorrect attempts were made to carry out repairs.

Precautions:

- ▶ Do not open the product!
- ▶ Only Leica Geosystems authorised service centres are entitled to repair these products.

For the AC/DC power supply and the battery charger:

WARNING

Electric shock due to use under wet and severe conditions

If unit becomes wet it may cause you to receive an electric shock.

Precautions:

- ▶ If the product becomes humid, it must not be used!
- ▶ Use the product only in dry environments, for example in buildings or vehicles.



- ▶ Protect the product against humidity.

1.6

Description

Electromagnetic Compatibility (EMC)

The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

WARNING

Electromagnetic radiation

Electromagnetic radiation can cause disturbances in other equipment.

Precautions:

- ▶ Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed.

CAUTION

Use of the product with accessories from other manufacturers. For example field computers, personal computers or other electronic equipment, non-standard cables or external batteries

This may cause disturbances in other equipment.

Precautions:

- ▶ Use only the equipment and accessories recommended by Leica Geosystems.
- ▶ When combined with the product, they meet the strict requirements stipulated by the guidelines and standards.
- ▶ When using computers, two-way radios or other electronic equipment, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

CAUTION

Intense electromagnetic radiation. For example, near radio transmitters, transponders, two-way radios or diesel generators

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that function of the product may be disturbed in such an electromagnetic environment.

Precautions:

- ▶ Check the plausibility of results obtained under these conditions.
-

WARNING

Use of product with radio or digital cellular phone devices

Electromagnetic fields can cause disturbances in other equipment, in installations, in medical devices, for example pacemakers or hearing aids and in aircrafts. Electromagnetic fields can also affect humans and animals.

Precautions:

- ▶ Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment can be disturbed or that humans or animals can be affected.
 - ▶ Do not operate the product with radio or digital cellular phone devices in the vicinity of filling stations or chemical installations, or in other areas where an explosion hazard exists.
 - ▶ Do not operate the product with radio or digital cellular phone devices near to medical equipment.
 - ▶ Do not operate the product with radio or digital cellular phone devices in aircrafts.
 - ▶ Do not operate the product with radio or digital cellular phone devices for long periods with the product immediately next to your body.
-

⚠ WARNING

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 the 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.

⚠ CAUTION

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

Labelling of iCON PA10 components

CRS101 machine anchor

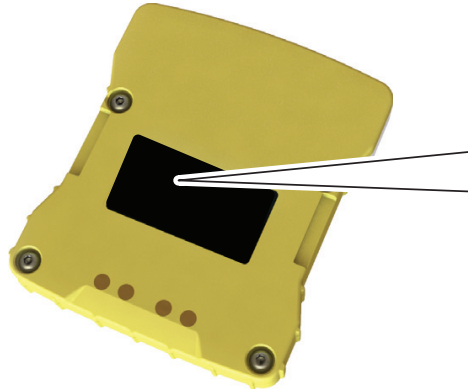


18154_002

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.

<p>Model: CRS101 FCC ID: RFD-CRS101 IC: IP67 Power: 12V-24V DC 1A max.</p>	<p>Leica Geosystems AG CH-9435 Heerbrugg Manufactured: 2019 Made in Denmark</p>

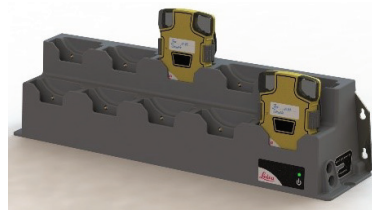
CRS103 pedestrian tag



18166.002



CRS106 gang charger



19090.002

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.



CRS125 power adapter



18167.002



CRS110 main unit



18197_002

Art. No.: 874526	S/N: 000000
Power Rating: 9-28 VDC / 0.5A	Model: CRS110 Rev: A
Manufactured: 2019 Leica Geosystems AG CH-9435 Heerbrugg Made in Switzerland	

CRS111 main unit



19629_002

Art. No.: 874523	S/N: 000000
FCC ID: RFD-CRS111 CONTAINS FCC ID: XPTYOBYL200 CONTAINS IC: 8595A-TOBYL200	Model: CRS111 Rev: A
Power Rating: 9-28 VDC / 0.5A	
Manufactured: 2019 Leica Geosystems AG CH-9435 Heerbrugg Made in Switzerland	

CRS113 display unit



18198_002

Model: CRS113	Manufactured: 2019
Art. No.: 874528	Leica Geosystems AG
S/N: 555555	CH-9435 Heerbrugg
	Made in Switzerland
	9-28VDC 200mA

CRS145 antenna



18324_001

	Model CRS145
878 405	Rev.A IPX7
	MANUFACTURED 2019
	Leica Geosystems

 WARNING

This Class (B) digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe (B) est conforme à la norme NMB-003 du Canada.

Canada Compliance Statement

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.

Canada Déclaration de Conformité

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.
-

2

Description of the System

2.1

Overview

Personal alert system

The main purpose of all machine control products of the Leica iCON PA series is to support machine drivers in recognising pedestrians or other vehicles moving around their vehicle, thus reducing the risk of accidents.

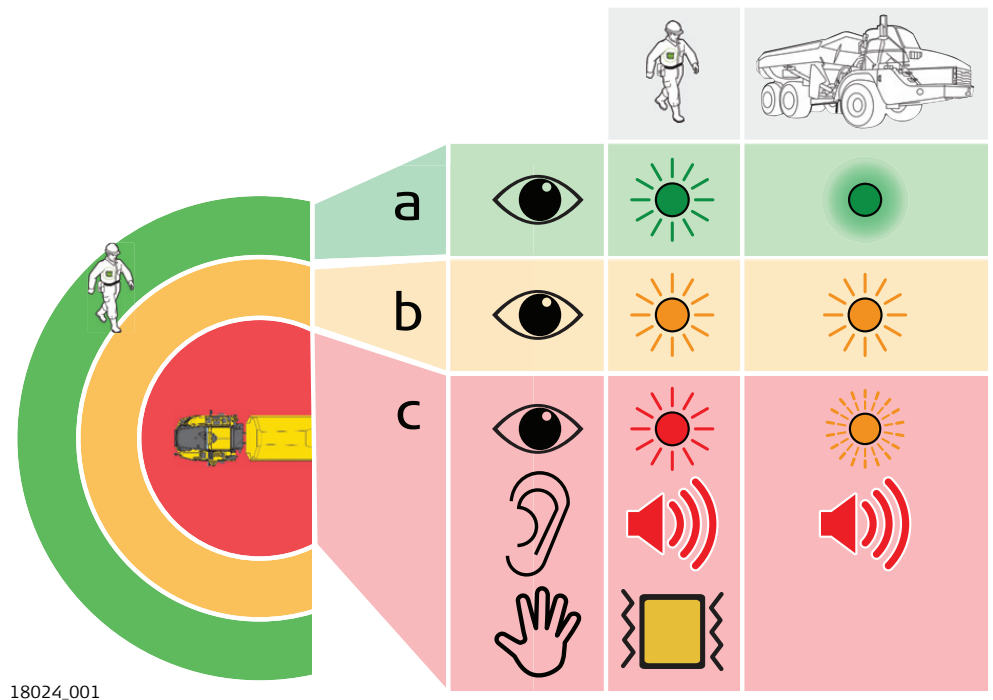
Leica iCON PA is an advanced personal alert system for machine drivers and on-site personnel based on the Time-of-Flight principle (ToF) for distance ranging.

Detection zones

iCON PA allows you to configure proximity limits for three different detection zones around a machine (Fig. 1):

- a) Far
- b) Near
- c) Close (danger zone)

As soon as a pedestrian enters one of these zones, both the pedestrian and the machine driver are alerted by the alarm signal specified for this zone.

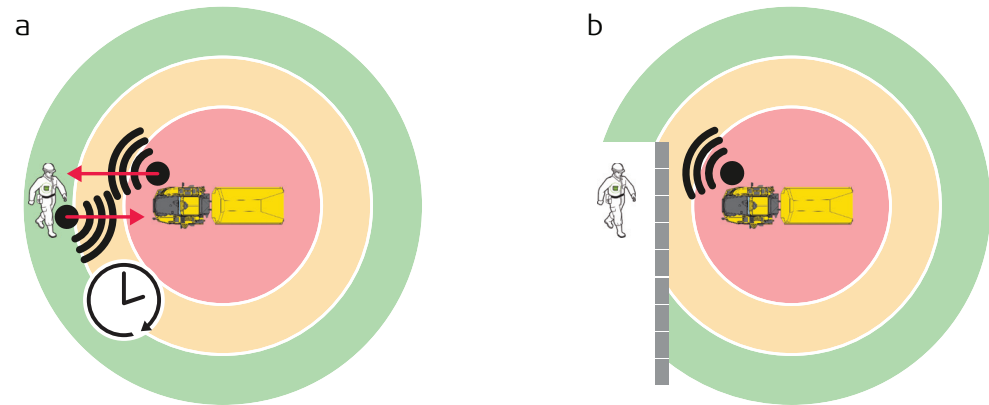


18024_001

Fig. 1: Detection zones and corresponding alarm signals

Distance detection

iCON PA operates on Ultra-Wideband based on the IEEE802.15.4-2011 standard. The maximum range for detection is 50 m with an accuracy of ± 20 cm and a repeatability of less than 5 cm.



18025_001

Fig. 2: Time-of-Flight principle and distance detection

- A machine anchor on the vehicle sends out a signal to which a pedestrian tag responds. The distance between anchor and tag is calculated based on the time it takes for the returning tag signal to reach the anchor.
- The distance ranging functionality requires a free line of sight between the cooperating system components, that is, between machine anchor and pedestrian tag.

2.2

Leica iCON PA systems

System Components

Main system components

The main components of all Leica iCON PA systems are tags worn by pedestrians and machine anchors mounted to vehicles and construction machines. These main components perform the distance ranging. In addition to these main components, a complete system consists of a display unit and, depending on the system configuration, a multipurpose antenna and a separate main unit.

Anchor configurations

Each iCON PA system supports various anchor configurations, depending on the target vehicle.

- A single-anchor configuration can be suitable for light vehicles and compact construction machines like skid steers or forward-facing dumpers.
- A two-anchor configuration is more suitable for medium-size articulated dump-trucks.
- When the host machine increases in size and complexity, use more than two anchors. A multiple-anchor configuration ensures true 360° visibility around the vehicle and helps to avoid blind spots.

Leica iCON PA10

Leica iCON PA10 is a standalone personal alert system for vehicles without MCP80/MC1-based system.

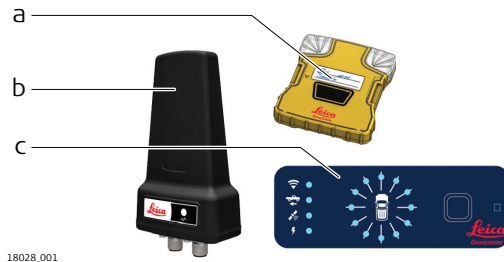


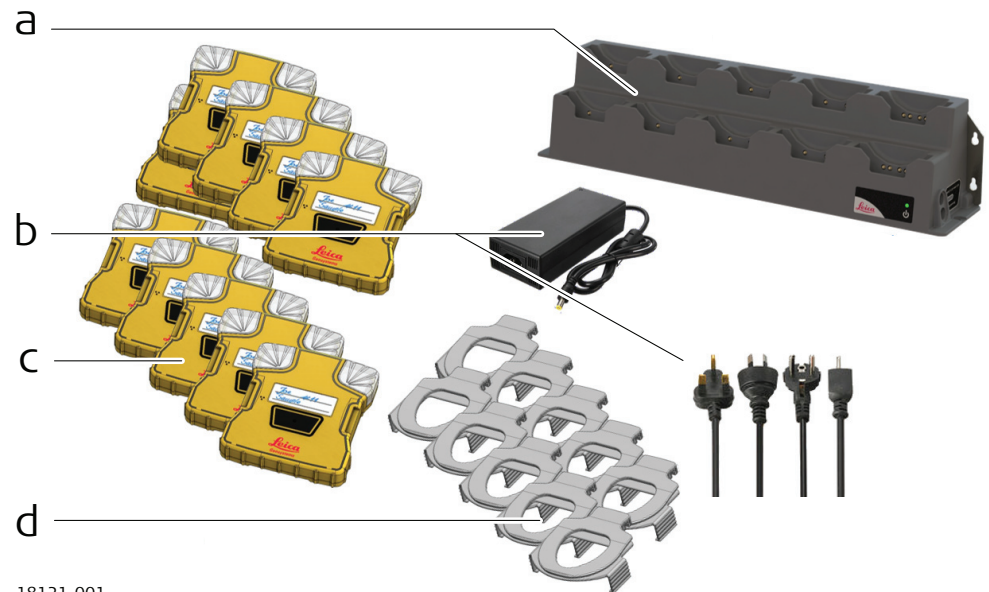
Fig. 3: iCON PA10 main components

- a CRS103 pedestrian tag
- b CRS101 machine anchor
- c CRS113 LED display unit

2.3

Available Kits

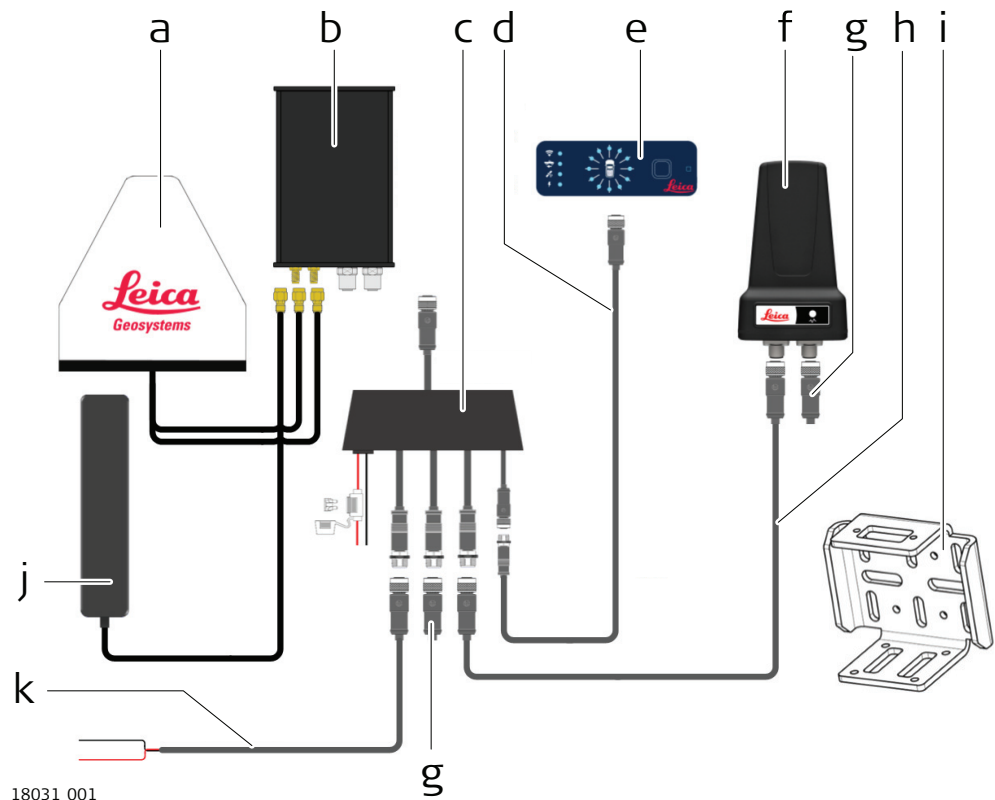
CRS130 pedestrian tag kit



18121.001

- CRS106 10-bay gang charger (874522)
- CRS125 power adapter for gang charger (874539), including area-specific plugs (879307)
- 10x CRS103 pedestrian tag (874455)
- 10x CRS104 clip for pedestrian tag (874520)

CRS151 single-anchor
kit for iCON PA10



18031_001

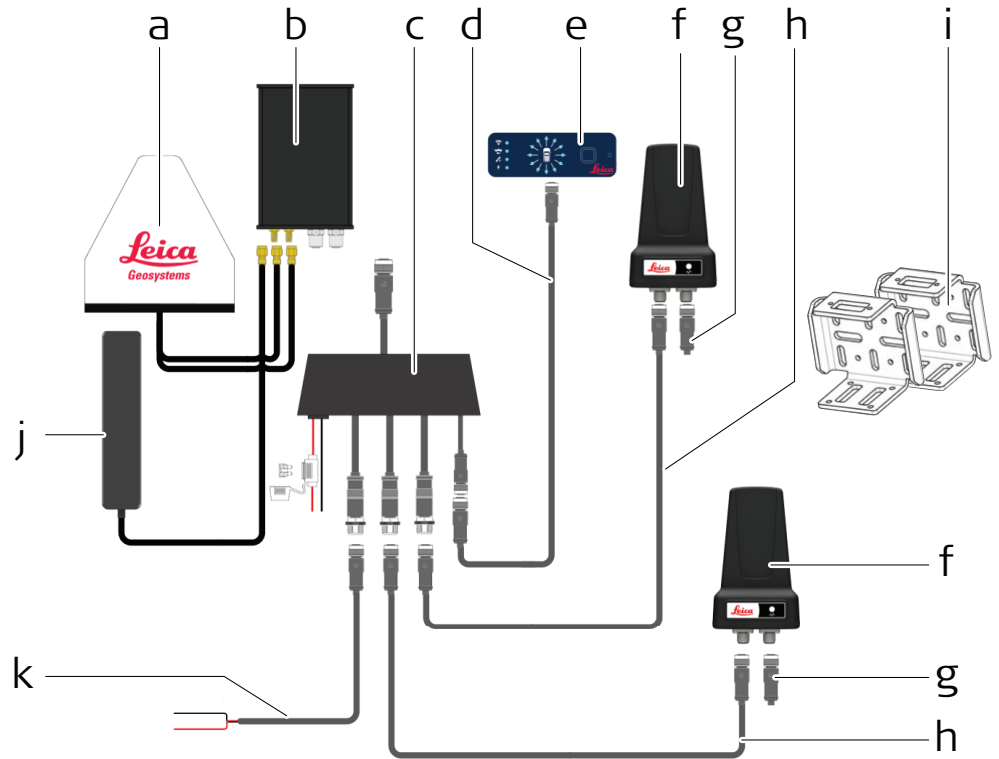
Fig. 4: Single-anchor configuration for iCON PA10

- a CRS145 antenna (878405)
- b CRS110 main unit (874526) OR CRS111 main unit (874527)
- c QD216 cable harness
- d QD222 LED-display cable, 5 m (836803)
- e CRS113 LED display unit (874528)
- f CRS101 machine anchor (870410)
- g 2x QT375 CAN Terminator (878402)
- h Not included: CAN cable, different lengths available (851348)
- i CRS102 mounting bracket for machine anchor (874378)
- j CRS139 antenna (878404)
- k QM104 power cable (836825)



Use this kit for light and compact vehicles such as small trucks, track-loaders or asphalt rollers. The kit includes the necessary licences.

CRS152 two-anchor
kit for iCON PA10



18118_001

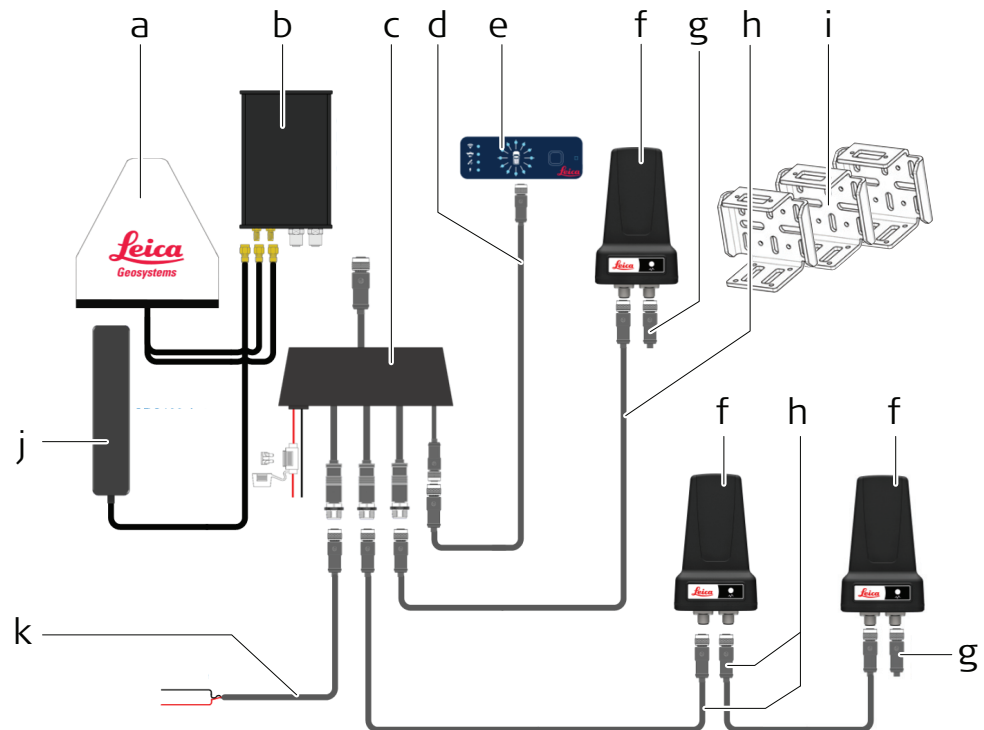
Fig. 5: Two-anchor configuration for iCON PA10

- a CRS145 antenna (878405)
- b CRS110 main unit (874526) OR CRS111 main unit (874527)
- c QD216 cable harness
- d QD222 LED-display cable, 5 m (836803)
- e CRS113 LED display unit (874528)
- f 2x CRS101 machine anchor (870410)
- g 2x QT375 CAN Terminator (878402)
- h Not included: CAN cable, different lengths available (851348)
- i 2x CRS102 mounting bracket for machine anchor (874378)
- j CRS139 antenna (878404)
- k QM104 power cable (836825)



Use this kit for articulated dump-trucks, haul trucks, larger compactors, graders or dozers. The kit includes the necessary licences.

**CRS153 three-anchor
kit for iCON PA10**



18119_001

Fig. 6: Three-anchor configuration for iCON PA10

- a CRS145 antenna (878405)
- b CRS110 main unit (874526) OR CRS111 main unit (874527)
- c QD216 cable harness
- d QD222 LED-display cable, 5 m (836803)
- e CRS113 LED display unit (874528)
- f 3x CRS101 machine anchor (870410)
- g 2x QT375 CAN Terminator (878402)
- h Not included: CAN cable, different lengths available (851348)
- i 3x CRS102 mounting bracket for machine anchor (874378)
- j CRS139 antenna (878404)
- k QM104 power cable (836825)



Use this kit for drill rigs, asphalt pavers or milling machines. The kit includes the necessary licences.

CRS154 four-anchor kit for iCON PA10

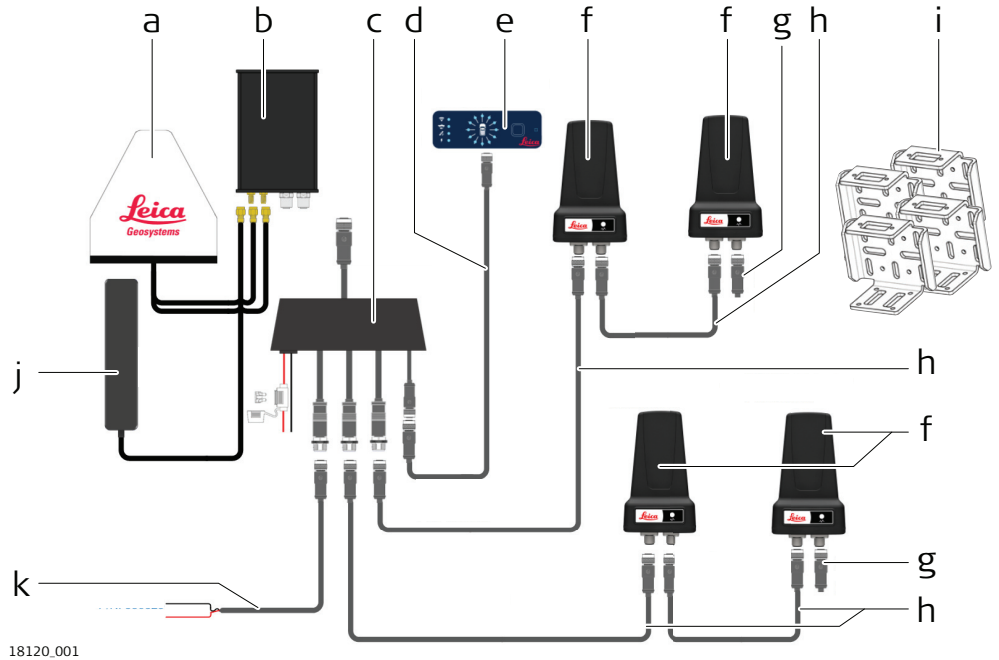


Fig. 7: Four-anchor configuration for iCON PA10

- a CRS145 antenna (878405)
- b CRS110 main unit (874526) OR CRS111 main unit (874527)
- c QD216 cable harness
- d QD222 LED-display cable, 5 m (836803)
- e CRS113 LED display unit (874528)
- f 4x CRS101 machine anchor (870410)
- g 2x QT375 CAN Terminator (878402)
- h Not included: CAN cable, different lengths available (851348)
- i 4x CRS102 mounting bracket for machine anchor (874378)
- j CRS139 antenna (878404)
- k QM104 power cable (836825)

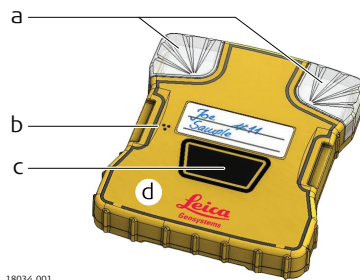


Use this kit for excavators, pavers or larger drillers and pilers. The kit includes the necessary licences.

2.4

User Interface

Pedestrian tag



- a Multi-colour LED
- b Buzzer
- c Acknowledge key
- d Built-in vibration generator

The Leica iCON PA tag is a battery-powered compact device to be worn on a person. The tag is designed to work up to 14 hours on a single charge, assuming continuous operation at normal conditions.

The pedestrian tag can generate visual, audible and haptic alarm signals.

CRS101 machine anchor

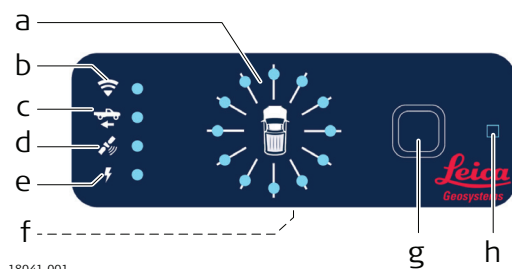
The machine anchor can be connected along other standard Leica Machine Control sensors through CAN bus connections.



18037_001

- a Multi-colour LED indicating power and anchor status
- b CAN/Power connectors

CRS113 LED display unit



18041_001

- a Indicator for tag position and proximity
- b Wi-Fi status indicator
- c Vehicle reversing indicator
- d GNSS status indicator
- e Power status indicator
- f Serial connector (4-pin M8 male)
- g Acknowledge key
- h Buzzer

An ambient light sensor automatically controls the LED brightness; during night operation, the LEDs are dimmed. The maximal volume of the buzzer is 85 dB at 10 cm distance. The volume is also automatically controlled based on ambient noise.

CRS110/CRS111 main unit



18108_001

- a GPS/GNSS connector
- b RF connector
- c Wi-Fi connector
- d GNSS status indicator
- e I/O connector (8-pin M12 male)
- f Main connector (8-pin M12 male)



All necessary installation works must be done by a dedicated installation specialist. Please contact the local selling unit or dealer for further information.

 **WARNING**

Unqualified installation on building or construction machinery

This may result in personal and material damage.

Precautions:

- ▶ Only an appropriately trained and qualified specialist may install this product on building or construction machinery.
-

4 Operation

4.1 Pedestrian Tag

4.1.1 General Working Information

Wearing the pedestrian tag

The iCON PA tag comes with a clip that allows for different wearing options (Fig. 8). For choosing an optimal wearing option you need to balance the importance of detection performance against wearing comfort:

- a **Pocket:** This wearing option offers a good compromise between performance and wearing comfort. The high position of the tag still ensures a good detection performance due to less obstructions, while at the same time the tag is comfortable to wear.
- b **Belt:** This wearing option is the most comfortable position, but results in the lowest detection performance due to a lot of obstructions.
- c **Helmet:** This wearing option ensures the highest detection performance due to the best "visibility" but it compromises the wearing comfort.

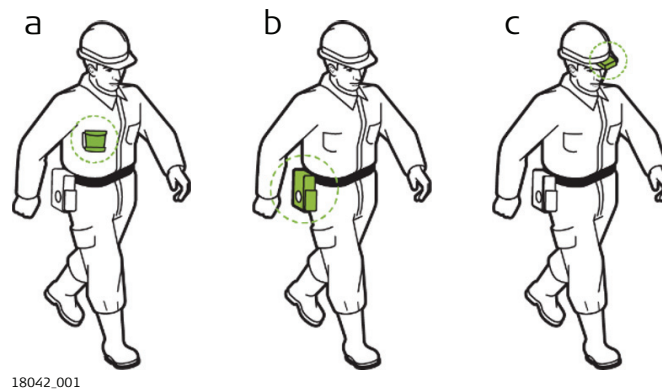
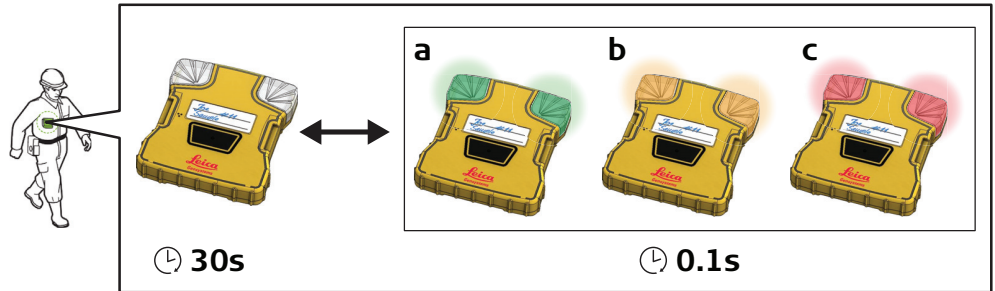


Fig. 8: Wearing options for the pedestrian tag

Operating status

During normal operation

To indicate normal operating status, the tag provides a visual "heartbeat" indication every 30 seconds for 0.1 seconds. The LED colour indicates the remaining operation time based on the battery charge level.



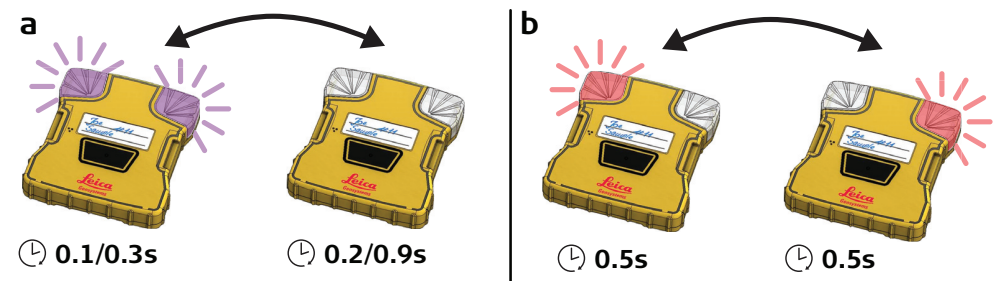
18043.001

Fig. 9: Visual "heartbeat" indication

- a Battery has sufficient charge for operation. Remaining operation time is more than two hours.
- b Battery charge is low. Remaining operation time is less than two hours.
- c Battery charge is critically low with insufficient charge for correct operation. Recharge the battery.

During shipping

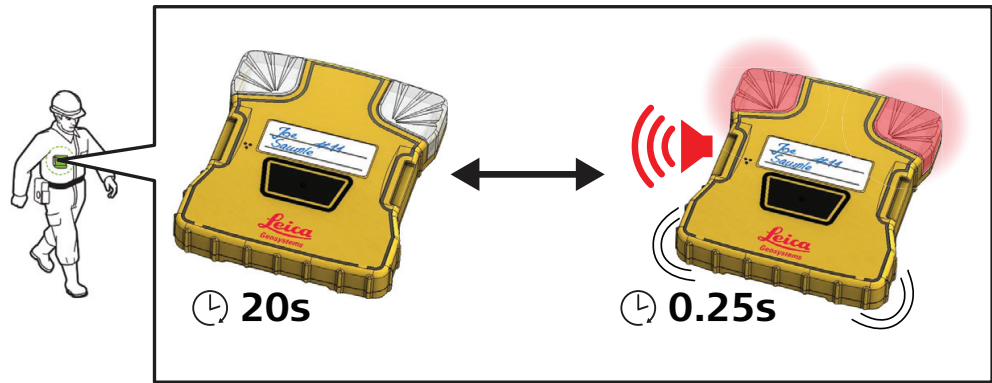
To comply with battery shipping regulations, a special shipping firmware is installed on the tag at delivery. This firmware disables all transmit functions and makes sure that the battery charge level is low enough for shipping. To operate the tag, update it with the standard firmware. Refer to "4.1.5 Firmware update".



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- a Shipping firmware installed on the tag, tag is not operable. Battery charge level is low enough for shipping.
- b Shipping firmware installed on the tag, tag is not operable. Battery charge level is too high for shipping.

Error on the tag

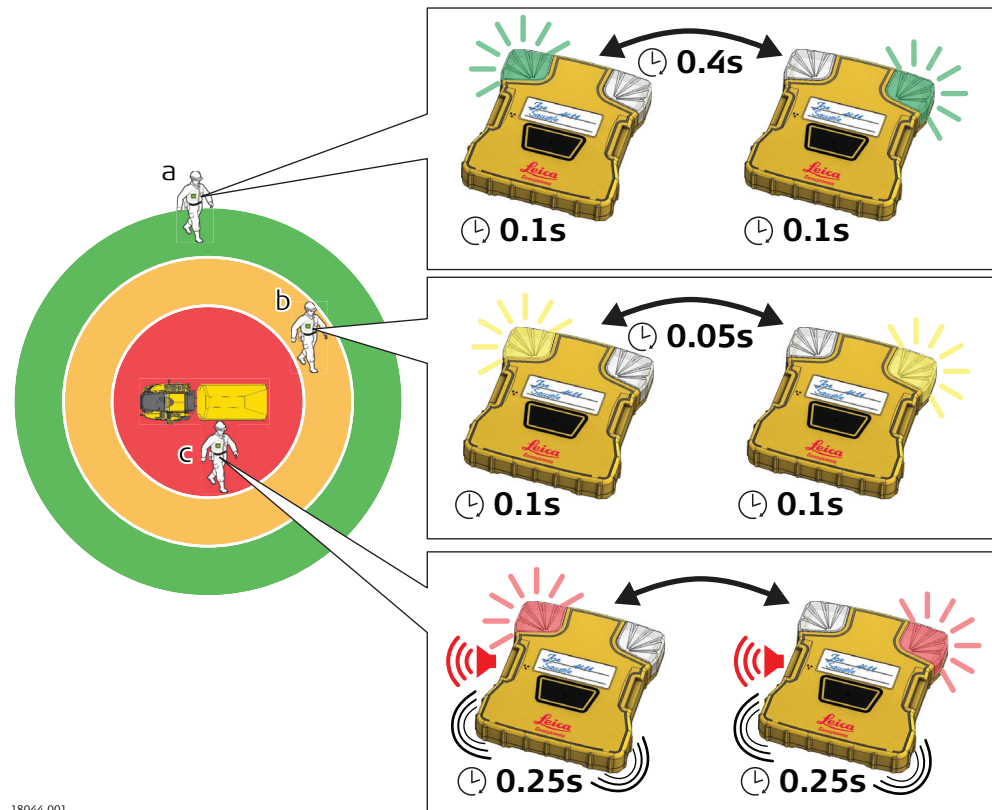


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Alarm signals

Alarms to indicate proximity to a machine

The iCON PA system supports three different detection zones. Each zone has a specific alarm signal which is clearly distinguishable from the alarms of the other zones.



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Fig. 10: Alarms to indicate proximity to a machine

- a **Far:** Left and right LED flash alternately green.
- b **Near:** Left and right LED flash alternately yellow.
- c **Close (danger zone):** Left and right LED flash alternately red. Buzzer and vibration generator emit a high-frequency alarm signal.


4.1.3

The Acknowledge Key

Functionalities


Acknowledging an alarm

A person wearing the pedestrian tag can acknowledge an alarm, thus silencing the audible and vibratory alarm signals.

 To acknowledge an alarm, press the acknowledge key once.


Setting off the Panic alarm

A person wearing the pedestrian tag can set off a Panic alarm to indicate the need for help. The Panic alarm is displayed on all iCON PA display units within communication range, enabling drivers of nearby machines to render assistance. (Refer to "Alarm signals" in "4.3.1 Status Indicators".)

 To set off the Panic alarm, press the acknowledge key longer than 6 seconds.

Running the self check of the tag

The pedestrian tag comes with an integrated self-check functionality which includes checking the battery status. (Refer to the section "Battery charge levels".)

 To run the self check, press the acknowledge key twice within a second.

Performing a hard reset of the tag

A hard reset is only possible when the tag is inserted into the gang charger. (Refer to the section "Performing a hard reset".)

4.1.4

Batteries

Battery charge levels

The iCON PA system constantly monitors the battery status of the pedestrian tag. The battery status is indicated in the following situations:

- during normal operation as visual "heartbeat". Refer to the section "Operating status".
- when running the integrated self check of the pedestrian tag. Refer to "4.1.3 The Acknowledge Key".
- when the integrated self check is automatically performed after removing the tag from the gang charger.

Indication of self check

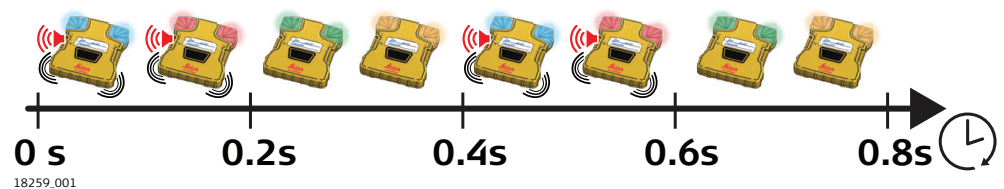
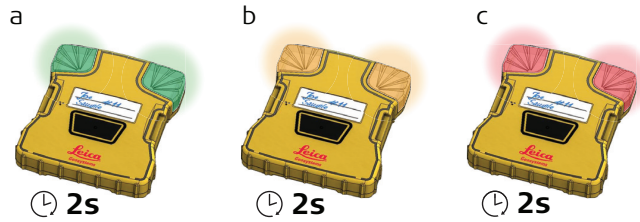


Fig. 11: Indication of self check

Indication of battery charge level at the end of the self check



18062.001

Fig. 12: Indication of battery charge levels

- a Battery has sufficient charge for operation. Remaining operation time is more than two hours.
- b Battery charge is low. Remaining operation time is less than two hours.
- c Battery charge is critically low with insufficient charge for correct operation. Battery needs to be recharged.



Charging the tag battery

Charge a pedestrian tag with the provided gang charger. The gang charger allows you to charge up to ten pedestrian tags simultaneously.



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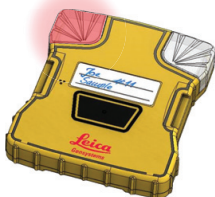
Fig. 13: 10-bay gang charger

1. Connect the power adapter of the gang charger to a suitable power source.
 2. Connect the gang charger to the power adapter.
The Power LED of the gang charger lights up green.
 3. Insert the pedestrian tag into a free bay of the gang charger.
The LEDs of the tag indicate the charging status. Refer to the section "Indication of battery status".
-  Before removing the tag from the charger in order to wear it, make sure that it is fully charged.
-  When removing the tag from the charger, the tag automatically performs the integrated self check. The battery charge level is indicated at the end of the self check.




Indication of battery status

When inserting the pedestrian tag into the gang charger, the tag LEDs indicate the battery status. The left LED indicates the battery health. The right LED indicates the battery charge level.

Battery health

LED pattern	Status	Possible causes
 <p>18065_001</p>	Left LED is permanently on in green.	Battery health is ok.
 <p>18072_001</p>	Left LED is permanently on in red.	Battery end-of-life. Battery capacity is not sufficient anymore. Replace the battery.

Battery charge level

LED pattern	Status	Possible causes
 <p>18070_001</p>	Both LEDs are off.	Tag is not communicating. Battery is flat.
 <p>18066_001</p>	Right LED flashes red at intervals of 2 seconds.	Charging not started yet. Several causes are possible. For example, temperature might be outside the allowed range for charging.
 <p>18067_001</p>	Right LED flashes blue at intervals of 2 seconds.	Charging in progress. n/a