

# PROTHEUS Trio

## Magnetic anomaly detector

The PROTHEUS Magnetic Anomaly Detector is an advanced device (a highly sensitive magnetometer) capable of reliably detecting mobile phones, smartwatches, wireless and wired headphones, and similar electronic and mechanical devices containing ferromagnetic materials. Detection is effective even when the devices are switched off. The system can also be used to detect concealed firearms or bladed weapons. These objects can be detected even if they are placed inside body cavities or wrapped in shielding materials (such as aluminum foil, metal cases, and similar).

The device is completely passive and emits no radiation. It operates on the principle of detecting changes in the magnetic field (either the Earth's magnetic field or the object's own field) caused by the movement of ferromagnetic materials. It therefore functions as a walk-through detector.

The device uses digital signal processing (DSP) and is highly resistant to natural fluctuations of the Earth's magnetic field as well as to homogeneous magnetic fields from distant sources. It also exhibits 100% immunity to alternating magnetic fields in the frequency range of 30 Hz to 1 MHz and is not affected by interference from the 50 Hz mains frequency.

Detection is carried out using a set of three sensors: one positioned near the ground, the second approximately at waist height, and the third at head height. Each detection position is equipped with a display showing the current signal intensity, with the option to set the detection threshold (and thus sensitivity) using buttons. When this threshold is exceeded, audible and visual alarms are triggered. The trio of displays allows the operator to roughly determine the position of the detected object and also to identify objects that are below the set detection threshold but already cause a visible change in the signal depending on the indicator position on the display.

### Approximate maximum detection range values:

- Larger iron objects (steel, cast iron, unmagnetized): 1–1.5m
- Firearm: 1–2m, depending on size
- Pocket knife: 0.5–1m, large kitchen knife: 1–2m
- Scissors, screwdriver, and other small tools: 0.5–1m
- Mobile phone, smartwatch: 1m
- Tablet, laptop: 1–1.5m

### Technical parameters:

- Device height: 165 cm
- Base dimensions (unfolded): 40x35 cm
- Device weight: 5kg
- Power supply: Built-in Li-Ion battery, 7.6 V, 6800 mAh (52 Wh)
- Charging: Supplied mains charger, 100–240V. Do not use any other power supply !
- Battery operating time: Approximately 6 hours
- Charging time to full capacity: Approximately 4 hours (when powered off)

### Installation and Start-Up:

Unscrew the locking nut at the bottom of the device, unfold the base arms fully to their end stops, then screw the locking nut back on and tighten it securely (see the illustrated instructions below).

Place the device on a solid surface (tiles, rigid flooring, concrete, asphalt) and switch it on by pressing the center button on the top panel. Do not place the device on a flexible surface that vibrates significantly when people pass by. Movement of the device may cause false detections.

Do not install the device in close proximity to objects made of ferromagnetic materials (e.g. a steel radiator). Do not install it within the range of large transformers, near DC electrical systems (traction power), or in locations close to passing vehicles. Choose the orientation of the device according to operational requirements; maximum sensitivity is achieved in the area in front of the device (in the direction of the detector cones).

**For powering and charging the device, use only the supplied adapter/charger.** Using any other power source may result in damage to the battery or the entire device. Charging is indicated by a **red LED** on the charger; a fully charged state is indicated by a **green LED**.



The device is switched on by briefly pressing the center button. After power-up, the display shows device information and a message indicating that the system is waiting for compensation of ambient fields and stabilization of the signal level. This process takes place on all three detectors and may take a different amount of time for each one. During this period, the upper multicolor status indicator is illuminated in blue. Approximately within 10-30 seconds after switching on, the indicator changes its color to green. The basic screen then appears, showing a moving signal-strength indicator, the set alarm threshold, and



- Detection level increase button  
Increases the value of the selected parameter in the menu*
- Power on/off button  
Menu entry / navigation / exit*
- Detection level decrease button  
Decreases the value of the selected parameter in the menu*
- Battery status indicator*
- Detection threshold for alarm activation*
- Current signal level indicator*

a battery status indicator. Using the upper and lower buttons, the detection threshold can be adjusted upward or downward. If the current signal level (indicated by the moving rectangular marker) exceeds the set threshold, visual signaling (red) and acoustic signaling (if enabled) are activated.

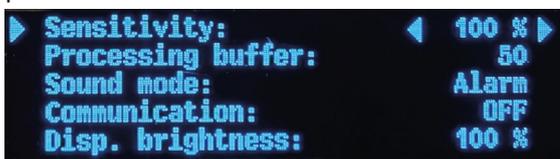
For maximum sensitivity, set the detection threshold slightly above the highest position reached by the indicator due to natural variations or environmental influences on the magnetic field. In other words, adjust it so that false alarms do not occur, or occur only with very low frequency.

**WARNING:** The operator setting the detection threshold should not carry any detectable objects, as these would increase the baseline signal level and would likely trigger an alarm. The device is sensitive to movement. When the device is handled or placed on a moving or unstable surface, false detections will occur. This is a normal condition resulting from the physical principle of operation. If the device is left stationary, the signal level will automatically decrease below the detection threshold after a short time.

The device is also sensitive to the movement of large ferrous objects even at greater distances (e.g. an automobile approximately 10–15 m away, prison bars or iron doors up to 8 m away). Movement of such objects may also trigger an alarm; however, the operator can distinguish these events because they will appear simultaneously on all three detectors. If a powered-on device is moved or reoriented, an alarm will be triggered as a result of the change in the surrounding magne-

tic field. This is normal behavior. Wait several tens of seconds; the device will automatically switch to adaptation mode (blue indication) and adapt in the same way as after power-up. If, after switching on or changing the device position, the signal does not stabilize below the detection threshold, try rotating the device slightly around its vertical axis or relocating it to another place. The cause may be interference from a source of a strong, varying magnetic field.

**Usage:** Once the indicator has stabilized and the green status indication is shown, the device is ready for use. With the sensitivity set to at least 50%, the device is capable of detecting small wearable electronics (miniature mobile phones, smartwatches, wireless earphones) on the body, even on the side farther from the detector, and of course within body cavities. A sensitivity of 40% is still sufficient for detection in body cavities during a simple walk-by past the detector. In this mode of operation, the probability of detecting objects located on more distant parts of the body or within body cavities is nearly 100%. It is also possible to use a pair of detectors positioned opposite each other. The detectors do not interfere with one another. This configuration significantly increases detection effectiveness for objects on both sides of the body without the need for the person to turn around.



#### Settings Menu

The settings menu is accessed by pressing and holding the center button for more than one second. Navigation through individual menu items is done by repeatedly pressing the center button. To exit the menu, press and hold the center button again.

**Sensitivity:** Device sensitivity, adjustable from 10–100%. The optimal value is around 50%. In environments with strong interference, sensitivity can be reduced; conversely, in low-interference environments, higher values can be used to detect smaller and more distant objects.

**Processing buffer:** Time window for signal processing; a value of 20 corresponds to one second. The optimal range is 50–70. Higher values slow down the response but improve resistance to interference, and vice versa.

**Sound mode:** **OFF** – disabled, **Tone** – single-frequency tone, **Alarm** – fluctuating alarm sound, **Sweep** – tone varies according to signal strength

**Communication:** **OFF** - no wireless communication, **Update1, 2, 3** - firmware update mode for each board, **WiFi** - wifi hotspot, web interface (<http://10.10.10.10>, password: protheuspass)

**switch off the device** - press and hold the center button. The system will display a shutdown message, save the current settings, and gradually power down all three detectors. In the powered-off state, power consumption is zero. Automatic shutdown also occurs shortly before the battery is fully depleted. If the device is switched on with an almost depleted battery, it will indicate that charging is required and then shut down again.

## Device installation procedure



The device is stored in a protective padded carrying case. Unzip both zippers along their full length so that the device can be easily removed. Place it in a suitable position or hold it horizontally to gain access to the lower part—the foldable base. If you need to place the device on a rough surface (concrete, asphalt, etc.), take care to avoid scratching it. The protective case can conveniently be used as a surface to place the device on.



The locking nut is screwed into the base. Unscrew it completely (take care not to lose the white Teflon washer fitted on it). Unfold the base legs, then screw the nut back on and tighten it so that the legs do not wobble. Afterwards, place the device on a solid surface that does not move significantly when people walk past the device.

### Detectable objects:

- Objects made of iron and its ferromagnetic alloys, i.e. metals to which a magnet will adhere, such as firearms, knives, scissors, steel tools, telescopic batons, throwing stars, etc.
- Electronic devices containing ferromagnetic components (which may be completely powered off), such as mobile phones (both smartphones and older feature phones), smartwatches, tablets, laptops, voice recorders, radios/walkie-talkies, and headphones (both wired and wireless, including small in-ear “earbuds”).
- Devices or items containing a significant proportion of steel components, or even a miniature magnet, such as handbags, wallets, and cases with steel clasps or magnetic closures, as well as steel reinforcements in clothing (e.g. underwire in bras).

- Devices containing even a very small electric motor (e.g. cameras, traditional hard disk drives, miniature drones, gimbal cameras).

### Objects not detectable or very difficult to detect:

- Objects made purely of non-ferrous metals, such as aluminum alloys, copper alloys (bronze, brass), titanium, and stainless steels (with the exception of martensitic types). Examples include ceramic knives, brass cartridge cases, door keys (usually not made of steel), and, in general, metals to which a magnet does not adhere.
- Miniature electronic devices or electronic systems without magnets, ferrite coils, and batteries, or only with a very small battery, such as SIM cards, memory cards, flash drives, and SSDs (if they do not have a steel enclosure).
- Very small eavesdropping devices (“bugs”) with miniature batteries – detectable only from very close range, on the order of a few tens of centimeters.

### What can interfere with the detector:

Although the device uses advanced mathematical methods to eliminate distant homogeneous fields, there are scenarios in which the detector may experience interference:

- Devices generating very strong, varying magnetic fields (traction power lines for trams, trolleybuses, metro, railways) within distances on the order of several tens of meters.
- Equipment containing large moving steel components (machine tools, molding machines) within up to 10 m.
- Devices with extremely strong static magnetic fields
- Passing vehicles in close proximity (passenger cars 10–15 m, larger vehicles 15–20 m).

If in doubt, we recommend contacting the supplier and testing the device at the planned installation site.