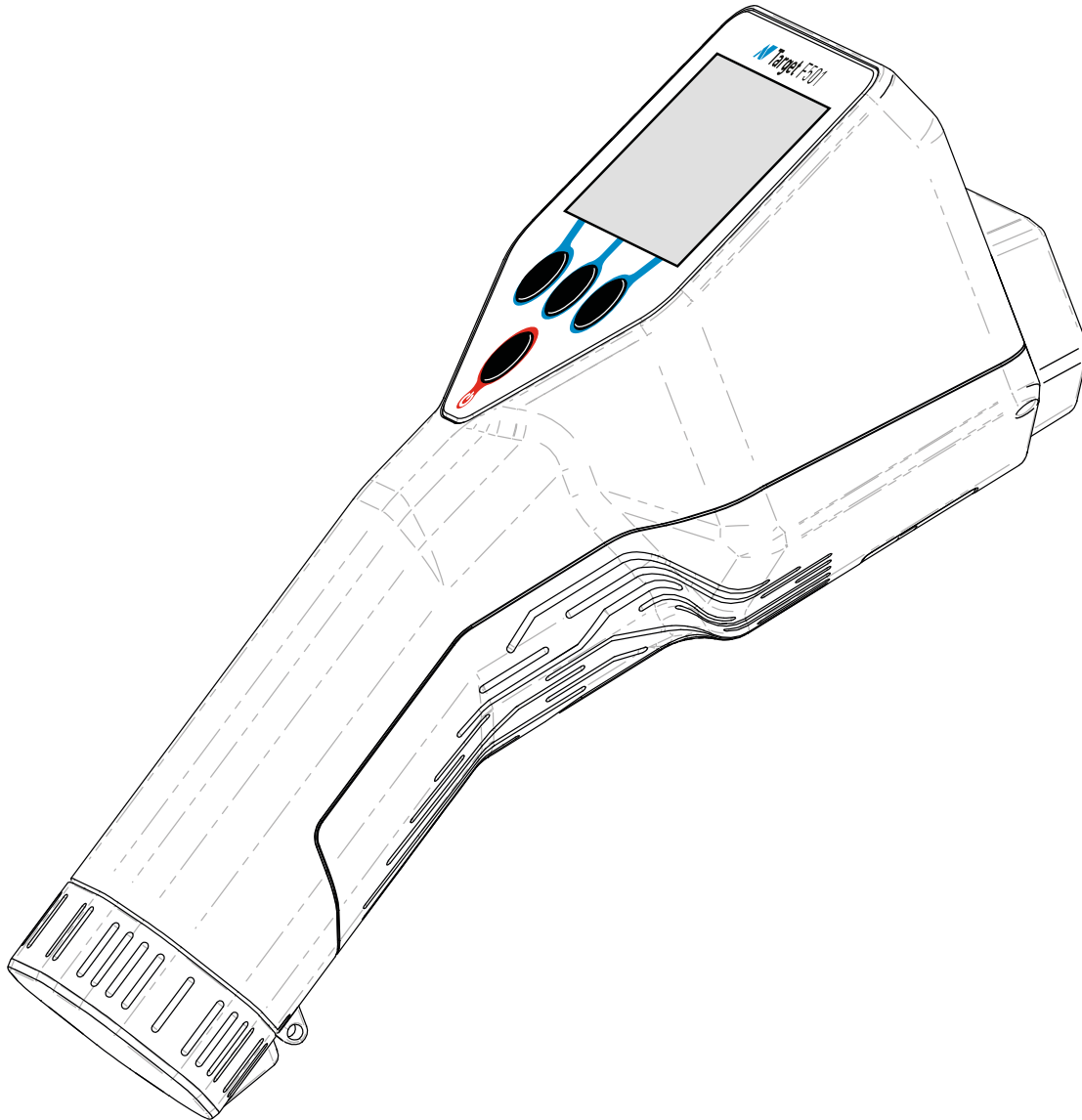




Target Systemelektronik

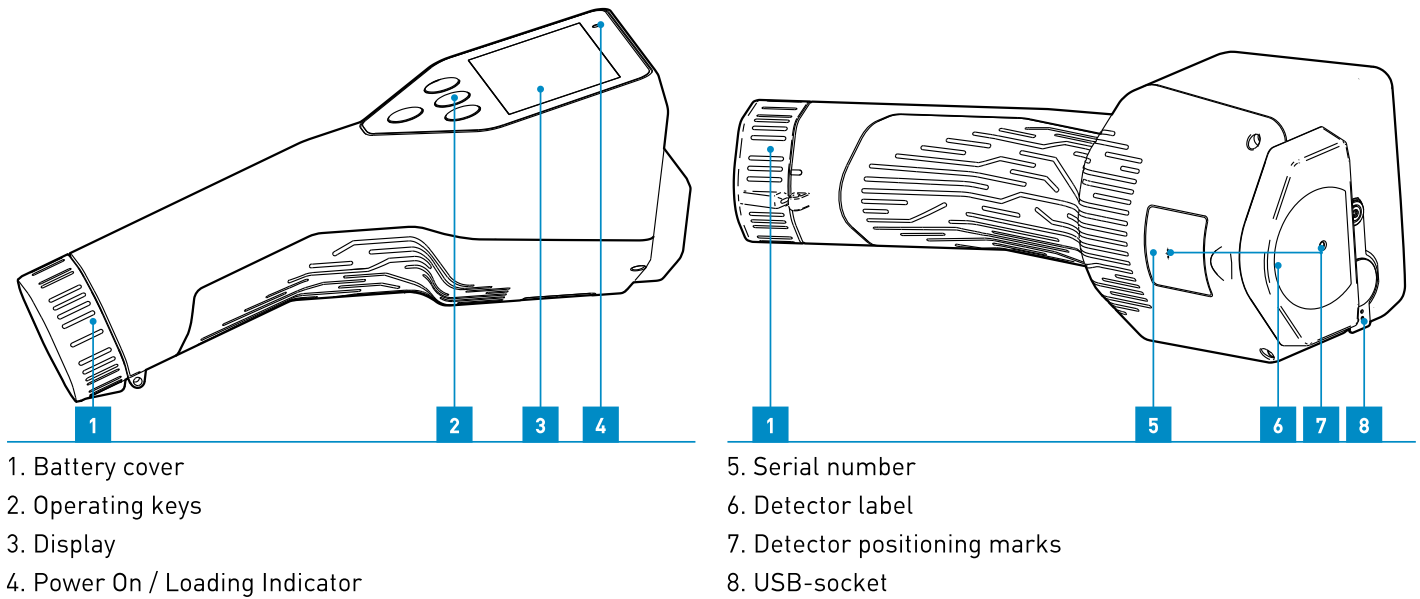


Target F501

User Manual

20.23.4 (20231207-3902)

The Hardware



Instrument Safety

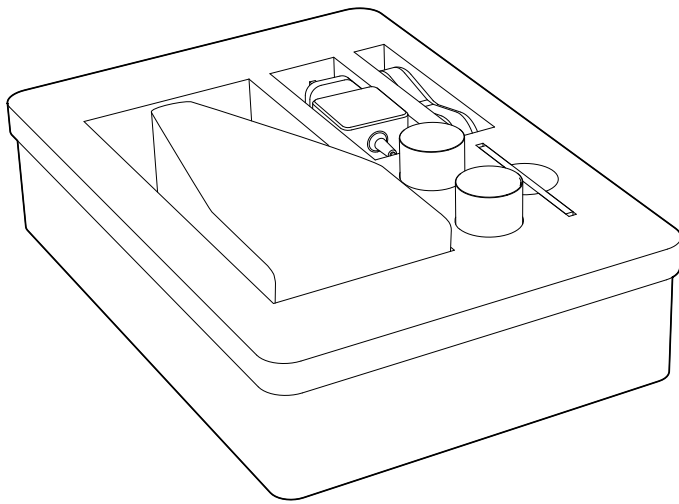
The Target F501 uses scintillation crystals to detect gamma radiation. There are versions of the Target F501 with different detectors:

- BGO ($\text{Bi}_4\text{Ge}_3\text{O}_{12} [\text{Gd}_2\text{O}_3]$)
- NAI (NaI:Tl)
- NAICN (NaI:Tl with capture neutrons)
- NAIL (NaI)
- CLLBC ($\text{Cs}_2\text{LiLa}[\text{Br}, \text{Cl}]_6:\text{Ce}$)
- LABR ($\text{LaBr}_3:(\text{Ce}, \text{Sr})$)

⚠ All detector crystals, except BGO, are very sensitive to shock.

Furthermore, the Target F501 has sensitive electronics and should therefore also be handled with care and never dropped.


Unpacking and Identifying Accessories



The Target F501 comes in a custom fit transport case with a set of the following accessories:

- 1x Lanyard
- 1x Belt Holster
- 2x USB Cable
- 1x USB-C Charger
- 2x Battery Pack PM18650

Check the parts and components received. If anything is missing, contact support.

 We recommend charging the Target F501 battery modules after unpacking and before first use.

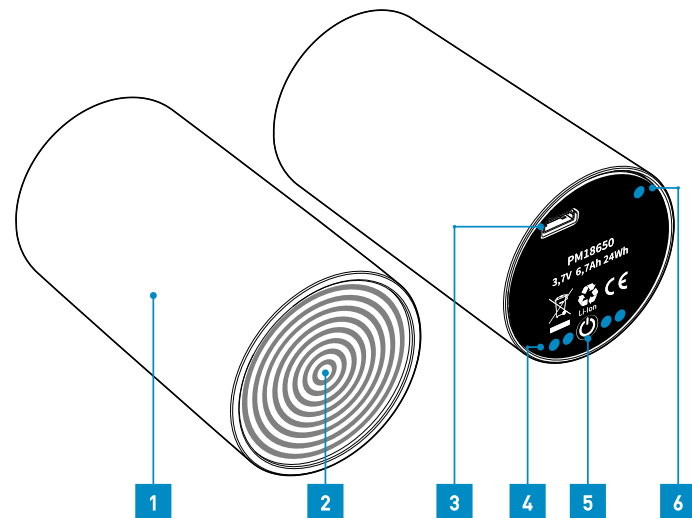
Spare Parts

Battery Pack PM18650	4210014
Battery Holder PM1 Cargo	4212836
Case and Foam	4213734
Case Label	4213732
Holster	4209891
USB-A / USB-C Cable	4202304
USB-C / USB-C Cable	103429
O-Ring 40x1.5 NBR 70A	4213725
UGREEN PD Fast Charger CD137 20 W USB-C	4213398
Synthetic O-Ring Grease 1ml	4214141
Wrist Strap	100034
4 mm Ring	103787

The Power Modules

There are different types of power modules available for the Target F501.

PM18650



The PM18650 is a rechargeable Lithium-ion power module.

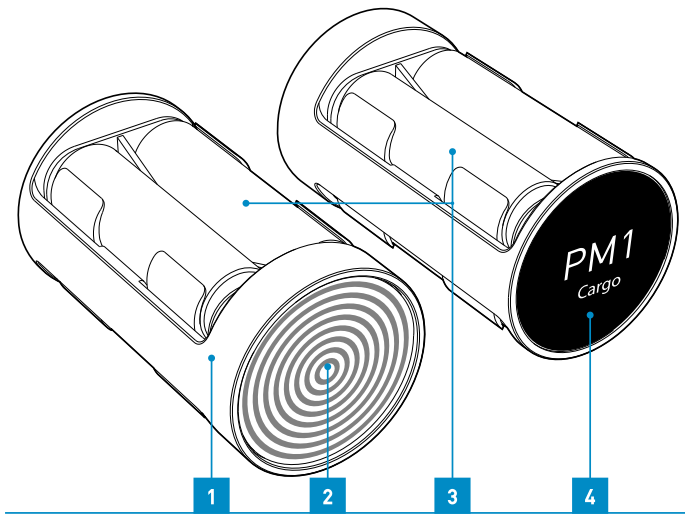
1. Housing
2. Contact plate
3. USB power socket
4. State of charge LEDs (4)
5. Test button
6. Status LED

To check for the state of charge of the power module press the test button. The four state of charge LEDs will indicate the remaining battery capacity.

- ○ 75 - 100 % state of charge
- ○ 50 - 75 % state of charge
- ○ 25 - 50 % state of charge
- ○ 10 - 25 % state of charge
- ○ below 10 % state of charge
- ● A fast flashing status LED means, that the state of charge of this power module is too low to be used in a Target F501.

- ⚠ To avoid damage through deep discharge recharge empty power modules within one month.
- ⚠ The power module PM18650 has no serviceable or removable parts inside. Under no circumstances should the housing be tampered with, penetrated, or otherwise removed.
- ⚠ Do not short-circuit the battery contacts and do not place the power modules with the contact board on a metallic surface. Batteries may be damaged by a short-circuit.

PM1 Cargo



The PM1 Cargo is a holder for four commercially available AA batteries.

1. Housing
2. Contact plate
3. AA battery cells
4. Front label

Compatible AA batteries are:

- 1.5 V Lithium/Iron Disulfide such as Energizer® Ultimate Lithium™ or equivalent. Energizer® Ultimate Lithium™ is a registered trademark of Energizer Brands of St. Louis, Missouri.
- 1.2 V Nickel–metal hydride (NiMH)

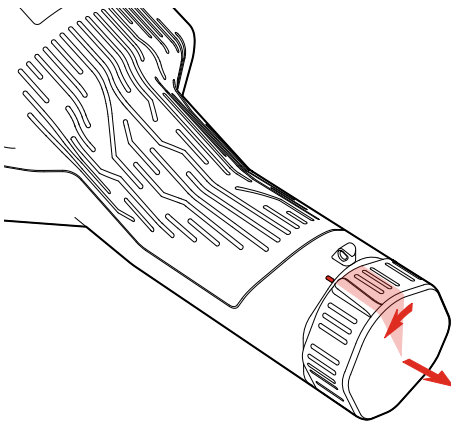
Always replace all four battery cells with fresh ones. If you do not want to use the freshly assembled battery module immediately, place a strip of non-conductive plastic, which is easy to remove, between the contact of a battery and the contact surface in the battery holder.

If NiMH batteries are used in the PM1 Cargo, they must be charged in an external, commercially available charger. If the Target F501 is operated with a PM1 Cargo, it cannot be operated permanently with a USB power supply unit.

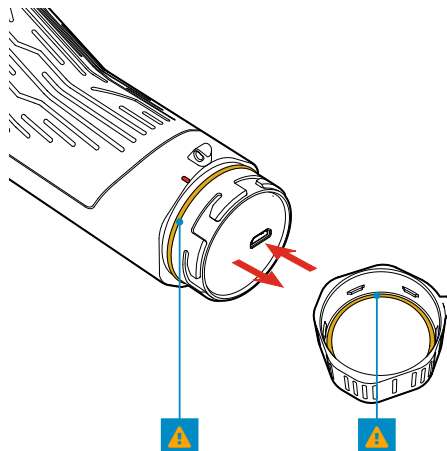
- ⚠ Don't use 3.6V Lithium batteries.
- ⚠ The use of alkaline batteries is not recommended, as they only have a runtime of 10 minutes and can become very hot inside the Target F501.
- ⚠ Don't mix different types of batteries.
- ⚠ Do not short-circuit the battery contacts and be careful when placing the power modules somewhere with the contact plate pointing downwards. Batteries may be damaged by a short-circuit.

Exchange Power Modules

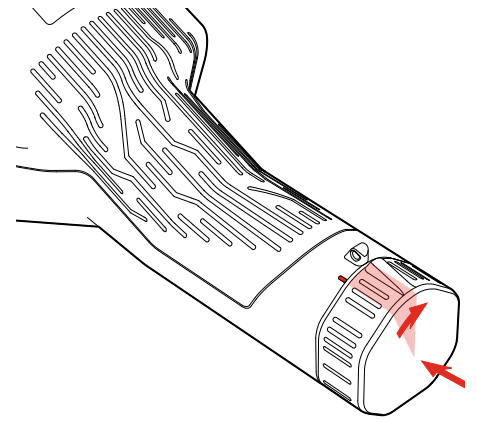
In order to exchange the power module shut down the Target F501 first.



Open the battery compartment




Change the power module



Close the battery compartment

Hold the Target F501 with one hand and with the other hand turn the battery lid counterclockwise for about 20° degrees. Pull off the battery cover and tilt the instrument until the battery module slides out. Insert a fresh power module with the contact plate pointing to the instrument. Put on the battery lid and turn it clockwise until the dots on the housing and on the lid are in line.

 When the battery compartment is opened, always inspect the sealing rings. Make sure that the seals are sufficiently lubricated. In case of any damage replace the sealing ring with a new one.







USB Charger


The charger included is a PD Fast Charger CD137 from UGREEN with Power Delivery 3.0.

 [UGREEN Declaration of Conformity](#)

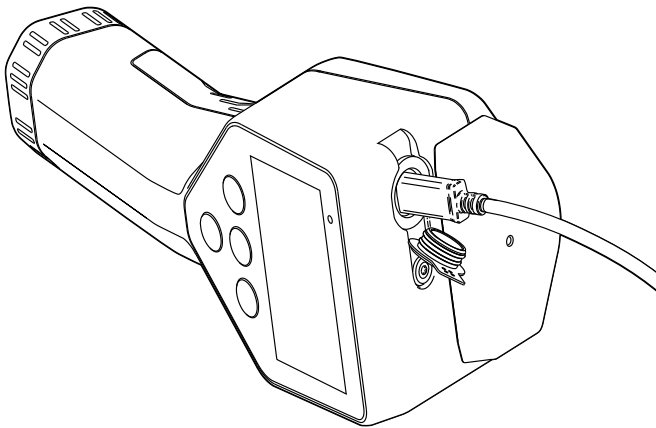
Recharging of the PM18650

To charge the PM18650, connect the USB plug of the wall charger to the USB socket of the battery module. The status LED is flashing slowly while charging, the four LEDs indicate the battery state of charge.

-   The power module has a state of charge between 10 % and 25 % and is charging
-   The power module has a state of charge of 100 %, charging has stopped
-   A fast flashing status LED indicates that the temperature of the battery is too low or too high to charge.

 The battery modules can be charged with any commercially available USB charger with USB-C connector.

Recharge the PM18650 inside the Target F501




You can charge a power module inside the Target F501 without opening the battery compartment.


Open the cap of the USB socket on the top of the Target F501 and connect the supplied USB charger.

A slowly flashing (0.6s in 1s) power indicator above the display of the Target F501 indicates the active charging process.


The power indicator LED is lit continuously after the charging has stopped.

 A slow but short flashing (0.1s in 1s) of the power indicator indicates that the power supplied by the charger is lower than the power consumption of the Target F501 which means that the charge of the battery continues to decrease, albeit at a slower rate. However, USB-C chargers usually provide enough power to run the Target F501 endlessly this way.

 A fast flashing status LED indicates that the temperature of the battery is too low or too high to charge.

 The power module inside the Target F501 does not charge, when the Target F501 is connected to a PC. This connection can only be used for communication, not for charging.

Storage of the power modules


 Power modules have to be charged before storing. Empty power modules should not be stored longer than a month, after this time the batteries may be damaged by self-discharge. Full power modules have to be recharged after one year of storage.

Starting the Target F501

1. Check the battery

(see the battery chapter for details)

2. Press the power button

 A fast flashing power-on-indicator means that the battery state of charge is too low and the Target F501 will not start.

3. Wait. This may take up to 60 seconds.

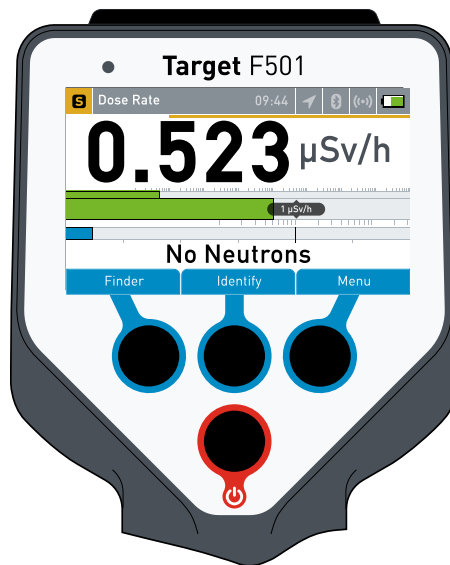
While the home screen is displayed with the company logo, the Target F501 loads its software and performs a self-test until the dose rate screen is displayed.

4. The Target F501 is stabilizing

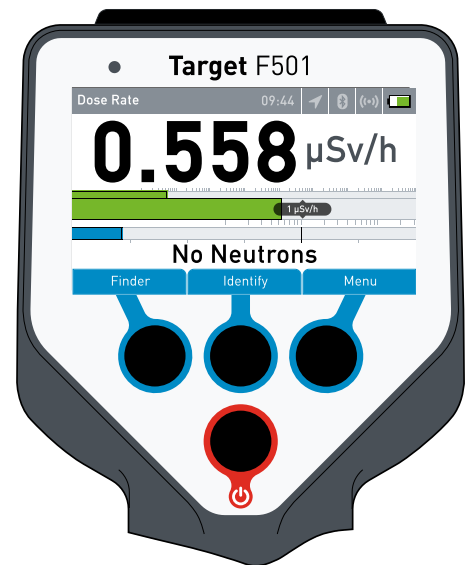
In the first seconds after that, the stabilization of the Target F501 is initialized in the background. The progress of the stabilization is displayed as a bar below the status bar. The Target F501 is fully functional during stabilization.



Press the  power button...



The Target F501 is stabilizing and fully functional.




The Target F501 is stabilized and fully functional.

The Target F501 is usually operated with the hardware buttons  and the on-board [user interface](#), but it can also be operated via the [web interface](#). Please refer to the appropriate chapters for more information.

Shutdown and Standby



 When the Target F501 is switched on, the power button has two different functions:

1. Standby

A short press of the power button will instantly put the Target F501 in sleep/standby mode.

There are some situations, in which it is not possible to switch to the standby mode, i.e. active alarms, running identifications.

In standby mode, the display and other power consuming hardware are switched off to save as much power as possible, without switching the instrument off completely. When the gamma value approaches the set threshold for a gamma alarm, the standby mode is automatically terminated.

Press the power button again and the Target F501 wakes up instantly showing the most recent screen.

2. Shutdown

To shut the Target F501 down press the power button until the shutdown screen appears. Press to switch off the Target F501 or to cancel the shutdown process.

The User Interface

User Interface - Web Interface

When we talk about the user interface in this manual, we always mean the interface of the Target F501 itself, with the four hardware buttons and the 800 x 480 pixel color display as opposed to the web interface, which is displayed in a browser on a connected computer.

Routine Mode

The user interface has no restricted areas, every screen and menu on the instrument is accessible for every operator and represents as such the routine mode of the Target F501.

Expert Mode

If you need to make more extensive changes to the instrument, access the nuclide library, or download N42.42 files from the Target F501, you will need to connect a computer and switch to the web interface. See chapter: [Web Interface](#)

In addition to generally accessible pages, there is a password-protected area that contains the sensitive setting parameters that should only be changed by experts.

Screens and Pages

To be able to distinguish the sections in this manual, we talk about screens when we describe the different modes of the user interface as opposed to pages when we describe the different web pages of the web interface.

Every screen of the user interface is vertically divided into three main parts:

1. **On top: the status bar**
2. **In the middle: the main content of the different screens**
3. **At the bottom: the button bar**




The Status Bar



The status bar shows all status information of the current status of the Target F501.




1. The title of the current screen.
2. The time of the instrument.
3. A set of icons, that indicate the status of:

Gamma and Neutron Alarms


-  Active Gamma Alarm
-  Active Neutron Alarm
-  Active Gamma and Neutron Alarm

X-Ray Filter

Some variants of the Target F501 are equipped with software that can filter an active X-ray beam and ensure valid measurements and identifications in an environment where the sample is being X-rayed.

-  X-ray filter is switched on but no x-ray beam was detected
-  X-ray filter has detected an x-ray beam and is scanning the frequency
-  X-ray filtering is active

Muted Alarms

-  Alarms are muted

Stabilization



The initial stabilization progress is at 75 %.



The stabilization is invalid or not present.




The Target F501 is perfectly stabilized

GPS

 GPS is switched off

 GPS is switched on, but has no fix


 GPS is switched on and has a fix


Bluetooth

 The Target F501 is not paired with a Bluetooth device

 The Target F501 is paired with a Bluetooth device


Wi-Fi

 Wi-Fi is switched off

 Wi-Fi access-point is switched on


 Wi-Fi access-point is switched on and a device is connected

 Wi-Fi is switched on and connecting

 Wi-Fi is switched on and connected to a network with good signal strength


Flight-Mode


 Flight-mode is switched off


 Flight-mode is switched on, Bluetooth and Wi-Fi are switched off

Power Supply

 The battery is empty; the instrument will shut down very soon

 The battery state of charge is under 10 %

 The battery is full

 The Target F501 is connected to a power supply and charges the battery

 The Target F501 is connected to a power supply and the battery is fully charged

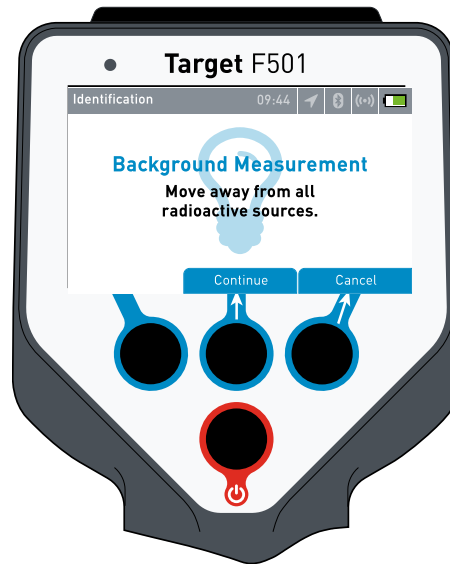
 The Target F501 is powered by a battery adapter and an external power supply

The button bar contains the graphical counterpart of the hardware buttons.

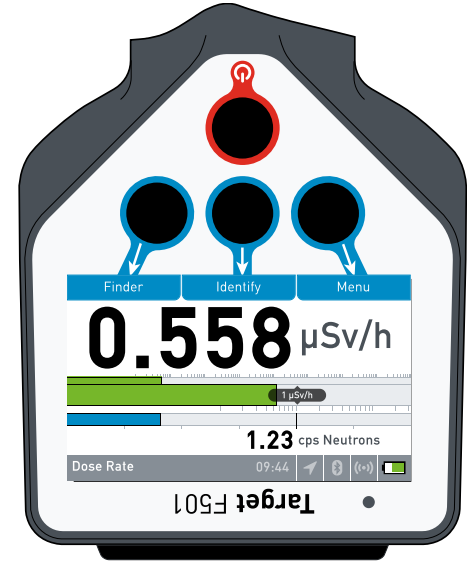
The button bar on the bottom of every screen is divided into three parts. Each part represents the visual software counterpart of the hardware keys near it.



Upside orientation



Example with two active buttons



Upside down orientation

The software buttons are labeled with a short text which describes the function of the button on the respective screen. In some screens, not all buttons have a function, software buttons with no function do not show up in the button bar.

Values And Units

Decimal separator

All values are displayed in localized form according to the set language. This means, for example, that if the user and web interface language is set to US English, the decimal separator is a dot.

If the language is set to e.g. German, the decimal separator is a comma.

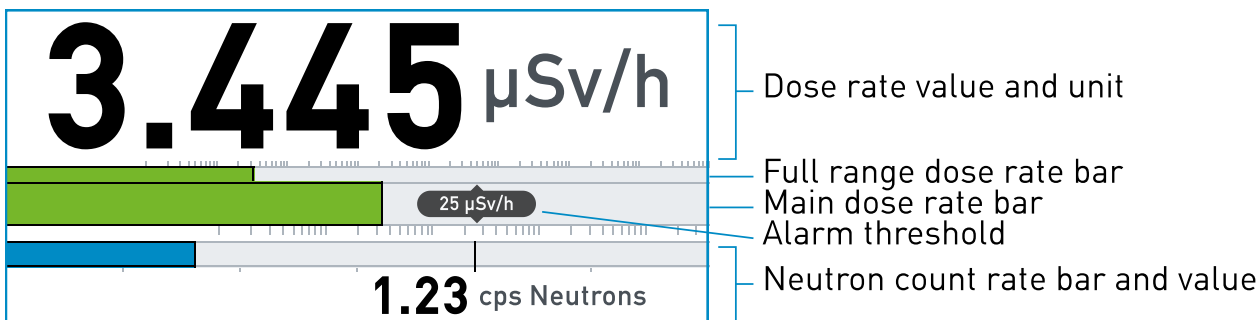
Dose Rate Unit

The dose rate values can be displayed in Sv/h* (ambient dose equivalent $\dot{H}^*(10)$), Sv/h (exposure rate) or rem/h (exposure rate). Dose rate in Sv/h as $\dot{H}^*(10)$ are displayed everywhere as Sv/h*.

Further information on ambient dose equivalent $\dot{H}^*(10)$: electropedia.org

Dose Rate Screen

The dose rate screen displays the current dose rate and the neutron probability.



A typical dose rate screen with a threshold of 25 µSv/h and the dose rate unit set to Sievert.

Dose rate value and unit

The Target F501 can display a dose rate range from 0.01 µSv/h up to 1 Sv/h. (0.001 mrem/h up to 100 rem/h).


The dose rate unit can either be Sv/h*, Sv/h or rem/h. The Target F501 scales the respective units automatically.

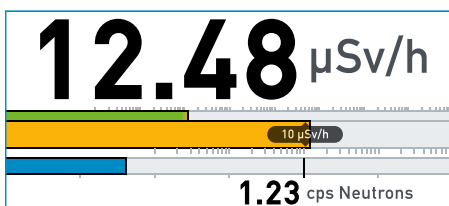
If set to Sv/h* or Sv/h the dose rate / unit schema looks like this:

- 0.001 - 999.9 µSv/h
- 1.000 - 9999 mSv

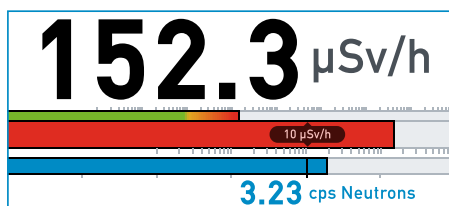
If set to rem/h the dose rate / unit schema looks like this:

- 1 - 999 µrem/h
- 1.000 - 999.9 mrem/h
- 1.000 rem/h - ...

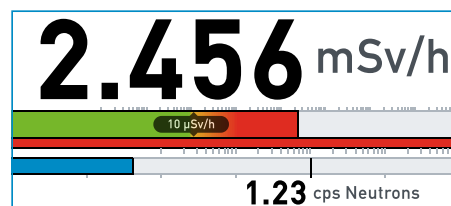
 The dose rate unit can be changed in the expert settings of the web interface.



Dose rate screen with a dose rate above the threshold.



Dose rate screen with a high dose rate and a neutron alarm.



Dose rate screen with a dose rate that exceeds the main dose rate bar.

The combined dose rate bar

The Target F501 combined dose rate bar is intended to provide the operator with an easy to read and unambiguous indication of the measured dose rate under all lighting conditions. The combined dose rate bar consists of two separate bars:

- **Full Range Bar**

A narrow bar at the top showing the full dose rate range of the Target F501.

- **Main Bar**

Below this, a wider bar displays the gamma dose rate with the preset dose rate alarm threshold at 2/3 of the display width.

- **Gamma Alarm Threshold**

The currently set value of the dose rate alarm threshold is displayed at the corresponding position of the bar.

(The dose rate alarm threshold can be changed in the expert settings of the web interface.)

Both bars are logarithmically scaled, thin lines indicate the orders of magnitude.

The color of the bars change according to the dose rate and dose rate alarm threshold.

- **Full Range Bar**

The full range bar has a color gradient depending on the dose rate alarm threshold. For dose rate values beneath the alarm threshold the bar is colored green, for values around the alarm threshold the bar changes to yellow and then to red the more the dose rate gets above the threshold.

- **Main Bar**

The main bar is colored monochrome. The bar changes its overall color according to the dose rate value and dose rate alarm threshold similar to the full range bar.

If the dose rate value exceeds the alarm threshold, the main bar reaches into the last third of the screen, the warning area.

In situations with very high dose rates and/or a low alarm threshold, the main bar can exceed the width of the instrument screen. In such a case the operator still has the visual feedback of the full range bar with the recent alarm threshold and dose rate within the full dose rate range of the instrument. (Note that the dose rate value is always also displayed with numbers and unit).

The neutron count rate

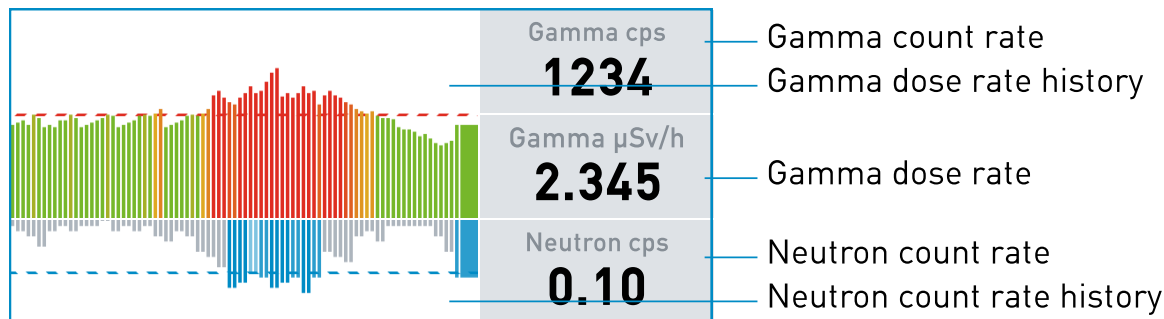
Although the Target F501 BGO has no extra neutron detector, it is able to calculate neutron cps.

The neutron count rate bar increases as the neutron count rate increases and changes color to blue when the count rate exceeds the threshold. The same applies to the color of the neutron count rate.

i If the neutron alarm display is turned on in the expert settings, the neutron alarm screen is displayed when the neutron count rate exceeds the threshold.

Finder Screen

The finder screen shows the dose rate history with a special threshold and high sensitivity to help locate radioactive sources.

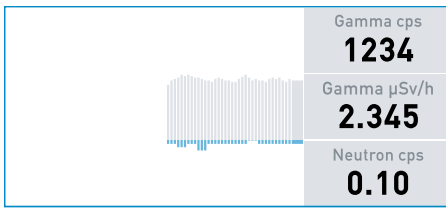


The finder screen while searching for radioactive sources

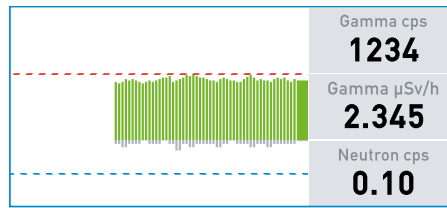
Adjusting the finder threshold

The finder mode is designed to help the operator with the locating of radioactive sources. This is done by showing a small history of measurements in the form of bars with a high sensitivity and a special threshold. To adjust the finder threshold, the Target F501 has to measure the background intensity accurately.

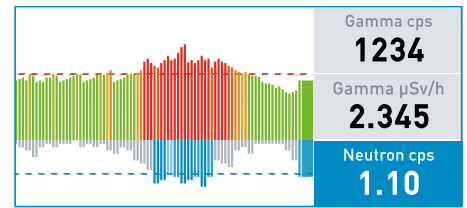
The Target F501 automatically starts this background measurement every time you enter the finder screen. During the first couple of seconds the background intensity is acquired and the finder threshold is calculated. During this process, the history bars are grayed out and no threshold area is displayed.



Measuring the background intensity



Completed background measurement



Active neutron alarm

Cancel The acquisition of the background intensity can always be stopped by pressing the Cancel button, which leads to the dose rate screen.

Skip If an earlier background measurement exists, you can also Skip the background acquisition and use the former threshold.

This gives you the flexibility you need in the field. On the one hand, you can move on quickly to continue searching for sources, or on the other hand, if you have reached an area of higher radioactivity and all the history bars are above the threshold, you can simply run a new background analysis by exiting and re-entering the Finder screen.

At the end of the background measurement the bars turn green and the warning area above the threshold appears.

Locating radioactive sources

When the background measurement is completed you can start to search for radioactive sources. Move (sweep) the Target F501 slowly around and observe the display. When the bars exceed the threshold, verify the measurement and slowly follow the direction the Target F501 points to at the highest dose rate.

If the bars tend to always exceed the threshold, repeat the background measurement (exit to the dose rate screen then go to the finder screen again). This should lead to the radioactive source, if there is any, within the shortest time.

Identify Screens

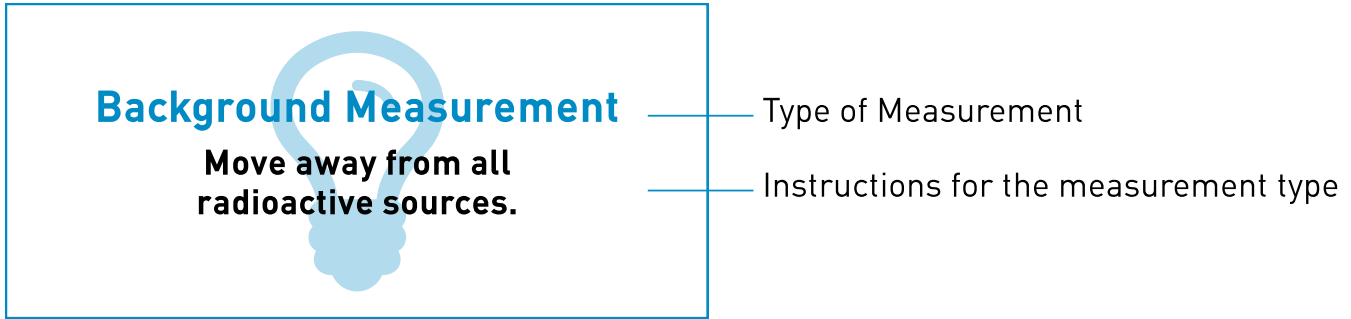
The identification process can take different lengths of time depending on the setting in the expert settings and may consist of several different measurements.

Depending on the setting, the following screen pages may be displayed in the user interface during an identification:

- **Identify Prepare Screen**
Instructions for the background or calibration measurement
- **Identify Measurement Screen**
Measuring background, calibration and foreground
- **Identify Result Screen**
Displaying the identification result.
- **Identify Menu Screen**
Menu of spectra and reachback options for the identification result

Identify Prepare Screen

The screen for preparing a measurement is displayed, for background or calibration measurements.



Depending on the identification settings a single identification can be a process of up to three different measurements.

Background

With this measurement the background radiation of the location will be determined. Make sure that the instrument is not exposed to any other radioactive source.

Calibration

This measurement uses a known source to do a calibration measurement in order to document the quality of the measurement results. Get your check source and place it close to the instrument.

Foreground

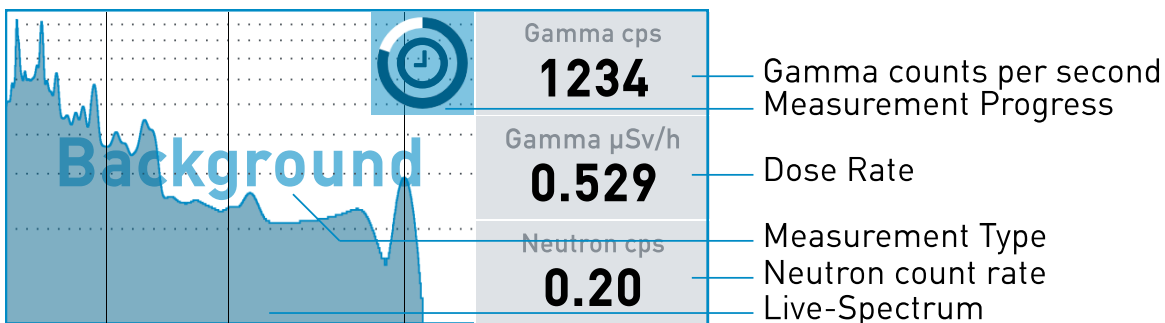
This is the measurement to which the "Background" measurement and "Calibration" measurement are actually assigned. If no "Background" or "Calibration" measurement is selected in the expert settings the measurement starts without a preparation screen.

Continue Pressing Continue starts the respective measurement.

Cancel Pressing Cancel leads back to the Dose Rate screen. All previous measurements made during this identification process will get lost

Identify Measurement Screen (Preparation)

The screen shows up during a Background or Calibration measurement.

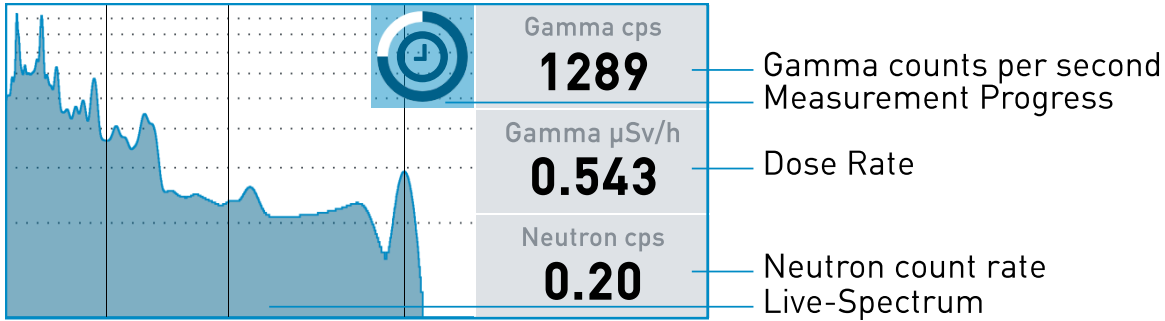


When the measurement is finished the next step in this identification process will be displayed.

Cancel Pressing Cancel leads back to the Dose Rate screen. All previous measurements made during this identification process will get lost.

Identify Running Screen

The identify running screen shows up during an identification with the most important information on the progress of the identification.



This screen shows an identification at 75% of progress time with a count rate of 1289 cps.

The Identification Process

To provide reliable identification results in the shortest possible time, we recommend having the Target F501 calculate the time for an identification based on a value we call ID statistics. The value of ID statistics depends on the internal physics of the Target F501 and the external conditions during an identification and cannot be changed. However, in the expert settings, the ID statistics can be scaled by a factor of up to 20. A value of two for ID statistics means that the statistical basis for an identification is doubled. Under identical circumstances, this doubles the time for an identification. The expert settings alternatively offer the possibility to set a fixed time for identification.

When the identification process is finished the Target F501 will automatically switch to the identify results screen.

Low Count Rates

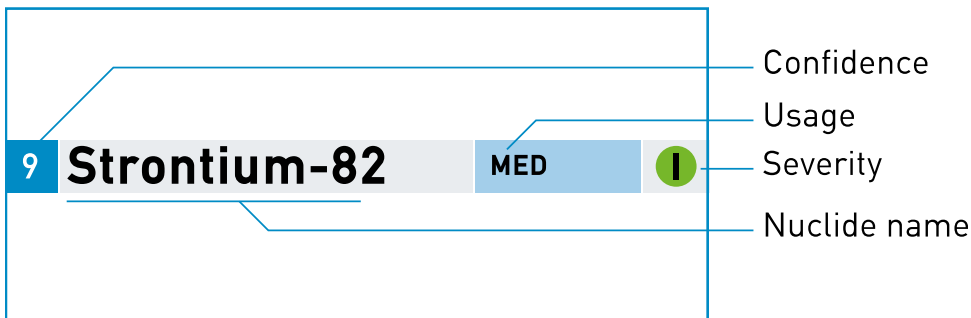
The Target F501 requires a minimum count rate to perform reliable identification.

If the count rate is too low, the background color of the gamma count rate will turn yellow. If the count rate is constantly too low during the identification process, the identification result will most likely be "NORM".

Cancel During an identification, the operator can cancel the identification, which brings him back to the Dose Rate screen. All previous measurements made during this identification process will get lost.

Identify Result Screen

The identify result screen displays the results of an identification.



The identification result screen with a single identification.

The Identification Result

The Target F501 displays up to four identified nuclides. If the identification result contains more than one nuclide, the nuclides are sorted by confidence and nuclide name. If the Target F501 cannot identify a nuclide "No Identification" is displayed. Each identification result is automatically stored with a consecutive number in the Target F501. If an identification setting with a background and/or reference measurement was made before this foreground measurement, all results are combined in a single .n42 file. The title of the screen in the status bar shows the consecutive number of the identification result. You can search all identification results stored in the device via the web interface.

Display Options

These options can be switched on or off in the expert menu of the web interface.

Confidence

The confidence of an identified nuclide is an indicator of the quality of the measurement.

The reliability can take values in a range between 0 and 10, where higher values mean greater reliability. A 10 means that the result is correct without any ambiguity.

Usage

The category Usage is an indicator that shows the main purpose of the respective nuclide, as there are:

- IND - industrial use
- NORM - natural occurring radioactive material
- MED - medical use
- SNM - special nuclear material
- NUC - use in nuclear facilities

Severity

Severity is displayed as an icon and shows the threats of a possible abuse of the respective nuclide.

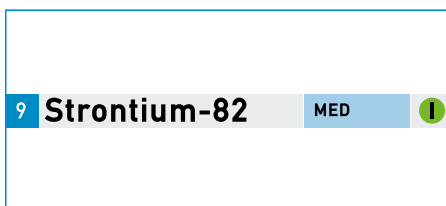
- 🟢 Innocent
- ⚠️ Suspicious
- 🔴 Threatening

Extend the Identification

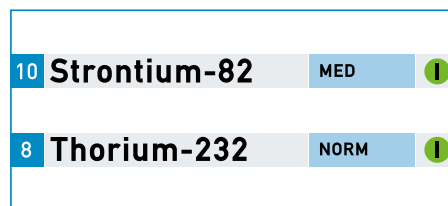
There may be reasons or instructions to extend the identification time.

Extend Pressing Extend adds another identification run.

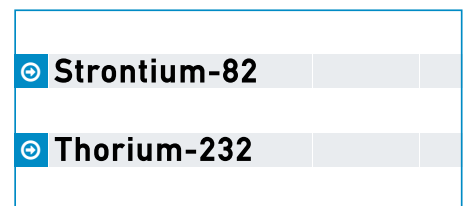
The identification result will be done based on the data of the first measurement plus the data of the extended measurement. This procedure can be repeated as long as you want. With regards to the database, a new entry is generated, in which the former foreground identifications are tracked with their start and stop times. The spectra are summed and the identification is based on this sum.



Result screen with one identification result



Result screen with two identification results



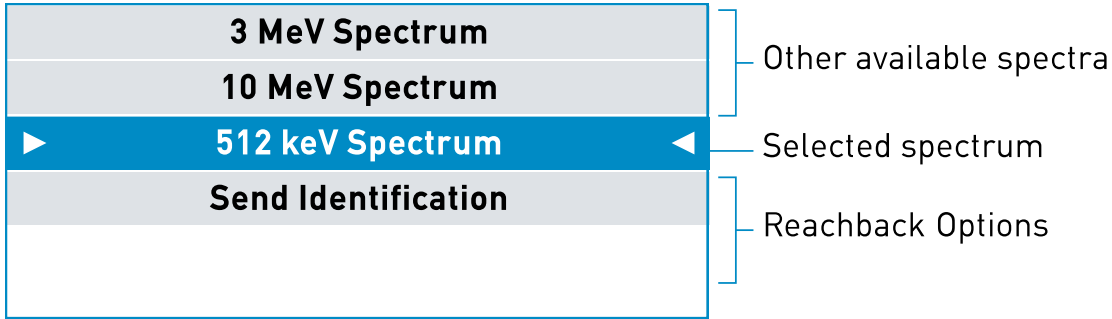
The same result without classification and confidence indicators

Open the Identification Menu

Menu To display the spectra of the measurement or choose one of the reachback options, press the Menu button and select one of the available menu entries.

Identify Menu Screen

The identification menu screen displays the spectra and reachback options of the identification.



Available spectra for this identification

Available Spectra

Related to every identification the Target F501 saves three different spectra to the internal database.

- 3 MeV Spectrum:** The 3 MeV spectrum is stabilized and linearized.
- 10 MeV Spectrum:** The 10 MeV spectrum is stabilized but not linearized.
- 512 keV Spectrum:** The 512 keV spectrum is stabilized and linearized.

Reachback Options

- **Send Identification**

Send the .n42 file of the identification with a connected mobile or a sat phone to one or more email recipients.

Navigating this Menu

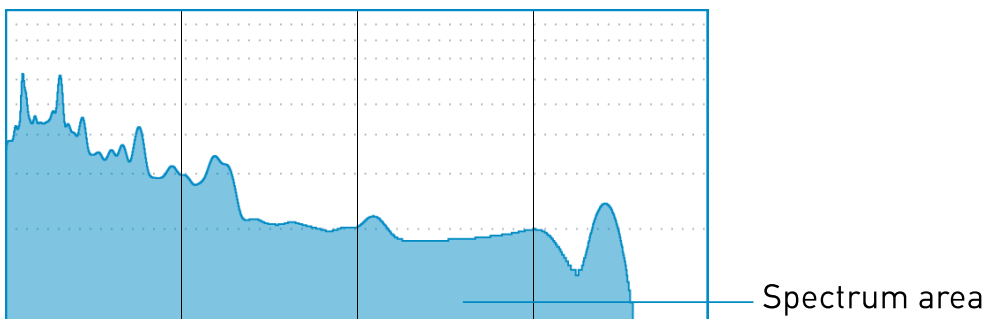
Next The Next button activates the next menu entry. The next menu entry is the entry underneath the active entry. If the bottom end of all menu entries is reached, the selection starts on the top again.

Navigate The Navigate button displays the selected spectrum screen.

Back The Back button takes you back to the identification result screen.

Identify Spectrum Screen

The spectrum screen displays the selected spectrum of a measurement.



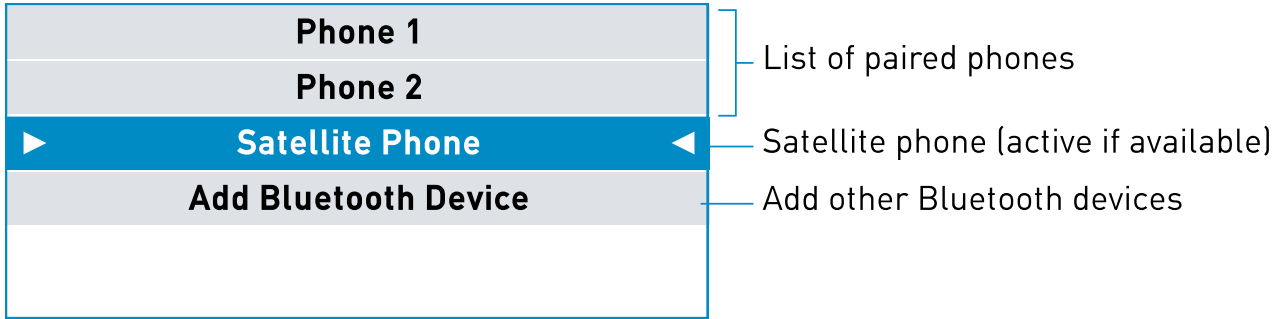
A 3 MeV spectrum.

Warning Remember that the 10 MeV spectrum is not linearized. All spectra are scaled logarithmically on the y-axis.

Back The Back button takes you back to the menu with the list of available spectra of the last identification measurement.

Send Identification Screen

The send identification screen displays a list of connected devices that can be used for reachback.



Choose a menu entry.

Next Press Next to choose one of the listed entries.

Send If a mobile phone is selected, press Send to send the .n42 file of the identification to a list of recipients. The Target F501 uses the smartphone to connect to the internet via Bluetooth-Tethering and takes the operator settings (Email Server, Email Username and Email Password) to email the Email Recipients.

If a sat phone is connected to the Target F501 the respective menu entry becomes active and selectable.

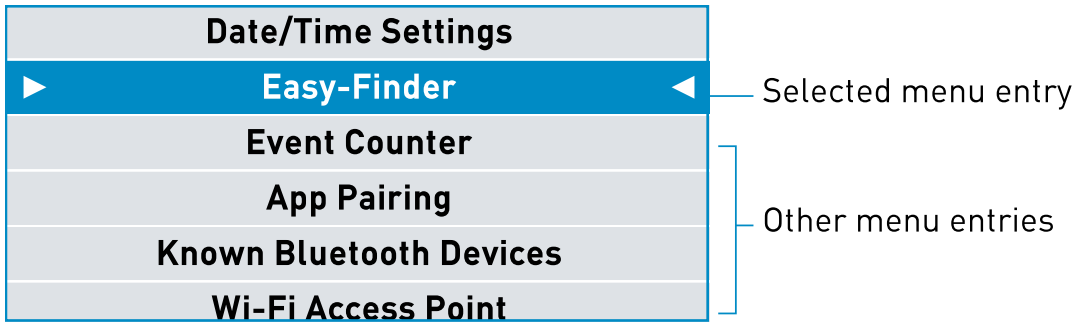
Send Pressing the Send button behaves in the same way as with a connected smartphone.

Add Select "Add Bluetooth Device" and Press Add to pair the Target F501 with a yet not known Bluetooth device.

Back The Back button takes you back to the menu of the last identification.

Main Menu Screen

The menu screen shows a set of available functions.



The menu screen with all entries

Navigating the Menu

↶ Next The Next button activates the next menu entry. The next menu entry is the entry underneath the active entry. If the bottom end of all menu entries is reached, the selection starts on the top again.

The center button can have different states depending on the menu entry.

Menu Entry	Center Button	Action
Operator Settings	Navigate →	Help for the Operator Settings Screen
Date/Time Settings	Navigate →	Help for the Date/Time Settings Screen
Easy-Finder	Navigate →	Help for the Easy-Finder Screen
Event Counter	Navigate →	Help for the Event Counter Screen
App Pairing	Navigate →	Help for the App Pairing Screen
Known Bluetooth Devices	Navigate →	Help for the Known Bluetooth Devices Screen
Wi-Fi Access Point	Navigate →	Help for the Wi-Fi Access Point Screen
Wi-Fi Connection	Navigate →	Help for the Wi-Fi Connection Screen
Calibration Check	Navigate →	Help for the Calibration Check Screen
Annunciator Test	Activate	Initializes a sound and a vibration pattern.
General Information	Navigate →	Help for the General Information Screen

↶ Back The Back button takes you back to the former screen.

Operator Settings Screen

The operator settings screen gives access to all changeable settings.

	Flight Mode	Off	Settings with their recent values
	Sound Volume	50 %	
	Alarm Feedback	All On	
→	Key Feedback	Off	Selected setting entry
	Display Brightness	75 %	Settings with their recent values
	Night Mode	On	

Changeable settings on the operator settings screen.

Changing setting values.

Next Select the setting you want to change with the Next button, jumping down through the list of available settings.

Edit Open the value editor for the selected setting by pressing Edit.

The value editor shows a list of up to 5 values for the corresponding setting.

Next Select the value you want to set with the Next button, jumping down through the list of available values.

Save When you are done, press Save and the changed value is displayed on the operator settings screen.

→	Mute	
	25 %	
	Sound Volume ▶	50 %
	75 %	
	100 %	

The value editor

→	Mute	
	25 %	
	Sound Volume ▶	100 %
	75 %	
	100 %	

Change the value

	Auto Suspend	60 seconds
	Flight Mode	Off
→	Sound Volume	100 %
	Alarm Feedback	All On
	Key Feedback	Off
	Display Brightness	75 %

Save it and done

Optional Operator Settings

In the Expert Settings of the Web Interface additional operator settings can be added for:

- Dose Rate Alarm Threshold
- Identification Settings
- Finder False Alarm Times

→	Dose Rate Alarm	(Custom)
	Auto Suspend	60 seconds
	Flight Mode	Off
	Sound Volume	Mute
	Alarm Feedback	All On
	Key Feedback	Off

Additional dose rate alarm setting...

→	Dose Rate Alarm	(Custom)
	Dose Rate Alarm ▶	200 µSv/h
	500 µSv/h	
	Danger	

...with this entries

Operator Settings for Dose Rate Alarm Thresholds	
Label	Value
200 µSv/h	200
500 µSv/h	500
Danger	1000

The corresponding expert setting

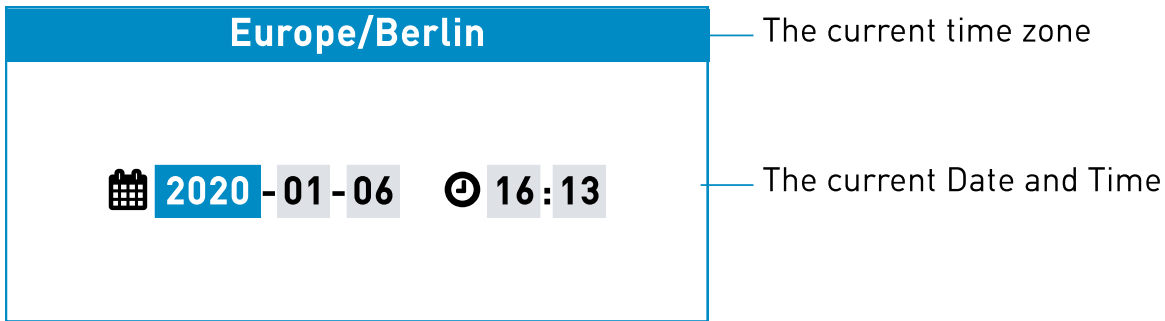
If the expert adds one of these additional settings, they will be listed at the beginning of this menu.

For example, if a default setting of 100 µSv/h was set for the Dose Rate Alarm Threshold by the expert and the following label/value pairs were added: **[200 µSv/h,200], [500 µSv/h,500], [Danger,1000]**

The labels 200 and 500 µSv/h indicate a value of 200 and 500 µSv/h, the label "Danger" a value of 1000 µSv/h for the dose rate alarm threshold. "(Custom)" is the label for the basic setting, in our example 100 µSv/h.

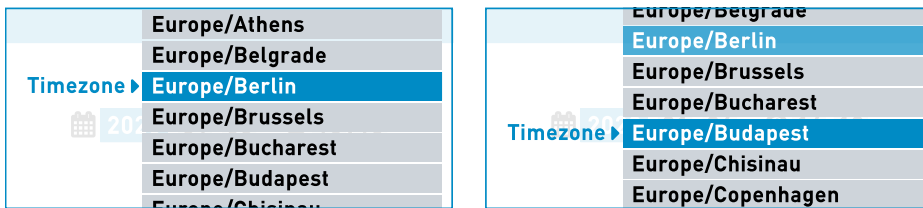
Date/Time Settings Screen

The page is for changing the date and time of the Target F501, in addition the time zone can be changed.



The date/time settings screen.

Changing the time zone.



The time zone selection menu

Choose your timezone.

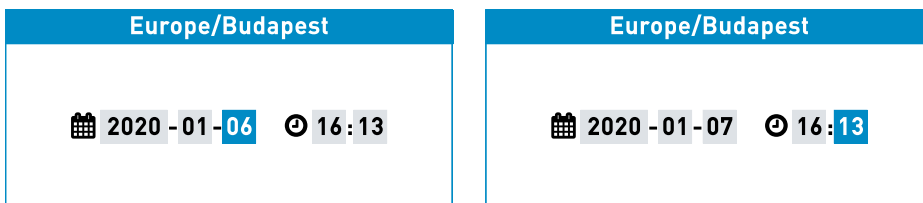
Set Time Zone Press the Set Time Zone button to bring up the time zone selection menu.

Next Select the appropriate time zone by moving through the values with the Next button.

Save Save the new time zone by pressing the Save button.

Cancel Return to the Date/time setting screen without changing the time zone with the Cancel button.

Changing the date and time.



Editing the Day

Editing the Minutes

Set Date/Time Press the Set Date/Time button to start editing date and time.

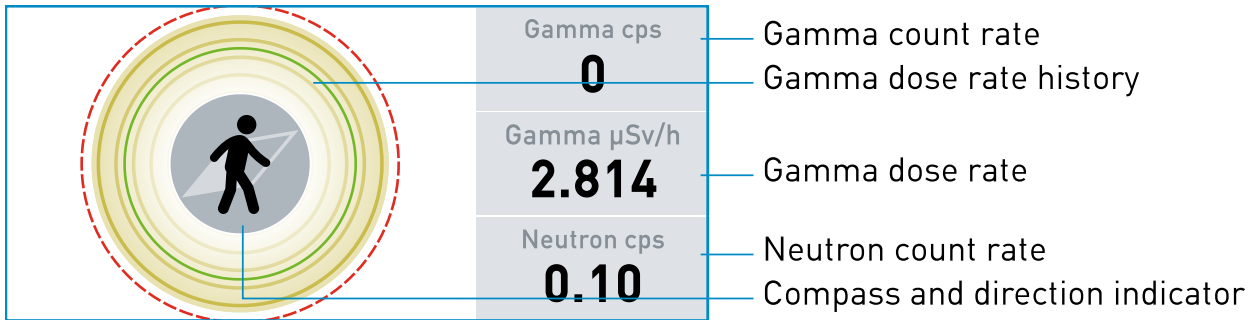
Next Select "Year", "Month", "Day", "Hours" or "Minutes" with the Next button.

+ Change the value with the + button.

Set Save the Date/Time with the Set button.

Easy-Finder Screen

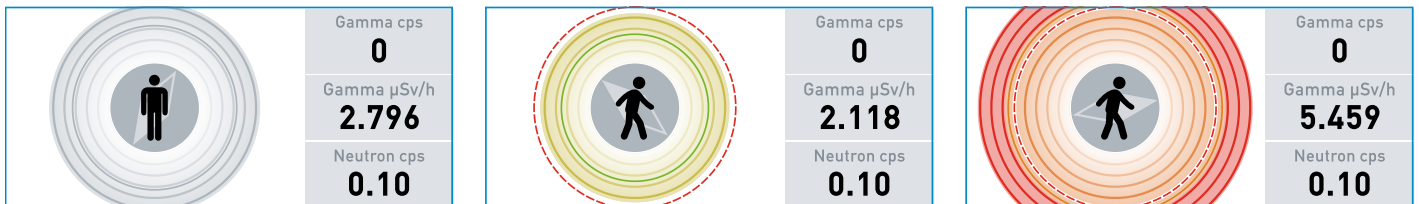
The Easy-Finder screen is an innovative way to locate radioactive sources.



Adjusting the Easy-Finder threshold

The Easy-Finder mode is designed to help the operator with the locating of radioactive sources. This is done by comparing a small history of measurements with a high sensitivity and a special threshold. To adjust the Easy-Finder threshold, the Target F501 has to measure the background intensity accurately. The Target F501 automatically starts this background measurement when you enter the Easy-Finder screen for the first time. During the first couple of seconds the background intensity is acquired and the Easy-Finder threshold is calculated. During this process, the dose rate circles are gray and no threshold circle is displayed.

Start Scan The acquisition of the background intensity can always be stopped by pressing the Start Scan button, which leads to the radial scan screen. At the end of the background measurement, the gray colored circles turn green and the threshold marker appears.



Background measurement

Completed background measurement

Dose rate history above the threshold

Survey an area

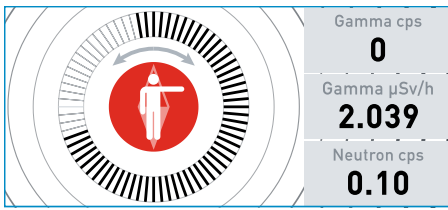
Use the Easy-Finder mode to actively scan the surroundings for radioactive sources. Move slowly along parallel paths about 3 m apart through the area you wish to examine.

Start Scan When the dose rate permanently exceeds the threshold and the dose rate circles turn red, press the Start Scan button.

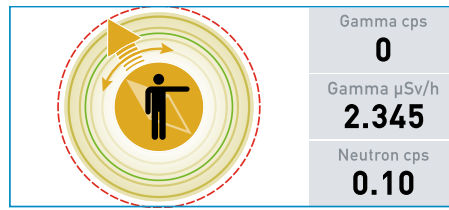
Do a radial scan

Hold the Target F501 horizontally with your outstretched arm and turn around your axis. You don't necessarily need to do a complete 360° turn, but it is important to turn slowly and to move the Target F501 on a circle around your body. Scanned angles are marked on the display.

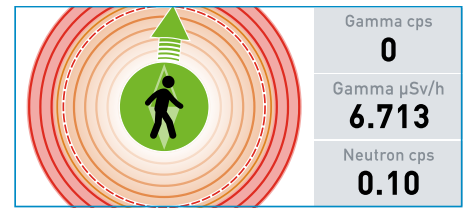
Stop Scan When you have scanned all angles of interest, press the Stop Scan button to stop the radial scan and get the calculated direction of the radioactive source displayed.



Almost completed 360° scan



Turn until the arrow points to the top



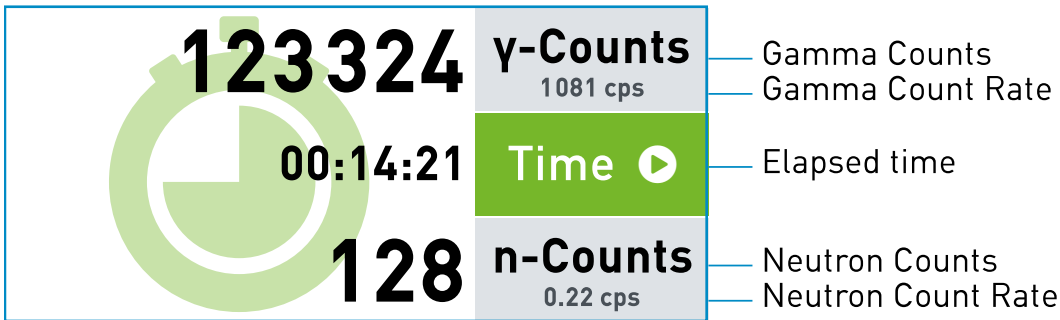
Move forward again

If the result of the radial scan is obscure no direction will be indicated; go on with your area scanning pattern. If the result of the radial scan was unambiguous the Target F501 will show an arrow pointing in the direction of the suspected source. Keep standing still and turn around your axis until the arrow turns green and points to the top of the screen.

Start Scan Move forward until the threshold value is exceeded again and repeat the radial scan by pressing the Start Scan button Within two or three repetitions of this procedure, you should be able to locate the radioactive source.

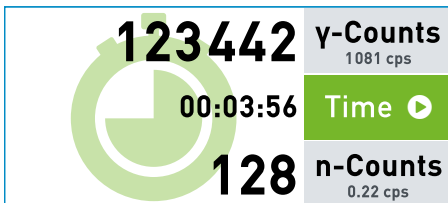
Event Counter Screen

The event counter screen is used to sum up gamma and, if applicable, neutron events over time.

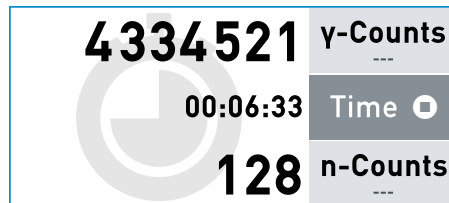


Start To start counting events press Start.

Stop To stop counting events press Stop.



A running event counter



A stopped event counter

Start To resume counting events press Start again.

Reset The counter is set to zero by pressing Reset.

Back Pressing the Back button brings you back to the main menu again.

App Pairing Screens

Pair a RIDcontrol App with the Target F501.



Bluetooth status messages

The RIDcontrol App connects to the Target F501 via Bluetooth. To add your Target F501 to the list of devices in the RIDcontrol App navigate to the App Pairing screen on the Target F501. Bluetooth is switched on and the Target F501 is now discoverable and should appear and be addable in the RIDcontrol App under Add Devices.

Depending on whether there has already been a connection between both devices, a confirmation is requested on both devices to establish a connection. A success message is displayed at the end of the pairing process.



Bluetooth is switched on and the Target F501 is discoverable.



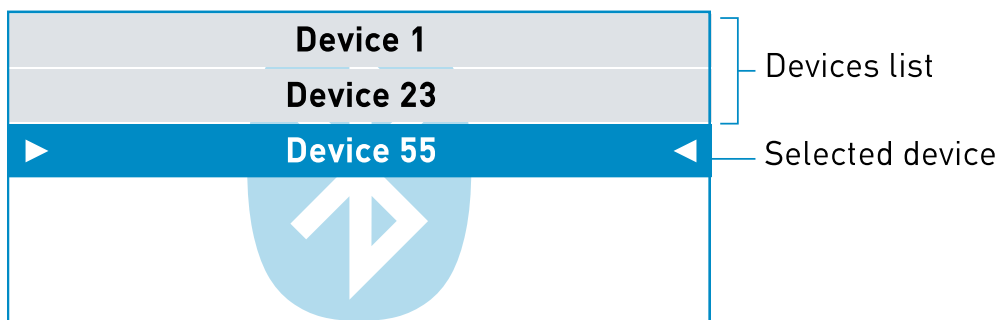
Pairing requires a confirmation.



Target F501 and the RIDcontrol App are successfully paired.

Known Bluetooth Devices Screen

This screen allows removing a Bluetooth device from the memory of the Target F501.



The list of known devices.

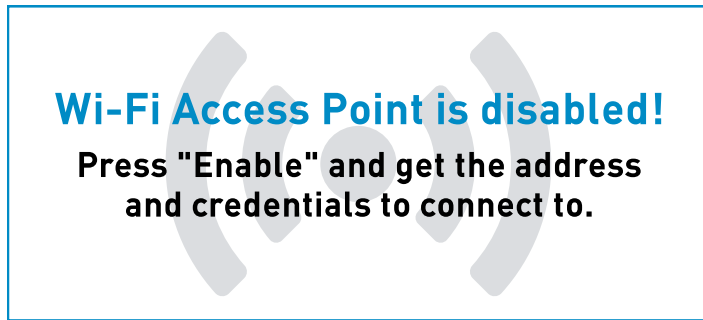
This screen shows all the devices that have been connected to the Target F501 with the RIDcontrol App via Bluetooth in the past.

Next Skip through the list of devices with the Next button.

Remove A selected device can be removed from this list and thus from the memory of the Target F501 by pressing the Remove button.

Wi-Fi Access Point Screen

The screen shows all information about the Wi-Fi access point.



The Wi-Fi access point is disabled.

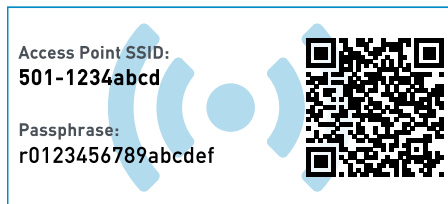
The Target F501 can be setup as a Wi-Fi access point.

Enable Press the Enable button to switch on the access point. You can now connect every Wi-Fi capable device to the Target F501. SSID (Wi-Fi name) and passphrase are shown on the Target F501 display. Enter the Wi-Fi settings of your device and search for a network with the shown SSID. Connect to this network and enter the passphrase.

To make the connection with the Target F501 access point a little easier, a QR code is displayed containing these information. With a device that is able to read QR codes (e.g. iPhones via the camera app) the connection to the Target F501 can be established without further input. To do so, point the camera at the QR code and confirm the connection build-up.

⚠ On Android phones after selecting a connection to an access point that has no internet connection (which is the case here) you will be asked in another dialog if this is really desired. This dialog can easily be overlooked and the Android phone will not connect to the access point.

Once the connection is successfully established, the Target F501 screen displays the URL of its web-interface. Also here a QR-code is displayed which automatically opens a browser with the URL of the web-interface.



The Wi-Fi access point is enabled.



The connection is established.

Via this connection it is now possible to edit all settings of the Target F501 in the web interface, download data to the connected device or remote control the Target F501.

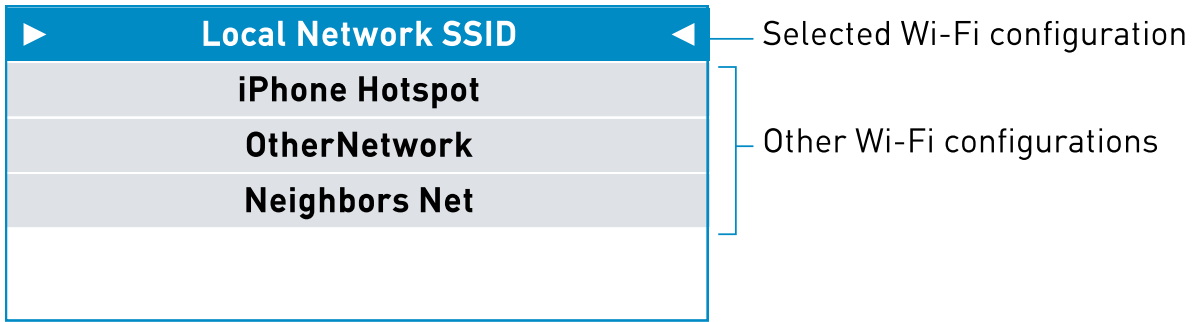
Disable To disable the access point press the Disable button.

⚠ Keep in mind that the access point of Target F501 is not connected to the internet and, as a result, devices connected to this access point also have no access to the internet for the duration of the connection.

⚠ Please note that activating the access point of the Target F501 automatically terminates an active connection of the Target F501 to a local network.

Wi-Fi Connection Screen


The Wi-Fi Connection Screen lists all configured networks.




List of configured Wi-Fi's

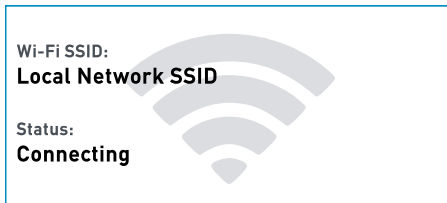
The list contains all connections to networks that have been previously configured and to which the Target F501 has successfully connected.

Connect Press the Connect button to connect the Target F501 to the selected network.

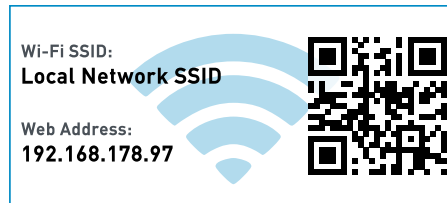
 Please note that configuration (entering the network key) is only possible in the web interface of the Target F501.

 Make sure that the Target F501 is in the range of the selected network.

If the connection to the selected network has been successfully established, the name of the network and the new assigned address of the Target F501 will be displayed. In addition, a QR code is displayed that calls up the web interface of the Target F501 with an appropriately equipped device.




Connecting



Connected network info

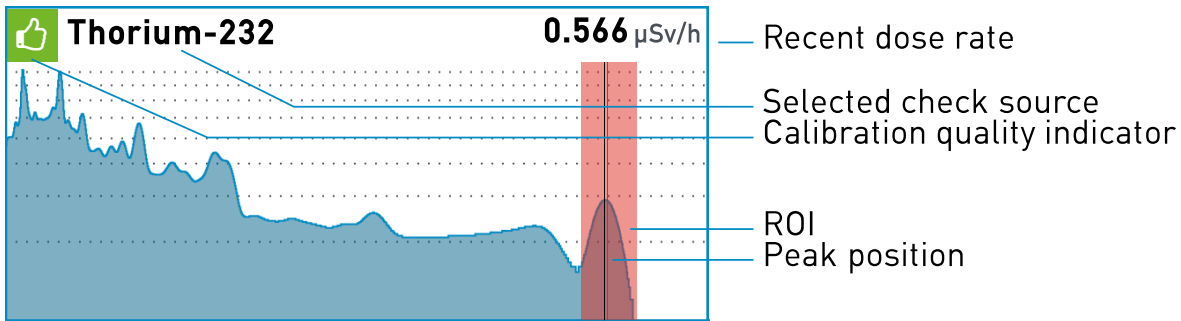
Observe the status of the connection process. If "Connected" is displayed, the connection to the network has been successfully established and the address is displayed in text form and as a QR code.

Disconnect To end the connection press Disconnect.

 Please note that using the Target F501 as a client on a network automatically disables the Target F501's Wi-Fi access point deployment.

Calibration Check Screen

The purpose of the calibration check screen is to check for the accuracy of the calibration of the Target F501.



This calibration check with Thorium-232 as a check source indicates the calibration is working correctly. The spectrum is scaled logarithmically on the y-axis.

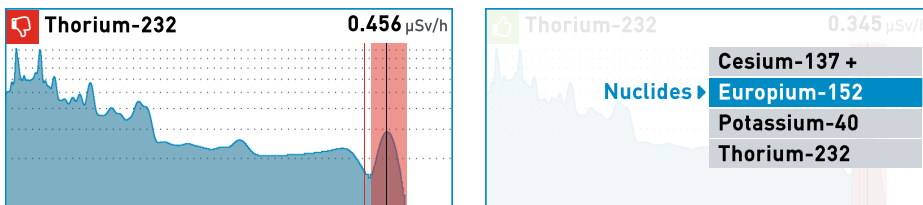
Performing the Target F501 calibration check

The calibration of the Target F501 should be checked weekly if used regularly and after a long period of non-use. Place a test source at a distance of 1 to 10 cm in front of the Target F501. The dose rate should be between 0.2 and 5 $\mu\text{Sv/h}$. Wait a short time and observe the calibration quality indicator:

Calibration of the Target F501 is in progress. This can take several minutes, especially with weak sources. If this state does not change even after a long time, there may be no or an incorrect test source in front of the Target F501.

The Target F501 is calibrated properly.

If the appropriate check source is used, the calibration of the Target F501 is not good anymore.



This calibration check failed.

Changing the check source.

Nuclide → After pressing the Nuclide button, a selection of nuclides is displayed with which the calibration check can be performed.

Select Select the appropriate Nuclide.

Clear Press Clear to clear the spectrum thereafter and receive the new calibration values.

Back Pressing the Back button brings you back to the main menu again.

i If the nuclide Cs-137 has been selected, the calibration check has an additional function:
If the calibration is no longer correct due to the aging of the detector, it will be corrected if the deviation is not too large. Please use an unshielded Cesium-137 source of 5 to 500 kBq (0.1 to 10 μCi) at a distance of 1 to 10 cm in front of the Target F501.

i When selecting the nuclides K-40 or Th-232, in many cases the natural background is sufficient to check the calibration. The calibration of the Target F501 can be checked with these nuclides without having an explicit test source at hand. The requirements are an appropriate background radiation and a long measurement time, which can take many minutes, especially with Th-232.

⚠ Do not use any other nuclides!

General Information Screen

The screen displays general information of the system.

Target Systemelektronik GmbH & Co.	—	Manufacturer name
Model: Target F501	—	Model name
Serial: sn-dw0sdwk0000CD	—	Serial number
Detector: Simulated	—	Detector type
Hardware:	—	Hardware Version
Software: 20.23.4	—	Software Version
(20231207-3902-TARGET)	—	Software Build


The general information screen

↶ Back The Back button takes you back to the former screen.

Alarm Screens

Depending on the measurement situation and device status, one of the following alarm screens may be displayed.

Depending on the settings for alarm feedback, tones are played or the Target F501 vibrates in certain rhythms. Multiple alarms of different types are stacked in the order of occurrence and must be acknowledged separately, multiple alarms of the same type are accumulated and only the last one is displayed.

 The personal hazard alarm is an exception to this rule and will always be displayed on top. It can only be muted (sound, vibration) and disappears only at the time the dose rate falls below the threshold for the personal hazard.

Every alarm will automatically be saved to the internal database of the Target F501 with a unique id at the moment the alarm is stopped. You will not lose any data if you swap batteries or run out of battery power after the alarm has stopped. You can browse the database with all alarms via the web interface.

Dose Rate Alarm Screen

The dose rate alarm screen gets displayed, when the dose rate alarm threshold is exceeded.



Dose rate alarm!


102.8 $\mu\text{Sv/h}$

0.14 cps Neutrons

- Alarm Reason
- Dose rate value and unit
- Neutron count rate value

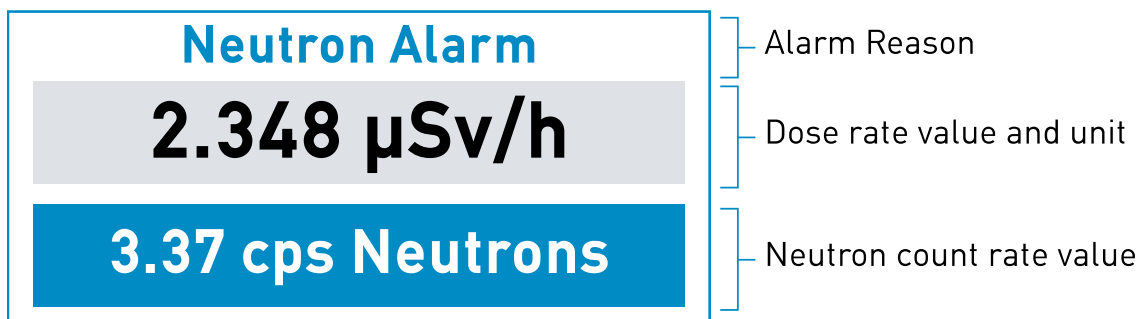
The dose rate alarm screen

Acknowledge Acknowledging the alarm with the Acknowledge button will mute the alarm annunciators and leads back to the previous screen.

 As long as the alarm is active, this will be indicated in the status bar.

Neutron Alarm Screen

The neutron alarm screen gets displayed, when the neutron probability threshold is exceeded.



Neutron Alarm


2.348 $\mu\text{Sv/h}$

3.37 cps Neutrons

- Alarm Reason
- Dose rate value and unit
- Neutron count rate value

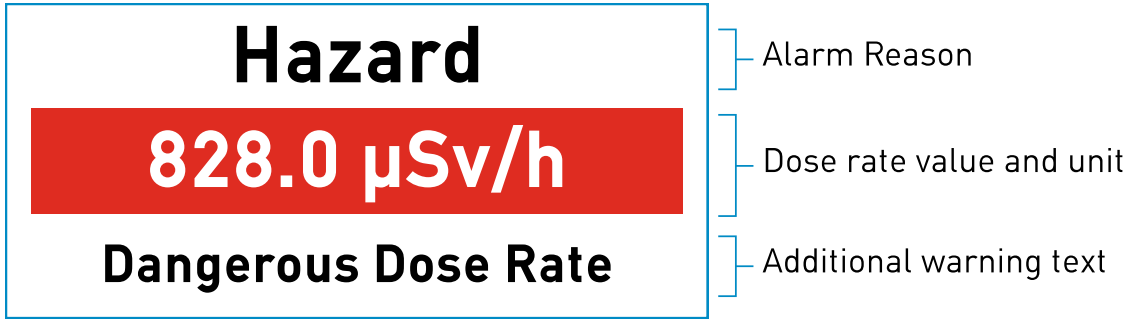
The neutron notification screen

Acknowledge Acknowledging the alarm with the Acknowledge button will mute the alarm annunciators and leads back to the previous screen.

 As long as the alarm is active, this will be indicated in the status bar.

Personal Hazard Alarm Screen

The personal hazard alarm screen is displayed, when the personal hazard alarm threshold is exceeded.



The personal hazard alarm screen

The goal of the personal hazard alarm screen is to protect the operator of the Target F501 from dangerous high dose rates. Therefore the screen is not changeable and is displayed until the dose rate falls beneath the threshold.

Mute Pressing the Mute button will mute the alarm annunciators.

High Load Mode Screen

From a dose rate > 200 µSv/h the Target F501 switches to the high load mode.



The high load screen still displays a valid dose rate.

In situations with high dose rates the Target F501 switches to the high load mode to avoid damages to the instrument.

In this mode no identification or other functions are possible.

No keys are displayed in the key bar, but it is still possible to switch off the Target F501 by pressing and holding the Power key. The Target F501 automatically switches back to normal operation when the dose rate drops below the limit. If the dose rate keeps increasing, the Target F501 will eventually need to rescale the system to avoid damage to the instrument and still display a valid dose rate. During rescaling, no dose rate value is displayed and takes approximately 10 seconds. This may repeat up to three times until the dose rate reaches a value of 500 mSv/h and the overload warning is displayed.

Over Range Mode Screen

With dose rates above 500 mSv/h the Target F501 switches to the over range mode.



The over range screen with a dose rate above 500 mSv/h.

Even far above the over range threshold the Target F501 is still able to measure the dose rate value.

Safety Shutdown Screen

With dose rates above 1 Sv/h the detector is switched off to avoid damage.

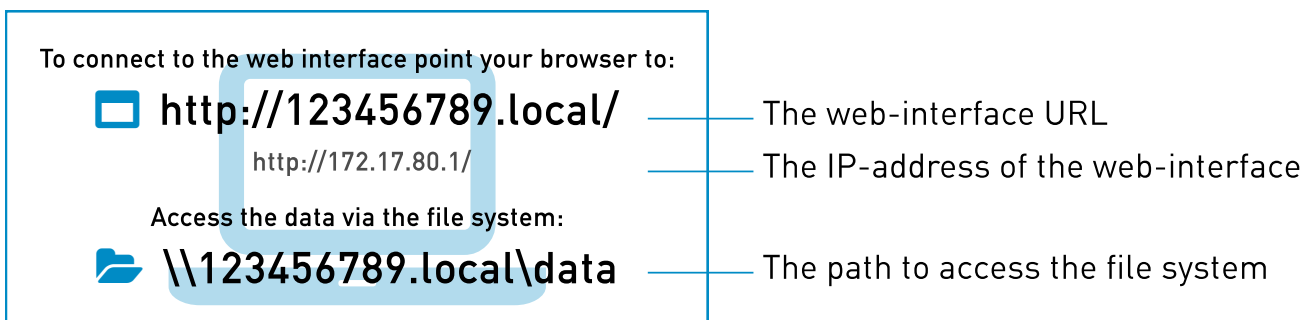


The safety shutdown screen.

A safety shutdown means the Target F501 switches the detector off and cannot automatically re-discover a sunken dose rate to switch the detector back on. This must be done manually by pressing the 'Turn On' button.

Connection Established Screen

Displayed when a computer is connected to the Target F501 via a USB cable.



The connection screen

To access the web interface open a web browser on the connected computer and enter the displayed URL.

✓ You should now see the web interface of the Target F501.

✗ If the browser displays an error message or you are redirected to the result page of your web search engine, please check the URL carefully and re-enter.

✘ Some combinations of operating systems and browser versions are not able to resolve this kind of URL. In such cases try a different browser. Please take a look at the table with the minimal versions of the different browsers.

Browser Compatibility	Edge	Firefox	Chrome	Safari	Opera	IE
Minimal Version	79	69	64	13.7	52	not supported

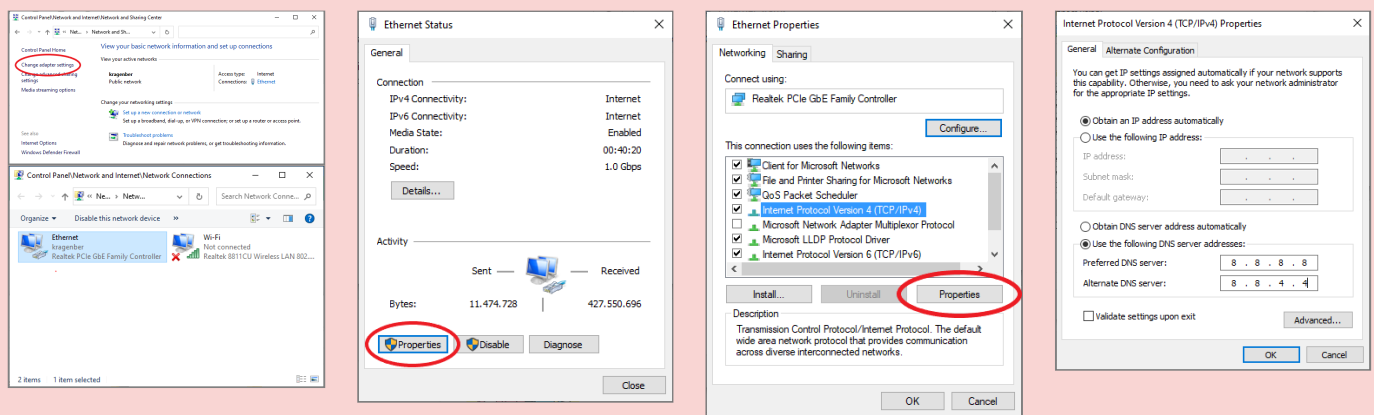
Connection Problems

Problems connecting the computer to the Target F501 can have a variety of causes. The browser version, network environment and security settings of the computer play the main roles here. The most common problem is that the name resolution of the URL does not work. For this reason, the IPv4 or IPv6 address of the device is displayed below the .local URL. This address can be relatively long and is inconvenient to enter, but should work in any case. Please note that the IPv4 address only works for the USB connection, while the .local address can also be used for a Wi-Fi connection. The IPv4 address is static, so IP collisions may occur if you have several devices connected to your computer via USB.

If you still want to work with the .local address, try using a different browser first. We recommend using the latest version of Firefox. If that fails, contact your network administrator or try the following workaround:

(The solution is sketched exemplarily for Windows 10)

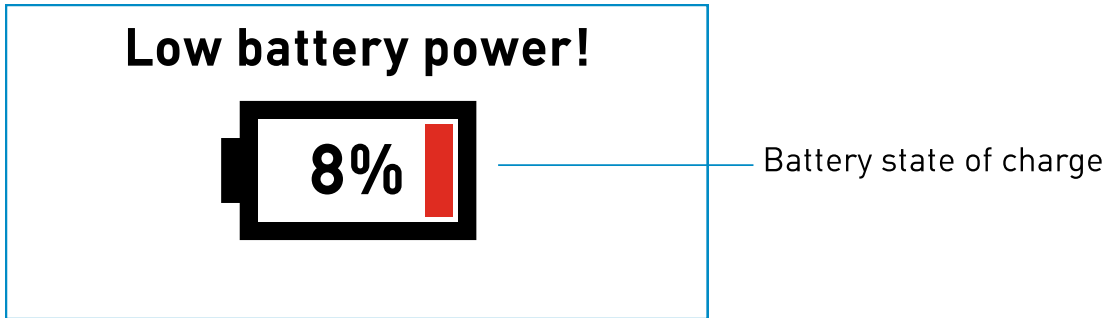
- **Q** **Control Panel** Open the control panel and follow the path:
- **Control Panel > Network and Internet > Network and Sharing Center**
- There click on "Change adapter settings" then doubleclick the currently used network adapter.
- Open the "Properties" and select "Internet Protocol Version (TCP/IPv4)" and edit the "Properties".
- Enable "Use the following DNS server addresses:" and enter the Google DNS sever addresses "8.8.8.8" and "8.8.4.4".



OK Acknowledging the screen with the OK button leads back to the previous screen.

Low Power Warning Screen

The low power warning is displayed when the battery charge level is less than 10%.

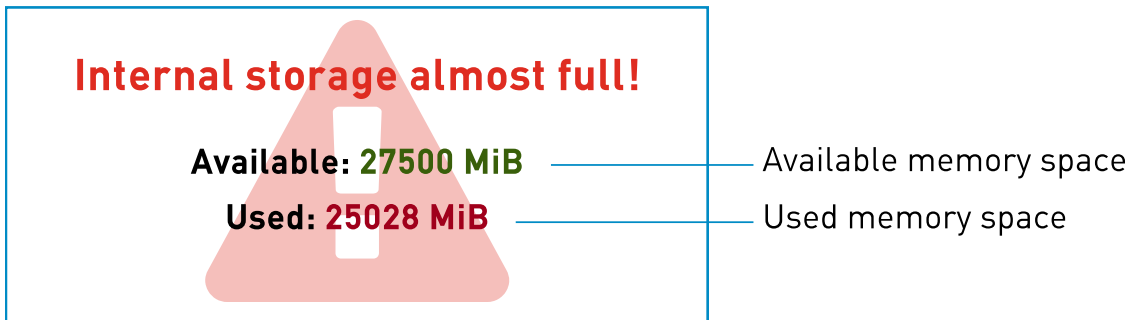


The low power warning screen

OK Acknowledging the warning with the OK button leads back to the previous screen.

Internal Storage Warning Screen

The internal memory warning is displayed when the internal memory is running low.



The internal storage warning screen

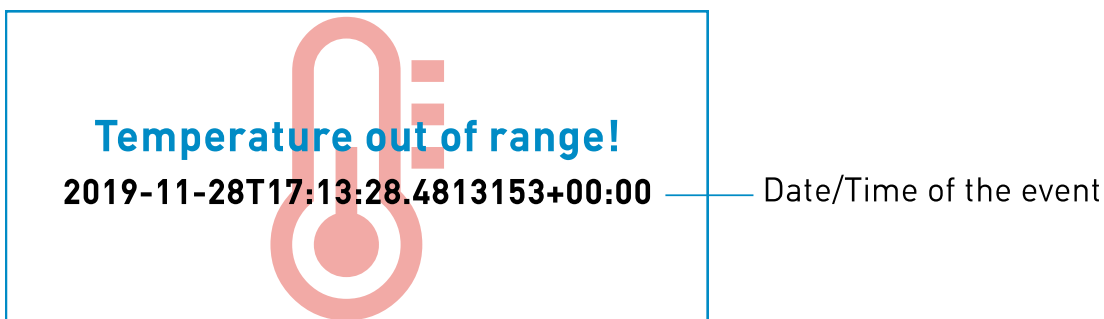
Acknowledge Acknowledging the warning with the Acknowledge button leads back to the previous screen.

To create more space on the Target F501, use the web interface and delete some data on the Target F501.

Warning Make sure that have downloaded all important data before.


Temperature Warning Screen

The temperature warning screen is displayed when the temperature in the Target F501 is outside the allowed range.



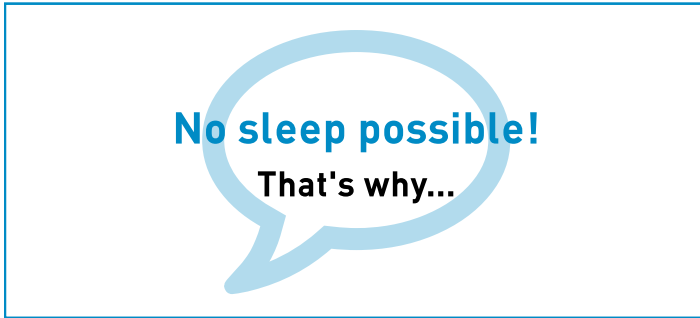
The temperature warning screen

Acknowledge Acknowledging the warning with the Acknowledge button leads back to the previous screen.

 Every detected temperature fault is listed in the session data.


No Sleep Possible Warning Screen

No sleep possible is displayed, when the power button is pressed and the system does not allow to be set to sleep mode.



The no sleep possible warning screen

Possible reasons are i.e. a running identification, a USB-connection to a computer or a running measurement on the Spectrum page of the web interface.

 Acknowledging the warning with the OK button leads back to the previous screen.

Functionality vs. Dose Rate

Functionality through the full dose rate range.

Range	10 - 200 $\mu\text{Sv/h}$		0.2 - 500 mSv/h		0.5 - 1 Sv/h	> 1 Sv/h
Dose Rate						
Identify						
Finder						
Menu						
Alarms						
Warnings						

The Web Interface

After you have connected the computer to the Target F501, you can access the web interface.

Target F501 BGO Web Interface

Serial Number:	sn-DESKTOP-S45F8JN
Detector Type:	Simulated
Hardware Version:	999999999
Software Version:	20.23.2 (dev-20230508)

Remote Screens
Full Screen Remote

Settings
Settings

Documentation
User Manual

Welcome to the Target F501 Web Interface.

The software of the Target F501 is by concept strictly divided into two parts, the **User Interface** and the **Web Interface**.

The **User Interface** is what you see when you hold an Target F501 in your hand and look at its display. It is designed to be as simple and clear as possible to provide the user with an instrument that is easy and unambiguous to operate in the field.

New Features

- Connect to WLAN networks
- Improved id-algorithm
- New long-term stabilization

The web interface has basically three tasks:

- On the one hand, all activities are bundled here that are not possible or only possible very awkwardly via the user interface with its three hardware keys. Activities that require a connection to the Internet are also easier to perform in the web interface.
- Furthermore, the web interface contains all settings that should be reserved for an expert and are therefore located in a password-protected area.
- The web interface also offers the possibility to monitor and control the Target F501 remotely. The integrated manual, which can be used to display the respective help content in parallel to the active user interface screens, is also a great help during training or other demonstrations.

⚠ With the web interface, settings can be changed, that may affect the results of measurements. Use it carefully and change things only, if you know, what you are doing.

🔒 The password-protected pages can be recognized in the menus by the preceding lock symbol.

Enter password:

Log in

The login window requires a keyboard entry of any combination of numbers, letters and special characters.

Login Press the Login to proceed.

- ⚠ The default password as delivered or after a reset is: 1 1 1 1 1**
Change the password to something different in [Settings > Administration](#).

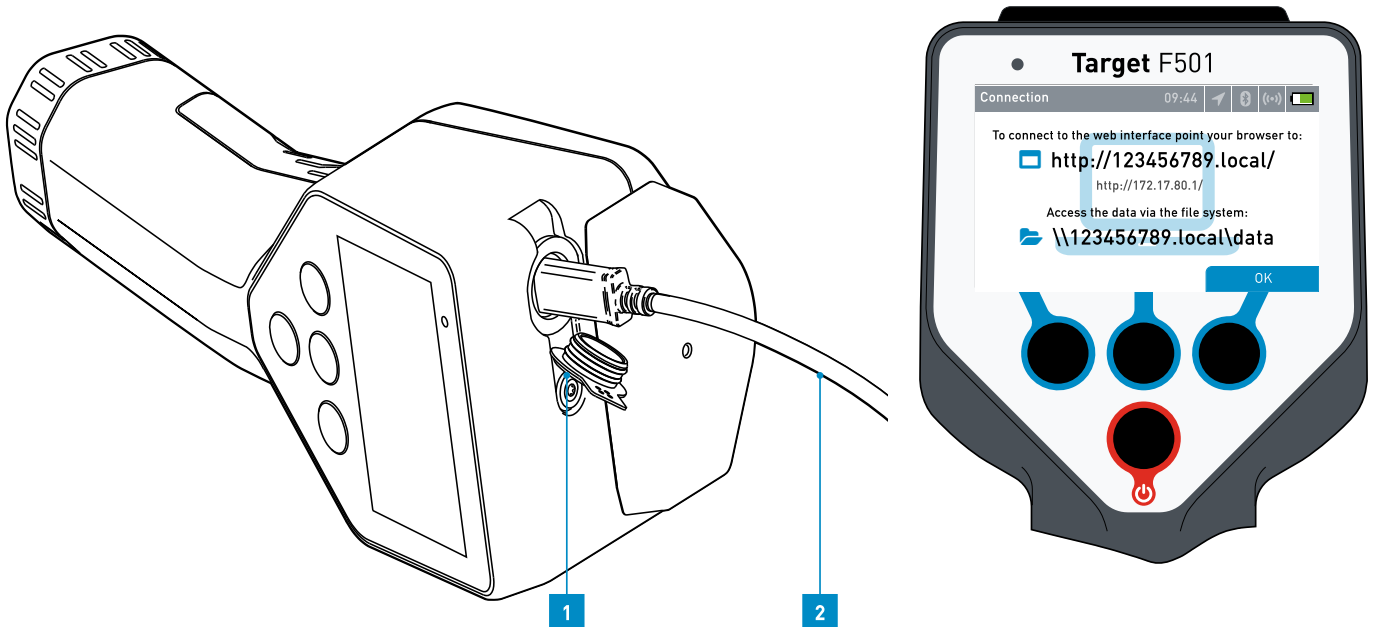
The web interface works with all modern browsers and uses JavaScript. Cookies are used to keep your personal settings, such as the spectrum display setting, in sync.

Every page of the web interface is vertically divided into three main parts:

1. On top, the fixed header-line with the main navigation.
2. At the bottom, you will find some additional information, links to support sites and some useful address and contact information.
3. In the middle, you will find the main content.

The manual pages have an additional navigation area on the right to help you find your way around this rather long page.

Connecting the Target F501 to a computer



1. Open the USB socket by lifting the socket cap.
2. Connect the computer to the Target F501 with the supplied USB cable.
3. The Target F501 will switch to a screen showing the URL of the instrument and play a sound.
4. Open a web browser on the connected computer and enter the displayed URL.

The URL is always of following scheme: `http://hostname.local/`

The second URL that is displayed is the IPv4 or IPv6 address of the device. If all attempts to use the .local address fail, this URL serves as a fallback and should work in any case.

IPv4 form: `http://172.17.80.1/`

IPv6 form [Do not forget to include the square brackets.]: `http://[1234::abcd:12ab:ab12:1a2b]/`

5. **✓** You should now see the web interface of the Target F501.
✗ If the browser displays an error message or you are redirected to the result page of your web search engine, please check the URL carefully and re-enter.

- ⚠** Some combinations of operating systems and browser versions are not able to resolve this kind of URL. In such cases try a different browser. Please take a look at the table with the minimal versions of the different browsers.

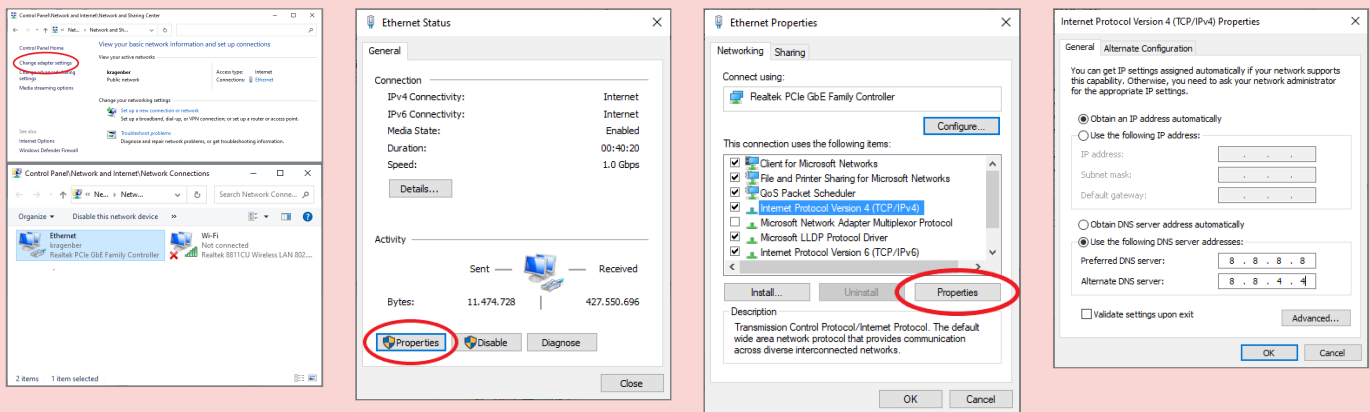
Connection Problems

Problems connecting the computer to the Target F501 can have a variety of causes. The browser version, network environment and security settings of the computer play the main roles here. The most common problem is that the name resolution of the URL does not work. For this reason, the IPv4 or IPv6 address of the device is displayed below the .local URL. This address can be relatively long and is inconvenient to enter, but should work in any case. Please note that the IPv4 address only works for the USB connection, while the .local address can also be used for a Wi-Fi connection. The IPv4 address is static, so IP collisions may occur if you have several devices connected to your computer via USB.

If you still want to work with the .local address, try using a different browser first. We recommend using the latest version of Firefox. If that fails, contact your network administrator or try the following workaround:

{The solution is sketched exemplarily for Windows 10}

- **Q** **Control Panel** Open the control panel and follow the path:
- **Control Panel > Network and Internet > Network and Sharing Center**
- There click on "Change adapter settings" then doubleclick the currently used network adapter.
- Open the "Properties" and select "Internet Protocol Version (TCP/IPv4)" and edit the "Properties".
- Enable "Use the following DNS server addresses:" and enter the Google DNS sever addresses "8.8.8.8" and "8.8.4.4".



Spectrum

On the spectrum page, you can record a spectrum and download the recorded data to your computer.

Set the real-time preset

Setting the "Real-Time Preset" limits the time the spectrum is acquired.

To acquire a spectrum for 1 hour 20 minutes and 33 Seconds set the "Real-Time Preset" input to 01:20:33

To set the "Real-Time Preset" to unlimited time enter: 0

Set the gross counts preset

Set the "Gross Counts Preset" to limit the acquiring of the spectrum to a maximum number of overall counts.

To set the "Gross Counts Preset" to 10.000 counts enter: 10000.

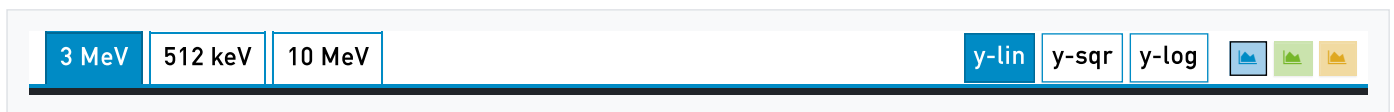
If you don't want to limit the gross counts at all, set it to: 0.

The energy spectrum

The energy spectrum consists of three parts:

- **On top:** The headline with the spectrum settings

In the header-line above a spectrum you will find a tab for each spectrum of this measurement with a different energy range.



a. 3 MeV Energy Spectrum

The 3 MeV spectrum has an energy range from 0 - 3072 keV and is stabilized and linearized.

b. 10 MeV Energy Spectrum

The 10 MeV spectrum has an energy range from 0 - 10 MeV and is stabilized but not linearized.

c. 512 keV Energy Spectrum

The 512 keV spectrum has an energy range from 0 - 512 keV and is stabilized and linearized.

On right hand of the header line you will find buttons to change the display settings of the spectrum. Here you can change the scaling or the color-scheme of the spectrum.

- **In the center:** The spectrum area

Energy Spectrum

Info-line: Energy-range, stabilization status and linearization status of the spectrum

x-axis:Energy (0 - 3072 keV / 0 - 512 keV / 0 - 10 MeV)

y-axis:Event Counts (0 - n)

Cursor: Counts at y-position, Energy/Channel at x-position

- **At the bottom:** A bar with the spectrum status and control buttons to start, stop or clear the spectrum measurement.


Start a spectrum measurement

Start ▶ Start a measurement by pressing the Start button, located under the energy spectrum area.

Stop ■ You can always stop the acquisition by pressing the Stop button.

Clear ✕ Clear the spectrum with the Clear button.

Download the spectrum

Save spectrum  Press the Save spectrum button to download the spectrum to your computer.









You can activate/focus the download button with a shortcut key:  [Alt] [Shift] + d  [Control] [Alt] + d

This will download an XML-file to your computer with an extended data format according to the "ANSI N42.42-2012" standard. (You will find a download link for the extension schema in the Appendix section of the manual)

The file contains three 3 spectra (100 keV, 3 MeV, 10 MeV) and will have the name:

Spectrum Measurement (data-id-creation date:y-m-dTH_M_S.ZZ).n42.

Iconography

-  Acquisition state: Connecting
-  Acquisition state: Acquiring
-  Acquisition state: Stopped
-  Acquisition state: Disconnected, you have to refresh the browser window
-  Counts per second (cps)
-  Real time (D.HH:MM:SS) / Live time (D.HH:MM:SS)
-  Acquisition start time
-  Acquisition stop time


Data Management

The Target F501 has an internal data-base, where every identification and every alarm is stored. You can browse through this data-base with the web interface following the links in the Data menu. On these pages an overview of the regarding event is shown including the plotted spectrum or the plotted time-line of an alarm. For detailed information a standardized .n42 file for this event can be downloaded.











If you need to download multiple or all .n42 files that are on the instrument, you can do this by using the file system of the connected computer.

After connecting the Target F501 to a computer the Target F501 shows the connection screen. In the same moment a network-share-device named after the hostname of the Target F501 will be mounted to the computer. The last text line on the connection screen shows the path to the folders containing the .n42 files.

 Enter the path to the file explorer on your computer.

Under this path you will find the following folder structure:

-  <serial-number>
-  data
 -  Identifications
 -  Dose Rate Alarms
 -  Neutron Alarms
 -  Personal Hazard Alarms
 -  Sessions

 **Keep in mind that this is only a simulated file system. You can only read and download files within these folder. You cannot delete any files in these folders or copy other files into these folders.**

On newer Windows (e.g. Windows 11) systems, SMB 1.0 support is disabled by default and must be enabled to view the device's data. Press Win + R and enter the command "optionalfeatures" to open Windows-features and check the SMB1 status or enable its client. Place a check mark next to "Support for SMB 1.0/CIFS file sharing" as you scroll down the list of features.

The database contains data of the following events

- Identifications
- Dose Rate Alarms
- Neutron Alarms
- Personal Hazard Alarms
- Sessions Data

Identifications

The identifications page shows the details of an identification.

The identification results database

Initially the latest recorded identification will be displayed. The header shows the database-id of the identification and in the subtitle, you will find the date of the recording.

With the forward and backward buttons of the data-navigator on the right hand you can navigate through the set of recorded identifications.



The list of identified nuclides

Beneath the header a table with the list of identified nuclides is displayed.

Each row contains:

- The confidence of the identification (0 = low, 10 = high)
- Nuclide name
- The usage classification (IND , NORM, MED, SNM, NUC)
- The severity classification (Innocent, Suspicious, Threatening)

The energy spectrum

Energy Spectrum

x-axis: Energy (0 - 3072 keV / 0 - 512 keV / 0 - 10 MeV)

y-axis: Event Counts (0 - n)

Cursor: Counts at y-position, Energy/Channel at x-position

The info bar below the spectrum shows:

-  Real-time (Accumulated real-time if the time was extended after the first identification.)

Download the identification data to a computer

 Download > Identification (id) Click on the "Download > Identification (id)" button to download the identification to your computer.

You can activate/focus the download button with a shortcut key:  [Alt][Shift]+d  [Control][Alt]+d

This will download an XML-file to your computer with an extended data format according to the ANSI N42.42-2012 standard.

The file will have the name: "Identification (id).n42".

You will find a download link for the extension schema to the N42.42 XML standard in the Appendix section of the manual.

Delete the identification data

 Delete > Identification (id) Click on the "Delete > Identification (id)" button to delete the respective identification.

Dose Rate Alarms

The dose rate alarms page shows the details of a dose rate alarm.

The dose rate alarms database


Initially the latest recorded dose rate alarm will be displayed. The header shows the database-id of the dose rate alarm and in the subtitle, you will find the date the alarm occurred.

With the forward and backward buttons of the data-navigator on the right hand you can navigate through the set of recorded alarms.



The dose rate alarm time line

Dose Rate Alarm Time Line

 **Red** : Dose rate time line




 **Blue** : Neutron data time line

x-axis: Number of the alarm event (0 - n)


y-axis (left): Dose rate $\mu\text{Sv/h}$

y-axis (right): Neutron data

The info bar below the graph shows:

-  Start time of this dose rate alarm
-  Stop time of this dose rate alarm
-  Threshold for this dose rate alarm

Saving the dose rate alarm to a computer

 **Download > Dose Rate Alarm (id)** Click on the "Download > Dose Rate Alarm (id)" button to download the alarm to your computer.

You can activate/focus the download button with a shortcut key:  `[Alt][Shift]+d`  `[Control][Alt]+d`

This will download an XML-file to your computer with an extended data format according to the ANSI N42.42-2012 standard.

The file will have the name: **Dose Rate Alarm #(id).n42**.

You will find a download link for the extension schema to the N42.42 XML standard in the Appendix section of the manual.

Neutron Alarms

The neutron alarms page shows the details of a neutron alarm.

The neutron alarms database


Initially the latest recorded neutron alarm will be displayed. The header shows the database - id of the neutron alarm and in the subtitle, you will find the date the alarm occurred.

With the forward and backward buttons of the data-navigator on the right hand you can navigate through the set of recorded alarms.



The neutron alarms time line

Neutron Alarm Time Line

 **Blue** : Neutron data

 **Red** : Dose rate

x-axis: Number of the event (0 - n)

y-axis (right): Neutron data

y-axis (left): Dose rate $\mu\text{Sv/h}$

The info bar below the graph shows:

- 🕒 Start time of this neutron alarm
- 🕒 Stop time of this neutron alarm
- 📶 Threshold for this neutron alarm

Saving the neutron alarm time line to a computer

[Download > Neutron Alarm \(id\)](#) Click on the "Download > Neutron Alarm (id)" button to download the neutron alarm file to your computer.

You can activate/focus the download button with a shortcut key:  [Alt][Shift]+d  [Control][Alt]+d

This will download an XML-file to your computer with an extended data format according to the ANSI N42.42-2012 standard. The file will have the name: **Neutron Alarm (id).n42**.

You will find a download link for the extension schema to the N42.42 XML standard in the Appendix section of the manual.

Personal Hazard Alarms

The personal hazard alarms page shows the details of a personal hazard alarm.

The personal hazard database


Initially the latest recorded personal hazard alarm will be displayed. The header shows the database-id of the personal hazard alarm and in the subtitle, you will find the date the alarm occurred.


With the forward and backward buttons of the data-navigator on the right hand you can navigate through the set of recorded alarms.



The personal hazard alarm time line

Personal Hazard Alarm Time Line

 **Red** : Dose rate time line

 **Blue** : Neutron data time line

x-axis: Number of the alarm event (0 - n)

y-axis (left): Dose rate $\mu\text{Sv/h}$

y-axis (right): Neutron data

The info bar below the graph shows:

- 🕒 Start time of this personal hazard alarm
- 🕒 Stop time of this personal hazard alarm
- 📶 Threshold for this personal hazard alarm

Saving the personal hazard alarm time line to a computer

[Download > Personal Hazard \(id\)](#) Click on the "Download > Personal Hazard (id)" button to download personal hazard alarm file to your computer.

You can activate/focus the download button with a shortcut key:  [Alt][Shift]+d  [Control][Alt]+d

This will download an XML-file to your computer with an extended data format according to the ANSI N42.42-2012 standard. The file will have the name: **Personal Hazard Alarm (id).n42**.

You will find a download link for the extension schema to the N42.42 XML standard in the Appendix section of the manual.

Sessions


The sessions page shows the list of sessions on the instrument.

The sessions database


The Target F501 regularly stores all data of its current state. The session starts when the Target F501 is started and ends when the Target F501 is switched off. On the sessions page these sessions are displayed for download sorted by date.

Only if the Target F501 has been shut down properly a duration for the session will be displayed. If the Target F501 was terminated by removing the power modules or if the software of the Target F501 crashes unexpectedly, the session data is saved until that point and can be downloaded, but the duration of the session is not calculated and is displayed as zero in the list.

Saving the session data to a computer

 Click on the "Download data" button to download the session data to your computer.

This will download a .n42 XML file named Session #SessionId.n42 that contains the 3 MeV spectra per second and all alarms for the period.

 **Please note that the files can become relatively large depending on the length of the session and the download can take a correspondingly long time. A 60-hour session generates a 750 MB file that takes about 10 minutes to download from the Target F501. Internally, the Target F501 uses an optimized format to store the data.**

Remote Screens

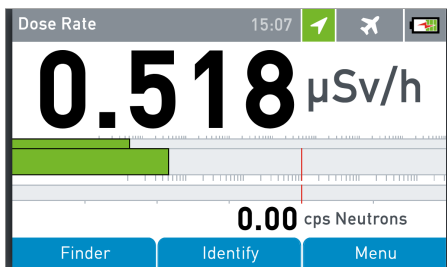
The remote area contains different variants of remote screens.

If you have established a connection between the Target F501 and a computer, tablet or any other device with a web browser, you can use this connection not only to set up the Target F501, but you can also operate the Target F501 remotely.

[See the chapter "Connect to the Target F501" for more information on how to connect to the Target F501]

Connect to the Target F501

Following remote screens are available:



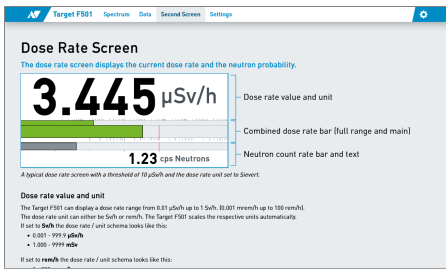
Full Screen Remote

Displays the user interface in a browser window of a connected computer and scales it to 100% of the window width or height. The display of the Target F501 and the browser window of the connected computer are updated synchronously and display identical content.



Remote and Help

The remote screen is rendered within the web interface with the appropriate help content displayed aside. This is a great tool to learn how to operate the Target F501.



Full Screen Help

Displays only the respective help information in a full screen browser window, i.e. connected to a mobile phone, you always have the appropriate help for the screens of the Target F501 in your hand. If you switch the screen on the Target F501, the help page in the browser window switches synchronously.

Settings

i Some general information on the different types of input fields and saving concepts.

Saving Concept

Instant saving on change

All settings are automatically saved to the Target F501 at the moment they are changed and the editor field loses focus (This happens as soon as the input field is left with the TAB key or by clicking on any position outside the input field).

Input Types

Standard input

[TAB] The standard setting works as expected, you can set the focus with the mouse or toggle through the settings with the [TAB] key, then enter the value with the keyboard.

Invalid inputs are indicated instantly and will not be saved to the instrument.

Standard Input


Standard Input with Unit


Input with validation error

⚠ Invalid Number.

Drop-down

Drop-down menus are used for settings with a small number of possible values. You can operate the drop-down menus with the mouse or with the keyboard.

 With the mouse click on the drop-down menu, it opens and you can choose one of the values.

 **[TAB]** Select the setting with the [TAB] key.

[ARROW DOWN] Open the drop-down menu with the [ARROW DOWN] key, select a setting value with the [ARROW DOWN] or [TAB] key.

[RETURN] Then set the setting to the chosen value with the [RETURN] key.

Drop-down select (closed)

Drop-down select (opened)

- ✓
-
-

Drop-down select (opened)

- ✓
-
-

Radio button

Radio buttons are used for settings with only two possible values. You can operate the radio buttons with the mouse or with the keyboard.

Radio button



Click on the radio button to toggle the value.

[TAB] Set the focus with the [TAB] key.

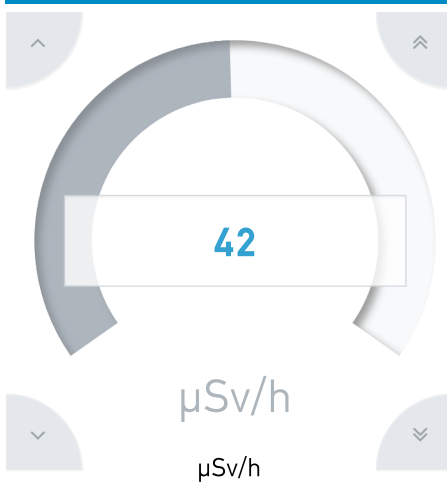
[RETURN] Toggle the setting with the [RETURN] key.

Special knob

The special knob is used for settings with a fixed value range and/or fixed steps between the values. As with all other settings, the special knob is operable with both, mouse and keyboard.

Invalid values are indicated instantly and not saved to the instrument.

Special Knob



Click and drag the mouse on the value arc to change the setting within the complete value range.

Click on the step buttons in the 4 corners of the setting element.

Increases the value by 1 or by one step.

Decreases the value by 1 or by one step.

Increases the value by 10 or by nine steps.

Decreases the value by 10 or by nine steps.

Click on the input rectangle to set the focus to the input element.

[TAB]: Toggle through the setting elements and set the focus to the input rectangle.

[ARROW UP]: Increases the value by 1 or by one step.

[ARROW DOWN]: Decreases the value by 1 or by one step.

[PAGE UP]: Increases the value by 10 or by nine steps.

[PAGE DOWN]: Decreases the value by 10 or by nine steps.

If a setting has fixed steps between the values, keyboard inputs to the input rectangle are changed to the nearest valid value.

Operator Settings

The operator settings page holds all settings which are available for every operator.

These settings are available on the user interface of the instrument too.

General settings

Language

Changes the language of the user interface.

"English US"

Changes the language of the user interface to English US

"Deutsch"

Changes the language of the user interface to German

"简体中文"

Changes the language of the user interface to Chinese simplified

Flight Mode

Controls the general availability of Bluetooth and Wi-Fi

On

No Bluetooth and Wi-Fi functionality.

Off

Bluetooth and Wi-Fi are generally available, but may require additional settings.

-  **Start in Finder Mode**

Controls the start-up behavior of the Target F501

- **On**
The Target F501 starts in Finder mode after a cold start.
- **Off**
The Target F501 starts in Dose Rate mode after a cold start.

-  **Display Brightness**

Changes the brightness of the display.

- **0 %**
Switches the background lighting off.
- **25 %**
Sets the background lighting to 25 %.
- **50 %**
Sets the background lighting to 50 %.
- **75 %**
Sets the background lighting to 75 %.
- **100 %**
Sets the background lighting to 100 %.

-  **Rotation Lock**

Stops the display rotating depending on the orientation of the instrument.

- **On**
The display orientation is fixed.
- **Off**
The display flips its orientation depending on the orientation of the instrument.

-  **Auto Suspend**

Changes the time without user interaction after which the device is set to standby mode.

- **Never**
The instrument will never automatically be set to the standby mode.
- **60 seconds**
After 60 seconds with no user interaction the instrument will be set to standby mode.
- **5 minutes**
After 5 minutes with no user interaction the instrument will be set to standby mode.

Feedback settings

-  **Alarm Feedback**

Sets the feedback of the instrument for alarm.

Available options:

- **Off**
Vibration and sound alarms are switched off. The alarms are still indicated on the display of the instrument.
- **Sound**
The Target F501 indicates an alarm by playing a sound.
- **Vibrator**
The Target F501 indicates an alarm with rhythmical vibrations.
- **All On**
The Target F501 indicates an alarm with rhythmical vibrations and sound.

The alarm feedback is turned off as soon as the operator acknowledges the alarm.

-  **Key Feedback**

Sets the feedback for pressing the hardware keys.

Available options:

- **Off**
Vibration and sound feedback for pressing keys are switched off.
- **Sound**
The Target F501 plays a short sound when the hardware keys are pressed.
- **Vibrator**
The Target F501 vibrates for a moment when the hardware keys are pressed.
- **All On**
The Target F501 plays a short sound and vibrates for a moment when the hardware keys are pressed.
The visual feedback of the user interface is unaffected by this setting.

- **🔊 Sound Volume**

Changes the volume of the Target F501

- **Mute**
Mutes all feedback sounds.
- **25 %**
Sets the feedback sound volume to 25 %.
- **50 %**
Sets the feedback sound volume to 50 %.
- **75 %**
Sets the feedback sound volume to 75 %.
- **100 %**
Sets the feedback sound volume to 100 %.

Reachback settings

- **✉ Email Server**
Text entry with the address of the email server that will be used for reachback.
- **✉ Email Username**
Text entry with the email username.
- **✉ Email Password**
Password entry with the user password.
- **✉ Email Recipients**
Text entry with the email recipients separated by comma.

Save settings

- **All settings are automatically saved to the Target F501 at the moment they are changed and the editor field loses focus.**

Expert Settings

The expert settings page holds settings which need special expert knowledge to be set.

- **The expert settings are only available via the web interface. You cannot change them with the user interface of the Target F501.**

General Settings

- **UI Dose Rate Unit**

Changes unit for the dose rate in the user interface.

Available Options:

- **Sv/h*** ($\mu\text{Sv/h}^*$, mSv/h^*)
Ambient dose equivalent $\dot{H}^*(10)$
- **Sv/h** ($\mu\text{Sv/h}$, mSv/h)
Exposure rate
- **rem/h** ($\mu\text{rem/h}$, mrem/h , rem/h)
Exposure rate

i **Dose rate values of settings in web-interface are always displayed in $\mu\text{Sv/h}^*$ or $\mu\text{Sv/h}$.**

- **Save GPS Position**

Controls the saving of available GPS data into the .n42 files of identification results and session logs. The streaming to the Sigma server is also affected.

Available Options:

- **Yes**
GPS data will be saved to identification results, session files and streaming data if available.
- **No**
No GPS coordinates are output in streams or files

Alarm Settings

- **Dose Rate Alarm Threshold**

Sets the threshold for the dose rate alarm.

Range: Full dose rate range.

Available values: 10 values per logarithmic-decade

i **The unit for the dose rate alarm threshold here is always $\mu\text{Sv/h}^*$ or $\mu\text{Sv/h}$.**

To reduce irritations the value and unit of the dose rate alarm threshold as displayed in the user interface on the instrument is displayed below the knob.

- **Operator Settings for Dose Rate Alarm Thresholds**

Set up to five value-label pairs.

Values entered here can be selected by the operator in the instrument's user interface in:

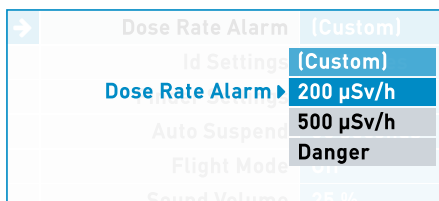
Menu -> Operator Settings -> Dose Rate Alarm

The label must contain a string and is initially set to a default value.

x Deletes the respective value-label pair.

+ Adds a new value-label pair until the upper limit of five.

The label/value pairs of i.e. [200 $\mu\text{Sv/h}$,200], [500 $\mu\text{Sv/h}$,500], [Danger,1000] results in the user interface with an additional Dose Rate Alarm setting looking like this:



- **Personal Hazard**

Sets the threshold for the personal hazard alarm.

Range: Full dose rate range.

Available values: 10 values per logarithmic-decade

 **The unit for the dose rate alarm threshold here is always $\mu\text{Sv/h}^*$ or $\mu\text{Sv/h}$.**

To reduce irritations the value and unit of the dose rate alarm threshold as displayed in the user interface on the instrument is displayed below the knob.

- **Neutron Alarm**

Sets whether a neutron alarm is triggered, if the neutron data exceed the threshold.

Identification Settings

- **Identification Result**

- **Show Confidence**

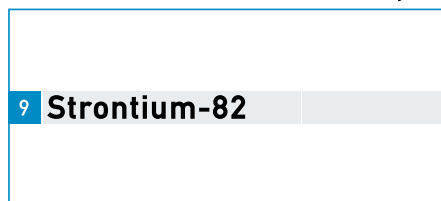
Show or hide the identification confidence in id-results.

- **Show Usage**

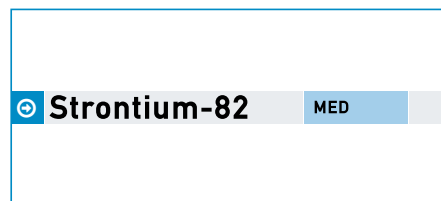
Show or hide the nuclide usage indication in identification results.

- **Show Severity**

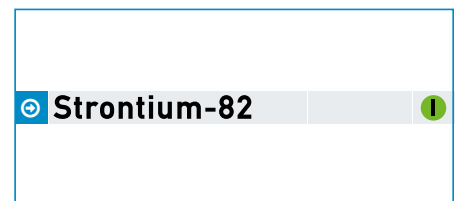
Show or hide the nuclide severity in identification results.



Show Confidence



Show Usage



Show Severity

- **Background**

These are the settings for a background measurement. This measurement does not influence the primary identification measurement (Foreground) and is usually not required, unless a special work-flow requires it.

- **Enable Background**

This enables a separate background measurement in advance to the main foreground measurement. Before this measurement starts the operator is asked to keep away from other radioactive sources.

- **Background Real Time**

This setting determines a fixed time for the background measurement.

Time: hh:mm:ss

If the background Real Time is set to 00:00:00 there is no time base stop trigger.

- **Background Statistics**

To provide reliable results in the shortest possible time, the Target F501 calculates the time to do a measurement based on a value we call statistics. The base value of "1" represents the optimum compromise between the length of the measurement and the reliability of the result depending on the internal physics of the Target F501 and the external conditions during the measurement.

Available values: 0-20

A value of two for statistics means that the statistical base will be doubled. Under identical circumstances this will double the time for the measurement, on the other hand it may increase the measurement quality especially with weak sources. A value of 0 means there is no statistic based stop trigger.



The background measurement is stopped if either the "Background Real Time" or the "Background Statistics" is reached, whatever occurs first will stop the measurement.

- **Calibration Measurement**

These are the settings for a calibration measurement with a known source. This measurement does not influence the

primary identification measurement (Foreground) and is usually not required, unless a special work-flow requires it.

- **Enable Calibration Measurement**

This enables a separate calibration measurement in advance to the main foreground measurement. Before this measurement starts the operator is asked to keep away from other radioactive sources.

- **Calibration Real Time**

This setting determines a fixed time for the Calibration measurement.

Time: hh:mm:ss

If the calibration real time is set to 00:00:00 there is no time base stop trigger.

- **Calibration Statistics**

To provide reliable results in the shortest possible time, the Target F501 calculates the time to do a measurement based on a value we call statistics. The base value of "1" represents the optimum compromise between the length of the measurement and the reliability of the result depending on the internal physics of the Target F501 and the external conditions during the measurement.

Available values: 0-20

A value of two for statistics means that the statistical base will be doubled. Under identical circumstances this will double the time for the measurement, on the other hand it may increase the measurement quality especially with weak sources.

A value of 0 means there is no statistic based stop trigger.



The Calibration measurement is stopped if either the "Calibration Real Time" or the "Calibration Statistics" is reached, whatever occurs first will stop the measurement.

- **Foreground**

These are the settings for the very measurement to identify radionuclides.

- **Foreground Real Time**

This setting determines a fixed time for the Foreground measurement.

Time: hh:mm:ss

If the Foreground Real Time is set to 00:00:00 there is no time base stop trigger.

- **Foreground Statistics**

To provide reliable results in the shortest possible time, the Target F501 calculates the time to do a measurement based on a value we call statistics. The base value of "1" represents the optimum compromise between the length of the measurement and the reliability of the result depending on the internal physics of the Target F501 and the external conditions during the measurement.

Available values: 0-20

A value of two for statistics means that the statistical base will be doubled. Under identical circumstances this will double the time for the measurement, on the other hand it may increase the measurement quality especially with weak sources. A value of 0 means there is no statistic based stop trigger.



The Foreground measurement is stopped if either the "Foreground Real Time" or the "Foreground Statistics" is reached, whatever occurs first will stop the measurement.

- **Extension**

These are the settings for the extension measurement. A extension measurement can be triggered by the user after the foreground measurement result. The foreground measurement and the extension measurement are summed and the new identification result is based on this sum.

- **Extension Real Time**

This setting determines a fixed time for the extension measurement.

Time: hh:mm:ss

If the Extension Real Time is set to 00:00:00 there is no time base stop trigger.

- **Extension Statistics**

To provide reliable results in the shortest possible time, the Target F501 calculates the time to do a measurement based on a value we call statistics. The base value of "1" represents the optimum compromise between the length of the measurement and the reliability of the result depending on the internal physics of the Target F501 and the external conditions during the measurement.

Available values: 0-20

A value of two for statistics means that the statistical base will be doubled. Under identical circumstances this will double the time for the measurement, on the other hand it may increase the measurement quality especially with weak sources. A value of 0 means there is no statistic based stop trigger.



The Extension measurement is stopped if either the "Extension Real Time" or the "Extension Statistics" is reached, whatever occurs first will stop the measurement.

- **Operator Settings for Identification**

Set up to five labeled identification settings. Settings entered here can be selected by the operator in the instrument's user interface in: **Menu -> Operator Settings -> Identification Settings** Each row contains a complete identification setting with following inputs:

- **Label**

- The label must contain a string and is initially set to a default value.

- **Background**

- Enable background measurement
Yes / No
- Background Real Time
Time: hh:mm:ss
- Background Statistics
Value: 0-20

- **Calibration Measurement**

- Enable a calibration measurement with a known source
Yes / No
- Calibration Real Time
Time: hh:mm:ss
- Calibration Statistics
Value: 0-20

- **Foreground** (*Main identification measurement, always active*)

- Foreground Real Time
Time: hh:mm:ss
- Foreground Statistics
Value: 0-20

- **Extension** (*On demand*)

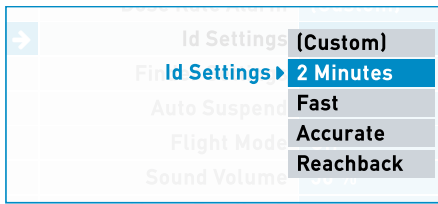
- Extension Real Time
Time: hh:mm:ss
- Extension Statistics
Value: 0-20



Deletes the respective identification setting row.



Adds a new identification setting until the upper limit of five. Adding settings with labels [2 Minutes], [Fast], [Accurate], [Reachback] results in the user interface with an additional Identification setting looking like this:



Finder Settings

- **Finder False Alarm Threshold**

Setting for the number of hours with one false alarm in finder mode.

Value Range: 0.1h - 10h (6 minutes to 10 hours)

Settings with a higher number of hours will make the Target F501 less sensitive during finder mode.

- **Operator Settings for Finder False Alarm Thresholds**

Set up to five value-label pairs.

Values entered here can be selected by the operator in the instrument's user interface in:

Menu -> Operator Settings -> Finder False Alarm

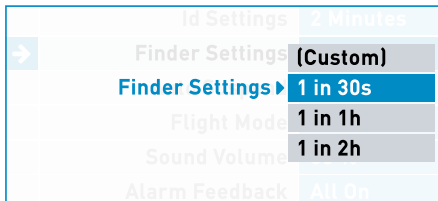
The label must contain a string and is initially set to a default value.

Value Range: 0.1h - 10h (6 minutes to 10 hours)

Deletes the respective value-label pair.

Adds a new value-label pair until the upper limit of five.

Adding settings with labels [1 in 30s], [1 in 1h], [1 in 2h] results in the user interface with an additional Finder setting setting looking like this:



X-Ray Filter Settings

Some variants of the Target F501 are equipped with software that can filter an active X-ray beam and ensure valid measurements and identifications in an environment where the sample is being X-rayed.

- **X-Ray Burst Detection**

Switching the X-ray filter On or Off

- **X-Ray Burst Frequency**

Set the X-ray burst frequency (200 - 2000 Hz)

Clock settings

- **Time Zone**

Choose your time zone by clicking on one of the available entries in the time zone list. You can filter this long entry list with the input box or by setting the filter to the time zone of your browser. The blue box time zone beneath the headline is the time zone the Target F501 will be set to.




Save settings

- **All settings are automatically saved to the Target F501 at the moment they are changed and the editor field loses focus.**

Nuclide Settings

The nuclide settings page shows the list of nuclides of the Target F501 with their usage and severity classifications and their importance value.

 The nuclide settings are only available via the web interface. You cannot change them with the user interface of the Target F501.

Edit the settings of a nuclide

To change the settings of a nuclide, click on the row of the nuclide and an area with the editable parameters of the nuclide will expand.

Change the classification of a nuclide

Every nuclide is classified by usage and severity. Choose one of the following usages for the nuclide:

- Industrial (IND)
- Medical (MED)
- Special Nuclear Material (SNM)
- Special Nuclear Material Related (SNMR)
- Nuclear Material (NUC)
- Natural (NORM)

The nuclides severity classes are:

- Innocent
- Suspicious
- Threatening

Change the importance value of a nuclide

The importance value of a nuclide controls in which order nuclides are displayed in identification results with more than one nuclide. The lower the importance value, the further forward the corresponding nuclides are shown in the identification results. Nuclides with an importance value of 1 are displayed on top and empty entries at the end of identification results. Nuclides with the same importance value are displayed in alphabetical order.

Save settings


- **All settings are automatically saved to the Target F501 at the moment they are changed and the editor field loses focus.**

Wi-Fi Settings

The Wi-Fi settings page provides all settings and information to set up a connection to a Wi-Fi server or to enable the built-in Wi-Fi access point.

It is important to understand the difference between providing a Wi-Fi access point and establishing a Wi-Fi connection. Providing a Wi-Fi access point means that the Target F501 provides a Wi-Fi network to which external devices such as a smartphone can connect. To do this, select this Wi-Fi network on the smartphone and enter the credentials displayed in the user interface of the Target F501. Since the network is provided by the Target F501, which by itself has no connection to the Internet, a smartphone that is connected to the Target F501 in this way also has no connection to the Internet.

If, on the other hand, you establish a Wi-Fi connection to a local network with the Target F501, all devices that are in this local network can access the Target F501. So if you are connected to this local network with your smartphone and the local network is connected to the Internet, you can access both the Target F501 and the Internet.

 It is not possible to provide a Wi-Fi access point and connect to a local Wi-Fi network at the same time.

Wi-Fi Access Point

Enable Wi-Fi Access Point

Available Options:

- **On**
Wi-Fi access point is enabled.
In the user-interface go to Menu > Wi-Fi Access Point to see the SSID and the passphrase for this Wi-Fi network.
- **Off**
Wi-Fi access point is disabled.

Wi-Fi Connection

Connect to Wi-Fi


Enable Wi-Fi on the Target F501


Available Options:


- **On**
Enables Wi-Fi and tries to connect to the selected Wi-Fi network.
It is only possible to enable Wi-Fi if at least one connection is configured on the instrument.
- **Off**
Disables Wi-Fi on the Target F501.


Wi-Fi Configurations

Add and delete Wi-Fi configurations on the Target F501.

 Adds a new row for a Wi-Fi configuration.

 Add the SSID (name) of the Wi-Fi network and the corresponding password in the appropriate fields and press Connect to connect the Target F501 to this network. Only after a successfully established connection this network configuration is stored on the Target F501.

 Turns the button to red.

 Another click on the button deletes the respective Wi-Fi configuration row.

Streaming Settings

[The streaming settings page provides all settings and information to set up a connection to the streaming server.](#)

Streaming

Switches the streaming to the streaming server on and off.

Available Options:

- **On**
Streaming data to the streaming server is enabled.
- **Off**
Streaming data to the streaming server is disabled.

Metadata

Information provided by the Target F501 in connection with the streaming capability.


Metadata are displayed for:

- **Device** Make, Model, Serial

The credentials for streaming and reporting are linked to this device metadata. They are displayed here to facilitate the initial setup of the credentials and for troubleshooting. So when the administrators of the streaming Server ask for the data of the Target F501 during setup, they want to know this device metadata.

- **Sensor** Make, Model, Serial

The sensor metadata is displayed here as additional information. The sent measurement data is linked to a sensor with this metadata.

 **Device and sensor metadata are permanently linked to the respective Target F501 hardware and cannot be changed.**



Credentials


The URLs for streaming and reporting as well as the respective credentials are managed here.


Header


If no valid configuration is available yet, "Empty Configuration" is displayed in the header and an edit button is shown.


 Press the Edit button to open the editor.

  A valid configuration is displayed with "Valid Configuration" and the buttons Clear stored credentials and Edit are available.

 Press the Edit button to open the editor.

 Press the Clear stored credentials to clear the stored credentials and URLs.


 **Deleting the URLs and credentials happens immediately without any further security query and cannot be undone. This will also close any active connection. You'll need to reenter credentials and URLs before you can connect again.**

 **A valid configuration does not automatically mean that the entered URLs and credentials work, but only that all fields are filled with content of the correct type. Always refer to the streaming log to check the status of the connection.**

Body

In case of a valid configuration, the body will show the set URLs for streaming and reporting or the note "Not yet configured".

When the editor is open, the Streaming URL, Streaming Credentials, Reporting URL and Reporting Credentials fields are displayed for entry.

 Fill in the fields with the information you have received from the administrators of the streaming Server and press the button Save Credentials. The fields for the URL of the streaming and the reporting server must not be empty and must contain a valid URL. The fields for the credentials of the streaming and the reporting server must not be empty. Test the configuration by switching on streaming and watching the streaming log if a connection to the streaming server is established successfully.

 **When opening the editor again, the credentials for streaming and reporting are not displayed again and must be entered again if changed URLs are to be saved**


Streaming Log

This box displays a log of the communication between the Target F501 and the streaming server. The streaming log updates automatically and always shows the latest change.

On the administration page you can reset the instrument to the delivery conditions.

Settings


- **Load a settings file from the computer**

Load settings from a file 


To load a settings file from the computer to the Target F501 press the Load settings from a file button and choose the appropriate file. The file must be a valid JSON file.

The success of the operation will be indicated with a check-mark: 

Loaded settings are directly saved to the Target F501.

 **Keep in mind that the password will be loaded from the JSON file as well. In doubt open the JSON file with an editor to find out what it is set to.**

- **Save settings to the computer**

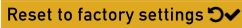
Save settings to the computer 


Pressing the Save settings to the computer button will save a JSON file to your computer. The default name is settings.json and the file will all settings including the password.

- **Reset to factory settings**

Reset to factory settings 

Press the Reset to factory settings button to change all settings on the instrument to their default factory values.

Successfully resetting will be indicated: 

 **Keep in mind that the password will be reset to the default password as well.
The default password is: 1 1 1 1 1 1**

Data

- **Delete all data on the Target F501**

 Delete all data on the Target F501 

Press the 'Delete all data on the Target F501' button to delete all identifications, dose rate alarms, neutron notifications, personal hazard and session data on the instrument.

In order to delete all data the database is killed completely and a restart of the instrument is required.

 Delete all data on the Target F501 

After pressing the 'Delete all data on the Target F501' button the instrument shuts down automatically.



Wait some seconds and press the power button to start the instrument again. All data on the instrument are gone and a new session is started.

Power Management

- **Turn the Target F501 off**

Turn the Target F501 off

Press the 'Turn the Target F501 off' button to turn the device off.




This will of course break the connection to the Target F501 and the Target F501 must then be turned back on by pressing the hardware button.

Clock

- **Sync date and time to the Target F501**

You can set the date and time of the Target F501 by synchronizing the date and time to the date and time of the computer the Target F501 is connected with.

 Press the Sync Time button to set date and time of the Target F501 to date and time of the connected computer.

A successful synchronization will be indicated: 



Keep in mind that it may take some seconds due to the slow update rate of the status bar until changes take effect.

Password


- **Enter the current password**


Fill the input field with the current password.

- **Enter the new password**

Fill the input field with the new password.

- **Save the new password**










 Press the Change the Password button to save the new password to the instrument.

A successfully changed password will be indicated: 

Software Update

On the software update page you can choose an update file which is uploaded and installed to the instrument.

The update status box on top of the page steps through following states:

-  The Browser connects to the instrument.
The browser is connected to the instrument.
-   To choose the update file click the Choose the update file! button and select the appropriate file in the file-selection dialog box.
-  The update file is uploaded to the instrument.
-  The update file is successfully uploaded and ready to be installed.
 To start the software installation press the Install button.
-  The installer is running. **Don't turn off the instrument while installing.**
During the installation the user-interface of the instrument shows this icon: 
-  The installation was successful. After the installation the instrument was automatically shut down. Turn the instrument back on again by pressing the power button on the instrument.

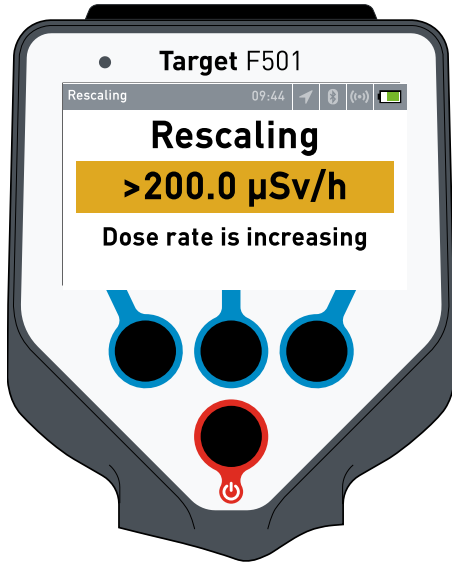
Below the update status box the log output is listed.

Appendix

Troubleshooting

If you run into a problem, first check this troubleshooting list.

The System rescale screen is displayed after start-up



If the system rescale screen is displayed after a start-up try to reset the Target F501 by long-pressing the On/Off button or disconnecting the battery for a short time. If the Target F501 always ends up with displaying the system rescale screen after the start, it is a indication of a detector failure or an other hardware defect.

Contact service/support to send the device in for repair.

Calibration stalls



Under certain circumstances it may happen that after a start from zero you see the calibration screen. This happens when the calibration process takes longer than the user interface software needs to start. It does not mean that something is wrong with the Target F501 because there are a lot of influencing factors for both, start up time and calibration time. In any case the calibration process should be finished within a few seconds.

If the progress bar of the calibration screen does not move for a longer time, try to restart the instrument by long-pressing the On/Off button or disconnecting the battery for a short time. If that does not help and the Target F501 always ends up with displaying a static calibration screen, something is wrong with the Target F501 hardware.

Contact service/support to send the device in for repair.

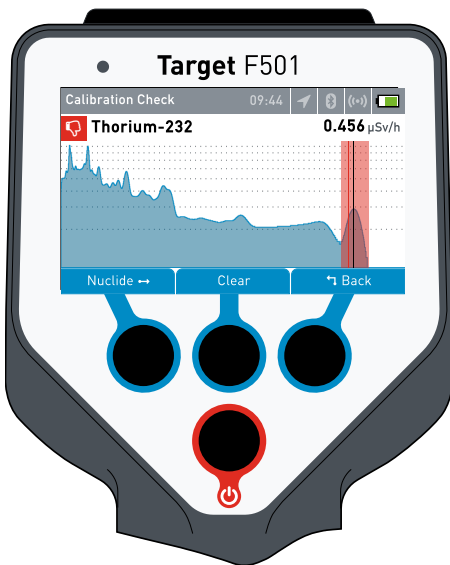
It is not possible to do an identification or a calibration check



When you switch from the dose rate screen to the identification process or calibration check, the Target F501 may still be busy with the stabilization process.

The Target F501 displays the stabilization progress and automatically starts the identification after the stabilization process is complete.

Calibration check is invalid



If the calibration check displays an invalid result, first make sure that the appropriate test source is placed in front of the Target F501. You cannot do a calibration check without one of the radioactive test sources that are listed in the menu of the user interface.

Make sure that the appropriate nuclide is chosen in the user interface on the Target F501.

If you still get an invalid result, try to do a calibration check with a different test source and/or a different type of test source.

Make sure that no other radioactive sources in the surrounding have an influence on the measurement.

If all of this does not help and you constantly get an invalid calibration result the Target F501 needs to be re-calibrated by the service. Contact service/support to send the device in for repair.

The Target F501 does no longer respond to key press

Although we do everything to avoid it, it may happen that the software hangs and the Target F501 no longer responds to a key press or that the web interface is not reachable anymore.

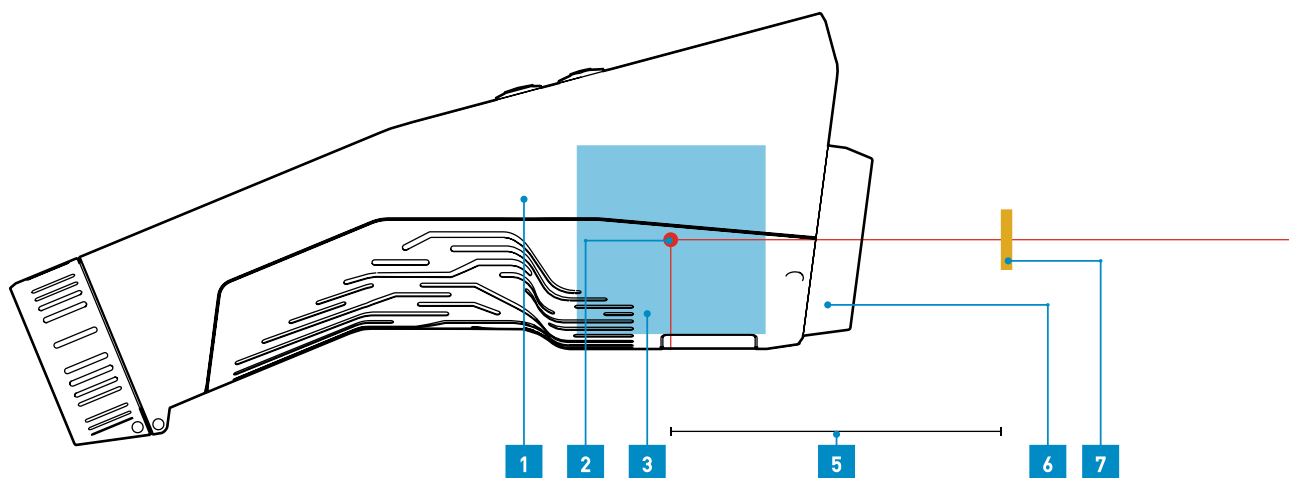
In situations like this, open the battery compartment and remove the power module for a moment.

After re-inserting the battery and closing the battery compartment press the On/Off button until the Target F501 restarts.

Where do I find contact information?

Contact information are displayed on the back of the printed quick start guide in the scope of delivery or in the footer section of the web interface.

The Detector Position and Test Setup



1. Target F501 Housing
2. Detector center (detector center marks are printed on the back label and on the top extension cap)
3. Simulated detector
5. Minimum distance between detector center and test source 8,5 cm /3.35"
6. Extension cap
7. Test source

Technical Data

System Overview

Technology	Radionuclide Identification Device (RID)
Scope	Detection of gamma, beta, cosmic radiation and neutrons (only with the appropriate detectors) emitted from natural and man-made sources. Identification of special nuclear material, industrial, medical, and natural radioactive sources. Measurement of x-ray and gamma exposure rate or ambient dose equivalent.

BGO Detector

Operating Range	Gamma and thermal neutron detection
Material	$\text{Bi}_4\text{Ge}_3\text{O}_{12}$ (Gd_2O_3)
Size	51 \emptyset x 25 mm ³ (2" x 1")
PHR	9.0 \pm 1.5 % @ 662 keV
Energy range	10 keV _{ee} – 1000 MeV _{ee} (Total) 10 keV – 10 MeV (Gamma and X-rays) 10 MeV _{ee} – 1000 MeV _{ee} (cosmic radiation, muons, charged particles)
Dose rate range total (Cs-137)	10 nSv/h - 500 mSv/h (1 μ rem/h - 50 rem/h) \pm 30 %
Dose rate range ID mode (Cs-137)	10 nSv/h - 200 μ Sv/h (1 μ rem/h - 20 mrem/h)
Dose rate range current-variance mode (Cs-137)	200 μ Sv/h - 500 mSv/h (0,02 rem/h - 50 rem/h)
Dose rate overload range (Cs-137)	> 500 mSv/h (50 rem/h)

Energy response (60 keV - 3000 keV)	< +/- 30%
Maximum input count rate in ID mode	1 million cps (Cs-137)
Gamma sensitivity	1,850 cps/ μ Sv/h (Cs-137)
Neutrons	According to ANSI N42.34
Neutron sensitivity	~5 cps/nv

NAI Detector

Operating Range	Gamma detection
Material	Nal:Tl
Size	51 \emptyset x 51 mm ³ (2" x 2")
PHR	6.0 \pm 0.5 % @ 662 keV
Energy range	10 keV _{ee} – 1000 MeV _{ee} (Total) 10 keV – 10 MeV (Gamma and X-rays) 10 MeV _{ee} – 1000 MeV _{ee} (cosmic radiation, muons, charged particles)
Dose rate range total (Cs-137)	10 nSv/h - 500 mSv/h (1 μ rem/h - 50 rem/h) \pm 30 %
Dose rate range ID mode (Cs-137)	10 nSv/h - 200 μ Sv/h (1 μ rem/h - 20 mrem/h)
Dose rate range current-variance mode (Cs-137)	200 μ Sv/h - 500 mSv/h (0,02 rem/h - 50 rem/h)
Dose rate overload range (Cs-137)	> 500 mSv/h (50 rem/h)
Energy response (60 keV - 3000 keV)	< +/- 20%
Maximum input count rate in ID mode	1 million cps (Cs-137)
Gamma sensitivity	1,750 cps/ μ Sv/h (Cs-137)

NAICN Detector

Operating Range	Gamma, fast and thermal neutron detection
Material	Nal:Tl
Size	51 \emptyset x 51 mm ³ (2" x 2")
PHR	6.0 \pm 0.5 % @ 662 keV
Energy range	10 keV _{ee} – 1000 MeV _{ee} (Total) 10 keV – 10 MeV (Gamma and X-rays) 10 MeV _{ee} – 1000 MeV _{ee} (cosmic radiation, muons, charged particles)
Dose rate range total (Cs-137)	10 nSv/h - 500 mSv/h (1 μ rem/h - 50 rem/h) \pm 30 %

Dose rate range ID mode (Cs-137)	10 nSv/h - 200 μ Sv/h (1 μ rem/h - 20 mrem/h)
Dose rate range current-variance mode (Cs-137)	200 μ Sv/h - 500 mSv/h (0,02 rem/h - 50 rem/h)
Dose rate overload range (Cs-137)	> 500 mSv/h (50 rem/h)
Energy response (60 keV - 3000 keV)	< +/- 20%
Maximum input count rate in ID mode	1 million cps (Cs-137)
Gamma sensitivity	1,750 cps/ μ Sv/h (Cs-137)
Neutrons	Indication
Neutron sensitivity	~3 cps/nv

NAIL Detector

Operating Range	Gamma and thermal neutron detection
Material	Nail
Size	51 \emptyset x 51 mm ³ (2" x 2")
PHR	7.5 \pm 0.5 % @ 662 keV
Energy range	10 keV _{ee} - 1000 MeV _{ee} (Total) 10 keV - 10 MeV (Gamma and X-rays) 10 MeV _{ee} - 1000 MeV _{ee} (cosmic radiation, muons, charged particles)
Dose rate range total (Cs-137)	10 nSv/h - 500 mSv/h (1 μ rem/h - 50 rem/h) \pm 30 %
Dose rate range ID mode (Cs-137)	10 nSv/h - 200 μ Sv/h (1 μ rem/h - 20 mrem/h)
Dose rate range current-variance mode (Cs-137)	200 μ Sv/h - 500 mSv/h (0,02 rem/h - 50 rem/h)
Dose rate overload range (Cs-137)	> 500 mSv/h (50 rem/h)
Energy response (60 keV - 3000 keV)	< +/- 20%
Maximum input count rate in ID mode	1 million cps (Cs-137)
Gamma sensitivity	1,750 cps/ μ Sv/h (Cs-137)
Neutrons	According to ANSI N42.34
Neutron sensitivity	~10 cps/nv

CLLBC Detector

Operating Range	Gamma and thermal neutron detection
------------------------	-------------------------------------

Material	Cs ₂ LiLa(Br,Cl) ₆ :Ce
Size	36 Ø x 38 mm ³ (1.4" x 1.5")
PHR	3.8 ±0.3 % @ 662 keV
Energy range	10 keV _{ee} – 1000 MeV _{ee} (Total) 10 keV – 10 MeV (Gamma and X-rays) 10 MeV _{ee} – 1000 MeV _{ee} (cosmic radiation, muons, charged particles)
Dose rate range total (Cs-137)	10 nSv/h - 500 mSv/h (1 µrem/h - 50 rem/h) ±30 %
Dose rate range ID mode (Cs-137)	10 nSv/h - 200 µSv/h (1 µrem/h - 20 mrem/h)
Dose rate range current-variance mode (Cs-137)	200 µSv/h - 500 mSv/h (0,02 rem/h - 50 rem/h)
Dose rate overload range (Cs-137)	> 500 mSv/h (50 rem/h)
Energy response (60 keV - 3000 keV)	< +/- 15%
Maximum input count rate in ID mode	500,000 cps (Cs-137)
Gamma sensitivity	950 cps/µSv/h (Cs-137)
Neutrons	According to ANSI N42.34
Neutron sensitivity	~20 cps/nv

LABR Detector

Operating Range	Gamma detection (neutron detection optional)
Material	LaBr ₃ :(Ce,Sr)
Size	38 Ø x 38 mm ³ (1.5" x 1.5")
PHR	2.4 ±0.3 % @ 662 keV
Energy range	10 keV _{ee} – 1000 MeV _{ee} (Total) 10 keV – 10 MeV (Gamma and X-rays) 10 MeV _{ee} – 1000 MeV _{ee} (cosmic radiation, muons, charged particles)
Dose rate range total (Cs-137)	10 nSv/h - 500 mSv/h (1 µrem/h - 50 rem/h) ±30 %
Dose rate range ID mode (Cs-137)	10 nSv/h - 200 µSv/h (1 µrem/h - 20 mrem/h)
Dose rate range current-variance mode (Cs-137)	200 µSv/h - 500 mSv/h (0,02 rem/h - 50 rem/h)
Dose rate overload range (Cs-137)	> 500 mSv/h (50 rem/h)
Energy response (60 keV - 3000 keV)	< +/- 15%
Maximum input count rate in ID mode	1 million cps (Cs-137)

Gamma sensitivity	950 cps/ μ Sv/h (Cs-137)
Performance	
Power-up time	Operative in less than one minute
Identification time	Identification of 1 μ Ci Cs-137 in 3 s (5 cm to crystal center)
Linearization	Real-time linearization of gamma energy
User-interface update frequency	0.5 s
Nuclide library	> 70 nuclides (exceeding IEC 62327, ANSI N42.34)
Physical	
Weight	950 - 1,250 g (2.1 - 2.75 lbs) depending on detector type
Dimensions (L x H x W) equipped with PM18650	232 mm x 88 mm x 92 mm (9.13" x 3.46" x 3.62")
Dimensions (L x H x W) equipped with PM18650+	307 mm x 88 mm x 92 mm (12.08" x 3.46" x 3.62")
Housing material	Machined aluminum
Operating Conditions	
Operating temperature	-20 °C to 50 °C (-4 °F to 122 °F)
Operating humidity	Up to 93 % at 40 °C (104 °F) non-condensing
Protection rating	IP68 according to IEC 60529 submersible, up to 10 m (33 ft) 30 min
Operating Modes	
Dose Rate	Gamma dose rate and dose rate history viewer, neutron count rate with the appropriate detector
Finder	Count rate history display
Easy Finder	Source strength and direction
Identification	Gamma spectrum measurement and identification, spectrum viewer
Power Module PM18650	
Capacity	3,6 V / 7 Ah / 25 Wh
Run time at 20 °C (68 °F)	> 6 h regular use (non-alarm state)
Operating temperature	-20 °C to 50 °C (-4 °F to 122 °F)
Charging temperature	0 °C to 40 °C (+32 °F to 104 °F)
Storage temperature	-20 °C to 50 °C (-4 °F to 122 °F)

Weight	135 g (0.3 lbs)
Power Module PM18650+ (optional)	
Capacity	3,6 V / 14 Ah / 50 Wh
Run time at 20 °C (68 °F)	> 12 h regular use (non-alarm state)
Operating temperature	-20 °C to 50 °C (-4 °F to 122 °F)
Charging temperature	0 °C to 40 °C (+32 °F to 104 °F)
Storage temperature	-20 °C to 50 °C (-4 °F to 122 °F)
Weight	270 g (0.6 lbs)
Hardware	
Data storage	30 GB internal memory
Wi-Fi	Wi-Fi access point 2,4 GHz 802.11 g, encryption WPA-PSK AES
Bluetooth	Bluetooth LE for connection to the Mobile App
GPS	Navstar GPS, Galileo, Glonass, Beidou
USB-C	Power and data port
Software	
Web server	Web Interface for setup, data download and remote control
Data streaming	Support of the Sigma streaming API via BT tethering
Data reporting	Support of the Sigma reporting API via BT tethering
Session data	Continuous tracking of GPS position, dose rate, alarms and identification results
Mobile App	
Supported operating systems	Apple iOS, Android
Remote setup	Adjustment of all instrument settings
Remote operation	Remote operation and observation of the instrument
Reachback	Reachback functionality (e-mail with attached ANSI N42.42 data)
Standards Compliance	
RID	IEC 62327, ANSI N42.34
Environmental tests	IEC 62706
Data format	ANSI N42.42, IEC 62755

Nuclide List

The Target F501 can detect and identify the following nuclides:

#	Displayed Name	Short Name	Possible Sources
1	Actinium-225	Ac-225	Ac-225
2	Americium-241	Am-241	Am-241
3	Annihilation Radiation		F-18, Ge-68/Ga-68, Na-22, Sr-82/Rb-82
4	Antimony-124	Sb-124	Sb-124
5	Antimony-125	Sb-125	Sb-125
6	Barium-133	Ba-133	Ba-133
7	Beta Emitter		Beta Emitter, Sr-89, Sr-90/Y-90
8	Bismuth-207	Bi-207	Bi-207
9	Cadmium-109	Cd-109	Cd-109
10	Californium-252	Cf-252	Cf-252
11	Cesium-131	Cs-131	Cs-131
12	Cesium-134	Cs-134	Cs-134
13	Cesium-137	Cs-137	Cs-137
14	Chromium-51	Cr-51	Cr-51
15	Cobalt-56	Co-56	Co-56
16	Cobalt-57	Co-57	Co-57
17	Cobalt-58	Co-58	Co-58
18	Cobalt-60	Co-60	Co-60
19	Europium-152	Eu-152	Eu-152
20	Europium-154	Eu-154	Eu-154
21	Europium-155	Eu-155	Eu-155
22	Fluorine-18	F-18	F-18
23	Gadolinium-153	Gd-153	Gd-153
24	Gallium-67	Ga-67	Ga-67
25	Germanium-68	Ge-68	Ge-68
26	Holmium-166m	Ho-166m	Ho-166m
27	Indium-111	In-111	In-111
28	Iodine-123	I-123	I-123
29	Iodine-125	I-125	I-125
30	Iodine-131	I-131	I-131
31	Iridium-192	Ir-192	Ir-192

32	Iron-59	Fe-59	Fe-59
33	Lanthanum-138	La-138	La-138
34	Lead-210	Pb-210	Pb-210
35	Lutetium-176	Lu-176	Lu-176
36	Lutetium-177	Lu-177	Lu-177
37	Lutetium-177m	Lu-177m	Lu-177m
38	Manganese-54	Mn-54	Mn-54
39	Manganese-56	Mn-56	Mn-56
40	Molybdenum-99	Mo-99	Mo-99
41	Neptunium-237	Np-237	Np-237
42	Neutrons		Hydrogen Neutron Capture, Neutrons
43	Niobium-94	Nb-94	Nb-94
44	Niobium-95	Nb-95	Nb-95
45	NORM		NORM, Thorium, Radium, Terrestrial Background
46	Not Identified		
47	Palladium-103	Pd-103	Pd-103
48	Plutonium	Pu	Plutonium, Reactor-grade plutonium, Weapons-grade plutonium, Pu-239
49	Plutonium-238	Pu-238	Pu-238
50	Potassium-40	K-40	K-40
51	Radium-223	Ra-223	Ra-223
52	Radium-226	Ra-226	Ra-226
53	Samarium-153	Sm-153	Sm-153
54	Scandium-46	Sc-46	Sc-46
55	Selenium-75	Se-75	Se-75
56	Silver-110m	Ag-110m	Ag-110m
57	Sodium-22	Na-22	Na-22
58	Strontium-82	Sr-82	Sr-82
59	Technetium-99m	Tc-99m	Tc-99m
60	Thallium-201	Tl-201	Tl-201
61	Thallium-202	Tl-202	Tl-201
62	Thallium-204	Tl-204	Tl-204
63	Thorium-228	Th-228	Th-228
64	Thorium-232	Th-232	Th-232
65	Tungsten-187	W-187	W-187
66	Unknown		All nuclides that are not part of the instrument library
67	Uranium	U	U-Nat, Low-enriched Uranium

68	Uranium-232	U-232	U-232
69	Uranium-233	U-233	U-233
70	Uranium-235	U-235	High-enriched Uranium, U-235
71	Uranium-238	DU	Depleted Uranium, U-238
72	Xenon-133	Xe-133	Xe-133
73	Yttrium-88	Y-88	Y-88
74	Zinc-65	Zn-65	Zn-65
75	Zirconium-95	Zr-95	Zr-95

Factory Settings

The Target F501 is delivered with the following factory settings:

- **Operator Settings**

```
{
  "Language": "en-US",
  "FlightMode": false,
  "DisplayBrightness": 100,
  "RotationLock": false,
  "AutoSuspend": 1,
  "AlarmFeedback": 3,
  "KeyFeedback": 2,
  "SoundVolume": 4,
  "EmailPassword": "",
  "EmailRecipient": "",
  "EmailServer": "",
  "EmailUsername": ""
}
```

- **Experts Settings**

```
{
  "DoseRateUnit": 0,
  "Password": "111111",
  "TimeZone": "UTC",
  "SaveGpsPosition": true,
  "FinderFalseAlarmTime": 1.0,
  "FinderFalseAlarmTimeOperatorValues": [],
  "IdentificationBackgroundRealTime": "00:05:00",
  "IdentificationBackgroundStatistics": 0.0,
  "IdentificationCalibrationRealTime": "00:05:00",
  "IdentificationCalibrationStatistics": 0.0,
  "IdentificationEnableBackground": false,
  "IdentificationEnableCalibration": false,
  "IdentificationExtendRealTime": "00:00:00",
  "IdentificationExtendStatistics": 1.0,
  "IdentificationForegroundRealTime": "00:00:00",
}
```

```

"IdentificationForegroundStatistics": 4.0,
"IdentificationOperatorValues": [],
"ShowConfidence": true,
"ShowSeverity": true,
"ShowUsage": true,
"GrossCountsPreset": 0,
"RealTimePreset": "00:00:00",
"SigmaEnabled": false,
"DoseRateAlarmThreshold": 100.0,
"DoseRateAlarmThresholdOperatorValues": [],
"NeutronNotification": true,
"PersonalHazard": 1000.0
}

```

- **Nuclide Settings**






```

{
  "Actinium-225": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Americium-241": {"Usage": "SNMR", "Severity": "Threatening", "SortNr.": 1},
  "AnnihilationRadiation": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Antimony-124": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Antimony-125": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Barium-133": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Beta Emitter": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Bismuth-207": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Cadmium-109": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Californium-252": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Cesium-131": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Cesium-134": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Cesium-137": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 2},
  "Chromium-51": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Cobalt-56": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Cobalt-57": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Cobalt-58": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Cobalt-60": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 1},
  "Europium-152": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Europium-154": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Europium-155": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Fluorine-18": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Gadolinium-153": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Gallium-67": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Germanium-68": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Holmium-166m": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
  "Indium-111": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Iodine-123": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Iodine-125": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Iodine-131": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Iridium-192": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 2},
  "Iron-59": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
  "Lanthanum-138": {"Usage": "NORM", "Severity": "Innocent", "SortNr.": 3},
  "Lead-210": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},

```

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"Lutetium-176": {"Usage": "NORM", "Severity": "Innocent", "SortNr.": 3},
"Lutetium-177": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Lutetium-177m": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Manganese-54": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Manganese-56": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Molybdenum-99": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Neptunium-237": {"Usage": "SNM", "Severity": "Threatening", "SortNr.": 1},
"Neutrons": {"Usage": "SNMR", "Severity": "Threatening", "SortNr.": 1},
"Niobium-94": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Niobium-95": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"NORM": {"Usage": "NORM", "Severity": "Innocent", "SortNr.": 4},
"Not Identified": {"Usage": "UKN", "Severity": "Innocent", "SortNr.": },
"Palladium-103": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Plutonium": {"Usage": "SNM", "Severity": "Threatening", "SortNr.": 1},
"Plutonium-238": {"Usage": "SNMR", "Severity": "Threatening", "SortNr.": 1},
"Potassium-40": {"Usage": "NORM", "Severity": "Innocent", "SortNr.": 4},
"Radium-223": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Radium-226": {"Usage": "NORM", "Severity": "Innocent", "SortNr.": 4},
"Samarium-153": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Scandium-46": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Selenium-75": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 2},
"Silver-110m": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Sodium-22": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Strontium-82": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Technetium-99m": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Thallium-201": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Thallium-202": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Thallium-204": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Thorium-228": {"Usage": "NORM", "Severity": "Innocent", "SortNr.": 4},
"Thorium-232": {"Usage": "NORM", "Severity": "Innocent", "SortNr.": 4},
"Tungsten-187": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Unknown": {"Usage": "UKN", "Severity": "Suspicious", "SortNr.": },
"Uranium": {"Usage": "SNM", "Severity": "Threatening", "SortNr.": 1},
"Uranium-232": {"Usage": "SNM", "Severity": "Threatening", "SortNr.": 1},
"Uranium-233": {"Usage": "SNM", "Severity": "Threatening", "SortNr.": 1},
"Uranium-235": {"Usage": "SNM", "Severity": "Threatening", "SortNr.": 1},
"Uranium-238": {"Usage": "SNMR", "Severity": "Threatening", "SortNr.": 1},
"Xenon-133": {"Usage": "MED", "Severity": "Innocent", "SortNr.": 3},
"Yttrium-88": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Zinc-65": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
"Zirconium-95": {"Usage": "IND", "Severity": "Innocent", "SortNr.": 3},
}
```


Safety Warnings

-  The Target F501 is designed for indoor and outdoor use. When operated in accordance with the operating instructions, it should not present any hazard to the operator.
-  The integrity of the housing is essential to the safe operation of the instrument. Under no circumstances should the housing be tampered with, opened, or otherwise removed except for normal access to the external connections and battery compartment.
-  The Target F501 is not certified for use in explosive environments.
-  The usual caution should be exercised when handling the power supply unit connected to the mains voltage. In particular, the power supply unit should not be connected to the mains voltage in damp or wet environments.
-  The nature of the application is such that objects being surveyed with the Target F501 could emit radioactive radiation with hazardous intensity.

Manufacturer's Declaration of Conformity (CE)

The Target F501 complies with the EMC Directive 2004/108/EC and the harmonized European standard DIN EN 61326.


 [Declaration of Conformity](#)

Other Resources

The N42.42 files you can download from the Target F501 have an extended ANSI N42.42 schema. You can download it here:

 [Target-Extensions](#)

Notes to the Tester

1. For static measurements set up the instrument according to the drawing in: [The Detector Position and Test Setup](#)
2. For static measurements set the Target F501 to the recommended test settings:
Reset to factory settings  Reset the settings by pressing the Reset to factory settings button in the web interface [Administration](#)
3. The Target F501 is designed to operate in a very large energy range. To avoid risks to the operator the Target F501 has a "Personal Hazard Alarm". This alarm tells the operator to leave the surveyed area and disappears on its own with dose-rates under the threshold. The "Personal Hazard Alarm" cannot be switched off.
4. The "Dose Rate Alarm" of the Target F501 is called "Personal Protection Alarm" in ANSI N42.34. After acknowledging this alarm the Target F501 can be operated as usual.
5. The "Maximum Response" due to the ANSI N42.34 is 1,000 $\mu\text{Sv/h}$.
6. The "Maximum Exposure Rate" due to the ANSI N42.34 is 0.5 Sv/h.
7. To transmit data from the Target F501 to a computer, you must follow the instructions in:
 - o [Connecting to a computer](#)
 - o [The Web Interface](#)
 - o [Data Management](#)You can either download data via the network-share-device, which will be mounted to the connected computer, or via the web service using the HTTP protocol on the single data pages of the web interface.
8. If you analyze a Target F501 N42.42 file after downloading, you will find a background spectrum filled with zeros inside. This is not a bug; it is because the Target F501 does not need a background spectrum to do a reliable identification. In order to avoid any confusion, we decided to add this "null-spectrum".
9. The Target F501 does some basic functional tests and calibrates during the start. Usually the calibration process is fast enough, that it will not show up during the start of the instrument.
10. The Target F501 does not need to be calibrated manually. If you want to check, whether the instrument is calibrated correctly, follow the instructions in the user interface > [Calibration Check](#).
11. Count rate readings are displayed during identification.
12. It is a indicative of a detector failure or other hardware defect if the "Rescale Screen" is displayed after start up.
13. Information to the energy calibration can be found in the N42.42 files for each spectrum.

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