

# NEW TECH HOLDING

NG10  
Portable Laser Methane Detection System

Manual  
DTR

# 1 Precautions, measurement rules and information on technical parameters


## 1.1 Safety Tips

Before using the appliance, please read the following information carefully and with understanding.

### REMARK

Before each use, inspect the condition and assembly of the unit for cracks, deformations, clogged tubing, and blocked filters to prevent potential hazards.

### DANGER

The device is II 3G Ex ic IIA T3 Gc marked and can be used in explosion hazard zones. However, it is strictly forbidden to charge devices in  these zones.

### REMARK

It is recommended to wear the device on a strap to prevent accidental dropping and its consequences.

### REMARK

It is forbidden to repair or replace the components of the device yourself! If the appliance does not operate properly or an error message appears, refer to the corresponding description in this manual to perform cleaning of the appliance or contact the manufacturer's service department.

### REMARK

Do not expose the appliance to water. In addition, the device should not be thrown, dropped or exposed to other mechanical injuries. Doing so may damage your device or cause it to malfunction.

### REMARK

Only use the original charger to charge the device. Before charging, check that the charging port and charger are not damaged to avoid potential short circuits.

## 1.2 Functional description

Portable Laser Methane Leak Control System is a gas detection device, based on TDLAS technology, used to control natural gas pipeline networks. The device sucks the measured gas from the outside into the device via a pump.

## 1.3 Measurement principle

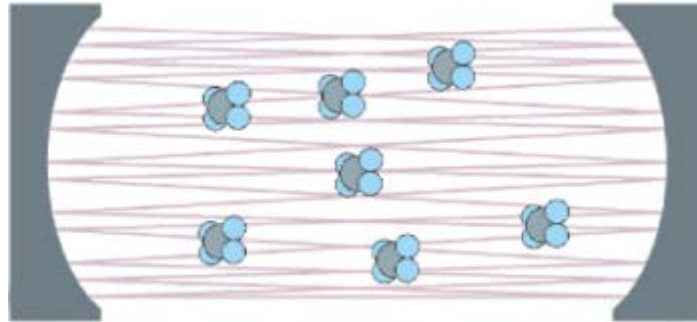
*"Methane molecules absorb light at specific wavelengths"*

*- Principle of molecular absorption spectroscopy*

*"There is a linear relationship between the concentration and absorbance of a solution, which makes it possible to calculate the concentration of a solution by measuring its absorbance."*

*- Lambert-Beer's law*

According to the above laws of physics, a beam of a specific wavelength can be passed through a gas, and depending on how weakened the beam is, the concentration of methane in the transmitted air mass can be measured.



**Figure 1 Visualization of absorption**

In addition, the use of a multi-reflection detection chamber, allowing the laser to pass through the measured gas multiple times, significantly increases the accuracy of the measurement.

## 2 Equipment and maintenance

A portable laser methane detector is a device designed to measure trace concentrations of methane (the main component of natural gas). It is equipped with a sampling pump and can be used in conjunction with a probe or hand trolley for pipeline inspection.

### 2.1 Content overview

Remove components from the box and then inspect the devices for visible damage. If you find these or any of the items in the list below are missing, please contact the manufacturer's service.

The set includes:

- Detector – 1 pc.
- Pre-filter – 3 pcs.
- Hydrophobic filter – 2 pcs.
- Flexible probe (with an additional filter) – 1 pc.
- Quick coupling – 1 pc.
- Charger – 1 pc.
- Documentation – 1 pc.
- Mobile device with a dedicated application – 1 pc.

The case is waterproof and dustproof. When the detector is not in use, it should be stored in its carrying case.

There is an option to adapt the device to the customer's requirements in terms of, m.in, increasing the number of filters, replacing the mobile device with a version with a larger display or making programming changes in a dedicated application. Thus, component configurations may vary depending on predetermined requirements.

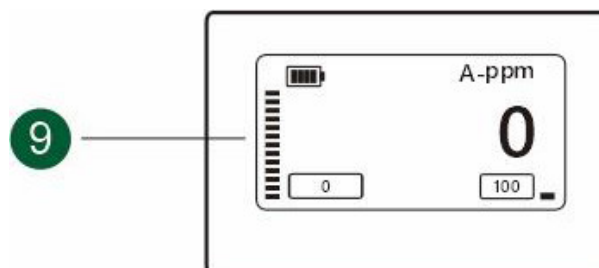
### 2.2 Detector Description

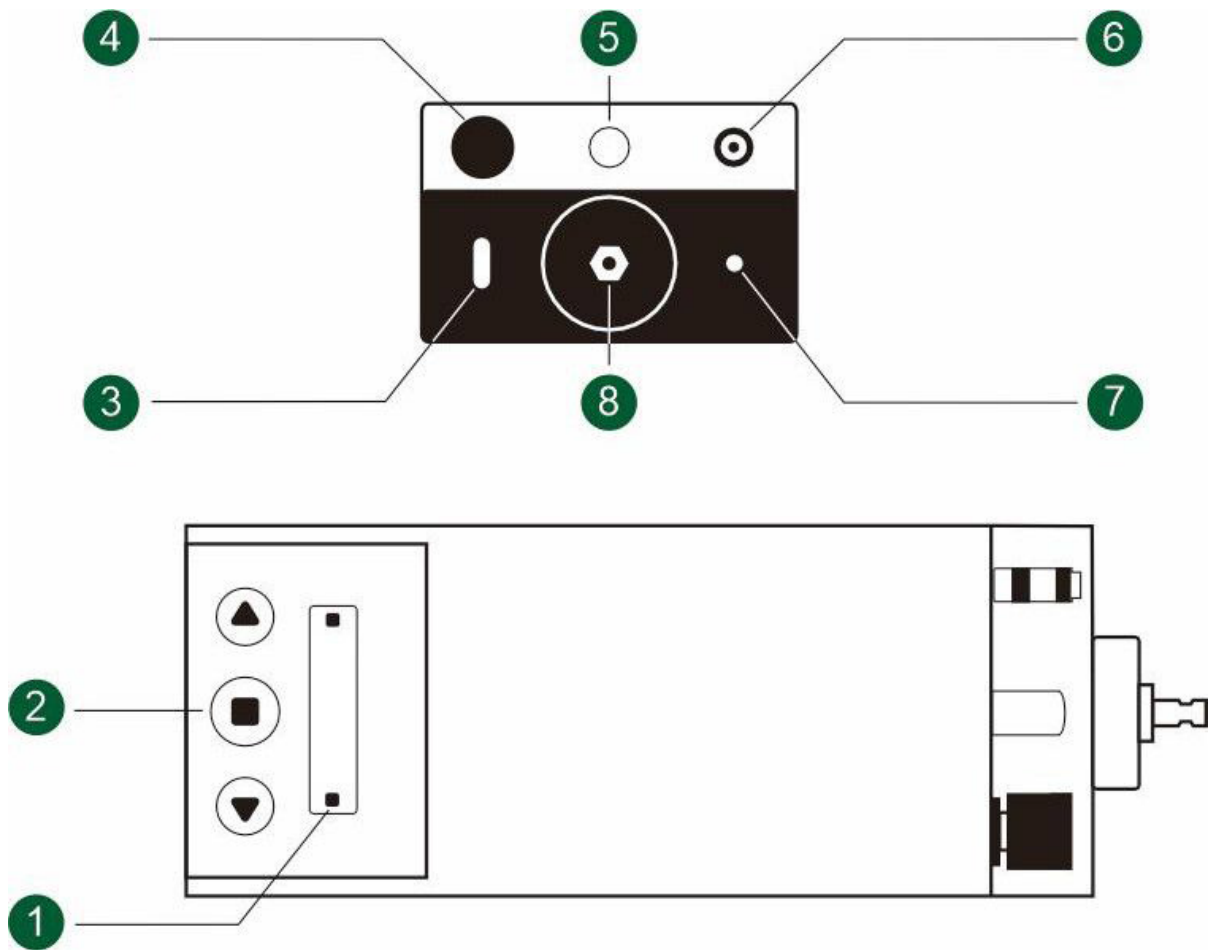
There is a display on the front of the detector.

At the rear, there are: air intake, air outlet and charging port.

The buttons for operating the device and the indicator light are located in the upper part.

- [1] Indicator light
- [2] Buttons to operate the device
- [3] Charging port
- [4] Bluetooth antenna
- [5] Air outlet
- [6] Port for connecting an external pump (only for NG10V)
- [7] Buzzer
- [8] Air intake
- [9] Operation panel – display

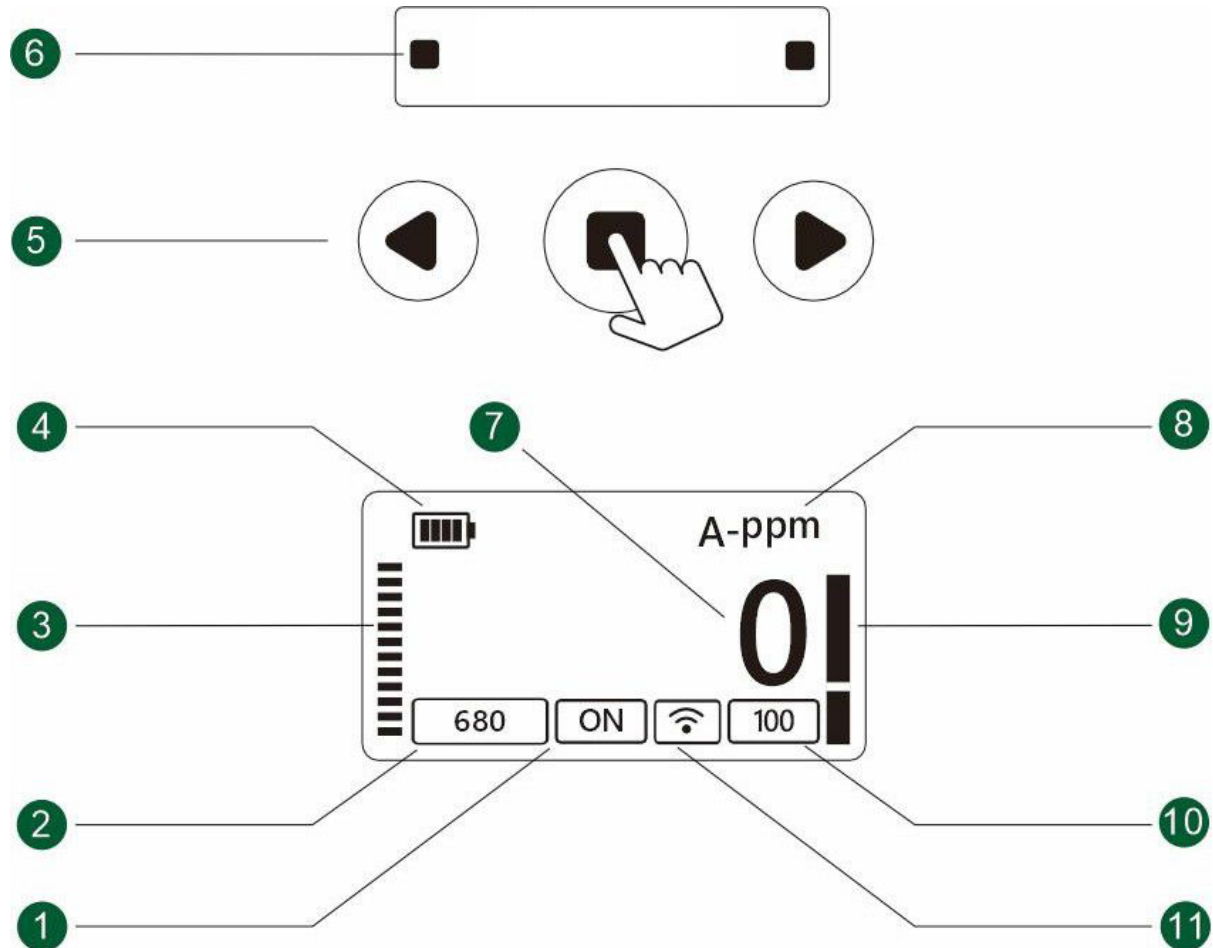




### 3 Interface

The device provides information to the user via a display, indicator lights and a buzzer.




The user enters data into the device using buttons.



- [1] Pump on
- [2] Maximum Value
- [3] Laser light intensity indicator
- [4] Battery level
- [5] Buttons
- [6] Led
- [7] Concentration value

- [8] Concentration Reading Unit
- [9] Concentration Indicator Bar
- [10] Alarm threshold
- [11] Bluetooth connection

### 3.1 Button functions


Button	Name	Short press	Double press	Press and hold
	Middle	Confirmation/ Shutting down the pump/ Battery check	Pump switching on	Incorporation/ Power off
	Right	Raising the alarm threshold	Alarm threshold adjustment	/
	Left	Lowering the alarm threshold/ Checking the maximum concentration	Changing the Unit	Reset values

## 4 Operating the device

### 4.1 Loading

Only charge the device with the original charger. The charging port is located on the back of the device.

- [1] Insert one end of the USB cable into the charger and plug the charger into a power outlet. Make sure the outlet is powered.
- [2] Plug the other end of the USB cable into the charging port on the back of the device.
- [3] Press the middle button. A long beep will be heard and the battery level icon will be displayed on the screen.

The  icon indicates that the battery is fully charged.

#### 4.1.1 Check the charge level

To check the current battery level, press the middle button while the device is turned off. After a short beep, the screen will display the current charge level.

#### REMARK

Battery capacity depends on the age of the device and the ambient temperature. The heat generated by the device itself can improve the instantaneous capacity of the battery when used in cold environments.

If the battery capacity has been significantly reduced, contact the manufacturer's service center.

### 4.2 Work

#### 4.2.1 Initial inspection

Check the air hose and filters of the unit for water and debris buildup. Inspect the unit for visible damage, debris, and deformation.

#### 4.2.2 Installing the sampling accessories

Connect the accessory of your choice (flexible probe, bell probe, hand trolley or other) to the air intake. Make sure that the suction hose is not blocked or bent tightly.

#### 4.2.3 Power On

To turn on the device, press and hold the middle button until you hear a beep. The device will turn on and start self-calibrating. When calibration is complete, which takes a few seconds, the device will emit a short beep to indicate that it is ready to start working.

#### 4.2.4 Pump Switching On

Pressing the middle button twice, after turning on the device, will emit two short beeps and turn on the sample pump. An icon will appear on the screen to turn on the pump. The device will start working: the concentration value will be displayed, the concentration indicator bar will be displayed and if the alarm threshold is exceeded, sound and light signaling will be activated.

#### REMARK

The letter "A" before the measuring unit means that the device automatically changes the unit depending on the concentration level (ppm, %LEL, %VOL).



### 4.2.5 Shutting down the pump

When you have finished the check, press the middle button one at a time. A short beep will sound and the pump will be switched off.

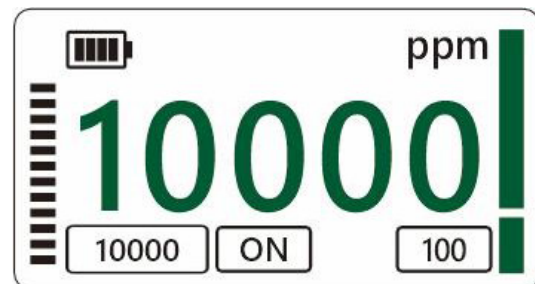
### 4.2.6 Power off

As with the power-on procedure, press and hold the middle button. When a long beep sounds, the unit will turn off.

## 4.3 Other settings

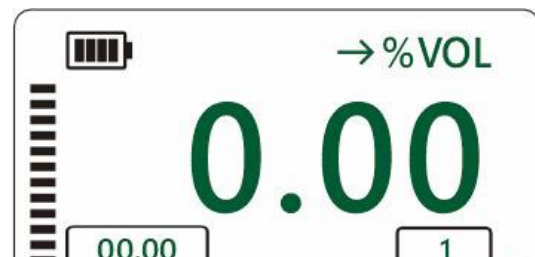
### 4.3.1 High Concentration Measurement

Methane concentration per unit ppm can be measured up to 10000ppm. When this value is exceeded, the device will automatically switch the concentration unit to %LEL or %VOL (if automatic mode is selected) or you must manually switch the measurement unit (if automatic mode is disabled).



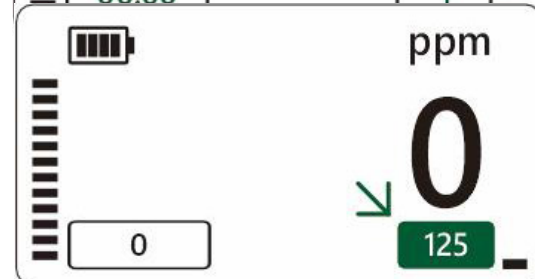
### 4.3.2 Switching the concentration unit

To change the concentration unit, press the Left button twice. Two short beeps will sound. An arrow will appear in the upper right corner indicating the concentration unit. To change the unit, use the *Left* and *Right* buttons. With each button press, the unit (A-/ppm/%LEL/%VOL) will cycle through. To confirm, press the middle button.



### 4.3.3 Change the alarm threshold

To change the alarm threshold, press the Right button twice. Two short beeps will sound. The emergency threshold icon will change the background color. Changing the values is done by pressing the *Left* and *Right* buttons. Pressing the middle button confirms your selection.



### 4.3.4 Checking the maximum concentration

The device records the maximum gas concentration every 10 seconds and displays it in the lower left corner of the screen. To check the maximum concentration value at a given time, press the Left button.



### 4.3.5 Reset values

To reset the value, press and hold the *Left* button. When a long beep sounds, the device resets the values.

### 4.3.6 Invert the display of the screen

In order to make it easier for the user to operate the device, it is possible to rotate the screen. To do this, press and hold the *Left* and *Right* buttons at the same time for 3 seconds. After this time, a short beep will sound and the display will be flipped. Also, the *Left* and *Right* buttons will be swapped.

## 4.4 Calibration

The device has a built-in self-calibration function. Each time the device is started, it automatically updates the zero point, without user intervention.

## 4.5 App connection

The device has a Bluetooth function and can be connected to the mobile device included in the package. Connecting to the app gives you access to more advanced features, including GPS support.

# 5 Software

The proprietary *NTH Inspection software* enables full control over the NT10i automotive methane detection system in the range of m.in:

- GPS satellite navigation based on *OpenStreetMap*
- Layering with gas network elements in \*.shp format
- Reading the current concentration
- Classify gas networks as *tested* when approached at a reasonable distance
- Generate logs in the \*.csv format from the audit and then report them in the \*.pdf and \*.shp formats.

The software is available for both PCs and phones with Android version 13 and higher.

## 5.1 Software navigation

The program enters the Map tab by default.

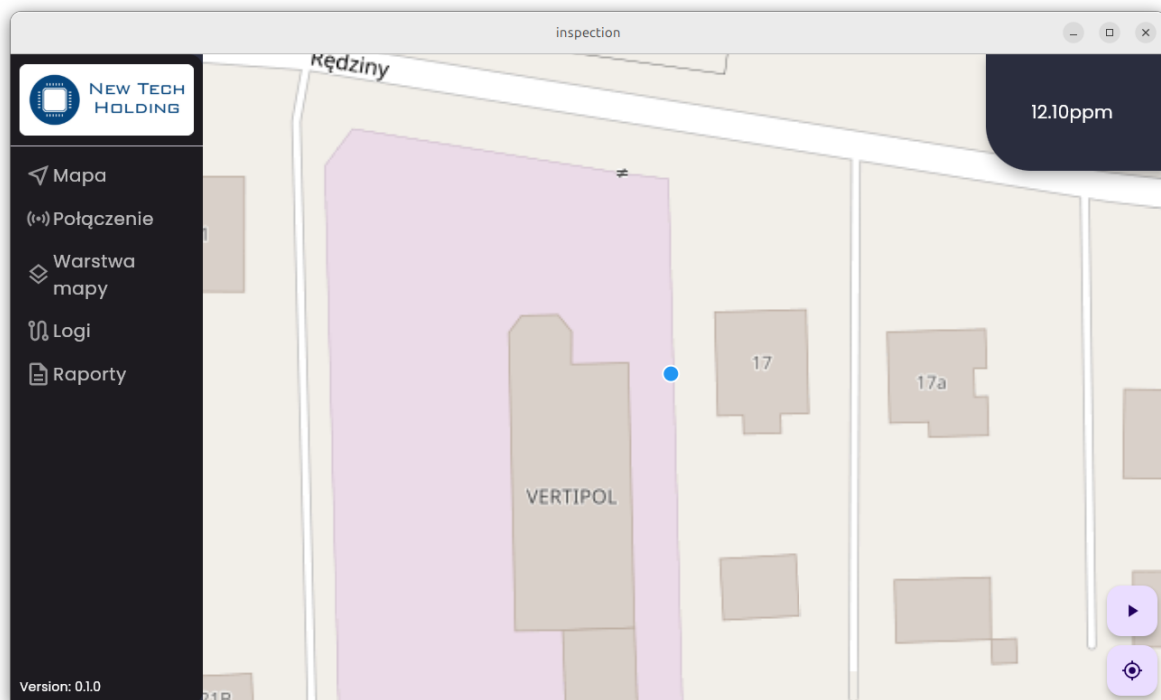


Figure 2 Map tab

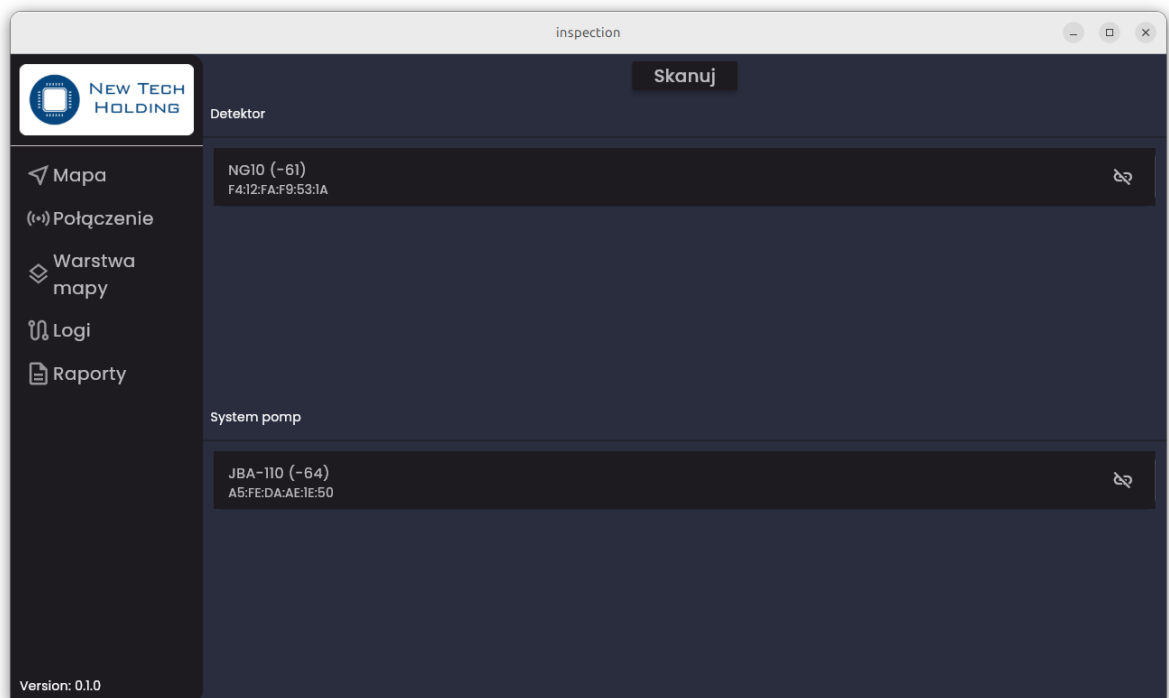
You can navigate through the program using the ribbon on the left, which contains the following elements:

1. Map  
This card allows you to start and end inspections, check the current location, determine the distance from the nearest gas pipeline, and view the current concentration reading.
2. Connection  
This card is used to establish a connection to the detector and pump system and to later manage them.
3. Layer  
This tab allows you to load the layer containing the elements of the gas network and to clear it.
4. Logs  
This tab allows you to view the existing set of logs in \*.csv format from the inspections carried out and generate reports in \*.pdf and \*.shp format on their basis.
5. Reports  
This tab allows you to view and view an existing set of inspection reports.

## 5.2 Service

The software is operated sequentially. To start an inspection, follow these steps:

1. Start *NTH Inspection Software*
2. Go to the *Connection* tab, press *the Scan* button, and then connect to the selected Detector.



**Figure 3**Connection tab

After proper connection, the card will change, allowing you to view the current parameters of the device and possible configuration (e.g. change of the alarm triggering threshold).

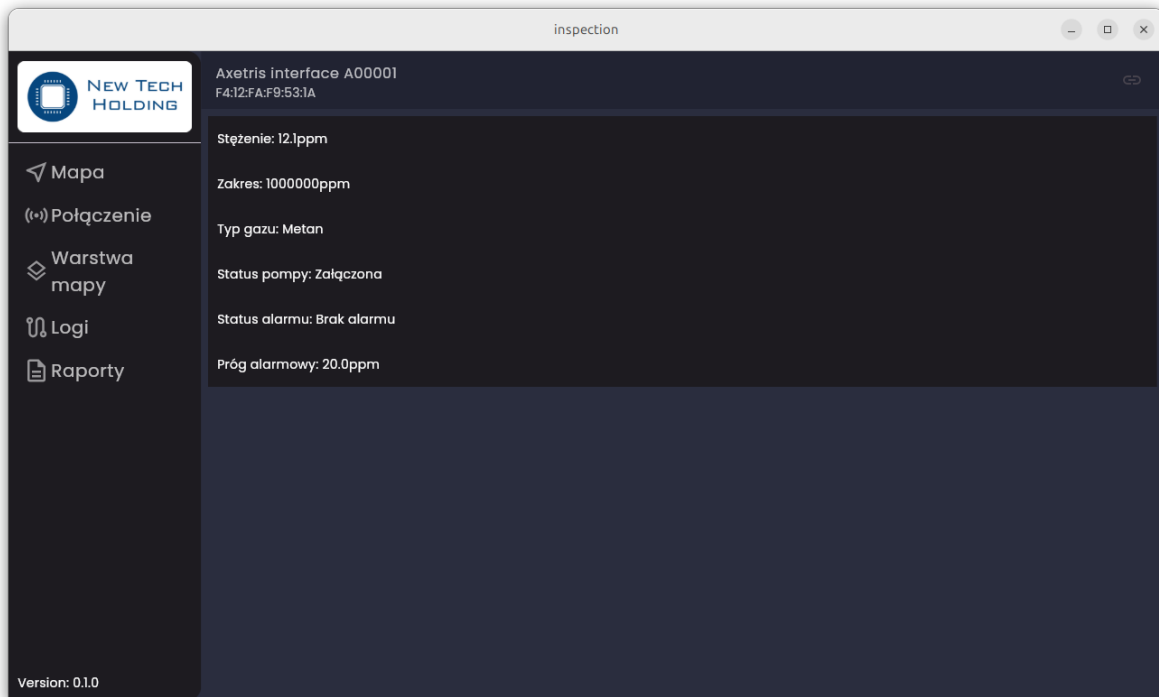


Figure 4 Connection - Device Connected Tab

3. Go to the *Layer* tab, press *Load shapefile*, and then select the shapefile containing the gas network representation. After this operation, the *Map* tab is updated with the new layer.

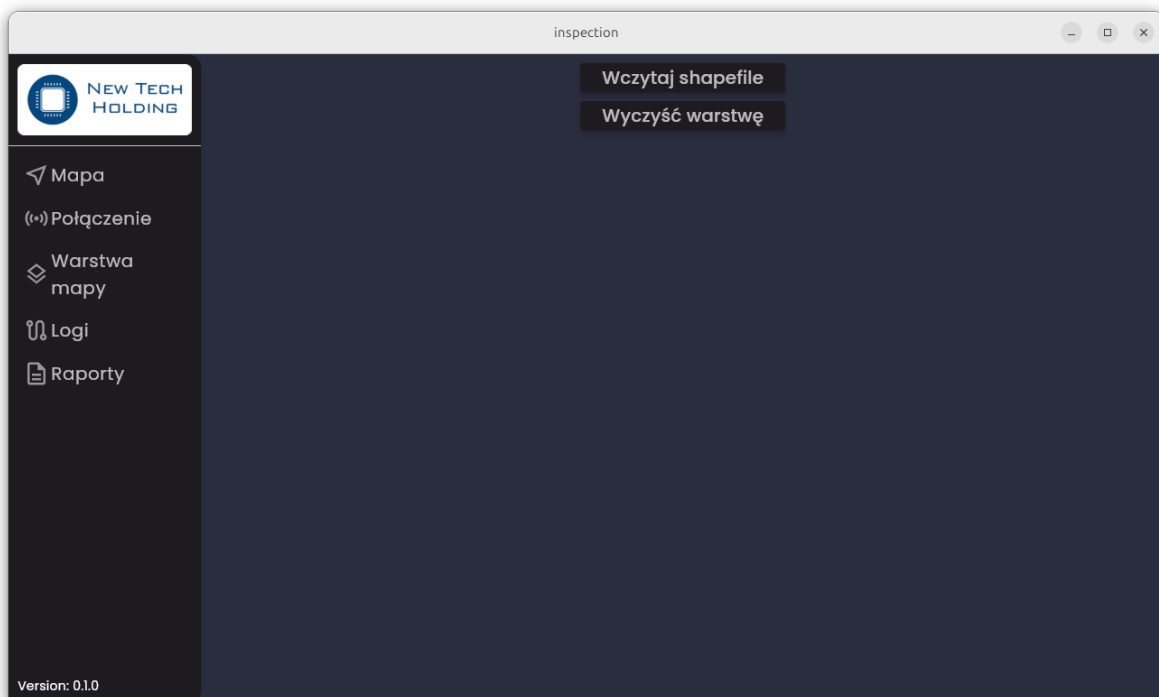


Figure 5 Layer tab

4. Go to the *Map* tab and start a new inspection by pressing the *Start button* in the lower-right corner of the screen.

5. Inspect the gas pipeline.
6. End the inspection by pressing the *Stop button* in the lower-right corner of the screen.
7. Go to the Logs tab. Click on the last log file, select the appropriate channel (in the case of NG10 channel 1 – methane), select the appropriate map zoom, press *Generate report*.

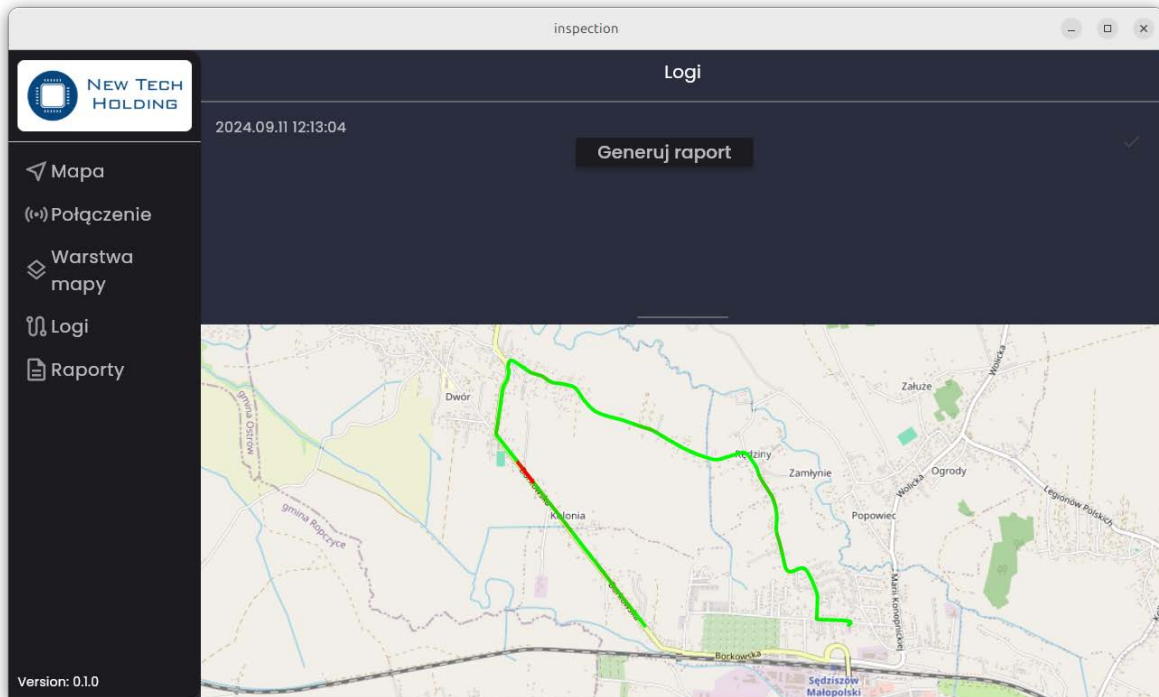


Figure 6Logs tab

- Reports in \*.pdf and \*.shp format have been generated.
8. Go to the *Reports tab* and open the most recent report.

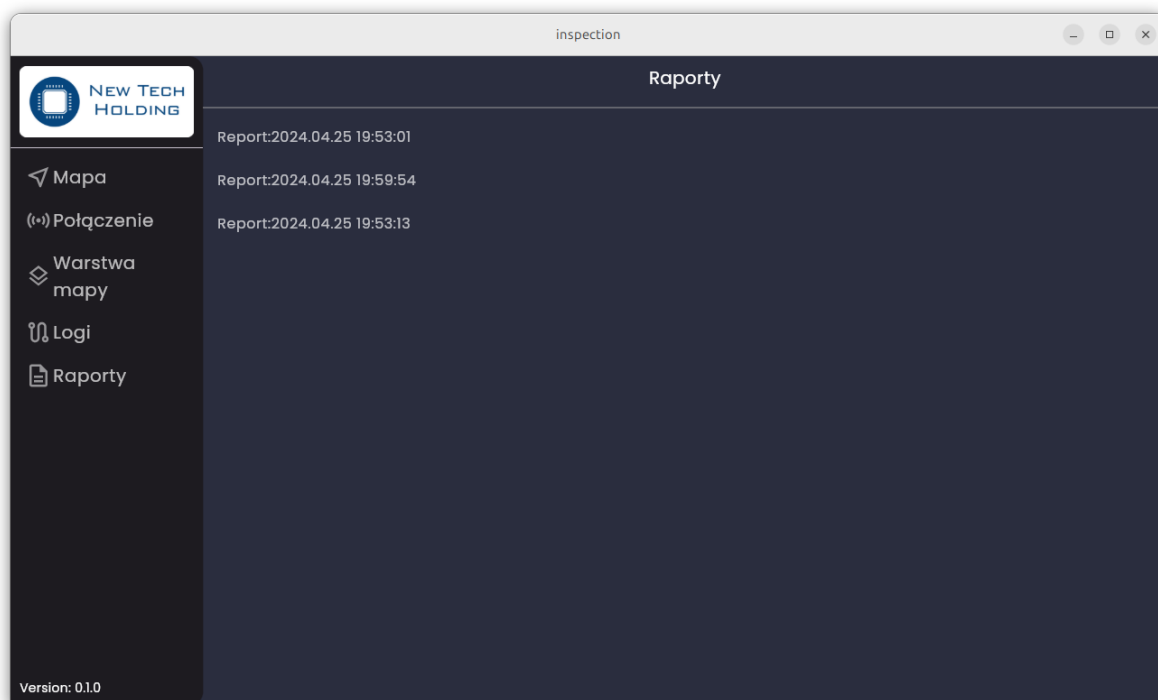


Figure 7 Reports tab

9. Once the inspection is complete, go to the *Connection* tab, disconnect the devices by clicking on their name, and then close the software.

## 6 Device maintenance and troubleshooting

### 6.1.1 Routine Inspections of the Device

To keep the device in good condition and ensure trouble-free, long-term operation, the following recommendations should be followed:

- Store the device in its case if it is not in use for a long time
- Charge the device to 50%-80% if it is not in use for an extended period of time
- Use a soft, damp cloth to clean the exterior of the appliance
- It is forbidden to wash with a pressure washer
- Periodically inspect the filtration system

#### REMARK

During operation, watch out for the accumulation of water, foreign objects and dust on the surface to be measured. In addition, it is strictly forbidden to immerse the probe in water. Failure to follow these recommendations may lead to filtration system failure or even damage to the gas chamber.

### 6.1.2 Overview of the filter system

#### REMARK

The laser chamber measuring the gas concentration inside the device is a delicate optical element that is susceptible to dust and water contamination in the event of a failure, so the gas taken must be well filtered before entering the detector.

The filter system consists of the following components:

1. Prefilter
2. Hydrophobic filter
3. Filter inside the test probe

The life of filters may vary depending on the operating environment and how often inspections are performed. It is recommended to clean and inspect at least once every 1 week. Timely replacement of contaminated and damaged parts significantly extends the life of the device.

#### 6.1.2.1 Check

1. Switch off the appliance, disconnect the hoses.
2. Disconnect and pull out the filters.
3. Check the components for water and dust.
4. Check filters for discoloration and impurities.
5. Replace damaged and worn components.

#### REMARK

The filtration system should be checked and cleaned at least once a week, and contaminated and damaged parts should be replaced regularly to extend the life of the detector. It is absolutely forbidden to use the Methane Detection System with a damaged filtration system.

### 6.1.3 Battery

The device is equipped with a lithium-ion battery. During extended periods of non-use, it is recommended to charge the battery to between 50% and 80%. In addition, the device should be stored in a dry and cool place.

Charging your device once a month will prevent irreversible loss of capacity caused by self-discharge due to long-term storage.

**TIP**

To extend the life of the battery, it is recommended that you perform a full charge and discharge cycle at least once a month, charging the battery to 100% capacity and running it until a low battery warning is displayed.

## 6.2 Troubleshooting

The device has a self-diagnostic function. If an error occurs, one long and two short beeps will be emitted. During this time, an error code will be displayed on the screen.

Error	Procedure to fix the error
<b>[E001] Out of range operating temperature</b>	1. Switch off the appliance and leave it at room temperature for 1 hour. 2. Restart. If the error persists, contact the Manufacturer's service.
<b>[E005 / E006 / E202] Unstable operating temperature</b>	1. Switch off the appliance and leave it at room temperature for 1 hour. 2. Restart. If the error persists, contact the Manufacturer's service.
<b>[E102 / E103] Abnormal battery temperature</b>	1. Switch off the appliance and leave it at room temperature for 1 hour. 2. Restart. If the error persists, contact the Manufacturer's service.
<b>[E104 / E105] Battery failure</b>	1. Turn off the device. 2. Restart. If the error persists, contact the Manufacturer's service.
<b>[E200] Zero autocalibration error</b>	1. No possibility of sucking gas into the device. Recalibrate.
<b>[E201 / E203 / E204 ] Configuration error</b>	1. Turn off the device. 2. Restart. If the error persists, contact the Manufacturer's service.
<b>[E205 / E206 / E207] Calibration error</b>	1. Turn off the device. 2. Restart. If the error persists, contact the Manufacturer's service.
<b>[Abnormal laser intensity]</b>	1. Turn the machine over and turn the pump on for 10 minutes. If the error persists, contact the service.