

OCT3i TESTER USER MANUAL

(v1)



Reading the user manual is a way to familiarize yourself with the functions and to learn how to handle the tester in various situations. It also allows you to use all the features of the device. Please pay special attention to the highlighted cautions regarding safe operation.

Note: We are constantly working on improving our product, including hardware and software changes. Improvements and additional functionality may cause the information, descriptions and illustrations in the user manual to differ depending on the version.

The manufacturer reserves the right to make changes to the instructions without prior notice.

1. PURPOSE

The device is designed to assess the presence of ozone (O₃) inside rooms. Depending on the measuring probe used, ozone concentrations can be measured in a wide range. This allows the device to be used to control the concentration after ozonation or, for example, to compare the efficiency of ozone generators.

Thanks to the use of configurable relay outputs, it is possible to use the device to automate ozonation-related processes, e.g. switching on a warning signal or switching off the ozone generator after reaching the required concentration.

2. TECHNICAL PARAMETERS

Parameter	Value
Power supply	built-in Li-ion / USB battery
Working time	approx. 8 hours on battery power
Charging connector	5V, 500mA
Sensor type (set)	electrochemical
Measurement method	diffusion
Range	20ppm
Accuracy	15%
Relay outputs	2
Contact load capacity	30V 1A for direct current (DC) 125V 0.5A for alternating current (AC).
Maximum contact voltage	120 V DC (power up to 30 W) 250 V AC (power up to 60 VA)

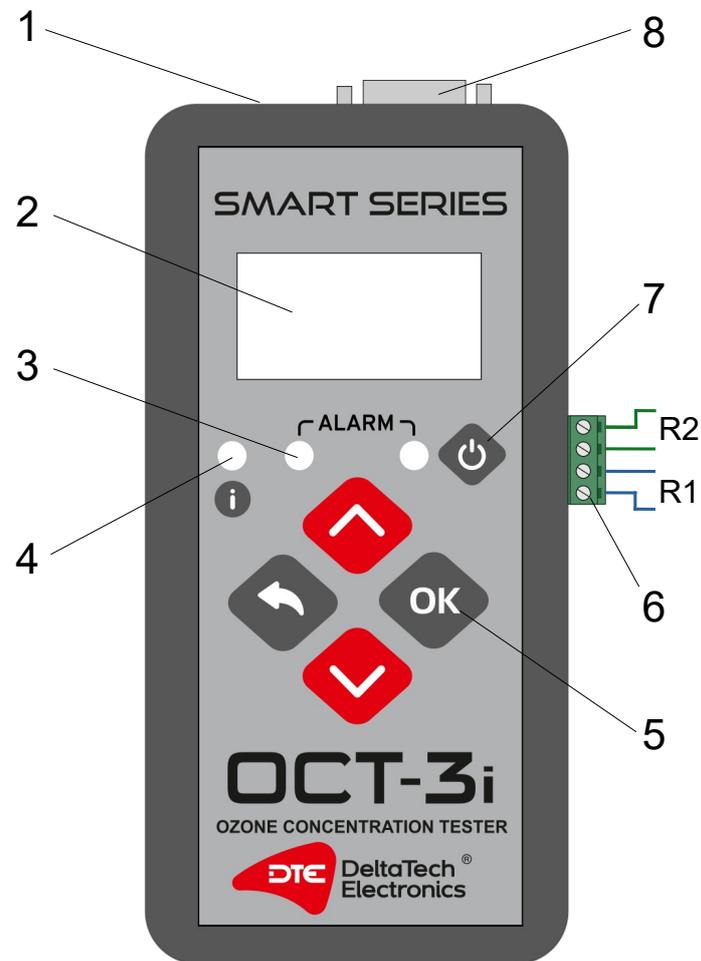
Working conditions:

- Ambient temperature: 10 to +40°C
- Relative humidity: 30 - 80%, non-condensing
- Due to the measurement method, free air flow must be ensured around the probe.

Storage conditions:

- Ambient temperature: -20 to +50°C (not used)
- Relative humidity: <80%, non-condensing
- Store the device in a cool and dry place.
- Avoid direct sunlight.
- In the event of a sudden change in ambient temperature that could cause condensation of water vapour (taking the device from a colder to a warmer place), wait until the temperatures equalise and the condensed water evaporates.

3. APPEARANCE AND CONNECTION



Device components:

1. Mini USB connector
2. LCD display
3. Alarm lights
4. Device status light
5. Control buttons
6. Relay outputs (removable terminal block)
7. Power button
8. Measuring probe connector

Control button functions:

[OK] Confirm the selection of a menu or function, proceed to the next test step.

[] Return from the selected function to the menu, return from the submenu to the main menu, cancel the selection.

[▲] – selects the previous option from the list, increases the modified value, switches additional options during measurement.

[▼] – selects the next item from the list, decreases the modified value, switches additional options during measurement.

Indicator light – uses different colours to indicate the device’s operation or, in the case of a connected charger or computer, shows the battery charge status (red – “charging”, green – “charged”).

Relay outputs R1 and R2 are configurable via the device menu (see the rest of the manual)

4. OPERATION OF THE DEVICE

4.1 Charging the device

The device is powered by a built-in battery. Charging is done by connecting an external 5V charger (min. 500mA) connected to the mini USB connector, you can also use the USB port of your computer. Charging the built-in battery takes up to 2.5 hours depending on the degree of discharge. During charging, the device indicator lights up red, after it is finished it changes to green. During charging, you can use the device normally.



Do not discharge the battery for a long time, as this may damage it. If you leave the device unused for a long time, you should charge the battery first.

The internal battery charge level is displayed in the upper right corner of the screen with a battery symbol (). If the symbol is visible next to it  , it means that Bluetooth is active and can be connected to a compatible mobile device.

4.2 Switching on

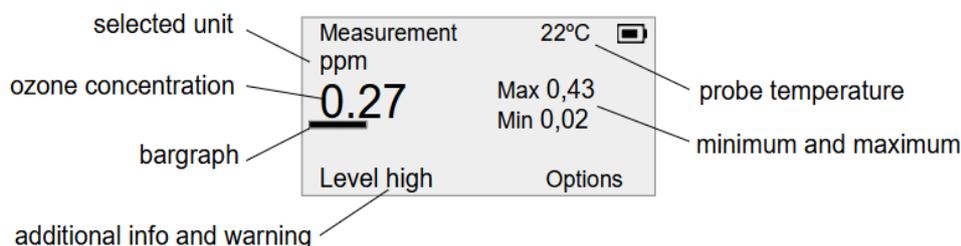
After switching on the device using the power button, a summary will be displayed containing information about the set thresholds or disabled signaling. Additionally, at the bottom of the screen there is information about the auto-power-off status.

After 10 seconds or pressing the button, the device will go to the main menu display. Use the [▲] and [▼] keys to select the desired function and [OK] to confirm.

The list of available menu items is discussed in the following sections.

4.3 Measurement

After entering the *Measurement menu*, the device will start measuring the gas concentration in the range corresponding to the attached measuring probe. In order for the results to be reliable, you should wait a minute from switching on the device for the sensor element to warm up. The device signals this time by the lack of a measured value along with information about the remaining time at the bottom of the screen. The temperature at which the measuring probe is located is signaled at the top of the screen.



Exceeding the measurement range is signalled by the “>MAX” signal.

Below the value, information is displayed about the value within the norm or exceeding the norm. The comparative value is the level of the MAC (Highest Allowable Concentration) for ozone specified in the regulation of the Polish Ministry of Family, Labor and Social Policy of 12.06.2018.

The temperature value presented on the screen concerns the sensor element and its main task is to enable compensation of the temperature effect on the sensor readings. In the case of electrochemical sensors (20 ppm range), the presented value corresponds to the ambient temperature throughout the measurement. For semiconductor sensors (1 or 1000 ppm range), the temperature is consistent with the ambient conditions only at the start of the measurement. These sensors require an integrated heater that after some time increases the presented temperature by several degrees relative to the environment.



Due to the diffusion measurement method, air flow at the location of the measuring probe must be ensured to obtain reliable results.

The following options are available during measurement:

- *Hold* – allows you to freeze the currently measured value on the screen. Selecting this option again will resume measurement.
- *Reset max/min* – resets the minimum and maximum values presented during the measurement.
- *Unit* – allows you to change the display unit (see 3.3 Settings).
- *Calibrate Zero* – allows you to enter the zero calibration mode (See 3.2 Sensor calibration).

4.4 Sensor Calibration

Ozone sensors are elements that are also sensitive to other gases and are subject to wear. The available menu allows for partial compensation of phenomena related to the specificity of environmental conditions and component aging.



The durability of the sensors used is about 2 years. To ensure reliable readings, periodic calibration of the sensors is recommended. The recommended calibration period is 6 months.



To increase the durability of electrochemical sensors (20 ppm range), it is worth closing the measuring probe in a tight container when not in use.

Calibrate zero

To obtain full measurement accuracy for the 20 ppm probe (electrochemical sensor), the zero value should be calibrated periodically. To do this, place the device in conditions that meet the specifications (10 – 30°C, relative humidity (RH) 30 – 80%) at a low ozone concentration (<0.01 ppm). The zeroing procedure can be performed, for example, in a room before ozonation. The calibrated value remains stored in the device.

Regeneration (semiconductor sensors – available as an option)

If the sensor has not been used for a long time (longer than a month) or has been exposed to unfavorable conditions, regeneration should be performed. To do this, leave the device switched on for 24 hours in a place with low ozone concentration:

1. Connect the device to the charger (the energy stored in the battery is not enough to perform the procedure)

2. From the menu, select *Sensor Calibration* → *Regeneration*, then confirm with *OK* and wait until regeneration is complete.
3. Once the procedure is complete, the device will turn off automatically.
4. If the regeneration has been shortened, a zero calibration must be performed before resuming measurements (see previous point of the instructions).

For electrochemical sensors in the 20ppm range, regeneration is neither available nor required.

4.5 Settings

The menu allows you to change device settings.

Tongue

The menu allows you to select the language of the device interface.

Use the [▲] and [▼] keys to change the value. The [►] button confirms the selection, [◀] returns to the previous setting.

Bluetooth

Use the [▲] and [▼] keys to select *Enable* or *Disable* .

The [►] button confirms the selection, [◀] returns to the previous setting.

Turning off Bluetooth when not needed will extend battery life.

Unit

The device can display measured values in two units – mg/m³ or ppm. Use the [▲] and [▼] keys to select the unit. The [►] button confirms the selection, [◀] returns to the previous setting.

Signaling

The menu allows you to configure light and sound signals and relay outputs according to the user's requirements.

In each case we can set the output state (active/inactive), the on threshold and the off threshold.

For light and sound signals, the switch-off threshold must be lower than the switch-on threshold.

In the case of relay outputs, there are two situations:

- The on threshold is higher than the off threshold. This is a typical situation where the relay contacts will close when the set level is reached and open when the off threshold is reached. At zero reading the contacts will remain open.
- The on threshold is lower than the off threshold. In this mode, the relay contacts operate in reverse: they open when the level defined as the off threshold is reached. When it falls below the on threshold, the contacts close. With a zero reading, the relay contacts remain closed.

The difference between the on and off thresholds is called hysteresis. Its greater value reduces the frequency of the relay state change or signaling in the event of fluctuations in the indicated concentration.



By default, the device is distributed with the auto-switch function enabled, which will switch the device off after a period of inactivity. It should be disabled in the menu to ensure continuous operation of the signaling.

Enter code

After replacement, the new sensor must be coded (this does not apply to the case of using the tester interchangeably with different sensors if they were supplied with the device or previously coded). To enter the code, enter the letters of the designation using the [▲] and [▼] keys. Confirm subsequent characters with the **OK button**. **To complete the setting, press OK** after entering the last character .

Auto power off

To prevent accidental battery discharge, the device can automatically turn off after a specified time: 15 minutes, 30 minutes or 2 hours. The default setting is 15 minutes. The automatic shutdown function can be turned off, allowing the device to work continuously (the tester can then be permanently connected to the charger).

Version

Displays the device software version. To return to the previous menu, press [←] .

5. ANDROID APP

For OCT-3i it is possible to extend the device's capabilities by working with a dedicated application. To download the application, use the link to the Play store:



Alternatively, the application can be downloaded from the DTE website:



<http://dte.com.pl/download/oct/>

To download the program from the DTE website, you must provide the device's serial number. It is located on the bottom side of the housing.

Program window:



Measurement screen – allows remote reading of measurement parameters. After completing the measurement, a report can be prepared containing, in addition to measurement results, company data, information about the ozonated object

Settings – allows you to configure the Bluetooth connection, personalize the data included on printouts, and display information about the device and software versions.

Reports – allows you to view measurement reports generated using the application. Reports are saved in PDF format. The report contains a specified number of measurement points, as well as a graph and statistics of the values achieved.

To connect to the app:

- Turn on Bluetooth on the tester and on the mobile device.
- Start the OCT-3 application

When connecting for the first time, select the Bluetooth device in the app by selecting *Settings* → *Bluetooth*.



All reports are saved in the device's main memory. To obtain information about their location in order to make a copy or transfer to another device, simply expand the program menu and select *Data storage path*.

6. OZONE – PRACTICAL INFORMATION

Ozone (O_3) is a form of oxygen that has 3 atoms in its molecule, unlike typical oxygen, which consists of diatomic molecules. Ozone is unstable and after some time (depending on

temperature, presence of water vapor and other gases) it turns into diatomic oxygen. It has very strong oxidizing properties and is toxic in very low concentrations, which is used for disinfecting rooms. Ozone is about 1.66 times heavier than air, which is why the concentration in rooms is usually not uniform.

The smell of ozone is very characteristic and can be sensed by humans from about 25ug/m³. However, care must be taken because when in contact with the gas, the sense of smell becomes less sensitive and it can no longer be relied on.

Ozone in concentrations achieved during ozonation is colorless (in very high concentrations achieved in the laboratory it may have a light blue tint). The characteristic mist formed in the room consists of suspended particles of substances oxidized by ozone. Haze indicates that some of the ozone produced has already reacted and the concentration achieved will be lower than if the haze had not occurred.

The gas used in the ozonation process is usually obtained as a result of corona discharges in the air. This is the most efficient method available, but its efficiency depends on the water vapor content and the presence of impurities. Generally, the drier the air (the lower the dew point), the greater the efficiency of the ozonator. Similarly, the cleaner the air, the greater the efficiency of the process.

The specifics of the rooms significantly affect the rate of decomposition of the produced ozone. It is often assumed that the half-life of ozone is 20 or 30 minutes. However, this is only an estimate. For specific conditions, this value can be determined independently - using a graph of ozone concentration during ozonation. To do this, ozonation should be performed for a specified time and then the rate of decrease should be observed after the ozonator is turned off. The time after which the concentration drops to half of the initial value is the half-life. In favorable conditions, it can increase for more than an hour, or it can be shortened to just a few minutes.

Ozone also occurs naturally. Concentrations outside on a sunny day can reach even above 100ug/m³. Indoors, the natural concentration of ozone reaches from 20 to 80% of the outdoor value and depends on the intensity of ventilation.

The lowest ozone concentrations occur in less ventilated rooms at night and in the morning (when outdoor concentrations are also lowest).

The MAC value (Highest allowable concentration) according to the regulation of the Minister of Family, Labor and Social Policy of 12 June 2018 is 150 ug/m³ (0.07 ppm).

6.1 Disinfection by ozonation



These recommendations are for guidance only and have been developed based on the limited amount of available material in this area. Always follow the recommendations of the state health authorities and applicable regulations first.

- Do not stay in ozonated rooms or those directly adjacent to them.
- If it is necessary to enter a room, appropriate protective measures should be used, in particular tight-fitting masks with appropriate absorbent.
- To achieve a uniform concentration of ozone in a room, it is necessary to ensure its tightness and set up fans to ensure air mixing.
- In the case of large rooms, it is better to use several smaller ozonators than one, even one with high efficiency.
- Ozonators should not be placed on the floor, but on a platform.
- After the ozonation procedure, the rooms should be aired for at least 30 minutes or left for several hours until the produced ozone almost completely disintegrates.

For disinfection purposes, the recommended concentrations are 2 to 5 ppm, and the suggested process time is 1 to 5 hours. The maximum level achieved cannot be the only criterion for disinfection effectiveness.

The value that determines the biocidal effect to a good approximation is the product of the concentration achieved and the time for which this concentration occurred. Thanks to this, by achieving a higher concentration, we can proportionally shorten the ozonation time. If we have a low-efficiency ozonator, we can extend the ozonation period accordingly to obtain a similar effect. Available publications indicate that a concentration of 0.5 ppm should cause a clear biocidal effect. It should be remembered that the neutralization of viruses and bacteria suspended in the air occurs much faster than those settled on surfaces.

7. TROUBLESHOOTING

<i>Problem</i>	<i>Remedies</i>
The device does not turn on. No indicator lights up when connected to the charger	<p>Check if the charger is operational.</p> <p>Make sure the battery is charged by connecting it to the charger for a long time.</p> <p>If that doesn't help, the battery may be worn out or damaged.</p>
The device works very briefly after charging and/or charging stops shortly after being connected to the charger.	The battery is worn out and needs to be replaced. Contact the manufacturer.
The obtained concentrations are lower than theoretical for the room parameters.	<p>There are many possible causes:</p> <ol style="list-style-type: none"> 1. Most of the concentration calculators that are available are overly optimistic about estimating the level, failing to take into account the complexity of the problem. 2. In different rooms, even of similar cubic capacity, both ozone decomposition and its production can differ significantly. The presence of impurities or moisture affects both factors. Finishing materials and type of equipment can also react with ozone, accelerating its decomposition. 3. Some ozonators have lower efficiency than declared. Compare the ozonator with another with similar declared efficiency. 4. The sensor in the meter may be damaged or worn. Have the device checked or compare the results with another reliable ozone meter.
The device gives incorrect readings (over or under)	Only perform measurements under the conditions specified in the instructions. Remember that the device is not designed for outdoor environmental testing. Make sure that the sensor has not been damaged. Re-enter the sensor code, then perform a regeneration (for 1 ppm or

	1000 ppm sensors) or zero (for 20 ppm sensors).
When using Bluetooth, the tester will not pair with the mobile device.	Perform the following procedure. With the device turned off, press the up arrow button. While holding the button, turn the device on and wait until the main menu appears. Release the arrow button.

If the list of suggested solutions is exhausted or a problem occurs that is not listed in the table above, please contact the device manufacturer.