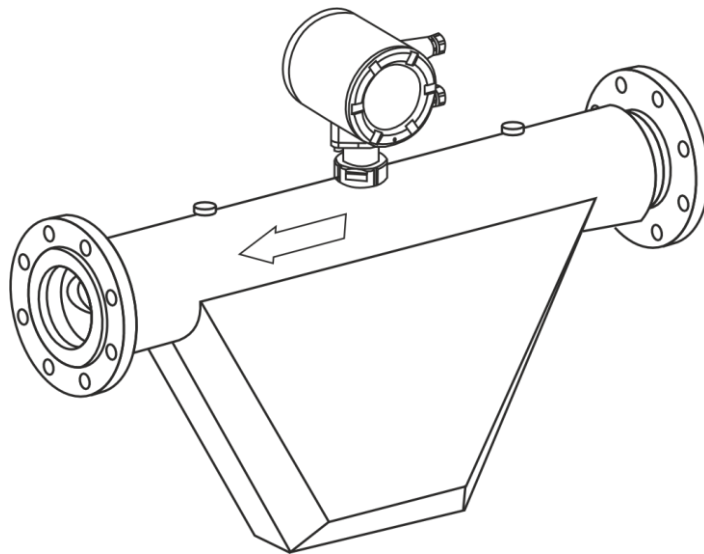




## **LIQUID COUNTERS**



**LC Corio-95/380/1200/2300/3800/6700**

**“Monitor” software user manual**

**Version 1.0**



**TECHNOTON**

ADVANCED MACHINERY TELEMATICS

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# 1 General provisions

This manual contains instructions and recommendations for using the **“Monitor” service software** (hereinafter referred to as the “Monitor” software), intended for operation with [LC Corio](#) liquid counters.



**RECOMMENDATION:** Before using the “Monitor” software, it is **strongly recommended** to carefully study the document [LC Corio liquid counters. Operation manual](#) (see the [Technoton document center](#)).

All LC Corio counters are calibrated by the manufacturer and supplied ready for use. However, for connecting LC Corio to an external device or for adaptation to specific operating conditions, **additional configuration** of the counter via the RS-485 interface (Modbus RTU protocol) using the “Monitor” software is possible.

For configuration, it is necessary to connect LC Corio to a computer (hereinafter referred to as a PC) using a **service adapter** (purchased separately).



**ATTENTION:** To operate the “Monitor” software, a dedicated PC (desktop or laptop) is required, on which only Technoton [service programs](#) are installed, meeting the following minimum requirements:

- Windows 10/11 operating system, x32/x64;
- processor — Intel Core i3, 2 cores, 2.0 GHz;
- RAM — 4 GB;
- USB 2.0 port;
- display resolution 1366×768.

Before starting work with the service adapter, perform the following steps:

**1) Download the archives containing the **special software**:**

- [CP210x USB to UART Bridge VCP Drivers](#) USB driver (see the [Software/firmware](#) section of the website <https://jv-technoton.com/>);
- “Monitor” software (provided upon user request by [Technoton technical support](#) via e-mail: [support@jv-technoton.com](mailto:support@jv-technoton.com)).

**2) Extract the USB driver from the archive and install on the PC the driver corresponding to the Windows version.**

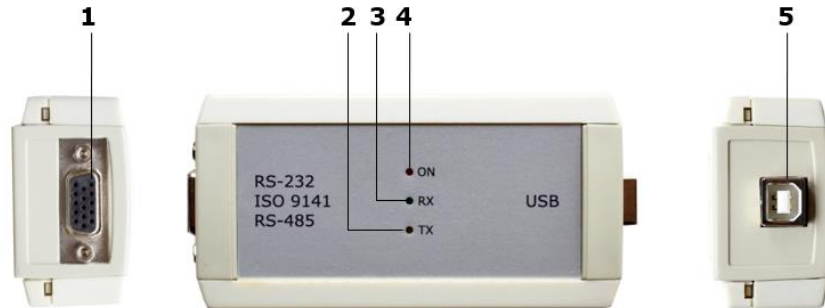
**3) Extract the “Monitor” software folder from the archive.**



**IMPORTANT:** Operation of the service adapter is impossible without prior installation of the USB driver.

## 2 Service adapter

The **service adapter** (hereinafter referred to as the adapter) is intended to provide data exchange between the LC Corio counter and the PC (see Figure 1).



- 1** – **RS-232/ISO 9141/RS-485** connector — for connection to LC Corio via the RS-485 interface
- 2** – yellow **TX** LED indicator — for data transmission to LC Corio;
- 3** – green **RX** LED indicator — for data reception from LC Corio;
- 4** – red **ON** LED indicator — for power connection;
- 5** – **USB B** connector — for connection to the PC.

Figure 1 — Appearance and design of the service adapter

The adapter is also supplied with:

- **USB A-B cable** — for connecting the adapter to the PC.
- **RS-485 service cable** — for connecting the adapter to LC Corio (see Table 1).

Table 1 — Assignment of wires and contacts of the RS-485 service cable connector

Connector view	Contact number	Wire		Signal		
		Marking	Color	Name	Type	
	6	GND		Brown	Ground "-"	-
	7	GND		Brown	Ground "-"	-
	10	485B		Red	Transmitted data	Digital, RS-485 interface
	11	SEL1		Brown	RS-485 selection	Discrete
	15	485A		White	Received data	Digital, RS-485 interface
Wire ends		GND		Brown	Ground "-"	-
		485A		White	Received data	Digital, RS-485 interface
		485B		Red	Transmitted data	Digital, RS-485 interface

### 3 Connecting the service adapter

**1) External inspection.** Before connecting the service adapter for the first time, it should be inspected for defects caused by transportation, storage or careless handling:

- visible damage to the connectors and housing of the adapter;
- damage to the connectors and insulating sheath of the cables.

If defects are found, contact the supplier of the product.

**2) Operating limitations.** When connecting the service adapter to a counter installed on site, the following shall be prevented:

- ingress of fuels, lubricants and moisture onto the contacts of the adapter and cable connectors;
- possible damage to the adapter and cable insulation by rotating and heated engine components.



**ATTENTION:** To prevent failures during operation of the service adapter on the communication line between LC Corio and the PC, make sure that there are no sources of electromagnetic interference near the workplace (operating electric motors, high-power transformers and switching equipment, welding equipment, high-voltage lines, etc.).

Before starting work on connecting the counter, de-energize the power circuits of the equipped object (switch off the onboard power supply).

**3) Connection of LC Corio to the PC** shall be carried out in accordance with the wiring diagram shown in Figure 2 in the following sequence:

- Unscrew the cover of the LC Corio terminal compartment.
  - Connect the RS-485 service cable to the corresponding terminals of the counter:
    - to the RS-485 (Modbus RTU) communication line (terminal block X3);
    - to the power supply (terminal block X1).
  - To ensure operation of the counter, connect an external DC 24 V power supply to the corresponding contacts of terminal block X1.
  - Connect the adapter to a free USB port of the PC using the USB A-B cable.
- Note — It is allowed to connect the adapter to the USB port of the PC after the power is switched on and the software is launched.
- Apply DC 24 V power supply.

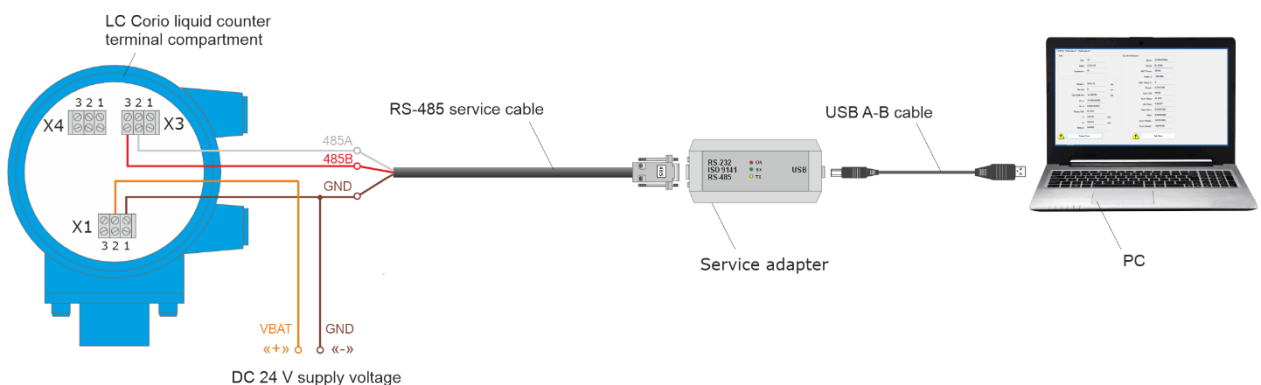


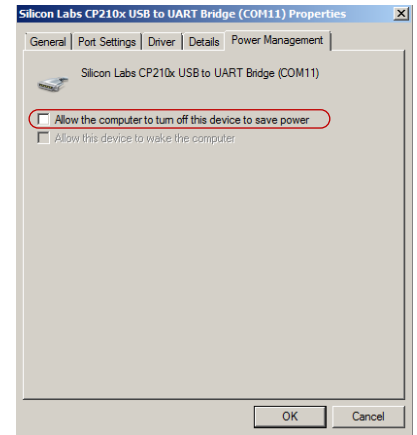
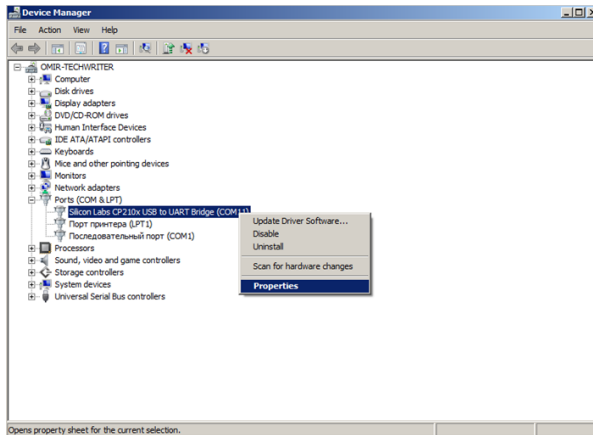
Figure 2 — Wiring diagram for connecting LC Corio to a PC using the service adapter

## 4 Functional check

Windows automatically detects the adapter connected to the PC as a USB device and enables the virtual COM port driver for it, which is displayed in the Ports list of the Windows Device Manager (see Figure 3).



**ATTENTION:** When working with the “Monitor” software, it is recommended to clear the checkbox allowing the virtual COM port to be turned off to save power in its properties (see Figure 3 b).






a) selecting Port Properties in the context menu      b) clearing the permission to turn off the port

Figure 3 — Virtual COM port configuration in Windows Device Manager

The service adapter is ready for operation from the moment power is applied (from the power supply source or from the USB port of the PC).

The signal values of the LED indicators located on the adapter housing shall correspond to Table 2.

Table 2 — Signal values of the adapter LED indicators

LED indicator			Meaning of the light signal
Designation	Signal type	Signal color	
ON		Red	Power on
	No signal		Power off (supply voltage is below the minimum permissible value)
RX		Green	Data are being received from LC Corio
	No signal		No data are being received from LC Corio
TX		Yellow	Data are being transmitted to LC Corio
	No signal		No data are being transmitted to LC Corio

## 5 Operation with the software



**IMPORTANT:** Before using the “Monitor” software, turn off the hardware write protection microswitches\* in the LC Corio electronic module. This will allow the modified counter settings to be written to its internal memory (see the document [LC Corio Liquid Counters. Operation Manual](#)).

### 5.1 Start-up

- Open the folder into which the downloaded “Monitor” software archive was extracted, and run the file **commserver reg.bat** as administrator.



**NOTE:** To run the file as administrator, point to the **commserver reg.bat** file and right-click it. In the context menu that appears, select **Run as administrator**.

- Run the **install.reg** file.
- Go to the **SW LC Corio** folder and run the **Master.exe** file as administrator.

### 5.2 Mode selection

In the **Selection of operation mode** window that appears (see Figure 4), specify the software mode — **Controller configuration and setup**.

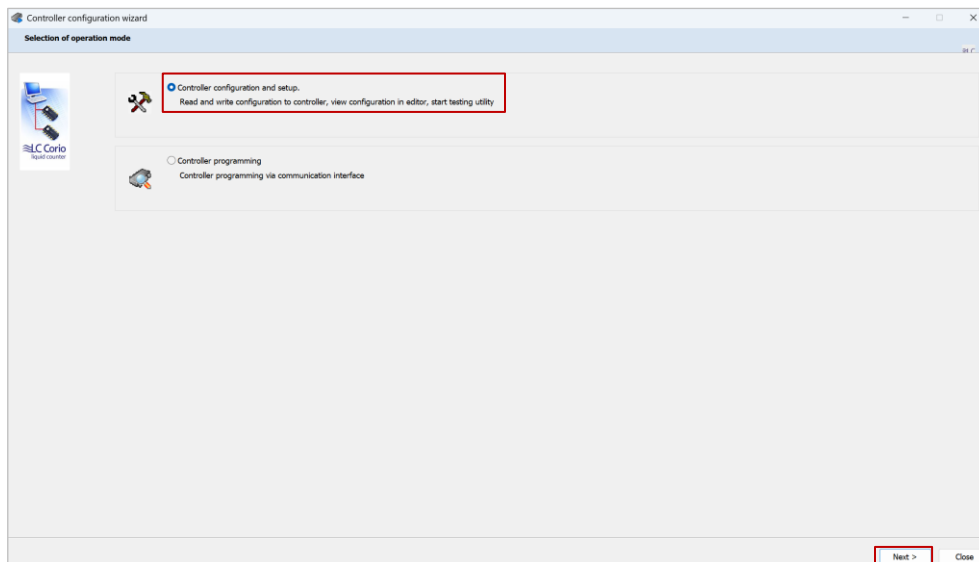



Figure 4 — Software mode selection

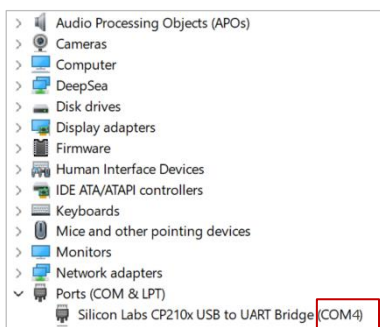
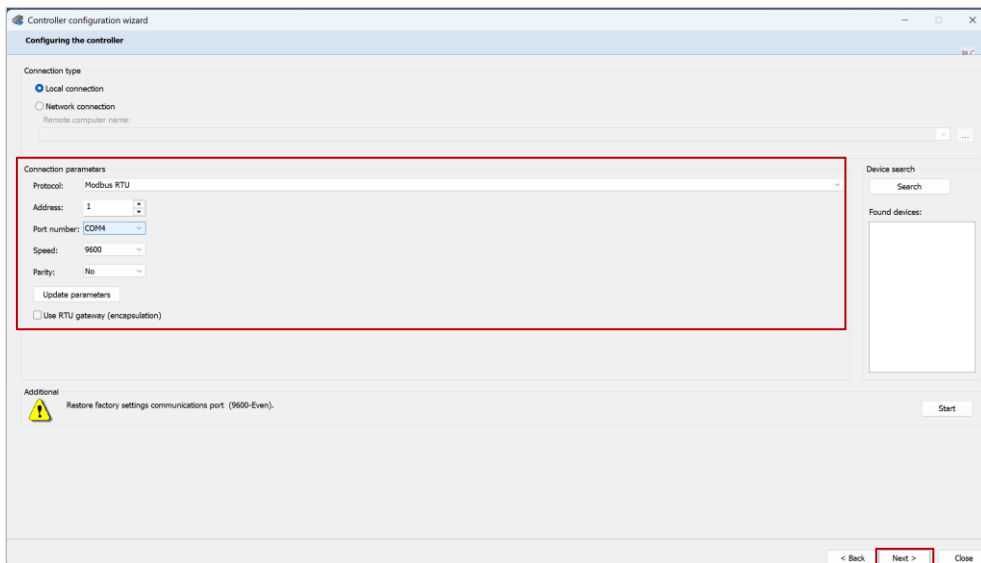
After selecting the software mode, click the  button in the lower-right corner to proceed to the next window.

\* In some versions of LC Corio counters, hardware write protection and microswitches are not provided.

## 5.3 Connection settings

In the **Connection parameters** area of the **Configuring the controller** window, set the connection parameters for the LC Corio counter via the RS-485 serial interface (see Figure 5):

- data transmission protocol (**Protocol** drop-down list) — **Modbus RTU**;
- network address of the LC Corio controller (**Address** field) — **1**;
- connection port number (**Port number** drop-down list) — must correspond to the virtual COM port number displayed in the **Ports** list in the Windows Device Manager (see 4);
- data exchange rate (**Speed** field) — **9600**;
- parity control mode for data transmission (**Parity**) — **No**.



Identification of the virtual COM port number in Windows Device Manager

Figure 5 — Entering connection settings for LC Corio via the RS-485 serial interface

After entering the connection settings, click the **Next >** button in the lower-right corner to proceed to the next window.

## 5.4 Reading the counter settings

On the second page of the **Configuring the controller** window, select the **Reading configuration from device** field to enable reading the counter settings from the Modbus RTU registers (see Figure 6).

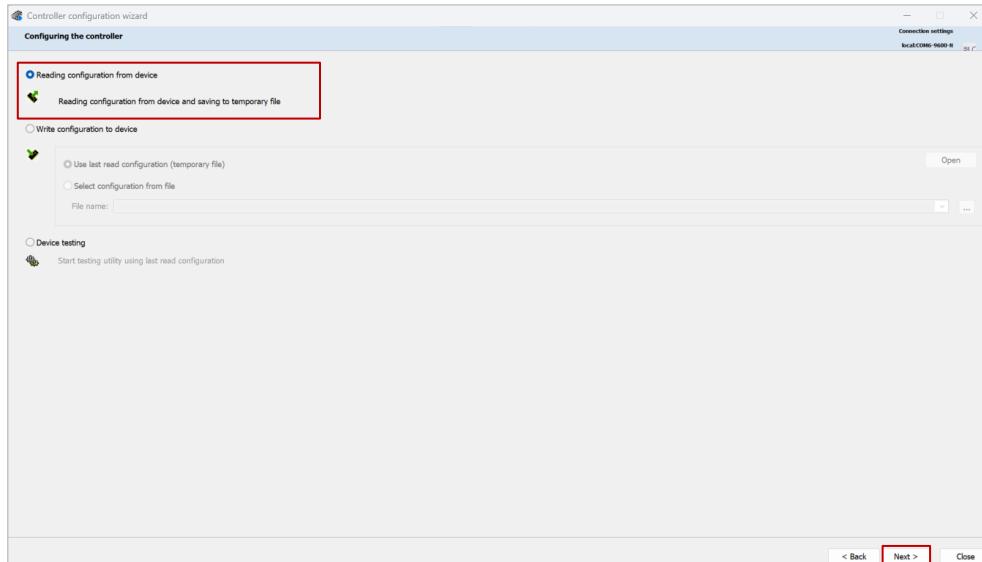


Figure 6 — Enabling reading of LC Corio settings from Modbus RTU registers

After enabling reading of the counter settings from the Modbus RTU registers, click the **Next >** button in the lower-right corner to proceed to the next window.

## 5.5 Enabling the reverse flow direction. Saving the counter profile

The **Configuration editor** window that opens contains a list of the counter settings read from the Modbus RTU registers. If necessary, in the **Flow reversal** field, you can select the checkbox to enable the reverse direction of liquid flow through LC Corio (see Figure 7). This setting is relevant when the actual direction of liquid flow does not match the direction indicated by the arrow on the counter housing.

After making the change, the current counter settings can be saved to a profile file (\*.cnfg) on the PC disk for future use.

To exit the **Configuration editor** window, click the  button in the upper-right corner.

To return, if necessary, to the previous page of the **Configuring the controller** window, click the **< Back** button in the lower-right corner.

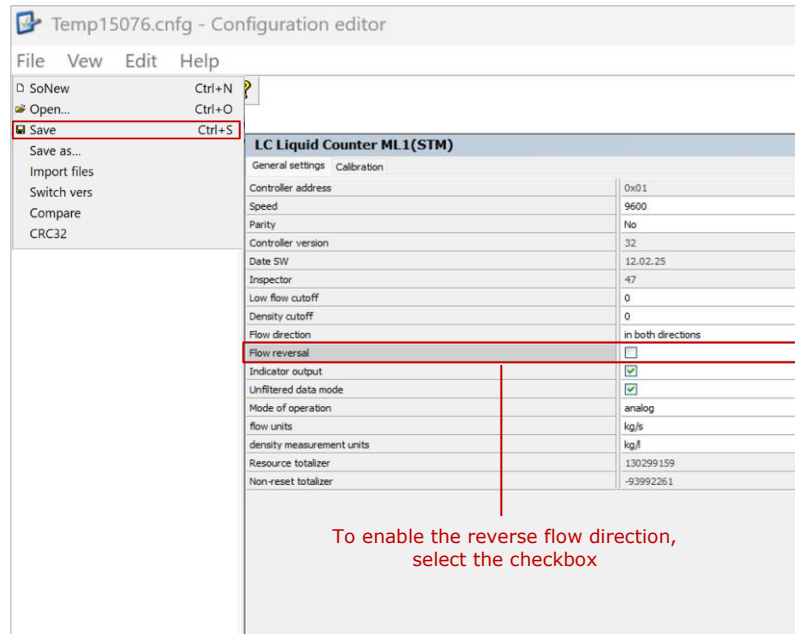


Figure 7 — Enabling the reverse direction of liquid flow and saving LC Corio settings to a profile file

## 5.6 Loading the counter profile

To load a previously saved LC Corio counter profile, return to the second page of the **Configuring the controller** window and select the **Write configuration from device** and **Select configuration from file** fields there. Then select the required counter profile file (\*.cnfg) on the PC disk and click the button to load it (see Figure 8).

To edit and save the loaded profile in the **Configuration editor** window, click the Next > button and then follow the steps as described in [5.5](#).

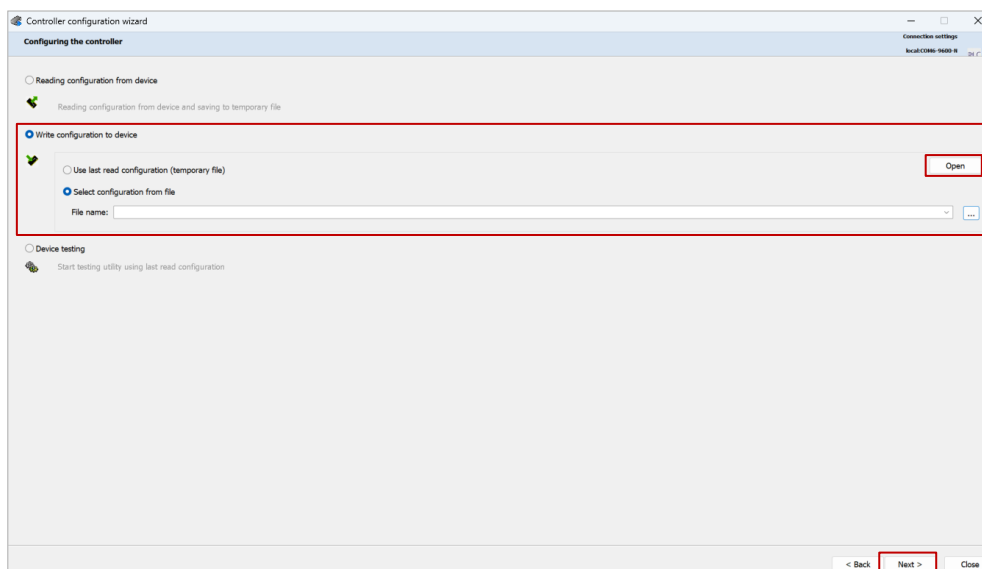


Figure 8 — Loading a previously saved LC Corio profile from the PC disk

## 5.7 Zero calibration point correction

The **zero calibration point value corresponding to no flow** is set by the manufacturer during calibration of the LC Corio counter for standard operating conditions and is specified in the product passport. After installation of the counter, it is recommended to correct the zero calibration point value for the specific operating conditions.

When correcting the zero point, the following factors shall be taken into account:

- Correction shall be performed only for liquid media that do not contain gas or solid particles.
- A mandatory condition for correct correction is complete filling of the measuring tubes with the working liquid at zero flow rate (flow velocity equals 0 m/s). This condition can be ensured, for example, by means of shut-off valves installed in the pipeline section immediately upstream of the primary converter and/or downstream of it.

Zero point correction procedure:

- 1) Wait until the counter readings stabilize.
- 2) Stop the flow ( $V = 0$  m/s).
- 3) Check the shut-off valves for leakage.
- 4) Make sure that the pressure of the working liquid corresponds to the operating variation range (0...4 MPa).
- 5) In the "Monitor" software, perform zero point correction.

To start the LC Corio zero calibration point correction procedure, return to the second page of the **Configuring the controller** window. Select the **Start testing utility using last read configuration** field and click the  button in the lower-right corner (see Figure 9).

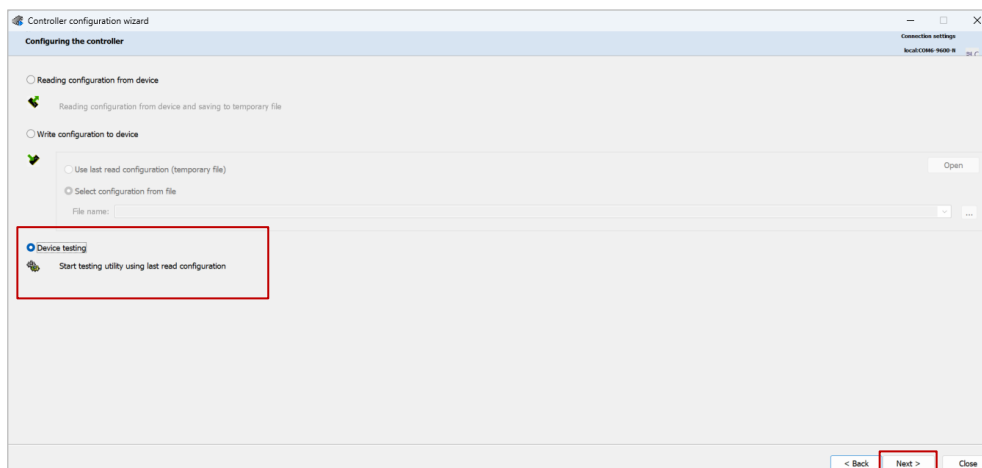


Figure 9 — Starting the LC Corio zero point correction procedure

In the **Testing and setup controller** window that opens, the current data from the Modbus RTU registers are displayed — service information and LC Corio counter readings (see Figure 10).

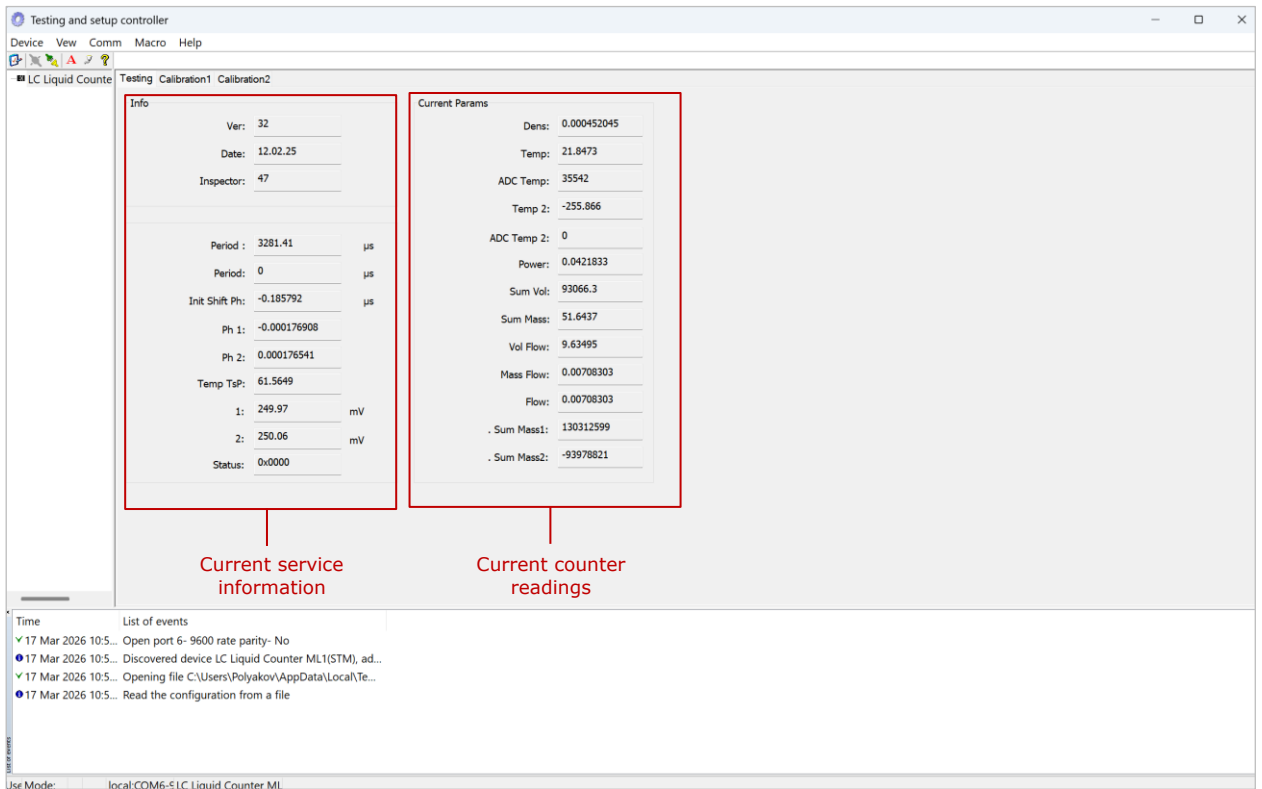


Figure 10 — Display of current data from the LC Corio Modbus RTU registers

To access modification of the Modbus RTU register data, open the **Device** → **User** menu and authorize the user in the **Change privileges** window. To do this, use the password provided by [Technoton technical support](#) (see Figure 11).

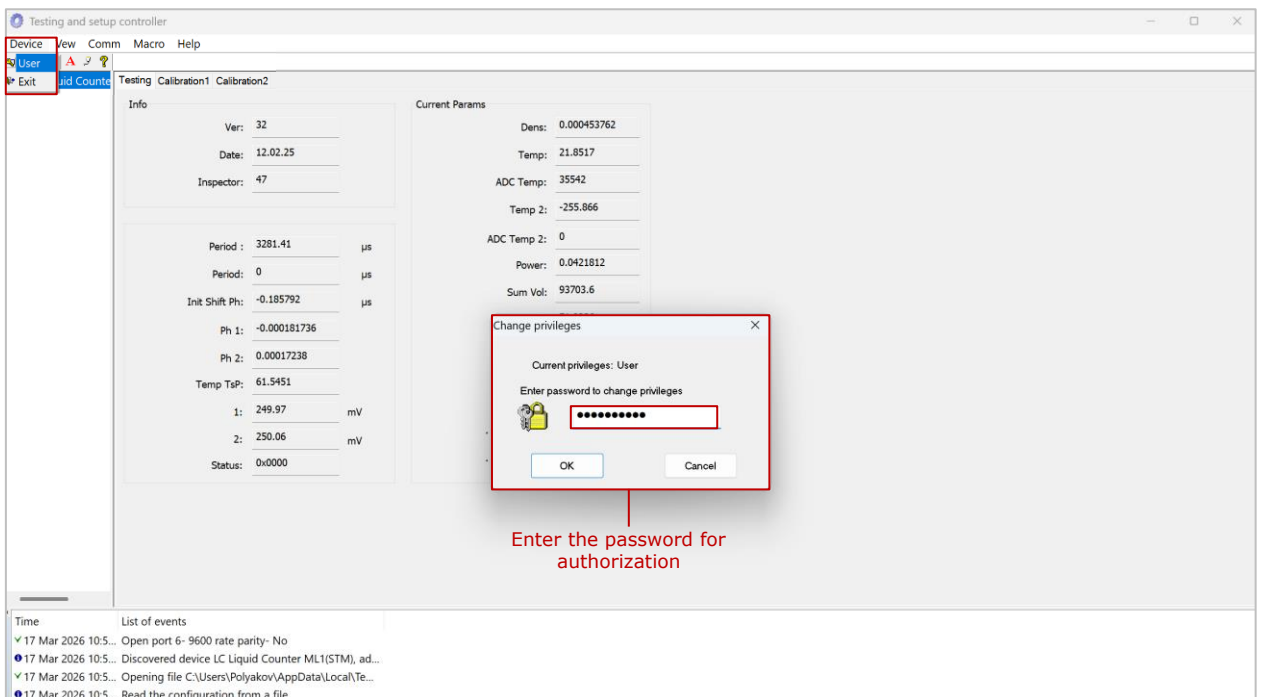


Figure 11 — User authorization for access to modification of LC Corio data stored in the Modbus RTU registers of the LC Corio counter

After successful user authorization, two buttons will be displayed in the lower part of the **Testing and setup controller** window (see Figure 12), by clicking which the Modbus RTU register data can be changed:

- button — for writing a new zero calibration point value to the LC Corio memory.
- button — for simultaneous reset of the accumulated internal counters of the total liquid volume and mass.

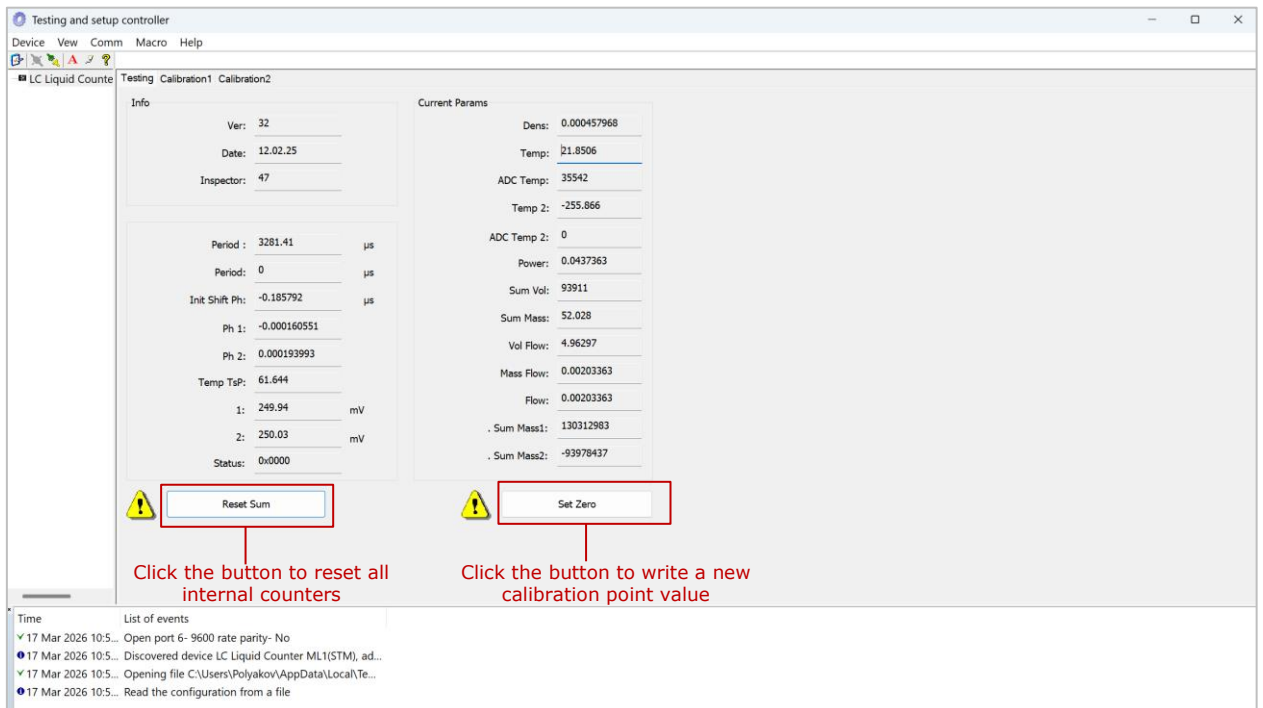


Figure 12 — Writing a new zero calibration point value and resetting all LC Corio internal counters

## Contacts

### **Distribution, technical support and service**



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