UKRAINE
TERA
PJSC

DATA LOGGER

USER MANUAL

DLT-10	Temperature Data Logger
DLT-10-Pt	Temperature Data Logger with External Temperature Probe
DLT-10-2Pt	Temperature Data Logger with two External Temperature Probes
DLT-11	Humidity & Temperature Data Logger
DLT-11-Pt	Humidity & Temperature Data Logger with External Temperature Probe
DLT-11-2Pt	Humidity & Temperature Data Logger with two External Temperature Probes

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Contents

This User's Manual is intended to familiarize maintenance personnel with DLT-10(-11) Data Logger and its modifications DLT-10-Pt, DLT-10-2Pt, DLT-11-Pt, DLT-11-2Pt (hereinafter Data Logger), its design, specifications and components, as well as instructions necessary for correct and safe operation, storage and transportation.

1. DESCRIPTION AND DEVICE OPERATION

1.1. Purpose

1.1.1. Data Logger is designed for climate control and logging of measurement results in manufacture and laboratory rooms, museums, warehouses, greenhouses, for the transport of perishable products and materials.

1.2. Specifications

1.2.1. Main specifications of Data Logger are shown in Table 1.

Table 1. Main Specifications of Data Logger.

Characteristic	Value
Powering, V (Li element EF702338)	3,6
Logging Interval, sec	60…3600
PC Connection	USB 2.0
Activation and Operating Mode Indication	OLED display
Electromagnetic environment, class • DLT-10, DLT-11 (without external sensor) • DLT-10-Pt, DLT-10-2Pt, DLT-11-Pt, DLT-11-2Pt (with external sensor)	 E2 E1
Ingress Protection	IP 54
Dimensions, max, mm	88,4x34,6x26,4
Weight, max, g	47

Table 1.1. Specifications of DLT-10 Data Logger.

Characteristic	Value
Temperature Range, °C	-30…+60
Basic Absolute Temperature Accuracy, °C	±0,5
Temperature Resolution, °C	0,1
Sensor Response Time (63%), min	12
Records in the Memory	3932160

Table 1.2. Specifications of DLT-10-Pt, DLT-10-2Pt Data Loggers.

Characteristic	Value
Temperature Range measured by Internal Sensor, °C	-30…+60
Basic Absolute Accuracy of temperature measurement by Internal Sensor, °C	±0,5
Temperature Resolution of Internal Sensor, °C	0,1
Response Time (63%) of Internal Sensor , min	12
Number of External Temperature Probes: • DLT-10-Pt • DLT-10-2Pt	 1 2
Sensor Type of External Temperature Probes	Pt1000
Temperature Range measured by External Probe, °C	-50…+250[1]
Probe connection cable length, m, max	2
Absolute Accuracy of temperature measurement by External Probe, °C	±0,4+0,002|t|[2]
Records in the Memory: • DLT-10-Pt • DLT-10-2Pt	 2621440 1966080

Table 1.3. Specifications of DLT-11 Data Logger.

Characteristic	Value
Humidity Measurement Range Rh, % (without condensation)	0…100
Temperature Range, °C	-30…+60
Basic Absolute Accuracy of temperature measurement by Internal Sensor, °C	±0,5
Temperature Resolution, °C	0,1
Basic Absolute Humidity Accuracy, % • in the range 0…10 % • in the range 10…90 % • in the range 90…100 %	 ±4 ±3 ±4
Humidity Resolution, %	1
Internal Sensor Response Time (63%), min • Humidity • Temperature	 15 12
Records in the Memory, min	2621440

[1] The operating range is determined by the design of external probe.

[2] In set with external Probe.

Table 1.4. Specifications of DLT-11 Data Logger.

Characteristic	Value
Humidity Measurement Range Rh, % (without condensation)	0…100
Temperature Range measured by Internal Sensor, °C	-30…+60
Basic Absolute Accuracy of temperature measurement by Internal Sensor, °C	±0,5
Temperature Resolution of Internal Sensor, °C	0,1
Basic Absolute Humidity Accuracy, % • in the range 0…10 % • in the range 10…90 % • in the range 90…100 %	 ±4 ±3 ±4
Humidity Resolution, %	1
Internal Sensor Response Time (63%), min • Humidity • Temperature	 15 12
Number of External Temperature Probes • DLT-11-Pt • DLT-11-2Pt	 1 2
Sensor Type of External Temperature Probe	Pt1000
Temperature Range measured by External Probe, °C	-50…+250[1]
Probe connection cable length, m, max	2
Absolute Accuracy of temperature measurement by External Probe, %	±0,4+0,002|t|[2]
Records in the Memory, min • DLT-11-Pt • DLT-11-2Pt	 1966080 1572864

1.2.2. Data Logger is intended for use in the following conditions:

- Ambient temperature from -30 oC to +60 oC;
- Atmospheric pressure from 84 to 107 kPa;
- Relative humidity (non-condensing) from 0 to 99 %.

1.3. Additional Specifications

Data logging mode: CYCLIC and TILL THE MEMORY FULL. Report file format: PDF/CSV. Operating life duration, average – not less than 15000 hours.

1.4. Package

Data Logger ..... 1 pc
Software ..... 1 pc
Passport ..... 1 copy
Consumer packaging ..... 1 pc
External Temperature Probe[3] ..... 1 pc

[1] The operating range is determined by the operating range of external probe (operating range can be extended by agreement with the customer). Main Specifications of External Probe is set in its passport.

[2] In set with external Probe.

[3] The type of External Temperature Probe is determined when ordering.

1.5. Design and Modifications

1.5.1. Data Logger's design is shown in Figure 1.

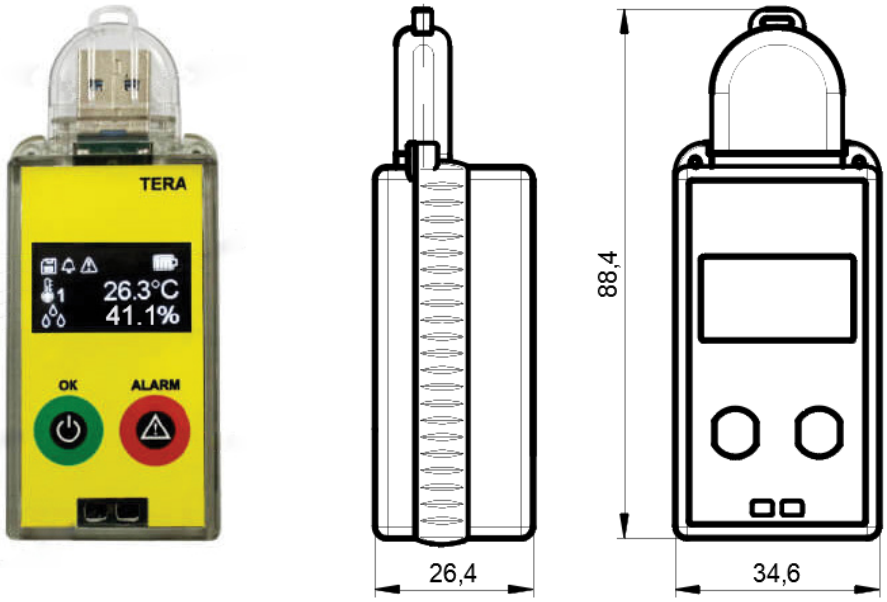


Figure 1. Data Logger's Design.

1.5.2. Data Logger is available in six modifications, differing in the number of measurement channels. Modifications of the logger are shown in Table 2.

Table 2. Modifications of the Data Logger.

Modification	Internal Temp Sensor	External Temp Probe 1	External Temp Probe 2	Humidity Sensor
DLT-10	✔	✘	✘	✘
DLT-10-Pt	✔	✔	✘	✘
DLT-10-2Pt	✔	✔	✔	✘
DLT-11	✔	✘	✘	✔
DLT-11-Pt	✔	✔	✘	✔
DLT-11-2Pt	✔	✔	✔	✔

1.6. Control Functions and Indication

1.6.1. Two control buttons serve to control the modes of the logger. Set parameters and operation modes are indicated on the OLED display.

1.6.2. Buttons are intended for the following functions of the logger:

- Calling up the display during sleep.
- Switching the mode when connecting to the PC
  - FLASH drive
  - COM port
- Logging START.
- Alarm ON/OFF.
- View the minimum and maximum measured values for the current archiving period.

Table 3 shows the algorithm for pressing buttons that leads to the Data Logger functions listed above.

Table 3. Description of the sequence of pressing the buttons and the functions of the logger.

Action	Purpose
Short **OK** button push (less than 1 sec)	Calling the main screen display or COM Port mode, if the logger is connected to the computer within 5 seconds after pressing (releasing) the button
Double short **OK** button push (pause between pressing no more than 0.5 sec)	Calling the alarm screen
Long **OK** button push (5 sec)	Calling the service information screen
Long simultaneous **OK** and **ALARM** buttons push (5 sec)	Logging Start / Stop[1]
Short **OK** button push, then long **ALARM** button push	Alarm ON/OFF
Short **OK** button push, then short **ALARM** button push	Calling up the display of the minimum and maximum measured values for the current archiving period
Long press **ALARM** on the page indicating the minimum and maximum measured values for the current archiving period	Reset the minimum and maximum measured values for the current archiving period

1.6.3. Data Logger status.

The main screen (Figure 3) contains the status bar of the logger, in which the following icons can be present:

 Logging ON

 Alarm ON

 Alarm during logging

 Logging/alarm delay (after logging start)

 Start logging at a specific time

 Manual start of logging

Regardless of the mode of the logger, the status bar also shows the battery level  . When the battery charge is less than 12%, the icon  will be displayed.

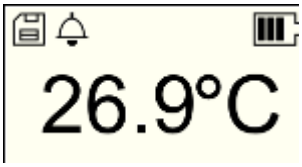
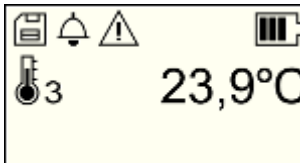
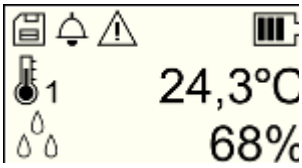
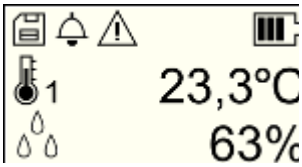
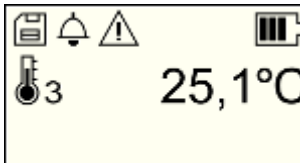
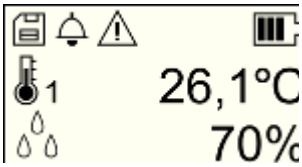
Below the status bar the channel measurement results are displayed (Figure 3).

 Temperature measuring channel

 Humidity measuring channel

[1] Archivation can be stopped only if the Unrestricted function is selected for the operation of the buttons (set on the PC using the LoggerSoft software).

Table 4. Data Logger's Main Screen.

Model	First page	Second page
DLT-10		
DLT-10-Pt		
DLT-10-2Pt		
DLT-11		
DLT-11-Pt		
DLT-11-2Pt		

For loggers with more than two measuring channels, the measurement results are displayed on two pages. The second page automatically shows after 3 seconds.

When calling indication, the data logger makes measurement regardless of the logging state. These results are not recorded in the archive.

When connecting the logger to the PC in the COM-port mode, the display looks like in Figure 2.

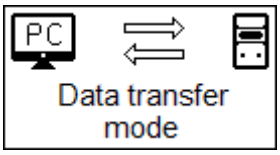


Figure 2. Indication of the COM-Port Mode

In the Flash Drive mode, the display is shown in Figure 3a and 3b.

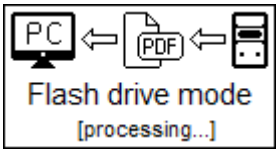


Figure 3a. Report is generated.

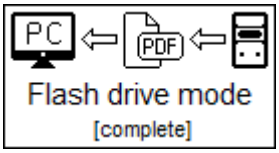


Figure 3b. Report generation completed.

The Alarm screen (Figure 4) shows the channels through which the alarms and alarm conditions were detected (limits, time of violation).

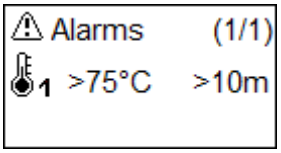


Figure 4. Alarm Screen.

The Service information screen (Figure 5) contains the serial number of the logger (SN), the logger label (LB) and the software version (ver.).

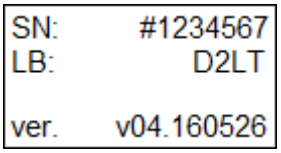


Figure 5. Service Information Screen.

When starting logging by button (manual start up of the archiving) or turning alarm on / off, the display shows a graphical confirmation (Figures 6, 7 respectively).

Figure 6. Logging ON.

Figure 7. Logging OFF.

When the alarm is turned on/off (figures 8, 9, respectively), a graphical confirmation is shown on the display.

Depending on the settings, the launch of the alarm can be one-time (“1 transit launched”) or repeated (“repeatable”).

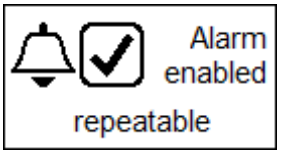


Figure 8. Alarm ON.

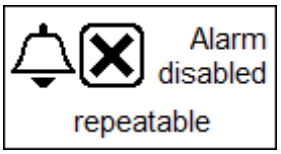


Figure 9. Alarm OFF.

When archiving is started, the logger stores the measured minimum and maximum values for the current archiving period in a separately allocated area of non-volatile memory (Figure 10).

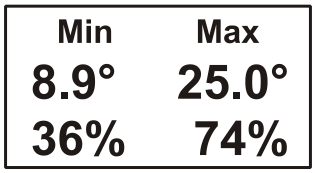


Figure 10. Displaying maximum and minimum values.

When resetting the minimum and maximum measured values for the current archiving period, a graphic confirmation of the action performed is displayed (Figure 11).

Figure 11. Resetting the minimum and maximum measured values.

1.7. PC connection

Connecting Data logger to the PC is possible in the COM Port mode or in the Fash Drive mode.

The COM Port mode allows to configure the logger and download the stored data using **LoggerSoft** PC software.

To do this, press the **OK** button and within 5 seconds connect the logger to the PC USB-port. In this mode the logger display is shown in the Figure 4.

In the Flash Drive mode, the logger generates PDF or CSV report available for downloading to the PC. To do this, connect the logger to the PC USB-port. The minimum report generation time is 30 seconds. During this time disconnecting the logger from the PC is not recommended. In this mode the logger display is shown in the Figures 3a, 3b.

2. DATA LOGGER SETUP

Data Logger is set up with the help of **LoggerSoft** PC software. Follow **User's Manual**, **Data Logger Setup**, **Data Logger Settings**. Starting Data Logger can be done either during setup or by pressing the buttons. Below are the features of the Data Logger setup, not marked in **LoggerSoft**, **User's Manual**.

2.1. Logging Interval

Valid Logging Interval limits are from 1 to 60 minutes. The list of valid values: 1 min; 2 min; 3 min; 5 min; 10 min; 15 min; 20 min; 30 min; 60 min.

Important! After changing the archiving period, the previous data is overwritten.

2.2. Logging Modes

- TILL THE MEMORY FULL. Logging starts from the launch moment and stops after filling all the memory (from the start point). Restart logging is only possible after re-configuration
- CYCLIC. Logging is continuous, cyclically wiping the oldest data with new data.

2.3. Options for starting Logging

- AFTER SETTING. Logging starts immediately after Data Logger setup without user intervention.
- BY BUTTON. Logging starts after pressing the button.
- AT SPECIFIC TIME.

For options After Setting and By Button, the Delayed Start option is available (see paragraph 2.4).

Note: Before selecting option for starting logging it is necessary to synchronize time (**LoggerSoft**, **User's Manual**, **Data Logger Setup**, **Time Synchronization**).

Important! Performing the time synchronization stops the current logging.

2.4. Delayed start

Two types of delays are possible:

- Archiving start delay. This is the delay from the moment archiving is started (see section 2.3 Archiving start options) until the actual start of archiving.
- Alarm statistics collection start delay. This is the delay after the alarm is turned on by the button until the actual start of alarm statistics collection.

2.5. Alarm Processing

If the data is logged, the Data Logger operates in one of two states:

- ALARM ON. In this state, Data Logger measures the sensor readings, archives them and keeps alarm statistics according to the settings.
- ALARM OFF. In this state, Data Logger measures the sensor readings, archives them but does not keep alarm statistics.

The initial state of the logger after logging start is set in Data Logger Setup. In the future, the alarm is ON / OFF by clicking on the button. Multiple ON / OFF during data collection (for multiple uses) is possible.

2.6. Alarm Conditions

Data Logger has three types of alarm conditions:

- DISABLED
- HIGH/LOW
- MULTILEVEL (Only for internal temperature channel).

ATTENTION! The alarm can only be reset using the reconfiguration.

2.7. High/Low Limits Alarm Settings

Under this condition, the High and Low limits, alarm delay and method of recording trigger delay (for each violation or total for all violations) are set. If the sensor readings are within the specified limits or if they briefly go beyond the limits of values, the alarm does not turn on. If any of the limits is violated for a time longer than the delay, alarm is triggered.

2.8. Multilevel Value Scale

Five limits divide the scale of values into six zones. The zones are numbered from top to bottom from 1 to 6. Zone 4 is a zone of acceptable values. For other zones, the following is indicated:

- Alarm delay.
- Method of recording trigger delay (for each violation or total for all violations).
- Allowable number of limit violations.

In addition, there is an option “3 + 5” - the combination of zones 3 and 5. This is the extension of permissible values to zones 3, 4 and 5.

Zones 1, 2 and 6 can be disabled.

2.9. Restrictions of Control Buttons

- BUTTONS INACTIVE. Available only Flash Drive / COM Port mode switching and indication call.
- START ONLY. Everything is allowed, as in the paragraph 1, plus the start of logging.
- ONLY ONE USE. Everything is allowed, as in the paragraph 2, as well as alarm ON/OFF. But you can activate the alarm only once.
- MULTIPLE USE. Everything is allowed, as in the paragraph 3, but the alarm can be turned ON and OFF many times.

3. BATTERY LIFE

The lifetime of Data Logger is determined by the lifetime of the battery EF702338. The main influencing factors that reduce the lifetime of the element:

- Self discharge of the element during storage or operation at elevated temperature.
- Activated indication on the logger screen.
- Short logging interval.

Table 4 shows the predicted operating time of Data Logger at different temperatures, with different logging intervals without activated indication and with a fresh battery.

Table 4. Predicted Battery Life.

Nnn	T, °C	Evaluated time before battery replacement (archiving period)		
1	+25	~1 year (1 min)	~1,5 years (5 min)	~2,0 years (10 min)
2	0	~0,8 year (1 min)	~1,2 years (5 min)	~1,6 years (10 min)
3	-20	~0,6 year (1 min)	~0,9 year (5 min)	~1,2 years (10 min)

Activation of indication shortens the logger operating time from one battery to 10 logging intervals per every second of the indication.

More detailed information is available in **LoggerSoft**, **User's Manual**, **Data Logger Setup**, **Changing Logging Interval**.

4. MARKING

Data Logger housing contains the following marks:

- Manufacturer's trademark
- Device name and modification
- Symbol
- Serial number (allowed to be specified in internal memory)
- Date of manufacture: year, month (allowed to be specified in internal memory)
- QR code

5. PACKAGING

Data Logger is packed in consumer packaging.

6. SAFETY REQUIREMENT

AVOID GETTING MOISTURE in the internal electro- and radio- elements of the logger.

NOT USE THE DEVICE IN CORROSIVE MEDIUM WITH ACIDS, ALKALIS, OILS, ETC. IN THE ATMOSPHERE.

Operation and maintenance service of the logger should be made only by the qualified staff which has learned this manual.

7. OPERATING INSTRUCTIONS

Before operating, connect Data Logger to the PC in the ”COM Port” mode and configure the logger using the Logger Soft software (operating temperature, logging interval, alarm conditions, PDF or CSV report format, etc.).

According to the technical specifications of the measuring unit, the sensor provides the smallest measurement error under operating conditions in the recommended range of temperature from 5°C to 60°C and humidity from 20% to 80%. Long-term exposure to abnormal conditions, especially high humidity, can temporarily shift the result of relative humidity reading (for example, by + 3% after 60 hours of storage at a relative humidity over 80%). After returning to the normal range of temperature and humidity, the sensitive element itself will slowly return to normal results. Prolonged exposure of the sensor outside the recommended temperature and humidity range can accelerate aging of the sensor.

In the modifications of loggers with a humidity measuring channel, the humidity sensor is protected by a filter that prevents direct water ingress or condensations on the sensitive element. If the water still gets on the sensitive element or if the logger has been operated for a long time (several days) at 100% humidity, it is necessary to dehydrate the sensor. To do this, the logger should be placed in an air environment with a temperature of 20...30 °C and a humidity not exceeding 55%, and stand it for at least 24 hours.

The data is downloaded by connecting the logger to the PC in the COM-Port or Flash Drive mode. In the first connection case, use the Logger Soft software, in the second - wait (approximately 30 seconds) until the logger is determined by the operating system as a USB flash drive that contains the report in the selected format.

8. SERVICE

The device should undergo servicing at least once every three months.

During maintenance, remove any dust and dirt, inspect the quality of external connections, and check the device’s operation.

Important! Before sending the logger for maintenance or repair, it is NECESSARY to read and save the archived data, because during the service the archived data will be lost.

9. STORAGE

Store the Data Logger in closed, well-heated rooms, inside the consumer packaging, within a temperature range of 0 to 30°C. Maintain a relative humidity up to 80%.

Ensure that the air is free from dust, acidic and alkaline vapors, as well as corrosive gases.

When starting to use the Data Logger after it has been stored at low temperatures (for at least one month), place it in a heated room with an ambient temperature of +20°C inside the packaging for at least one hour, after unpacking, allow it to sit for at least one hour to naturally remove any possible condensation.

10. TRANSPORT

When transporting the Data Logger inside its packaging, it is permissible to transport it at temperatures ranging from -20°C to 60°C, with a relative humidity of less than 98% at 35°C.

Transport the Data Logger in its original packaging using all types of covered vehicles, following the applicable shipping regulations for this type of transport.

Ensure that the logger is transported only in the manufacturer’s designated shipping container.

11. PRODUCT WARRANTY

The manufacturer guarantees that the Data Logger complies with all technical requirements when operated, transported, and stored following the specified guidelines.

The warranty period is 18 months from the date of sale, or in the absence of sales data, from the date of issue. Please note that the warranty does not cover the CR 2032 battery.

The average warranty period for storing a logger with a battery is 2 months from the date of issue. If the logger is stored for a longer period, the battery must be removed and reinstalled when the logger is put into operation.

If the Data Logger experiences a failure during the warranty period while being used in accordance with the prescribed guidelines for operation, transportation, and storage, the manufacturer is obligated to provide free repair or replacement.

The warranty does not cover logger failures resulting from improper operation or mechanical damage.

The Data Logger has a lifespan of 15 years from the date of manufacture or sale. This lifespan can be extended based on the results of tests, verifications, or calibrations.

12. RECYCLING INFORMATION

When the Data Logger reaches the end of its operational life, it must be disposed of in accordance with established hygiene requirements for handling industrial waste and determining their safety classification for public health.