

MADE IN GERMANY



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Data Sheet

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■ USB-TL

Temperatur Daten Logger



1. Features

8 inputs. Temperature. Precise.

Up to eight DS18B20 (-55..125 °C) temperature sensors can be connected to the measurement system. The accuracy is $\pm 0.5^{\circ}\text{C}$ in the range from -10°C to $+85^{\circ}\text{C}$.

Plug. Clamp. USB-C.

The sensors are connected using pluggable screw terminals. Connected sensors are automatically detected and recorded. Power is supplied via a USB-C connector with a power adapter or a power bank.

Autonomous. Mobile. Months.

At a storage rate of 0.1 Hz, it is possible to record measurement data for up to 3 months. During the measurement, the data can already be read out via the USB-C connector.

Analyze. Document.

The measurement data is exported as an lfx or CSV file and can be analyzed with many different programs. Graphical analyses and complex evaluations can be created very quickly with our NextView measurement data software.

Compact. Cost-effective.

With dimensions of 70mm (L) x 70mm (W) x 17mm (H), the USB-TL can be used easily anywhere. A temperature sensor with a matching pluggable screw terminal is included in the scope of delivery.

2. Block Diagram

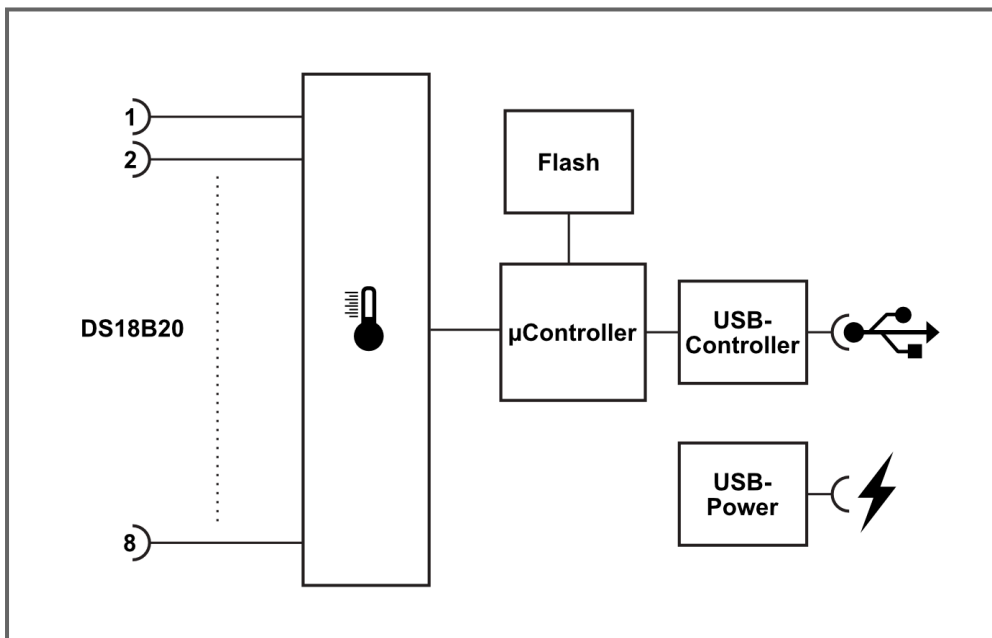


Fig. 1: Functional diagram

3. Commissioning

The USB-TL must be de-energized when connecting and disconnecting sensors.

No individual configuration of the device is necessary. Simply plug the desired sensors into the USB-TL and connect the device to a 5V power supply. Here you can use either the **USB-C Power** or the **USB-C Data** port.

After starting, the **State** LED on the top blinks according to the number of temperature sensors found. As long as the USB-TL is supplied with power, the data from the connected sensors is stored.

It can take up to 140 seconds for the measured values to be transferred to permanent storage. Please make sure that the USB-TL is supplied with power for long enough.

4. Web Application

The web application usbtlnextview.de can be used to check the measurement setup. Here you can view all recorded temperatures live, check and clear the current storage status, and synchronize the internal clock with the computer time.

When the web application starts, a browser dialog appears showing the USB-TL that was found. Select the entry and confirm with the OK button.

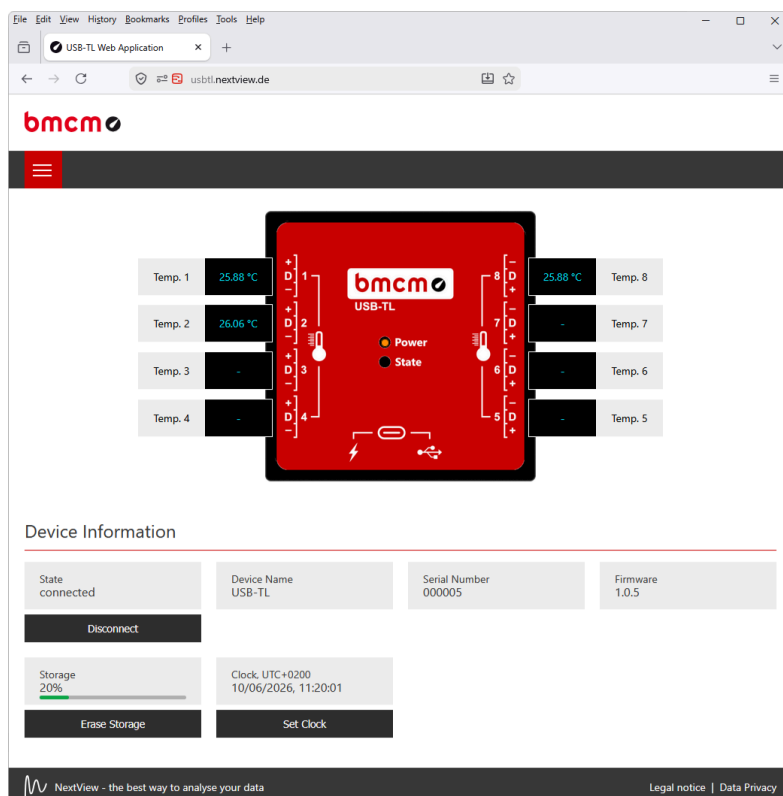


Fig. 2: Web application usbtlnextview.de

Only current browsers support the WebSerial function, which is required to communicate with the USB-TL.

4.1. Erasing Measurement Data

The "Erase Storage" button deletes all measurement data stored on the device. The State LED blinks during the erasing process. Depending on the amount of data, this process can take several minutes.

Deleted data cannot be recovered.

4.2. Setting the Internal Clock

If the internal clock is no longer correct after a battery change, the "Set Time" button can be used to transfer the current PC time to the USB-TL. Internally, the USB-TL works with the time in UTC.

The time cannot be set backwards if measurement values are already stored on the USB-TL for that time. In this case, all measurement data must first be deleted.

5. Connections

5.1. Inputs 1..8

The eight inputs of the USB-TL support the 1-Wire® protocol for reading out DS18B20 temperature sensors. The DS18B20 temperature sensor is a widely used, cost-effective sensor with high accuracy in the range of -55..125 °C.

The temperature sensors are connected to the device using a pluggable screw terminal (RM3.5; PTR-AK1550/3).

1-Wire® is a registered trademark of Maxim Integrated Products, Inc.

The design of the USB-TL theoretically allows cable lengths of up to 200m. The longer the cables used, the higher the probability of interference. Suitable shielding must be ensured here.

5.1.1. DS18B20

A DS18B20 including a mounted 3-pole screw terminal is included in the scope of delivery. The sensor is equipped with a waterproof stainless steel sleeve with a 1m cable. Additional sensors can be purchased in a set of four at www.bmcm.de.

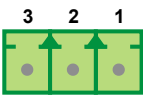
Device View	#	Designation	Function	Sensor Color
	1	-	Ground (GND)	BK
	2	D	Data	YL
	3	+	Vcc	RD



Fig. 3: Example of DS18B20 sensor with cable

5.2. USB-C Connectors

The USB-TL is equipped with two USB-C sockets for power supply and data transfer with power supply. As soon as at least one of the two USB-C ports is connected to a power supply, the device starts automatically and measurement data is recorded.

Depending on which USB-C ports are used, the USB-TL behaves differently.

Some power adapters or power banks deactivate the power supply if the current drawn is very low. Check whether the Power LED is still lit 20 to 30 seconds after plugging in.

5.2.1. USB-C Power

Connector for 5V power supply.



If only the **USB-C Power** connector is used, the USB-TL activates the internal ZEDA mode (Zero-waste Energy Data Acquisition) to reduce power consumption and maximize battery life.

5.2.2. USB-C Data

Connector for 5V power supply and data transfer.



This connector allows measurement data to be read out from the internal memory of the USB-TL. It registers with end devices as a USB drive.

Additionally, the USB-TL web application (usbtl.nextview.de) can be used to check the sensors, erase the internal memory, and update the clock.

6. Data Storage

As soon as a power supply is present at at least one of the two **USB-C ports**, the logger automatically starts recording. A separate measurement file is created per power cycle (plugging in until unplugging), with the start date/time as the file name.

The USB-TL has a sampling rate of 0.1 Hz. To reduce power consumption and increase runtime when operating on battery, the collected measurement values are stored every 140 seconds. For time-critical measurements, please make absolutely sure that the measurement runs at least 140 seconds longer.

All measurement data is stored both in NextView's own data format **lfx** and as a **csv** text document.

All files are created when an end device (e.g. computer, tablet, mobile) is connected to the **USB-C Data** port (USB symbol). The USB-TL registers as a USB drive from which the files can simply be copied. The currently running measurement is also available as a file.

While an end device is connected to the **USB-C Data** port, the files are **not** regenerated. To create a new export file, the **USB-C Data** port must be disconnected from the respective end device for at least 10 seconds.

It is possible to use both USB ports simultaneously. This allows updated files to be generated during a measurement.

6.1. CSV File

Specification:

- Separator: comma
- Date: ISO 8601, time zone UTC (YYYY-MM-DDTHH:MM:SSZ)
- Decimal separator: period (.)

6.2. Lfx File

The lfx files can be imported directly into NextView and evaluated directly. The extensive analysis functions, such as x/y display, digital filters, integration/differentiation or FFT, are included in the Professional and Analysis license for NextView. All information and the NextView manual can be found at www.nextview.de.

A free NextView Analysis license is included in the scope of delivery of the USB-TL. Please keep the business card with the license number in a safe place, as you cannot activate new installations without it.

7. LEDs

The current status of the device can be determined from the LEDs.

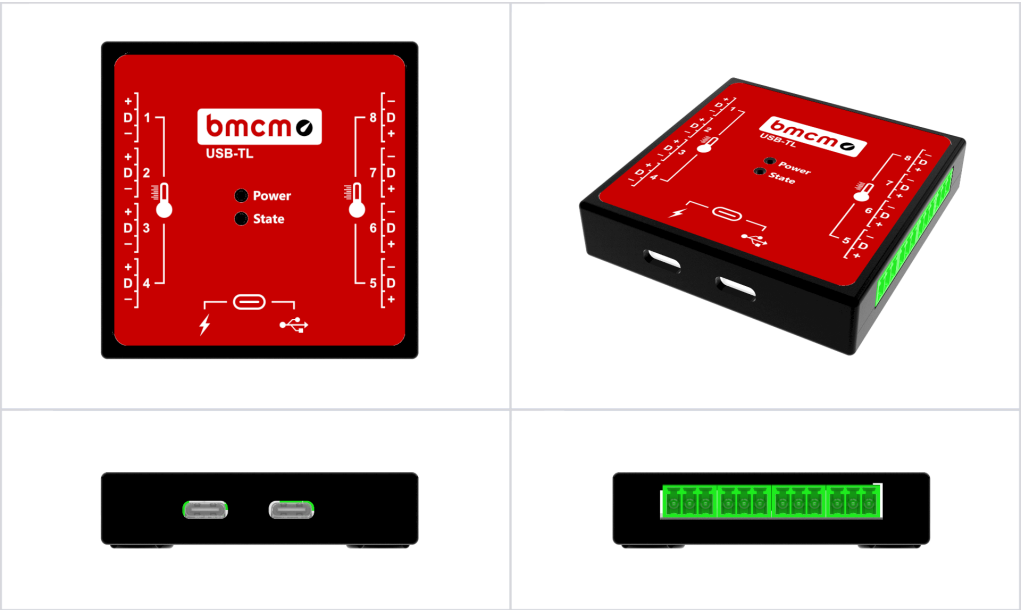
States:

LED	State	Function
Power & State	permanently on	Device is initializing
	blinking alternately	Battery empty, see chapter Internal Battery .
Power	permanently on	Device ready
State	brief blink every 10s	Measurement is running
	slow blinking	blinks once per detected sensor
	continuous blinking	internal memory is being erased

8. Internal Battery

To replace the internal **LR44 button cell**, the screws on the underside (4x **TORX PLUS® 10IP**) must be removed. The housing can then be opened and the battery replaced.

9. Views



10. Technical Data

(typ. at 20°C, after 5min., +5V supply)

Measurement Channels	
Temperature channels	8x for DS18B20 temperature sensor
Sampling rate	10s
General Data	
USB interface	USB-C 2.0 compatible (full-speed)
Power supply	+4.5V..+5.5V from USB port, max. 100mA
CE standards	EN61000-6-1, EN61000-6-3, EN61010-1
ElektroG // ear registration	RoHS and WEEE compliant // WEEE reg. no. DE75472248
max. potentials	60V DC per VDE, max. 1kV ESD on open lines
Temperature range	Operating temp. 0..70°C, storage temp. -25..70°C
relative humidity	0-90% (non-condensing)
Dimensions	70 x 70 x 17 mm ³
Protection class	IP30
Scope of delivery	Device in plastic housing; 1x 3-pole screw terminal; 1x DS18B20 (with 1m cable); USB cable (C->A); 1x NextView Analysis license
available accessories	ZU4XDS1M (4x DS18B20 sensors + 4x 3-pole screw terminal - manufacturer PTR: AK1550/3)
Warranty	2 years from date of purchase at bmcm, damage to the product due to improper use is excluded
Software	
NextView®	Software for visualizing and analyzing measurement data under Windows® 10/11

Manufacturer: BMC Messsysteme GmbH. Errors and misprints, as well as changes that serve technical progress, reserved.