Instruction Manual

Temperature Measuring Device TMD9

CAPBs®enabled

☞ Read before usage!

☞ Please consider notes on safety!

☞ Store for future usage!

02.2018

Contents

1 About this instruction manual

This manual is part of the product.

▶ Read this manual before using the product.
▶ Keep this manual during the entire service life of the product and always have it readily available for reference.
▶ Always hand this manual over to future owners or users of the product.

1.1 Structure of warning

WARNING **The type and source of danger is shown here.**

▶ Precautions to take in order to avoid the danger are shown here.

There are three different levels of warnings.

Warning	Meaning
DANGER	Imminent danger! Failure to observe the information will result in death or serious injuries.
WARNING	Possible imminent danger! Failure to observe the information may result in death or serious injuries.
ATTENTION	Dangerous situation! Non-observance may lead to light or medium injuries or physical damage.

1.2 Explanation of the symbols and notations

Symbol	Meaning
☑	Prerequisite for an activity
▶	Activity consisting of a single step
1.	Activity consisting of several steps
⮡	Result of an activity
•	Bulleted list
Text	Indication on a display
Emphasis	Emphasis

2 Safety

2.1 Intended use

This product is exclusively suitable for Temperature Measuring TMD9.

Any use other than the use explicitly stated in this instruction manual is not permitted.

2.2 Predictable incorrect application

In particular, the temperature measurement device TMD9 may not be used in the following cases:

- Areas in danger of explosions
  Spark formation in areas in danger of explosions may lead to deflagrations, fire or explosions.
- Use on humans and animals.

2.3 Safe handling

This product corresponds with the state of technology and the accepted safety-related rules. Each device is checked for functioning and safety before being commissioned.

▶ This product is only to be used in immaculate state, in consideration with the user manual, the usual regulations and guidelines as well as the valid safety directions and accident prevention regulations.

External environmental conditions may impede the functioning of the product.

▶ Product to be protected from shocks.
▶ Product to be used only in indoor areas.
▶ Product to be protected from moisture.

2.4 Qualification of personnel

Assembly, start-up, operation, maintenance, shut-down and disposal may only be conducted through subject-specifically qualified operators.

Works on electric parts may only be conducted by a qualified specialist electrician in accordance with current regulations and guidelines.

2.5 Modifications to the product

Unauthorized product modifications may lead to failure and are prohibited due to safety reasons.

2.6 Use of spare parts and accessories

The product can be damaged through the use of unsuitable spare parts and accessories.

▶ Only use genuine spare parts and accessories from the manufacturer.

2.7 Liability information

The manufacturer assumes no liability in case of damage and consequential damaged caused through ignoring technical regulations, instructions and recommendations.

The manufacturer and distributing company further assume no responsibility for costs or damages incurred by the user by third parties through the use of the device, in particular through the incorrect use of the device, through misuse or malfunction of the connection and through malfunctions in the device or in connected devices. Neither the manufacturer nor the distributing company assume liability for the misuse of the device.

The manufacturer assumes no liability for printing errors.

3 Product description

3.1 Properties and functions

Figure 1: Frontal view

1	Clear/Back-key
2	Up-arrow-key
3	ON/OFF-key
4	Protective case
5	Down-arrow-key
6	Menu/Enter-key
7	Display
8	Connections
9	Speaker
10	IR printer connection
11	miniUSB charger
12	microSD card slot

4 Technical Data

Table 1: Technical Data

Parameter	Value
General data	
Case measurements incl. protective case (B x H x W)	66 x 37 x 143 mm (2.6 in x 1.5 in x 5.6 in)
Weight	Approx. 160 g (5.64 oz)
Case material	Polyamide (PA)
Response delay	T 90 < 10 s
Temperature range for application	
Environment	0°C to +45°C / +32°F to +113°F
Storage	-20°C to +50°C / -4°F to +122°F
Power supply	
Nominal voltage	Through mains adaptor (USB)
Electric safety	
Protection class	IP 40 EN 60529
Electromagnetic compatibility (EMC)	
Transient emissions	DIN EN 61000-6-3 (VDE 0839-6-3)
Interference resistance	EN 61000-4-3 (VDE 0847-4-3)
ESD	EN 61000-4-2 (VDE 0847-4-2)

Table 2: Product specifications (Basis-Version)

	TMD 9
Measurement range [°C] / [°F] - minimal - maximal	-50°C / -58°F +1100°C / +2012°F
Measuring range [°C] / [°F]	-50.0°C to +1,100°C
Resolution [°C] / [°F]	0.1°C / 0.1°F

	TMD 9
Accuracy [% of Reading] -50.0°C to +300°C -58°F to +212°F	± 1°K + 1 digit
+300°C to +1100°C +212°F to +2012°F	± 1%
Connections	2x Thermo connector (Type-K)

5 Transportation and storage

ATTENTION

Device may be damaged through inappropriate transportation

▶ Do not throw device or drop it

ATTENTION

Device may be damaged through inappropriate storage

▶ Store device so that it is protected against shocks.

▶ Only store device in dry and clean working environment.

▶ Only store device within the approved temperature range.

6 Operation

Switch on device: Briefly press the 🔵 button.

6.1 Menu structure V2.0

From the firmware V2.0 a new main menu structure is available. The menu is divided in different lists: Favourites, Internal, Wireless and System. Switch with the "back arrow" key between the different menu lists.

Favourites: Internal: Wireless: System:
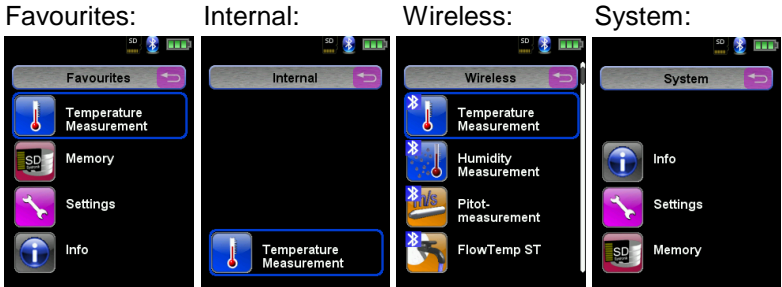
Menu Favourites: On new devices a default favourites list is available. Measuring programs from the lists Internal, Wireless and System can be activated for the Favourites list. New Favourites programs will occur at the end of the list. Set of factory settings won't change the favourites list. Set of factory setting with an empty favourites list, will set the default favourites list.

Menu Internal: In this list are all measuring program which access to the internal sensors.

Menu Wireless: In this list are all measuring program which connect to the CAPBs.

Menu System: In this list are all System information.

Edit Favourites list
In every measuring program in the settings menu is the menu item "In favourites". If this item is activated the program will occur in the favourites list. Otherwise this program isn't available in the favourites list.

CAPBs product description

CAPBs are measuring instruments for different applications. CAPBs can be used to extend BlueLine measuring instruments by the measured variables provided by the CAPBs. The BlueLine measuring instrument or an app on a smartphone or tablet display, evaluate and log the measured values. The measured values are transferred via Bluetooth Smart technology.

The following BlueLine measuring instruments can be paired with the CAPBs: BLUELYZER ST, EUROLYZER STx, MULTILYZER STe, S4600 ST series and TMD9.

The various CAPBs allow you to measure pressure, differential pressure, flow, temperature and humidity. There are CAPBs for detecting gas leaks and CAPBs to measure air quality.

CAPBs are modular. This way, various sensor modules can be connected via different connection types. This results in numerous application solutions.

Overview

1	LED
2	Multi-purpose key
3	Magnets
4	Unlocking mechanism for removing CAPBs sens
5	Battery compartment
6	Snap-in mechanism for CAPBs sens

LED display

LED status	Meaning
Flashing blue	CAPBs is searching for a Bluetooth Smart connection
Flashing green	CAPBs is connected
Flashing yellow	Measuring mode
Flashing white	Measurement finished – measured data available
Flashing magenta	Data logger active
Flashing red	Sensor error
Flashing red, fast	CAPBs connected, no CAPBs sens plugged in
Flashing magenta, fast	CAPBs not connected and no CAPBs sens plugged in

Modular system with base handle STm

The CAPBs constitute a modular system consisting of the universal base handle CAPBs STm and an application-specific sensor module CAPBs sens for a wide variety of measured variables.

The base handle CAPBs STm holds the various sensor modules CAPBs sens. The base handle can be combined with any sensor module to form a complete CAPBs measuring unit. A multi-purpose key is located at the front; it is used for switching the unit on and off, for zero adjustment, for activating the Hold mode or for starting the data logger function. The multi-colour LED displays the status of the CAPBs measuring unit by means of different colours and flashing frequencies.
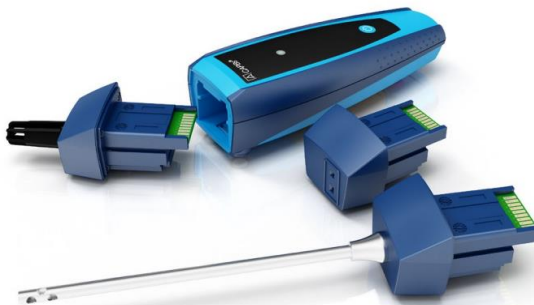
Operation with BlueLine devices

Initial commissioning
1. For switching on, press and hold down for two seconds the multi-purpose key of the CAPBs device.
2. Start the required CAPBs program on the measuring instrument, designated by the Bluetooth symbol ⚡.
3. Press the "Enter" key to open the main menu in the measurement program.
4. Select the Bluetooth Smart search for CAPBs under "Settings → Bluetooth SMART".

The Bluetooth Smart search takes approximately 30 seconds. The CAPBs must be on while the search is running. The CAPBs devices found are displayed with serial number of the base handle and the designation of the CAPBs sens.

5. Select the required CAPBs and press the "Enter" key to establish the connection.

When the connection is established, the colour of the LED at the CAPBs LED changes from blue to green. The selected CAPBs is now paired with the BlueLine device. In the future, it will connect automatically. It is sufficient to switch on the CAPBs before you start the required measurement program on the BlueLine device.

CAPBs settings
You can assign a function to the key of the multi-purpose key of the CAPBs via the menu item "Settings → Bluetooth SMART → CAPBs Key". The following functions are available (depending on the measurement program): Start/Stop, Hold, Zero, Reset Max/Min and Data Logger (option).

In the Direct Access menu, you can switch between different CAPBs devices via the menu item "CAPB".

6.2 Measuring mode

Program selection

The program selection area represents the available programs as icons. There you can select programs with the arrow buttons and start them with the „Menu/Enter"-button.
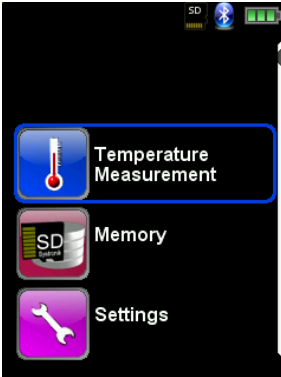

Fig 5: Program selection in the start menu,
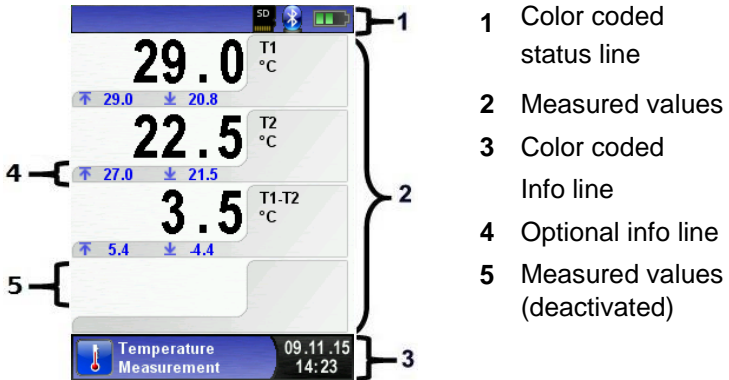*(ex.: Temperature measurement)*

Main Display

1 Color coded
status line

2 Measured values

3 Color coded
Info line

**4** Optional info line

5 Measured values
(deactivated)

Fig. 6: Display showing measuring program (example: Temperature measurement)

Status line

The status line shows the status of relevant program information such as remaining battery power, Hold-function, Print-function,

Bluetooth®-function and operating of the MicroSD-card. The information displayed depends on the mode and function-specific criteria.

Symbol	Bedeutung
SD	MicroSD card in the device
	Status battery
	Active Bluetooth Smart connection
	Inactive Bluetooth Smart connection
	Measuring data sending to the EUROprinter
	Status CAPBs battery
	CAPBs searching

Information line
The information line provides details on the time and date, chosen fuel, service messages, etc.

Information line
The information line provides details on the time and date, service messages, etc.

Optional info line
The optional info line gives additional Information about the corresponding measured values, Min- and Max-values etc.

Measured values (deactivated)
In an unconnected or inactive sensor measuring the corresponding measurement value is displayed in grey.

Main Menu

▶ Activate the Main Menu with the „Menu-/Enter"-Button.

The Main Display include the main functions of the device.

All other functions respectively settings, are in additional submenus.
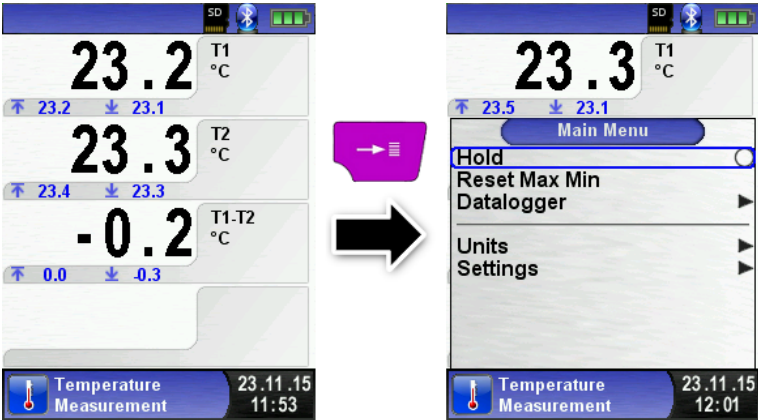
Direct access menu

▶ Print the measured values or Quit Measurement.

Press the "Back" button to show the direct access menu. The captured values may be either printed or saved in a report on the MicroSD card. Furthermore you can deactivate HOLD- or stop the measurement and return to the Start menu.
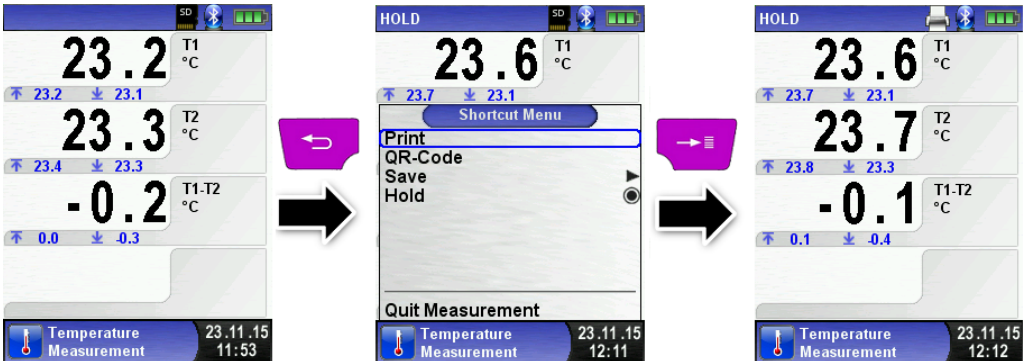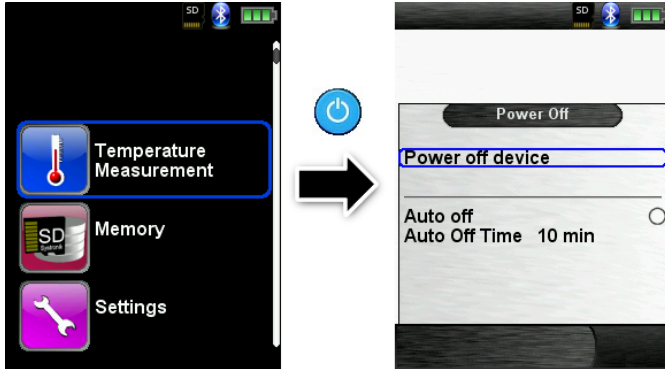

As soon as the print command is chosen, the record is printed parallel to the measuring task ($\rightarrow$ multitasking function), i.e. the measurement mode remains active.

▶ Switch off the device.

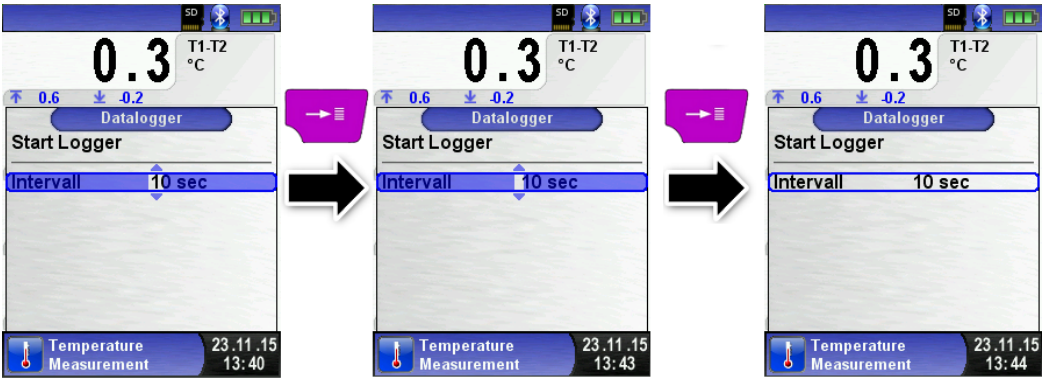Briefly press the „On-/Off"-button 🔵 and confirm with the „Menu/Enter"-Button.

Editor

The editor modus is used in different sub menus to set different values, as example: interval time in Data Logger function.

▶ Set interval time in Data Logger function

To change the interval time select "Interval" and start the modification with the "Enter" button. With the "arrow" keys change the value. To get a zero set "---". Begin to set the first number.

Than confirm with the "Enter" button and set the second number. Again confirm with "Enter" button and finally set the third number. Confirm the number with "Enter" button.

Screenshot 1:
- T1-T2 °C
- -0.1
- 0.6 -0.2
- Datalogger
- Start Logger
- Intervall --- sec
- Temperature Measurement 23.11.15 13:30

Screenshot 2:
- T1-T2 °C
- 0.3
- 0.6 -0.2
- Datalogger
- Start Logger
- Intervall --- sec
- Temperature Measurement 23.11.15 13:36

Screenshot 3:
- T1-T2 °C
- 0.3
- 0.6 -0.2
- Datalogger
- Start Logger
- Intervall 10 sec
- Temperature Measurement 23.11.15 13:40

Screenshot 4:
- T1-T2 °C
- 0.3
- 0.6 -0.2
- Datalogger
- Start Logger
- Intervall 10 sec
- Temperature Measurement 23.11.15 13:40

Screenshot 5:
- T1-T2 °C
- 0.3
- 0.6 -0.2
- Datalogger
- Start Logger
- Intervall 10 sec
- Temperature Measurement 23.11.15 13:43

Screenshot 6:
- T1-T2 °C
- 0.3
- 0.6 -0.2
- Datalogger
- Start Logger
- Intervall 10 sec
- Temperature Measurement 23.11.15 13:44

6.3   Generating QR-CODE

With the QR-Code the measured values could be transferred to a Tablet or Smartphone. All available QR-Code Apps could be used.


## 6.4   Datalogger function

▶   Start Data Logger function.

The function „Datalogger" is available in different measuring program in the main menu. The Data Logger will be explained in the pressure menu. Without MicroSD card the Datalogger will not start. The MicroSD card is important to store the logged values.

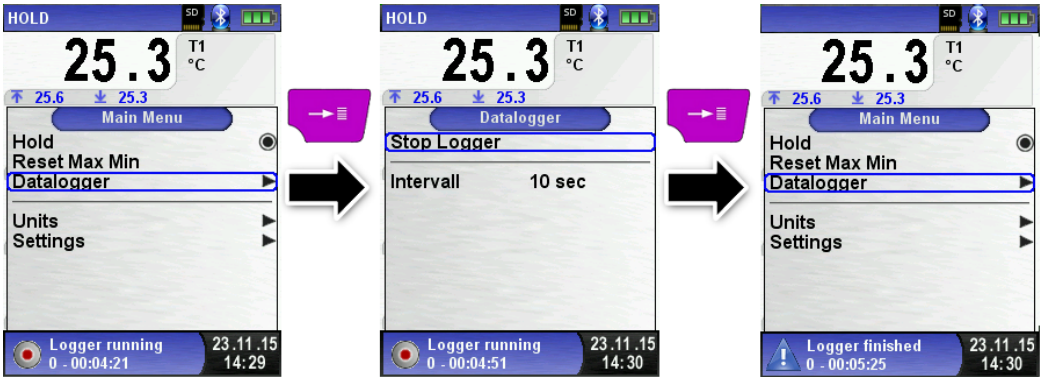Open the main menu with the "Enter" button and navigate to "Datalogger" and confirm with "Enter" button.
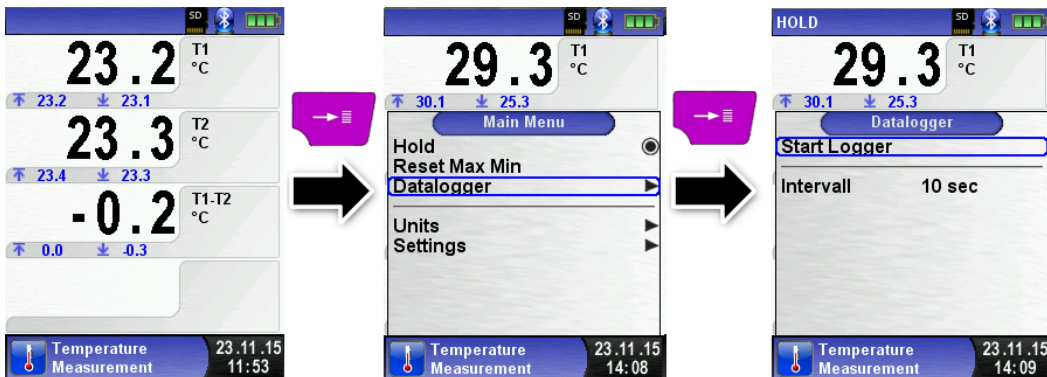
Start the Datalogger with the "Enter" button on "Start Logger". In the lower field of information the time progress of the logger is shown.
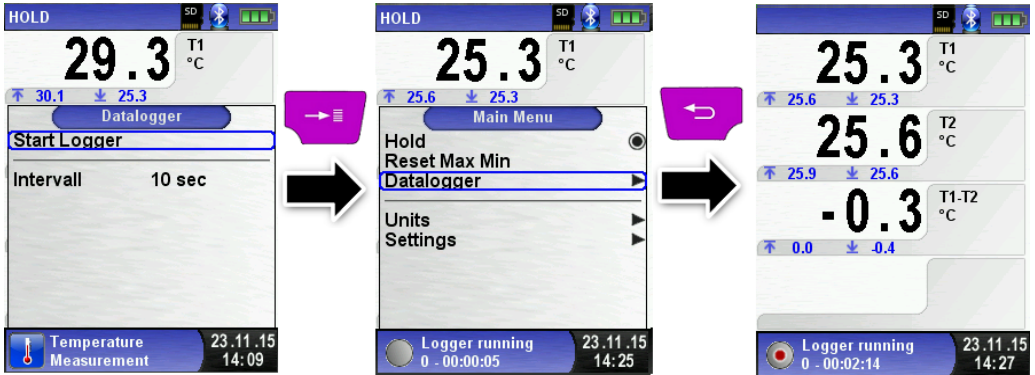
Stop the Datalogger with the "Enter" button on "Stop Logger".

The logged values will be stored on the MicroSD card in the folder „LOGGER\<Date>". File name is the starting time. Every 7200 lines the device will automatically create a new XML log file. With a logger interval of 1 second and a 1 GB MicroSD card it is possible to log in minimum a time period of 2 months.

▶   Set Data Logger interval.

In the editor modus the sampling rate is adjustable between 1 and 999 seconds.
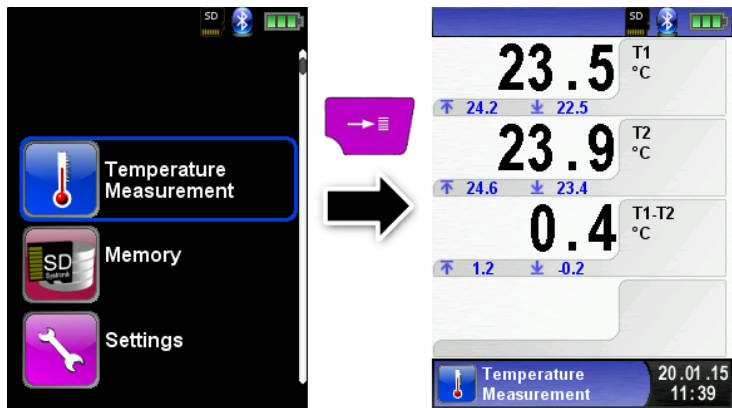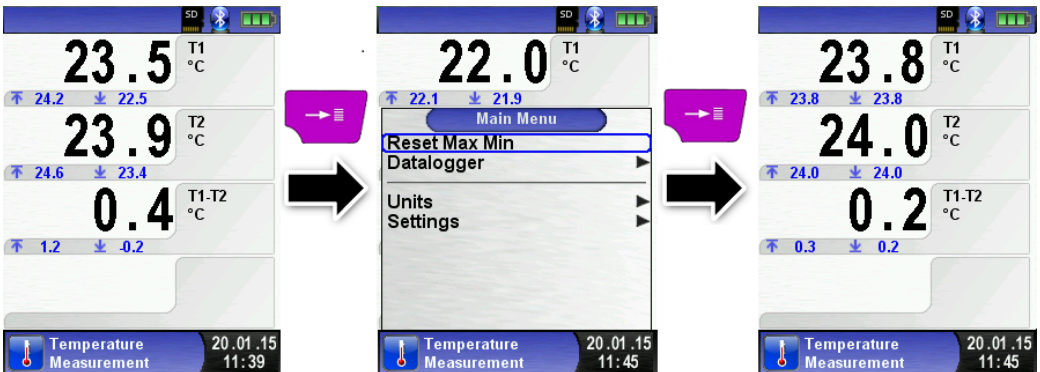
7 Temperature Measurement program

▶ Start "Temperature" program.

(menu color: Blue)

First plug temperature sensors at the TMD9 instrument. After the start of the program „Temperature" the measured temperature values and the resulting differential temperature and Min-/ Max-values are shown on the display.

From the main menu you can clear the minimum and maximum values or change the temperature unit.

▶ Reset the Min- and Max-values.

▶ Change the temperature unit.

▶ Print / save protocol, quit measurement.

When you press the "Clear" button the direct access menu appears. The captured values may be either printed or saved in a report on the MicroSD card.

Furthermore you can deactivate HOLD- or stop the measurement and return to the Start menu.

# 8 Settings

▶ Time / date setting change.

For example, to change the month, select the month-line with the arrow buttons and confirm with the "Menu / Enter" button. The blue line indicates that you can now change the value using the arrow buttons, use the "Menu / Enter" button to confirm. The device can handle leap years and summer-/wintertime.
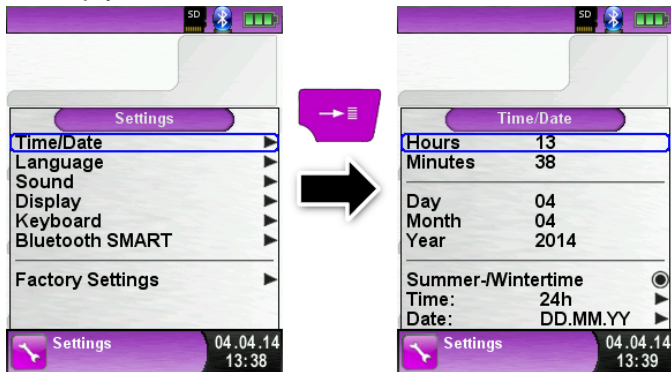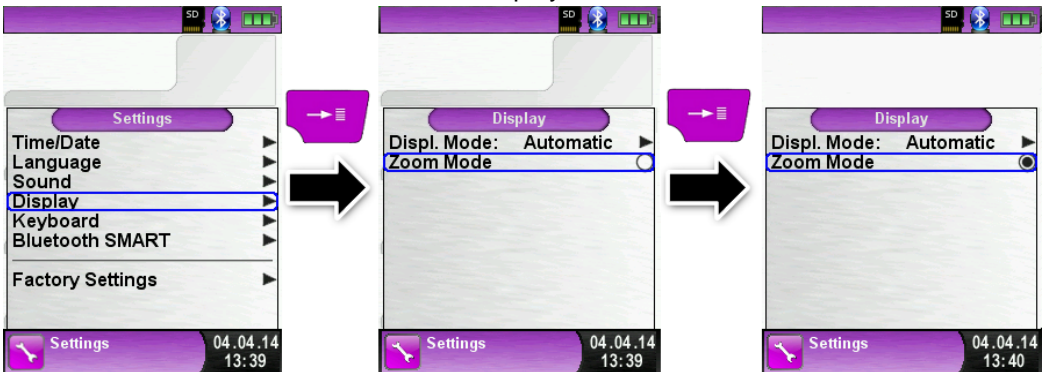
8.1 Set Display

▶ Set display brightness.

The device provides three display settings: "Normal", "Automatic" and "Eco Mode". The selected setting influences the battery life.
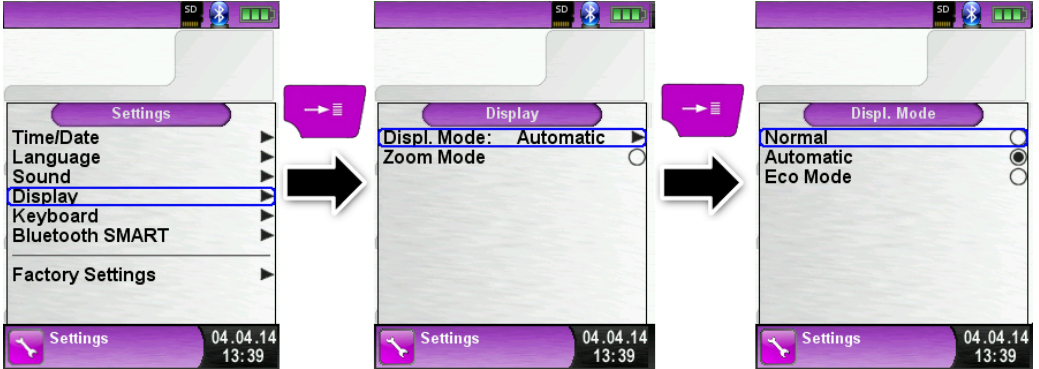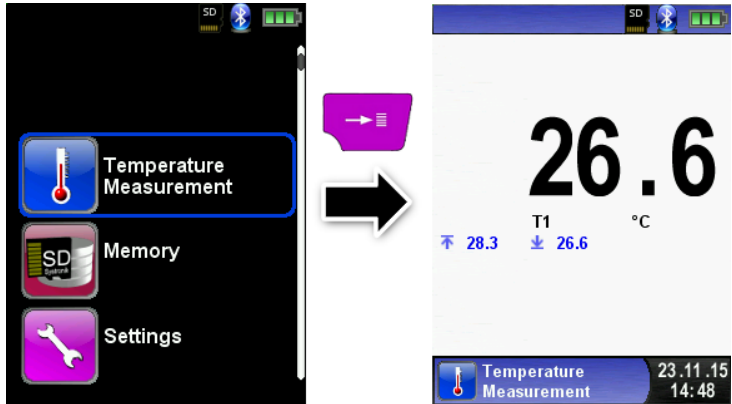

▶ Activate „Zoom Mode".

The characters of the display will be shown in double size:

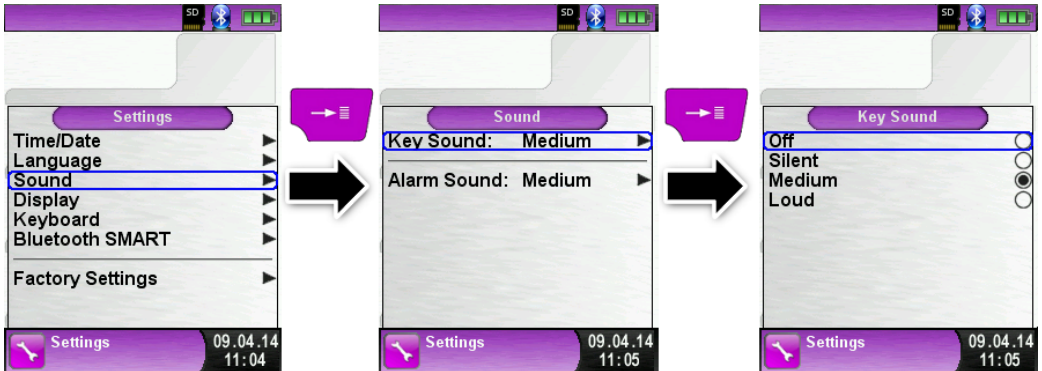"Zoom Mode" shown in the "Pressure Measurement" program:

8.2   Set Sound Levels

▶   Configure Button Sound and Alarm sound.

There are four sound levels for the touch tone and the alarm tone:

1. Off
2. Low
3. Mean
4. Loud

8.3　Show device information

▶　Show Info-data.

To show device pending Info-data press the „Clear"-button in the start menu. In the "Diagnose" menu following data will be displayed: Firmware-Version, Release-Date and Serial-Nr.

▶　Show Diagnose-data.

To show Diagnose-data press the „Clear"-button in the start menu. In the "Diagnose" menu following parameters will be displayed:

Battery-voltage, Power-supply-voltage, battery-temperature (in charging mode) and System/Status-code.

9 Memory mode and memory structure

9.1 How to save measured values

The use of MicroSD memory cards as system-independent storage media ensures maximum flexibility in terms of storing and managing the measured data. MicroSD cards with a memory of up to 16 GB can be used. The card can be read without any additional software by all SD-card-enabled data processing systems (PCs, laptops, notebooks, etc.) using a web browser. More than 1,000,000 measured values can be saved with the recommended memory capacity of 4 GB.
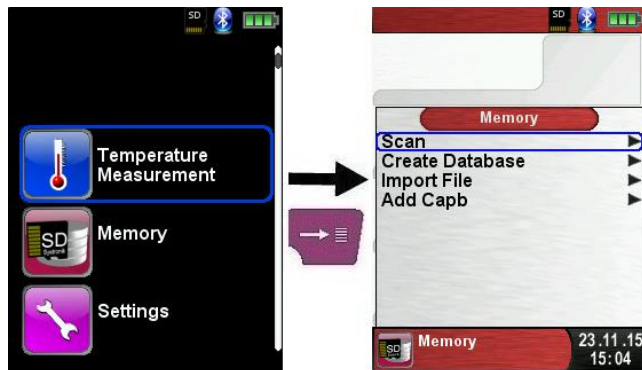

| CAUTION	Damage to the memory card slot due to improper plugging in
⚠️	▶ Always insert the MicroSD straight and with the contacts pointing up as shown above.

▶ Displaying the "Memory" menu.

> ▶ Before you use a MicroSD card for the first time, you should create the folder structure

The function "Create Memory" creates 10 folders with 10 files each on the MicroSD card; this represents the memory structure of TMD9. The function takes a few seconds to finish.

Note: This function deletes a memory structure that may already be available on the card. However, private user data (such as pictures, documents, etc.) are not deleted by this function.
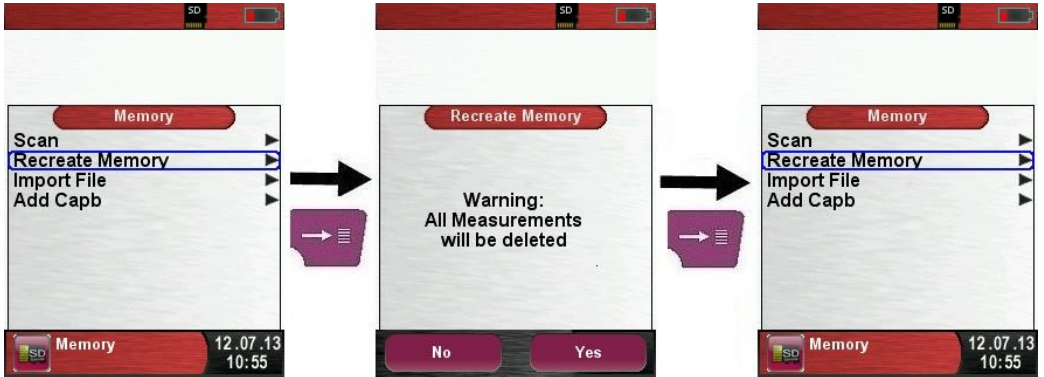
> ▶ The memory structure of TMD9 consists of 100 memory blocks; one measurement log can be written to each of these blocks.

At the end of a measurement, the measurement log can be saved to a free memory block. A total of 10 x 10 memory blocks are available. The file name is automatically generated by the device according to the following structure:

Temperature 26.02.12-08:41

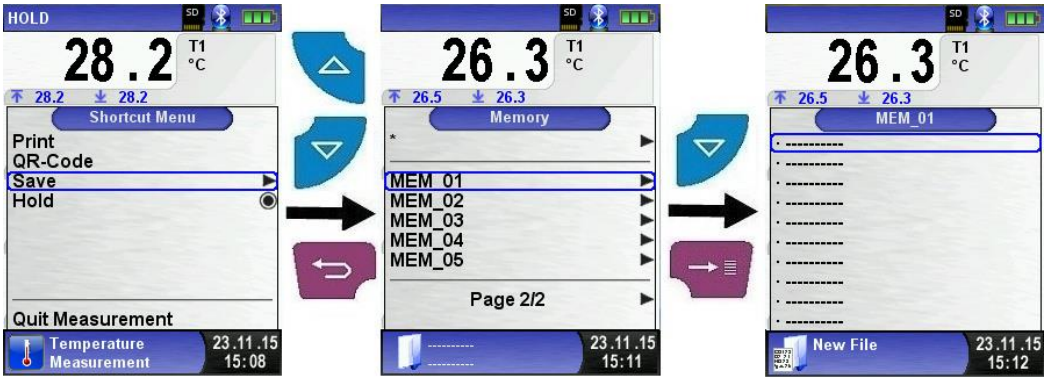Type of measurement (e.g. Temperature measurement) date (day.month.year) and time
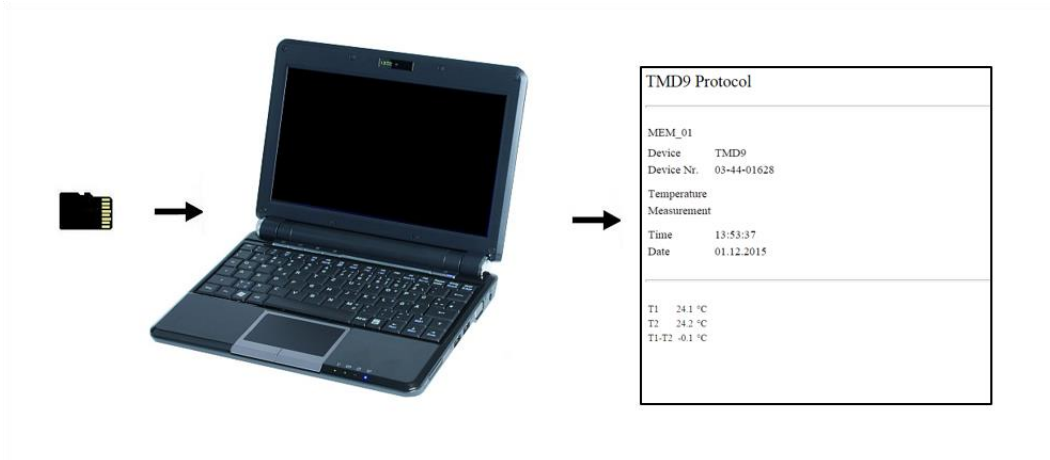
Note:

A file which has been created and saved on the card is protected against manipulation and, if manipulated, can neither be displayed by the device nor printed!

A saved file may there be displayed, printed or overwritten by a new measurement.

The saved file can also be displayed via a browser (such as Mozilla Firefox).

9.2 Database Memory (Option)

▶   Create a customer database

Measurements can be saved direct in the customer folder. Every folder has 8 entry lines with 20 characters. The first entry is the key word for the search function in the device. The further lines are for detailed customer information like: Street, City, Email, Phone No…
The customer information will be print out with every measurement print and shown in the protocol.

It is possible to create or modify the customer database either on the TMD9 instrument or on a PC.

▶   For first use of the MicroSD card the database should be generated

For new database open menu „Memory" and choose "Create Database". Confirm the warning "All entries will be deleted" with yes.
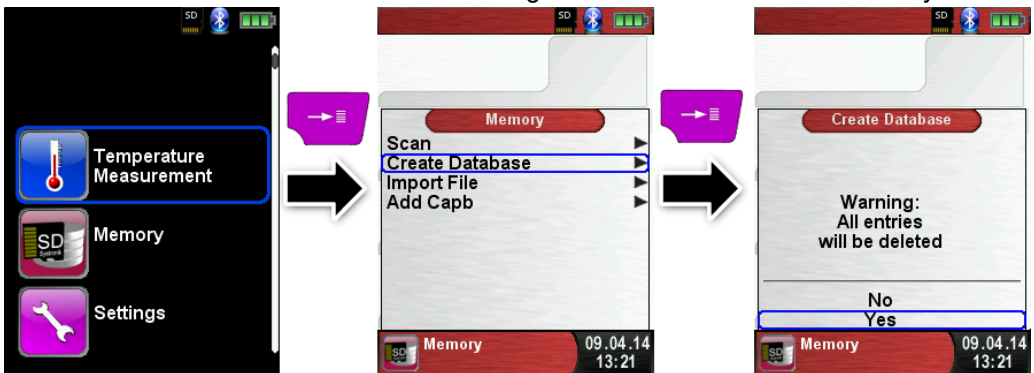
With this procedure a file named DATABASE.CSV will be generated on the MicroSD card. This file will show the database entries of the TMD9. This process needs a few seconds.

WARNING	▶ Existing Database will be deleted! Private files (images, documents etc.) won't be deleted!

▶ Create / modify customer database on the TMD9

Select „Scan" in the menu „Memory" and type the customer name:
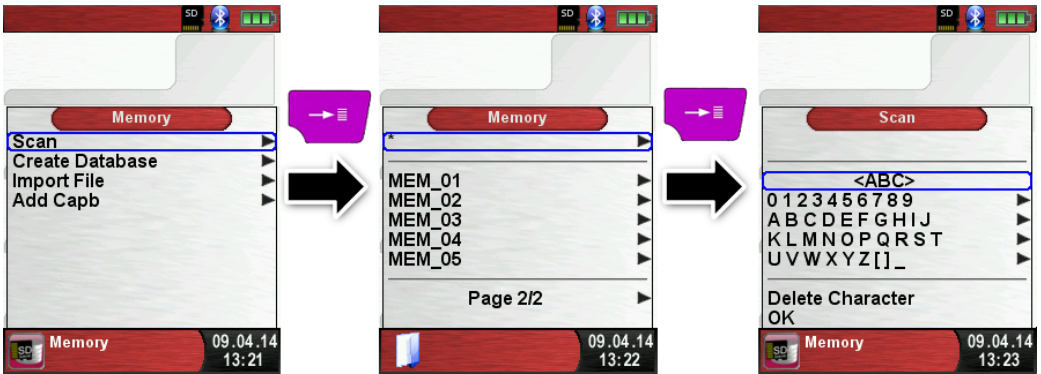
Select with the arrow keys the row with the desired character. Open the row with the „enter key" and select the desired character using the arrow keys. Select letter by letter in this way:
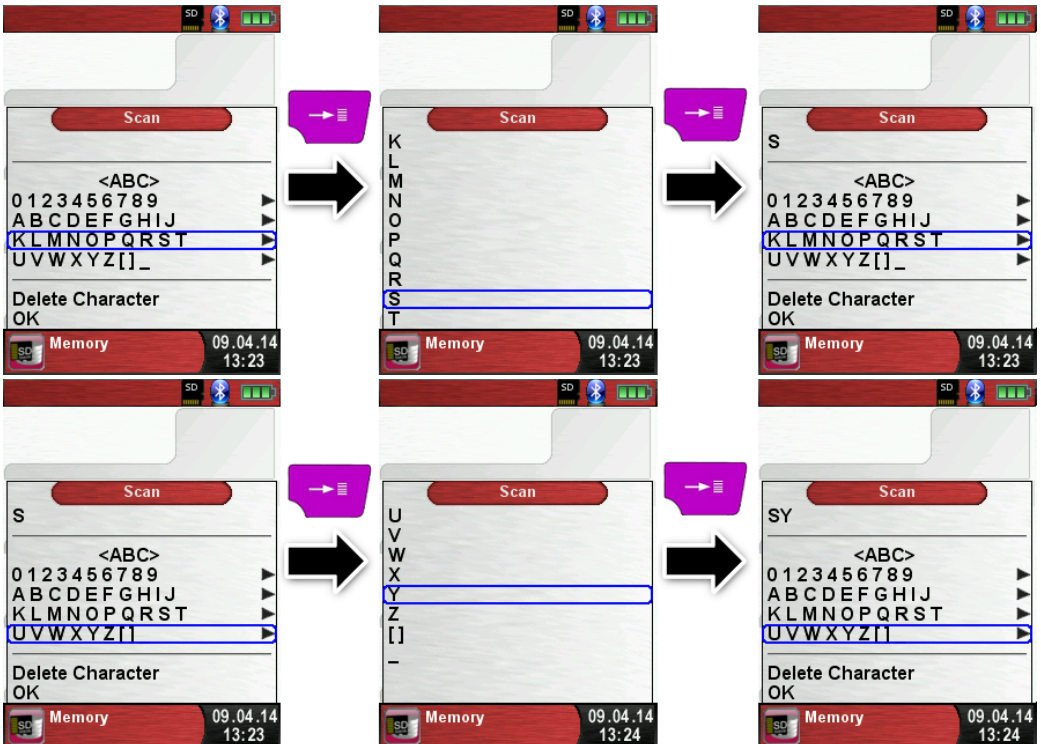
Switch between upper and lower case letters and special characters with „<ABC>". "Delete character" will delete the last character. With „OK" save the customer name. Already existing name will be shown. If the name doesn't exist it is possible to save the customer name with „New entry".
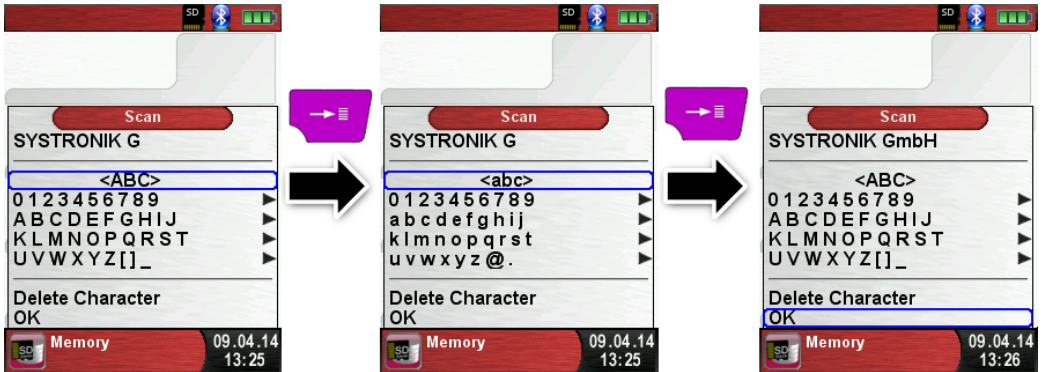
Now additional information could be saved. (Street, City, Email, and Phone No.):

Select „OK" to save the individual lines. Finally select "Save changes" to save all customer information.

To delete customers in the database there mustn't be any measurements stored. Select the customer and choose „Scan", if there are no measurements stored the request „Entry is empty delete?" will occur. Confirm the request with "Yes".

▶ Create / modify customer database on PC

The customer database can be create / modify on the PC as well. Open the file "DATABASE.CSV" on the MicroSD card with the PC. Now type customer information in the table of the "DATABASE.CSV" file. Column A is the customer name and column B – H are for additional customer information. Don't use special characters only „@", „_" and „.". Maximum 20 characters per field.

CAUTION

▶ Incorrect editing of the „DATABASE.CSV" could generate errors in the TMD9.

A1	▾	⋮	✕	✓	*fx*	SYSTRONIK GmbH

	A	B	C	D	E
1	SYSTRONIK GmbH	Gewerbestr. 57	88636	Illmensee	
2	Essie	Vaill	Litronic Industries	14225 Hancock Dr	Anchorage
3	Cruz	Roudabush	Meridian Products	2202 S Central Ave	Phoenix
4	Billie	Tinnes	D M Plywood Inc	28 W 27th St	New York
5	Zackary	Mockus	Metropolitan Elevator Co	286 State St	Perth Amboy
6	Rosemarie	Fifield	Technology Services	3131 N Nimitz Hwy -105	Honolulu
7	Bernard	Laboy	Century 21 Keewaydin Prop	22661 S Frontage Rd	Channahon
8	Sue	Haakinson	Kim Peacock Beringhause	9617 N Metro Pky W	Phoenix
9	Valerie	Pou	Sea Port Record One Stop Inc	7475 Hamilton Blvd	Trexlertown
10	Lashawn	Hasty	Kpff Consulting Engineers	815 S Glendora Ave	West Covina
11	Marianne	Farman	Albers Technologies Corp	6220 S Orange Blossom Trl	Orlando

Finally save the „DATABASE.CSV" and restart the TMD9 before import the MicroSD card. In this way the database will be newly read.

▶ Use of the memory

The memory structure consists of 1,000 memory entries (customer or location), within every entry 10 measurements protocols can be stored. In total 10,000 measurements can be stored.

At the end of a measurement you can take the measurement protocol in a free space. The file name is automatically assigned by the device and is structured as follows:

26.05.14 08:41 Temperature

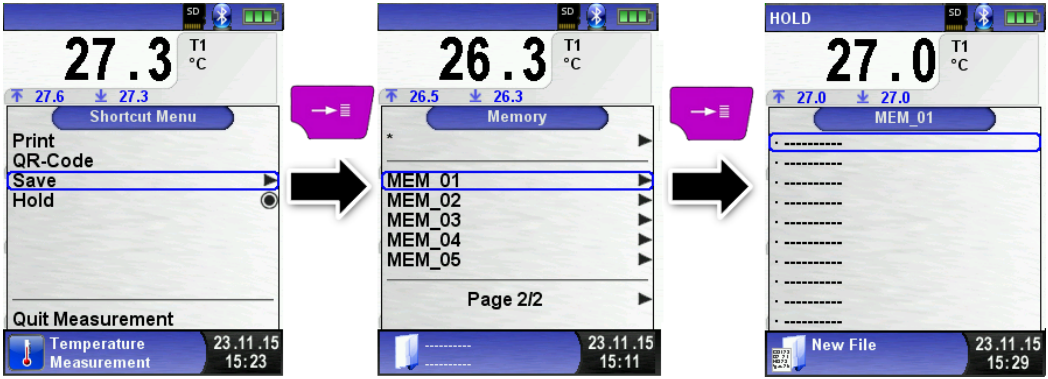Date and time   Type of measurement (ex.: 'Temperature)
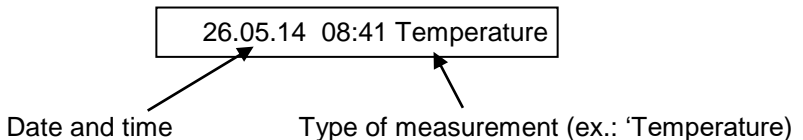
CAUTION

A file which has been created and saved on the card is protected against manipulation and, if manipulated, can neither be displayed by the device nor printed!
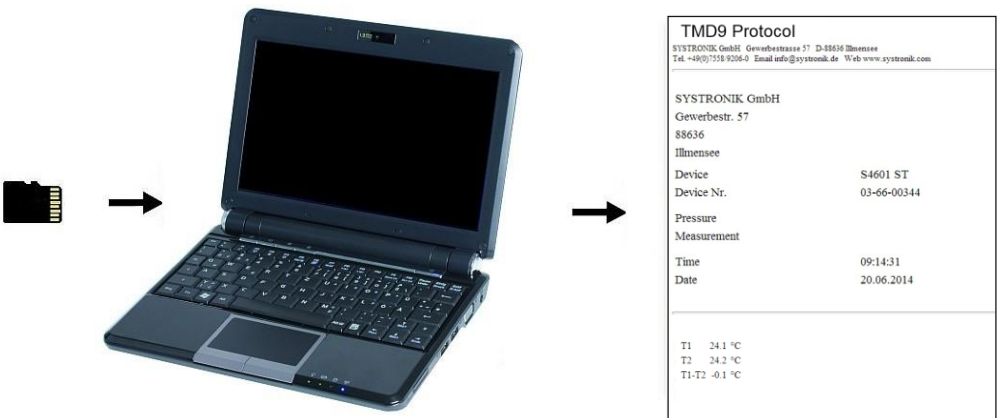
▶   Save, print or override it with a new measurement.

The file name and the storage location is shown in the lower bar. In this example: Storage folder: MEMORY/0000 and file name 0000_00.txt:

The customer information will be shown in the header of the measurement report.

The saved file can be opened with a web browser (e.g.: Chrome, Firefox, Explorer, Opera, etc.)

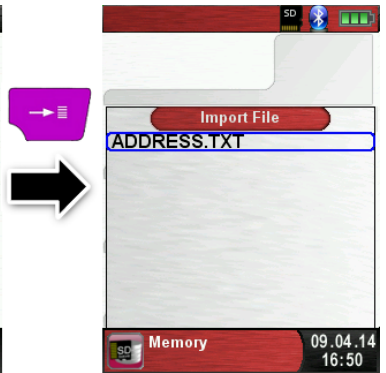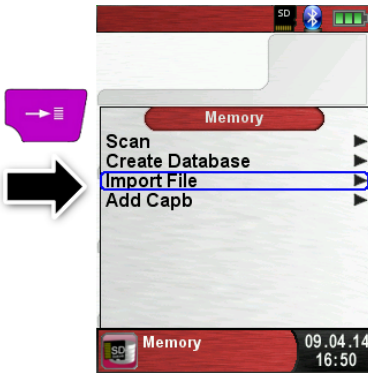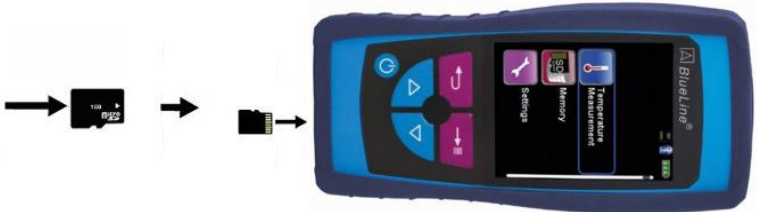## 9.3   Entering the user address

For importing the user address, you must first create s special file "**Address.txt**" on the MicroSD card. This is a plain text file with the extension .txt. The text file can be created on the PC using any text editor (such as Notepad). The maximum length is 8 lines with 22 characters each.

Note: A new user address overwrites an existing user address.

10 Battery management

10.1 Battery operation / charging mode

- Battery operation: The battery life in continuous measurement mode depends on the selected display mode. With display setting "Normal", continuous measuring is possible for up to 18 hours, with display setting "Automatic" for up to 25 hours and with display setting "Eco Mode" of up to 38 hours.

- Charging mode: External power supply unit 100-240 V~/50-60 Hz. Intelligent charging by means of an integrated charging management system.

10.2 Charging the batteries

CAUTION	**Damage to the battery or the device caused by power supply units that are not device-specific.**
⚠	▶ Use only the power supply unit delivered with the device for charging the batteries.

▶ Connect the device-specific power supply unit to mains and then to the TMD9.

✎ The charging process of the batteries starts automatically:
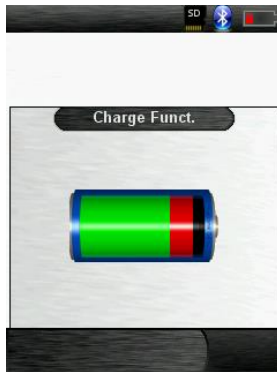
Green area	Current battery capacity

Key	Function
⏎	Close battery menu.

✎ During measurements, the battery is also charged continuously and monitored by the system.

ᗺ When the battery is fully charged and if the Battery menu is active, the device automatically switched off; if it is not active, the device switches to passive recharging mode (trickle charging).

ᗺ When recharging is finished, the charger can remain connected to TMD9 without the battery being damaged.

Service life and capacity of the battery

The TMD9 is equipped with a high-performance lithium ion battery. The service life and capacity of the battery are primarily determined by the way the device is charged and used. In order to make handling safer, the device features efficient and battery-saving charge management suitable for all application situations.

The graphical charge level indicator of TMD9 consists of three elements of a battery symbol and helps the user to correctly estimate the capacity of the battery. Five different battery states are detected.

The battery can be recharged at any time given that the charge management system recognises the need to recharge the battery. Otherwise, the charge management system will not release the battery for charging.

Operating the device at temperatures below +5 °C will considerably reduce the service life of the lithium ion battery.

11 Maintenance

Table 3: Maintenance times

When	Activity
If required	▶ Clean the device.

Replacing the battery

For technical reasons, old battery blocks may only be replaced by the manufacturer or an authorised service partner.

▶   To protect the environment, batteries must **not** be disposed of together with normal household waste. Return old batteries to the point of purchase or to a collecting point.

12 Troubleshooting

Repairs may only be performed by specially trained, qualified staff.

Table 4: Troubleshooting

Problem	Possible reason	Repair
Device switches off automatically.	Battery empty.	▶ Charge battery.
	Battery defective.	▶ Take device to service centre.
	Automatic power-off	▶ Deactivate the automatic power-off
Device cannot be switched on.	Battery empty.	▶ Charge battery.
No indication of temperature	No Type-K thermocouple	▶ Attach Type-K thermocouple
Display frozen / device does not respond to key presses.	–	▶ Hold down "On/Off" key for six seconds,
Other malfunctions	–	▶ Send the device to the manufacturer.

13 Disposal

▶ To protect the environment, this device must **not** be disposed of together with the normal household waste. Dispose of the device according to according to local directives and guidelines.

This device consists of materials that can be reused by recycling firms. The electronic inserts can be easily separated and the device consists of recyclable materials.

If you do not have the opportunity to dispose of the used device in accordance with environmental regulations, please contact us for possibilities to return it.

14 Warranty

The manufacturer's warranty for this product is 12 months after the date of purchase. This warranty shall be good in all countries in which this device is sold by the manufacturer or its authorised dealers.

15 Copyright

The manufacturer retains the copyright to these operating instructions. These operating instructions may not be reprinted, translated, copied in part or in whole without prior written consent.

We reserve the right to technical modifications with reference to the specifications and illustrations in this manual.

16 Customer satisfaction

Customer satisfaction is our prime objective. Please get in touch with us if you have any questions, suggestions or problems concerning your product.

17 Addresses

The addresses of our worldwide representations and offices can be found on the Internet at www.systronik.com