ifm electronic

CE

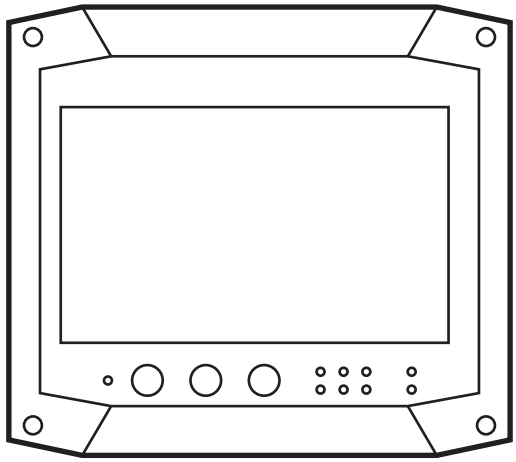
Short instructions

UK

CAN BusTester
Mobile device for the analysis of CAN networks

ecomat100®

EC2100



7390922 / 00 05 / 2012

Contents

UK

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1 Preliminary note

1.1 Symbols used

► Instructions
> Reaction, result
[…] Designation of pushbuttons, buttons or indications
→ Cross-reference

Important note
Non-compliance can result in malfunction or interference.

Information
Supplementary note

1.2 Warning signs used

⚠ WARNING
Warning of serious personal injury.Death or serious irreversible injuries may result.

⚠ CAUTION
Warning of personal injury.Slight reversible injuries may result.

NOTE
Warning of damage to property.

2 Safety instructions

These instructions are part of the device. They contain information and illustrations about the correct handling of the device and must be read before installation or use.

Observe the operating instructions.

Non-observance of the instructions, operation which is not in accordance with use as prescribed below, wrong installation or incorrect handling can affect the safety of operators and machinery.

The installation and connection must comply with the applicable national and international standards. Responsibility lies with the person installing the device.

Only the signals indicated in the technical data or on the device label may be supplied to the connections or wires.

3 Functions and features

The device is a mobile industrial PC specially developed for diagnostic purposes in 11-bit or 29-bit identifier CAN networks.

In conjunction with the "CANexplorer Touch" program, it ensures the CAN bus observation and the analysis of CAN data by means of layer-7 protocols such as CANopen or SAE J1939.

⚠ WARNING

The device is intended for use indoors or in closed vehicles. It must not be operated in hazardous areas.

3.1 Features at a glance

- 7" TFT touch screen
- Operating system Windows XP Embedded
- CANexplorer 4 with application CANexplorer Touch, preinstalled
- CAN interface with CANopen and SAE J 1939 protocol
- Ethernet and USB interfaces
- CAN data transfer cyclical, blockwise or manual
- Display of the bus load, voltage level, baud rate and error frames
- Filter and trigger functions

3.2 Help and additional information

These short instructions describe the main steps for the connection, setup and operation of the device.For detailed information we refer you to the context-sensitive help (→ 8.1.1 Main menu).

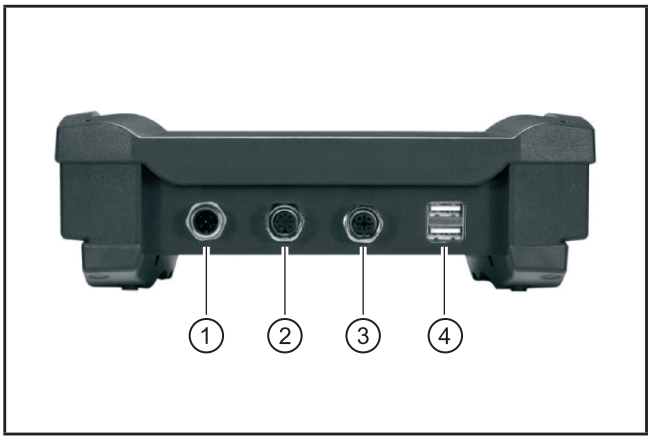
4 Installation

The device is designed for mobile applications. It is supplied and used without any mounting accessories.

5 Electrical connection

5.1 General electrical connection

The interfaces to external systems are at the bottom of the device.
CAN bus, USB devices and the LAN network are automatically recognised when they are connected.



Bottom of the device

1: Supply, CAN (M12 connector, 5 poles)
2: Supply, CAN (M12 socket, 5 poles)
3: Ethernet (M12 socket, 4 poles, D-coded)
4: USB (2 x type A)

Wiring of the connectors (→ 9 Technical data)

5.2 Operating voltage

The supply voltage rate is 10...32 V DC. Supply is effected via the 5-pole M12 connector (1).

5.2.1 Battery charging

As soon as an external voltage supply is applied, the integrated rechargeable batteries are charged.

With first setup please note that the device is operated until the integrated rechargeable batteries are fully charged.

5.2.2 Battery life

When the supply voltage is switched off, battery operation starts at once.

The integrated rechargeable batteries are used as a buffer for short-time voltage interruptions (≤ 10 min). During operation the voltage is supplied, for example, via the on-board voltage of a vehicle.

5.3 CAN interface (terminating resistor)

To be able to loop into existing CAN networks the CAN interfaces do not have any terminating resistor.

5.4 Ethernet interface

► Use a shielded CAT5 cable.
STP, shielded twisted pair, according to EIA/TIA-568. Max. length 100 m

The max. cable length depends for example on the bus topology, the selected operating mode (10/100 Mbits/s) or the quality of the connectors.

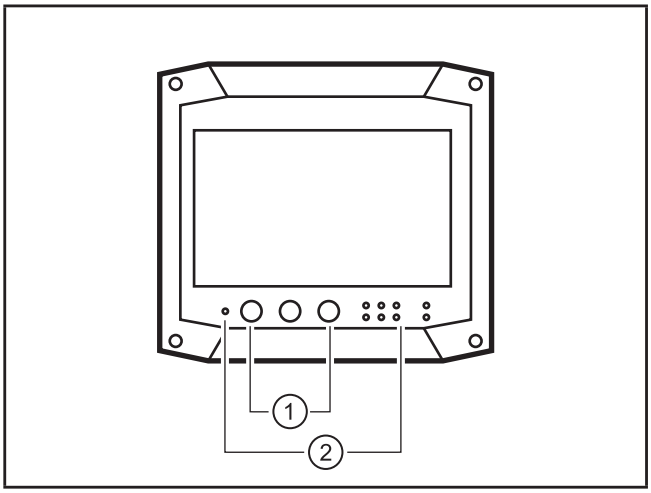
- ► Use screened connector housings and connect the screen of the Ethernet cable to the connector housing.
- ► Do not lay the Ethernet cable in parallel to live cables.

Interference due to external influences
Faulty or insufficient radio interference suppressors in other electrical equipment, such as inverters or generators, as well as voltage fluctuations when switching on/off electric loads may lead to problems with the data transmission.

5.5 USB interfaces

The USB interfaces are used for the temporary connection of a USB flash drive or an external keyboard.

6 Operating and display elements



1: Pushbuttons
2: LEDs

Operating and display elements

6.1 Display

LED	Status	Description
PWR	On	External voltage supply applied
HDD	Flashing	Device is switched on Data access to internal memory
BATTERY	Flashing On	Battery is charging Battery is completely charged
LAN-LINK LAN-ACT	ON Flashing	Device is connected to Ethernet Communication via Ethernet
CAN-Rx CAN-Tx	Flashing	Communication via CAN
WLAN	-	No function
BT	-	No function

6.2 Operating elements

Button	Description	Description
	ON/OFF	Switching the device on and off
	Brighter	Regulation of the display lighting
	Darker	Regulation of the display lighting

7 Setup

7.1 General notes

The preinstalled measurement setup allows for example the visualisation of the RawCAN messages, cyclical, blockwise or manual transfer of messages and logging of messages. Further it is possible to define filters and trigger events, to start or stop recordings.

A status line displays information about the CAN bus.

The device features a context-sensitive help.The help is selected in the main menu via [Help].

The following screenshots show the preset user interface in English.

7.1.1 Notes on the touch screen

► Do not operate the touch screen using pointed or sharp objects.

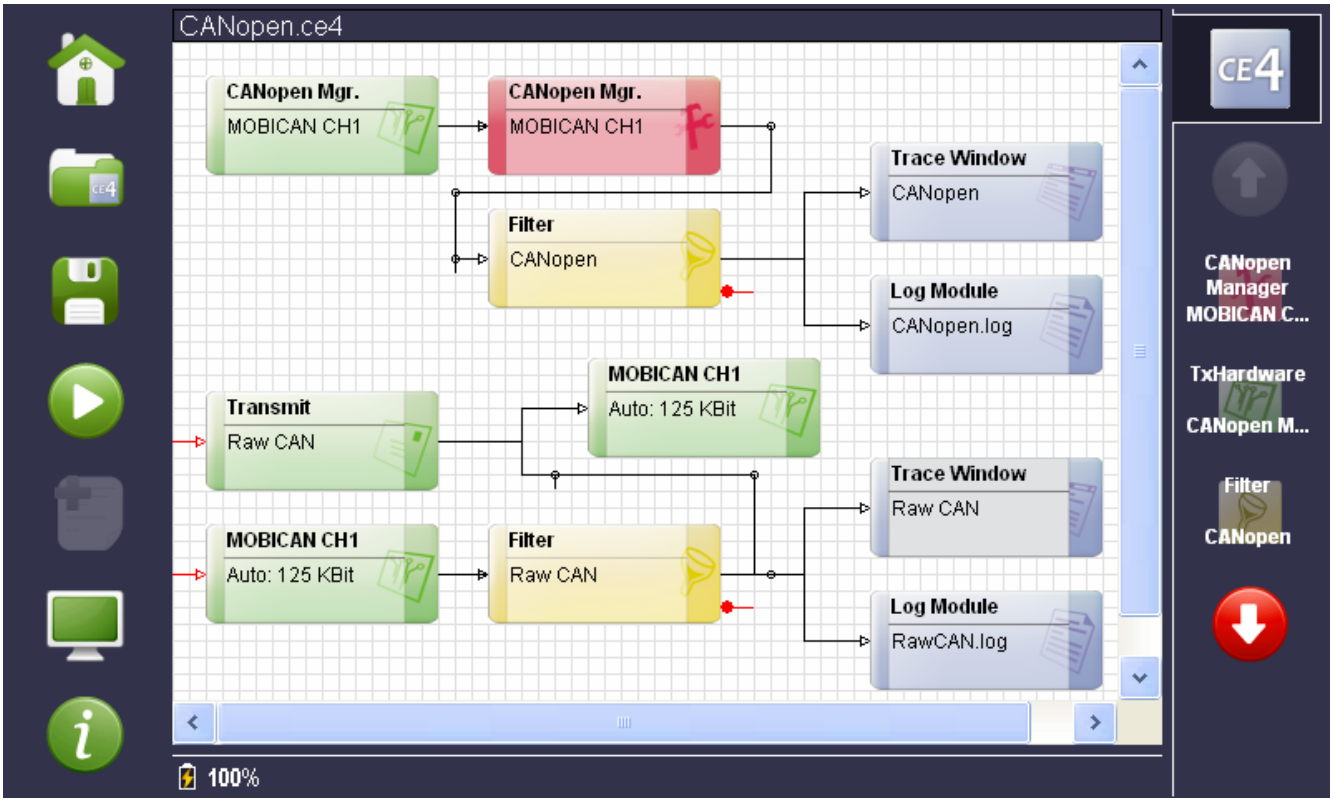
NOTE

Pointed or sharp objects may damage the device.
Only operate the touch screen using your finger or a touch-screen pen.

7.2 Switch on the device

► Press [ON/OFF] for approx. 2 seconds.

> The operating system and "CANexplorer Touch" are started.
> The preinstalled measurement setup "CANopen" opens.



Splash screen

The switch-on delay of approx. 2 seconds prevents that the device is switched on unintentionally. The entire boot process until display of the above-shown splash screen takes approx. 30 seconds.

7.3 Switch off the device

7.3.1 Switch off via the ON/OFF key

When it has been ensured that no data recording is interrupted, switch off the device using the ON/OFF key.

► Press [ON/OFF] for approx. 2 seconds.

7.3.2 Switch off via softkey

► Select [Home] in the main menu on the left (→ 8.1.1 Main menu).
► Select the switch-off symbol in the area of "System functions"

This approach prevents a possible loss of data.
The running software and the operating system are shut down regularly.
The device is switched off.

7.4 Set the screen contrast

► Press [Brighter] or [Darker].

7.5 Switch the screen on/off

► Press [Brighter] and [Darker] simultaneously for approx. 5 seconds.

7.6 Language selection

The user interface can be changed from English to German. The factory setting is English.

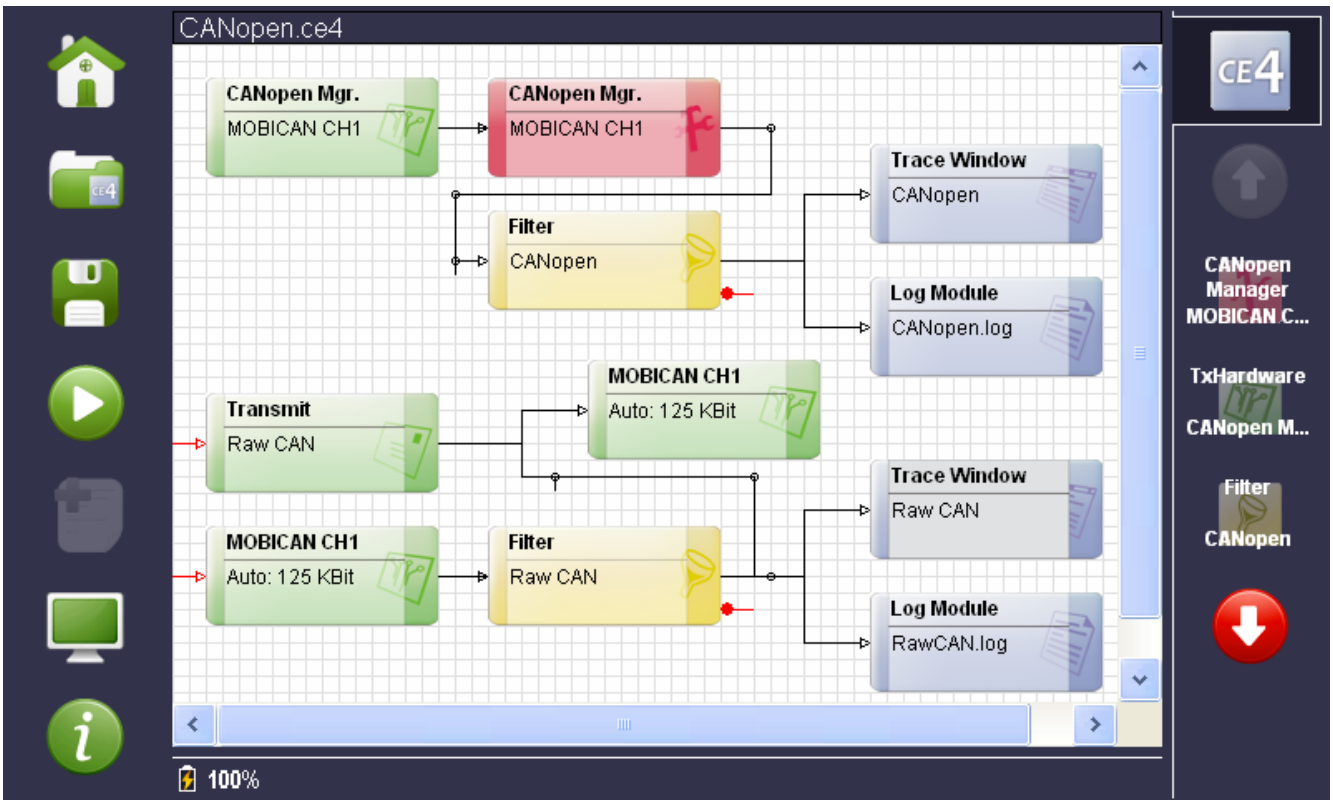
► Select [System] in the main menu on the left (→ 8.1.1 Main menu).
► Select [Language] in the area of "Settings".

System menu (Update)

► Select and apply the language.

8 Operation

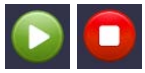
8.1 User interface



Main menu, measurement setup and configuration menu

8.1.1 Main menu

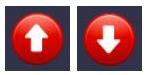
The menu on the left is the main menu and is used for the general control of the device.

Softkey	Name	Description
	Home	Opens a window with the most important device functions. ● Exit (shut the device down and switch it off) ● Log file administration (save and load the log file on an external data carrier) ● Measurement setups used last
	Open	Open a measurement setup. On delivery the menu contains the preinstalled measurement setup "CANopen".
	Save	Save the open and possibly changed measurement setup.
	Start/Stop	Start/stop the open measurement setup. Please note: The device is preset to “Automatic baud rate detection". Depending on the network structure the baud rate detection may take up to several seconds until the status line is displayed (→ 8.1.3 Status Line).

Softkey	Name	Description
	Keyboard	Allows to add a note when the measurement setup has been started. To do so, an on-screen keyboard is displayed for entry. Alternatively entry is also possible via a connected, external USB keyboard. Then the note and the time stamp (time when the button has been pressed) are written to the log file. Only visible when notes can be made.
	System	The system window provides the possibility to make basic device settings. ● Exit ● File editor ● Log file administration ● Update ● Date/time ● Change language
	Help	Help and information for the currently open window or menu.

8.1.2 Configuration menu

The menu on the right is the configuration menu and is used for navigation in the measurement setup. It allows to call the configuration window for the individual function elements.

Softkey	Name	Description
	CANexplorer	Change to the measurement setup.
	Button	Opens the configuration window of the respective function element.
	Navigation	Navigation of the buttons (scroll function).
	Tools	Open/close element-specific tools and input possibilities.

8.1.3 Status Line

The status line is at the lower end of the user interface.
When the measurement setup has been started, the bus load, the voltage level, the baud rate and the number of error frames are displayed after some seconds.
The battery charging status is displayed on the left.

Status line (measurement setup started)

8.2 The most important function elements of the measuring setup

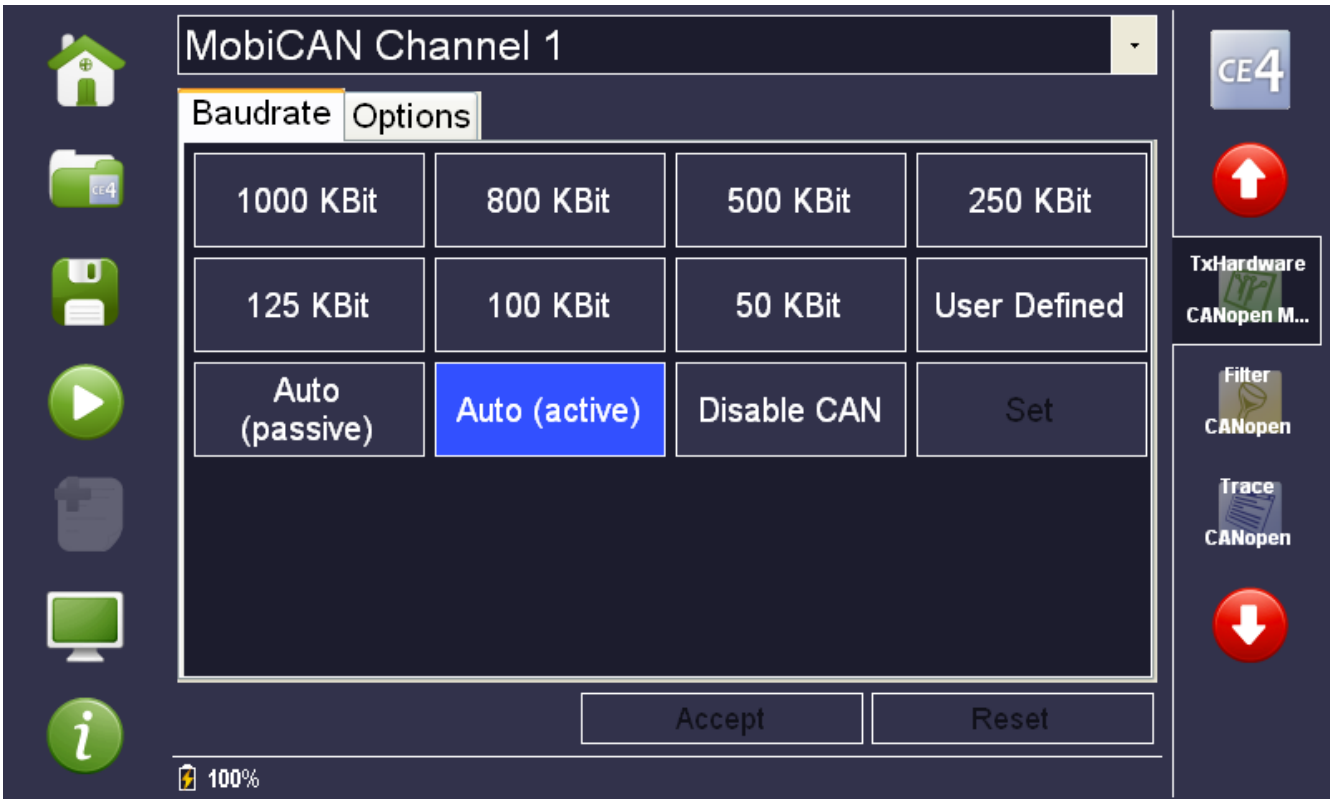
The configurations of the function elements can be opened in two ways:

- Select the function element in the measurement setup.
- Select the button in the configuration menu on the left.

8.2.1 CANopen Manager (hardware)

A channel of a CAN device is represented by the hardware element.
There are hardware elements for transmitting and for receiving (depending on the TxHardware and RxHardware buttons).

Hardware element CANopen manager



Configuration CANopen manager (Baudrate tab)

Tab	Description
Baudrate	**Baudrate buttons** A predefined baud rate can be selected. **Auto (preset)** The baud rate to be used is determined by the device. The baud rate must be determined in accordance with the pre-defined values. With automatic detection a communication must be available on the channel to be automaticaly configured. **Deactivate CAN** The channel is deactivated. **User-defined** A non standard baud rate can be configured. **Change** Opens a window in which a user-defined baud rate configuration can be set via several parameters using a baud-rate calculator.
Options	**Master activated** When the "Master" checkbox was activated, each previous setting of the channel is overwritten when the channel is opened. This has to be considered if you access the same CAN channel with several applications. **Master deactivated** When the "Master" checkbox was deactivated, any settings made for this channel by another application are assigned. If no settings were made by other applications, the hardware configuration settings are assigned. **Listen only activated** No CAN acknowledge is used (only passive listening). **Listen only deactivated** CAN acknowledge is used. **Echo activated** After sending, CAN messages are received again and displayed in the Trace panel. **Echo deactivated:** Sent CAN messages are not received. **Error frame activated** Error frames occurring on the bus are displayed in the Trace panel. **Error frame deactivated** Error frames occurring on the bus are not displayed in the Trace panel.
Start via trigger (only with RxHardware)	Opens a window in which the start of the function element can be released via trigger. That means that this element does not start working before the number of the configured trigger events has been reached.

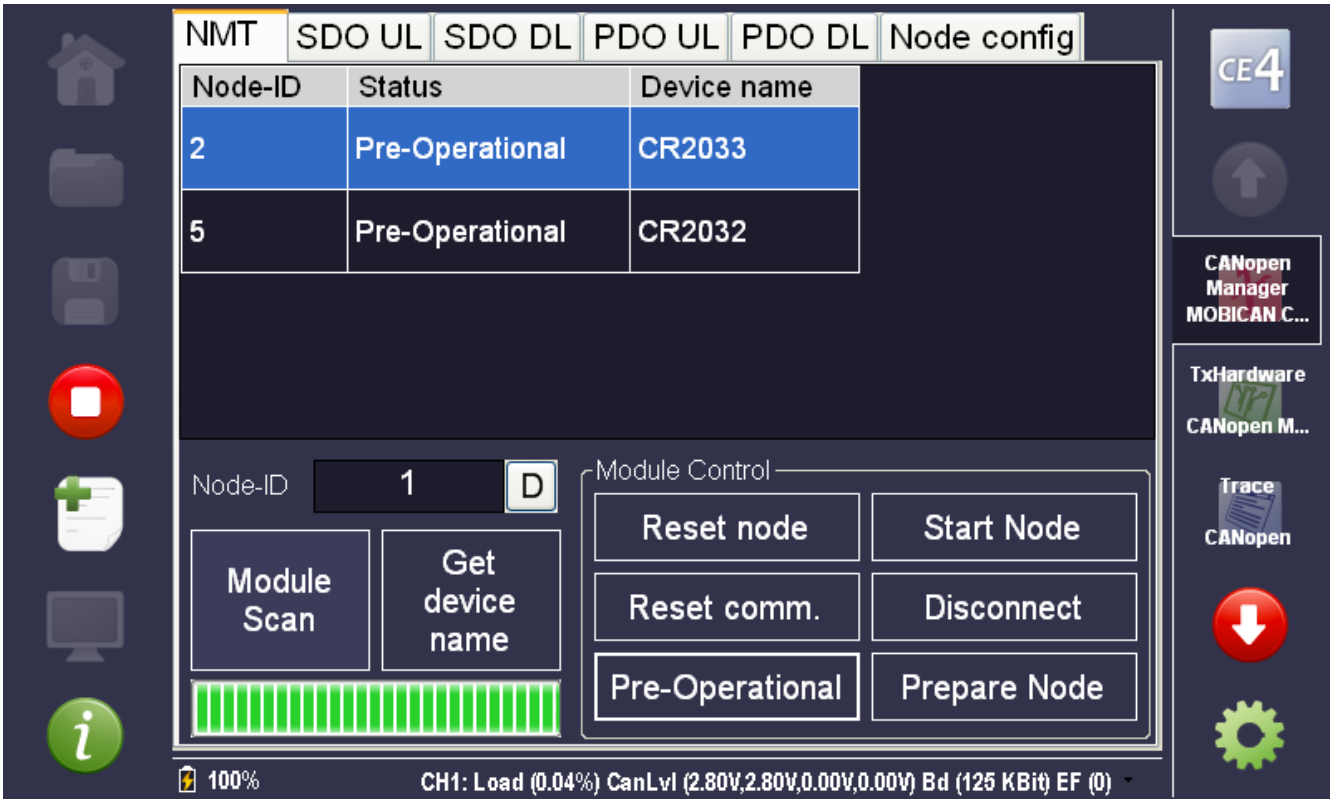
[Accept] saves the current configuration volatilely.
Permanent storage is effected in the main menu (→ 8.1.1).

[Reset] resets the configuration to the data saved last.

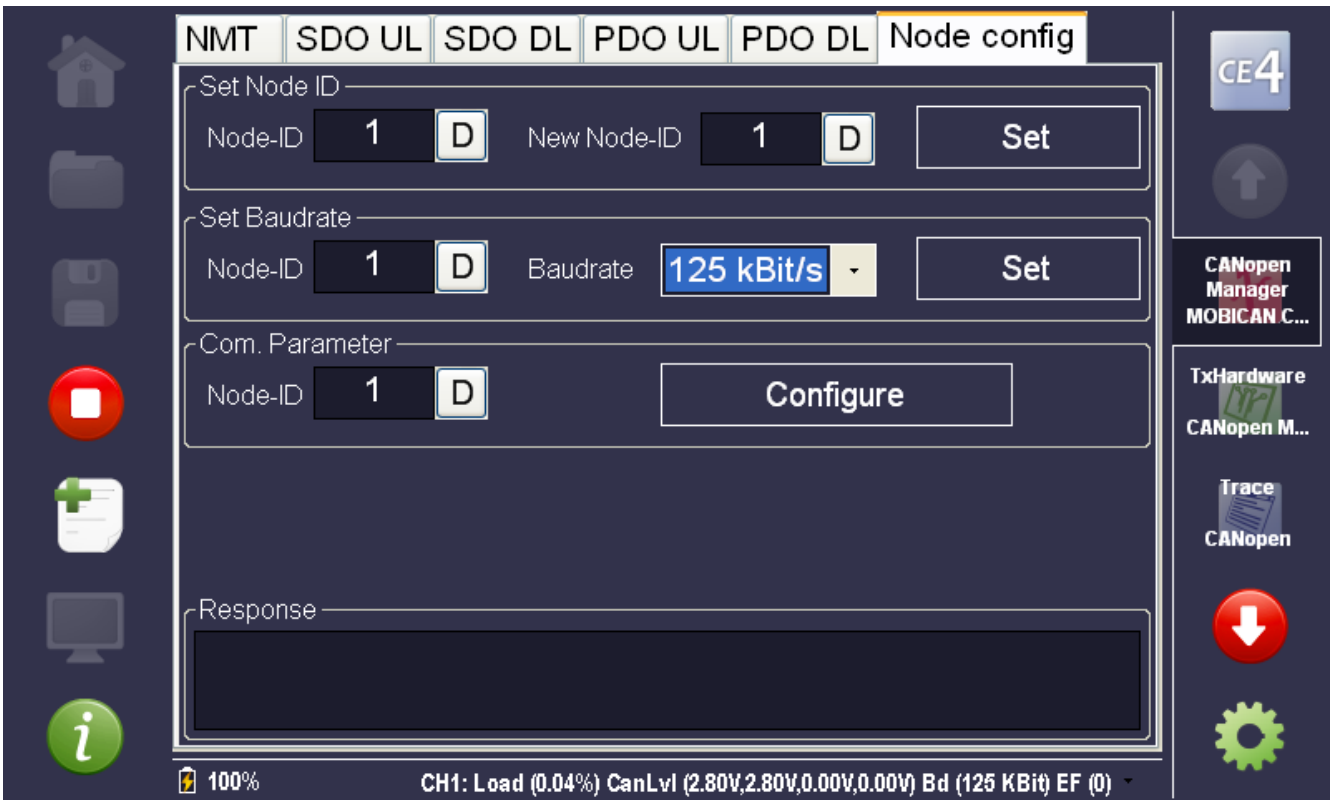
8.2.2 CANopen Manager

Via this function element all available nodes of a CANopen bus system can be controlled.

Function element CANopen manager



Configuration CANopen manager (tab NMT services)



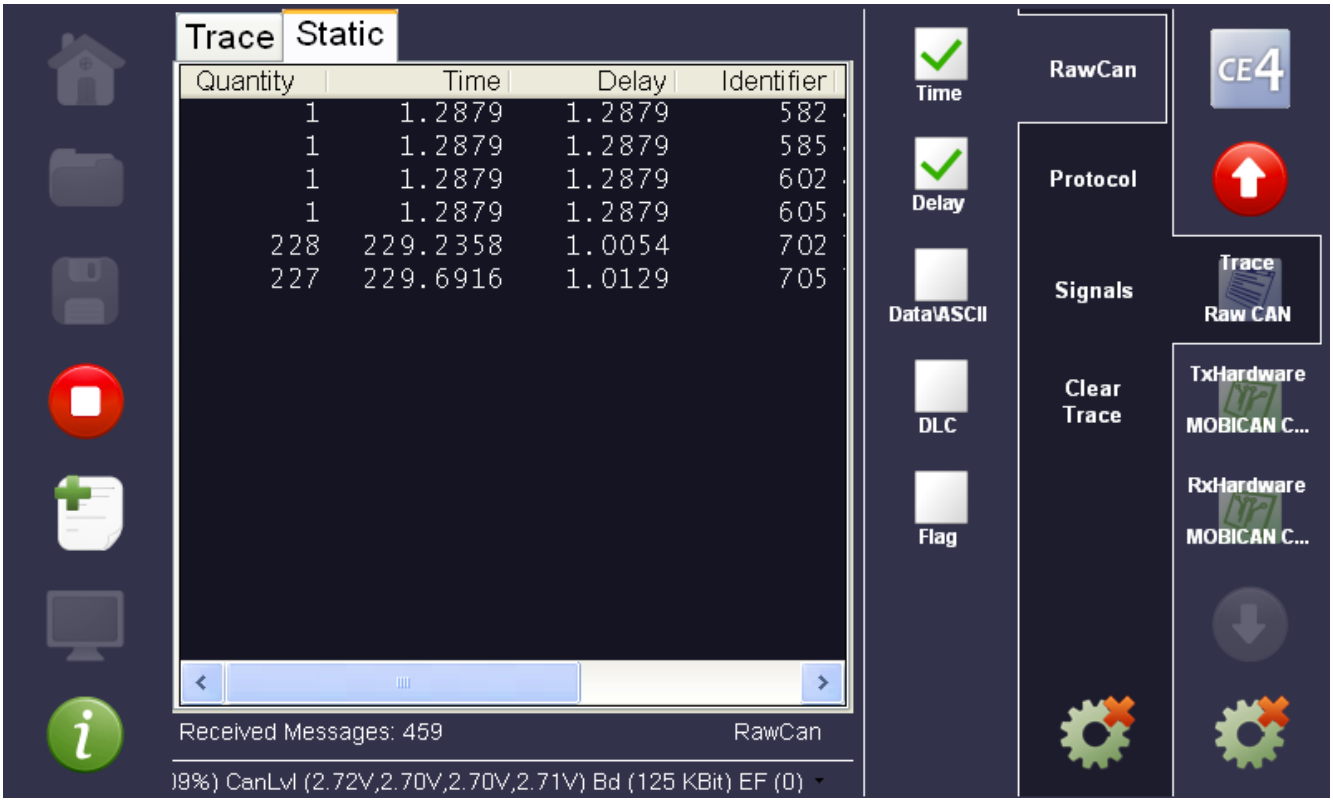
Configuration CANopen manager (node configuration)

Tab	Description
NMT services	Administers available CANopen-compatible devices within the CAN network.
SDO upload	Provides the possibility to execute an SDO upload. To do so, the node number, the index and the subindex must be indicated.
SDO download	Provides the possibility to execute an SDO download. To do so, the node number, the index, the subindex and the data to be transferred must be indicated.
PDO upload	Provides the possibility to execute a PDO upload. To do so, the node number and the PDO number must be indicated.
PDO download	Provides the possibility to execute a PDO download. To do so, the node number, the PDO number, the length of the data (max. 4 bytes) and the data must be indicated.
Node configuration	Provides the possibility to administer the detected CANopen-compatible devices within the CAN network. Node Guarding (at "Configure) Setting the HeartBeatTime, GuardTime and LifeTime

8.2.3 Trace panels (RawCAN and CANopen)

The function elements are used to display received CAN messages in Raw or CANopen format. It is distinguished between the Continuous and the Static view.

Function element Trace panels (RawCAN)



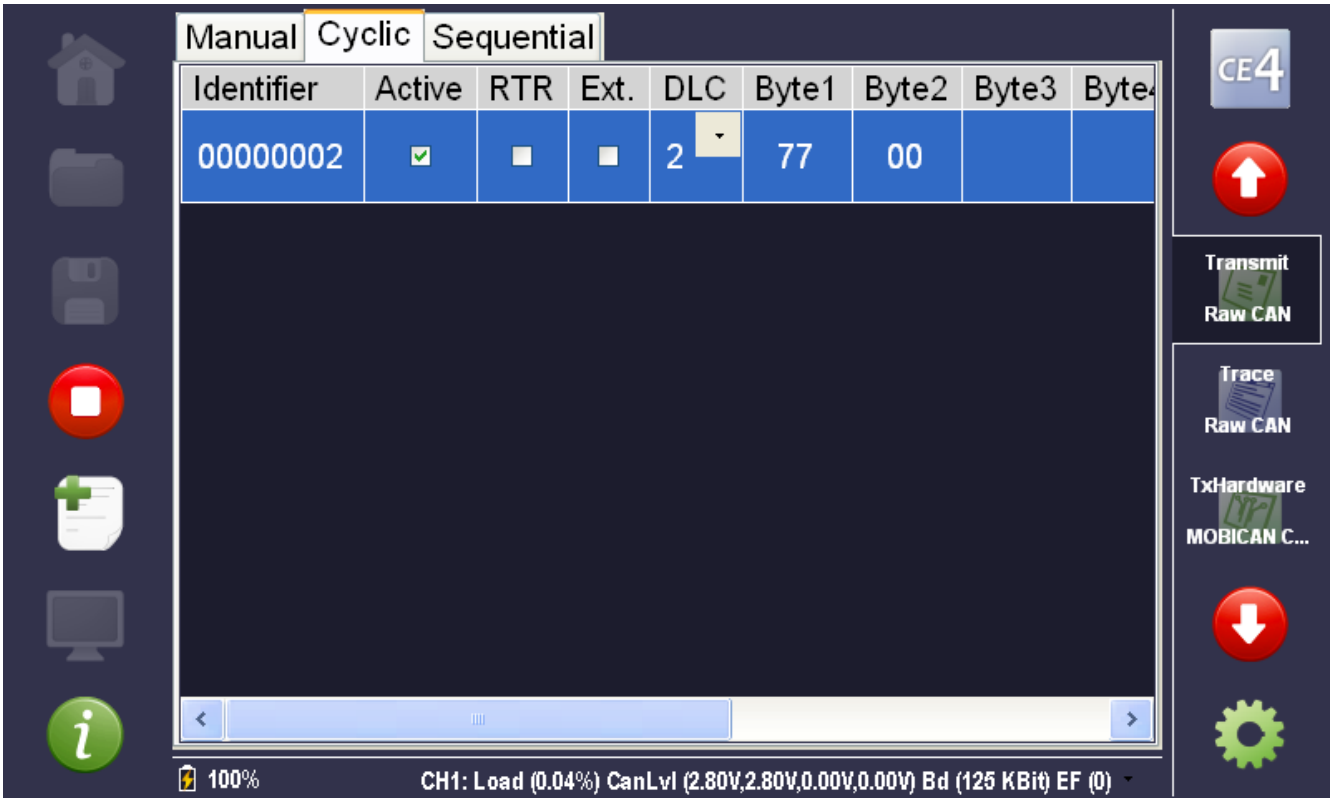
Configuration Trace panels (Static tab)

Tab	Description
Trace	In the Trace view all CAN messages received by the trace element are continuously displayed in a list.
Static	In the Static view the CAN messages received are grouped according to their identifiers. A line is reserved in the list of the Static view for each identifier. If a CAN message is received and if its identifier is already available in the Static window, the data of the previous CAN message are overwritten with the currently received data.

Button	Description
RawCAN	The RawCan button is used to change the Trace panel into the RawCAN view. This mode contains the additional columns Identifier and Data.
Protocol	The Protocol button is used to change the Trace panel into the Protocol view. In this mode the type and a description of the CAN message are displayed in additional columns.
Signals	The Signal button is used to change the Trace panel into the Signal view.
Clear Trace	Deletes the contents of the Trace panel.
Time Delay Data/ASCII DLC Flag	Columns addable to the Trace panel

8.3 Further function elements of the measurement setup

Further function elements



Transmit configuration

Function element	Description
Transmit	Is used to send CAN messages. The following options are provided: ● Transmission of single CAN messages (manual). ● Cyclical transmission of CAN messages. ● Sequential transmission of CAN messages.
Filters	Are used to filter the data flows for specific information. Arriving data flows can, for example, be filtered to identifiers and data bytes.
Log modules	Are used to save received CAN messages in a file. The internal memory of the device and the connected USB storage media are available.

For detailed help and information about the a.-m. function elements please see the device-internal context-sensitive help (→ 8.1.1 Main menu).

9 Technical data

EC2100

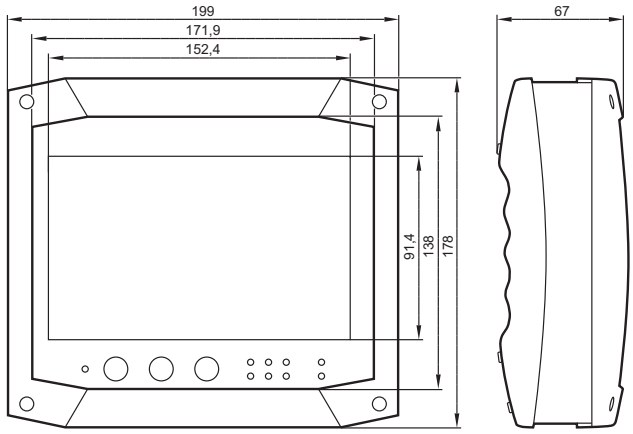
CAN BusTester

Mobile device for the analysis of CAN networks

11/29-bit identifiers

7" WVGA TFT colour display

10...32 V DC



Technical data	E.g. analysis of the voltage level, bus statistics, bus load or number of error frames
Operating and display elements	
Display	WVGA TFT colour display 800 x 480 pixels, 152.4 x 91.4 mm (7" diagonal)
Number of colours	262,144
Background illumination	LEDs (3 x 11 LEDs)
Brightness	Max. 400 cd/m²
Keys	Touchscreen, resistive hard keys: ON/OFF, display darker, display brighter
Indication	Power LED (PWR) Battery LED (full/loading) HDD/SD LED (access to storage medium) Ethernet Link/Act (connected/communication with Ethernet) CAN Tx/Rx (CAN transmits/receives)
Mechanical data	
Housing material	Plastic ABS, graphite grey
Dimensions (H x W x D)	199 x 178 x 67 mm
Operating temperature	0...50 °C
Storage temperature	– 10...60 °C
Protection rating	IP 62
Electrical data	
Operating voltage	10...32 V DC (via CAN M12 connector)
Backup battery	6 NiMH cells (7.2 V, internal, cannot be changed) operating time with fully charged battery ≤ 10 min.
Interfaces	1 x CAN (1 x M12 pin, 1 x M12 socket) 1 x Ethernet (100 Mbits, M12, D-coded) 2 x USB 2.0 (type A)
Processor	Intel ATOM Z510 1.1 GHz
Working memory (RAM)	512 MB (DDR2 RAM, 400 MHz)
Data memory (Flash)	512 MB (SSD flash memory for operating system, bootable) 2 GB SD card, in the device in SD slot (for applications and user data, not bootable)
Operating system	Windows XP Embedded
Diagnostic software	CANexplorer 4 Touch incl. preinstalled measurement set-up with CANopen manager for NMT command function, SDO/PDO support and CAN device configuration

UK

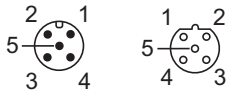
EC2100	Technical data

Functions

CAN messages	● Autodetect and manual selection of the baud rate ● Receive ● Transmit RawCAN, individual messages ● Basic CANopen support (single frames, PDOs and expedited SDOs) ● Filter (easy masks) ● Display (Trace panel) ● Saving (automatic data name generation) ● Transmit, cyclical and blockwise ● Protocol support (basis and detail) – SAEJ1939 – CANopen
CAN bus analysis	● Number of messages Tx and Rx, cumulative and per second ● Bus load in % ● Error frames, cumulative and per minute
System functions and settings	● File transfer – Save log files on USB device – Read licence files from USB device ● Set time/date

Wiring

CAN
(2 x 5 poles, M12, pin/socket)



Pin	Potential
1	CAN_GND
2	10...32 V DC
3	GND
4	CAN_H
5	CAN_L
Thread	screen
Connectors are linked	

Ethernet
(1 x 4 poles, M12, D-coded)

Pin	Potential
1	TxD +
2	RxD +
3	TxD –
4	RxD –

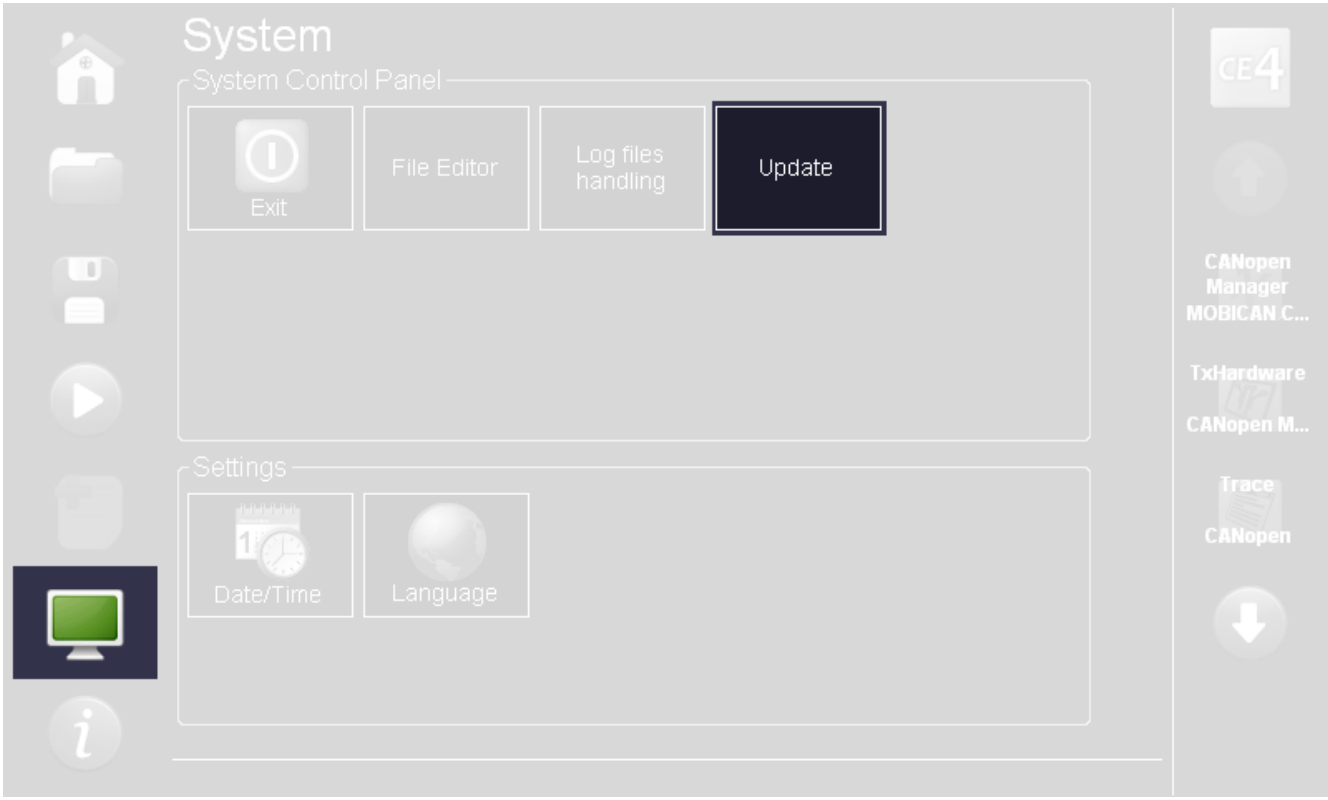
USB
(2 x type A)

Pin	Potential
1	Vcc (+ 5 V DC)
2	Data –
3	Data +
4	GND

10 Maintenance, repair and disposal

10.1 Device update

A device update can be made via the "Update" function in the system menu. The installation process is automated.



System menu (Update)

The update files must be on the root directory of a USB flash drive. The USB flash drive is recognised automatically when it is connected.

When the installation is completed, a message is displayed that has to be confirmed with OK. After the confirmation the device is automatically booted and is put into hibernation after approx. 30 seconds. The update process is completed.

Then the device can be switched on again.

10.2 Cleaning the display surface

Unsuitable cleaning agents and chemicals can damage the display surface.

The following agents are not suited for cleaning the display:

- chemicals dissolving plastics such as methylated spirit, benzine, thinner, alcohol, acetone or ammonia.
- paper towels, crepe paper etc.
- abrasive cleaners
- polish or wax

► Clean the device from dirt using a soft, chemically untreated and dry cloth.
► In case of heavy dirt, use a damp cloth.

Micro-fibre cloths without chemical additives are recommended.

10.3 Cleaning the housing surface

- ► Disconnect the device.
- ► Clean the device from dirt using a soft, chemically untreated and dry cloth.
- ► In case of heavy dirt, use a damp cloth.

10.4 Repair

- ► The device must only be repaired by the manufacturer.
  Observe the safety instructions.

10.5 Change of battery

- ► The battery must only be changed by the manufacturer.

10.6 Disposal

- ► Dispose of device in accordance with the national environmental regulations.