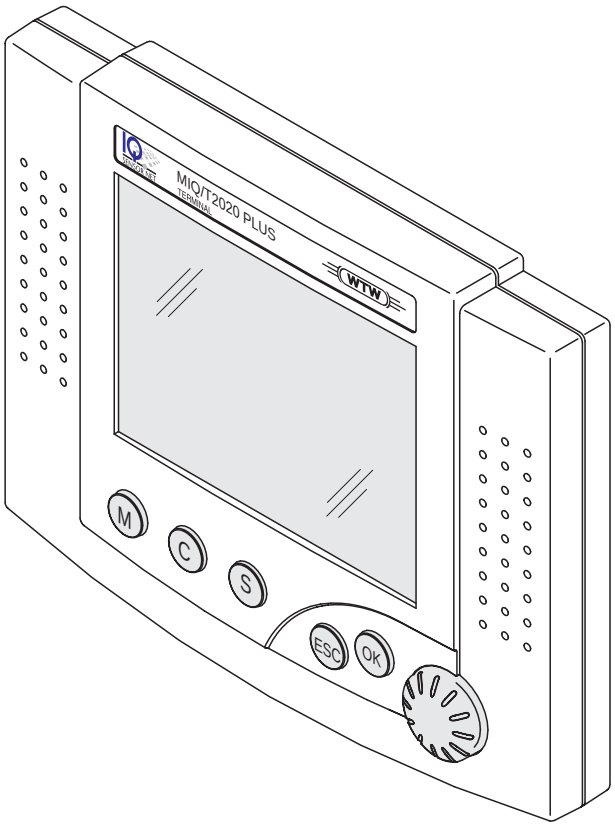
Operating Manual

MIQ/T2020 PLUS



IQ SENSOR NET Terminal with redundant controller function

ba64126e01 03/2004

Accuracy when going to press

The use of advanced technology and the high quality standard of our instruments are the result of continuous development. Consequently, this may result in some differences between this operating manual and your instrument. Also, we cannot guarantee that there are absolutely no errors in this manual. Therefore, we are sure you will understand that we cannot accept any legal claims resulting from the data, figures or descriptions.



Note
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1 Overview

1.1 How to use this component operating manual

Structure of the IQ SENSOR NET operating manual

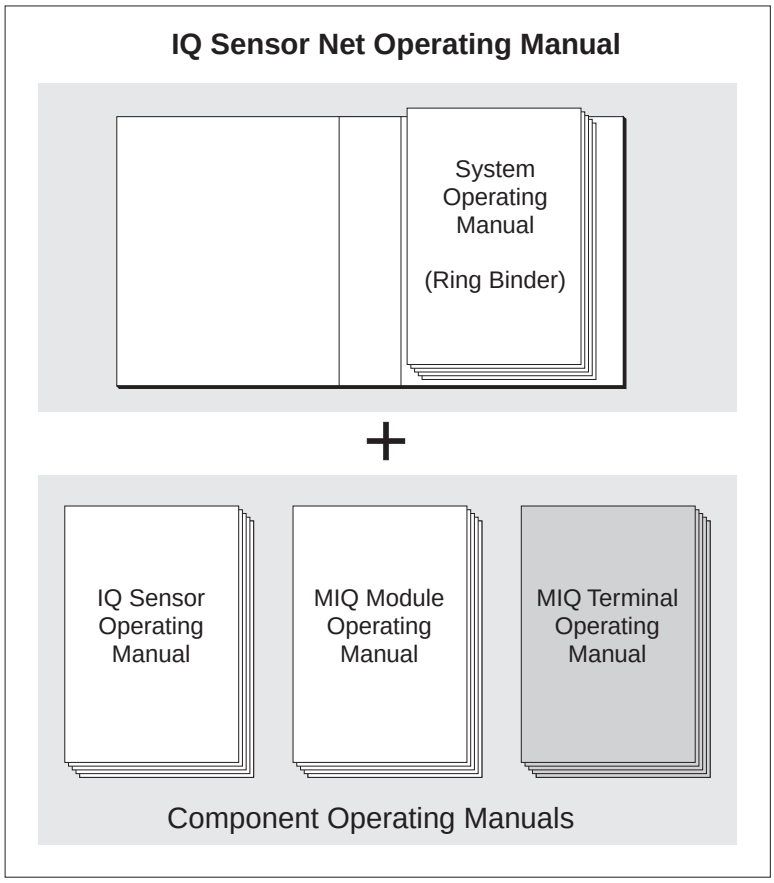


Fig. 1-1 Structure of the IQ SENSOR NET operating manual

The IQ SENSOR NET operating manual has a modular structure like the IQ SENSOR NET itself. It consists of a system operating manual and the operating manuals of all the components used.

Please file this component operating manual into the ring binder of the system operating manual.

1.2 Terminal function of the MIQ/T2020 PLUS

The MIQ/T2020 PLUS terminal is an extension component for the IQ SENSOR NET system. It can be docked on – and removed again from – any free lid front of an MIQ module as a mobile control unit. The docking is performed by a simple manual action without the need for any tools.

Information that describes the behavior of the terminal after the docking maneuver can be stored in each MIQ module. This information includes:

- The name of the respective measurement location
- A selection of measured values that should be displayed at this measurement location.

This function (local identity function) can be used, e.g. to quickly find sensors for calibration on site. The information is transmitted by the two upper contacts on the back of the terminal.

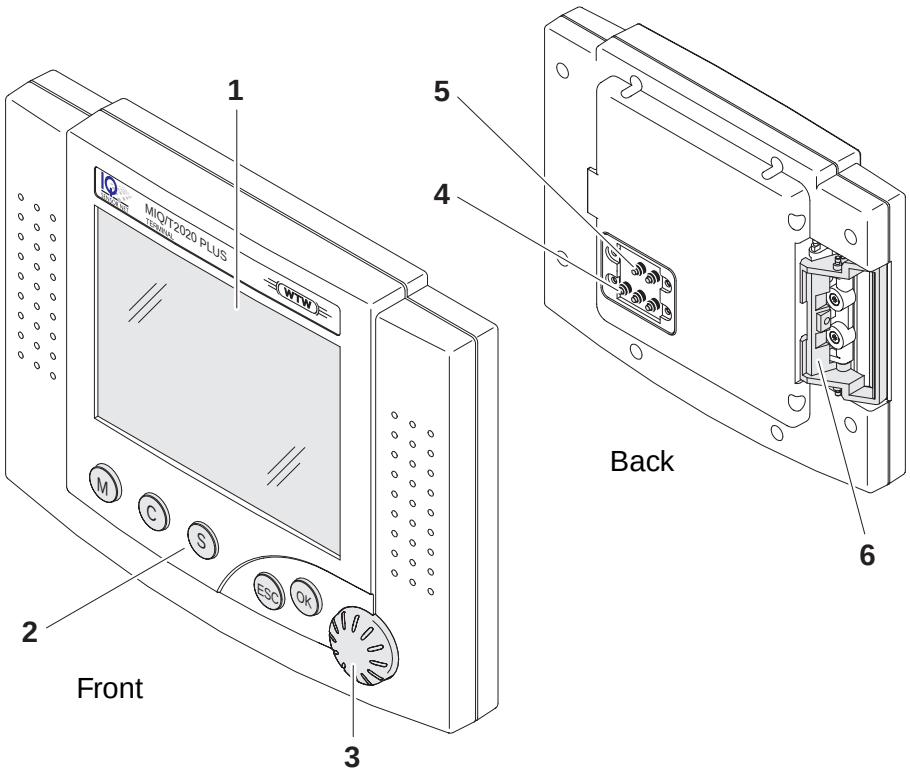


Fig. 1-2 MIQ/T2020 PLUS terminal

1	Graphical display
2	Keys
3	Rotary switch
4	Contacts for voltage and communication
5	Contacts for the local identity function
6	Docking mechanism

1.3 MIQ/T2020 PLUS controller operation

Automatic safety function

The MIQ/T2020 PLUS has a controller that takes over the basic functions of the IQ SENSOR NET controller if it fails and thus considerably increases the operational safety of the system. For this purpose, the MIQ/T2020 PLUS automatically and regularly saves the system configuration during the regular terminal operation.

System configuration

The system configuration contains the allocation of the sensor numbers and all settings of the following menus:

- *Settings of sensors and diff. sensors*
- *Settings of outputs and links*
- *Edit list of sensors*
- *Edit list of outputs*
- *Measured value recording* (datalogger settings).

In the IQ SENSOR NET, the system configuration is saved in the controller (MIQ/C184 or MIQ/MC).

Functions in the MIQ/ T2020 PLUS controller operation

The MIQ/T2020 PLUS controller operation comprises all basic functions of the IQ SENSOR NET. Relay and current interfaces work without restrictions.

Restrictions in the MIQ/ T2020 PLUS controller operation

In the MIQ/T2020 PLUS controller operation, the following functions cannot be supported:

- Editing the system configuration. Apart from date and time, all settings in the *Settings* menu are locked and cannot be released for changing
- Adding new sensors and input or output modules
- Continuing the datalogger operation of the main controller
- Continuing the Profibus, Modbus, or modem communication of the main controller (due to missing interfaces).
  A redundant data logging function can be set up with the aid of the MIQ/IF232 interface module.

Manual saving function

Apart from automatically saving the system configuration, the system configuration can be saved manually in the MIQ/T2020 PLUS at any time during regular terminal operation. This function can be used for the MIQ/T2020 PLUS controller operation and for the following tasks as well:

- Making a safety copy of the system configuration, for example before changing settings that may have to be undone again (testing new settings).
- Transmitting the system configuration to a second IQ SENSOR NET system. This facilitates the quick commissioning of several similar systems.

2 Safety instructions

This operating manual contains special instructions that must be followed during the installation of the MIQ/T2020 PLUS. Thus, it is essential for the operator to read this component operating manual before carrying out any work with the system. In addition to this manual, the SAFETY chapter of the IQ SENSOR NET system operating manual must be followed.

Always keep this component operating manual together with the system operating manual and all other component operating manuals in the vicinity of the IQ SENSOR NET system.

General safety instructions

The following safety labels in the individual chapters of this operating manual indicate different levels of danger:



Warning
indicates instructions that must be followed precisely in order to prevent serious danger to personnel.

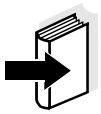


Caution
indicates instructions that must be followed precisely in order to avoid slight injuries to personnel or damage to the instrument or the environment.

Other labels



Note
indicates notes that draw your attention to special features.



Note
indicates cross-references to other documents, e.g. operating manuals.

2.1 Authorized use

The authorized use of the MIQ/T2020 PLUS consists of its use as a control unit with redundant controller function in the IQ SENSOR NET. Please adhere to the technical specifications given in chapter 7 TECHNICAL DATA. Only operation according to the instructions in this operating manual is authorized.

Any other use is considered to be **unauthorized**. Unauthorized use invalidates any claims with regard to the guarantee.

2.2 General safety instructions

The MIQ/T2020 PLUS is constructed and inspected according to the relevant guidelines and norms for electronic instruments (see chapter 7 TECHNICAL DATA).
It left the factory in a safe and secure technical condition.

Function and operational safety

The failure-free function and operational safety of the MIQ/T2020 PLUS is only guaranteed if the generally applicable safety measures and the special safety instructions in this operating manual are followed during its use.

The failure-free function and operational safety of the MIQ/T2020 PLUS is only guaranteed under the environmental conditions that are specified in chapter 7 TECHNICAL DATA.

Safe operation

If safe operation is no longer possible, the MIQ/T2020 PLUS must be taken out of operation and secured against inadvertent operation.
Safe operation is no longer possible if the MIQ/T2020 PLUS:

- has been damaged in transport
- has been stored under adverse conditions for a lengthy period of time
- is visibly damaged
- no longer operates as described in this manual.

If you are in any doubt, contact the supplier of your MIQ/T2020 PLUS.

3 Installation

3.1 Scope of delivery

- MIQ/T2020 PLUS terminal
- Operating Manual

3.2 Commissioning

Note
Follow the installation instructions in the INSTALLATION chapter of the system operating manual.

Up to three terminal components can be docked on an IQ SENSOR NET system.

3.2.1 Software requirements

The MIQ/T2020 PLUS requires for its operation an IQ SENSOR NET main controller with the software version 2.04 or higher. Full functionality is available when using a main controller with the software version 2.70 or higher. Using older main controller versions there are small functional restrictions when retransferring the stored settings (for details, see section 4.3.3).

3.2.2 Docking and removing a terminal

The mobile MIQ/T2020 PLUS terminal is docked on the lid of any free MIQ module. The terminal can be docked while the system is running without the measurement being interrupted.

Docking the terminal

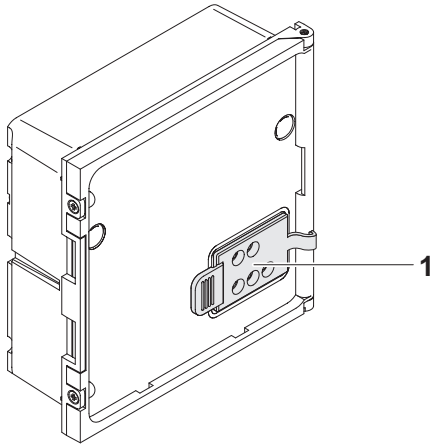


Fig. 3-1 Preparing the MIQ module for docking

1	Pull the cover off the contacts (pos. 1 in Fig. 3-1) on the lid of the MIQ module.

Note
For the temporary docking of a mobile terminal, do not remove the whole contact cover. Leave it hanging on the side of the MIQ module. After removing the terminal, replace the cover again to protect the contacts.

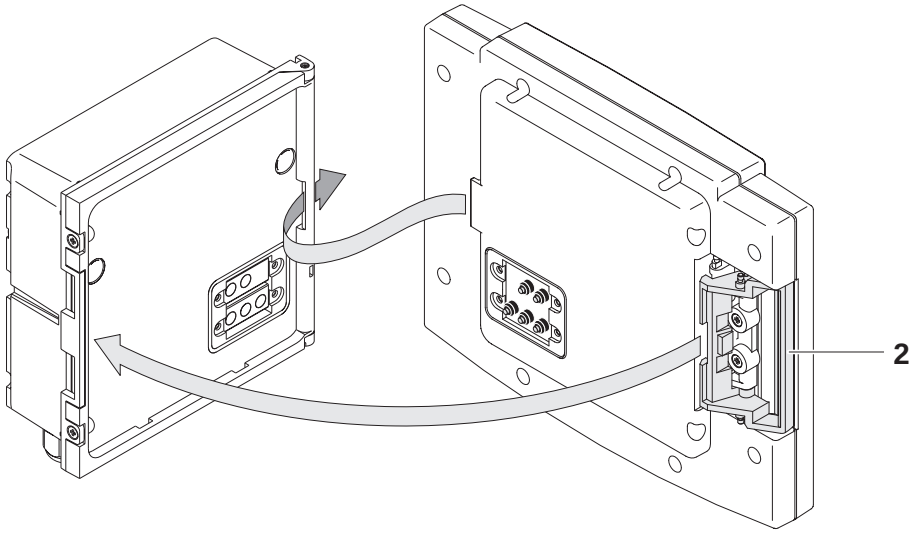


Fig. 3-2 Docking the terminal

2	Place the terminal on the module lid. To do so, insert the flap on the back of the terminal into the slot on the door hinge of the module. Then, pull back the interlocking lever (pos. 2 in Fig. 3-2), place the terminal completely on the module and release the interlocking lever.

Removing the terminal

To remove the terminal, press the locking lever and pull the terminal forwards.

3.2.3 Initialization

When the system is running, the terminal automatically starts to operate as soon as contact is established to the IQ SENSOR NET. In the first phase, the background illumination of the display switches on and the terminal is initialized. This process may last a few seconds. The following display appears (Fig. 3-3):

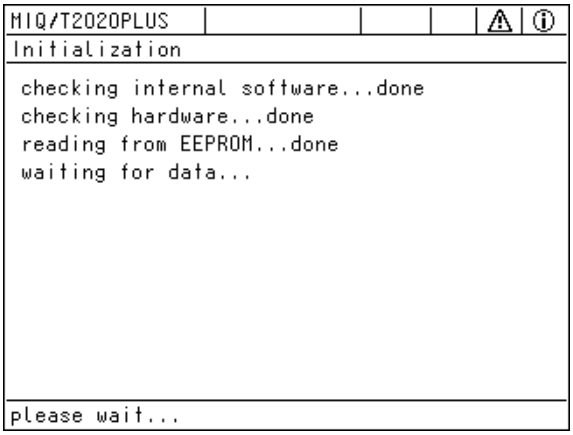


Fig. 3-3 Display during the initialization process

The terminal then switches to the measured value display.

4 Operation

4.1 Introduction

The MIQ/T2020 PLUS terminal is a control unit for the IQ SENSOR NET.

The terminal can be used to:

- Display measured values
- Start calibration
- Perform system and terminal settings
- Display messages.

Note
To guarantee data safety within the IQ SENSOR NET, access to the following functions is only possible from one terminal at the same time:

- Opening the *Settings* menu
- Starting calibration
- Assigning sensors or output modules as substitutes.

If one of these functions is already active at another terminal, a note appears on the display.

4.1.1 Overview of the operating elements

This section gives basic information on the operation of the IQ SENSOR NET system via the MIQ/T2020 PLUS.

The terminal is equipped with a large display for the clear presentation of current measured values, the graph of measured values, status displays and message texts.

The IQ SENSOR NET system is operated using the 5 keys Ⓜ,Ⓒ,Ⓢ,ESC,OK and the rotary switch ⟳.

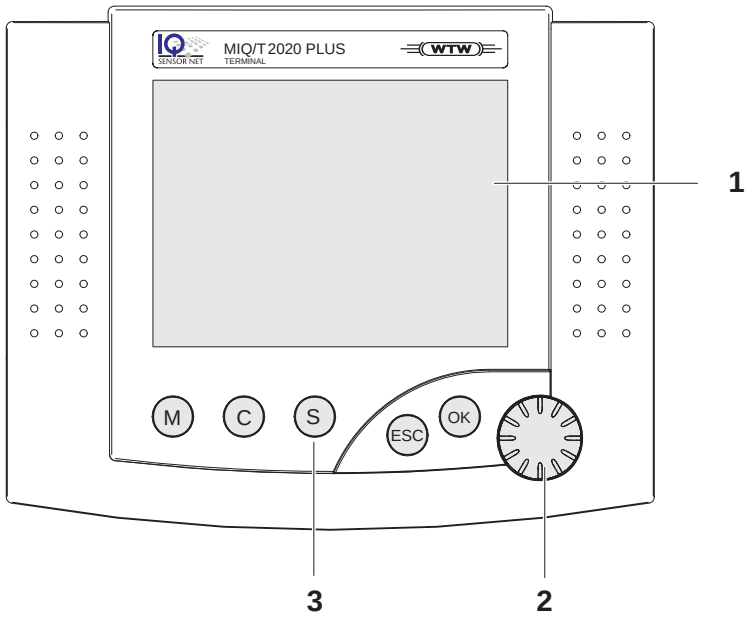


Fig. 4-1 View of the MIQ/T2020 PLUS terminal

1	Display (see section 4.1.2 DISPLAY)
2	Rotary switch (see section 4.1.4 ROTARY SWITCH)
3	5 keys Ⓜ,Ⓒ,Ⓢ,ESC,OK (see section 4.1.3 KEYS)

4.1.2 Display

The display contains the following information:

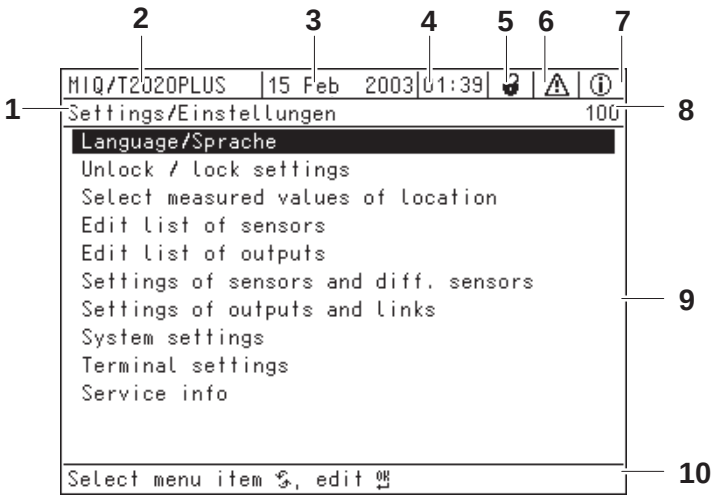


Fig. 4-2 View of the display

1	Name of the display
2	Name of the terminal and instrument designation (display changes in cycles of 5 s)
3	Date
4	Time
5	Lock safety setting: open (settings released) – System settings can be changed closed (settings locked) – All system settings can only be read
6	Error symbol ⚠: If the error symbol flashes, a new or unacknowledged error message is present in the log book.
7	Info symbol ⓘ: If the info symbol flashes, a new or unacknowledged error message is present in the log book.
8	Number of the display
9	Display range for measured values, menus, lists, etc.
10	Help line with operating instructions

Note
A detailed description of the log book is given in the IQ SENSOR NET system operating manual.

Measured value display

The measured value display contains the following information for each sensor/differential sensor:

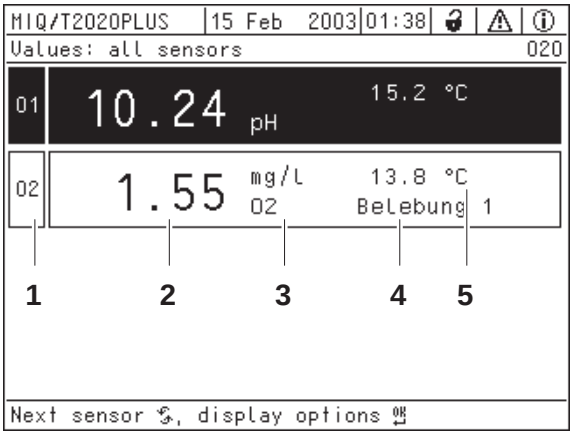


Fig. 4-3 Display - measured value display

1	Consecutive numbering of the measured values
2	Main measured value
3	Unit and parameter of the main measured value
4	Name of the sensor
5	Secondary measured value with unit, e.g. temperature

Special displays

Init	Sensor is being initialized ● during commissioning or ● if a new sensor is identified and this does not yet provide any measured values
Set	Sensor is being set
Cal	Sensor is being calibrated
----	Invalid measured value, or defective sensor
Error	Communication with sensor interrupted
OFL	Measuring range undercut or exceeded (overflow)
Clean	The time-controlled sensor cleaning function is active (see MIQ/CR3 operating manual).
Display flashes	Sensor in maintenance condition

4.1.3 Keys

Key	Function
(M)	Display measured values
(C)	Start calibration of the sensor selected in the measured value display
(S)	Open the *Settings* menu
(ESC)	Change to the higher menu levels or abort entries without storing them
(OK)	Confirm selection

4.1.4 Rotary switch

Rotary switch	Function
(↻)	Highlight and select: ● Menu items ● Entries ● Columns or fields ● Letters or numerals

Note
The selection highlighted with the rotary switch is displayed as white text on a black background (reverse video).

4.2 General operating principles

The operation of the IQ SENSOR NET is standardized and user-friendly.

- Make a selection with the rotary switch
  - Highlight individual elements in menus, lists and tables, e.g. menu entries, list elements, columns or fields
  - Select a setting in selection fields
  - Select a character in text entry fields
- Confirm a selection with the OK key.
- Break off an action and change to the next higher level with the ESC key.
- Start a calibration procedure with the C key.
- Switch to the settings with the S key.
- Change to the measured value display and break off current actions with the M key.

Note
Short operating instructions are given in the help lines on the display.

Examples of the operating principles are given below:

- Navigation in menus, lists and tables (see chapter 4.2.1)
- Entering text and numerical values (see chapter 4.2.2)

4.2.1 Navigating in menus, lists and tables

1	Open the *Settings* menu with (S). Menus appear in the form of a list on the display, e.g. the *Settings* menu shown here.

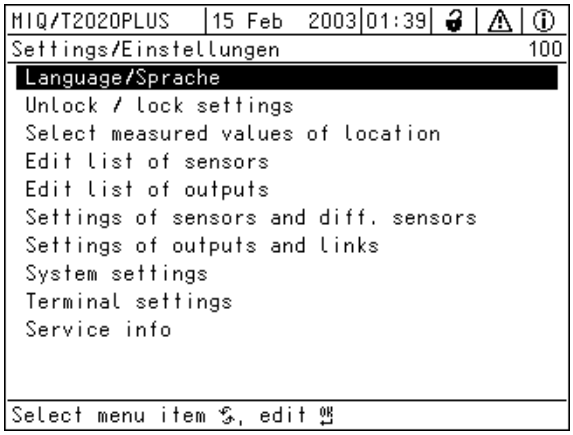


Fig. 4-4 100 - Settings

2	Select a menu item (e.g. *System settings*) with (↻). Move the highlighting (reverse video display, black background) in the list of menu items by turning the rotary switch (↻).
3	Confirm the menu item (e.g. *System settings*) with (OK). The display (e.g. *System settings*) opens. Confirm the selection and move to a new display by pressing the (OK) key.
4	Return to a higher level with (ESC). or: Switch to the measured value display with (M).

4.2.2 Entering text or numerical values

You can assign names to sensors, outputs, terminals and locations.
Example: Entering a sensor name:

1	Open the *Settings* menu with (S).
2	Select the *Edit list of sensors* menu item with (↻).
3	Confirm the menu item (e.g.*Edit list of sensors*) with (OK). The *Edit list of sensors* display opens. A column is highlighted.
4	Select the *Sensor name* column with (↻).
5	Confirm the column *Sensor name* with (OK). A sensor name is highlighted.
6	Select a sensor name with (↻).

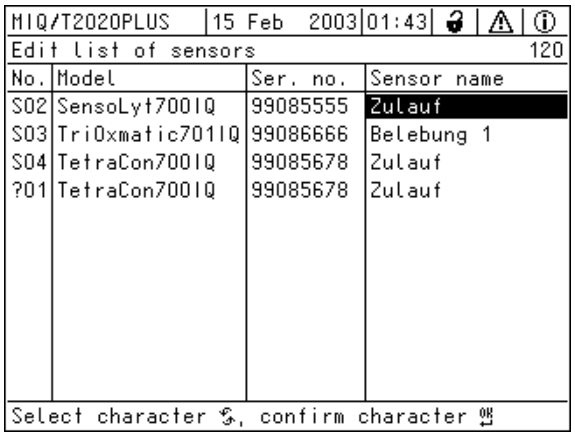


Fig. 4-5 120 - Edit list of sensors

7	Confirm the selection with (OK). The name of the selected sensor is edited.

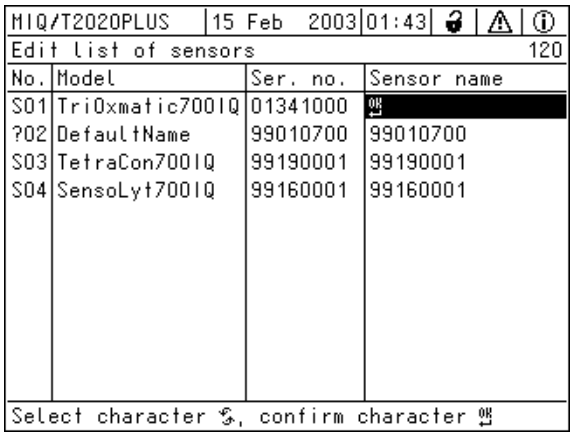


Fig. 4-6 120 - Edit list of sensors

Note
The following letters, numerals and special characters can be entered:
AaBb..Zz0..9µ%&/()+-=><!?_ °.

8	Select a letter or numeral with ⟲.
9	Confirm the letters with OK. The character ↵ appears behind the last letter.

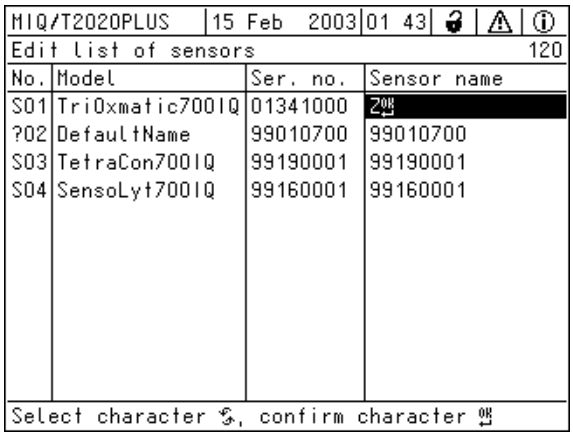


Fig. 4-7 120 - Edit list of sensors

10	● Add a new character Select the character to be added with ⟳ and confirm with (OK). or ● Delete the last character Select the character ← with ⟳ and confirm with (OK). or ● Adopt the name Select the character OK with ⟳ and confirm with (OK).
11	Repeat steps 8 to 10 until the whole name has been entered.

Note
Break off entering the name with (ESC). The old name is retained.

4.3 MIQ/T2020 PLUS controller operation

4.3.1 General information

The diagram on the following page shows the functionality of the MIQ/T2020 PLUS controller operation:

Operation of the MIQ/T2020 PLUS controller (simplified)

Controller operation

Terminal operation

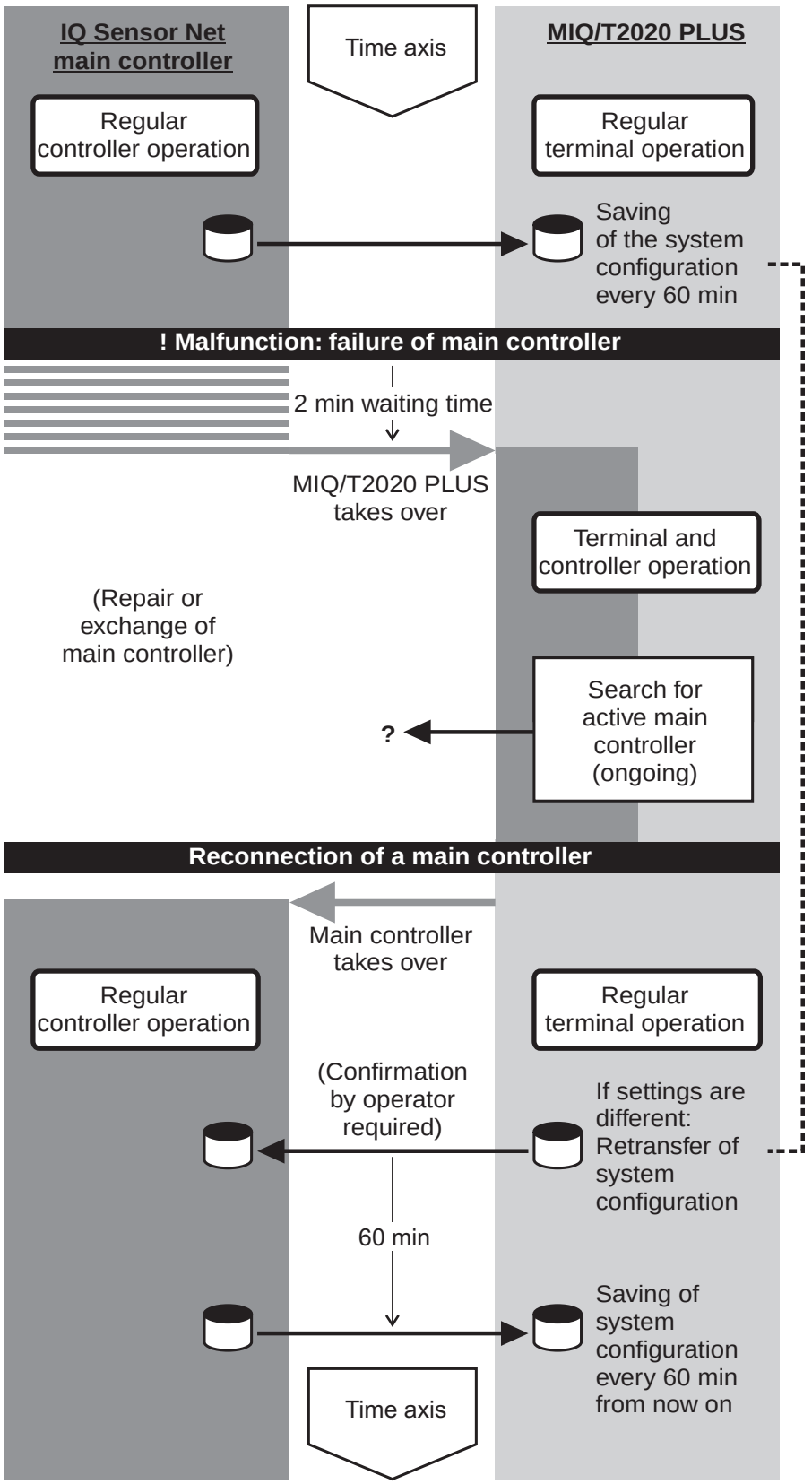


Fig. 4-8 Taking over the controller functions

How it works in detail:

Normal operation

- In normal operation, the main controller carries out the regular controller functions.
- The MIQ/T2020 PLUS works as a regular terminal.
- The MIQ/T2020 PLUS saves the system configuration:
  - Automatic saving processes take place 60 minutes after initialization and then regularly every 60 min.
  - Additionally to automatic saving, the saving can also be started manually at any time (see section 4.3.2). When doing so the timer for automatic saving is reset.
  - Automatic saving only takes place in the measuring mode (normal measured value display). If the MIQ/T2020 PLUS is in a different mode, the next saving process takes place as soon as it is switched to the measuring mode.
  - If a saving process fails, e.g. because another terminal is in the setting or calibration mode, a new saving process is started after 30 s. After three failed trials the next automatic saving process takes place after 60 min.
  - A message appears on the display during the saving process. If required, the running saving process can be canceled with the ESC or M key.
- The MIQ/T2020 PLUS continuously receives information on the status of the main controller.

Event: Failure of the main controller (MIQ/T2020 PLUS controller operation)

- If the MIQ/T2020 PLUS does not receive a valid telegram from the main controller **for a period of 2 minutes** it takes over the controller operation. The MIQ/T2020 PLUS is reinitialized.
- A log book message is generated when the controller operation is taken over.
- During the MIQ/T2020 PLUS controller operation
  - an "A" (=active) appears behind the instrument designation in the top left corner of the display.
  - no changes of the IQ SENSOR NET configuration can be made. Only the date and time can be changed. All other settings are locked (🔒).
  - neither sensors nor input or output modules can be added.
  - no data logger is available. Accordingly, the data transmission function cannot be carried out.
  - the MIQ/T2020 PLUS keeps a separate log book. The log book is empty when the controller operation is taken over. The topmost

message contains the information on controller operation. It cannot be acknowledged or erased. The log book is erased when the controller operation is terminated.

Event: Main controller starts operation again

- As soon as the MIQ/T2020 PLUS receives a valid telegram from a main controller in the IQ SENSOR NET again, it is reinitialized as a regular terminal. The main controller continues to work as the regular controller. When doing so it uses the settings of its own (or the default settings if it is a virgin controller).
- The MIQ/T2020 PLUS recognizes whether the system configuration in the main controller differs from the saved system configuration and, if necessary, offers to retransfer the saved system configuration to the main controller (see section 4.3.3).



Note
With controller versions 2.66 or higher, the actual system configurations are compared by means of a checksum. This is not possible with older controller versions. Instead the series number is checked to determine whether it is the original instrument or a replacement. If the series number is different the MIQ/T2020 PLUS automatically offers to retransfer the system configuration.

4.3.2 Saving the system configuration manually

Apart from automatically saving the system configuration, the system configuration of the main controller can be saved manually in the MIQ/T2020 PLUS at any time during regular terminal operation.

To do so, proceed as follows:

1	Open the *Settings* menu with (S).
2	Select the *Service* menu item with (↻) and press (OK).
3	Using (↻), select the menu item, *Save configuration,* and press (OK). The process is started.
4	Wait until the saving process is finished.
5	Confirm the closing message with (OK).

Safety copy before changing the system configuration

If you want to carry out changes of the system configuration that may have to be undone again (for example if you want to test certain functions for a short time), you can perform a manual saving process beforehand. When doing so the timer for automatic saving is reset, i. e. the safety copy is available for 60 minutes. Then it is overwritten with the current configuration.

4.3.3 Retransferring the system configuration

The system configuration saved by the MIQ/T2020 PLUS can be retransferred to the main controller. Thus, the original system configuration can be quickly restored after exchanging a defective controller. Precondition for this is that both controllers are of the same type and the software version of the replacement controller is equal or higher than that of the original controller.



Note
With controller versions lower than 2.70, the following settings cannot be retransferred:

- Password
- Locking open or closed
- Language
- Height of the location (with systems without automatic air pressure compensation only).

The settings of the main controller are retained here.

Retransfer after MIQ/T2020 PLUS controller operation

After being initialized as the regular terminal, the MIQ/T2020 PLUS checks whether the system configuration in the main controller differs from that in the MIQ/T2020 PLUS (date and time are not taken into account). If the configurations differ, a window appears on the display containing a corresponding note and the offer to retransfer the system configuration to the main controller.



Note
The timer for the regular automatic saving process carried out by the MIQ/T2020 PLUS only starts when you have confirmed or rejected the command for retransferring the system configuration. From this point of time, it takes 60 minutes for the first automatic saving process to start (there is the additional option to save manually). If you reject the command to retransfer the system configuration and continue to work with the system configuration of the main controller, the system configuration stored up to this time is overwritten in the MIQ/T2020 PLUS after 60 minutes and cannot be restored anymore.

Manual retransfer

The system configuration stored in the MIQ/T2020 PLUS can be manually retransferred to the main controller at any time. To do so, proceed as follows:

1	Open the *Settings* menu with (S).
2	Select the *Service* menu item with (↻) and press (OK).
3	Using (↻), select the menu item, *Retransfer configuration,* and press (OK). The process is started.
4	Wait until the retransfer is completed.
5	Confirm the closing message with (OK).

4.4 Software status

The system gives information on the current versions of the software.

1	Call up the measured value display with (M).
2	Open the *Settings* menu with (S).
3	Highlight the *Service* menu item with (↻) and confirm with (OK). The *Software versions* dialog window opens.

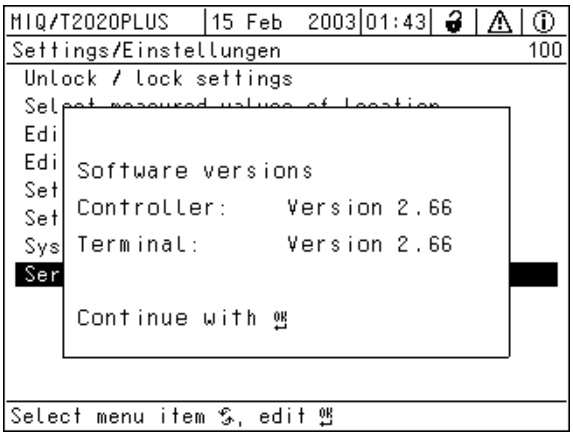


figure 4-9 100 - Settings -> Service

4	Leave the *Software versions* dialog window with (M) or (OK).

5 Settings/Setup

5.1 Selecting the language

A list shows all the available system languages.

1	Open the *Settings* menu with Ⓢ.
2	Select and confirm the menu item *System settings* -> *Language* with ⟲ and Ⓞ. The *Language* display opens.

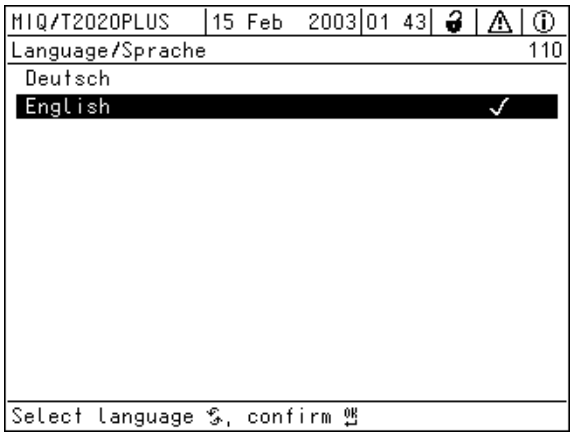


Fig. 5-1 110 - Language

3	Select a language from the list with ⟲ and confirm with Ⓞ. The active language is marked with a tick.
4	Switch to the higher menu level with Ⓔ. or: Switch to the measured value display with Ⓜ.

Note
If the selected system language is not available in a component, all indications of this component (e.g. sensor, controller, terminal, MIQ/CR3) appear in the standard language, English. To activate the selected system language for this component, a software update of the component is required. Please contact WTW.

5.2 Terminal settings

The terminal settings include:

- *Terminal name*, user-defined
- *Illumin. brightness*
- *Display contrast*

1	Open the *Settings* menu with (S).
2	Select the *Terminal settings* menu item with (↻) and confirm with (OK). The *Terminal settings* display opens.

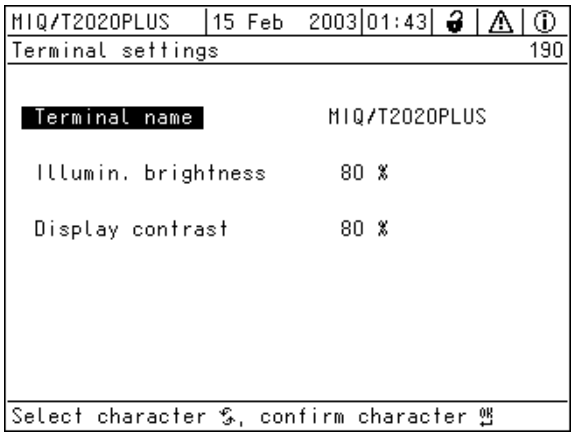


Fig. 5-2 190 - Terminal settings

Terminal name

The name of the terminal and the instrument designation alternately appear in the top left corner of the display (display changes in cycles of 5 s). 15 characters are available for the name.

3	Select the *Terminal name* menu item with (↻) and confirm with (OK).
4	Enter the terminal name with (↻) and (OK) and confirm with (OK) (see also section 4.2.2).

Illumination brightness

The brightness of the illumination can be continuously adjusted.

5	Select the *Illumin. brightness* menu item with ⟳ and confirm with OK.
6	Select a brightness level and confirm with ⟳ and OK.

Display contrast

The contrast level of the display can be continuously adjusted.

7	Select the *Display contrast* menu item with ⟳ and confirm with OK.
8	Select a contrast level and confirm with ⟳ and OK.

6 Maintenance and cleaning

6.1 Maintenance

The MIQ/T2020 PLUS requires no special maintenance. The general maintenance of IQ SENSOR NET components is described in the IQ SENSOR NET system operating manual.

6.2 Cleaning

The cleaning of IQ SENSOR NET components is described in the IQ SENSOR NET system operating manual.

7 Technical data

Dimensions

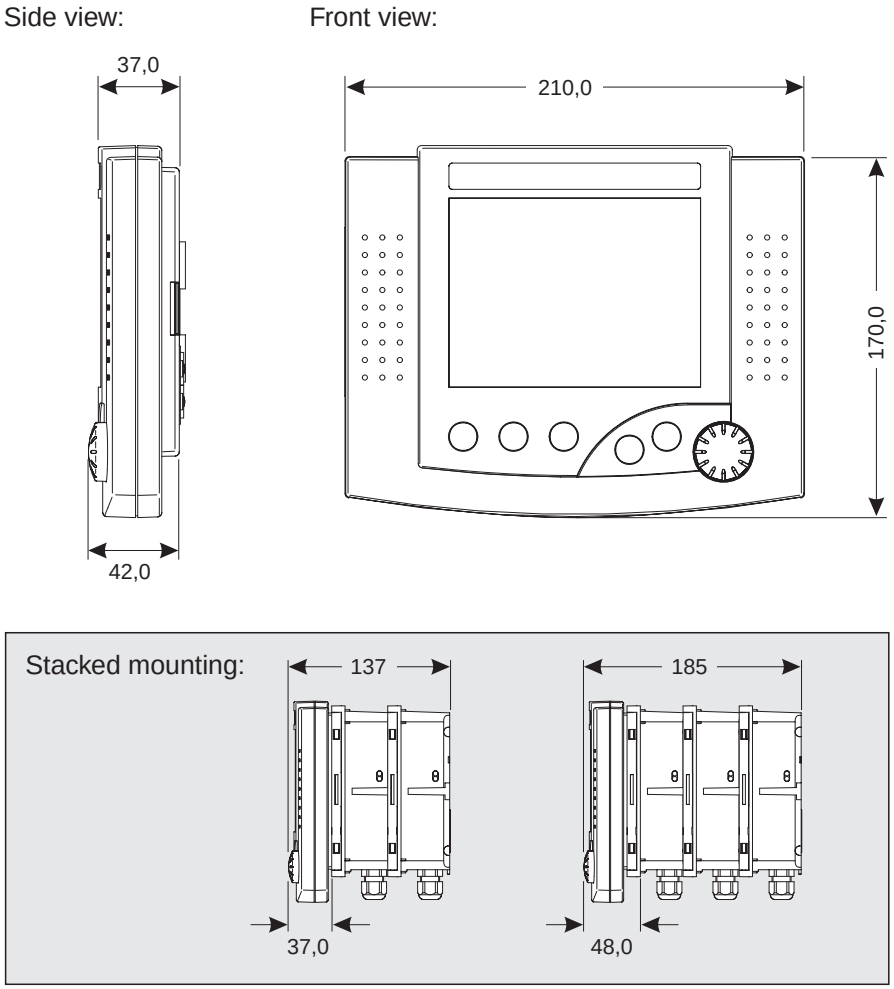


Fig. 7-1 Dimension drawing of the MIQ/T2020 PLUS terminal (dimensions in mm)

Mechanical construction

Housing material	ASA (Acrylonitrile Styrene Acrylesterpolymer)
Weight	Approx. 0.7 kg
Type of protection	– IP 66 – In accordance with NEMA 4X The terminal is not suitable for conduit connection – NEMA 3S

Number of MIQ/ T2020 PLUS in the IQ SENSOR NET

Depending on the number of terminal components already installed. A total of up to three terminal components can be used in the IQ SENSOR NET.

Electrical data

Supply voltage	Max. 24 VDC via the IQ SENSOR NET (for details, see chapter TECHNICAL DATA of the system operating manual)
Power consumption	3.0 W