SCU
Control Unit

Description, Start-up, Operation

CO
mg/m³
12.3

Sensor Intelligence.
**Product**
Product name: SCU  
Version: SCU-P100

**Manufacturer**
SICK AG  
Erwin-Sick-Str. 1 · 79183 Waldkirch · Germany  
Phone: +49 7641 469-0  
Fax: +49 7641 469-1149  
E-Mail: info.pa@sick.de

**Legal information**
This document is protected by copyright. Any rights derived from the copyright shall be reserved for SICK AG. Reproduction of this document or parts of this document is only permissible within the limits of the legal determination of Copyright Law. Any modification, shortening or translation of this document is prohibited without the express written permission of SICK AG. The trademarks stated in this document are the property of their respective owner.

© SICK AG. All rights reserved.

**Original document**
This document is an original document of SICK AG.
# Contents

1 About this Document ................................................................. 6  
1.1 Symbols and document conventions ........................................ 6  
1.1.1 Warning symbols ............................................................. 6  
1.1.2 Warning levels and signal words ........................................ 6  
1.1.3 Information symbols ....................................................... 6  
1.2 Intended use ............................................................... 6  
1.3 Responsibility of user ...................................................... 7  
1.4 Additional documentation/information .................................... 7  
1.5 Data integrity ............................................................... 7  

2 Description of the SCU ....................................................... 8  
2.1 Product identification ................................................... 8  
2.2 Overview of the SCU ................................................... 8  
2.2.1 The SCU controls an own analyzer ................................ 8  
2.2.2 The SCU controls several analyzers (remote control) .......... 9  
2.3 Features of the SCU .................................................... 10  
2.3.1 Control, parameter setting and display ......................... 10  
2.3.2 Processing, saving and output of measured values ........ 10  
2.3.3 Data interfaces ......................................................... 10  
2.3.4 SOPAS ET engineering tool ......................................... 10  
2.4 Method of operation of the SCU ....................................... 10  
2.5 SOPAS system concept ................................................... 11  
2.6 Subassemblies associated with the SCU ........................... 12  

3 Start-up ................................................................. 13  
3.1 Scope of delivery ...................................................... 13  
3.2 Start-up ................................................................. 13  
3.2.1 Registering an analyzer ........................................... 15  
3.2.1.1 Automatic installation of device description file ......... 15  
3.2.1.2 Installing the device description file, manual/automatic .... 15  
3.3 RS485 plug ............................................................. 16  
3.4 CAN bus ............................................................... 16  
3.4.1 CAN interface on the SCU ........................................ 17  
3.4.1.1 Plug with terminating resistor ............................... 17  
3.5 Ethernet interface ...................................................... 18  
3.5.1 Connection to a PC ............................................... 18  
3.5.2 Connection to a switch or a hub ............................... 19  
3.6 Modbus ................................................................. 19  
3.7 OPC ................................................................. 19
7 Clearing Malfunctions ................................................................. 48
  7.1 Faults on the monitor............................................................... 48
  7.2 Incorrect display of date and/or time ....................................... 48
  7.3 A status field lights yellow or red ........................................... 48
  7.4 Menu level line is highlighted red .......................................... 48
  7.5 CAN communication interrupted .......................................... 48

8 Technical Documentation .......................................................... 49
  8.1 Compliances ........................................................................ 49
    8.1.1 Electrical protection ....................................................... 49
  8.2 Licenses ............................................................................. 50
  8.3 Dimensions and fitting opening .............................................. 51
    8.3.1 Fastening ..................................................................... 52
  8.4 Technical data ..................................................................... 53
    8.4.1 Panel .......................................................................... 53
    8.4.2 Data lines ..................................................................... 53

9 Glossary .................................................................................. 54
1 About this Document

1.1 Symbols and document conventions

1.1.1 Warning symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️</td>
<td>Hazard (general)</td>
</tr>
<tr>
<td>⚡️</td>
<td>Hazard by voltage</td>
</tr>
</tbody>
</table>

1.1.2 Warning levels and signal words

**Danger**
Risk or hazardous situation which *will* result in severe personal injury or death.

**Warning**
Risk or hazardous situation which *could* result in severe personal injury or death.

**Caution**
Hazard or unsafe practice which *could* result in personal injury or property damage.

**NOTICE**
Hazard with possible risk of damage.

1.1.3 Information symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️</td>
<td>Important technical information for this product</td>
</tr>
<tr>
<td>⚡️</td>
<td>Important information on electrical or electronic functions</td>
</tr>
</tbody>
</table>

1.2 Intended use

The SCU (System Control Unit) is a control unit for comfortable and efficient control of analyzers.
1.3 Responsibility of user

Correct use
- Use the SCU only as described in these Operating Instructions. The manufacturer bears no responsibility for any other use.
- No components may be removed, added or changed on the SCU unless described and specified in the official manufacturer information.

Otherwise:
- The SCU could become dangerous to use.
- Any warranty by the manufacturer becomes void.

Retention of documents
These Operating Instructions:
- Must be available for reference.
- Must be passed on to new owners.

1.4 Additional documentation/information

Additional instructions:
- Technical Information SCU (for programmers)
- Operating Instructions for the connected analyzer/sensor
- Operating Instructions “Modular I/O System”

1.5 Data integrity

SICK AG uses standardized data interfaces such as, for example, standard IP technology, in its products. The focus here is on product availability and features. SICK AG always assumes that the customer is responsible for the integrity and confidentiality of data and rights involved in connection with using the products. In all cases, the customer is responsible for the implementation of safety measures suitable for the respective situation, e.g., network separation, firewalls, virus protection and patch management.
2 Description of the SCU

2.1 Product identification

<table>
<thead>
<tr>
<th>Product name</th>
<th>SCU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>SCU-P100</td>
</tr>
<tr>
<td>Part No.</td>
<td>2056275</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>SICK AG Erwin-Sick-Str. 1 · 79183 Waldkirch · Germany</td>
</tr>
</tbody>
</table>

The identification number (type plate/device plate) is located on the rear of the operator panel.

2.2 Overview of the SCU

The SCU (System Control Unit) is a control unit for comfortable and efficient control of analyzers. The following actions can be performed on the analyzers via the SCU:

- Control, parameter setting and display.
- Measured value processing.
- Remote diagnosis.

The SCU is connected with the analyzers via a System bus. The SCU has digital and analog I/O interfaces for peripheral connections. The SCU is operated via the built-in screen (operator panel) or a PC.

2.2.1 The SCU controls an own analyzer

When the SCU controls an own analyzer, the SCU is then typically in the analyzer. The analyzer is operated via the SCU.

In the simplest case, the interfaces to the process peripherals and to the System bus are also in the analyzer (see Operating Instructions of analyzer).
2.2.2 The SCU controls several analyzers (remote control)

Fig. 2: SCU on the System bus

When remote control or joint control of several analyzers is used, the analyzers are connected to the SCU via a System bus. All connected analyzers are operated via the SCU. In this case, interfaces to the process peripherals are located on the SCU and additionally on the System bus (depending on the configuration).
2.3 Features of the SCU

2.3.1 Control, parameter setting and display

- Numeric and/or graphic display of measured values in variable combinations.
- Setting parameters of connected analyzers.
- Control of sequences such as check cycles and relay switching.
- Generation of status messages and logbook entries.

2.3.2 Processing, saving and output of measured values

- Comprehensive calculation options; input of formulas in the Formula editor.
- Data smoothing through averaging.
- Monitoring and signaling limit values.
- Scaling of measured values by conversion to standard physical conditions with default values or measured values of connected analyzers.
- Control of processes by logical linking.
- Export of logbook entries.
- Activation of I/O interfaces.

2.3.3 Data interfaces

- Access to SCU communication with analyzers via System bus (CAN bus).
  - CAN1 (System bus to analyzer); 125 kBaud (default setting).
  - CAN2 (System bus to remote I/O interface (option)); 50 kBaud.
  - Cable length:
    - Max. 500 m for 125 kbaud
    - Max. 1000 m for 50 kbaud
    (longer lengths for lower transfer rates).
- Data transfer from maximum 16 analyzers.
- Interfaces
  - RS485 (Modbus RTU)
  - Ethernet (Modbus TCP/IP)
  - OPC (option)
  - SOPAS ET
- Modular I/O system

2.3.4 SOPAS ET engineering tool

Operator menus and measured value displays are also available on an external PC via the Ethernet connection with the SOPAS ET engineering tool (see “SOPAS Engineering Tool (SOPAS ET)”, page 47).

2.4 Method of operation of the SCU

The SCU searches for (“scans”) analyzers via the System bus. The analyzers found are displayed and can then be operated from the SCU.

When modular system I/O (see “Subassemblies associated with the SCU”, page 12) is connected, the SCU checks the position and function of the connected I/O module.
2.5 SOPAS system concept

The SICK Open Portal for Applications and Systems (SOPAS) is an engineering tool for communication with analyzers and sensors.

SOPAS is based on the following techniques:

- Device communication via Ethernet (TCP/IP).
- A common engineering tool for the various product lines.
- Universal device description file as the data source for all relevant device data and parameters required for communication and display.
- Interfaces for direct communication with the analyzers or SCU.

Access paths to SOPAS-based analyzers

- Via the SCU control unit.
- Via a PC with the program (Engineering Tool) SOPAS ET (see “SOPAS Engineering Tool (SOPAS ET)”, page 47)

Fig. 3: SOPAS system concept

The menu structure and presentation are principally identical on the SCU and on the PC with SOPAS ET. The presentation on the SCU is adapted to the smaller monitor.

For more information on the SOPAS concept, see the Help menu of SOPAS ET.
2.6 Subassemblies associated with the SCU

Fig. 4: Overview of subassemblies associated with the SCU

Description of the “CAN bus gateway” and “Modular system I/O” see Operating Instructions “Modular system I/O.”
3 Start-up

3.1 Scope of delivery

- SCU
- 2 CAN plugs with switchable CAN bus termination
- CD-ROM with:
  - License conditions
  - Operating Instructions SCU
  - Operating Instructions “Modular I/O System”
  - SOPAS ET (program)
  - SCU installation package

⚠️ Pay attention to the license conditions (see CD-ROM).

3.2 Start-up

The SCU is pre-installed and ready for operation.
It contains a CompactFlash card and all driver programs required for operation.
It does not contain the device descriptions for the specific analyzers (.sdd) for visualization.

+i Installing programs on the SCU see “Technical Information of the SCU”

Fig. 5: Connections on the back of the panel
**Start-up procedure**

1. Install the panel (fitting opening, see “Dimensions and fitting opening”, page 51).
2. Connect potential equalization (see “Connections on the back of the panel”, page 13).
3. CAN1: Connect the System bus to the analyzers.
   - Observe CAN bus termination (see “CAN bus”, page 16).
4. CAN2: Connect the System bus to the "Modular I/O system”.
   - Observe CAN bus termination (see “CAN bus”, page 16).
5. Install the modular I/O system, see Operating Instructions “Modular I/O System”.
6. Connect the power supply (24 V DC) (plug provided).
7. Connect Ethernet when available (see “Ethernet interface”, page 18)
   - Operation of SCU, see “Operation”, page 20
   - Operation of SCU via SOPAS ET (option), see “SOPAS Engineering Tool (SOPAS ET)”, page 47
3.2.1 Registering an analyzer

The SCU recognizes connected analyzers automatically.

A so-called device description file is installed during installation of the analyzer.

3.2.1.1 Automatic installation of device description file

The following screen message is displayed when the analyzer supports automatic installation:

- The menu displays the identification of the analyzer connected.
- To install the device description file, touch the “Install Device description file” field. The device description file is then loaded automatically.
- “Restart the user interface” (see “Selecting analyzers and general setup”, page 24).

3.2.1.2 Installing the device description file, manual/automatic

The following screen message is displayed when the analyzer does not support automatic installation:

- The menu displays the identification of the analyzer connected.
- Install the device description file (*.sdd) with SOPAS ET.
  1. Open SOPAS ET
  2. Menu SCU_P100/Parameter/Device
  3. Enter the name of the desired device description file (*.sdd) and download the file.
3.3 RS485 plug

*Fig. 7: PIN assignment of RS485 plug for Modbus*

![Diagram of RS485 plug PIN assignment]

The RS485 interface is not electrically isolated.

To use the interface outside of the housing containing the SCU: Use the kit for galvanic isolation (Part No.: 2071639).

3.4 CAN bus

The CAN bus is a serial 2-wire bus system to which all bus participants are connected parallel (i.e. with short stub lines).

- The CAN bus is a line structure. Do not use star topology here.

- Each end of the CAN bus must be closed off with a 120 ±10% Ohm terminating resistor (prevents reflections).
- This is also required for very short line lengths.

*Fig. 8: CAN bus principle*

![Diagram of CAN bus principle]

- Terminating resistors for the first and last bus participants must be activated.
- The terminating resistor for middle bus participants must be deactivated.

The following is valid for the SCU:

- Stub lines lead to reflections on the bus, therefore:
  - Avoid stub lines whenever possible, otherwise limit these to max. 10 m.
- Max. CAN bus length:
  - 500 m for 125 kbaud
  - 1000 m for 50 kbaud
3.4.1 CAN interface on the SCU

The SCU does not contain an internal terminating resistor.

Fig. 9: PIN assignment of interfaces CAN1 and CAN2

Pin assignment of plug SUB-D 9-pole:
- 2 - CAN low
- 3 - GND
- 7 - CAN high

3.4.1.1 Plug with terminating resistor

Two plugs are enclosed with the SCU to switch the respective terminating resistor (CAN1 or CAN2) on and off.

These plugs can be connected to interface CAN1 or CAN2.

Fig. 10: Plug with slide switch for terminating resistor

The plugs have a slide switch for switching the terminating resistor on or off:

<table>
<thead>
<tr>
<th>Position</th>
<th>Terminating resistor</th>
<th>Bus participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>Switched on</td>
<td>Terminal equipment</td>
</tr>
<tr>
<td>OFF</td>
<td>Switched off</td>
<td>First or middle device</td>
</tr>
</tbody>
</table>

Terminating resistor: 120 Ohm.

Connecting the CAN line

1. Unscrew the plug.
2. Connect the CAN line inside the plug (the connecting diagram is inside the plug).
   Specification of CAN line, see “Data lines”, page 53.
3. Connect the shield across the complete bus and only ground galvanically at one location (prevents ground loops).
4. Screw the plug in again.
5. Set the switch to the desired position.
6. Insert the plug in the CAN1 or CAN2 port and screw tight.
3.5 Ethernet interface

*Fig. 11: Ethernet port on the back of the panel*

- Plug: RJ 45
- Transfer parameter: 100 Mbit/s

**Address settings:** see “Technical Information SCU” Manual

3.5.1 Connection to a PC

*Fig. 12: SCU on the PC*

- Cable: Crossover

**Procedure**

▸ Connect the Ethernet cable.
3.5.2 Connection to a switch or a hub

Fig. 13: SCU on hub/switch

A PC and a network can be connected simultaneously to the SCU using a switch (multiple distributor) or hub.

- Port on the switch: Optional.
- Cable: 1:1 (no crossover).
  Crossover cable possible, depending on switch or hub.

**Procedure**

- Connect the Ethernet cable.

3.6 Modbus

A menu is available to configure the inputs and outputs.

- It is possible to set whether Modbus TCP (Ethernet) or Modbus RTU (RS485) is used via menu System Control Unit/Configuration/Modbus (see “Technical Information SCU” Manual).
- The inputs and outputs can be configured via menu System Control Unit/Configuration/I/O/Data/Modbus outputs (see “Technical Information SCU” Manual).

![Pin assignment plug: see “RS485 plug”, page 16](#)

3.7 OPC

- The OPC outputs can be configured via menu System Control Unit/Configuration/I/O/data/OPC outputs (see “Technical Information SCU” Manual).
4 Operation

4.1 Operator panel (screen)

The SCU is operated via its operator panel (with touchscreen).

4.1.1 Starting the SCU

1. After the power supply is switched on (see "Start-up", page 13):
   - The SICK logo appears after a few seconds
   - The green LED “POWER” goes on after a few more seconds.
2. A brown progress bar is shown.
3. The display goes off for a few seconds.
4. A blue progress bar, a gray status bar and a clock symbol with rotary segments are shown.
   This process runs for a few minutes (depending on the number and type of analyzers connected).

Fig. 14: Operator panel

5. The Start screen is displayed with the Measuring screen (see "Measuring screen", page 21).
   (Start screen default: see “Start screen”, page 27.)
4.1.2 Measuring screen

Typical Measuring screen:

- **2 status bars**, see “Status bars”, page 22
- **Current menu level**
- **Measuring box**, see “Measuring box (description)”, page 29
- **Highlighted Light brown**: The respective analyzer is shown in the lower status bar

Switch to higher menu level. The field “Measure” is then displayed instead of “Date and Time”:

Touching “Measure” shows the Measuring screen again.

Date and time (dd.mm.yy)

Further information on the Measuring screen, see “Measuring box (description)”, page 29

- To exit the menu: Touch .
- Set the Measuring screen parameters: see “Measuring screen”, page 27

4.1.2.1 Set time and date

Set time and date, see “Incorrect display of date and/or time”, page 48
4.1.3 Status bars

The SCU has 2 status bars:

- Upper status bar: Status bar of the SCU (host control unit).
- Lower status bar: Status bar of the analyzer currently selected.

The status bars have status fields (according to parameter settings) to show the respective device status.

Significance of the status fields

<table>
<thead>
<tr>
<th>Code</th>
<th>Color</th>
<th>Significance</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>green</td>
<td>Correct operation</td>
<td>---</td>
</tr>
<tr>
<td>MReq</td>
<td>Yellow</td>
<td>Maintenance</td>
<td>A device function will soon be restricted.</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>Check</td>
<td>Internal functional check is running.</td>
</tr>
<tr>
<td>U</td>
<td></td>
<td>Outside specification</td>
<td>Measured values are outside the specification.</td>
</tr>
<tr>
<td>F</td>
<td>red</td>
<td>Failure</td>
<td>Failure.</td>
</tr>
</tbody>
</table>

The status fields are dependent on the parameter setting of the SCU (see "Technical Information SCU" Manual) or the analyzer.

Status of the measuring box:
- White: Measured value OK
- Yellow: Function control/maintenance request/ outside specification
- Red: Failure

Existence and logic of the status field are dependent on the parameter setting of the SCU (see "Technical Information SCU" Manual) or the analyzer.
The following can be done if a status field is yellow or red:

- Touch the colored measuring box: The lower status bar will display the respective analyzer. If no analyzer displays a failure: The failure is caused by the SCU.
- Touch repeatedly until the menu selection (see “Selecting analyzers and general setup”, page 24) appears and then go to the menu of the respective analyzer or of the SCU.
- Go to the Diagnosis menu (depending on the analyzer).

Usually, the status bar of the SCU is parameterized as “Group alarm”. This means that the error message of an analyzer which is not displayed will appear as status message in the status bar of the SCU.
4.2 Selecting analyzers and general setup

▸ To position to the top menu line: Touch \[\text{ }\] (several times).

4.3 Entering text

When you touch a line requiring a text input: A screen is displayed to enter the text:

- “CAPS” button: Toggle between lower and upper case letters.
  - The “CAPS” LED goes on: Upper case letters are switched on.
- Button “12?”: Switches to number pad and special characters

You can also enter texts using SOPAS ET (see “SOPAS Engineering Tool (SOPAS ET)”, page 47).
### 4.4 SCU menu tree

The menus for user levels “user” and “authorized operator” are shown.

Password: see “Login (user level)”, page 26

<table>
<thead>
<tr>
<th>Menu tree</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCU</strong></td>
<td></td>
</tr>
<tr>
<td>Login</td>
<td>see page 26</td>
</tr>
<tr>
<td>Upload all Parameters from Device</td>
<td>see page 27</td>
</tr>
<tr>
<td>Start screen</td>
<td>see page 27</td>
</tr>
<tr>
<td>Measuring screen</td>
<td>see page 27</td>
</tr>
<tr>
<td>Measuring screen 1 .. 16</td>
<td>see page 27</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td>see page 31</td>
</tr>
<tr>
<td>Restart SCU</td>
<td>see page 31</td>
</tr>
<tr>
<td>Data backup - Parameter settings</td>
<td>see page 31</td>
</tr>
<tr>
<td>Tests</td>
<td>see page 32</td>
</tr>
<tr>
<td><strong>Adjustment</strong></td>
<td>see page 37</td>
</tr>
<tr>
<td>Test Gas Table</td>
<td>see Technical Information SCU</td>
</tr>
<tr>
<td>Manual adjust</td>
<td>see page 37</td>
</tr>
<tr>
<td><strong>Diagnosis</strong></td>
<td>see page 39</td>
</tr>
<tr>
<td>Logbook</td>
<td>see page 39</td>
</tr>
<tr>
<td>Device state data</td>
<td>see page 42</td>
</tr>
<tr>
<td>Cyclic Trigger</td>
<td>see page 42</td>
</tr>
<tr>
<td><strong>Device</strong></td>
<td>see page 43</td>
</tr>
<tr>
<td>Validation results[1]</td>
<td>see page 44</td>
</tr>
<tr>
<td>Adjustment results[1]</td>
<td>see page 45</td>
</tr>
<tr>
<td>System overview</td>
<td>see page 46</td>
</tr>
<tr>
<td><strong>Parameter settings</strong></td>
<td>see Technical Information SCU</td>
</tr>
<tr>
<td>Measuring screen</td>
<td>see Technical Information SCU</td>
</tr>
<tr>
<td>I/O</td>
<td>see Technical Information SCU</td>
</tr>
<tr>
<td>Modbus</td>
<td>see Technical Information SCU</td>
</tr>
<tr>
<td>OPC outputs (OPCDo)</td>
<td>see Technical Information SCU</td>
</tr>
<tr>
<td>Device</td>
<td>see Technical Information SCU</td>
</tr>
</tbody>
</table>

[1] Only appears when an analyzer is connected
5 SCU Menus (Representation)

5.1 Login (user level)

Menu: System Control Unit/Login

<table>
<thead>
<tr>
<th>User level</th>
<th>Designation</th>
<th>Allowed actions</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>User</td>
<td>Viewing measured values and parameters. No password</td>
<td>No password</td>
</tr>
<tr>
<td>3</td>
<td>Authorized operator</td>
<td>Starting actions and changing parameters</td>
<td>HIDE[3]</td>
</tr>
</tbody>
</table>

[3] The password is valid for the operator panel and SOPAS ET

- If there is no input at user level 3 for a period of 30 minutes, a dialog window is shown where you can confirm that you want to remain at this user level.  
- At user level 1, the menus of user level 3 are not shown or are blocked for inputs. The blocked fields are then grayed out.

The menus for user levels “user” and “authorized operator” are described in this Manual.
5.2 Upload all parameters from device

Menu: System Control Unit

The current parameters from the SCU memory are loaded to the SCU operating unit. There is no further query, touching the Menu item will start parameter loading.

⚠️ If it is possible that parameters were changed in the SCU via the Ethernet (e.g., via SOPAS ET):
- Perform “Upload all Parameters from Device” before changing parameters.

5.3 Start screen

Menu: System Control Unit/Start screen

The Start screen is automatically displayed after the start of the SCU or after touching “Measure”.

You can select the desired Start screen from the displayed list of Measuring screens (see “Measuring screen”, page 27).

5.4 Measuring screen

Menu: System Control Unit/Measuring

Select the desired parametrized Measuring screen from the list shown.

- The Measuring screens comprise:
  - Measuring box (see page 29)
  - Bargraph (see page 30)
  - LineWriter (see page 30)
- Signal, switch and button in the measuring screen
SCU MENUS (REPRESENTATION)

- Signal

Display of a single signal:

| Pump | ON |

Display of a switch signal:

| Pump | ON |

In case of an error, the signal blinks.

- Button

By pressing the button, the function stated in the button field is started. An acknowledgement appears (when set).

Example: The button blinks during function execution.

- Switch

By pressing the switch, the function in the switch field is changed. An acknowledgement appears (when set).

Example: The color of the switch changes and the switch blinks until the function is terminated (e.g.: a pump started).

- Parameter setting of the Measuring screen (see “Technical Information SCU” Manual)

**i** Refresh interval for display: Approx. 1 second
5.4.1 Measuring box (description)

A measuring box shows the measured value in numeric representation.

(Default setting of the measuring box: see “Technical Information SCU” Manual)

Measured value display example with 16 measuring boxes:

Touching a measuring box activates the touched box.

• The activated box is highlighted in light brown.
  - If NN (instead of the component) or a.u. (instead of the unit) is displayed:
    - No measured value has been assigned.
  - The measuring box is highlighted in gray:
    The measuring box is not used (see “Technical Information SCU” Manual).

• The status of the analyzer to which the activated (light brown) box is assigned is shown in the Status bar.

Scaling (measuring box, bargraph, line writer)

Touching an activated measuring box calls up a screen to scale the measuring box:
### 5.4.2 Bargraph representation (description)

The bargraph representation shows the measured value as a graphic bar.

(Default setting of the measuring box: see “Technical Information SCU” Manual)

Typical bar chart representation:

![Bargraph representation example]

*Significance and settings: see Measuring box (see “Measuring box (description)”, page 29)*

### 5.4.3 Line writer (description)

The line writer shows a maximum of 8 measured values in an y-t diagram.

(Default setting of the line writer: see “Technical Information SCU” Manual)

Line writer example:

![Line writer example]

*Significance and settings: see Measuring box (see “Measuring box (description)”, page 29)*
5.5 Maintenance

5.5.1 Restart SCU

Menu: System Control Unit/Maintenance/Restart SCU
This menu serves to perform an SCU restart.

NOTE:
During a restart of the SCU, the analog and digital outputs have an undefined state for a short time.

5.5.2 Data backup - parameter settings
Activate saved parameters. 3 options are available:

- Save the current configuration
- Activate the parameter set last saved
- Reset to factory configuration

1. Software serial number
2. Button to load the parameter set last saved[1]
3. Date of the parameter set last saved
4. Button to save the current parameter set.
   Caution: This will overwrite an existing saved parameter set
5. Loads the parameter set configured at the factory.
6. Date when the factory settings were created

[1] The timestamp remains empty when no data records exist or the software version and the saved data records do not match. This is typical during a software update. Any existing data records are kept so that these can be accessed when the matching version is restored.

+ Restart the SCU after restoring a saved parameter set.

+ Loading saved data records or the factory settings is recorded in the logbook.
5.5.3  Tests

Menu: System Control Unit/Maintenance/Tests

This menu serves to test the analog and digital interfaces.

Required: “Service” user level.

Explanation of the interface menu: see “Technical Information SCU” Manual

see page 33
see page 34
see page 35
see page 36
5.5.3.1 Analog outputs

Menu: System Control Unit/Maintenance/Tests/Analog Output

SCU Analyzer 1

<table>
<thead>
<tr>
<th>Index</th>
<th>Module</th>
<th>Source</th>
<th>Name</th>
<th>AO(n) [phys. Unit]</th>
<th>Unit</th>
<th>AO(n)O [mA]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N1M10AO01(AO02)</td>
<td>rv1</td>
<td>ao1</td>
<td></td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>N1M10AO02(AO02)</td>
<td>rv2</td>
<td>ao2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>N1M11AO02(AO02)</td>
<td>rv3</td>
<td>ao3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test menu:

SCU Analyzer 1

<table>
<thead>
<tr>
<th>Index</th>
<th>Module</th>
<th>Test value [mA]</th>
<th>AO(n)O [mA]</th>
<th>AO(n) [phys. Unit]</th>
<th>Designation</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N1M10AO01(AO02)</td>
<td>12</td>
<td>12</td>
<td>701</td>
<td>Live</td>
<td>Checkmark: The states are updated continuously. Deactivate “Live” before performing “Test”.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mark</td>
<td>Mark line(s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Test</td>
<td>Perform a test. Deactivate “Live” before performing “Test”.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Index</td>
<td>Number of the selected output. Appears automatically.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Source</td>
<td>Tag of source.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Name</td>
<td>Name of output. Appears automatically.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Test value [mA]</td>
<td>Input: Setpoint value of the current to be output. (Available only at “Service” user level).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AO(n)O [mA]</td>
<td>Actual value of the current output.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unit</td>
<td>Unit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AO(n) [phys. Unit]</td>
<td>Output value converted to the physical unit.</td>
</tr>
</tbody>
</table>
5.5.3.2 Analog inputs

Menu: System Control Unit/Maintenance/Tests/Analog Input

### SCU Menus (Representation)

#### SCU Analyzer 1

**Live**

Mark Test

<table>
<thead>
<tr>
<th>Index</th>
<th>Module</th>
<th>Name</th>
<th>Unit</th>
<th>Zero</th>
<th>Range Start</th>
<th>Range End</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N1M14AI01(AI02)</td>
<td>AI1</td>
<td>mA</td>
<td>4mA</td>
<td>0.0E00</td>
<td>1.0E02</td>
</tr>
<tr>
<td>2</td>
<td>N1M14AI02(AI02)</td>
<td>AI2</td>
<td>mA</td>
<td>4mA</td>
<td>0.0E00</td>
<td>1.0E02</td>
</tr>
<tr>
<td>3</td>
<td>N1M14AI03(AI02)</td>
<td>ai3</td>
<td>mA</td>
<td>4mA</td>
<td>0.0E00</td>
<td>1.0E02</td>
</tr>
<tr>
<td>etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Test menu:**

**Index**

1

**Module**

<table>
<thead>
<tr>
<th>Module</th>
<th>AI(n) [mA]</th>
<th>AI(n) [phys. Unit]</th>
<th>701</th>
</tr>
</thead>
</table>

**Designation**

- **Live**: Checkmark: The states are updated continuously. Deactivate "Live" before performing "Test".
- **Mark**: Mark line(s)
- **Test**: Perform a test. Deactivate "Live" before performing "Test".
- **Index**: Number of the selected input. Appears automatically.
- **Name**: Name of input. Appears automatically.
- **AI(n) [phys. Unit]**: Converted physical measured value.
- **Unit**: Unit of variable read in.
- **AI(n) [mA]**: Current measured on the analog input.
- **Zero**: 0/4 mA current at zero point.
- **Range Start**: Measuring range start.
- **Range End**: Measuring range end.
5.5.3.3 Digital outputs

Menu: System Control Unit/Maintenance/Tests/Digital Output.

<table>
<thead>
<tr>
<th>Index</th>
<th>Module</th>
<th>Source</th>
<th>Name</th>
<th>DO(n) [Source]</th>
<th>DO(n) [State]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N1M02DOO01(DO04)</td>
<td>bv11</td>
<td>di1</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2</td>
<td>N1M02DOO02(DO04)</td>
<td>bv12</td>
<td>D12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>N1M02DOO03(DO04)</td>
<td>s2e9</td>
<td>D13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Test menu:

<table>
<thead>
<tr>
<th>Index</th>
<th>Module</th>
<th>Source</th>
<th>Name</th>
<th>DO(n) [Source]</th>
<th>DO(n) [State]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N1M02DOO01(DO04)</td>
<td>bv11</td>
<td>di1</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Designation | Remark
---|---
Live | Checkmark: The states are updated continuously. Deactivate “Live” before performing “Test”.
Mark | Mark line(s).
Test | Perform a test. Deactivate “Live” before performing “Test”.
Index | Number of the selected output. Appears automatically.
Source | Tag of source
Name | Name of output. Appears automatically.
Test Parameter | The checkmark shows the state of the source. The output signal is not considered.
DO(n)O [State] | No checkmark or LED off: Relay open. Checkmark or LED on: Relay closed.
DO(n) [Source] | LED off: Program specification: Physical contact should be open. LED on: Program specification: Physical contact should be closed.
5.5.3.4  Digital inputs

Menu: System Control Unit/Maintenance/Tests/Digital Input

Test menu:

<table>
<thead>
<tr>
<th>Index</th>
<th>Module</th>
<th>Name</th>
<th>[Source]</th>
<th>[State]</th>
<th>Inverted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N1M01DI01(DI04)</td>
<td>di1</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>2</td>
<td>N1M01DI02(DI04)</td>
<td>DI2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>N1M01DI03(DI04)</td>
<td>DI3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Designation | Remark
--- | ---
Live | Checkmark: The states are updated continuously. Deactivate “Live” before performing “Test”.
Mark | Mark line(s).
Test | Perform a test. Deactivate “Live” before performing “Test”.
Index | Number of the selected input. Appears automatically.
Name | Name of input. Appears automatically.
DI(n) [Source] | No checkmark or LED off: Physical contact open. Checkmark or LED on: Physical contact closed.
DI(n) [State] | Computed value of [Source] (“Inverted” is taken into consideration).
Inverted | Checkmark: Inverted.
5.6  Adjustment

5.6.1  Manual Adjust

*Menu: System Control Unit/Adjustment/Manual Adjust*

Triggers an adjustment on an analyzer with a test gas.

Prerequisites:
- Parameters set for selection of a sequence control program (*Parameter/Sequence Controls/Manual Adjust*).
- Parameters set for the sequence control program specified there (*Parameter/Sequence Controls*).
- Optionally, parameters set for a Test Gas Table (*Parameter/Test Gas Table*).
- Optionally, an analyzer supporting tasks specific to measured values.

### Manual adjust

<table>
<thead>
<tr>
<th>Program</th>
<th>Adjustment</th>
<th>&lt;&lt;</th>
<th>&gt;&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test gas</td>
<td>NO</td>
<td>&lt;&lt;</td>
<td>&gt;&gt;</td>
</tr>
<tr>
<td>Test gas concentration</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Adjustment</td>
<td>&lt;&lt;</td>
<td>&gt;&gt;</td>
</tr>
<tr>
<td>Component</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Program state</th>
<th>Pre-purging</th>
<th>Start</th>
<th>Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
<td>Purging</td>
<td>Error</td>
<td>Maintenance</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>Error</td>
<td>Maintenance</td>
</tr>
</tbody>
</table>

(For a better overview, this menu is displayed in “SOPAS ET” view.)
### SCU MENUS (REPRESENTATION)

<table>
<thead>
<tr>
<th>Designation</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program</td>
<td>This line accesses the parametrized sequence control program from the Sequence Controls/Manual Adjust Table. The identifier entered in the MAL list (see &quot;Technical Information SCU&quot; Manual) is used as identifier. If an identifier is not entered there, the identifier of the selected SCU is used</td>
</tr>
<tr>
<td>Test gas</td>
<td>Selection of test gas name.</td>
</tr>
<tr>
<td>Test gas concentration</td>
<td>Test gas concentration inlet</td>
</tr>
<tr>
<td>Process</td>
<td>State control (e.g. pre-purging).</td>
</tr>
<tr>
<td>Component</td>
<td>Measuring component selection from the Test Gas Table, 'Usage' column.</td>
</tr>
<tr>
<td></td>
<td>The selected entry also shows the measured value identifier, dimension identifier and the current value. A connection to the analyzer must exist in this case.</td>
</tr>
</tbody>
</table>
| Program state (Start)| Adjustment start. The Start button creates the Formula interpreter command from the selected data to start a sequence control program with parameters P0..P5 and then starts the sequence control program with this command (see Manual Technical Information of the SCU):  
  `!+SCi[P0\P1\P2\P3\P4\P5]   
  !+SCi<MALj/Name>TGiSmSmMVnSmMVnTAo<MAk>]  
  "SCi" is taken from the left box in the first line.  
  - P0: Adjustment identifier from the first line; if empty, the parameter is also left empty.  
  - P1: "TGi", as specified in the left box in the second line. If empty, the parameter is also empty.  
  The test gas can be opened or closed off during the sequential control. See the commands `!+TGi` and `!-TGi`.  
  - P2: "Si", sensor as shown in the left box in the 4th line. Read out and set the sensor state in the sequence control program.  
  - P3: "SiMVj", Measured value reference as shown in the left box in the fourth line.  
  - P4: "SiMVjTAk", Task reference as shown in the left box in the fourth line. Trigger a task in the sequence control program (see SiMVjTAkS=n) and query state (see x=SiMVjTAk).  
  - P5: Selected line index from Sequence Controls/Manual Adjust. Can be used, e.g. for a GOTO instruction in the sequence control program (example, SCiS=#5). The command `!+SCi[\P3]` is executed in minimum. |
| (Stop)               | Stop executes "!-SCi". The sequence control program terminates without executing further actions. |
| Device               | Shows the task state of measured value processing (see SiMVj).         |
| Empty fields         | Status of the measured values.                                        |
|                      | - Measuring component                                                 |
|                      | - Measured value                                                      |
|                      | - Unit                                                                |
5.7 Diagnosis

Menu: System Control Unit/Diagnosis

5.7.1 Logbook

Menu: System Control Unit/Diagnosis/Logbook

- The status of the following sources is entered in the logbook:
  - Connected analyzer
  - SCU itself
  - I/O of peripherals
- Max. number of entries: Approx. 5000.

(Representation: Uncompressed data storage)

<table>
<thead>
<tr>
<th>No.</th>
<th>Device</th>
<th>Text</th>
<th>Classification</th>
<th>Date Start</th>
<th>Time Start</th>
<th>Date Stop</th>
<th>Time Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System</td>
<td>Systemstart</td>
<td>X</td>
<td>yy/mm/dd</td>
<td>hh:mm:ss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>System</td>
<td>Systemstart</td>
<td>X</td>
<td>yy/mm/dd</td>
<td>hh:mm:ss</td>
<td>yy/mm/dd</td>
<td>hh:mm:ss</td>
</tr>
<tr>
<td>3</td>
<td>System</td>
<td>Systemstart</td>
<td>X</td>
<td>yy/mm/dd</td>
<td>hh:mm:ss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>System</td>
<td>Systemstart</td>
<td>X</td>
<td>yy/mm/dd</td>
<td>hh:mm:ss</td>
<td>yy/mm/dd</td>
<td>hh:mm:ss</td>
</tr>
</tbody>
</table>

Designation | Remark
--- | ---
Fill level of logbook in %.
When the characters are red: The logbook is full.
Warning mode: Further entries are not accepted.
Circular buffer mode: Oldest entries are overwritten.

Data storage:
Symbol *not crossed out*: Compressed.
Symbol *crossed out*: Uncompressed.

Circular buffer mode
Warning mode
Significance and default setting: see “Technical Information SCU” Manual

Entries | Number of entries of selected filter.
Filter for messages | Only the filtered messages are shown.
- Show active failures
- Show all failures
- Show active valuations
- Show all valuations
- Show active uncertain
- Show all uncertain
- Show active extended messages
- Show all extended messages
- Show active messages
- Show all messages
Classification see further on in this Table.

Reset | Clear all entries.
### SCU MENUS (REPRESENTATION)

<table>
<thead>
<tr>
<th>Designation</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Export (Only in SOPAS ET)</strong></td>
<td>All entries selected via the filter (see further back in this Table) are saved on the PC as .log file. Format: CSV (comma-separated list). Can be read in EXCEL, for example.</td>
</tr>
<tr>
<td><strong>Update</strong></td>
<td>Update display of logbook entries.</td>
</tr>
<tr>
<td><strong>Backward</strong></td>
<td>Scroll back.</td>
</tr>
<tr>
<td><strong>Forward</strong></td>
<td>Scroll forward.</td>
</tr>
<tr>
<td>▲▼</td>
<td>Sort in ascending/descending order. To switch sorting or change sequence: Touch column header.</td>
</tr>
</tbody>
</table>
| Consecutive message number.        | ---- Red LED: Message still pending.  
Red LED: Message still pending.  
Green LED: Message no longer pending.  |
| **Device**                         | Triggering unit. Examples:  
– GM32(S2): Analyzer 2 (GM32)  
– P/GM32(S2MV6): Analyzer 2, measured value 6  
– T/GM32(S2MV5): Analyzer 2, measured value 5  
List of all tags: see “Technical Information SCU”.

CO2 = measured component  
P = pressure value of GM32  
T = temperature value of GM32  
The names are equivalent to the measured variables provided by the analyzers. |
| **Entries[1]**                     | Number of times errors have occurred. Significance and default setting: see “Technical Information SCU” Manual.                                                                               |
| **Text**                           | Logbook message.  
– Messages from SCU  
– Messages from connected analyzers                                                                                                                                                     |
| **Classification**                 | Classification according to NAMUR:  
– F = Failure  
– M = Maintenance  
– C = Check  
– U = Outside specification / Uncertain  
– E = Extended  
Some sensors provide additional statuses with classification “E”. These serve for internal control tasks, diagnosis etc. As standard, these statuses are not taken over into the logbook (see Manual “Technical Information SCU”, menu “Parameter/Logbook”). |
| **Date Start**                     | Format: yy/mm/dd  
For “Uncompressed”: Occurrence of message.  
For “Compressed”: Last occurrence of message. |
| **Time Start**                     | Format: hh:mm:ss  
For “Uncompressed”: Occurrence of message.  
For “Compressed”: Last occurrence of message. |
| **Date Stop**                      | Format: yy/mm/dd  
For “Uncompressed”: Clearing of message.  
For “Compressed”: Last clearing of message. |
| **Time Stop**                      | Format: hh:mm:ss  
For “Uncompressed”: Clearing of message.  
For “Compressed”: Last clearing of message. |

[1] Only for compressed data storage
### Logbook entries

<table>
<thead>
<tr>
<th>Logbook entry</th>
<th>Description</th>
<th>Possible cause/clearance[1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure</td>
<td>“F” classification in logbook, status field on operator panel (see “Measuring screen”, page 21) lights red</td>
<td></td>
</tr>
<tr>
<td>DeviceOff</td>
<td>CAN bus connection failure.</td>
<td>Check: Address settings, baud rate, parameter records, lines and connections, allowable line lengths.</td>
</tr>
<tr>
<td>Mismatched</td>
<td>Analyzer software does not match the SCU data set.</td>
<td>Switch the SCU off and on again.</td>
</tr>
<tr>
<td>Maintenance Request</td>
<td>“M” classification in logbook, status field on operator panel (see “Measuring screen”, page 21) lights yellow</td>
<td></td>
</tr>
<tr>
<td>Extended</td>
<td>“X/E” classification in logbook, no display of further information</td>
<td></td>
</tr>
<tr>
<td>Status of IO modules</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>CONF (Config.Err)</td>
<td>Found modules do not comply with defaults.</td>
<td>Wrong module?: Adjust module with defaults.</td>
</tr>
<tr>
<td>COM (I2C-Communication)</td>
<td>Communication failure on node N0.</td>
<td>Check firm seating of I/O modules.</td>
</tr>
<tr>
<td>OVx</td>
<td>OVO = 1. terminal, OV1 = 2. terminal, etc.</td>
<td>Check external power source.</td>
</tr>
<tr>
<td></td>
<td>Input range of nth analog input was exceeded.</td>
<td>Check external load.</td>
</tr>
<tr>
<td></td>
<td>Desired current on nth analog output was not reached.</td>
<td></td>
</tr>
<tr>
<td>PFO (PowerFault)</td>
<td>Fault in internal voltages.</td>
<td>Check voltages on the CAN nodes.</td>
</tr>
<tr>
<td>Uncertain</td>
<td>“U” classification in logbook, status field on operator panel (see “Measuring screen”, page 21) lights yellow</td>
<td></td>
</tr>
<tr>
<td>Check</td>
<td>“C” classification in logbook, status field on operator panel (see “Measuring screen”, page 21) lights yellow</td>
<td></td>
</tr>
</tbody>
</table>

5.7.3 Device state data

5.7.3.1 Cyclic trigger (CTi)

Menu: System Control Unit/Diagnosis/Device state data/Cyclic Trigger

List of the next start timepoints.


<table>
<thead>
<tr>
<th>Designation</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTi</td>
<td>Cyclic trigger name</td>
</tr>
</tbody>
</table>
5.7.4 Device information

5.7.4.1 Status (system)

Menu: System Control Unit/Diagnosis/Device Info/Status (system)

This menu shows the system status.

Significance of status: see “Status bars”, page 22

5.7.4.2 Device information

Menu: System Control Unit/Diagnosis/Device Info/Device Info

This menu shows device information of the SCU.

Have these numbers available when you have a service request concerning the SCU.
5.7.5 Validation results

Menu: System Control Unit/Diagnosis/Validation results

“Validation” is equivalent to “drift check”.

The results of the last validation are shown here.

These values can be used for example for QAL3.

The validation serves to check deviations of a measured variable at different span points. The value of the respective span point is shown as nominal value and the result of the validation as actual value.

A validation can be performed with internal or external test media (e.g., test gas). Normally, at least the zero point and the 70% point (relative to the measuring range) of a component are checked.

The connected analyzer must support sending the values.

The validation can be performed:

- Internally or externally (test gas)
- Checking the zero value or a reference value

<table>
<thead>
<tr>
<th>Index</th>
<th>Component</th>
<th>Type</th>
<th>Actual value</th>
<th>Nominal value</th>
<th>Unit</th>
<th>Status</th>
<th>Timestamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CO</td>
<td>Zero with gas</td>
<td>0.82456</td>
<td>0 ppm</td>
<td></td>
<td>----</td>
<td>2014-01-30 17:31</td>
</tr>
<tr>
<td>2</td>
<td>CO2</td>
<td>Zero with gas</td>
<td>0.06976</td>
<td>0 Vol.%</td>
<td>-M--</td>
<td></td>
<td>2014-01-30 13:24</td>
</tr>
<tr>
<td>3</td>
<td>NN</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td>----</td>
<td></td>
</tr>
</tbody>
</table>
Designation | Remark
--- | ---
Location | Name of measuring location (read out from analyzer).
Device | Device (read out from analyzer).
SN | Serial number (read out from analyzer).
Reset | Deletion of all table entries (for example after maintenance).
Index | Consecutive number
Component | Measured component
Type | Specification which value was determined with which test medium. Zero = zero gas or reference gas (test gas) external (with gas) or internal (without gas) (This information is always shown in English)
Actual value | Actual value
Nominal value | Nominal value
Unit | Unit (read out from analyzer).
Status | Classification according to NAMUR:
- F = Failure
- M = Maintenance
- C = Check
- U = Outside specification / Uncertain
Timestamp | Date and time when the drift value was registered. Date and time originate from the analyzer or, if the analyzer does not send them, from the SCU. Format: YYYY-MM-DD hh:mm

Tags for processing and exporting the file: see Manual “Technical Information SCU”

5.7.6 Adjustment results

Menu: System Control Unit/Diagnosis/Adjustment results

“Adjustment results” is identical with “Validation results” (see above), however, the measuring results are adjusted to the nominal values.
5.7.7 System overview

Menu: System Control Unit/Diagnosis/System overview

This menu serves to display the analyzers connected to the SCU.

<table>
<thead>
<tr>
<th>Index</th>
<th>Device</th>
<th>Component</th>
<th>Mounting Location</th>
<th>SN</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>THERMOR</td>
<td>H2</td>
<td>Stack 1</td>
<td>0000</td>
<td>0000</td>
</tr>
<tr>
<td>S2</td>
<td>OXOR</td>
<td>O2</td>
<td>Stack 2</td>
<td>0000</td>
<td>0000</td>
</tr>
<tr>
<td>S3</td>
<td>etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Designation             Remark
Index                    Connected device. Index can be used in formulas.
Device                   Name of connected device.
Component                Measuring component of connected device.
Mounting Location        Name of installation location.
SN                       Serial number of connected device.
Version                  Version number of connected device.

5.8 Parameter settings

Parameter settings see Manual “SCU Technical Information”
6 SOPAS Engineering Tool (SOPAS ET)

The SCU and the connected analyzers can also be operated via a PC with the SOPAS ET Engineering Tool.

SOPAS ET can be downloaded free of charge from the SICK website.

The menu structure and the representation of the menus are principally identical on the control unit and on SOPAS ET.

SOPAS ET offers more operating comfort than the operator panel when:

- Setting parameters of the SCU and connected analyzers.
- Displaying measured values of the analyzer directly or converted measured values from the SCU.

6.1 Installing SOPAS ET on the PC

1. Insert the installation CD in the PC.
2. If the installation does not start automatically: Call up “setup.exe”.
3. Follow the operating instructions of the program.

For more information on SOPAS ET, see the Help menus of SOPAS ET and documents in the Installation directory of SOPAS ET.
7 CLEARING MALFUNCTIONS

7.1 Faults on the monitor

<table>
<thead>
<tr>
<th>Error</th>
<th>Possible cause</th>
<th>Remarks[1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor is blank.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- &quot;POWER&quot; LED not on.</td>
<td>No voltage supply.</td>
<td>Check voltage supply (power supply unit) and supply lines.</td>
</tr>
<tr>
<td>- &quot;POWER&quot; LED on.</td>
<td>Monitor is defective.</td>
<td>SCU itself is ready for operation.</td>
</tr>
<tr>
<td>Monitor illuminates.</td>
<td>Program not running.</td>
<td>Switch the voltage supply (power supply unit) off and on.</td>
</tr>
<tr>
<td>Touch operation not possible.</td>
<td>Monitor is dirty.</td>
<td>When the monitor is dirty: Clean with a moist cloth, and liquid detergent if necessary.</td>
</tr>
<tr>
<td>Monitor too bright or too dark.</td>
<td>Monitor is defective.</td>
<td>Setting is not possible. Please contact SICK Customer Service.</td>
</tr>
</tbody>
</table>


7.2 Incorrect display of date and/or time

  The date is then automatically set.
- If the time is incorrect each time the unit is switched on:
  The battery in the SCU is empty.
  Have the battery replaced by SICK Customer Service.

7.3 A status field lights yellow or red

![Status bars](#)

See “Status bars”, page 22

7.4 Menu level line is highlighted red

The connection to the connected device (SCU or analyzer) is interrupted.

1. Go to the top menu level by touching 📞 (see “Selecting analyzers and general setup”, page 24).
2. Touch the red highlighted line of the SCU or analyzer: The SCU and the analyzer are connected again.
   If the connection is not established:
   - Check connection between the analyzer and SCU.
   - Restart SCU and analyzer and touch the line that is highlighted red again.

7.5 CAN communication interrupted

Check whether the terminating resistor is set correctly: see “CAN bus”, page 16
8 Technical Documentation

8.1 Compliances

The technical design of this device complies with the following EU directives and EN standards:

- LVD 73/23/EEC
- EMC 89/336/EEC
- EN 61010-1, Safety requirements for electrical equipment for measurement, control and laboratory use
- EN 61326, Electrical equipment for measurement, control and laboratory use - EMC requirements
- EMC 92/31/EC
- 93/68/EC
- 93/465/EC
- EN 61326/A1/A2/A3

8.1.1 Electrical protection

- Insulation: Protection class 1 according to EN 61010-1.
- Contamination: The device operates safely in an environment up to degree of contamination 2 according to EN 61010-1 (usual, nonconductive contamination and temporary conductivity by occasional moisture condensation).
- Electrical energy: The wiring system to the supply voltage of the system must be installed and fused according to the relevant regulations.
8.2 Licenses

Exclusion of liability
The firmware for this device has been developed using Open Source Software. Any changes to the Open Source components are in the general responsibility of the user. All warranty claims are excluded in this case.

The following exclusion of liability applies to the GPL components in relation to the rights holders: This program is distributed in the hope that it will be of use, but with no guarantee of this; neither is there any implied guarantee of marketability or suitability for a particular purpose. Refer to the GNU General Public License for details.

With regard to the other Open Source components, we refer to the liability disclaimers of the copyright holders in the license texts on the CD delivered.

Software licenses
In this product, SICK uses unchanged and, as far as necessary and in compliance with relevant licence conditions, changed Open Source Software.

The firmware of this device is therefore subject to the copyrights listed on the CD delivered. Please refer to the CD delivered for a complete list of the Open Source programs used as well as the relevant license conditions.

Source codes
The source codes for the Open Source programs used in this device can be requested using the following e-mail address: Please enter as subject “Open Source Software”.
8.3 Dimensions and fitting opening
8.3.1 Fastening

- Opening: 303.0 mm x 229.0 mm (W x H)
- Tolerance: +1 mm
- Room for screws: 15 mm (around)
- Space required: 333.0 mm x 259.0 mm

Fastening the operator panel:
Hang the delivered hooks in at the edge and use these to screw the operator panel tight.
### 8.4 Technical data

#### 8.4.1 Panel

<table>
<thead>
<tr>
<th>Part No.:</th>
<th>2056275</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touchscreen:</td>
<td>Touch-sensitive 10.4&quot; color monitor, 262T colors, 800x600 pixels</td>
</tr>
<tr>
<td></td>
<td>Front: Acid-resistant polyester foil</td>
</tr>
<tr>
<td>Operating temperature:</td>
<td>0 °C ... +50 °C (32...122 °F)</td>
</tr>
<tr>
<td>Storage temperature:</td>
<td>-20 °C ... +60 °C (0...140 °F)</td>
</tr>
<tr>
<td>Degree of protection:</td>
<td>IP 65 front-side</td>
</tr>
<tr>
<td>Storage medium:</td>
<td>2 GB CompactFlash-Card[1]</td>
</tr>
<tr>
<td>Weight:</td>
<td>Approx. 2.8 kg (60 lb)</td>
</tr>
<tr>
<td>Voltage supply:</td>
<td>24 V DC ± 20%</td>
</tr>
<tr>
<td>Power consumption:</td>
<td>Approx. 1.0 ... 1.5 A</td>
</tr>
<tr>
<td>Interfaces:</td>
<td>2 x Ethernet RJ45</td>
</tr>
<tr>
<td></td>
<td>1 x RS 485 SUB-D (Modbus)</td>
</tr>
<tr>
<td></td>
<td>2 x CAN ports, electrically isolated</td>
</tr>
<tr>
<td></td>
<td>2 x USB[2]</td>
</tr>
<tr>
<td></td>
<td>1 x PS2 (keypad)[2]</td>
</tr>
</tbody>
</table>

[1]Only use CompactFlash-Card from SICK (Part No.: 2056276, programmed)
[2]Not used

#### 8.4.2 Data lines

### Ethernet

| Ethernet:            | 100 MBit/s line (100 BASE-T), plug: RJ45 |
|                      | Max. line length: 100 m |
| Part No.:            | 6026084 (3 m) |

### RS485

<table>
<thead>
<tr>
<th>Type:</th>
<th>ANSI/TIA/EIA-485-A-98</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance:</td>
<td>100 Ohm ± 20%</td>
</tr>
<tr>
<td>Loop resistance:</td>
<td>&lt;100 Ohm/km</td>
</tr>
<tr>
<td>Capacitance per unit length:</td>
<td>&lt; 80nF/km</td>
</tr>
<tr>
<td>Type:</td>
<td>Twisted pairs, shielded</td>
</tr>
<tr>
<td>Terminating resistor:</td>
<td>390 - 220 - 390 Ohm</td>
</tr>
</tbody>
</table>

### CAN bus

| Overall length:      | 500 m (longer lengths available on request) |
| Surge impedance:     | 135 ... 165 Ohm (3 ... 20) MHz |
| Impedance:           | 120 Ohm ± 15% |
| Loop resistance:     | <100 Ohm/km |
| Capacitance per unit length: | < 80nF/km |
| Type:                | ISO 11898, twisted pair, shielded |
| Pin assignment Plug SUB-D 9-pole: | 2 - CAN low, 3 - GND, 7 - CAN high |
| Plug for terminating resistor (120 Ohm): | see “CAN bus”, page 16 |
## Glossary

<table>
<thead>
<tr>
<th>CAN bus</th>
<th>Control Area Network. Field bus.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompactFlash®-Card</td>
<td>Memory card.</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Computer network technology. Basis for network protocols, e.g. TCP/IP.</td>
</tr>
<tr>
<td>Firewall</td>
<td>Safety concept of software and hardware components to restrict access to computer networks.</td>
</tr>
<tr>
<td>Modbus®:</td>
<td>Fieldbus communication protocol.</td>
</tr>
<tr>
<td>PROFIBUS®:</td>
<td>Fieldbus communication protocol.</td>
</tr>
<tr>
<td>OLE</td>
<td>Object Linking and Embedding. Standardized data interface (Microsoft Corporation).</td>
</tr>
<tr>
<td>OPC</td>
<td>OLE (object link) for Process Control. Standardized data interface (OPC-Foundation®).</td>
</tr>
<tr>
<td>SOPAS</td>
<td>(SICK Open Portal for Applications and Systems): SICK Parameter Setting and Data Calculation Software.</td>
</tr>
<tr>
<td>SOPAS ET</td>
<td>SOPAS PC Engineering Tool. Configuration protocol.</td>
</tr>
<tr>
<td>Tag</td>
<td>Identifier. How to program tags is described in the “SCU Technical Information” (for programmers).</td>
</tr>
<tr>
<td>TCP/IP</td>
<td>Network protocol.</td>
</tr>
<tr>
<td>S</td>
<td>Scope of delivery .......................................................... 13</td>
</tr>
<tr>
<td></td>
<td>Screen (text input) ......................................................... 24</td>
</tr>
<tr>
<td></td>
<td>Serial number .............................................................. 8, 43</td>
</tr>
<tr>
<td></td>
<td>Single adjustment (parameter) ......................................... 37</td>
</tr>
<tr>
<td></td>
<td>SOPAS .......................................................... 54</td>
</tr>
<tr>
<td></td>
<td>SOPAS ET ..................................................................... 11, 47, 54</td>
</tr>
<tr>
<td></td>
<td>SOPAS system concept ................................................... 11</td>
</tr>
<tr>
<td></td>
<td>Start ................................................................. 13</td>
</tr>
<tr>
<td></td>
<td>Start screen ............................................................. 27</td>
</tr>
<tr>
<td></td>
<td>Starting the SCU ......................................................... 20</td>
</tr>
<tr>
<td></td>
<td>Start-up ............................................................... 13</td>
</tr>
<tr>
<td></td>
<td>State (status) .............................................................. 22</td>
</tr>
<tr>
<td></td>
<td>Status (significance) .................................................... 22</td>
</tr>
<tr>
<td></td>
<td>Status (system) ......................................................... 43</td>
</tr>
<tr>
<td></td>
<td>Status field - yellow/red .............................................. 22</td>
</tr>
<tr>
<td></td>
<td>Subnet mask ....................................................... 43</td>
</tr>
<tr>
<td>T</td>
<td>Tag ................................................................. 54</td>
</tr>
<tr>
<td></td>
<td>TCP/IP .......................................................... 54</td>
</tr>
<tr>
<td></td>
<td>Technical data .......................................................... 51</td>
</tr>
<tr>
<td></td>
<td>Terminating resistor (CAN) ............................................. 17</td>
</tr>
<tr>
<td></td>
<td>Tests (interfaces) ....................................................... 32</td>
</tr>
<tr>
<td></td>
<td>Text input (screen) ...................................................... 24</td>
</tr>
<tr>
<td></td>
<td>Time - Display .......................................................... 21</td>
</tr>
<tr>
<td></td>
<td>- Setting ................................................................. 48</td>
</tr>
<tr>
<td></td>
<td>Top menu level ......................................................... 24</td>
</tr>
<tr>
<td>U</td>
<td>Uncertain ............................................................ 40</td>
</tr>
<tr>
<td></td>
<td>Upload parameters ...................................................... 27</td>
</tr>
<tr>
<td></td>
<td>Upload parameters from device ...................................... 27</td>
</tr>
<tr>
<td></td>
<td>User level ............................................................. 26</td>
</tr>
<tr>
<td></td>
<td>User levels ........................................................... 26</td>
</tr>
</tbody>
</table>

<p>| V | Validation (menu) ...................................................... 44 |
|   | Version numbers ........................................................ 43 |</p>
<table>
<thead>
<tr>
<th>Country</th>
<th>Address</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td></td>
<td>+61 3 9457 0600</td>
<td><a href="mailto:sales@sick.com.au">sales@sick.com.au</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1800 334 802 – tollfree</td>
<td></td>
</tr>
<tr>
<td>Austria</td>
<td></td>
<td>+43 (0)22 36 62 28 8-0</td>
<td><a href="mailto:office@sick.at">office@sick.at</a></td>
</tr>
<tr>
<td>Belgium/Luxembourg</td>
<td></td>
<td>+32 (0)2 466 55 66</td>
<td><a href="mailto:marketing@sick.com.br">marketing@sick.com.br</a></td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>+55 11 3215-4900</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td>+1 905 771 14 44</td>
<td><a href="mailto:information@sick.com">information@sick.com</a></td>
</tr>
<tr>
<td>Czech Republic</td>
<td></td>
<td>+420 2 57 91 18 50</td>
<td><a href="mailto:sick@sick.cz">sick@sick.cz</a></td>
</tr>
<tr>
<td>Chile</td>
<td></td>
<td>+56 2 2274 7430</td>
<td><a href="mailto:info@schadler.com">info@schadler.com</a></td>
</tr>
<tr>
<td>China</td>
<td></td>
<td>+86 4000 121 000</td>
<td><a href="mailto:china@sick.net.cn">china@sick.net.cn</a></td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td>+45 45 82 64 00</td>
<td><a href="mailto:sick@sick.dk">sick@sick.dk</a></td>
</tr>
<tr>
<td>Finland</td>
<td></td>
<td>+358-9-2815 800</td>
<td><a href="mailto:sick@sick.fi">sick@sick.fi</a></td>
</tr>
<tr>
<td>France</td>
<td></td>
<td>+33 1 64 62 35 00</td>
<td><a href="mailto:info@sick.fr">info@sick.fr</a></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td>+49 211 5301-301</td>
<td><a href="mailto:info@sick.de">info@sick.de</a></td>
</tr>
<tr>
<td>Great Britain</td>
<td></td>
<td>+44 (0)1727 831121</td>
<td><a href="mailto:info@sick.co.uk">info@sick.co.uk</a></td>
</tr>
<tr>
<td>Hong Kong</td>
<td></td>
<td>+852 2153 6300</td>
<td><a href="mailto:ghk@sick.com.hk">ghk@sick.com.hk</a></td>
</tr>
<tr>
<td>Hungary</td>
<td></td>
<td>+36 1 371 2680</td>
<td><a href="mailto:office@sick.hu">office@sick.hu</a></td>
</tr>
<tr>
<td>India</td>
<td></td>
<td>+91 – 22 – 4033 8333</td>
<td><a href="mailto:info@sick-india.com">info@sick-india.com</a></td>
</tr>
<tr>
<td>Israel</td>
<td></td>
<td>+972-4-6881000</td>
<td><a href="mailto:info@sick-sensors.com">info@sick-sensors.com</a></td>
</tr>
<tr>
<td>Italy</td>
<td></td>
<td>+39 02 27 43 41</td>
<td><a href="mailto:info@sick.it">info@sick.it</a></td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td>+81 (0)3 5309 2112</td>
<td><a href="mailto:support@sick.jp">support@sick.jp</a></td>
</tr>
<tr>
<td>Malaysia</td>
<td></td>
<td>+603 80807045</td>
<td><a href="mailto:enquiry.my@sick.com">enquiry.my@sick.com</a></td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td>+31 (0)30 229 25 44</td>
<td><a href="mailto:info@sick.nl">info@sick.nl</a></td>
</tr>
<tr>
<td>New Zealand</td>
<td></td>
<td>+64 9 415 0459</td>
<td><a href="mailto:sales@sick.co.nz">sales@sick.co.nz</a></td>
</tr>
<tr>
<td>Norway</td>
<td></td>
<td>+47 67 81 50 00</td>
<td><a href="mailto:sick@sick.no">sick@sick.no</a></td>
</tr>
<tr>
<td>Poland</td>
<td></td>
<td>+48 22 837 40 50</td>
<td><a href="mailto:info@sick.pl">info@sick.pl</a></td>
</tr>
<tr>
<td>Romania</td>
<td></td>
<td>+40 356 171 120</td>
<td><a href="mailto:office@sick.ro">office@sick.ro</a></td>
</tr>
<tr>
<td>Russia</td>
<td></td>
<td>+7-495-775-05-30</td>
<td><a href="mailto:info@sick.ru">info@sick.ru</a></td>
</tr>
<tr>
<td>Singapore</td>
<td></td>
<td>+65 6744 3732</td>
<td>sales@<a href="mailto:sick@sg.com">sick@sg.com</a></td>
</tr>
<tr>
<td>Slovakia</td>
<td></td>
<td>+421 482 901201</td>
<td><a href="mailto:mail@sick-sk.sk">mail@sick-sk.sk</a></td>
</tr>
<tr>
<td>Slovenia</td>
<td></td>
<td>+386 (0)-47 69 990</td>
<td><a href="mailto:office@sick.si">office@sick.si</a></td>
</tr>
<tr>
<td>South Africa</td>
<td></td>
<td>+27 11 472 3733</td>
<td><a href="mailto:info@sickautomation.co.za">info@sickautomation.co.za</a></td>
</tr>
<tr>
<td>South Korea</td>
<td></td>
<td>+82 2 786 6321</td>
<td><a href="mailto:info@sickkorea.net">info@sickkorea.net</a></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td>+34 93 480 31 00</td>
<td><a href="mailto:info@sick.es">info@sick.es</a></td>
</tr>
<tr>
<td>Sweden</td>
<td></td>
<td>+46 10 110 10 00</td>
<td><a href="mailto:info@sick.se">info@sick.se</a></td>
</tr>
<tr>
<td>Switzerland</td>
<td></td>
<td>+41 41 619 29 39</td>
<td><a href="mailto:contact@sick.ch">contact@sick.ch</a></td>
</tr>
<tr>
<td>Taiwan</td>
<td></td>
<td>+886 2 2375-6288</td>
<td><a href="mailto:sales@sick.com.tw">sales@sick.com.tw</a></td>
</tr>
<tr>
<td>Thailand</td>
<td></td>
<td>+66 2645 0009</td>
<td><a href="mailto:tawiwat@sicksgp.com.sg">tawiwat@sicksgp.com.sg</a></td>
</tr>
<tr>
<td>Turkey</td>
<td></td>
<td>+90 (216) 528 50 00</td>
<td><a href="mailto:info@sick.com.tr">info@sick.com.tr</a></td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td></td>
<td>+971 (0) 4 88 65 878</td>
<td><a href="mailto:info@sick.com">info@sick.com</a></td>
</tr>
<tr>
<td>USA/Mexico</td>
<td></td>
<td>+1(952) 941-6780</td>
<td>1 (800) 325-7425 – tollfree</td>
</tr>
<tr>
<td>Vietnam</td>
<td></td>
<td>+84 8 62920204</td>
<td><a href="mailto:Ngo.Duy.Linh@sicksgp.com.sg">Ngo.Duy.Linh@sicksgp.com.sg</a></td>
</tr>
</tbody>
</table>

More representatives and agencies at [www.sick.com](http://www.sick.com)