

NUMERIK
JENA



SCM

SMART COMMUNICATION MODULE FOR LENGTH GAUGE ACANTO

USER MANUAL

English Original Instruction

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1. FEATURES AND APPLICATIONS

The SCM (Smart Communication Module) enables the conversion and data transfer of length gauges ACANTO using the Open Platform Communications Unified Architecture (OPC) UA IoT-protocol to transfer information to IT systems and IoT software.

OPC UA is a service-oriented industrial communication standard for secure and reliable data exchange. The protocol is platform-independent and enables a seamless flow of information between devices from different manufacturers. OPC UA defines the transport of data and interfaces, security mechanisms and the semantic structure of the data, as well as services for the exchange of data between clients and servers - including access to real-time data, monitoring of alarms and events, access to historical data and other applications. This standard is maintained and developed by the "OPC UA FOUNDATION".

Essential features:

- Wireless data transmission up to 50 m
- Transmission of measured values, diagnostic data and evaluation numbers
- Identification and transfer of additional environmental information (such as humidity, temperature, pressure)
- Use of the OPC UA communication structure
- Available for length gauge ACANTO (EnDat 2.2) in Europe.

Essential Benefits:

- Cost-effective extension of networks, systems and applications
- Flexibility to integrate new devices into an existing network infrastructure
- Improved usability through wireless data transmission
- Data Improvement - Transparency for analysis and reporting at all IT levels
- Improved IT security through a sophisticated communication concept, protecting against unauthorized data access
- Improved data availability and data security through a robust data architecture with reliable communication mechanisms
- Reduction of downtimes due to predictive maintenance processes

2. SAFETY INFORMATION

2.1 General Information

- Make sure to familiarize yourself thoroughly with the contents of the user manuals and data sheets before installing and starting up the device!
- The devices as well as the accessory are guaranteed to function if the mounting and operating conditions are maintained as stated in the respective user manuals and data sheets .
- NUMERIK JENA GmbH is not liable for damages caused by unauthorized handling of the devices and the accessory. Any unauthorized handling leads to forfeiture of all warranty claims!
- NUMERIK JENA GmbH does not assume any liability for any damages or operating errors caused by incorrect mounting and/or startup operations.
- Please consider user manuals, data sheets and safety instructions of devices from other manufacturers which will be used in combination with encoders and accessories from NUMERIK JENA to ensure a reliable operation.
- Please contact the support of NUMERIK JENA GmbH or an authorized representation for further information. Please visit the NUMERIK JENA website to get the contact information.
- Please pay attention to the safety instructions and warning symbols in the user manuals and data sheets from NUMERIK JENA!



Danger to the device or to the function of the device!



Pull the plug!



Highly inflammable!

2.2 Notes on Legal Requirements



Approval for radio transmission: For operation in radio mode.

NUMERIK JENA GmbH hereby declares that the SCM transmitter/receiver unit is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

The EC Declaration of Conformity can be requested from

NUMERIK JENA GmbH

Im Semmicht 4

07751 Jena

Germany

or www.numerikjena.de

Other countries on request.

USA FCC ID 2AC7Z-ESPWROOM32 - THE DEVICE COMPLIES WITH PART 15 OF THE FCC RULES



This equipment radiates radio frequency energy and if not used properly - that is, in strict accordance with the instructions in this manual - may cause interference to radio communications and television reception.

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- (3) Reorient or relocate the receiving antenna.
- (4) Increase the separation between the equipment and receiver.
- (5) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- (6) Consult the dealer or an experienced radio/TV technician for help.

2.3 Notes on Transport, Storage and Handling

The products from NUMERIK JENA GmbH must be transported and stored in the original packaging only!

2.4 Notes on Operation



- The devices and accessories from NUMERIK JENA GmbH must be operated with the supply voltage stated in the respective user manual or data sheet only.



- Comply with applicable PIN assignment if auxiliary electronic units are connected!



Do not connect or disconnect plugs if the power is on!

2.5 Environmental Protection and Disposal



Environmental damage due to incorrect disposal of the product, accessories or peripherals!

- Do not dispose in domestic waste.
- Dispose only by authorized collection points. Electrical waste and electronic components are subject to special-waste regulations.
- Observe the applicable country-specific regulations.

More detailed information on legal regulations can be obtained from competent authorities.

2.6 Scope of Delivery of SCM-1000

The SCM-1000 comes with the following items:

- Smart Communication Module SCM-1000
- USB adapter cable, cable length 1.80 m
- Installation instructions

The current version of the data sheet is available in the download area at www.numerikjena.de.

3. TECHNICAL INFORMATION

3.1 Technical specification

The SCM-1000 complies with the following technical specification:

Parameter	SCM	Unit
Interfaces	USB 2.0 WiFi 802.11 b/g/n	
Supply voltage	5.0 ± 10%	V
Current consumption (max.)	165	mA
Samplerate Position (max.)	100	Hz
Weight	50	g
IP-rating (EN 60 529)	IP50	
Dimensions	59.65 x 24	mm
Operating temperature	0 to +55 (+32 to +131)	°C (°F)
Storage temperature	-20 to +70 (-4 to +158)	°C (°F)
Shock [per 11 ms]	≤ 500 (EN 60 068-2-27)	m/s ²
Vibration [within 55-2000 Hz]	≤ 100 (EN 60 068-2-6)	m/s ²
Range (typical)	50	m

Table 1: Technical data of the SCM-1000

3.2 Technical drawing

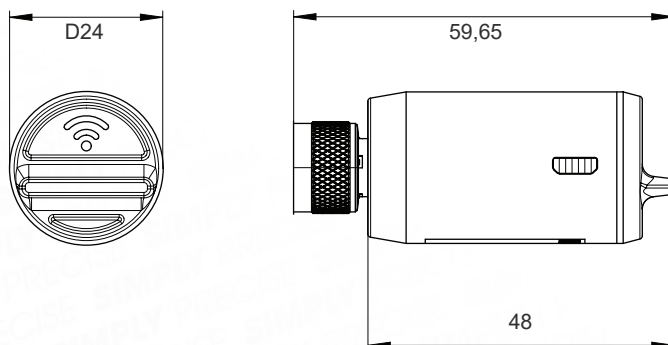


Illustration 1: Technical drawing (all dimensions in mm)

3.3 Nameplate

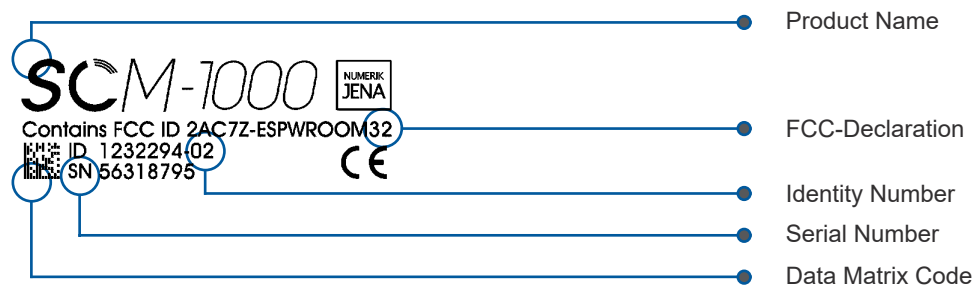


Illustration 2: Figure of the SCM-1000 nameplate

4. STATUS MESSAGES IN OPERATING MODE

The current status of the SCM-1000 is indicated by the integrated LED (check figure 3).



Illustration 3: Schematic figure of the SCM

Depending on the Smart Communication Modules status, the LED can assume one of the following LED states (see table 2). Please note that the current state of assembly or disassembly of the length gauge ACANTO is relevant for the correct interpretation of the status message.

LED status	Length gauge connected	Definition
Blue (steady)	Yes	Length gauge detected, SCM operable
Red (steady)	Yes	SCM-1000 Error
Red (flashing)	Yes	Length gauge Error please check the length gauge
Blue (steady)	No	Search for connected length gauges
Red (flashing) / (steady)	No	Setup mode active; SCM-1000 initiated access point

Table 2: LED states - overview

5. INITIAL SETUP OF THE SMART COMMUNICATION MODULE

5.1 Factory Settings

The module is delivered with the following factory settings (please check table 3). For the initial setup or a change of previous settings (for example changing the custom network name or password), these factory defaults will be loaded and a hotspot will be generated automatically by the SCM, in case no length gauge ACANTO is connected.

Setting	Value
WLAN - SSID	scm1000
WLAN - Password	12345678
Hostname	scm1000
Network IPv4 module	192.168.4.1/24
Gateway	192.168.4.1
DHCP Server	active
URL	opc.tcp://192.168.4.1:4840

Table 3: Overview of the factory settings

5.2 Mechanical connections

The SCM-1000 has the following physical connection points:

- USB connector (Type Micro-B connector)
- 8-pin M12 coupling



Illustration 4: Schematic figure of the SCM-1000 with connected length gauge

The power supply (see section 3) of the SCM-1000 and the connected length gauge is realized via USB. Please note that SCM and connected device are using the same power supply (Source: USB).

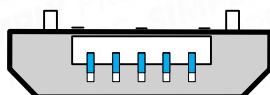


Illustration 5: USB connector type Micro-B

The 8-pin M12 connector realizes the data transmission as well as the power supply of the length gauge ACANTO.

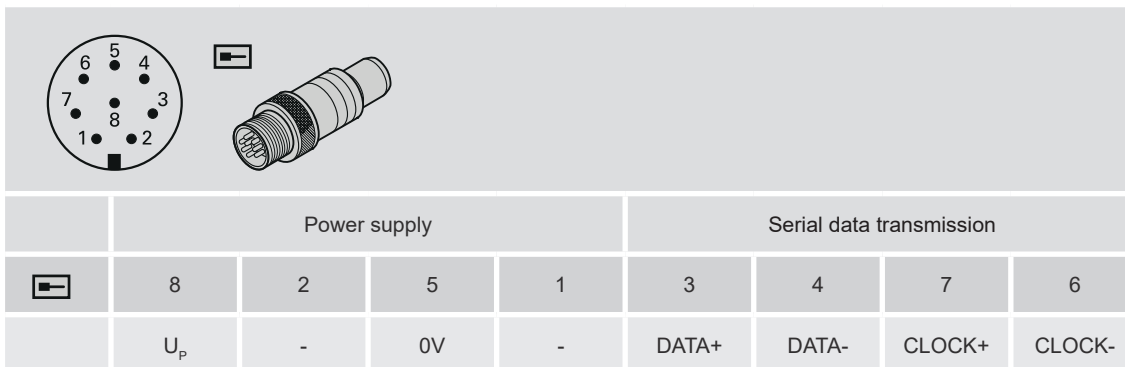


Illustration 6: Pin assignment 8 pol. Coupling M12 (U_p = power supply)

5.3 Compatible software

The SCM-1000 can be used in WLAN or USB mode. For this purpose NUMERIK JENA provides the “Smart Communication App” (SCA) as free of charge software for Windows and Android.

The SCA includes the following functions:

- “SCM MANAGER” – management assistant for the integrated SCMs via WiFi or USB
- “ADD SCM” – Setup wizard for setting up SCMs over WiFi
- “MONITORING” – evaluation assistant with various graphic display options
- “SCA SETTINGS” – Wizard for internal software settings



Illustration 7: SCA - Start screen (Figure: Smart Communication App)



Illustration 8: Figure SCA-Menu

5.3.1 *SCM in WiFi mode (OPC UA compatible)*

If the SCM-1000 is used in WiFi mode, a device with an installed OPC UA client is required. For the following operating systems NUMERIK JENA GmbH provides an OPC UA compatible software free of charge:

Operating system	App-Name	Download
Android 6 (and higher)	Smart Communication App	Google Play Store
Windows 7 / 8 / 10	Smart Communication App	Download available at www.numerikjena.de or at the Google Play Store

Table 5: Overview of the software recommendations for WiFi mode

5.3.2 *SCM in USB mode*

In case the SCM-1000 is used in USB mode, a device with the USB device driver installed is required. For the following operating systems, NUMERIK JENA GmbH provides software free of charge:

Operating system	App-Name	Download
Windows 7 / 8 / 10	Smart Communication App	Download available at www.numerikjena.de or at the Google Play Store

Table 6: Software recommendations for USB-Mode

5.4 Commissioning of the Smart Communication Module

- 1 Connect the Smart Communication Module to a power supply (length gauge disconnected). The WiFi-hotspot is established automatically by the module, set up with the factory settings (Please check section 5.1). During the commissioning the LED of the SCM lights red.

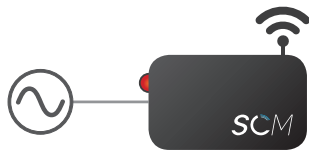


Illustration 9: SCM with WLAN (LED lights up red)

- 2 Connect the SCM-1000 to your setup device directly via the USB interface or via WiFi. For the WiFi connection, an access point is automatically established by the SCM-1000 with the factory settings (see Table 7).

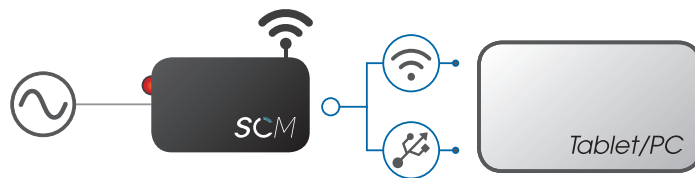


Illustration 10: Schematic diagram for setting up the SCM (LED lights up red) via USB/WLAN

Setting	Value
WLAN - SSID	scm1000
WLAN - Password	12345678
Hostname	scm1000
Netzwerk IPv4 module	192.168.4.1/24

Table 7: Settings attributes (network connection and access data)

- 3 Open the Smart Communication App (SCA) from NUMERIK JENA GmbH to set up the network settings. If you are using an alternative software for setup, please refer to Table 8 below for the relevant setting notes.

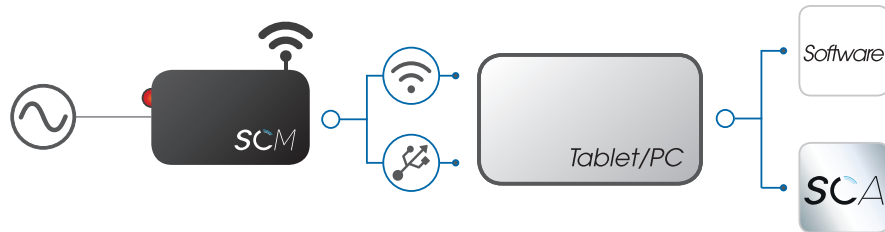


Illustration 11: Schematic representation of SCM network setup using SCA / alternative software

Feature	Path	Value
Netzwerk-Name	SCM-1000/Software/Network Settings/WIFI SSID	max. 64 characters
Netzwerk-Password	SCM-1000/Software/Network Settings/WIFI PASS	max. 64 characters
OPC UA Username (optional)	SCM-1000/Software/Login Settings/Username	<OPC-UA-Username>
OPC UA Password (optional)	SCM-1000/Software/Login Settings/Password	<OPC-UA-Password>
Operating mode	SCM-1000/Software/Network Settings/NetworkMode	RJ45 Ethernet = 0
		WLAN Client = 1
		WLAN Access Point = 2

Table 8: SCM network setup data

- 4 The SCA has an integrated assistant („ADD SCM“) for setting up the SCM-1000 network settings. Open the assistant and follow the instructions.

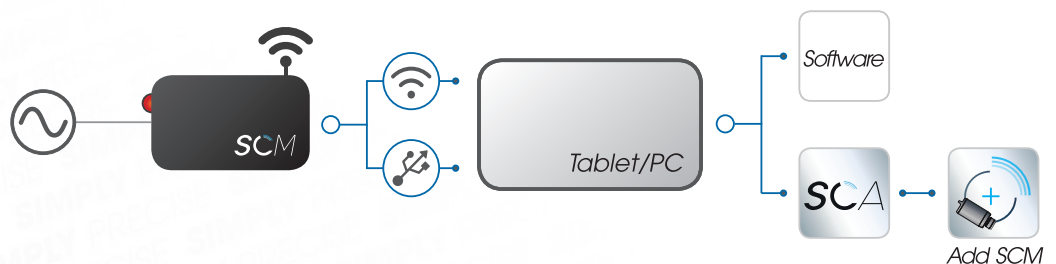


Illustration 12: Schematic representation of the SCM network setup using the SCA start-up wizard

When the setup is completed, the network settings made are permanently stored in the SCM (even if the power supply is disconnected) and are loaded if an ACANTO length gauge is connected. To change the network settings again, repeat steps 1 to 4.



Illustration 13: Software display of the setup wizard "ADD SCM"

5.5 Change of customer-specific settings

To change the customer-specific settings the length gauge must be disconnected from the SCM and restarted by interrupting the power supply.

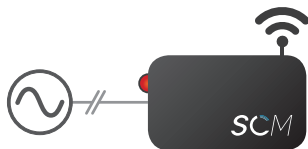


Illustration 14: Schematic diagram SCM (LED lights red, WLAN access point is set up) with power supply without gauge

Subsequently, the factory settings of the SCM will be loaded and a separate hotspot will be established. A commissioning (see section 5.4) can be repeated.

Please note that by restarting the SCM without a connected length gauge an access point is created automatically. The previously entered user-specific network data is stored in the SCM.



6. OPERATION OF THE SMART COMMUNICATION MODULE

Connect the Smart Communication Module (SCM) with an ACANTO length gauge to a power supply. During operation, the SCM's LED is permanently lit in blue. The SCM-1000 can then be used directly via USB interface or via WiFi.

For a WiFi connection, the entered network settings (see Chapter 4) will be loaded automatically.

- SCMs that are connected via a WLAN connection can be used by all output devices (PC/tablet) in the network.
- SCMs that are integrated via the USB interface can only be used on the connected terminal device.

The output values of the SCMs (SCM-data/ length gauge) can be read out via the SCA from NUMERIK JENA GmbH or via alternative software.

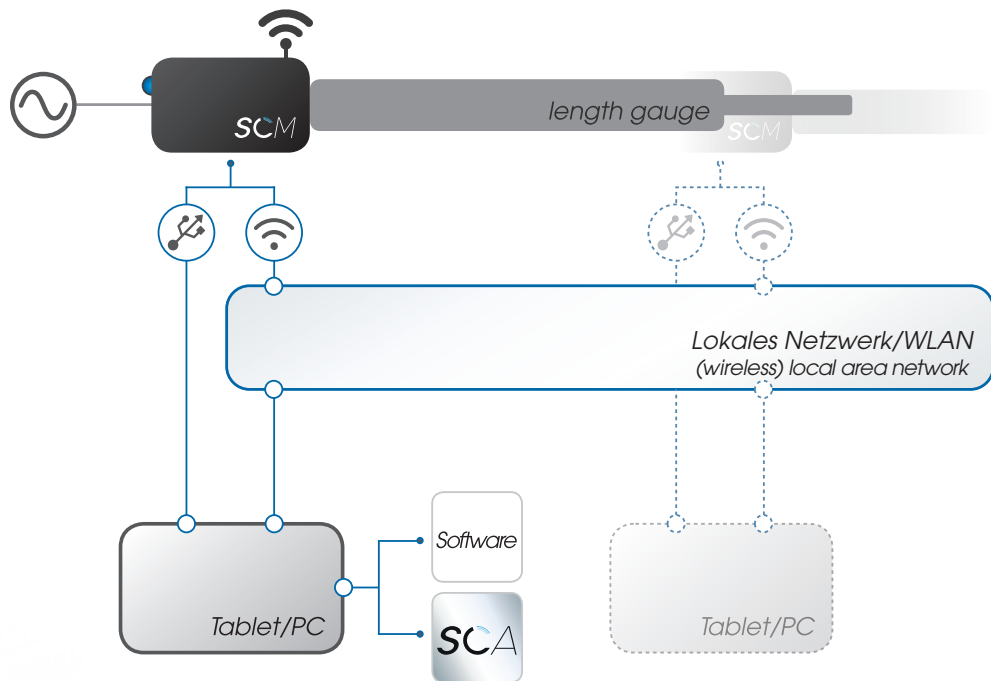


Illustration 15: Schematic network illustration with several SCMs/end devices

6.1 Operation of the SCM with the SCA

The Smart Communication App (SCA) from NUMERIK JENA has an integrated assistant („SCM MANAGER“) to manage all SCMs in the network as well as the locally connected USB devices. In this menu measured values and information (e.g. temperature & humidity) of the SCM/ ACANTO length gauge are provided. In addition, changes to the SCMs can be made in the submenu options (including naming, network settings, etc.).

If you are using an alternative software to manage your embedded devices, please refer to chapter 6.2/6.3 for the available information.

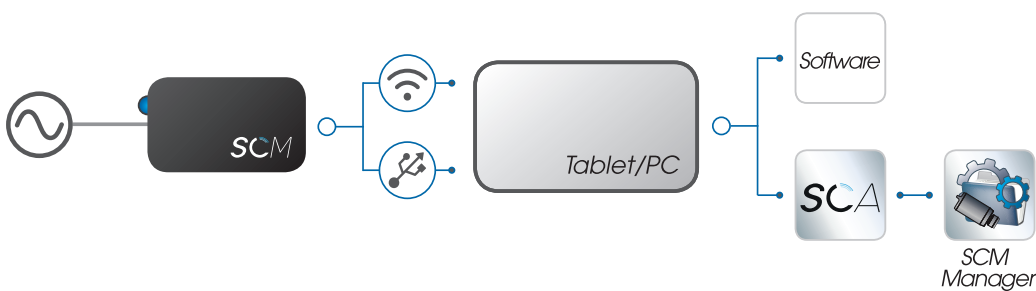


Illustration 16: Schematic illustration of SCM management using the SCA's „SCM MANAGER“

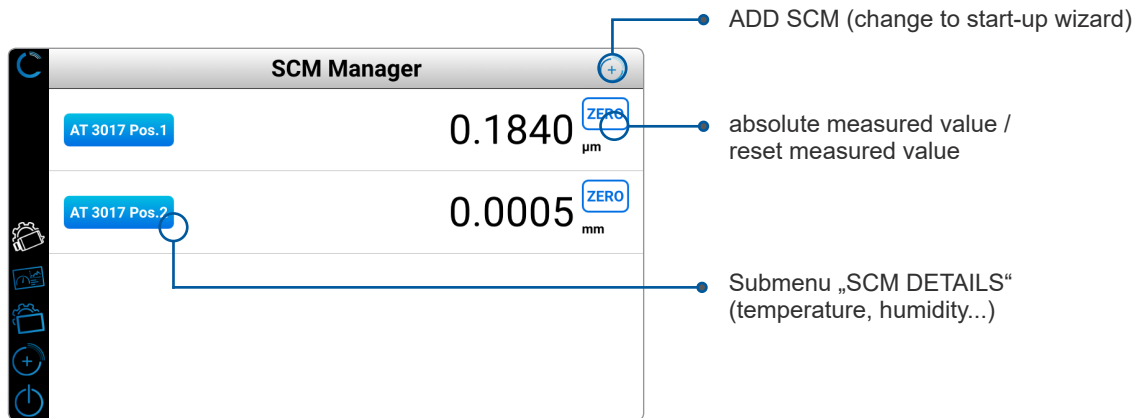


Illustration 17: „SCM MANAGER“ software interface

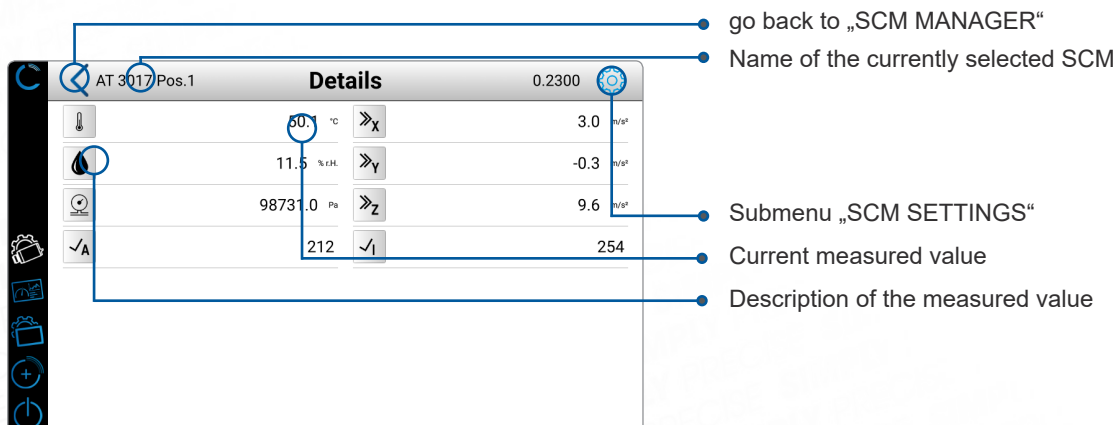


Illustration 18: Submenu „SCM MANAGER - Details“ with specific information

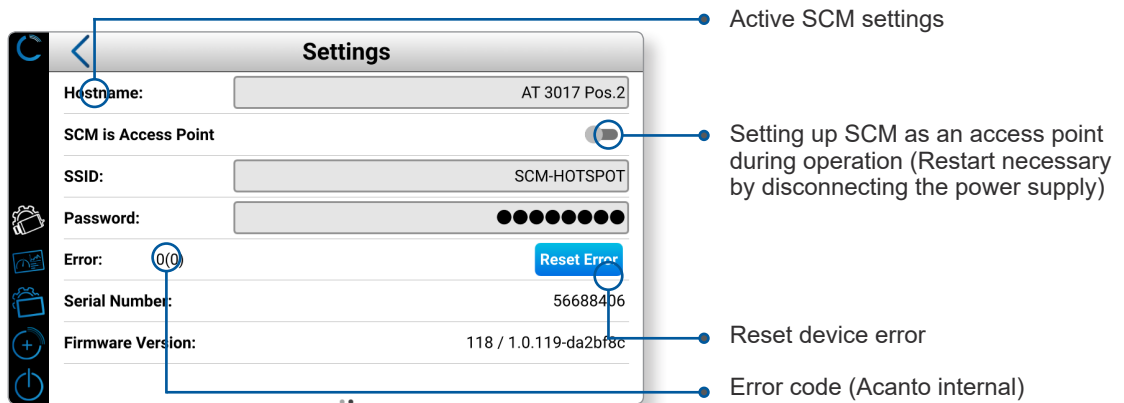


Figure 18: Submenu "SCM MANAGER - Settings" with SCM-specific parameters

The app also provides a monitoring assistant („MONITORING“), which allows a graphical monitoring and recording of the information/measured values of the integrated devices in the network with various options.

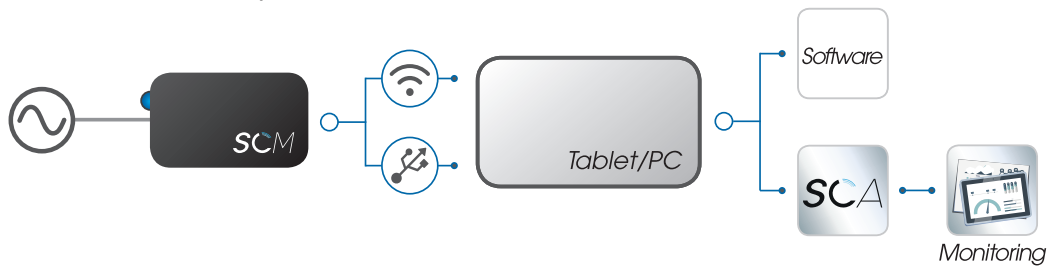


Figure 19: Schematic illustration of the graphical representation of information using the SCA's "MONITORING"-assistant

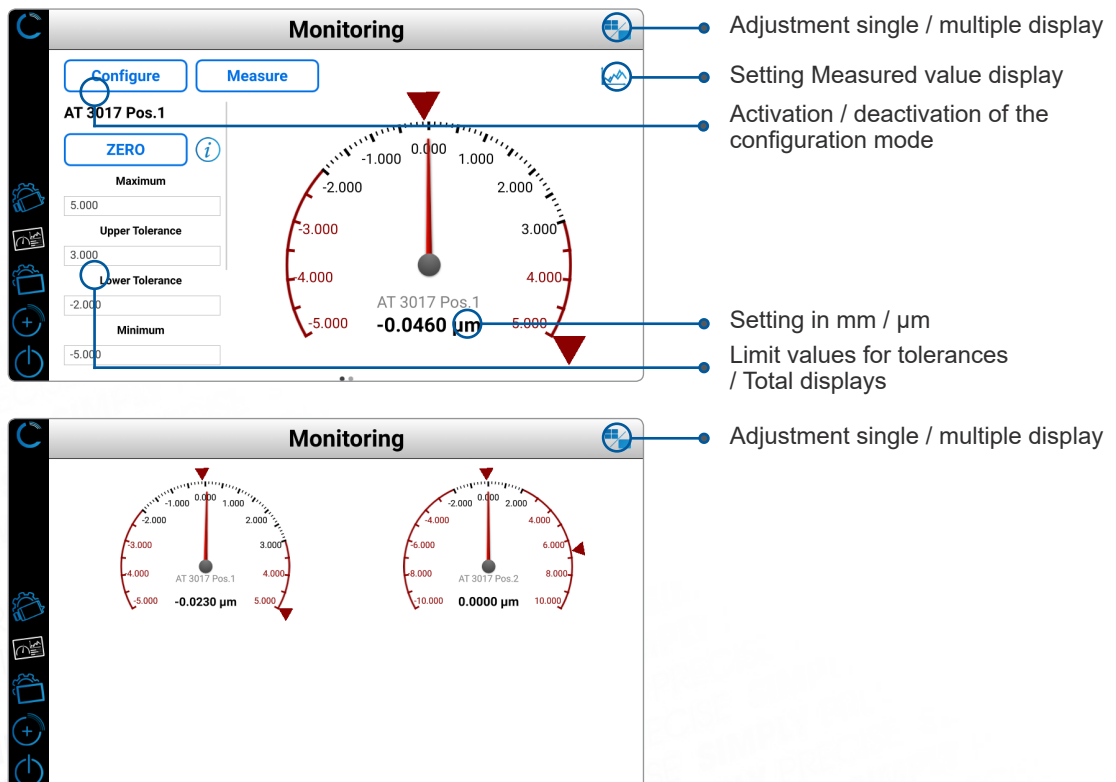


Figure 20: Software surface "MONITORING"

6.2 SCM output parameter

The SCM-1000 provides the following information independently of the connected probe (Note: All parameters are measured within the module):

Parameter	Condition	Min	Typ	Max	Unit
Temperature					
Operating Range	operational	-40	25	85	°C
Absolute temperature accuracy	0...65		±1.0		°C
Resolution	API output resolution		0.01		°C
Path	SCM-1000\Hardware\Temperature				
Humidity					
Operating Range	for temperatures < 0 °C and > 60 °C	-40	25	85	°C
		0		100	%RH
Absolute accuracy tolerance	20...80 %RH, 25 °C		±3		%RH
Resolution			0.008		%RH
Path	SCM-1000\Hardware\Humidity				
Acceleration					
Sensitivity ±2g	average temperature = 25 °C		4096		LSB/g
Resolution			0.244		mg/LSB
Path	SCM-1000\Hardware\Accel X SCM-1000\Hardware\Accel Y SCM-1000\Hardware\Accel Z				
Pressure					
Operating temperature range	operational	-40	25	85	°C
Operating pressure range	full accuracy	300		1100	hPa
Absolute accuracy pressure	300...1100 hPa, 0...65 °C		±1.0		hPa
Path	SCM-1000\Hardware\Pressure				

Table 8: Overview of module-specific output values

6.3 ACANTO length gauge output parameter

The output values can be read with a suitable software under the following paths:

Parameter	Min	Typ	Max	Unit
Length				
SCM-1000\Axes\Axis 1\Encoder 1\Position				mm
Valuation Number				
SCM-1000\Axes\Axis 1\Encoder 1\Diagnostic\Incremental Track	0		255	–
SCM-1000\Axes\Axis 1\Encoder 1\Diagnostic\Absolute Track	0		255	–

Table 9: Overview of gauge settings

6.4 Encoder settings

The following settings can be adapted with a suitable software for SCM / length gauge:

Functionality	Path	Value	
Set zero position (manually)	SCM-1000\Axes\Axis 1\Encoder 1\Config\Datum Shift	<User-defined>	
zero position (Automatic - current position)	SCM-1000\Axes\Axis 1\Encoder 1\Config\Use actual pos. for Datum Shift	1	= set value
Set counter unit	SCM-1000\Axes\Axis 1\Encoder 1\Config\Measuring Unit	0	= mm/deg
		1	= counts
Set power save mode	SCM-1000\Axes\Axis 1\Encoder 1\isActive	0	= switch off
		1	= switch on
Get error status	SCM-1000\Axes\Axis 1\Encoder 1>Error	0	= no error
		1	= error
Read device name plate	Identnummer: SCM-1000\Axes\Axis 1\Encoder 1\Nameplate\Ident Number		
	Seriennummer: SCM-1000\Axes\Axis 1\Encoder 1\Nameplate\Serial Number		
Read SCM name plate	Identnummer: SCM-1000\Nameplate\Ident Number		
	Seriennummer: SCM-1000\Nameplate\Serial Number		

Table 10: Overview of encoder settings

7. APPLICATION PROGRAMMING INTERFACE

For the creation of user-specific software, NUMERIK JENA GmbH will provide information on the application programming interface on request. The API is also available in the download area at www.numerikjena.de.

8. ORDER INFORMATION

Description	Scope of delivery	Order number
Smart Communication Module	<ul style="list-style-type: none"> SCM - Smart Communication Module USB-Cable (USB Typ A/USB Typ B micro) 	1232294-02
Replacement USB cable	<ul style="list-style-type: none"> 1.8m 	1279537-01
SCA (for Android)	SCA is available for free at the Google Playstore	
SCA (for Windows)	SCA is available for free at www.numerikjena.de	

Table 11: Overview with description, scope of delivery and order number

9. SCM & SCA – TROUBLESHOOTING

Connection type	Behaviour	Potential cause	Proposed solution
Behavior occurs if NO gauge is connected to the SCM.	SCM LED is not lit	Power supply insufficient	Check power supply
	SCM LED lights up red	No error, behaviour is intended in commissioning mode	Continue commissioning, the SCM will set up an access point (see chapter 4)
	SCM LED flashes red	No error, behaviour is intended in commissioning mode	Continue commissioning (see section 5.4)
	SCM LED lights red - Access Point is not established	SCM is connected to the PC	SCM connects via the USB port > Connection via separate power supply If the SCM is connected via USB, no access point is established (see chapter 5.3.2)
	SCM LED is not lit	If the LED does not light up in any of the possible connection options, this may be a defect.	Please contact our support

Table 12: Overview of possible error sources while the SCM-1000 is connected.

Connection type	Behaviour	Potential cause	Proposed solution
Behavior occurs if a gauge is connected to the SCM	SCM LED is not lit	Power supply insufficient	Check SCM for functionality without terminal device – Check suitability of the measuring instrument
	SCM LED lights up red	Error of the SCM	Check power supply
	SCM LED flashes red	Error in the connected measuring device	Check error code in SCA (Path: SCM MANAGER/DETAILS/SETTINGS) or under *Insert Path* and reset if necessary
	SCM LED lights up blue – Access Point is not set up	SCM is connected to the PC	SCM connects via the USB port > Connection via separate power supply
		SCM is not set up as an access point	Connect the SCM without measuring device to the power supply and adjust the network settings (see section 5.4) Check in the SCM settings whether the network setting is set to “Client” or “Access Point”
	SCM lights up blue, no measurement data from the connected measuring device is displayed	Measuring device is not recognized	Check suitability of the measuring device
		Instrument has an internal error	Check Error Code (Path: SCM MANAGER/DETAILS/SETTINGS)
		The power supply is insufficient	Check power supply
	SCM flashes red, no measurement data from the connected measuring device is displayed	Measuring device was not recognized Insufficient power supply for SCM & gauge	Verifying the connection Replacement of the measuring device Replacement of the power supply cable

Table 13: Overview of possible error sources without an SCM-1000 connected

In case further errors occur during operation, please contact our support. We are constantly interested in improving our products.

USER MANUAL

Smart Communication Module

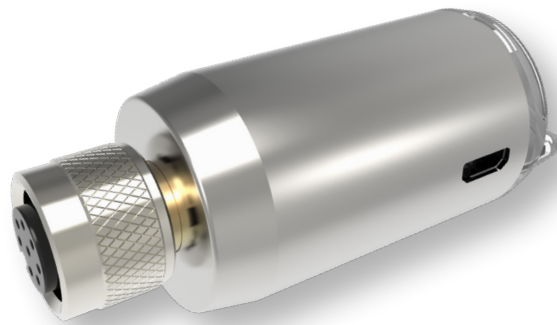


Figure 21: SCM-1000

NUMERIK
JENA

SIMPLY PRECISE

NUMERIK JENA GmbH

Im Semmicht 4
07751 Jena
Germany

Phone: +49 3641 4728-0
E-Mail: info@numerikjena.de
www.numerikjena.de

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