ANALYTICAL INSTRUMENTS

A-96.150.351 / 130525

AMU-II Rescon

Operator's Manual

SWISS MADE

AMU-II Rescon

Customer Support

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This manual applies to firmware V1.00 and higher.
The information contained in this document is subject to change without notice.

Table of Contents

Operator's Manual

This document describes the main steps for instrument setup, operation and maintenance.

1. Safety Instructions

General

The instructions included in this section explain the potential risks associated with instrument operation and provide important safety practices designed to minimize these risks.
If you carefully follow the information contained in this section, you can protect yourself from hazards and create a safer work environment.
More safety instructions are given throughout this manual, at the respective locations where observation is most important. Strictly follow all safety instructions in this publication.

Target audience

Operator: Qualified person who uses the equipment for its intended purpose.
Instrument operation requires thorough knowledge of applications, instrument functions and software program as well as all applicable safety rules and regulations.

OM location

Keep the Operator's Manual in proximity of the instrument.

Qualification, training

To be qualified for instrument installation and operation, you must:

- read and understand the instructions in this manual as well as the Material Safety Data Sheets.
- know the relevant safety rules and regulations.

1.1. Warning Notices

The symbols used for safety-related notices have the following meaning:

DANGER

Your life or physical wellbeing are in serious danger if such warnings are ignored.

- Follow the prevention instructions carefully.

WARNING

Severe injuries or damage to the equipment can occur if such warnings are ignored.

- Follow the prevention instructions carefully.

CAUTION

Damage to the equipment, minor injury, malfunctions or incorrect process values can be the consequence if such warnings are ignored.

- Follow the prevention instructions carefully.

Mandatory signs

The mandatory signs in this manual have the following meaning:

Safety goggles

Safety gloves

Warning signs The warning signs in this manual have the following meaning:


Electrical shock hazard


Corrosive


Harmful to health


Flammable


General warning


Attention

1.2. General Safety Regulations

Legal requirements

The user is responsible for proper system operation. All precautions must be followed to ensure safe operation of the instrument.

Spare parts and disposables

Use only official Swan spare parts and disposables. If other parts are used during the normal warranty period, the manufacturer's warranty is voided.

Modifications

Modifications and instrument upgrades shall only be carried out by an authorized service technician. Swan will not accept responsibility for any claim resulting from unauthorized modification or alteration.

WARNING

Mains voltage

Electrical shock hazard

- Maintenance on electronic parts shall be performed by authorized personnel only.
- Whenever maintenance on electronic parts is required, disconnect instrument power and power of devices connected to.
  - relay 1,
  - relay 2,
  - alarm relay
- If proper operation is no longer possible, the instrument must be disconnected from all power lines, and measures must be taken to prevent inadvertent operation.

2. Product Description

2.1. Description of the System

Application range

The AMU-II Rescon is applicable for the measurement of specific resistivity or specific conductivity in ultrapure water.
The transmitter can be used with a two-electrode sensor with an integrated NT5k temperature sensor, e.g. Swansensor RC U.

Special features

Many temperature compensation curves for specific resistivity or conductivity measurement:

- none
- Coefficient
- Neutral salts
- High-purity water
- Strong acids
- Strong bases
- Ammonia, Ethanolamine
- Morpholine

Standard temperature

The displayed resistivity or conductivity value is compensated to 25 °C standard temperature.

Signal outputs

Two signal outputs programmable for measured values (freely scalable, linear, bilinear, log) or as continuous control output (control parameters programmable).

Current loop:	0/4–20 mA
Maximal burden:	510 Ω

Relays

Two potential-free contacts programmable as limit switches for measured values, controllers or timer with automatic hold function.
Maximum load: 100 mA/50 V resistive

Alarm relays

Two potential-free contacts (one normally open and one normally closed). Summary alarm indication for programmable alarm values and instrument faults.

- Normally open contact: closed during normal operation, open on error and power loss.
- Normally closed contact: open during normal operation, closed on error and power loss.

Maximum load: 100 mA/50 V resistive

Input

One input for potential-free contact to freeze the measured value or to interrupt control in automated installations. Programmable as HOLD or OFF function.

Communication interface (option)

- RS485 interface (galvanically separated) for communication via Modbus or Profibus DP
- USB interface for logger download
- HART interface
- RS232 interface for logger download with HyperTerminal

Safety features

No data loss after power failure. All data is saved in non-volatile memory. Overvoltage protection of inputs and outputs. Galvanic separation of measuring inputs from signal outputs.

2.2. Single Components

2.2.1 AMU-II Rescon Transmitter

General	Electronics housing:	Noryl® resin
	Protection degree:	up to IP54 (front)
	Ambient temperature:	-10 to +50 °C
	Humidity:	10–90% rel., non condensing
	Display:	backlit LCD, 75 x 45 mm
	Dimensions:	96 x 96 x 85 mm
	Cutout size:	92 x 92 mm (DIN IEC 61554:2002-08)
	Weight:	0.30 kg
Power supply	AC variant:	100–240 VAC (±10%) 50/60 Hz (±5%)
	DC variant:	10–36 VDC
	Power consumption:	max. 3 VA
Sensor type	2-electrode sensor.	

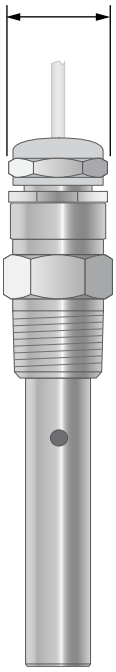
Measuring range	**Range**	**Resolution**
	0.01–18.24 MΩ×cm	0.01 MΩ×cm
	0.055–2.999 µS/cm	0.001 µS/cm
	3.00–29.99 µS/cm	0.01 µS/cm
	30.0–99.9 µS/cm	0.1 µS/cm
	100–1000 µS/cm	1 µS/cm
	Automatic range switching.	

Accuracy at 25 °C		
	0.01–18.24 MΩ×cm	±0.5 %
	0.055–20.00 µS/cm	±0.5 %
	20.00–1000 µS/cm	±1 %
	of measured value or ±1 digit (whichever is greater) Ranges and accuracy with Swansensor RC U (cell constant ~0.01 cm^{-1}).	

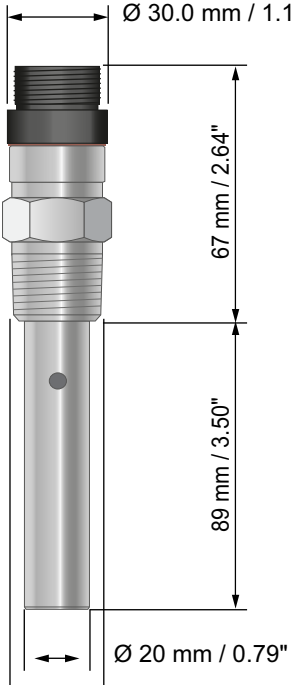
Sensor cell constant	0.00500–1.00000 cm^{-1}	
Temperature measurement	NT5k type sensor	
	Measuring range:	-30 to +130 °C
	Resolution:	0.1 °C
Sample flow measurment	with digital SWAN sample flow sensor	

2.2.2 Swansensor RC U

Two-electrode conductivity sensor for continuous measurement of ultrapure water at high pressure.



Swansensor RC U
with integrated cable



Swansensor RC U
with M16 male plug

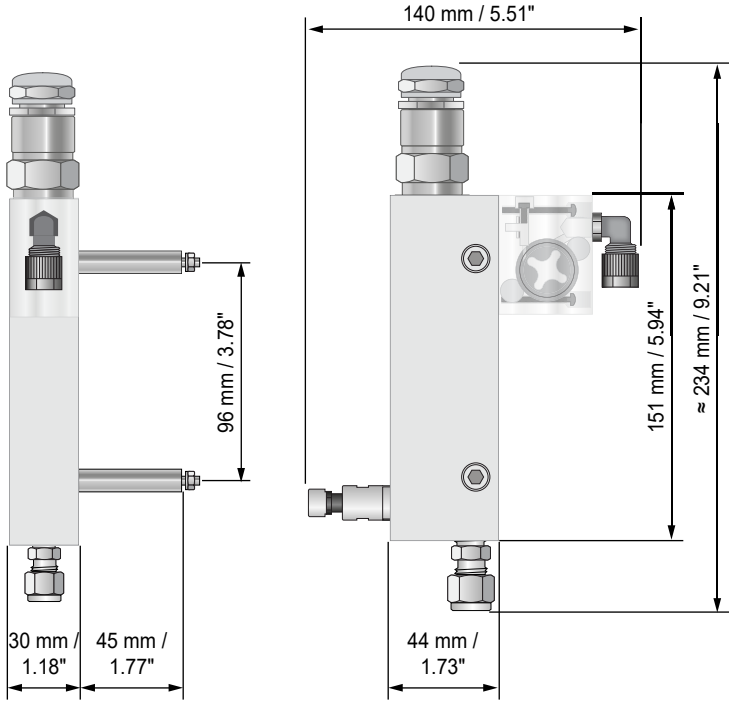
Specifications

Measuring range:	0.055–1000 µS/cm 0.01–18.24 MΩ×cm
Operating temperature:	-10 to 70 °C
Operating pressure:	50 bar
Accuracy (at 25 °C):	> ±0.5% up to 20 µS/cm ±1% from 20 µS/cm to 1000 µS/cm
Cell constant:	~0.01 cm^{-1}
Temperature sensor:	NT5k (±0.2 °C)
Process connection:	NPT ¾”

2.2.3 Flow Cell QV-HFlow L130

Flow cell for continuous conductivity measurement in ultrapure water with integrated needle valve for flow adjustment and integrated sample flow meter.

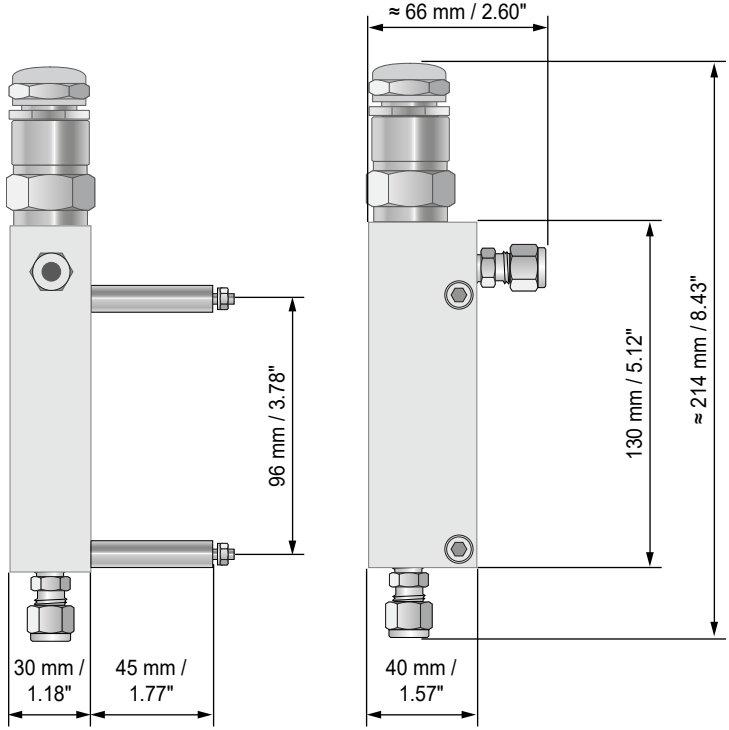
For one sensor with ¾" NPT thread.



Sample conditions	Operating temperature:	0 to 50 °C
	Inlet pressure:	max. 2 bar
	Outlet pressure:	ambient pressure
	Sample flow:	20 to 100 l/h
Process connections	Inlet:	Swagelok fitting with R ⅛" (ISO 7-1) thread for ¼" tube OD
	Outlet:	8 mm Serto tube adapter (PA)

2.2.4 Flow Cell B-Flow L130

Flow cell for continuous conductivity measurement in ultrapure water at high pressure.
For one sensor with ¾" NPT thread.

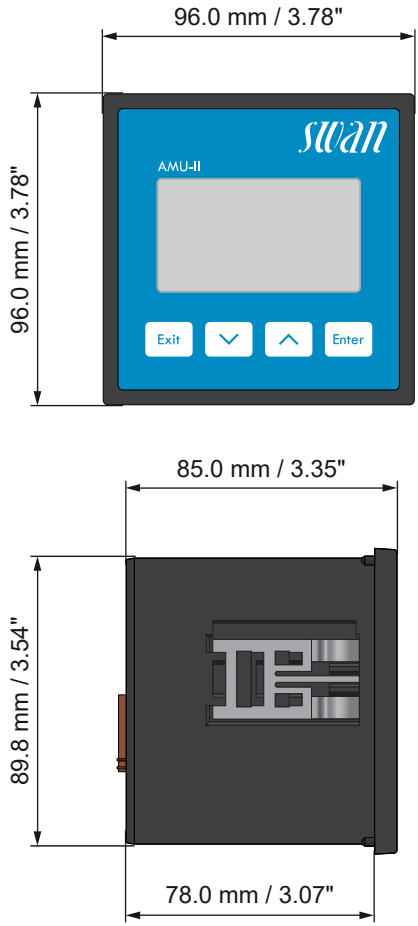


Sample conditions	Sample temperature:	-10 to 100 °C
	Operating pressure:	max. 50 bar
Process connections	Inlet and outlet:	2x female thread G ⅛" (ISO 228-1) (Swagelok fittings must be ordered separately)

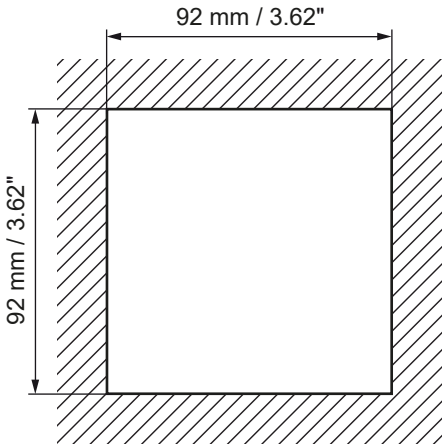
3. Installation

3.1. Mounting of the AMU-II Transmitter

Transmitter dimensions

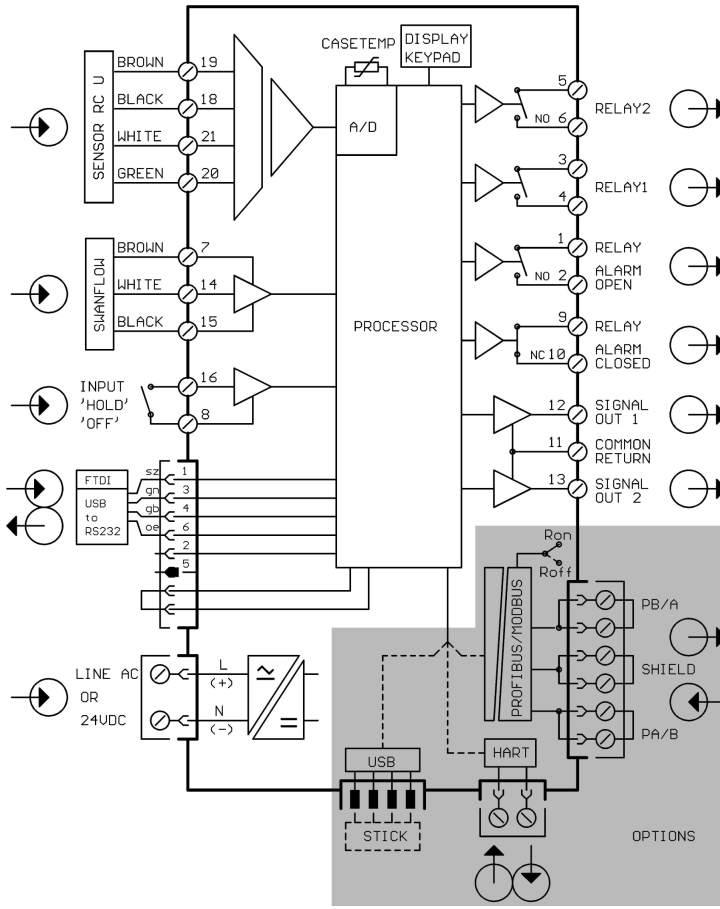


Cutout dimensions



3.2. Electrical Connections

Connection diagram



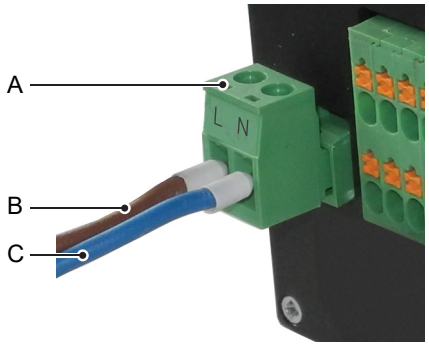
CAUTION

Use only the terminals shown in this diagram, and only for the mentioned purpose. Use of any other terminals will cause short circuits with possible corresponding consequences to material and personnel.

3.3. Power Supply

CAUTION

Do not apply power to the transmitter until all electrical connections have been made.



A *Pluggable terminal block*
B *Phase/(+) conductor*
C *Neutral/(-) conductor*

Installation requirements

The installation must meet the following requirements:

- Mains cable according to standards IEC 60227 or IEC 60245; flammability rating FV1
- Mains equipped with an external switch or circuit-breaker
  - near the instrument
  - easily accessible to the operator
  - marked as interrupter for AMU-II Rescon

3.4. Sensor

Terminals: see Connection diagram, p. 17.
Sensor settings: see Instrument Setup, p. 26.

3.5. Swan Flow Meter

Terminals: see Connection diagram, p. 17.

3.6. Input

Note: *Use only potential-free (dry) contacts.*

Terminals 16/8
For programming see Program List and Explanations, p. 45.

3.7. Relay Contacts

3.7.1 Alarm Relay

Note: *Max. load 100 mA/50 V resistive*

Alarm output for system errors. For error codes see Error List, p. 37.

	Terminals	Description
NC Normally Closed	9/10	Active (opened) during normal operation. Inactive (closed) on error and loss of power.
NO Normally Open	1/2	Active (closed) during normal operation. Inactive (opened) on error and loss of power.

3.7.2 Relay 1 and 2

Note: *Max. load 100 mA/50 V resistive*

Terminals 3/4: Relay 1
Terminals 5/6: Relay 2
For programming see Program List and Explanations, p. 45.

3.8. Signal Output 1 and 2 (Current Outputs)

Note: *Max. burden 510 Ω*
If signals are sent to two different receivers, use signal isolator (loop isolator).

Signal output 1: Terminals 12 (+) and 11 (-)
Signal output 2: Terminals 13 (+) and 11 (-)
For programming see Program List and Explanations, p. 45, Installation menu.

3.9. Interface Options

The functionality of the AMU-II Rescon can be expanded with one of the following interface options:

- RS485 with Modbus or Profibus protocol
- HART
- USB

3.9.1 Installation

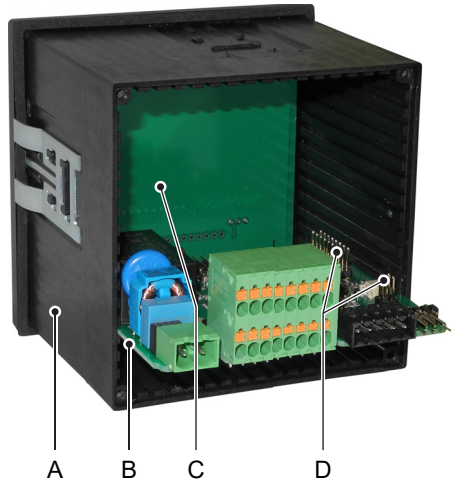
WARNING

Electrical shock hazard

Before opening the housing, disconnect the AMU-II transmitter from the power supply.

CAUTION

Observe precautions for handling electrostatic discharge sensitive devices.



A *Housing*
B *Mainboard*
C *Display board*
D *Pins for interface option*

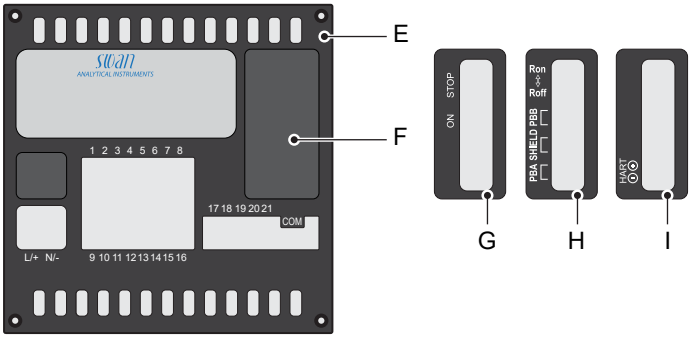
To install an interface option, proceed as follows:

1 Switch power off.
2 Loosen the four screws at the back of the AMU-II transmitter and remove the backplate.
3 Pull the mainboard [B] completely out of the housing.
4 Plug the interface option onto the pins [D] on the mainboard.
5 Reinsert the mainboard into the housing, making sure to insert both boards into the correct guide grooves.

Mainboard:	Fourth guide groove from the bottom
Interface option:	First guide groove from the right

6 Carefully press the mainboard [B] against the display board [C] until it snaps into place.

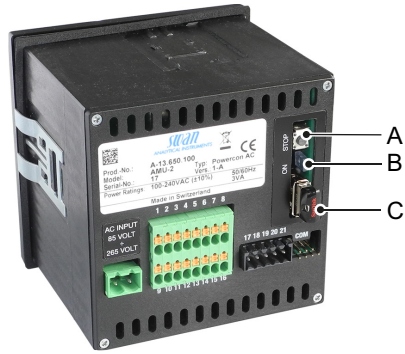
Connector field



E *Backplate*
F *Covered connector field (condition at delivery)*
G *Labeling for USB option*
H *Labeling for RS485 option*
I *Labeling for HART option*

7 Remove the cover [F] from the connector field.
8 Apply the supplied sticker [G], [H] or [I] to the connector field.
9 Reinstall the backplate [E] onto the housing.

3.9.2 USB Option



A *Pushbutton*
B *Blue LED*
C *USB stick*

Menu item Calling up the <Operation>/<Eject USB Stick> menu item performs the following actions:

- the calibration history and the event history are copied to the USB stick,
- the logger file is completed (the next time the USB stick is inserted, a new file will be created),
- the USB stick is deactivated and can be removed.

Pushbutton Pressing the pushbutton [A] has the same effect as calling up the <Eject USB Stick> menu item.

Blue LED The blue LED is **on** if the USB stick is plugged in and ready to record data.
The blue LED is **off** when the USB stick has been deactivated and is ready to be removed.

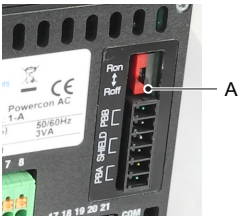
3.9.3 RS485 Option

Menu items

After the RS485 option has been installed, the <Installation>/<Interface> menu item becomes visible. Select Modbus RTU or Profibus as protocol.

Terminating resistor

On the last RS485 interface in the network, move the switch to the position marked “Ron” to activate the terminating resistor.



A *Switch for terminating resistor*

Interface Description

The Modbus and Profibus interface descriptions can be downloaded from www.swan.ch.

3.9.4 HART Option

Menu items

The configuration is done via the following menu items:
<Installation>/<Signal Outputs>/<Signal Output 3>:
<Installation>/<Interface>/<Device Address>:

Field Device Description

The HART® 7.x Field Device Specification can be downloaded from www.swan.ch.

3.10. RS232 Interface

The RS232 interface is located on the back of the AMU-II transmitter. Use the USB to RS232 interface converter available from Swan.

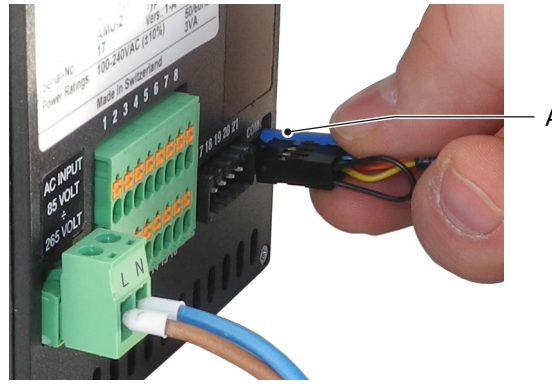
Downloading SwanTerminal

To use the functions provided via the RS232 interface, the SwanTerminal program is required, which can be downloaded from www.swan.ch.

Establishing a connection

To establish a connection between the PC and the AMU-II transmitter, proceed exactly in the following order:

1. Apply power to the AMU-II transmitter.
2. First connect the interface converter to the USB port of the PC without the AMU-II connected to the other end of the cable.
3. Wait a few seconds for the interface converter to be detected by the operating system.
4. Connect the other end of the cable to the pins labeled “COM” on the back of the AMU-II transmitter. The blue coding pin [A] must be at the top right corner.
   ⇒ *The AMU-II transmitter reboots automatically.*



5. Start the SwanTerminal program on the PC and select the correct COM port.
6. Click the button in SwanTerminal to connect to the AMU-II transmitter.

4. Instrument Setup

4.1. Establish Sample Flow

1 Open flow regulating valve.
2 Switch on power.
3 Adjust sample flow.

Note: *To allow a precise measurement in the range of 18–18.24 MΩ×cm, set the sample flow to 70–100 l/h.*

4.2. Programming

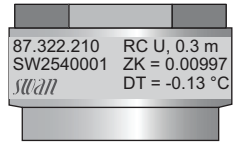
Flow Measurement
Menu 5.1.1
Select the flow sensor you are using:
- None
- Q-Flow
- Q-HFlow

Meas. Mode
Menu 5.1.2
Select Resistivity or Conductivity according to your application.

Temp. compensation
Menu 5.1.3
Choose between:
- none
- Coefficient
- Neutral salts
- High-purity water
- Strong acids
- Strong bases
- Ammonia, Ethanolamine
- Morpholine

Sensor Parameters

Menu 5.1.4:
Enter the following parameters printed on the sensor label.



- Cell constant ZK
- Temperature correction DT
- Sensor cable length. If the sensor cable length is 0.3 m, set the cable length to 0 m.

External devices

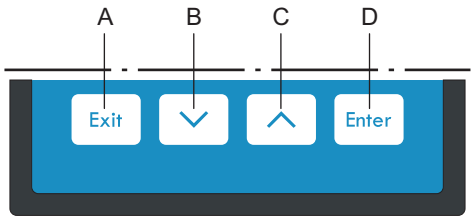
Program all parameters for external devices (interface, recorders, etc.) See program list and explanations 5.2 Signal Outputs, p. 50 and 4.2 Relay Contacts, p. 48.

Limits, alarms

Program all parameters for instrument operation (limits, alarms). See program list and explanations 4.2 Relay Contacts, p. 48.

5. Operation

5.1. Keys



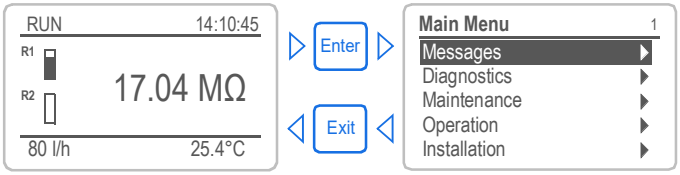
A to exit a menu or command (rejecting any changes)
to move back to the previous menu level

B to move DOWN in a menu list and to decrease digits

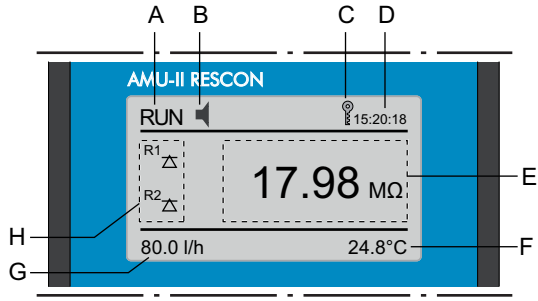
C to move UP in a menu list and to increase digits

D to open a selected sub-menu
to accept an entry

Program access, exit



5.2. Display



A RUN — normal operation

HOLD — input closed or cal delay: Instrument on hold (shows status of signal outputs).

OFF — input closed: control/limit is interrupted (shows status of signal outputs).

B Error — Error — Fatal error

C Keys locked, transmitter control via Profibus

D Time

E Process values

F Sample temperature

G Sample flow

H Relay status

Relay status, symbols

upper/lower limit not yet reached

upper/lower limit reached

control upw./downw. no action

control upw./downw. active, dark bar indicates control intensity

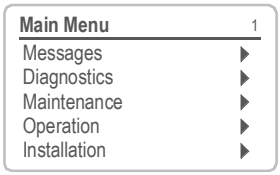
motor valve closed

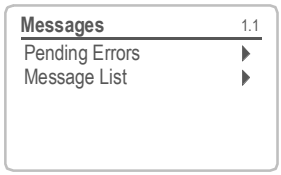
motor valve: open, dark bar indicates approx. position

timer

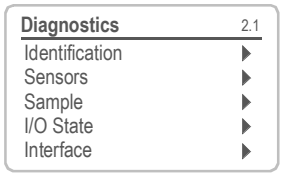
timer: timing active (hand rotating)

5.3. Software Structure

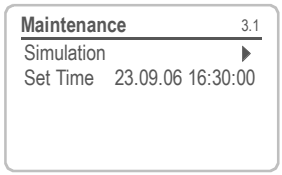




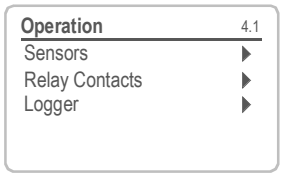
Menu **Messages 1**
Reveals pending errors as well as an event history (time and state of events that have occurred at an earlier point of time).
It contains user relevant data.



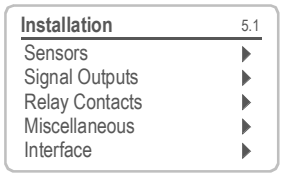
Menu **Diagnostics 2**
Provides user relevant instrument and sample data.



Menu **Maintenance 3**
For instrument calibration, relay and signal output simulation, and to set the instrument time.
It is used by the service personnel.



Menu **Operation 4**
User relevant parameters that might need to be modified during daily routine. Normally password protected and used by the process-operator.
Subset of menu 5 - Installation, but process-related.

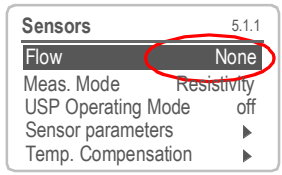


Menu **Installation 5**
For initial instrument set up by SWAN authorized person, to set all instrument parameters. Can be protected by means of password.

5.4. Changing Parameters and Values

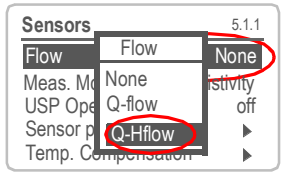
Changing parameters

The following example shows how to set the Q-HFlow sensor:



1 Select the parameter you want to change.

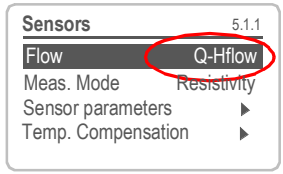
2 Press <Enter>



3 Press [▲] or [▼] key to highlight the required parameter.

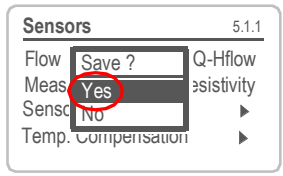
4 Press <Enter> to confirm the selection or <Exit> to keep the previous parameter).

⇒ *The selected parameter is indicated (but not saved yet).*



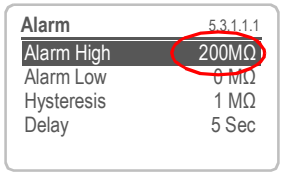
5 Press <Exit>.

⇒ *Yes is highlighted.*



6 Press <Enter> to save the new parameter.
⇒ *The system reboots, the new parameter is set.*

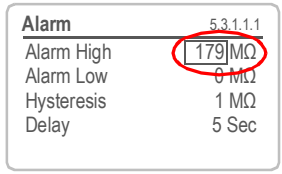
Changing values



1 Select the value you want to change.

2 Press <Enter>.

3 Set required value with [▲] or [▼] key.



4 Press <Enter> to confirm the new value.

5 Press <Exit>.
⇒ *Yes is highlighted.*

6 Press <Enter> to save the new value.

6. Maintenance

6.1. Maintenance Schedule

If required	◆ Clean the sensor.

6.2. Stop of Operation for Maintenance

1 Stop sample flow.
2 Shut off power of the instrument.

6.3. Maintenance of Sensor

6.3.1 Clean Sensor

The Swansensor RC-U is largely maintenance free. However, depending on the application, it can be contaminated, which may cause problems.

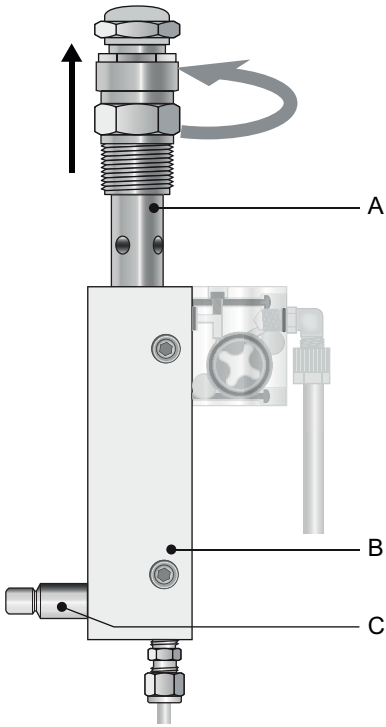
The Swansensor RC-U is available in the following 2 different versions:

- Sensor with fixed cable
- Sensor with plug

Sensor with fixed cable: To avoid damage of the sensor cable due to torsion when screwing the sensor out of the flow cell, disconnect the cable from the terminals of the transmitter.

Remove the sensor with fixed cable

1. Open the transmitter housing.
2. Disconnect the sensor cable from the terminals.
3. Remove the sensor cable from the transmitter housing.
4. Unscrew and remove the sensor [A] from the flow cell block [B], use a monkey spanner.
5. Remove the teflon tape from the sensor thread.
6. Clean the sensor with soap water.
7. Rinse the sensor well with high purity water.



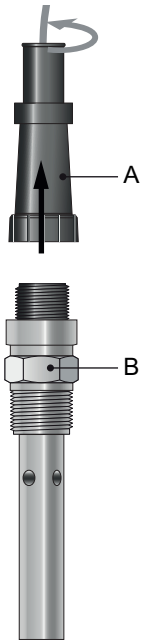
A *Sensor*
B *Flow cell*
C *Flow regulating valve*

Install the sensor with fix cable

1. Wrap 7 turns of teflon tape around the sensor thread.
2. Screw the sensor into the flow cell and tighten it well.
3. Feed the sensor cable into the transmitter housing.
4. Connect the sensor cable to the terminals of the AMU transmitter, see Electrical Connection, p. 19.
5. Close the transmitter housing.
6. Open the flow regulating valve [C].
7. Switch on power.

Remove the sensor with plug

1. Unscrew and remove the sensor plug [A] from the sensor [B].
2. Proceed according to “Remove the Sensor with fixed cable”, step 4.



A *Sensor plug*
B *Sensor*

Install the sensor with plug

1. Wrap 7 turns of teflon tape around the sensor thread.
2. Screw the sensor into the flow cell and tighten it well.
3. Screw the sensor plug on to the senor
4. Open the flow regulating valve [C].
5. Switch on power.

6.4. Longer Stop of Operation

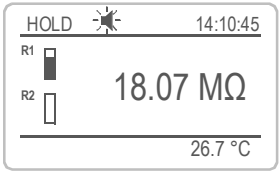
1. Stop sample flow.
2. Shut off power of the instrument.
3. Unscrew and remove the sensor.
4. Empty and dry the flow cell.

7. Error List

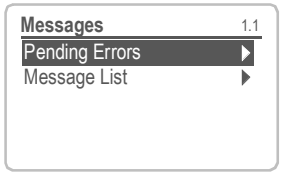
Error
Non-fatal error. Indicates an alarm if a programmed value is exceeded. Such errors are marked **E0xx** (bold and black).

Fatal error (blinking symbol)
Control of dosing devices is interrupted.
The indicated measured values are possibly incorrect.
Fatal errors are divided in the following two categories:

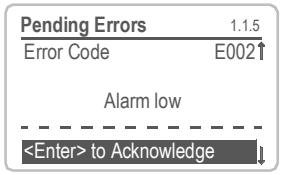
- Errors which disappear if correct measuring conditions are recovered (i.e. Sample Flow low).
  Such errors are marked **E0xx** (bold and orange)
- Errors which indicate a hardware failure of the instrument.
  Such errors are marked **E0xx** (bold and red)



Error or fatal error
Error not yet acknowledged.
Check **Pending Errors 1.1.5** and take corrective action.



Navigate to <Messages>/<Pending Errors>.



Press [Enter] to acknowledge a pending error.

⇒ *The error is reset and saved in the message list.*

Error	Description	Corrective action
E001	Alarm high	– check process – check programmed value
E002	Alarm low	– check process – check programmed value
E007	Sample Temp. high	– check process – check programmed value
E008	Sample Temp. low	– check process – check programmed value
E009	Sample Flow high	– check sample flow – check programmed value
E010	Sample Flow low	– establish sample flow – clean instrument – check programmed value
E011	Temp. shorted	– Check wiring of sensor – Check sensor
E012	Temp. disconnected	– Check wiring of sensor – Check sensor
E013	Case Temp. high	– check case/environment temperature – check programmed value
E014	Case Temp. low	– check case/environment temperature – check programmed value
E017	Control Timeout	– check control device or programming
E019	Sensor shorted	– Check wiring of sensor – Check sensor
E020	Sensor interrupted	– Check wiring of sensor – Check sensor
E024	Input active	– See If Fault Yes is programmed in Menu see 5.3.4, p. 61
E026	IC LM75	– call service
E030	EEProm Frontend	– call service

Error	Description	Corrective action
E031	Calibration Recout	– call service
E032	Wrong Frontend	– call service
E033	Power-on	– none, normal status
E034	Power-down	– none, normal status

8. Program Overview

For explanations about each parameter of the menus see Program List and Explanations, p. 45.

- Menu 1 **Messages** informs about pending errors and maintenance tasks and shows the error history. Password protection possible. No settings can be modified.
- Menu 2 **Diagnostics** is always accessible for everybody. No password protection. No settings can be modified.
- Menu 3 **Maintenance** is for service: Calibration, simulation of outputs and set time/date. Please protect with password.
- Menu 4 **Operation** is for the user, allowing to set limits, alarm values, etc. The presetting is done in the menu Installation (only for the system engineer). Please protect with password.
- Menu 5 **Installation**: Defining assignment of all inputs and outputs, measuring parameters, interface, passwords, etc. Menu for the system engineer. Password strongly recommended.

8.1. Messages (Main Menu 1)

Pending Errors 1.1*	*Pending Errors*	1.1.5*	* Menu numbers
Message List 1.2*	*Number*	1.2.1*	
	Date, Time		

8.2. Diagnostics (Main Menu 2)

Identification	Designation			* Menu numbers
2.1*	Version			
	Factory Test	*Instrument*	2.1.3.1*	
	2.1.3*	*Motherboard*		
		Front End		
	Operating Time	*Years / Days / Hours / Minutes / Seconds*		2.1.4.1*
	2.1.4*			
Sensors	Cond. Sensor	*Current Value MOhm*		
2.2*	2.2.1*	*(Raw value) MOhm*		
		Cell Constant		
		Cal. History	*Number*	2.2.1.5.1*
		2.2.1.5*	*Date, Time*	
			RSlo (KOhm)	
	Miscellaneous	*Case Temp.*	*2.2.2.1**	
	2.2.2*			
Sample	*Sample ID*	2.3.1*		
2.3*	*Temperature °C*			
	Nt5K Ohm			
I/O State	*Alarm Relay*	2.4.1*		
2.4*	*Relay 1/2*	2.4.2*		
	Input			
	Signal Output 1/2			
Interface	*Protocol*	2.5.1*		
2.5*	*Baud rate*			

8.3. Maintenance (Main Menu 3)

Simulation	*Alarm Relay*	3.2.1*	* Menu numbers
3.1*	*Relay 1*	3.2.2*	
	Relay 2	3.2.3*	
	Signal Output 1	3.2.4*	
	Signal Output 2	3.2.5*	
Set Time	*(Date), (Time)*		
3.2*			
3.3*			

8.4. Operation (Main Menu 4)

Sensors	*Filter Time Const.*	4.1.1*		* Menu numbers
4.1*	*Hold after Cal.*	4.1.2*		
Relay Contacts	**Alarm Relay**	**Alarm**	*Alarm High*	4.2.1.1.1*
4.2*	4.2.1*	4.2.1.1*	*Alarm Low*	4.2.1.1.26*
			Hysteresis	4.2.1.1.36*
			Delay	4.2.1.1.46*
	Relay 1 and 2	*Setpoint*	4.2.x.100*	
	4.2.2* and 4.2.3*	*Hysteresis*	4.2.x.200*	
		Delay	4.2.x.30*	
	Input	*Active*	4.2.4.1*	
	4.2.4*	*Signal Outputs*	4.2.4.2*	
		Output / Control	4.2.4.3*	
		Fault	4.2.4.4*	
		Delay	4.2.4.5*	
Logger	*Log Interval*	4.3.1*		
4.3*	*Clear Logger*	4.3.2*		

8.5. Installation (Main Menu 5)

Sensors	*Flow*			* Menu numbers
5.1*	5.1.1*			
	Meas. Mode			
	5.1.2*			
	Sensor Parameters	*Cell Constant*		
	5.1.4	*Temp. Corr.*		
		Cable length		
	Temp. Compensation	*Comp.*	5.1.5.1	
	5.1.5*			
Signal Outputs	**Signal Output 1 and 2**	*Parameter*	5.2.1.1 - 5.2.2.1*	
5.2*	5.2.1* and 5.2.2*	*Current Loop*	5.2.1.2 - 5.2.2.2*	
		Function	5.2.1.3 - 5.2.2.3*	
		Scaling	*Range Low*	5.2.x.40.10/10*
		5.2.x.40	*Range High*	5.2.x.40.20/20*
Relay Contacts	**Alarm Relay**	**Alarm**	*Alarm High*	5.3.1.1.1*
5.3*	5.3.1*	5.3.1.1*	*Alarm Low*	5.3.1.1.26
			Hysteresis	5.3.1.1.36
			Delay	5.3.1.1.46
		Sample Flow	*Flow Alarm*	5.3.1.2.1
		5.3.1.2*	*Alarm High*	5.3.1.2.2*
			Alarm Low	5.3.1.2.36*
		Sample Temp.	*Alarm High*	5.3.1.3.1*
		5.3.1.3*	*Alarm Low*	5.3.1.3.26*
		Case Temp. high	5.3.1.4*	
		Case Temp. low	5.3.1.5*	
	Relay 1 and 2	*Function*	5.3.2.1–5.3.3.1*	
	5.3.2* - 5.3.3*	*Parameter*	5.3.2.20–5.3.3.20*	
		Setpoint	5.3.2.300–5.3.3.301*	
		Hysteresis	5.3.2.400–5.3.3.401*	
		Delay	5.3.2.50–5.3.3.50*	

	Input	*Active*	5.3.4.1*
	5.3.4*	*Signal Outputs*	5.3.4.2*
		Output/Control	5.3.4.3*
		Fault	5.3.4.4*
		Delay	5.3.4.5*
Miscellaneous	*Language*	5.4.1*	
5.4*	*Set defaults*	5.4.2*	
	Load Firmware	5.4.3*	
	Password	*Messages*	5.4.4.1*
	5.4.4*	*Maintenance*	5.4.4.2*
		Operation	5.4.4.3*
		Installation	5.4.4.4*
	Sample ID	5.4.5*	
Interface	*Protocol*	5.5.1*	
5.5*	*Device Address*	5.5.21*	
	Baud Rate	5.5.31*	
	Parity	5.5.41*	

* Menu numbers

9. Program List and Explanations

1 Messages

1.1 Pending Errors

1.1.5 Provides the list of active errors with their status (active, acknowledged). If an active error is acknowledged, the alarm relay is active again. Cleared errors are moved to the Message list.

1.2 Message List

1.2.1 Shows the error history: Error code, date / time of issue and status (active, acknowledged, cleared). 64 errors are memorized. Then the oldest error is cleared to save the newest error (circular buffer).

2 Diagnostics

In diagnostics mode, the values can only be viewed, not modified.

2.1 Identification

Designation: Designation of the instrument.
Firmware: Firmware of the instrument (e.g. V1.00-02/25).

2.1.3 **Factory Test**: Test date of the instrument and motherboard.

2.1.4 **Operating Time:** Shows the operating time in years, days, hours, minutes and seconds.

2.2 Sensors

2.2.1 **Cond.Sensor:**

- *Current value*: Shows the actual measured value in MΩ or µS.
- *Raw value*: Shows the actual measured value in MΩ or µS.
- *Cell Constant*: Shows the cell constant.

2.2.2 **Miscellaneous**:

2.2.2.1 *Case Temp:* Shows the temperature in °C inside the transmitter.

2.3 Sample

2.3.1
- *Sample ID***:** Shows the assigned sample identification. This identification is defined by the user to identify the location of the sample
- *Temperature:* Shows temperature in °C.
- *(Nt5k)*: Shows raw value of the temperature in Ω.

2.4 I/O State

Shows status of all inputs and outputs.

2.4.1

- *Alarm relay*: Active or inactive
- *Relay 1 and 2*: Active or inactive
- *Input*: Open or closed.
- *Signal output 1 and 2*: Actual current in mA

2.5 Interface

Only available if optional interface is installed. Review programmed communication settings.

3 Maintenance

3.1 Simulation

To simulate a value or a relay state, select the

- alarm relay,
- relay 1or 2,
- signal output 1 or 2

with the [▲] or [▼] key.
Press the [Enter] key.
Change the value or state of the selected item with the [▲] or [▼] key.
Press the [Enter] key.

⇒ *The value is simulated by the relay/signal output.*

3.1.1	*Alarm relay:*	Active or inactive
3.1.2	*Relay 1:*	Active or inactive
3.1.3	*Relay 2*	Active or inactive
3.1.4	*Signal output 1:*	Actual current in mA
3.1.5	*Signal output 2*	Actual current in mA

At the absence of any key activities, the instrument will switch back to normal mode after 20 min. If you quit the menu, all simulated values will be reset and the transmitter reboots.

3.2 Set Time

Adjust date and time.

4 Operation

4.1 Sensors

4.1.1 *Filter Time Constant:* Used to damp noisy signals. The higher the filter time constant, the slower the system reacts to changes of the measured value.
Range: 5–300 Sec

4.1.2 *Hold after Cal:* Delay permitting the instrument to stabilize again after calibration. During calibration plus hold time, the signal outputs are frozen (held on last valid value), alarm values, limits are not active.
Range: 0–6‘000 Sec

4.2 Relay Contacts

See 5.3.2 and 5.3.3, p. 57.

4.3 Logger

The instrument is equipped with an internal logger. The logger data can be downloaded to a PC using the built-in RS232 interface.

The logger can save approx. 1500 data records. The Records consists of: Date, time, alarms, measured value, raw value (MΩ), case temperature, flow.

4.3.1 *Log Interval:* Select a convenient log interval. Consult the table below to estimate the max logging time. When the logging buffer is full, the oldest data record is erased to make room for the newest one (circular buffer).
Range: 1 second to 1 hour

Interval	1 s	5 s	1 min	5 min	10 min	30 min	1 h
Time	25 min	2 h	25 h	5 d	10 d	31 d	62 d

4.3.2 *Clear Logger:* If confirmed with **yes**, the complete logger data is deleted. A new data series is started.

5 Installation

5.1 Sensors

5.1.1 **Flow:** Select the type of flow cell. Possible flow cells:

Mode
None
Q-flow
Q-Hflow

B-Flow

Q-Flow

QV-flow

Selection of the suitable flow cell.

Flow cell type	**Mode**
B-Flow	None
Q-Flow or QV-Flow	Q-flow
Q-Hflow or QV-Hflow	Q-Hflow

5.1.2 **Meas. Mode:** The two measuring modes Conductivity or Resistivity are available.

5.1.4 **Sensor parameters:**

5.1.4.1 *Cell Constant:* Enter the cell constant ZK printed on the label of the sensor (see Sensor Parameters, p. 26).

5.1.4.2 *Temp. Corr:* Enter the temperature correction value DT printed on the label of the sensor (see Sensor Parameters, p. 26).

5.1.4.3 *Cable length:* Enter the cable length of the sensor.

5.1.5 **Temp. Compensation:** Choose between

- none
- coefficient
- neutral salts
- ultrapure water
- strong acids
- strong bases
- ammonia, ethanolamine
- morpholine

5.2 Signal Outputs

Note: *The navigation in the menu <Signal Output 1> and <Signal Output 2> is identical. For reason of simplicity only the menu numbers of Signal Output 1 are used in the following.*

5.2.1 and 5.2.2 **Signal Output 1 and 2:** Assign process value, the current loop range and a function to each signal output.

5.2.1.1 *Parameter:* Assign one of the process values to the signal output. Available values:

Resistivity	**Conductivity**
Meas. Value	Meas. Value
Temperature	Temperature
Sample Flow	Sample Flow
Meas. uc	Meas. uc

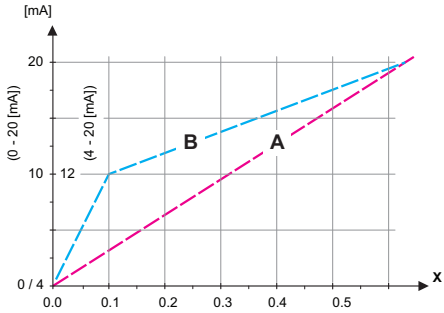
5.2.1.2 *Current Loop:* Select the current range of the signal output. Make sure the connected device works with the same current range.
Available ranges: 0–20 mA or 4–20 mA

5.2.1.3 *Function:* Define if the signal output is used to transmit a process value or to drive a control unit. Available functions are:

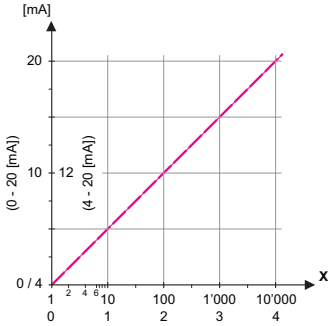
- Linear, bilinear or logarithmic for process values.
  See As process values, p. 51
- Control upwards or control downwards for controllers.
  See As control output, p. 52

As process values

The process value can be represented in 3 ways: linear, bilinear or logarithmic. See graphs below.



A *linear*
B *bilinear*
X *Measured value*



X *Measured value (logarithmic)*

5.2.1.40 **Scaling:** Enter beginning and end point (Range low & high) of the linear or logarithmic scale. In addition, the midpoint for the bilinear scale.

If Parameter = Meas. Value

5.2.1.40.10 Range low: 0.00–200 MΩ or 0.000–2000 µS

5.2.1.40.20 Range high: 0.00–200 MΩ or 0.000–2000 µS

If Parameter = Temperature

5.2.1.40.11 Range low: -30.0 to +130 °C

5.2.1.40.21 Range high: -30.0 to +130 °C

If Parameter = Sample flow

5.2.1.40.12 Range low: 0–200 l/h

5.2.1.40.22 Range high: 0–200 l/h

If Parameter = Meas. uc

5.2.1.40.13 Range low: 0.00–200 MΩ or 0.000–2000 µS

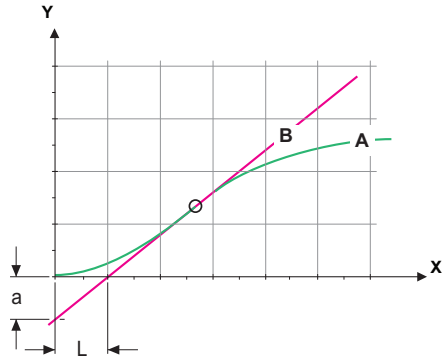
5.2.1.40.23 Range high: 0.00–200 MΩ or 0.000–2000 µS

As control output

Signal outputs can be used for driving control units. We distinguish different kinds of controls:

- *P-controller:* The controller action is proportional to the deviation from the setpoint. The controller is characterized by the P-Band. In the steady-state, the setpoint will never be reached. The deviation is called steady-state error.
  Parameters: setpoint, P-Band
- *PI-controller:* The combination of a P-controller with an I-controller will minimize the steady-state error. If the reset time is set to zero, the I-controller is switched off.
  Parameters: setpoint, P-Band, reset time.
- *PD-controller:* The combination of a P-controller with a D-controller will minimize the response time to a fast change of the process value. If the derivative time is set to zero, the D-controller is switched off.
  Parameters: setpoint, P-Band, derivative time.
- *PID-controller:* The combination of a P-, an I - and a D-controller allows a proper control of the process.
  Parameters: setpoint, P-Band, reset time, derivative time.

Ziegler-Nichols method for the optimization of a PID controller:
Parameters: Setpoint, P-Band, Reset time, Derivative time



A *Response to maximum control output* ***Xp*** *= 1.2/a*
B *Tangent on the inflection point* ***Tn*** *= 2L*
X *Time* ***Tv*** *= L/2*

The point of intersection of the tangent with the respective axis will result in the parameters a and L.

Consult the manual of the control unit for connecting and programming details. Choose control upwards or downwards.

If Control upwards or Control downwards is active

Setpoint: User-defined process value (measured value or flow)

P-Band: Range below (upwards control) or above (downwards control) the set-point, within the dosing intensity is reduced from 100% to 0% to reach the set-point without overshooting.

5.2.1.43 **Control Parameters:** if Parameter = Meas. value

5.2.1.43.10 *Setpoint*: 0.00–200 MΩ or 0.000–2000 µS

5.2.1.43.20 *P-Band:* 0.00–200 MΩ or 0.000–2000 µS

5.2.1.43 **Control Parameters:** if Parameter = Temperature

5.2.1.43.11 *Setpoint*: -30 to +130 °C

5.2.1.43.21 *P-Band*: 0 to +100 °C

5.2.1.43 **Control Parameters:** if Parameter = Sample Flow

5.2.1.43.12 *Setpoint*: 0–200 l/h

5.2.1.43.22 *P-Band*: 0–200 l/h

5.2.1.43 **Control Parameters:** if Parameter = Meas. uc

5.2.1.43.13 *Setpo*int: 0.00–200 MΩ or 0.000–2000 µS

5.2.1.43.23 P-Band: 0.00–200 MΩ or 0.000–2000 µS

5.2.1.43.3 *Reset time:* The reset time is the time till the step response of a single I-controller will reach the same value as it will be suddenly reached by a P-controller.
Range: 0–9'000 sec

5.2.1.43.4 *Derivative time:* The derivative time is the time till the ramp response of a single P-controller will reach the same value as it will be suddenly reached by a D-controller.
Range: 0–9'000 sec

5.2.1.43.5 *Control timeout:* If a controller action (dosing intensity) is constantly over 90% during a defined period of time and the process value does not come closer to the setpoint, the dosing process will be stopped for safety reasons.
Range: 0–720 min

5.3 Relay Contacts

5.3.1 **Alarm Relay:** The alarm relay is used as cumulative error indicator. Under normal operating conditions the contact is active.

The contact is inactive at:

- Power loss
- Detection of system faults like defective sensors or electronic parts
- High case temperature
- Process values out of programmed ranges.

Program alarm levels for the following parameters:

- Meas. Value
- Temperature
- Sample Flow (if a flow sensor is selected)
- Case Temperature high
- Case Temperature low

5.3.1.1 Alarm

5.3.1.1.1 *Alarm High:* If the measured value rises above the alarm high value, the alarm relay is activated and E001, is displayed in the message list.
Range: 0.000–2000 µS or 0.00–200 MΩ

5.3.1.1.26 *Alarm Low:* If the measured value falls below the alarm low value, the alarm relay is activated and E002 is displayed in the message list.
Range: 0.000–2000 µS or 0.00–200 MΩ

5.3.1.1.36 *Hysteresis:* Within the hyst. range, the relay does not switch. This prevents damage of relays contacts when the measured value fluctuates around the alarm value.
Range. 0.000–2000 µS or 0.00–200 MΩ

5.3.1.1.46 *Delay:* Duration, the activation of the alarm relay is retarded after the measured value has risen above/fallen below the programmed alarm.
Range: 0–28‘800 Sec

5.3.1.2 **Sample Flow:** Define at which sample flow a flow alarm should be issued.

5.3.1.2.1 *Flow Alarm:* Program if the alarm relay should be activated if there is a flow alarm. Choose between yes or no. The flow alarm will always be indicated in the display, pending error list, saved in the message list and the logger.
Available values: Yes or no

Note: *Sufficient flow is essential for a correct measurement. We recommend to program yes.*

5.3.1.2.2 *Alarm High:* If the measured values rises above the programmed value E009 will be issued.
Range: 0–200 l/h

5.3.1.2.36 *Alarm Low:* If the measured values falls below the programmed value E010 will be issued.
Range: 0–200 l/h

5.3.1.3 **Sample Temp.:** Define at which sample temperature an alarm should be issued.

5.3.1.3.1 *Alarm High:* If the measured value rises above the alarm high value, the alarm relay is activated and E007 is issued.
Range: -30 to +160 °C

5.3.1.3.26 *Alarm Low:* If the measured value rises above the alarm high value, the alarm relay is activated and E008 is issued.
Range: -30 to +130 °C

5.3.1.4 *Case Temp. high:* Set the alarm high value for temperature of electronics housing. If the value rises above the programmed value E013 is issued.
Range: 30–75 °C

5.3.1.5 *Case Temp. low:* Set the alarm low value for temperature of electronics housing. If the value falls below the programmed value E014 is issued.
Range: -10 to +20 °C

5.3.2 and 5.3.3 **Relay 1 and 2:** The function of relay contacts 1 or 2 are defined by the user.

Note: *The navigation in the menu <Relay 1> and <Relay 2> is identical. For reason of simplicity only the menu numbers of Relay 1 are used in the following.*

1 First select the functions as:
- Limit upper/lower
- Control upwards/downwards
- Timer
- Fieldbus

2 Then enter the necessary data depending on the selected function.

5.3.2.1 Function = Limit upper/lower:

When the relays are used as upper or lower limit switches, program the following:

5.3.2.20 *Parameter*: select a process value

5.3.2.300 *Setpoint*: If the measured value rises above respectively falls below the set-point, the relay is activated.

Parameter	Range
Meas. Value	0.00–200 MΩ or 0.000–2000 µS
Temperature	-30 to +130 °C
Sample flow	0–200 l/h
Meas. uc (uncompensated)	0.00–200 MΩ or 0.000–2000 µS

5.3.2.400 *Hysteresis:* within the hysteresis range, the relay does not switch. This prevents damage of relay contacts when the measured value fluctuates around the alarm value.

Parameter	Range
Meas. Value	0.00–200 MΩ or 0.000–2000 µS
Temperature	-30 to +130 °C
Sample flow	0–200 l/h
Meas. uc (uncompensated)	0.00–200 MΩ or 0.000–2000 µS

5.3.2.50 *Delay:* Duration, the activation of the alarm relay is retarded after the measured value has risen above/fallen below the programmed alarm.
Range. 0–600 Sec

5.3.2.1 Function = Control upwards/downwards:

The relays may be used to drive control units such as solenoid valves, membrane dosing pumps or motor valves. When driving a motor valve both relays are needed, relay 1 to open and relay 2 to close the valve.

5.3.2.22 *Parameter*: select a process value (Meas. Value, Temperature, Sample flow, Meas. uc)

5.3.2.32 Settings

Choose the respective actuator:

- Time proportional
- Frequency
- Motor valve

Actuator = Time proportional

Examples of metering devices that are driven time proportional are solenoid valves, peristaltic pumps.

Dosing is controlled by the operating time.

5.3.2.32.20 *Cycle time:* duration of one control cycle (on/off change).
Range: 0–600 sec.

5.3.2.32.30 *Response time:* Minimal time the metering device needs to react.
Range: 0–240 sec.

5.3.2.32.4 Control Parameters:

Range for each Parameter same as 5.2.1.43, p. 54

Actuator = Frequency

Examples of metering devices that are pulse frequency driven are the classic membrane pumps with a potential free triggering input. Dosing is controlled by the repetition speed of dosing shots.

5.3.2.32.21 *Pulse frequency:* Max. pulses per minute the device is able to respond to. Range: 20–300/min.

5.3.2.32.31 Control Parameters:

Range for each Parameter same as 5.2.1.43, p. 54

	Actuator = Motor valve
	Dosing is controlled by the position of a motor driven mixing valve.
5.3.2.32.22	*Run time:* Time needed to open a completely closed valve Range: 5–300 Sec.
5.3.2.32.32	*Neutral zone:* Minimal response time in % of the runtime. If the requested dosing output is smaller than the response time, no change will take place. Range: 1–20 %
5.3.2.32.4	**Control Parameters:** Range for each Parameter same as 5.2.1.43, p. 54
5.3.2.1	Function = Timer
	The relay will be activated repetitively depending on the programmed time scheme.
5.3.2.24	*Mode:* Operating mode

Mode
interval
daily
weekly

5.3.2.24	*Interval*
5.3.2.340	*Interval:* The interval can be programmed within a range of 1–1'440 min.
5.3.2.44	*Run Time*: Enter the time the relay stays active. Range: 5–32'400 sec.
5.3.2.54	*Delay*: during run time plus the delay time the signal and control outputs are held in the operating mode programmed below. Range: 0–6'000 sec.
5.3.2.6	*Signal Outputs*: Select operating mode of the signal output:

Cont.: Signal outputs continue to issue the measured value.

Hold: Signal outputs hold the last valid measured value. Measurement is interrupted. Errors, except fatal errors, are not issued.

Off: Signal outputs are switched off (set to 0 or 4 mA). Errors, except fatal errors, are not issued.

5.3.2.7 *Output/Control*: Select operating mode of the controller output:

Cont.: Controller continues normally.
Hold: Controller continues based on the last valid value.
Off: Controller is switched off.

5.3.2.24 *daily*

The relay contact can be activated daily, at any time of a day.

5.3.2.341 *Start time*: to set the start time proceed as follows:

1 Press [Enter], to set the hours.
2 Set the hour with the [▲] or [▼] keys.
3 Press [Enter], to set the minutes.
4 Set the minutes with the [▲] or [▼] keys.
5 Press [Enter], to set the seconds.
6 Set the seconds with the [▲] or [▼] keys.

Range: 00:00:00–23:59:59

5.3.2.44 *Run Time*: see Interval
5.3.2.54 *Delay*: see Interval
5.3.2.6 *Signal Outputs*: see Interval
5.3.2.7 *Output/Control*: see Interval

5.3.2.24 *weekly*

The relay contact can be activated at one or several days, of a week. The daily starting time is valid for all days.

5.3.2.342 Calendar:

5.3.2.342.1 *Start time*: The programmed start time is valid for each of the programmed days. To set the start time see 5.3.2.341, p. 60.
Range: 00:00:00–23:59:59

5.3.2.342.2 *Monday*: Possible settings, on or off
to
5.3.2.342.8 *Sunday*: Possible settings, on or off

5.3.2.44 *Run Time*: see Interval
5.3.2.54 *Delay*: see Interval
5.3.2.6 *Signal Outputs*: see Interval
5.3.2.7 *Output/Control*: see Interval

5.3.2.1 Function = Fieldbus

The relay will be switched via the Profibus input. No further parameters are needed.

5.3.4 **Input:** The functions of the relays and signal outputs can be defined depending on the position of the input contact, i.e. no function, closed or open.

5.3.4.1 *Active:* Define when the input should be active:

No:	Input is never active.
When closed:	Input is active if the input relay is closed
When open:	Input is active if the input relay is open

5.3.4.2 *Signal Outputs:* Select the operation mode of the signal outputs when the relay is active:

Continuous:	Signal outputs continue to issue the measured value.
Hold:	Signal outputs issue the last valid measured value. Measurement is interrupted. Errors, except fatal errors, are not issued.
Off:	Set to 0 or 4 mA respectively. Errors, except fatal errors, are not issued.

5.3.4.3 *Output/Control:* (relay or signal output):

Continuous:	Controller continues normally.
Hold:	Controller continues on the last valid value.
Off:	Controller is switched off.

5.3.4.4 *Fault:*

No:	No message is issued in pending error list and the alarm relay does not close when input is active. Message E024 is stored in the message list.
Yes:	Message E024 is issued and stored in the message list. The Alarm relay closes when input is active.

5.3.4.5 *Delay:* Time which the instrument waits, after the input is deactivated, before returning to normal operation.
Range: 0–6‘000 Sec

5.4 Miscellaneous

5.4.1 *Language:* Set the desired language.

Language
German
English
French
Spanish

5.4.2 *Set defaults:* Reset the instrument to factory default values in three different ways:

Set defaults
no
Calibration
In parts
Completely

- **Calibration**: Sets calibration values back to default. All other values are kept in memory.
- **In parts**: Communication parameters are kept in memory. All other values are set back to default values.
- **Completely**: Sets back all values including communication parameters.

5.4.3 *Load Firmware:* Firmware updates should be done by instructed service personnel only.

Load Firmware
no
yes

5.4.4 Password: Select a password different from 0000 to prevent unauthorized access to the following menus:

5.4.4.1 Messages

5.4.4.2 Maintenance

5.4.4.3 Operation

5.4.4.4 Installation.

Each menu may be protected by a *different* password. If you forgot the passwords, contact the closest SWAN representative.

5.4.5 *Sample ID:* Identify the process value with any meaning full text, such as KKS number.

5.4.6 **LCD Contrast:** Adjusts the contrast of the LCD display.
5.4.6.1 EV: Fine adjustment
5.4.6.2 SRR: Coarse adjustment

5.5 Interface

Select one of the following communication protocols. Depending on your selection, different parameters must be defined.

5.5.1 *Protocol:* **Profibus**
5.5.20 Device address: Range: 0–126
5.5.30 ID-Nr.: Range: Analyzer; Manufacturer; Multivariable
5.5.40 Local operation: Range: Enabled, Disabled

5.5.1 *Protocol:* **Modbus RTU**
5.5.21 Device address: Range: 0–126
5.5.31 Baud rate: Range: 1200–115200 Baud
5.5.41 Parity: Range: none, even, odd

5.5.1 *Protocol:* **HyperTerminal**
Baud rate: Range: 1200–115200 Baud

5.5.1 *Protocol.* **HART**
Device address Range: 0–63

10. Default Values

Operation:

Sensors	Filter Time Const.:	10 s
	Hold after Cal.:	300 s
Relay Contacts	Alarm Relay	same as in Installation
	Relay 1/2	same as in Installation
	Input	same as in Installation
Logger	Logger Interval:	30 min
	Clear Logger:	no

Installation:

Sensors	Flow:	None
	Meas. Mode:	resistivity or conductivity (remains as set)
	Sensor Parameters; Cell Constant	0.01000 cm^{-1}
	Sensor Parameters; Temp. corr.	0.00 °C
	Sensor Parameters; Cable length	0.0 m
	Temp. Compensation; Comp.	none
Signal Output 1	Parameter:	Meas. value
	Current loop:	4–20 mA
	Function:	linear
	Scaling: Range low:	0.00 MΩ/0.000 µS
	Scaling: Range high:	20.00 MΩ/1000 µS
Signal Output 2	Parameter:	Temperature
	Current loop:	4–20 mA
	Function:	linear
	Scaling: Range low:	0 °C
	Scaling: Range high:	50 °C
Alarm Relay	Alarm:	
	Alarm high:	200 MΩ/2000 µS
	Alarm low:	0.00 MΩ/0.000 µS
	Hysteresis:	1.00 MΩ/10.00 µS
	Delay:	5 s
	Sample Flow:	
	Flow Alarm	yes
	Alarm high:	120 l/h
	Alarm low:	5 l/h
	Sample Temp:	
	Alarm High:	90 °C
	Alarm Low:	0 °C

	Case Temp. high:	65 °C
	Case Temp. low:	0 °C
Relay 1/2	Function:	limit upper
	Parameter:	Meas. value
	Setpoint:	200 MΩ/1000 µS
	Hysteresis:	1 MΩ/10.00 µS
	Delay:	30 s
	If Function = Control upw. or dnw:	
	Parameter:	Meas. value
	Settings: Actuator:	Frequency
	Settings: Pulse Frequency:	120/min
	Settings: Control Parameters: Setpoint:	200 MΩ/1000 µS
	Settings: Control Parameters: P-band:	1 MΩ/10.00 µS
	Settings: Control Parameters: Reset time:	0 s
	Settings: Control Parameters: Derivative Time:	0 s
	Settings: Control Parameters: Control Timeout:	0 min
	Settings: Actuator:	Time proportional
	Cycle time:	60 s
	Response time:	10 s
	Settings: Actuator	Motor valve
	Run time:	60 s
	Neutral zone:	5%
	If Function = Timer:	
	Mode:	Interval
	Interval:	1 min
	Mode:	daily
	Start time:	00.00.00
	Mode:	weekly
	Calendar; Start time:	00.00.00
	Calendar; Monday to Sunday:	Off
	Run time:	10 s
	Delay:	5 s
	Signal output:	cont
	Output/Control:	cont
Input	Active	when closed
	Signal Outputs	hold
	Output/Control	off
	Fault	no
	Delay	10 s
Miscellaneous	Language:	English
	Set default:	no

Load firmware:..... no
Password:.....for all modes 0000
Sample ID:.....- - - - - - - -

11. Notes

swan
ANALYTICAL INSTRUMENTS

A-96.150.351 / 130525

Swan Products - Analytical Instruments for:

Swan is represented worldwide by subsidiary companies and distributors and cooperates with independent representatives all over the world. For contact information, please scan the QR code.

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