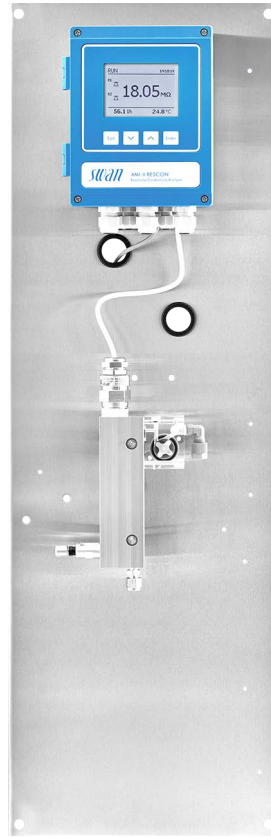
ANALYTICAL INSTRUMENTS

A-96.210.461 / 2026-07-01

AMI-II Rescon

Operator's Manual



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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

Electrical shock hazard

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.

- To prevent from electrical shock, always make sure that the ground wire is connected.
- Service shall be performed by authorized personnel only.
- Whenever electronic service is required, disconnect instrument power and power of devices connected to
  - relay 1,
  - relay 2,
  - alarm relay.

WARNING

For safe instrument installation and operation you must read and understand the instructions in this manual.

2. Product Description

2.1. Description of the System

Application range

The AMI-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.

Available variants

The instrument is available in two variants:

- Monitor on stainless steel panel.
- Single components.

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

Two additional signal outputs with the same specifications available as an option.

Relays

Two potential-free contacts programmable as limit switches for measured values, controllers or timers with automatic hold function.
Maximum load: 1 A/250 VAC

Alarm relay

One potential-free contact. Summary alarm indication for programmable alarm values and instrument faults.
Maximum load: 1 A/250 VAC

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 (optional)

- Two additional signal outputs
- RS485 with fieldbus protocol Modbus RTU or Profibus DP
- HART

Safety features

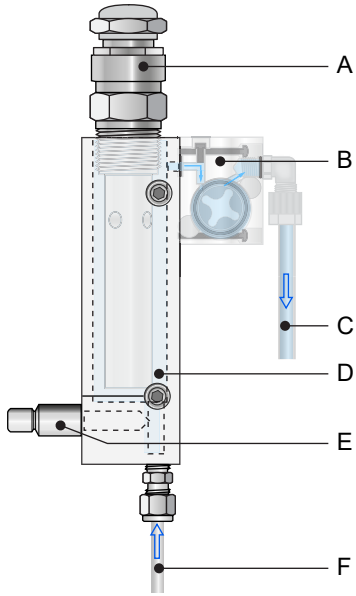
No data loss after power failure. All data is saved in non-volatile memory. Overvoltage protection of inputs and outputs. Galvanic separation of measuring inputs from signal outputs.

Correction or calibration

Not necessary, auto zero is performed automatically and continuously with each measurement.

Fluidics

The flow cell QV-HFlow consists of the flow cell block [D], the flow sensor [B] and the flow regulating valve [E].
The conductivity sensor RC U [A] with integrated temperature sensor is screwed into the flow cell block [D].
The sample enters at the sample inlet [F]. It flows through the flow regulating valve [E], where the flow rate can be adjusted. Then the sample flows through the flow cell block [D] were the resistivity of the sample is measured.
The sample leaves the flow cell block via flow meter through the sample outlet [C].



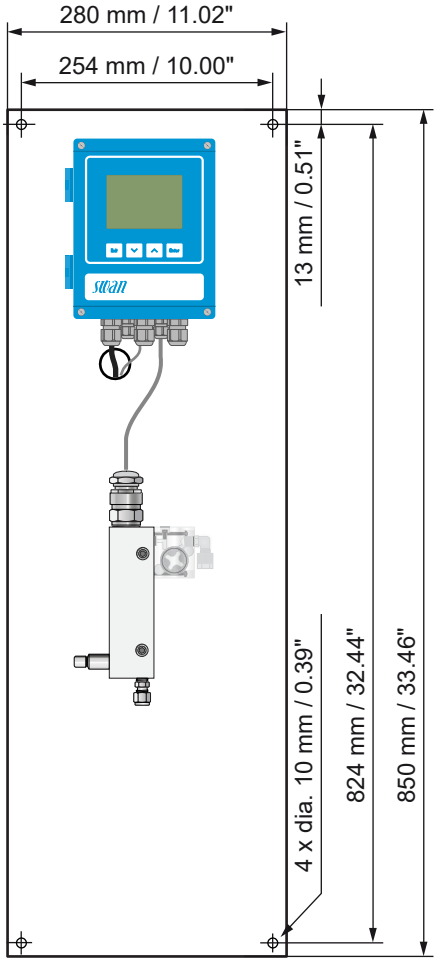
A *Sensor RC U*
B *Flow sensor*
C *Sample outlet*
D *Flow cell block*
E *Flow regulating valve*
F *Sample inlet*

2.2. Instrument Specification

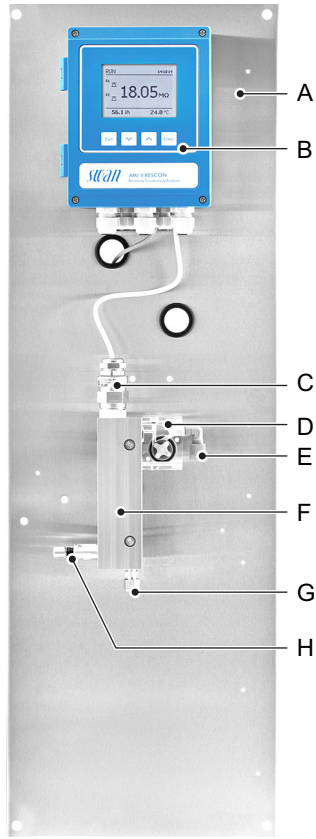
Power supply	AC variant:	100–240 VAC (±10%) 50/60 Hz (±5%)
	DC variant:	10–36 VDC
	Power consumption	max. 35 VA
Sample requirements	Flow rate:	20–100 l/h
	Temperature:	up to 50 °C
	Inlet pressure:	up to 2 bar
	Outlet pressure:	pressure free
On-site requirements	The analyzer site must permit connections to:	
	Sample inlet:	Swagelok fitting with R ⅛" (ISO 7-1) thread for ¼" tube OD
	Sample outlet:	8 mm Serto tube adapter (PA)
Measuring range	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
Accuracy (at 25 °C)	0.01 to 18.24 MΩ×cm	±0.5 %
	0.055 to 20.00 µS/cm	±0.5 %
	20.00 to 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}).	
Temperature measurement	NT5k type sensor	
	Measuring range:	-30–130 °C
	Resolution:	0.1 °C
Transmitter specifications	Housing:	aluminum, with a protection degree of IP 66 / NEMA 4X
	Ambient temperature:	-10 to +50 °C
	Humidity:	10–90% rel., non condensing
	Display:	backlit LCD, 74 × 53 mm

Dimensions

Panel:	stainless steel
Dimensions:	280×850×200 mm
Screws:	8 mm
Weight:	7 kg



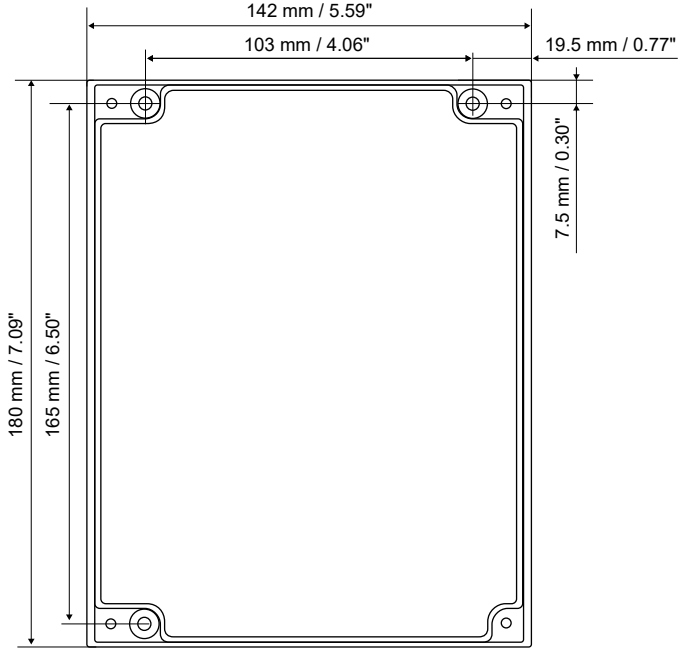
2.3. Instrument Overview



A *Panel*
B *Transmitter*
C *Sensor RC U*
D *Flow meter*
E *Sample outlet*
F *Flow cell*
G *Sample inlet*
H *Flow regulating valve*

2.4. Single Components

2.4.1 AMI-II Transmitter



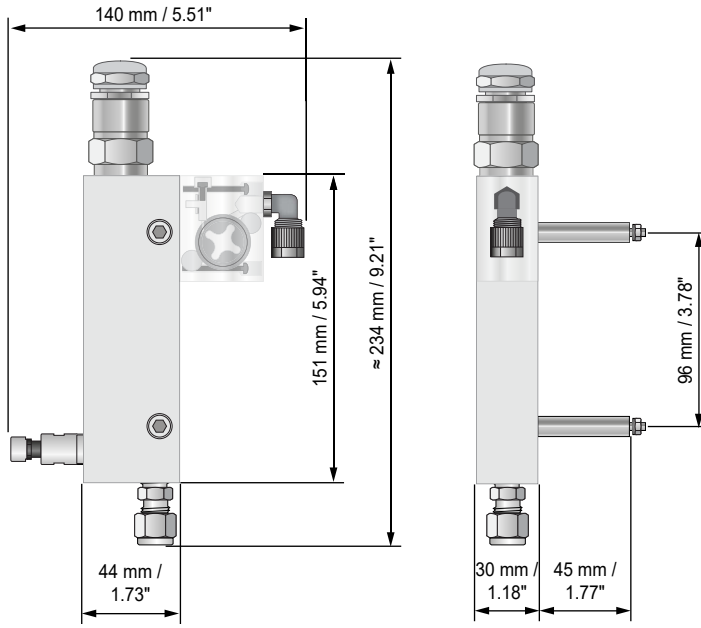
Specifications

Electronics case:	Cast aluminum
Protection degree:	IP 66 / NEMA 4X
Display:	backlit LCD, 74 x 53 mm
Electrical connectors:	screw clamps

2.4.2 Flow Cell QV-HFlow L130

Flow cell for continuous conductivity measurement in ultrapure water.

Dimensions

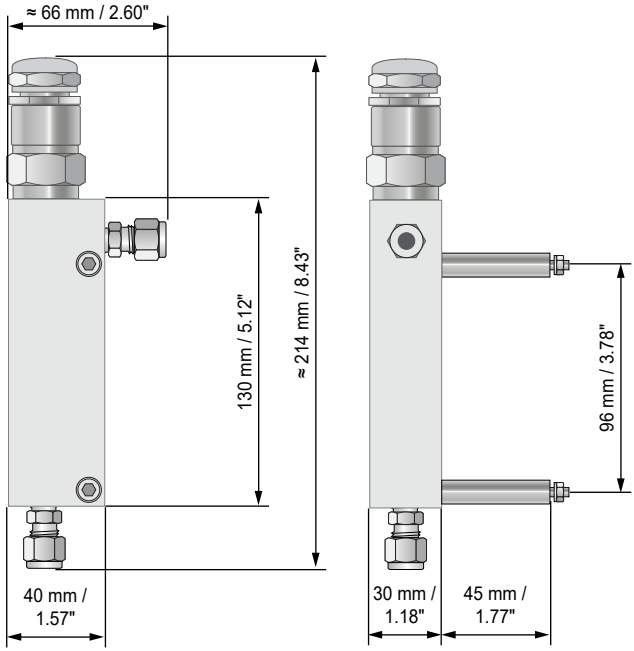


Sample conditions	Operating temperature:	max. 50 °C
	Inlet pressure:	max. 2 bar
	Outlet pressure:	pressure free
	Sample flow	20 to 100 l/h
Process connections	Inlet:	Swagelok fitting with R ⅛" (ISO 7-1) thread for ¼" tube OD
	Outlet:	8 mm Serto tube adapter (PA)
Holes for sensor installation	Thread:	NPT ¾"
	Insertion depth:	max. 89 mm
Material	Stainless steel 1.4404 (SS316L)	

2.4.3 Flow Cell B-Flow L130

Flow cell for continuous conductivity measurement in ultrapure water at high pressure.

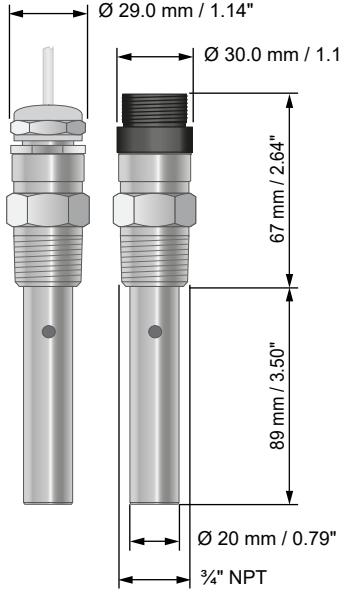
Dimensions



Sample conditions	Sample temperature: Operating pressure:	-10 to 100 °C max. 50 bar
Process connections	Inlet and outlet:	2x female thread G ⅛” (ISO 228-1). Swagelok fittings must be ordered separately.
Holes for sensor installation	Thread: Insertion depth:	NPT ¾" max. 89 mm
Material	Stainless steel 1.4404 (SS316L)	

2.4.4 Swansensor RC U

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



Measurement	Measuring range:	0.055 µS/cm to 1000 µS/cm or 0.01 to 18.24 MΩ×cm
	Accuracy (at 25 °C):	
	0 to 20 µS/cm	> ±0.5% of measured value
	20 to 1000 µS/cm	±1% of measured value
	Cell constant:	0.01 cm^{-1}
	Temperature sensor:	NT5k
	Measuring range and accuracy apply to the combination of Swansensor RC U and AMI-II Rescon.	
Operation and installation	Operating temperature:	-10 to 70 °C
	Operating pressure:	50 bar
	Process connection:	NPT ¾"
	Electrical connection:	fixed cable with end sleeves or M16 male plug (IP67)

3. Installation

3.1. Installation Checklist

On-site requirements	AC variant: 100–240 VAC (±10%), 50/60 Hz (±5%). DC variant: 10–36 VDC. Power consumption: 35 VA maximum. Protective earth connection required. Sample line with sufficient sample flow and pressure (see Instrument Specification, p. 9).
Installation	Mount the instrument in vertical position. Display should be at eye level. Single components: Install the sensor and connect the sensor cable. Connect sample inlet and outlet.
Electrical wiring	Connect all external devices like limit switches and current loops according to the connection diagram. Connect power cord.
Power-up	Start sample flow and wait until the flow cell is completely filled. Switch on power.
Instrument setup	Adjust sample flow. Program all sensor parameters. Program all parameters for external devices (interface, recorders, etc.). Program all parameters for instrument operation (limits, alarms).
Run-in period	Let the instrument run continuously for 1 h.

3.2. Mounting the Instrument

Mounting requirements

Mount the instrument in vertical position. The display should be at eye level to simplify operation and maintenance.
The instrument is intended for indoor installation.

Dimensions

For panel dimensions, see p. 10.
For dimensions of single components, see p. 12.

3.3. Connecting Sample Inlet and Outlet

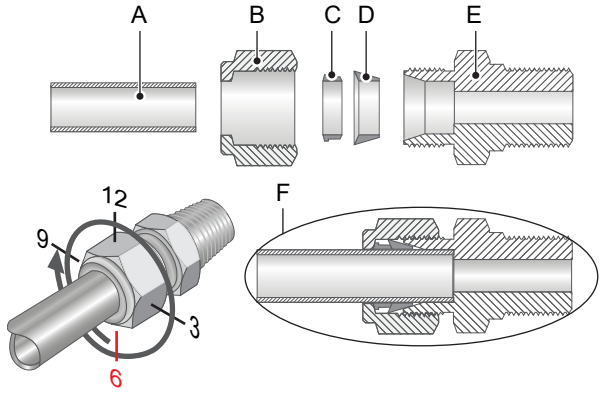
3.3.1 Stainless Steel Swagelok Fitting at Sample Inlet

Preparation

Cut the tube to length and deburr it. The tube must be straight and free from blemishes for approximately 1,5 x tube diameter from the end.
Lubrication with lubricating oil, MoS2, Teflon etc. is recommended for the assembly and reassembly of bigger sized unions (thread, compression cone).

Installation

1. Insert the compression ferrule [C] and the compression cone [D] into the union nut [B].
2. Screw on the union nut onto the body, do not tighten it.
3. Push the stainless steel pipe through the union nut as far as it reaches the stop of the body.
4. Mark the union nut at 6 o'clock position.
5. While holding the fitting body steady, tighten the nut union 1¼ rotation using an open ended spanner.



A Stainless *steel tube*
B *Union nut*
C *Compression ferrule*
D *Compression cone*
E *Body*
F *Tightened connection*

3.3.2 Sample Outlet

HD-PE flexible tube 8 mm. Connect the tube to the Serto elbow union and Insert it into an atmospheric drain of sufficient capacity. Maximum tube length is 1.5 m. Do not connect longer tubes.

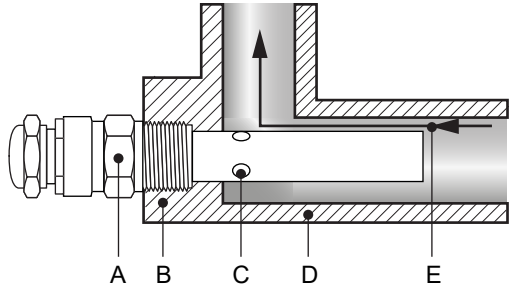
3.4. Install Sensor RC U

To install the sensor RC U into a flow cell or a pipe flange proceed as described in Install sensor with fixed cable, p. 36 or Install sensor with plug, p. 37.

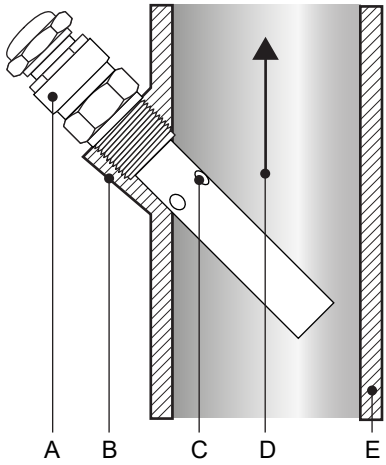
Install sensor into a pipe

Installation in a by-pass is recommended. Choose the installation point carefully to ensure the sensor is always filled with water, even if sample flow is interrupted. To avoid the formation of air bubbles inside the sensor make sure that the air vent holes are always submerged.

Installation examples for pipe installation



A *Sensor*
B *Flange*
C *Air vent hole*
D *Pipe*
E *Flow direction*



A *Sensor*
B *Flange*
C *Air vent hole*
D *Flow direction*
E *Pipe*

1 Wrap 7 turns of teflon tape around the sensor thread.
2 Screw the sensor into the flow cell or the pipe flange.
3 Tighten the sensor well.

3.5. Electrical Connections

WARNING

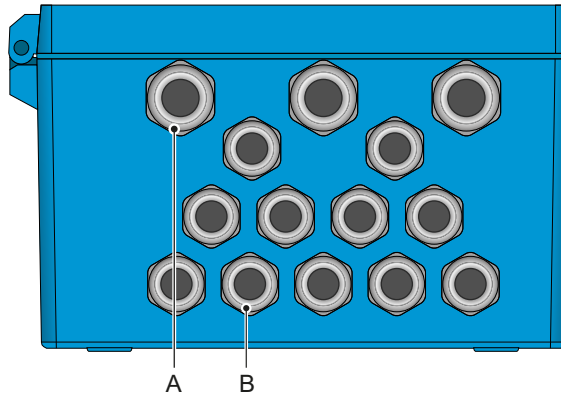
Risk of electrical shock

Failure to follow safety instructions can result in serious injury or death.

- Before working on electrical components, turn off power to the instrument. External power sources connected to relay 1 or 2 or to the alarm relay must also be turned off.
- Do not connect the instrument to power unless the ground wire (PE) is connected.
- Make sure the power specification of the instrument corresponds to the power on site.

Cable thicknesses

In order to comply with IP66, use the following cable thicknesses. Protect unused cable glands.

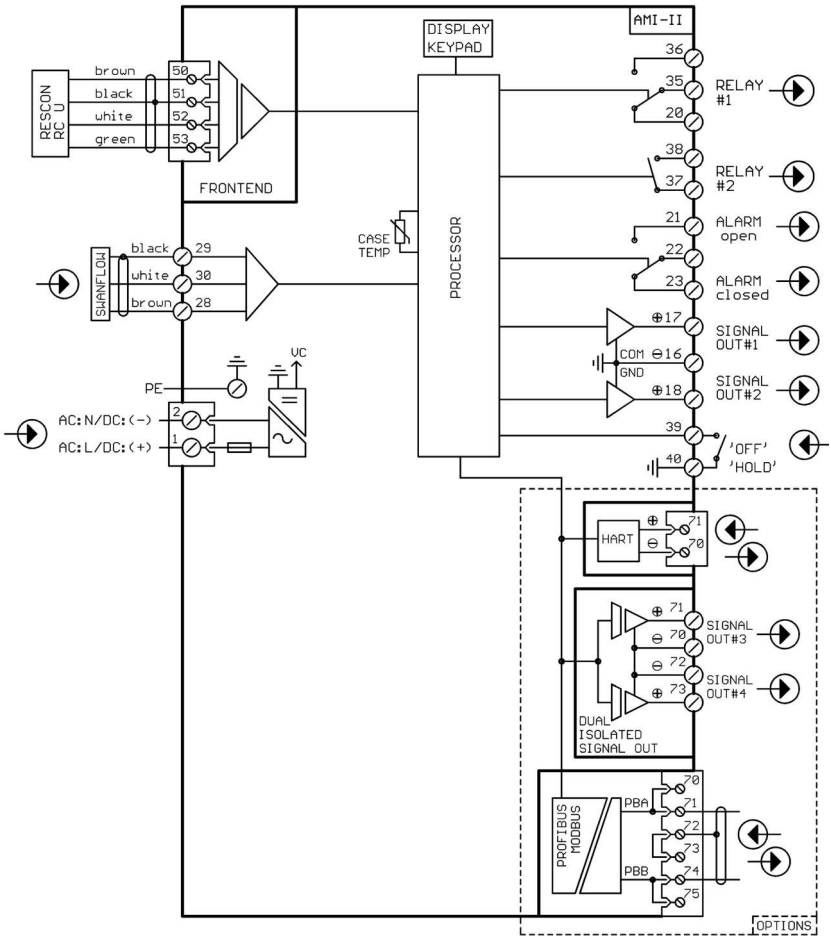


A *M16 cable glands (3x): cable $Ø_{outer}$ 5–10 mm*
B *M12 cable glands (11x): cable $Ø_{outer}$ 3–6 mm*

Wires

For power and relays: Use max. 1.5 mm^2 / AWG 14 stranded wire with end sleeves.
For signal outputs and input: Use 0.25 mm^2 / AWG 23 stranded wire with end sleeves.

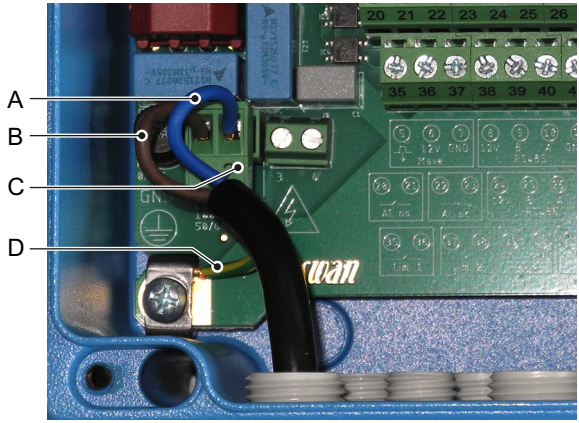
3.5.1 Connection Diagram



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.

3.5.2 Power Supply



A *Neutral conductor, terminal 2*
B *Phase conductor, terminal 1*
C *Power supply connector*
D *Protective earth PE*

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 AMI-II Rescon

3.6. Relay Contacts

3.6.1 Input

Use only potential-free (dry) contacts.
Terminals: 39/40

3.6.2 Alarm Relay

One alarm output for system errors.

- Normally open contact (terminals: 21/22):
  Active (closed) when no error is present. Inactive (opened) on error and loss of power.
- Normally closed contact (terminals: 22/23):
  Active (opened) when no error is present. Inactive (closed) on error and loss of power.

Max. load: 1 A/250 VAC.
For switching inductive loads, please observe the information in section Types of Loads, p. 25.

3.6.3 Relay 1 and 2

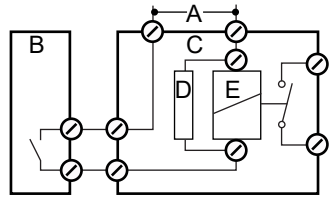
- Relay 1:
  - terminals 35/36 (normally open) or
  - terminals 35/20 (normally closed).
- Relay 2: terminals 37/38 (normally open).

Max. load 1 A/250 VAC.
For switching inductive loads, please observe the information in section Types of Loads, p. 25.

3.6.4 Types of Loads

Inductive loads

Small inductive loads (max 0.1 A) as for example the coil of a power relay can be switched directly. To avoid noise voltage in the AMI-II transmitter it is mandatory to connect a snubber circuit in parallel to the load.

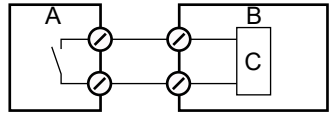


A *AC or DC power supply*
B *AMI-II transmitter*
C *External power relay*
D *Snubber*
E *Power relay coil*

To switch inductive loads higher than 0.1 A, use suitable power relays.

Resistive loads

Resistive loads (max. 1 A) and control signals for PLC, impulse pumps and so on can be connected without further measures.



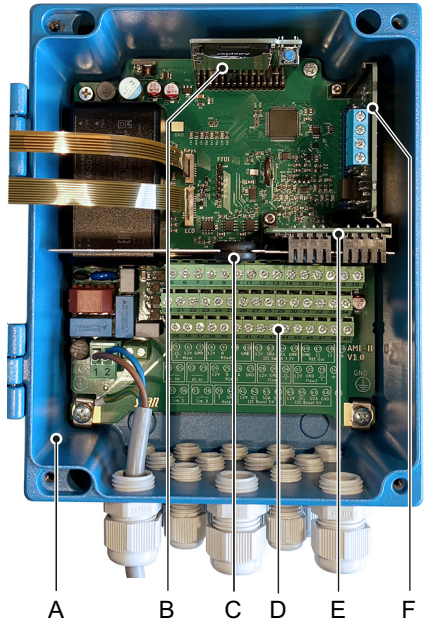
A *AMI-II transmitter*
B *PLC or controlled pulse pump*
C *Logic*

3.7. Signal Outputs

3.7.1 Signal Output 1 and 2 (Current Outputs)

Max. burden 510 Ω.
If signals are sent to two different receivers, use signal isolator (loop isolator).
Signal output 1: Terminals 17 (+) and 16 (-)
Signal output 2: Terminals 18 (+) and 16 (-)

3.8. Interface Options



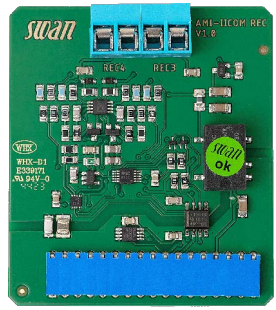
A *AMI-II transmitter*
B *SD card slot*
C *Cable grommet*
D *Screw terminals*
E *Frontend*
F *Communication option*

The slot for interfaces can be used to expand the functionality of the AMI-II transmitter with either:

- Two additional signal outputs
- Profibus or Modbus
- HART

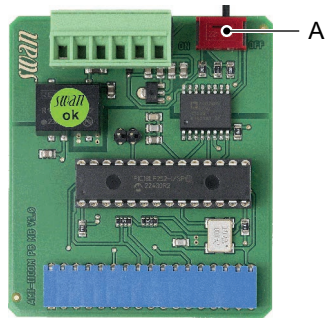
3.8.1 Signal Outputs 3 and 4

Max. burden 510 Ω.
If signals are sent to two different receivers, use signal isolator (loop isolator).
Signal output 3: terminals 71 (+) and 70 (-).
Signal output 4: terminals 73 (+) and 72 (-).



3.8.2 RS485 (Profibus or Modbus Protocol)

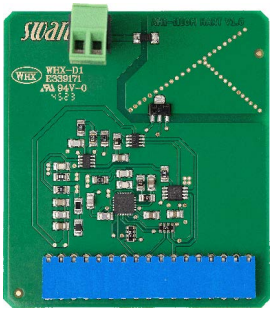
Terminal 74/75 PB, terminal 70/71 PA, terminal 72/73 shield
The switch [A] must be set to “ON” if only one instrument is installed or on the last instrument in the bus.



A *On/off switch*

3.8.3 HART

Terminals 71 (+) and 70 (-).



4. Instrument Setup

4.1. Establish Sample Flow

1 Open the needle valve.
2 Wait until the flow cell is completely filled.
3 Switch on power.

4.2. Programming

Sensor parameters

Menu 5.1.2
The sensor characteristics are printed on the label of each sensor.

87.322.210	RC U	Sensor type
SWxxxxxxx	ZK = 0.00997	Cell constant
SWAN AG	DT = -0.13 °C	Temperature correction

Enter the following parameters:
- Cell constant [cm^{-1}]
- Temperature correction [°C]
- Cable length. If the transmitter and the flow cell are mounted together on one panel, set the cable length to 0.0 m.

Flow cell

Menu 5.1.1
Select the type of flow cell used:
- None
- Q-Flow
- Q-HFlow (standard on monitors)

Measuring mode

Menu 5.1.1.2
Set the measuring mode:
- Resistivity
- Conductivity

External devices

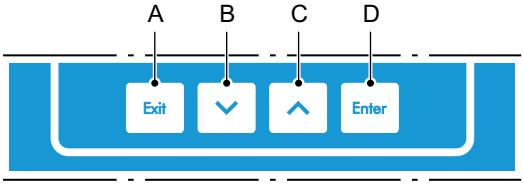
Menu 5.2 Signal Outputs
Menu 5.4 Interface

Limits and alarms

Menu 5.3 Relay Contacts
Program all parameters for instrument operation (limits, alarms).

5. Operation

5.1. Keys



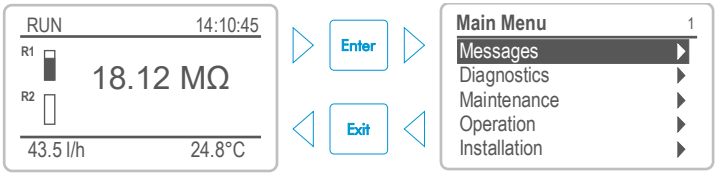
A to exit a menu or command (rejecting any changes)
to move back to the previous menu level

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

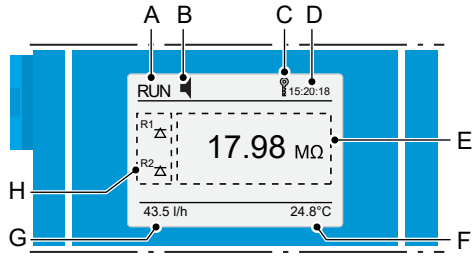
C to move up in a menu list and to increase digits

D to open a selected menu item
to accept an entry

Program access, exit



5.2. Display

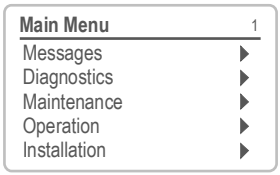


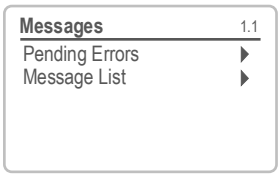
A	RUN	Normal operation
	HOLD	Input active or cal delay: Instrument on hold (shows status of signal outputs)
	OFF	Input active: Signal outputs go to 0/4 mA.
B	Error	Non-fatal error / Fatal error
C	Keys locked, transmitter control via Profibus	
D	Time	
E	Process value	
F	Sample temperature	
G	Sample flow	
H	Relay status	

Symbols used for relay status:

- Upper/lower limit not yet reached
- Upper/lower limit reached
- Control upw./downw. no action
- Control upw./downw. active, dark bar indicates control intensity
- Timer
- Timer: timing active (hand rotating)
- Relay inactive (controlled via fieldbus)
- Relay active (controlled via fieldbus)

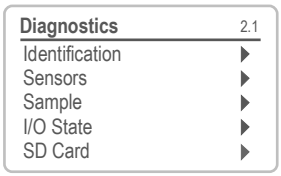
5.3. Software Structure





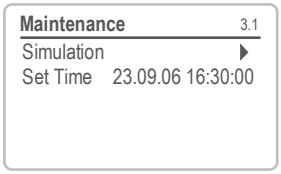
Menu 1 Messages

Shows pending errors as well as the event history (time and state of events that have occurred at an earlier point of time).
Contains user-relevant data.



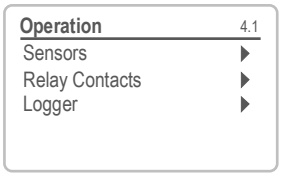
Menu 2 Diagnostics

Provides user-relevant instrument and sample data.



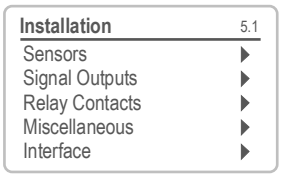
Menu 3 Maintenance

For instrument calibration, relay and signal output simulation, and to set the instrument time.
Used by service personnel.



Menu 4 Operation

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.



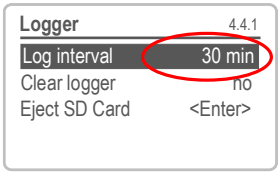
Menu 5 Installation

For initial instrument set up by Swan authorized person.
Password protection strongly recommended.

5.4. Changing Parameters and Values

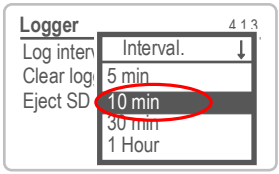
Changing parameters

The following example shows how to change the logger interval:



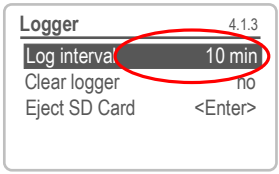
1 Select the parameter you want to change.

2 Press [Enter].



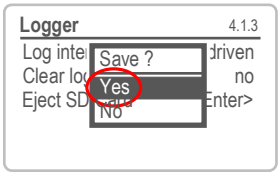
3 Press ^ or v to highlight the required parameter.

4 Press [Enter] to confirm the selection or [Exit] to keep the previous parameter).



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

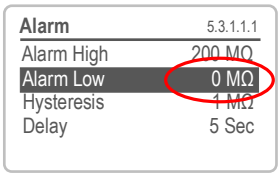
5 Press [Exit].



⇒ *Yes is highlighted.*

6 Press [Enter] to save the new parameter.

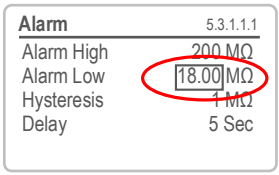
Changing values



1 Select the value you want to change.

2 Press [Enter].

3 Set required value with ^ or v.



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 necessary	◆ Clean sensor.

6.2. Stop of Operation for Maintenance

1 Stop sample flow.

2 Shut off power of the instrument.

6.3. Cleaning the 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 two variants:

- 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 sensor with fixed cable

1 Open the transmitter housing.

2 Disconnect the sensor cable from the terminals.

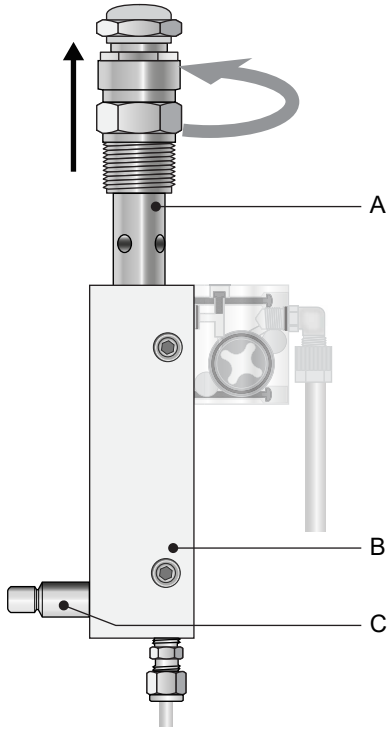
3 Remove the sensor cable from the transmitter housing.

4 Unscrew and remove the sensor [A] from the flow cell block [B].

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.



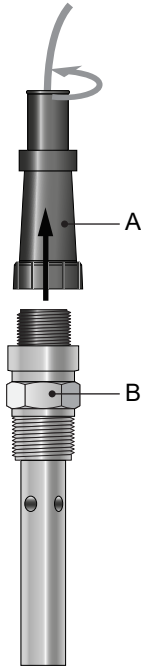
A *Sensor*
B *Flow cell*
C *Flow regulating valve*

Install sensor with fixed 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 transmitter as shown in the electrical connection scheme.
5. Close the transmitter housing.
6. Open the flow regulating valve [C].
7. Switch on power.

Remove 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 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 sensor
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 the flow cell.

7. Troubleshooting

This chapter provides some hints to make troubleshooting easier.
For information on how to handle/clean parts refer to Maintenance, p. 34.
For information on how to program the instrument refer to Program List and Explanations, p. 50.
If you need help please contact your local distributor. Note serial number of instrument and all diagnostic values before.

7.1. Error List

Two categories of messages are distinguished:

Non-fatal error

Non-fatal instrument error or exceeding of a programmed limit value. Such errors are marked **E0xx** (bold and black) in the following list.

Fatal error (flashing symbol)

Fatal instrument error. Control is interrupted and the displayed measured values may not be correct.
Fatal errors are divided into the following two subcategories:

- Errors which disappear when correct measuring conditions are recovered (i.e. sample flow low).
  Such errors are marked **E0xx** (bold and orange) in the following list.
- Errors which indicate a hardware failure of the instrument.
  Such errors are marked **E0xx** (bold and red) in the following list.

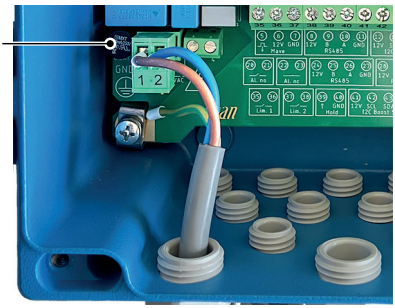
Error	Description	Corrective action
E001	Alarm high	– Check process. – Check programmed value.
E002	Alarm low	– Check process. – Check programmed value.
E007	Sample temp. high	– Check process. – Check programmed value.
E008	Sample temp. low	– Check process. – Check programmed value.
E009	Sample Flow high	– Check process. – Check programmed value.
E010	Sample Flow low	– Check process. – Check programmed value.
E011	Temp. shorted	– Check wiring of temperature sensor. – Check temperature sensor.
E012	Temp. disconnected	– Check wiring of temperature sensor. – Check temperature 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 in menus **Installation** > **Relay contacts** > **Relay 1** and **Installation** > **Relay contacts** > **Relay 2**.
E019	Sensor shorted	– Check wiring of conductivity sensor. – Check conductivity sensor.
E020	Sensor interrupted	– Check wiring of conductivity sensor. – Check conductivity sensor.
E024	Input active	– Message informing that the relay input has been actuated. – Can be deactivated in menu **Installation** > **Relay contacts** > **Input** > **Fault**.
E026	IC LM75	– Call support.

Error	Description	Corrective action
E030	I2C Frontend	– Call support.
E031	Calibration Recout	– Call support.
E032	Wrong Frontend	– Call support.
E049	Power-on	– None, normal status.
E050	Power-down	– None, normal status.

7.2. Replacing Fuses

When a fuse has blown, find out the cause and fix it before replacement. Use tweezers or needle-nosed pliers to remove the defective fuse.
Use original fuses provided by Swan only.

AMI-II transmitter



A *0.8 AT/250V Instrument power supply*

8. Program Overview

Explanations of each parameter in the menus can be found in chapter Program List and Explanations, p. 50.

- 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 accessible to anyone at any time. No password protection. No settings can be modified.
- Menu 3 **Maintenance** is intended for service technicians: Calibration, simulation of outputs and set time/date. Please protect with password.
- Menu 4 **Operation** is intended for the user and allows setting of limit values, alarm values, etc. The presetting is made in the Installation menu (for the system engineer only). 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 1.3*	*Number*	1.3.1*	
	Date, Time		

8.2. Diagnostics (Main Menu 2)

Identification 2.1*	*Designation*			* Menu numbers
	Version			
	Bootloader			
	Factory Test 2.1.3*	*Motherboard*	2.1.3.1*	
		Front End		
	Operating Time 2.1.4*	*Years, days, hours, minutes, seconds*		2.1.5.1*
Sensors 2.2*	**Cond. Sensor** 2.2.1*	*Current Value MOhm*	2.2.1.1*	
		(Raw value) MOhm		
		Cell constant		
	Miscellaneous 2.2.2*	*Case Temp.*	2.2.2.1*	
Sample 2.3*	*Sample ID*	2.3.1*		
	Temperature °C			
	[Nt5K] Ohm			
	Sample flow l/h			
	[Raw value] Hz			
I/O State 2.4*	**Relays** 2.4.1*	*Alarm Relay*	2.4.1.1*	
		Relay 1/2		
		Input		
	Signal Outputs 2.4.2*	*Signal Output 1/2*	2.4.2.1*	
SD Card 2.5*	*State*	2.5.1*		
Interface 2.6*	*Protocol*	2.6.1*		(only with RS485 interface)
	Baud rate			

8.3. Maintenance (Main Menu 3)

Simulation	**Relays**	*Alarm Relay*	3.1.1.1*	* Menu numbers
3.1*	3.1.1*	*Relay 1*	3.1.1.2*	
		Relay 2	3.1.1.3*	
	Signal Outputs	*Signal Output 1*	3.1.2.1*	
	3.1.2*	*Signal Output 2*	3.1.2.2*	
Set Time	*(Date), (Time)*			
3.3*				

8.4. Operation (Main Menu 4)

Sensors	*Filter Time Const.*	4.1.1*		* Menu numbers
4.1*				
Relay Contacts	**Alarm Relay**	**Alarm**	*Alarm High*	4.2.1.1.1*
4.2*	4.2.1*	4.2.1.1*	*Alarm Low*	4.2.1.1.25*
			Hysteresis	4.2.1.1.35*
			Delay	4.2.1.1.45*
	Relay 1/2	*Setpoint*	4.2.x.200*	
	4.2.2*/4.2.3*	*Hysteresis*	4.2.x.300*	
		Delay	4.2.x.40*	
	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*		
	Eject SD Card	4.3.3*		

8.5. Installation (Main Menu 5)

Sensors	*Flow*			* Menu numbers
5.1*	5.1.1*			
	Meas. Mode			
	5.1.2*			
	Sensor Parameters	*Cell Constant*	5.1.3.1*	
	5.1.3*	*Temp. Corr*	5.1.3.2*	
		Cable length	5.1.3.3*	
	Temp. Compensation	*Comp.*	5.1.4.1*	
	5.1.4*			
Signal Outputs	**Signal Output 1/2**	*Parameter*	5.2.1.1/5.2.2.1*	
5.2*	5.2.1/5.2.2*	*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.40.10/11*
		5.2.x.40	*Range High*	5.2.x.40.20/21*
Relay Contacts	**Alarm Relay**	**Alarm**	*Alarm High*	5.3.1.1.1*
5.3*	5.3.1*	5.3.1.1*	*Alarm Low*	5.3.1.1.25*
			Hysteresis	5.3.1.1.35*
			Delay	5.3.1.1.45*
		Sample flow	*Flow alarm*	5.3.1.2.1*
		5.3.1.2*	*Alarm High*	5.3.1.2.2*
			Alarm Low	5.3.1.2.34*
		Sample Temp.	*Alarm High*	5.3.1.3.1*
		5.3.1.3*	*Alarm Low*	5.3.1.3.25*
		Case Temp. high	5.3.1.4*	
		Case Temp. high	5.3.1.5*	
	Relay 1/2	*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*	
		Delay	5.3.2.50*	
	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*		* Menu numbers
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*		(only with RS485
5.5*	*Device Address*	5.5.21*		interface)
	Baud Rate	5.5.31*		
	Parity	5.5.41*		

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). When all active errors have been 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 and time of issue and status (active, acknowledged, cleared). 64 errors are memorized. Then the oldest error is cleared to save the newest one (circular buffer).

2 Diagnostics

2.1 Identification

Desig.: Designation of the instrument.
Version: Version of the instrument firmware.
Bootloader: Version of the bootloader.

2.1.4 Factory Test: Test date of the mainboard and frontend.

2.1.5 Operating Time: Years, days, hours, minutes, seconds.

2.2 Sensors

2.2.1 Cond. Sensor

Current value: Shows the measured value in MΩ or µS.
Raw value: Shows the raw value in MΩ or µS.
Cell constant: Shows the cell constant.

2.2.2 Miscellaneous

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

2.3 Sample

2.3.1 *Sample ID:* Shows the ID used to identify the location of the sample.
Temperature: Shows the sample temperature in °C.
(Nt5K): Shows the sample temperature in Ohm.
Sample flow: Shows the sample flow in l/h.
(Raw value): Shows the sample flow in Hz.

2.4 I/O State

2.4.1 Relays

2.4.1.1	*Alarm Relay:*	Active or inactive
	Relays 1 and 2:	Active or inactive
	Input:	Open or closed

2.4.2 Signal Outputs

2.4.2.1	*Signal Outputs 1 and 2:*	Current in mA
	Signal Outputs 3 and 4:	Current in mA (if option is installed)

2.5 SD Card

2.5.1 *Status:* Shows the status of the SD card.

2.6 Interface

Settings of the installed communication option (if any).

3 Maintenance

3.1 Simulation

To simulate a value or a relay state, select

- alarm relay
- relay 1 or 2
- signal outputs 1 or 2
- signal outputs 3 or 4 (if option is installed)

Change the value or state of the selected item with the arrow keys.
Press [Enter].

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

At the absence of any key activities, the instrument will switch back to normal mode after 20 min.

3.1.1	**Relays**	
3.1.1.1	*Alarm relay:*	Active or inactive
3.1.1.2	*Relay 1:*	Active or inactive
3.1.1.3	*Relay 2:*	Active or inactive
3.1.2	**Signal outputs**	
3.1.2.1	*Signal output 1:*	Current in mA
3.1.2.2	*Signal output 2:*	Current in mA
3.1.2.3	*Signal output 3:*	Current in mA
3.1.2.4	*Signal output 4:*	Current in mA

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 s

4.2 Relay Contacts

See Relay Contacts, p. 58.

4.3 Logger

The instrument is equipped with an internal logger. The logger data can be copied to the SD card.

4.3.1 *Log Interval:* Select a convenient log interval.
Range: 1 s, 5 s, 1 min, 5 min, 10 min, 30 min or 1 h.

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

4.3.3 *Eject SD Card:* With this function all logger data are copied to the SD card and the SD card can be removed.

5 Installation

5.1 Sensors

5.1.1 *Flow measurement:* Select the installed flow meter type.
- None
- Q-Flow
- Q-HFlow

5.1.2 *Meas. Mode:* Select the measuring mode.
- Resistivity
- Conductivity

5.1.3 Sensor parameters

5.1.3.1 *Cell Constant:* Enter the cell constant printed on the sensor label.

5.1.3.2 *Temp. Corr:* Enter the temperature correction printed on the sensor label.

5.1.3.3 *Cable length:* Enter the cable length. If the transmitter and the flow cell are mounted together on one panel, set the cable length to 0.0 m.

5.1.3.4 *Temp. Comp.:* Available compensation models:
- none
- coefficient
- neutral salts
- high purity water

- strong acids
- strong bases
- ammonia, ethanolamine
- morpholine

5.2 Signal Outputs

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

5.2.1 **Signal Output 1:** 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:

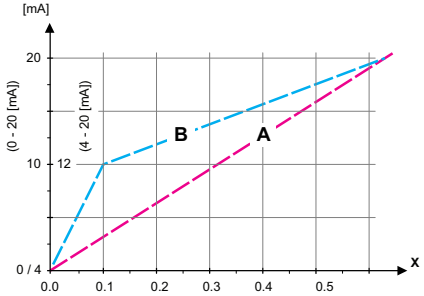
- Measured value
- Temperature
- Sample flow (if a flow meter is selected)
- Meas. uc (measurement without temperature compensation)

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

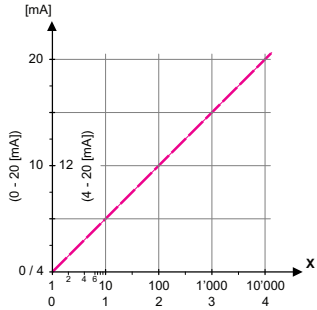
5.2.1.3 *Function:* Define if the signal output is used to transmit a process value or to drive a control unit. Available functions are:

- Linear, bilinear or logarithmic for process values.
- Control upwards or control downwards.

As process values The process value can be represented in three 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 and high) of the linear or logarithmic scale. In addition, the midpoint for the bilinear scale.

Parameter Meas. value (conductivity):
5.2.1.40.10 *Range low:* 0.000–2000 µS/cm
5.2.1.40.20 *Range high:* 0.000–2000 µS/cm

Parameter Meas. value (resistivity):
5.2.1.40.10 *Range low*: 0.00–200 MΩ
5.2.1.40.20 *Range high*: 0.00–200 MΩ

Parameter Temperature:
5.2.1.40.11 *Range low*: -30–130 °C
5.2.1.40.21 *Range high*: -30–130 °C

Parameter Sample flow:
5.2.1.40.13 *Range low*: 0–200 l/h
5.2.1.40.23 *Range high*: 0–200 l/h

Parameter Meas. uc (conductivity):
5.2.1.40.10 *Range low:* 0.000–2000 µS/cm
5.2.1.40.20 *Range high:* 0.000–2000 µS/cm

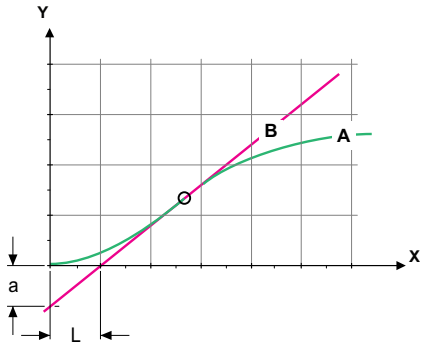
Parameter Meas. uc (resistivity):
5.2.1.40.10 *Range low*: 0.00–200 MΩ
5.2.1.40.20 *Range high*: 0.00–200 MΩ

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.

Control upwards or downwards

Setpoint: User-defined process value for the selected parameter.
P band: Range below (upwards control) or above (downwards control) the setpoint, within which the dosing intensity is reduced from 100% to 0% to reach the setpoint without overshooting.

5.2.1.43 **Control Parameters:** if Parameter = Meas. Value (conductivity)
5.2.1.43.10 Setpoint: 0.000–2000 µS/cm
5.2.1.43.20 P-Band: 0.000–2000 µS/cm

5.2.1.43 **Control Parameters:** if Parameter = Meas. Value (resistivity)
5.2.1.43.10 Setpoint: 0.00–200 MΩ
5.2.1.43.20 P-Band: 0.00–200 MΩ

5.2.1.43 **Control Parameters:** if Parameter = Temperature
5.2.1.43.11 Setpoint: -30 °C to +130 °C
5.2.1.43.21 P-Band: 0 °C to +100 °C

5.2.1.43 **Control Parameters:** if Parameter = Sample flow
5.2.1.43.12 Setpoint: 0.0 l/h–200 l/h
5.2.1.43.22 P-Band: 0.0 l/h–200 l/h

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: 0–9000 s

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: 0–9000 s

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, hysteresis values and delay times for the following parameters:

- Measured value
- Temperature
- Sample flow (if a flow sensor is installed)
- 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 becomes inactive and E001 is displayed in the message list.
Range: 0.000 to 2000 µS or 0.00 to 200 MΩ

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

5.3.1.1.35 *Hysteresis:* Within the hysteresis range, the relay does not switch. This prevents damage to the relay contacts when the measured value fluctuates around the limit.
Range: 0.000 to 2000 µS or 0.00 to 200 MΩ

5.3.1.1.45 *Delay:* Waiting time before the alarm relay becomes inactive after the measured value has risen above or fallen below the programmed alarm value.
Range: 0–28‘800 s

5.3.1.3 Sample Flow

5.3.1.3.1 *Flow Alarm:* Program if the alarm relay should become inactive if there is a flow alarm. The flow alarm will always be indicated on the display, in the pending error list, saved in the message list and the logger.
Range: yes or no

Note: *Sufficient flow is essential for a correct measurement. It is recommended to program yes.*

5.3.1.3.2 *Alarm High:* If the measured value rises above the alarm high value, the alarm relay becomes inactive and E009 is displayed in the message list.
Range: 0–200 l/h

5.3.1.3.35 *Alarm Low:* If the measured value falls below the alarm low value, the alarm relay becomes inactive and E010 is displayed in the message list.
Range: 0–200 l/h

5.3.1.4 Sample Temp.

5.3.1.1.2 *Alarm High:* If the measured value rises above the alarm high value, the alarm relay becomes inactive and E007 is displayed in the message list.
Range: -30–160 °C

5.3.1.1.35 *Alarm Low:* If the measured value falls below the alarm low value, the alarm relay becomes inactive and E008 is displayed in the message list.
Range: -30–130 °C

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

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

5.3.x Relay 1 and 2: The function of relay contacts 1 or 2 is defined by the user.

Note: *The navigation in the menus Relay 1 and Relay 2 is equal. 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. The same values can also be entered in menu 4.2.

5.3.5.3.2.1 Function = Limit upper/lower

If 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 setpoint, the relay is activated.

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

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 limit.

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

5.3.2.50 *Delay:* Time by which the switching of the relay is delayed after the measured value has risen above or fallen below the programmed setpoint.
Range. 0–600 s

5.3.2.1 Function = Control upwards/downwards

If the relays are used to control dosing units, program the following.

5.3.2.22 *Parameter:* Choose one of the following process values.
- Meas. value
- Temperature
- Sample Flow
- Meas. uc (uncompensated)

5.3.2.32 Settings: Choose the respective actuator:
- Time proportional
- Frequency

5.3.2.32.1 Actuator = Time proportional

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 s.

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

5.3.2.32.4 **Control Parameters**
Range for each parameter same as 5.2.1.43.

5.3.2.32.1 Actuator = Frequency

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.

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 (interval, daily, weekly).

5.3.2.24 Interval

5.3.2.340 *Interval:* The interval can be programmed within a range of 1–1440 min.

5.3.2.44 *Run Time:* Enter the time the relay stays active.
Range: 5–32400 s.

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: 0–6000 s.

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. 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:* Time of day at which the relay is activated.
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 on one or several days of a week.
5.3.2.342	**Calendar**
5.3.2.342.1	*Start time:* The programmed start time is valid for each of the programmed days. 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 is switched via Profibus or Modbus. 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 when the input relay is closed
	When open: Input is active when the input relay is open
5.3.4.2	*Signal Outputs:* Select the operation mode of the signal outputs when the input is active:
	Continuous: Signal outputs continue to issue the measured value.
	Hold: Signal outputs hold the last valid measured value. Errors, except fatal errors, are not issued.
	Off: Sets the signal outputs to 0 or 4 mA. Errors, except fatal errors, are not issued.
5.3.4.3	*Output/Control:* (relay or signal output):
	Continuous: Controller continues normally.
	Hold: Controller continues based 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 become inactive when the input is active. Message E024 is stored in the message list.
Yes:	Message E024 is issued and stored in the message list and the alarm relay becomes inactive when the input is active.

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

5.4 Miscellaneous

5.4.1 *Language:* Set the desired language.
Available settings: German, English, French, Spanish.

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

- **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.

5.4.4 **Password:** Select a password different from 0000 to prevent unauthorized access to the menus “Messages”, “Maintenance”, “Operation” and “Installation”.
Each menu can 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 meaningful text, such as KKS number.

5.5 Interface

Select one of the following communication protocols.

5.5.1 *Protocol:* **Profibus**

5.5.20	Device address:	Range: 0–126
5.5.30	ID no.:	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: 1 200–115 200 Baud
5.5.41	Parity:	Range: none, even, odd

5.5.1 *Protocol:* **HART**

	Device address:	Range: 0–63

10. Default Values

Operation

Sensors:	Filter Time Const.:	10 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
	Sensor parameters: Cell constant:	0.01000 cm^{-1}
	Sensor parameters: Temp. corr.:	0.00 °C
	Sensor parameters: Cable length:	0.0 m
Signal Output 1	Parameter:	Meas. Value
	Current loop:	4 –20 mA
	Function:	linear
	Scaling: Range low:	0.00 MΩ
	Scaling: Range high:	20.00 MΩ
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
	Alarm: Alarm low:	0.00 MΩ
	Alarm: Hysteresis:	1.00 MΩ
	Alarm: Delay:	5 s
	Sample Flow: Flow Alarm:	yes
	Sample Flow: Alarm High:	120 l/h
	Sample Flow: Alarm Low:	5 l/h
	Sample Temp: Alarm high:	90 °C
	Sample Temp: 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

	Hysteresis: 1 MΩ
	Delay: 30 s
	If Function = Control upw. or dnw:
	Settings: Actuator: Frequency
	Settings: Pulse Frequency: 120/min
	Settings: Control Parameters: Setpoint: 200 MΩ
	Settings: Control Parameters: P-band: 1 MΩ
	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
	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: - - - - - - - -

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ANALYTICAL INSTRUMENTS

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