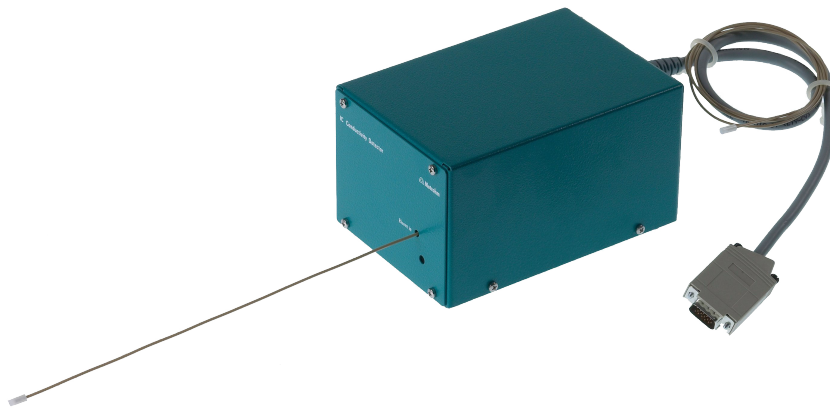


IC Professional Detector



IC Conductivity Detector

Manual

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2.850.9010

Manual

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This documentation has been prepared with great care. However, errors can never be entirely ruled out. Please send comments regarding possible errors to the address above.

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1 Introduction

1.1 Instrument description

The **IC Conductivity Detector** is an intelligent conductivity detector for usage in the instruments of the 850 Professional IC, the 881 Compact IC pro and the 882 Compact IC plus line of instruments.

The IC Conductivity Detector continuously measures the conductivity of the liquid passing through and indicates these signals in digital form (DSP – Digital Signal Processing). The conductivity detector exhibits outstanding thermal stability and thus guarantees reproducible measuring conditions.

The IC Conductivity Detector can only be used together with the IC instrument. The software **MagIC Net** automatically recognizes the IC Conductivity Detector and checks its functional readiness. It controls and monitors all the instruments connected, evaluates the measured data and administers it in a database. The operation of MagIC Net is described in the online help and in the tutorial for MagIC Net.



1.2 Overview of the instrument

1.2.1 Front

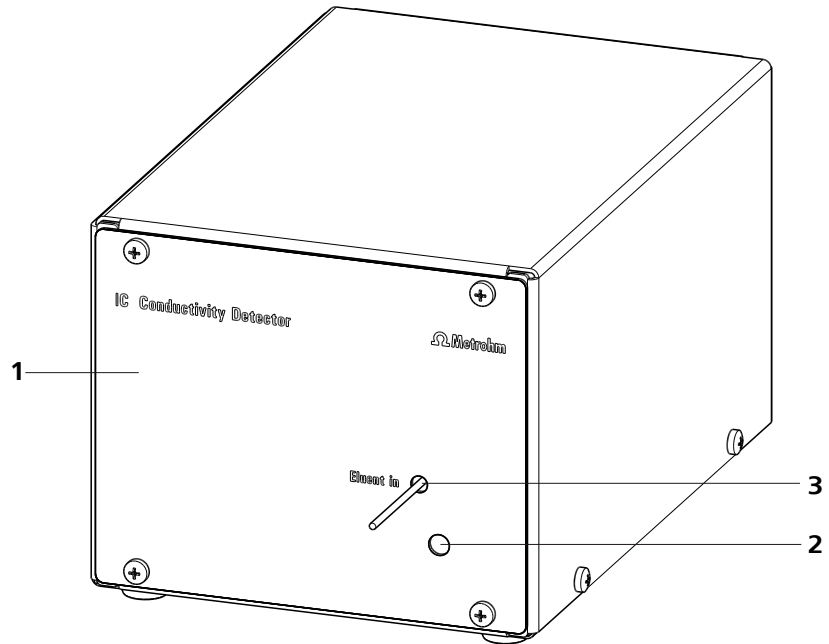


Figure 1 Front

1 IC detector 2.850.9010

2 Opening for temperature sensor

3 Detector inlet capillary
Permanently installed.

1.2.2 Rear

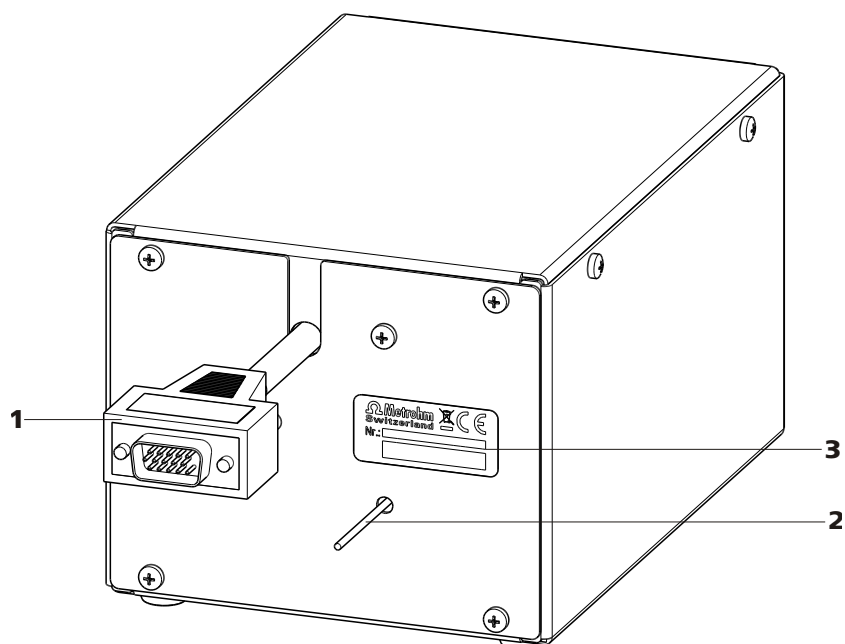


Figure 2 Rear

1 Detector cable
With mounted plug.

2 Detector outlet capillary
Permanently installed.

3 Type plate
With serial number.

1.3 Intended use

The IC Conductivity Detector can only be used together with an IC instrument. It is used for the precise measurement of the conductivity during the ion chromatographic determination of cations and anions.

As the corresponding IC instrument, the IC Conductivity Detector is also suitable for processing chemicals and flammable samples. The usage of the IC Conductivity Detector therefore requires that the user has basic knowledge and experience in the handling of toxic and caustic substances. Knowledge with respect to the application of the fire prevention measures prescribed for laboratories is also mandatory.



1.4 About the documentation



CAUTION

Please read through this documentation carefully before putting the instrument into operation. The documentation contains information and warnings which the user must follow in order to ensure safe operation of the instrument.

1.4.1 Symbols and conventions

The following symbols and styles are used in this documentation:

(5-12)	<p>Cross-reference to figure legend</p> <p>The first number refers to the figure number, the second to the instrument part in the figure.</p>
1	<p>Instruction step</p> <p>Carry out these steps in the sequence shown.</p>
	<p>Warning</p> <p>This symbol draws attention to a possible life hazard or risk of injury.</p>
	<p>Warning</p> <p>This symbol draws attention to a possible hazard due to electrical current.</p>
	<p>Warning</p> <p>This symbol draws attention to a possible hazard due to heat or hot instrument parts.</p>
	<p>Warning</p> <p>This symbol draws attention to a possible biological hazard.</p>
	<p>Caution</p> <p>This symbol draws attention to a possible damage of instruments or instrument parts.</p>
	<p>Note</p> <p>This symbol marks additional information and tips.</p>

1.5 Safety instructions

1.5.1 General notes on safety



WARNING

Operate this instrument only according to the information contained in this documentation.

This instrument left the factory in a flawless state in terms of technical safety. To maintain this state and ensure non-hazardous operation of the instrument, the following instructions must be observed carefully.

1.5.2 Electrical safety



WARNING

Only personnel qualified by Metrohm are authorized to carry out service work on electronic components.



WARNING

Never open the housing of the instrument. The instrument could be damaged by this. There is also a risk of serious injury if live components are touched.

There are no parts inside the housing which can be serviced or replaced by the user.

Protection against electrostatic charges



WARNING

Electronic components are sensitive to electrostatic charges and can be destroyed by discharges.

Do not fail to pull the power cord out of the power socket before you set up or disconnect electrical plug connections at the rear of the instrument.



1.5.3 Working with liquids



CAUTION

Periodically check all system connections for leaks. Observe the relevant regulations in respect to working with flammable and/or toxic fluids and their disposal.

1.5.4 Recycling and disposal



This product is covered by European Directive 2012/19/EU, WEEE – Waste Electrical and Electronic Equipment.

The correct disposal of your old instrument will help to prevent negative effects on the environment and public health.

More details about the disposal of your old instrument can be obtained from your local authorities, from waste disposal companies or from your local dealer.

2 Installation

2.1 Setting up the instrument

2.1.1 Packaging

The instrument is supplied in highly protective special packaging. Keep this packaging, as only this ensures safe transportation of the instrument.

2.1.2 Check

Immediately upon receiving the shipment, check it against the delivery note to ensure that it is complete and undamaged.

2.1.3 Location

The IC Conductivity Detector is designed for usage in the detector chamber of the IC instruments. For the location, the same conditions apply as for the IC instrument.

2.2 Inserting the detector

The IC Conductivity Detector is inserted into the instruments from the rear.

Figure 3 shows how the detector is inserted into an 850 Professional IC instrument within 6 simple steps. Inserting the detector into an 881 Compact IC pro or 882 Compact IC plus instrument is carried out analogously.

2.2 Inserting the detector

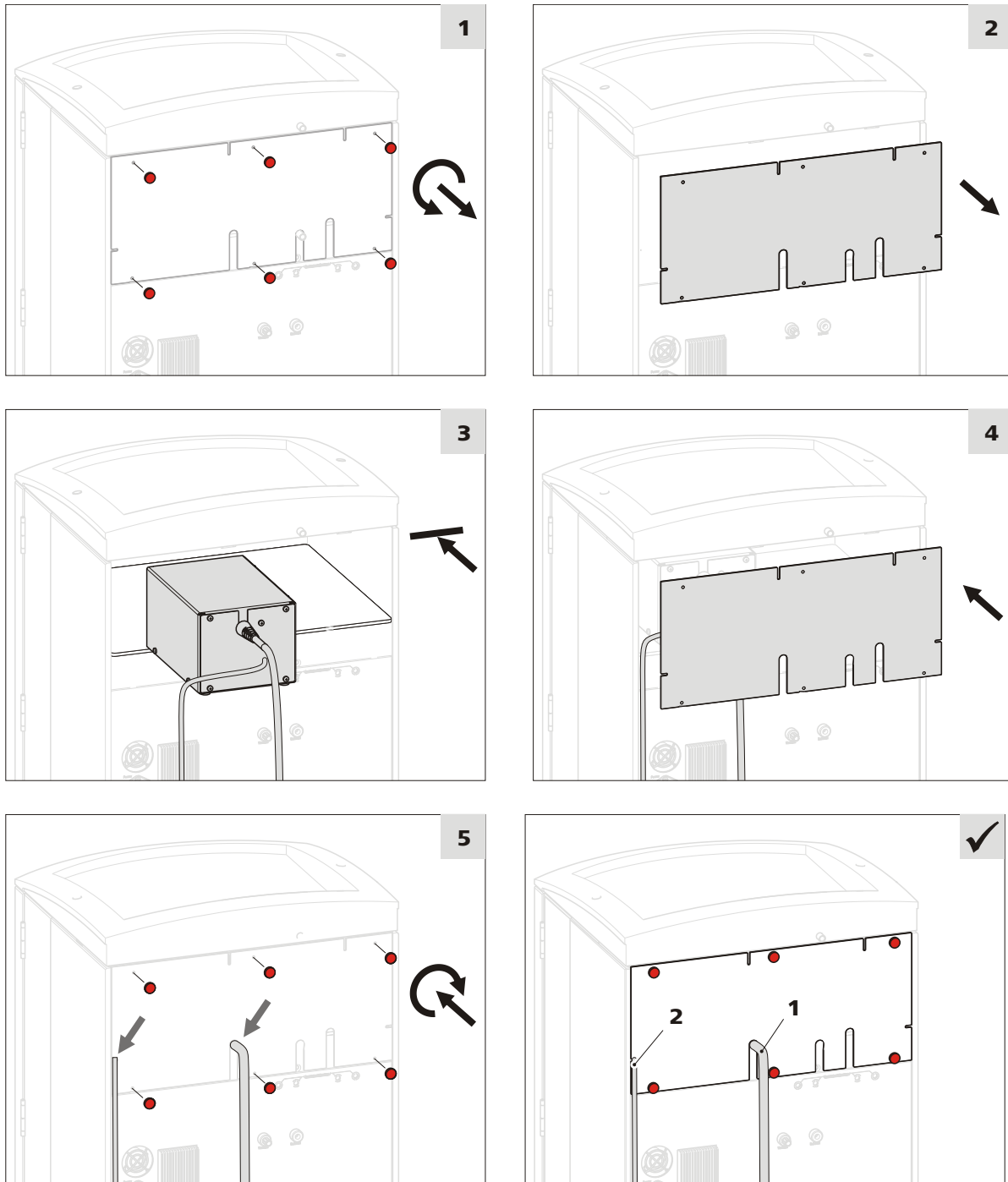


Figure 3 Inserting the detector

1 Detector connection cable

2 Detector outlet capillary

**NOTICE**

With the instruments of the 850 Professional line of instruments, up to two detectors can be placed and connected.

Placing the detector in the instrument**1 Removing the knurled screws**

- Unscrew knurled screws on the rear panel.
- *Optional with 850 instruments:* Remove the handle if it is still fastened to the instrument.

2 Removing rear panel

- Remove rear panel.

3 Positioning the detector

- Put the detector through the opening and position it on the support surface intended for this purpose and slide it as far as the limit stop to the front.

4 Replacing rear panel

- Insert the detector cable in a cable feed-through on the rear panel.
- Place the detector outlet capillary in a suitable capillary feed-through.
- Replacing the rear panel.

The detector cable (3-1) and the detector outlet capillary (3-2) should freely hang out of the cable or capillary feed-through.

5 Tightening the knurled screws

- *Optional with 850 instruments:* Reattach the handle higher up and use it as a holder for MPaks.
- Tighten the knurled screws.



2.3 Connecting the detector

Connecting the detector cable and the detector outlet capillary



CAUTION

The instrument **must** be switched off when connecting a detector.

1 Connecting the detector

- Connect the detector connection cable (3-1) to the detector connection socket *Detector 1*.



NOTICE

Recommendation: In AnCat systems with 2 detectors: anions to *Detector 1*, cations to *Detector 2*.

2 Connecting the detector outlet capillary

- Guide the detector outlet capillary (3-2) into a sufficiently large waste container and fasten it there.



NOTICE

The detector outlet capillary must be free of blockages (the measuring cell is tested to 5 MPa = 50 bar backpressure).



NOTICE

The detector outlet capillary must **not** be shortened!
Shortening the detector outlet capillary leads to increased noise!

2.4 Connecting the detector inlet capillary

Depending on the equipment of the IC instruments the detector inlet capillary is connected differently:

- With instruments without suppression, directly to the separation column (see "Connect the detector inlet capillary to the separation column", page 11).
- With instruments with chemical suppression, to the MSM or MSM-HC (see "Connecting detector inlet capillary to MSM / MSM-HC", page 12).
- With instruments with sequential suppression, to the MCS (see "Connecting the detector inlet capillary to the MCS", page 12).



NOTICE

In order to prevent unnecessary peak widening after separation, the connection between the outlet of the separation column and the inlet in the detector should be kept as short as possible.

Connect the detector inlet capillary to the separation column

1 Connecting detector input

- Fasten the detector inlet capillary (4-1) on the output of the column (4-3) using a 6.2744.070 pressure screw (4-2).

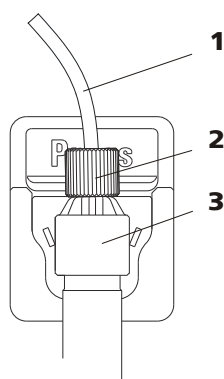


Figure 4 Connection detector – separation column

1 Detector inlet capillary

2 PEEK pressure screw, short 6.2744.070

3 Separation column



Connecting detector inlet capillary to MSM / MSM-HC

1 Connecting detector input

- Connect the detector inlet capillary (5-1) and the capillary of the MSM / MSM-HC (5-2) labeled with *out* to one another using a 6.2744.040 coupling (5-3) and two 6.2744.070 short pressure screws (5-4).

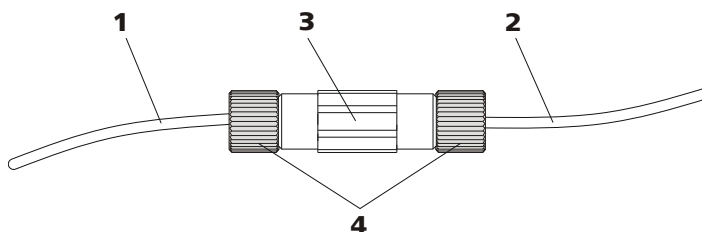


Figure 5 Connector detector – MSM

1 Detector inlet capillary	2 MSM / MSM-HC outlet capillary labeled with <i>out</i> .
3 Coupling 6.2744.040	4 Pressure screws, short 6.2744.070

Connecting the detector inlet capillary to the MCS

1 Connecting detector input

- Fasten the detector inlet capillary (6-1) using a 6.2744.090 long PEEK pressure screw (6-2) on the output of the MCS (6-3).

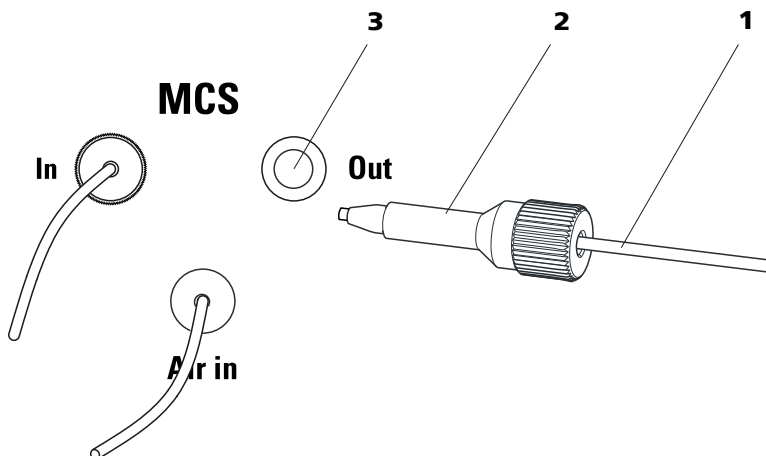


Figure 6 Connection detector – MCS

1 Detector inlet capillary	2 Pressure screw, long 6.2744.090
3 MCS output	

2.5 Connecting the instrument to the power grid



WARNING

Electric shock from electrical potential

Risk of injury by touching live components or through moisture on live parts.

- Never open the housing of the instrument while the power cord is still connected.
- Protect live parts (e.g. power supply unit, power cord, connection sockets) against moisture.
- Unplug the power plug immediately if you suspect that moisture has gotten inside the instrument.
- Only personnel who have been issued Metrohm qualifications may perform service and repair work on electrical and electronic parts.

Connecting the power cord

Accessories

Power cord with the following specifications:

- Length: max. 2 m
- Number of cores: 3, with protective conductor
- Instrument plug: IEC 60320 type C13
- Conductor cross-section 3x min. 0.75 mm² / 18 AWG
- Power plug:
 - according to customer requirement (6.2122.XX0)
 - min. 10 A



NOTICE

Do not use a not permitted power cord!

1 Plugging in the power cord

- Plug the power cord into the instrument's power socket.
- Connect the power cord to the power grid.



3 Start-up

The IC Conductivity Detector is put into operation together with the IC instrument in which it has been inserted to. Additional information can be found in the *Start-up* chapter in the manual for the IC instrument.

4 Operation and maintenance

4.1 Maintenance



CAUTION

The conductivity detector must not be opened!



WARNING

When rinsing the detector without column, the pressure must not exceed **5 MPa**. In order to ensure this, the maximum pressure of the high pressure pump must be set to **5 MPa** in MagIC Net.

If the conductivity detector is blocked, you should first of all check whether the blockage results from the capillary ends being pressed together too firmly. In this case, shorten the detector inlet capillary (**1-3**) or the detector outlet capillary (**2-2**) by several millimeters.

If this does not help, the conductivity detector can be rinsed against the normal flow direction. For this, connect the high pressure pump to the detector outlet capillary (**2-2**) and rinse - **the pressure may not exceed 5 MPa**.



5 Troubleshooting

5.1 Problems and their solutions

Problem	Cause	Remedy
The pressure in the system markedly increases.	<i>Conductivity detector blocked.</i>	<i>(see chapter 4, page 15)</i> <ul style="list-style-type: none">▪ Shorten capillary ends by several mm .▪ Rinse detector against the normal flow direction.
Conductivity detector is not recognized in the software	<i>No connection.</i>	<ul style="list-style-type: none">▪ Check the connection of the detector cable.▪ Switch the instrument off and on again (after 15 seconds).

6 Technical specifications

6.1 Conductivity measuring system

<i>Type</i>	<ul style="list-style-type: none"> ▪ Microprocessor-controlled Digital Signal Processing (DSP technology) ▪ Intelligent detector with 6 reference chromatograms
<i>Measuring range</i>	0 - 15,000 $\mu\text{S}/\text{cm}$ without range switching
<i>Noise</i>	< 0.1 nS at 1 $\mu\text{S}/\text{cm}$
<i>Linearity deviations</i>	<ul style="list-style-type: none"> ▪ < 0.1% for conductivity values higher than 16 $\mu\text{S}/\text{cm}$ ▪ < 1% for conductivity values lower than 16 $\mu\text{S}/\text{cm}$
<i>Drift</i>	< 0.2 nS/cm per hour
<i>Measuring rate</i>	10 measurements per second for optimum results without filtering
<i>Resolution</i>	0.0047 nS/cm
<i>Baseline</i>	Noise < 0.2 nS/cm typical for sequential suppression
<i>Conductivity detector</i>	
<i>Cell volume</i>	0.8 μL
<i>Cell constant</i>	<ul style="list-style-type: none"> ▪ Individual calibration data saved in the detector ▪ Adjustable in the range: 13.0 - 21.0 /cm
<i>Electrodes</i>	Ring-shaped electrodes made from stainless steel
<i>Materials in contact with eluent</i>	Chemically inert PCTFE
<i>Maximum operating pressure</i>	5.0 MPa (50 bar)
<i>Cell temperature</i>	20 - 50 °C in increments of 5 °C
<i>Temperature stability</i>	< 0.001 °C
<i>Temperature compensation</i>	0 - 5%/K adjustable, default 2.3%/K
<i>Heating time</i>	< 30 minutes (40 °C)



6.2 Interfaces

Detector cable D-sub 15-pin, high-density

6.3 Energy supply

Power supply via detector cable 5 V, 6.5 V, 42 V

6.4 Reference conditions

Ambient temperature 25 °C (± 3 °C)

Instrument status > 40 min in operation

6.5 Dimensions

Width 108 mm

Height 93 mm

Depth 158 mm

Weight (without accessories) 1.858.9010: 2.3 kg

Material

Housing Steel, coated

7 Accessories

Up-to-date information on the scope of delivery and optional accessories for your product can be found on the Internet. You can download this information using the article number as follows:

Downloading the accessories list

- 1 Enter <https://www.metrohm.com/> into your Internet browser.
- 2 Enter the article number (e.g. **2.850.9010**) into the search field.
The search result is displayed.
- 3 Click on the product.
Detailed information regarding the product is shown on various tabs.
- 4 On the **Included parts** tab, click on **Download the PDF**.
The PDF file with the accessories data is created.



NOTICE

Once you have received your new product, we recommend downloading the accessories list from the Internet, printing it out and keeping it together with the manual for reference purposes.



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