Power Box

Manual

8.110.8022EN / 2020-02-17

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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 Description

The Power Box is used to provide the 899 Coulometer with an uninterruptible power supply in environments with an unstable or non-existent mains supply. For instance, you can connect the Power Box to the mains supply and the 899 Coulometer to the Power Box. If the mains supply fails while operating the 899 Coulometer, the Power Box automatically starts supplying power. If you are working completely without a mains supply, you can operate the 899 Coulometer for at least twelve hours using a fully-charged Power Box.

1.2 Intended use

The Power Box is intended solely for supplying the 899 Coulometer with power. No other instruments may be connected to the Power Box.

1.3 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.

1.3.1 Symbols and conventions

The following symbols and formatting may appear in this documentation:

*(5-**12**)*	**Cross-reference to figure legend** The first number refers to the figure number, the second to the instrument part in the figure.
1	**Instruction step** Carry out these steps in the sequence shown.
Method	**Dialog text**, **parameter** in the software
File ▸ New	Menu or menu item
[Next]	**Button** or **key**

	**WARNING** This symbol draws attention to a possible life-threatening hazard or risk of injury.
	**WARNING** This symbol draws attention to a possible hazard due to electrical current.
	**WARNING** This symbol draws attention to a possible hazard due to heat or hot instrument parts.
	**WARNING** This symbol draws attention to a possible biological hazard.
	**CAUTION** This symbol draws attention to possible damage to instruments or instrument parts.
	**NOTE** This symbol highlights additional information and tips.

1.4 Safety instructions

1.4.1 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.

1.4.2 Electrical safety

The electrical safety when working with the instrument is ensured as part of the international standard IEC 61010.

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.

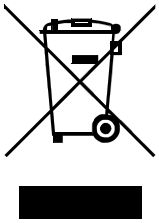
Mains voltage

WARNING

An incorrect supply voltage can damage the instrument.

Only operate this instrument with a supply voltage specified for it (see rear panel of the instrument).

1.4.3 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 Overview

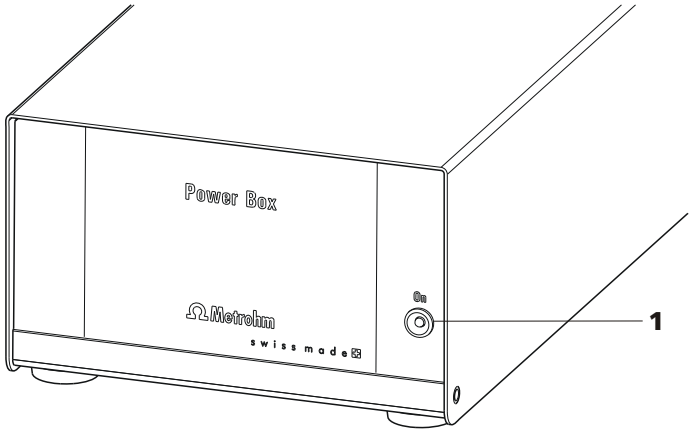


Figure 1 Front Power Box

1 LED "On"
Lights up if the Power Box is being charged or is partially charged. Lights up more brightly if the Power Box is fully charged.

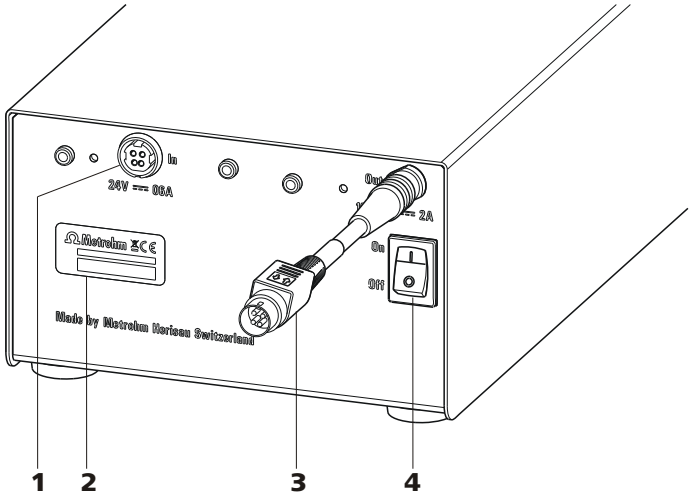


Figure 2 Rear Power Box

1 Mains connection socket (In)
For connecting the external power supply unit (6.2164.010).

2 Type plate
Contains the serial number.

3 Connection cable (Out)
For connecting the Power Box to the 899 Coulometer.

4 Mains switch
For switching the Power Box on and off.

3 Installation

3.1 Installation location

The Power Box has been developed for operating the 899 Coulometer with an uninterruptible power supply. It can be used indoors or outdoors. The Power Box must not be used in environments with explosion or fire hazards.

Place the instrument in a location which is suitable for operation, free of vibrations, protected from corrosive atmosphere, and contamination by chemicals.

Ensure that there is a safety distance of at least 10 cm between the Power Box's rear panel and parts or devices that can generate sparks. This way, hydrogen that can be generated in the event of any malfunction in the power box can safely escape out through the ventilation holes.

The Power Box should be protected against excessive temperature fluctuations and direct sunlight.

3.2 Connecting the 899 Coulometer to the Power Box

Proceed as follows:

1 Place the 899 Coulometer on the Power Box.

2 Plug in the connection cable *(2-**3**)* for the Power Box at the 899 Coulometer's mains connection socket (Power).

NOTICE

The connection cable's plug is protected against accidental disconnection of the cable by means of a pull-out protection feature. If you wish to pull out the plug, you will first need to pull back the outer plug sleeve.

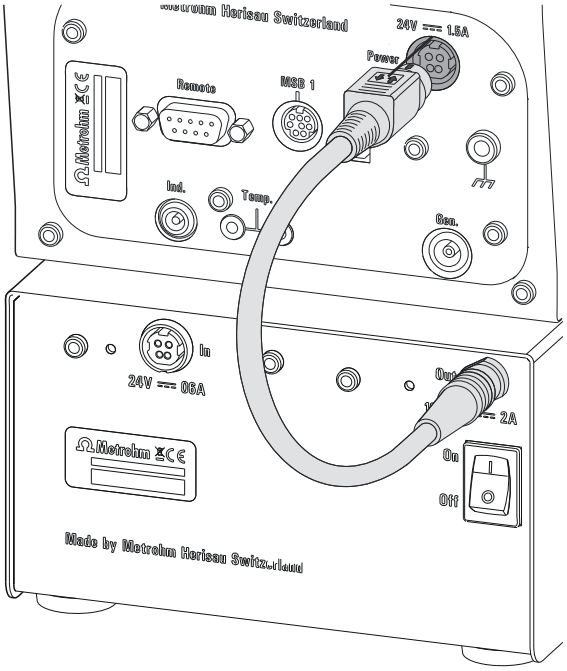


Figure 3 Connecting the 899 Coulometer to the Power Box

3.3 Connecting the power supply unit to the Power Box

The Power Box can be charged while connected to the mains supply by using the 6.2164.010 power supply unit that is provided with the 899 Coulometer.

WARNING

An incorrect mains voltage can damage the Power Box.

Only operate the Power Box at the mains voltage for which it has been specified. In addition, only use the power supply unit provided with the 899 Coulometer.

Proceed as follows:

1 Plug in the plug for the power supply unit at the mains connection socket *(2-**1**)* for the Power Box.

NOTICE

The plug of the power supply unit is protected against accidental disconnection of the cable by means of a pull-out protection feature. If you wish to pull out the plug, you will first need to pull back the outer plug sleeve.

2 Connect the power supply unit to the mains supply using the mains cable.

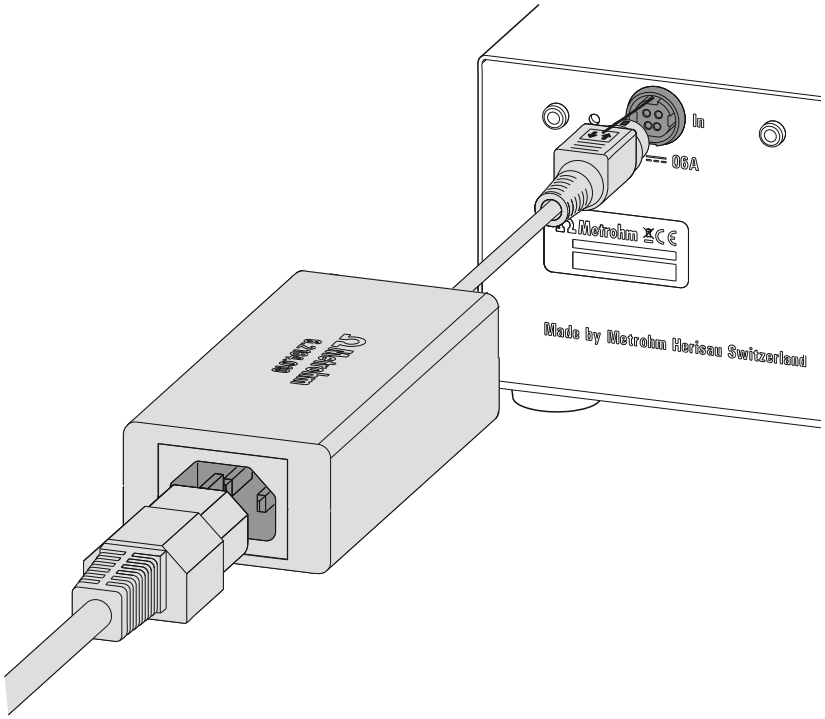


Figure 4 Connecting the power supply unit to the Power Box

CAUTION

Make sure that the connection cable *(2-**3**)* is not plugged in at the mains connection socket *(2-**1**)* accidentally. Otherwise the Power Box will be discharging needlessly.

4 Operation and maintenance

4.1 Start-up of the Power Box

Ensure that the following conditions are met before you put the Power Box into operation together with the 899 Coulometer:

- The rear panel of the Power Box must be at least 10 cm away from parts or devices that can generate sparks.
- The Power Box must be fully charged.

4.1.1 Charging the Power Box

When the Power Box is fully charged, the 899 Coulometer can be operated without a mains supply for at least 12 h. Once the charge drops below a critical limit, you are prompted via a message on the coulometer to charge the Power Box.

Fully charging the Power Box takes at least 14 h. If there is too little time for charging after approximately 8 h of operation using the 899 Coulometer, the Power Box can be charged once for 1 h. Afterwards the charge will suffice for approximately another 8 h of operation. After that, however, the Power Box must be charged for at least 14 h.

To charge the Power Box, proceed as follows:

1 Plug in the plug for the power supply unit at the mains connection socket *(2-**1**)* for the Power Box.

2 Connect the power supply unit to the mains supply using the mains cable.

3 Switch on the Power Box.

4 Leave the Power Box connected to the mains supply for at least 14 h.

The Power Box cannot be overcharged, even if it is left connected to the mains supply for more than 14 h.

NOTICE

Switch the Power Box off if you are not using it together with the 899 Coulometer immediately after charging. This way you can avoid an unnecessarily high self-discharge.

4.1.2 Displaying the charge

The state of charge is displayed on the Power Box itself and on the 899 Coulometer's display.

"On" LED on the Power Box

If the Power Box is connected to the mains supply and is switched on, the LED indicates that the Power Box is in charging mode by lighting up. If the Power Box is fully charged, the LED's light intensity increases.

If a fully charged Power Box is switched on, it takes approximately 10 s until the LED displays the full charge by switching to a higher light intensity.

Battery symbol on the 899 Coulometer's display

You can track the Power Box's state of charge using the four-level battery symbol on the 899 Coulometer's display. This symbol is displayed in the main dialog and during live display of the conditioning:

When the Power Box is in charging mode, the battery symbol fills from right to left. If the 899 Coulometer is being operated using the Power Box, the battery symbol empties in the opposite direction.

4.2 Operating modes

The Power Box can be operated with the 899 Coulometer in different modes. Below you can find all of the operating modes the Power Box can be operated in.

Power failure mode

- The power supply unit is connected to the Power Box and to the mains supply.
- The Power Box is switched on.
- The 899 Coulometer is connected to the Power Box.
- The 899 Coulometer is switched on.

If the mains supply fails, the Power Box takes over continuing operation of the 899 Coulometer *(see chapter 4.3, page 11)*.

Charging mode

- The power supply unit is connected to the Power Box and to the mains supply.
- The Power Box is switched on.
- The 899 Coulometer is connected to the Power Box.

The Power Box is charged no matter whether the 899 Coulometer is switched on or switched off.

899 Coulometer with the Power Box without power failure mode

- The power supply unit is connected to the Power Box and to the mains supply.
- The Power Box is switched off.
- The 899 Coulometer is connected to the Power Box.
- The 899 Coulometer is switched on.

The 899 Coulometer can be operated normally as long as the mains supply is stable. The Power Box does not take over supplying power if the mains supply fails. The 899 Coulometer is shut down in a controlled way.

899 Coulometer with the Power Box without power supply unit

- The Power Box is fully charged and switched on.
- The Power Box is not connected to the power supply unit and the mains supply.
- The 899 Coulometer is connected to the Power Box.
- The 899 Coulometer is switched on.

The 899 Coulometer can be operated for at least 12 h *(see chapter 4.4, page 12)*.

Stand-alone operation

- The power supply unit is connected to the Power Box and to the mains supply.
- The Power Box is switched on.

The Power Box is charged. Once it is fully charged, the LED switches to a higher light intensity *(1-**1**)*.

The intelligence of the Power Box prevents overcharging, even if the Power Box is connected to the mains supply for more than 14 h.

4.3 Using the 899 Coulometer on an unstable power supply

If you are working in an environment where only an unstable power supply is available, you can operate the 899 Coulometer as follows:

1. Connect the 899 Coulometer to the Power Box.
2. Plug in the 6.2164.010 power supply unit at the power socket *(2-**1**)* for the Power Box and connect it to the power supply.
3. Switch on the Power Box.
4. Switch on the 899 Coulometer.

   If the power supply fails, the Power Box takes over providing the 899 Coulometer with power. Once the charge drops below a critical limit, you are prompted via a message on the Coulometer to charge the Power Box.

NOTICE

If you continue to operate the coulometer after this message is displayed without charging the Power Box, it will be switched off automatically after a certain time. This automatic process prevents a deep discharge of the Power Box during operation with a 899 Coulometer. Depending on the availability of the power supply, the coulometer is also shut down in a controlled way.

The Power Box ends up in charging mode no matter whether the coulometer is switched on or switched off. You can tell by the LED on the front of the instrument lighting up.

4.4 Using the 899 Coulometer not connected to the power grid

If you are working in an environment without an available power supply, you can operate the 899 Coulometer as follows:

1. Connect the 899 Coulometer to the fully-charged Power Box.
2. Switch on the Power Box.
3. Switch on the 899 Coulometer.

   After 12 h of operation at the earliest, you will be prompted via a message on the coulometer to charge the Power Box.

NOTICE

If you continue to operate the coulometer after this message is displayed without charging the Power Box, it will be switched off automatically after a certain time. This automatic process prevents a deep discharge of the Power Box during operation with a 899 Coulometer. The 899 Coulometer is shut down in a controlled way.

4.5 Storing the Power Box

CAUTION

If the Power Box is not being used for an extended period, the batteries may be damaged by a deep discharge. This also occurs if the Power Box is switched off. The discharge can amount to 3% per month. Repeated deep discharges can shorten the life of the batteries and lower their capacity.

Avoid deep discharges and keep the following in mind:

- Ensure that the Power Box is fully charged before you put it in storage.
- Switch off the Power Box before you put it in storage.
- If you keep the Power Box in storage or do not use it for 12 months, it must be charged after this period for at least 14 hours using the 6.2164.010 power supply unit.

4.6 Replacing the batteries

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.

Contact your local Metrohm Service to replace dead or defective batteries.

NOTICE

Warranty

The batteries are considered consumables. A 6-month warranty is granted starting from the day of delivery.

5 Technical specifications

5.1 Power supply

External power supply unit (6.2164.010)	24 V, 65 W
Input voltage	24 V DC (± 3%)
Input current	max. 600 mA
Output voltage range	19 - 28 V
Output current	max. 2 A
Fuse	2.5 A, slow-acting

5.2 Ambient temperature

Nominal function range	0 - +40 °C (at a maximum of 85% humidity)
Storage	–20 - +60 °C
Transport	–20 - +60 °C

5.3 Capacity

Maximum capacity	4 Ah
Usable capacity	90%
Work with a 899 Coulometer:	12 h of continuous operation during standard titration (120 s of titration, 180 s of conditioning, 1200 µg of water).
Remarks	After a typical titration operation lasting 8 h, the Power Box can be charged for approximately 1 h. This can allow for another 8 h of operation. Afterwards, the Power Box must be charged for 14 h (full charge).

5.4 Placement

Safety distance

Minimum safety distance between the rear panel of the Power Box and parts and devices that can generate sparks:

- 10 cm (in accordance with EN 50272-2)

An 899 Coulometer can be placed on top of the Power Box.

5.5 Battery

Type	NP4-12 YUASA (2 pieces)
Approvals	UN2800 / EN/IEC 61056 / VDE/UL MH12970 / MH28018
Air transport	UN2800 / Class 8 / Packaging group 3
Ocean transport	UN2800 / Class 8 / Packaging group 3
Surface transport	UN2800 / Class 8 / Packaging group 3
Nominal voltage	12 V DC each (= 24 V DC, series circuit)
Capacity	max. 4 Ah
Charging time	≤ 14 h
Capacity loss	≤ 3% per month
Dimensions L × W × H	90 × 70 × 106 mm
Weight	1,750 g

5.6 Dimensions

Width	141.5 mm
Height	86 mm
Depth	330 mm
Material	
Housing	Steel sheet
Weight	5,500 g

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