JUMO Simulator

for pH/redox
type 202711/10



Operating Manual

JUMO

20271110T90Z001K000

V2.01/EN/00727307/2023-07-28

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1 Introduction

1.1 Safety information

1.1.1 General Information

This manual contains information that must be observed in the interest of your own safety and to avoid material damage. This information is supported by symbols which are used in this manual as indicated.

Please read this manual before starting up the device. Store this manual in a place that is accessible to all users at all times.

If difficulties occur during startup, please do not intervene in any way that could jeopardize your warranty rights!

1.1.2 Warning symbols



CAUTION!

This symbol in connection with the signal word indicates that **personal injury** may occur if the respective precautionary measures are not carried out.

NOTICE!

This note in connection with the signal word indicates that **material damage or data loss** will occur if the respective precautionary measures are not taken.

1.1.3 Note symbols



NOTE!

This symbol refers to **important information** about the product, its handling, or additional benefits.

1.2 Description

1.2.1 Intended use

The simulator for pH/redox is used for startup, for calibration, and for inspecting/troubleshooting pH and redox transmitters.

1.2.2 Operating principle

The simulator is used to check that technical pH and redox measurement instruments are working correctly.

The simulator is used in place of a conventional pH/redox electrode and is connected to a measuring amplifier. It enables you to check the laid connecting cable and the measuring amplifier.

Simulating the pH values 0 to 14 allows you to check and optimize the measuring amplifier outputs (display values, control contacts and analog/digital outputs) when the system is dry.

When using the simulator with redox measurement instruments, a potential of ±414 mV is simulated in increments of 59 mV.

A switch allows a high-resistance check[1] of laid connecting cables for shunts or humidity problems.

The pH simulator is operated using a 9-V battery[2]. There is an integrated test function for checking the battery.

You connect the simulator to the pH or redox meter run using various optional connecting cables (see chapter 2.3 "Accessories", Page 6).

[1] Impedance 1000 MOhm.
[2] Included in the scope of delivery.

2 Identifying the device version

2.1 Order details

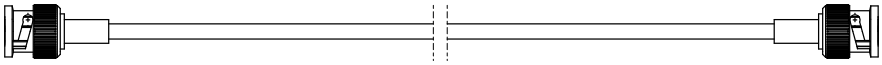
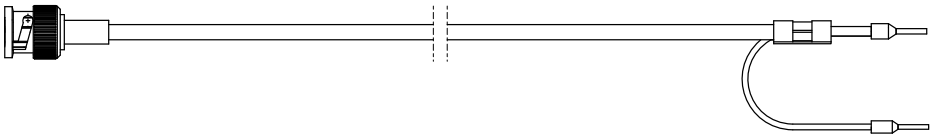
	(1)	Basic type
202711/10		JUMO simulator for pH/redox

	(1)
Order code	
Order example	202711/10

2.2 Scope of delivery

JUMO simulator for pH/redox, 9-V block battery, operating manual

2.3 Accessories

Designation	Part no.
Connecting cable for pH simulator 202711/10, BNC to BNC-connector, length 1.1 m, for testing measuring devices with a BNC socket as the pH input 	00082906
Connecting cable for pH simulator 202711/10, BNC to N-connector, length 1.1 m, for testing the pH meter run from the electrode head (for standard electrodes with an N-/S7-/S8-plug head), not suitable for electrodes with integrated temperature probes 	00082908
Connecting cable for pH simulator 202711/10, BNC to Shield-Kon®(free cable end with ferrule), length 1.5 m, for testing measuring devices with screw terminals as the pH input 	00513412

3 Electrical connection

3.1 Connecting cables

You can find suitable connecting cables for the device in chapter 2.3 "Accessories", Page 6.

4 Operation

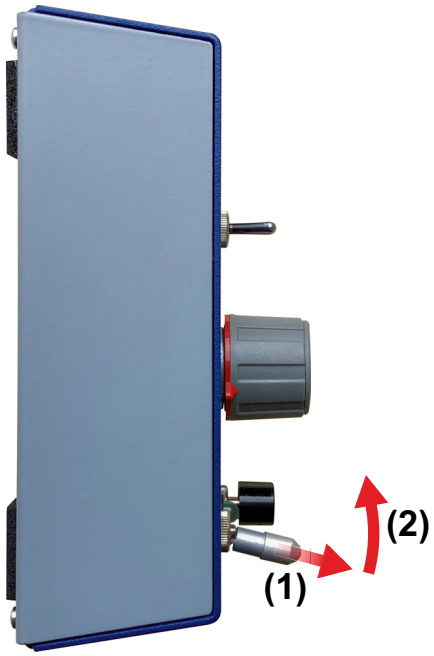
4.1 General information

You switch the pH simulator on or off using the "ON/OFF" switch. **To switch it on, pull out the switching knob first (1) and then flick it upwards (2)**.

To switch it off, pull out the switching knob again and flick it downwards.

You can test the internal battery using the "Batt.-Test" push-button. If the battery is intact, the LED lights up when you press the button.

The battery has an operating life of approx. 50 operating hours. A used battery can be replaced with a standard 9-V block battery
(⇨chapter 5.1 "Replacing used batteries", Page 15).



NOTE!

Switch the device off again after use.

NOTICE!

A dirty or damp connection port can lead to incorrect measurements.

▶ Protect the high-resistance connection port of the device during storage, so that it does not become damp or dirty.

4.2 Testing the input of a pH transmitter

4.2.1 Transmitter settings

Depending on the device configuration (manual temperature specification or automatic temperature compensation), you first have to set the reference conditions for the temperature compensation on the transmitter.

In the case of a manual temperature specification, you have to set the temperature to 25 °C.

In the case of automatic temperature compensation, the temperature of the connected temperature probe must be adjusted to 25 °C. If this is not possible, an alternative solution is to connect a resistor of 110 Ω (Pt100) or 1.1 kΩ (Pt1000).

4.2.2 Settings and steps for operating the simulator

1. Test the battery of the pH simulator and visually inspect the connecting cable (coaxial cable).
2. Connect the simulator to the transmitter using the correct coaxial cable.
3. Switch on the simulator.
4. Set the simulator's output resistance to "Direkt" (1).
5. Turn the pH selection switch to "7".
   The pH transmitter must display 7.00 pH +0.05 pH. If necessary, correct the display using the zero point adjustment.
6. Turn the pH selection switch to "14". Wait until the value displayed on the transmitter is stable
   The pH transmitter must display 14.00 pH +0.05 pH. If necessary, correct the display using the slope adjustment.
7. Set the simulator's output resistance to "1000 MΩ".
   The displayed pH value is allowed to change by a maximum of +0.05 pH, and the output current by a maximum of 0.5 %.
8. Switch off the pH simulator (2).



4 Operation

4.3 Calibrating pH transmitters and checking connected components

4.3.1 Transmitter settings

Depending on the device configuration (manual temperature specification or automatic temperature compensation), you first have to set the reference conditions for the temperature compensation on the transmitter.

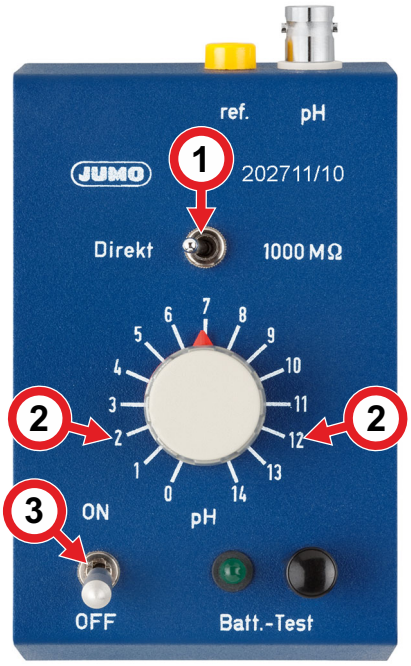
In the case of a manual temperature specification, you have to set the temperature to 25 °C.

In the case of automatic temperature compensation, the temperature of the connected temperature probe must be adjusted to 25 °C. If this is not possible, an alternative solution is to connect a resistor of 110 Ω (Pt100) or 1.1 kΩ (Pt1000).

4.3.2 Settings and steps for operating the simulator

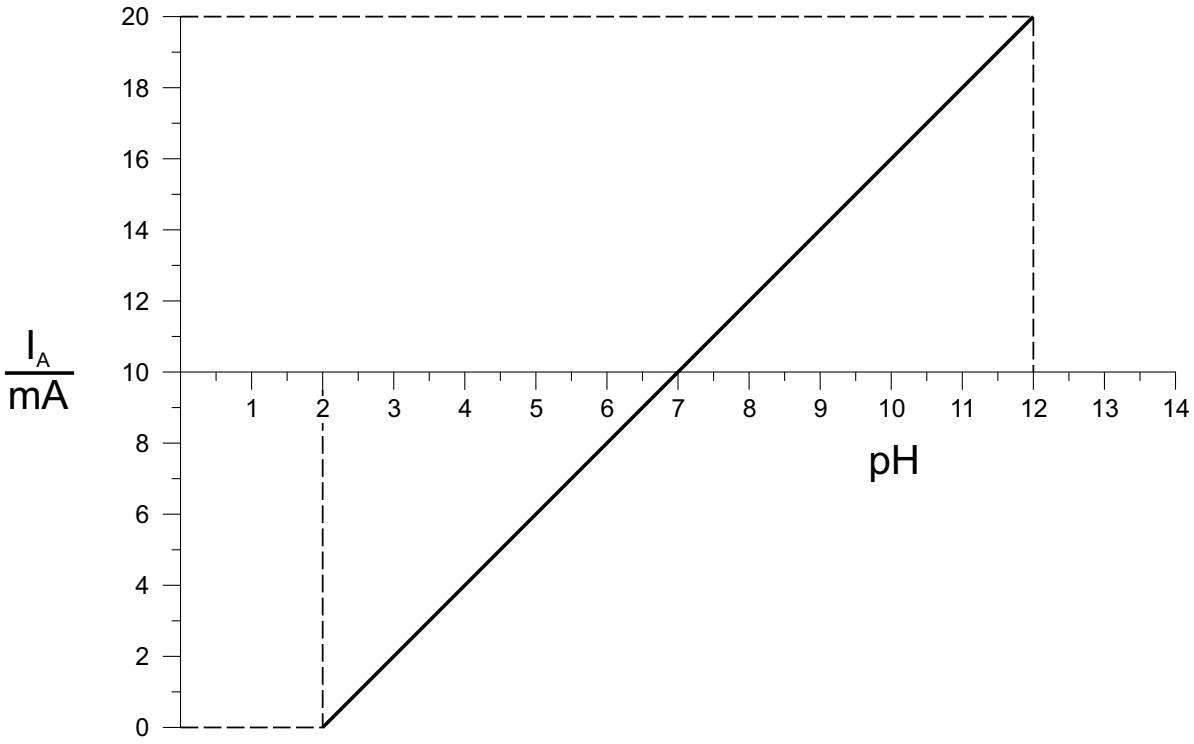
Example for the measuring range **2 to 12 pH**≙ 0 to 20 mA current output

1. Test the battery of the pH simulator and visually inspect the connecting cable (coaxial cable).
2. Connect the simulator to the transmitter using the correct coaxial cable.
3. Switch on the simulator.
4. Set the simulator's output resistance to "1000 MΩ" (1).
5. Turn the pH selection switch to "7".
6. Using the zero point adjustment, set the display of the transmitter to 7.00 pH ±0.02 pH.
   The value of the current output on the transmitter must be 10 mA ±1 % (test using a measuring device).
7. Turn the pH selection switch to "2" or "12" (2).
8. Using the transmitter's slope adjustment, set the display of the transmitter to pH value 2.00 pH ±0.02 pH or 12.00 pH ±0.02 pH.
9. Check the zero point 7 pH again.
10. Check the linearity of the current output by turning the pH selection switch from "2" (≙ 0 mA) to "12" (≙ 20 mA). You can find the correct current values in the diagram on the next page.
11. Switch off the pH simulator (3).



4.3.3 Allocating the current/pH value

The following diagram shows how the correct current values on the transmitter's actual value output are allocated to the pH values set on the pH simulator, for the measuring range 2 to 12 pH ≙ 0 to 20 mA.



4 Operation

4.4 Testing the input of a redox transmitter

4.4.1 Transmitter settings

The display of the transmitter must be set to "mV". In the case of customer-specific settings, the operator/user has to perform the calculation themselves.

4.4.2 Settings and steps for operating the simulator

1. Test the battery of the simulator and carry out a visual inspection of the connecting cable (coaxial cable).
2. Connect the simulator to the transmitter using the correct coaxial cable.
3. Switch on the simulator.
4. Set the simulator's output resistance to "Direkt" (1).
5. Turn the pH selection switch to "7".
   The redox transmitter must display 0.00 mV ±5 mV. If necessary, correct the display using the zero point adjustment.
6. Turn the pH selection switch to "0" (3).
   The redox transmitter must display 414 mV ±0.05 mV
7. Set the simulator's output resistance to "1000 MΩ".
   The displayed value is allowed to change by a maximum of ±5 digits, and the output current by a maximum of 0.5 %.
8. Switch off the pH simulator (2).



4.5 Calibrating redox transmitters and checking connected components

In principle, the process used for checking a redox transmitter is similar to the process used for checking a pH transmitter – as described on page 10.

Depending on the measuring span of the redox transmitter to be calibrated, set values between 7 pH and 0 pH on the simulator's pH selection switch. Please refer to the redox potential table below for selecting the correct mV value.

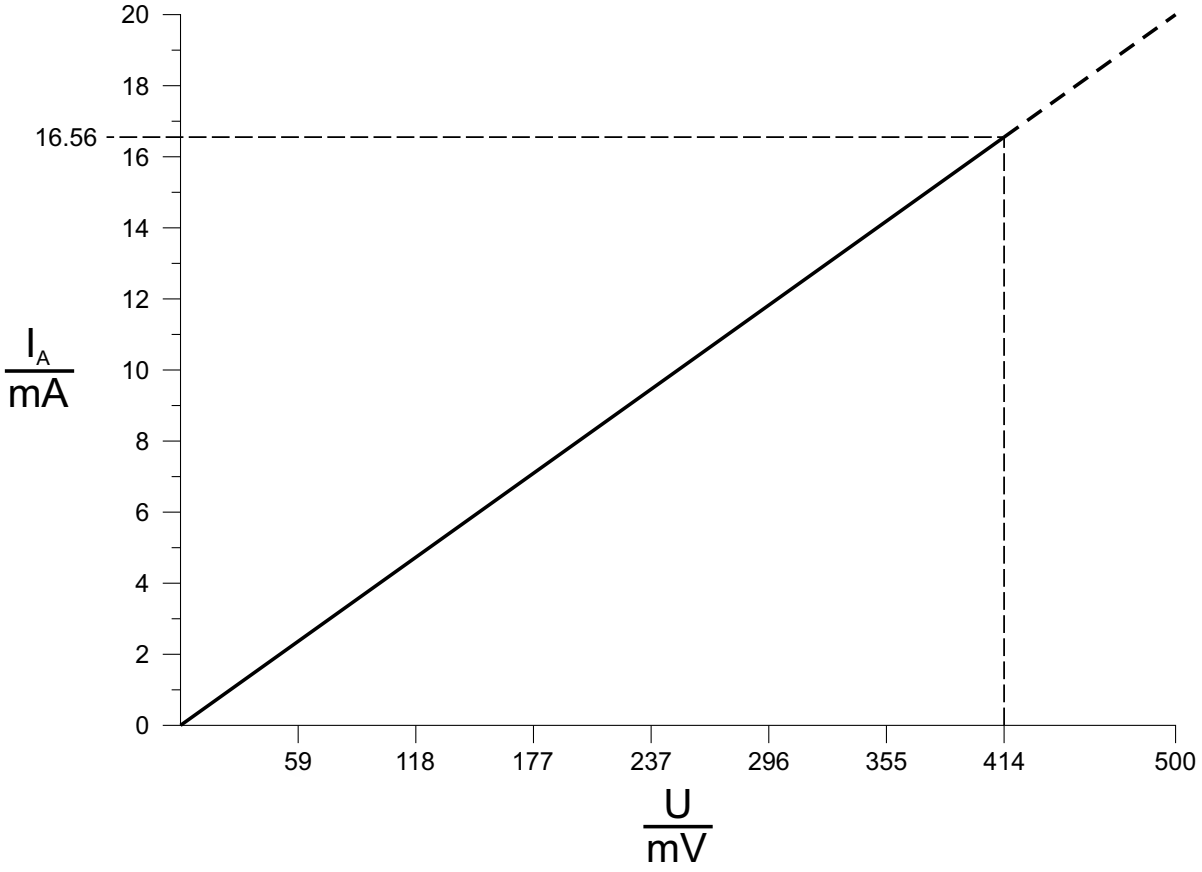
Example:
The measuring span of the redox transmitter is 0 to 100 mV.
Zero point adjustment in the case of switch position 7 pH = 0.00 mV ±2 mV.

Redox potential table

Switch position pH	Potential ±1 %
0	+414 mV
1	+355 mV
2	+296 mV
3	+237 mV
4	+177 mV
5	+118 mV
6	+59 mV
7	0 mV
8	-59 mV
9	-118 mV
10	-177 mV
11	-237 mV
12	-296 mV
13	-355 mV
14	-414 mV

4.5.1 Allocating the current value/redox potential

The following table shows how the correct current values on the transmitter's actual value output are allocated to the simulated redox potential on the simulator using the set pH values for the measuring range 0 to 500 mV ≙ 0 to 20 mA (zero point at 0 mV).



4.6 Testing switch and controller outputs

Once you have calibrated the transmitter, you can test the functionality of the switch and controller outputs. To do so, read the corresponding chapter in the operating manual for the transmitter.

5.1 Replacing used batteries

To replace a used battery, proceed as follows:

1. Remove the 4 screws from the back cover of the device.
2. Pull the two housing parts apart.
3. Replace the used batteries.
4. Put the two housing parts back together again.
5. Screw the 4 screws back into the back cover of the device.

6 Technical data

Simulation range	0 to 14 pH in increments of 1 pH or redox potential +414 mV to -414 mV in increments of 59 mV
Accuracy	±1 % of the set pH value
Reference temperature	25 °C
Output resistance	Depending on the switch position: 1 kΩ or 1000 MΩ (for testing pH connecting cables)
Voltage supply	ANSI 1604D PP3 (9-V block battery) included in scope of delivery
Battery test	Integrated, push-button with LED display
Connection	BNC socket and socket for reference electrode
Admissible ambient temperature	0 to 50 °C
Housing	Sheet steel, powder-coated
Dimensions	130.5 × 73 × 59 mm (H x W x D)



产品组别 Product group: 202711 部件名称 Component Name	产品中有害物质的名称及含量 China EEP Hazardous Substances Information					
	铅 （Pb）	汞 （Hg）	镉 （Cd）	六价铬 （Cr(VI)）	多溴联苯 （PBB）	多溴二苯醚 （PBDE）
外壳 Housing (Gehäuse)	○	○	○	○	○	○
过程连接 Process connection (Prozessanschluss)	X	○	○	○	○	○
螺母 Nuts (Mutter)	X	○	○	○	○	○
螺栓 Screw (Schraube)	○	○	○	○	○	○

本表格依据SJ/T 11364的规定编制。
This table is prepared in accordance with the provisions SJ/T 11364.
○：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。
Indicate the hazardous substances in all homogeneous materials' for the part is below the limit of the GB/T 26572.

×：表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。
Indicate the hazardous substances in at least one homogeneous materials' of the part is exceeded the limit of the GB/T 26572.

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