

**JUMO GmbH & Co. KG**  
 Delivery address: Mackenrodtstraße 14,  
 36039 Fulda, Germany  
 Postal address: 36035 Fulda, Germany  
 Phone: +49 661 6003-0  
 Fax: +49 661 6003-607  
 e-mail: mail@jumo.net  
 Internet: www.jumo.net

**JUMO Instrument Co. Ltd.**  
 JUMO House  
 Temple Bank, Riverway  
 Harlow, Essex CM 20 2TT, UK  
 Phone: +44 1279 635533  
 Fax: +44 1279 635262  
 e-mail: sales@jumo.co.uk  
 Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
 8 Technology Boulevard  
 Canastota, NY 13032, USA  
 Phone: 315-697-JUMO  
 1-800-554-JUMO  
 Fax: 315-697-5867  
 e-mail: info@jumo.us  
 Internet: www.jumo.us



# JUMO ecoTRANS pH 03 Microprocessor transmitter/ switching device for pH/Redox voltage and temperature

with a 2-line LCD  
 for mounting on a 35 mm DIN rail

## Brief description

Depending on the configuration, the instrument measures and regulates the pH-value or the Redox voltage in aqueous solutions. Typical applications are in general water and wastewater management, measurement of drinking water, process water, surface water and sea water, swimming pool and well water, aquariums, etc.

The transmitter has two analog inputs. The primary analog input is for connection of a pH or Redox electrode. PH or Redox sensors with an isolated reference electrode can also be connected, as well as antimony electrodes. The second analog input is for connection of an RTD temperature probe Pt100 or Pt1000 for temperature compensation.

There are up to two analog outputs and a SPDT relay (changeover contact) available. The analog outputs are galvanically isolated and assigned to the inputs. Either the primary value (pH-value or Redox voltage) or the temperature can be assigned to the relay contact.

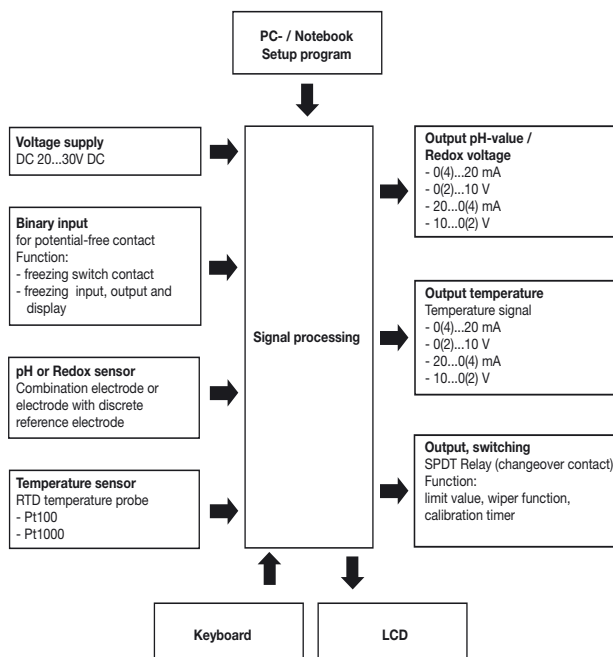
The devices can be operated and configured using the front face buttons and the integrated LCD, or the configuration can also be done very conveniently from a computer using the optional cable and setup program. It is possible to save and print the configuration data from the setup program, thus simplifying plant documentation and allowing for easy downloading of the configuration file to multiple units.

The devices are supplied with a calibration certificate in which the device data and calibration data are documented.



Type 202723/000-...

## Block structure



## Special features

- Can be changed over from pH to mV / ORP (Redox voltage)
- Simple connection of the sensors with screw terminals
- Asymmetric and symmetric connection of the pH-sensors
- 2 galvanically isolated analog outputs 0(4) ... 20mA / 0(2) ... 10V freely configurable as actual value output for pH, Redox or temperature
- Switching output: SPDT relay (changeover contact)
- Monitoring of the medium temperature is possible
- Simple, guided calibration procedure
- 3-way isolation (input, output and supply voltage are galvanically isolated from one another)
- For mounting on a DIN rail
- Calibration timer
- Delivery including calibration certificate

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## Operation

The JUMO ecoTRANS pH 03 can be operated either with the keys of the instrument and the LCD or with the optional setup program via a PC / laptop.

### pH measurement

It is possible to connect both, pH combination electrodes as well as glass electrodes with a separate reference electrode. There are two possible connection types:

- asymmetric high-resistance (the common variant)
- symmetric high-resistance

The symmetric connection can facilitate a more stable measurement in electrically disturbed media (e.g. from insulation problems of electrical operating equipment, pumps etc.).

The temperature compensation of the pH-value is achieved through the automatic measurement of the temperature over the second input or by manually inputting the value.

### Redox measurement

It is possible to connect both - Redox combination electrodes as well as metal electrodes with a separate reference electrode. The display can be either in mV or freely scaled.

## Calibration

### pH-value measurement

- Single-point calibration
- Two-point calibration

### Redox measurement

- Single-point calibration with mV display
- Two-point calibration with display in % (free-scale)

### Calibration timer

The calibration timer indicates when a user-defined routine calibration interval has been reached. The number of days after the timer alarm is triggered is adjustable (plant specification or specification of owner-operator).

## Binary input

The following functions can be invoked by means of the binary input:

- Freezing of switch contact  
 Upon activation of this function, the switch contact remains in its current switch position.
- Freezing the inputs, outputs and display.  
 Upon activation of this function, the momentary values are retained.
- Freezing of switch contact and actual value outputs  
 Upon activation of this function, the actual value outputs retain their momentary values and the switch contact retains its momentary switch position.

Application:

Avoiding uncontrolled reaction of the outputs e.g. in case of cleaning work at the sensor. If the corresponding connecting terminals are bridged by a potential-free contact (e.g. a relay), the pre-defined function is activated.

## Functions of the outputs of the JUMO ecoTRANS pH 03

### Analog outputs

- One analog actual value output each for pH- (Redox-) value and temperature.
- The analog output signals are freely scalable (measurement range starting and end value)

In case of the measurement range being overshoot or undershoot, the analog outputs can take on the following states:

"Low" corresponds to 0 mA or 4 mA or 3.4 mA / 0 V or 1.4 V or 2 V depending on the selected output signal type.  
 "High" corresponds to 20 mA or 22 mA / 10 V or 10.7 V depending on the selected output signal type.

These states can be recognized by downstream devices (e.g. a PLC) as "irregular" and used for raising alarms.

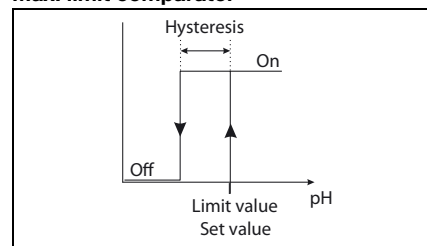
- Simulation of the actual value output:  
 The analog actual value outputs can be freely set in "Manual" mode.  
 Application: Dry commissioning of the plant (without electrode); Troubleshooting; Service.

### Switch output

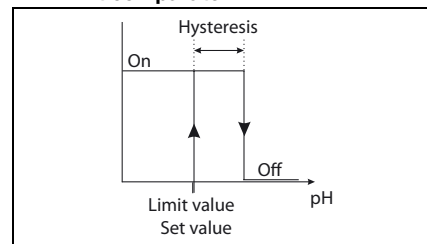
The switch output can be used for monitoring the pH- (Redox-) value or the temperature. The following functions can be assigned to the relay output:

- Process alarms (high or low limits) with programmable hysteresis.

#### Max. limit comparator



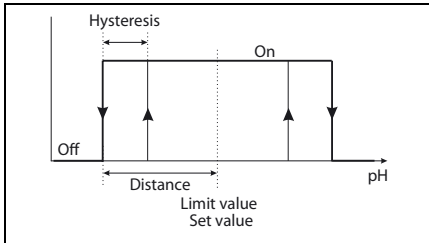
#### Min. limit comparator



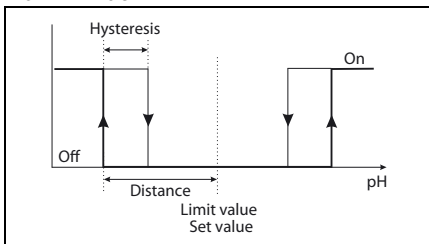


- Deviation band alarm high or low.

#### Alarm window 1

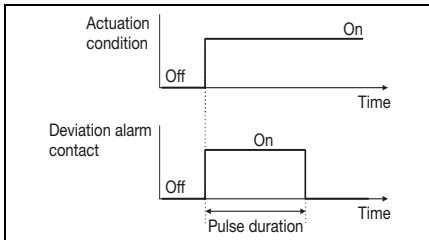


#### Alarm window 2

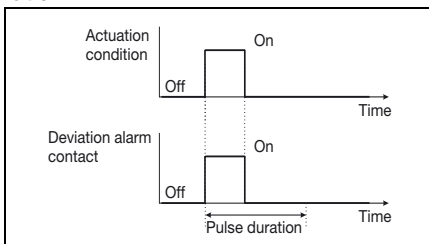


- Deviation alarm (wiper function), output closes briefly when the switching point is reached and then opens again.

#### Deviation alarm contact triggering condition longer than pulse duration



#### Deviation alarm contact triggering condition shorter than pulse duration



- Actuation and dropping delay programmable.
- Window limit comparator.
- Switching outputs can be inverted.
- The behavior of the measurement range overshooting or undershooting is programmable (actuation/ dropping).
- Signaling "elapsed calibration timer".
- Signaling sensor error, out of range.

## Technical data

### Inputs

#### Analog input 1 (pH / Redox)

- Combination electrode
- Glass or metal electrodes with separate reference electrode
- Antimony electrode

#### Measurement ranges pH / Redox

-2 ... 16 pH or  
 -1500 ... +1500 mV

#### Accuracy pH / Redox

± 1% of the measurement range

#### Analog input 2 (Temperature)

- Resistance thermometer  
 Pt100 or Pt1000

The RTD temperature sensor can be connected in a 2-wire circuit.

It is possible to toggle the display of the readings between °C / °F.

#### Temperature offset analog input 2

An offset correction of the actual value can be carried out in the range from -20 ... +20°C.

#### Temperature, measurement range

-10 ... +150°C or 14 ... 302°F

#### Characteristic curve deviation, temperature

in case of Pt100 / Pt1000: ≤ 1.5 K of the measurement range

### Outputs

#### Two analog outputs:

freely configurable:

0(2) ... 10V  $R_{Load} \geq 2 \text{ k}\Omega$  or  
 10 ... (2)0V  $R_{Load} \geq 2 \text{ k}\Omega$  or  
 0(4) ... 20mA  $R_{Load} \leq 400 \Omega$  or  
 20 ... (4)0mA  $R_{Load} \leq 400 \Omega$

galvanically isolated to the inputs:

$\Delta U \leq 30V \text{ AC}$  or  $\Delta U \leq 50V \text{ DC}$   
 Scaling range minimum 10% of the measurement range

#### Characteristic curve deviation of the output signal

≤ 0.075% of the measurement range

#### Relay output:

SPDT contact

Breaking capacity: 8 A/250V AC or 8 A/24V DC with resistive loads.

Contact life: > 100,000 switching operations at rated load.

## General characteristic values

#### A/D converter

Resolution 14Bit

#### Sampling time

500ms = 2 measurements / second

#### Ambient temperature influence

≤ 0.6% / 10 K

#### Measurement circuit monitoring

Input 1 (primary value): out-of-range

Input 2 (temperature): out-of-range, sensor short-circuit, sensor rupture.

The outputs take on a defined (configurable) state in case of a fault.

#### Data backup

EEPROM

#### Voltage supply

20 ... 30V DC, residual ripple <5%,

power drawn ≤ 4 W,

with polarity reversal protection.

Operation only at SELV- or PELV circuits.

#### Electrical connections

Screw terminals up to 2.5 mm<sup>2</sup>

#### Operating temperature range

0 ... 50°C

#### Functional temperature range

-10 ... +60°C

#### Permissible storage temperature

-20 ... +75°C

#### Climatic requirements

rel. humidity ≤ 75% without condensation

#### Protection rating (according to EN 60 529)

IP 20

#### Electrical safety

in accordance with EN 61 010

air gaps and leakage paths for

- overvoltage category II

- degree of fouling 2

#### Electromagnetic compatibility

according to EN 61 326

Immunity to interference: Industrial

requirement

class B

#### Housing

DIN rail mounting made of PC (Polycarbonate)

#### Assembly

on DIN rail 35mm x 7.5mm according to

DIN EN 60 715

#### Installation position

as desired

#### Weight

approx. 150g

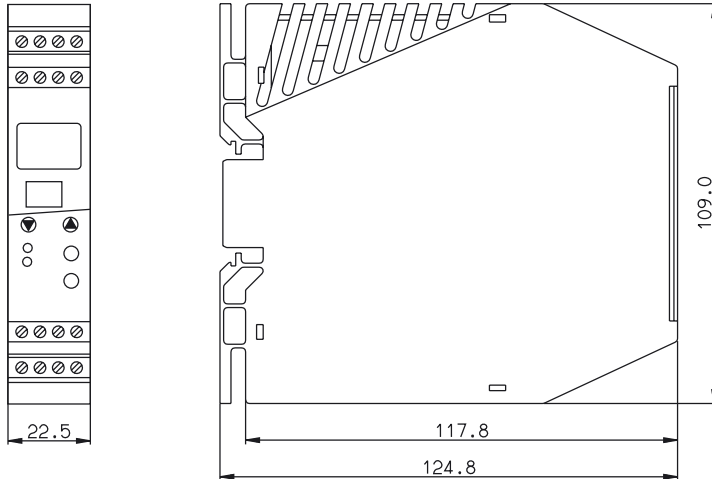
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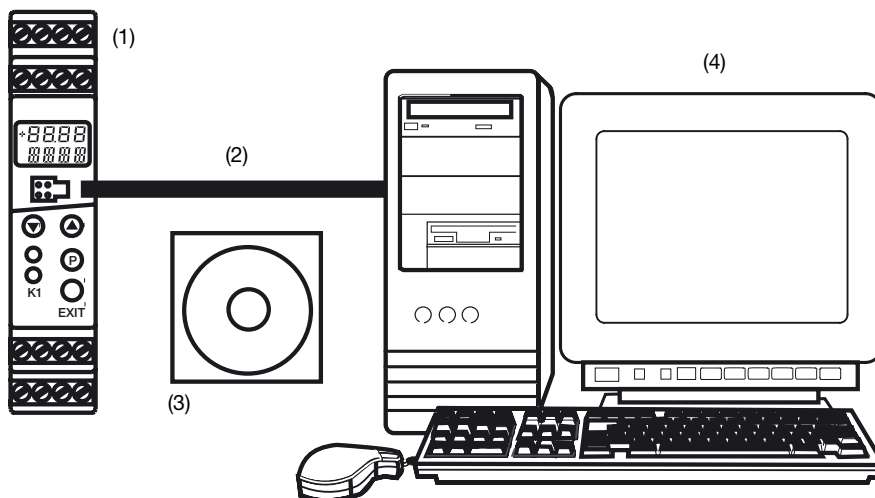
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## Dimensions



## Operation via Setup interface



- (1) JUMO ecoTRANS pH 03
- (2) PC interface cable (optional accessories)
- (3) JUMO PC Setup Software, multi-lingual D / GB / F (optional accessories)
- (4) PC or Notebook with USB port  
 Operating system: Windows 2000<sup>®</sup>, Windows XP<sup>®</sup> or Windows NT<sup>®</sup> from 4.0 onwards

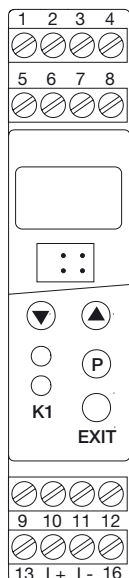
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## Electrical connections



Measurement inputs	Termination assignment	Symbol
pH combination electrode or Redox combination electrode	16 13	Reference system Glass electrode / metal electrode (inner conductor)
pH glass electrode or metal electrode (with separate reference electrode)	13	Glass / metal electrode (inner conductor)
Reference electrode (with separate electrodes)	16	Reference system
Liquid potential (connect only with symmetric connection)	12	
Reference thermometer in two-wire circuit	9 10	
Binary input	11 12	

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Outputs	Termination assignment		Symbol
I analog actual value output pH / Redox (galvanically isolated)	5 6	+ -	
II analog actual value output temperature (galvanically separate)	7 8	+ -	
III Relay	1 3 4	common break (n.c.) make (n.o.)	

Voltage supply	Termination assignment		Symbol
Voltage supply (with polarity reversal protection)		L- L+	

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**Order details:** **JUMO ecoTRANS pH 03**  
**Microprocessor transmitter/ switching device**  
**for pH-value/ Redox voltage and temperature**

**(1) Basic type**

	202723	JUMO ecoTRANS pH 03 Microprocessor transmitter/ switching device for pH-value/ Redox-voltage and temperature
x	888	<b>(2) Output I (pH-value/ Redox-voltage)</b> Analog actual value output, freely programmable
x	000	<b>(3) Output II (temperature)</b> None
o	888	Analog actual value output, freely programmable
x	000	<b>(4) Output III (switching)</b> None
o	101	1x relay, toggle contact
x	000	<b>(5) Extra codes</b> none
o	024	With PC-Setup software

x = standard  
 o 0 optional  
 - = not possible

	(1)	/	(2)	-	(3)	-	(4)	/	(5)
<b>Order code</b>	<input type="text"/>	/	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	/	<input type="text"/>
<b>Ordering example</b>	202723	/	888	-	888	-	101	/	024

**Stock versions** (shipping in 3 working days of receipt of order)

Type	Description	Part No.
202723/888-000-000/000	One analog output for pH / Redox, without relay	20/00508665
202723/888-888-101/000	Two analog outputs, one relay output	20/00508663
202723/888-888-101/024	Two analog outputs, one relay output, with Setup software	20/00508664

**Accessories** (shipping in 3 working days of receipt of order)

Designation	Part No.
PC-Setup software for JUMO ecoTRANS pH 03	20/00513893
PC interface cable with USB / TTL-transducer and two adapters (USB connecting cable)	70/00456352
pH simulator (see Data Sheet 20.1090)	20/00300477
Connecting cable for pH-simulator, 1.5 m, BNC-plug and stripped cable ends	20/00513412
Switching mode power supply, Type PS5R-A24 for DIN rail assembly; Input voltage 100 ... 240V AC / 50 ... 60Hz, Output voltage 24V DC / 0.3A	20/00374661

For compatible pH or Redox sensors, see Data Sheets 20.1005, 20.1020 and 20.1030.