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# JUMO tecLine HD pH/Rd

## pH and redox combination electrodes, digital with reusable JUMO digiLine electronics or analog

**Series 201021 — pH electrodes**
**Series 201026 — redox electrodes**

## Brief description

Premium matierals and components make JUMO tecLine HD electrodes particularly suitable for the most demanding applications in process and industrial measurement technology. They are designed as combination electrodes (glass or metal electrodes and reference electrodes in one shaft). Depending on the model, a Pt1000 temperature probe can be optionally integrated.

An optimised PTFE ring diaphragm enables a quick response time while at the same time being largely impervious to greater pollution loads or oily/fatty process water and wastewater. Alternatively, a variant with a pinhole diaphragm is available as the optimal solution for processes with a high solids content (e.g. wastewater with sand particles or media that is subject to precipitation and/or crystallization reactions).

JUMO tecLine HD electrodes are state-of-the-art for modern pH and redox electrodes. Each top-quality electrode is individually tested and supplied with a calibration certificate. Modern production facilities ensure consistent characteristics.

All standard electrodes are manufactured using physiologically safe and FDA-listed materials. They feature lead-free shaft glass and therefore comply with the RoHS-2 directive.




**Type 201021/10...**

## Typical areas of application

**Chemical industry:**
Process water, high process pressures up to 13 bar, broad temperature range up to max. 135 °C, and wide pH range from pH 0 to pH 14; suspensions, coatings and media with solid particles.

**Industrial wastewater engineering:**
Process wastewater, wastewater with highly contaminating media (presence of oil or electrode poisons)

**Galvanic:**
Process water, media with electrode poisons (metal ions, complexing agents)

**Power plants and waste incineration plants (flue gas scrubbing):**
Wide pH range of pH 0 to pH 14, presence of fine ash particles

**Sugar industry:**
Consistent high temperature, presence of electrode poisons (e.g. sulfides)

## The advantages of electrodes with combined JUMO digiLine electronics

- Fail-safe digital data transfer for optimal process monitoring
- Modular system: for single measuring points and for establishing electrode networks
- Plug and Play function when connected to transmitters from the JUMO AQUIS touch series. This facilitates the replacement of electrodes or the brief exchange of electrodes for calibration purposes.
- Also suitable for use with the JUMO mTRON T automation system
- Version with 4 to 20 mA output for integration into existing systems
- digiLine electronics can continue to be used even when the electrode becomes worn
- Easy and secure configuration in the lab using USB interface and JUMO DSM tool (software)

## Special features

- Low-maintenance thanks to dirt-repellant PTFE ring diaphragm with polymerized highly elastic gel
- Alternatively with a pinhole diaphragm for suspensions, coatings and media with solid particles
- Designed for use at a continually high process temperature of up to max. 135 °C[1]
- For process pressures of up to 13 bar
- Pt1000 temperature probe can be integrated as an option
- With salt reserve to increase service life in media with low conductivity
- Long service life with presence of electrode poisons thanks to double-chamber version
- Redox versions with platinum or gold tip up to ±1500 mV
- Supplied with quality certificate

[1] Electrodes with a PTFE diaphragm: 135 °C
Electrodes with a pinhole diaphragm: 110 °C

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# Technical data

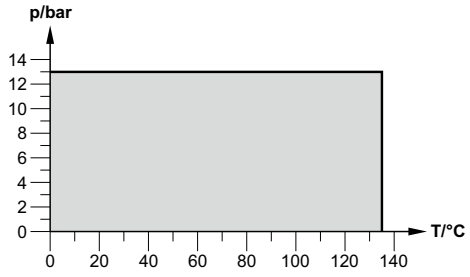
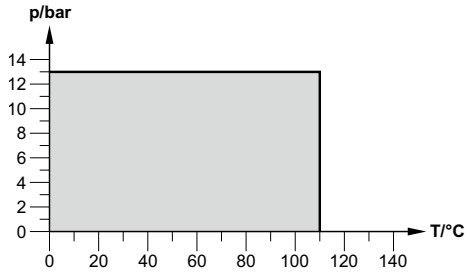
## Specifications

| | |
|---|---|
| Measurands | pH value or redox potential<br>Temperature (optional) |
| Measuring ranges | |
| pH | 0 to 14 pH |
| Redox potential | ±1500 mV |
| Temperature | 0 to max. 135 °C on versions with a PTFE diaphragm<br>0 to max. 110 °C on versions with a pinhole diaphragm |

## Environmental influences

| | |
|---|---|
| Storage temperature | -5 to +30 °C |
| Protection type | IP66 and IP 67 |

## Process conditions

| | Versions with a PTFE diaphragm[a] | Versions with a pinhole diaphragm |
|---|---|---|
| Process temperature | 0 to +135 °C | 0 to +110 °C |
| Process pressure | 13 bar | |
| Pressure-temperature diagram |  |  |
| Recommended minimum conductivity | 50 µS/cm | 500 µS/cm |

[a] Pressure/temperature diagrams for the electrode in conjunction with electrode holders ⇨page 9.

## Structure

| | |
|---|---|
| Process connection | Pg13.5 |
| Temperature sensor | Pt1000 (class A) |
| Plug heads | N screw head (S8), Pg13.5 thread<br>VarioPin (VP) plug head, Pg13.5 thread |
| Reference system | Pressure-compensated **double-chamber system**, silver/silver chloride (Ag/AgCl) cartridge-style conduction system, highly elastic gel (AgCl-free) |
| Diaphragm | |
| Exterior | PTFE ring diaphragm or pinhole diaphragm |
| Interior | Ceramic diaphragm[a] |
| Glass membrane | Spherical |
| Membrane glass | High-temperature (HT) glass, high alkaliresistant |
| Materials | See illustrations in chapter "Dimensions", Page 4 |

[a] In double chamber

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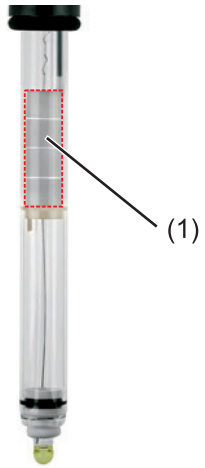
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## Special design features

### Salt reserve




The electrode is equipped as standard with a salt reserve in the form of four salt rings (see illustration).[a]

This makes it particularly well suited for use in low-ion media or at high flow rates.

The salt reserve helps to improve the service life of the electrode.

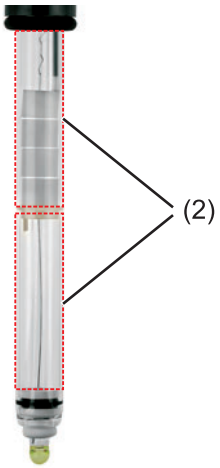
The rings are not a manufacturing defect (crystallization).

The „usage status“ of the electrode can be assessed by the reduction of the salt rings.

(1) Salt reserve

[a] KCl powder as a salt reserve on versions with a pinhole diaphragm

### Double chamber




If electrode poisons such as sulfides are present in the measurement medium, the extended diffusion path (due to the two consecutive chambers – double chamber system) and the double diaphragm separation prevent electrode poisoning.

(2) Double chamber

### JUMO digiLine electronics




The JUMO digiLine electronics are delivered screwed firmly to the combination electrode. They can continue to be used even when the sensor becomes worn.

The factory calibration and further sensor data are stored in the head. Additional information is available in data sheet 202705 and in system data sheet 203501.

**Extra code /960:** JUMO digiLine interface, bus-compatible (the transmission of measured values, calibration and configuration are all digital).

**Extra code /961:** with analog 4 to 20 mA output for integration into an existing infrastructure (the transmission of measured values is analog, calibration and configuration are performed via a digital interface). With additional digital input (e.g. hold function).

(3) M12 plug connector
(4) Screw connection
(5) Combination electrode

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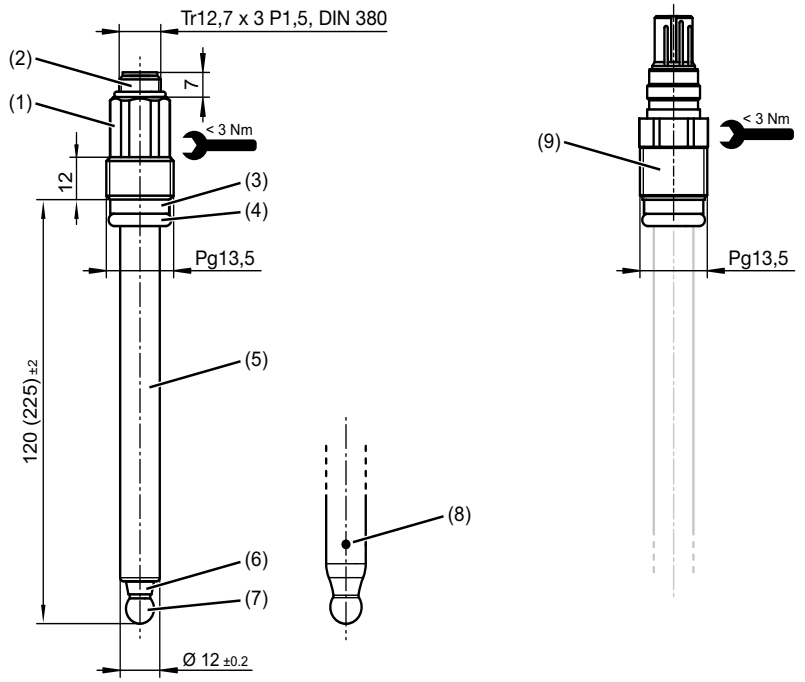
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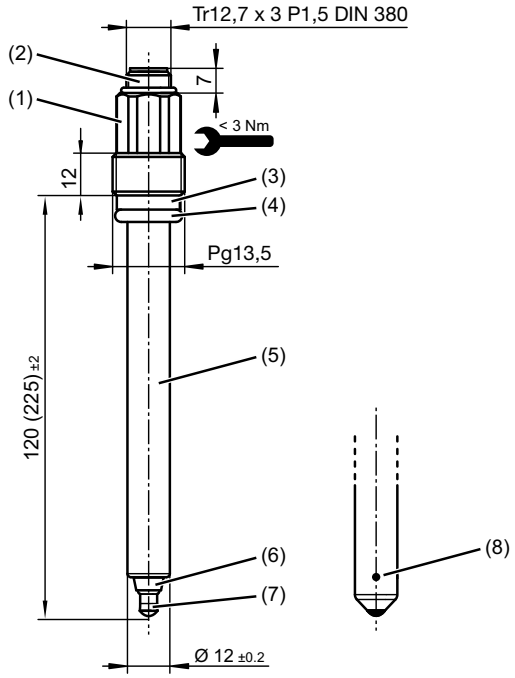
# Dimensions

## pH combination electrode type 201021/10...




(1) N screw head (S8) Pg13.5 (PPS), max. tightening torque 3 Nm
(2) Thread Tr12.7 × 3 P1.5
(3) Ring (PEEK)
(4) O-ring 10 × 3.5 (FPM70)
(5) Electrode shaft (glass DIN 19263)
(6) Ring diaphragm (PTFE)
(7) Spherical membrane
(8) Pinhole diaphragm
(9) VarioPin (VP) plug head connection variant with rotatable union nut Pg13.5 (PBT), max. tightening torque 3 Nm

## Redox combination electrode type 201026/10...




(1) N screw head (S8) Pg13.5 (PPS), max. tightening torque 3 Nm
(2) Thread Tr12.7 × 3 P1.5
(3) Ring (PEEK)
(4) O-ring 10 × 3.5 (FPM70)
(5) Electrode shaft (glass DIN 19263)
(6) Ring diaphragm (PTFE)
(7) Platinum or gold tip
(8) Pinhole diaphragm

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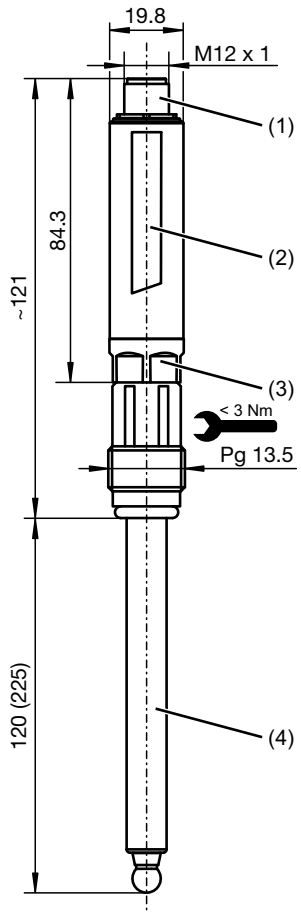
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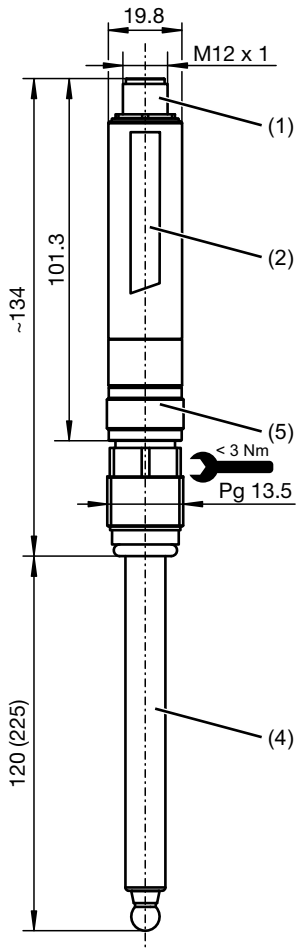


## Combination electrode with reusable JUMO digiLine electronics

JUMO digiLine electronics with N connection




JUMO digiLine electronics with VarioPin connection




(1) M12 plug connector, 5 or 8-pole (see order details)

(2) JUMO digiLine electronics

(3) N connection (screw head S8) for JUMO digiLine electronics

(4) pH or redox electrode with N connection

(5) VarioPin connection[a] (plug head) for JUMO digiLine electronics

[a] Only for type 201021/...

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# Order details type 201021

| | | |
|---|---|---|
| | **(1)** | **Basic type** |
| 201021/10 | | JUMO tecLine HD pH — pH combination electrode in glass shaft version, solid gel, double chamber, salt reserve, 13 bar |
| | **(2)** | **Active pH component** |
| 12 | | HT glass |
| | **(3)** | **Diaphragm** |
| 04 | | PTFE ring |
| 11 | | Pinhole diaphragm |
| | **(4)** | **Electrical connection** |
| 18 | | VarioPin (VP) plug head Pg13.5 |
| 82 | | N screw head (S8) Pg13.5, material PPS |
| | **(5)** | **Insertion length** |
| 120 | | 120 mm (standard) |
| 225 | | 225 mm |
| | **(6)** | **Extra code** |
| 000 | | none |
| 841 | | Integrated Pt1000 |
| 960 | | With JUMO digiLine electronics, 5-pin M12 plug connector (digital interface output) |
| 961 | | With JUMO digiLine electronics, 8-pin M 12 plug connector (4 to 20 mA output and digital programming interface) |

| | (1) | | (2) | | (3) | | (4) | | (5) | | (6) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Order code** | | - | | - | | - | | - | | / | |
| **Order example** | 201021/10 | - | 12 | - | 04 | - | 82 | - | 120 | / | 000 |

**Important information:**

The order code is not modular. When placing orders, if possible please select the items listed under **"Stock versions"** or **"Production versions"**.
**We must check the technical feasibility of and approve freely chosen combinations of individual code parts.**

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# Order details type 201026

| | | |
|---|---|---|
| | **(1)** | **Basic type** |
| 201026/10 | | JUMO tecLINE HD Rd — Rd combination electrode in glass shaft version,<br>Solid gel, double chamber, salt reserve, 13 bar |
| | **(2)** | **Active pH component** |
| 22 | | Pt (platinum) tip |
| 32 | | Au (gold) tip |
| | **(3)** | **Diaphragm** |
| 04 | | PTFE ring |
| 11 | | Pinhole diaphragm |
| | **(4)** | **Electrical connection** |
| 82 | | N screw head (S8) Pg13.5, material PPS |
| | **(5)** | **Insertion length** |
| 120 | | 120 mm (standard) |
| 225 | | 225 mm |
| | **(6)** | **Extra code** |
| 000 | | none |
| 960 | | With JUMO digiLine electronics, 5-pin M12 plug connector (digital interface output) |
| 961 | | With JUMO digiLine electronics, 8-pin M 12 plug connector (4 to 20 mA output and digital programming interface) |

| | **(1)** | | **(2)** | | **(3)** | | **(4)** | | **(5)** | | **(6)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Order code** | | - | | - | | - | | - | | / | |
| **Order example** | 201026/10 | - | 22 | - | 04 | - | 82 | - | 120 | / | 000 |

**Important information:**

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**We must check the technical feasibility of and approve freely chosen combinations of individual code parts.**

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# Scope of delivery

| |
|---|
| 1 electrode in the ordered version |
| 1 quality certificate for the electrode |
| 1 operating manual 202900.0 for electrodes |

For extra codes /960 and /961 (JUMO digiLine electronics) also:

| |
|---|
| Combination electrode screwed firmly, sealed and pre-calibrated to the JUMO digiLine electronics |
| 1 calibration certificate for JUMO digiLine electronics |
| 1 JUMO digiLine installation instructions |

# Stock versions

(Delivery within 3 working days after receipt of order)

| **Type** | **Part no.** |
|---|---|
| 201021/10-12-04-82-120/000 (HT glass, PTFE diaphragm, N screw head, 120 mm) | 00621059 |
| 201021/10-12-04-18-120/841 (HT glass, PTFE diaphragm, VarioPin plug head, 120 mm, Pt1000) | 00621070 |
| 201021/10-12-11-18-120/841 (HT glass, pinhole diaphragm, VarioPin plug head, 120 mm, Pt1000) | 00648964 |
| 201026/10-22-04-82-120/000 (platinum tip, PTFE diaphragm, N screw head, 120 mm) | 00625340 |

# Accessories

Cables

| **Item** | **Part no.** |
|---|---|
| Cable for sensors with N screw head (S8) Pg13.5: 202990/02-92-x-13<br>Cable for sensors with VarioPin (VP) plug head: 202990/11-95-x-11 | See data sheet 202990 |

Solutions

| **Item** | **Part no.** |
|---|---|
| pH buffer solutions<br>Redox reference solution<br>Electrode cleanser | See data sheet 202950 |

JUMO digiLine electronics (for retrofitting a combination electrode with digiLine functionality or as a replacement)

| **Item** | **Part no.** |
|---|---|
| 202705/10-90-530/000 (pH, VarioPin plug head, digital interface output) | 00652273 |
| 202705/10-90-888/000 (pH, VarioPin plug head, 4 to 20 mA output) | 00652277 |
| 202705/10-86-530/000 (pH, N screw head, digital interface output) | 00652283 |
| 202705/10-86-888/000 (pH, N screw head, 4 to 20 mA output) | 00652284 |
| 202705/20-90-530/000 (redox, VarioPin plug head, digital interface output) | 00652285 |
| 202705/20-90-888/000 (redox, VarioPin plug head, 4 to 20 mA output) | 00652286 |

more JUMO digiLine system components

| **Item** | **Part no.** |
|---|---|
| JUMO DSM software (digital sensor management), base version (measuring, sensor information, configuration, calibration), for free download from the internet (product page JUMO tecLine HD ⇨Software) | |
| JUMO DSM software (digital sensor management), activation of the „data management“ module | 00655587 |
| USB-RS485 converter, DC coupling, M12 | 00746250 |
| JUMO digiLine system data sheet 203501 | |

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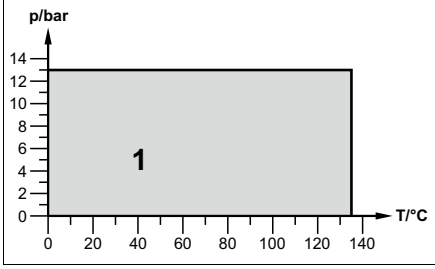
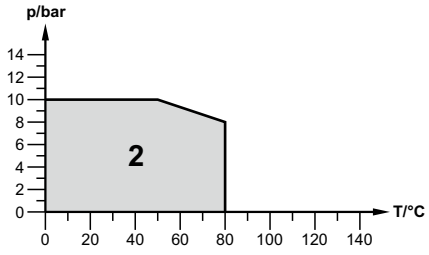
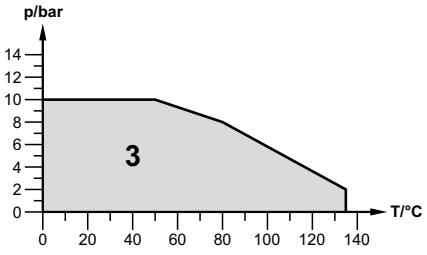
## Electrode holder

Electrode holders can be used to install **electrodes with a PTFE membrane** and a length of **120 mm** (types 20102x/xx-xx-**04**-xx-**120**/xxx) in tanks or pipelines with 3/4-14 NPT threaded connections.

| **Item** | | **Part no.** |
|---|---|---|
| Stainless steel electrode holder |  | 00674618 |
| PEEK electrode holder | | 00674617 |
| PPS electrode holder | | 00674620 |
| PP electrode holder | | 00674619 |
| PVDF electrode holder (Fig.) | | 00673945 |

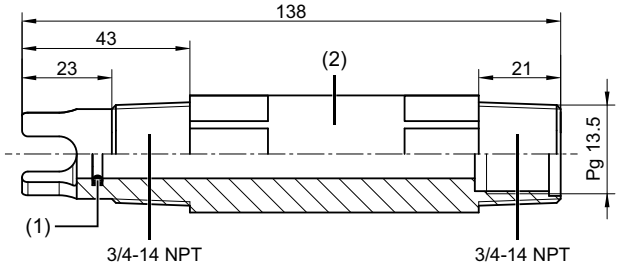
## Process conditions

When using the electrodes in conjunction with the electrode holders, the following pressure/temperature limits must be observed:

| Electrode holders made of stainless steel, PEEK, PPS | Electrode holder made of PP | Electrode holder made of PVDF |
|---|---|---|
| 0 °C (13 bar); 135 °C (13 bar) | 0 °C (10 bar); 50 °C (10 bar); 80 °C (8 bar) | 0 °C (10 bar); 50 °C (10 bar); 80 °C (8 bar); 135 °C (2 bar) |
|  |  |  |



## Dimensions




(1) O-ring (material: FKM)

(2) Electrode holder (material: stainless steel or PEEK or PPS or PP or PVDF)