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# pH and Redox Combination Electrodes

## JUMO tecLine pH

## JUMO tecLine Rd

with glass or plastic shaft

### 201020 Series - pH electrodes

### 201025 Series - redox electrodes

#### Brief description

JUMO tecLine electrodes are high-quality sensors for professional application in process and industrial measurement technology. The use of materials and components that meet the highest standards is the distinguishing feature of these electrodes. They are designed as combined electrodes (the glass or metal electrode and the reference electrode are combined in a single shaft). Depending on the type, a temperature probe can additionally be integrated (option). Suitable models are available for the most diverse requirements:

#### JUMO tecLine

- for industrial and municipal water and wastewater engineering
- for measurement in suspensions and varnishes
- for measurement in low-ion media
- for high-alkaline / high-temperature and sterilization processes
- for media containing fluorides and for low-temperature applications
- PRO version for the toughest operating conditions

JUMO tecLine sensors incorporate state-of-the-art technology for modern pH or redox electrodes. Each electrode is a quality product and individually tested. Modern production facilities ensure constant characteristics.

#### General notes on the construction of the JUMO tecLine series

All standard electrodes have been manufactured from physiologically safe, FDA-listed materials.



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### Active elements of the pH or redox electrode

Membrane glass or active component	Designation	pH or redox range	Temperature range	Typical application
U glass	universal glass	pH 0 – 12 (briefly pH 14)	-5 to +80°C	water and wastewater engineering, process measurement technology, low-ion media
HA glass	high-alkaline glass	pH 0 – 14	-5 to +80°C	for highly alkaline media (above pH 12)
HT glass	high-temperature glass	pH 0 – 14	0 to +135°C	for temperatures above 80°C or with highly alkaline media
DS glass	steam-sterilizable glass	pH 0 – 12	-5 to +80°C briefly up to 130°C (20 min)	biotechnology, pharmaceutical and food technology, sterilization processes
C glass	fluoride-resistant glass	pH 0 – 11	-5 to +50°C	media containing fluoride (hydrofluoric acid) (c(HF) up to 1000 mg/l)
TT glass	low-temperature glass	pH 0 – 12	-30 to +30°C	cooling cycles, low-temperature applications
Platinum tip	redox measurement	+/- 2000 mV	-10 to +135°C	chromate reduction, nitrite oxidation, swimming pool and drinking water disinfection
Gold tip	redox measurement	+/- 2000 mV	-10 to +135°C	cyanide oxidation, water disinfection

### Constructional variations of the reference system (reference electrode)

Only reference electrolytes that are free from silver ions are used for the JUMO tecLine electrodes. A cartridge-style conductive system contains the silver / silver chloride (Ag / AgCl). Various forms of diaphragm are used.

Diaphragm type	Explanation	Possible electrolytes	Typical application / limitations
1 x ceramic diaphragm	high-quality zirconium dioxide diaphragm <sup>1</sup> .	highly viscous KCl gel or liquid KCl	general water or wastewater engineering, industrial processes etc.
2 x ceramic diaphragm or 3 x ceramic diaphragm	as above but, due to increased number, more KCl escapes	highly viscous KCl gel or liquid KCl TT glass: low-temperature gel	for polluted or low-ion media (<100 µS/cm); low-temperature applications
Glass fiber diaphragm	glass fiber bundle instead of ceramic diaphragm for electrodes with plastic shaft	highly viscous KCl gel	general water or wastewater engineering (slightly polluted media)
PTFE ring diaphragm	large-area ring diaphragm	highly viscous KCl gel	only with heavily polluted media or e.g. adherent media containing oil
Annular-gap or perforated diaphragm	open transition between solid electrolyte and medium implemented in annular or point form	polymerized solid electrolyte	suspensions, varnishes, media containing solids, heavily polluted media. Not suitable for very pure drinking water and low-ion media
Ground diaphragm	fixed or movable ground element. open transition between electrolyte and medium	liquid KCl	low-ion media (e.g. pure or high-purity water)
Doka types (2-chamber system)	longer diffusion path and double diaphragm separation prevents electrode poisoning	highly viscous gel KCl/KCl bridge	low-ion media (e.g. pure or high-purity water)
		KCl/KNO <sub>3</sub> bridge	in the presence of electrode poisons, cyanides
		solid electrolyte	in the presence of electrode poisons, sulfides

### Additional pH and redox electrodes can be found in the following data sheets:

Data Sheet 20.1005 JUMO ecoLine pH / Rd

Data Sheet 20.1030 JUMO LabLine or Data Sheet 20.1080 JUMO single sensors

<sup>1</sup> zirconium dioxide diaphragm: high-quality ceramic material of constant porosity. This means optimum diffusion properties.

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# JUMO tecLine pH / Rd with ceramic or glass fiber diaphragm for water and process measurement technology

## Typical applications

- Industrial and municipal as well as general water and wastewater engineering
- Process measurements, electroplating plant, final checks, neutralization plant
- Drinking and well water, boiler feed water
- Mildly polluted wastewater
- 2-chamber system in the presence of electrode poisons (e.g. sulfides, cyanides, etc.)
- Low-temperature applications (-30 to +30°C), e.g. measurement in cooling plant
- Media containing fluoride (hydrofluoric acid) up to 1000mg/l HF
- High-alkaline applications (reduced alkaline error at pH values > pH 12)

## Key features

- High-quality zirconium dioxide diaphragm (glass fiber diaphragm for plastic shaft)
- Cartridge-style conductive system with reference electrolyte (free from silver ions)
- Pressure-resistant versions up to 10 bar (50°C)
- Temperature range: up to -5 to +80°C (+90°C with redox) or -30 to +30°C (with TT version)
- Temperature probes can optionally be integrated
- Optional salt reservoir for extending the operational life in media with low conductivity or in drinking water
- JUMO-HA glass for continuous measurement in the range up to pH 14
- Redox versions with platinum or gold tip up to +/-2000mV

## Extra code

### Salt reservoir, extra code 837



As an option, the electrode can be provided with a salt reservoir in the form of 4 rings of salt (see diagram). This is recommended if the electrode is used in low-ion media or with high flow-through rates.

The salt reservoir serves to increase the operating life of the electrode. The rings are intentional, and not a manufacturing fault (e.g. crystallization).

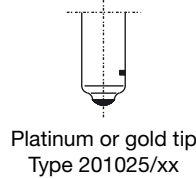
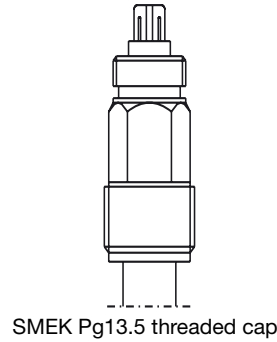
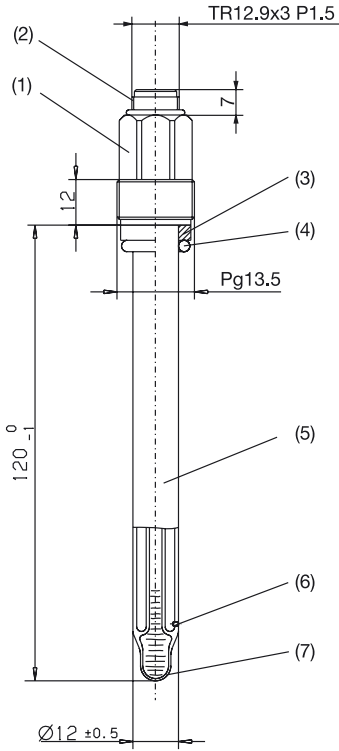
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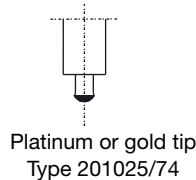
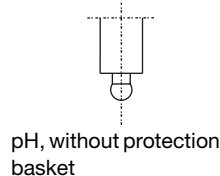
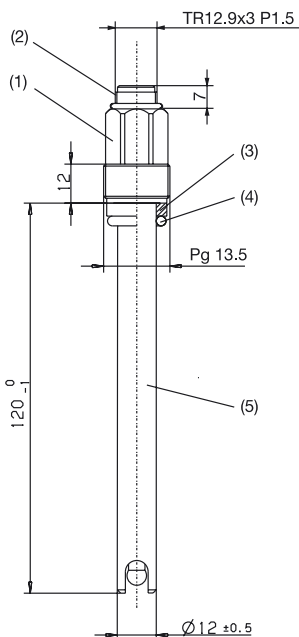


## Dimensions



### Type 20102x/51

- |                             |   |
|-----------------------------|---|
| (1) Pg13.5 threaded cap     | (5) Electrode shaft (glass DIN 19 263)                          |
| (2) TR12.9x 3 P1.5 thread   | (6) 1 to 3 diaphragm(s) (ceramic / zirconium dioxide 1 mm dia.) |
| (3) Ring (PSU)              | (7) Rounded membrane  |
| (4) O-ring 10 x 3.5 (FPM70) |   |



### Type 20102x/74

- |                                   |
|-----------------------------------|
| (1) Pg13.5 threaded cap           |
| (2) TR12.9x 3 P1.5 thread         |
| (3) Ring (PSU)                    |
| (4) O-ring 10 x 3.5 (FPM70)       |
| (5) Electrode shaft (PSU plastic) |

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# JUMO tecLine pH / Rd pH / redox combination electrodes for water and process measurement technology

## Order details

		<b>(1) Basic type</b>	
		201020	pH combination electrode JUMO tecLine pH
		201025	redox combination electrode JUMO tecLine Rd
		<b>(2) Basic type extension</b>	
x	x	51	glass shaft / gel-sealed / cartridge-style conductive system
o	o	72	plastic shaft PEI with protection basket / gel-sealed / glass silk diaphragm / cartridge-style conductive system
o	o	73	PSU plastic shaft, no protection basket / gel-sealed / glass silk diaphragm / cartridge-style conductive system <sup>1</sup>
o	o	74	PSU plastic shaft with protection basket / gel-sealed / glass silk diaphragm / cartridge-style conductive system <sup>1</sup>
		<b>(3) Active component</b>	
x	-	10	U glass / pH 0 – 12 (briefly 14) / -5 to +80°C
o	-	11	C glass / pH 0 – 12 / -5 to +50°C / fluoride-resistant
o	-	13	TT glass / pH 0 – 12 / -30 to +30°C / low-temperature <sup>2</sup>
o	-	17	HA glass / pH 0 – 14 / -5 to +80°C / high-alkaline application
-	x	22	platinum tip / redox range +/-2000 mV / -5 to +90°C
-	o	32	gold tip / redox range +/-2000 mV / -5 to +90°C
		<b>(4) Diaphragm</b>	
o	o	05	1 x glass silk diaphragm <sup>3</sup>
x	x	07	1 x zirconium dioxide diaphragm (special ceramic)
o	o	08	2 x zirconium dioxide diaphragm (special ceramic)
o	o	09	3 x zirconium dioxide diaphragm (special ceramic)
		<b>(5) Connection</b>	
o	-	17	SMEK Pg13.5 threaded cap <sup>4</sup>
x	x	22	Pg 13.5 threaded cap (S8)
		<b>(6) Fitting length</b>	
x	x	120	fitting length 120 mm (standard)
o	o	225	fitting length 225 mm other lengths on request
		<b>(7) Extra codes</b>	
o	o	000	none
x	x	837	salt reservoir
o	o	838	2-chamber system (DOKA) with KCl/KCl bridge
o	o	839	2-chamber system (DOKA) with KCl/KNO <sub>3</sub> bridge <sup>5</sup>
o	-	840	with Pt100 temperature probe
o	-	841	with Pt1000 temperature probe

**Order code**                     /  -  -  -  -  /  . ...<sup>6</sup>

**Order example**                201020        /        51        -        10        -        07        -        22        -        120        /        837        .

<sup>1</sup> available in fitting length 225 only  
<sup>2</sup> only in conjunction with diaphragm 09  
<sup>3</sup> only with basic type extension 72, 73 or 74  
<sup>4</sup> for electrodes with extra code 840 or 841  
<sup>5</sup> not in conjunction with active component 11, 13 or 17  
<sup>6</sup> List extra codes in sequence, separated by commas

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**Stock items for pH** (shipment within 3 working days from receipt of order)

Type	Brief description	Sales No.
201020/51-10-07-21-120/837	glass shaft, gel-sealed, zirconium dioxide diaphragm, threaded cap (S8), 120 mm, salt reservoir	20/00300151
201020/51-10-07-22-120/000	glass shaft, gel-sealed, zirconium dioxide diaphragm, threaded cap (S8), 120 mm,	20/00300148
201020/52-10-07-17-120/837, 840	glass shaft, gel-sealed, zirconium dioxide diaphragm, SMEK threaded cap, 120 mm, salt reservoir, integrated Pt100	20/00351265
201020/51-17-07-22-120/837	glass shaft, gel-sealed, zirconium dioxide diaphragm, threaded cap (S8), 120 mm (highly alkaline applications)	20/00408953
201020/74-10-05-22-225/000	plastic shaft PSU with protection basket, gel-sealed, glass silk diaphragm, threaded cap (S8), 225 mm	20/00354295
201020/73-10-05-22-225/000	plastic shaft PSU, no protection basket, gel-sealed, glass silk diaphragm, threaded cap (S8), 225 mm	20/00330857
201020/72-10-05-22-120/837, 838	plastic shaft PEI with protection basket, gel-sealed, glass silk diaphragm, threaded cap (S8), 120 mm, salt reservoir, 2-chamber system	20/00303398

**Non-stock items for pH** (shipment within 10 working days from receipt of order)

Type	Brief description	Sales No.
201020/51-10-07-22-225/000	glass shaft, gel-sealed, zirconium dioxide diaphragm, threaded cap (S8), 225 mm,	20/00399535
201020/51-11-07-22-120/000	glass shaft, gel-sealed, zirconium dioxide diaphragm, threaded cap (S8), 120 mm	20/00375623
201020/72-10-05-17-120/840	plastic shaft PEI with protection basket, gel-sealed, glass silk diaphragm, SMEK threaded cap (S8), 120mm, integrated Pt100	20/00364282

**Stock items for redox** (shipment within 3 working days from receipt of order)

Type	Brief description	Sales No.
201025/52-22-07-22-120/837	glass shaft, gel-sealed, platinum tip, zirconium dioxide diaphragm, threaded cap (S8), 120 mm, salt reservoir	20/00300397
201025/52-32-07-22-120/837	glass shaft, gel-sealed, gold tip, zirconium dioxide diaphragm, threaded cap (S8), 120 mm, salt reservoir	20/00300396
201025/74-22-07-22-120/837, 838	plastic shaft PEI no protection basket, gel-sealed, platinum tip, glass silk diaphragm, threaded cap (S8), 120 mm, salt reservoir, 2-chamber version	20/00084011

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# JUMO tecLine pH / Rd for wastewater, heavily polluted media, suspensions, varnishes

## Typical applications

- Industrial wastewater engineering
- Process measurements, electroplating plant, paper industry, drinks industry
- Wastewater containing oil
- Suspensions, varnishes, media containing solid particles
- 2-chamber system in the presence of electrode poisons
- Media containing fluoride (hydrofluoric acid) up to 1000mg/l HF

## Key features

- Dirt-repellent PTFE ring diaphragm with highly viscous KCl solution (gel) or perforated or annular-gap diaphragm with polymerized solid electrolyte - effectively blockage-free
- Cartridge-style conductive system with reference electrolyte (free from silver ions)
- Pressure-resistant versions up to 10 bar (50°C)
- Temperature range: see order details
- Temperature probes can optionally be integrated
- Optional salt reservoir for extending the operational life in low-conductivity media

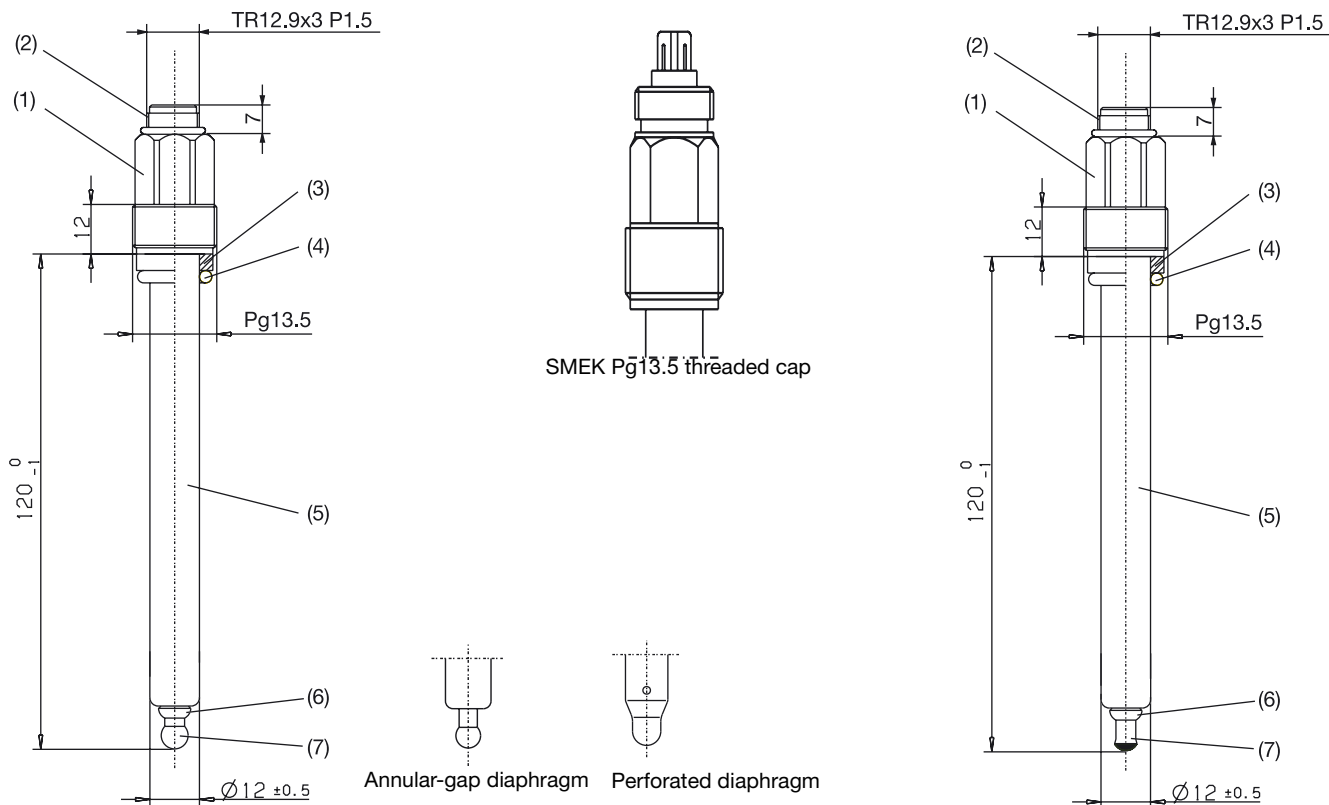
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## Dimensions



### Type 201020/51

- (1) Pg13.5 threaded cap
- (2) TR12.9x3 P1.5 thread
- (3) Ring (PSU)
- (4) O-ring 10 x 3.5 (FPM70)
- (5) Electrode shaft (glass DIN 19 263)
- (6) Ring diaphragm (PTFE)
- (7) Rounded membrane

### Type 201025/51

- (1) Pg13.5 threaded cap
- (2) TR12.9x3 P1.5 thread
- (3) Ring (PSU)
- (4) O-ring 10 x 3.5 (FPM70)
- (5) Electrode shaft (glass DIN 19 263)
- (6) Ring diaphragm (PTFE)
- (7) Platinum or gold tip



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# JUMO tecLine pH / Rd

## pH / redox combination electrodes for wastewater, heavily polluted media, suspensions, varnishes

### Order details

		<b>(1) Basic type</b>	
	201020	pH combination electrode JUMO tecLine pH	
	201025	redox combination electrode JUMO tecLine Rd	
		<b>(2) Basic type extension</b>	
x	x	51	glass shaft / gel-sealed / cartridge-style conductive system
		<b>(3) Active component</b>	
x	-	10	U glass / pH 0 – 12 (briefly 14) / -5 to +80°C
o	-	11	C glass / pH 0 – 12 / -5 to +50°C / fluoride-resistant
o	-	13	TT glass / pH 0 – 12 / -30 to +30°C
o	-	17	HA glass / pH 0 – 14 / -5 to +80°C / high-alkaline application
-	x	22	platinum tip / redox range +/-2000 mV / -5 to +90°C
-	o	32	gold tip / redox range +/-2000 mV / -5 to +90°C
		<b>(4) Diaphragm</b>	
x	x	04	PTFE ring diaphragm
o	o	10	annular-gap diaphragm / gel from polymerized solid electrolyte ("no diaphragm") <sup>1</sup>
o	o	11	perforated diaphragm / gel from polymerized solid electrolyte ("no diaphragm") <sup>1</sup>
		<b>(5) Connection</b>	
o	-	17	SMEK Pg13.5 threaded cap <sup>1</sup>
x	x	18	VP head, Pg 13.5 threaded cap <sup>1</sup>
x	x	22	Pg 13.5 threaded cap (S8)
		<b>(6) Fitting length</b>	
x	x	120	fitting length 120 mm (standard)
o	o	225	fitting length 225 mm <sup>3</sup> andere Längen auf Anfrage
		<b>(7) Extra codes</b>	
o	o	000	none
x	x	837	salt reservoir <sup>3</sup>
o	o	838	2-chamber system (DOKA) with KCl/KCl bridge <sup>2,3</sup>
o	o	839	2-chamber system (DOKA) with KCl/KNO <sub>3</sub> bridge <sup>2,4</sup>
o	-	840	with Pt100 temperature probe <sup>5</sup>
o	-	841	with Pt1000 temperature probe <sup>5</sup>
o	-	842	flat membrane

**Order code**                    (1)                    /                    (2)                    -                    (3)                    -                    (4)                    -                    (5)                    -                    (6)                    /                    (7)                    ,                    ...<sup>6</sup>

**Order example**                    201020                    /                    51                    -                    10                    -                    04                    -                    22                    -                    120                    /                    837

<sup>1</sup> for electrodes with extra code 840 or 841.  
<sup>2</sup> not in conjunction with diaphragm 10 or 11.  
<sup>3</sup> not in conjunction with active component 17.  
<sup>4</sup> not in conjunction with active component 11, 13 or 17.  
<sup>5</sup> only with connection 17.  
<sup>6</sup> List extra codes in sequence, separated by commas.

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**Stock items for pH** (shipment within 3 working days from receipt of order)

Type	Brief description	Sales No.
201020/51-10-04-22-120/000	glass shaft, gel-sealed, PTFE diaphragm, threaded cap (S8), 120 mm,	20/00327907
201020/51-10-04-22-120/837	glass shaft, gel-sealed, PTFE diaphragm, threaded cap (S8), 120 mm, salt reservoir	20/00321035
201020/51-10-04-22-225/837	glass shaft, gel-sealed, PTFE diaphragm, threaded cap (S8), 225 mm, salt reservoir	20/00327142
201020/51-17-04-22-120/837	glass shaft, gel-sealed, PTFE diaphragm, threaded cap (S8), 120 mm (highly alkaline applications)	20/00332794

**Non-stock items for pH** (shipment within 10 working days from receipt of order)

Type	Brief description	Sales No.
201020/51-10-04-17-120/840	glass shaft, gel-sealed, PTFE diaphragm, SMEK threaded cap, 120 mm, integrated Pt100	20/00383865
201020/51-10-04-22-225/000	glass shaft, gel-sealed, PTFE diaphragm, threaded cap (S8), 225 mm	20/00372505
201020/51-10-10-22-120/837	glass shaft, gel-sealed, annular-gap diaphragm and solid electrolyte, threaded cap (S8), 120 mm, salt reservoir	20/00446112
201020/51-10-11-22-120/837	glass shaft, gel-sealed, perforated diaphragm and solid electrolyte, threaded cap (S8), 120mm, salt reservoir	20/00445428
201020/51-10-11-17-120/837, 840	glass shaft, gel-sealed, perforated diaphragm and solid electrolyte, SMEK threaded cap, 120mm, salt reservoir, integrated Pt 100	20/00468525
201020/51-10-10-17-120/837, 840	glass shaft, gel-sealed, annular-gap diaphragm and solid electrolyte, SMEK threaded cap, 120mm, salt reservoir, integrated Pt 100	20/00468524
201020/51-10-04-22-120/837, 842	glass shaft, gel-sealed, PTFE diaphragm, threaded cap, 120 mm, salt reservoir, flat membrane	20/00460412
201020/51-11-04-17-120/840	glass shaft, gel-sealed, PTFE diaphragm, SMEK threaded cap, 120 mm,	20/00410112
201020/51-11-04-22-120/000	integrated Pt100 glass shaft, gel-sealed, PTFE diaphragm, threaded cap (S8), 120 mm	20/00376194

**Stock items for redox** (shipment within 3 working days from receipt of order)

Type	Brief description	Sales No.
201025/52-22-04-22-120/837	glass shaft, gel-sealed, platinum tip, PTFE diaphragm, threaded cap (S8), 120 mm, salt reservoir	20/00321746

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# JUMO tecLine pH / Rd for high-temperature and sterilization applications

## Typical applications

- Processes with permanently elevated temperatures (up to 135°C max.)
- Sterilization applications
- 2-chamber system in the presence of electrode poisons
- Media containing fluoride (hydrofluoric acid) up to 1000mg/l HF

## Key features

- Proven JUMO HT glass (pH high-temperature membrane glass) 0 – 14 pH
- JUMO DS membrane glass for sterilization applications
- Cartridge-style conductive system with reference electrolyte (gel) free from silver ions
- Pressure-resistant versions up to 10 bar (50°C)
- Temperature range: 0 to 135°C<sup>1</sup>
- Temperature probes can optionally be integrated
- Redox versions with platinum or gold tip up to +/-2000 mV

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<sup>1</sup> Sterilizable version:  
Sterilization at 135°C max. for up to 20 minutes.  
Continuous electrode operation after sterilization up to 80°C max.

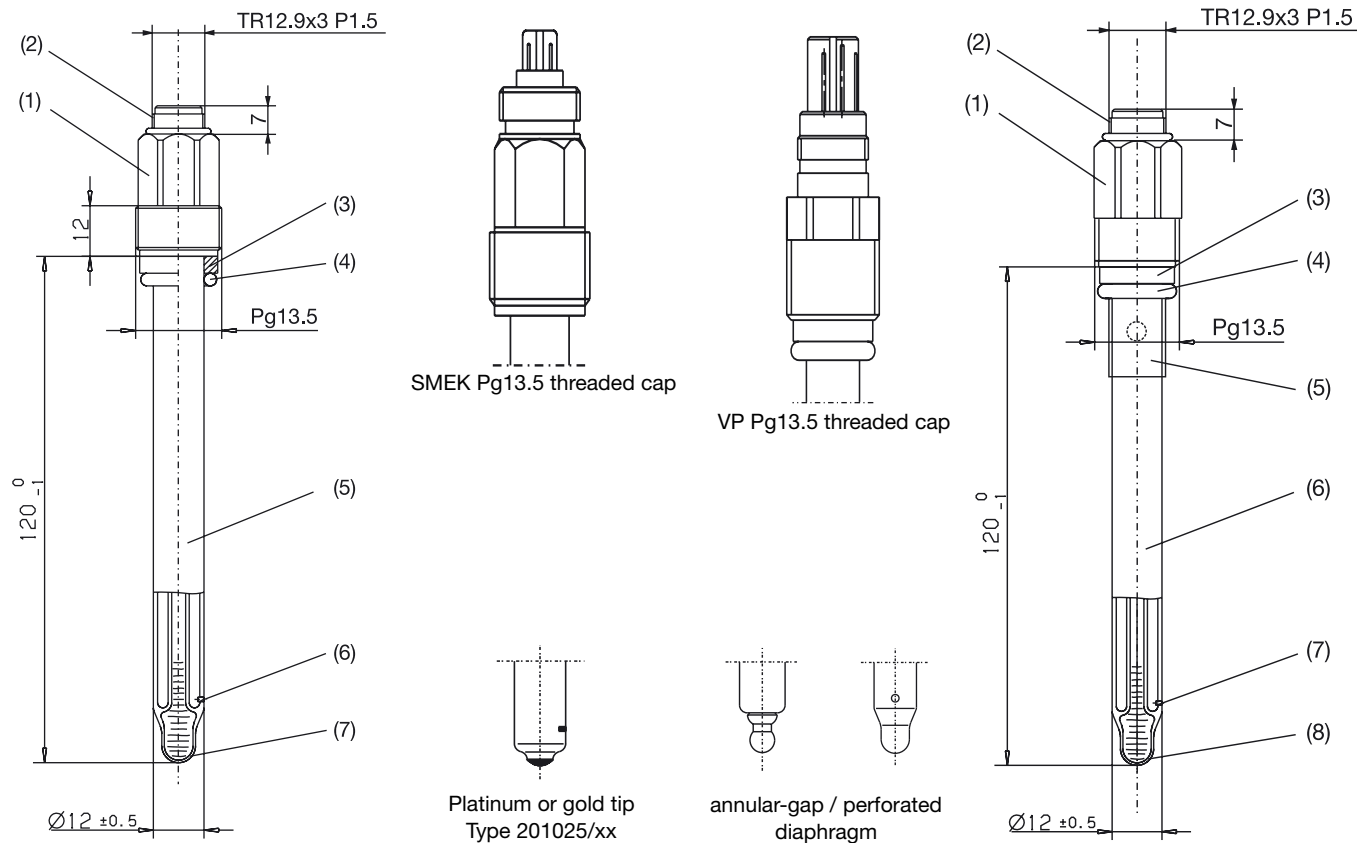
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## Dimensions



### Type 20102x/51

- (1) Pg13.5 threaded cap
- (2) TR12.9x3 P1.5 thread
- (3) Ring (PSU)
- (4) O-ring 10 x 3.5 (FPM70)
- (5) Electrode shaft (glass DIN 19 263)
- (6) 1 to 3 diaphragm(s) (ceramic / zirconium dioxide 1 mm dia. )
- (7) Rounded membrane

### Type 20102x/52

- (1) Pg13.5 threaded cap
- (2) TR12.9x3 P1.5 thread
- (3) Ring (PSU)
- (4) O-ring 10 x 3.5 (FPM70)
- (5) Tubular seal
- (6) Electrode shaft (glass DIN 19 263)
- (7) Diaphragm (ceramic / zirconium dioxide 1 mm dia. )
- (8) Rounded membrane

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# JUMO tecLine pH / Rd pH / redox combination electrodes for high-temperature and sterilization applications

## Order details

		<b>(1) Basic type</b>	
	201020	pH combination electrode JUMO tecLine pH	
	201025	redox combination electrode JUMO tecLine Rd	
		<b>(2) Basic type extension</b>	
x	x	75	glass shaft / HT gel (high-temperature) / sealed / cartridge-style conductive system
		<b>(3) Active component</b>	
x	-	12	HT glass / pH 0 - 14 / -5 to +135°C
o	-	14	DS glass / pH 0 - 14 / -5 to +80°C / can be sterilized for 20 min at 135°C
-	x	22	platinum tip / redox range +/-2000 mV / -5 to +135°C
-	o	32	gold tip / redox range +/-2000 mV / -5 to +135°C
		<b>(4) Diaphragm</b>	
x	x	07	1 x zirconium dioxide diaphragm (special ceramic)
o	o	08	2 x zirconium dioxide diaphragm (special ceramic)
o	o	09	3 x zirconium dioxide diaphragm (special ceramic)
o	o	10	annular-gap diaphragm / gel from polymerized solid electrolyte ("no diaphragm") <sup>1</sup>
o	o	11	perforated diaphragm / gel from polymerized solid electrolyte ("no diaphragm") <sup>1</sup>
		<b>(5) Connection</b>	
o	-	17	SMEK Pg13.5 threaded cap <sup>1</sup>
o	-	18	VP Pg13.5 threaded cap <sup>1</sup>
x	x	22	Pg 13.5 threaded cap (S8)
		<b>(6) Fitting length</b>	
x	x	120	fitting length 120 mm (standard)
o	o	225	fitting length 225 mm other lengths on request
		<b>(7) Extra codes</b>	
o	o	000	none
o	-	840	with Pt100 temperature probe <sup>2</sup>
o	-	841	with Pt1000 temperature probe <sup>2</sup>

**Order code**                    (1) / (2) - (3) - (4) - (5) - (6) / (7)

**Order example**            201020 / 75 - 12 - 07 - 22 - 120 / 000

<sup>1</sup> for electrodes with extra code 840 or 841  
<sup>2</sup> only with connection 17

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**Stock items for pH** (shipment within 3 working days from receipt of order)

Type	Brief description	Sales No.
201020/75-12-07-22-120/000	glass shaft, gel-sealed, HT gel, zirconium dioxide diaphragm, threaded cap (S8), 120 mm (high-temperature applications)	20/00304030

**Non-stock items for pH** (shipment within 10 working days from receipt of order)

Type	Brief description	Sales No.
201020/75-14-07-17-120/840	glass shaft, gel-sealed, HT gel, zirconium dioxide diaphragm, SMEK threaded cap, 120 mm (for sterilization processes)	20/00410027
201020/75-14-07-22-120/000	glass shaft, gel-sealed, HT gel, zirconium dioxide diaphragm, threaded cap (S8), 120 mm (for sterilization processes)	20/00430366
201020/75-11-10-22-120/837	glass shaft, gel-sealed, solid electrolyte, perforated diaphragm, threaded cap (S8), 120 mm	20/00468301
201020/75-12-11-17-120/840	glass shaft, gel-sealed, solid electrolyte, perforated diaphragm, SMEK threaded cap, 120 mm (high-temperature applications)	20/00449510

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## JUMO tecLine pH / Rd with liquid KCl filling, refillable

### Typical applications

- Low-ion media (including high-purity water)
- Electroplating processes, PCB production
- Fermenters
- Heavily polluted, adherent media
- Suspensions, varnishes
- Boiler feed water

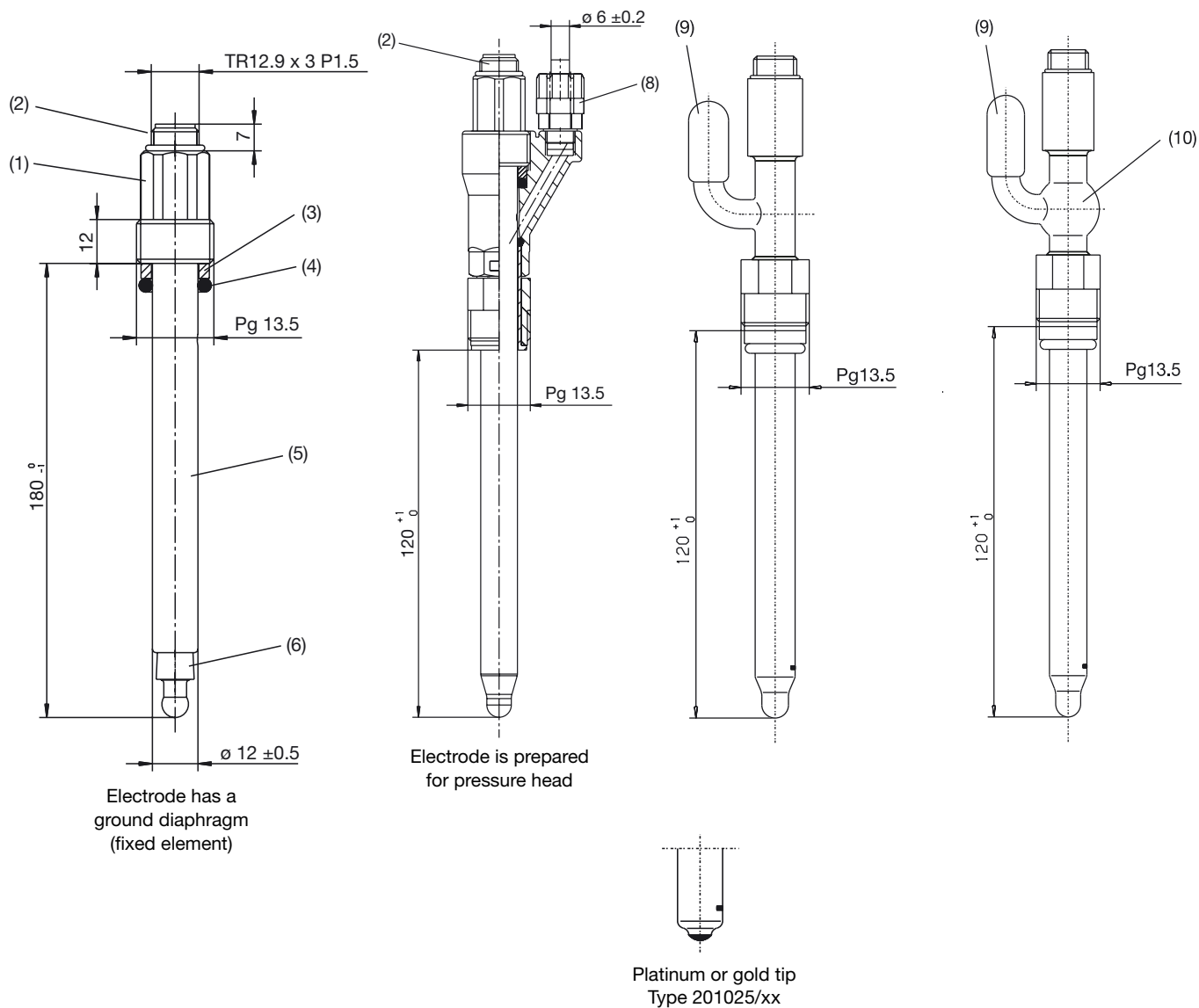
### Key features

- Can be combined with all JUMO membrane glasses
- Zirconium dioxide diaphragm or ground diaphragm
- Cartridge-style conductive system. Refillable KCl solution (free from silver ions)
- Temperature range: up to -10 to +135°C<sup>1</sup>
- Redox versions with platinum or gold tip up to +/-2000mV

---

<sup>1</sup> Depending on the type of glass

## Dimensions



### Type 201020/xx

- (1) Pg13.5 threaded cap
- (2) TR12.9x3 P1.5 thread
- (3) Ring (PSU)
- (4) O-ring 10 x 3.5 (FPM70)
- (5) Electrode shaft (glass DIN 19 263)
- (6) 1 to 3 diaphragm(s) (ceramic / zirconium dioxide 1 mm dia.)
- (7) Rounded membrane (universal glass 40 — 60 M $\Omega$ )
- (8) Pressure head
- (9) Tube nipple
- (10) Spherically enlarged shaft

## Extra code

### KCl connection, extra code 829

Material: PPO (polyphenylene oxide)  
 Temperature range: 0 to 105°C, briefly to +130°C  
 Pressure range: max. 10bar (25°C)



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# JUMO tecLine pH / Rd pH / redox combination electrodes with liquid KCl filling, refillable

## Order details

		<b>(1) Basic type</b>	
	201020	pH combination electrode JUMO tecLine pH	
	201025	redox combination electrode JUMO tecLine Rd	
		<b>(2) Basic type extension</b>	
x	x	76	glass shaft / KCl liquid electrolyte / cartridge-style conductive system
		<b>(3) Active component</b>	
x	-	10	U glass / pH 0 – 12 (briefly 14) / -5 to +80°C
o	-	11	C glass / pH 0 – 12 / -5 to +50°C
o	-	12	HT glass / pH 0 – 14 / 0 to +135°C (also for highly alkaline applications)
o	-	14	DS glass / pH 0 – 12 / 0 to +80°C (up to 135°C for 20 minutes max.)
-	x	22	platinum tip / redox range +/-2000 mV / -5 to +90°C
-	o	32	gold tip / redox range +/-2000 mV / -5 to +90°C
		<b>(4) Diaphragm</b>	
x	x	07	1 x zirconium dioxide diaphragm (special ceramic)
o	o	08	2 x zirconium dioxide diaphragm (special ceramic)
o	o	09	3 x zirconium dioxide diaphragm (special ceramic)
o	-	14	ground diaphragm (fixed element)
		<b>(5) Connection</b>	
x	x	19	tube nipple, spherically enlarged shaft and Pg 13.5 thread (S8) cemented on
x	x	20	tube nipple and Pg 13.5 thread (S8) cemented on
x	x	22	Pg 13.5 threaded cap (S8)
		<b>(6) Fitting length</b>	
x	x	120	fitting length 120 mm (standard)
o	o	180	effective fitting length 120 mm, but glass length 180 mm for use with pressure head (extra code 833)
o	o	225	fitting length 225 mm
		<b>(7) Extra codes</b>	
o	o	000	none
o	o	829	KCl connection
o	-	833	prepared for pressure head (select fitting length 180 mm)

<b>Order code</b>		(1)	/	(2)	-	(3)	-	(4)	-	(5)	-	(6)	/	(7)	
<b>Order example</b>		201020	/	76	-	10	-	07	-	22	-	120	/	837	000

<sup>1</sup> only in conjunction with extra code 829

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## Non-stock items for pH (shipment within 10 working days from receipt of order)

Type	Brief description	Sales No.
201020/76-10-13-22-180/833	KCl liquid electrolyte, ground diaphragm (fixed element), threaded cap (S8), 180 mm, for use with pressure head	20/00373781
201020/76-10-08-22-180/829	replacement electrode for pressure head / KCl connection glass shaft, liquid KCl electrolyte, 2 x zirconium dioxide diaphragm, fitting length 180 mm	20/00373964
201020/76-10-14-22-180/829	replacement electrode for pressure head / KCl connection glass shaft, liquid KCl electrolyte, ground diaphragm (fixed element), fitting length 180 mm	20/00373781
201020/76-12-07-20-120/000	glass shaft, liquid KCl electrolyte, zirconium dioxide diaphragm, tube nipple with cemented-on Pg 13.5 screw fitting, 120mm	20/00300160

## Accessories

Type	Sales No.
KCl connection	20/00475617
pressure head	20/00390360
KCl reservoir, pressure-resistant, for wall mounting.	20/00060254
For setting up an electrolyte bridge or when using KCl-filled electrodes. 250 ml 3-molar KCl solution, packed in units of 5 (see also Data Sheet 20.2900)	20/00306215

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# JUMO tecLine PRO pH / Rd pH and redox combination electrodes

## 201020 Series pH electrodes 201025 Series redox electrodes

(previous designation 2 GE-20-...)

### Gernal description

Electrodes in the 201020(25)/79 series are distinguished by high mechanical and chemical resistance. Thanks to the tough PVDF housing, they are practically unbreakable. The electrolyte for the combination electrode guarantees stable measurement, even in critical media containing sulfides.

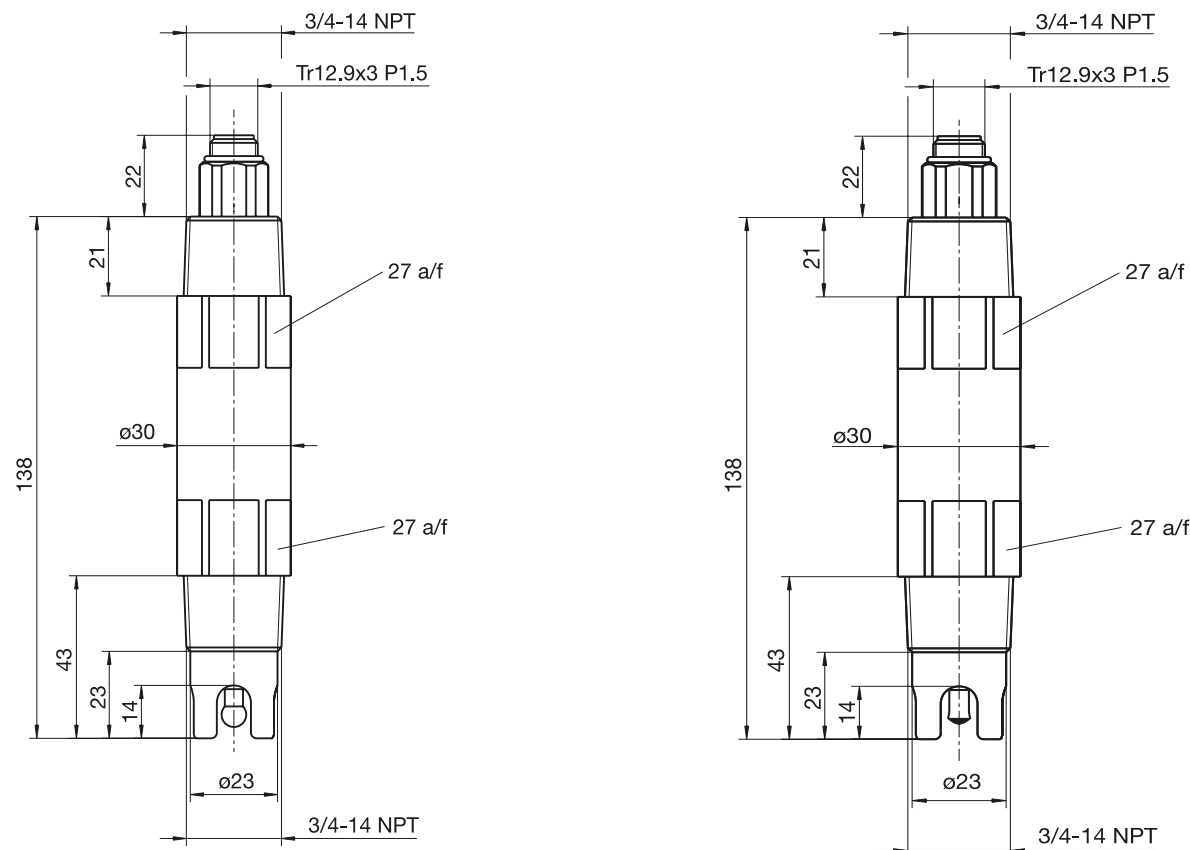
A Pt1000 temperature sensor is integrated, and the electrodes can be manufactured as pH or redox electrodes, according to the application. An annular-gap diaphragm is used.

### Areas of application

- Chemical industry
- Wastewater treatment
- Clarification plant
- Paper industry



### Dimensions



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**Order details**

	<b>(1) Basic type</b>	
	201020	JUMO tecLine PRO pH
	201025	JUMO tecLine PRO Redox
x x	<b>(2) Basic type extension</b>	
	79	process electrode
	<b>(3) Active component</b>	
x	10	U glass, -5 to +80°C; pH 0 – 12 (briefly pH 14)
o	12	HT glass, 0 to 110°C; pH 0 – 14
x	22	platinum tip, 0 to 110°C; ±2000mV
o	32	gold tip, 0 to 110°C; ±2000mV
	<b>(4) Diaphragm</b>	
o o	10	annular-gap diaphragm; gel made from polymerized solid electrolyte (“no diaphragm”)
	<b>(5) Electrical connection</b>	
o o	17	SMEK cap
x x	22	threaded cap
	<b>(6) Extra codes</b>	
x x	000	none
x	837	salt reservoir
x	841	integrated Pt1000

	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>						
<b>Order code</b>													
<b>Order example</b>	201020	/	79	-	12	-	10	-	22	-	43	/	841

**Non-stock items for pH** (shipment within 10 working days from receipt of order)

Type	Brief description	Sales No.
201020/79-10-10-17/837, 841	SMEK cap, solid electrolyte, annular-gap diaphragm, salt reservoir, Pt1000	20/00468776
201020/79-10-10-22/837	threaded cap, solid electrolyte, annular-gap diaphragm, salt reservoir	20/00468999
201020/79-12-10-17/837, 841	SMEK cap, solid electrolyte, annular-gap diaphragm, salt reservoir, Pt1000	20/00470258
201020/79-12-10-22/837	threaded cap, solid electrolyte, annular-gap diaphragm, salt reservoir	20/00469853

**Accessories**

Type	Sales No.
SMEK connecting cable, 5 m, type 2994-10(5)-0	20/00347843
SMEK connecting cable, 10 m, type 2994-10(10)-0	20/00346442