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Measuring Cells for free chlorine, chlorine dioxide, ozone

**Type 202630/40, Type 202630/41,
 Type 202630/45, Type 202630/46,
 Type 202630/50, Type 202630/51**

- 2- or 3-electrode principle
- easy calibration
- integrated temperature compensation
- proven measuring system

Brief description

These membrane-covered, amperometric measuring cells are used to determine the concentration of free chlorine, chlorine dioxide or ozone in aqueous solutions (e.g. in drinking or pool water as well as in service, process or cooling water).

The cell for free chlorine can be applied to determine the following anorganic chlorination agents: chlorine gas (Cl₂), electrolytically produced chlorine, sodium hypochlorite (NaOCl, chlorine bleach), calcium hypochlorite (Ca(OCl)₂) or chlorinated lime (Ca(OCl)Cl).

The cell for chlorine dioxide is available for measuring chlorine dioxide in chlorite/chlorine and chlorite/hydrochloric acid plants.

And, by using the cell for ozone, it is also possible to measure electrolytically produced ozone, for example.

The integral electronics of the cells provides a temperature-compensated 4 – 20 mA current signal. Calibration is performed through a connected instrument (indicator, controller, recorder, PLC, etc.).

The measuring cells can be directly connected to a suitable indicator/control instrument.

The JUMO dTRANS Az 01 indicator/controller (Data Sheet 20.2550) lends itself ideally to being combined with measuring cells. It provides the necessary voltage for the cell and enables simple calibration of the measuring system.

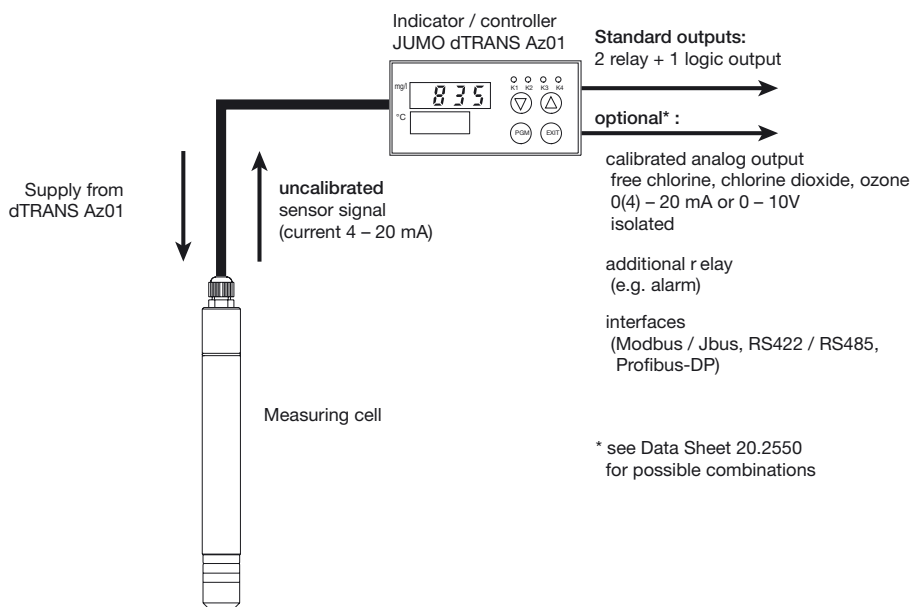


Type 202630/40-...

Notes

- Measurement can only be performed in a suitable flow-through fitting (see accessories).
- For proper operation, the incident flow of the sample liquid on the cell must be at least 15 cm/sec (0.5 liters/min). This minimum incident flow velocity can be assured through the JUMO flow monitoring assembly (see accessories), consisting of a flow monitor and a suitable fitting.
- In the case of cells with a hydrophobic membrane, the sample liquid must not contain any tensides (as contained in detergents, cleaning agents and disinfectants).
- Cells with a membrane that is insensitive to chemicals and tensides can also be used in polluted water that is not of drinking or swimming pool water quality. (These cells are only available for ClO₂ and O₃, but **not** for free chlorine).
- In the case of cells with a hydrophilic membrane, it must be checked for each individual application whether the presence of tensides will noticeably shorten the operational life of the cell. However, also in this case, the water should have a quality similar to drinking or swimming pool water.
- A test set is required for calibration, to determine the concentration of free chlorine, chlorine dioxide or ozone according to the DPD method. Suitable photometric/colorimetric test sets are on the market (e.g. Spectroquant or Microquant chlorine tests from Merck).

Operation



- To ensure a fault-free sensor performance, only one disinfectant at a time should be used.
- In the cell for free chlorine (Type 202630/40), the pH value must be kept constant after calibration of the cell ($\Delta\text{pH} < 0.05$). If this is not possible, then either the compensation is calculated within the range 6.5 to 8.5 pH using the JUMO LOGOSCREEN AQUA 500, or the cell for free chlorine with reduced pH dependence (Type 202630/41) must be employed.
- The output signal of the cell for free chlorine with reduced pH dependence (Type 202630/41) does not depend on the pH value within the range pH 5 to 7. Outside this range, the pH dependence is reduced (see Technical data).
- If the cell for free chlorine with reduced pH dependence (Type 202630/41) is to function properly, the sample liquid must have a conductivity of at least 10 $\mu\text{S}/\text{cm}$.
- The cell for free chlorine (Type 202630/40) is not suitable for determining organic chlorination agents (e.g. products based on cyanuric acid). This application is covered by the cell for free chlorine with reduced pH dependence (Type 202630/41).
- Further informationen about the construction and application of amperometric sensors can be found in our publication "Information on the amperometric measurement of free chlorine, chlorine dioxide and ozone in water".

Technical data

Analyte	Free chlorine		Chlorine dioxide (ClO ₂)		Ozone (O ₃)	
	hydrophobic PTFE membrane	hydrophilic membrane	hydrophobic PTFE membrane	membrane insensitive to chemicals and tensides	hydrophobic PTFE membrane	membrane insensitive to chemicals and tensides
Membrane type	Type 202630/40	Type 202630/41	Type 202630/45	Type 202630/46	Type 202630/50	Type 202630/51
Measurement cable connection	2-pole terminal, Pg7 gland in polyamide core cross-section 2 x 0.25 mm ² , cable diameter approx. 4 mm					
Supply	U _B 12 to 30 V DC (isolation is recommended)					
Output signal	4 – 20 mA					
Burden	$\leq \frac{U_B - 11 \text{ V}}{0.02 \text{ A}}$					
Settling time	approx. 30 min					
Incident flow velocity	approx. 15 cm/sec If the cell is installed in the JUMO flow-through fitting Type 202810/72-102-86-80-55, this corresponds to a flow-through rate of approx. 30 liters/hr					
Measurement ranges (other ranges on request)	0 – 0.5 mg/liter or 0 – 2.0 mg/liter (ppm)		0 – 2.0 mg/liter (ppm)			
Resolution	0.001 mg/liter, for the 0 – 0.5 mg/liter range 0.01 mg/liter, for the 0 – 2.0 mg/liter range					
Measurement accuracy	± 2% of indicated value					
Signal stability / loss of slope	< 1% per month	< 3% per month	< 1% per month			
Response time	t ₉₀ < 30 sec	t ₉₀ < 2 min	t ₉₀ < 15 sec			t ₉₀ < 1 min
Operating temperature / temp. compensation	> 0 to 45°C		> 0 to 55°C		> 0 to 45°C	> 0 to 55°C
pH application range	5.5 to 8 pH Note the effect of pH on the disinfecting properties, corrosion or dissociation curve!	4 to 12 pH	1 to 14 pH			
pH dependence (loss of slope)	with pH 8: approx. 65% with pH 9: approx. 95% with pH 10: > 99% (starting from pH 7)	within the range 5 to 7 pH: no loss of slope with pH 8: approx. 10% with pH 9: approx. 20% with pH 10: approx. 30% (starting from pH 7)	no pH dependence			
Safe pressure	1 bar Variations in pressure are not permissible for pressurized operation. We recommend unpressurized operation (atmospheric pressure)					
Material	shaft, cover, cap: PVC	shaft, cover, cap: PVC, membrane holder: st. steel	shaft, cover, cap: PVC	shaft, cover, cap: PVC, membrane holder: st. steel	shaft, cover, cap: PVC	shaft, cover, cap: PVC, membrane holder: st. steel
Dimensions	diameter: 25 mm, length: 220 mm					
Weight	approx. 125 g					

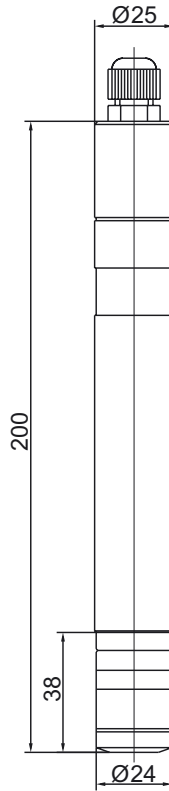
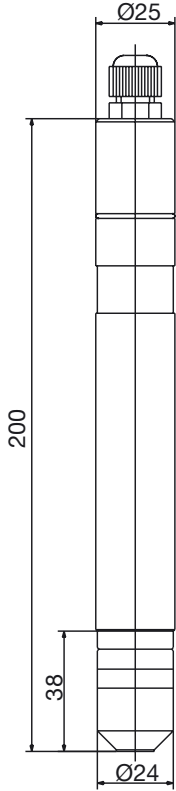
Delivery package

2-wire measuring cell including membrane cap, electrolyte and special abrasive paper for cleaning the cathode

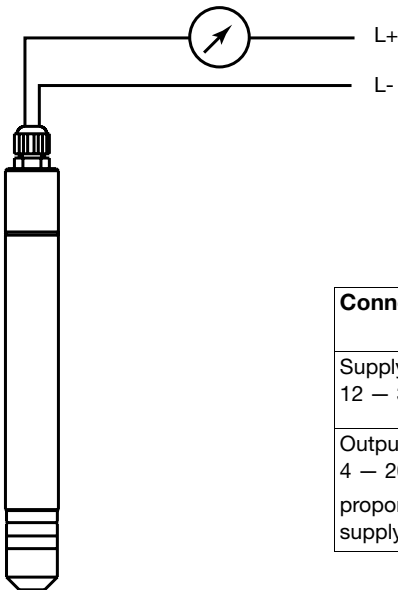
Dimensions

Type 202630/40, Type 202630/45, Type 202630/50

Type 202630/41, 202630/46, 202630/51



Electrical connection



Connection		Screw terminal
Supply 12 – 30 V DC		1 L+ 2 L-
Output 4 – 20 mA 2-wire proportional 4 – 20 mA current in supply		1 L+ 2 L-

Accessory (optional)

**Flow-through fitting for chlorine/
chlorine dioxide or ozone cell**

Type 202810/01-102-86-080-055

Sales No. 20/00392611

Material

housing: PVC

sample vessel: PC

Permissible temperature / pressure

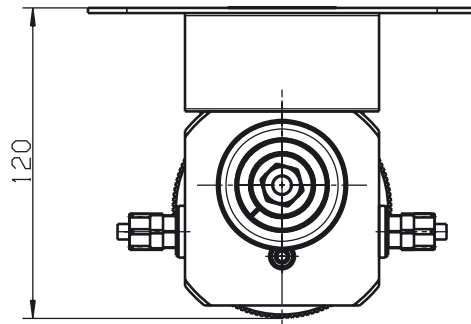
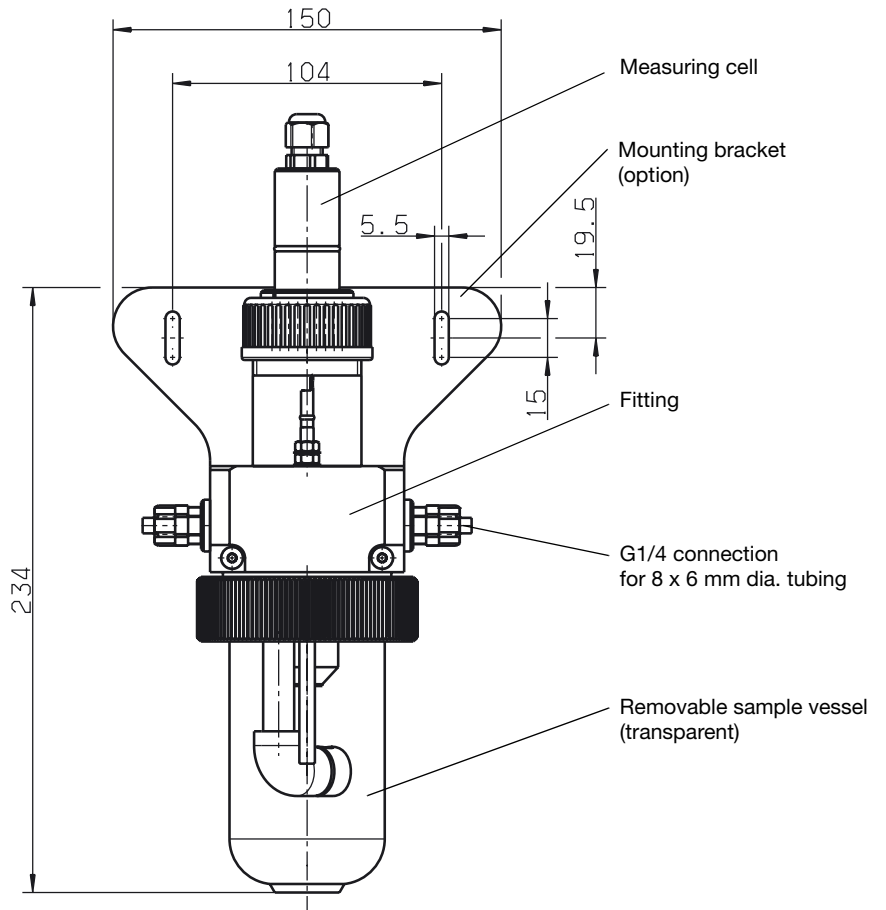
>0 to +90°C; up to 1 bar

Connection

G 1/4 threaded hose connection

Fixing

option: mounting bracket in stainless steel,
Mat. Ref. 1.4571

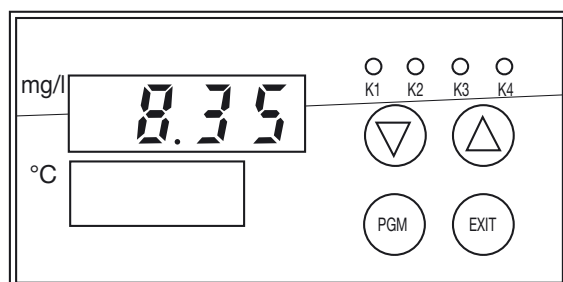


Options

JUMO dTRANS Az 01

**Microprocessor indicator/controller for
analytical measurement**

as indicating/operating and control unit
(see Data Sheet 20.2550 for details)



Flow-monitoring assembly

consisting of:

Flow monitor

Sales no. 20/00396471

and

Fitting for flow monitor

Sales no. 20/00396470

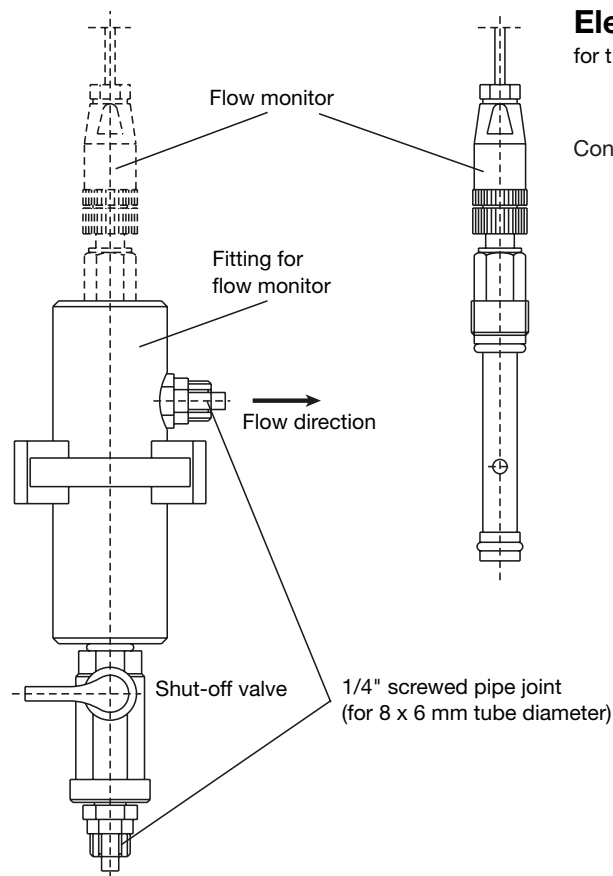
Operation:

For proper operation, the incident flow of the sample liquid on the cell must be at least 15 cm/sec.

Below this minimum incident flow velocity, the cells will indicate values that are too low. This may cause a connected control system to apply a dangerous over/underdose. Above this minimum, the measurement signal will only be slightly affected by the incident flow velocity.

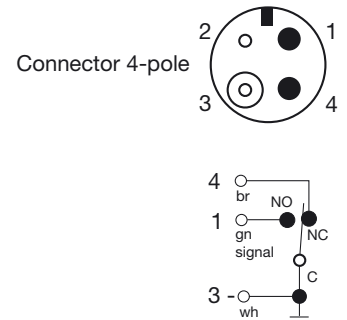
The minimum incident flow velocity of 15 cm/sec can be monitored by means of the flow monitoring assembly.

The flow monitoring assembly consists of a flow monitor and the appropriate fitting. It is installed in line with the flow-through fitting. On reaching or exceeding the minimum incident flow velocity, a contact in the terminal head of the flow monitor will switch. This contact can then be used to operate, for instance, one logic input of the JUMO dTRANS Az 01 (microprocessor indicator/controller for analytical measurement). With insufficient incident flow, the JUMO dTRANS Az 01 is set to "HOLD", thereby avoiding an incorrect dosage.



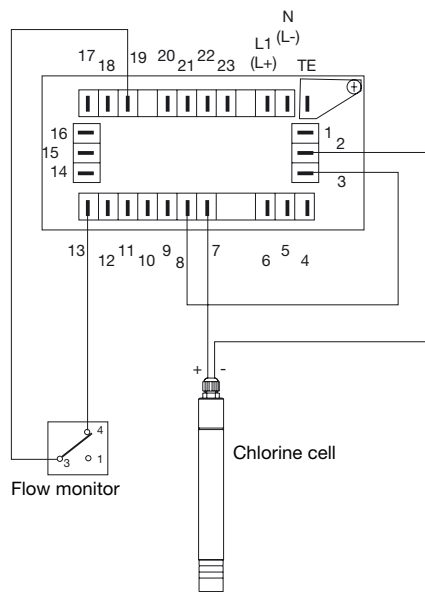
Electrical connection

for the flow monitor



Application example

Connection example of cell and flow monitor to the JUMO dTRANS Az 01 (microprocessor indicator/controller for analytical measurement)



Terminal assignment of the dTRANS Az01

Terminal	Connection
2 + 3 -	Supply for 2-wire transmitter 18 V DC
7 - 8 +	Standard signal input 4 – 20 mA
13 19	Logic input 1 (e.g. for flow monitoring)

Operation

Above a flow velocity of 15 cm/sec, the contact (3+4) of the flow monitor is opened. When the contact (3+4) is closed and the logic input 1 or 2 of the JUMO dTRANS Az 01 is wired up and configured correspondingly, the instrument goes into "HOLD". This avoids incorrect dosing as a result of an insufficient incident flow on the cell.

Order details

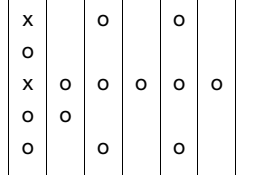
(1) **Basic type**
202630 Measuring cell

(2) **Basic type extensions**

40	for free chlorine
41	for free chlorine (reduced pH dependence)
45	for chlorine dioxide
46	for chlorine dioxide (insensitive to chemicals and tensides)
50	for ozone
51	for ozone (insensitive to chemicals and tensides)

(3) **Range**

10	0.000 – 0.500 mg/liter (ppm)
15	0.00 – 1.00 mg/liter (ppm)
20	0.00 – 2.00 mg/liter (ppm)
25	0.00 – 5.00 mg/liter (ppm)
35	0.00 – 10.00 mg/liter (ppm)



x = fitted as standard
o = available as an option

Order code (1) (2) (3)
 / -
Order example 202630 / 40 - 20

Note:

The type code is a type designation, not a modular system.

When ordering, please make a selection from the listed “Stock versions” or “Production versions” wherever possible.

Any other freely chosen combination of individual features must be technically checked and approved by us.

In case of doubt, please ask.

Stock versions (shipment: 3 working days after receipt of order)

Type	Sales No.
Measuring cell for free chlorine, Type 202630/40-10/000	20/00391395
Measuring cell for free chlorine, Type 202630/40-20/000	20/00391396
Flow-through fitting, Type 202810/01-102/86/080/055	20/00392611

Production versions (shipment: 10 working days after receipt of order)

Type	Sales No.
Measuring cell for chlorine dioxide, Type 202630/45-20/000	20/00392199
Measuring cell for chlorine dioxide, Type 202630/45-35/000	20/00443713
Measuring cell for chlorine dioxide (insensitive to chemicals and tensides), Type 202630/46-20/000	20/00441317
Measuring cell for ozone, Type 202630/50-20/000	20/00392202
Measuring cell for ozone, Type 202630/50-35/000	20/00398169
Measuring cell for ozone (insensitive to chemicals and tensides), Type 202630/51-20/000	20/00441319
Measuring cell for free chlorine, Type 202630/40-25/000	20/00401586
Measuring cell for free chlorine, Type 202630/40-35/000	20/00452993
Measuring cell for free chlorine (reduced pH dependence), Type 202630/41-20/000	20/00392574
Measuring cell for free chlorine (reduced pH dependence), Type 202630/41-25/000	20/00428275
Suitable indicator/controller: JUMO dTRANS Az 01, Type: 202550/10-665-888-140-23-00/000 (see Data and Price Sheets 20.2550 for additional models)	20/00392573

Accessories (shipment: 10 working days after receipt of order)

Designation	Sales No.
Spare set for chlorine / chlorine dioxide / ozone (1 x membrane cap, fine abrasive paper)	20/00392331
Spare set for chlorine (reduced pH dependence) (1 x special membrane cap, G-holder, fine abrasive paper)	20/00402292
Spare set for chlorine dioxide, insensitive to chemicals and tensides (1 x membrane cap, fine abrasive paper)	20/00409344
Spare set for ozone, insensitive to chemicals and tensides (1 x membrane cap, fine abrasive paper)	20/00441309
Special electrolyte for chlorine 100 ml	20/00438122
Special electrolyte for chlorine 100 ml (reduced pH dependence)	20/00438123
Special electrolyte for chlorine dioxide 100 ml	20/00392332
Special electrolyte for chlorine dioxide 100 ml (insensitive to chemicals and tensides)	20/00441316
Special electrolyte for ozone 100 ml	20/00392333
Special electrolyte for ozone 100 ml (insensitive to chemicals and tensides)	20/00441311
Flow monitor	20/00396471
Fitting for flow monitor	20/00396470
Mounting bracket for flow-through fitting for chlorine, chlorine dioxide or ozone measuring cells	20/00455706

Measuring Cells for peracetic acid or hydrogen peroxide

Type 202630/55
Type 202630/60

- acquisition of hydrogen peroxide or peracetic acid concentrations in mg range
- 2-electrode principle
- membrane insensitive to chemicals and tensides
- integrated temperature compensation
- easy calibration

Brief description

The type 202630/60... measuring cell is used to determine the concentration of hydrogen peroxide in aqueous solutions. The type 202630/55... cell serves to measure the concentration of peracetic acid. Typical applications are in electroplating plant, the pharmaceutical sector, food and drinks industry, dairies, swimming pools, and the chemical industry.

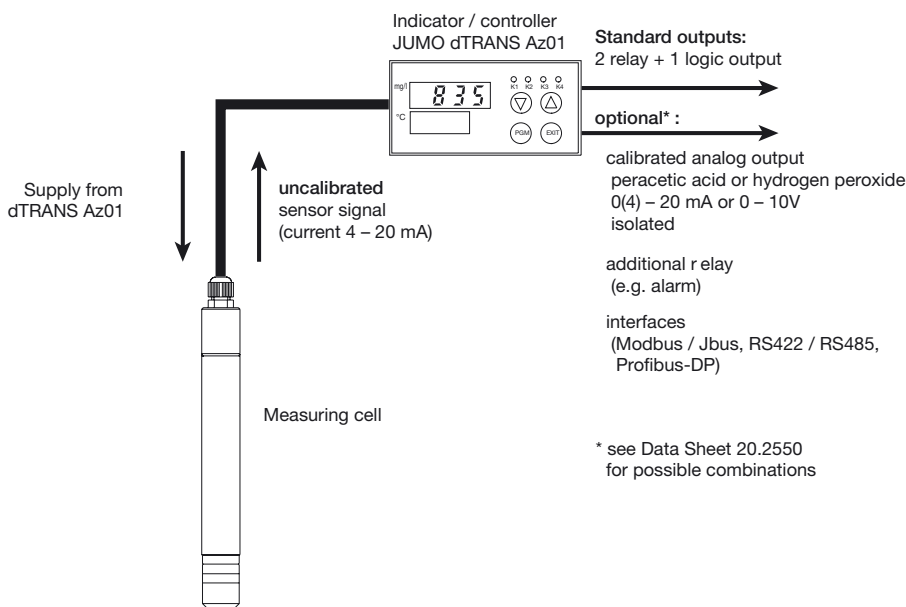
The cell has an elastic membrane and can be directly attached to a suitable transmitter, controller or indicator (e.g. JUMO dTRANS AZ 01 or JUMO LOGOSCREEN AQUA 500). The cell electronics provides a standard 4 – 20 mA current signal, which is compensated for temperature.

Calibration (1-point) is performed on the connected instrument (transmitter, controller or indicator), which also supplies the power (2-wire signal).



Type 202630/60-...

Operation



Notes

- The measurement can only be carried out in a suitable flow-through fitting (see accessories).
- For proper operation, the incident flow of the sample liquid on the cell must be at least 15 cm/sec (0.5 liter/min). This minimum incident flow can be ensured through the JUMO flow monitoring assembly (see accessories), consisting of a flow monitor and the appropriate fitting.
- An electrolyte is required for start-up and maintenance of the sensor (see accessories).

Delivery package

2-wire measuring cell including membrane cap, electrolyte and special abrasive paper for cleaning the cathode

Technical data

Measuring cell

Measuring cable connection

2-pole terminal, Pg7 gland
core cross-section 2 x 0.25 mm²,
cable diameter approx. 4 mm

Supply

U_B 12 to 30 V DC
(isolation is recommended)

Output signal

4 – 20 mA

Burden

$$\leq \frac{U_B - 11 \text{ V}}{0.02 \text{ A}}$$

Incident flow velocity

approx. 15 cm/sec.

When the cell is installed in the JUMO flow-through fitting type 202810/01-102-86-80-55, this corresponds to a flow rate of approx. 0.5 liter/min

Ranges

0 – 500 mg/liter to
0 – 10,000 mg/liter (ppm)
other ranges on request

Measuring accuracy

± 2% of displayed value

Response time

3 to 4 min

Operating temperatures / temperature compensation

0 to 50°C

Safe pressure

pressurized operation up to 1 bar possible

Material

shaft, cover, cap: PVC

Cell dimensions

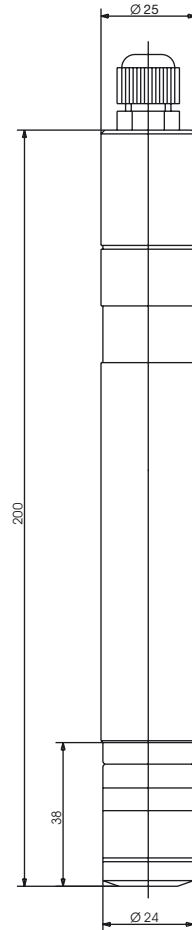
diameter: 25 mm, length: 225 mm

Weight

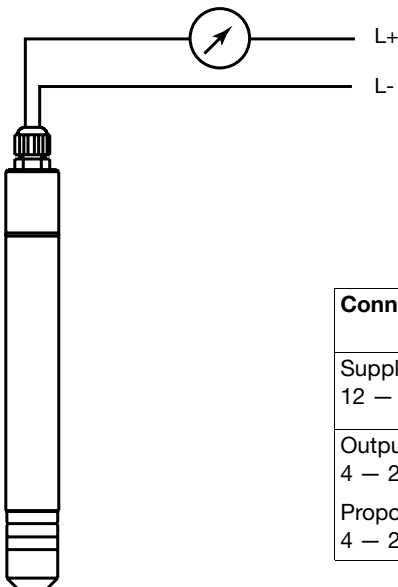
approx. 125 g

Dimensions

Type 202630/55, Type 202630/60



Electrical connection



Connection		Screw terminal
Supply 12 – 30 V DC		1 L+ 2 L-
Output 4 – 20 mA 2-wire Proportional current 4 – 20 mA in supply		1 L+ 2 L-

Accessory (optional)

Flow-through fitting for cell for hydrogen peroxide or peracetic acid

Type 202810/01-102-86-080-055

Sales No. 20/00392611

Material

housing: PVC

sample vessel: PC

Permissible temperature / pressure

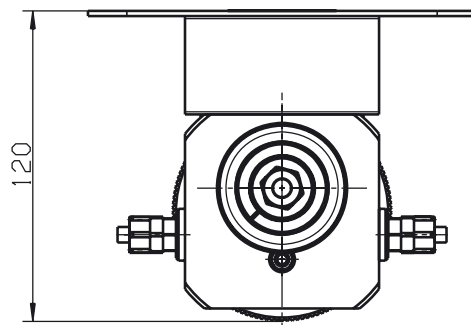
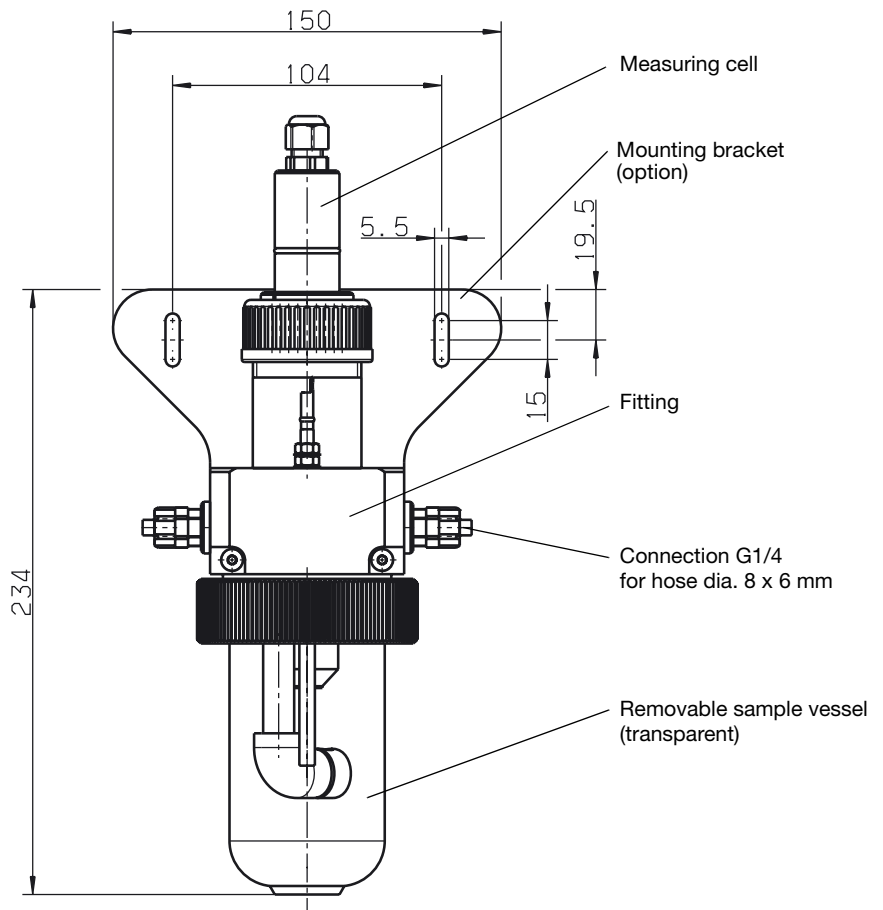
0 to 50°C; up to 1 bar

Connection

G 1/4 threaded hose connection

Fixing

option: mounting bracket in stainless steel, Mat. Ref. 1.4571

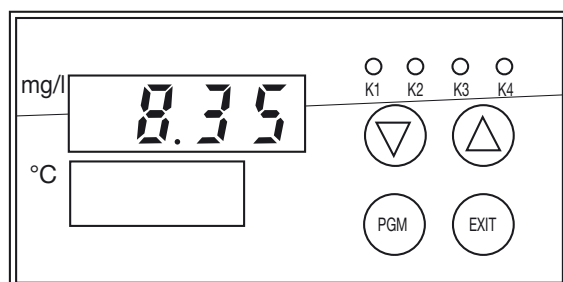


Options

JUMO dTRANS Az 01

Microprocessor indicator/controller for analytical measurement

as indicating/operating and control unit (for details, please see Data Sheet 20.2550)



Flow-monitoring assembly

Consisting of:

Flow monitor

Sales No. 20/00396471

and

Fitting for flow monitor

Sales No. 20/00396470

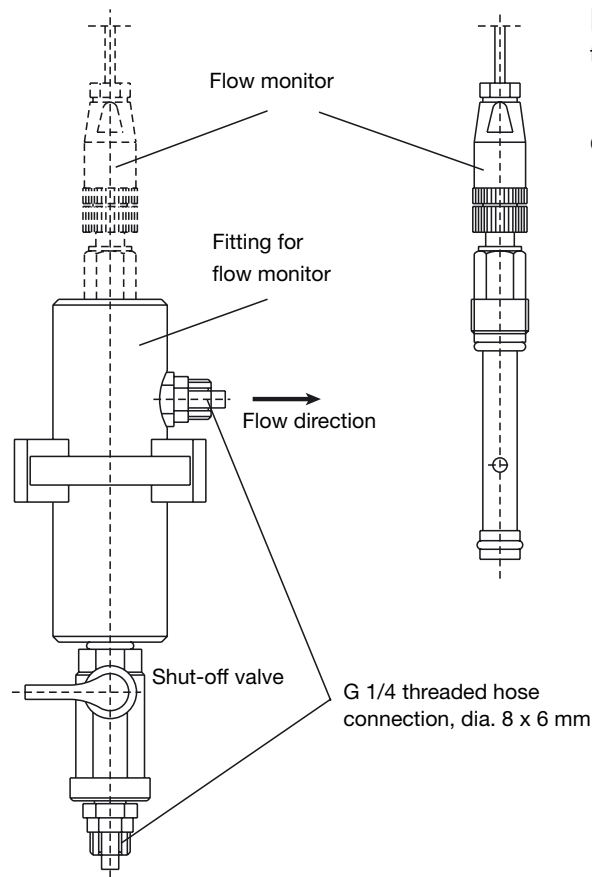
Operation

For proper operation, the incident flow of the sample liquid on the cell must be at least 15 cm/sec.

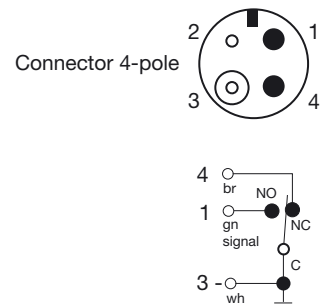
Below this minimum flow velocity, the cells will indicate values that are too low. This may cause a connected control system to apply a dangerous over/underdose. Above this minimum, the measurement signal will only be slightly affected by the incident flow velocity.

The minimum incident flow velocity of 15 cm/sec can be monitored by means of the flow monitoring assembly.

The flow monitoring assembly consists of a flow monitor and the appropriate fitting. The flow monitoring assembly is installed in line with the flow-through fitting. On reaching, or exceeding, the minimum flow velocity, a contact in the terminal head of the flow monitor will switch. This contact can then be used to operate, for instance, one logic input of the JUMO dTRANS Az 01 (microprocessor indicator/controller for analytical measurement). With insufficient incident flow, the JUMO dTRANS Az 01 is set to "HOLD", thereby avoiding an incorrect dosage.

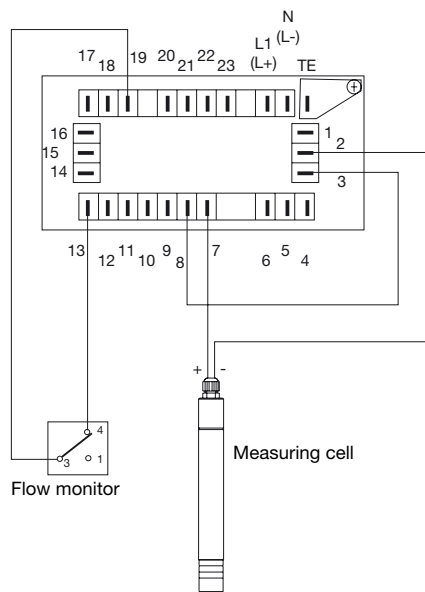


Electrical connection for flow monitor



Application example

Connection example of the cell and the flow monitor to the JUMO dTRANS Az 01 (microprocessor indicator/controller for analytical measurement)



Terminal assignment for the JUMO dTRANS Az01

Terminal	Connection
2 + 3 -	Supply for 2-wire transmitter 18 V DC
7 - 8 +	Input for standard 4 – 20 mA signal
13 19	Logic input 1 (e.g. for flow monitoring)

Operation

Above a flow velocity of 15 cm/sec, the contact (3+4) of the flow monitor is opened. When the contact (3+4) is closed and the logic input 1 or 2 of the JUMO dTRANS Az 01 is wired up and configured accordingly, the instrument reacts with "HOLD". This will prevent incorrect dosing as a result of insufficient incident flow on the cell.

Order details

(1) Basic type

202630 Measuring cell

(2) Basic type extensions

		55	peracetic acid
		60	hydrogen peroxide
		(3) Range¹	
<input type="checkbox"/>	<input type="checkbox"/>	60	0 – 500 mg/liter (ppm)
<input type="checkbox"/>	<input type="checkbox"/>	80	0 – 10,000 mg/liter (ppm)

x = fitted as standard
o = available as an option

	(1)	(2)	(3)
Order code	<input type="text"/>	/ <input type="text"/>	- <input type="text"/>
Order example	202630	/ 60	- 60

¹ others on request

Stock versions (shipment: 3 working days after receipt of order)

Type

Flow-through fitting, Type 202810/01-102/86/080/055

Sales No.

20/00392611

Production versions (shipment: 10 working days after receipt of order)

Type

Measuring cell for hydrogen peroxide, Type 202630/60-60/000
 Measuring cell for hydrogen peroxide, Type 202630/60-80/000
 Measuring cell for peracetic acid, Type 202630/55-60/000
 Measuring cell for peracetic acid, Type 202630/55-80/000

Sales No.

20/00409342
 20/00409343
 20/00421852
 20/00443718
 20/00392573

Suitable indicator/controller:
 JUMO dTRANS Az 01, type 202550/10-665-888, 140-23-00/000
 (for other versions, please see Data and Price Sheet 20.2550)

Accessories (shipment: 10 working days after receipt of order)

Important:

Please always specify the measuring range when ordering spare parts kits for the cells!

Designation

Spare parts kit for 202630/55 and /60 measuring range 0 to 500 mg/l (ppm)
 (1 x membrane cap, fine abrasive paper)
 Spare parts kit for 202630/55 and /60 measuring range 0 to 10.000 mg/l (ppm)
 (1 x membrane cap, fine abrasive paper)
 Special electrolyte for 202630/55, 100 ml
 Special electrolyte for 202630/60, 100 ml
 Flow monitor
 Fitting for flow monitor
 Mounting bracket for flow-through fitting for chlorine, chlorine dioxide or ozone measuring cells

Sales No.

20/00409344
 20/00438125
 20/00440821
 20/00438126
 20/00396471
 20/00396470
 20/00455706