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.

885 Fox Chase, Suite 103
Coatesville PA 19320, USA
Phone: 610-380-8002
1-800-554-JUMO
Fax: 610-380-8009
E-mail: info@JumoUSA.com
Internet: www.JumoUSA.com

Measuring Cells for free chlorine, chlorine dioxide, ozone

Type 202630

- **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 (Cl_2), electrolytically produced chlorine, sodium hypochlorite (NaOCl, chlorine bleach), calcium hypochlorite ($Ca(OCl)_2$) or chlorinated lime (Ca(OCl)Cl).

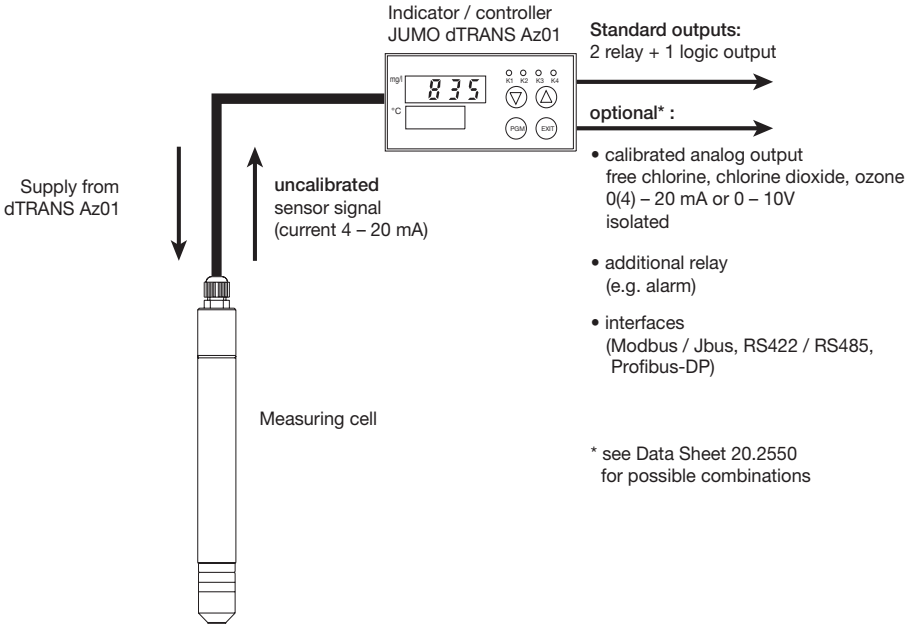
The cell for chlorine dioxide is available for measuring chlorine dioxide in chlorite/chlorine and chlorite/hydrochloric acid plants.

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.

Operation



Notes

- Measurement can only be performed in a suitable flow-through fitting (see accessories).
- For proper operation, the incident flow of the sample liquid at the cell must be at least 15 cm/sec.
  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 ClO_2 and O_3, 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).

– 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 (ΔpH < 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 µS/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

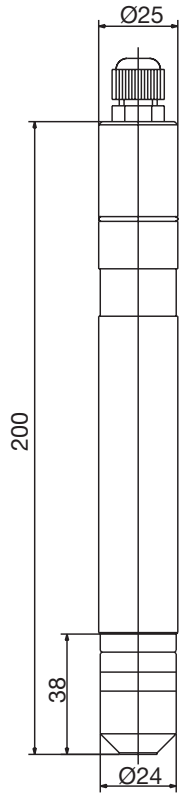
Analyte	**Free chlorine**		**Chlorine dioxide (ClO_2)**		**Ozone (O3)**	
Membrane type	hydrophobic PTFE membrane	hydrophilic membrane	hydrophobic PTFE membrane	membrane insensitive to chemicals and tensides	hydrophobic PTFE membrane	membrane insensitive to chemicals and tensides
	Type 202630/40	Type 202630/41	Type 202630/45	Type 202630/46	Type 202630/50	Type 202630/51
Meaurement 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	$\leq \frac{U_B - 11\ V}{0.02\ A}$					
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 the 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

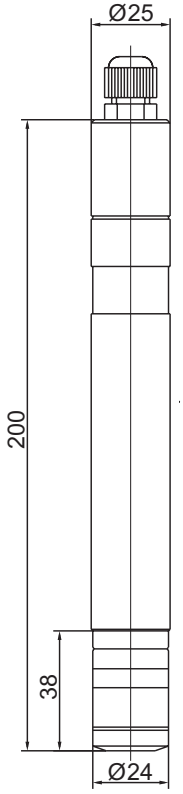
Dimensions

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

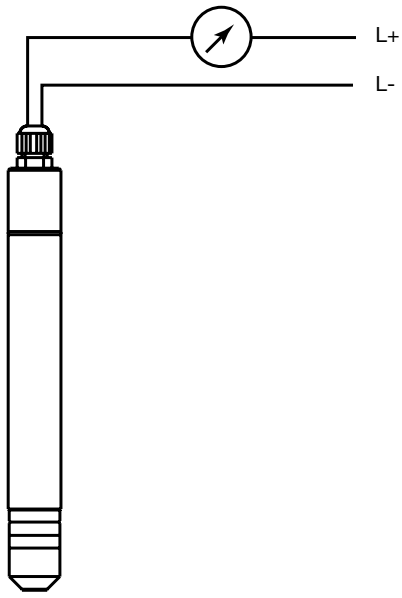


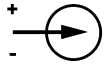
Dimensions

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



Electrical connection



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

Accessories (optional)

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

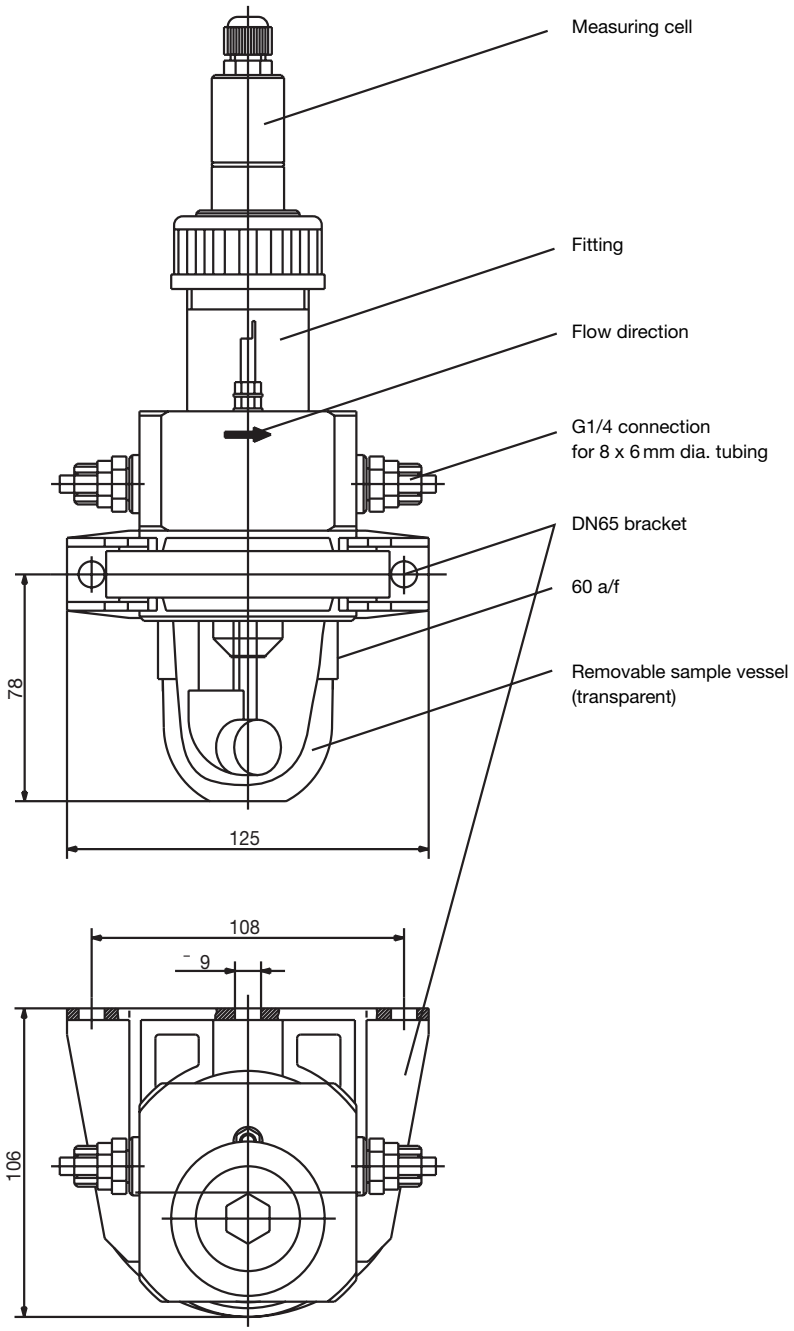
Type 202810/01-102-86-080-055

Sales No. 20/00392611

Material
housing: PVC
sample vessel: Macrolon®

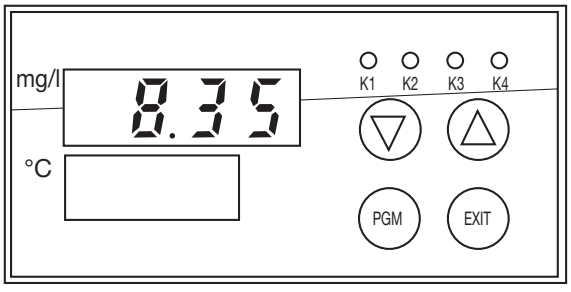
Permissible temperature / pressure
>0 to +90°C; up to 1 bar

Connection
G 1/4 A
DN65 bracket for wall mounting



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 at the cell must be at least 15 cm/sec.

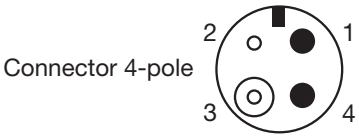
Below this minimum incident flow velocity, the cells will indicate values that are too low. This may cause a connected control system to apply a dangerous over/underdose. Above this minimum, the measurement signal will only be slightly affected by the incident flow velocity.

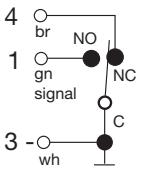
The minimum incident flow velocity of 15 cm/sec can be monitored by means of the flow monitoring assembly.

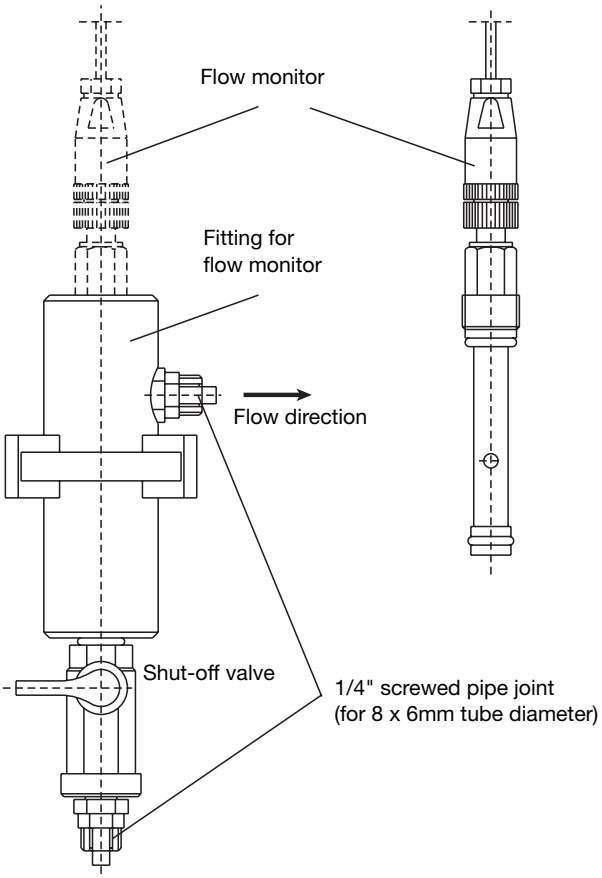
The flow monitoring assembly consists of a flow monitor and the appropriate fitting. It is installed in line with the flow-through fitting. On reaching or exceeding the minimum incident flow velocity, a contact in the terminal head of the flow monitor will switch. This contact can then be used to operate, 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

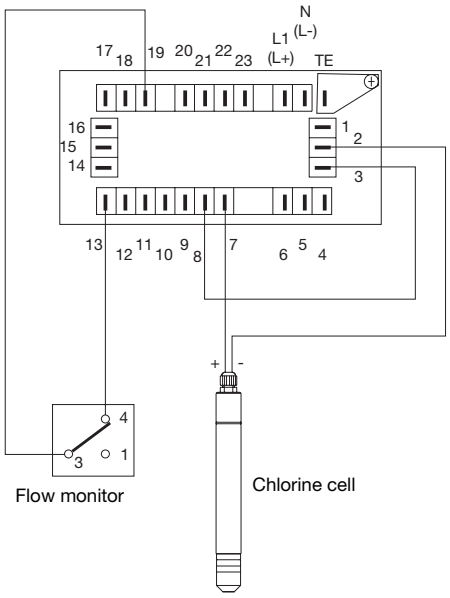






Application example

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



Terminal assignment of the JUMO dTRANS Az01

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

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 at the cell.

Order details

	(1)	**Basic type**
202630		Measuring cell for free chlorine or chlorine dioxide or ozone
	(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)	**Measurement range**
0050		0.000 to 0.500 mg/liter
0200		0.00 to 2.00 mg/liter
	(4)	**Extra codes**
000		none

	(1)		(2)		(3)		(4)
Order code	202630	/		-		/	
Order example	202630	/	40	-	0200	/	000

Stock items (delivery 3 working days after receipt of order)

Type	Sales No.
Measuring cell for free chlorine, Type 202630/40-0050/000	20/00391395
Measuring cell for free chlorine, Type 202630/40-0200/000	20/00391396

Flow-through fitting, Type 202810/01-102/86/080/055	20/00392611

Non-stock items (delivery 2 weeks after receipt of order)

Type	Sales No.
Measuring cell for chlorine dioxide, Type 202630/45-0200/000	20/00392199
Measuring cell for chlorine dioxide (insensitive to chemicals and tensides), Type 202630/46-0200/000	20/00441317
Measuring cell for ozone, Type 202630/50-0200/000	20/00392202
Measuring cell for ozone (insensitive to chemicals and tensides), Type 202630/51-0200/000	20/00441319
Measuring cell for free chlorine (reduced pH dependence), Type 202630/41-0200/000	20/00392574

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

Optional accessories available from stock (delivery 3 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