



Sensor Data Sheets

without ISA

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In setting up the device it is important amongst other things to note the correct electrical connections, protection against connections to foreign bodies, humidity, protection against excessive moisture due to condensation and to the overheating of the device in proper and improper use.

The implementation of these measures is the responsibility of the installers who setup this device.

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8 Level/Pressure 9 ORP

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Conductivity sensor

Conductivity sensor with electromagnetic measuring method and integrated temperature sensor

Article-No. 461 2000 (submersible)



Properties

- conductivity sensor with electromagnetic measuring method
- without electrical contact to medium
- measuring range and accuracy according to customer specification
- calibration control once a year
- insensitive to soiling
- service reduced

Applications

- process control
- dishwasher control
- water quality management

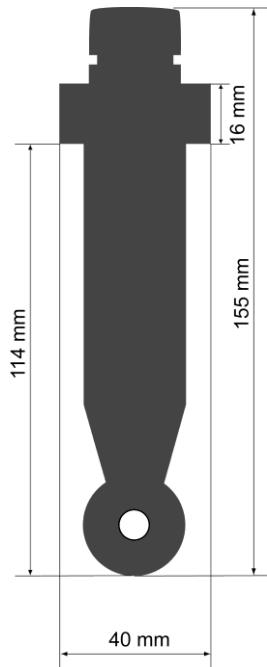
Technical data

	Conductivity	Temperature
Measuring principle	inductive cell with compensation	NTC
Measuring range	0 - 2000 µS/cm	-2°C to +90°C
Measuring accuracy	5 µS/cm or 1% FS	0,9°C
Measuring resolution	1 µS/cm	0,1 °C
Measuring rate	1 s	1 s
Material	PVC-U	
Ambient temperature	-10°C to +60°C	
Weight	approx. 0.8 kg	
Dimensions	length: approx. 160 mm diameter measuring head: approx. 60 mm	

Conductivity sensor

Conductivity sensor with electromagnetic measuring method

Article-No. 461 2040 for to mount in a level measuring tube



Properties

- conductivity sensor with electromagnetic measuring method
- without electrical contact to medium
- measuring range and accuracy according to customer specification
- for to mount in a level measuring tube
- calibration control once a year
- insensitive to soiling
- service reduced

Applications

- process control
- dishwater control
- drinking water monitoring
- ground water monitoring

Technical data

Measuring principle	inductive cell with compensation
Measuring range	40 - 4000 µS/cm
Measuring accuracy	5 µS/cm or 1% of the measured value
Measuring resolution	1 µS/cm
Measuring interval	1 s
Material	PVC-U
Temperature	-10°C to +60°C
Weight	0,2 kg without cable and mounting set
Dimensions	see drawing

Conductivity sensor

Conductivity sensor with electromagnetic measuring method

Article-No. 461 2050 flow through version



Properties

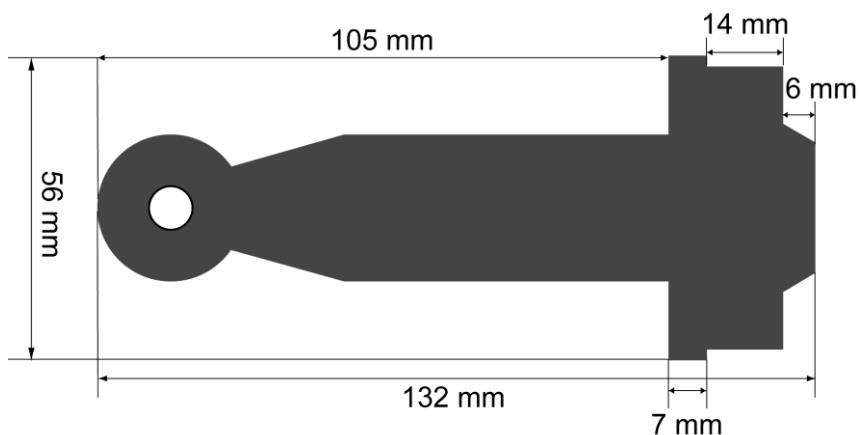
- conductivity sensor with electromagnetic measuring method
- without electrical contact to medium
- measuring range and accuracy according to customer specification
- well-defined mounting direction by encoding
- calibration control once a year
- insensitive to soiling
- service reduced

Applications

- process control
- dishwasher control
- water quality management

Technical data

Measuring principle	inductive cell with compensation
Measuring range	40 - 4000 µS/cm
Measuring accuracy	5 µS/cm or 1% of the measured value
Measuring resolution	1 µS/cm
Measuring interval	1 s
Material	PVC-U
Temperature	-10°C ... +60°C
Weight	0,2 kg without cable and mounting set
Dimensions	see drawing prepared for mounting in DN 50 branch connexion

Dimensions

Temperature sensor

Article-No. 461 3110 in submerge case

Properties

- measuring principle NTC
- without electrical contact to medium
- measuring range and accuracy according to customer specification
- calibration control once a year
- insensitive to soiling
- service reduced

Applications

- process control
- dishwater control
- drinking water monitoring
- ground water monitoring

Technical data	
Measuring principle	NTC
Measuring range	-4°C bis +60°C
Measuring accuracy	0,3°C absolute
Measuring resolution	0,1°C
Measuring interval	≥ 5 s
Housing material	PVC
Temperature	-10°C bis +85°C
Weight	0,25 kg
Dimensions	length: 80 mm; diameter: 60 mm
Cable length	250 g

Temperature sensor

Article-No. 461 3120 flow through version, prepared for mounting in DIN 50 branch



Properties

- measuring principle NTC without electrical contact to medium
- measuring range and accuracy according to customer specification
- prepared for mounting in DN 50 branch
- calibration control once a year
- insensitive to soiling
- service reduced

Applications

- process control
- dishwasher control
- drinking water monitoring
- ground water monitoring

Technical data

Measuring principle	NTC
Measuring range	-4°C bis +60°C
Measuring accuracy	0,3°C absolute
Measuring resolution	0,1°C
Measuring interval	≥ 5 s
Housing material	PVC
Temperature	-10°C bis +85°C
Weight	0,25 kg
Dimensions	length: 80 mm; diameter: 60 mm
Cable length	250 g

O₂ sensor

Oxygen sensor for measurement of dissolved oxygen with integrated temperature sensor

Article-No. 461 4000



Properties

- oxygen sensor working with galvanic cell, mounted in robust dipping enclosure
- measuring independent from oncoming flow
- calibration in air or in air saturated water
- long life cycle
- can be positioned directly into waterbodies
- cost-effective
- no defined approaching flow necessary

Applications

- process control
- wastewater control
- drinking water monitoring
- aquaculture

Technical data O₂

Measuring principle	galvanic cell
Measuring range	0 ... 20 mg/l
Measuring accuracy	+/- 0,2 mg/l
Measuring resolution	0,1 mg/l
Measuring interval	≥ 1 s
Housing material	PVC
Temperature range	-4°C...+50°C
Weight	0,25 kg
Dimensions	length 130 mm; diameter: 50 mm

Technical data Temp.

Measuring principle	NTC
Measuring range	-4°C to +60°C
Measuring accuracy	0,3°C, absolute
Measuring resolution	0,1 °C
Measuring interval	≥ 5 s

Dissolved oxygen sensor

Artikel-No. 461 4600

Optical Sensor — No Membranes — No Constant Calibration

The optical dissolved oxygen sensor is a unique system that combines advanced electronics with a solid-state, optical sensor. The system allows for flexible and economical monitoring and control. The DO sensor does not need membranes, electrolyte, nor routine calibrations and maintenance.



Features

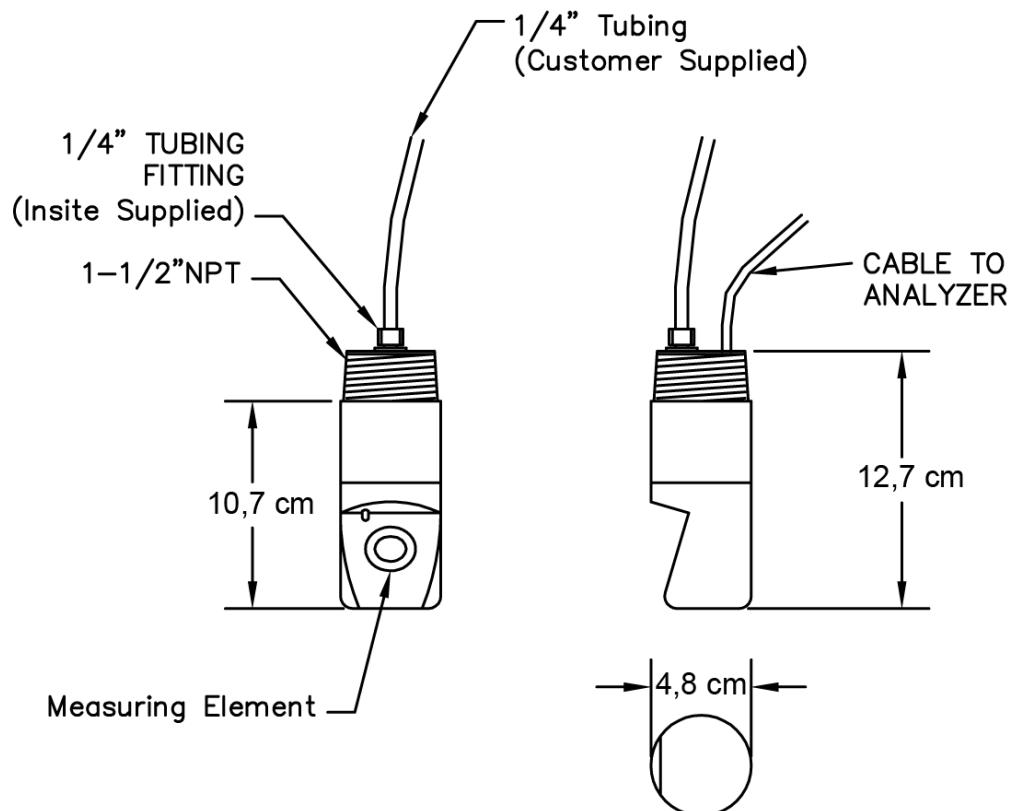
- fluorescence sensor technology
- no membranes, no electrolyte
- not damaged by exposure to sunlight
- calibration is factory adjusted

Benefits

- increased accuracy
- easy to use
- reduced maintenance requirements

Technical data	
Measuring range	DO — 0 to 25 ppm
Accuracy	DO — 1% of reading or .02 ppm, whichever is greater
Sensitivity / Resolution	DO — .01 ppm below 4.00, .1 ppm above 4.0
Repeatability	DO — .01 ppm
Sensor drift	less than 1% per year
Temperature range	0°C to 60°C
Response time	95% in less than 60 seconds
Sensor check	automatic self diagnostics
Output	RS-485 Modbus
Power supply	6 – 16 V DC; 10 mA
Sensor cable length	25 ft (7,6 m) standard, optimal length up to 2000 ft (610 m)
Ambient temperature	-20°C to +70°C
Ambient humidity	0% to 100%
Wetted materials	epoxy, polyurethane, and PVC
Maximum pressure	6 bar
Weight	310 g

Dimensions



Replacement O₂ sensor for 461 4000

Article-No. 461 4901



Properties

- sensor replacement element for O₂-Sensor für 461 4000
- live cycle typically 12 to 24 months

Technical data	
Measuring principle	galvanic cell
Measuring range	0 - 20 mg/l
Measuring accuracy	+/- 0,2 mg/l
Measuring resolution	0,1 mg/l
Measuring interval	≥ 1 s
Ambient temperature	-4°C to +50°C
Weight	approx. 0,1 kg
Dimensions	length 55 mm; diameter: 13 mm

pH and temperature sensor with integrated temperature sensor

Article-No. 461 5000 flow through

Article-No. 461 5010 dip version, without picture



Properties

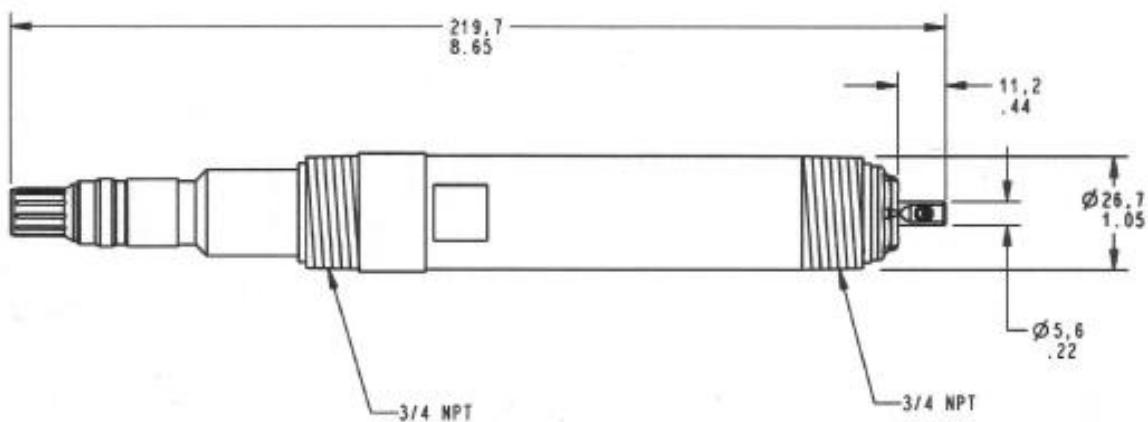
- pH-sensor working with ISFET
(Ion selective field effect transistor)-principle
- robust ceramics diaphragm
- calibration 1 times a week to 1 times a month
(depending on application)
- regeneration of electrodes after 12 to 18 months
operation time (depending on application)
- protection class IP67
- ph probe in submerge version with additional
probe protection cap

Applications

- process control (e.g. food and chemical Industry)
- water monitoring
- waste water control

Technical data

	pH	Temperature
Measurement Principle	ISFET	NTC
Measuring range	pH 1 ... 14	-2°C to +90°C
Measurement accuracy	pH 0.1	0.9°C
Measurement resolution	pH 0.1	0.1 °C
Measurement interval	1 s	1 s
Temperature		0°C to +110°C
Weight		0.23 kg
Connection		¾`` NPT screw thread; 11-Pin Vario Pin
Dimensions		see technical drawing

Dimensions

pH electrode

pH single-rod measuring cell

Article-No. 461 5100**Properties**

- pH- single-rod measuring cell
- ceramics diaphragm
- reference system Ag/AgCl
- protection class IP67

Applications

- process control (e.g. food and chemical Industry)
- water monitoring
- wastewater control

Technical data

Principle	pH- single-rod measuring cell with Ag/AgCl reference
Range	pH 2 - pH 13
Accuracy	< 1 % FS
Resolution	0,05 % FS
Diaphragm	ceramic
Temperature range	-5°C to 80°C
Reference filling solution	Gel
Max pressure	3 bar
Mounting length	120 mm
Min conductivity of solution	50 µS
Mounting position	10° to 170°

pH elektrode single-rod measuring cell with integrated temperature sensor**Artikel-No. 461 5215****Properties**

- low maintenance
- Elektrolyte: Referid® (polymer with visible KCl reserve), not refillable

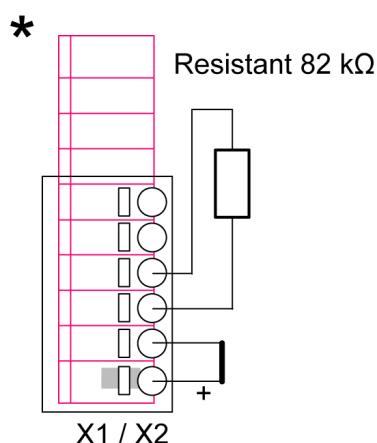
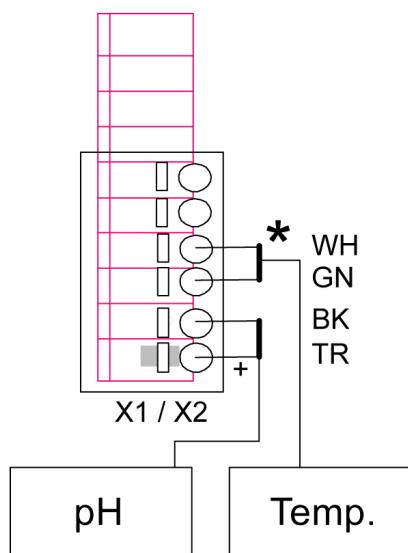
Applications

especially for measurements in

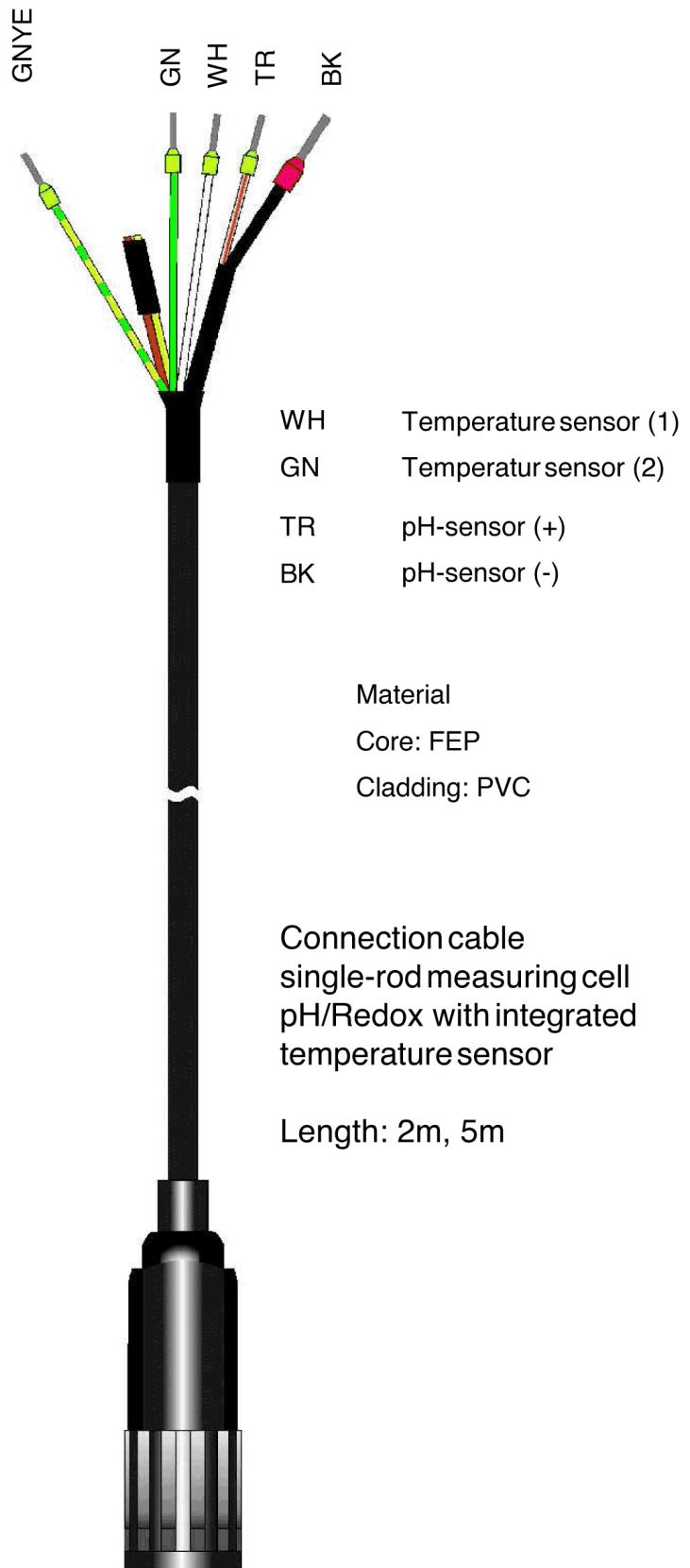
- drinking water
- process water
- waste water

Technical data	
measuring principle pH	glass electrode
measuring principle temp.	NTC 30 kΩ
measuring range pH	pH 2 - pH 13
measuring range temp.	0°C bis 80°C
pressure range	0 bar – 10 bar
zero point	pH 7
installation length	120 mm
shaft diameter	12 mm

Sensor terminal connection
BlueSense Transducer



If no temperature sensor is connected, the open input must be closed with a resistance of 82 kΩ.



SMEK plug-in connector IP67

Turbidity sensor with scattered light measurement**Article-No. 461 6724****Properties**

- measurement range adjustable
- low energy use
- small body
- very low voltage offset, therefore no adaption necessary
- robust, corrosion-free material
- insusceptible against ambient light
- heigh compressive strength

Applications

- real time control of contamination
- font monitoring
- water and waste water monitoring
- river monitoring

Technical data

Measuring principle	scattered light detection
Measuring range	0 ... 100 / 1000 / 3000 NTU, adjustable
Measuring accuracy	2% FS
Measuring resolution	850 nm
Measuring interval	< 5 s
Material	316 Stainless Steel
Temperature	0°C to +50°C
Max submerge depth	600 m
Weight	0,16 kg
Dimensions	length: 110 mm; Diameter: 22 mm

Turbidity probe compact turbidity probe, submersible (max. 10m)

Article-No. 461 6725



Properties

- complete probe with 4...20 mA-Output
- 90°-scattered light measurement according to DIN EN ISO 7027
- adjustable measuring range 0-50/100/200/500/1000/2000 FNU
- high resolution from 0,01 FNU
- integrated display
- nano-coated glass, dirt-repellent
- dynamic compensation of extraneous light
- factory calibrated, long-term stable

Applications

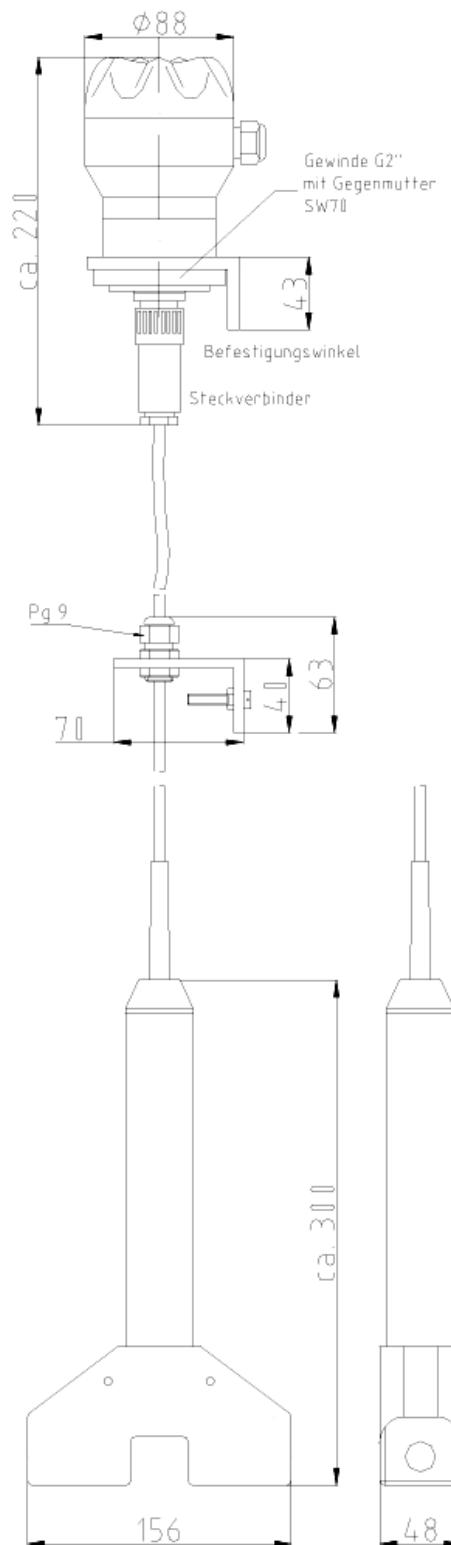
- controlling WWT outlet
- filter controlling
- sedimentation process
- cooling water

Technical data

Principle	90° scattered light according to DIN EN ISO 7027
Range	adjustable: 0 ... 50/100/200/500/1000/2000 FNU
Accuracy	+/-5% measured value and +/-1% FS
Resolution	0,01 – 1 FNU depends on Measuring range
Protection class	IP68 (max. 10m)
Material measuring head	PVC
Environmental conditions	+0°C...+45°C
Cable lenght	6 m
Power supply	24 V DC; (1,2 W)

dimensions at backside

Dimensions



Turbidity sensor

Compact turbidity sensor in flow through version in PVC with both sided DN-bolting or in PP with both sided loose flange

Article-No. 461 6726



Properties

- complete probe with 4 - 20 mA-Output
- 90°-scattered light measurement according to DIN EN ISO 7027
- adjustable measuring range 0-50/100/200/500/1000/2000 FNU
- high resolution from 0,01 FNU
- integrated display
- nano-coated glass, dirt-repellent
- factory calibrated, long-term stable



Applications

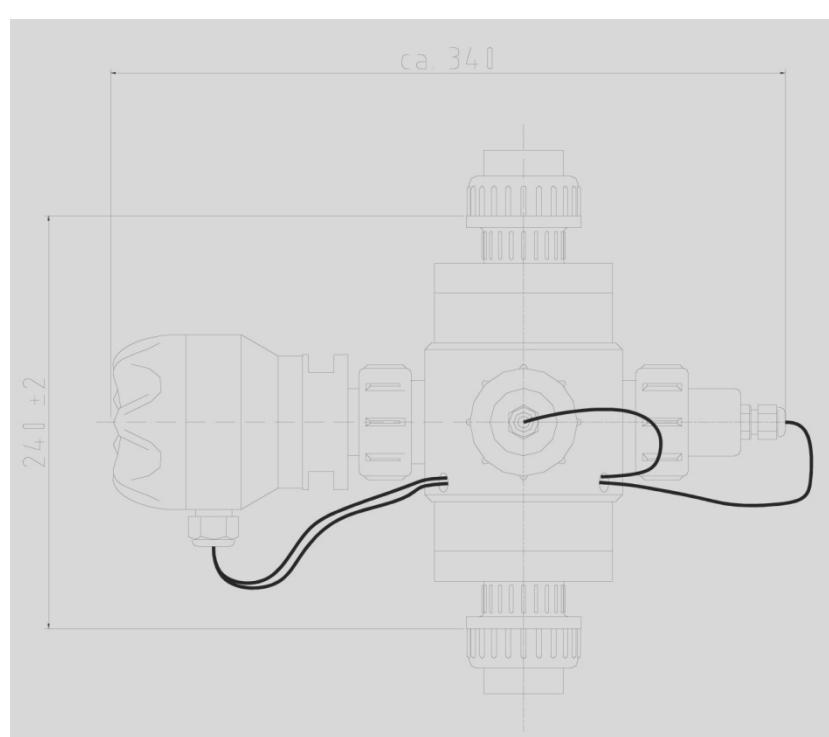
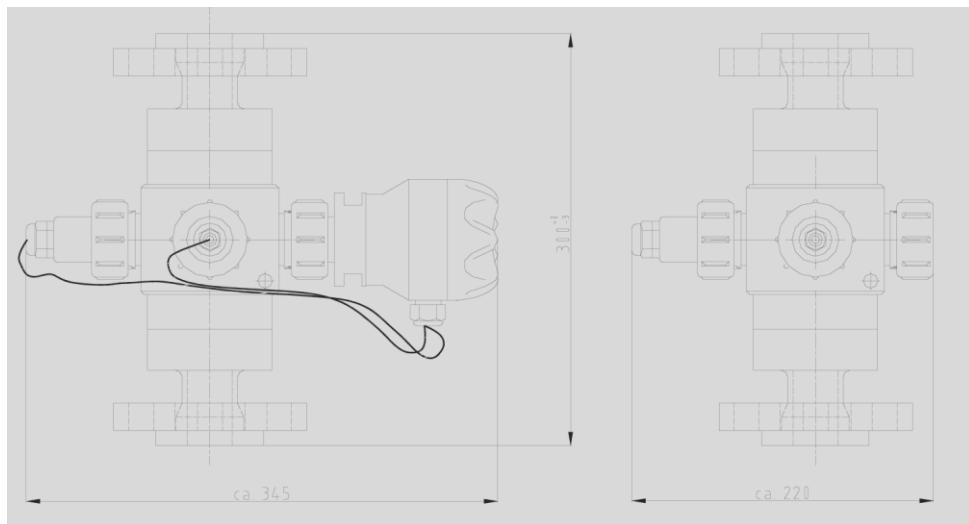
- controlling WWT outlet monitoring
- font controlling
- filter controlling
- sedimentation process monitoring
- cooling water monitoring

Technical data

Measuring principle	90° scattered light according to DIN EN ISO 7027
Measuring range	adjustable: 0 - 50/100/200/500/1000/2000 FNU
Measuring accuracy	+/-5% measured value and +/-1% FS
Measuring resolution	0,01 – 1 FNU depends on Measuring range
max. pressure	6 bar/20°C, 1 bar/60°C
Material measuring head	PVC oder PP
Environmental emperature	PVC: +5°C to +60°C; PP +5°C to +80°C
Sensor window glass	borosilicate-glass
Supply voltage	24 V DC; (1,2 W)

dimensions see next page

Dimensions



Attention:
Mounting only in vertical tube allowed.
Best is to mount in a rising tube with slowdown section
approx. 600 mm before and approx. 400 mm behind.

Turbidity sensor in flow through fitting

Article-No. 461 6730



Properties

- turbidity sensor in a compact flow through fitting
- 90° scattered light measurement at 860 nm
- measuring range and accuracy according to customer specification
- various process connections: e.g. ½'' tube fitting, tube connection (10 mm) with quick connectors

Applications

- process control
- waste water monitoring
- environment monitoring

Technical data

Material of flow through case	POM
Cable length to the transducer	1,2 m
Measurement principle	scattered light 90°
Light source	860 nm
Measurement range	0 - 10 NTU; 0 – 100 NTU
Measurement accuracy	2% FS or +/- 0,02 - 40 NTU; 5% FS higher 40 NTU
Measurement resolution	0,001
Measurement interval	>1 s
Protection class	IP 65
Temperature range	-10°C to +45°C
Housing dimensions	approx. 100 mm x 122 mm x 112 mm
Current supply	via transducer / sensor module

Turbidimeter

Turbidimeter in flow through enclosure with integrated measuring transducer

Article-No. 461 6731



Properties

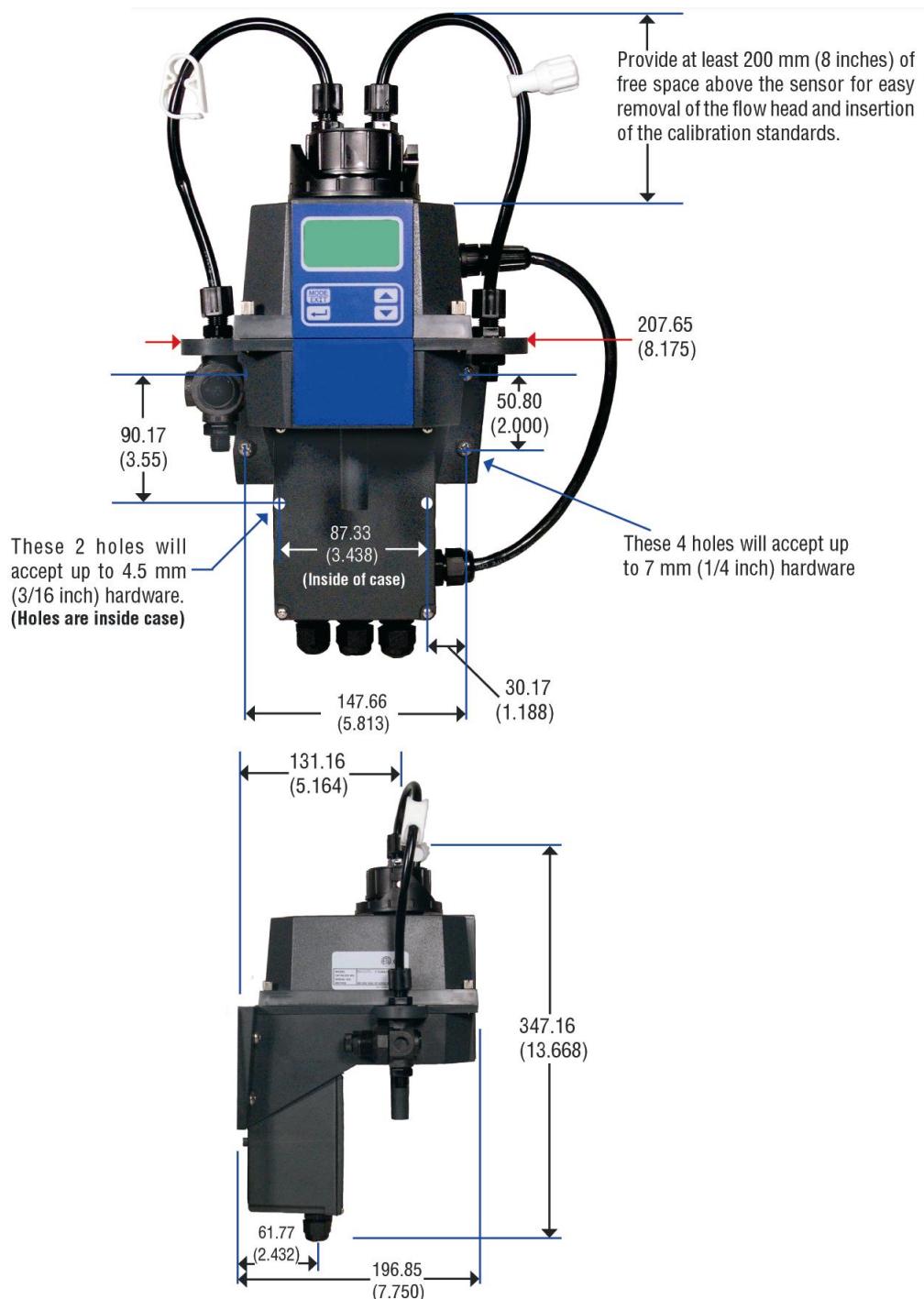
- turbidimeter with scattered light measuring method
- ready for connection in flow through enclosure
- integrated measuring transducer, output analog or digital
- easy to handle

Applications (exemplary)

- process control
- water quality management
- drinking water control

Technical data

Range	0 – 100 NTU
Measurement principle	Nephelometry (90 degrees)
Accuracy	2 % of reading or +/- 0.02 below 40 NTU 5 % of reading above 40 NTU
Resolution	0.0001 selectable
Response time	adjustable (5 to 500 seconds) (0 – 1000 NTU)
Input pressure	1 – 200 psi (built in regulator set at 15 psi)
Standard outputs	4 – 20 mA Galvanic Isolated or RS-485
RS-485 protocols	Modbus, HF Simplebus, HF Online Interface
Light source	white Light
User alarms	2 High / Low Alarms
Alarm contacts	FORMC 250 VAC 2A
Display	Multiline Custom Backlight LCD
Security code	prevents unauthorized access
Built in diagnostics	yes
Storage temperature	- 4° F to 140° F (-20°C to 60°C)
Operating temperature	32° F to 122° F (0°C to 50°C)
Wetted surfaces	Nylon, Borosilicate Glass, Silikon, Polypropylene, Stainless Steel
Enclosures	designed to meet NEMA 4X, IP66
Outdoor installation	32° F to 122° F (0°C to 50°C)
Certifications	USEPA, ISO 180.1
Dimensions	14" x 12" x 12" (35 cm x 30 cm x 30 cm)
Shipping weight	2.5 kg (5.5 lbs.)



Refined oil in water / BTEX sensor

fluorescence measurement

Article-No. 461 6750



Properties

- measurement range adjustable
- low energy use
- small body
- very low voltage offset, therefore no adaption necessary
- robust, corrosion-free material
- insusceptible against ambient light
- heigh compressive strength

Applications

- real time control of contamination
- water and waste water monitoring
- river monitoring

Technical data

Measuring principle	fluorescence measurement light source < 300 nm reading between 300 nm and 400 nm
Measuring range	0,1 – 30 ppm / 30 – 300 ppm / 300 – 3000 ppm
Measuring accuracy	2% FS
Detection limit	0,1 ppm
Measuring interval	< 5 s
Material	housing: titanium
Temperature	0°C to +50°C
Max submerge depth	600 m
Weight	0,16 kg
Dimensions	length: 110 mm; Diameter: 22 mm

Crude oil in water

fluorescence measurement

Article-No. 461 6751 titanium housing

Article-No. 461 6752 stainless steel housing



Properties

- measurement range adjustable
- low energy use
- small body
- very low voltage offset, therefore no adaption necessary
- robust, corrosion-free material
- insusceptible against ambient light
- heigh compressive strength

Applications

- real time control of contamination
- water and waste water monitoring
- river monitoring

Technical data

Measuring principle	fluorescence measurement light source < 300 nm reading between 300 nm and 400 nm
Measuring range	0,1 – 10 ppm / 10 – 100 ppm / 100 – 1000 ppm
Measuring accuracy	2% FS
Detection limit	0,1 ppm
Measuring interval	< 5 s
Material	housing: stainless steel (optional titanium)
Temperature range	0°C to +50°C
Max. submerge depth	600 m
Supply voltage	3 – 15 V DC
Power input	max. 360 W
Weight	0,16 kg
Dimensions	length: 110 mm; Diameter: 22 mm
Cable length	0,6 m (prolongable)

Chlorine sensor

for the measurement of free chlorine

Article-No. 461 7001



Properties

- tenside will be accepted partially
- appropriate chlorinate agent (inorganic chlorine compounds):
 - NaOCl (=chlorine bleaching lye)
 - Ca(OCl)₂
 - chlorine gas
 - chlorine produced by electrolysis

Applications

- swimming bathes
- drinking water monitoring

Technical data

Measuring principle	Membrane covered, amperometric working potentiostatic 3-electrode system with integrated electronic
Measurand	free chlorine
Operating temperature	>5°C to <45°C
Temperature compensation	by automatically integrated temperature sensor
max. operating pressure	0,5 bar, no pressure surges and/or vibrations
Mass flow	approx. 30 L/h, low flow dependency exists
pH-range	pH 6 – pH 8, reduced pH-value-dependence
Running-in time	on first starting up approx. 2 h
Response time	T ₉₀ : approx. 30 s
Zero compensation	not necessary
Slope matching	On the meter by means of analytical determination of chlorine (DPD-1 method)
Disturbance	ClO ₂ : will be recorded O ₃ : will be measured with a slope of approx. 80 % (factor 0,8 referring to the slope of chlorine)
Dimensions	Diameter: approx. 25 mm Length: approx. 175 mm (4-pol-plug-adapter-connection) approx. 220 mm (4 - 20 mA, 2-pole clamp connection)
Storage	unlimited storable when frost free, dry and without electrolyte Benutzte Membrankappen sind nicht lagerfähig!
Maintenance	regular inspection of the measuring signal min. once a week replacement of the membrane cap: once a year (depends on the water quality) electrolyte replacement: every 3 - 6 months

Version	Measurement range in ppm	Resolution in ppm	Output source resistance	Connection
CS2.3N	0,05 – 20,00	0,01	0 – 2000 mV 1kΩ	4-pole plug-adapter
CS2.3Up	0,05 – 20,00	0,01	0 – 2000 mV 1kΩ	4-pole plug-adapter
CS2.3HUn	0,005 – 2,000	0,001	0 – 2000 mV 1kΩ	4-pole plug-adapter
CS2.3MA2	0,01- 2,00	0,01	4 – 20 mA uncalibrated	2-pole clamp
CS2.3MA5	0,01- 5,00	0,01	4 – 20 mA uncalibrated	2-pole clamp
CS2.3MA10	0,01- 10,00	0,01	4 – 20 mA uncalibrated	2-pole clamp

Chlorine sensor

for the measurement of free chlorine

Article-No. 461 7100



Properties

- the pH value must be constant.
- no surfactants should be included.
- appropriate chlorinate agent (inorganic chlorine compounds):
NaOCl (=chlorine bleaching lye)
Ca(OCl)₂
chlorine gas
chlorine produced by electrolysis

Applications

- swimming batheries
- drinking water monitoring
- process water monitoring

Technical data

Measuring principle	membrane covered, amperometric 2-electrode system with integrated electronic
Measurand	free chlorine
Operating temperature	>5°C to <45°C
Temperature compensation	by automatically integrated temperature sensor
max. operating pressure	1,0 bar, no pressure surges and/or vibrations
Mass flow	approx. 30 L/h, low flow dependency exists
pH-range	pH 6 – pH 8, attend to dissociation curve HOCl !
Running-in time	on first starting up approx. 1 h
Response time	T ₉₀ : approx. 30 s
Zero compensation	not necessary
Slope matching	on the meter by means of analytical determination of chlorine (DPD-1 method)
Disturbance	ClO ₂ : is recognized by a factor of 9 of its measured value O ₃ : is recognized
Dimensions	Diameter: approx. 25 mm Length: approx. 175 mm (4-pol-plug-adapter-connection) approx. 220 mm (4-20 mA, 2-pole clamp connection)
Storage	unlimited storable when frost free, dry and without electrolyte
Maintenance	regular inspection of the measuring signal min. once a week replacement of the membrane cap: once a year (depends on the water quality) electrolyte replacement: every 3 - 6 month

Version	Measurement range in ppm	Resolution in ppm	Output	Connection
CL4.1MA2	0,01 – 2,00	0,01	4 – 20 mA	2-pole clamp
CL4.1MA5	0,01 – 5,00	0,01	4 – 20 mA	2-pole clamp
CL4.1MA10	0,01 – 10,00	0,1	4 – 20 mA	2-pole clamp

Chlorine dioxide sensor

Article-No. 461 7200



Properties

- no surfactants should be included.

Applications

- swimming bathes
- drinking water monitoring
- process water monitoring

Technical data

Measuring principle	membrane covered, amperometric 2-electrode system with integrated electronic
Measurand	chlorine dioxide
Operating temperature	>5°C to <45°C
Temperature compensation	by automatically integrated temperature sensor
max. operating pressure	1,0 bar, no pressure surges and/or vibrations
Mass flow	approx. 30 L/h, low flow dependency exists
pH-range	pH 1 – pH 11
Running-in time	on first starting up approx. 1 h
Response time	T ₉₀ : approx. 15 s
Zero compensation	not necessary
Slope matching	on the meter by means of analytical determination
Disturbance	Cl ₂ : is recognized by a factor of 0,03 of its measured value O ₃ : is recognized
Dimensions	Diameter: approx. 25 mm Length: approx. 175 mm (4-pol-plug-adapter-connection) approx. 220 mm (4-20 mA, 2-pole clamp connection)
Storage	unlimited storable when frost free, dry and without electrolyte
Maintenance	regular inspection of the measuring signal min. once a week replacement of the membrane cap: once a year (depends on the water quality) electrolyte replacement: every 3 - 6 month

Version	Measurement range in ppm	Resolution in ppm	Output	Connection
CD4MA0.5	0,005 – 0,500	0,001	4 – 20 mA	2-pole clamp
CD4MA2	0,05 – 2,00	0,01	4 – 20 mA	2-pole clamp
CD4MA10	0,05 – 10,00	0,01	4 – 20 mA	2-pole clamp

Ozone sensor

Article-No. 461 7300



Properties

- amperometric, membrane covered ozone measuring cell
- surfactants are tolerated

Applications

all types of water treatment, e.g.:

- bottle washing machines
- CIP-systems
- rinser
- control of disinfection levels

Technical data	
Measuring principle	membrane covered, amperometric 2-electrode system
Measurand	ozone
Operating temperature	>5°C to <45°C
Temperature compensation	by automatically integrated temperature sensor temperature change <5°C per hour
max. operating pressure	1,0 bar, no pressure surges and/or vibrations
Mass flow	approx. 30 L/h, low flow dependency exists
pH-range	pH 2 – pH 11
Running-in time	on first starting up approx. 1 h
Response time	T ₉₀ : approx. 50 s
Zero compensation	not necessary
Slope matching	on the meter by means of analytical determination
Disturbance	Cl ₂ : OZ7H: leads to an increase of the measured value by 1,5 % OZ7N: negligible CLO ₂ : OZ7N: leads to an increase of the measured value by 6%
Dimensions	diameter: approx. 25 mm length: approx. 220 mm (4-20 mA, 2-pole clamp connection)
Storage	unlimited storable when frost free, dry and without electrolyte Used membrane caps are not storable!
Maintenance	regular inspection of the measuring signal min. once a week replacement of the membrane cap: once a year (depends on the water quality) electrolyte replacement: every 6 month

Version	Measurement range in ppm	Resolution in ppm	Output	Connection
OZ7MA0.2	0,05 – 0,20	0,01	4 – 20 mA uncalibrated	2-pole clamp
OZ7MA0.5	0,05 – 0,50	0,01	4 – 20 mA uncalibrated	2-pole clamp
OZ7MA2	0,05 – 2,00	0,01	4 – 20 mA uncalibrated	2-pole clamp
OZ7MA5	0,05 – 5,00	0,01	4 – 20 mA uncalibrated	2-pole clamp
OZ7MA10	0,05 – 10,00	0,01	4 – 20 mA uncalibrated	2-pole clamp

Ion-Selective Electrode (ISE) for Ammonium

Measurement and Reference Half Cell Combined

Article-No. 461 7400

Properties

- single-rod measuring cell
- slope 55 +/- 3 mV/pNH₄⁺
- durability 6 to 12 month

Applications

- waste water
- environment
- aquaculture

Technical data	
Measuring principle	Ion-Selective Electrode (ISE)
Measuring range	10 ⁻⁶ – 10 ⁻¹ mol/L; Linear: 10 ⁻⁵ – 10 ⁻¹ mol/L 0,018 mg NH ₄ ⁺ /L – 1,8 g NH ₄ ⁺ /L (Linear: 0,18 mg NH ₄ ⁺ /L – 1,8 g NH ₄ ⁺ /L)
Temperature range	0°C to 40°C
Pressure range	1 bar – 2 bar
pH range	3 pH – 8 pH
Selectivity coefficients	$C_{Li, NH4} \quad 1 \times 10^{-4}$ $C_{Na, NH4} \quad 3 \times 10^{-3}$ $C_{K, NH4} \quad 2 \times 10^{-1}$ $C_{Rb, NH4} \quad 6 \times 10^{-2}$ $C_{Cs, NH4} \quad 5 \times 10^{-3}$ $C_{Mg, NH4} \quad 1 \times 10^{-4}$ $C_{Ca, NH4} \quad 1 \times 10^{-5}$ $C_{Sr, NH4} \quad 1 \times 10^{-3}$ $C_{Ba, NH4} \quad 1 \times 10^{-4}$
Slope	55 +/- 3 mV/pNH ₄ ⁺
Dimensions	Diameter: 12 mm (Shaft) and 16 mm (Connection Cap) Length: 107 mm (Shaft) and 147 mm (Shaft + Cap)

Preparation to Measurement

The electrode is delivered with the electrolyte solution inside the shaft. If the electrolyte solution is not inside the shaft the electrode has to be refilled 1 cm under filling port.

Calibration and Measurement

The electrode should be calibrated by standard solutions with known concentrations. It depends on the measurement if a one-point calibration (1 known concentration and the blanc) is enough or if it would be better to calibrate with more than 1 standard solutions of different concentrations.

Exchange of the Membrane Module and Filling of the Electrode

1. Open the filling port on the electrode shaft and unscrew the black membrane module.
2. Rinse with distilled water through the inner shaft.
3. Drain of water (splash).
4. Fill the electrolyte solution into the black membrane module.
5. Screw the black membrane module containing the electrolyte solution onto the electrode shaft.
6. Fill the electrolyte solution into the electrode shaft through the filling port 1-2 cm under this port.
7. Close the filling port.

Storage of the Electrode

When it is not measured with the electrode, it is recommended to store it dry (with the original electrolyte solution) above the level of water in the tube, that is delivered with the electrode.

Ion Selective Electrode ISE for Fluoride

Measurement and Reference Half Cell Combined

Article-No. 461 7600

Properties

- single-rod measuring cell
- durability 6 to 12 month

Applications

- waste water
- environment
- aquaculture

Technical data	
Measuring principle	Ion-Selective Electrode (ISE)
Measuring range	$10^{-6} - 10^{-1}$ mol/L; Linear: $10^{-5} - 10^{-1}$ mol/L $0,019$ mg/L – $1,9$ g/L; Linear: $0,19$ mg/L – $1,9$ g/L $1,9 \times 10^{-6} - 1,9 \times 10^{-1}$ Mass-%; Linear: $1,9 \times 10^{-5} - 1,9 \times 10^{-1}$ Mass-%
Temperature range	0°C to 50°C
Pressure range	1 bar – 2 bar
pH range	4 pH – 8 pH
Interferences	OH^- (Compensated by pH Value)
Dimensions	Diameter: 12 mm (Shaft) and 16 mm (Connection Cap) Length: 107 mm (Shaft) and 147 mm (Shaft + Cap)

Preparation to Measurement

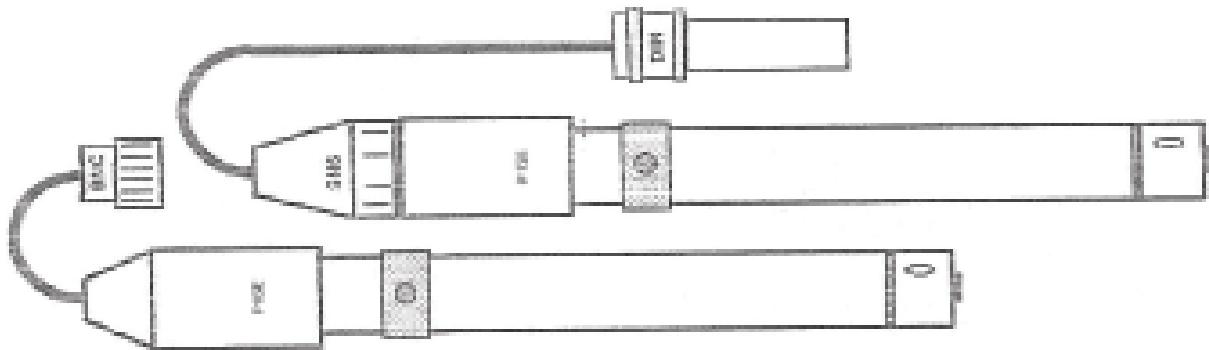
The electrode is delivered with the electrolyte solution inside the shaft. If the electrolyte solution is not inside the shaft the electrode has to be refilled 1 cm under filling port.

Calibration and Measurement

The electrode should be calibrated by standard solutions with known concentrations. It depends on the measurement if a one-point calibration (1 known concentration and the blanc) is enough or if it is more suitable to calibrate with more than 1 standard solutions of different concentrations (for example: within the non-linear concentration range).

Using of the F-ISE

The F-ISE may be used only in aqueous solutions or mild organic solvents like ethanol. Please do not use ketones, esters, higher alcohols, dioxan, tetrahydrofuran or other similar solvents.

Technical Drawing of the F-ISE**Exchange of the Membrane Module and Filling of the Electrode**

1. Open the filling port on the electrode shaft and unscrew the black membrane module.
2. Rinse with distilled water into shaft.
3. Drain of water (splash).
4. Fill the electrolyte solution into the black membrane module.
5. Screw the black membrane module with the electrolyte solution on the electrode shaft.
6. Fill the electrolyte solution into the electrode shaft through the filling port 1-2 cm under this port.
7. Close the filling port.

Storage of the Electrode

When it is not measured with the electrode it is recommended to store it dry (with the original electrolyte solution) above the level of water in the tube that is delivered with the electrode.

Ion-Selective Electrode (ISE) for Chloride

Measurement and Reference Half Cell Combined

Article-No. 461 7620

Properties

- single-rod measuring cell
- durability 6 to 12 month

Applications

- drinking water
- waste water
- environment
- aquaculture

Technical data	
Measuring principle	Ion-Selective Electrode (ISE)
Measuring range	$10^{-5} - 10^{-1}$ mol/L; (Linear: $10^{-4} - 10^{-1}$ mol/L) 0,35 mg Cl ⁻ /L – 3,5 g Cl ⁻ /L; (Linear: 3,5 mg Cl ⁻ /L – 3,5 g Cl ⁻ /L)
Slope at 25°C	-55 ± 3 mV/pCl
Temperature range	0°C to 50°C
pH range	1 pH – 13 pH
Selectivity coefficients	C_{Cl, Br^-} 1×10^{-3} $C_{Cl, S^{2-}}$ 1×10 C_{Cl, J^-} 1×10^{-5} $C_{Cl, S_2O_3^{2-}}$ 8×10^{-2} C_{Cl, CN^-} 1×10^{-2} S^{2-} must not be present
Reference	Ag/AgCl
Dimensions	Diameter: 12 mm (Shaft) and 16 mm (Connection Cap) Length: 105 mm (Shaft) and 145 mm (Shaft + Cap)

Storage

Over short periods of time (1-2 days), the electrode can be stored in water or better in a 0,1 mM KCl solution. For longer periods we recommend a dry storage. To do this, wipe the surface of the electrode gently with a soft cloth or paper, and store them dry in the original packaging or in a similar container.

Commissioning of the electrode

Before the first use of the electrode and after prolonged dry conditions, put the electrode for at least an hour (better overnight) in water or better into a 0,1 mM KCl solution to condition the surface.

Calibration of the electrode

To calibrate the electrode usually 2 calibration solutions are used in various concentrations. The concentration of the calibration solutions should differ by a factor of 10 to 100 and must be within the measuring range of the electrode. Ideally, the concentrations of the calibration solutions covering the expected concentration of the measuring solution.

Because of the temperature dependence of the ISE measurement, the temperature should be identical to the calibration of the measuring solution.

For details, read also the manual of the used ion meter.

Cleaning

Deposits on the surface of the electrode could be removed by immersion in dilute acid (1% HCl) or by carefully wiping with a damp cloth. This depends on the type of the deposit. In the case of organic deposits use alcohol but never acetone.

Ion-Selective Electrode (ISE) for Lithium

Measurement and Reference Half Cell Combined

Artikel-Nr. 461 7750

Properties

- single-rod measuring cell
- slope 55 +/- 3 mV/pLi
- durability 6 to 12 month

Applications

- process water
- environment

Technical data	
Measuring principle	Ion-Selective Electrode (ISE)
Measuring range	10 ⁻⁵ – 10 ⁻¹ mol/L (Linear: 10 ⁻⁵ – 10 ⁻¹ mol/L) 0,07 mg Li / L – 0,7 g Li / L (Linear: 0,7 mg Li / L – 0,7 g Li / L)
Temperature range	0°C bis 40°C
Pressure range	1 bar – 2 bar
pH range	3 pH – 10 pH
Selectivity coefficients	NH_4^+ 8×10^{-3} Na^+ 3×10^{-2} K^+ 3×10^{-3} Rb^+ 2×10^{-3} Cs^+ 2×10^{-3} Mg^{2+} 3×10^{-4} Ca^{2+} 8×10^{-4} Sr^{2+} 2×10^{-4} Ba^{2+} 1×10^{-4}
Slope	55 +/- 3 mV/pLi
Dimensions	Diameter: 12 mm (Shaft) and 16 mm (Connection Cap) Length: 105 mm (Shaft) and 145 mm (Shaft + Cap)
Reference	Ag/AgCl

Storage:

Over short periods of time (1-2 days), the electrode in water or better in a 0.1 mM LiCl solution are stored. For longer periods we recommend a dry place. To do this, wipe the surface of the electrode with a soft cloth or paper, and store them dry in the original packaging or similar container.

Commissioning of the electrode:

Prior to the first use of the electrode and after prolonged dry storage, put the Electrode for at least an hour (better overnight) in water or better into a 0,1 mM LiCl solution to condition the surface.

Calibrate the electrode:

To calibrate the electrode there are normally used two calibration solutions with different Concentration. The concentration of the calibration should differ by a factor 10 to 100 and must be within the measuring range of the electrode.

Ideally the concentrations of the calibration dilutions should cover the expected concentration of measurement solution.

Because of the temperature dependence of the ISE measurement, the temperature of the calibration should be identical to that of the test sample.

For details, read also the manual of the used Ion meter.

Cleaning:

Deposits on the surface of the electrode could be removed with dilute acid (1% HCl) or by gently wiping with a damp cloth (depends on the type of the immersion). In the case of organic deposits use alcohol but never acetone.

Ion-Selective Electrode (ISE) for measurement of Perchlorate

Article-No. 461 7900

Properties

- single-rod measuring cell
- durability 6 to 12 month

Applications

- drinking water
- waste water
- environment
- aquaculture
- process water

Technical data	
Measuring principle	Ion-Selective Electrode (ISE)
Measuring range	$10^{-6} - 10^{-1}$ mol/L (Linear: $10^{-5} - 10^{-1}$ mol/L) 0,099 mg ClO ₄ / L – 9,9 g ClO ₄ / L (Linear: 0,99 mg ClO ₄ / L – 9,9 g ClO ₄ / L)
Slope at 25°C	-55 ± 3 mV/pClO ₄
Temperature range	0°C – 40°C
pH range	3 pH – 10 pH
Selectivity coefficients	F ⁻ $2,5 \times 10^{-4}$ J ⁻ $1,2 \times 10^{-2}$ H ₂ PO ₄ ⁻ < 10^{-5} Cl ⁻ $2,2 \times 10^{-4}$ NO ₃ ⁻ $1,5 \times 10^{-3}$ HCO ₃ ⁻ 10^{-4} Br ⁻ $5,6 \times 10^{-4}$ SO ₄ ²⁻ < 10^{-5}
Reference	Ag/AgCl
Dimensions	Diameter: 12 mm (Shaft) and 16 mm (Connection Cap) Length: 105 mm (Shaft) and 145 mm (Shaft + Cap)

Storage

Over short periods of time (1-2 days), the electrode can be stored in water or better in a 0,1 mM NaClO₄ solution. For longer periods we recommend a dry storage. To do this, wipe the surface of the electrode gently with a soft cloth or paper, and store them dry in the original packaging or in a similar container.

Commissioning of the electrode

Before the first use of the electrode and after prolonged dry conditions, put the electrode for at least an hour (better overnight) in water or better into a 0,1 mM NaClO₄ solution to condition the surface.

Calibration of the electrode

To calibrate the electrode usually 2 calibration solutions are used in various concentrations. The concentration of the calibration solutions should differ by a factor of 10 to 100 and must be within the measuring range of the electrode. Ideally, the concentrations of the calibration solutions covering the expected concentration of the measuring solution.

Because of the temperature dependence of the ISE measurement, the temperature should be identical to the calibration of the measuring solution.

For details, read also the manual of the used ion meter.

Cleaning

Deposits on the surface of the electrode could be removed by immersion in dilute acid (1% HCl) or by carefully wiping with a damp cloth. This depends on the type of the deposit. In the case of organic deposits use alcohol but never acetone.

Level sensor

Article-No. 461 8000

sealed gauge

Properties

- simple installation
- ceramic measuring cell

Applications

- level measurement
- environment monitoring

Technical data	
Measuring principle	Ceramic, resistive
Measuring range	0 – 10 m; 0 – 20 m; 0 – 40 m; 0 – 50 m
Safe overrange	50%
Zero point tolerance	+/-0,2 mV/V at 25°C
Linearity	<= +/-0,2 to 1,5 % FS terminal based
Stability	<= +/-0,3 % FS at 25°C
Temperature range	-10°C to + 65°C
Voltage feed	5 - 30 VDC
Output voltage	0,5 V - 4,5 V
Housing	1.4571, D: 25mm, L: 129mm; stainless steel
Weight	approx. 0,4 kg (without cable)
Connection cable	3-pole; Length: Measuring range +5m, H07 RN-F3G1 (other lengths optional on request)

Level sensor

Article-No. 461 8010

gauge

Properties

- simple installation
- ceramic measuring cell

Applications

- level measurement
- environment monitoring

Technical data	
Measuring principle	Ceramic, resistive
Measuring range	0 – 10 m; 0 – 20 m; 0 – 40 m; 0 – 50 m
Safe overrange	50%
Zero point tolerance	+/-0,2 mV/V at 25°C
Linearity	<= +/-0,2 ... 1,5 % FS terminal based
Stability	<= +/-0,3 % FS at 25°C
Temperature range	-10°C to + 65°C
Voltage feed	5 - 30 VDC
Output voltage	0,5 V - 4,5 V
Housing	1.4571, D: 25mm, L: 129mm; stainless steel
Weight	approx. 0,4 kg (without cable)
Connection cable	3-pole; Length: Measuring range +5m, H07 RN-F3G1 (other lengths optional on request)

Pressure sensor

Article-No. 461 8050

Screw-in thread ½ inch



Properties

- ceramic measuring cell
- for mounting in a tube

Applications

- process check
- tube monitoring
- pressure tank monitoring

Technical data	
Measuring principle	Ceramic, resistive
Measuring range	0 – 1 bar; 0 – 10 bar; 0 – 20 bar
Safe overrange	50%
Zero point tolerance	+/-0,2 mV/V at 25°C
Linearity	<= +/-0,2 to 1,5 % FS terminal based
Stability	<= +/-0,3% FS at 25°C
Temperature range	-10°C to + 65°C
Voltage feed	5 - 30 VDC
Output voltage	0,5 V - 4,5 V
Housing	1.4571, D: 25mm, L: 129mm; stainless steel
Weight	approx. 0,4 kg (without cable)
Connection cable	3-pole; Length: depends on design and optional on request; H07 RN-F3G1

Float switch with protective casing**Article-No. 461 8800****Properties**

- installation in a tank
- short response time

Applications

- tank monitoring
- overflow protection
- pump pit monitoring

Technical data	
Switch	Reed switch, potential free
Material	PVC
Connection cable	3 m (other lengths optional on request) R1/8"

ORP-probe

ORP single –rod measuring cell

Article-No. 461 9000**Properties and performance**

- single-rod measuring cell with Ag/AgCl reference system
- length 120 mm with PG13,5 process connection
- min conductivity of medium 50 µS/cm
- electrical connection: S7 connector
- ceramic diaphragm

Applications

- environmental monitoring
- water controlling
- desinfection

Technical data

Value	ORP
pH range	2 - 13 pH
Accuracy	1% measured value
Resolution	1 mV
Interval	1 s
Material	glass elektrode with Ag/AgCl reference system
Temperature range	-5°C to +80°C
max pressure	3 bar
Dimensions	length 120 mm; prozess connection PG 13,5

ORP-probe

ORP single-rod measuring cell, robust

Article-No. 461 9001



Properties und performance

- robust ORP electrode
- gel-electrolyte
- silamid-reference system
- sensor platinum pin 1 mm Ø
- plugable connector
- zero point of the ph electrode pH = 7,0 ± 0,3
- ceramic diaphragm

Applications

- wastewater
- aquarium
- brewery
- disinfection
- dispersion colourant
- fertilizer solution
- emulsion, in Wasser
- galvanic waste water
- ground water
- drinking water
- environmental analytics

Technical data

Value	ORP
pH-range	2 - 13 pH
Accuracy	1% measured value
Resolution	1 mV
Interval	1 s
Material	plastic shaft, fibre diaphragma, gel electrolyte, platinum pin
Temperature range	-5°C to +80°C
Connection	plug head
Dimensions	length 120 mm diameter 12 mm