TARAline CS4

indicator	Free chlorine reduced dependence on pH
Application	e. g. Swimming pool water, drinking water, sea water Surfactants (tensides) are partially tolerated.
Chlorination agents	inorganic chlorine compounds: NaOCl (=sodium hypochlorite), $Ca(OCl)_2$, chlorine gas, electrolytically generated chlorine
Measuring system	Membrane covered, amperometric potentiostatic 3-electrode system with electronic inside
Electronic	Analog version: - voltage output - not galvanically isolated electronics - analog internal data processing - output signal: analog (analog-out/analog) Digital version: - electronic is completely galvanically isolated - digital internal data processing - output signal: analog (analog-out/digital) or digital (digital-out/digital) mA-version: - current output analog - not galvanically isolated electronics - output signal: analog (analog-out/analog)
Information about the measuring range of sensors with 4-20 mA	Slope of a sensor can vary production-related or application-related between 65% and 150% of the nominal slope -> Recommendation to determine the suitable measuring range or the suitable sensor: Concentration to be measured x factor 1.5 = measuring range of the sensor Example: Concentration to be measured 1.6 ppm x 1.5 = 2.4 -> recommended sensor with a measuring range of 5 ppm
Accuracy after calibration at repeatability conditions (25°C, pH 7.2 in drinking water) of the upper full scale	– Measuring range 2 mg/l: at 0.4 mg/l <1% at 1.6 mg/l <1% – Measuring range 20 mg/l: at 4 mg/l <1% at 16 mg/l <3%
Slope drift At repeatability conditions (25 °C, pH 7,2 in drinking water)	approx. -1% per month
Working temperature	Measuring water temperature: 0 … +45 °C (no ice crystals in the measuring water) Ambient temperature: 0 … +55 °C
Temperature compensation	Automatically, by an integrated temperature sensor Sudden temperature changes must be avoided

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Max. allowed working pressure	Operation without retaining ring: 0.5 bar, no pressure impulses and/or vibrations
	Operation with retaining ring: 3 bar, no pressure impulses and/or vibrations
Flow rate	approx. 15-30 l/h in TARAflow FLC, small flow rate dependence is given (see diagram last page of the data sheet “Slope of TARAline CS4 versus flow rate”)
pH-range	pH 4 – pH 9, reduced dependence on pH-value (see diagram last page of the data sheet “Slope of TARAline CS4 versus pH”)
Conductivity	10 µS/cm – 50 mS/cm (sea water)
Run-in time	First start-up approx. 2 h
Response time	T_{90}: approx. 2 min.
Zero point adjustment	Not necessary
Slope calibration	At the device, by analytical determination, DPD-1-Method
interferences	ClO_2: factor 0.75 O_3: factor 0.8 Bound chlorine can increase the measuring value. Corrosion inhibitors can lead to measuring errors. Stabilisers for water hardness can lead to measuring errors.
Absence of the disinfectant	Max. 24 h
Connection	analog-out/analog version: 4-pole plug adapter analog-out/digital version: 4-pole plug adapter digital-out/digital version: 5-pole M12, plug-on flange 4-20 mA version: 2-pole terminal or 5-pole M12, plug-on flange
material	Microporous hydrophilic Membrane, PVC-U, stainless steel 1.4571
Size	diameter: approx. 25 mm Length: analog-out/analog version approx. 175 mm analog-out/digital version approx. 195 mm digital-out/digital version approx. 205 mm 4-20 mA version approx. 220 mm (2-pole-terminal) approx. 190 mm (5-pole-M12)

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Transport	+5 … +55 °C (Sensor, electrolyte, membrane cap)	
storage	Sensor:	dry and without electrolyte no limit at +5 … +40 °C
	Electrolyte:	in original bottle protected from sunlight at +5 … +35 °C min. 1 year or until the specified EXP-Date
	Membrane cap:	in original packing no limit at +5 … +40 °C (used membrane caps can not be stored)
maintenance	Regularly control of the measuring signal, min. once a week The following specifications depend on the water quality: Change of the membrane cap: once a year Change of the electrolyte: once a year	
CE	EMC-Testing DIN EN 61326-1, 61326-2-3 RoHS compliant	

Option 1: **Membrane cap M48.4S**	especially for applications in sea water	

Spare parts

Type	Membrane cap	Electrolyte	Emery	O-ring
All CS4	M48.4E Art. No. 11051-E	ECS2.1/GEL, 100 ml Art. No. 11007	S1 Art. No. 11908	14 x 1.8 NBR Art. No. 11806
	For sea water applications: M48.4S Art. No. 11051-S			

(Subject to technical changes!)

Technical Data

1. CS4 (analog output, analog internal signal processing)
analog-out / analog

A potential-free electrical connection is necessary as the sensor electronic is not equipped with a galvanical isolation.

	Measuring range **in ppm**	**Resolution** **in ppm**	**Output** **Output resistance**	**Nominal slope** (at pH 7.2) **in mV/ppm**	**Power supply**	**Connection**
CS4H	0.005…2.000	0.001	0…-2000 mV 1 kΩ	-1000	±5 - ±15 VDC 10 mA	4-pole screw connector
CS4N	0.05…20.00	0.01		-100		
CS4L	0.5…200.0	0.1		-10		
CS4HUp	0.005…2.000	0.001	0…+2000 mV 1 kΩ	+1000	10 - 30 VDC 10 mA	
CS4Up	0.05…20.00	0.01		+100		

(Subject to technical changes!)

2. CS4 (analog output, digital internal signal processing)
analog-out / digital

- The power supply is galvanically isolated inside of the sensor.
- The output signal is galvanically isolated too, that means potential-free.

	Measuring range **in ppm**	**Resolution** **in ppm**	**Output** **Output resistance**	**Nominal slope** (at pH 7.2) **in mV/ppm**	**Power supply**	**Connection**
CS4H-An	0.005… 2.000	0.001	analog 0…-2 V (max. -2.5 V) 1 kΩ	-1000	9-30 VDC approx. 56-20 mA	4-pole screw connector
CS4N-An	0.05… 20.00	0.01		-100		
CS4L-An	0.5… 200.0	0.1		-10		
CS4H-Ap	0.005… 2.000	0.001	analog 0…+2 V (max. +2.5 V) 1 kΩ	+1000		
CS4N-Ap	0.05… 20.00	0.01		+100		
CS4L-Ap	0.5… 200.0	0.1		+10		

(Subject to technical changes!)

3. CS4 (digital output, digital internal signal processing)
digital-out / digital

- The power supply is galvanically isolated inside of the sensor.
- The output signal is galvanically isolated too, that means potential-free.

	Measuring range **in ppm**	**Resolution** **in ppm**	**Output** **Output resistance**	**Power supply**	**Connection**
CS4H-M0c	0.005… 2.000	0.001	Modbus RTU There are no terminating resistors in the sensor.	9-30 VDC approx. 56-20 mA	5-pole M12 plug-on flange
CS4N-M0c	0.05… 20.00	0.01			
CS4L-M0c	0.5… 200.0	0.1			

(Subject to technical changes!)

4. CS4 4-20mA (analog output, analog internal signal processing)
Analog-out / analog

A potential-free electrical connection is necessary as the sensor electronic is not equipped with a galvanical isolation.

4.1 Electrical connection: 2 pole terminal clamp

	Measuring range **in ppm**	**Resolution** **in ppm**	**Output** **Output resistance**	**Nominal slope** (at pH 7.2) **in mA/ppm**	**Power supply**	**Connection**
CS4MA2	0.005…2.000	0.001	4…20 mA uncalibrated	8.0	12…30 VDC R_L 50Ω…R_L 900Ω	2-pole terminal (2 x 1 mm²) Recommended: Round cable ∅ 4 mm 2 x 0.34 mm²
CS4MA5	0.05…5.00	0.01		3.2		
CS4MA10	0.05…10.00	0.01		1.6		
CS4MA20	0.05…20.00	0.01		0.8		
CS4MA-200	0.5…200.0	0.1		0.08		

(Subject to technical changes!)

4.2 Electrical connection: 5 pole M12 plug-on flange

	Measuring range **in ppm**	**Resolution** **in ppm**	**Output** **Output resistance**	**Nominal slope** (at pH 7.2) **in mA/ppm**	**Power supply**	**Connection**
CS4MA2-M12	0.005…2.000	0.001	4…20 mA uncalibrated	8.0	12…30 VDC R_L 50Ω…R_L 900Ω	5-pole M12 plug-on flange Function of wires: PIN2: +U PIN3: -U
CS4MA5-M12	0.05…5.00	0.01		3.2		
CS4MA10-M12	0.05…10.00	0.01		1.6		
CS4MA20-M12	0.05…20.00	0.01		0.8		
CS4MA-200-M12	0.5…200.0	0.1		0.08		

(Subject to technical changes!)

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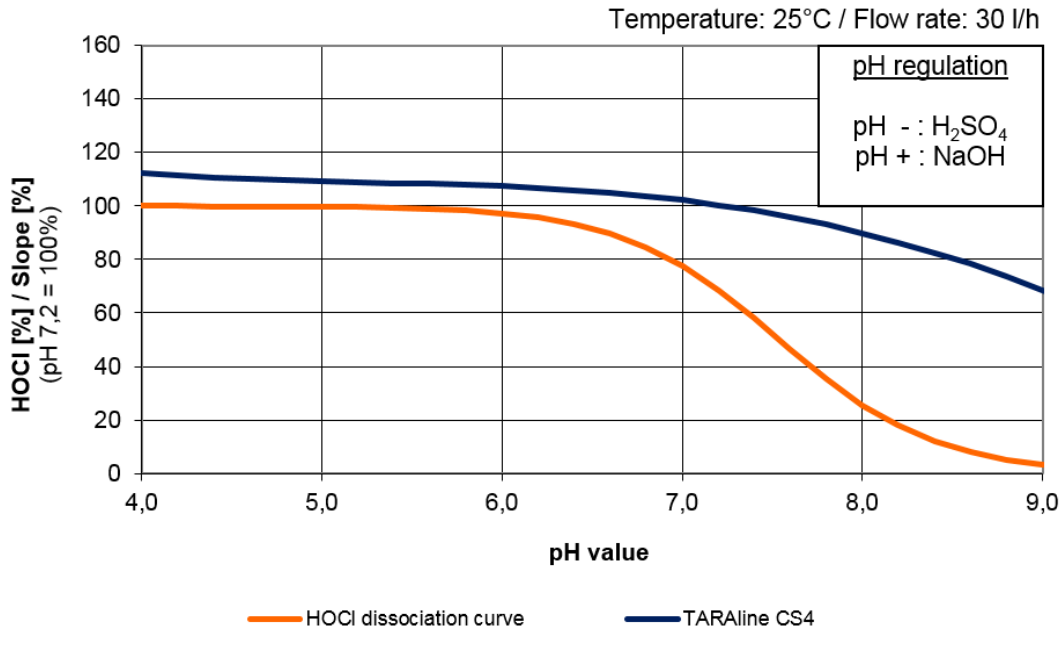
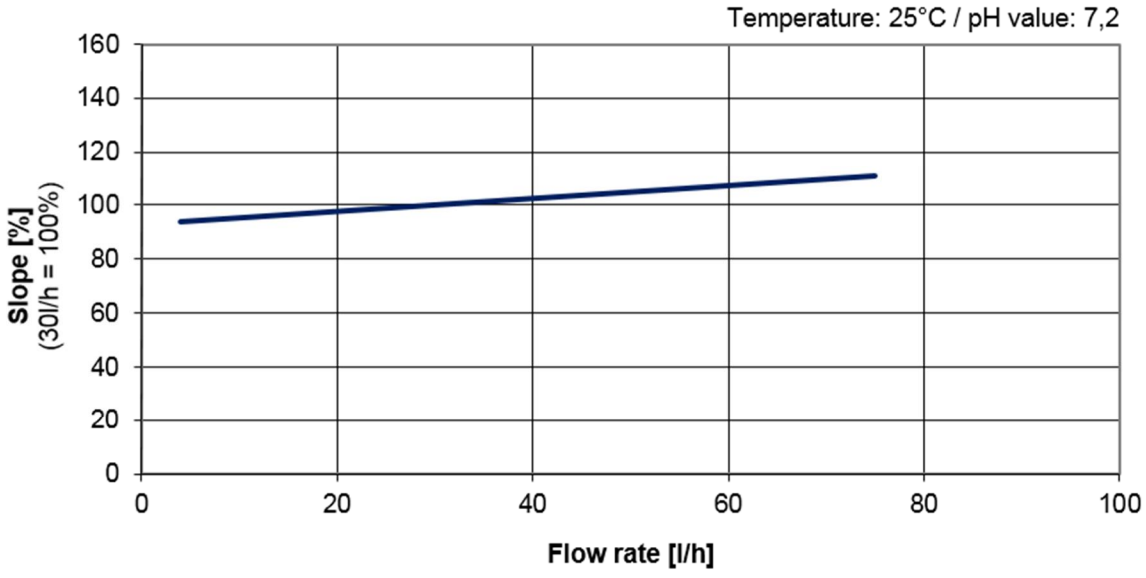
Slope of TARAline CS4 versus pH



Slope of TARAline CS4 versus Flow rate



This values are only valid for the probe housing FLC1 / FLC3