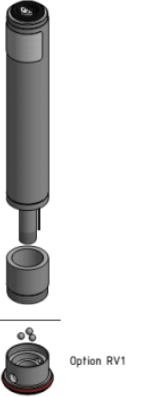
	<h1>TARAsens</h1> <h2>AS2 / AS3</h2>
<p>indicator</p>	<p>AS...-CL: Free chlorine</p> <p>AS...-CD: Chlorine dioxide</p>
<p>Application</p>	<p>drinking water cold, hot until max. 70 °C</p>
<p>Chlorination agents</p>	<p>inorganic chlorine compounds: NaOCl (=sodium hypochlorite), Ca(OCl)₂, chlorine gas, electrolytically generated chlorine</p>
<p>appropriate chlorine dioxide production methods</p>	<p>e. g.:</p> <ul style="list-style-type: none"> - Acid/Chlorite-method - Chlorine/Chlorite-method
<p>Measuring system</p>	<p>amperometric potentiostatic 3-electrode system</p>
<p>Electronic</p>	<p>Analog version:</p> <ul style="list-style-type: none"> - voltage output - not galvanically isolated electronics - analog internal data processing - output signal: analog (analog-out/analog) <p>Digital version:</p> <ul style="list-style-type: none"> - electronic is completely galvanically isolated - digital internal data processing - output signal: analog (analog-out/digital) or digital (digital-out/digital) <p>mA-version:</p> <ul style="list-style-type: none"> - current output analog - not galvanically isolated electronics - output signal: analog (analog-out/analog)
<p>Information about the measuring range of sensors with 4-20 mA</p>	<p>Slope of a sensor can vary production-related or application-related between 65% and 150% of the nominal slope</p> <p>-> Recommendation to determine the suitable measuring range or the suitable sensor: Concentration to be measured x factor 1.5 = measuring range of the sensor</p> <p>Example: Concentration to be measured 1.6 ppm x 1.5 = 2.4 -> recommended sensor with a measuring range of 5 ppm</p>
<p>Working temperature</p>	<p>Measuring water temperature: AS2...: 0 ... +50 °C AS3...: 0 ... +70 °C (no ice crystals in the measuring water)</p> <p>Ambient temperature: 0 ... +55 °C</p>

	<h1>TARAsens</h1> <h2>AS2 / AS3</h2>	
Temperature compensation	Automatically, by an integrated temperature sensor Response time t_{90} = approx. 10 min. Max. change in temperature: 30 °C per hour, sudden temperature changes must be avoided	
Max. allowed working pressure	Operation without retaining ring: 0.5 bar	
	Operation with retaining ring: 8 bar	
Cleaning equipment RV1	Use is recommended for AS...-CL (chlorine) Advantages: - significant extension of maintenance intervals - considerably more stable signal over long term	
Flow chamber	TARAFLOW FLC (separate data sheet available)	
Flow rate	Without RV1: min. 15 l/h, in TARAFLOW FLC	
	With RV1: 45-90 l/h, in TARAFLOW FLC	
pH-range	AS...-CL: pH 5 – pH 9, pay attention to the dissociation equilibrium HOCL (see diagram "AS-sensors, relative dependence on pH", p. 11)	
	AS...-CD: pH 1 – pH 12 or the beginning of decomposition of chlorine dioxide at/over pH 12	
Run-in time	First start-up approx. 1 h up to 2 days, depending on the water quality	
Response time	T_{90} : approx. 30 sec.	
Zero point adjustment	Not necessary	
Slope calibration	Chlorine: At the device, by analytical determination, DPD-1-Method Chlorine dioxide: At the device, by analytical determination, (without chlorine) DPD-1-Method	
Interferences	AS...-CL: Ozone, chlorine dioxide, chlorite are measured	
	AS...-CD: Chlorine, chlorite are measured with less than 2 % of their value	
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	

 <p>Option RV1</p>	<h1>TARAsens</h1> <h2>AS2 / AS3</h2>																		
material	AS2: PVC-U AS3: PEEK																		
Size	<table border="0"> <tr> <td>diameter:</td> <td>approx.</td> <td>25 mm</td> </tr> <tr> <td>Length:</td> <td>approx.</td> <td>175 mm</td> </tr> <tr> <td> analog-out/analog version</td> <td>approx.</td> <td>195 mm</td> </tr> <tr> <td> analog-out/digital version</td> <td>approx.</td> <td>205 mm</td> </tr> <tr> <td> digital-out/digital version</td> <td>approx.</td> <td>220 mm (2-pole-terminal)</td> </tr> <tr> <td> 4-20 mA version</td> <td>approx.</td> <td>190 mm (5-pole-M12)</td> </tr> </table>	diameter:	approx.	25 mm	Length:	approx.	175 mm	analog-out/analog version	approx.	195 mm	analog-out/digital version	approx.	205 mm	digital-out/digital version	approx.	220 mm (2-pole-terminal)	4-20 mA version	approx.	190 mm (5-pole-M12)
diameter:	approx.	25 mm																	
Length:	approx.	175 mm																	
analog-out/analog version	approx.	195 mm																	
analog-out/digital version	approx.	205 mm																	
digital-out/digital version	approx.	220 mm (2-pole-terminal)																	
4-20 mA version	approx.	190 mm (5-pole-M12)																	
Transport	+5 ... +50 °C (Sensor, electrolyte)																		
storage	<table border="0"> <tr> <td>Sensor:</td> <td>- wet up to one year at +5 ... +35 °C (filled with electrolyte and electrolyte-filled protection-cap)</td> </tr> <tr> <td></td> <td>- only for AS2: dry no limit at +5 ... +40 °C (without electrolyte)</td> </tr> <tr> <td>Electrolyte:</td> <td>in original bottle protected from sunlight at >+5 - <+35 °C min. 1 year or until specified EXP-Date</td> </tr> </table>	Sensor:	- wet up to one year at +5 ... +35 °C (filled with electrolyte and electrolyte-filled protection-cap)		- only for AS2: dry no limit at +5 ... +40 °C (without electrolyte)	Electrolyte:	in original bottle protected from sunlight at >+5 - <+35 °C min. 1 year or until specified EXP-Date												
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Electrolyte:	in original bottle protected from sunlight at >+5 - <+35 °C min. 1 year or until specified EXP-Date																		
maintenance	<table border="0"> <tr> <td colspan="2">Regularly control of the measuring signal, min. once a week</td> </tr> <tr> <td colspan="2">The following specifications depend on the water quality:</td> </tr> <tr> <td>- Cleaning of the gold electrodes:</td> <td>without RV1 every 4 – 12 weeks with RV1 every 6-12 months</td> </tr> <tr> <td>- Change of the electrolyte:</td> <td>every 3 - 6 months</td> </tr> <tr> <td>Option:</td> <td>Factory service/maintenance (return the sensor to the manufacturer)</td> </tr> </table>	Regularly control of the measuring signal, min. once a week		The following specifications depend on the water quality:		- Cleaning of the gold electrodes:	without RV1 every 4 – 12 weeks with RV1 every 6-12 months	- Change of the electrolyte:	every 3 - 6 months	Option:	Factory service/maintenance (return the sensor to the manufacturer)								
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- Cleaning of the gold electrodes:	without RV1 every 4 – 12 weeks with RV1 every 6-12 months																		
- Change of the electrolyte:	every 3 - 6 months																		
Option:	Factory service/maintenance (return the sensor to the manufacturer)																		
	EMV-Prüfung DIN EN 61326-1, 61326-2-3 RoHS konform																		

Option	<p>Cleaning equipment RV1-M</p> <ul style="list-style-type: none"> - direct installation on the sensor - approaching flow to the sensor through RV1 - cleaning effect of RV1 is moderate, i. e. weak deposits on the electrodes will be removed, e. g. weak rust films - for a correct and proper operation of sensor with cleaning equipment RV1 flow chamber FLC-3 has to be used!! - flow rate min. 45 l/h - Sensor can be upgraded at any time <p><u>Advice:</u></p> <ul style="list-style-type: none"> - Using with AS...-CL: => slope is approx. 3 times higher (see diagram "AS-Chlorine Sensor with and without RV1", p. 11) - Using with AS...-CD: => slope is approx. 2 times higher 	
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(Subject to technical changes.)

Accessories

Component	Art. No.	
<p>Cleaning equipment RV1-M</p> <ul style="list-style-type: none"> • Cleaning equipment RV1 • 2 bags with each 3 cleaning balls • emery S3 		12112

(Subject to technical changes.)

Spare Parts


Type	Hull	Electrolyte	Emery	O-ring
All AS2	Hull AS2 Art. No. 11103	EAS1/GEL, 50 ml Art. No. 11905	S3 Art. No. 11904	20 x 1.5 silicone Art. no. 11803
All AS3	Hull AS3 Art. No. 11019			

(Subject to technical changes.)

Technical Data
A) Chlorine
1. AS – CL (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		resolution in ppm	Output Output resistance	Nominal slope (at pH 7.2)		Voltage supply	Connection
	in ppm				in mV/ppm			
	Without RV1	with RV1			Without RV1	with RV1		
AS2H-CL	0.005... 2.000	0.005... 0.700	0.001	analog 0...-2000 mV 1 kΩ	-1000	-3000	±5 - ±15 VDC 10 mA	4-pole screw connector
AS2N-CL	0.03... 20.00	0.03... 7.00	0.01		-100	-300		
AS2Up-CL	0.03... 20.00	0.03... 7.00	0.01	analog 0...+2000 mV 1 kΩ	+100	+300	10 - 30 VDC 10 mA	
AS3H-CL	0.005... 2.000	0.005... 0.700	0.001	analog 0...-2000 mV 1 kΩ	-1000	-3000	±5 - ±15 VDC 10 mA	
AS3N-CL	0.03... 20.00	0.03... 7.00	0.01		-100	-300		
AS3Up-CL	0.03... 20.00	0.03... 7.00	0.01	analog 0...+2000 mV 1 kΩ	+100	+300	10 - 30 VDC 10 mA	

(Subject to technical changes.)

2. AS – CL (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		Resolution in ppm	Output Output resistance	Nominal Slope (at pH 7.2)		Power supply	Connectio n		
	in ppm				in mV/ppm					
	Without RV1	with RV1			Without RV1	with RV1				
AS2H-CL-An	0.005... 2.000	0.005... 0.700	0.001	analog 0...-2 V (max. -2.5 V) 1 kΩ	-1000	-3000	9-30 VDC approx. 56-20 mA	4-pole screw connector		
AS2N-CL-An	0.03... 20.00	0.03... 7.00	0.01		-100	-300				
AS3H-CL-An	0.005... 2.000	0.005... 0.700	0.001		-1000	-3000				
AS3N-CL-An	0.03... 20.00	0.03... 7.00	0.01		-100	-300				
AS2H-CL-Ap	0.005... 2.000	0.005... 0.700	0.001	analog 0...+2 V (max. +2.5 V) 1 kΩ	-1000	-3000			9-30 VDC approx. 56-20 mA	4-pole screw connector
AS2N-CL-Ap	0.03... 20.00	0.03... 7.00	0.01		-100	-300				
AS3H-CL-Ap	0.005... 2.000	0.005... 0.700	0.001		-1000	-3000				
AS3N-CL-Ap	0.03... 20.00	0.03... 7.00	0.01		-100	-300				

(Subject to technical changes.)

3. AS – CL (digital output, analog 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		Resolution	Output Output resistance	Power supply	Connection
	in ppm					
	Without RV1	with RV1				
AS2H-CL-M0c	0.005... 2.000	0.005... 0.700	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
AS2N-CL-M0c	0.03... 20.00	0.03... 7.00	0.01			
AS3H-CL-M0c	0.005... 2.000	0.005... 0.700	0.001			
AS3N-CL-M0c	0.03... 20.00	0.03... 7.00	0.01			


(Subject to technical changes.)

4. AS – CL 4-20 mA (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		resolution	Output Output resistance	Nominal slope (at pH 7.2)		Voltage supply	Connection
	in ppm				in ppm	in mA/ppm		
	Without RV1	with RV1			Without RV1	with RV1		
AS2MA1-CL	0.003... 1.000	0.003... 0.400	0.001	4...20 mA uncalibrated	16.0	48.0	12...30 VDC R _L 50Ω...R _L 900Ω	2-pole terminal (2 x 1 mm ²) Recommend ed: Round cable ∅ 4 mm 2 x 0.34 mm ²
AS2MA2-CL	0.003... 2.000	0.003... 0.700	0.001		8.0	24.0		
AS2MA5-CL	0.03... 5.00	0.03... 1.70	0.01		3.2	9.6		
AS2MA10-CL	0.03... 10.00	0.03... 4.00	0.01		1.6	4.8		
AS2MA20-CL	0.03... 20.00	0.03... 7.00	0.01		0.8	2.4		
AS3MA1-CL	0.003... 1.000	0.003... 0.400	0.001		16.0	48.0		
AS3MA2-CL	0.003... 2.000	0.003... 0.700	0.001		8.0	24.0		
AS3MA5-CL	0.03... 5.00	0.03... 1.70	0.01		3.2	9.6		
AS3MA10-CL	0.03... 10.00	0.03... 4.00	0.01		1.6	4.8		
AS3MA20-CL	0.03... 20.00	0.03... 7.00	0.01		0.8	2.4		

(Subject to technical changes.)


4.2 Electrical connection: 5 pole M12 plug-on flange

	Measuring range		resolution	Output Output resistance	Nominal slope (at pH 7.2)		Voltage supply	Connectio n
	in ppm				in mA/ppm			
	Without RV1	with RV1	in ppm	Without RV1	with RV1			
AS2MA1-CL-M12	0.003... 1.000	0.003... 0.400	0.001	4...20 mA uncalibrated	16.0	48.0	12...30 VDC R _L 50Ω...R _L 900Ω	5-pole M12 plug- on flange Function of wires: PIN2: +U PIN3: -U
AS2MA2-CL-M12	0.003... 2.000	0.003... 0.700	0.001		8.0	24.0		
AS2MA5-CL-M12	0.03... 5.00	0.03... 1.70	0.01		3.2	9.6		
AS2MA10-CL-M12	0.03... 10.00	0.03... 4.00	0.01		1.6	4.8		
AS2MA20-CL-M12	0.03... 20.00	0.03... 7.00	0.01		0.8	2.4		
AS3MA1-CL-M12	0.003... 1.000	0.003... 0.400	0.001		16.0	48.0		
AS3MA2-CL-M12	0.003... 2.000	0.003... 0.700	0.001		8.0	24.0		
AS3MA5-CL-M12	0.03... 5.00	0.03... 1.70	0.01		3.2	9.6		
AS3MA10-CL-M12	0.03... 10.00	0.03... 4.00	0.01		1.6	4.8		
AS3MA20-CL-M12	0.03... 20.00	0.03... 7.00	0.01		0.8	2.4		

(Subject to technical changes.)

B) Chlorine Dioxide
1. AS – CD (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		resolution	Output Output resistance	Nominal slope		Voltage supply	Connectio n
	in ppm				in mV/ppm			
	Without RV1	with RV1	in ppm	Without RV1	with RV1			
AS2H-CD	0.005...2.000	0.005...1.000	0.001	0...-2000 mV 1 kΩ	-1000	-2000	±5 - ±15 VDC 10 mA	4-pole screw connector
AS2N-CD	0.03...20.00	0.03...10.00	0.01		-100	-200		
AS2Up-CD	0.03...20.00	0.03...10.00	0.01	0...+2000 mV 1 kΩ	+100	+200	10 - 30 VDC 10 mA	
AS3H-CD	0.005... 2.000	0.005... 1.000	0.001	0...-2000 mV 1 kΩ	-1000	-2000	±5 - ±15 VDC 10 mA	
AS3N-CD	0.03... 20.00	0.03... 10.00	0.01		-100	-200		
AS3Up-CD	0.03... 20.00	0.03... 10.00	0.01	0...+2000 mV 1 kΩ	+100	+200	10 - 30 VDC 10 mA	

(Subject to technical changes.)

2. AS – CD (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		Resolution	Output Output resistance	Nominal Slope		Power supply	Connection		
	in ppm				in mV/ppm					
	Without RV1	with RV1	in ppm	Without RV1	with RV1					
AS2H-CD-An	0.005... 2.000	0.005... 1.000	0.001	analog 0...-2 V (max. -2.5 V) 1 kΩ	-1000	-2000	9-30 VDC approx. 56-20 mA	4-pole screw connector		
AS2N-CD-An	0.03... 20.00	0.03... 10.00	0.01		-100	-200				
AS3H-CD-An	0.005... 2.000	0.005... 1.000	0.001		-1000	-2000				
AS3N-CD-An	0.03... 20.00	0.03... 10.00	0.01		-100	-200				
AS2H-CD-Ap	0.005... 2.000	0.005... 1.000	0.001	analog 0...+2 V (max. +2.5 V) 1 kΩ	+1000	+200			9-30 VDC approx. 56-20 mA	4-pole screw connector
AS2N-CD-Ap	0.03... 20.00	0.03... 10.00	0.01		+100	+200				
AS3H-CD-Ap	0.005... 2.000	0.005... 1.000	0.001		+1000	+2000				
AS3N-CD-Ap	0.03... 20.00	0.03... 10.00	0.01		+100	+200				

(Subject to technical changes.)

3. AS – CD (digital output, analog 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		Resolution	Output Output resistance	Power supply	Connection
	in ppm					
	Without RV1	with RV1				
AS2H-CD-M0c	0.005... 2.000	0.005... 1.000	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
AS2N-CD-M0c	0.03... 20.00	0.03... 10.00	0.01			
AS3H-CD-M0c	0.005... 2.000	0.005... 1.000	0.001			
AS3N-CD-M0c	0.03... 20.00	0.03... 10.00	0.01			


(Subject to technical changes.)

4. AS – CD 4-20 mA (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

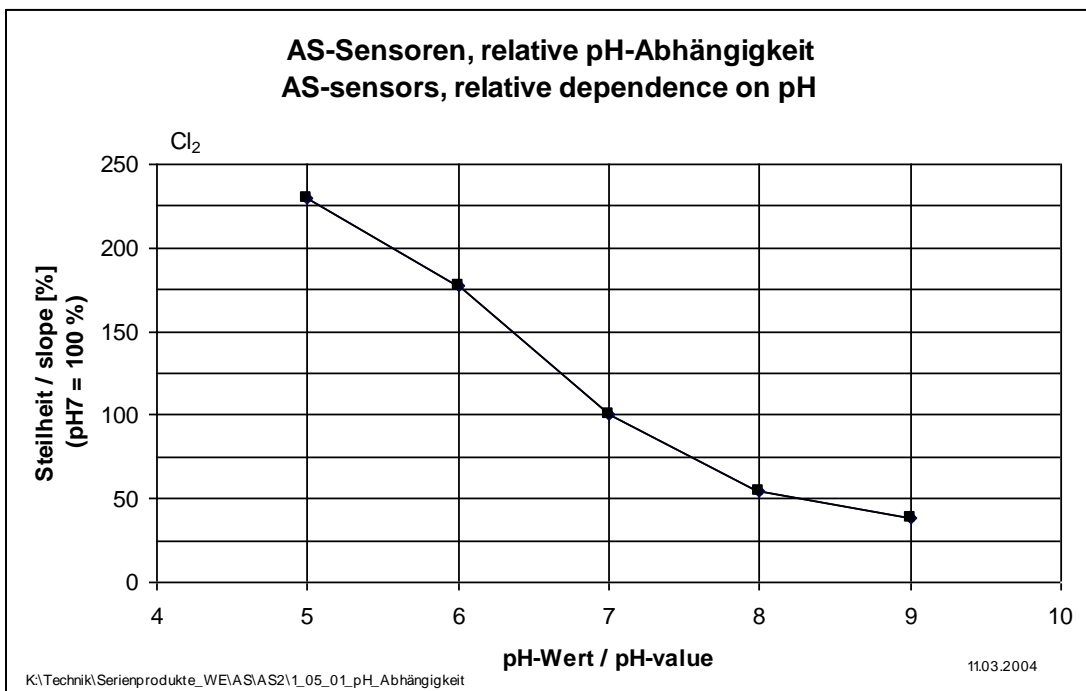
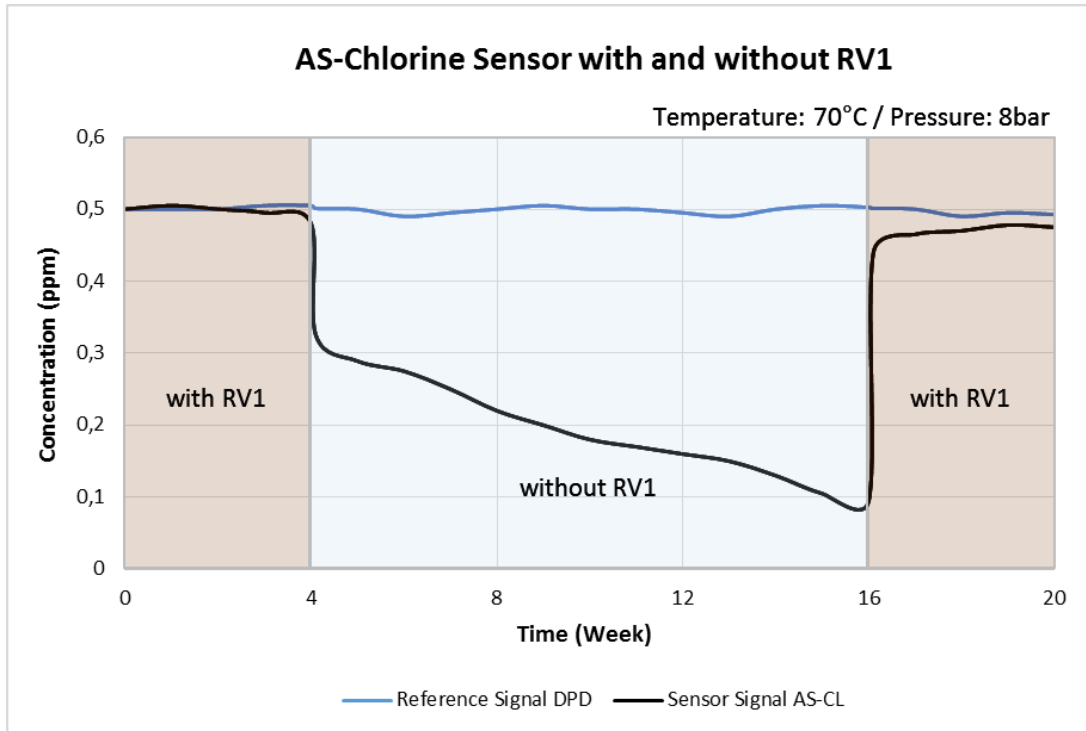
	Measuring range		resolution	Output Output resistance	Nominal slope		Voltage supply	Connection
	in ppm				in ppm	in mA/ppm		
	Without RV1	with RV1			Without RV1	with RV1		
AS2MA1-CD	0.003... 1.000	0.003... 0.500	0.001	4...20 mA unkalibriert	16.0	32.0	12...30 VDC R _L 50Ω...R _L 900Ω	2-pole terminal (2 x 1 mm ²) Recommended : Round cable ∅ 4 mm 2 x 0.34 mm ²
AS2MA2-CD	0.003... 2.000	0.003... 1.000	0.001		8.0	16.0		
AS2MA5-CD	0.03... 5.00	0.03... 2.50	0.01		3.2	6.4		
AS3MA1-CD	0.003... 1.000	0.003... 0.500	0.001		16.0	32.0		
AS3MA2-CD	0.003... 2.000	0.003... 1.000	0.001		8.0	16.0		
AS3MA5-CD	0.03... 5.00	0.03... 2.50	0.01		3.2	6.4		

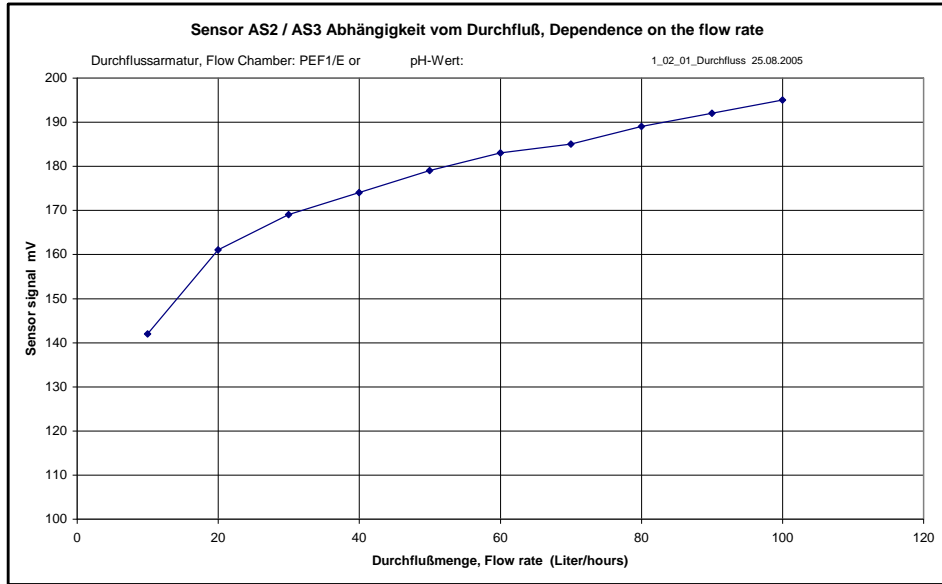
(Subject to technical changes.)

4.2 Electrical connection: 5 pole M12 plug-on flange

	Measuring range in ppm		resolution	Output Output resistance	Nominal slope in mA/ppm		Voltage supply	Connectio n
	Without RV1	with RV1	in ppm		Without RV1	with RV1		
AS2MA1-CD-M12	0.003... 1.000	0.003... 0.500	0.001	4...20 mA unkalibriert	16.0	32.0	12...30 VDC R _L 50Ω...R _L 900Ω	5-pole M12 plug-on flange Function of wires: PIN2: +U PIN3: -U
AS2MA2-CD-M12	0.003... 2.000	0.003... 1.000	0.001		8.0	16.0		
AS2MA5-CD-M12	0.03... 5.00	0.03... 2.50	0.01		3.2	6.4		
AS3MA1-CD-M12	0.003... 1.000	0.003... 0.500	0.001		16.0	32.0		
AS3MA2-CD-M12	0.003... 2.000	0.003... 1.000	0.001		8.0	16.0		
AS3MA5-CD-M12	0.03... 5.00	0.03... 2.50	0.01		3.2	6.4		

(Subject to technical changes.)





(Subject to technical changes.)