

Manual

Version 21.03.2017

Concentration Transmitter Model CCAb **Turbidity Sensor Model CSW (22)**

Chemtronic Waltemode GmbH

40789 Monheim am Rhein
Niederstr. 14
Germany

Phone: +49-(0)2173-57007 Fax: +49-(0)2173-56007

E-Mail: info@chemtronic-gmbh.de

Internet: www.chemtronic-gmbh.de



Transportation Damages!



Please inspect the instrument immediately after receiving for potential shipping damages.
For any claims to the transportation insurance or warranty repair, it is absolutely required to notify transportation damages immediately after receiving the instrument. In case of obvious damages of the outer packaging, the carrier must give a receipt for this damage to make demands for the insurance. In case of a delayed announcement the insurance will not pay for damages and Chemtronic Waltemode GmbH will not assume liability for these damages.



Content

Transportation Damages!	2
Copyright	3
Non-warranty	3
Warranty conditions	3
Storage	3
Shipment of the instrument	3
Safety instructions	4
Principle of Operation	5
Typical Turbidity Measuring Units	6
Typical Ranges (depending by product)	6
Installation Guidelines	7
General	8
Operating Elements Transmitter Model CCAb	8
Calibration procedure	8
Wiring Diagram Model CSW / CCAb	9
Dimensional Drawing Transmitter Model CCAb	10
Dimensional Drawing Sensor Model CSW (22)	11
Trouble Shooting	12
Replacement of measuring Lamp at Sensor Model CSW (22)	13
Explosion Drawing Sensor Model CSW (22)	14
Part list Sensor Model CSW (22)	15
Technical Data / Data Sheet concentration transmitter model CCAb	16
Technical Data / Data Sheet concentration transmitter model CCAb	16
Technical Data / Data Sheet Sensor model CSW (22)	17

Copyright

© 2017 Chemtronic Waltemode GmbH

This manual including all of its parts are protected by copyright of Chemtronic Waltemode GmbH.

Any further use beyond the copyright laws is not allowed without the written approval of

Chemtronic Waltemode GmbH.

There are no further reaching warranty claims to take because of the content of existing document.

Non-warranty

Chemtronic Waltemode GmbH takes no responsibility or warranty for technical or editorial mistakes or omissions in this document. The information in this publication will be provided without warranty for their correctness. Chemtronic Waltemode GmbH reserves all rights to make changes to this document without announcement.

Chemtronic Waltemode GmbH is by no means liable for any consequential damages or miscellaneous damages, which occur during the use or storage of the system.

Some countries do not allow the limitation of liability, so that this exclusion is possibly not valid for you.

Warranty conditions

The warranty for this product takes place according to the legal provisions. As places of warranty we explicitly name Chemtronic Waltemode GmbH, Monheim am Rhein, Germany. In case of warranty service at the customer site, Chemtronic will charge the additional expenses e.g. travel expenses, overnight cost, etc.

Consumable parts as well as wearing parts e.g. lamps, gaskets, etc. are not covered by warranty.

Improper use, gross negligence, use of the system outside of the technical specifications, missing or improper maintenance will cause a loss of the warranty claim. Please pay attention to our general terms of contract.

Storage

Please inspect the instrument immediately after receiving for potential shipping damages.

If the instrument has already been unpacked for inspection or testing, or if the instrument has been removed from the process and it is not to be installed or reinstalled for more than 1 day, the following procedure should be observed:

1. If the instrument has been in service, the wetted portion should be thoroughly cleaned (typically with clean water) and then thoroughly dried.
2. In case the original packing material is not available, place the instrument in a sealed heavy plastic bag with a desiccant added to assure clean dry storage.
3. The instrument should then be stored in a protected area until time of installation.

Shipment of the instrument

Please clean the instrument carefully before shipment (e.g. for revision / repair). Please use fixed packaging to protect the instrument against any shipping damages.

Safety instructions

Take notice to the following general safety instructions during use and operation of the system. Ignoring these instructions or special warnings inside of this manual can damage the sensor, cause inaccurate measurements, and possibly result in unsafe installations. Chemtronic Waltemode GmbH will not take any responsibility for consequences arising from ignoring the safety instructions and warnings.

For ALL chemical liquids

Reagents, standards or the measured product may be toxic or otherwise harmful to human health. Observe appropriate precautions when handling and disposing the reagents. Review the appropriate published material safety data sheets regarding the safe handling and disposal of all these products.

Electrical installation

Qualified technical personnel must perform the electrical installation of the system.



Hazardous area

DO NOT INSTALL the system in hazardous area. Operation of non Ex- proof systems in hazardous area will cause an extreme high risk.



Maintenance

Always disconnect the instrument from power during maintenance, replacement of components, installation of additional components or any other operations at the open instrument.

Only qualified technical personnel must perform this work.

Operating the instrument with open enclosure

Only qualified technical personnel should operate the instrument when the enclosure is open (e.g. repair). Be careful that no moisture enters the enclosure.



Some components inside the instrument may be energized with voltages, which can cause lethal shocks in case of contact. Be careful during installation, handling and operation of the instrument.



Improper installation / operation of the system

Warranty is void if the system is / was installed improperly, handled improperly, used outside of the technical specifications or damaged by gross negligence.

Principle of Operation

The inline absorption photometer model CSW/CCAb is used to measure the turbidity of liquid products. The light absorption is measured at a specific wavelength, typically in the near infrared (NIR) at about 700nm to 850nm. Measuring the absorption in the NIR- spectrum compensates for changes in product color and makes sure that the instrument detects turbidity only.

What does Turbidity mean?

Turbidity is an optical impression, which describes the characteristic of a transparent product, to scatter and absorb light. A focused light beam will be attenuated and scattered in hazy products, so that this product can become practically opaque in bigger layers.

What Causes Turbidity?

Turbidity is caused by particles in transparent products. A particle is defined as something with a different refractive index as the carrier product. Some examples of particles are minerals, yeast cells, metals, oil drops in water, milk in water, gas bubbles and aerosol's.

Measurement of Turbidity

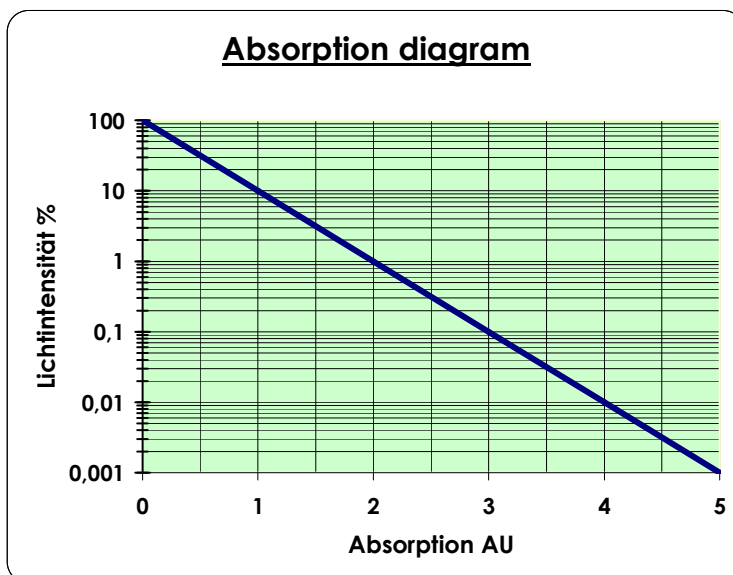
Turbidity is not a clearly defined magnitude like e.g. temperature or pressure. Turbidity is a subjective impression. For this reason turbidity measurement systems will be typically calibrated by using a comparison's standard such as Formazin or Diatomaceous Earth.

Principle of Absorbance Measurement

A light source and a detector are located parallel over against. The change in light intensity, caused by the product between lamp and detector, will be detected and displayed as measuring result. The application is the measurement of concentrations (color or solids) in a liquid. The basic measurement unit of an absorption photometer is called AU (Absorption - Unit).

Definition of AU:

- 1 AU = 90 % loss of light intensity
- 2 AU = 99 % loss of light intensity
- 3 AU = 99,9 % loss of light intensity
- 4 AU = 99,99 % loss of light intensity
- 5 AU = 99,999 % loss of light intensity



The absolute range of CSW absorption sensor:

- 0 to 0.1 AU (lowest range)
- 0 to 5 AU (highest range)

Typical Turbidity Measuring Units

ppm:	Parts per million	FNU ¹ :	Formazin nephelometric unit
FTU:	Formazin Turbidity Unit	mg/l:	Milligram per liter
TEF:	Trübungseinheiten Formazin (German for FTU)	gr/l:	Gram per liter
EBC:	European brewery convention	% TS:	Percent total solids
NTU ¹ :	Nephelometric turbidity unit	AU	Absorption unit

The Dependencies of Different Measurement Units

1FTU = 1TEF = 1NTU¹ = 1FNU¹ = 0,25EBC

¹ Nephelometry describes the method of side scatter turbidity measurement these units are used at 90° side scattered turbidimeter only.

Based on comparisons measurements, by using a 12° forward turbidity measurement system we have found the following dependencies.

1FTU = 1TEF = 0,25EBC = 2,05ppm = 2,05mg/l = 0,00205g/l = 0,00000205 %TS

* At a specific particle weight of 1kg/dm, 1mg/l particles in 1kg of water will correspond to 1ppm.

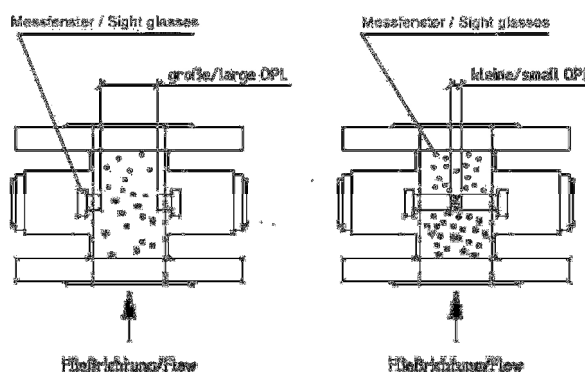
Concentration Measurement

Mainly two parameters will affect the sensitivity of the measurement.

1. The initial intensity of the light source, which is a constant value of the respective sensor.
2. The optical path length (OPL) which is a variable magnitude of the sensor.

The sensor requires a large optical path length (OPL) to generate enough light attenuation at low colour concentration.

The sensor requires a small optical path length (OPL), to ensure enough light intensity penetrates the product at high colour concentration.



Large OPL = Low concentrations / high sensitivity

Small OPL = High concentrations / low sensitivity

¹OPL [= optical path length] specifies the product slot between light source and detector

Typical Ranges (depending by product)

OPL	lowest range	highest range
3 mm	approx. 0 - 2g/l	approx. 0 - 100g/l (10%TS)
50 mm	approx. 0 - 200mg/l	approx. 0 - 6g/l

The OPL has to be specified according to the requirements of customer's application. The Sensor allows to specify optical path lengths between 1/10" (2mm) and 20" (500mm).

Installation Guidelines

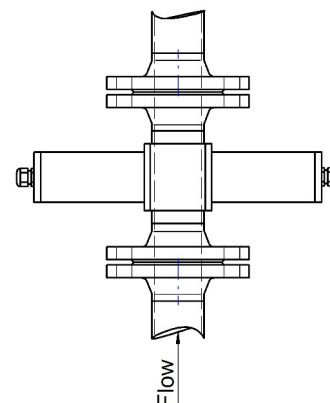


Danger!

Exceeding the specified maximum pressure and / or the specified maximum temperature will cause a very high safety risk. Please read the additional safety instructions before installation and start-up.

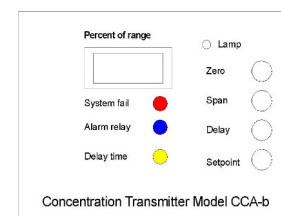
- Transmitter and Sensors are sensitive components, do not drop and handle with care.
- The sensor is manufactured according to the customer's application (variable line size, flange type, cleaning jets, gasket material etc.).
- It is recommended to proceed the calibration of the system before installation.
- The location / installation of the sensor should be in a vertical standpipe.
- The process pressure should never exceed the specification of the sensor.
- The process temperature should never exceed the specification of the sensor.
- Avoid air and gas bubbles inside the sensor, they cause disturbances. Air and gas bubbles will cause noise and drift of the measurement signal. (Air bubbles are not expected at pressures upwards of 2bar in aqueous solutions).
- Purge lamp and detector housings with dry instrument air (approx. 10 l/h). In case the process temperature should fall under the dew point or rise above 85 °C. Condensed water or too high temperatures may damage the sensor.
- In case the optional cleaning jets are being used, make sure the pressure of the cleaning fluid is at least 50% higher than the process pressure.

CSW Sensor



- Follow the wiring diagrams in this manual
- Please do not use the system in case of any visible mechanical damages!
- The CCAb enclosure fits IP30 / Nema 1 protection class, we recommend rail mount in a dry and dust free location.
- The ambient temperature for the transmitter must be in a range of -10°C to 50°C (use dry purge air above 40°C approx. 10 l/h).
- The power consumption of the CCAb transmitter is less than 25VA.
- Transmitter relay ratings for alarms and external devices are 2A at 48V.
- Do not operate with open enclosure. Exposed electronics will promote the risk of electrical shock and might cause damage to the unit.
- Do not alter cable length. The instrument was calibrated with a specified cable length. Altering cable length can cause unstable signals and void instrument calibration.
- Use original cables and spare parts only.

CCAb Transmitter



General

The converter model CCA-b together with the CSW sensor is used to measure turbidity in liquids. The transmitter provides a 3,5digit LCD display, an analogue output signal 0/4-20mA, a setpoint relay and a system fail relay.

Operating Elements Transmitter Model CCAb

A	0-100%	LCD Display (0-100% of range)
B	System fail	LED red, System fail
C	Alarm relay	LED blue, signal relay status
D	Delay time	LED yellow, signal delay time active
E	lamp	Adjust the lamp voltage of the sensor
F	Zero	Zero calibration
G	Span	Span calibration
H	Delay	Adjust relay delay time
I	SET	Adjust relay setpoint

Percent of range



System fail ●

Alarm relay ●

Delay time ●

☐ Lamp

Zero ☐

Span ☐

Delay ☐

Setpoint ☐

Concentration Transmitter Model CCA-b

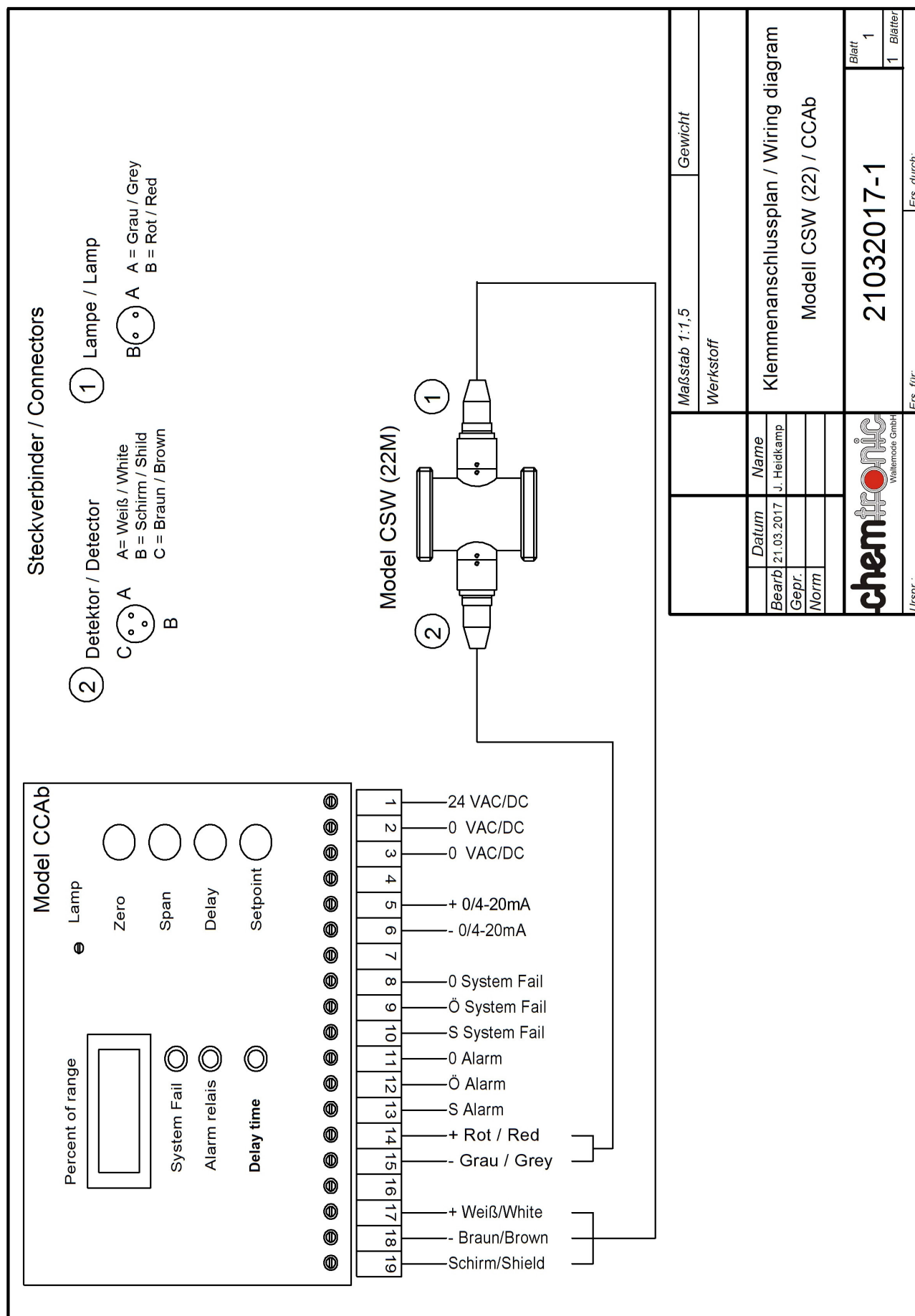
Calibration procedure

Following items are needed to calibrate the system:

- 1 pc. Screwdriver for potentiometer adjustment (use correct size only).
- 1 - 2 l Laboratory sample with a concentration of 0 % measurement range (normally water).
- 1 - 2 l Laboratory sample with a concentration of approx. 65% - 100% of measurement range.

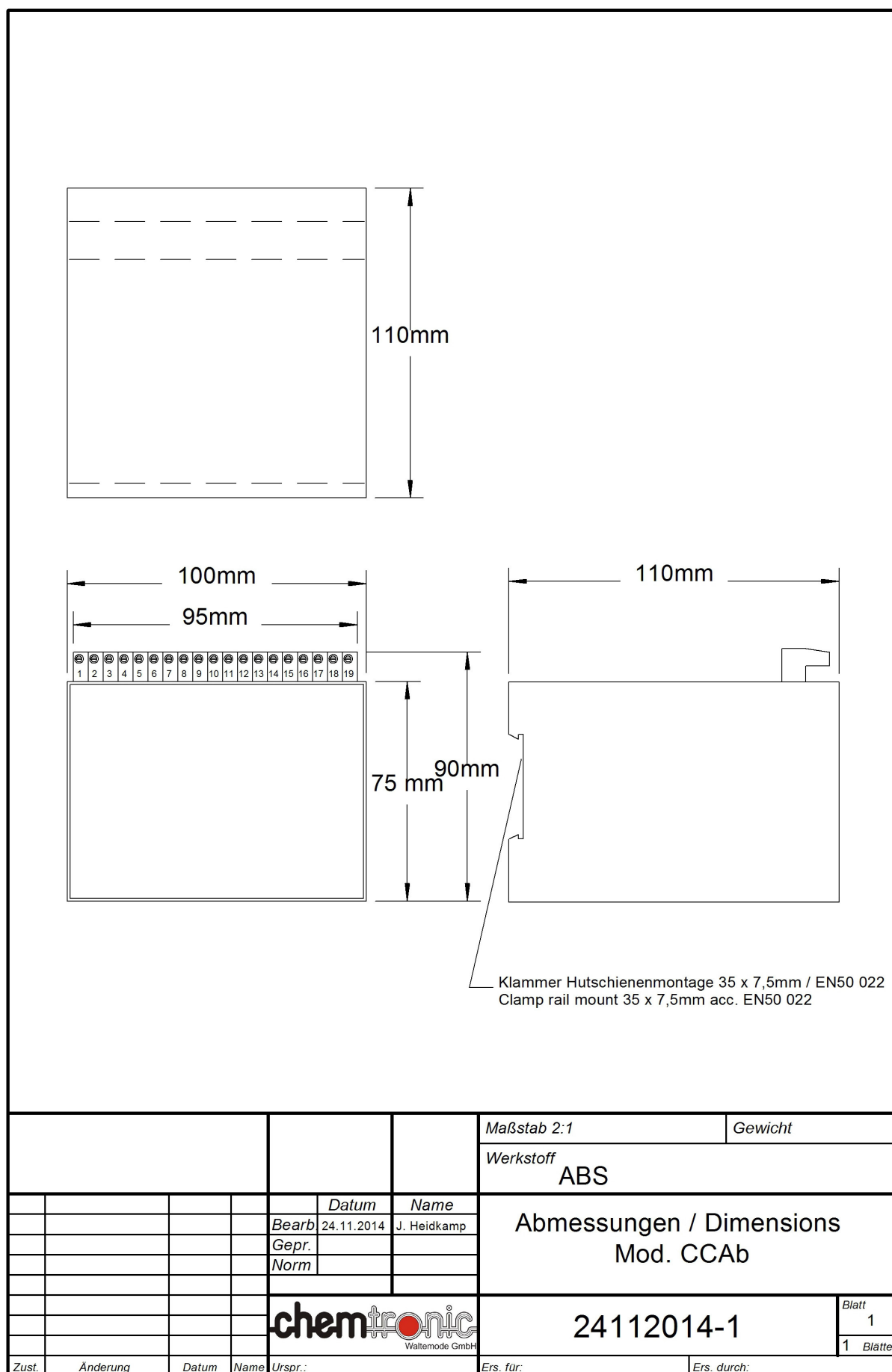
- Connect the instrument according to wiring diagram
- Fill the first laboratory sample into the clean sensor (concentration 0 %, normally water)
- Protect sensor against ambient light
- Adjust the zero potentiometer until the LCD display shows „000%“.
- Empty the sensor
- Fill the second laboratory sample into the clean sensor (concentration e. g. 75 % of range)
- Protect sensor against ambient light
- Adjust the span potentiometer until the LCD display shows „75%“.
- Empty the sensor
- The system is calibrated
- Adjust your relay set point by using the SET potentiometer.
- Adjust the switching delay of the set point relay by using the DELAY potentiometer (0 ... 30 sec.).

Wiring Diagram Model CSW / CCAb

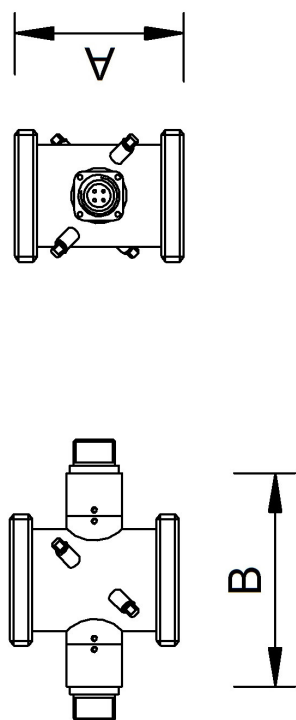


Maßstab 1:1,5		Gewicht	
Werkstoff			
Klemmenanschlussplan / Wiring diagram			
Modell CSW (22) / CCAb			
chemtronic Waltemode GmbH		21032017-1	
Urspr.:		Ers. für:	
Blatt 1		1 Blätter	

Dimensional Drawing Transmitter Model CCAb



Dimensional Drawing Sensor Model CSW (22)



Milchgewinde/Milk fitting: DIN11851

DN	25	32	40	50	65	80	100	125	150
A	102	102	102	102	104	112	120	---	---
B	136	142	150	160	176	190	210	---	---

alle Angaben in mm / all dimensions in mm

Maßstab 1:1		Gewicht	
Werkstoff		1.4301 / 316SS	
Name		Abmessung Modell CSW (22M) Milchgewinde	
Bearb.	02.03.2015	J. Heidkamp	
Gepr.			
Norm			
chemtronic Waltemode GmbH		02032015-6	
Urspr.:		Ers. durch:	
		Blatt 1	
		1 Blätter	

Trouble Shooting

Instrument shows permanently over range: Turbidity over range!

Check connection of the sensor cables!
Check the measuring lamp of the sensor!
Check the calibration!

Instrument does not switch:

Check connection of the sensor cables!
Check the relay set point!
Check the relay delay time!

Instrument permanently switched on:

Turbidity over range!
Check connection of the sensor cables!
Check the measuring lamp of the sensor!
Check the relay set point!

Set point relay switches permanent on and off:

Check the relay set point!
Check the relay delay time!

System fail is signalised:

Check connection of the sensor cables!
Check the measuring lamp of the sensor!
System defective call service!

Replacement of measuring Lamp at Sensor Model CSW (22)

The average life time of the measuring lamp is approx. one year of continuous operation. If the instrument is turned on and off frequently, the life span will be shorter.

Lamp rating: 2.3 Volt/DC /300mA.

- 1.) Disconnect the 2-pin connector from the lamp housing.



- 2.) Loosen the four Phillips screws and pull out the measuring lamp assembly carefully.



- 3.) Loosen the union nut (lamp retainer) and pull the lamp out of it's socket.



- 4.) Replace the old lamp by a new one.

Take notice: The two lamp pins are out off centre.

Lamp or socket will be damaged if you try to insert the measuring lamp the wrong way.



- 5.) Reassemble the sensor in reverse order.

Explosion Drawing Sensor Model CSW (22)

25

27

10 18-20

14

21

10

2-5 6-9 11 12

10

14 11 10

14

17 21 12

15-16 10

26

28

29

Pos. 6-9

Unterschiedliche Messfenster

Differend measuring windows

Maßstab 1:1,5

Gewicht

Werkstoff

Modell CSW (22)

chemtronic

Waltemode GmbH

22092014-1

Blatt 1

Blätter 1

Urspr.:

Ers. für:

Ers. durch:

Part list Sensor Model CSW (22)

Chemtronic Waltemode GmbH Tel.: +49 - (0)2173/57007
 Niederstr. 14 Fax: +49 - (0)2173/56007
 40789 Monheim E-mail: info@chemtronic-gmbh.de
 Home: www.chemtronic-gmbh.de

Ersatzteilliste / Spare-parts-list

Pos.	Qty required	Article-No.	Article-Description
001	1	S-0000-0010-00	Stückliste CSW (22)
002	2	C208-2020-EP	O-Ring (22 • EP • 18,72x2,62)
003	2	C208-2020-KA	O-Ring (22 • KA • 18,72x2,62)
004	2	C208-2020-SI	O-Ring (22 • SI • 18,72x2,62)
005	2	C208-2020-VI	O-Ring (22 • VI • 18,72x2,62)
006	2	2200-1150-SA	Messfenster / measuring window (Saphir 11,5mm) - (22 , 45)
007	2	2200-2200-PY	Messfenster / measuring window (Pyrex 22,0mm) - (22 , 45)
008	2	2200-2800-PY	Messfenster / measuring window (Pyrex 28,0mm) - (22 , 45)
009	2	2200-3250-PY	Messfenster / measuring window (Pyrex 32,5mm) - (22 , 45)
010	4	C208-2018-00	O-Ring (22 • SI • 18,77x1,78)
011	2	1022-0016-00	Messingverschraubung / Packing nut - (22 , 45)
012	2	C208-2026-00	O-Ring (22 • SI • 31,47x1,78)
013	2	2200-1027-EX	Dichtung / gasket (Ex-Arm) - (22 , 45)
014	2	C305-1002-00	Luftanschluss 90°/Connector air purge 90°
015	1	1022-0003-00	Messlampe (inkl.Stecker) / lamp assy (incl.plugin) - (22 , 45)
016	1	1022-0003-IR	Messlampe (IR-Diode inkl.Stecker) / lamp assy (IR-Diode incl.plugin) - (22 , 45)
017	1	C402-0127-00	Messlampe / measuring lamp - (22 , 45)
018	1	1022-0004-00	Detektor IR / detector IR - (22 , 45)
019	1	1022-0004-10	Detektor VIS / detector VIS - (22 , 45)
020	1	1022-0004-95	Detektor Sonderwellenlänge / detector Special wavelength - (22 , 45)
021	2	1022-0012-00	Messarm Standard CSW / Housing standard mod. CSW
022	2	1022-0012-WS	Messarm CSW IP65 / housing CSW Nema 4x
023	1	2200-0000-KG	Kalibrierarm standard CSW / filter housing standard CSW
024	1	1022-0012-WD	Kalibrierarm IP 65 Modell CSW / housing cal. filter Nema 4x
025	1	1022-0020-00	Fensterschlüssel / Spanner wrench - (22 , 45)
026	1	C305-0098-00	Steckverbinder / Connector Cannon (2p • w • Kabelmontage)
027	1	C305-0096-00	Steckverbinder / Connector Cannon (3p • w • Kabelmontage)
028	1	1022-0120-00	Lampenkabel / lamp cable - (22 , 45)
029	1	1022-0121-00	Detektorkabel / detector cable - (22)

Die Liste enthält die gängigsten Ersatzteile für nicht gelistete Teile kontaktieren Sie Chemtronic / This list contains the most common spare parts, for non listed parts contact Chemtronic.

Site of Company: 40213 Düsseldorf, Amtsgericht Düsseldorf, HRB 45293

Technical Data / Data Sheet concentration transmitter model CCAb

Model CCAb



- Wide measurement range (max. 4 AU / Ext.)
- Analogue output: 0 / 4 – 20mA
- Adjustable set point
- Adjustable delay time (max. 30 Sec. set point relay)
- 3,5 digit LCD display
- Automatic self diagnostic
- Rail mount enclosure

Description:

The turbidity transmitter model CCAb can be used with different Monitek sensors model 22 ..., 25 ... or LAS. The system uses the principle of light absorption to detect dissolved or suspended particles in liquids. The transmitter as well as the sensor is distinguished by easy operation and low maintenance. The calibration of the system is done via zero and span adjustment. Because of the automatic self diagnostic routine, highly reliable measurement results are assured. Actual measurement values are shown by the implemented display. The 0/4-20mA output allows transferring of the measurement results to an external PLC- system.

Applications:

- Product concentration
- Turbidity measurement
- Oil in water / Water in oil
- Single channel colour measurement

Operational areas:

- Chemical industry
- Petrochemical industry
- Pulp & Paper
- Bear & Beverage

Technical Data:

Supply voltage: 24 V AC/DC
Power consumption: Maximum 25 VA
Set point: 1 Relay (48V / 2A)
System fail: 1 Relay (48V / 2A)
Analogue output: 0/4 - 20mA / 800Ohm

Measurement range: 0 – 4 AU
Reproducibility: $\pm 1\%$
Ambient temperature: 5°C to 45°C
Enclosure: IP30 / NEMA1 ABS- rail mount
Dimensions: 100 x 90 x 110mm / 0,3Kg

Technical Data / Data Sheet Sensor model CSW (22)

Model 22 (CSW)



- Low maintenance
- Extended calibration interval: Typical 12 month
- Sight glass material: Sapphire
- Flow cell material: 1.4404
- Process connection: DIN, ANSI, SMS, NPT, APV, TH, ...
- Cleaning in place (CIP)
- Optional air purge connection: 4mm

Description:

The sensor model 22 uses the principle of light absorption to detect dissolved or suspended particles / colour in liquids. The transmitter model Messenger or CCAb is required to use this sensor. According to the application, calibration can be done in multiple ranges and measurement units like EBC, ppm, %, etc.. The measurement system has been designed for continuous operation with long life time. The sensors can be installed into almost any type of pipe. Process connection, gasket material, etc will be application specific. Due to the availability of multiple optical path lengths (2mm up to 120mm) the sensors can cover measurement ranges of 0-50EBC up to 0-10000EBC. The sensor will detect the IR-absorption for turbidity measurement. Therefore the measurement results are not affected by product colour. In case the customer wants to detect the product colour, the absorption will be measured at an application specific wavelength.

Applications:

- Product concentration
- Turbidity measurement
- Suspension
- Oil in water / Water in oil

Operational areas:

- Chemical industry
- Petrochemical industry
- Dairies
- Brew & Beverage

Technical Data:

Line size: DN 25 – DN 125 / 1/2" - 5"
 Process pressure: PN16 / ANSI class 150
 Process temperature: maximum 140°C
 Sensor material: 1.4471 / 316SS
 Sight glass material: Sapphire
 Gasket material: Application specific

Measurement range: Typical 0–50EBC, 0–10000EBC
 Reproducibility: ± 1 %
 Detector: Silica diode
 Measurement wavelength: typical 830nm
 Protection: IP65 / NEMA4X
 Sterilization: CIP