

Manual

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Absorption Probe

Model AP2

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Content

Copyright.....	3
Non-warranty.....	3
Warranty conditions	3
Before installation and start-up.....	3
Installation guidelines	3
Safety instructions.....	4
For all chemical liquids	4
Electrical installation	4
Hazardous area	4
Maintenance	4
Operating the instrument with open enclosure.....	4
Improper installation / operation of the system	4
Storage	5
Transport damage.....	5
Shipment of the instrument.....	5
Principle of Measurement	6
Installation of measurement system.....	8
Probe Installation.....	9
Calibration Procedure	10
Maintenance Instructions.....	11
Spare Parts:.....	11
Wiring Diagram AP2 / Messenger (single Probe).....	12
Wiring Diagram AP2 / Messenger (four Probes)	13
Wiring Diagram AP2 / CCAb	14
Dimensional Drawing AP2	15
Dimensional Drawing AP2 with Ingold- Adapter.....	16
Dimensional Drawing AP2 with TH- Varivent plate.....	17
Dimensional Drawing AP2 with DIN- / ANSI- flange.....	18
Technical Data Model AP2	19

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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, we will charge 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.

Before installation and start-up

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.

- The sensor is manufactured according to the customer's application (variable line size, flange type, cleaning jets, gasket material etc.).
- It is recommended to run the calibration of the system before installation of the sensor.
- The location / installation of the sensor should be in a vertical standpipe.
- The process pressure should never exceed the specification of the delivered sensor.
- The process temperature should never exceed the specification of the delivered 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. (The air bubbles are not expected at pressures upwards of 2 bar in aqueous solutions).
- In case the process temperature should fall under the dew point or rise above 85 °C purge the sensor optic housings with dry instrument air (approx. 10 l/h). Condensed water and excessive temperatures can damage the sensor and cause inaccurate measurements.
- Due to potential noise problems it is recommended not to extend the sensor cables.
- Due to potential noise problems use original Chemtronic sensor parts only.
- 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.

Safety instructions

Pay attention 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

The reagents or standards 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 reagents or standards.

Electrical installation

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

Hazardous area

DO NOT INSTALL the system in hazardous area without the optional Ex-proof equipment. Operation of non Ex- proof systems in hazardous area will cause a high risk.



Using the system in hazardous areas (Ex Zone I / Ex Zone II) will only be safe with the installation of the optional special Ex-proof designs including all required certifications



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. during calibration procedure).

Be careful that no moisture enters the enclosure.



Some components inside the instrument are 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 installed improperly, handled improperly, used outside of the technical specifications (of the instrument), or damaged by gross negligence.

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. The instrument should be placed in the original packing material.
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.

Transport damage

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 will not assume liability for these damages.

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.

If at all possible the original packaging should be used.

Principle of Measurement

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 aerosols.

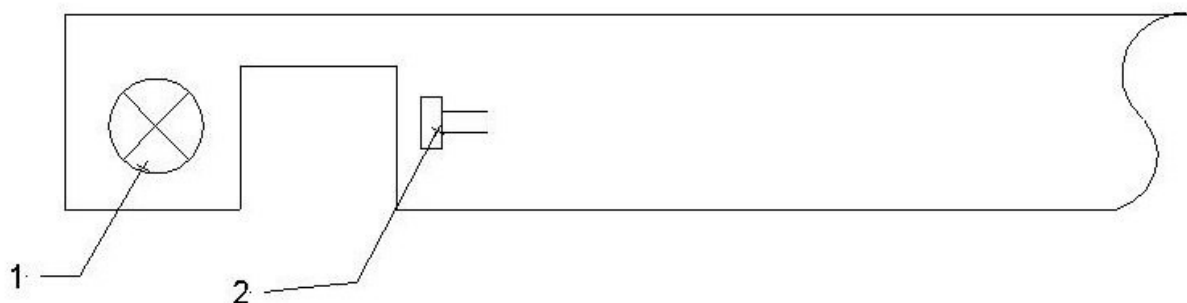
Measurement of Turbidity

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.

Turbidity probe model AP2

The probe model AP2 uses the single beam absorbance measurement to detect turbidity in liquids: The measurement wavelength is typically 880nm (other wavelength on request).



- 1. Light source
- 2. Detector.

Typical Turbidity Units

ppm:	Parts per million	FNU ¹ :	Formazine nephelometric unit
FTU:	Formazine 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 on the Different Measurement Units

1 FTU = 1 TEF = 1 NTU¹ = 1 FNU¹ = 0,25 EBC

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

Typical turbidity applications

- Measurement of lauter wort in breweries
- Measurement of yeast concentration
- Dosage systems (Yeast / Diatomaceous earth)
- Beer / Water / Lye separation
- Concentration measurement of various products
- Freight measurement systems (in combination with a flow meter)
- Centrifuge control
- Bio mass concentration
- Cell growth (OD)
- Measurements in flotation- / sedimentation tanks

Installation of measurement system

To guaranty the best accuracy and reproducibility of the measurement results please observe the following items.

Transmitter

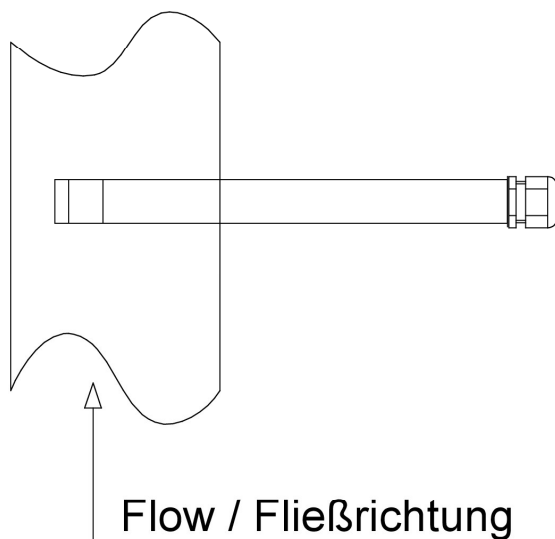
- If possible install the transmitter protected in a dry and dust free area.
- Avoid direct sun light.
- The ambient temperature should be within the technical specification of the transmitter.
- Please purge the transmitter with dry instrument air in case of ambient temperatures above +30 °C.
- The power of the transmitter has to be supplied by a circuit without disturbance sources.
- Connect the specified supply voltage only.
- Follow the wiring Diagram carefully.
- The distance between measuring cables and power cables should be at least 0.5 meters.

Probe

- Make sure that the system is calibrated before pipe installation.
- Install probe in an upright stand pipe to guarantee best possible measuring results.
- Adjust the measurement gap so, that bubbles inside the liquid can rise.
- Make sure that the process pressure is within the technical specification of the probe (PN16).
- Make sure that the process temperature is within the technical specification of the probe (140°C).
- Air and gas bubbles inside the process liquid will cause noisy and drifting of measuring results.

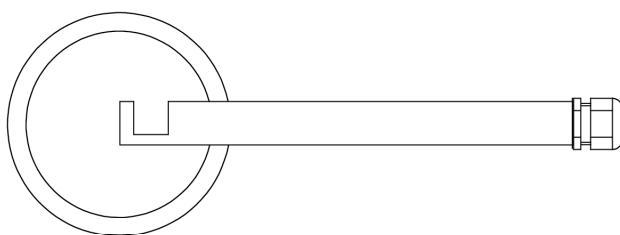
Probe Installation

Einbau in eine vertikale Rohrleitung Installation in a vertical pipe



Maßstab 1:1,5		Gewicht	
		Werkstoff	
		Installation Mod. AP2	
		26112014-8	
		Ers. durch:	
		Blatt 1	
		1 Blätter	
		Urspr.:	
		chemtronic Waltemode GmbH	
		Datum	
		Name	
		Bearb. 26.11.2014	
		Gepr.	
		Norm	

Einbau in eine horizontale Rohrleitung Installation in a horizontal pipe



dem Messspalt entweichen.

Air or gas bubbles can easily escape from the measurement gap.

Calibration Procedure

The probe model AP2 is simple to calibrate by using defined turbidity samples.

- 1.) Insert the probe into a liquid with a low turbidity (normally clean water) and protect the probe against ambient light to perform a calibration. Make sure that the measurement gap is filled with liquid and without bubbles.
- 2.) Enter the 0 value for calibration.
- 3.) Insert the probe into a liquid with a turbidity of 30% of specified range and protect the probe against ambient light.. Make sure that the measurement gap is filled with liquid and without bubbles. See manual of the transmitter to enter the sample.
- 4.) Insert the probe into a liquid with a turbidity of 80% of specified range and protect the probe against ambient light.. Make sure that the measurement gap is filled with liquid and without bubbles. See manual of the transmitter to enter the sample.

The calibration procedure depends on the transmitter used. Please read users manual of the transmitter for detailed information of the calibration procedure and how you have to enter the calibration values.

Maintenance Instructions



Ignoring of the following hints will cause a loss of warranty



Notice:

- Qualified technical personnel must perform repair and maintenance.
- Before beginning any work the probe must be cleaned and flushed thoroughly. Depending on customers' application product residues can be very dangerous (aggressive, poisonous). Please handle the probe careful due to possible leakage.
- Avoid pulling and twisting of the cable.

The probe does not contain any wearing parts. In case of dirtying of the probe or of the sapphire windows, please use a suitable agent for cleaning.

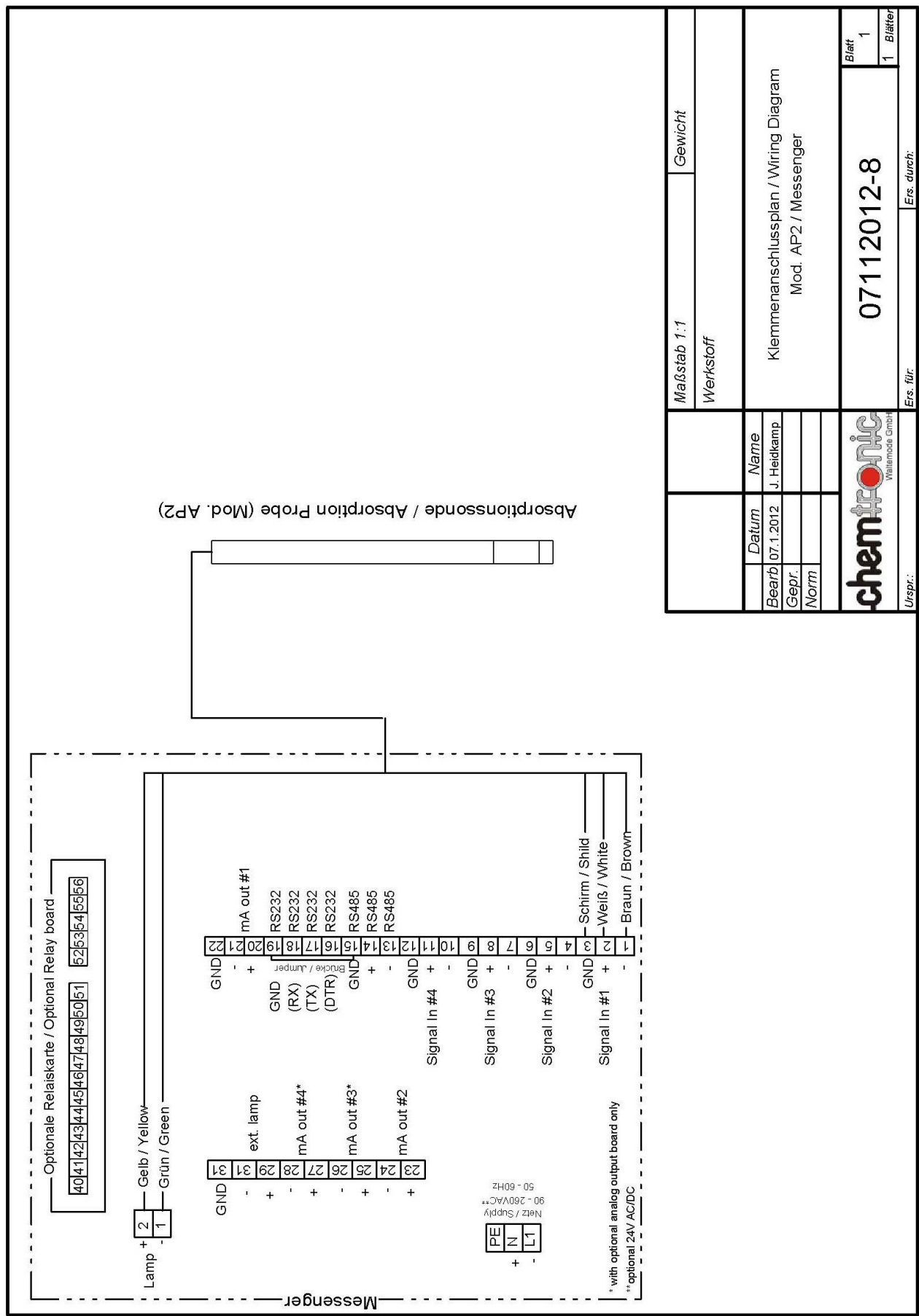
Please take notice:

The probe does not have any wearing parts.

Spare Parts:

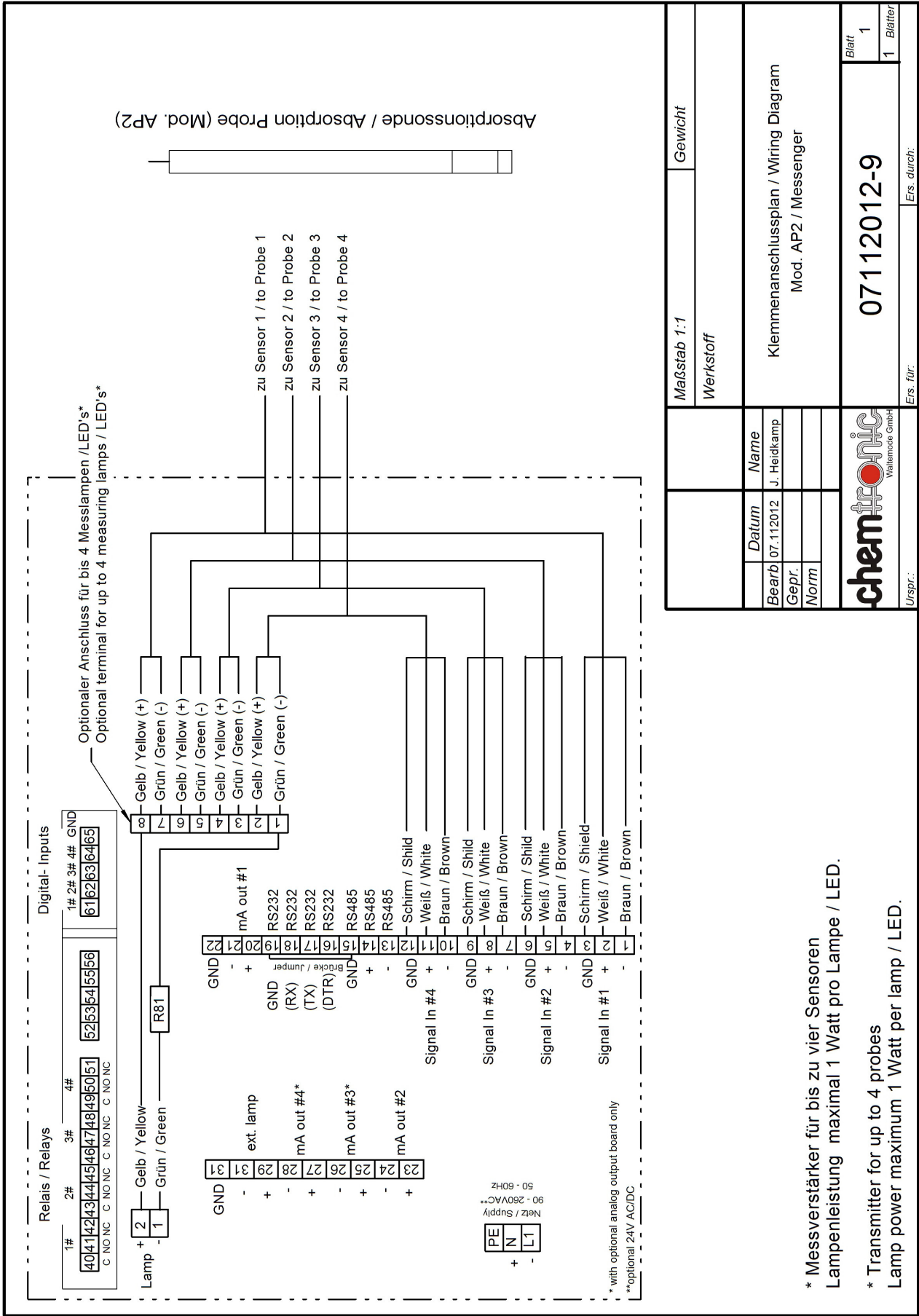
**The probe does not have wearing parts and does not require spare parts.
In case of any defect or damage return probe to factory.**

Wiring Diagram AP2 / Messenger (single Probe)

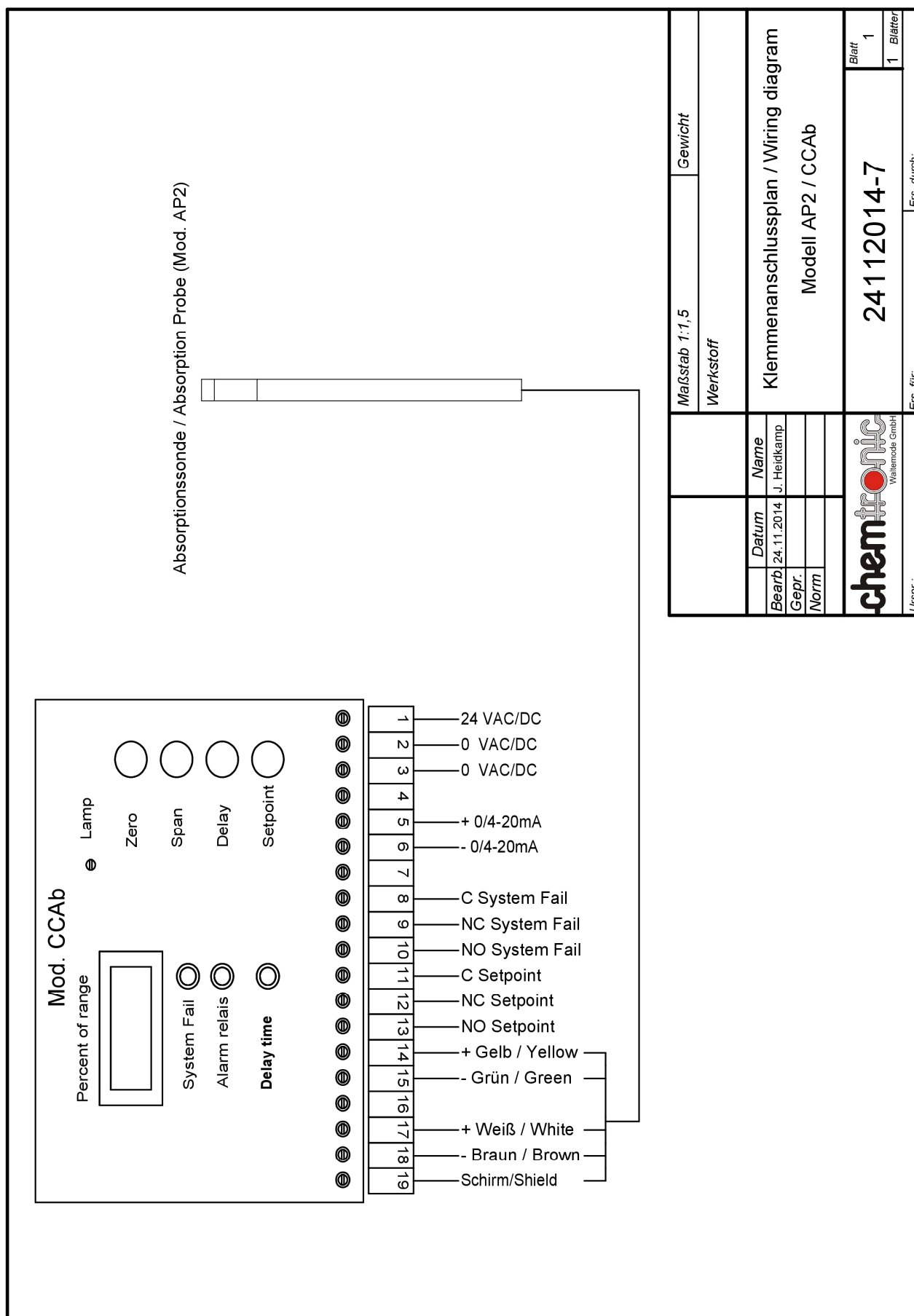


Maßstab 1:1		Gewicht	
Werkstoff		Name	
Datum		Bearb	
07.1.2012		J. Heidkamp	
Gepr.		Norm	
Klemmenanschlussplan / Wiring Diagram		Mod. AP2 / Messenger	
07112012-8		Blatt	
1		1	
Ers. für:		Ers. durch:	
Urspr.:		Blätter	
1		1	

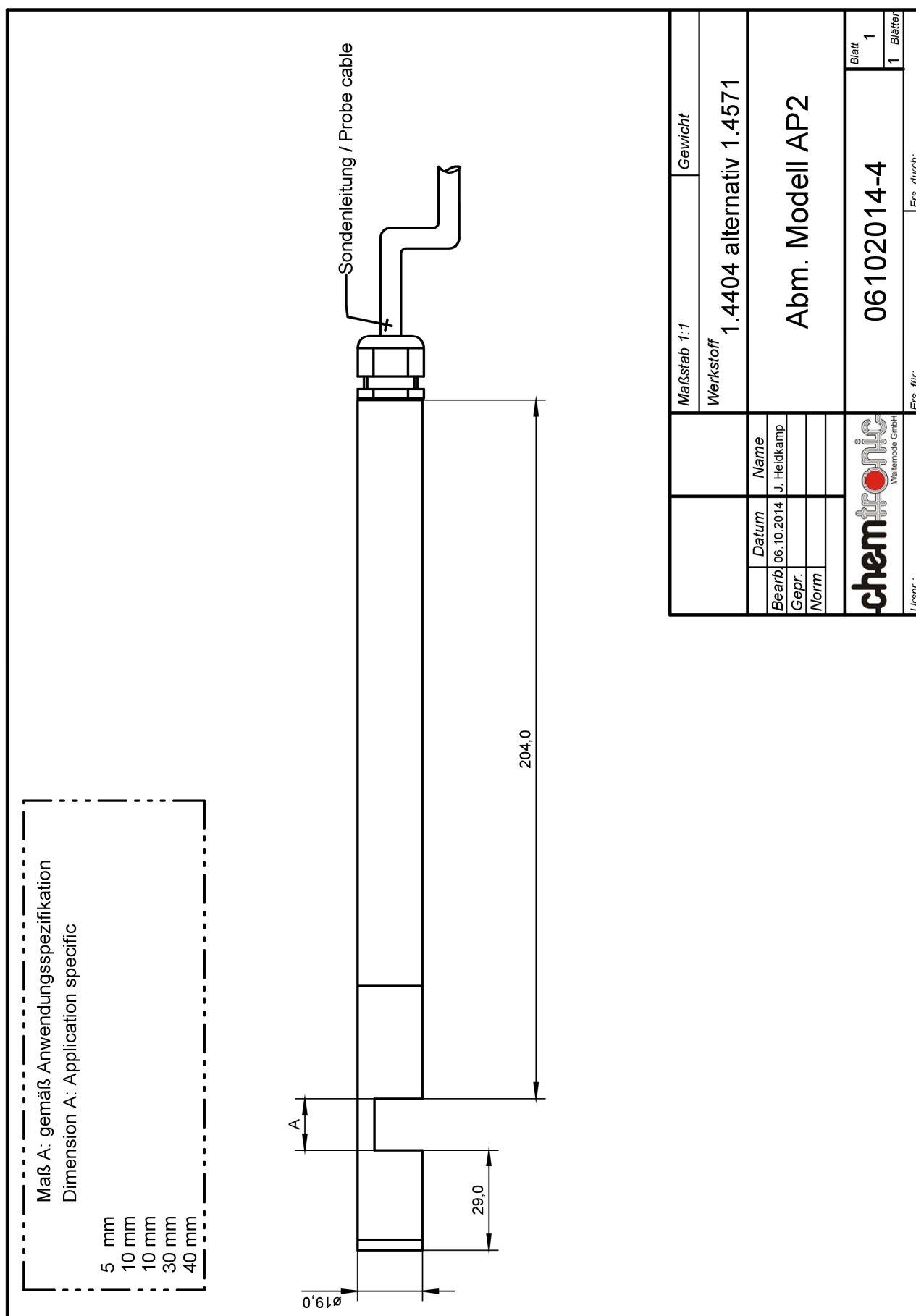
Wiring Diagram AP2 / Messenger (four Probes)



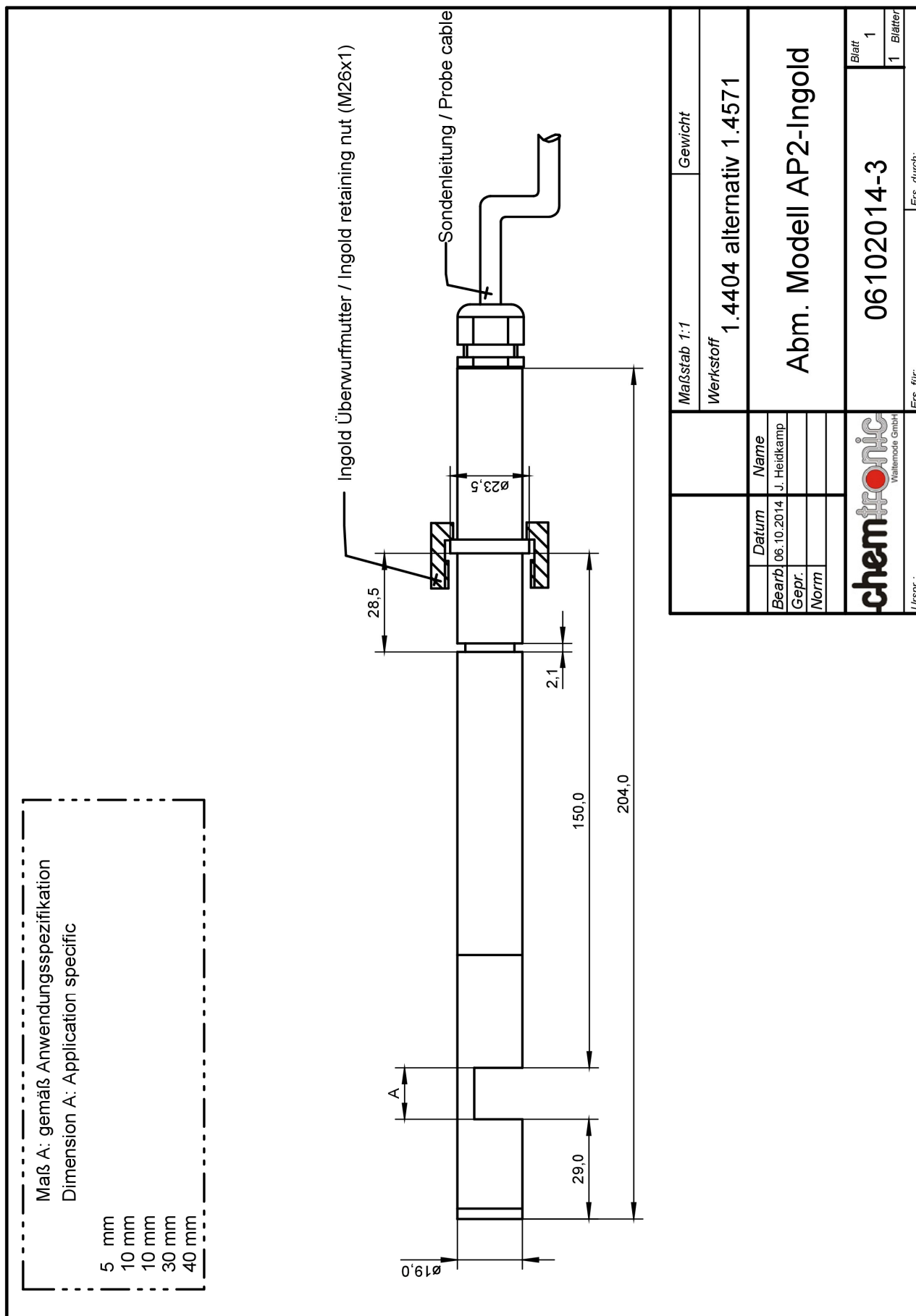
Wiring Diagram AP2 / CCAb



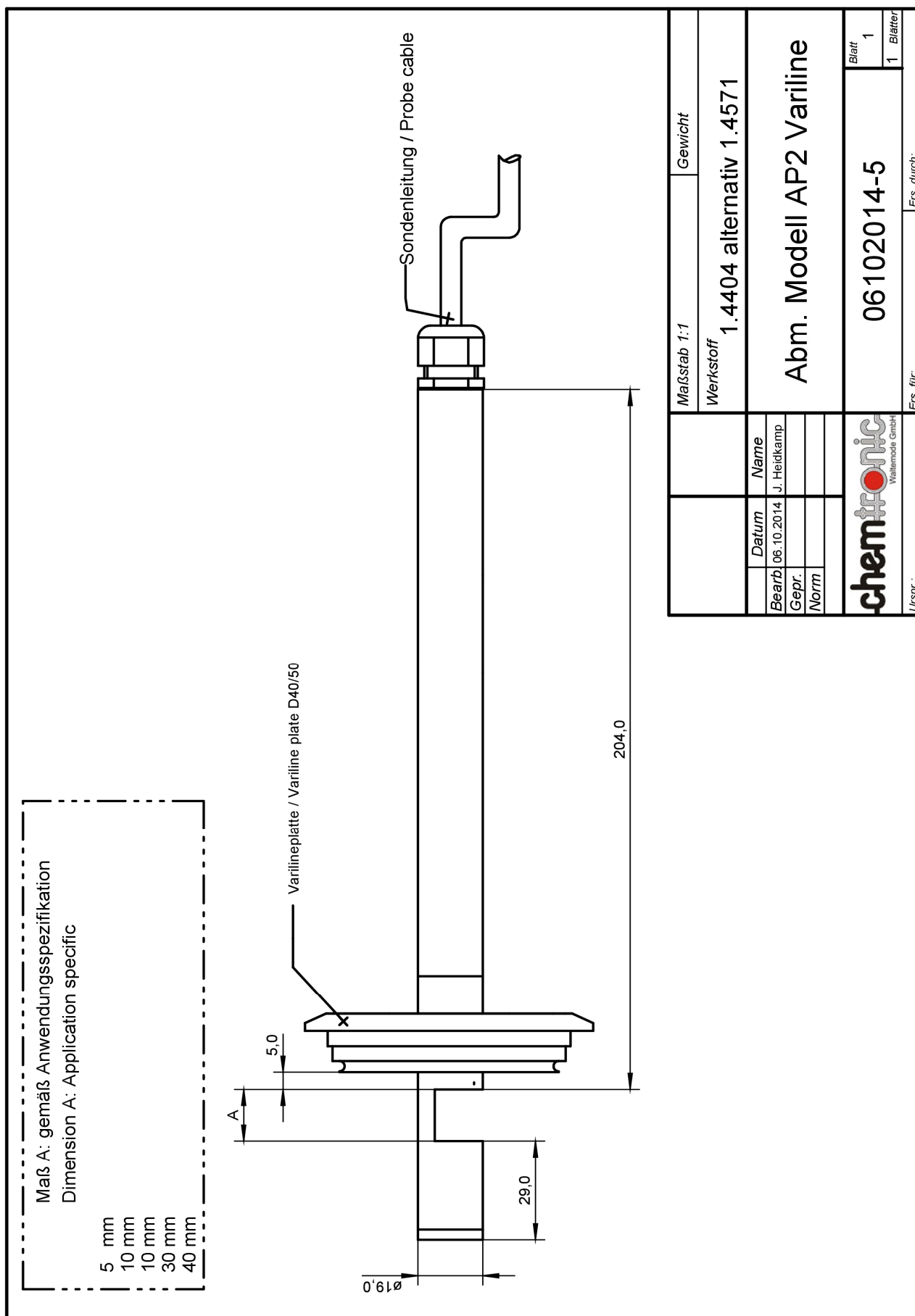
Dimensional Drawing AP2



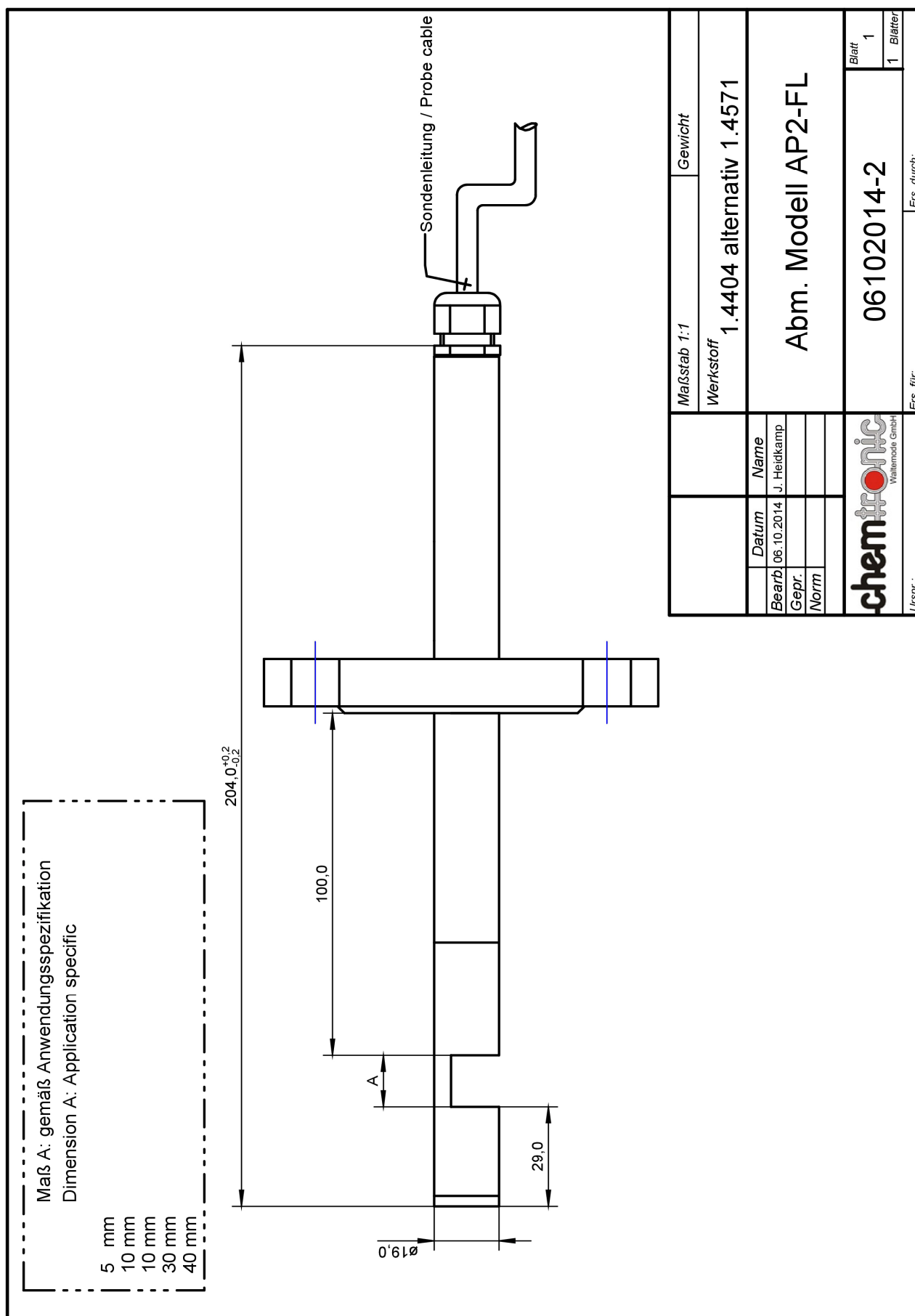
Dimensional Drawing AP2 with Ingold- Adapter



Dimensional Drawing AP2 with TH- Varivent plate



Dimensional Drawing AP2 with DIN- / ANSI- flange



Technical Data Model AP2

Turbidity Probe Model AP2



- 19 mm probe technology
- Measurement method: Absorbance
- Different measurement wavelength on request
- Low maintenance
- Extended calibration interval: Typical 12 month
- Sapphire measuring windows
- Hygienic design
- Cleaning in place (CIP)
- Process installation via TH- Varivent plates available
- Process installation via DIN / Ansi flange available
- Process insertion via ball valve with adapter available

Description:

The probe model AP2 uses the principle of light absorption to detect colour or turbidity in liquids. The transmitter model Messenger or CCAB is required to use this sensor. The system has been designed for continuous operation with long life time. The 19mm probe design allows insertion to laboratory fermentation tanks. Different flanges, TH- Varivent plates, APV- plates or ball valves are as well available and allow the easy installation of the probe to many applications.

Applications:

- Product Separation
- Turbidity measurement
- TSS concentration measurement

Operational areas:

- Breweries
- Beverages
- Dairies
- Bio technology
- Water / Waste water
- Chemical industry

Technical Data:

Line size:	DN 25 / 1" up to	Measurement ranges:	typical 0–100EBC, 0–500EBC
Process pressure:	PN16 / ANSI class 300	Reproducibility:	± 1 %
Process temperature:	45°C (131°C short time CIP)	Measurement wavelength:	880nm (other on request)
Sensor material:	1.4404 / 316L	Protection:	IP65 / NEMA4X
Sight glass material:	Sapphire	Hazardous Area:	ATEX, Zone 1 & Zone 2 (option)
Gasket material:	EPDM (other on request)	Sterilization:	CIP