

EMCO 4-electrode Conductivity Sensor series 821 for Alkali Concentration Measurement of White and Cooking Liquor

APPLICATIONS

The EMCO alkali sensor type 821 and the EMCO Analyzer type 580 calculate the concentration of white and cooking liquor in the pulp and paper industry by measuring the conductivity of the liquor.

In the digester in a pulp mill the wood chips are cooked with white liquor in order to remove the lignin and other unwanted substances. The lignin is the product which bonds the wood fibres together.

The white liquor is a chemical mixture of mainly sodium hydroxide (NaOH) and sodium sulphide (Na₂S).

NaOH and Na₂S are significantly much more conductive than the rest of the components in the white liquor. Therefore the conductivity can represent the effective Alkali (EA) and active Alkali (AA) concentration.

The sensors are designed to be installed directly into the feed circulations as it supplies the operator with a real time measurement and optimum conditions to fine tune the alkali and temperature in the process.

Alternatively a complete bypass solution is available which includes additional items such as main pipe spool piece, bypass measuring pipe, valves, restriction orifice plate and cooler etc. All items will be provided and manufactured by EMCO Controls.

CONSTRUCTION

The sensor element has a 4 electrode design for higher accuracy over the 2 electrode design. The sensor element has an accurate temperature sensor with low response time for fast temperature compensation.

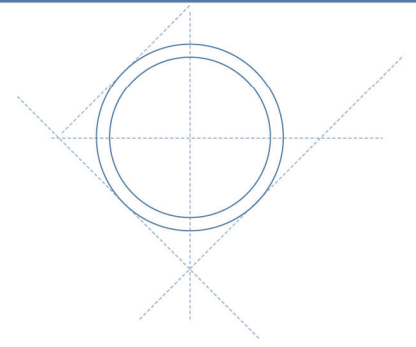
The sensor is to be mounted in a pipe size larger than 200 mm.

The cable to connect to the Analyzer is especially selected to ensure high accuracy and long distance between sensor and analyzer. The cable is a part of the supply of the sensor.

Our many years in the field of instrument design guarantees a rugged design, but still allows the possibility to solve customers' special requirements.

0-11-013-0e





FEATURES

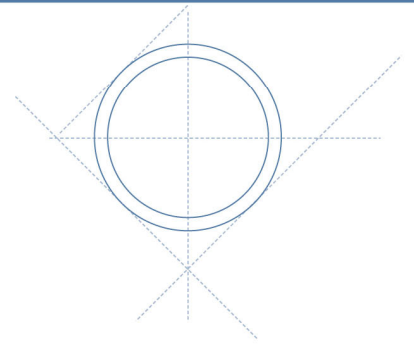
The sensor is extremely resistant to wear.
The disk type design ensures no risk of scaling (product build up).
The unique sensor design eliminates risk of catching air bubbles which would influence measurement accuracy.

PRINCIPLE OF MEASUREMENT

The conductivity is equal to the conductance of the liquid times the cell constant.
The conductance is the reciprocal of the electrical resistance of the liquid measured.
The cell constant is equal to the distance between the electrodes divided by the effective area of the electrodes.

TECHNICAL SPECIFICATION

Measuring range	: 0- 2000 mS/cm
Process connection	: Flange according to ANSI B 16.5, EN 1092-1 or DIN
Pressure ratings	: 300 lbs or PN 40
Sizes	: 1½", 2", DN 40, DN 50.
Pressure max.	: 30 bar
Temperature max.	: 180°C
Material. sensor body	: AISI 316
Material. electrodes	: AISI 316
Material, electrode support	: PTFE
Insertion length	: 286 mm
Temperature element	: Pt1000 Class A IEC 751
Cell constant	: Individually determined, marked on sensor
Accuracy	: better than 3 % (2 % per decade)
Protection	: IP 65
Sensor cable	: 9 pole
Cable lengths	: 3 m, 5 m, 10 m, 20 m, 30 m.
Suitable Analyzer	: model 580



DOCUMENTATION

Dimensional drawing

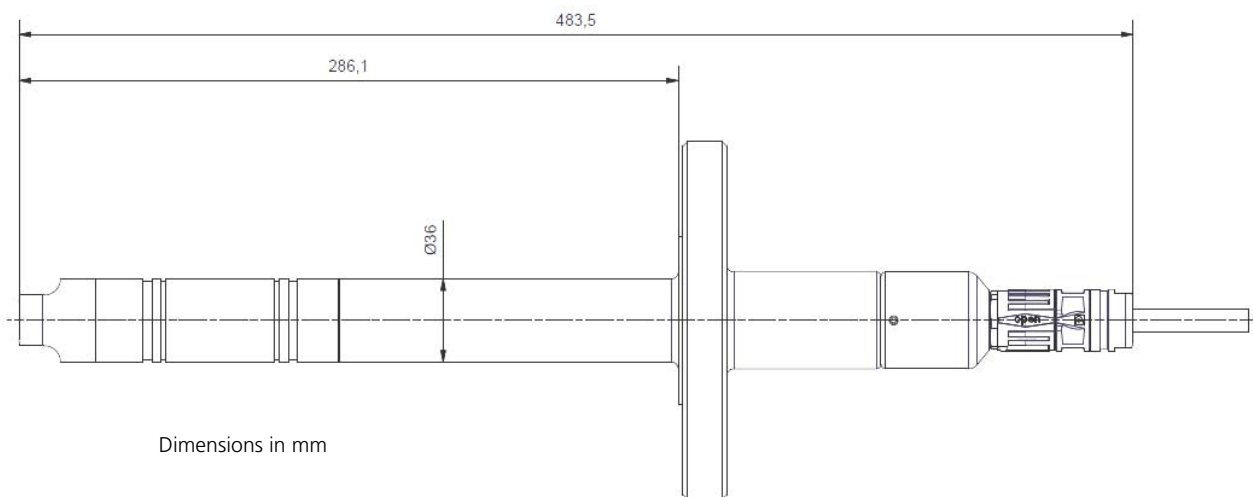
Material certificate according to EN 10204-3.1

Pressure test certificate

Calibration certificate

Instruction manual

OVERALL DIMENSIONS

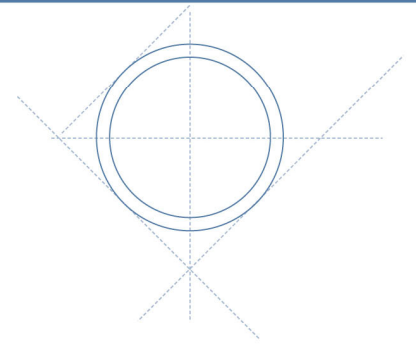


ACCESSORIES

With our fully equipped machine shop including welding EMCO Controls can supply mechanical parts including flow tubes, by-pass systems and coolers etc.

QUALITY ASSURANCE

EMCO Controls is certified according to : ISO 9001- 2008,
Pressure Equipment Directive PED Module H,
Welding quality certificate to EN 3834-2
and Sellich



SENSOR CODING

1. Type 821
2. Mounting

DN 40 PN 40 flange	code	44F
1 ½" 300 lbs RF flange	code	43F
Between 1½" ANSI flanges	code	4VS
DN 50 PN 40 flange	code	54F
2" 300 lbs RF flange	code	53F
Between 2" ANSI flanges	code	5VS
3. Electrode type

External	code	2
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4. Electrode material

Stainless steel 316	code	316
Other, please specify		
5. Sensor body

316/PTFE	code	3P
Other, please specify		
6. Length, insertion

286 mm	code	028
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7. Length, cable

5 meter	code	05
10 meter	code	10
20 meter	code	20
30 meter	code	30

Example

Alkali sensor with DN 40 PN 40 flange, external electrodes in stainless steel 316, sensor body in AISI 316 and PTFE and installation length 286 mm has following code:

821-44F-2-316-3P-028-05