General Specifications

Model SR20
Single reference electrode (pH)

GS 12B06J01-10EN-P

■ Overview

A good reference electrode satisfies the following requirements:

- the output voltage is determined by Nernst's law
- the output voltage is stable

The purpose of the junction is to maintain contact between the reference system in the electrode and the process liquid. When selecting the correct junction, consideration must be given to ensure that the process liquid does not penetrate the electrode causing poisoning and a consequential unstable liquid junction potential.

■ Features

- Easy maintenance
- Flowing type useable in Ultra-Pure Water
- No reference liquid wastage
- Maximum process pressure: 1000 kPa (10 bar)
- High quality Ag/AgCl reference system (pin) which can stand high temperatures

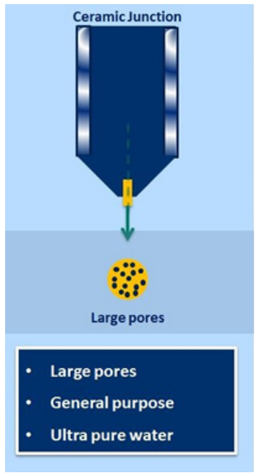
■ 1. General Specification SR20

Selecting the right junction
The Reference sensor completes the electrical circuit of the measuring loop and provides a stable reference potential. Between 70-80% of the pH sensor failures are generally caused by an issue with the reference junction. Selecting the correct type of reference junction is, therefore an important step and will significantly increase the lifetime of the pH sensor.

The purpose of the junction is to maintain contact between the reference system in the electrode and the process liquid. Selecting the correct junction ensures the process liquid does not penetrate the electrode. This is something to avoid as it causes poisoning, and it might even create an unstable liquid junction potential.

The selection of the correct type of junction of a reference electrode depends on the process conditions under which this electrode must function. The following junction types are available:
1. Ceramic junction.
2. Glass sleeve capillary element.
3. PTFE junction.

Each of these junction materials has their particular advantages and disadvantages.
1. Ceramic junctions have very large pores. This means the ceramic junction must be small. The added advantage is that the electrolyte inside the sensor will not deplete very fast in applications for example with a high salt content. The downside is that in dirty applications it is easily blocked unless a flowing type sensor is used (cleans itself).
2. PTFE is well known for its fouling resistant properties. In applications where there is a lot of fouling or scaling it will repel the dirt and keep the junction free. The downside of having a PTFE junction are small pores, which only allows a small flow out of the sensor. When measuring in solutions with a high concentration of salts, this low flow can generate a potential difference across the PTFE junction (see figure 4) generating an error in the pH measurement.
3. The Sleeve is a very special type of junction. There is one hole in the main glass tube. Around the hole the glass is made deliberately uneven by lightly sandblasting. This creates small pathways for the electrolyte to flow from the sensor. Over this hole another sandblasted glass tube is placed (the sleeve). This will ensure a steady small flow of electrolyte out of the sensor. This is especially important in applications where the conductivity is low. The glass sleeve can be lifted to clean the pathways, which is especially handy for very dirty applications



SR20 Single Reference Electrodes (non-flow)
A non-flow type reference electrode can be used for processes that don't contain components that poison the reference system. The gel-type electrodes have a large area of porous PTFE junction for optimal resistance against electrode pollution.
The SR20-AP26 electrode is the optimal choice for processes that cannot stand contamination with KCl.
The SR20-AC22 electrode has a flexible PTFE tube. Therefore, this electrode can be applied in processes with frequent temperature- and pressure fluctuations.

Additional features of types SR20-AC22
- Temperature/pressure variation compensation.
- To be used in non-polluting fluids.
- Saturated KCl-solution (pellets).
- For low ionic applications and high temperatures.
- Temperature range: 0 to 120ºC.
- Diaphragm resistance (25ºC) <5kΩ.

Additional characteristics of type SR20-AP24
- General purpose PTFE diaphragm electrode.
- Large PTFE diaphragm.

Additional characteristics of type SR20-AP26
- When KCl is prohibited in the application.
- Double junction, thickened KNO_3 in buffer compartment.
- Large PTFE diaphragm against pollution.

SR20 Single Reference Electrodes (flow)
In the following situations, it is advisable to consider using a flowing type reference:

- Heavy fouling/scaling: The electrolyte flowing out of the sensor will keep the junction clean.
- Low conductivity: Everything flows from high to low. High salt concentration in the sensor, low salt concentration in the process. The electrolyte will flow fast out of the sensor. When using a non-flowing type sensor, it will cause the sensor to deplete fast and fail.

Additionally, in processes with pressure variations, the composition of the electrolyte may change because of process liquid penetration into the electrode. Any change in the composition of the electrolyte may cause a measuring error or even poisoning of the reference system of the electrode.

To prevent penetration of the process liquid into the electrode the pressure in the electrode must be higher than the process pressure. The SR20-AC52 reference sensor can be equipped with a large electrolyte reservoir which will create a constant overpressure depending on how high the reservoir is mounted. The refillable reference electrodes have a positive flow of electrolyte

In processes where the pressure fluctuates regularly or in ultra-pure water applications (>0.056 µS/cm) the SR20-AC32 with integral automatic pressure compensation system is the best solution. These electrodes are also called "Bellomatic" type. This Bellomatic system creates a constant flow of reference liquid, independent of the process pressure variations for minimal diffusion potential

Features
- Flow prevents diaphragm fouling and poisoning the reference system
- High quality Ag/AgCl reference system
- Automatic compensation for process pressure variations (SR20-AC52)
- Suitable for pure water applications and for polluting fluids.
- Refillable, large KCl reservoir.
- Reference liquid 3.3M KCl
- Flow @25 °C: SR20-AC32 ... 0.2 ml / 24hr
  SR20-AC52 ... 0.5 ml / 24hr

Note:
The flow is highly dependent on temperature. When using the electrode continuously at temperature over 70ºC it is recommended to fill the electrode with a reference liquid having a higher viscosity, order part no. K1520VN (3.3 m. KCl).

SB20 Salt Bridge

This reference electrode/salt bridge combination allows the measurement of pH or redox in those cases when:

• Excessive contamination of the reference diaphragm or poisoning of the reference system is expected.
The flow of the reference liquid through the diaphragm is increased by pressuring the container. The distance to the reference system is increased. Consequently, the contamination rate will decrease.

• The process can not be contaminated with KCl.
The salt bridge can be filled with several types of electrolytes.

• Measurement has to be performed at processes up to 1000 kPa (10 bar) and temperatures up to 100°C. As the reference electrode is mounted in the container and therefere in more favourable conditions, the lifetime will be extended reasonably. The container with reference liquid can be pressurized.

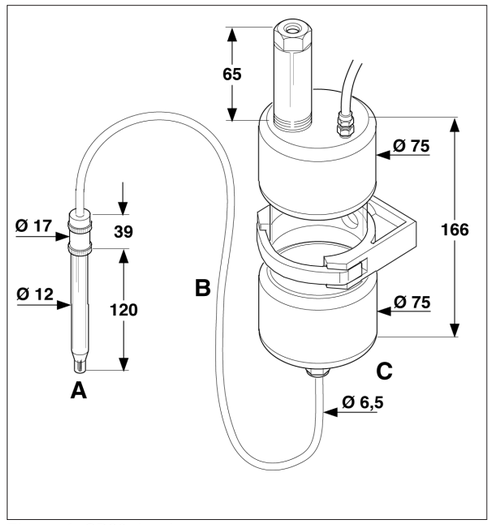


Figure 1: SB20 drawing

FLOW TUBE (A)
Material : glass
Flow diaphragm : ceramic, PTFE or sleeve
Connector : Ryton R4

TUBING (B)
Material : nylon
Diameter : 1/4” o.d.
Length : 5 or 10 mtr.

CONTAINER (C)
Container : PVC, PVC (transparent)
Electrode mounting set : Ryton R4
“O” ring : silicone
Connection : nylon
Weight : approx. 300 g.

Mounting : wall mounting (screw M5)
Temperature/pressure ratio : max. 200 kPa (2 bar) at 100°C

The normal standard reference electrodes can be mounted in the container. This reference electrodes can be ordered separately. For standard applications the SR20-AP24 is the most suitable.

1.1 Measuring Elements

Sensor type	: pH reference electrode
Reference system	: Ag/AgCl
Reference type	
-AC22	: Non flow
-AP24	: Non flow
-AP26	: Non flow
-AC32	: Flow
-AC52	: Flow
Reference liquid	
-AC22	: Sat. KCl
-AP24	: 3.3m KCl
-AP26	: 3.3m KCl/ 3.3m KNO3
-AC32	: 3.3m KCl
-AC52	: 3.3m KCl
Junction type	
-AC22	: Ceramic
-AP24	: PTFE
-AP26	: PTFE
-AC32	: Ceramic
-AC52	: Ceramic
Glass Impedance range @25°C	
-AC22	: < 10.0kΩ
-AP24	: < 5.0kΩ
-AP26	: < 5.0kΩ
-AC32	: < 12.5kΩ
-AC52	: < 10.0kΩ
Flow @25°C	
-AC22	: N/A
-AP24	: N/A
-AP26	: N/A
-AC32	: ±0.2 ml / 24hr
-AC52	: ±0.5 ml / 24hr

1.2 Wetted parts construction material

Sensor body	: Glass
O-rings/bellomatic	: N/A, Bellomatic, FKM(-AC32)

1.3 Operating range

Temperature	
-AC22	: 0°C ... 120°C
-AP24	: 0°C ... 80°C
-AP26	: 0°C ... 80°C
-AC32	: 0°C ... 120°C*
-AC52	: 0°C ... 100°C

* only when atm>vapor p. to prevent boiling, otherwise 0°C ... 100°C*

pH	
-AC22	: 0-14
-AP24	: 0-14
-AP26	: 0-14
-AC32	: 0-14
-AC52	: 0-14
Pressure	
-AC22	: 1,5… 1000 KPa
-AP24	: 1,5… 1000 KPa
-AP26	: 1,5… 1000 KPa
-AC32	: 1,5… 1000 KPa
-AC52	: Atm.

1.5 Shipping Details

SR20-AC22/AP24/AP26
Package size (LxWxH) : 260 x 45 x 45 mm
: (10.2 x 1 x1 inch)

SR20-AC32
Package size (LxWxH) : 435 x 60 x 60 mm
: (17.1 x 2.4 x 2.4 inch)

SR20-AC52
Package size (LxWxH) : 300 x 95 x 73 mm
: 11.8 x 3.7 x 2.8 inch

1.6 Environmental conditions

Storage temp. : -10 to 50 °C
: (14 to 122 ºF)

1.7 Regulatory standards

CE
- RoHS Directive 2011/65/EU
Commission Delegated Directive (EU) 2015/863 amending Annex II as regards the list of restricted substances, and by applying following standards:
EN-IEC 63000: 2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

UKCA
- RoHS The restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

■ 2. Dimensions

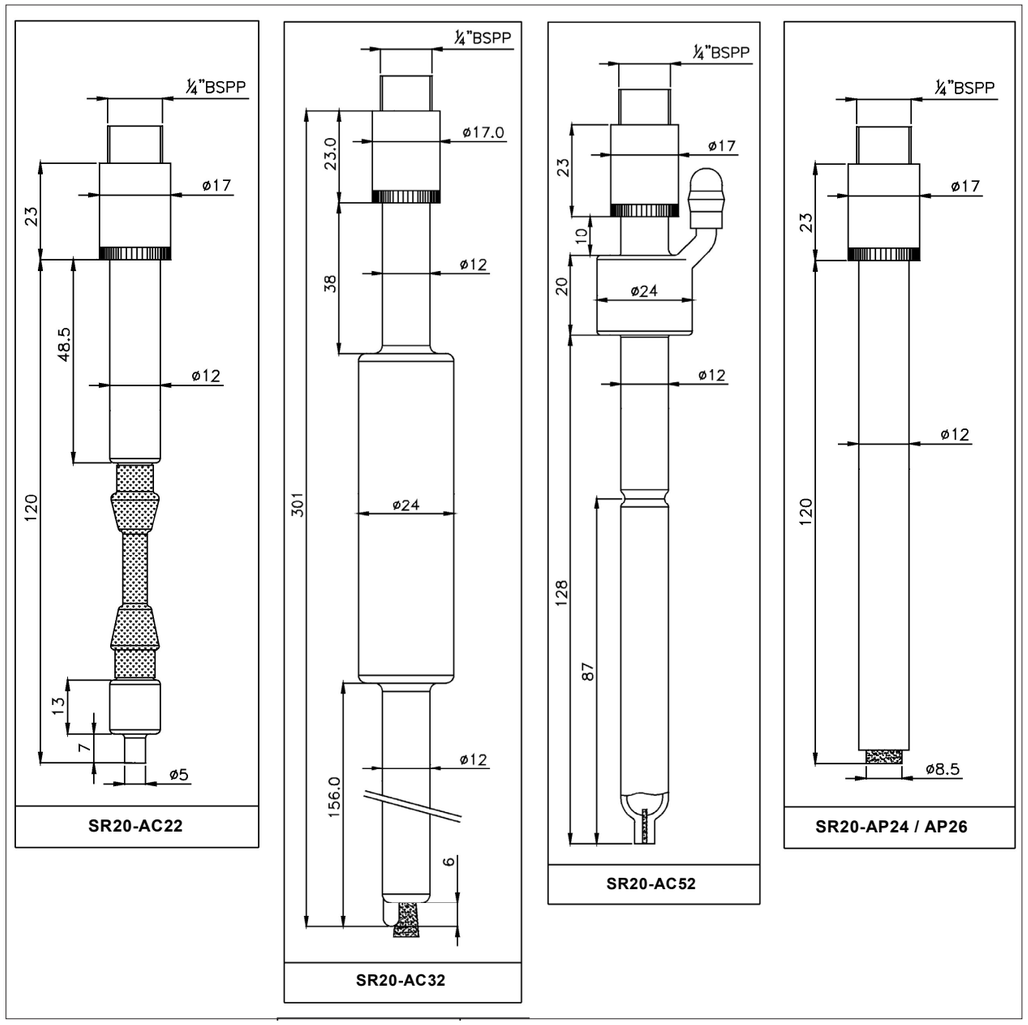


Figure 2: SR20 dimensions

■ 3. Model Codes & Parts

Table 1: Model & Suffix codes SR20

Model	Suffix Code	Option Code	Description
SR20			Reference sensor
	-AC22		Ref. pH, non flow, ceramic
	-AC32		Ref. pH, refill, bellomatic
	-AC52		Ref. pH, refill, ceramic, Low Flow
	-AP24		Ref. pH, non flow, PTFE
	-AP26		Ref. pH, non flow,PTFE, DJ

Table 2: Model & Suffix codes SB20

Model	Suffix Code	Option code	Description
SB20			Salt bridge
	-VC		Flow diaphragm: ceramic
	-VP		Flow diaphragm: PTFE
	-VS		Flow diaphragm: sleeve

Table 3: Spare parts SR20

Part number	Description
K1500BZ	O-rings Viton 11x3 (6Pcs)
K1500FZ	O-rings 10x4 5pcs SR20-AC52
K1500GE	O-ring sets (5x). SR20-.C32
K1500GF	1 Molal KCl sol. 250 ml
K1500GG	1 Molal KCl sol. 250 ml, thickened
K1520JL	Adapter Y-CAP - PG13.5 SS
K1520JN	Adapter M25x1.5 - PG13.5 PVC
K1520VA	3.3 Molal KCL solution
K1520VN	3.3 molal KCl sol. 250 ml. thickened
K1523JA	Adapter PG13.5 in F*40 PPO
K1523JB	Adapter PG13.5 to ¾"NPT PPO
K1523JC	Adapter PG13.5-sensors in F*40 SS
K1523JD	Adapter PG13.5 to ¾" NPT SS
K1524AA	O-Ring Sil. 10.77x2.62&Slide Ring (1 pc.)
K1598AC	Flow fitting (3.1), for SC4A
K1500DW	Set of 12 cable nuts for WU20

■ 4. Cables

Table 4: Model & Suffix codes WU20

Model	Suffix Code	Option code	Description
WU20			Industrial pH/ORP cable
	-PC		Coax
		01	1 meter cable
		02	2 meter cable
		05	5½ meter cable
		10	10 meter cable
		15	15 meter cable
		20	20 meter cable
		25	25 meter cable

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Addendum 1: Typical installation

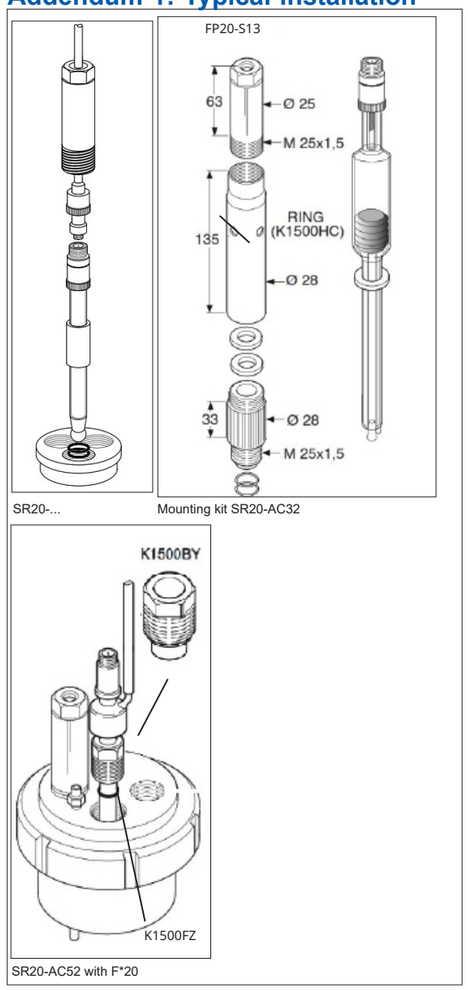

Figure 3: Standard mounting options

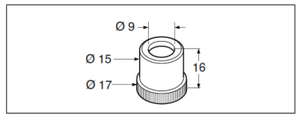

Figure 4: K1500DW (set of 12 cable nuts)

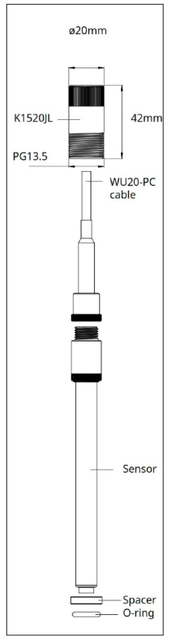

Figure 5: Mounting PG13.5 for Y-CAP sensors

Addendum 2: Available models

Table 5: SR20 and SB20 Available models

MS-code	SR20-AC22
	SR20-AC32
	SR20-AC52
	SR20-AP24
	SR20-AP26

MS-code	SB20-VC
	SB20-VP
	SB20-VS

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