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Operating Instruction for pH/orp- electrodes

Delivery and shipping
The electrodes are supplied with a protection cap filled with a 3-mole KCl-storage solution. This cap prevents a draining of the electrode. Otherwise they lose their function.

Storage
The electrodes should be stored within the temperature range -5...+30°C. Otherwise they can be damaged irreparably, by temperatures under -5°C. In order to avoid a draining of the electrodes, these should be stored with the associated protective cap. With longer storage time, the level of liquid of the cap is to be examined. A storage time longer than 1 year is not recommendable.

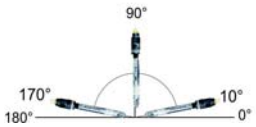
Refreshing
Drained electrodes normally can be regenerated, but they will never achieve the original conditions Therefore the electrode must be stored in a 3-mole KCl-solution for 24 hours. If the electrode should bring thereafter still no satisfying values, a heating up to 60-80° in a water bath can cleanse a possibly blocked up diaphragm.
Electrodes with liquid reference must to be filled up.

Preparing for Measurement
During adjustment of the cable length, the black insulating of the coax lead must be removed.
pH- electrodes have a high internal resistance. Humidity at the connection plug must be avoided (danger; creeping current). Don't touch the contacts of the plug while removing the plug protection cap. Transition resistances lead to an erroneous measurement.
Take off the Protection cap and rinse off possible salt incrustations. Electrodes with liquid electrolyte for the reference electrode must be possibly refilled. Electrodes with gel filling may not be opened, protecting covers may not be shifted. If there are some bubbles at the front measuring area, they are removable by shaking the electrode (like a fibre thermometer).

Calibration
In practice the characteristic curves of the electrode deviate from the ideal line. For precise measurement it is necessary to calibrate the pH-electrode during commissioning and after regular time intervals.
It is common to calibrate the electrode with a 2-point-calibration for zero-point and the slope.
The value of the buffer-solution should be nearly at the measuring value of the process.
For higher precision it is recommended to heat the solution to the process temperature.
Alkaline solutions change their value while picking up CO_2 from the air. Acid solutions are ideal because they have a high stability. For the best result it's recommend to calibrate with buffer-solution pH4.00 and pH7.00. The test-solutions should be used only once.
Before dipping the electrode into the buffer solution, it must be rinsed with water and dabbed with clean fleece cloth. Each pollution of the buffer solution can change their value, and worsen the accuracy of the calibration.

Mounting
It is very important to mount the electrode immediately before starting up the system, to protect the electrode against drainage.
For the mounting it necessary to use a 17mm ring- or mouth spanner. Other tools will damage the glass protection sheath.

Mounting direction
The mounting direction should be in range 10° and 170° from the vertical position
See pictures.



Cleaning and maintenance
Dirty electrodes supply incorrect results of measurement. Therefore they should be cleaned in regular intervals. In order not to damage the electrodes, the glass diaphragm should not be scratched or scouring agents treated.
- are dabbed rough contamination with a fleece cloth.
- oily and greasy contamination are eliminated with household cleaner (no scrubbing means).
- calcifying are solved by diluted hydrochloric acid.
- Protein contamination are solved with hydrochloric acid and pepsin mixture.
- contamination of sulphide can be separated in a mixture from hydrochloric acid and thiourea.