

GREISINGER GE 014 pH and Reference Electrodes Instruction Manual

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GREISINGER GE 014 pH and Reference Electrodes



Specification

Type	Description	Operating range	Reference electrolyte	Connection	Cable	Notes
GE 014		pH 2-12, 0-60°C		cinch	1 m	

GE 014 BNC	Low Cost pH-electrode	, > 200 µS/cm	3mol/l KCl	BNC	1 m	
GE 100	Standard pH-electrode	pH 0-14, 0-80°C , > 200 µS/cm	3mol/l KCl	cinch	1 m	
GE 100 BNC				BNC	1 m	
GE 101	Injection-electrode	pH 2-11, 0-60°C , > 200 µS/cm	3mol/l KCl	cinch	1 m	
GE 101 BNC				BNC	1 m	
GE 103	Double chamber- electrode	pH 0-14, 0-80°C , > 200 µS/cm	3mol/l KCl 1mol/l KNO3	cinch	1 m	
GE 103 BNC				BNC	1 m	
GE 104	Special grinding- electrode	pH 0-14, 0-80°C , > 20 µS/cm	3mol/l KCl	cinch	1 m	
GE 104 BNC				BNC	1 m	
GE 106	Electrode for VE-Water	pH 2-11, 10-80° C, > 25 µS/cm	3mol/l KCl	cinch	1 m	
GE 106 BNC				BNC	1 m	
GE 107	pH-electrode with int. Pt1000-Sensor	pH 0-14, 0-80°C , > 200 µS/cm	3mol/l KCl (Gel)	DIN and 4mm banana	2 m	Pressure resistant up to 6 bar. With PG13.5 thread
GE 108	Standard electrode, pressure resistant	pH 0-14, 0-80°C , > 200 µS/cm	3mol/l KCl (Gel)	cinch	2 m	Pressure resistant up to 6 bar. With PG13.5 tread
GE 108 BNC				BNC	2 m	
GE 109	pH-electrode with int. Pt100-Sensor	pH 0-14, 0-60°C , > 200 µS/cm	3mol/l KCl (Gel)	BNC and MiniDIN	2 m	Pressure resistant up to 6 bar.
GE 117	pH-electrode with int. Pt1000-Sensor	pH 0-14, 0-60°C , > 200 µS/cm	3mol/l KCl (Gel)	BNC and 4 mm banana	2 m	Pressure resistant up to 6 bar. With PG13.5 thread
GE 120	Injection-electrode	pH 0-14, 0..80°C, > 200 µS/cm	Ag/AgCl (Gel)	cinch	1 m	incl. changeable cutting blade
GE 120 BNC				BNC	1 m	

GE 125	pH-electrode with int. Pt1000-Sensor	pH 0-14, 0-70°C , > 200 µS/cm	3mol/l KCl (Gel)	BNC and 4 mm banana	2 m	waterproof IP 67 incl. plug
GE 151	pH-electrode for difficult measurement conditions	pH 0-14, -5..80° C, > 200 µS/cm	3mol/l KCl	cinch	1 m	alkali resistant
GE 151 BNC				BNC	1 m	

Working-pressure
pressure-less cartridge (GE 014, GE 100, GE 101, GE 103, GE 104, GE 106, GE 120, GE 125, GE 151) medium pressure max. 6 bar, depending on assembly conditions (GE 107, GE 108, GE 109, GE 117)

Diaphragm
ceramic-diaphragm (GE 120, GE 151, GE 125) 2 ceramic-diaphragm (GE 014, GE 100, GE 101, GE 103, GE 107, GE 108, GE 109, GE 117), 3 ceramic-diaphragm (GE 106) or grinding-diaphragm (GE 104)

Working-system
Ag/AgCl, chlorinated Ag-wire (GE 014, GE 100, GE 106, GE 107, GE 108, GE 109, GE 117, GE 125) Ag/AgCl-cartridge (GE 101, GE 103, GE 104) Ag/AgCl-Gel (GE 151)

Diaphragm-shape
Ball (GE 014, GE 100, GE 103, GE 106), cone (GE 101, GE 120) or cylinder (GE 104, GE 107, GE 108, GE 109, GE 117,GE 125, GE 151)

Electrode-flagpole
GE 014 transparent plastics-flagpole, approx. Ø12 x 110 mm GE 100, GE 103, GE 106, GE 125, GE 151 transparent plastics-flagpole, appr. Ø12 x 120 mm GE 101 glass-flagpole, Ø12mm, with injection spike approx. Ø6 x 50mm, Full length appr. 120mm GE 104 glass-flagpole, Ø12mm, full length appr. 120mm Head: appr. Ø6 x 30mm, GE 107, GE 108, GE 109, GE 117 black plastics-flagpole, appr. Ø12 x 120 mm

Introduction

All electrodes are delivered checked and ready for measuring. The warranty period is 6 months for appropriate treating. pH-electrodes are wearing parts and have to be exchanged when the demanded values are not complying with, even after thoroughly cleaning the electrode and regenerating it, depending on chemical and mechanical strain. When using please consider that different substances in aqueous solution may affect glass and that chemicals may react with the KCL-dilution in the electrode and could block the diaphragm
Examples: – protein-containing dilutions, as used in medicinal and biological measuring, the protein could be de-natured by the KCl-dilution

- coagulated lacquers
- dilutions containing higher concentration of silver-ions

Other problems could happen when measuring ion-depleted and solvent-containing mediums. The problems occur-ring measuring these mediums could partly be solved by using our double-chamber electrode with appropriate bridge-electrolyte (different, depending on use) e.g. GE 103 Substances that deposit on the diaphragm, influence the measuring and have to be removed regularly. This can be done with the help of e.g. automatic-cleaning-facilities

Different fields of application

1. Measuring ion-depleted mediums (rainwater, aquarium-water, VE-water) GE 104 (special-grinding-electrode from 20 µS/cm) or GE 106 (from 25 µS/cm)
2. Seawater-aquarium Normal pH-single-rod measuring cells with 3 mol/l KCl e.g. GE 100.
3. Photo-laboratories Double-chamber-electrode GE 103 with bridge-electrolyte. (front chamber 1 mol/l KNO3, rear chamber: 3 mol/l KCl). Watering-cap for storing the electrode has to be filled with 1 mol/l KNO3.
4. Swimming-pool Standard pH-electrode with 3 mole/l KCl e.g. GE 100 or GE104.
5. Ground survey Glass-electrode with different diaphragms e.g. GE 101. Use our pre-injection-spike VD120!
6. Cheese, fruits, meat Injection-electrode GE 101, with frozen food GE 120. When measuring cheese, milk and other products containing protein, the electrode has to be cleaned wit a spe-cial cleaning-fluid (pepsin-cleaning agent – e.g. contained in working and calibration set)
7. Permanent immersion including shaft and handle waterproof electrode: GE 125 (BNC connector meets IP67 when connected to the device)
   Normal cleaning: Put the electrode for 10 min. in the pepsin-cleaning agent GRL100 (0,1 mole HCl with pepsin)
8. The lifetime of electrodes is normally at least 8-10 months, when treating and cleaning the electrodes thoroughly it can be risen up to over 2 years. Exact statements can not be given, because it depends on the relative case of operation.

When the pH X-Value can not be set, this is a sign that the electrode is exhausted and has to be exchanged or the buffer-dilution has exhausted (prepare new dilution). Prepared buffer-dilutions have a limited life time (about 1 month) when using/calibrating it thoroughly (no procrastination of buffer-dilution-residua from one dilu-tion to an other through cleaning and drying the electrode not enough) Buffer-capsules have no lifetime limitations, therefor we recommend keeping a sufficient number of them in stock. PH12-buffer-capsules (white) have to be stored in an exsiccator or stored together with drying agent. The electrolyte (3mol/l KCl) should always be available for refilling, its also recommended to keep enough in stock.

General maintenance and measuring instructions for pH-combination-electrodes
This pH-electrode has been tested and has been subordinated strict quality controls in all manufacturing-steps

- To keep the optimum efficiency and accuracy for a long time take care of the following points:
- Remove the storing protection-cap form the pH-glass-diaphragm and clean the glass-rod and the diaphragm with distilled water. After that dry the diaphragm and the glass rod with a soft paper towel.
- Important! The pH-glass-diaphragm has to be kept wet. When not in use the electrode must be stored in 3 mole/l KCl-dilution.
- (except GE 103 – here 1 mol/l KNO3). Should the pH-glass-diaphragm be dried out, the ef-ficiency and the responsiveness are affected.
- To continuously moistening the electrode store it in 3 mol/l KCl-dilution for 24 hours. (except GE 103) longer storage of a single-rod-electrode or a reference-electrode in destined water will deplete them of KCl.
- Please refill KCl-electrolyte (saturated or 3 mole) in time (except GE 103)
- Do not touch the glass-diaphragm! Damages on the surface and attrition affect the efficiency negatively.
- Before using perform a visual check of the pH-electrode.
- Should there be air-bubbles in the pH-glass-diaphragm or the outer reference-electrode you can get them out by shaking the electrode downward (like handling a quicksilver-fibre-thermometer)
- Take care that the side diaphragm contacts the media you want to measure. Minimum depth for GE 100 e.g. 20 mm, maximum 50 mm
- Keep cable and plug of the electrode always clean and dry. When not, the electric insulation will be lost, through this measuring errors may occur.

- The electrode has to be stored in dry rooms at temperatures between 10°C to 30°C. Below –5°C the electrode may be damaged because the electrolyte may freeze.

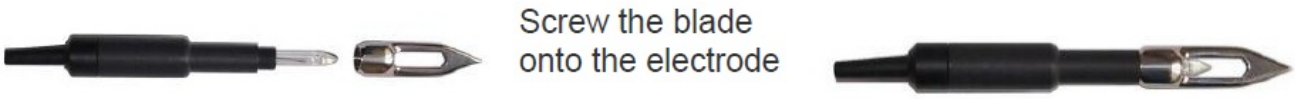
care and maintenance

- check the liquid level of the reference-electrode regularly and refill it with 3 mole KCl with the help of an injection or a pipette. (except GE 107, GE 108, GE 109 an GE 117)
- Crystallisation of the 3 mole/l KCl (3 mole KCl) is inevitable! Crystallised KCl on the protection-cap and the breech-collar can be removed with fingernails or a paper towel. This is no defect or a reason for reclamation.

Contaminated electrodes have to be cleaned. The suitable cleaning agents for the pH-glass-diaphragm are given in the table below: contamination cleaning-agent general deposits mild washing-agent inorganic coatings common fluids for glass cleaning metallic compounds 1 mole/l HCl-dilution oil, fat special cleaning agents or solvent biological coatings with protein pepsin-enzyme in 0,1 molar HCl-dilution (GRL100) resin-lignin acetone extreme resistant deposits hydrogen peroxide, sodium hypochloride.

The distinct materials of the electrode have to be considered when choosing the cleaning agent. E.g. electrodes with plastics shaft must not be cleaned with solvents. In case of doubt please contact the manufacturer for further advice. The same has to be considered when using aggressive or other, non water based agents!

GE 120: blade assembly



Operating instructions

- The electrode must be stored in 3 mol/l KCl (e.g. KCl3M), in order to avoid drying out (excluded GE103).
- The electrodes must only be used with the suitable devices. Wen using inappropriate devices the electrode and the device can be damaged or destructed!
- Device and sensor must be treated well and must be used according to the given technical specification (do not throw, bounce, etc…).
- Plug and sockets of the device and the electrode must be protected from contamination and humidity.
- Before measuring the protection-cap has to be removed.
- Calibrating of the measuring cell (single-rod measuring cell or measuring- and reference-electrode) have to be done according to the manufacturers instructions buffer-dilution with a value that is near the measuring cell (e.g. pH 7,0) the “asymmetry” is set. For the slope (pH X) a second buffer-dilution is used which pH-Value should be within the measuring range (e.g. pH 4,0; pH 10,0; pH12,0), but at least 2 pH-units different form the buffer-dilution used first.
- Our pH-electrodes can be used in a degree range from 90° to ±45° compared to horizontal

Disposal instructions
Exhausted pH-electrodes must be disposed via special refuse. When delivering exhausted electrodes from our product range, free for us (sufficient post paid), we will dispose them for free.

Safety regulations

This device was designed and tested considering the safety regulations for electronic measuring devices. Faultless operation and reliability in operation of the measuring device can only be assured if the General Safety Measures and the devices specific safety regulation mentioned in this users manual are considered.

1. Faultless operation and reliability in operation of the measuring device can only be assured if the device is used within the climatic conditions specified in the chapter “Specifications“.
2. When transporting the device from a cold to a warm environment, condensation could affect the device’s function. In this case you have to wait until the device has the same temperature as the environment before using it.
3. When connecting the device to other devices the interconnection has to be designed most thoroughly, as internal connections in third-party devices (e.g. connection of ground with protective earth) may lead to undesired voltage potentials that can affect the connected devices, could damage them or even may destruct the devices.
4. The device must be switched off and must be marked against using again, in case of obvious malfunctions of the device which are e.g.:
    - visible damage.
    - the device is not working as prescribed.
    - storing the device under inappropriate conditions for longer time.
    - When not sure, the device should be sent to the manufacturer for repairing or servicing.
5. Attention: Do NOT use this product as safety or emergency stopping device, or in any other application where failure of the product could result in personal injury or material damage. Failure to comply with these instructions could result in death or serious injury and material damage.
6. The electrodes contain 3 molar KCL (GE103: 1mol/l KNO3), which is acidly. First-Aid-provisions After contact with skin: clean with sufficient water. After contact with eyes: rinse opened eye with sufficient water, contact oculist After swallowing: drink much water. When feeling sick, contact doctor.
7. Attention! The electrodes containing glass. If the ph-electrode is damaged please abolish the medium being measured! If swallowed gullet and gastrointestinal tract could be injured.

Documents / Resources

	GREISINGER GE 014 pH and Reference Electrodes [pdf] Instruction Manual GE 014 pH- and Reference Electrodes, GE 014, pH- and Reference Electrodes, Reference Electrodes, Electrodes

References

- Manual-Hub.com - Free PDF manuals!
- User Manual

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