

**INSTRUCTION MANUAL FOR
CALOMEL ELECTRODE, TYPE K501**

PRINTED BY RADIOMETER A/S
COPENHAGEN — DENMARK



RADIOMETER A/S · 72 EMDRUPVEJ · COPENHAGEN NV · DENMARK

1. USES

This electrode has been designed for polarography, but is equally useful for other amperometric measurements as well as for potentiometric measurements in special cases where a low internal impedance is wanted.

2. CHARACTERISTICS

The characteristic features of the type K501 Calomel Electrode are

- Low internal impedance (250 Ω max.)
- The electrode can carry currents up to 200 μ A
- Liquid junction between electrode and sample by means of a replaceable filter paper wick
- Plunger type filling system for easy renewal of liquid junction
- Replaceable calomel filling

The electrode is a saturated calomel electrode. Its potential against the standard hydrogen electrode is at various temperatures:

t °C	0	10	20	30	40	50	60	70	80	90
E mV	260.2	254.1	247.7	241.1	234.3	227.2	219.9	212.4	204.7	196.7

(Reference: Reference Electrodes, Theory and Practice, by D. Ives and G. Janz, Academic Press, 1961, page 161).

Note: The potential of the electrode is determined by the temperature of the calomel half-cell which is mounted in the wide branch of the H-shaped electrode.

3. HOW TO MOUNT THE CALOMEL ELECTRODE, K501

- (1) Dismount the perspex container by unscrewing the perspex screw, and place some mercury in the well - enough to cover the platinum wire so that the

mercury surface stands approximately 1 mm over the edge of the lower part of the container and fills the cross section of the wide part of the container.

- (2) Pour approximately a 1 mm thick layer of calomel paste on the mercury in the container and add a few drops of saturated KCl solution to form a smooth layer of calomel on the mercury surface.
- (3) Place a plate of filter paper, type B781/10, on the calomel layer and soak it with saturated potassium chloride solution.
- (4) Place the 3-bore perspex cone on the filter plate with the base in contact with it.
- (5) Fix the elements mounted in the calomel container by means of the 3-bore screw.

Note: Do not tighten the screw so much that the mercury and calomel paste are pressed up along the sides of the container, but be sure that no air bubbles are present in the small bores.

- (6) Place the mounted container in the wide branch of the H-shaped glass part, and press it into position so that the 3 mm screw in the bottom protrudes from the narrow end of the glass part.
- (7) Mount the electrode cable on the protruding threaded pin with a pertinax ring between the glass and the nut of the electrode cable.
- (8) Fill the cell with saturated KCl solution.
- (9) Mount the big plastic stopper on the wide glass tube.
- (10) Tilt the calomel cell so that no air will be present in the side with the wide branch.
- (11) Screw off the cap of the small stopper.
- (12) Mount the plunger of the small stopper in the salt bridge side of the electrode and press till all the air has escaped.
- (13) Screw on the cap of the small stopper.
- (14) Press a few drops of KCl solution through the liquid-junction filter using

the small stopper as a plunger.

- (15) Mount the electrode prepared in this way in the electrode assembly.

Renewing the liquid junction

The saturated solution of potassium chloride in the salt bridge is separated from the sample in the vessel by some discs of filter paper. When changing to a new sample, expel a drop of the saturated solution of KCl through the filter at the tip:

- (1) Release the thumb nut, which acts as a stop for the plunger of the small stopper, half a turn.
- (2) Press the plunger down to the new stop.

4. MAINTENANCE

Keep the electrode filled with saturated KCl solution. Free crystals of KCl must always be visible.

Never flush the electrode with anything but saturated KCl solution.

Refilling the calomel electrode

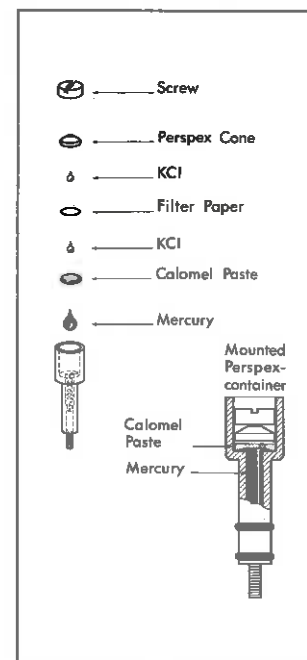
- (1) Screw off the cap of the small stopper.
- (2) Pull up the small plunger.
- (3) Refill with saturated KCl solution as much as required.
- (4) Follow the instructions above from (12) to (15).

Replacing the filter paper

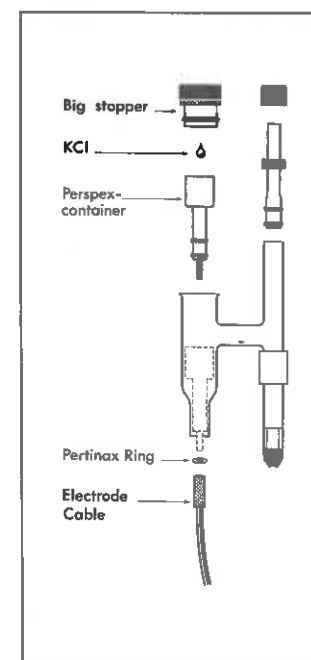
If the filter paper at the tip of the salt bridge has been contaminated or otherwise damaged, it must be replaced:

- (1) Empty the salt bridge of the solution of potassium chloride.
- (2) Pour enough acetone into the branch with the filter in the tip to cover the piece of plastic tubing, type B7221/10, that keeps the filter in position.

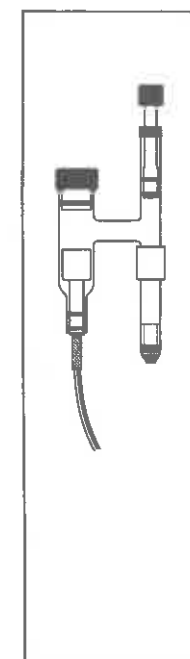
- (3) Now let the electrode stand overnight so that the piece of plastic tubing first can swell, the acetone then evaporate, and the piece of plastic tubing afterwards dry out again.
- (4) Push the plug of filter paper and the above piece of plastic tubing out of the salt bridge.
- (5) Using a cotton-tipped stick, clean the salt bridge internally - first with acetone, and afterwards with water containing a small amount of detergent.
- (6) Rinse a new piece of plastic tubing in a mixture of water and detergent until its surface becomes smooth to the touch.
- (7) Place a stack of six fresh discs of filter paper, type B781/9, in the tip of the salt bridge.
- (8) Press down the new piece of plastic tubing. Use the tool, i.e. the plastic rod, to compress the filter paper in the tip of the salt bridge.
- (9) Refill the electrode with saturated solution of potassium chloride.
- (10) Complete the mounting of the electrode by following the instructions given in section 3, steps (10) through (15).



Preparing the Perspex Container of the K501, Calomel Electrode



Preparing the Electrode, type K501



Mounted Electrode type K501.