

<b>System</b>	<b>Moisture Probe MB-MO-SE1</b>
<b>Documentation</b>	<b>Maintenance</b>

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## General Information

This document also covers the maintenance of other types of the MBraun Moisture Probes. (Some details of removal etc. may be different!)

The measuring principle of the Moisture Probes is based on absorption of moisture in a thin layer of phosphoric acid (in its totally dehydrated form) that is coated on the surface of an insulator between two Platinum wires and the electrolysis of the resulting  $H^+$  and  $OH^-$  ions to  $H_2$  and  $O_2$ . So, the water molecules coming to the sensor surface are removed and the resulting current is depending on the concentration of the water molecules in the gas. The primary signal is compensated for temperature and amplified.

The individual primary calibration in our factory comprises adjustment of zero-signal, span and temperature compensation. The long-term stability of this calibration is excellent, so that recalibration with calibration gas will not be necessary for a period of more than 12 months.

On the other hand, due to the measuring principle, any contaminant in the box atmosphere, gaseous or particulate, may also contaminate the surface of the moisture sensor, resulting in an additional conductivity of the phosphoric acid (independent of moisture level) and so in a higher reading of the ppm-value. This happens especially with basic gases like  $NH_3$ , by forming a salt compound.

We therefore recommend to clean and impregnate the sensor surface regularly every three months, or shorter if there is an abnormal high reading of Moisture (compared with the Oxygen reading).

## Maintenance:

This routine maintenance consists in cleaning the platinum winding of the detector and moistening it with phosphoric acid  $H_3PO_4$ .

The following aids are required for disassembling and maintenance of the Moisture Probe.

- Soft, absorbent, lintfree cloth (cotton)
- Small quantity of phosphoric acid  $H_3PO_4$ . (85%, Lab grade; better use MBraun Kit!)
- Protective gloves and goggles
- One dummy cover for the open circulation piping (DN40-KF)

**Caution: Be cautious when handling phosphoric acid! Do wear protective gloves and goggles! Any phosphoric acid getting in contact with your skin should immediately be rinsed off using running water. When getting in contact with your eyes, the acid should immediately be rinsed out also using running water, afterwards you should immediately consult a medical doctor.**

### Removal of the Probe

First disconnect the probe cable from the probe. The reading of moisture in the Operation Panel (OP) goes to „<1ppm“. Turn off the circulation of the box. Set the box pressure to 10 **mbar overpressure**! This avoids to “poison” the box atmosphere with oxygen.

Open the clamp of the Probe flange, remove the probe and quickly close the opening with the dummy cover and the clamp. The circulation can be switched on now, if necessary.

### Unscrew Protective Cover

τ Please observe: From now on you should use protective means as described above!

Unscrew the protective cover of the detector element as shown below!



Unscrew protective cover

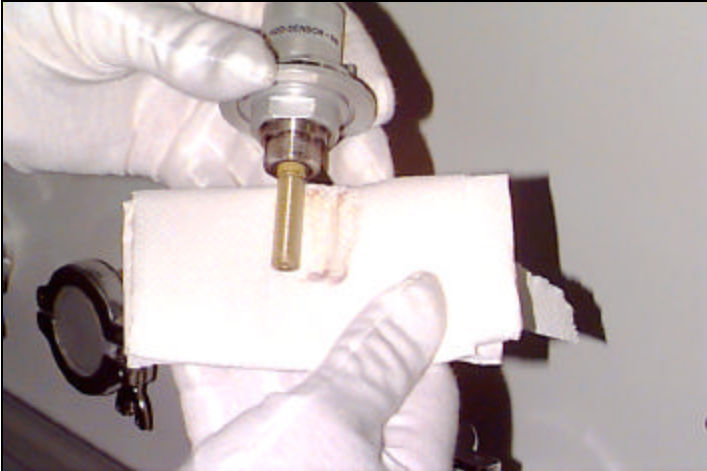
### Cleaning of the Detector Element

Carefully clean the detector element by rinsing it with distilled water and wiping it (by turning) several times until no color can be seen on the cloth.



Cleaning the sensor with distilled water

Use a new cloth to dry the Sensor Element carefully.



Carefully dry the winding

**Remoisten Sensor Element**

Then use some droplets of Phosphoric Acid to impregnate the Sensor Element on the whole surface. Use a new cloth to remove excessive acid from the sensor by turning the sensor on the cloth as shown below.

**Do not dry the sensor element.** The surface of the insulating material should be still looking “wet”



Moisten winding with phosphoric acid

**Remount Protective Cover**

Remount the Protective Cover as shown below. Tighten it slightly by hand, do not use force!



Remount protective cover

### Final Installation

Finally the Probe has to be mounted again.

Turn off the circulation of the box. Set the box pressure to **2 mbar overpressure!** This avoids to “poison” the box atmosphere with oxygen.

Open the clamp of the dummy cover flange, remove the cover and quickly install the probe and the clamp. The circulation should be switched on now.

Plug in the electric connector to the Probe.

**Please observe:** The display of the OP will show “Moisture level too high” , as due to the measuring principle described above the wet Phosphoric Acid has to be desiccated by the gas circulation and the electrolysis of the water.

It needs approximately 10 to 15 minutes until the OP shows a reading of the moisture level.

It needs another 30 to 60 minutes until the final reading is reached, i.e. until the real moisture level is displayed.