

# GMH 3692 / GMH 3695 GOG - H

# GMH 3692 / GMH 3695 GOG - L

For quick and cost-effective measurement of residual oxygen, check-up of protective atmosphere in food packaging and for selective “sniffing”



### Scope of supply:

- 1 display instrument GMH3692 or GMH 3695 (depending on set type, not in scope of supply at „369 GOG-SET H/L“)
- 2 hand pump with tube (compress to use, the hand pump automatically draws in the measuring gas after release, period of drawing about 30 seconds)
- 3 GOG oxygen sensor with penetration needle, optimised for quick measurement of tiniest amounts of gases, 6 pole connection for GMH369x use

Not shown in picture: Case, spare needle, 40 cell foam stickers, battery, manual

### Specification:

Sensor element

Application:

Measuring range hPa O<sub>2</sub>

% O<sub>2</sub>

Response time T<sub>90</sub>

GMH 369x-GOG - H

GOEL 370

standard

0 .. 1100

0,0 .. 100,0

< 10 s

GMH 369x-GOG - L

GOEL 380

low oxygen concentrations

0 .. 300

0,0 .. 25,0

< 5 s

## Checking the calibration:

In order to get the optimum precision of the measuring, we suggest to check the calibration before each measuring. This check is done at normal ambient air.

Before the check or calibration, the sensor's temperature has to be adjusted to the ambient temperature. In order to optimise the operational readiness of the instrument it is good practice to store it directly at the location, where the measuring should be made.

For the check of the calibration the protection cap of the needle has to be removed. Compress the hand pump (while the instrument is switched on) and release it afterwards. Then, already after 10 seconds the display should show a oxygen content of 20.9 ... 21.0%. If there are greater deviations we suggest to calibrate the instrument according to the manual GMH 3692 or GMH 3695 (chapter: Calibration of the oxygen sensor).

## Measurement:

### Preparation / Recommendations

Before measuring we recommend to put a rubber foam sticker onto the package. (see illustration on the right hand side).

The sticker prevents the package from tearing up due to the penetration of the needle. Furthermore it prevents a gap between package and needle, no ambient air can flow in. This would corrupt the measuring.



This is especially important for the accuracy of the measurement of packages with little gas volume.

**Procedure:**

1. Penetrate the rubber foam sticker until the needle hits a hollow space of the package.  
**Attention:** *You must take care not to draw foodstuffs in, because otherwise the needle can be blocked and the sensor can be contaminated.*
2. Compress the hand pump completely. A valve prevents air from flowing into the package due to the compression of the hand pump.
3. After releasing it, the pump draws the measuring gas out of the packing for ~30 seconds.



Compressed hand pump

After been compressed, the hand pump draws in for approx. 30 seconds.  
The intake / measuring can be continued by compress the pump again.



Uncompressed hand pump

4. The oxygen contents can read off the display already after ~5 - 10 seconds (depending on type - H or - L).

**Note: You can only read off a valid measured value while the hand pump is drawing gas.**

The pump can be compressed several times while connected to the same package; a reverse valve prevents air from flowing into the package due to the compression of the hand pump, that would falsify the measured value.

**Flushing the sensor:**

The measuring system has to be flushed with ambient air after the measuring. Compress therefore the hand pump for one or two times.

**Measuring accuracy and calibration**

You could carry out a two-point-calibration of the GMH 3695 and GMH 3692\*) in order to get absolute precise measured values. Therefore a second reference point - besides air- is required. We recommend to use N<sub>2</sub> if you want to check-up on the residual oxygen content in food packaging filled with protective atmosphere. N<sub>2</sub> is available in bottles and is equivalent to 0.0% oxygen. The type of the calibration has to be selected in the device menu before calibrating.

If the whole system is carefully calibrated and the measuring will done accurately the accuracy of measurement will be:

1 point calibration:  $\pm 0.2\% \text{ O}_2 \pm 1 \text{ digit}$  at concentrations  $< 10\% \text{ O}_2$

2 point calibration:  $\pm 0.1\% \text{ O}_2 \pm 1 \text{ digit}$  at concentrations  $< 10\% \text{ O}_2$

For information to the 2-point calibration please refer to the GMH 369x operating manual.

The measuring system is optimised for needle with  $\varnothing 0.9\text{mm}$ . By needles with lesser diameter the needed gas volume can be reduced further. But the measuring value will be lowered by the resulting under pressure. (up to 40 hPa at  $\varnothing 0.45\text{mm}$ )

Example: 40 hPa under pressure at 1000 hPa ambient pressure:

$$(1000-40)/1000 * 20.9\% \rightarrow \text{display } 20.1\%.$$

For measuring of protective atmosphere this error can be neglected in most cases (Example display of 1.9% instead 2.0%). With the GMH 5695 this error can be compensated by adding a tube via T-piece connection to the instruments pressure port.

\*) not GMH 3692 with Version  $\leq 1.1$