

ACCESSORIES

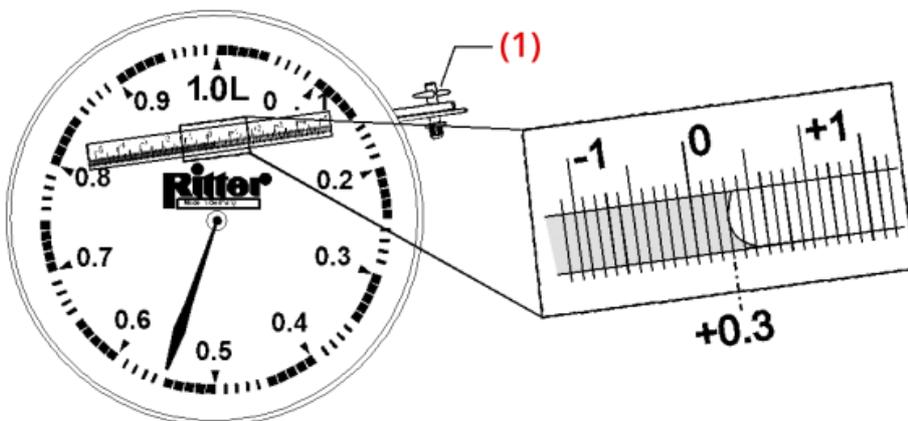
HIGH PRECISION PACKING LIQUID LEVEL INDICATOR

»HPLI« • DATA-SHEET



Application

The High-Precision Packing Liquid Level Indicator »HPLI« allows highly precise reading and setting of the packing liquid level in RITTER Drum-type Gas Meters. Precise adherence to the factory-set level is very important for the Meter's measurement accuracy, as the measurement deviation given in the Calibration Certificate is only valid when the packing liquid level is correct. Packing liquid levels other than that set in the factory cause the volume in the chambers of the measuring drum to be different to the volume at time of calibration, which inevitably results in a measurement error.



(1) Screw cap (Not with high pressure meters; with high pressure meters the upper end of the High-Precision Packing Liquid Level Indicator »HPLI« tube is connected to the inside of meter casing above the liquid level.) Location of indicator shown for models TG 05 to TG 10. Location with models TG 20 to TG 50: Beside of the counter mechanism casing.

Operational principle

The High Precision Packing Liquid Level Indicator »HPLI« consists of the following parts:

- > sloping glass tube
- > scale (behind the sloping tube)
- > screwed cap (not present on High Pressure Meters)

Following the principle of communicating pipes, the sloping tube is connected with the packing liquid in the Gas Meter casing. Because of this, the liquid level in the sloping tube exactly reflects the level in the Gas Meter casing.

Because the tube is sloping i.e. set at a small angle to horizontal, a small change in the liquid level in the Gas Meter casing results in a large change in the liquid level inside the sloping tube. Thus, the sloping tube acts like a "magnifier" of the liquid level inside the casing and can therefore be set extremely precisely. Furthermore, a parallax error when reading the level, which can occur with the Standard Level Indicator, is nearly impossible.

Setting the correct level

1. The gas meter must be aligned horizontally and unpressurised (not connected to gas tubes). Before filling the gas meter casing with the packing liquid (through the filling nozzle on the rear plate of the casing), the screwed cap (1) on the outer end of the glass tube must be removed by unscrewing it (not applicable to high-pressure meters). During filling, the liquid level rises inside the sloping glass tube in proportion to the level inside of the casing. (It becomes visible only when the liquid level in the casing approaches the correct level.)
2. The correct liquid level is represented by a scale value of the scale in the sloping tube. This value is stated in the calibration certificate of the respective meter.
3. The dial face of gas meters with the HLPI is equipped with two indicator needles as shown in the adjoining photo:
 - a. »Needle no. 1« which is positioned behind »Needle no. 2«. This needle is directly and fixed coupled to the measuring drum. **Please note: The fixture of this needle to the shaft must not be released. Otherwise the calibration becomes invalid.**
 - b. »Needle no. 2« which is positioned at the front tip of the shaft. This needle is movable and can be set to zero at the beginning of a measurement as needed.
4. When the filling level comes close to the stated scale value, needle 1 must be positioned to the 6 o'clock position (position »3« in the photo). This can either be done by carefully and slowly moving needle 1 (plus coupled measurement drum) to that position or by attaching a tube to the gas inlet and blowing into that tube. This way the measurement drum is positioned in the same position as during the calibration. If the fixture of needle 1 is released from the shaft, the drum position during calibration is irrecoverably lost and the meter would have to be recalibrated.
5. Now the liquid level can be set to the final scale value in the sloping tube which is stated in the calibration certificate of the respective meter. For this purpose, please see »Adjustment of the packing liquid level«.



Attention: If water is used as packing liquid during application of the gas meter it might be possible that the high surface tension of the water disables the movement of the liquid column inside the inclined glass tube of the Liquid Level Indicator. **Therefore, the use of oil as packing liquid is recommended.**

Adjustment of the packing liquid level in the gas meter casing using the scale value given in the calibration certificate:

The surface of the liquid column inside the tube has a concave meniscus due to surface tension. **The base of the meniscus arc defines the correct liquid level (and not the points where the meniscus touches the glass tube).** This is demonstrated in the right-hand drawing on the previous page. In this example, the base of the meniscus arc is positioned exactly at the scale value of +0.3. If this were also the scale value given in the Meter's Calibration Certificate, the packing liquid level of this Meter would be correct.

In the above example, if the scale value given in the Meter's Calibration Certificate were +0.8, packing liquid would have to be added through the filling nozzle on the rear-plate of the casing until the base of the meniscus arc was positioned exactly on the sloping tube's scale value of +0.8. Similarly, if the scale value given in the Meter's Calibration Certificate were -1.2, packing liquid

would have to be drained out of the Meter casing via the drainage faucet on the casing's rear-plate, until the base of the meniscus arc was positioned exactly on -1.2.

Once the packing liquid level has been correctly set in this way, the screwed cap on the outer end of the sloping tube must be replaced (not applicable to High Pressure Meters). Hereby the level will slightly be moved downwards. However, this does not affect the measurement accuracy. The screwed cap must always be closed before gas measurements are made, otherwise the gas pressure will force packing liquid out of the tube!!

Cleaning the inside surface of the glass tube

If the liquid column inside of the glass tube does not run smoothly during setting of the liquid level, the tube's inside surface might be contaminated. (Contamination may occur through the use of oil or grease polluted gas.)

In this case, the glass tube can be cleaned by using the attached cleaning rods (similar to pipe cleaners). The cleaning rods should be soaked with an appropriate cleaning liquid (alcohol, detergent, etc.).

- a. With Standard Meters: Remove the screwed cap.
- b. With High Pressure Meters: **The Gas Meter must be pressure-free.** Take out the hexagon socket screw by turning it anti-clockwise. The hexagon socket screw is located at the 2-o'clock-position of the counter mechanism casing.

Lower the liquid level within the glass tube by either tilting the Meter backwards or by partly emptying out the packing liquid. Clean the inside of the glass tube by using a cleaning rod. Finally, the glass tube must be closed again.

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The most recent version of this data-sheet can be found at <https://www.ritter.de/en/data-sheets/hpli/>

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