



TG 1 Model 7
 (Fig. with "Totalizing Roller Counter")

RITTER drum-type gas meters are universally applicable for measuring the volume of flowing gases and are particularly effective when measurements demand the highest precision.

The possibility of selecting the gas meter material from among 5 different excellent materials (polyvinyl chloride (PVC), polypropylene (PP), polyvinylidene fluoride (PVDF), PE-el (polyethylene electrically conductive) or refined stainless steel 1.4571 (316 L) enables the user individually to meet measurement requirements even in case of highly aggressive gases.

For rugged, industrial applications, robust models with a stainless steel casing and plastic drum (three different materials) are available.

The desired measurement range can be selected from among 9 magnitudes (types) extending as a whole from 0.1 ltr/h to 18,000 ltr/h at a gas temperature ranging from -50 to +120 °Celsius. The solidly manufactured casing of the standard meters is designed to withstand a maximum over-pressure of 50 mbar (plastic casings) or 500 mbar (stainless steel casings); meters for higher pressure ranges up to 16 bars are available.

The measurement of **RITTER** drum-type gas meters works on the principle of displacement. The gas meters contain a revolving measuring mechanism (measuring drum) within a packing liquid (usual: water or thin-bodied oil). The measuring drum compulsorily measures volume by periodically filling and emptying four rigid measuring chambers.

Fastidious production methods and calibration enable a measuring accuracy of $\pm 0.2\%$ at standard flow rate and approx. $\pm 0.5\%$ over the whole measuring range.



TG 10 Model 5
 (Fig. with "Totalizing Roller Counter")



TG 50 Model 7
 (Fig. with "Resettable Roller Counter")

The major advantage and the superiority of volumetric Gas Meters (like Drum-type Gas Meters) over other measurement principles, which determine gas volume using secondary measurable variables such as speed, heat capacity, hot-wire resistance or similar, is that the volume is **directly** measured. That means that the condition and the composition of the gas has no influence on the measurement accuracy.

Correcting factors which take into account gas type, temperature, humidity etc are therefore **not necessary**. It should be noted that with other, non-volumetric measurement processes, the measurement accuracy given for that process can only be achieved if the correcting factors for the immediate condition of the gas are exactly known.

Standard Equipment:

- 4-Chamber Measuring Drum
- Magnetic Coupling (between the measuring drum and counting mechanism)
- 8-digit Totalizing Roller Counter
- large, one-Needle dial
- Filling-level Indicator (for setting the Packing Liquid level)
- Manometer/Thermometer Supports
- Viton sealing
- Level; and Levelling Feet.

Performance Data:

- Measuring accuracy:
± 0.2% at standard flow rate (exact value is stated in individual Calibration Certificate),
approx ± 0.5% over the measurement range
- Maximum gas inlet pressure (overpressure):
50 mbar with plastic casings
500 mbar with stainless steel casings
- Flow rate (measuring range) and meter indication:

Type	Flow Rate			Indication	
	Minimum [ltr/h]	Maximum [ltr/h]	Standard [ltr/h]	Min. Dial Division [ltr]	Maximum Value [ltr]
TG 01	0.1	40	10	0.0005 ⁽¹⁾	999.9999 ⁽¹⁾
TG 05	1	60	50	0.002	9,999,999.9
TG 1	2	120	100	0.01	99,999,999
TG 3	6	360	300	0.02	99,999,999
TG 5	10	600	500	0.02	99,999,999
TG 10	20	1,200	1,000	0.1	99,999,999
TG 20	40	2,800	2,000	0.2	999,999,990
TG 25	50	7,000	5,000	0.1	999,999,990
TG 50	100	18,000	10,000	0.5	999,999,990

⁽¹⁾ Indication at EDU32

Available Models (Materials):

Casing	Measuring drum	Model	Legend:
PVC-transparent	PVC-grey	5	PVC = Polyvinyl chloride
PP-grey	PP-grey	6	PP = Polypropylene
PVDF	PVDF	7	PVDF = Polyvinylidene fluoride
PE-el	PE-el	8	PE-el = Polyethylene-electrically conductive
1.4571 (316 L)	PVC-grey	1	1.4571 = 316 L
1.4571 (316 L)	PE-el	2	= Refined stainless steel
1.4571 (316 L)	PP-grey	3	Viton = Fluorine rubber
1.4571 (316 L)	PVDF	4	

For chemical resistance properties please contact **RITTER**.
Both the casings out of plastic and stainless steel are welded.



DRUM-TYPE GAS METERS

01.05

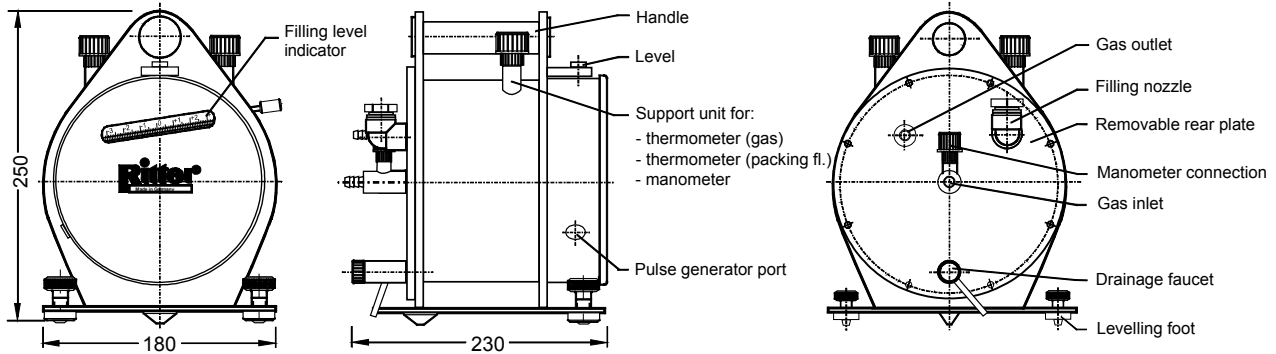
Overview

Rev. 07/03

Accessories: Thermometer (gas), range 0° to +60°C
Thermometer (packing liquid), range 0° to +60°C
Manometer, range 10 mbar differential pressure
Electronic Display Unit, including Interface RS 232 and Analog Output
(requires Pulse Generator)

Built-in Options:

Pulse Generator (for connection of Electronic Display Unit or Computer)
High Precision Liquid Level Indicator ("HPLI")
Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)



Performance Data:

Minimum flow $Q_{\min}$	0.1 ltr/h	Maximum gas inlet pressure	50 mbar
Standard flow Q_{stand}	10 ltr/h	Minimum differential pressure ¹⁾	0.3 mbar
Maximum flow $Q_{\max}$	40 ltr/h	Minimum indication (EDU 32)	0.001 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication (EDU 32)	999.9999 ltr
Packing liquid quantity, approx.	0.9 ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	0.1 ltr/Rev.	Hose barb outside diameter	12 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
5	PVC-grey	PVC-grey	2.0	40
7	PVDF	PVDF	2.5	120
8	PE-el	PE-el	1.4	70

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

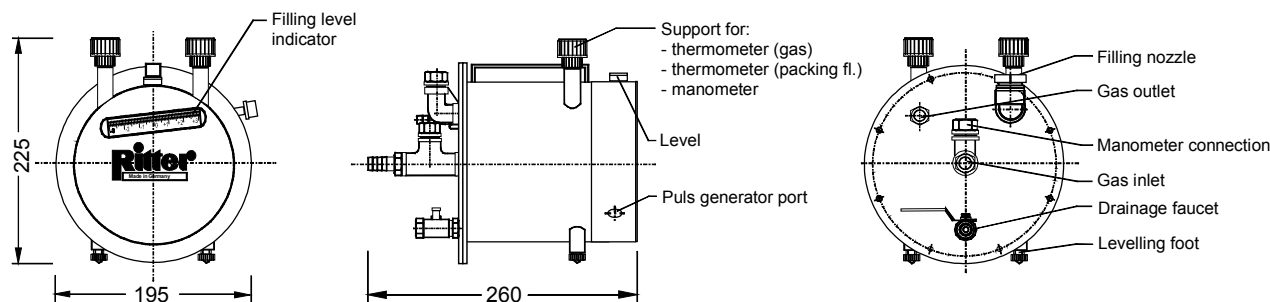
For chemical resistance properties please contact **RITTER**.

Standard Equipment:

4-Chamber Measuring Drum	Viton Sealing
Pulse Generator (inductive proximity switch, NAMUR)	Level
High Precision Packing Liquid Level Indicator (HPLI)	Levelling Feet
Manometer/Thermometer Supports	

Accessories:

Electronic Display Unit EDU 32 FP (needed for volume display) including Interface RS 232 and Analog Output
Pulse Generator, EX-proof version
Thermometer (gas), range 0° to +60°C
Thermometer (packing liquid), range 0° to +60°C
Manometer, range 10 mbar differential pressure



Performance Data:

Minimum flow $Q_{\min}$	0.1 ltr/h	Maximum gas inlet pressure	500 mbar
Standard flow Q_{stand}	10 ltr/h	Minimum differential pressure ¹⁾	0.3 mbar
Maximum flow $Q_{\max}$	40 ltr/h	Minimum indication (EDU 32)	0.001 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication (EDU 32)	999.9999 ltr
Packing liquid quantity, approx.	1.3 ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	0.1 ltr/Rev.	Hose barb outside diameter	11.2 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	2.7	40
3	Stainless Steel	PE-el	2.1	70
4	Stainless steel	PVDF	3.2	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

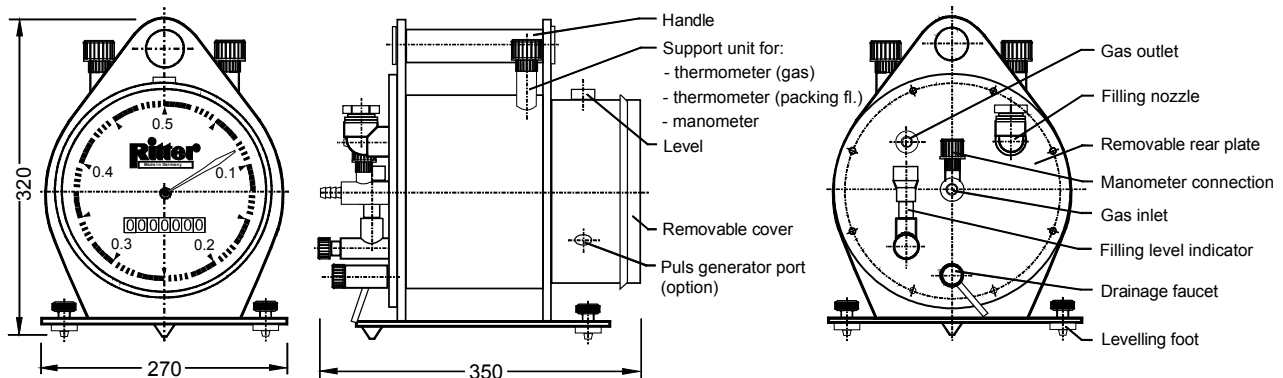
For chemical resistance properties please contact **RITTER**.

Standard Equipment:

4-Chamber Measuring Drum	Viton Sealing
Pulse Generator (inductive proximity switch, NAMUR)	Level
High Precision Packing Liquid Level Indicator (HPLI)	Levelling Feet
Manometer/Thermometer Supports	

Accessories:

Electronic Display Unit EDU 32 FP (needed for volume display)
including Interface RS 232 and Analog Output
Pulse Generator, EX-proof version
Thermometer (gas), range 0° to +60°C
Thermometer (packing liquid), range 0° to +60°C
Manometer, range 10 mbar differential pressure



Performance Data:

Minimum flow $Q_{\min}$	1 ltr/h	Maximum gas inlet pressure	50 mbar
Standard flow Q_{stand}	50 ltr/h	Minimum differential pressure ¹⁾	0.4 mbar
Maximum flow $Q_{\max}$	60 ltr/h	Minimum dial division	0.002 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	9,999,999.9 ltr
Packing liquid quantity, approx.	2.5 ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	0.5 ltr/Rev.	Hose barb outside diameter	16 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
5	PVC-transparent	PVC-grey	4.0	40
6	PP-grey	PP-grey	3.0	70
7	PVDF	PVDF	5.0	120
8	PE-el	PE-el	3.0	70

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

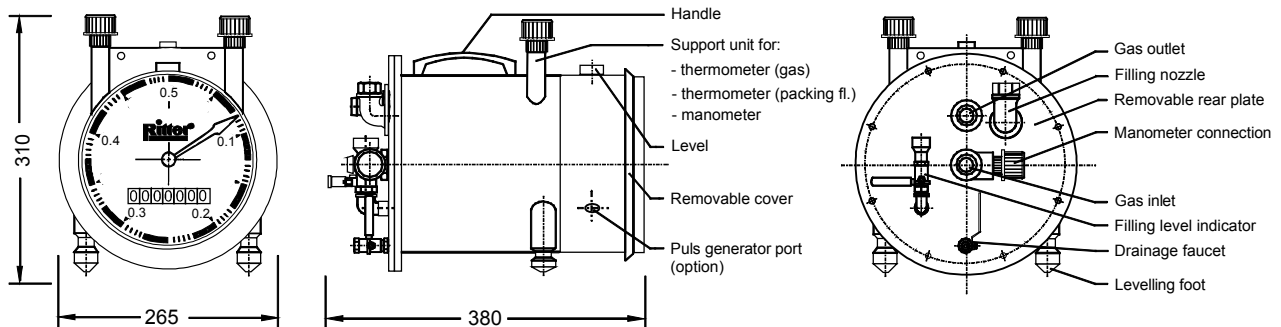
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	1 ltr/h	Maximum gas inlet pressure	500 mbar
Standard flow Q_{stand}	50 ltr/h	Minimum differential pressure ¹⁾	0.4 mbar
Maximum flow $Q_{\max}$	60 ltr/h	Minimum dial division	0.002 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	9,999,999.9 ltr
Packing liquid quantity, approx.	3.5 ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	0.5 ltr/Rev.	Hose barb outside diameter	12 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	8.3	40
2	Stainless Steel	PE-el	8.2	70
3	Stainless steel	PP-grey	8.2	70
4	Stainless steel	PVDF	8.5	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

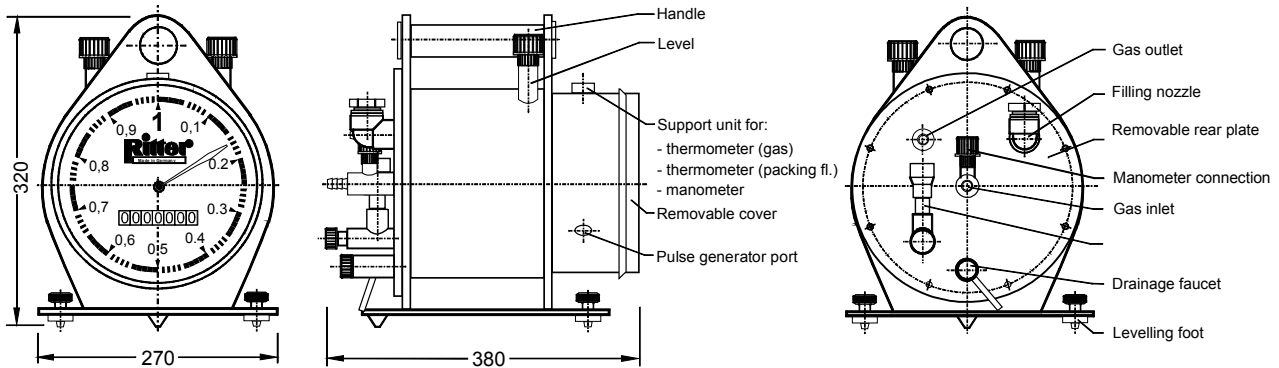
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	2 ltr/h	Maximum gas inlet pressure	50 mbar
Standard flow Q_{stand}	100 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow $Q_{\max}$	120 ltr/h	Minimum dial division	0.01 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	3.0 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	1.0 ltr/Rev.	Hose barb outside diameter	16 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
5	PVC-transparent	PVC-grey	4.3	40
6	PP-grey	PP-grey	3.1	70
7	PVDF	PVDF	5.1	120
8	PE-el	PE-el	3.1	70

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

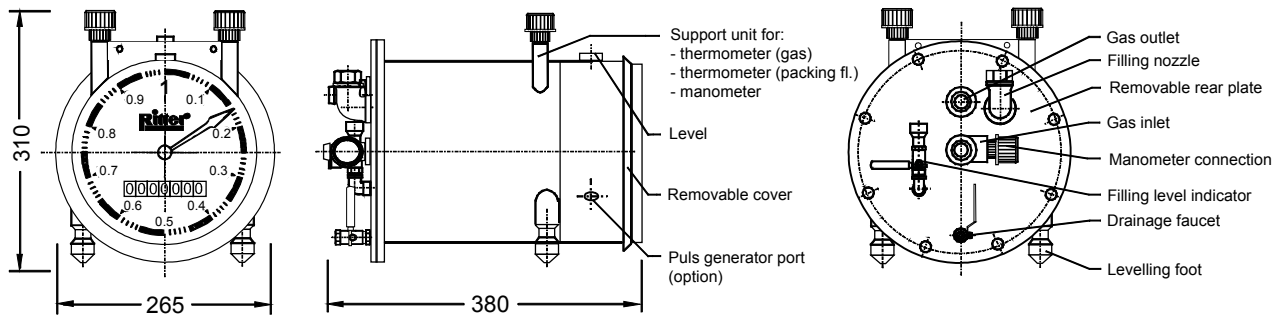
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	2 ltr/h	Maximum gas inlet pressure	500 mbar
Standard flow Q_{stand}	100 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow $Q_{\max}$	120 ltr/h	Minimum dial division	0.01 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	3.5 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	1.0 ltr/Rev.	Hose barb outside diameter	12 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	8.5	40
2	Stainless Steel	PE-el	8.3	70
3	Stainless steel	PP-grey	8.3	70
4	Stainless steel	PVDF	8.9	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

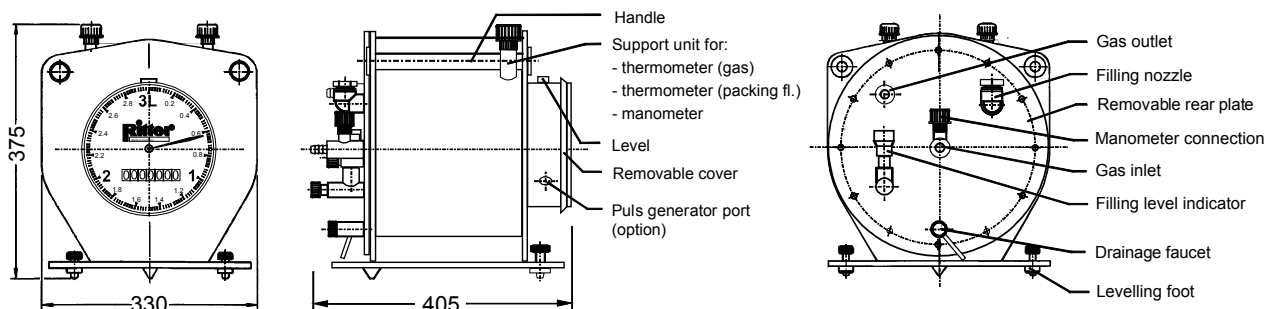
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	6 ltr/h	Maximum gas inlet pressure	50 mbar
Standard flow Q_{stand}	300 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow $Q_{\max}$	360 ltr/h	Minimum dial division	0.02 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	6.0 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	3.0 ltr/Rev.	Hose barb outside diameter	16 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
5	PVC-transparent	PVC-grey	6.3	40
6	PP-grey	PP-grey	4.5	70
7	PVDF	PVDF	8.1	120
8	PE-el	PE-el	4.5	70

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

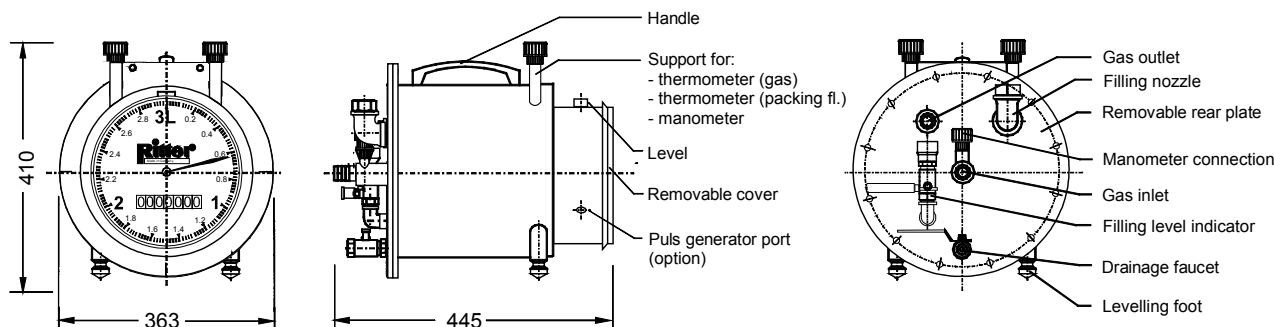
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	6 ltr/h	Maximum gas inlet pressure	500 mbar
Standard flow Q_{stand}	300 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow $Q_{\max}$	360 ltr/h	Minimum dial division	0.02 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	11 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	3.0 ltr/Rev.	Hose barb outside diameter	17 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	15.8	40
2	Stainless Steel	PE-el	15.7	70
3	Stainless steel	PP-grey	15.7	70
4	Stainless steel	PVDF	16.2	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

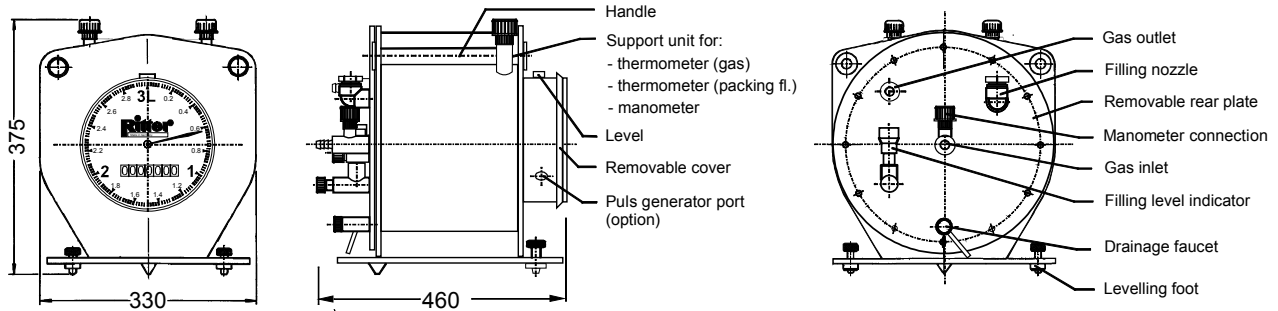
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	10 ltr/h	Maximum gas inlet pressure	50 mbar
Standard flow Q_{stand}	500 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow $Q_{\max}$	600 ltr/h	Minimum dial division	0.02 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	8.5 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	5.0 ltr/Rev.	Hose barb outside diameter	16 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
5	PVC-transparent	PVC-grey	7.1	40
6	PP-grey	PP-grey	4.9	70
7	PVDF	PVDF	9.2	120
8	PE-el	PE-el	4.9	70

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

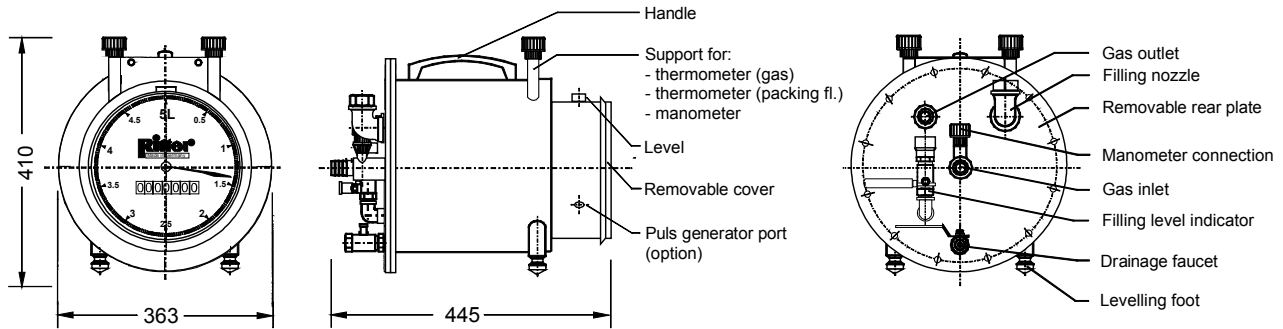
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	10 ltr/h	Maximum gas inlet pressure	500 mbar
Standard flow Q_{stand}	500 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow $Q_{\max}$	600 ltr/h	Minimum dial division	0.02 ltr
Measuring accuracy	± 0.2 %	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	11 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	5.0 ltr/Rev.	Hose barb outside diameter	17 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	16.0	40
2	Stainless Steel	PE-el	15.8	70
3	Stainless steel	PP-grey	15.8	70
4	Stainless steel	PVDF	16.2	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

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Standard Equipment:

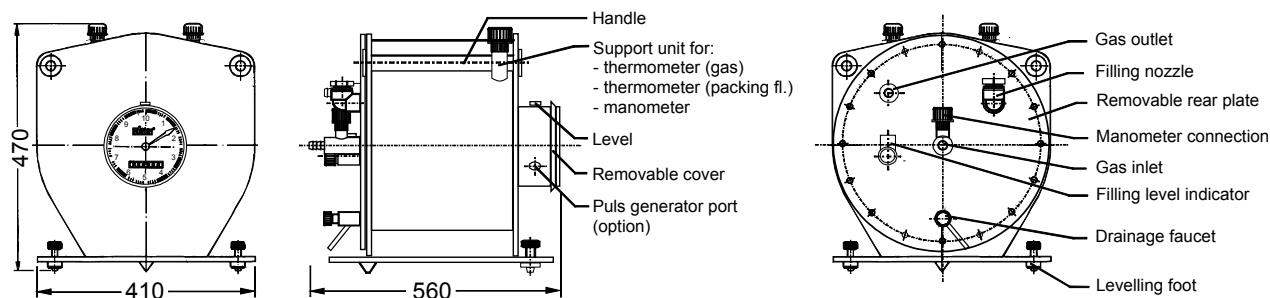
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	20 ltr/h	Maximum gas inlet pressure	50 mbar
Standard flow Q_{stand}	1,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow $Q_{\max}$	1,200 ltr/h	Minimum dial division	0.1 ltr
Measuring accuracy	± 0.2 %	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	15.5 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	10.0 ltr/Rev.	Hose barb outside diameter	25 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
5	PVC-transparent	PVC-grey	10.6	40
6	PP-grey	PP-grey	7.8	70
7	PVDF	PVDF	13.6	120
8	PE-el	PE-el	7.8	70

- **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

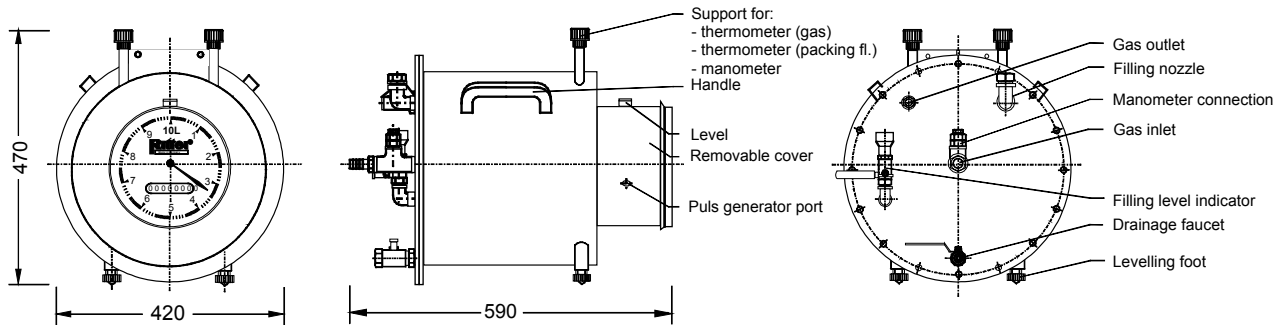
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow Q_{min}	20 ltr/h	Maximum gas inlet pressure	500 mbar
Standard flow Q_{stand}	1,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow Q_{max}	1,200 ltr/h	Minimum dial division	0.1 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	21 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	10.0 ltr/Rev.	Hose barb outside diameter	34 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	25.6	40
2	Stainless Steel	PE-el	25.2	70
3	Stainless steel	PP-grey	25.2	70
4	Stainless steel	PVDF	25.8	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

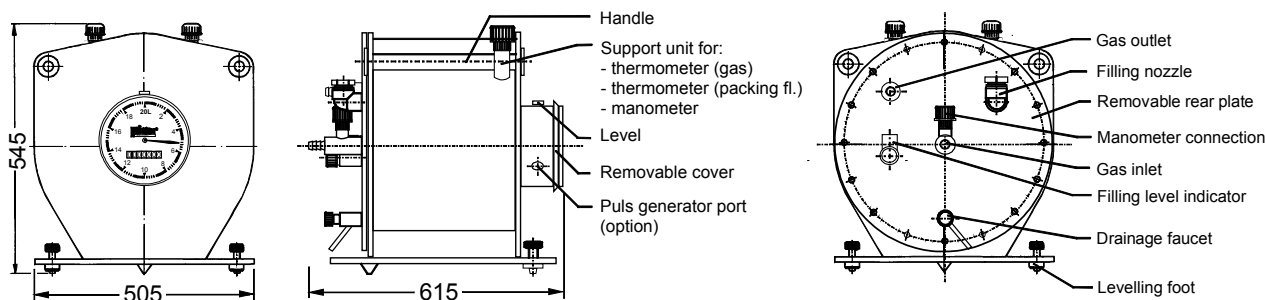
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	40 ltr/h	Maximum gas inlet pressure	50 mbar
Standard flow Q_{stand}	2,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow $Q_{\max}$	2,800 ltr/h	Minimum dial division	0.2 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	999,999.990 ltr
Packing liquid quantity, approx.	28.5 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	20.0 ltr/Rev.	Hose barb outside diameter	25 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
5	PVC-transparent	PVC-grey	18.0	40
6	PP-grey	PP-grey	13.4	70
7	PVDF	PVDF	23.2	120
8	PE-el	PE-el	13.4	70

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

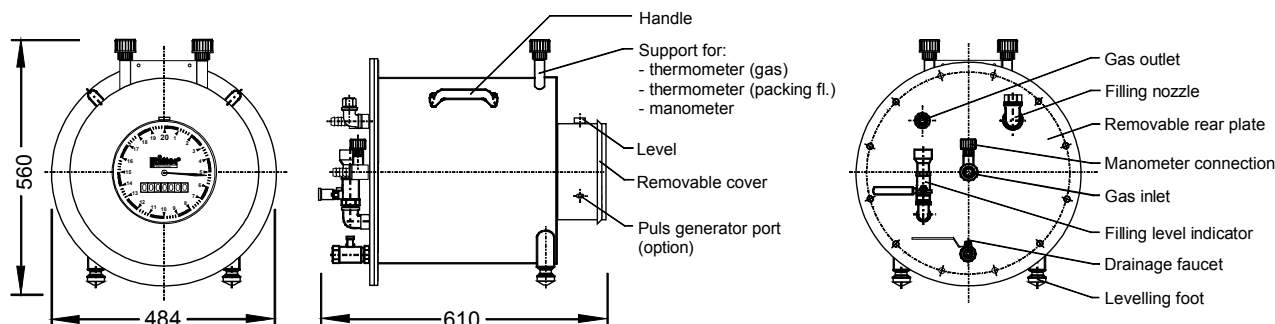
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	40 ltr/h	Maximum gas inlet pressure	500 mbar
Standard flow Q_{stand}	2,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow $Q_{\max}$	2,800 ltr/h	Minimum dial division	0.2 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	999,999.990 ltr
Packing liquid quantity, approx.	30 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	20.0 ltr/Rev.	Hose barb outside diameter	34 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	31.6	40
2	Stainless Steel	PE-el	31.2	70
3	Stainless steel	PP-grey	31.2	70
4	Stainless steel	PVDF	32.4	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

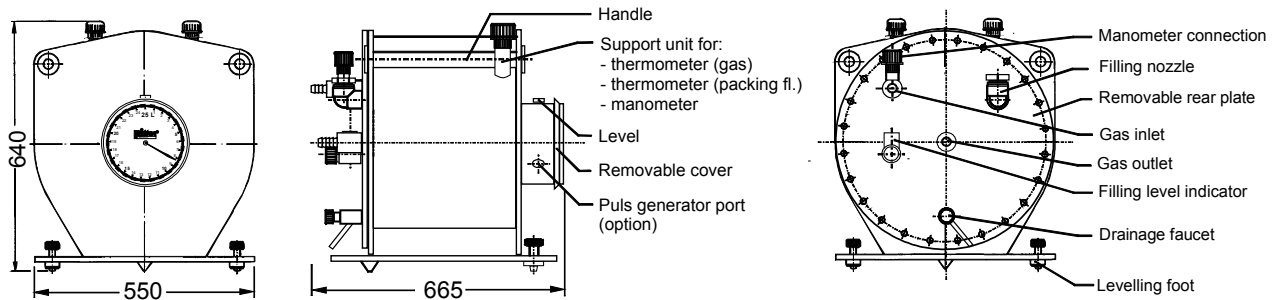
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	50 ltr/h	Maximum gas inlet pressure	50 mbar
Standard flow Q_{stand}	5,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow $Q_{\max}$	7,000 ltr/h	Minimum dial division	0.1 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	999,999,990 ltr
Packing liquid quantity, approx.	42 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	25 ltr/Rev.	Hose barb outside diameter	32 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
5	PVC-transparent	PVC-grey	26.7	40
6	PP-grey	PP-grey	19.4	70
7	PVDF	PVDF	34.5	120
8	PE-el	PE-el	19.4	70

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

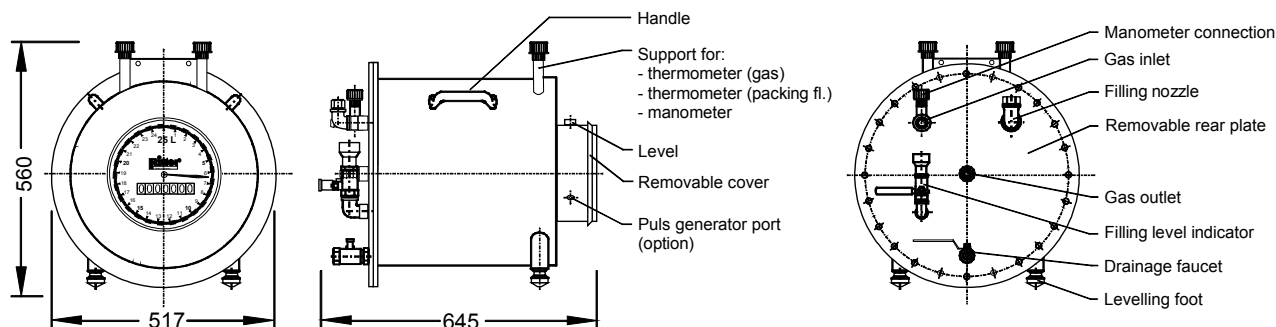
5-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	50 ltr/h	Maximum gas inlet pressure	500 mbar
Standard flow Q_{stand}	5,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow $Q_{\max}$	7,000 ltr/h	Minimum dial division	0.1 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	999,999,990 ltr
Packing liquid quantity, approx.	59 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	25 ltr/Rev.	Hose barb outside diameter	34 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	54.7	40
2	Stainless Steel	PE-el	54,3	70
3	Stainless steel	PP-grey	54,3	70
4	Stainless steel	PVDF	55.5	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

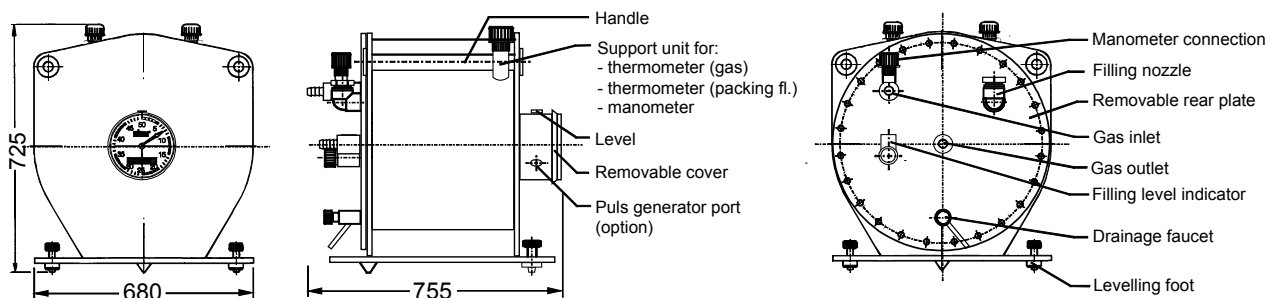
5-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	100 ltr/h	Maximum gas inlet pressure	50 mbar
Standard flow Q_{stand}	10,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow $Q_{\max}$	18,000 ltr/h	Minimum dial division	0.5 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	999,999,990 ltr
Packing liquid quantity, approx.	91 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	50.0 ltr/Rev.	Hose barb outside diameter	40 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
5	PVC-transparent	PVC-grey	57.0	40
6	PP-grey	PP-grey	40.7	70
7	PVDF	PVDF	73.3	120
8	PE-el	PE-el	40.7	70

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

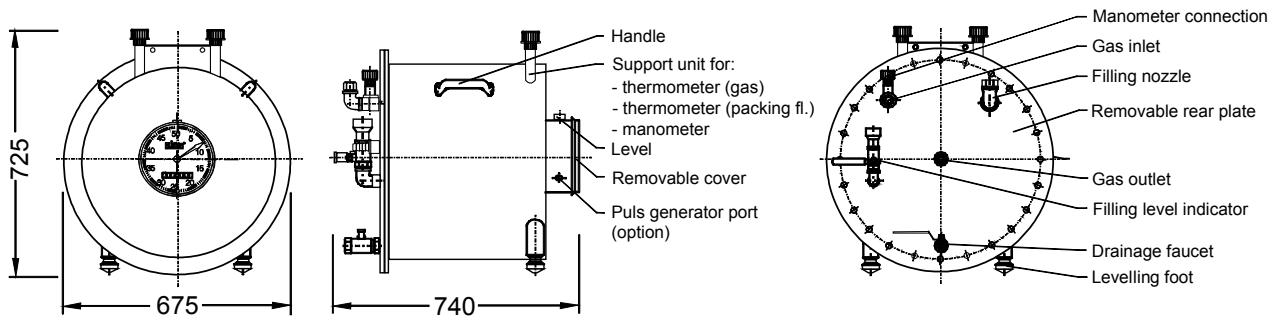
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow $Q_{\min}$	100 ltr/h	Maximum gas inlet pressure	500 mbar
Standard flow Q_{stand}	10,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow $Q_{\max}$	18,000 ltr/h	Minimum dial division	0.5 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	999,999,990 ltr
Packing liquid quantity, approx.	88 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	50.0 ltr/Rev.	Hose barb outside diameter	48 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	91.0	40
2	Stainless Steel	PE-el	90.0	70
3	Stainless steel	PP-grey	90.0	70
4	Stainless steel	PVDF	94.2	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

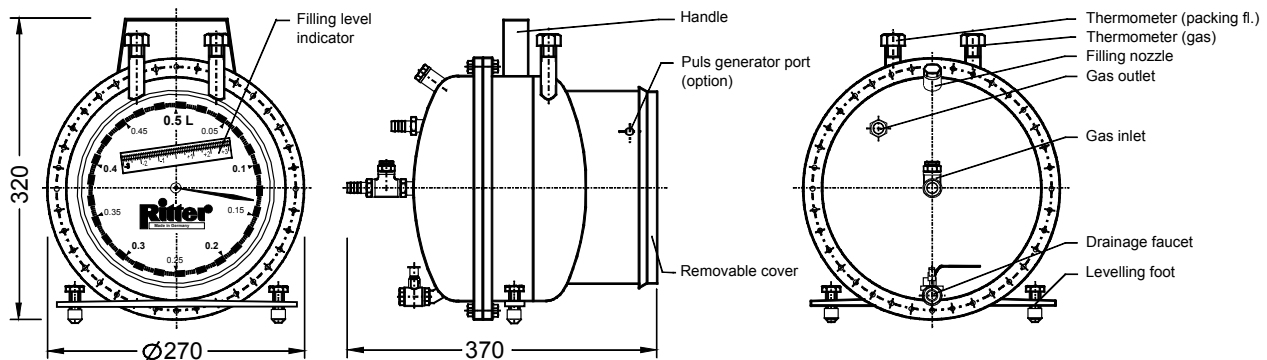
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 mbar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow Q_{min}	1 ltr/h	Maximum gas inlet <u>overpressure</u>	6 bars
Standard flow Q_{stand}	50 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow Q_{max}	60 ltr/h	Minimum dial division	0.002 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	9,999,999.9 ltr
Packing liquid quantity, approx.	3 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	0.5 ltr/Rev.	Hose barb diameter (external)	11 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	11.3	40
2	Stainless steel	PE-el	11.2	70
3	Stainless steel	PP-grey	11.2	50
4	Stainless steel	PVDF	11.5	50

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

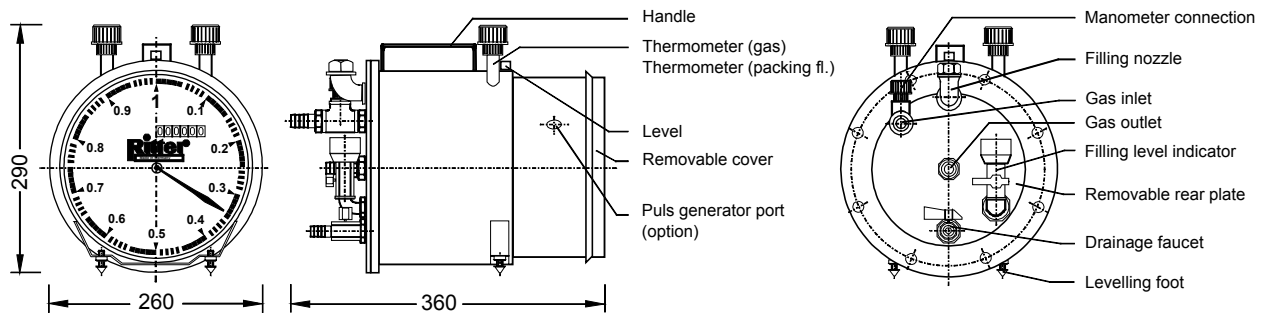
High Precision Liquid Level Indicator (HPLI)	Manometer/Thermometer Supports
4-Chamber Measuring Drum	Viton Sealing
Magnetic Coupling	Level, Levelling Feet
Totalizing Roller Counter (8-digit)	

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)



Performance Data:

Minimum flow $Q_{\min}$	2 ltr/h	Maximum gas inlet pressure	1 bar
Standard flow Q_{stand}	100 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow $Q_{\max}$	120 ltr/h	Minimum dial division	0.01 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	3 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	1.0 ltr/Rev.	Hose barb diameter (external)	12 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	19.6	40
2	Stainless Steel	PE-el	19.1	70
3	Stainless steel	PP-grey	19.1	70
4	Stainless steel	PVDF	21.2	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

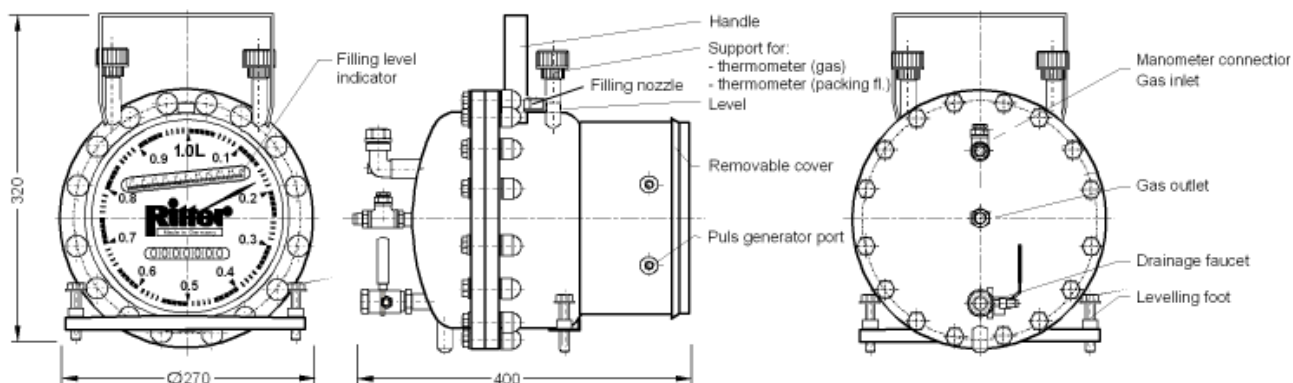
4-Chamber Measuring Drum	Manometer/Thermometer Supports
Magnetic Coupling	Viton Sealing
Totalizing Roller Counter (8-digit)	Level, Levelling Feet

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)
 High Precision Liquid Level Indicator (HPLI)



Performance Data:

Minimum flow Q_{min}	2 ltr/h	Maximum gas inlet pressure	6 bar
Standard flow Q_{stand}	160 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow Q_{max}	200 ltr/h	Minimum dial division	0.01 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	3.7 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	1.0 ltr/Rev.	Hose barb diameter (external)	12 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	13,9	40
2	Stainless Steel	PE-el	13,7	70
3	Stainless steel	PP-grey	13,7	70
4	Stainless steel	PVDF	14,3	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

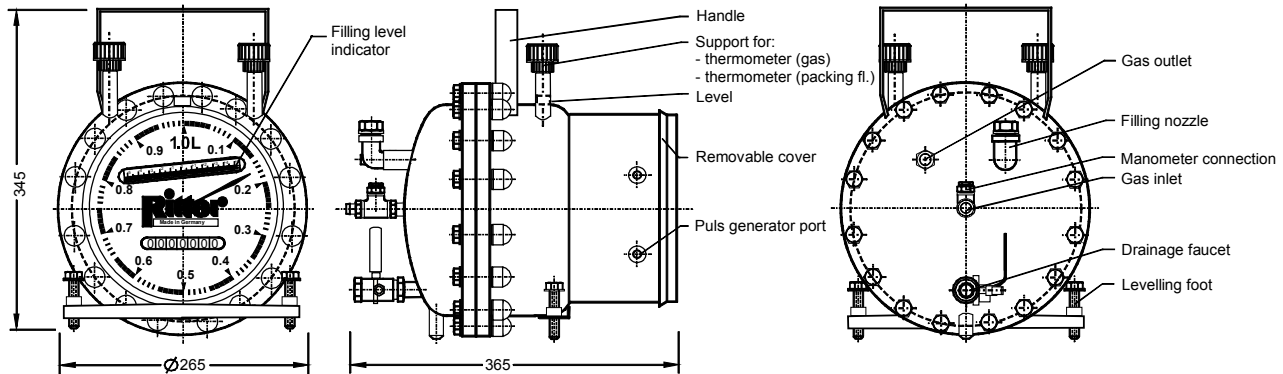
High Precision Liquid Level Indicator (HPLI)	Manometer/Thermometer Supports
4-Chamber Measuring Drum	Viton Sealing
Magnetic Coupling	Level, Levelling Feet
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)



Performance Data:

Minimum flow $Q_{\min}$	2 ltr/h	Maximum gas inlet pressure	16 bar
Standard flow Q_{stand}	100 ltr/h	Minimum differential pressure ¹⁾	0.2 mbar
Maximum flow $Q_{\max}$	120 ltr/h	Minimum dial division	0.01 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	99,999,999 ltr
Packing liquid quantity, approx.	3.3 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	1.0 ltr/Rev.	Hose barb diameter (external)	12 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	12.1	40
2	Stainless Steel	PE-el	11.9	70
3	Stainless steel	PP-grey	11.9	70
4	Stainless steel	PVDF	12.5	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

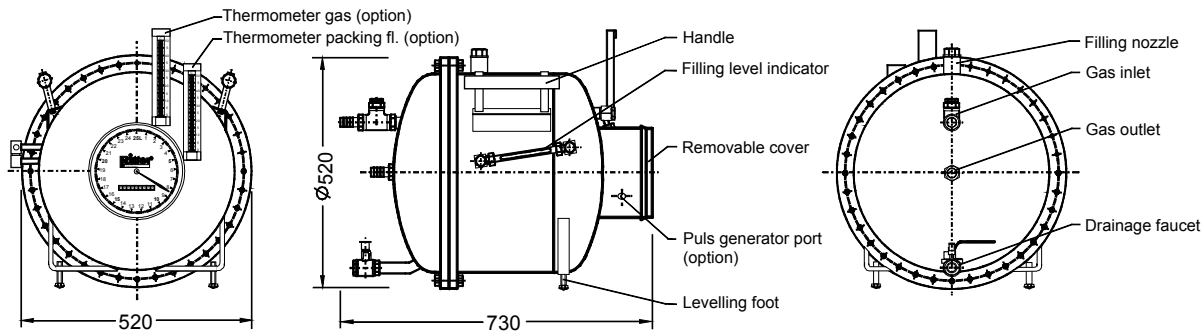
High Precision Liquid Level Indicator (HPLI)	Manometer/Thermometer Supports
4-Chamber Measuring Drum	Viton Sealing
Magnetic Coupling	Level, Levelling Feet
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)



Performance Data:

Minimum flow $Q_{\min}$	50 ltr/h	Maximum gas inlet pressure	6 bar
Standard flow Q_{stand}	5,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow $Q_{\max}$	7,000 ltr/h	Minimum dial division	0.2 ltr
Measuring accuracy	$\pm 0.2 \%$	Maximum indication value ²⁾	999,999,990 ltr
Packing liquid quantity, approx.	42 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	25.0 ltr/Rev.	Hose barb diameter (ext./int.)	26/18 mm

¹⁾Differential pressure (= pressure loss) gas inlet $\Rightarrow$ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	53.0	40
2	Stainless Steel	PE-el	52.5	70
3	Stainless steel	PP-grey	52.5	70
4	Stainless steel	PVDF	54.6	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

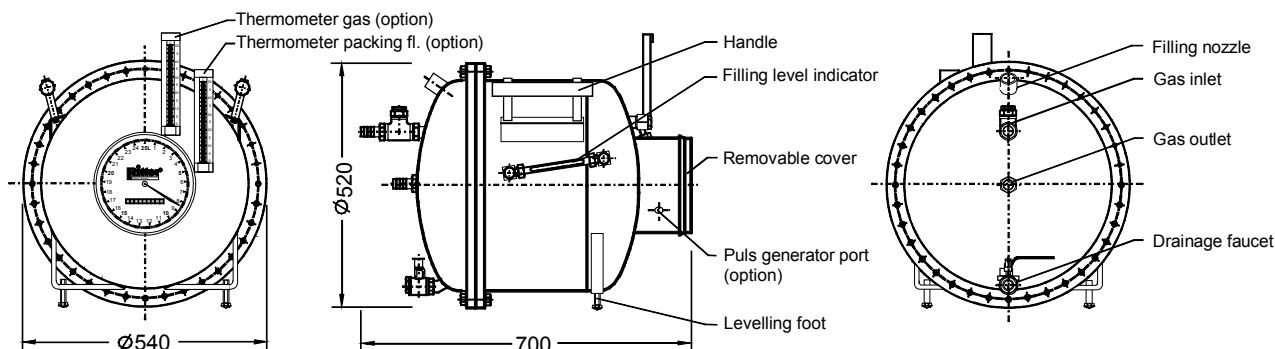
High Precision Liquid Level Indicator (HPLI)	Manometer/Thermometer Supports
5-Chamber Measuring Drum	Viton Sealing
Magnetic Coupling	Level, Levelling Feet
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	

Accessories:

Thermometer (gas), range 0° to +60°C
Thermometer (packing liquid), range 0° to +60°C
Manometer, range 10 bar differential pressure
Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
Pulse Generator (for connecting Electronic Display Unit/Computer)



Performance Data:

Minimum flow Q_{min}	50 ltr/h	Maximum gas inlet pressure	10 bar
Standard flow Q_{stand}	5,000 ltr/h	Minimum differential pressure ¹⁾	0.1 mbar
Maximum flow Q_{max}	7,000 ltr/h	Minimum dial division	0.2 ltr
Measuring accuracy	± 0.2 %	Maximum indication value ²⁾	999,999,990 ltr
Packing liquid quantity, approx.	46 Ltr	Connection gas in/outlet	Hose barb
Measuring drum volume	25.0 ltr/Rev.	Hose barb diameter (external)	25 mm

¹⁾Differential pressure (= pressure loss) gas inlet ⇒ gas outlet

²⁾Standard Totalizing Roller Counter

Models (Materials):

Model	Casing	Measuring drum	Weight (kg) (without packing liquid)	Max. constant use temperature °Celsius
1	Stainless steel	PVC-grey	53.0	40
2	Stainless Steel	PE-el	52.5	70
3	Stainless steel	PP-grey	52.5	70
4	Stainless steel	PVDF	54.6	120

• **Caution** Before and after measurements with **oxygen** purge the meter with an inert gas to avoid the danger of **explosion**.

For chemical resistance properties please contact **RITTER**.

Standard Equipment:

High Precision Liquid Level Indicator (HPLI)	Manometer/Thermometer Supports
5-Chamber Measuring Drum	Viton Sealing
Magnetic Coupling	Level, Levelling Feet
Totalizing Roller Counter, 9 digits, last digit (unit) = 0	

Accessories:

Thermometer (gas), range 0° to +60°C
 Thermometer (packing liquid), range 0° to +60°C
 Manometer, range 10 bar differential pressure
 Electronic Display Unit, including Interface RS 232 and Analog Output (requires Pulse Generator)

Built-in Options:

Resettable Roller Counter, 6-digit (substitutes Totalizing Roller Counter)
 Pulse Generator (for connecting Electronic Display Unit/Computer)

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1. Packing Liquid

1.1. General

The Gas Meter (which is shipped dry) must be approximately half-filled with a suitable so-called "Packing Liquid" before first use. The measuring drum which rotates in this packing liquid forms the actual measuring unit in conjunction with the liquid.

The packing liquid has two functions: Firstly, it seals off the active measuring chamber (= measuring chamber inside the measuring drum which is being filled with gas) and secondly, the level of the packing liquid inside the measuring chamber defines the volume of the measuring chamber. The latter function is the basis for calibration of the gas meter's measuring accuracy which is performed at the factory. Because of this, the measuring accuracy is directly dependent on the packing liquid level and so an incorrectly set level at time of installation is bound to cause incorrect measurements (see 2.3).

1.2. The mutual influence of packing liquid and gas

Irrespective of the chosen packing liquid, the packing liquid and the flowing gas inevitably affect each other with respect to **evaporation** and **dissolving**:

- 1) Absorption of evaporated particles of the packing liquid by the gas,
- 2) Dissolving of the gas in the packing liquid up to the saturation limit.

Generally valid figures and limit values for the mutual influence of gas and packing liquid cannot be stated, because they depend to a very great extent on the particular gas and its state. For example, when water is used as a packing liquid, a dry, warm gas absorbs significantly more evaporated water particles than a moist, cold gas.

The solubility of gases in the packing liquid also varies greatly: for example, the solubility of nitrogen is 6 %, air 7 to 8 %, oxygen 12 %, carbon dioxide 90 % (volume % at 20 °C) in "Autin-B" White Oil (mentioned below). The gas can, of course, only dissolve in the packing liquid up to the saturation limit. A measuring error caused by solubility can be avoided if the gas can dissolve in the packing liquid up to the saturation limit during test operation before the experiments are subsequently carried out.

1.3. Selection of packing liquid

The criterion for choosing a packing fluid should be that any mutual influence between the packing fluid and the flowing gas should be as small as possible, or that the effects can be ignored. In most cases, water can be used as the packing fluid. No special requirements for the water are necessary - that means that normal clean tap water can be used.

When water is not suitable to be used as the packing fluid, RITTER recommends, and can supply, the following alternatives:

"**Rixol-III**" or "**Autin-B**", which are paraffin oils without olefin. The following always applies to the selection of oils: the more thin-bodied the oil is (the more similar its viscosity to that of water), the lower the friction resistance of the rotating measuring drum, and therefore the lower the pressure loss between gas input and gas output.

"**CalRiX**", which is a completely synthetic fluid on a fluorine base. It is almost totally inert, even to the most aggressive gases. It can also be used without difficulty under the most demanding and critical application situations. Further advantages of **CalRiX** are: low evaporation rate; a viscosity similar to that of water; 1.8 times the density of water and

very low surface tension, which result in a more even rotation of the measuring drum; dry gases remain dry.

2. Installation

2.1. High-Pressure Gas Meters (> 1bar)

Before performing the initial set-up please read the general instructions in Point 4 and continue installation with point 2.2.

2.2. Positioning

Place the drum-type gas meter onto a solid, vibration-free support. Align the gas meter precisely horizontally by means of the integrated level (at top of casing) and the levelling feet.

2.3. Filling with the packing liquid

Standard-Gas Meters:

- TG 01: Remove the screwed cap of the High Precision Packing Liquid Level Indicator "HPLI" on the outer end of the glass tube by unscrewing it (please refer to the Data Sheet "HPLI" as well). Open the filling nozzle located at the rear plate by turning the sealing screw anti-clockwise until it is unscrewed. Pour the chosen packing liquid into the gas meter through the filling nozzle.
- TG 05 – TG 50: Open the filling-level indicator located at the rear plate by turning the sealing screw 2 or 3 times anti-clockwise. Please pay attention, that the screw is not unscrewed out of the thread. Open the filling nozzle located at the rear plate by turning the sealing screw anti-clockwise until it is unscrewed. Pour the chosen packing liquid into the gas meter through the filling nozzle.

High-pressure Gas Meters: Loosen and remove the sealing screw of the filling nozzle (hexagonal screw). Pour the selected Packing Liquid into the Gas Meter via the filling nozzle. After setting the Packing Liquid level correctly as described in Point 2.4, replace the sealing screw and firmly tighten it with a spanner.

2.4. Quantity of packing liquid (Adjusting the packing liquid level)

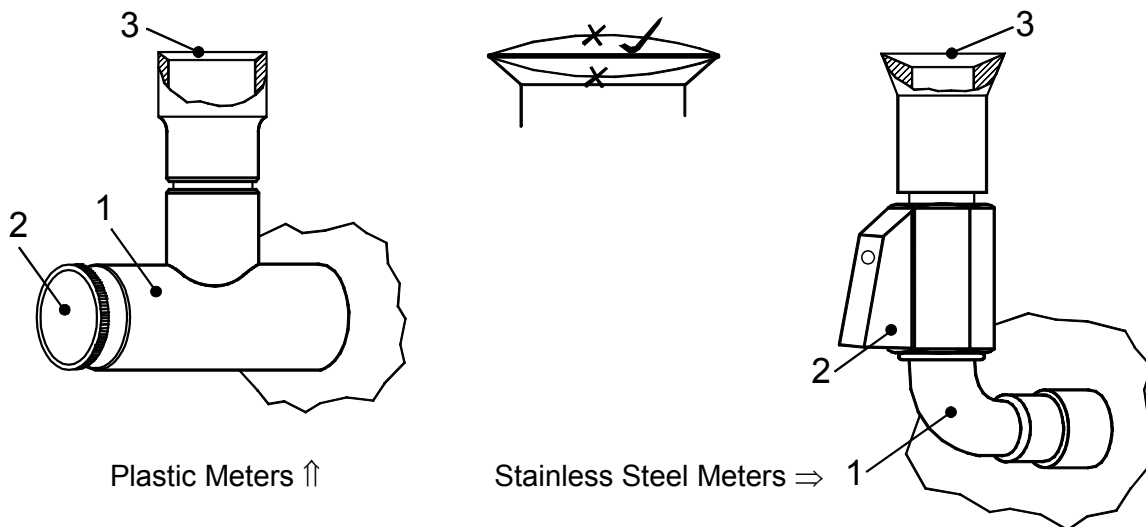
The amount of packing liquid depends on the gas meter size (type) and on the individual setting for each unit. The approximate quantity is shown in the data sheet enclosed with every gas meter. This quantity does not take into account individual differences based on the calibration performed in the factory.

Fine adjustment of the packing liquid level is of greatest significance to the measuring accuracy, **since the measuring accuracy/display depends directly on the packing liquid level and reacts very sensitively to an incorrectly set level!**

The correct packing liquid level is set as follows:

- For Gas Meters with the High Precision Packing Liquid Level Indicator (HPLI) (optional extra): please refer to the relevant HPLI Data Sheets.
- For Gas Meters with the standard Packing Liquid Level Indicator (located on the rear plate of the Meter):

When the filling-level indicator (1) is opened by turning the sealing screw (2) with Plastic Meters (or stop cock (2) with Stainless Steel Meters), the rising pipe of the level indicator is connected to the packing liquid in the gas meter housing in accordance with the communicating pipes principle. When the level in the gas meter housing rises as a result of topping-up with packing liquid, the level in the level indicator rises in the same way. The correct packing liquid level is reached when the surface of the liquid column in the level indicator is flush with the upper edge of the level indicator (3) and forms neither a dome nor an indent (see middle picture below).



The liquid column can be read off (if water is used as the packing liquid) more easily by reducing the surface tension by adding a drop of detergent. If too much packing liquid has been added, it comes over the level indicator causing the level to adjust itself to a certain extent. Any resulting liquid dome at the upper edge of the level indicator must, however, be remedied by draining off liquid via the drainage nozzles.

A small tip for checking the packing liquid level following an extended downtime of the gas meter: Following an extended downtime, the liquid in the level indicator is mostly evaporated, whereas it is not in the inside of the (closed) housing. If the level indicator's screw plug is now opened, the packing liquid flows out of the housing into the level indicator. Even if the packing liquid level was previously correct inside the housing, packing liquid must now be added and the level re-adjusted. This can be avoided by filling the level indicator with packing liquid **before** the screw plug is opened (neither dome nor indent). If the level does not change **after** the screw plug is opened, the packing liquid level was and still is correct.

2.5. After filling and adjustment of the packing liquid

- TG 01: Replace the screwed cap on the outer end of the sloping tube of the HPLI. Close the filling nozzle by turning the sealing screws clockwise.
- TG 05 – TG 50: Close the filling-level indicator and filling nozzle by turning the respective sealing screws clockwise
- When the Meter is equipped with the HPLI (standard with the TG01)
When closed, the HPLI can indicate a slightly lower filling level than it did after correct filling of the Meter. This can also occur during operation. This is system-related and does not indicate any error.. The given correct filling level will only be indicated when the Meter is not in operation and simultaneously, when the HPLI is open and not connected to the gas supply so that it is pressure-free.

2.6. Grounding of Gas Meters made out of electrically conductive material (PE-el)

Gas Meters with a casing and/or measuring drum made out of electrically conductive material (PE-el) must be grounded in order to discharge a potential static charge.

To do so the feeder clamp at a flange screw of the meter's rear plate must be connected to ground (earth).

2.7. Connection of gas pipe

Connect the gas pipe to the inlet nozzle marked "gas-inlet" at the rear plate. Allow the meter to perform one or two revolutions in order to remove any possible air bubbles within the measuring drum. Then disconnect the gas pipe again and repeat the steps in paragraphs 2.3 and 2.4.

2.8. Moving of the filled meter

If the Gas Meter has to be moved after having been filled (for example carried into another room), it must be kept in a horizontal position. This is to avoid Packing Liquid getting into the Gas Inlet. If this occurs, the Gas Meter should be tipped 90° forwards (the dial face would then point to the floor). The Packing Liquid can then flow out of the Gas Inlet again (and back into the Meter).

3. Measurement**3.1. Initial set-up**

- Type TG 01

In order to keep the mechanical resistance as low as possible, the TG01 is equipped as Standard with a Pulse Generator instead of with a mechanical counter. There is therefore no display of measured volume at the Gas Meter. Instead, the TG01 is equipped as standard with a pulse generator, from which the signals (= pulses) can be transferred either direct to a Electronic Display Unit EDU 32 FP (recommended) or to a user-specific data logging system which can further process the voltage signals. The EDU 32 FP displays volume and calculates flow rate.

In order for the pulses to be transmitted, the Output socket of the Pulse Generator (located at the 8 o'clock position on side of the Pulse Generator casing) must be connected via the accompanying cable (2 x 5-pin DIN-plugs) to the Electronic Display Unit EDU 32 FP. The EDU 32 FP must be turned on and programmed for use with the Gas Meter type TG 01 (please see the EDU 32 FP Operating Instructions, chapter 6).

The Gas Meter is then ready for Operation.

- Type TG 05 – TG 50:

For ease of reading at the end of measurement, the large Needle of the dial plate can be set manually to zero prior to each measurement. In the case of units with a totalizing roller-type counter (standard version), the counter reading must be noted. On the version with a resettable roller-type counter (optional), the counter can be set to zero with the reset button. The Needles can be set manually to zero on units with a totalizing Needle-type counter (optional).

The Gas Meter is then ready for Operation.

3.2. Check: Liquid level

Prior to each subsequent measurement, the fluid level must again be checked in accordance with paragraphs 2.3 and 2.4.

3.3. Check: Performance data

When taking measurements, pay attention to the performance data of the respective gas meter (refer to the attached data sheet). **The maximum pressure load is 50 mbar** for the standard drum-type gas meters made out of plastic and **500 mbar** with meters with a stainless steel casing!

3.4. Measurements with oxygen

The mixture of some gases with oxygen may cause an explosion. Therefore, before and after measuring with oxygen, ensure that no gas used in the previous measurement is still within the measuring drum or the inside of the housing. To exclude this danger of explosion, the gas meter has to be purged with an inert gas (e.g. nitrogen or any noble gas). The purging can be performed by operating the gas meter with an inert gas for at least five revolutions of the measuring drum (= five revolutions of the large Needle on the dial plate).

4. High-Pressure Gas Meters(> 1bar)

- The Gas Meters may only be used within the Over-Pressure and Temperature operating limits listed on the Meter label and in the Data Sheet.
- If the Gas Meter is placed in an elevated position, for example on a stand or similar, it must be firmly secured so that it cannot move or slip. This is to avoid personal injury or property damage due to the Meter falling. The feet of the Meter should be secured with tension clamps, screws or similar.
- The Gas Meters do not have an Over-Pressure Safety Valve installed. In order to completely avoid exceeding the admissible operating pressure (listed on the Meter label and in the Data Sheet), an Over-Pressure Safety Valve must be installed in the connected gas pipes.
- In the event of Gas Meter disassembly, the Gas Meter must be pressure-free before disassembly begins.
- Only original parts should be used to rebuild the Gas Meter if it has been disassembled.
- Disassembly of the Meter, i.e. removal & replacement of the measuring drum, can alter the calibration results (please refer to Point 5.2).

5. Maintenance

5.1. General

By use of a magnetic coupling between measuring drum and counter mechanism no leakage from the gas meter housing can occur. Thus, all Ritter drum-type gas meters are maintenance-free.

5.2. Disassembly of the rear plate

The rear plate of the housing can be removed in order to allow the gas meter housing to be cleaned from the inside if required. When removing the plate, it is essential to ensure that the support secured onto the inner face of the housing rear plate and which engages in the measuring drum is not broken off and that the measuring drum is not damaged by this support.

However, after opening the gas meter housing and removing the measuring drum, it must be borne in mind that following refitting the measuring drum will very probably no longer be in exactly the same position as it was during calibration at the factory. This could result in a different calibration result.

We therefore recommend that you send your gas meter to the works for inspection, cleaning and recalibration if the measuring drum becomes dirty and in the event of measuring inaccuracies or other operational faults.

5.3. Trouble shooting

In the unlikely event of problems with the function of the meter, please contact your national distributor or the Ritter Company. In order to be able to be of assistance, we kindly ask you to check the following items and to collect the requested data **prior to your contact**:

- a) Serial number of the meter.
- b) Is the packing liquid level set correctly?
- c) What is the gas flow rate at which the problem occurs?
- d) What is the gas inlet pressure at this flow rate?
- e) What is the spread of the gas inlet pressure (min./max. pressure) at this flow rate?
- f) Is the gas meter outlet nozzle free to atmosphere?
- g) What is the approx. gas temperature?

Especially the data according to (d) and (e) are valuable information to find the reason for the problem(s).

1. General

Rixol-III is a Paraffin Oil with additives. These additives cause the oil not only to have a low vapour pressure but also provide it with the following excellent characteristics: The oil is protected by these additives against ageing and will not froth. Additionally, parts in contact with the oil are protected against corrosion and wear.

2. Application

Rixol-III can be used in all **RITTER** Drum-type Gas Meters except those made out of PP or containing a PP measuring drum. As opposed to water as a Packing Fluid, Rixol-III can be used under 0°C as well. It also has a lower evaporation rate. Because of this, the Packing Liquid level remains stable over a longer period of time. This leads to an improvement in the repeatability of measurement results, and in a reduction in the required frequency of Packing Liquid level monitoring.

The use of Rixol-III is further recommended when the gas should remain dry or when the gas reacts with water.

Not appropriate for HCl gas and chlorine gas.

3. Advantages

- Use under 0°C (down to -10°C)
- extremely low evaporation rate in comparison to water due to its low vapour pressure, resulting in greater stability of the Packing Fluid level and in more consistent measurement result
- the gas remains dry
- in general, a lower chemical reactivity than water

4. Solubility (Bunsen ^{*} coefficient at 1013 mbar, 20°C)

Air	0.07-0.08
Ammonia	0.18
Carbon Dioxide	0.90
Nitrogen	0.06
Oxygen	0.12

^{*} Bunsen coefficient (N ml/ml): volume of gas, reduced to Normal condition (1013 mbar, 0°C), dissolved in the volume unit of fluid.

5. Properties

Viscosity:	-30 °C	12	cSt (=mm ² /sec)
	-10 °C	5.8	cSt
	0 °C	4.3	cSt
	+10 °C	3.4	cSt
	+20 °C	2.8	cSt
	+40 °C	2.0	cSt



PACKING FLUID FOR RITTER GAS METERS
R i x o I - III
Data Sheet

01.38
V 1.0
Rev. 08/03

Density:	+15 °C	0.82 g/ml
Vapour pressure:	0 °C	0.08 mbar
	20 °C	0.30 mbar
	40 °C	0.96 mbar
	65 °C	3.46 mbar
	80 °C	6.83 mbar
	100 °C	15.54 mbar
Boiling range:	220-243 °C	
Pour point:	-42 °C	
Flashpoint:	85-90 °C	
Appearance:	Yellowish, clear. Odour: similar to mineral oil	

6. Safety Information

Personal Protective Measures:

- General: Avoid frequent, long and intensive skin contact; if necessary, wear appropriate protective clothing; use skin-cleansing or -care products; oil-soaked clothing should always be removed; do not eat, drink or smoke during use; keep away from food and drinks.
- Breathing Protection: By atomisation, turn exhaust fans on.
- Hand Protection: If consistent with your machinery safety procedures, we recommend wearing protective gloves made of appropriate plastic or synthetic rubber when the oil would be in intensive skin contact; otherwise special protective skin cream should be used.
- Eye Protection: In case of oil squirting, use tightly fitting protective glasses.
- Body Protection: In case of oil squirting wear oil-proof clothing; preventative skin protection necessary; after handling, use skin-cleaning and -care products.

In Case of Fire:

- Appropriate fire-extinguishing substances: Foam; CO₂; Dry fire-extinguishing substances; Water spray/drizzle and sand.
- Inappropriate fire-extinguishing substances: Water, never use a strong jet of water.

Danger Classification: A III

For further Safety Information, please request the Safety Data Sheet.

1. General

Silox is a synthetic oil belonging to the group of polydimethyl siloxane. It is colourless and clear with a weak odour.

2. Application

Silox can be used in all **RITTER** Drum-type Gas Meters. As opposed to water as a Packing Fluid, Silox can be used under 0°C. It also has a lower evaporation rate in combination with a viscosity similar to water. Because of this, the Packing Liquid level remains stable over a longer period of time. This leads to an improvement in the repeatability of measurement results, and in a reduction in the required frequency of Packing Liquid level monitoring.

The use of Silox is further recommended when the gas should remain dry or when the gas reacts with water.

3. Advantages

- Use under 0°C (down to -40°C)
- less evaporation than water due to its lower vapour pressure, resulting in greater stability of the Packing Fluid level and in more consistent measurement result
- the gas remains dry
- in general, a lower chemical reactivity than water

4. Properties

Chemical name:	cyclic polydimethyl siloxane		
Viscosity:	20 °C	4	cSt (=mm ² /sec=mPa.sec
	25 °C	4	cSt
Density:	15 °C	0.96	g/ml
	25 °C	0.95	g/ml
	50 °C	0.93	g/ml
Vapour pressure:	20 °C	0.16	mbar (=hPa)
	50 °C	38	mbar
Boiling Point:	205 °C		
Pour point:	-40 °C		
Flash point:	76 °C		
Ignition temperature:	450 °C		
Appearance:	clear, colourless fluid with a weak odour		



PACKING FLUID FOR RITTER GAS METERS
Autin-B
Data Sheet

01.40
V 1.0
Rev. 10/01

1. General

Autin-B is a Paraffin Oil (white oil) without Polyolefin. It is colourless, clear and odourless.

2. Application

Autin-B can be used in all **RITTER** Drum-type Gas Meters. As opposed to water as a Packing Fluid, Autin-B can be used under 0°C as well. It also has a lower evaporation rate. Because of this, the Packing Liquid level remains stable over a longer period of time. This leads to an improvement in the repeatability of measurement results, and in a reduction in the required frequency of Packing Liquid level monitoring.

The use of Autin-B is further recommended when the gas should remain dry or when the gas reacts with water.

Not appropriate for chlorine gas.

3. Advantages

- Use under 0°C
- less evaporation than water due to its lower vapour pressure, resulting in greater stability of the Packing Fluid level and in more consistent measurement result
- the gas remains dry
- in general, a lower chemical reactivity with water

4. Solubility (Bunsen ^{*} coefficient at 1013 mbar, 20°C)

Air	0.07-0.08
Ammonia	0.18
Carbon Dioxide	0.90
Nitrogen	0.06
Oxygen	0.12

^{*} Bunsen coefficient (N ml/ml): volume of gas, reduced to Normal condition (1013 mbar, 0°C), dissolved in the volume unit of fluid.

5. Properties

Viscosity:	20 °C	37.0 cSt (=mm ² /sec)
	40 °C	16.0 cSt
	100 °C	3.6 cSt
Density:	15 °C	0.85 g/ml
Vapour pressure:	20 °C	< 0.1 mbar
Boiling range:	335-410 °C	
Pour point:	-24 °C	
Flashpoint:	>150 °C	
Appearance:	Colourless, clear. odourless fluid	



PACKING FLUID FOR RITTER GAS METERS
CalRiX
Data Sheet

01.41
V 1.0
Rev. 10/03

1. General

CalRiX is a completely synthetic fluid on a fluorine base. It is of low molecular weight, colourless, clear and odourless.

More detailed information about the chemical composition and molecular structure of this fluid can be obtained upon request.

2. Application

CalRiX can be used with all Ritter Drum-type Gas Meters (Wet-type Gas Meters). Because CalRiX is completely inert to most gases including oxygen, it can be used as a Packing Fluid when water or paraffin oil are not suitable. For example, when the gas needs to remain dry, and when the gas is highly reactive to water or paraffin oil. It is appropriate for use with such gases as:

Butane	Hydrogen Fluoride
Carbon Dioxide	Methane
Carbon Tetrafluoride	Nitrogen
Carbon Tetrachloride	Nitrogen Trichloride
Chlorine	Oxygen
Deuterium	Phosphine
Fluorine	Propane
Helium	Silane
Hydrogen	Sulphur Hexafluoride
Hydrogen Chloride	

3. Advantages

- Extremely resistant even against highly aggressive gases because of CalRiX's fluorine base,
- less evaporation than water due to its lower vapour pressure, resulting in greater stability of the Packing Fluid level and in more consistent measurement result,
- very smooth rotation of the measuring drum in the Gas Meter because of CalRiX's high density and low surface tension,.

4. Properties

Viscosity:	20	°C	2.7 cSt (=mm ² /sec)
	100	°C	0.7 cSt
Density:	20	°C	1.80 g/ml
	100	°C	1.64 g/ml
Vapour pressure:	20	°C	0.4 mbar
	100	°C	30.8 mbar
	120	°C	65.6 mbar
Working Temp. Range:	-50	°C	to 170 °C
Boiling Point:	200	°C	
Pour point:	-85	°C	
Solubility of Water:	14	ppm	
Solubility of Air:	26	cm ³ gas per 100 cm ³ liquid	



PACKING FLUID FOR RITTER GAS METERS
CalRiX
Data Sheet

01.42
V 1.0
Rev. 10/03

Volatility: 34.4 % in 22 hours at 66°C
Appearance: Clear, odourless, colourless fluid

5. Solubility of Gases (Bunsen coefficient at room temperature)

Butane	8.5
Boron Trichloride	13.1
Boron Trifluoride	0.22
Carbon Dioxide	1.2
Carbon Tetrachloride	52.6
Carbon Tetrafluoride	0.68
CFC 114	14.9
CFC 12	4.25
CFC 133a	13.9
CFC 134a	4.7
CFC 21	13.1
CFC 22	4.86
Chlorine	3.19
Deuterium	0.10
Esafluoroethane	2.12
Fluorine	0.20
Helium	0.08
Hydrochloric acid	0.806
Hydrogen	0.10
Methane	0.17
Nitrogen	0.19
Nitrogen Trichloride	0.83
Oxygen	0.29
Phosphine	0.67
Propane	3.8
Silane	0.36
Sulphur Hexafluoride	3.5

The Bunsen coefficient [N ml/ml] is the volume of gas, reduced to Normal condition (1013 mbar, 0°C), dissolved in the volume unit of fluid.