



TG 05 Model 5 (PVC transparent), HPLI, resettable Roller Counter

## User Benefits

- Highest accuracy
- Use with extremely corrosive and inert gases
- Calibration traceable to National Primary Standard
- Lowest measurable flows
- Largest selection of measuring ranges
- Computer monitoring option
- Real-time electronic display option
- Most durable construction available
- No maintenance

## Applications

RITTER™ drum-type (wet-test) gas meters are used universally to measure volumetrically **gas volume** (and **gas flow rate** in conjunction with the RITTER™ software *Rigamo* or Digital Display Unit *EDU 32 FP*) in R&D laboratories for example in the petrochemical, chemical, coal mining, and steel production industries as well as in universities and environmental technology.

RITTER™ wet-test meters consistently provide the highest accuracy and precision even at the lowest gas flows with the most aggressive or inert gases.

## Measurement Principle

RITTER™ gas flow meters function upon the principle of positive displacement. The sample gas stream rotates a measuring drum within a packing fluid, usually water or low viscous white (clear) oil. Coupled to the rotating drum, a needle-dial and counting mechanism record the volume of gas flow as it sequentially

fills and empties from the drum's rigid, fixed volume measuring chambers.

## Measuring Ranges

Select from 9 standard measuring ranges from as low as 0.1 litre per hour to 18,000 litres per hour.

## Accuracy

Every RITTER™ wet-test gas flow meter provides measuring accuracy of  $\pm 0.2\%$  or better at standard flow ( $\pm 0.5\%$  across full measurement range). Each instrument is manufactured to the most rigorous German standards of quality control and final calibration.

## Gas Pressure & Temperature

RITTER™ wet-test gas meters have a maximum gas inlet pressure of 50 mbar (0.725 psi) with plastic casings and 500 mbar (7.25 psi) with stainless steel casings; custom meters up to 16 bars (230 psi).

RITTER™ meters withstand constant use temperatures ranging from  $-20^{\circ}\text{C}$  to  $+120^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$  to  $+248^{\circ}\text{F}$ ), depending on meter material.

## Data Presentation

Standard models provide direct needle-dial readouts and accumulating counter. For data acquisition by PC the Windows software *Rigamo* is available. For remote operation the digital display unit "EDU 32 FP" (including RS232) can be used.

## Measurement Standard

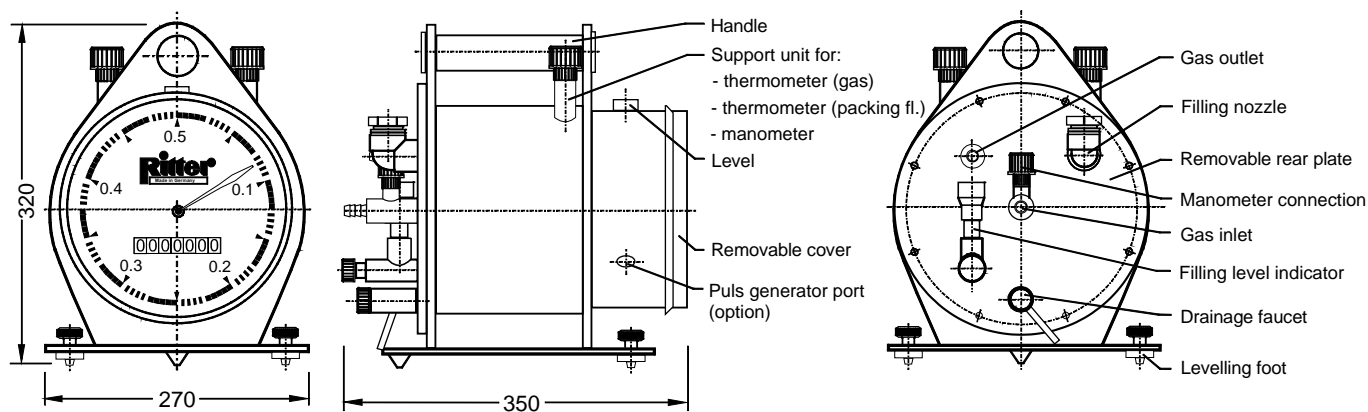
RITTER™ wet-test meters measure the **actual volume** of gas flow **directly**. This is the major advantage and the superiority of the drum-type Gas Meter over other measurement principles, which determine gas volume using secondary measurable variables such as speed, heat capacity, hot-wire resistance or similar.

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**.

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*Ritter Gas Meters  
... where Perfection becomes Reality*



TG 05 Model 5 - 8

## Performance Specifications

Type	Flow Rate			Readout Indication		Packing Fluid Required <sup>(4)</sup>		Measuring Drum Capacity [liters]	Max. Gas-Inlet Pressure [mbar]	Min. Pressure Loss [mbar]
	Min. [l/hr]	Max. [l/hr]	Std. <sup>(1)</sup> [l/hr]	Min. <sup>(2)</sup> [ltr]	Maximum [liters]	Plastic [ltr]	SS [ltr]			
TG 01	0.1	30	10	0.002 <sup>(3)</sup>	999.9999	0.9	1.3	0.1	Plastic casing: 50	0.2
TG 05	1	60	50	0.002	9,999,999.9	2.5	3.5	0.5		0.4
TG 1	2	120	100	0.01	99,999,999	3.0	3.5	1.0		0.2
TG 3	6	360	300	0.02	99,999,999	6.0	11	3.0		0.2
TG 5	10	600	500	0.02	99,999,999	8.5	11	5.0		0.2
TG 10	20	1,200	1,000	0.1	99,999,999	15.5	21	10.0	SS casing: 500	0.1
TG 20	40	4,000	3,200	0.2	999,999,990	28.5	30	20.0		0.1
TG 25	50	7,000	5,000	0.1	999,999,990	42	39	25.0		0.1
TG 50	100	18,000	10,000	0.5	999,999,990	91	88	50.0		0.1

<sup>(1)</sup> Accuracy determined @ standard flow and 20° C (68° F)

<sup>(2)</sup> Minimum dial division

<sup>(3)</sup> At EDU 32 FP

<sup>(4)</sup> Approximate

## Models & Materials of Construction

RITTER™ wet-test gas meters are built to deliver superior performance with the same unbeatable results under the most demanding industrial and environmental gas measurement applications or in controlled laboratory and research environments.

Corrosion-resistant materials ensure continuously reliable measurements even in the presence of the most aggressive gases.

Casing	Measuring Drum	Model No.	Max. Constant Use Temperature	
			°C	°F
PVC-transparent	PVC-grey	5	40	104
PP	PP	6	80	176
PVDF	PVDF	7	120	248
PE-el	PE-el	8	60	140
SS (316 Ti)	PVC-grey	1	40	104
SS (316 Ti)	PE-el	2	60	140
SS (316 Ti)	PP	3	80	176
SS (316 Ti)	PVDF	4	120	248

PVC = Polyvinyl Chloride

PE-el = Polyethylene electrically conductive

PVDF = Polyvinylidene Fluoride

PP = Polypropylene

SS = Stainless Steel

US: 316 Ti, GER: 1.4571

## Packing Fluid

The measurement principle of drum-type gas meters requires the meter to be partly filled with a so called „packing fluid“. The high accuracy of RITTER™ drum-type gas meters is achieved through the rotation of the precision-made RITTER™ measuring drum „within this packing fluid“. Ordinary tap water is a suitable packing fluid for most gases. For those applications in which water is not suitable, RITTER™ recommends and supplies the following alternatives:

**Ondina-909** is a paraffinic medical mineral „white“ oil, which can be used for gases which are highly soluble in or reactive with water. Appearance: colourless, clear and odourless.

**Autin-B** is a paraffin „white“ oil with higher viscosity than Ondina-909 for use with lower and higher temperatures. Appearance: colourless and odourless.

**CalRiX** Packing Fluid is ideal for use with the most aggressive of gases and under the most exacting of measurement conditions. It is a synthetic fluid which is completely inert to almost all gases.

## Maintenance

None

### Standard Equipment

Multi-chamber rotary measuring drum with counting mechanism. Large needle-dial readout. 8-digit accumulating counter. Liquid-level indicator for packing fluid. Supports for thermometer and manometer. Bubble level for levelling with adjustable feet.

### Options /Accessories Available

- Windows software "Rigamo" for data acquisition by PC.
- High Precision Packing Liquid Level Indicator "HPLI" (**patented**)
- Thermometer (gas).
- Thermometer (packing fluid).
- Manometer.
- Resettable electronic roller counter (8-digit)
- Pulse Generator.
- Digital Display Unit "EDU 32 FP"
- Custom meter design.

### Dimensions: (approximate)

Type	Model	(mm)			(inches)		
		H	W	L	H	W	L
TG 01	1-4	225	195	260	8.9	7.7	10.2
	5-8	250	180	230	9.8	7.1	9.1
TG 05	1-4	310	265	380	12.2	10.4	15.0
	5-8	320	270	350	12.6	10.6	13.8
TG 1	1-4	310	265	380	12.2	10.4	15.0
	5-8	320	270	380	12.6	10.6	15.0
TG 3	1-4	410	363	445	16.1	14.3	17.5
	5-8	375	330	405	14.8	13.0	15.9
TG 5	1-4	410	363	445	16.1	14.3	17.5
	5-8	375	330	460	14.8	13.0	18.1
TG 10	1-4	470	420	590	18.5	16.5	23.2
	5-8	470	410	560	18.5	16.1	22.0
TG 20	1-4	560	484	610	22.0	19.1	24.0
	5-8	545	505	615	21.5	19.9	24.2
TG 25	1-4	560	517	645	22.0	20.4	25.4
	5-8	640	550	665	25.2	21.7	26.2
TG 50	1-4	725	675	740	28.5	26.6	29.1
	5-8	725	680	755	28.5	26.8	29.7

### User Check List

#### Gases to be measured:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

#### Line pressure:

- Maximum \_\_\_\_\_
- Minimum \_\_\_\_\_

#### Max. Gas Temperature:

- 40°C / 104°F
- 60°C / °F
- 80°C / 158°F
- 120°C / 248°F

#### Packing Fluid:

- Water
- Ondina 909
- Autin-B „White“ Oil
- CalRiX

#### Flow Rate Required:

- 0.1-30 l/h     20-1,200 l/h
- 1-60 l/h     40-4,000 l/h
- 2-120 l/h     50-7,000 l/h
- 6-360 l/h     100-18,000 l/h
- 10-600 l/h
- Other: \_\_\_\_\_

#### Model Number:

- 5 (PVC)     1 (SS/PVC)
- 6 (PP)     2 (SS/PE-el)
- 7 (PVDF)     3 (SS/PP)
- 7 (PE-el)     4 (SS/PVDF)

#### Accessories:

- Data acquisition software
- Thermometer (Gas)
- Thermometer (Pack. Fluid)
- Manometer
- Digital Display Unit EDU 32

#### Options:

- Resettable Counter (8-digit)
- Pulse Generator
- High Prec. Level Indicator



TG 1 Model 7 (PVDF)



TG 5 Model 6 (PP)

### Weight (approximate; without packing fluid)

Type	Model 1		Model 2&3		Model 4		Model 5		Model 6&8		Model 7	
	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb
TG 01	2.7	6.0	2.1	4.6	3.2	7.1	2.0	4.4	1.4	3.1	2.5	5.5
TG 05	8.3	18.3	8.2	18.1	8.5	18.7	4.0	8.8	3.0	6.6	5.0	11.0
TG 1	8.5	18.7	8.3	18.3	8.9	19.6	4.3	9.5	3.1	6.8	5.1	11.2
TG 3	15.8	34.8	15.7	34.6	16.2	35.7	6.3	13.9	4.5	9.9	8.1	17.9
TG 5	15.0	33.1	14.8	32.6	15.2	33.5	7.1	15.7	4.9	10.8	9.2	20.3
TG 10	25.6	56.4	25.2	55.6	25.8	56.9	10.6	23.4	7.8	17.2	13.6	30.0
TG 20	31.6	69.7	31.2	68.8	32.4	71.4	18.0	39.2	13.4	29.5	23.2	51.2
TG 25	40.0	88.2	39.6	87.3	40.8	90.0	26.7	58.9	19.4	42.7	34.5	76.1
TG 50	91.0	201	90.0	198	94.2	208	57.0	126	40.7	89.7	73.3	162

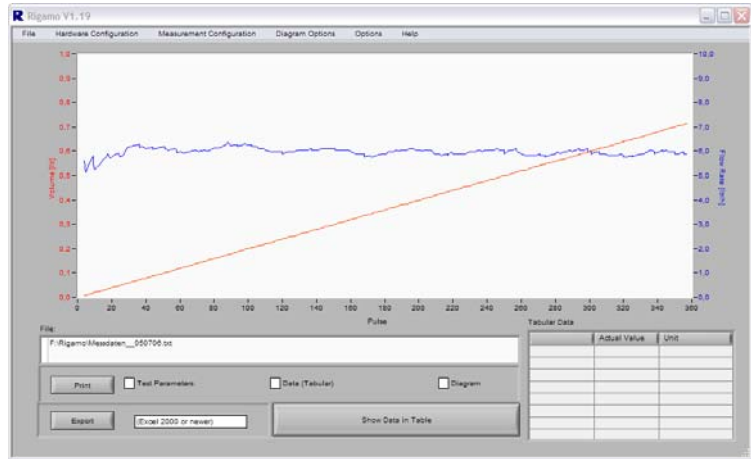
## Data Acquisition Software "Rigamo" (Accessory)

### Software Features

- Transmission of measurement data of gas volume and flow rate from a Ritter gas meter to a PC (RS232)
- Graphical and tabular display of these data
- Storing of data
- Conversion of data into Microsoft Excel® format and export to an Excel spread-sheet (if required)

### System Specification

- Gas meter with built-in pulse generator (option)
- Operation system Windows 2000 or higher
- Recommended processor performance: 1.8 GHz
- Interface RS232 (COM-port)



## Pulse Generators (Option)

### Application

The Ritter™ Pulse Generators are rotary encoders with pulsed electronic output. They transfer the measured pulses, which are equivalent to the volume (litres) of measured gas; to a data acquisition system.

### Available versions

- V2.0 For ex-proof areas with inductive sensor, 50 P/Rev
- V3.2: 200 Pulses per Revolution
- V4.01: 2x200 P/Rev with forward / backward recognition
- V4.11: 500 P/Rev

## Digital Display Unit EDU 32 FP (Accessory)



Front view

### Application

The EDU 32 FP accessory is a microcomputer-controlled counter and display apparatus. It is designed to be used in conjunction with all RITTER™ Gas Meters equipped with a Pulse Generator. The EDU 32 FP counts and displays the absolute volume and flow rate of gases flowing through the RITTER™ meter.

It consists of a unit in a separate (desk top) casing with a two-line Text-LCD-Display. The EDU 32 FP is free-programmable and provides the user with a number of adjustment options.

### Features

- Large 2-line LCD Display
- Free-programmable functions: Gas Meter type, display language (English/German), etc.
- Display of:
  - measured **gas volume**
  - actual **flow rate**
  - programmed Gas Meter
- Interface **RS 232** for data transmission to PC
- Analogue **output:** 4 - 20 mA or 0 - 1 Volt
- Battery operation

### Technical Data

Power supply:	110 V / 60 Hz or 230 V / 50 Hz
Input:	Pulses from Pulse Generator
Digital Output:	Interface RS 232 Signal: ± 15 Volts Transmission rate: 9,600 Baud Data = 8 Bit, Parity = N, Stopbit = 1
Analog Output:	0 - 1 Volt or 4 - 20 mA
Dimensions:	155 x 200 x 120 mm
Weight:	1.4 kg
Temperature Range:	0°C to + 50°C



Rear view