

# ACCESSORIES

## PULSE GENERATOR V3.2-50 »SMART PG« • DATA-SHEET



### Quick reference

- > 50 pulses per revolution of measuring drum
- > For use with TG05 to TG50 and BG4 to BG100
- > Uni-directional
- > Not applicable for ex-proof areas

### Application

The Pulse Generator for RITTER Drum-type Gas Meters and Bellows-type Gas Meters is a rotary encoder for pulse output. It can be used to transfer the measured gas volume for remote display and/or data processing (calculation of flow rate, data transfer via RS232) to the Electronic Display Unit »EDU 32 FP« (accessory) or to an external measuring system / PC. In the latter case, the external system must provide the power supply (5-24 V) for the photo sensor as well as the evaluation circuit/logic which enables the direct readout of the measured volume and flow rate. For connection to an external system, please refer to the electrical data and wiring diagrams further down the page.

### Components

The Pulse Generator is located within the housing of the counter mechanism of the Gas Meter (behind the dial plate) and it consists of the following components:

- > Optical encoding film disc
- > mini board with integrated infrared photo sensor and LED operating indicator
- > round, 5-pin output socket (180°, DIN 41524)

### Description

The measuring drum of drum-type meters and the measuring unit of bellow-type meters are coupled 1:1 to the slit disc via a magnetic coupling. The slits/flags of the slit disc rotate through the U-shaped photo sensor, thereby interrupting the light beam of the photo diode intermittently. Thus, the photo interrupter converts the revolution of the measuring drum into a sequence of pulses. The number of pulses represents the **volume of gas** which has passed through the Gas Meter, depending on the respective resolution (see »Performance Data« table below). The frequency of the sequence of pulses is a measure of the rotational speed of the measuring drum and thereby a measure of the **flow rate** of the gas.

For operation of the photo sensor, an external electric power supply in the range of 5-24 Volts DC is required. More electrical data are stated on the »Electrical Data« table below. **The output signal is a TTL signal**, whereby the pulse level (= min./max. voltage of the signal) depends on the power supply:

- > Power Supply 5 V → Output Signal Level 0.7 / 3.7 Volt
- > Power Supply 24 V → Output Signal Level 2 / 21 Volt

For power supply values between 5 and 24 Volts, the output signal level can be linearly interpolated for the first approximation.

## Output Socket

The pin connection of the 5-pin output socket is shown under »Pin configuration of the Output Socket«.

## Sample circuit

The connection of a measurement instrument to the Pulse Generator is shown schematically under »Wiring diagram / sample circuit«.

## Use with Drum-type Gas Meters

Drum-type gas meters are volumetric gas meters. That means, that they are measuring gas volume precisely. When the Pulse Generator is used with drum-type gas meters for recording the gas flow, it is possible for the respective Voltage Output curve (line) to be wavy, even when gas flow is constant. This is (unpreventably) caused by the type of construction of the measuring drum: the drum consists of four separate chambers, which are closed and opened in sequence. The previous chamber **has to be** closed **before** the next chamber will open.

This compulsory measurement is the reason for the high measurement accuracy. However, each closing also causes a little build-up of pressure at the inside of a chamber. The surface tension creates an additional pressure increase during emerging of a chamber (water highest surface tension, oil: lower, CalRix lowest). The resulting pressure increase causes a small reduction in the rotational speed of the measuring drum. This is barely visible to the eye but is documented precisely by a computer/transcriber. Thus, the wavy output line at constant input flow documents the **true** flow through the gas meter.

## Performance Data

Gas Meter [Type]	Pulses per Revolution* [P/R]	Gas Flow per Revolution* [ltr/R]	Resolution [ltr/Pulse]	Pulses per Liter [Pulse/ltr]	Maximum Pulse Frequency [Pulse/min]
TG 01	not applicable				
TG 05	50	0.5	0.01	100	100
TG 1	50	1.0	0.02	50	100
TG 3	50	3.0	0.06	17	100
TG 5	50	5.0	0.1	10	100
TG 10	50	10	0.2	5	100
TG 20	50	20	0.4	3	117
TG 25	50	25	0.5	2	233
TG 50	50	50	1.0	1	300

BG 4	50	10	0.2	5	500
BG 6	50	20	0.3	3	417
BG 10	50	50	1	1	267
BG 16	50	100	2	1	208
BG 40	50	100	2	1	542
BG 100	50	100	2	1	1.333

\* TG types: Revolution of measuring drum  
( = revolution of large needle of dial plate)

BG types: Revolution of large needle of dial plate

## Temperature range

> 0 to +55°C

At higher temperatures the Pulse Generator must be cooled by flushing the counter mechanism casing with room air.

Necessary equipment: Optional connection nozzle at counter mechanism casing.

## Humidity range

> 0 to 65% relative humidity, **non-condensing**

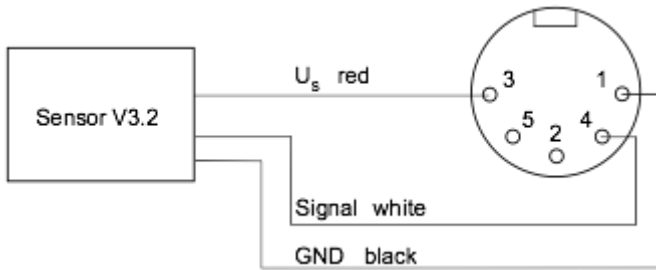
With a higher humidity, the circuit board of the Pulse Generator can be covered with a protective lacquer. Please indicate prior to order.

## Electrical Data

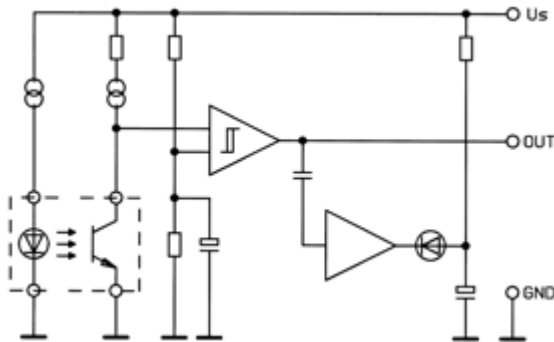
Supply Voltage $U_s$		5 – 24	V DC
Supply Current		< 3	mA
Voltage output $U_s = 5$ V:	high level	min. 3.7	V
	low level	max. 0.7	V
Voltage output $U_s = 24$ V:	high level	min. 21	V
	low level	max. 2	V
Current Output	Source	min. +7	mA
	Sink	min. -6	mA
Operating Frequency photo diode		0 – 250	Hz

## Pin configuration of the Output Socket

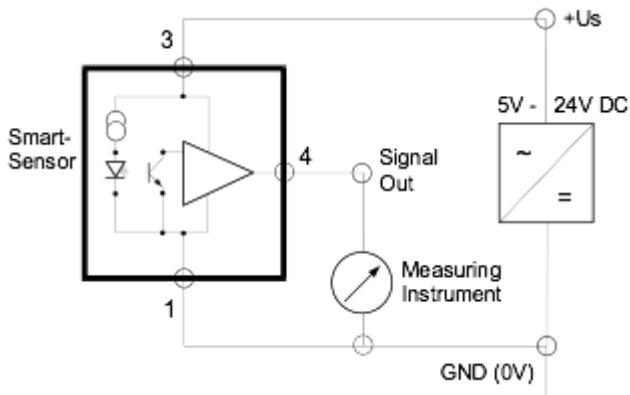
(View to **plug-side** of the socket)



### Circuit diagram



### Wiring diagram / sample circuit (schematic)

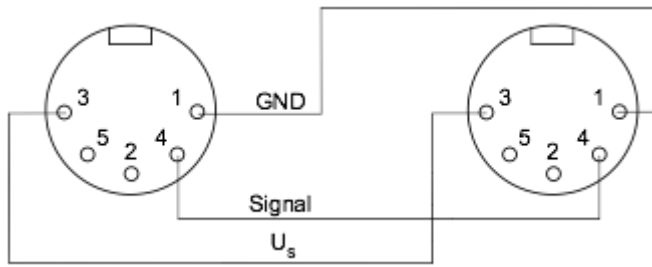


## Connection of the Pulse Generator to the Electronic Display Unit »EDU 32 FP« (optional accessory)

The Pulse Generator can be connected to the optional accessory »Electronic Display Unit« by means of the 3-pin connection cord, which is supplied in conjunction with the Electronic Display Unit. The Electronic Display Unit contains the power supply for the inductive sensor as well as the evaluation circuit/logic which enables the direct readout of the measured volume [ltr] and flow rate [ltr/h].

### Wiring of the Pulse Generator to the EDU socket

(view to **plug-side** of the sockets):



Pulse Generator Output / Socket EDU Input Socket

The measurement results displayed by the Electronic Display Unit can be transmitted to a computer via the standard-type interface RS 232 (please refer to the EDU Operation Instructions, paragraph 7.3 as well). Additionally, the value of the flow rate can be transmitted to an analog measurement device via the standard-type analog output (0-1 Volt or 4-20 mA).

#### Set-up of EDU:

- > Programming of sensor type: Select sensor type »PG V3.X«  
(please refer to the EDU Operation Instructions par. 6.2.4 as well)
- > Programming of slit disc / encoding disc: Select »50 Pulses/Rev«  
(please refer to the EDU Operation Instructions par. 6.2.5 as well)

## Dimensions of encoding disc

	TG05 to TG50 / BG [mm]
Diameter:	144
Slit width:	4.2
Flag width:	4.4

## Exchanging the spare parts kit »Complete Photo diode«

The kit consists of the following components which are already mounted on a transparent plastic cover plate:

- > Photo diode on a mini board
- > Fixture
- > Wiring
- > 5-pin socket

Removal of the built-in kit:

- > Remove the plug of the signal transmission cable from the socket of the pulse generator
- > Unscrew the 4 screws of the transparent cover plate
- > Remove the cover plate together with the built-in-kit

Replacement with the new kit:

- > Carefully mount the fork-shaped photo diode over the circumference of the folio disc without bending the disc.
- > Fasten the cover plate to the counter mechanism casing with the 4 screws. By way of the free play in the washer holes the photo diode can be positioned such that the folio disc can freely rotate through the middle of the fork-shaped photo diode. After that tighten the screws to fix the built-in-kit.

The most recent version of this data-sheet can be found at <https://www.ritter.de/en/data-sheets/pulse-generator-v3-2-50-smart-pg/>

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