

ACCESSORIES

PULSE GENERATOR V2.0-EX • DATA-SHEET




Quick reference

- > 50 pulses per revolution of measuring drum
- > For use with TG05 to TG50 and BG4 to BG100
- > Uni-directional
- > Applicable for ex-proof areas ⁽¹⁾

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 instrument (PC, transcriber). In the latter case, the external system must provide the power supply (5 - 25 V) for the 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.

 This explosion proof Pulse Generator is equipped with an inductive sensor for use in hazardous environments ⁽¹⁾ according categories ⁽²⁾ ATEX 1G and ATEX 2G. Approval No.: PTB 99 ATEX 2219 X, marking: II 1 G EEx ia IIC T6

For use in ex-proof areas an external intrinsic safety barrier has to be installed between Pulse Generator (gas meter) and the power supply (for example by the EDU) for galvanic decoupling. The intrinsic safety barrier must mandatorily be installed outside the EX zone.

For selection of the gas meter model to be used in ex-proof areas: See footnote.

Equipment

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

- > Slit disc
- > Sensor: inductive proximity switch with PTB/ATEX certificate
- > 3-pin ex-proof output socket

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 inductive sensor. Thus, the inductive sensor 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 **flowrate** of the gas.

For operation of the inductive sensor, an external electric power supply with 5 Volts DC is required. More electrical data are stated in the »Technical Data« table below. The output signal is a rectangular pulse, whereby the pulse level (= min./max. voltage of the signal) depends on the user-side circuit, i.e. the value of the used resistors.

Output Socket

The pin connection of the 3-pin output socket is shown under »Pin configuration of the Output Socket«.

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

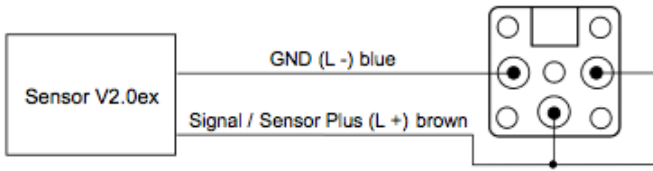
Gas Meter [Type]	Pulses per Revolution* [P/R]	Gas Flow per Revolution* [ltr/R]	Resolution [ltr/Pulse]	Pulses per Liter [Pulse/ltr]	Maximum Pulse Frequency [Pulse/min]
TG 01	not applicable				
TG 05	50	0.5	0.01	100	100
TG 1	50	1.0	0.02	50	100
TG 3	50	3.0	0.06	17	100
TG 5	50	5.0	0.1	10	100
TG 10	50	10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

Pin configuration of the Output Socket

(View to the (female) socket)



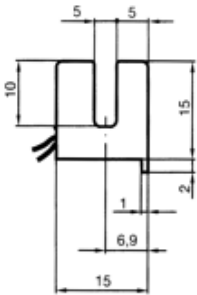
Temperature range

- > -25°C to +70°C
- > At higher temperatures the Pulse Generator can be cooled by flushing the counter mechanism casing with room air.
Necessary equipment: Optional connection nozzle at counter mechanism casing.

Dimensions of encoding disc:

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

Dimensions of Sensor



Standard symbol, connection



Technical Data

Slot width	5	mm
Entry depth	5 ... 7	mm
Nominal voltage	8	V
Operating voltage	5 - 25	V
Current consumption:		
Sensing face covered	≤ 1	mA
Sensing face free	≥ 3	mA
Switching frequency	0 ... 2000	Hz

Hysteresys	0.05 ... 0.65	mm
EMC to	EN 60947-5-2	
In compliance with	DIN EN 60947-5-6 (NAMUR)	
Protection to IEC 60529	IP67	
Operating temperature	-25 ... +100	°C
Connection	0.5 m, leads LIY	
Conductor cross section	0,14 mm ²	
Casing material	PBT	
Ex category	1G, 2G	

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

The EDU is not suitable for use in ex-proof areas and must therefore be positioned outside of the ex-proof area.

In this case the pulse generator must be connected to the EDU via an external intrinsic safety barrier for galvanic decoupling of the power supply (by the EDU).

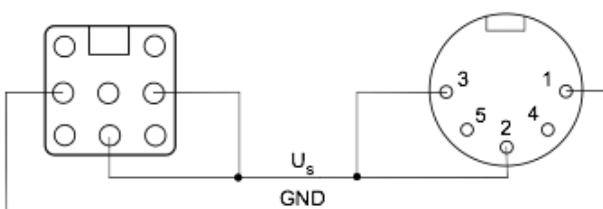
For programming of the EDU for this application please refer to the instructions in »Set-up of the EDU« below.

In case the gas meter is not positioned in an ex-proof area and/or shall be connected to the EDU for testing purposes only, the Pulse Generator can be connected to the EDU by means of the 3-pin connection cord, which is supplied in conjunction with the EDU.

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:

1. Gas meter is positioned inside of ex-proof area and connected to the EDU via an external switch amplifier for galvanic decoupling of the power supply (by the 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)

2. Gas meter is positioned outside of ex-proof area and connected to the EDU via the 3-pin connection cord, which is supplied in conjunction with the EDU:

Programming of sensor type: Select sensor type »PG **V2.0Ex**«

(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)

(1) Please note: According to European laws (EC directive 94/9/EC), a Declaration of Conformity (»ATEX« Declaration of Conformity) must be available for the gas meter, in which the Pulse Generator is built into, if and when the meter shall be used in ex-proof areas. This Declaration of Conformity is in preparation for the meter models made out of PE-el (model no. 8).

(2) Equivalence of categories and zones: category 1 = zone 0, category 2 = zone 1, category 3 = zone 2

»G« stands for »gas« (»D« for »dust«)

V 2.0ex / Rev. 2019-02-11 / Subject to alterations.

The most recent version of this data-sheet can be found at <https://www.ritter.de/en/data-sheets/pulse-generator-v2-0-ex/>

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