

# Magnetostrictive level gauge and densimeter SENS PMP-201

NPP SENSOR Datasheet LS 17.01



## Application

High-accuracy measurement of level, density, media interface level, temperature, volume and mass of petroleum products and LPG.

Main operating sites:

- Petrol stations, tank farms, refineries and other hazardous production sites requiring application of explosion-safety equipment;
- industrial automation systems of the food and chemical industries, municipal service.

## Features

- A broad list of design versions for various operational conditions and customer technical requirements.
- A large selection of cable shield mounting devices.
- A wide selection of the data output interfaces for the measured value: 4-20 mA (HART), RS-485 (Modbus RTU), SENS.
- Operational ranges:
  - temperature: from minus 50 to plus 60 °C;
  - pressure: up to 2.5 MPa (up to 10 MPa – on order);
  - medium density: from 500 to 1500 kg/m<sup>3</sup>;
  - guide length: up to 6000 mm.
- Liquid level measurement step: 1 mm.
- The PMP are suitable for creation of commercial accounting systems for petroleum products and LPG, which is evidenced by the certified mass measurement techniques.
- Ambient operational temperature range is from minus 50 to plus 100 °C.
- Measurement range up to 6 meters.



## Description

Measurement of liquid level is based on magnetostriction effect. Through the acoustic duct located inside the PMP guide, a current pulse is supplied, forming a magnetic field around the acoustic duct. At the location of the float with permanent magnet, an elastic deformation pulse occurs, which is going through acoustic duct with a constant speed. The PMP measures time intervals from the moment of formation of a current pulse in the acoustic duct until receiving of elastic deformation pulse from the float. The distance to place of crossing of acoustic duct with float magnetic field is defined as the value which is proportional to the time interval of flexible pulse distribution.

The media interface level measurement is similar to the liquid level measurement, using additional media interface float. The float is selected on the basis of densities of media which interface level is needed to be controlled.

Measuring of temperature is multi-point, realized with integrated temperature sensors placed regularly on the sensing element (max. 8 points). For determination of the average liquid temperature the indications of the temperature sensors located under the liquid surface are used, and vapors temperature is determined with the sensors located above the surface.

Liquid volume is determined in one of two ways:

1. using tank calibration table (the most precise) - the volume is calculated for the measured level by the table of correspondence between level and volume. Tank calibration table is uploaded into the PMP memory during manufacturing or operation;
2. using mathematical formulas (for tanks with simple geometry).

The density is determined by the immersion depth of the density float relative to the level float.

Mass calculation is carried out by multiplication of volume and average density. Applicable to LPG, the PMP also outputs the total of its liquid and vaporized states.

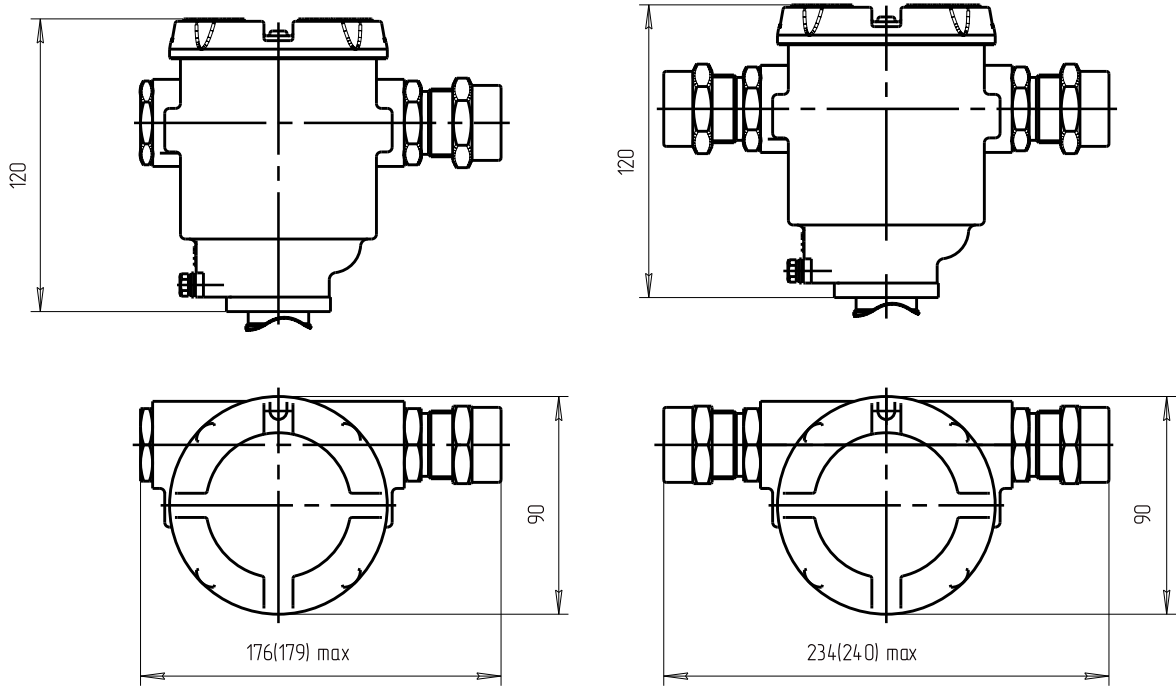
## Certification

Ex-EAC	CU RU C-RU.ГБ05.B.00333 CU RU C-RU.BH02.B.00001
Ex-ATEX	SENS PMP-201 MP 16 ATEX 0175 X II 1/2G Ex d IIB T6 Ga/Gb SENS PMP-201D MP 16 ATEX 0176 X II 1/2G Ex d IIB T6 Ga/Gb
ISO 9001-2015	RU228579Q-U
Quality management system	MP 16 ATEX 0187 QMS

## Main specifications

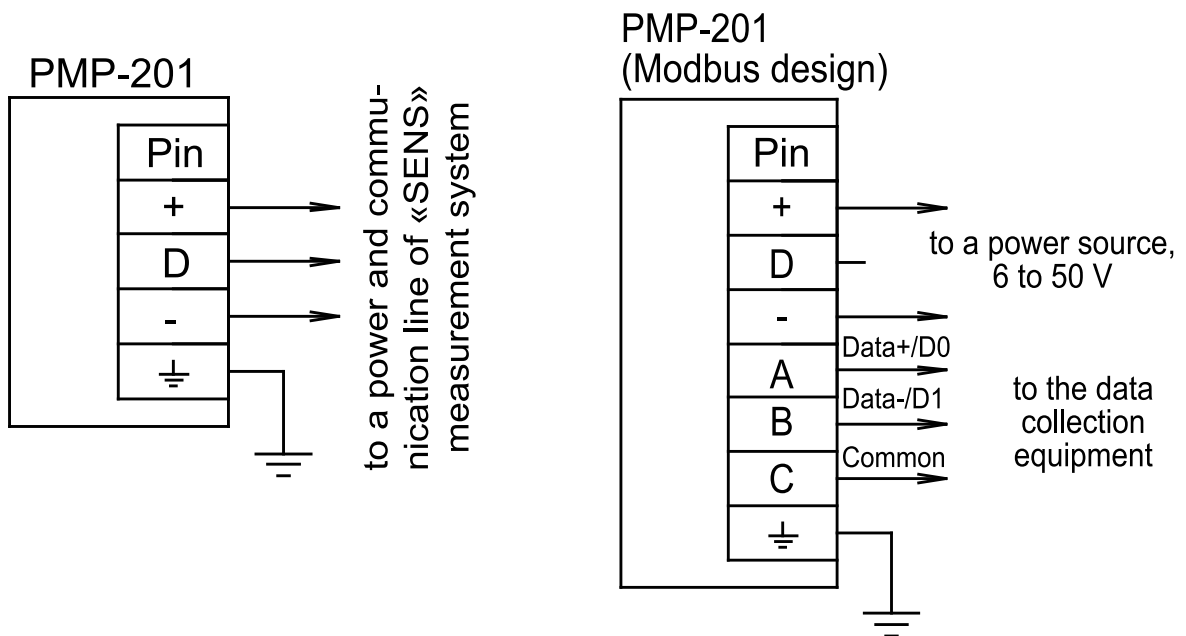
Length of guide, mm	from 500 to 6000
Lower / upper non-meterable areas, mm, not less than	25 / 15
The limits of accepted main inaccuracy for level measurement, mm	±1
Controlled medium temperature range, °C	from minus 50 to plus 60
Limits for accepted absolute inaccuracy for temperature measurement, °C	from ±0.5
Controlled medium density range, kg/m <sup>3</sup>	from 500 to 1500
Limits of absolute inaccuracy for density measurement, kg/m <sup>3</sup>	from ±1
Power supply voltage (Up), V	from 4 to 15 (from 6 to 50 for PMP with Modbus interface)
Power consumption, mW, not more than	200 (400 – for PMP with Modbus interface)
Pressure of controlled medium, MPa, not more than	2,5 (10 – on order)
Ambient temperature, °C	from -50 to +60
Ingress Protection Rating in accordance with GOST 14254	IP66
Climatic design under GOST 15150-96	UHL1 (within temperature range from -50 to +60 °C)
Explosion protection marking according with GOST 31610.26-2012 / IEC 60079-26:2006	Ga/Gb Ex d IIB T3
Mass, for reference	guide – 1 kg·m, Flange Dn50 – 3.5 kg, case – 1.5 kg
Mean time between failures, hours	50 000
Average lifetime, years	15

## General view, overall dimensions



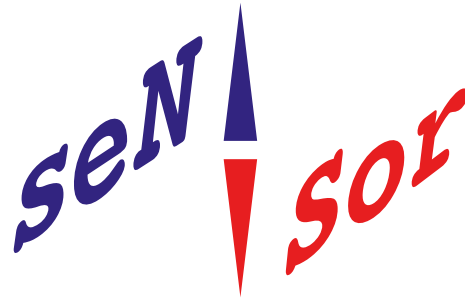
Overall dimensions are determined on the guide length

## Connection diagram



Connection diagram for the system using «SENS» protocol

Connection diagram for the system with Modbus protocol



## CONTACT INFORMATION

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