L-Dens 7400 Ex d Density Sensor

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Density Sensors

The L-Dens 7400 flame-proof enclosure (Ex d) density sensor combines an accuracy of 1 x 10^{-4} grams per cubic centimeter (g/cm^3) in a compact design. Continuous measurement of density, concentration, and API gravity optimizes production processes and ensures a consistently high-quality product. The small and compact design enables easy integration into measuring stations.

Features

- Compact design enables easy integration into measuring stations and skids
- First choice for fiscal density measurements with its high accuracy and stability
- Approved for use in hazardous areas

Applications

The L-Dens 7400 Ex d is used at refineries and production plants, as well as for storage, transport, and delivery of petroleum and biofuel products. It measures low-viscosity, non-corrosive fluids, such as the intermediate and end products of refineries, crude oil, liquefied petroleum gas (LPG), ethanol, biodiesel, and chemicals. The applications include:

- Online density measurement
- Mass flow rate determination in combination with a volumetric flow meter
- Product differentiation and phase separation
- Product blending
- Quality control for pipeline and product loading and unloading applications
- Fiscal measurements

Specifications

Dimensions

Overall: 241 x 142 x 211 millimeters (mm)

Inner diameter of oscillator: 6,3 mm

Material

Sensor housing material: Stainless steel

Wetted materials: Stainless steel 1.4404

Sealing: Fluoroelastomer (FKM) 80/840VI

Weight

The L-Dens 7400 weighs approximately 4.8 kilograms (kg).

Ambient Conditions

Ambient operating temperature: -40 to 70 °F (-40 to 158 °C)

Degree of protection: Ingress protection (IP66) and NEMA 4X

For hazardous areas:

- ATEX: Ex II 2G Ex db IIB T4/T5 Gb
- IECEx: Ex db IIB T4/T5 Gb
- CSA/UL/FM:
  - Class I, Division 1, Gr CD T4/T5
  - Ex db IIB T4/T5 Gb
  - Class I, Zone 1, AEx db IIB T4/T5 Gb

Process Connection Inline Adapter Set DN50/2"

Design: 12.7 mm pitot tubes with flange

- EN 1092-1 DN50 PN 16
- EN 1092-1 DN50 PN 40
- ANSI B16.5 2" CL150
- ANSI B16.5 2" CL300

O-ring seals material: FKM 80/VI 840

Wetted materials: 1.4404/AISI 316 L, FKM 80/VI 840

Accuracy and Operating Conditions

> **NOTE:** All specifications are valid for correct installation, constant measuring conditions, and vibration levels < 1e-3 $(m/s^2)^2/Hz$.

Density

Measuring range: Up to 3 grams (g) per cubic centimeter (cm^3)

Accuracy in the adjusted range: 1 x 10^{-4} g/cm^3

Repeatability: 2 x 10^{-5} g/cm^3

Temperature

Temperature range sample:

- T4: -40 to 125 °C (-40 to 257 °F)
- T5: -40 to 95 °C (-40 to 203 °F)

Temperature measurement: 2 x PT1000 integrated

Accuracy in the adjusted range: 0,1 °C

Factory Adjustment

Standard: -40 to 50 °C (-40 to 122 °F) without pressure adjustment

Pressure

> **NOTE:** **Note:** Consider the specifications of the process connection.

Pressure range: Maximum 50 bar (725 pound-force per square inch (psi))

Pressure influence: Approximately 0.000025 g/cm^3/bar

Recommended flow rate: 100 to 500 liters per hour (l/h)

Contamination: Particles must not exceed a size that is 1/10 of the diameter of the pipe

Electrical Connections

Sensor supply voltage: 24 volts direct current (VDC) (range 20 to 28.8 VDC)

> **NOTE:** The device has functional isolation for a maximum of DC 30 V. Protection against potentially hazardous touch current must be ensured by the customer in accordance with local regulations.

> **NOTE:** All inputs and outputs (including relay outputs) connected to Pico 3000 must comply with protective extra-low voltage (PELV) of EN 61140 or safety extra-low voltage (SELV) specification of EN 60950.

Frequency signal:

- Voltage of 12 to 26 VDC frequency density-dependent from 750-2000 hertz (Hz)
- Two-wire current loop with 2/20 milliampere (mA) passive interface supplied by flow computer
- Rectangular signal with duty cycle approximately 1:1 galvanically isolated, passive current output

Temperature measurement:

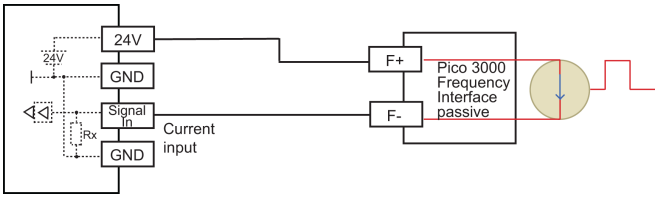
- Two times PT 1000 integrated
- Temperature signal with an active galvanically insulated 4 to 20 mA output

Electrical connection: Push-in spring connection

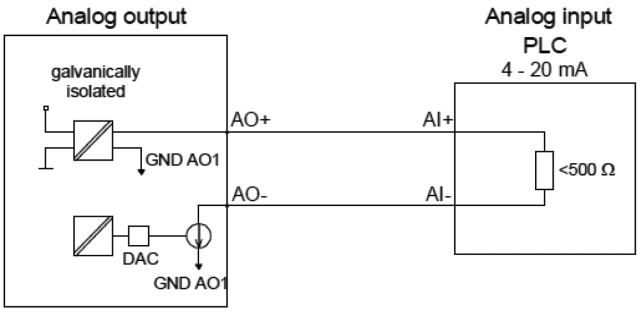
Cable gland thread of Ex housing: M 20x1.5, shielded or 1/2" - 1/4 NPT shielded

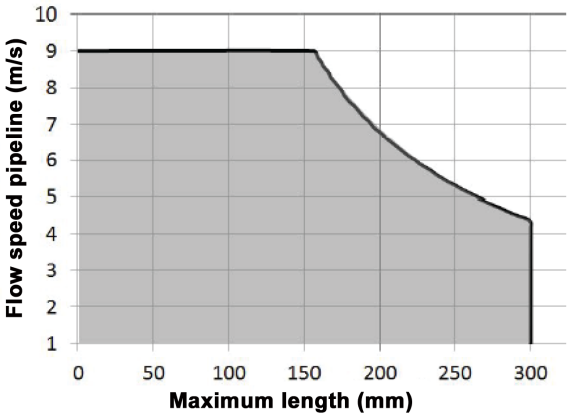
> **NOTE:** **Note:** The internal shunt resistance receive (Rx) must meet the following condition: R_x (V_{supply} -12 V)/20 mA

The following figure portrays a flow computer with internal power supply and current input.

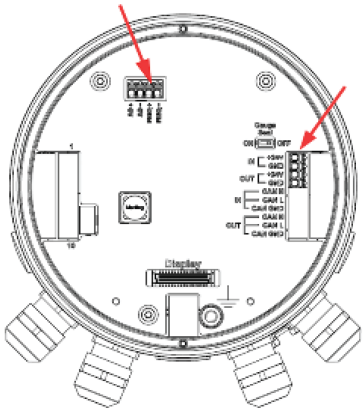


The following figure portrays the block diagram of an analog output.





Terminal Connections



Cable Terminal		Function	Connection
IN	+24 V	Supply voltage	DC +
	GND	Supply voltage	DC -
AO +		PT1000 interface	Measuring circuit
AO -		PT1000 interface	Measuring circuit
FREQ +		Frequency interface	Measuring circuit
FREQ -		Frequency interface	Measuring circuit

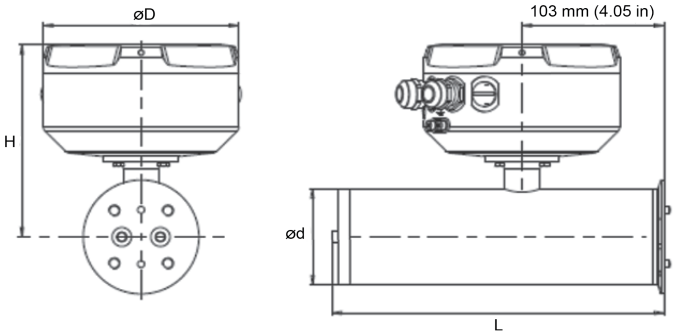
Flow Conditions

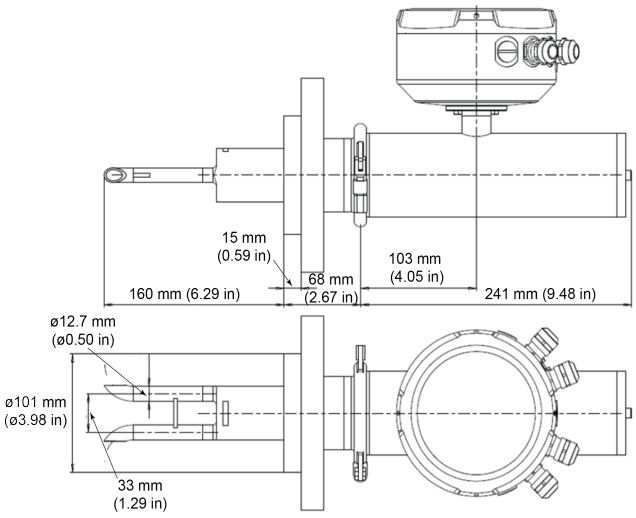
The recommended minimum flow speed in the main pipe depends on the viscosity of the fluid, whereas the maximum speed in the main line depends on the length of the pitot tubes.

Fluid Viscosity	Inline Adapter
η = 1 millipascal-second (mPa•s)	1.3 meters per second (m/s)
η = 5 mPa•s	1.6 m/s
η = 15 mPa•s	2.0 m/s

Dimensions

L-Dens 7400 Ex d	
Height (H)	163 mm (6.41 in)
Diameter (⌀D)	156 mm (6.14 in)
Length (L)	241 mm (9.48 in)





References

- E04IB001EN_H_LDens_7000_LCom_Exd_RefGuide
- E04IE035EN_I_DataSheet_L_Dens7000
- XDPIE142EN_K_DataSheet_L_Dens7000_L_Com_Adapter
- E22IB001EN_K_EN_Pico_3000_Ex_RefGuide

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