FMC Technologies

Densitometers

L-Dens 427F Ex Density Sensor

Specifications

Issue/Rev. 0.1 (2/12)

Bulletin SS04001E

*The **L-Dens 427F Ex Density Sensor** combines an accuracy of 1 x 10^{-4} g/cm³ 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 allows for easy integration into measuring stations, for example for mass flow rate measurement.*

Features

- **Easy to integrate** – The compact design allows for easy integration into measuring stations and skids
- **For fiscal measurements** – With its high accuracy and stability, L-Dens 427F Ex is the first choice for fiscal measurements
- **Flexible** – The L-Dens 427F Ex provides a hazardous area rating

Applications

L-Dens 427F Ex is used at refineries, production plants, storage, transport and delivery of petroleum and biofuel products. It measures all low-viscosity, non-corrosive fluids such as the intermediate and end products of refineries, crude oil, LPG, lubricants, ethanol, biodiesel and chemicals.

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

Material, Dimensions, and Weight

Inner diameter of oscillator	6.6 mm
Wetted materials	Hastelloy C276 Stainless steel 1.4571, 1.4404 Silver solder (Ag 54%/Cu 21%/Pd 25%)
Housing material	Stainless Steel
Dimensions	226 x 112 x 97,6 mm
Weight	approx. 3400 g

Ambient Conditions

Temperature range – ambient	-40 °C to +70 °C (T5: to +40 °C) (-40 °F to +158 °F (T5: to +104 °F))
Degree of protection	IP66, NEMA 4X
ATEX	EC type examination certificate according to 94/9/EG Ⓔx II 2 G Ex d IIC T4/5
FM	Class I, DIV 1, Groups A, B, C, D (US) Class I, DIV 1, Groups B, C, D (CA)

L-Dens 427F Ex Density Sensor

Connection Kit for Swagelok® 12 mm (included)

Design	Tube ending D = 12 mm, .5 inches suitable for Swagelok® fitting
Material o-ring seals	MFQ
Wetted materials	1.4571, 1.4404, MFQ
Pressure, max.	125 bar (1800 psi)

Accuracy and Operating Conditions

Density	
Measuring range	0 to 3 g/cm³
Accuracy in the adjusted range*	1 x 10^{-4} g/cm³
Repeatability*	2 x 10^{-5} g/cm³
Temperature	
Termperature range – sample	-40 °C to +125 °C (T5: to +70 °C) (-40 °F to 257 °F (T5: to +158 °F))
Temperature measurement	PT100 integrated (1/10 DIN IEC 751 KL.B)
Accuracy in the adjusted range*	Better 0,1 °C
Factory Adjustment	
Standard	-40 °C to +50 °C, (-40 °F to +122 °F), without pressure adjustment
Pressure ***Note: Consider the specification of the process connection.***	
Pressure range	0 to 125 bar (0 to 1800 psi)
Pressure influence	approx. 0.0001 g/cm³/bar
Flow Rate	100 to 500 L/h (recommended range)
Contamination	Particles must not exceed a size of 0.7 mm which is 1/10 of the diameter of the pipe
**** All specifications are valid for constant measuring conditions and correct installation.***	

Electrical Connections

Supply voltage**	DC 12 to 26 V
Frequency signal*	Frequency, density-dependent from 750 to 2000 Hz 2-wire current loop with 2/18 mA Rectangular signal with duty cycle approx. 1:1 Passive, grounded circuit (open collector)
Temperature measurement*,**	4-wire PT100 integrated 4-wire connection, temperature circuit Uimax = 10 V Temperature measuring signal Uimax = 5 V measuring current ≤ 1 mA PT 100 characteristics according to DIN IEC 751 1/10 DIN Class B, R0=100 Ω, A=3.9083E-3, B=-5.775E-7 Galvanically isolated: min. creepage path ≥ 0.5 mm
Electrical connection	Screw terminals
Cable glands (not included)	Recommended type ATEX: HSK-M-Ex-d NPT 1/2"
Cable (not included) Frequency interface (supply) PT 100 interface	Recommended cable type: LiYCY, diameter 7 to 12 mm Two cores twisted in pairs, screened, double insulation Insulation resistance/test voltage 4000Veff, 50/60 Hz Twin-core Four-wire

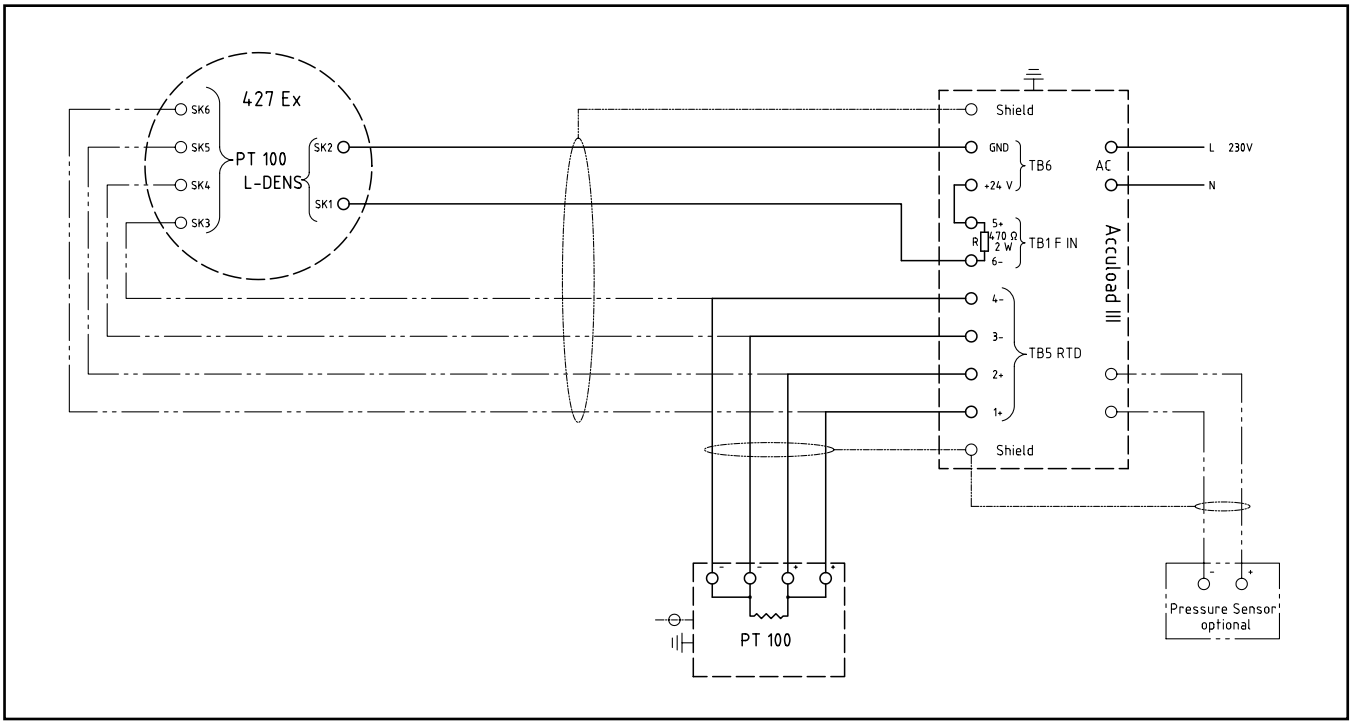
* *Linearization and temperature compensation in the connected evaluation unit/flow computer.*

** *The device has a functional insulation for DC 26V. Protection against potentially hazardous touch current has to be ensured by the customer in accordance with local regulations.*

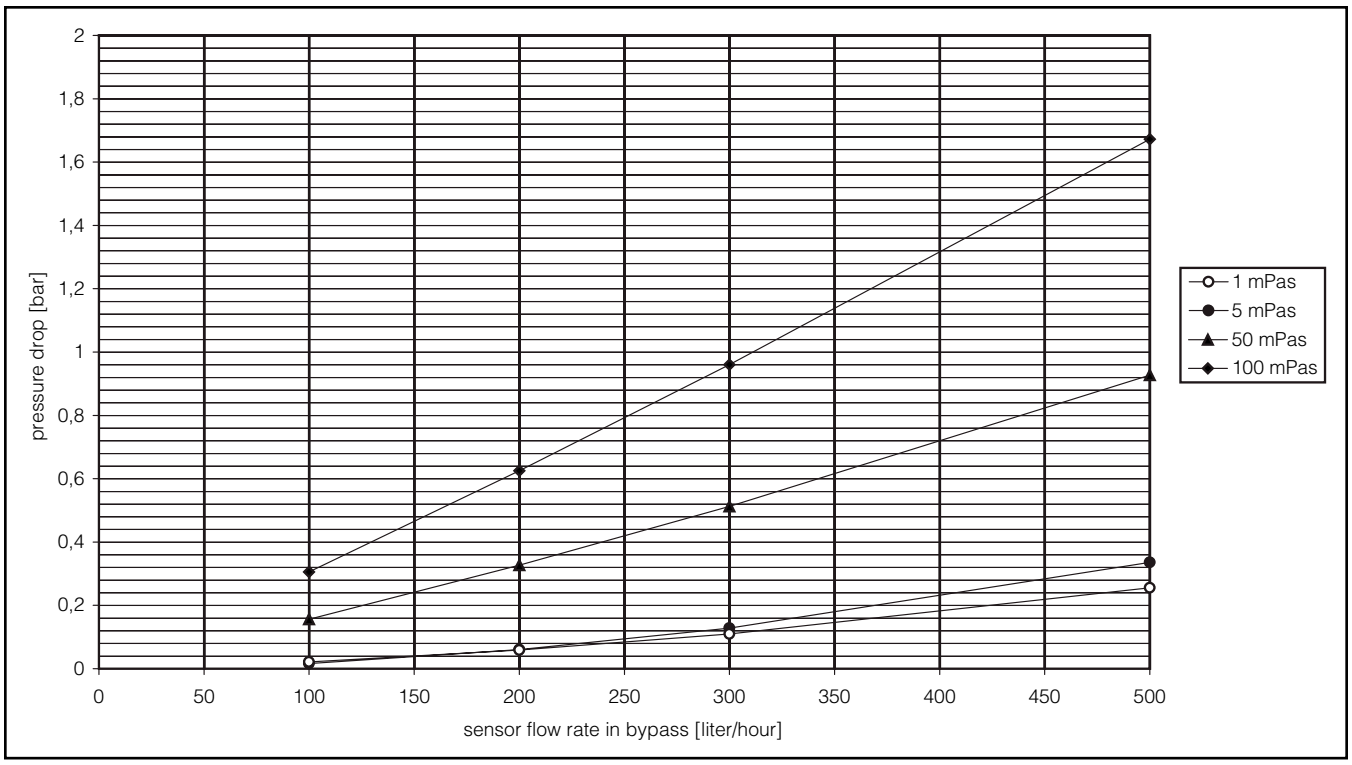
Terminal Connections

Cable terminal	Function	Connection
SK1	Supply voltage and frequency interface	DC +
SK2	Supply voltage and frequency interface	DC -
SK3	PT100 interface	Measuring circuit
SK4	PT100 interface	Measuring current
SK5	PT100 interface	Measuring circuits
SK6	PT100 interface	Measuring circuits

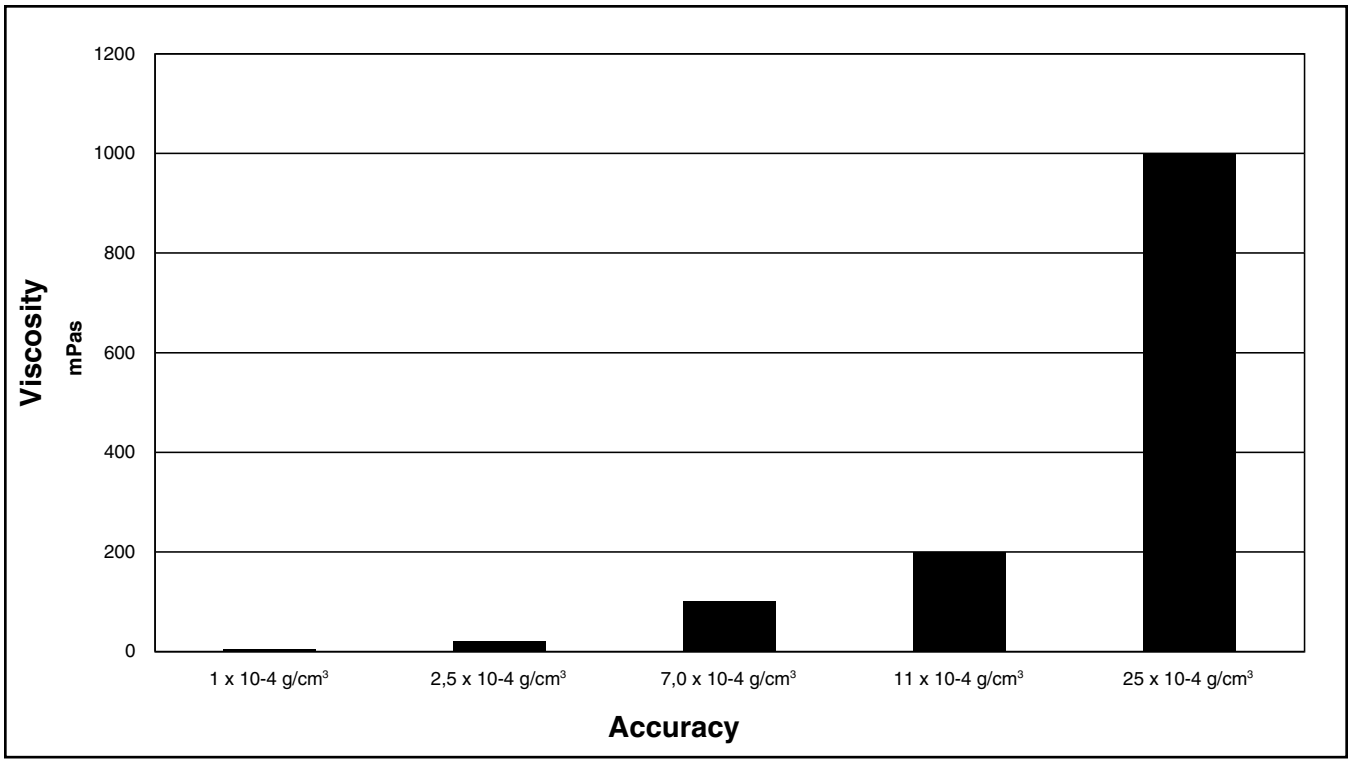
Electrical Wiring (Example)



Pressure Drop L-Dens 427 with Connection Kit 12 mm



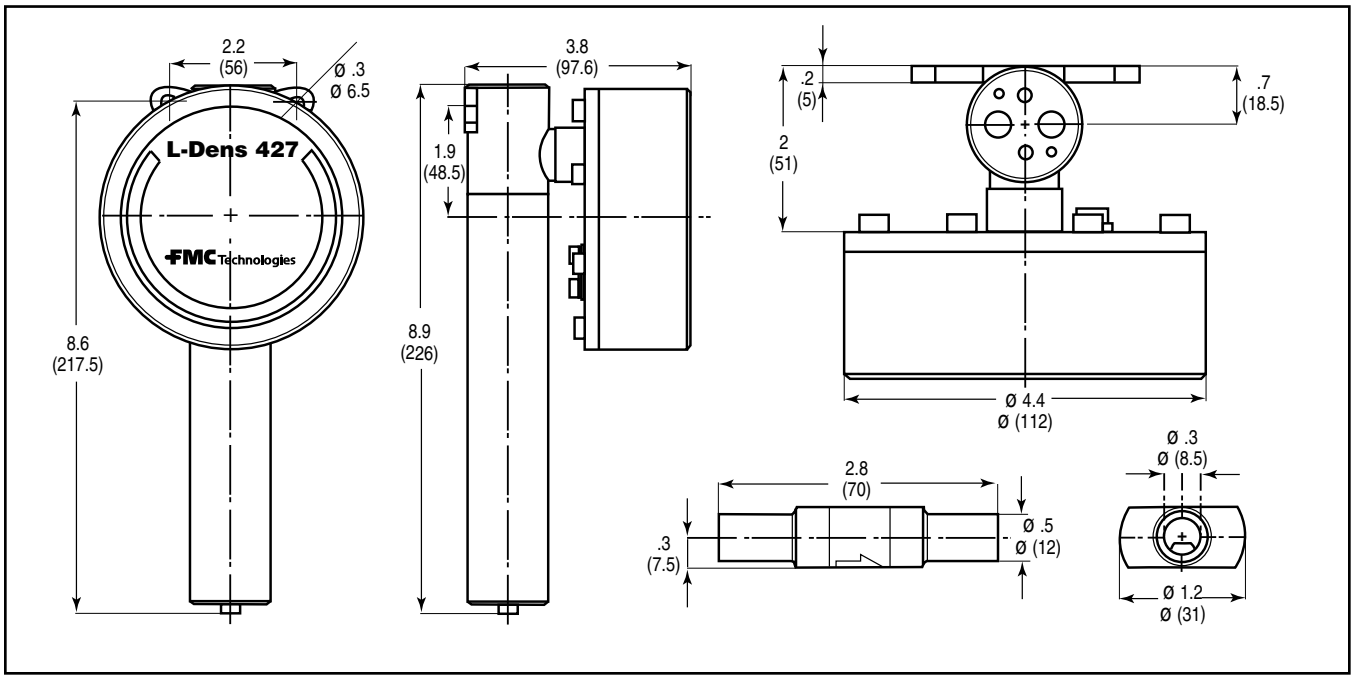
Accuracy effect through increased viscosity based on factory calibration (approximation)



Note: Insitu calibration can reduce or eliminate the effect caused by laminar conditions.

Dimensions

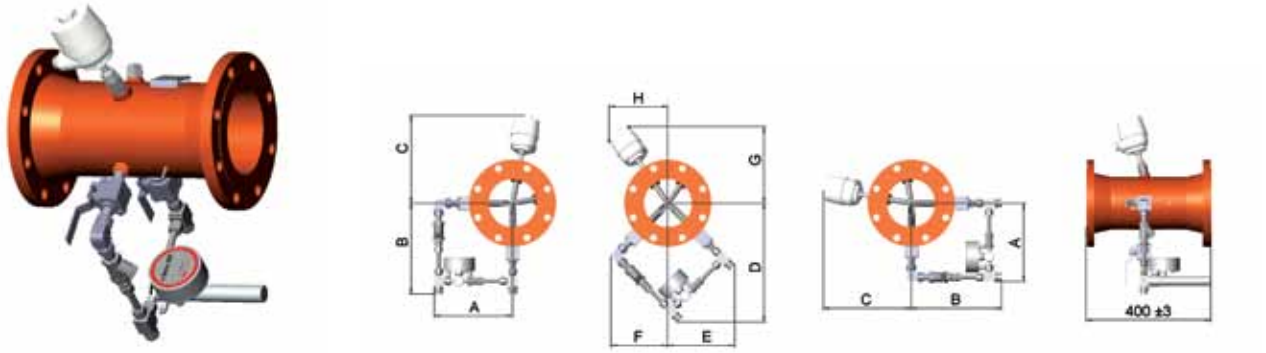
inches (mm)



Note: Dimensions – Inches to the nearest tenth (millimetres to the nearest whole mm), each independently dimensioned from respective engineering drawings.

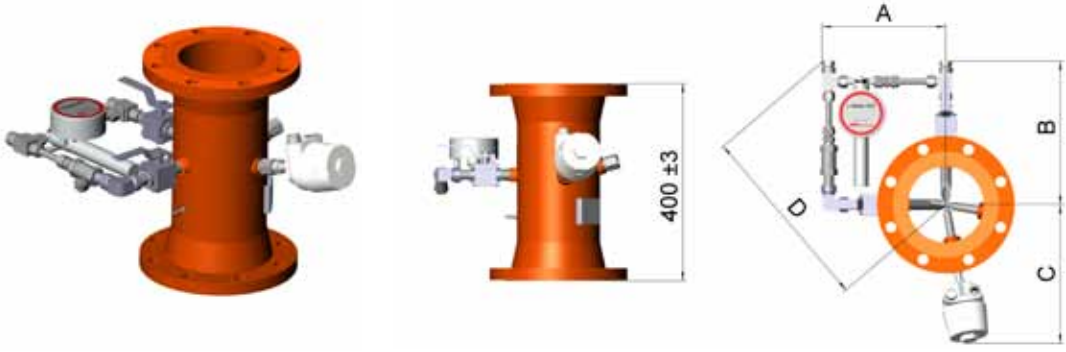
Installation Kit

Horizontal Installation*



** Installation must be within a 180° range underneath the horizontal line of the midpoint of the pipe*

Vertical Installation



Dimensions Installation Kit

*inches (mm)**

Size	A	B	C	D	E	F	G	H
4"	9.1 (230)	11.4 (290)	10.2 (260)	14.4 (365)	8.5 (215)	6.5 (165)	8.1 (205)	8.1 (205)
6"	10.0 (255)	11.4 (290)	11.2 (285)	15.2 (385)	8.5 (215)	7.3 (185)	9.7 (245)	7.5 (190)
8"	10.2 (260)	11.8 (300)	12.0 (305)	15.4 (390)	8.7 (220)	7.7 (195)	7.5 (280)	7.3 (185)
10"	11.4 (290)	12.6 (320)	12.8 (325)	16.3 (415)	6.5 (165)	10.2 (260)	13.0 (330)	4.5 (115)
12"	12.4 (315)	13.6 (345)	14.4 (365)	18.3 (465)	9.9 (250)	9.7 (245)	13.2 (335)	8.9 (225)
*All dimensions in inches (mm) with a tolerance of +.2 inches (+5 mm)								

Note: Dimensions – Inches to the nearest tenth (millimetres to the nearest whole mm), each independently dimensioned from respective engineering drawings.

Flange Pressure Ratings

Flange Pressure Sensor	Maximum Operating Pressure
PN 16 DIN	16 bar 232 psi
PN 25 DIN	25 bar 363 psi
PN 40 DIN	40 bar 580 psi
ANSI 150	19.7 bar 286 psi
ANSI 300	50 bar 725 psi
others	*consult factory*

Catalogue Code

	Sensor		Installation Kit						Description
	Function	Model	Pressure Group	Flanged			Mounting	Option	
K	D	A	2	0	4	A	H	T	Example
K									Catalogue Code
	D								Density
		A							Model Anton Paar OEM 427 Ex d with 12 mm Connection Kit
			2						PN16
			3						PN25 - ANSI 150
			4						PN40 - ANSI 300
				0	3	A			3" ANSI
				0	4	A			4" ANSI
				0	6	A			6" ANSI
				0	8	A			8" ANSI
				1	0	A			10" ANSI
				1	2	A			12" ANSI
				0	3	D			DN 80
				0	4	D			DN 100
				0	6	D			DN 150
				0	8	D			DN 200
				1	0	D			DN 150
				1	2	D			DN 300
							H		Horizontal Installation
							V		Vertical Installation
								T	Extra PT100 installed (TP-4, Probe with Junction Box and Well, TPW-4)

Reference: – Instructional Manual C77IB11C.fm – Anton Paar GmbH, 8054 Graz/Austria
– Ex Approval – Anton Paar GmbH, 8054 Graz/Austria

Revisions included in SS04001E Issue/Rev. 0.1 (2/12):
Page 1: Standard Factory Adjustment corrected from -10°C to -40°F
Stainless Steel corrected as Housing Material.

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