Solartron

7828 insertion density transmitter

Advantages of the 7828

- Fully integrated 'fit and forget' digital density measurement for monitoring and control
- Two direct analog (4-20mA) output of density, base density, or special calculation (% solids, °API, Specific Gravity, etc.)
- RS485/Modbus communications
- Low maintenance
- PC configuration tool for diagnostics and data logging

Description

The 7828 insertion density transmitter is a sensor for continuous real time measurement of fluid density in pipelines, open or closed tanks.

It can be used in process control where density is the primary control parameter for the end product, or as an indicator of some other quality control parameter such as % solids or % concentration.

Typical industries include:

- Oil and petrochemical
- Brewing
- Food
- Pharmaceutical
- Minerals processing (clays, carbonates, silicates, etc.)

Applications include:

- Interface detection in multi product pipelines
- Mass flow when used in conjunction with a volumetric flow meter
- Sugar refining (°Brix)
- Wort gravity
- Slurries
- Coatings
- Evaporator control
- Product mixing
- End point detection in batch reactions
- Solvent separation

Technical specification sheet
IP7828
November 2006

Density

Principle of operation

All Solartron liquid density transducers operate on the same general principle and can be likened to that of a mass spring system. When a mass on a spring is displaced and released it will oscillate at a natural frequency until it comes to a rest due to viscous damping. When a driving force is applied to the mass to overcome the effect of damping, the vibration is maintained in resonance.
As the measured product density changes, it in turn changes the vibrating mass of the density transducer, which is then detected by a change in the resonant frequency**.**

Features

Its features include a configured microprocessor-based electronic module which places the full signal conditioning, calculation and diagnostic facilities within the transmitter itself. Remote electronics are not required for signal processing.

The 7828 is **factory calibrated** and *no further calibration is necessary*. The calibration is traceable to **UK National Standards** through our UKAS approved laboratory.
It measures line density and temperature, and calculates base density using API tables or a matrix referral as well as parameters such as °API, °Brix, %solids, %mass, %volume and Specific Gravity (there is even a user-defined quadratic equation calculation available).

Any of these parameters can be used to drive the integral analog (4-20mA) outputs, enabling it to be used as the process variable in control applications, without the need for additional processing electronics.

All measurements are available digitally via the built-in RS485/Modbus communications interface, for integration into plant data systems.

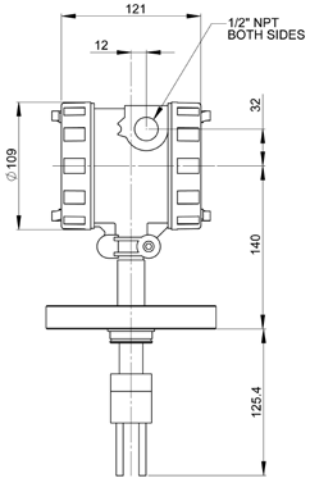
The design of the 7828 ensures accurate and reliable results. Maintenance is minimal, leading to lower overall operating costs.

Installation

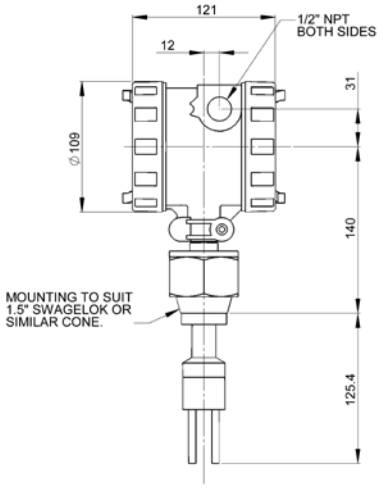
A variety of installation accessories can be provided, such as weldolets, for direct pipeline insertion, or flow-through chambers, which provide the optimum environment for the 7828.

Ask for brochure IP7004 for more details.

Flange connection details



Cone seat connection details



Density

Part number identification

Code	Product
7828	7828 Insertion density transmitter

Code	Material	Code	Material
A	316 Stainless steel, standard finish	E	Hastelloy C22, standard finish
C	316 Stainless steel, electro-polished	D	Hastelloy C22, electro-polished
F	316 Stainless steel, PTFE laminated tines	G	Hastelloy C22, PTFE laminated tines
V	304 Stainless steel, standard finish	H	Monel 400, standard finish
T	Titanium, standard finish	J	Monel 400, electro-polished tines
U	Hastelloy B2, standard finish	L	Monel 400, PTFE laminated tines
Z	Special: Use this letter code during quotation request		

Code	Amplifier system
C	Advanced: 4-20mA output, ATEX EEX d IIC T4, <200°C
D	Advanced: 4-20mA output, CSA Class 1 Div 1 Groups C&D, <200°C

Code	Amplifier housing
A	Aluminium alloy [T4 (-40°C < Ta < +110°C)]

Code	Process connections	Code	Process connections
A	2" ANSI 150 RF	J	2" Ladish triclamp (Hygienic)
B	2" ANSI 300 RF	K	3" Ladish triclamp (Hygienic)
C	2" ANSI 600 RF	L	2" IDF (Hygienic)
D	2" ANSI 900 RF	M	3" IDF (Hygienic)
F	2" ANSI 1500 RF	N	1.5" Cone seat compression fitting
G	50 mm DIN 2527 DN 50/PN 40		
H	50 mm DIN 2527 RF DN 50/PN 100		
R	50 mm DIN 2527 DN 50/PN 16		
Z	Special: Use this letter code during quotation request		

Code	Stem length
A	0 mm : no stem extension and with standard spigot
Z	Special: Use this letter code during quotation request

Code	Default configuration 4-20mA output #1*
A	API Degrees (Americas)
B	Base density to API tables (metric configuration)
C	Line density only
D	General process including matrix (user data required)
Z	Special

Code	Calibration type
L	Density at 20°C
Z	Special

Code	Calibration boundary	Code	Calibration boundary
A	Free stream		
B	2" schedule 40 boundary		
C	3" schedule 40 boundary		
D	2" schedule 80 boundary		
E	3" schedule 80 boundary		
F	2" hygienic	G	3" hygienic
Z	Special: Use this letter code during quotation request		

Code	Factory set
B	Factory set option

Code	Traceability
A	None
X	Certificates of material traceability

*Analog output #2 default setting : Temperature

Density

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Diagnostic tool

ADView is a software package provided by enabling you to:

- Configure our density and viscosity transmitters.
- View and save data from them.
- Check that they are functioning correctly.

ADView is installed on a PC and interacts with the 7828 insertion density transmitter through one of the PC's standard serial (RS-232) ports.

ADView provides many useful facilities, such as:

- Setting up serial link to communicate with the 7828 insertion density transmitter.
- Configuring the 7828 insertion density transmitter.
- Displaying data in real time, or as a graph.
- Logging data to a file.
- Verifying correct operation of the system, and diagnosing faults.
- Loading or storing Modbus register values.
- Read/write to individual Modbus registers.

Specification

Density operating range:	0 - 3g/cc (0 - 3000kg/m^3) (0-187.4 lb/ft^3)
Calibrated range:	0.6 - 1.25g/cc (600-1250kg/m^3) (38.5-80.25 lb/ft^3)
Accuracy:	±0.001g/cc (±1.0kg/m^3) (±0.06 lb/ft^3)
Repeatability:	±0.0001g/cc (±0.1kg/m^3) (±0.006 lb/ft^3)
Temperature range: Process Ambient	 -50°C to +200°C (-60°F to +392°F) -40°C to +85°C (-40°F to +185°F)
Pressure range (max working)	207bar (3000psi)
Viscosity range:	up to 20,000cP
Temperature sensor (integral):	PT100 BS1904 Class B, DIN 43760 Class B
4-20mA analog outputs: Controlled by: Accuracy: Repeatability:	Isolated, not self-powered Any user-selected parameter ±0.1% reading, ±0.05%FS @20°C (68°F) ±0.05%FS over range -40°C to +85°C(-40°F to +185°F)
RS485 Interface:	9600baud, Modbus (Modicon) RTU
Electrical connection	Screw terminal, cable entry to suit 1/2" NPT gland (20mm adaptor available)
Environment:	IP66
Power Supply:	20 to 28Vdc, 35-45mA
Wetted materials:	Stainless Steel, Hastelloy, Monel, Titanium
Tine finish:	Standard, PTFE coated or Electro-polished
Connections:	ANSI 150 to 600RF; DIN 50 PN40 and PN100 1.5" compression; IDF and RJT hygienic
Approvals:	ATEX II 2G EEx d IIC T4 CSA Class 1, Division 1, Group C & D T4 EMC: EN61326

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