

# Solartron 7828 insertion density transmitter

## the complete density solution

Data sheet  
IP7828

The 7828 digital density transmitter is a 4-20mA transmitting fork sensor for online continuous measurement of fluid density in pipe lines and open or closed tanks. It features “on-node” configured microprocessor-based electronic package which places the full signal conditioning, calculation and diagnostic facilities within the transmitter itself. Remote electronics are not required for signal processing. The 7828 density transmitter is now available for top mounting in open or closed tanks as a long stem version with stem lengths of up to 4000mm.

**Factory calibrated and programmed, the 7828 delivers on-line results within minutes!**

The 7828 operates with fluid viscosities of up to 20,000cP, a significant advantage over other similar devices.

7828 measures line density and line temperature, and calculates base density (using API or Matrix referral) and 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 analog (4-20mA) output, 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 7828, together with an expanding range of installation techniques and accessories, ensure accurate and reliable results, even in the presence of gas or solid contaminants. Maintenance is minimal, leading to lower overall operating costs. ADView is Solartron's powerful Windows-based data logging and remote diagnostics tool, which also provides facilities for re-configuring the transmitter if required.

### Installation

Solartron can provide a variety of installation accessories, 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.

### Application areas

Density monitoring and control for:

- ▶ Interface detection
- ▶ Solvent separation
- ▶ Brewing
- ▶ China clay slurries
- ▶ Evaporator control
- ▶ Food product mixing
- ▶ Polymer addition control
- ▶ Pipeline installations
- ▶ Open tank
- ▶ Pressurised closed tanks

- ▶ Fully integrated ‘fit and forget’ digital density measurement for monitoring and control
- ▶ Direct analog (4-20mA) output of density, base density, or special calculation (% solids, °API, Specific Gravity, etc.)
- ▶ RS485/Modbus communications
- ▶ On-node configured
- ▶ PC configuration tool for diagnostics and data logging



Ordering information for standard forks (valid from June 2003)

7828	Fork type digital density transmitter 4-20mA output (for stand alone use)										
Code		Materials of construction									
A	316 Stainless Steel	316 Stainless steel tines	Standard finish								
C	316 Stainless Steel	316 stainless steel tines	Electro-polished								
F	316 stainless steel	316 stainless steel tines	PTFE laminated tines								
V	304 stainless Steel	304 Stainless steel tines	Standard finish								
E	Hastelloy C22	Hastelloy C22 tines	Standard finish								
D	Hastelloy C22	Hastelloy C22 tines	Electro-polished								
G	Hastelloy C22	Hastelloy C22 tines	PTFE laminated tines								
U	Hastelloy B2	Hastelloy B2 tines	Standard finish								
H	Monel 400	Monel 400 tines	Standard finish								
J	Monel 400	Monel 400 tines	Electro-polished tines								
L	Monel 400	Monel 400 tines	PTFE laminated tines								
T	Titanium	Titanium tines	Standard finish								
Z	Special: Use this letter code during quotation request.										
Code		Amplifier system									
C	ADVanced: 4-20mA output ATEX II 2G EEx d IIC T4 (Std. Fork, <200°C / 392°F)										
D	ADVanced: 4-20mA output CSA Class 1 Div 1 Groups C&D (Std. Fork, <200°C / 392°F)										
Code		Amplifier Housing									
A	Alloy (cast)										
Code		Process Connections									
A	2" ANSI 150 RF										
B	2" ANSI 300 RF										
C	2" ANSI 600 RF										
D	2" ANSI 900 RF										
G	50 mm DIN 2527 RF DN 50/PN 40										
H	50 mm DIN 2527 RF DN 50/PN 100										
R	50 mm DIN 2527 RF DN 50/PN 16										
J	2" Ladish Triclamp (Hygienic)										
K	3" Ladish Triclamp (Hygienic)										
L	2" IDF (Hygienic)										
M	3" IDF (Hygienic)										
N	1.5" Cone seat compression fitting										
Z	Special: Use this letter code during quotation request.										
Code		Stem length (nominal length)									
A	0 mm : no stem extension and with standard spigot										
Z	Special: Use this letter code during quotation request.										
Code		Default configuration (Amplifier outputs)									
A	API Deg (US)										
B	API Base Density (UK)										
C	Line Density										
D	Matrix										
Z	Special: Use this letter for any special configuration.										
Code		Calibration type									
L	Density at 20 °C / 68°F										
M	Density at 20 °C / 68°F with "Q" correction										
Z	Special: Use this letter for any special configuration.										
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 for any special configuration										
Code		Reserved									
B	Default setting										
Code		Traceability									
A	None										
X	Certificates of material traceability										
7828	A	C	A	A	A	A	L	A	B	A	Typical ordering code
	5	6	7	8	9	10	11	12	13	14	



Refer to factory for "Q" correction option details

**Ordering information for long stem forks (valid from June 2003)**



7828	Fork type digital density transmitter 4-20mA output (for stand alone use)										
Code	Materials of construction										
A	316 Stainless Steel, 316 Stainless steel tines, standard finish										
C	316 Stainless Steel, 316 stainless steel tines, Electro-polished										
F	316 stainless steel, 316 stainless steel tines, PTFE laminated tines										
Z	Special: Use this letter code during quotation request.										
Code	Amplifier system										
W	Safe Area: Advanced 4-20mA (long stem, <200°C / 392°F)										
K	ADVanced: 4-20mA output ATEX II 1/2G EEx d IIC T4 (long stem, <160°C / 320°F)										
L	ADVanced: 4-20mA output CSA Class 1 Div 1 Groups C&D (long stem, <160°C / 320°F)										
P	ADVanced: 4-20mA output ATEX II 1/2G EEx d IIC T4 (long stem, <100°C / 212°F)										
R	ADVanced: 4-20mA output CSA Class 1 Div 1 Groups C&D (long stem, <100°C / 212°F)										
Code	Amplifier housing										
A	Alloy (cast)										
Code	Process connections										
A	2" ANSI 150 RF										
B	2" ANSI 300 RF										
C	2" ANSI 600 RF										
D	2" ANSI 900 RF										
G	50 mm DIN 2527 RF DN 50/PN 40										
H	50 mm DIN 2527 RF DN 50/PN 100										
R	50 mm DIN 2527 RF DN 50/PN 16										
T	No Connectors (for open tank long stem forks)										
Z	Special: Use this letter code during quotation request.										
Code	Stem length (nominal length)										
C	500 mm / 20" with removable transit cover										
D	750 mm / 30" with removable transit cover										
E	1000 mm / 40" with removable transit cover										
F	1500 mm / 60" with removable transit cover										
G	2000 mm / 80" with removable transit cover										
H	3000 mm / 120" with removable transit cover										
J	4000 mm / 160" with removable transit cover										
Z	Special: Use this letter code during quotation request.										
Code	Default configuration (Amplifier outputs)										
A	API Deg (US)										
B	API Base Density (UK)										
C	Line Density										
D	Matrix										
Z	Special: Use this letter for any special configuration.										
Code	Calibration type										
L	Density at 20 °C / 68°F										
M	Density at 20 °C / 68°F with "Q" correction										
Z	Special: Use this letter for any special configuration.										
Code	Calibration boundary										
A	A: Free stream										
Z	Z: Special: Use for any special configuration										
Code	Unused										
B	Default										
Code	Traceability										
A	None										
X	Certificates of material traceability										
7828	A	W	A	A	C	A	L	A	B	A	Typical ordering information
	5	6	7	8	9	10	11	12	13	14	

Refer to factory for "Q" correction option details

## Configuration

Windows based ADView from Solartron Mobrey allows the 7828 to be re-configured using the RS485 communications if desired. ADView provides full diagnostic access to all measured and calculated parameters, and allows the storage of the unique sensor configuration to disc.

Data logging of parameters is possible including logging several transmitters linked together by multi-drop communications.



## Specification

Density operating range:	0 to 3g/cc (0 - 3000kg/m <sup>3</sup> ) / 0 - 187.4 lb/ft <sup>3</sup>
Calibrated range:	0.6 to 1.25g/cc (600 - 1250kg/m <sup>3</sup> ) / 38.5 - 80.25 lb/ft <sup>3</sup>
Accuracy:	±0.001g/cc (±1.0kg/m <sup>3</sup> ) / ±0.06 lb/ft <sup>3</sup>
Repeatability:	±0.0001g/cc (±0.1kg/m <sup>3</sup> ) ±0.006 lb/ft <sup>3</sup>
Temperature range	
Process**	-50°C to +200°C / -60°F to +392°F
Ambient	-40°C to +85°C / -40°F to +185°F
Electronics surface	-20°C to +110°C / -4°F to +230°F (ATEX)***
Pressure range	207bar / 3000psi (max working)

\*\* NOTE: Where ATEX is required the process temperature is further limited for long stem variants to -20°C to +100°C or +160°C / -4°F to +212°F or 230°F according to long stem option chosen.

Viscosity range:	up to 20,000cP
Temperature sensor (integral):	PT100 BS1904 Class B, DIN 43760 Class B
4-20mA analog output:	Isolated, not self-powered
Controlled by:	Any user-selected parameter
Accuracy:	±0.1% reading, ±0.05%FS @20°C / 68°F
Repeatability:	±0.05%FS over range -40°C to +85°C / -40°F to +185°F
RS485 Interface:	9600baud, Modbus (Modicon)
Environment:	IP66
Power Supply:	20 to 28Vdc, 35-45mA
Wetted materials:	Stainless steel, Hastelloy C22 or Monel 400
Tine finish:	Standard, PTFE coated or Electropolished
Connections:	ANSI 150 to 1500RF; 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:	EN50081-2, EN50082-2 (Industrial)

\* Long stem: ATEX II 1/2G EEx d IIC T4 (Pending)

\*\*\* -40°C to +110°C / -40°F to + 230°F on application. Consult sales office.

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