

# Solartron 7828 Long Stem Density Transmitter the complete density solution

Data sheet IP7828L

### Advantages of the 7828

- 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
- Low maintenance
- PC configuration tool for diagnostics and data logging



### Description

The 7828 long stem density transmitter is a sensor for continuous real time measurement of fluid density in open or closed tanks. It has been designed specifically for tank applications where top entry only is possible. Stem lengths of up to 4000mm are available.

The 7828 long stem density transmitter is a further development of our successful 7828 Insertion Density Transmitter. 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:

- Wort gravity
- Slurries
- % alcohol
- Coatings
- Evaporator control
- Product mixing
- End point detection in batch reactions
- Solvent separation

### Principle of operation

All Solartron Mobrey 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 long stem is **factory calibrated** and *no further calibration is necessary*. The calibration is traceable to **UK National Standards** through Solartron Mobrey's own UKAS approved laboratory. The 7828 long stem operates with fluid viscosities of up to 20,000cP, making is suitable to measure wide range of liquids.

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, % olume 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) 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 the 7828 ensures accurate and reliable results. Maintenance is minimal, leading to lower overall operating costs.

### Installation

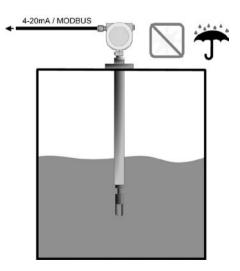
### **Open-tank installation**

For open-tank installations, the 7828 long stem is clamped to structure. The position of the clamp determines the insertion depth.

# 4-20mA / MODBUS

### **Closed-tank installation**

For closed-tank installations, the 7828 long stem is clamped to structure. The position of the clamp determines the insertion depth.



# Part Number Identification

7828 Lo Code	ng Stem													
Code	uct 8 Long Stem Density Transmitter													
oouc	Material													
А		tainless Steel with standard finish												
С		inless Steel, Electro-polished												
F		16 stainless Steel, PTFE laminated tines												
Z	Special													
	Code	Amplifier System												
	W					output - Safe Area only (<200°C)								
	ĸ												< +110°C)]	
			le											
						-								
							Connectio	ne						
								115						
				G				DN 5	0/PI	N 40				
				Н	50	mm [	DIN 2527	RF D	N 50	D/PN 100				
				R	50	mm [	DIN 2527	DN 5	0/PI	N 16				
	T No connectors (for open tanks)													
				Z										
						de								
							2000 mm (with removable transit cover)							
							Code	Defa	ault	Configurat	ion (Ampl	lifier Ou	tputs)	
							А							
							В	Base	e de	nsity to AF	PI tables (	metric o	configuration)	
							С		Line Density only					
						Process in	cluding N	latrix (ι	iser data require					
							Z							
L Der														
						-								
								2		· ·	Calibrat	ion Por	Indony	
													indary	
												Culli		
										-		Facto	ry Set Option	
											В		ry set option	
												Code	Traceability	
												А	None	
												Х	Certificates	
													of material	
↓	$\checkmark$	_ ↓	,	. ↓		↓	$\checkmark$	•	,	$\checkmark$	$\checkmark$	↓		
Δ	W	Δ		Δ		C	Δ			Δ	R	Δ	(Typical Code)	
	A	K	K Adv Coc A C	K Advances Code A C	K Advanced 4-200 Code Ampl A Alum C Stain Code A B C G H R T Z	K       Advanced 4-20mA out         Code       Amplifier Ho         A       Aluminium a         C       Stainless state         Code       Pro         A       2"         B       2"         G       50         H       50         R       50         T       No         Z       Spi         Code       F         G       H         J       Z         Spi       Code         H       J         Z       Spi         K       H         J       Z         Spi       Code         H       J         Z       Spi         Code       F         G       H         J       Z	K       Advanced 4-20mA output -         Code       Amplifier Housing         A       Aluminium alloy         C       Stainless steel         Code       Process         A       2" ANSI         C       2" ANSI         C       2" ANSI         G       50 mm         H       50 mm         R       50 mm         T       No conn         Z       Special         Code       C         Code       C         B       2" ANSI         G       50 mm         H       50 mm         T       No conn         Z       Special         Code       C         D       E         F       G         G       H         J       Z	K       Advanced 4-20mA output - ATEX EEX         Code       Amplifier Housing         A       Aluminium alloy         C       Stainless steel         Code         Process Connectio         A       2" ANSI 150 RF         B       2" ANSI 300 RF         C       2" ANSI 600 RF         G       50 mm DIN 2527         H       50 mm DIN 2527         R       50 mm DIN 2507         No connectors (for Z       Special         Code       X         J       4000 m         J       4000 m         J       4000 m         J       Code         A       B         C       D         D       Z	K       Advanced 4-20mA output - ATEX EEX d IIC         Code       Amplifier Housing         A       Aluminium alloy         C       Stainless steel         Code       Process Connections         A       2" ANSI 150 RF         B       2" ANSI 300 RF         C       2" ANSI 300 RF         C       2" ANSI 600 RF         G       50 mm DIN 2527 DN 5         H       50 mm DIN 2527 DN 5         T       No connectors (for open Z         Z       Special         Code       Stem Length (         C       500 mm (with E         J       4000 mm (with E         J       4000 mm (with G         Z       Special         Code       Defail         A       API         B       Bas         C       Line         D       Gen         Z       Special	K       Advanced 4-20mA output - ATEX EEX d IIC T4         Code       Amplifier Housing         A       Aluminium alloy         C       Stainless steel         Code       Process Connections         A       2" ANSI 150 RF         B       2" ANSI 600 RF         C       2" ANSI 600 RF         G       50 mm DIN 2527 DN 50/PI         H       50 mm DIN 2527 DN 50/PI         T       No connectors (for open tan)         Z       Special         Code       Stem Length (nom         Z       Special         Code       Stem Length (nom         C       500 mm (with re         D       750 mm (with re         D       750 mm (with re         G       2000 mm (with re         J       4000 mm (with re         J       4000 mm (with re         J       4000 mm (with re         Z       Special         Code       Default         A       API Deg         B       Base de         C       Line Dei         D       General         Z       Special	K       Advanced 4-20mA output - ATEX EEX d IIC T4 (<150°C)	K       Advanced 4-20mA output - ATEX EEX d IIC T4 (<150°C) [T4 (-40°	K       Advanced 4-20mA output - ATEX EEX d IIC T4 (<150°C) [T4 (-40°C < Ta -	

# **Diagnostic Tool**

ADView is a software package provided by Solartron Mobrey to enable you to:

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

ADView is installed on a PC and interacts with the 7828 long

### Specification

stem 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 long stem density transmitter.
- Configuring the 7828 long stem density transmitter.
- D Displaying data in real time, or as a graph.
- Logging data to a file. Þ
- Verifying correct operation of the system, and diagnosing faults.
- Loading or storing Modbus register values.
- Read/write to individual Modbus registers.

Density operating range:	0 - 3g/cc (0 - 3000kg/m <sup>3</sup> ) (0-187.4 lb/ft <sup>3</sup> )								
Calibrated range:	0.6 - 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)								
Pressure range (max working)	100bar (1450psi)								
Viscosity range:	up to 20.000cP								
Temperature sensor (integral):									
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)								
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								
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								
	EMC EN50081-2, EN50082-2 (Industrial)								

\*\* NOTE: Where ATEX is required the process temperature is further limited to  $-40^{\circ}$ C to  $+150^{\circ}$ C /  $-4^{\circ}$ F to  $+302^{\circ}$ F.

China

Polska

Sverige

France

Belgium

**Solartron Mobrey Limited** 

158 Edinburgh Avenue Slough Berks UK SL1 4UE Tel: 01753 756600 Fax: 01753 823589 e-mail: sales@solartron.com www.solartronmobrey.com

Solartron Mobrey GmbH Solartron Mobrey Ltd Solartron Mobrey sp z o o Solartron Mobrey AB Solartron Mobrey SA Solartron Mobrey SA-NV

Solartron Mobrey

19408 Park Row, Suite 320, Houston TX 77084 USA Tel: 281 398 7890 Fax: 281 398 7891 e-mail: sales@solartron.com www.solartronusa.com

Deutschland tel: 0211/99 808-0 tel: 021 6353 5652 tel: 022 871 7865 tel: 08-725 01 00 tel: 01.30.17.40.80 tel: 02/465 3879





The right is reserved to amend details given in this publication without notice

# IP7828L Aug 04