Model 278 UGC Vibrating Densitometer Vibrating Densitometer for Pipeline and Process Measurement

Features and Benefits

- Continuous on-line density measurement
- No moving parts; accurate and reliable
- Provides input for mass flow calculations
- Small and compact
- Excellent repeatability and longterm stability
- Designed to meet code for Class I, Division 1, Groups C and D, for hazardous locations with proper use and operation
- Measurements made at operating conditions
- Model 278 CSA approved
- Easily installed and maintained
- Outstanding dependability
- Durable

Description

For more than 20 years, the Chandler Densitometer has been used by major pipelines and other industries. It was developed primarily for extremely accurate fluid metering (custody transfer), plus many other applications, such as pipeline interface detection, blending, process control, etc. The frequency output of the Chandler Vibrating Densitometer is compatible with most flow computers. The Vibrating Densitometers are rugged and accurate and designed to meet the most demanding applications found in pipeline and process measurement. The vibrating element is manufactured from Ni-Span C, a nickel-ironchromium alloy with additions of aluminum and titanium, for excellent long-term stability under the most difficult conditions. For corrosive applications, other materials are available.

Operation

The Vibrating Densitometer is composed of two tubes and end pieces forming a mechanical resonant system. The tubes are maintained in oscillation at resonant frequency by an electronic amplifier that uses a piezoelectric driver and pickup elements in a feedback arrangement. The Densitometer is installed with scoops in such a manner that a sample of the fluid from the pipeline is diverted through the two tubes — flowing up through the first tube and down

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$Du = K_0 + (K_1 \times T) + (K_2 \times T_2)$

Where: Du = Density, in gr/cc, uncorrected for pressure or temperature; and T = Period(microseconds). K0, K1 and K2 are determined at calibration by measuring the period of oscillation with three liquids of known density and solving three simultaneous equations for the coefficients.



Specifications

Accuracy:

- 1. +/- .0002 gr/cc max. from .3 to .5 gr/cc;
 - +/- .0125 from 18.7 to 31 lb/ft3
- 2. +/- .0004 gr/cc max. from .5 to 1.0 gr/cc;
 - +/- .025 from 31 to 62 lb/ft3
- 3. +/- .0005 gr/cc max. from 1.0 to 1.6 gr/cc;
 - +/- .031 from 62 to 100 lb/ft3

Repeatability:

- 1. +/- .0001 gr/cc max. for .3 to 1.0 gr/cc density range;
 - +/- .0062 from 18.7 to 62 lb/ft3
- 2. +/- .0002 max. for 1.0 to 1.6 gr/cc density range;
 - +/- .0125 from 62 to 100 lb/ft3

Calibrated Density Range:

.3 - 1.0 gr/cc (300 to 1000 kg/m3) (18.7 to 62.43 lb/ft3)

Optional: To 1.6 gr/cc (1600 kg/m3) (100 lb/ft3)

Temperature Range:

-40 to 85°C (-40 to 185°F)

Process Connections:

3/4" FNPT. Specify pipeline size for optional scoops.

Recommended Flow Rate: Minimum 5.7 LPM (1.5 GPM)

Maximum Working Pressure:

FP27800 (Ni-Span C) 4000 PSI (276 BARS)

FP27800 (SS) 3200 PSI (220 BARS)

FP27800 (Hastelloy) 3200 PSI (220 BARS)

Power Requirements:

15 to 36 VDC (24 VDC ± 8 VDC @ 35 mA)



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One of a family of innovative process analyzer solutions from AMETEK Process Instruments. Specifications subject to change without notice.

Output Signal:

The open collector output (referenced to power supply common) is capable of sinking up to one Amp of current (35 mA is nominal). Typical frequency range from 1 KHz - 2 KHz. Pull-up resistor is required when used with typical flow computers.

Safety Approval:

Canadian Standards Association (CSA) approved for Class I, Div 1, Groups C&D

Size: 100mm round, 460mm long (4" x 18 1/8")

Manifold: Model 278: 203mm x 50mm x 50mm (8" x 2" x 2")

Shipping Weight: 25 lb (11 kg)

Wetted Parts:

Ni-Span C Tubes; 304 stainless steel manifold; Viton O-rings.

Standard Cover:

NEMA 4, alodine-coated and powder-coated aluminum.

Options

- Stainless steel or Hastelloy C wetted parts for corrosive liquids.
- Kalrez O-rings for corrosive liquids.
- BUNA O-rings for liquid CO2 applications.
- NEMA 4X stainless steel cover.

Model 303 Signal Linearizer

This optional microprocessor converter provides accurate calculation of density or mass flow. It linearizes the Densitometer's frequency output and converts it to a standard 4-20 mA analog signal proportional to corrected density. Setup and calibration data is stored in nonvolatile memory in the EEPROM. Setup parameters are accessible using Microsoft Windows' HyperTerminal[™], Symantec's ProComm Plus[™] or other terminal emulation software using the RS-232 port and personal computer. There is an LCD display for monitoring density in selectable density units. It calculates mass flow with flow meter input and product density at flowing condition, corrected 60°F per API 23 A/B, or MAPCO TP-16 for natural gas liquids.

Power Requirements: 18 to 36 VDC, 0.5 A

Temperature Range: 0 to 50°C (32 to 122°F)

Frequency Input: 1 densitometer

Turbine Meter Frequency Input: 5000 Hz max @ 10 mA min.

Input/Output Signals:

One 4-20 mA analog output; 700 Ohms max loop resistance.

Two 4-20 mA analog inputs for temperature and pressure transmitters.

Four 24 VDC 100 mA outputs activated by selected density ranges.

Three 24 VDC 100 mA alarm outputs; Loss of Signal or Outof-Range; Microprocessor Fail; Temperature/Pressure Out-of-Range.

Selectable Density Units:

gm/cm3, kg/m3, lb/ft3, lb/Gal, lb/ LLB, degrees API, SGU

RTD Input: 100 Ohms, 3-wire Enclosure: NEMA 4 or NEMA 7

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