Technical specification sheet
IP7829, Rev. C
November 2007

Micro Motion
7829 Visconic Viscosity Meter

Description
The 7829 Visconic viscosity meter is an accurate measurement instrument for continuous real time process control of liquid viscosity and density in pipelines, open sample loops and closed tanks.

It can be used for measurements where viscosity or 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.

As part of its unique and rugged design the 7829 directly measures both dynamic viscosity and density, allowing a true measurement of kinematic viscosity which is the preferred parameter in many industries.

Advantages of the 7829 Visconic
- Fully integrated 'fit and forget' digital viscosity and density measurement for monitoring and control
- Two direct analog (4-20mA) outputs of viscosity and density, base density, or special calculation (% solids, °API, Specific Gravity, etc.)
- RS485/Modbus communications
- Low maintenance
- PC configuration tool for diagnostics and data logging

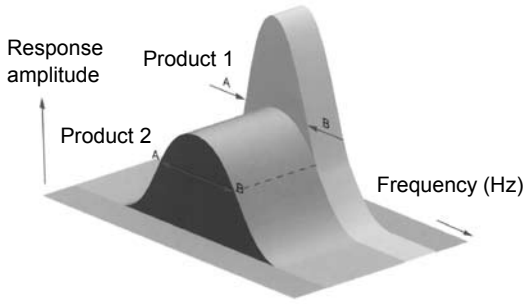
Applications include:
- Interface detection in multi product pipelines
- Mass flow when used in conjunction with a volumetric flow meter
- Sugar refining (°Brix)
- Wort gravity
- Slurries
- Coatings
- Evaporator control
- Product mixing
- End point detection in batch reactions
- Solvent separation

Principle of Operation
The sensor is a simple tuning fork maintained in vibration electronically. The density is a function of the resonant frequency, the viscosity is a function of the bandwidth.

7829 digitally measures the frequency at a point A (the lower -3db point) and then at point B (the upper -3db point) - see diagram. From these two measurements the on-board electronics can calculate the bandwidth (B-A), resonant frequency ((A+B)/2) and hence the Quality Factor (Resonant Frequency/Bandwidth), to give digitally determined values of the density and viscosity of the fluid.

$$Q = \frac{\text{Resonant Frequency}}{\text{Bandwidth}}$$

$$Q \propto \frac{1}{\sqrt{\text{Viscosity}}}$$



Product 1: Low viscosity
Product 2: High viscosity

Micro Motion®

EMERSON™
Process Management

Ordering information for standard forks

7829	Visconic viscosity transmitter		
Code	**Materials of construction**		
A	316 Stainless steel	316 Stainless steel tines	Standard finish
E	Hastelloy C22	Hastelloy C22 tines	Standard finish
H	Monel 400	Monel 400 tines	Standard finish
V	304 Stainless steel	304 Stainless steel tines	Standard finish
T	Titanium	Titanium tines	Standard finish
U	Hastelloy B2	Hastelloy B2 tines	Standard finish
C	316 Stainless steel	316 Stainless steel tines	Electro-polished
D	Hastelloy C22	Hastelloy C22 tines	Electro-polished
F	316 Stainless steel	316 Stainless steel tines	PTFE laminated tines
J	Monel 400	Monel 400 tines	Electro-polished tines
G	Hastelloy C22	Hastelloy C22 tines	PTFE laminated tines
L	Monel 400	Monel 400 tines	PTFE laminated tines
Z	Special		

Code	Amplifier system
C	Advanced: 4-20mA output ATEX II 2 G 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
Z	Special

Code	Process connections		
A	2" ANSI 150 RF	B	2" ANSI 300 RF
C	2" ANSI 600 RF		
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		
K	3" Ladish Triclamp (Hygienic)		
M	3" IDF (Hygienic)		
N	1.5" Cone Seat Compression Fitting		
Z	Special		

Code	Stem length (nominal length)
A	0 mm : no stem extension and with standard spigot

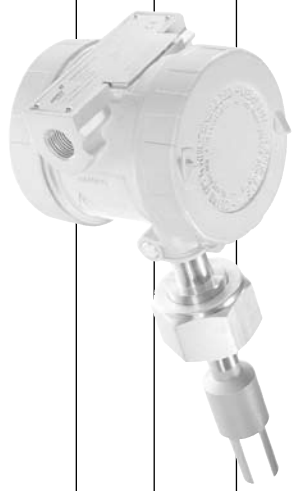
Code	Default configuration 4-20mA output # / *
H	0-25cst
J	0-50cst
E	0-100cst
K	0-500cst
F	0-1000cst
Z	Special

Code	Calibration type
B	0.5 to 100cP
F	10-1000cP
Z	Special

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
G	3" Hygienic
Z	Special

Code	Reserved
B	Default

Code	Traceability
A	None
X	Certificates of material traceability



7829	A	C	A	A	A	H	B	A	B	A	Typical ordering information

* Analog output # Default setting: temperature

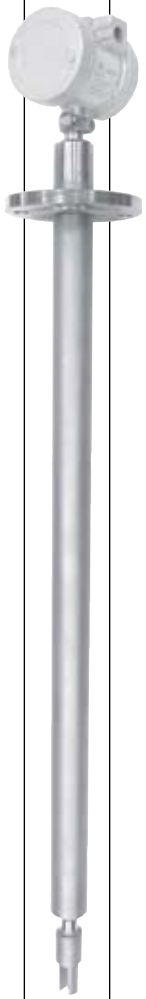
Ordering information for long stem forks

7829	Long stem Visconic viscosity transmitter

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

Code	Amplifier system
W	Safe Area: Advanced 4-20mA (long stem, <200°C / 392°F)
K	Advanced: 4-20mA output ATEX II 1/2 G EEX d IIC T4 (<150°C / 302°F)
L	Advanced: 4-20mA output CSA Class 1 Division 1 Group C & D, <160°C / 320°F
Z	Special

Code	Amplifier housing
A	Alloy (cast)
C	Stainless steel



Code	Process connections
A	2" ANSI 150 RF
B	2" ANSI 300 RF
C	2" ANSI 600 RF
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
T	No Connectors (open tank) - safe area only
Z	Special

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

Code	Default configuration (Amplifier outputs)
H	0-25cSt
J	0-50cSt
E	0-100cSt
K	0-500cSt
F	0-1000cSt
Z	Special

Code	Calibration type
B	0.5 to 100cP
F	10-1000cP
Z	Special

Code	Calibration boundary
A	Free Stream
Z	Special

Code	Reserved
B	Default

Code	Traceability
A	None
X	Certs. of material traceability

7829	A	W	A	A	C	H	B	A	B	A	Typical ordering information

Viscosity

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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 7829 Visconic viscosity meter 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 7829 Visconic viscosity meter.
- Configuring the 7829 Visconic viscosity meter.
- 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.

Performance

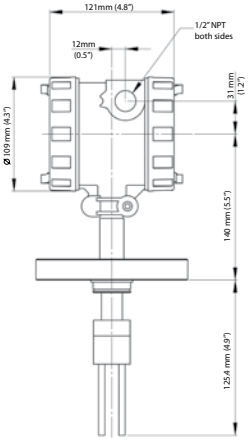
Viscosity calibrated ranges	0.5 - 100cP, 10 to 1000cP
Viscosity accuracy	±1%span (±0.2cP in 0-10cP range)
Viscosity repeatability	±0.5% of reading

Specification

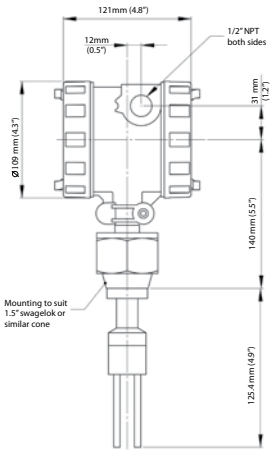
Density operating range:	0 - 3g/cc (0 - 3000kg/m^3) (0-187.4 lb/ft^3)
Calibrated range:	0.6 - 1.25g/cc (600-1250kg/m^3) (38.5-80.25 lb/ft^3)
Accuracy:	±0.001g/cc (±1.0kg/m^3) (±0.06 lb/ft^3)
Repeatability:	±0.0001g/cc (±0.1kg/m^3) (±0.006 lb/ft^3)
Temp. range: Process Ambient	-50°C to +200°C (-60°F to +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 ½" NPT gland (20mm / 0.8" 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, Div 1, Group C & D T4 EMC: EN61326

Dimensions

Flange connection details



Cone seat connection details



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