ViscoTron VP-1000

Viscosity transducers for process installations

Your process viscosity measurement solution

- Torsionally vibrating sensor, no wearing parts
- Low operating cost, no cooling required
- Rugged, virtually no maintenance
- Laser welded construction
- Proven technology
- Small dimensions

Viscotronics Co., Ltd.

VP-1000

The ViscoTron sensor series VP-1000 has been developed employing experience gained over more than 30 years of applying, developing and manufacturing torsional motion viscometers.

Laser welded construction allows the series VP-1000 sensors to be manufactured to exacting standards and competitive prices. Laser welding also eliminates extra processing steps, which are required after traditional welding, thus providing a stable measurement.

The series VP-1000 is available in versions to measure low, medium or high viscosities. Sensors can be constructed for pressures up to 5 MPa (725 psi) and temperatures up to 300˚C (570˚F). The systems are checked for functionality and optionally factory calibrated using Newtonian traceable fluids.

The viscometer torsionally displaces the sensor bulb. The drag on the twisting motion is a measure of the viscosity. Speed, direction and turbulence of flow have no influence on the measurement.

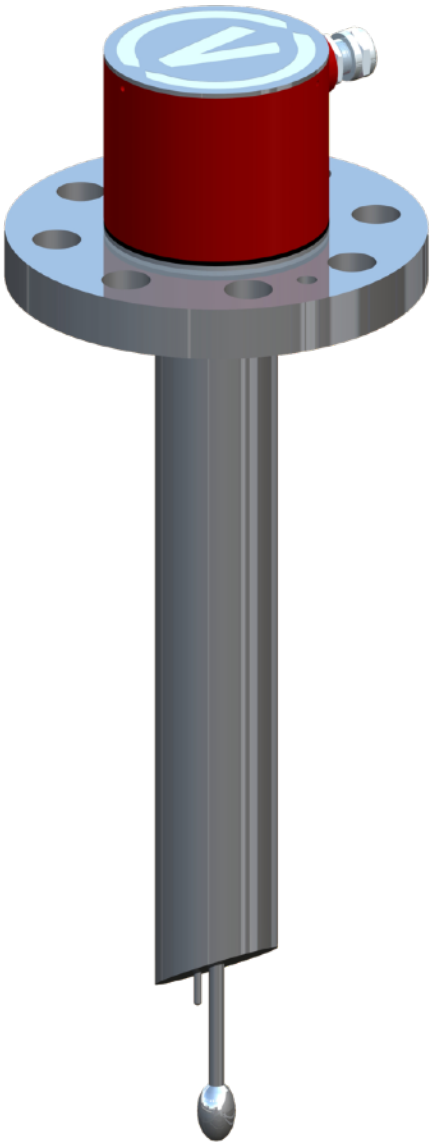
The resonant frequency is dependent on the mechanical construction of the sensor and typically between 120 and 400 Hz for the VP-1000. The microscopic motion is fast enough to be separated from outside mechanical vibrations, yet low enough to provide excellent sensitivity and resolution for newtonian and non-newtonian fluids.

Air cooling the sensor housing is not required. Eliminating air cooling lowers operating cost and eliminates temperature variations at the sensor bulb, which can result from air cooling the housing.

A PT1000 temperature probe can optionally be installed extending from the Flange, non-active extension or internal to the sensor.

ViscoTron series VP-1000 sensors are available as a general purpose version and as an intrinsically safe version for hazardous areas.

ViscoTron VT-IRFT transmitters measure the natural resonance response of the sensor. The measured power of the Fourier transform at the resonant frequency is equivalent to the viscosity. Using the FFT method, external mechanical vibrations at other frequencies, which could effect the measurement are eliminated at the source.



VP-1000M/3-LTE-S9-90N-111
For low pressure applications

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VP-1000 Specifications

Description	VP-1000L	VP-1000M	VP-1000H	VP-1000X
Measurement range (mPa·s x g/cm³)	**0.0 to 1,000**	**0 to 10,000**	**0 to 100,000**	**0 to 1,000,000**
	The measurement ranges indicated above are a guide only, the final range capability is dependent on pressure requirements, sensor dimensions and other design factors.			
Calibration	Functionality checks are performed at low and high end of the measurement range. Cable lenght independent factory calibration with Newtonian fluids is available for up to 3 decades within the measurement range. Thus the calibrated range can be matched to the customer requirements. See the configuration page for more details.			
Repeatability	0.5%			
Accuracy	1% or ±1 digit, whichever is greater (factory calibrated with NIST standards)			
Resonant frequency **Shear rate**	Typically 120 to 400 Hz (dependent on final design) Typically between 750 and 2,500 sec^{-1} (dependent on final design)			
Sensor length	60 to 140 mm, dependent on range and installation requirements			
Maximum process temperatures with external transmitter	LTE MTE STE	< 85°C / 185°F < 175°C / 350°F < 300°C / 570°F	no riser Includes 65 mm riser Includes 125 mm riser	
Maximum process temperatures with internal transmitter	LTI MTI	< 85°C / 185°F < 130°C / 270°F	Includes 65 mm riser Includes 95 mm riser	
Housing	IP65			
Wetted parts	SUS316 (standard) Optionally PTFE or equivalent low friction, corrosion resistant coating up to 150°C Optionally other materials and coatings are available			
Process connection	Process connections according to installation requirements (maximum pressure capability of sensor: 5 MPa / 725 psig)			
NAE (Non-active extension)	Extends the sensing parts into the fluid flow of a pipe connection, a reactor or t-piece Standard Ø 48 mm, 1.875” / Length up to 250 mm, 10.0” Other diameters, lengths and special shapes are available on request			
Cable length	250 meters maximum between sensor and transmitter (10 Ohm max.)			
Hazardous area approval (optional)	Intrinsically Safe IECEx, CSA, CSA (US)			
Process temperature measurement	Optionally a PT1000 temperature probe can be installed extending from the process connection, non-active extension or internal to the sensor			

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VP-1000 Configuration

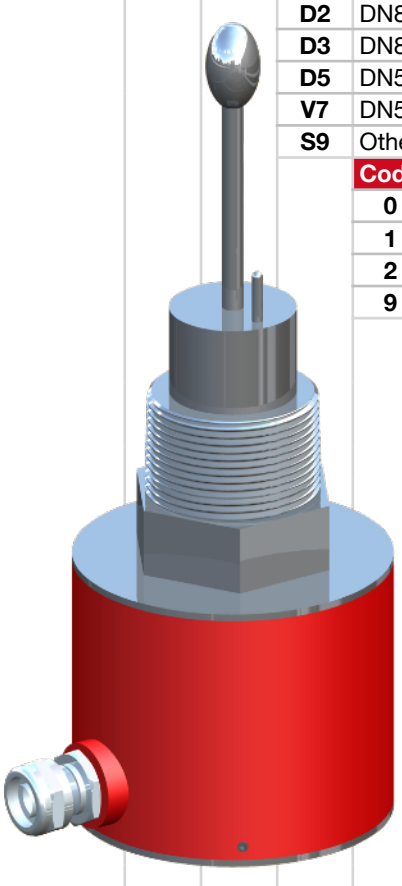
VP-1000	ViscoTron sensor type	mPa·s x g/cm³	Other ranges on request
VP-1000L	Low viscosity	0 to 1,000	Required maximum viscosity:
VP-1000M	Medium viscosity	0 to 10,000	Required maximum viscosity:
VP-1000H	High viscosity	0 to 100,000	Required maximum viscosity:
VP-1000X	High viscosity	0 to 1,000,000	Required maximum viscosity:

Code	Calibration	
0	Functionality check only, no factory calibration	
1	1 decade calibration within range capability	(example VP-1000L : 100 to 1,000 mPa.s x gr/cm³)
2	2 decade calibration within range capability	(example VP-1000L: 10.0 to 1,000 mPa.s x gr/cm³)
3	3 decade calibration within range capability	(example VP-1000L: 1.0 to 1,000 mPa.s x gr/cm³)

Code	Process temperature	
LTE	< 85°C / 185°F (no riser)	
MTE	< 175°C / 350°F (includes 65 mm riser)	
STE	< 300°C / 570°F (includes 125 mm riser)	
LTI	< 85°C / 120°F includes 65mm riser)	For use with internal transmitter
MTI	< 130°C / 270°F (includes 95 mm riser)	For use with internal transmitter

Code	Process connection	
N2	1 1/2”	NPT Male Fitting
N3	2”	NPT Male Fitting
A1	3” 300#	ASME Flange
A2	3” 150#	ASME Flange
A3	3” 600#	ASME Flange
A5	2” 150#	ASME Flange
D1	DN80 PN25/40	DIN Flange
D2	DN80 PN16	DIN Flange
D3	DN80 PN64	DIN Flange
D5	DN50 PN 16	DIN Flange
V7	DN50 Varivent	Sanitary Fitting
S9	Others on request	

Code	Non-Active-Extension (NAE)	Required Length
0	None	
1	Ø 48 mm x 125 mm max	Length in mm:
2	Ø 48 mm x 250 mm max	Length in mm:
9	Other diameters, lengths and special shapes are available on request	



VP-1000M/2-LTE-N2-10N-111

Code	Installation type
0	General purpose area
1	Intrinsically safe sensor for viscosity
2	Intrinsically safe sensor for viscosity and temperature

Code	Agency Approvals
N	None
I	IECEx Ex ia IIB T3-T6 Ga
C	CSA / UL Class I, Div I, Group C and D

Code	Coating and materials for wetted parts
1	SUS316
2	PTFE low friction coating
9	Special sensor coating or material on request

Code	Process temperature measurement
0	No temperature measurement
1	PT1000 extending from NAE, serviceable in place
2	PT1000 internal to sensor

Code	Housing
1	Powder coated
2	Polished Stainless Steel
9	Others on request

^	^	^	^	^	^	^	^	^	^	
VP-1000L	2	MTE	A3	2	2	I	1	1	1	EXAMPLE ORDER INFORMATION

Not all combinations are available for all configurations, some can only be combined with other options
Technical improvements reserved

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Approval and Application Examples

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

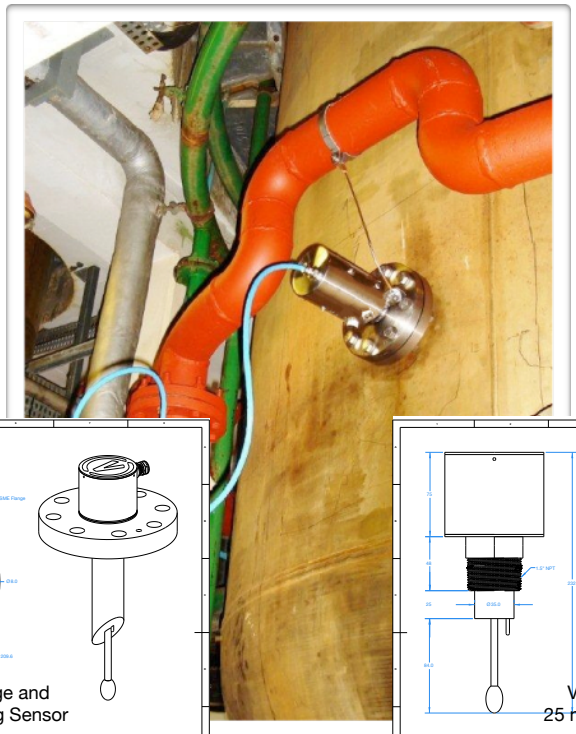
IECEx TEST REPORT COVER

ExTR Reference Number	CA/CSA/ExTR13.0028/00
ExTR Free Reference Number	CA/CSA/2013/TR2617216
Compiled by + signature (ExTL)	Nicholas Cameron
Reviewed by + signature (ExTL)	Andrew Redekop
Approved by + signature (ExCB)	Dorin Stochitoiu
Date of issue	August 8, 2013
Ex Testing Laboratory (ExTL)	CSA Group
Address	1707 94 Street, Edmonton, Alberta, Canada T6N 1E6
Ex Certification Body (ExCB)	CSA Group
Address	1707 94 Street, Edmonton, Alberta, Canada T6N 1E6
Applicant's name	Viscotronics Co., Ltd.
Address	32 Stradwick Way, Calgary, T3H 1G9
Standards associated with this ExTR package	IEC 60079-0:2011, 6th Edition, IEC 60079-11:2011: 6th Edition,
Clauses considered	All Clauses
Test procedure	IECEx System
Test Report Form Number	ExTR Cover_4 (released 2010-12)
Test item description	ViscoTron Viscosity Measurement Sensor Series
Model/type reference	VP-1000 and VP-3000
Code (e.g. Ex _ IIC _ T_)	Ex ia IIB T3-T6 Ga
Rating	7VDC and 28mA Max
All testing fully performed by ExTL staff at ExTL address above:	No

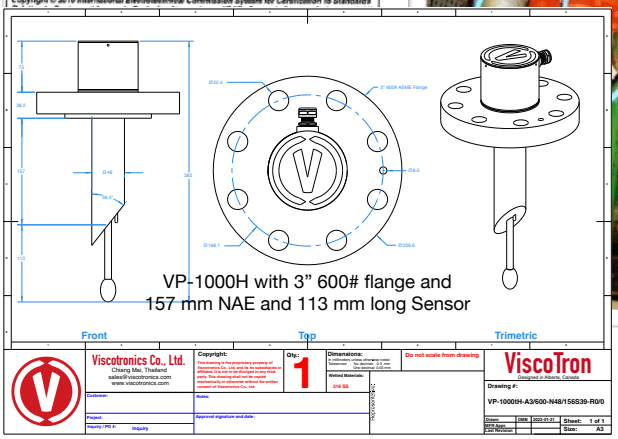
Instructions for Intended Use of ExTR Cover:
An ExTR Cover is the sole top-level document to associate together all other parts of an IECEx Test Report (ExTR) package. An ExTR package is comprised of an ExTR Cover and one or more associated ExTR documents (which may include Ex Test Reports, ExTR Addendums and ExTR of National Differences). All ExTR package documents are compiled and reviewed by the ExTL. The issuing ExCB indicates final approval of the overall ExTR package on this ExTR Cover.

← ECEx Approval for VP-1000 and VP-3000 transducers

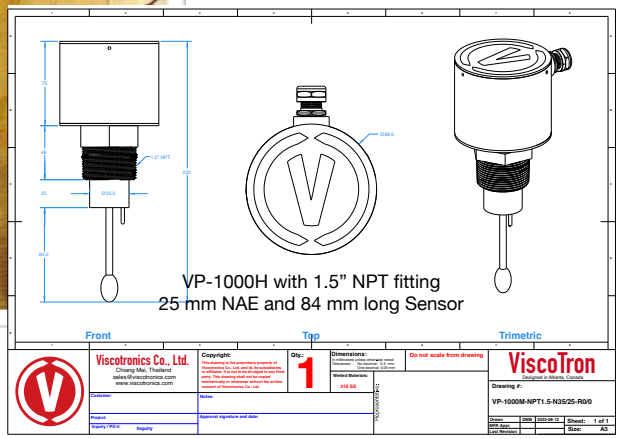
Batch polymer production @ 90 C, no air cooling required ↓



Polymers
Batch Resins
Silicone
Emulsions
Solutions
Blending
Ceramics
Additives
Slurries
Coatings
Spray Driers
Food Industry



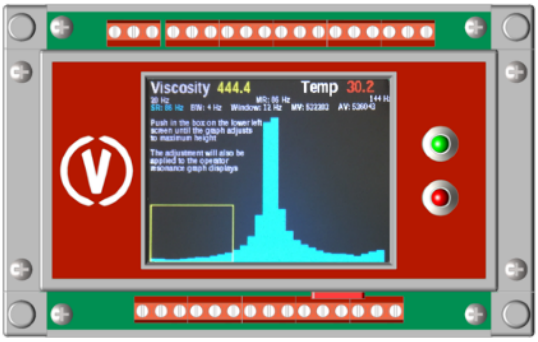
VP-1000H with 3" 600# flange and
157 mm NAE and 113 mm long Sensor



VP-1000H with 1.5" NPT fitting
25 mm NAE and 84 mm long Sensor

Compatible Transmitters

For more info request the transmitter brochures



ViscoTron VT-IRFTx-TFTTP
Induced Resonance FFT transmitter
(Universal Wall / DIN Rail mount enclosure)

ViscoTron VT-IRFTi-TFTTP
Induced Resonance FFT transmitter
(Panel mount enclosure)

Represented in North America exclusively by:

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