SENGENUITY
Sensor Engines by Vectron International

Datasheet

ViSmart®

Solid-State Viscosity Sensor

VS-2000, VS-2500 and VS-2600 Series

Description

The ViSmart® VS-2000, VS-2500 and VS-2600 series viscosity sensors measure the viscosity of a wide range of fluids including printing inks and a variety of industrial lubricants. The sensors make use of state of the art Acoustic Wave Technology to provide real-time, continuous monitoring of viscosity.

Key Features

- Continuous real-time, in-process relative viscosity measurement
- Unaffected by shock or vibration
- Industrial grade reliability
- Hazardous location approval for VS-2511

Applications

- Printing:
  - Water Based Inks
  - Solvent Based Inks
- Industrial lubricants

Performance Specifications

Parameter	VS-20XX	VS-25XX	VS-26XX
Physical			
	LEGACY ITEM*		
Viscosity Range (AV)[1](cSt)[2]	1 to 400 (0.4 to 140)[3]	1 to 400 (0.4 to 140)[3]	1 to 400 (0.4 to 140)[3]
Viscosity Repeatability % of Reading	± 10%	± 10%	± 10%
Sensor Head Pressure Rating [Gauge Pressure] PSIG (bar)	30 (2.07 bar) cabled Quick DisConnect	60 (4.14 bar)	60 (4.14 bar)
Burst Pressure Rating [Gauge Pressure] PSIG (bar)	90 (6.00 bar)	90 (6.00 bar)	90 (6.00 bar)
Measurement rate (Reading/second)	1 / second	1 / second	1 / second
Interface	Proprietary SPI	Proprietary SPI	Proprietary SPI
Electrical Data			
Power Supply Voltage (Vdc)	5 to 10	5 to 10	5 to 10
Power Supply Current (mA)	<35	<35	<35
Power Consumption (mW)	<175 @ 5V	<175 @ 5V	<175 @ 5V
Approvals			
EMC Immunity/Emission	EN 55000, EN 61000-4-2, EN 61000-4-3, EN 61000-4-6		
Environmental			
Fluid Operating Temperature (˚C)	-15 to 105	0 to 60	-15 to 105
Ambient Operating Temperature (˚C)	0 to 70	0 to 60	-15 to 105
Storage Temperature (˚C)	-40 to 80	-40 to 80	-40 to 80

Performance Specifications

Parameter	VS-20XX	VS-25XX	VS-26XX
Mechanical			
ViSmart® Sensor (inches)	Φ1.00 x L 3.40	Φ1.00 x L 4.23	Φ1.00 x L 4.23
ViSmart® Sensor (mm)	Φ25.40 x L 86.36	Φ25.40 x L 107.42	Φ25.40 x L 107.42
Sensor Connector (inches)	2.12 H x 2.07 W x 0.67 L	M12 x 1 Circular Connector	M12 x 1 Circular Connector High Temperature
Sensor Connector (mm)	53.85 H x 52.58 W x 17.02 L		
Weight (approximate) (oz) (g)	12 (344 g)	5 (153 g)	5 (153 g)
Ingress Protection Rating of ViSmart® Sensor	IP67[4]	IP67[5]	IP67[5]
Ingress Protection Rating of Sensor Connector	IP30	n/a	n/a
Connector Type	DB25 female D-Sub connector	M12x1, 8 pin male	M12x1, 8 pin male
Recommended max Torque for NPT thread engagement (N-m)	40	40	40
Vibration[6]	+/-20g (5-2000 Hz)	+/-20g (5-2000 Hz)	+/-20g (5-2000 Hz)
Shock[7]	100g (6ms)	100g (6ms)	100g (6ms)

Notes:

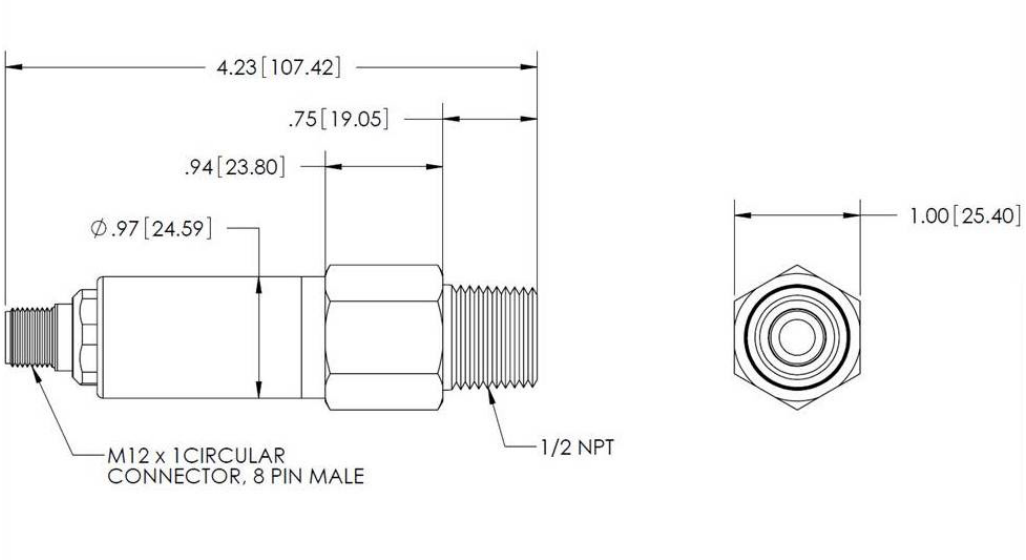
* Legacy Item: Please do not use for new designs.
1. All viscosity measurements are shear rate and material dependent. Variations in material properties and homogeneity could result in varied interpretations of acoustic viscosity by the sensor.
2. The general relationship between acoustic viscosity and kinematic viscosity is: Acoustic viscosity (AV) = kinematic viscosity x density^2 (cSt x (g/cm^3)^2).
3. cSt value based on use of calibration fluid with typical density value of 1.7 g/cm^3. Actual cSt range greater for lower density fluids. Correlation functions between acoustic viscosity and dynamic/kinematic viscosity should be constructed in consultation with SenGenuity. Attempts at using the above mentioned formulae in isolation will most likely result in poor results.
4. Sensor Head is rated IP67
5. When mated with IP67/IP68 rated connector and cordset
6. Per Mil-Std-810C, Figure 514.2-2
7. Per Mil-Std-202G, Method 213B

Wetted Material:

When completely immersed, the following materials are exposed to fluid media:
- AISI 304 Stainless Steel
- Loctite FP 4470
- Diamond like carbon
- Nickel Plated Kovar

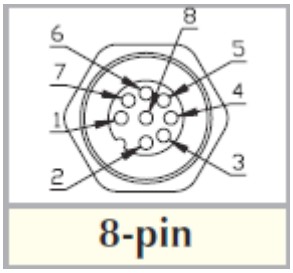
Physical Dimensions (VS-2500, VS-2600 Series)

Dimensions in inches (mm)



M12x1 Connector Pinout

Pin #	Name	Description
1	A1	Chip Select Decode 1
2	A0	Chip Select Decode 0
3	MISO	Master In/Slave Out
4	SCK	Serial Clock
5	GND	Supply Voltage Return
6	NC	No Connect
7	MOSI	Master Out/Slave in
8	V+	Supply Voltage Input



Product status and specifications are subject to change.

Additional Information

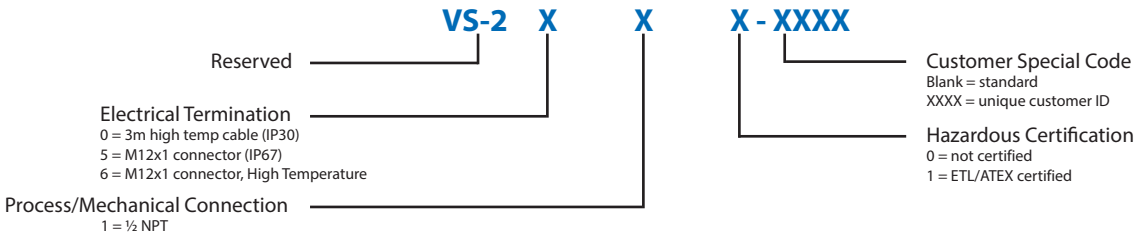
VS-2511 Hazardous Certification Information					
Parameter	Value				
Electrical Data					
Intrinsic Safety Parameters	Ui	Ii	Li	Pi	Ci
	8.6V	200mA	negligible	361mW	1uF
Conformity, Approvals, and Installations					
Examination Certificate Number	TÜV 12 ATEX 091790 X		Intertek ETL 4009279		
Group, Catagory, Type of Protections, Temperature Classification	II 2 G Ex ib IIB T4 Gb		Class I, Division 1, Groups CD, T4; Class I, Zone 1, Group IIB, T4 Intrinsically Safe, Securite Intrinseque		
QAN Certificate Number	ITS12ATEXQ7518; ITS12ATEXQ7712		N/A		
Directive Conformity	EN 60079-0, EN 60079-11		ANSI/UL Std 913; CAN/CSA C22.2 No. 157		

Note: The VS-2511 Hazardous Certification is only valid in conjunction with a VB-2510 Shunt-Diode Barrier.

Ordering Information

Part No.	Model	Description
712200025	VS-2010	VS-2010 ViSmart Viscosity Sensor with 1/2" NPT Thread/DB25 D-Sub Connector (Legacy*)
712200026	VS-2510	VS-2510 ViSmart Viscosity Sensor with 1/2 NPT Thread/M12 Connector
712200039	VS-2511	VS-2511 ViSmart Viscosity Sensor with 1/2 NPT Thread/M12 Connector, ETL/ATEX Certified
712200038	VS-2610	VS-2610 ViSmart Viscosity Sensor with 1/2" NPT Thread/M12 Connector/High Temp
	VS-2xxx-XXX**	ViSmart Viscosity Sensor with OEM code

**Please contact Vectron International for OEM applications



Please contact SenGenuity at sensors@sengenuity.com for further details, comments or questions regarding this or any other product.