4-20 mA Vibration Transmitter, Top connector

Main Characteristics

- Atex Approved for zone 0, 1, 2. (Pending until 2025)
- Improved velocity version with bandwidth from 3Hz to 1000 Hz (± 10%). Can monitor machine as low as 150 RPM
- Dynamic (acceleration or/ Velocity) output available
- Temperature output available (10 mV/°C)
- Submersible version down to 150 meters available with integral polyurethane and FEP cable.
- Life time hermetic sealing warranty with M12 & Mil glass seal connector
- ISO 10816 (or new ISO 20816) compliant.
- Reliable measurement with vibration as high as 100 & 500 g peak. Most competitors have electronic saturation as low as 40 g peak..

Competitive advantage

- No false trips thanks to improved capacitive MEMs sensor. Allowed Machine maximum vibration could be as high as 100 g peak and even 500 g peak depending on full scale version.
- Resistant to shock (magnet mounting)
- ESD and reverse wiring protection.
- The glass seal hermetic connector (option B=1, 2) protects the electronics from harmful environmental influences, significantly increasing their reliability and lifetime.
- Thanks to all stainless steel IP67 M12 connector (option B=3) an IP68 solution is possible when connected to an overmolded M12 cordset. It is then a perfect cost sensitive solution for a harsh environment.
- M12 connector (4-Pin) offers compatibility with numerous sensors used in automation.
- Large choice of submersible integral cable with stainless steel overbraid or conduit.

Description

The 4-20 mA loop powered industrial accelerometer model 425.51 is designed to monitor the vibration in harsh industrial environments. It uses the industry standard 2-wire 4-20mA Loop that interfaces directly with PLC, DCS and 4-20mA monitor .Large choice of output (velocity, acceleration, RMS, equivalent Peak) and frequency range will help to fit almost every customer requirements. Their compact size allows for installation in tight places. The dynamic signal output (acceleration) can also allow spectral vibration measurements.
Thanks to a large choice of acceleration input (100 g peak for ARXX, VRXX version, and 500 g peak for ASXX, VSXX version) customers will always find the right versions that fit their machines even the most difficult to monitor like pumps with cavitation.

Model 425.51-3 shown

Typical applications

Vibrations measurement in the rugged environments of industrial machinery monitoring. It allows continuous trending of overall machine vibration.

Approvals

Revision History

December 2018 : Released

Ordering information

To order, specify model number, options, accessories and suffix :

425.51- Full scale - Connector or Integral cable - Optional output - Housing thread - Agency approval - Engraving

Full Scale (=20mA)

AR01	Acceleration RMS 1g (3Hz to 10kHz ±10%)
AR05	Acceleration RMS 5g (3Hz to 10kHz ±10%)
AR10*	Acceleration RMS 10g (3Hz to 10kHz ±10%)
AR20	Acceleration RMS 20g (3Hz to 10kHz ±10%)
AS20	Acceleration RMS 20g (3Hz to 10kHz ±10%)
AS50	Acceleration RMS 50g (3Hz to 10kHz ±10%)
AS100	Acceleration RMS 100g (3Hz to 10kHz ±10%)
AP01	Acceleration Peak 1g (3Hz to 10kHz ±10%)
AP05	Acceleration Peak 5g (3Hz to 10kHz ±10%)
AP10	Acceleration Peak 10g (3Hz to 10kHz ±10%)
AP20	Acceleration Peak 20g (3Hz to 10kHz ±10%)
AQ20	Acceleration Peak 20g (3Hz to 10kHz ±10%)
AQ50	Acceleration Peak 50g (3Hz to 10kHz ±10%)
AQ100	Acceleration Peak 100g (3Hz to 10kHz ±10%)
VR10	Velocity RMS 10 mm/s (3Hz to 1000 Hz ±10%)
VR20*.....	Velocity RMS 20 mm/s (3Hz to 1000 Hz ±10%)
VR25*	Velocity RMS 25 mm/s (3Hz to 1000 Hz ±10%)
VR50	Velocity RMS 50 mm/s (3Hz to 1000 Hz ±10%)
VR100	Velocity RMS 100 mm/s (3Hz to 1000 Hz ±10%)
VR11	Velocity RMS 0.5 ips (3Hz to 1000 Hz ±10%)
VR21*	Velocity RMS 1 ips (3Hz to 1000 Hz ±10%)
VR51	Velocity RMS 2 ips (3Hz to 1000 Hz ±10%)
VR101	Velocity RMS 4 ips (3Hz to 1000 Hz ±10%)
VS50	Velocity RMS 50 mm/s (3Hz to 1000 Hz ±10%)
VS100	Velocity RMS 100 mm/s (3Hz to 1000 Hz ±10%)
VS51	Velocity RMS 2 ips (3Hz to 1000 Hz ±10%)
VS101	Velocity RMS 4 ips (3Hz to 1000 Hz ±10%)
VP10	Velocity Peak 10 mm/s (3Hz to 1000 Hz ±10%)
VP20	Velocity Peak 20 mm/s (3Hz to 1000 Hz ±10%)
VP25	Velocity Peak 25 mm/s (3Hz to 1000 Hz ±10%)
VP50	Velocity Peak 50 mm/s (3Hz to 1000 Hz ±10%)
VP100	Velocity Peak 100 mm/s (3Hz to 1000 Hz ±10%)
VP11	Velocity Peak 0.5 ips (3Hz to 1000 Hz ±10%)
VP21	Velocity Peak 1 ips (3Hz to 1000 Hz ±10%)
VP51	Velocity Peak 2 ips (3Hz to 1000 Hz ±10%)
VP101	Velocity Peak 4 ips (3Hz to 1000 Hz ±10%)
VQ50	Velocity Peak 50 mm/s (3Hz to 1000 Hz ±10%)
VQ51	Velocity Peak 2 ips (3Hz to 1000 Hz ±10%)
VQ100	Velocity Peak 100 mm/s (3Hz to 1000 Hz ±10%)
VQ101	Velocity Peak 4 ips (3Hz to 1000 Hz ±10%)

SR10 …….	Velocity RMS 10 mm/s (10Hz to 1000 Hz ±10%)
SR20…….	Velocity RMS 20 mm/s (10Hz to 1000 Hz ±10%)
SR25 …….	Velocity RMS 25 mm/s (10Hz to 1000 Hz ±10%)
SR50* ……..	Velocity RMS 50 mm/s (10Hz to 1000 Hz ±10%)
SR100 ……..	Velocity RMS 100 mm/s (10Hz to 1000 Hz ±10%)
SR11 …….	Velocity RMS 0.5 ips (10Hz to 1000 Hz ±10%)
SR21…….	Velocity RMS 1 ips (10Hz to 1000 Hz ±10%)
SR51 ……..	Velocity RMS 2 ips (10Hz to 1000 Hz ±10%)
SR101 ……..	Velocity RMS 4 ips (10Hz to 1000 Hz ±10%)
SP10 …….	Velocity Peak 10 mm/s (10Hz to 1000 Hz ±10%)
SP20…….	Velocity Peak 20 mm/s (10Hz to 1000 Hz ±10%)
SP25 …….	Velocity Peak 25 mm/s (10Hz to 1000 Hz ±10%)
SP50 ……..	Velocity Peak 50 mm/s (10Hz to 1000 Hz ±10%)
SP100 ……..	Velocity Peak 100 mm/s (10Hz to 1000 Hz ±10%)
SP11 …….	Velocity Peak 0.5 ips (10Hz to 1000 Hz ±10%)
SP21…….	Velocity Peak 1 ips (10Hz to 1000 Hz ±10%)
SP51 ……..	Velocity Peak 2 ips (10Hz to 1000 Hz ±10%)
SP101 ……..	Velocity Peak 4 ips (10Hz to 1000 Hz ±10%)

Note : Peak is based on the true RMS value of vibration. For a sine wave, the equivalent peak output is 1.414 times the RMS. value.
Note : VibraSens can also ship Velocity sensor with **ex**tended frequency range : 3Hz to 2000 Hz (± 10%). Ordering example : 425.51-**EX**VR20-3

Connector

1 …….	MIL-C-5015, glass seal, Type MS3143 10SL-4P
2 ……..	M12 glass seal, IEC 60947-5-2
3* ……..…	M12 epoxy seal, IEC 60947-5-2

Integral Cable

5(01-DD)* ……..……....	90°C Polyurethane cable
5(02-DD)* ……..……..…	200°C Teflon FEP cable
5(03-DD) ……...	120°C Radox Halogen Free cable
5(31-DD) …….....	90°C Polyurethane cable with DA or DV or T0 output
5(12-DD) ……...	200°C Teflon FEP cable with DA or DV output
5(13-DD) ……...	120°C Radox Halogen Free cable with DA or DV output
7(01-DD) ……....90°C Polyurethane cable with sstl overbraid protection	
7(02-DD)* ……...	200°C Teflon FEP cable with sstl overbraid protection
7(03-DD) ……	120°C Radox Halogen Free cable with sstl overbraid protection
7(12-DD) …….....	200°C Teflon FEP cable with DA or DV output
7(13-DD) ……..	120°C Radox Halogen Free cable with DA or DV output
8(01-DD)* ….	90°C Polyurethane cable with stainless steel protection conduit
8(02-DD) …….	200°C Teflon FEP cable with stainless steel protection conduit
8(03-DD) ……..	120°C Radox Halogen Free cable with sstl protection conduit
8(31-DD) ……..……	90°C PU cable with DA or DV or T0 output
8(12-DD) …..	200°C Teflon FEP cable with sstl conduit & DA or DV output
8(13-DD) ……...	120°C Radox cable with sstl conduit & DA or DV output

DD length in metres. Standard lengths are 2m, 5m, 10m, 15m, 20m, 30m, 40m, 50m.

Optional output (only one optional output is possible)
Omitted : no optional output

T0: Temperature output (Not available with Mil-C-5015 2-pin connector,)
(M12 connector or integral cable with 4 wires min.)
10 mV/°C. (range +2° to +120°C)

DA: Acceleration Dynamic Output (M12 connector or integral cable with 3 wires min.)

DV: Velocity Dynamic Output (M12 connector or integral cable with 3 wires min.)

Housing thread

Omitted *	……..	M6x1
H7	……....	1/4" 28 UNF-2A

Agency Approval (PENDING)

Omitted *	…….....	no specific agency approval

Y1 (Atex & IECEx : Pending) ……..……..…….. BASEEFA X.XXX

Group Category Gaz - Protection …….	II 1 G - Ex ia IIC T4 Ga
Group Category Dusts - Protection …	II 1 D - Ex ia IIIC T135°C Da
Group Mine - Protection ……..……	I M1 - Ex ia I Ma
Full scale can be ……..…	ARXX, ASXX, APXX, AQXX, SRXX, SPXX, VRXX, VSXX, VPXX, VQXX
Connector can be ……	1, 2
Integral can be ……	5(03-DD), 7(01-DD), 7(02-DD), 7(03-DD) 8(01-DD), 8(02-DD), 8(03-DD) & DD ≤ 99
Optional can be ……	Only Omitted
Housing Thread can be ……	Omitted or H7

Y5 (CSA Approval) ……..……... Not Released
IS Class 1, Division 1, Groups A to D
Ex ia IIC / Class I, Zone 0 AEx ia IIC T4
Options can be ……... Same as Y1 (Atex)

Engraving :

Omitted *	…….....	VibraSens Engraving
ZXX	……..	Specific customer Engraving

XX is a number supplied by VibraSens
Customer Engraving is not allowed for Explosion proof sensors.
OEM should contact VibraSens if they need custom Engraving for Explosion proof sensors.

Wiring :

Omitted *	…….....	Standard VibraSens Wiring
XXX	…….....	Call us for special wiring

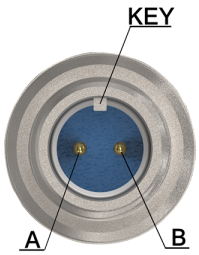
*** Most common options**

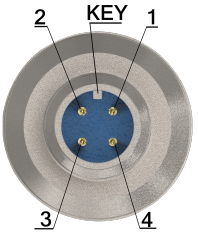
In Stock model :
Metric connector
425.51-VR20-3 // 425.51-VR21-3 // (425.51-VR20-2-Y1 Pending)
American/UK connector
425.51-VR21-1-H7

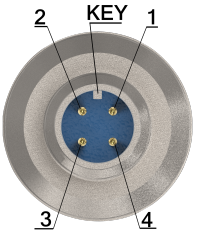
Ordering example :

425.51-VR21-3	4-20mA sensor, Full Scale=1 ips RMS, M12, top connector.
425.51-VR25-5(01-05)	4-20mA sensor, Full Scale=25 mm/s, Top IP68 integral Polyurethane cable, 5 meters.

Configurations







Mil-C-5015

4-20 mA Output:
-> Between Pin B (-) and Pin A(+)

Standard Cordset:
30.01-II2-5(01-DD)-A01 (Polyurethane)
31.01-II2-5(02-DD)-A01 (Teflon FEP)

4-20 mA Output:
-> Between White (-) and Red (+)
Raw Output (DAor DV):
-> Not available

Temperature output (T0) :
-> Not available

DD=2, 5, 10, 15, 23, 30, 40, 50, 60 meters.

M12 (glass seal)

4-20 mA Output:
-> Between Pin 2(-) and Pin 1(+)
Raw Output (DAor DV):
-> between Pin 2(-) and Pin 4(+)
Temperature Output (T0)
-> between Pin 3(-) and Pin 4(+)

Standard Cordset:
20.01-E02-5(31-DD)-A01 (Polyurethane)
21.01-E02-5(35-DD)-A01 (Teflon FEP)

4-20 mA Output:
-> Between White (-) and Brown (+)
Raw Output (DAor DV):
-> between White (-) and Black (+)
-> Blue : Not Connected
Temperature output (T0) :
-> between Blue (-) and Black (+)

DD=2, 5, 10, 15, 23, 30, 40, 50, 60 meters.

M12

Same as M12 glass seal

Integral Cable
5 (CC-DD)

5(01-DD) Polyurethane
5(02-DD) Teflon FEP
4-20 mA Output:
-> Between White (-) and Red (+)

5(03-DD) (Radox)
4-20 mA Output
-> Between White 1 (+) and White2 (-)

5(12-DD) (Teflon)
4-20 mA Output
-> Between White (-) and Red (+)
Raw Output (DAor DV):
-> Between White (-) and Black(+)

5(13-DD) (Radox)
4-20 mA Output
-> Between White 2 (-) and White 1 (+)
Raw Output (DAor DV):
-> Between White 2 (-) and White 3 (+)

5(31-DD) Polyurethane
4-20 mA Output
-> Between White (-) and Brown (+)
Raw Output (DAor DV):
-> Between White (-) and Black (+)
-> Blue : Not Connected
Temperature output (T0) :
-> Between Blue (-) and Black (+)

DD=2, 5, 10, 15, 23, 30, 40, 50, 60 meters.

Integral cable with overbraid B=7
7(CC-DD)

7(01-DD)
7(02-DD)

Same wiring color as 5(01-DD)

7(03-DD)
Same wiring color as 5(03-DD)

7(12-DD)
Same wiring color as 5(12-DD)

7(13-DD)
Same wiring color as 5(13-DD)

DD=2, 5, 10, 15, 23, 30, 40, 50, 60 meters.

Integral cable with protection conduit
8 (CC-DD)

8(01-DD)
8(02-DD)
Same wiring color as 5(01-DD)

8(03-DD)
Same wiring color as 5(03-DD)

8(12-DD)
Same wiring color as 5(12-DD)

8(13-DD)
Same wiring color as 5(13-DD)

8(31-DD)
Same wiring color as 5(31-DD)

DD=2, 5, 10, 15, 23, 30, 40, 50, 60 meters.

Specifications (24°C)

Dynamic

Sensitivity	
No vibration	4 mA ±5%
Full scale	20 mA ±5%
Transverse response sensitivity (20Hz, 5g)	<5%
Linearity	±1% Max
Accuracy (Repeatability)	±1% Max
Turn on time, 4-20 mA loop	< 10 Sec

Optional Output :

Temperature output T0 (powered by 4-20 mA current loop)

	Vout=10mV/°C * Temp.(°C)
	0 VDC at 0°
	Range+2° to 120°C

Dynamic acceleration DA (powered by 4-20 mA current loop)

Signal	2.4VDC ± 2V
Sensitivity (SRXX, SPXX, VRXX, VPXX, ARXX, APXX)	20 mV/g ± 10%
Frequency response (±10 %)	3 Hz - 10 kHz
Dynamic	100 g
Sensitivity (VSXX, VQXX, ASXX, AQXX)	4 mV/g± 10%
Frequency response (±10 %)	3 Hz - 10 kHz
Dynamic	500 g
Maximum transmission length (without distortion)	10 m

Dynamic velocity DV (powered by 4-20 mA current loop)

Signal	2.4VDC ± 2V
Sensitivity (SRXX, VRXX, VPXX, ARXX, APXX)	100 mV/ips ± 10%
Frequency response (±10 %)	3 Hz - 2 kHz
Sensitivity (VSXX, VQXX, ASXX, AQXX)	100 mV/ips± 10%
Frequency response (±10 %)	3 Hz - 2 kHz
Maximum transmission length	10 m

Electrical

Electrical Grounding	Isolated from machine ground
Isolation(Case to shield)	100 MΩ Min
Maximum Loop resistance	Rl Max=(Vdc power - 10V) / 20mA
Minimum Rl wattage	Watt min=0.0004xRl
Power requirements for two wire loop Voltage	+10 to +30 VDC
Protection	
Overvoltage	Yes
Reverse polarity	Yes
ESD Protection	> 40 V

WARRANTY:
Dommage to the built-in electronics resulting from the application of incorrect power is NOT covered by warranty.

Environmental

Temperature, operating continuous (Standard version, not Atex)	
max. loop current =10mA	-55 to 120 °C (-65 to 250 °F)
max. loop current =20mA	-55 to 90 °C (-65 to 212 °F)

Humidity / Enclosure		
	M12-MIL Glass seal	Glass seal, Not affected, hermetically sealed, 1E-8 torr.l/s, >IP68
	M12 (-3 option)	IP67
	M12 (-3 option) with IP68 M12 cordset plugged	IP68
	Integral cable	> IP68, 50 meters Submersible available
Acceleration limit		
	Shock	2 500g peak
	Continuous vibration	500g peak

Physical

Drawing, outline	425.51_Out
Weight with connector	70 gr Nom (2.5 Oz)
Weight with Integral cable : add sensor weight above + …	
5(CC-DD)	40gr/m
7(CC-DD)	60 gr/m
8(CC-DD)	105 gr/m
Material	AISI 316L, DIN 1.4404 (Stainless steel)
Mounting torque (M6, M7, M8 suffix)	2,4 N.m (21 in-lbs)

European Directive

EMC Directive		2014/30/EU
	Standards	61326-1
RoHS Directive		2011/65/EU
	Certificate	101.51-YN_Rohs2
CE Declaration		500600.02

Atex & IECEx Approval (YY=Y1) : PENDING

Atex Directive	2014/34/EU
Standards	EN 60079-0, Atex General
	EN 60079-11, Intrinsic safety, Gas, Dusts
	IEC 61241-0, Atex General
	IEC 61241-11, Intrinsic safety, Dust
Certificate	BASEEFA ATEX XXX
	IECEx XXXXXX
Installation Drawing (pending)	425.51-Y1-IMI
EU Declaration of Conformity (pending)	425.51-Y1_EUDC

Mounting Instructions

English	500502.01_EN
German	500502.01_DE
French	500502.01_FR
Arab	500502.01_AR

Calibration certificate, supplied

Supplied	7.6 x 5.1 cm Adhesive Paper certificate (inside the packing box)

Calibration certificate, separate A4 (21x29.7 cm), not supplied

504.01	4-20mA vibration A4 calibration Certificate

Accessories, not supplied

Cable assembly for sensor with (Mil connector)	
Polyurethane cable (90°C)	30.01-II2-5(01-DD)-A01
FEP Teflon cable (200°C)	31.01-II2-5(02-DD)-A01
FEP Teflon cable (200°C) protected by SSTL overbraid	31.03-II2-7(02-DD)-A03

Polyurethane cable protected by SSTL conduit dia 9.5mm	30.04-II2-8(01-DD)-A04

Cable assembly for sensor with M12 connector

Polyurethane cable (90°C)	20.01-E02-5(31-DD)-A01
FEP Teflon cable (200°C)	21.01-E02-5(35-DD)-A01
FEP Teflon cable (200°C) protected by SSTL overbraid	21.03-E02-7(35-DD)-A03
Polyurethane cable protected by SSTL conduit dia 9.5mm	20.04-E02-8(31-DD)-A04

Standard lengths (Stocked) * DD= 02, 05, 10, 20, 30, 40, 50 meters
Call us for more specific cable : additional BNC, Lemo, Fischer, …

Mounting Stud for sensor with M6 housing thread

M6 machine thread	191.01-06-06-1
1/4" 28 UNF machine thread	191.01-06-16-1
M8 machine thread	191.01-06-08-1
M10 machine thread	191.01-06-10-1

Mounting Stud for sensor with 1/4"28 UNF housing thread (H7 Option)

M6 machine thread	191.01-16-06-1
1/4" 28 UNF machine thread	191.01-16-16-1
M8 machine thread	191.01-16-08-1

Adhesive pad, model 204

Fit sensor with M6 housing thread	204.01-06-22-1
Fit sensor with ¼" 28 UNF housing thread (H7 option)	204.01-16-22-1

Magnets

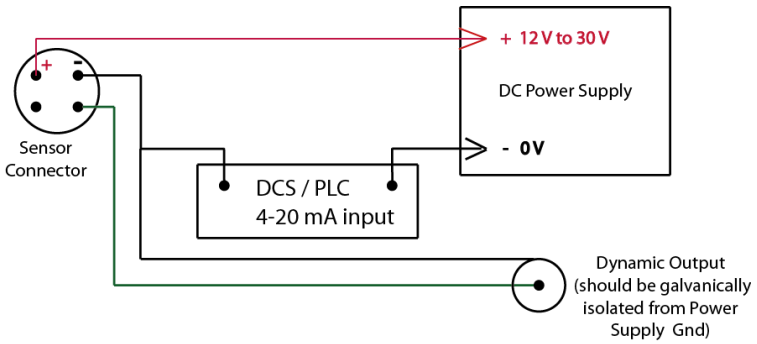
Flat	211.01
Curved	220.01

Repair

Consult factory for replacement of connector in case of broken or bended pins. Repair of electronics is not possible.

Wiring (non Atex version)

4-20 mA Input card



0-10 VDC Input card