

4-20 mA Vibration Transmitter, Top connector

Main Characteristics

- Atex Approved for zone 0, 1, 2. (Pending)
- Improved velocity version with bandwidth from 3Hz to 1000 Hz ($\pm 10\%$). Can monitor machine as low as 150 RPM
- Dynamic (acceleration or/ Velocity) output available
- Temperature output available (10 mV/ $^{\circ}$ C)
- Submersible version down to 150 metres 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 electronic 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-AAAA-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- AAAA - B - TT - HH - YY

AAAA : 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%)
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%)
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%)
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%)
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.

* Most common full scale

Note : VibraSens can also ship Velocity sensor with extended frequency range : 3Hz to 2000 Hz (± 10%). Ordering example : 425.51-EXVR20-3

B : 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

B (CC-DD) : 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 sssl overbraid protection
7(02-DD)*	200°C Teflon FEP cable with sssl overbraid protection
7(03-DD)	120°C Radox Halogen Free cable with sssl 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 sssl 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 sssl conduit & DA or DV output
8(13-DD)	120°C Radox cable with sssl conduit & DA or DV output

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

* Most common cable

TT : Optional output (only one optional output is possible)

Omitted : no optional output

T0: Temperature output (Not available with Mil-C-5015 2-pin connector)
10 mV/°C. (range +2° to +120°C)

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

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

HH : Housing thread

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

* Most common thread

YY : 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
AAAA can be ARXX, ASXX, APXX, AQXX,
SRXX, SPXX, VRXX, VSXX, VPXX, VQXX
B can be 1, 2
B(CC,DD) 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
TT can be Only Omitted
HH 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
AA Options can be Same as Y1 (Atex)

OEM or Customer Engraving :

Add ZXX at the end of the part number.
XX is a number supplied by VibraSens
Customer Engraving is not allowed for Explosion proof sensor.
OEM should contact VibraSens if they need custom Engraving for Explosion proof sensor.

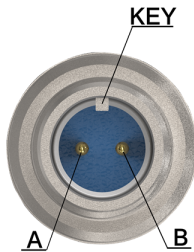
In Stock model :

Metric connector
425.51-VR20-3 // 425.01-VR21-3 // 425.51-VR20-2-Y1
American/UK connector
425.01-VR21-1-H7

Ordering example :

425.51-VR21-2 4-20mA sensor, FS=1 ips RMS, M12, top connector.

Configurations



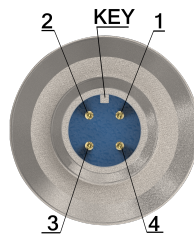
**Mil-C-5015
(B=1)**

Pin A : (+) Pin B : (-)

Associated cable
10.01-A01-B22-06-Length: Red (+);
White (-)

Associated cable
10.01-A01-B22-02-Length: Red (+);
White (-)

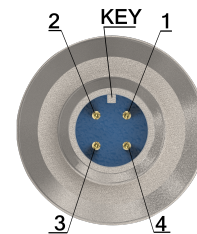
Note: No temperature option available



**M12 glass seal
(B=2)**

Pin 1 : (+) Pin 2 : (-)
Temperature Output (T0 option) between
Pin 3 (-) and Pin 4 (+)
Raw Output (DA) between Pin 2 (-) and
Pin 4 (+)

Associated cable
10.01-A01-E02-31-Length
Brown (+) White (-)
Raw Output DA between Black (+) and
White (-)
Temperature (T0 option) between Black
(+) and Blue (-)



**LCP connector
(B=3)**

Pin 1 : (+) Pin 2 : (-)
Temperature Output (T0 option) between
Pin 3 (-) and Pin 4 (+)
Raw Output (DA) between Pin 2 (-) and
Pin 4 (+)

Associated cable
10.01-A01-E02-31-Length
Brown (+) White (-)
Raw Output DA between Black (+) and
White (-)
Temperature (T0 option) between Black
(+) and Blue (-)



**Integral Cable
B=5 (CC-DD)**

CC=01, 02 (PU, Teflon) : White (-); Red (+)

CC=03 (Radox) : White N°1 (+); White N°2 (-)

CC=12 (Teflon): White (-) ; Red (+)
Raw output DA output between
Black(+) and White (-)

CC=13 (Radox) : White N°1 (+); White N°2 (-)
Raw output DA between White N°3 (+)
and White N°2 (-)

CC=31 (PU) : Brown (+); White (-)
Raw output DA between Black (+) and
White (-)
Temperature output (T0 option) between
Black (+) and Blue (-)

NC: Not connected; (1) with T0 option



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

Same wiring color as B=5



**Integral cable with protection conduit
B=8 (CC-DD)**

Same wiring color as B=5

Specifications (24°C)

Dynamic

Sensitivity	
No vibration	4 mA ±5%
Full scale (see AAAAA ordering information)	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
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	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
Senitivity (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	RI Max=(Vdc power - 10V) / 20mA
Minimum RI wattage	Watt min=0.0004xRI
Power requirements for two wire loop Voltage	+10 to +30 VDC
Protection	
Overvoltage	Yes
Reverse polarity	Yes
ESD Protection	> 40 V

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	
B=1, 2	Glass seal, Not affected, hermetically sealed, 1E-8 torr.l/s, >IP68
B=3	IP67
B=3 with IP68 M12 cordset plugged	IP68
B= 5, 7, 8	> IP68, 50 meters Submersible available
Acceleration limit	
Shock	2 500g peak
Continuous vibration	500g peak

Physical

Weight with connector	70 gr Nom (2.5 Oz)
Weight with Integral cable : add sensor weight above + ...	
BB=5(CC-DD)	40gr/m
BB=7(CC-DD)	60 gr/m
BB=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

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	425.51-Y1-IMI
EU Declaration of Conformity	425.51-Y1_EUDC

Calibration certificate, supplied

Calibration certificate supplied	Measured values printed on Packing Box
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Calibration certificate, not supplied

501.01	A4 calibration Certificate
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Accessories, not supplied

Cable assembly B=1 (Mil connector)	
Polyurethane cable (90°C)	10.01-A01-B22-06-Length
FEP Teflon cable (200°C) with sssl conduit protection	10.01-A01-B24-02-Length

Cable assembly B=2 or 3 (M12 connector)	
Polyurethane cable (90°C)	10.01-A01-E02-31-Length

For more cable option see Model 10.01 (specific cable harness).

Mounting Stud for M6 sensor 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

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

M6 machine thread
1/4" 28 UNF machine thread
M8 machine thread

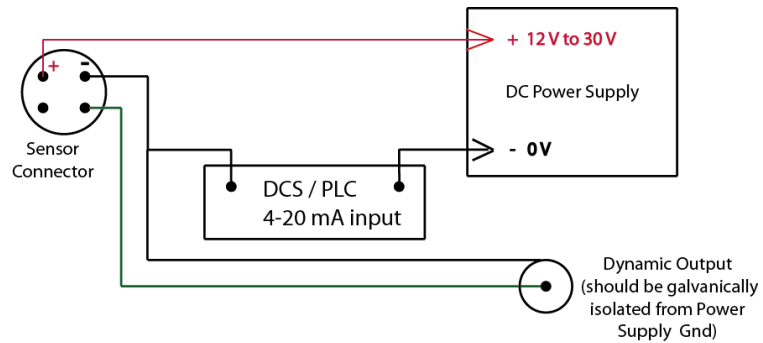
191.01-16-06-1
191.01-16-16-1
191.01-16-08-1

Repair

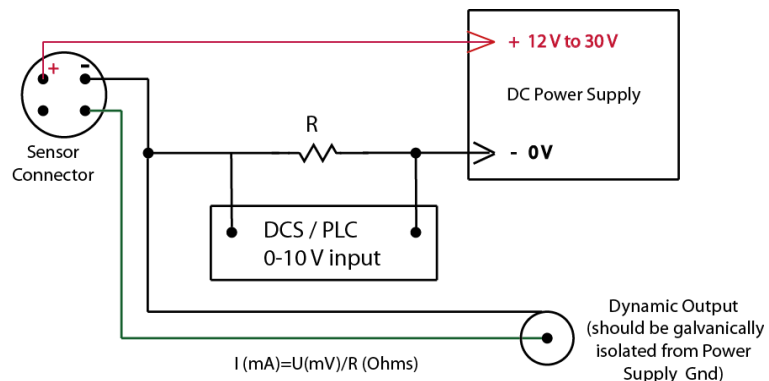
Consult factory for replacement of connector in case of broken or bended pins. Repair of electronic is not possible.

Wiring (non Atex version)

4-20 mA Input card



0-10 VDC Input card



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