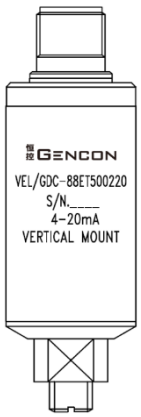
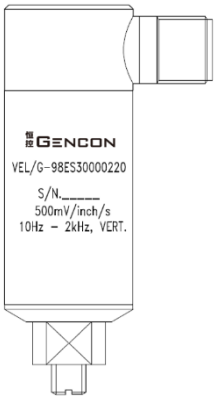
VEL/G Series Vibration Sensor

Self-Generating Velocity Transducer and Transmitter

GENCON Monitoring Solutions

DS.2205 Iss.1





- Heavy Industrial
- Stainless Steel Hermetically Sealed Dual Case
- Self-Generating, 2 wire 4-20mA loop power, IEPE 2-wire options
- High Noise Immunity
- Choice of cable lengths with or without armouring
- Top or Side exit connector or conduit
- Operating Temperature range -40ºC to +100ºC
- High Temperature opt. +200ºC
- Multi Hazardous Area Approved

Description

The VEL/G Series self-generating transducer produces a signal proportional to the velocity component of a mechanical vibration by means of relative movement between a coil and a magnet. The rugged construction and fully sealed body enables this transducer to be used in most Industrial environments.

The main body of the transducer is fitted with a polished stainless steel case and contains a moving coil and magnet assembly. The coil is suspended within the field of the magnet by means of diaphragms which permit virtually frictionless movement in one axis only. This measuring axis is coincident with the axis of the cylindrical body.

VEL/G Series are simple to interface with monitoring equipment or directly integrate to SCADA systems (PLC/DCS) in conjunction with low noise makes them particularly suitable for the applications where the grounding and electrical interference environment is a challenge.

Methods of mounting vary from integral, threaded studs of various sizes to integral mounting plates (refer to order codes for details). The transducer is supplied with either an electrical connector fitted to the top or side of the upper body, or an integral top or side exit cable.

⚠ Caution

If housing measurements are being used for overall protection of the machine, thought should be given to the usefulness of the measurement for each application. Most common machine malfunctions (imbalance, misalignment, etc.) originate at the rotor and cause a change of rotor vibration. For any housing measurement alone to be effective for protection purpose, a significant amount of rotor vibration must be faithfully transmitted to the bearing housing or machine casing, or more specifically, to the mounting location of the transducer. In addition, care should be taken in the physical installation of the transducer. Improper installation can result in a degradation of the transducer's performance, and signals generated not representing actual machine vibration. Integration of the output to displacement can worsen this. Extreme caution should be exercised if integrating to displacement.

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Specifications

Parameters are specified at +25±5°C unless otherwise indicated. Operation outside the specified limits will result in false readings or loss of machine monitoring.

VEL/G Specifications

Output signal	20mV/mm/s (500mV/in/s) PK ±3%
(10K Load)	or 4mV/mm/s (100mV/in/s) PK ±3%
Frequency range (3dB)	4.5Hz to 2kHz max.
(3dB)	Dependent on orientation/sensitivity, see Table 1.
Linearity	±2% at 100Hz
Max. displacement	2.5mm (100mils) PK to PK
Max acceleration	2000g in sensitive axis
	50g in non-sensitive axis
Output impedance	200Ω nominal
Dimensions	Φ30x80 typically
Weight	0.25kg approx.
Standard Operational temperature range	-40°C to 100°C
	Optional -40°C to 200°C
Connector / Cable orientation	Top or side exit
Hazardous Area Approval	Ex II 1 G Ex ia IIC T4 (Tamb = -30°C to +100°C)

Table 1. VEL/G Output sensitivity deviation over frequency range versus mounting angle relative to angle of calibration

Freq. Range (Hz)	Angle of Calibration	Angular Range of Operation (Degrees) From Angle of Calibration	Max. Sensitivity Deviation	Option (H)
15 - 2000	Vertical 0°	Universal (vertical 0°±180°	-10%	1
10 - 2000	Vertical 0°	Universal (vertical 0°±180°	-12%	2
10 - 2000	Horizontal 90°	Horizontal (90°±10°)	±2%	3
4.5 - 2000	Horizontal 90°	Horizontal (90°±20°)	-20%	4
4.5 - 2000	45°	45°±20°	-10%	5
4.5 - 2000	Vertical 0°	Vertical (0°±20°)	-6%	6

Note: The primary axis of the sensor is parallel to the cylindrical length of the main body assembly.

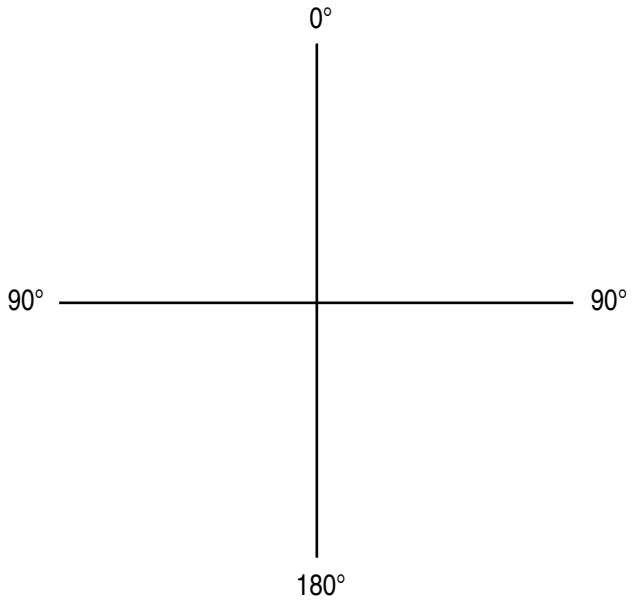

Fig 1. VEL/G Series Angle of Calibration and Mounting
Viewpoint is from the machine driving end, 0° is the Vertical Orientation

VEL/G Ordering Information

	A		BB		C		D		EEE		F		G		H		I
VEL/G -	9	-	8E	-	T	-	3	-	000	-	0	-	2	-	6	-	0

A. Electrical Configuration
9 – Self Generating, 2 wire

B. Connection Method
6A – Integral PVC Cable Unarmoured 80ºC
6B – Integral PVC Cable SWA Armour 80ºC
6C – Integral Teflon Cable Unarmoured 140ºC
6D – Integral Teflon Cable SWA Armour 140ºC
7G - Integral PU Cable, Submersible IP68, 10 Bar
8E - Integral Connection, 2-pin MIL-C-5015
8F - Integral Connector, BNC
8H - Integral Connector, 3-pin MIL-C-5015
8K - Integral Connector, 5-pin M12
9C - Integral Teflon with Convoluted Conduit

C. Connection / Cable Orientation
T – Top Exit
S – Side Exit

D. Mounting Type
1 – ¼ in UNF Male
2 – ½ in UNF Male
3 – M8
4 – Special Mounting Plate (i.e. 2, 3 or 4 hole)
5 – M10 Male or Female
6 – M16 Male or Female
7 - M6 Female
8 – ¼ in UNF Female
S – Special Threads such as 1/2"UNC, 1/4”UNC.

E. Cable / Conduit length
020 – e.g.2m cable, no conduit
02A – e.g.2m conduit, 0.5m excess cable from free end (std
02C – e.g.2m conduit, 1.0m excess cable from free end
02D – e.g.2m conduit, 1.5m excess cable from free end
02E – e.g.2m conduit, 2.0m excess cable from free end

F. Cable / Conduit End Fitting
0 – No cable/conduit end fitting
1 – ¼” BSP female
2 – M16 male
3 – M20 male

G. Output Sensitivity
1 – 4mV/mm/s (100mV/inch/s) Pk ±3%
2 – 20mV/mm/s (500mV/inch/s) Pk ±3%

H. Frequency band (3dB point) & Mounting
See Table 1.

I. Hazardous Area Approval
0 – None
1 – ATEX / IECEx
2 – CCC Ex (to be released)

VEL/GLF Specifications

Operating Voltage	18.0 to 28.0 Vdc
Output signal	IEPE Drive 2.0 mA to 10 mA
Sensitivity	20 mV/mm/s (500 mV/in/s)
Accuracy	±5%
Frequency Range	0.5 Hz to 1kHz, Refer to Figure 1
Maximum Displacement	2.0 mm pk-pk
Bias Voltage	12.0 Vdc ± 20%
Residual electrical noise	10^{-4} mm/sec (10Hz)
Isolation	500Vdc
Orientation	Horizontal or Vertical (±20º)
Weight	250 grams (nominal)
Acceleration limit	2000g pk
Temperature Range	-30°C to +100°C
Protection	Sealed to IP.67

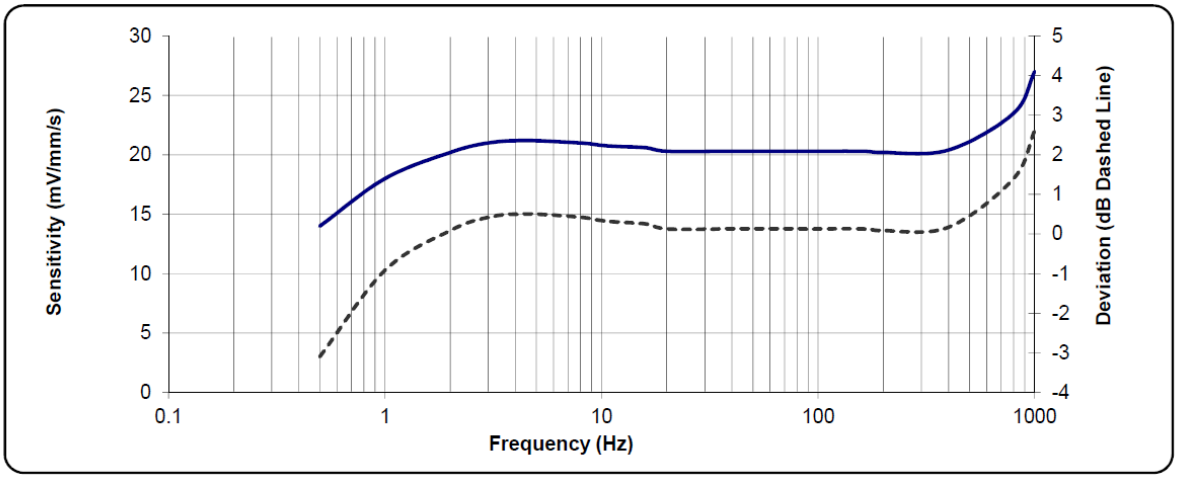

Fig. 1 VEL/GLF Frequency Response

VEL/GLF Ordering Information

	A		BB		C		D		EE		F
VEL/GLF -	2	-	8E	-	T	-	3	-	00	-	0

A. Electrical Configuration
2 – 2 wire, IEPE

B. Connection Method
6C – Integral Teflon Cable Unarmoured 140ºC
6D – Integral Teflon Cable SWA Armour 140ºC
8E - Integral Connection, 2-pin MIL-C-5015

C. Connection / Cable Orientation
T – Top Exit
S – Side Exit

D. Mounting Type
1 – ¼ in UNF Male
3 – M8
5 – M10 Male or Female

E. Cable Length
05 – e.g. = 5 metres

F. Orientation
1 – Vertical
2 – Horizontal

Connections

Connector	*Cable*	*Mode*
Pin A	Red	Hi
Pin B	Black	0V

VEL/GDC Specifications

Operating Voltage	15 to 35 volts DC
Output signal	4-20mA proportional to output range
Output ranges (factory set)	0 – 15mm/s, 20mm/s, 25mm/s & 50mm/s 0 – 100um, 125um, 250um, 500um
Accuracy	±2%
Frequency Range	Refer to Table 2
Maximum Displacement	1500um pk-pk
Maximum Loop Resistance	1000 Ohms
Dynamic Output Sensitivity	20mV/mm/s >100kOhm load
Isolation	500Vdc
Orientation	Refer to Table 2
Weight	250 grams (nominal)
Hazardous Area Approval	Ex II 1 G EEx ia IIC T4 (Tamb = -30°C to +100°C)
Acceleration limit	2000g pk
Temperature Range	-30°C to +100°C
Protection	Sealed to IP.67

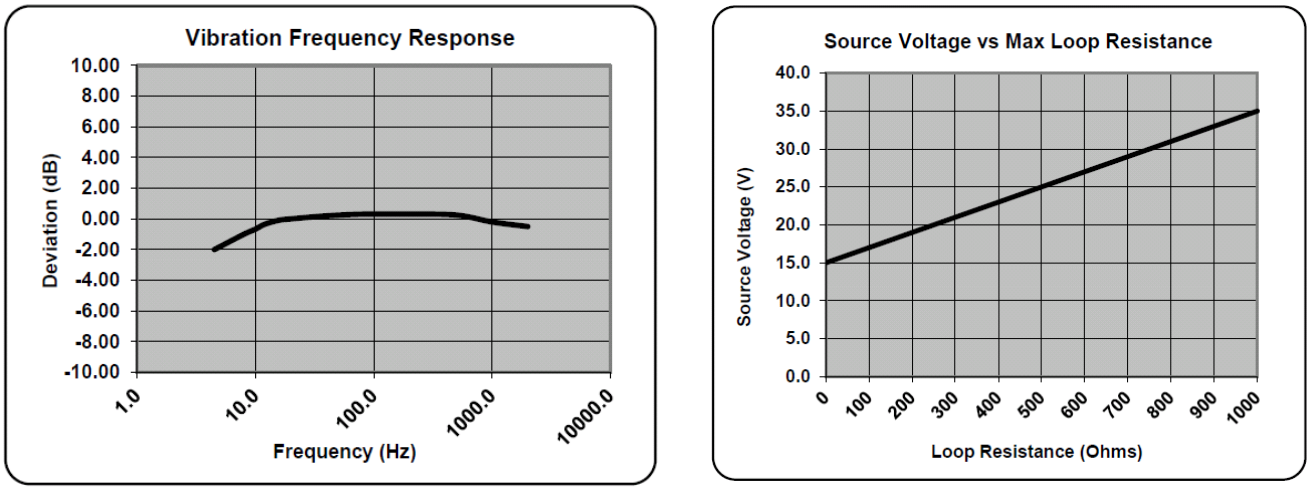

Fig. 2 VEL/GDC Frequency Response

Table 2. VEL/GDC Output sensitivity deviation over frequency range versus mounting angle relative to angle of calibration

Freq. Range (Hz)	Angle of Calibration	Angular Range of Operation (Degrees) From Angle of Calibration	Max. Sensitivity Deviation	Option (G)
15 - 1000	Vertical 0°	Universal (0°±180°	±3dB	1
10 - 1000	Vertical 0°	Vertical 0°±20°	±3dB	2
10 - 1000	Horizontal 90°	Horizontal (90°±10°)	±3dB	3
4.5 - 2000	Vertical 0°	Vertical (0°±20°)	±3dB	4
4.5 - 2000	Horizontal 90°	Horizontal (90°±20°)	±3dB	6

Note: The primary axis of the sensor is parallel to the cylindrical length of the main body assembly.

VEL/GDC Ordering Information

	A		BB		C		D		EE		F		G		H
VEL/GDC -	5	-	8E	-	T	-	3	-	00	-	3	-	2		0

A. Electrical Configuration
5 – 2-wire, loop powered
8 – 3-wire, loop powered + dynamic o/p

B. Connection Method
6C – Integral Teflon Cable Unarmoured 140ºC
6D – Integral Teflon Cable SWA Armour 140ºC
8E - Integral Connection, 2-pin MIL-C-5015

C. Connection / Cable Orientation
T – Top Exit
S – Side Exit

D. Mounting Type
1 – ¼ in UNF Male
3 – M8
5 – M10 Male or Female

E. Cable Length
05 – e.g. = 5 metres

F. Measurement Range

1 – 0 – 15 mm/s	5 – 0 – 100 µm
2 – 0 – 20 mm/s	6 – 0 – 125 µm
3 – 0 – 25 mm/s	7 – 0 – 250 µm
4 – 0 – 50 mm/s	8 – 0 – 500 µm

G – Frequency band & Mounting angle
See Table 2.

H – Hazardous Area Approval
0 – None
1 – ATEX / IECEx
2 – CCC Ex (to be released)

Connections

Connector	*Cable*	*Mode*
Pin 1	Red	Hi
Pin 2	Blue	Lo / 0V
Pin 3	Black	Sig

恒控 GENCON

GENCON Limited
Room 1406, 1332 Lujiabang Road, Shanghai 200011, China
Telephone: +86-21-63187618 Fax: +86-21-63186199
sales@gencon.com.cn www.gencon.com.cn