Bently Nevada 190501-02-99-00

01 Low-frequency measurement boundary

Bently Nevada 190501-02-99-00 measures low-frequency casing vibration velocity on cooling-tower and air-cooled heat-exchanger fan assemblies. This execution combines a 3/8–24 to 1/2–20 stud with an included 32-foot cable.

Rotor / structure	Mounted CT sensor	Cable + input	Velocity processing

Structural transmission

Velomitor CT measures absolute casing velocity rather than shaft displacement relative to a proximity probe. Rotor unbalance or misalignment can increase rotor motion, but a casing-mounted sensor detects that motion only through the machine’s structural transmission path. Select a mechanically representative bearing housing or casing position and avoid treating a low reading at an insensitive location as proof of a healthy rotor.

Frequency-domain interpretation

The narrow and wide frequency-response bands have different amplitude tolerances. Fan rotation, motor vibration and reducer components may occupy different parts of the response curve, so a single broadband number does not establish equal accuracy for all components. The receiving monitor’s filtering and amplitude convention must also be suitable for the speed and fault mechanism being evaluated.

Ordered installation interface

The ordered 3/8–24 to 1/2–20 stud defines the connection between the sensor base and machine surface. The included 32-foot cable defines the supplied signal interface, while conduit adapters and protective housings remain separate accessories. Mounting stiffness, base strain, cable loading and environmental exposure affect the usable measurement; these conditions must be checked together before a channel is returned to protection.

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02 Conversion and dynamic response

Measurement output	Vibration velocity
Nominal sensitivity	3.94 mV/(mm/s), equivalent to 100 mV/(in/s)
Sensitivity tolerance	±5% at specified reference conditions
Tight-band frequency response	3–900 Hz, ±1.0 dB
Wide-band frequency response	1.5 Hz–1 kHz, ±3.0 dB
Peak velocity range	63.5 mm/s; frequency-dependent operating curves apply
Amplitude linearity	±2% through 63.5 mm/s peak
Typical thermal sensitivity change	−8% to +5% over operating range
Transverse response	Less than 5% of axial sensitivity
Mounted resonance	9 kHz minimum, stud mounted; quick disconnect excluded
Output bias	10.1 ±1.0 V DC, Pin A relative to Pin B
Typical dynamic output impedance	Less than 400 Ω
Broadband noise floor	0.229 mm/s peak over 1.5 Hz–1 kHz

Low-speed frequency conversion

90 rpm equals 1.5 Hz and 180 rpm equals 3 Hz. These are derived rotational frequencies: the lower one is at the wide-band boundary, while the latter enters the tighter response band. Include the actual monitor filter response in the comparison.

Nominal signal example

A 10 mm/s velocity magnitude corresponds to 39.4 mV at nominal sensitivity. Use matching amplitude conventions and allow for sensitivity, temperature and frequency response; this arithmetic does not establish a complete measurement uncertainty.

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03 Mounting, cable and environmental limits

Base-strain sensitivity	0.43 mm/s per microstrain
Electrical grounding	Internal electronics isolated from case
Operating temperature	−40 to +85 °C
Storage temperature	−40 to +100 °C
Shock limit	5000 g peak maximum
Humidity	100% condensing; not submerged
Case material	316L stainless steel
Mounting hardware	3/8–24 to 1/2–20 stud
Connection execution	included 32-foot cable
Mounting torque	4.5 ±0.6 N·m
Mounting orientation	Any orientation; sensing direction retained
Maximum stated cable example	305 m of cable 02173006 under stated conditions
Conditional cable recommendation	219 m at 4 in/s, 1 kHz and 200 pF/m

Cable capacitance example

At 200 pF/m, 219 m represents 43.8 nF of cable capacitance, before connector or input effects. That derived value belongs to the stated cable recommendation and must not be applied to a different waveform without assessment.

Noise and usable signal

The broadband peak-noise figure describes the full specified band. It is not a universal alarm threshold or the noise in every narrow-band measurement. Validate the actual processing and operating background before choosing an acceptance criterion.

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04 Applications and interpretation decisions

Cooling-tower fan assemblies

Evaluate low-speed casing vibration where the structural transmission path is adequate for the protection objective.

Air-cooled heat-exchanger fans

Retain a suitably low-frequency monitoring path for slow fan rotation and associated harmonics.

Fan motor and speed reducer

Assess components inside the usable velocity-response band without assuming the same tolerance at every frequency.

Existing Velomitor CT channels

Restore the specified mounting and connection execution while preserving channel scaling, phase convention and filtering.

High-frequency overload

Vibration above 1 kHz exceeding 10 g peak can significantly reduce the available velocity range, even if the desired measurement component is at a lower frequency.

Cable statements

The 305 m specified-cable example and the 219 m recommendation at explicit amplitude, frequency and capacitance conditions are separate limits. Neither is a universal guarantee for every cable or waveform.

Mechanical strain

Base strain can create an apparent velocity contribution. Inspect seating, mounting stress and cable forces when the indication changes without a corresponding machine operating change.

Amplitude convention

Keep peak, RMS and peak-to-peak conventions consistent between the test reference and monitoring channel; nominal sensitivity alone does not define the displayed convention.

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05 Replacement scope and engineering checks

Lifecycle and replacement scope

The current manufacturing and support phase of 190501-02-99-00 is unconfirmed. Replacement suitability depends on the installed low-frequency velocity channel and mechanical execution. Retain the Velomitor CT measurement characteristic, mounting hardware, cable interface and required approval execution. A standard higher-frequency velocity sensor is not equivalent merely because its nominal sensitivity matches.

Can the included cable of 190501-02-99-00 be treated as proof that every connected monitor will retain the low-frequency response?

No. The monitor input and its filtering remain part of the measurement path. Check the configured low-frequency cutoff and compare the complete channel against an appropriate low-frequency reference before using the fan-speed component for protection.

Why can 190501-02-99-00 show a smaller fan-speed component at 90 rpm than expected from a 100 Hz calibration?

90 rpm is 1.5 Hz, at the edge of the wider ±3 dB band rather than the tighter ±1 dB band. Include both sensor and monitor response in the comparison and test near the actual rotational frequency.

Technical basis

Bently Nevada 190501 Velomitor CT Transducer, 141636 Rev. AF. The 190501-02-99-00 mounting and connection execution is interpreted from the 190501 ordering table. Sensor performance is specified at +20 to +30 °C and 100 Hz unless stated otherwise; cable, amplitude and frequency limits retain their individual conditions.

Other Bently Nevada product references

Bently Nevada 177230-02-01-05

Bently Nevada 330101-00-25-05-11-00

Bently Nevada 330101-00-30-90-02-05

Separate product references; no substitution or compatibility is implied.