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vb7 Portable Data Collector, Analyzer and Balancer

Datasheet

Bently Nevada Machinery Condition Monitoring

116M5255 Rev. H



Description

The vb7 Portable Data Collector, Analyzer and Balancer instrument is a dual channel vibration data collector, analyzer and balancer. You can use this device for on-route and off-route data collection, machine-side analysis and diagnosis as well as on-site dynamic balance correction.

The vb7 Portable Data Collector, Analyzer and Balancer is certified for Class 1 Division 2 hazardous areas. It is ergonomically designed and lightweight for all day comfort.

The vb7 provides recordings with up to 6,400 lines of resolution and up to 40 kHz F_{max}. Our patented adaptive settling algorithm and 6Pack recording system offer quick, one-step data recording.

The vb7 Portable Data Collector, Analyzer and Balancer has plenty of storage and long battery life, and is backed by a five year warranty.

The vb7 Portable Data Collector, Analyzer and Balancer is one of Bently Nevada hardware monitoring assets that work with System 1 software.

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The vb7 Portable Data Collector, Analyzer and Balancer offers the following features:

- Dual channel simultaneous recordings
- 6,400 lines FFT resolution
- Supports 40 kHz F_{max}
- Two-plane balancing
- Laser speed sensor for automatic capture of machine running speed
- Keyphasor tach mode
- 1 GB memory
- ≥ 95 dB dynamic range
- Spectrum and waveform recordings
- Demodulation for early detection of rotating machinery problems such as bearing faults
- Unique 6Pack recording system
- Full analysis capabilities such as time synchronous averaging, coastdown and runup, bump test, cross-channel phase, orbit plot, and long time waveform
- DC-coupled sensor support
- Numeric parameter input via keypad with trend and alarm capability
- Sensor cable self-test feature
- Option to add flex features such as modal analysis and Remote Comms
- USB host port for data transfer to external USB drive
- Upgradable Proflash system and free firmware updates for 5 years
- Five-year warranty on the instrument hardware

Specifications

Sensors

Sensor Input	Two channels simultaneous sampling
Compatible Sensor Types	Accelerometer, velocity, displacement, current
AC Coupled Range	16 V peak-peak Allows for ± 8 V sensor output swing (± 80 g)
DC Coupled Ranges	0 V to 20 V, -10 V to 10 V, -20 V to 0 V E.g. For reading prox-probe gap
Connectors	2 x BNC (CH1/CH2) Safety feature: Break-free inline connector
Analog to Digital Conversion	24-bit ADC
Sensor Excitation Current	0 mA or 2.2 mA (configurable), 24 V maximum 2.2 mA required power for IEPE/ICP type accelerometer
Sensor Detection	Warns if short circuit or not connected

Tachometer Sensor

Sensor Type	Laser sensor with reflective tape Sensor triggers on beam reflection
Laser Sensor Range	10 cm to 2 m nominal Range depends on size of reflective tape

Tachometer Input

Supported Sensor Types	Laser Tach, Contact, TTL Pulse, Keyphasor Instrument has optically isolated input
Power Supply to Sensor	5 V, 50 mA
TTL Pulse Rating	3.5 V (4 mA) min 28 V (5 mA) max Off-state 0.8 V
Keyphasor Thresholds	7.7 ± 0.5 V, 13.2 ± 0.8 V, 18.5 ± 1 V Nominally 8 V, 13 V, 18 V
Speed Range	10 RPM to 300,000 RPM (0.2 Hz to 5 kHz) Pulse width at least 0.1 ms
Accuracy	± 0.1 %
Output to Drive Strobe	Up to 140 Hz (8400 CPM) Typical Depends on strobe type Special cable required

Parameter Indication

Maximum Levels (peak)	> 1000 g (10,000 m/s2) > 1000 in/sec (25,000 mm/s) > 20 in (500 mm) > 10,000 amps Effective limit is sensor sensitivity and output voltage.
Dynamic Signal Range	> 95 dB typical at 400 line resolution
Harmonic Distortion	Less than -70 dB typical Other distortions and noise are lower
Units	g or m/s2 or adB in/s or mm/s or vdB mil or mm or µm adB, vdB, amps, user defined 0-peak, peak-peak or RMS

	Auto-scale by 1000x when required US and SI options for adB and vdB
Magnitude and Cursors	Overall RMS value Waveform True pk-pk Dual cursors Harmonics Digital readouts on chart
Base Accuracy	± 1% of readings approximately 0.1 dB For AC signal: % of reading For DC signal: % of full scale
High Frequency Attenuation	≤ 0.1 dB 100 Hz to 10 kHz ≤ 3 dB > 10 kHz to 40 kHz Attenuation tolerances are in addition to base accuracy.
AC Coupling Attenuation	≤ 0.1 dB 10 Hz to < 100 Hz ≤ 3 dB 1 Hz to < 10 Hz
Attenuation Due to Integration (normal mode)	≤ 0.1 dB 10 Hz to < 100 Hz ≤ 1.5 dB 1 Hz to < 10 Hz Values apply to single integration. (Acceleration to velocity) Double the values for double integration (Acceleration to displacement)
Attenuation Due to Integration (low frequency mode)	≤ 0.1 dB 1 Hz to <100 Hz ≤ 1.5 dB 0.2 Hz to <1 Hz Applies when coupling = DC and F_{max} ≤ 100 Hz

Spectrum Display

F_{max} Ranges	25, 50, 100, 125, 150, 200, 300, 400, 500, 600, 800, 1000, 1200, 1600, 2000, 2500, 3000, 4000, 5000, 6000, 8000, 10,000, 15,000, 20,000, 30,000, 40,000 Hz Or equivalent CPM values Or orders-based
	from 1X to 999X
F_{min} Possible Range	0 to F_{max} Instrument zeroes all spectral lines below Fmin.
Resolution	400, 800, 1600, 3200, 6400 lines

Frequency Scale	Hz, CPM, Orders Linear scale with zooming
Amplitude Scale	Acceleration, velocity, displacement, current, voltage Linear or log scales, auto or manual scaling
Window Shapes	Hanning Rectangular
Overlap	(0, 12.5, 25, 37.5, 50, 62.5, 75, 87.5) % Depends on Fmax and number of lines
Number of Averages	1, 2, 4, 8, 16, 32, 64, 128 Increases sampling time proportionally
Averaging Types	Linear, exponential, peak hold, synchronous
Demodulation Bandwidths	23 bandwidth options From 125 Hz to 1250 Hz Up to 16 kHz to 20 kHz
6Pack	Up to 40 kHz and 3200 lines (1 channel) Up to 20 kHz and 1600 lines (2 channels) Spectrum and waveform for low-frequency, high-frequency and demodulation
Order Tracking	Up to 6 kHz Fmax Orders-based Tachometer required Mounted on high-speed shaft
Order Tracking - Distortion	< -65 dB Within 50% to 200% speed variation during recording

Waveform Display

Number of Samples	1024, 2048, 4096, 8192, 16,384
Time Scale	10 ms to 256 seconds or orders based from 1 to 999 revs
Time Synchronous Averages	1, 2, 4, 8, 16, 32, 64, 128 Only available when tachometer triggered
Long Time Waveform F_{max}	25 Hz to 40 kHz 20 kHz dual channel
Long Time Waveform Duration	14.7 million samples (total over channels) E.g. for F_{max} 1 kHz, Fsample = 2.56 kHz and Duration = 1.6 hrs

Logging and Analysis

Output Formats	Instrument screen, transfer to Ascent or System 1, XML
Data Storage	Dual 1 GB non-volatile flash memories Database mirror copy on second flash memory
Data Storage Structure	Folders/machines/ points/locations/routes No limits are applied 50 character names
Max Folder Size	10,000 measurement locations

Balancing

Planes	Up to 2 planes 2 sensors
Speed Range	30 to 60 000 RPM
Measurement Type	Acceleration Velocity Displacement
Weight Modes	Angle 0° to 360° Fixed position Circumference arc E.g. Weights on fan blades, linear dist. around circumference
Remove Trial Weights	Leave or remove trial weights for final balance Automatic recalculation
Manual Data Entry	Yes Allows re-entry of previous balance jobs
Storage of balancing jobs	In the data structure where machine vibration readings are stored No limits applied

Display and Communication

Display	Graphic Grayscale LCD LED Backlight
Resolution and Size	480 x 320 (HVGA), 5.5" (140 mm) Readable in direct sunlight
Supported Languages	English, Chinese, French, German, Japanese, Portuguese, Russian and Spanish
Communication with PC	USB and Ethernet Use PROFLASH to upgrade instrument firmware
USB Host Port	USB 2.0, supplying 5V, 250mA Save folders to USB flash drive

Battery and Charger

Battery Type	Custom Lithium Ion pack, 7.4 V, 5 Ah
Operating Time	10 hours Backlight on — 60 second timeout
Charger Type	Internal charging, automatic control External power pack 12 V DC, 3 A output
Charge Rate	3 A nominal 3 hours for complete charge

Mechanical

Size	9.9" W x 5.8" L x 2.4" H (252 x 148 x 60 mm)
Weight	2.7 lb (1.2 kg) Including battery and strap

Environmental Limits

Operating Temperature	14 °F to 122 °F (-10 to 50 °C)
Storage Temperature and Humidity	-4 °F to 140 °F (-20 to 60 °C), 95% RH Up to 95 F (35 C), 85% RH if storage exceeds 1 month
Ruggedness	IP65 sealed 4' (1.2 m) drop onto concrete Procedure: 26 drops following MIL-STD-810F-516.5-IV

Compliance and Certifications

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

EMC

EN 61326-1: 2012

EN 61326-2-3: 2012

EMC Directive 2014/30/EU

Electrical Safety

EN 62133: 2002

LV Directive 2014/35/EU

RoHS

RoHS Directive 2011/65/EU

Hazardous Area Approvals

For the detailed listing of country and product specific approvals, refer to the *Approvals Quick Reference Guide* (108M1756) available from Bently.com.

CSA/NRTL/C (Approval Option 01)	Class I, Division 2, Groups A, B, C, D

Ordering Information

For the detailed listing of country and product specific approvals, refer to the *Approvals Quick Reference Guide* (108M1756) available from Bently.com.

VB7-AA

A: Agency Approval	
01	CSA / NRTL / C (Class 1, Division 2)

Basic Kit

We offer the vb7 Portable Data Collector, Analyzer and Balancer instrument in a basic kit with the option to purchase System 1 or Ascent software and license separately.

* Kit items below with multiple part numbers listed have limited regional availability due to certification requirements.

Part Number	Description	Qty
	vb7Portable Data Collector, Analyzer and Balancer single channel portable data collector	1
ACCL0547 or 200350 *	Straight accelerometer	1
ACCL0561 or 200350 *	Right-angled accelerometer or straight accelerometer	1
138M7748	Transducer cable, 4 ft. straight	2
MAGF0104	Accelerometer magnetic base	2
CABB0560	BNC to BNC cable, 1m	2
CABU0213	USB data transfer cable	1
110M8172-012	LEMO-BNC TTL Tach/Keyphasor cable	1
PLUS0230	Category A power plug, USA / Canada	1
PLSA0241	Category D power plug, South Africa / India	1
PLAU0228	Category M power plug, Australia / New Zealand / China	1
PLHK0245	Category G power plug, Hong Kong / UK	1
PLEU0229	Category C Power plug, Europe	1
CBVB0552	vbx instrument carry bag	1
109M2384-02	Neck strap with Sensor Keeper	1
108M4044	AC power adapter	1
DCCA0041	DC car adapter	1
108M3536	SCOUT100_Series and vbSeries Quick_Start_ Guide	1
MVBX0250	Instrument Reference guide	1

Metrology certification can be requested when an order is placed, however this service is charged. Standard test data can be requested for free, but is not evidence of calibration.

To request a periodic metrology calibration, contact **Bently Nevada Tech Suppport**.

Accessory Kits

Balancing Kit - 108M4050-02

Part Number	Description	Qty
113M5529-01	Reflective tape One roll, 60 cm	1
LASA0315	Laser Tach Kit Zone 2 rated	1
CBL50216	Laser cable Five meters	1
MAGA0063	Laser magnetic stand	1
CB5G0024	Sensor Cable Five meters, green	1
CB5R0025	Sensor Cable Five meters, red	1
CBBL0026	Carrying case for the kit	1

Zone 2 Laser Tach Kit - LASA0315

Part Number	Description	Qty
108M4064	Laser Tacho Holder	1
108M4066	Circlips - 20Mm Stainless	1
108M4067	Arp115 Oring	2
108M4069	Laser Tach Zone 2 rated	1

Additional Accessories

Software

Part Number	Description
108M4051	ASCENT Level 1
108M4052	ASCENT Level 2
3071/01	System 1

Miscellaneous Parts

Part Number	Description
MAGM0064	Accelerometer magnetic base Male connection
KEY70258	Keyphasor cable BNC to LEMO
VBMR0222	Stainless safety rings (1 pair)
100M5828	The vbSeries hard case
DTC70262	The vbSeries dust cover
BATT0575	Replacement battery pack, Li-Ion 7.4 V 5 Ah

All accessories included in the basic kit, balancing kit and Laser Tach kit may also be ordered separately.

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