

Snapshot IS (Intrinsically Safe) Portable Data Collector

Bently Nevada™ Asset Condition Monitoring



Description

The Snapshot™ IS is intended for periodic manual collection of data as part of a plant asset management program. The instrument offers a single vibration channel plus speed/phase input. Its ATEX Directive II Ga Ex ia IIC T4 (Ta -20°C to +50°C), and Directive I Ma Ex ia (Ta 0°C to +50°C) hazardous area approval permits use in Intrinsically Safe environments without the need for a special “hot work” permit. Snapshot™ IS interfaces with the Bently Nevada’s System 1™ software platform. The user configures point and route information in System 1, downloads the configuration to the Snapshot IS, and transfers collected data back to System 1 for display, trending, and storage. Selected features include:

- Unit provides single-channel data acquisition with a second channel for phase and speed input.
- Lightweight design allows single-handed use for extended periods of time with minimal physical effort.
- IP54 rating permits use in harsh environments.
- Removable NiMH battery provides 6 to 8 hours of use between charges.
- Polycarbonate/ABS case design provides high impact resistance and durability.
- 1/8 VGA display (backlit) and integral touchscreen provide a convenient user interface.
- Ergonomically designed keypad permits simple operation with either the left or right hand, even with gloves on.
- Intuitive user interface simplifies operation.
- 16 MB of standard on-board memory accommodates large data collection schedules.
- Unit supports a wide variety of rack buffered measurement types and signal processing options, including:
 - Proximity probes
 - Velocity transducers
 - Accelerometers
 - Temperature measurements
 - Numeric data

- Manually keyed notes
- User-configurable dynamic inputs
- REBAM® transducers

The Snapshot IS data collector uses System 1 host software (refer to System 1 Specifications and Ordering Information, p/n 145146-01) for permanent storage of all collected data and for system configuration functions.

Specifications

Operating System

Microsoft Windows® CE

System Features

Battery Power:

1800mAh

Battery Type:

4.8V NiMH

Memory:

16Mb on board.

Local Display Plots Supported

- Current value/bar graph
- Trend
- Direct and filtered timebases
- Half spectrum

Spectrum configurations

- Frequency resolution, user-selectable from 100, 200, 400, 800, 1600, 3200, 6400 lines
- Frequency span, user-selectable ranges between 0-25Hz and 0-40 kHz.

Inputs Supported

- Proximity transducers*
- REBAM transducers*
- Velocity Seismoprobe® transducers*
- Velomitor® transducers
- Accelerometers*
- Optical and Proximity Phase *
- Infrared (IR) Temperature Probe (optional item)
- Proportional Voltage
- Dynamic inputs*

***Note:** Internal transducer power is available only for constant current (2 wire) devices. Other devices require a valid rack buffered signal.

Measurements Supported

- mm/s², g – 0-pk, rms
- mm/s, in/s – 0-pk, rms
- μm, mil – pp
- Enveloping
- Integrated Velocity
- Integrated Displacement
- Direct Amplitude
- 1X & 2X Vectors
- REBAM (rotor region and prime spike filters)
- Gap
- Temperature
- Proportional Voltage
- Speed (10 to 100,000rpm)
- Phase
- User-definable low-, high- and band pass filters.

Note: The above measurements can be applied to user-configurable dynamic data within an input range of ± 10 volts or 0 to –24 Vdc

Environmental Limits

Operating Temperature:

–10°C to +50°C (14°F to +122°F)

Relative Humidity:

To 85%, non-condensing

Electro magnetic compatibility:

Complies with EN50081-2 (emission) and EN61000-6-2 (susceptibility)

Rating:

IP54

Safety Ratings

ATEX/IECEX:

Group II (Petrochemical) Ga Ex ia IIC T4

Group I (Mining) Ma Ex ia I

Physical**Length:**

186mm (7.3 in)

Width:93mm (narrowest) to 134mm
(widest)**Depth:**

50mm (2.0 in)

External Power Input and Battery**Power Input****Maximum Input Voltage:**

9.6 V

Maximum Current Draw:

600 mA

Connector:

Fischer DBPE102A051

Battery**Type:**

4.8V NiMH

Capacity:

1800 mAh

Time Between Charges:

6 to 8 hours (typical in use)

Charge Time:

11 hours

Transducer Power Supplies**Velomitor & Constant Current Transducers Power****Voltage:**

+19.0 to +21.0 V

Current:

3.36 to 5.04 mA

Signal Inputs**Displacement (Rack-Buffered Only)****Input Impedance:**125 k Ω nominal**Input Voltage Range:**

-0.20 to -24.25 V.

Analysis Application OK Limits:

-4.15 to -16.75 V

DC Accuracy: \pm 50 mV**AC Accuracy:** \pm 1.2% plus Filter Attenuation (signals below 5 kHz) \pm 1.7% plus Filter Attenuation (signals between 5 kHz and 40 kHz)**AC Accuracy (1X & 2X Vectors):****Note:** These specifications apply over the valid input frequency range of the Phase Reference (10-100,000 rpm). \pm 1.2% plus Filter Attenuation**Noise Offsets:**

Minimum noise offsets in all cases are zero. All values are based on Snapshot IS operating from its own battery.

Frequency Range

5 to 5,000 Hz

10 to 10,000 Hz

DisplacementSpecifications and Ordering Information
Part Number 167346-01
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< 4.0 mV pk
< 5.6 mV pk

Velomitor & Other Constant Current Velocity Transducers

Input Impedance:

50 kΩ nominal

Input Voltage Range:

0 to -19.17 V.

Analysis Application OK Limits:

-4.15 to -19.85 V

AC Accuracy (Non-Integrated):

±1.2% plus Filter Attenuation (signals below 5 kHz)
±1.7% plus Filter Attenuation (signals between 5 kHz and 40k Hz)

AC Accuracy (Integrated, for signals ≥ 10Hz):

±1.2% plus Filter Attenuation (signals below 5 kHz)
±1.7% plus Filter Attenuation (signals between 5 kHz and 40 kHz)

AC Accuracy (1X & 2X Vectors):

Note: These specifications apply over the valid input frequency range of the Phase Reference (10-100,000 rpm)
±1.2% plus Filter Attenuation (signals below 5 kHz)

Noise Offsets:

Minimum noise offsets in all cases are zero. All values are based on Snapshot IS operating from its own battery.

Frequency Range	Non-Integrated	Intg mil & μm pp 100 mV/in/s transducer
3 to 3,000 Hz	≤4.6 mV pk	≤0.33 mil (8.38 μm)
5 to 5,000 Hz	≤4.6 mV pk	≤0.23 mil (5.84 μm)
10 to 10,000 Hz	≤5.4 mV pk	≤0.23 mil (5.84 μm)

9200, 147633 and Other Seismoprobes

Input Impedance:

125 kΩ nominal

Input Voltage Range:

-10.1 to + 10.2 V.

Analysis Application OK Limits:

-4.0 to + 4.0 V

AC Accuracy (Non-Integrated):

±1.2% plus Filter Attenuation (signals below 5 kHz)
±1.7% plus Filter Attenuation (signals between 5 kHz and 40 kHz)

AC Accuracy (Integrated, for signals ≥ 10 Hz):

±1.2% plus Filter Attenuation (signals below 5 kHz)
±1.7% plus Filter Attenuation (signals between 5 kHz and 40 kHz)

AC Accuracy (1X & 2X Vectors):

Note: These specifications apply over the valid input frequency range of the Phase Reference (10-100,000 rpm).
±1.2% plus Filter Attenuation (signals below 5 kHz)

Noise Offsets:

Minimum noise offsets in all cases are zero. All values are based on Snapshot IS operating from its own battery.

Frequency Range	Non-Integrated	Intg mil & μm pp 500 mV/in/s transducer
3 to 3,000 Hz	≤ 3.2 mV pk	≤ 0.07 mil (1.78 μm)
5 to 5,000 Hz	≤ 3.2 mV pk	≤ 0.03 mil (0.76 μm)
10 to 10,000 Hz	≤ 3.9 mV pk	≤ 0.03 mil (0.76 μm)

Accelerometer (Rack-Buffered Only)**Input Impedance:**

125 k Ω nominal

Input Voltage Range:

-0.20 to -24.25 V

Analysis Application OK Limits:

-2.75 to -15.05 V

AC Accuracy (Non-Integrated):

$\pm 1.2\%$ plus Filter Attenuation (signals below 5 kHz)
 $\pm 1.7\%$ plus Filter Attenuation (signals between 5 kHz and 40 kHz)

AC Accuracy (Integrated, for signals ≥ 10 Hz):

$\pm 1.2\%$ plus Filter Attenuation (signals below 5 kHz)
 $\pm 1.7\%$ plus Filter Attenuation (signals between 5 kHz and 40 kHz)

AC Accuracy (1X & 2X Vectors)

Note: These specifications apply over the valid input frequency range of the Phase Reference (10-100,000 rpm).

$\pm 1.2\%$ plus Filter Attenuation (signals below 5 kHz)

Noise Offsets:

Minimum noise offsets in all cases are zero. All values are based on Snapshot IS operating from its own battery.

Frequency Range	Non-Integrated	Intg in/s & mm/s pk 100 mV/g transducer
5 to 5,000 Hz	≤ 4.0 mV pk	≤ 0.05 in/s (1.16 mm/s)
10 to 10,000 Hz	≤ 5.6 mV pk	≤ 0.05 in/s (1.16 mm/s)
20 to 20,000 Hz	≤ 6.4 mV pk	≤ 0.02 in/s (0.58 mm/s)
30 to 30,000 Hz	≤ 6.4 mV pk	≤ 0.02 in/s (0.58 mm/s)
40 to 40,000 Hz	≤ 9.5 mV pk	≤ 0.02 in/s (0.58 mm/s)

Constant Current Acceleration Transducer**Input Impedance:**

50 k Ω nominal

Input Voltage Range:

0 to +19.17 V.

Analysis Application OK Limits:

-2.05 to -15.05 V

AC Accuracy (Non-Integrated):

$\pm 1.2\%$ plus Filter Attenuation (signals below 5 kHz)
 $\pm 1.7\%$ plus Filter Attenuation (signals between 5 kHz and 40 kHz)

**AC Accuracy
(Integrated, for
signals ≥ 10 Hz):**

$\pm 1.2\%$ plus Filter Attenuation
(signals below 5 kHz)

$\pm 1.7\%$ plus Filter Attenuation
(signals between 5 kHz and 40
kHz)

**AC Accuracy (1X
& 2X Vectors)**

Note: These specifications apply
over the valid input frequency
range of the Phase Reference (10-
100,000 rpm).

$\pm 1.2\%$ plus Filter Attenuation
(signals below 5 kHz)

Noise Offsets:

Minimum noise offsets in all cases
are zero. All values are based on
Snapshot™ IS operating from its
own battery.

Frequency Range	Non-Integrated	Intg in/s & mm/s pk 100 mV/g transducer
5 to 5,000 Hz	≤ 3.8 mV pk	≤ 0.06 in/s (1.47 mm/s)
10 to 10,000 Hz	≤ 6.9 mV pk	≤ 0.04 in/s (1.12 mm/s)
20 to 20,000 Hz	≤ 3.1 mV pk	≤ 0.02 in/s (0.56 mm/s)
30 to 30,000 Hz	≤ 4.6 mV pk	≤ 0.02 in/s (0.56 mm/s)
40 to 40,000 Hz	≤ 6.1 mV pk	≤ 0.02 in/s (0.56 mm/s)

Temperature

**Input
Impedance:**

125 k Ω nominal

**Input Voltage
Range:**

-10.1 to + 10.2 V.

DC Accuracy:

± 10 mV for inputs between ± 2 V

Generic Vibration ± 10 V, 0 to -24 V

**Input
Impedance:**

125 k Ω

**Input Voltage
Range:**

-10.1 to + 10.2 V (± 10 V)

0 to -24.25 V. (0 to -24 V)

**Analysis
Application OK
Limits:**

Not implemented

DC Accuracy:

± 25 mV. (± 10 V)

± 50 mV. (0 to -24 V)

**AC Accuracy
(Non-
Integrated):**

$\pm 1.2\%$ plus Filter Attenuation
(signals below 5 kHz)

$\pm 1.7\%$ plus Filter Attenuation
(signals between 5 kHz and 40
kHz)

**AC Accuracy
(Integrated, for
signals ≥ 10 Hz):**

$\pm 1.2\%$ plus Filter Attenuation
(signals below 5 kHz)

$\pm 1.7\%$ plus Filter Attenuation
(signals between 5 kHz and 40
kHz)

**AC Accuracy (1X
& 2X Vectors)**

Note: These specifications apply
over the valid input frequency
range of the Phase Reference (10-
100,000 rpm).

$\pm 1.2\%$ plus Filter Attenuation
(signals below 5 kHz)

Noise Offsets:

Minimum noise offsets in all cases
are zero. All values are based on

Snapshot IS operating from its own battery.

Frequency Range	± 10 V Input Range	0 to -24 V Input Range
5 to 5,000 Hz	≤ 3.5 mV pk	≤ 4.0 mV pk
10 to 10,000 Hz	≤ 4.2 mV pk	≤ 5.6 mV pk
20 to 20,000 Hz	≤ 3.8 mV pk	≤ 4.8 mV pk
30 to 30,000 Hz	≤ 4.6 mV pk	≤ 5.6 mV pk
40 to 40,000 Hz	≤ 6.4 mV pk	≤ 8.4 mV pk

Process Variable (± 10 V)

Input Impedance:

125 k Ω nominal

Input Voltage Range:

-10.1 to + 10.2 V

DC Accuracy:

± 25 mV

Process Variable (0 to -24 V)

Input Impedance:

125 k Ω nominal

Input Voltage Range:

0 to -24.25 V

DC Accuracy:

± 50 mV

Phase Reference Input

Input Impedance:

125 k Ω nominal

Input Voltage Range:

-24 to + 10 V

Minimum Input Amplitude:

2.0 Vpp

Minimum Input Pulse Width:

1 % or 50 μ s whichever is greater

Speed Response:

10 to 100,000 rpm

Speed Accuracy:

± 1 rpm or 0.1% whichever is greater

Threshold Voltage Accuracy:

-865 mV, +861 mV

Hysteresis Setting Accuracy:

0.348 V Max (0.25 V)

0.693 V Max (0.5 V)

1.878 V Max (1.25 V)

3.684 V Max (2.5 V)

RMS Measurements

RMS performance meets the AC accuracy specifications stated earlier.

Signal Conditioning

**Filter Specifications
High Pass Filters**

Type:

4 Pole, Butterworth

Attenuation at corner Frequency:

-2.665 to -3.356 dB

RMS Measurements:

-2.665 to -3.356 dB

Passband Attenuation:

≤ 1.5 % of input signal amplitude max.

(Input frequency > 2.10 * Corner Frequency)

Low Pass Filters

Type:

4 Pole, Butterworth

Attenuation at corner

Frequency:

-2.665 to -3.356 dB

RMS

Measurements:

-2.665 to -3.356 dB

Passband

Attenuation:

≤1.5 % of input signal amplitude max.

(Input frequency < 0.55 * Corner Frequency)

Note: For configurations where the low pass filter is disabled, the passband frequencies (-1.5 % attenuation) are 30 kHz for integrated measurements and 40 kHz for other measurements.

Passband Attenuation

The passband attenuation is not additive for each filter. The attenuation is -1.5% at 2.1 x the high pass filter corner frequency and also at 0.55 x the low pass corner frequency. As the signal approaches midband the attenuation is reduced. The minimum low pass corner allowable by Snapshot is 4 x high pass corner which ensures that the passband attenuation is ≤ -1.5 % at the midband.

The midband frequency = $\sqrt{F_{HP} \times F_{LP}}$

Vector Measurements

1X Vector

Phase

Accuracy:

± 3° for speeds up to 50,000 rpm

± 5° for speeds from 50,000 to 100,000 rpm (unintegrated)

± 5° for speeds from 50,000 to 80,000 rpm, ± 8° for speeds from 80,000 to 100,000 rpm (integrated)

2X Vector

Phase

Accuracy:

± 6° for speeds up to 50,000 rpm

± 10° for speeds from 50,000 to 100,000 rpm (unintegrated)

± 10° for speeds from 50,000 to 80,000 rpm, ± 16° for speeds from 80,000 to 100,000 rpm (integrated)

Minimum 1X &

2X Rejection:

30 dB

Frequency Spectrum

Snapshot provides a simple frequency spectrum display to aid with machinery condition evaluation. Cursors are available on the screens, which allow the user to determine the amplitude and frequency of any particular vibration component.

Frequency Resolution:

Spectrum Frequency Span / Number of lines.

Frequency Accuracy:

± 0.01%

Amplitude Accuracy:

± 2% of input signal amplitude (For input signal frequency = Cursor frequency ± 5% of frequency resolution)

Signal to noise ratio (SNR):

30 dB minimum. (Signals > 10 mV pk)

Measurements Supported

For easy reference this table summarizes the measurements supported by the Snapshot for Windows CE and the Snapshot IS.

Measurement	Snapshot for Windows CE	Snapshot IS
Variables:		
Direct	✓	✓
Direct Max/Min/Avg	✓	✓
Rotor Region	✓	✓
Prime Spike	✓	✓
Gap	✓	✓
1x (Mag and Phase)	✓	✓
2x (Mag and Phase)	✓	✓
Speed (RPM)	✓	✓
DC Process Variable	✓	✓
Enveloped Overall	✓	✓
Dynamic:		
Asynchronous Time Waveform	✓	✓
Asynchronous Spectrum	✓	✓
Synchronous Time Waveform	✓	✗
Orbit	✓	✗
Enveloped Time Waveform	✓	✓
Enveloped Spectrum	✓	✓

Ordering Information

Snapshot IS

PDC400-A01

A: Accessory Package:

- 01** Snapshot IS with Velomitor Kit
- Snapshot™ IS Assembly
 - Battery & Power Adapters
 - Manual & (1) Stylus
 - RS232 Lap-link Cable
 - Transport Case
 - (2) BNC Cable
 - 330500 Velomitor
 - (1) 330500 Velomitor Cable
 - (1) Magnetic Base
 - (1 each) Long & Short Stinger
 - (1) Quick Connection Adapter
 - (1) Stud Adapter 1/4-28
 - Banana Adapter
 - (1) Test Clip Adapter

Accessories

140867-01

Snapshot Getting started guide

167982-01

Snapshot IS User Guide

02200283

RS232 LapLink Cable

173663

Spare battery pack

173665

Spare mains adapter/ battery charger

174204

Power Supply cable for Europe

174206

Power Supply cable for UK

174207

Power Supply cable for USA

174205

Power Supply cable for South Africa/India

174203

Power Supply cable for Australia

165774

PDC400 replacement transport case

173664

Snapshot IS leather carrying case with belt

173666

Snapshot IS replacement hand strap

173667

Snapshot IS leather neck strap

173668

Snapshot IS replacement stylus

Interface Kits

141664-01

- Velomitor Starter Kit
- (2) 330500 Velomitor
 - (2) Magnetic Bases
 - Long Stinger
 - Short Stinger

Specifications and Ordering Information
Part Number 167346-01
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- (2) 330500 Velomitor Interface Cable
- 141665-01
- Strobe Kit, 110V
- 110V handheld strobe
 - BNC to stereo adapter

Data Collection Accessories

02200375

Quick Connect Stud w/ ¼ 28 unf thread to machine

145473-01

¼ 28 unf set screw to attach Quick Connect Stud to machine

2200508

Quick Connect Stud w/ M8x1 thread to machine

145472-01

M8x1 set screw to attach Quick Connect Stud to machine

02200371

Magnetic Base

02200374

141259-01 Quick Connect Base (for transducer)

141260-01 Short Stinger (for transducer)

141686-01 Long Stinger (for transducer)

01609137 BNC-to-Stereo Adapter

01600123 BNC-to-Banana Adapter

BNC-to-Test Clip Adapter

Cables

02180060

2-Pin Mil-C Cable, for Velomitor, Coiled

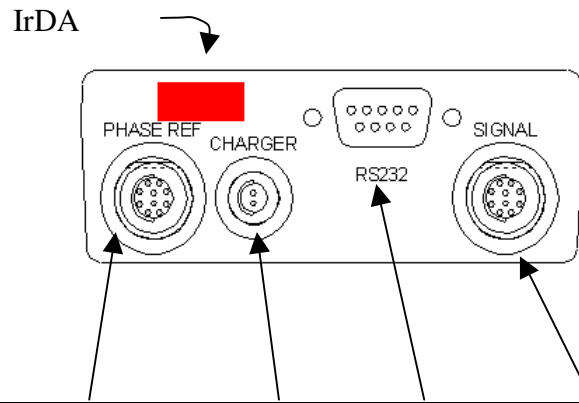
145518-01

2-Pin Mil-C Cable, for Velomitor, Straight

145520-01

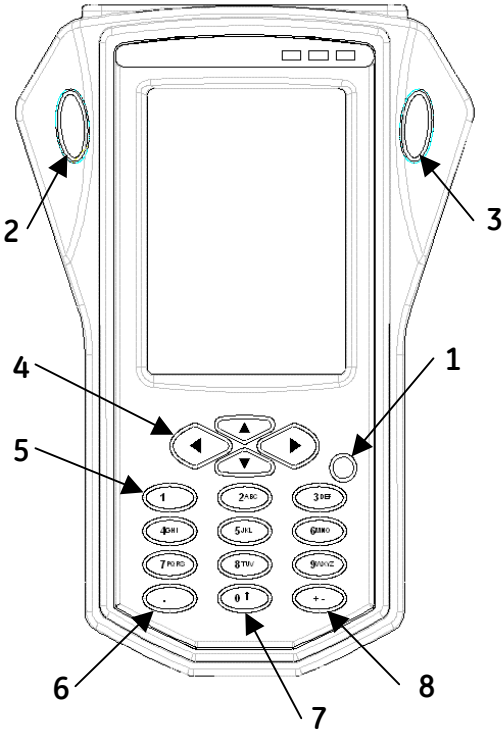
BNC Straight cable

External Connector Positions



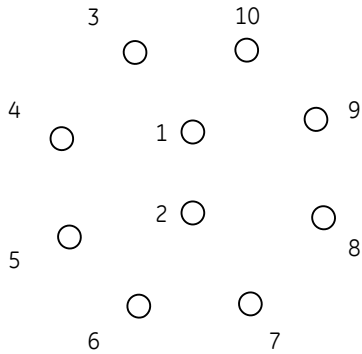
Pin No	Phase Ref.	POWER	RS-232	Signal
1		Ext-DC-IN	DCD-OUT	
2		Ground	RD-OUT	
3			TD-IN	Const Current Return
4			DTR-IN	Const Current Signal
5			Gnd	
6			DSR-OUT	
7	Gnd		RTS-IN	Gnd
8	Trigger In		CTS-OUT	Signal In
9			N/C	
10				

Keyboard Layout



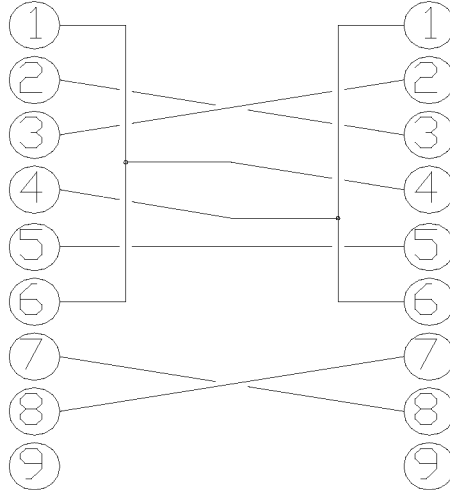
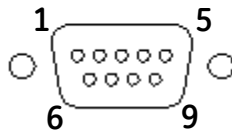
Button No.	Description
1	Power On/Off Button
2	Enter Key
3	Enter Key
4	Navigation buttons
5	Numeric/Text entry buttons
6	Period/dot button
7	Shift button
8	Plus/minus button

Field Wiring Connector Pin Assignments



Pin #	Input Signal	Phase Ref
1		
2		
3	Constant Current Return	
4	Constant Current Signal	
7	0 V	0 V
8	Signal	Signal
9		

Serial Communications Cable Pin Assignments



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