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 CENELEC ATEX Directive II 1G EEx ia IIC T4 (Ta –20°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:

    o Proximity probes

    o Velocity transducers

    o Accelerometers

    o Temperature measurements

    o 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

CENELEC ATEX Directive II 1G EEx ia IIC T4

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 kΩ nominal

Input Voltage Range:

-0.20 to –24.25 V.

Analysis Application OK Limits:

-4.15 to –16.75 V

DC Accuracy:

± 50 mV

AC Accuracy:

±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

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

Displacement

< 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 kΩ nominal

Input Voltage Range:

-0.20 to –24.25 V

Analysis Application OK Limits:

-2.75 to –15.05 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 ≥ 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 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 kΩ nominal

Input Voltage Range:

0 to +19.17 V.

Analysis Application OK Limits:

-2.05 to –15.05 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 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 kΩ 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 kΩ

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):

±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	± 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 kΩ nominal

Input Voltage Range:

-10.1 to + 10.2 V

DC Accuracy:

± 25 mV

Process Variable (0 to –24 V)

Input Impedance:

125 kΩ nominal

Input Voltage Range:

0 to –24.25 V

DC Accuracy:

± 50 mV

Phase Reference Input

Input Impedance:

125 kΩ nominal

Input Voltage Range:

-24 to + 10 V

Minimum Input Amplitude:

2.0 Vpp

Minimum Input Pulse Width:

1 % or 50 µs 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 × the high pass filter corner frequency and also at 0.55 × the low pass orner frequency. As the signal approaches midband the attenuation is reduced. The minimum low pass corner allowable by Snapshot is 4 × 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:

0 1   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

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
- (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

> Quick Connect Base (for transducer)

141259-01

> Short Stinger (for transducer)

141260-01

> Long Stinger (for transducer)

141686-01

> BNC-to-Stereo Adapter

01609137

> BNC-to-Banana Adapter

01600123

> BNC-to-Test Clip Adapter

Cables

02180060

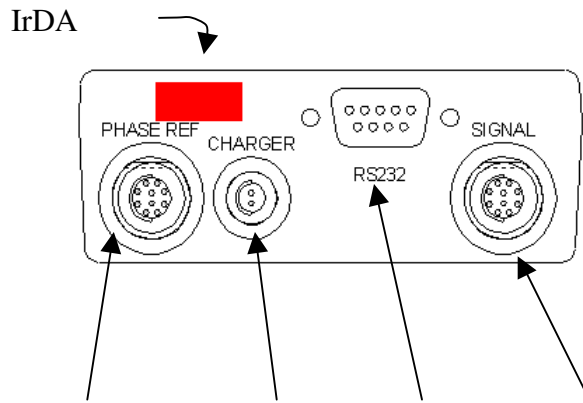> 2-Pin Mil-C Cable, for Velomitor, Coiled

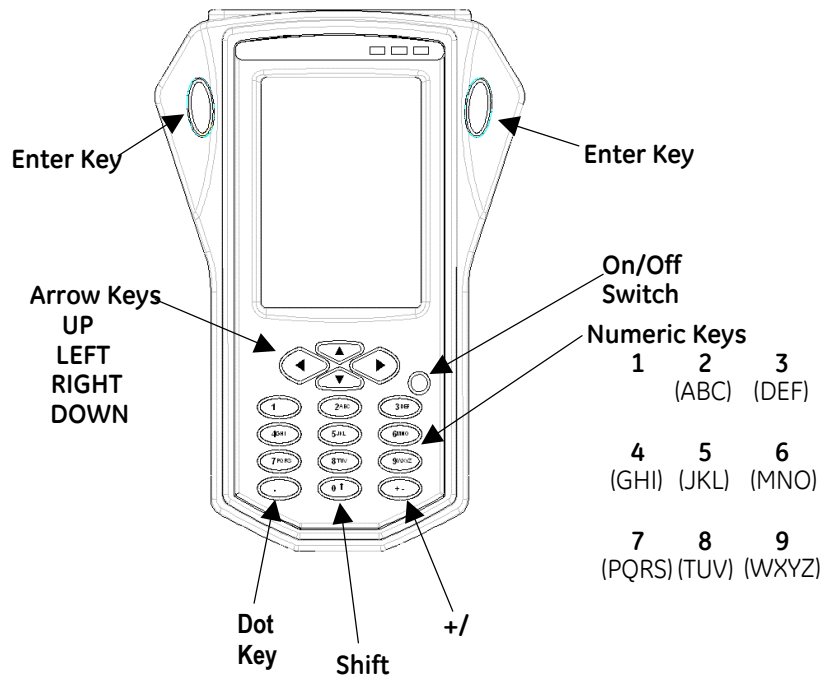**145518-01**

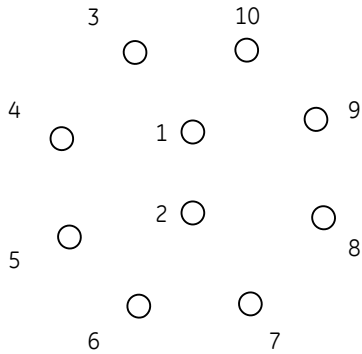> 2-Pin Mil-C Cable, for Velomitor, Straight

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				

Field Wiring Connector Pin Assignments

Pin #	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
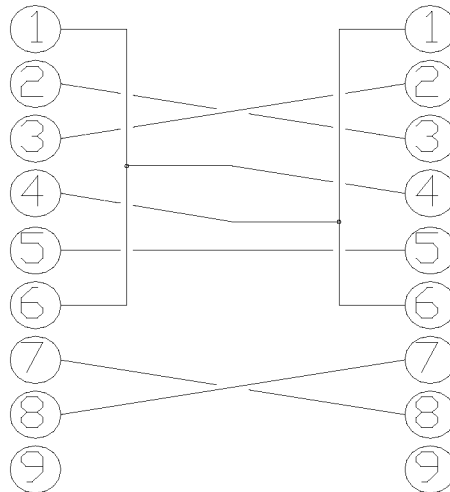
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