SCOUT140EX Vibration Data Collector, Analyzer and Balancer

Datasheet

Bently Nevada Machinery Condition Monitoring

323330 Rev. T

Description

The SCOUT140EX Vibration Data Collector, Analyzer and Balancer is a portable hardware monitoring device that supports four-channel vibration data collection, analysis, and balancing. Use the device to collect data from sensors on a route, for machine-side analysis and diagnosis, and on-site dynamic balance correction.

The SCOUT140EX is ATEX Zone 2 and IECEx Zone 2 compliant and safe for hazardous areas. It is both light and rugged. The neck strap includes an integrated Sensor Keeper that restrains your sensor while you walk or climb to reach other machines.

The device includes a complete suite of advanced recording and analysis capabilities, including tri-axial and 6Pack recordings, coast-down, long time waveform, modal analysis and cross channel spectrum (ODS).

The SCOUT140EX offers plenty of storage and long battery life. The device comes with a five year warranty. It works with System 1 software.

The SCOUT140EX Vibration Data Collector, Analyzer and Balancer offers the following features:

- Up to four-channel, simultaneous on-route recordings
- Simultaneous acquisition, two-plane balancing with up to four sensors
- Unique 6Pack recording system
- DC-coupled sensor support
- Support for acceleration, velocity, displacement, DC-coupled, current and voltage output sensors
- Triax-enabled

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- One GB memory plus virtually unlimited spectra and waveform storage

- Ten hours of battery life

- 12,800 lines of resolution

- 80 kHz Fmax

- Up to four channel time-synchronous averaging with tach input

- Full transient analysis including Coastdown/Runup and Long Time Waveform

- Modal Impact Testing & Cross Channel Spectrum (ODS)

- Ability to export data in Universal File Format (UFF) for additional analysis in ODS software such as Vibrant Technology ME' scope

- USB host port for data transfer to external USB memory

- Excellent ergonomics for walk-around data collection

- High contrast, backlit and direct-sunlight readable LCD

- True left and right-handed operation

- Numeric parameter input via keypad with trend and alarm capability

- Sensor cable self-test feature

- Lightweight, rugged IP65 rated case

- Five-year warranty on the instrument hardware

- ATEX and IECEx Zone 2 hazardous location certification

- Field-upgradable Proflash system and free firmware updates for five years

Calibration Service

Bently Nevada Technical Support provides calibration services for the SCOUT140EX SCOUT140-Ex. To obtain assistance from your nearest repair facility:

1. Visit Bently.com/services.

2. Select **Repair, Spare and Replacement Parts**.

3. Under Inspection Technologies, choose Repair and Calibration Services.

4. Download the list of repair facility contacts.

5. Contact the facility nearest you for service.

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Specifications

Sensors

Sensor input	Four Channels Simultaneous sampling
Compatible sensor types	Accelerometer, velocity, displacement, current, voltage output and 4 to 20 mA
AC coupled range	16 V peak-peak Allows for ± 8 V sensor output swing (± 80 g)
DC coupled ranges	0 to 20 V –10 to 10 V –20 to 0 V E.g. for reading prox-probe gap
Connectors	1 x BNC (CH1) 1 x LEMO (CH2/CH3/CH4) 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

Waveform Display

Number of samples	1024, 2048, 4096, 8192, 16,384, 32,768
Time scale	10 ms to 512 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 Fmax	25 Hz to 80 kHz 20 kHz dual channel
Long time waveform duration	14.7 million samples (total over channels) E.g. for Fmax 1 kHz Fsample = 2.56 kHz and Duration = 1.6 hrs

Tachometer

Sensor	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
Other sensor types supported	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 threshold	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

Logging & Analysis

Output formats	Instrument screen Transfer to Ascent, XML, UFF file export via USB, System 1 software
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
Modal analysis	CH1 for hammer, up to 3 response channels, ≤ 10 kHz Coherence and FRF — Accelerance/Mobility/Compliance
Cross channel spectrum	1 Reference and up to 3 other sensors Coherence and FRF for importing into ODS software

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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 amps, user-defined 0-peak, peak-peak or RMS Auto-scale by 1000x when required US and SI options for adB and vdB
Magnitude & 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 DC level — % of full scale For AC signal — % of reading
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	≤ 0.1 dB 1 Hz to <100 Hz ≤ 1.5 dB 0.2 Hz to <1 Hz ≤ 0.1 dB 10 Hz to <100 Hz ≤ 1.5 dB 1 Hz to <10 Hz Low frequency mode: When Coupling = DC and Fmax ≤ 100 Hz Normal mode is applicable in all other cases. Values apply to single integration. (Acceleration to velocity) Double the values for double integration (Acceleration to displacement)

Balancing

Planes	Up to 2 planes, 4 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 distance around circumference
Remove trial weights	Yes/No Automatic recalculation
Manual data entry	Yes Allows re-entry of previous balance jobs
Storage	Against machines in data structure No limits applied

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

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Spectrum Display

Fmax 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, 60,000, 80,000 Hz Or equivalent CPM values Or orders-based from 1X to 999X
Fmin possible range	0 to Fmax Instrument zeroes all spectral lines below Fmin.
Resolution	400, 800, 1600, 3200, 6400 and 12,800 lines 6400 lines max. for dual channel measurements 3200 lines max. for four-channel measurements
Frequency scale	Hz, CPM, Orders Linear scale with zooming
Amplitude scale	Acceleration, velocity, displacement, current or user-defined 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 & 3200 lines (1 channel) Up to 20 kHz & 1600 lines (3 channels) Spectrum and waveform for low-frequency, high-frequency demodulation
Order tracking	Up to 6 kHz Fmax, orders-based Tachometer required Mounted on high-speed shaft
Order tracking - Distortion	Less than -65 dB

	Within 50% to 200% speed variation during recording

Display and Communication

Display	Graphic Grayscale LCD White LED Backlight
Resolution and size	480 x 320 (HVGA), 5.5" (140 mm) Readable in direct sunlight
Supported Languages	English, French, Spanish, Portuguese, Russian, Chinese
Communication with PC	USB and Ethernet (optional USB dongle) Use PROFLASH to upgrade instrument firmware
USB host port	USB 2.0, supplying 5V, 250mA Save folders to USB flash drive
UFF export	Spectra, Coherence, FRF magnitude and phase Universal File Format for Modal and FRF data

Battery and Charger

Battery type	Custom Lithium Ion pack, 7.4 V, 5000 mAh
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

Environmental Limits

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

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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 61000-6-2

EN 61000-6-4

EMC Directive 2014/30/EU

RoHS

RoHS Directive 2011/65/EU
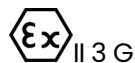
LVD

EN 61010-1

LV Directive 2014/35/EU

ATEX

ATEX Directive 2014/34/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.

ATEX/IECEx

$\langle Ex \rangle$ II 3 G

Ex ic IIB T4 Gc

T4 @ Ta= −10°C ≤Ta ≤+50°C

(+14ºF ≤ Ta ≤ +122ºF)

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Ordering Information

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

SCOUT140EX-AA-B

A: Agency Approvals	
02	ATEX
05	ATEX / IECEx / CSA (Class 1, Zone 2)
B: FLEX Options	
None	

SCOUT140Ex Basic Kit

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

Part Number	Description	Qty
108M3240	SCOUT140Ex four-channel portable data collector	1
ACCL0547 or 200350 *	Straight accelerometer	3
ACCL0561 or 200350 *	Right-angled accelerometer or straight accelerometer	1
108M4044	AC power adapter	1
CABB0560	BNC to BNC Cable, 1 meter	2
110M8172-012	Cable, BNC to Lemo, Tach/Keyphasor, 1.2 meters	1
CABU0213	USB data transfer cable	1
CBCC0027 or 138M7748 *	Transducer cable	4
CBTB0278	Triple BNC adapter	1
CBVB0032	SCOUT instrument carrying bag	1
DCCA0041	DC car adapter	1
113M5585	Accelerometer magnetic base	4
MVBX0250	Reference Guide	1
109M2384-01	Neck strap with Sensor Keeper	1
PLUS0230	USA/Canada – Category A power plug	1
PLSA0241	South Africa/India – Category D power plug	1
PLAU0228	Australia/New Zealand / China – Category M power plug	1
PLHK0245	Hong Kong/UK Category - G	1

Part Number	Description	Qty
	power plug	
PLEU0229	Europe – Category C power plug	1
108M4045	SCOUT quick start guide	1
110M8172-012	LEMO-BNC TTL Tach/Keyphasor cable	1

Accessory Kits

Balancing Kit - 108M4050-AA

A: Number of Channels	
02	Two channels
04	Four channels

Balancing Kit Contents (also available for separate purchase)

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

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Zone 2 Laser Tach Kit - LASA0315

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

Impact Hammer Kit

Impact_Hammer_Kit - AA-BB-CC-DD-EE-FF

A: 500lbf pk, 10mV/lbf, 0.3lbm (285570-01)	
00	None
B: 1000lbf pk, 5mV/lbf, 0.3lbm (285570-02)	
00	None
01	Hammer Included
C: 5000lbf pk, 1mV/lbf, 2.4lbm (285570-03)	
00	None
01	Hammer Included
D: Standard Accelerometer Kit (Not presently available)	
E: Micro Accelerometer Kit (Not presently available)	
F: Triaxial Accelerometer Kit (Not presently available)	

Software

Part Number	Description
3071/01	System 1 software

Additional Accessories

Software Accessories

Part Number	Description
DGLU0219	Dongle for software seat or license mobility

Part Number	Description
CLK20399	Aditional L2 user activation
SUNW0401	Network upgrade

Accelerometers

Part Number	Description
AS3100S2-Z2	General purpose accelerometer 100mV/g +/- 5% Side (right angle) exit 80g peak acceleration range ¼-28 mounting thread 0.92 inch base Zone 0
AM3100T2-Z2	General purpose accelerometer 100mV/g +/- 5% Top (straight) exit 80g peak acceleration range ¼-28 mounting thread Zone 2
AP3500T2-Z1	Low frequency accelerometer 500mV/g +/- 5% Top (straight) exit 10g peak acceleration range Zone 0/1
AP3500S2-Z1	Low frequency accelerometer 500mV/g +/- 5% Side (right angle) exit 10g peak acceleration range Zone 2
KTTC0331	Triaxial sensor kit 100 mV/g +/- 20% Magnet 6 ft coiled cable, with breakaway connector Zone 2 and Class 1, Div 2 rating

Miscellaneous Parts

Part Number	Description
MAGM0064	Accelerometer magnetic base Male connection
BATT0575	Battery pack ATEX
DTC70262	Neoprene dust cover
VBMR0222	Stainless safety rings (1 pair)
100M5828	SCOUT/Vb Series Hard Case

> All accessories included in the basic kit may also be ordered separately.

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