

SCOUT220-IS and SCOUT240-IS Portable Data Collectors

Datasheet

Bently Nevada Machinery Condition Monitoring

109M0226 Rev. U



Description

SCOUT220IS and SCOUT240IS are intrinsically safe portable data analyzer solutions designed to monitor machinery conditions in hazardous environments. Both are rated ATEX Zone 1 / Zone 21 (for gases and non-conductive dust) and CSA Class 1 / Div 1. These small form-factor, rugged devices take vibration recordings and upload the collected data for detailed analysis in System 1.

This is a two-part solution. The SCOUT data acquisition module uses Bluetooth to communicate with a wireless, industrial handheld device running the S1 Collector app.

Vibration recordings are viewed and stored on the **handheld device**. We offer these devices with hazardous area ratings up to Zone 1/21 & Div 1. The handheld runs the Android OS, so you can also use it like any smartphone or tablet to take pictures and video, send text messages, check email, make phone calls, track your location, create SOS alerts, and run other enterprise apps.

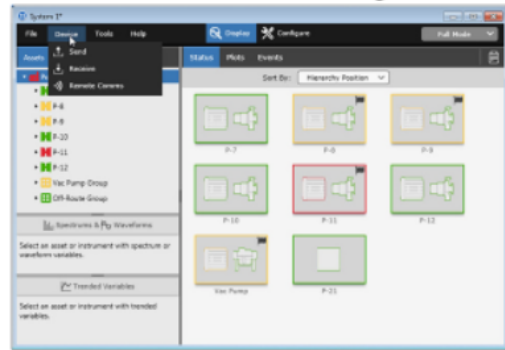
The high performance **data acquisition module** provides long battery life, yet is light & rugged. It hangs out-of-the-way on a shoulder strap, allowing you to focus on your job and move safely between machines. The SCOUT220IS can sample two sensor channels simultaneously, while the SCOUT240IS supports up to four channels. Both also support tachometer or Keyphasor triggering. These data acquisition modules provides up to ten hours of continuous use, while supporting an F_{max} up to 80 kHz and 12,800 lines of spectral resolution. Both models are rated IECEx/ATEX Zone 0 / 20 (for gases and non-conductive dust) and CSA Class 1 / Div 1.

The **System 1 software**, paired with SCOUT220IS and SCOUT240IS, enables you to track all of your machinery using a single enterprise monitoring system. Use System 1 to prepare routes, analyze data, detect long-term trends, and set and detect alarms. Then transfer the routes between System 1 and your SCOUT device using WiFi, file transfer, cellular network, or a USB cable.



Hardware Features

- Battery life of 10 hours allows the data collector to run all day.
- Five year warranty.
- Rugged, water, and dust resistant (IP-65), drop-tested, with intrinsically safe variants.
- Easy to carry: lightweight handheld unit, shoulder strap for data collector, keepers for sensors.
- Safety breakaways on both shoulder strap and sensor cables.
- Upgradable industrial handheld smartphone or tablet.
- Handheld Push-to-Talk (PTT) button is configured to start measurements (where available).



Software Features

- Seamless on-and off-route data collection.
- Route overview and easy route navigation.
- Up to four channel simultaneous recordings (including on-route).
- SCOUT240 supports Triaxial sensors.
- Fast sensor settling and data collection.
- Patented 6Pack time-saving measurement type.
- Synchronous sampling, peak demod, and bump test.
- Coast-down, run-up, and interval capture support.
- Custom note and numeric data entry.
- Up to 12,800 lines of spectral resolution, 80 kHz F_{max} .
- Data quality warnings and easy-to-understand alarm annunciation.
- Supports operator driven reliability (ODR).
- Supports accelerometer, velocity, displacement, and voltage-output sensors of AC and DC coupling types.

The SCOUT portable connects via Bluetooth to the handheld, which you can then sync with System 1.

Data Collector Specifications

Sensors

Sensor input Simultaneous sampling	SCOUT220IS : 2 channels. SCOUT240IS: 4 channels.
Compatible sensor types	Accelerometer, velocity, displacement, and voltage.
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
Connectors	2 x LEMO connectors for CH1 & CH2+ 1 X LEMO connector for Tach/Keyphasor SCOUT240IS includes a CH 2.4 breakout cable.
Analog to digital conversion	24-bit ADC
Sensor excitation current	0 mA or 2.2 mA (configurable), 24 V maximum 2.2 mA powers IEPE/ICP-type sensors
Sensor detection	Measures sensor bias voltage. Warns if short circuit or not connected.

Tachometer

Optional IS Zone 0 rated laser Tach	Battery-powered, handheld laser sensor. Triggers when beam on reflective tape range 10 cm to 2 m. Speed 6 to 250 krpm.
Optional Zone 2 rated laser Tach	Laser sensor powered by Portable Data Collectors. Triggers when beam on reflective tape range 10 cm to 2 m. Speed 6 to 250 krpm.
Other sensor types supported	Contact, TTL Pulse, Keyphasor
Power supply to sensor	5 V, 40 mA Rated for Zone 2, 22 and Division 2 only.
Input Impedance & max values	100 K Ω ± 28 V max
Waveform display	± 20 V range
Threshold	± 20 V range ± 0.4 V accuracy
Auto- threshold mode	Signal ≥ 3 V pk-pk Machine speed ≥ 60 rpm (1 Hz) Settles within < 15 s
Hysteresis	0.2 V to 2.5 V user configurable
Speed range	Minimum: 3 rpm (0.05 Hz) Maximum: 1,200,000 rpm (20 kHz)
Signal pulse width	10 μ s minimum 2% duty cycle (for auto-threshold)
Accuracy	$\pm (0.1\% + 1$ cpm) for speeds up to 5 kHz (300 kcpm). $\pm (0.3\%)$ for speeds above 5 kHz (300 kcpm).

Parameter Indication

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/s ² in/s or mm/s mil or mm or μm peak, or peak-peak, or RMS
Magnitude & cursors	Overall value: RMS, derived pk, derived pk-pk Dual cursors Digital readouts on chart
Base accuracy	For AC signal: ± 1% of readings For DC level: ± 1% of full scale (1% is approximately 0.1 dB)
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 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).

Spectrum Display

F _{max} ranges	25; 50; 100; 125; 150; 200; 300; 400; 500; 600; 800; 1,000; 1,200; 1,600; 2,000; 2,500; 3,000; 4,000; 5,000; 6,000; 8,000; 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.
F _{min} possible range	0 to F _{max} . Instrument zeroes all spectral

	lines below F _{min} .												
Resolution (Spectral lines)	400; 800; 1,600; 3,200; 6,400; 12,800 lines												
	<table border="1"> <thead> <tr> <th>Channels</th> <th>220 max lines</th> <th>240 max lines</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>6,400</td> <td>12,800</td> </tr> <tr> <td>2</td> <td>3,200</td> <td>6,400</td> </tr> <tr> <td>3 or 4</td> <td>N/A</td> <td>3,200</td> </tr> </tbody> </table>	Channels	220 max lines	240 max lines	1	6,400	12,800	2	3,200	6,400	3 or 4	N/A	3,200
	Channels	220 max lines	240 max lines										
1	6,400	12,800											
2	3,200	6,400											
3 or 4	N/A	3,200											
Frequency scale	Hz, CPM, Orders. Linear scale with zooming.												
Amplitude scale	Acceleration, velocity, displacement. Linear auto scaling.												
Window shapes	Hanning, Rectangular												
Overlap	(0, 12.5, 25, 37.5, 50, 62.5, 75, 87.5) % Dependent on F _{max} 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 types												
Demodulation bandwidths	23 bandwidth options from 125 Hz to 1,250 Hz and up to 16 kHz to 20 kHz. Peak demod: 500Hz-40kHz, 1-40kHz, 2-40kHz, 5-40kHz												
6Pack	Up to 40 kHz & 3,200 lines (1 channel). Up to 20 kHz & 1,600 lines (2-3 channels). Spectrum and waveform for each of low-frequency, high-frequency, demodulation												

Waveform Display

Number of samples	1,024; 2,048; 4,096; 8,192; 16,384; 32,768		
	Channels	220 max samples	240 max samples
	1	16,384	32,768
	2	8,192	16,384
	3 or 4	N/A	8,192
Time scale	10 ms to 256 seconds or orders based from 1 to 999 revs		

Communication

Bluetooth	BT 4.0 Classic
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Battery and Charger

Battery type	Custom Lithium Ion pack, 7.4 , 4000 mAh. Not user accessible but factory replaceable.
Operating Time	10 hours typical on-route data collection
Charger type	Internal charging, automatic control. External power pack 12 V DC, 3 A output.
Charge rate	2 A nominal 3 hours for complete charge.

Mechanical

Size	5.1" W x 5.1" L x 1.4" H (130 mm W x 130 mm L x 35 mm H)
Weight	1.5 lb ≈ 680g

Environmental Limits

Operating temperature	-4°F to 140°F (-20 to 60°C) 122°F (50°C) max when used in Ex hazardous areas
Ambient temperature for charging battery	0 to 25°C (32 to 77°F)
Storage temperature & humidity	-4 to 140°F (-20 to 60°C), 95%relative humidity If storage exceeds one month: up to 95°F (35°C), 85% relative humidity.
Ruggedness drop & sealing	Drop spec MIL-STD-810F-516.5-IV 26 drops at 4' (1.2 m) onto concrete IP65




Handheld Specifications Summary



A handheld devices is not included in the SCOUT kit. To order a device, add it as an accessory item, or obtain an appropriately rated device directly from the supplier.



For self-supplied handheld devices, we cannot guarantee SCOUT200 compatibility with every make/model or version of Android. Contact BN TechSupport for a list of tested models, or to request a test.

	Smart Ex 02 DZ2	Smart Ex 02 DZ1	Tab Ex 02 DZ2	Tab Ex 02 DZ1
Device Image				
Display & Touch	5", Gorilla glass, glove touch & wet mode		8" 1280x800, 480 nit, glove touch & wet mode	
Wireless & GPS	4G/LTE dual SIM, WiFi 2.4 & 5 GHz, BT 4.2, NFC, GPS		WiFi 2.4 & 5 GHz, BT 4.2, NFC, GPS	
Cameras	12 MP rear, 5 MP front		8 MP rear, 5 MP front	
OS	Android 9		Android 9	
CPU	Qualcomm Snapdragon 450		Exynos 7, 1.6 GHz Octa-Core	
Memory	3 GB RAM, 32 GB ROM up to 128 GB microSD		3 GB RAM, 16 GB ROM up to 256 GB microSD	
Battery	Replaceable Li-Ion 4400 mAh		Li-Ion 3.8 V, 4,450 mAh, up to 11 hrs	
Size & Weight	163 x 82 x 22 mm, 380 g		128 x 215 x 10 mm, 575 g	162 x 256 x 33 mm, 1250 g
Ruggedness	IP68, MIL-STD-810G, -20 to 60 °C		IP68, 1.2m drop, -20 °C ... +55 °C	IP65, -20 °C ... +50 °C
Warranty	3 years		3 years	
IECEX ATEX	Zone 2/22 Ex ic IIC T4 Gc IP64 Ex ic IIIC T120°C Dc	Zone 1/21 Ex ib IIC T4 Gb IP64 Ex ib IIIC T120°C Db	Zone 2/22 Ex ic IIC T5 Gc Ex ic IIIB T100°C Dc	Zone 1/21 Ex ia IIC T5 Gb Ex ia IIIC T100°C Db
CSA	Class I,II,III Div 2, Groups A .. G, T4	Class I,II,III Div 1, Groups A .. G, T4	Class I Div 2, Groups A .. D, T5	Class I,II Div 1, Groups A .. G, T5
Complete specs	www.ecom-ex.com		www.ecom-ex.com	

Compliance and Certifications




This section applies only to the Data Collector, not the handheld device.

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

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



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

RED/EMC	EN 61000-6-2 EN 61000-6-4 EN 300 328 EN 301 489-1 EN 301 489-17 EN 61326-1 2014/53/EU 2014/30/EU
ATEX/IECEX	 II 1 (1) GD II 3 (3) GD Ex ia [ia] IIC T4 Ga Ex ic [ic] IIC T4 Gc Ex ia [ia Ga] IIIB T135°C Da Ex ic [ic Gc] IIIB T135°C Dc
CSA/NRTL/C	Class I Division 1 Groups ABCD Class I Division 2 Groups ABCD Class II Division 1 Groups FG Class II Division 2 Groups FG Class I Zone 0, Ex/AEx ia [ia] IIC T4 Ga Class I Zone 2, Ex/AEx ic [ic] IIC T4 Gc Zone 20, Ex/AEx ia [ia Ga] IIIB

	T135°C Da Zone 22, Ex/AEx ic [ic Gc] IIIB T135°C Dc T4 @ Ta = -20°C to +50°C The installation must comply with the SCOUT2220/240 Hazardous Location Installation Control Drawing (document 111M0029).
ROHS	2011/65/EU

The above ratings include the following areas:

- Intrinsically safe Zone 0, 20 and Division 1
- Lower level protection of Zone 2, 22 and Division 2

Only the following restricted sensor types are certified for intrinsically safe use:

- SCOUT-powered sensors such as ICP/IEPE accelerometers
- Self-powered tachometers such as battery-powered handheld laser tachometers

You can use other types of sensors such as buffered outputs from instrumentation racks only in lower rated Zone 2, Division 2 areas. Refer to SCOUT2220/240 Hazardous Location Installation Control Drawing (document 111M0029) for details.



For the optional dust certification (Class II Groups F and G, and Zones 20 and 22), special dust-certified sensors are required. If this is required, inform your Bently Nevada sales professional so that the correct sensor can be substituted.



The overall hazardous system rating is defined by the minimum rating of the data collector, industrial handheld, and accessories.

Cyber Security

The SCOUT220IS and SCOUT240IS solutions include an industrial handheld device that runs the Android operating system and uses USB, cellular, Bluetooth and Wi-Fi for communication. These solutions have features that reduce but do not eliminate cyber security risks.

We strongly recommend implementing additional cyber security protections such as:

- Controlling user access
- Scanning for viruses
- Applying timely updates
- Using mobile device management software



The recommended measures are at your discretion and responsibility. Some residual risk may remain.

For details, see the *SCOUT200_Series Cyber Security Hardening Guideline* (document 131M1304) at BNTechSupport.com.



Ordering Information



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

SCOUT220IS-AA

A: Data Collector Approval Options

05 Multi Approvals (CSA, IECEx, ATEX)



The SCOUT220-IS basic kit does NOT include a handheld device, nor a System 1 software license. They are ordered separately under Optional Accessories below.

Part Number	Description	Qty
	SI Collector app	1
	SCOUT220IS Data Collector	1
108M4044	AC power adapter	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
109M2381, AM3100T2-Z0, or 200350*	Accelerometer, top exit	1

Part Number	Description	Qty
ACCL0561, AS3100S2-Z0, or 200350*	Accelerometer, side exit	1
138M7749	Transducer cable, 4 ft. straight	2
113M5585	Accelerometer magnetic base	2
109M2385-012	BNC to silver-LEMO cable. Connects rack buffered outputs to CH1/CH2 inputs.	2
110M8172-012	BNC to black-LEMO cable. Connects rack buffered Keyphasor to Tach input.	1
109M2384-01	Anti-static neck strap with Sensor Keeper	1
112M4551	Hard carrying case	1
109M1269	<i>SCOUT200 Series User Guide</i>	1
109M1270-01	<i>SCOUT200 Series Quick Start Guide</i>	1
Bently_Manuals DVD	Contains the SCOUT220IS and SCOUT240IS Product Datasheet (109M0226), the SCOUT200 Series Quick Start Guide (109M1270), and the SCOUT200 Series User Guide (document 109M1269).	1

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




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 Support](http://BentlyNevadaTechSupport.com).

SCOUT240IS-AA

A: Data Collector Approval Options


05	Multi Approvals (CSA, IECEx, ATEX)
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 The SCOUT240IS basic kit does NOT include a handheld device, nor a System 1 software license. They are ordered separately under Optional Accessories below.

Part Number	Description	Qty
	S1 Collector app	1
	SCOUT240IS Data Collector	1
108M4044	AC power adapter	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
109M2381, AM3100T2-Z0, 200350*	Accelerometer, top exit	3
ACCL0561, AS3100S2-Z0, 200350*	Accelerometer, side exit	1
138M7749	Transducer cable, 4 ft. straight	4
113M5585	Accelerometer magnetic base	4

Part Number	Description	Qty
109M2385-012	BNC to silver-LEMO cable. Connects rack buffered outputs to CH1/CH2 inputs.	2
110M8172-012	BNC to black-LEMO cable. Connects rack buffered Keyphasor to Tach input.	1
113M9350	Channel 2-4 breakout cable	1
109M2384-01	Anti-static neck strap with Sensor Keeper	1
112M4551	Hard carrying case	1
109M1269	SCOUT200 Series User Guide	1
109M1270-01	SCOUT200 Series Quick Start Guide	1
Bently_ Manuals DVD	Contains the SCOUT220IS and SCOUT240IS Product Datasheet (109M0226), the SCOUT200 Series Quick Start Guide (109M1270), and the SCOUT200 Series User Guide (109M1269)	1

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

 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 Support](#).

Optional Accessories

Hand Held Devices	
146M8212-01	Smart-Ex 02 DZ2 (North America & Europe)
146M8216-01	Smart-Ex 02 DZ1 (North America & Europe)
145M3278-01	Tab-Ex 02 DZ2 North America
146M8220-01	Tab-Ex 02 DZ2 Europe
151M7906-01	Tab-Ex 02 DZ1 North America
151M7907-01	Tab-Ex 02 DZ1 Europe



To obtain a handheld device suitable for a location not listed above, contact a handheld device distributor within the destination country.

Other Accessories	
125M2099-01	Cable for CSLS laser, 1.5m
113M5529-01	Reflective tape One roll, 60 cm (23.7 in)
VBMR0222	Pair of safety rings for attaching strap to data collector.

Other Accessories	
3071/01	System 1 software and license
109M2387	Handheld, battery-powered laser tach for IS zone 0. Order cable separately.
109M2389	1.2-meter cable for laser Tach 109M2387
108M4069	Laser Tach powered by SCOUT220-IS and SCOUT240-IS, for Zone 2. Order cable separately.
CBL50216	5-meter cable for laser Tach 108M4069.
122M9408	Monarch Compact Smart Laser Sensor (CSLS). Higher powered (3 mW) but larger size (2.6" x 2.4" x 2") and no Zone rating. Order cable separately.

Triax Sensor Kits

157M0806-01

Part Number	Description
156M6189	Triaxial sensor, 100 mV/g \pm 20%, 0.5 Hz .. 5 kHz, 8 μ g/ \sqrt Hz noise @ 10Hz
157M0852-01	Cable for SCOUT200 to triax 156M6189, 1.5 m, straight, safety breakaway
156M6204	Magnet, 2 pole, 38 mm diameter, 32 mm high, 25 kg pull, 1/4-28 female thread

157M0809-01

Part Number	Description
155M3055	Triaxial sensor, 100 mV/g \pm 10%, 0.6 Hz .. 10 kHz, 27 μ g/ \sqrt Hz noise @ 10 Hz
156M6180	Cable for SCOUT200 to triax 155M3055, 1.5 m, straight, safety breakaway
154M1355	Magnet, 2 pole, 35 mm diameter, 22 mm high, 23 kg pull, 1/4-28 female thread, triax alignment notch

Language Specific Warning Labels

110M9913	Magnet base label
110M9914	Sensor keeper side label
110M9915	Sensor keeper front label
111M7144	Hard carrying case label

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